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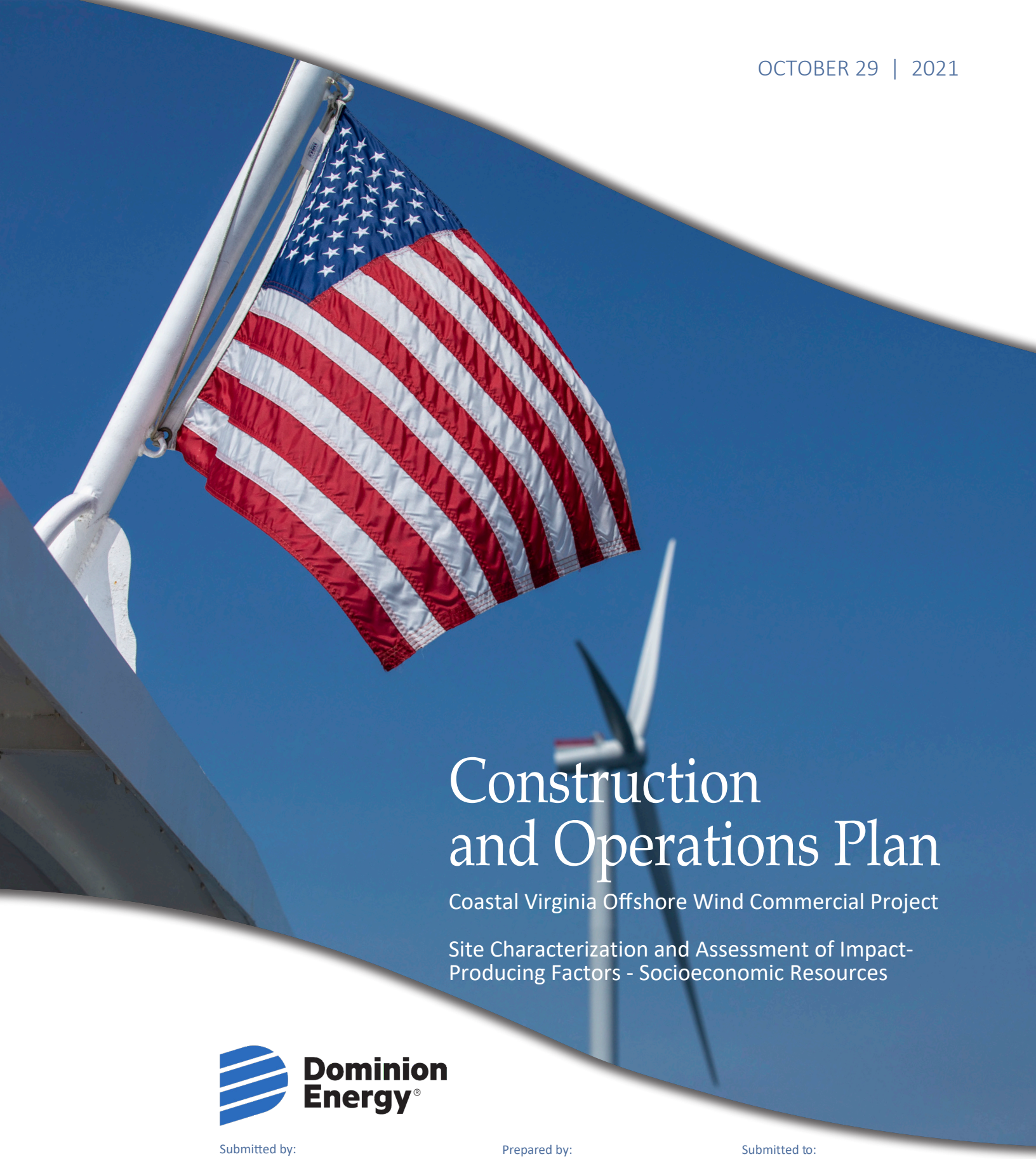

Construction and Operations Plan

Coastal Virginia Offshore Wind Commercial Project

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

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4.4 Socioeconomic Resources

4.4.1 Population, Economy, Employment, Housing, and Public Services

This section describes the socioeconomic resources within and surrounding the Onshore Project Area (see Section 3, Description of Proposed Activity). Potential impacts to socioeconomic resources resulting from construction, operations, and decommission of the Project are discussed. This section also describes avoidance, minimization, and mitigation measures proposed by Dominion Energy related to socioeconomic resources, such as population, economy, employment, housing, and public services. Other assessments detailed within this COP related to socioeconomics include:

- Environmental Justice (Section 4.4.2);
- Land Use and Zoning (Section 4.4.3);
- Land Transportation and Traffic (Section 4.4.4);
- Recreation and Tourism (Section 4.4.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Marine Transportation and Navigation (Section 4.4.7);
- Department of Defense and Outer Continental Shelf National Security Maritime Uses (Section 4.4.8);
- Marine Energy and Infrastructure (Section 4.4.9);
- Aviation and Radar (Section 4.4.10);
- Other Coastal and Marine Uses (Section 4.4.11); and
- Public Health and Safety (Section 4.4.12).

It should be noted that at the time this analysis was performed, in 2020 and 2021, the U.S. was experiencing a virus pandemic (COVID-19) and related economic recession. All the data used in the analyses in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, and Section 4.4.2, Environmental Justice, are pre-pandemic. They do not account for alterations in the socioeconomic environment resulting from social distancing, business and government closures, and large decreases in employment. The following analyses are presented with the most current data available and qualitative/quantitative assessments based on those data.

4.4.1.1 Affected Environment

For the purposes of this section, the Socioeconomic Study Area (the Study Area) is defined as the county-equivalent cities that have the greatest potential to be directly affected by the construction, operations and maintenance (O&M), and decommissioning of the Project. All incorporated cities in Virginia are classified as independent cities and considered as county equivalents by the U.S. Census Bureau for the purposes of data collection. The Onshore Export Cable Route and Switching Station would be located in the City of Virginia Beach, Virginia. In addition, the Interconnection Cable Route Alternatives would extend to the Onshore Substation, which is located in the City of Chesapeake.

U.S. Census Bureau data indicate that the majority of Virginia Beach's workforce reside in one of four cities: Virginia Beach, Chesapeake, Norfolk, and Portsmouth, suggesting significant economic linkages between the four cities (Table 4.4-1). These four cities also account for the majority of the workforce in Chesapeake. These are the cities where the construction and operations workforces are expected to reside and spend their wages. They are also the cities where most Project expenditures and tax payments will be made. Consequently, they represent the Study Area for this Project (Figure 4.4-1). There are 134 additional cities in Virginia that, combined, represent only 5.8 percent of Virginia Beach's workforce, and are therefore not included in the Study Area (Table 4.4-1). In addition, regional economic impacts are also assessed for the Hampton Roads area and the Commonwealth of Virginia, as described in Section 4.4.1.2, Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning.

Table 4.4-1. Residence City to Workplace City Commuting Flows, Virginia Beach

Residence City a/	Workplace City: Virginia Beach (% of Total Virginia Beach Workforce)
Virginia Beach	73.4
Chesapeake	9.2
Norfolk	9.6
Portsmouth	1.9
134 other counties or cities	5.8

Source: USCB 2019a
a/ The cities in the Study Area are county-equivalents.

The following sections provide a summary of the population, economic, employment, housing, and public service data by state and county-equivalent city.

Population, Economy, and Employment

This subsection introduces existing demographic and economic conditions within the Commonwealth of Virginia and the Study Area cities that could be affected by the Project. Existing demographic and economic conditions are summarized in Table 4.4-2.

Table 4.4-2. Demographic and Economic Conditions in the Socioeconomic Study Area

State/City	Total Population, 2019	Population Percent Change – 2010-2019	Population Density, 2019 a/	Median Household Income, (2019 dollars)	Civilian Labor Force, 2019	Unemployment Rate, 2019 (%)	Top 3 Industries, 2019 b/
Virginia	**8,535,519**	**6.7**	**216.1**	**$76,456**	**4,404,927**	**4.0%**	**E, P, R**
Virginia Beach	449,974	2.8	1,807.0	$79,054	235,460	4.1%	E, P, A
Chesapeake	244,835	10.1	718.4	$77,847	116,912	5.2%	E, P, R
Norfolk	242,742	0.0	4,485.3	$53,093	112,504	6.0%	E, A, P
Portsmouth	94,398	-1.2	2,805.3	$51,195	40,492	5.1%	E, R, T

Sources: USCB 2019b, 2020a
a/ Persons per square mile
b/ A = Arts, entertainment, and recreation, and accommodation and food services; E = Educational Services, and health care and social assistance; P = Professional, scientific, and management, and administrative and waste management services; R = Retail trade; T = Transportation and warehousing, and utilities.

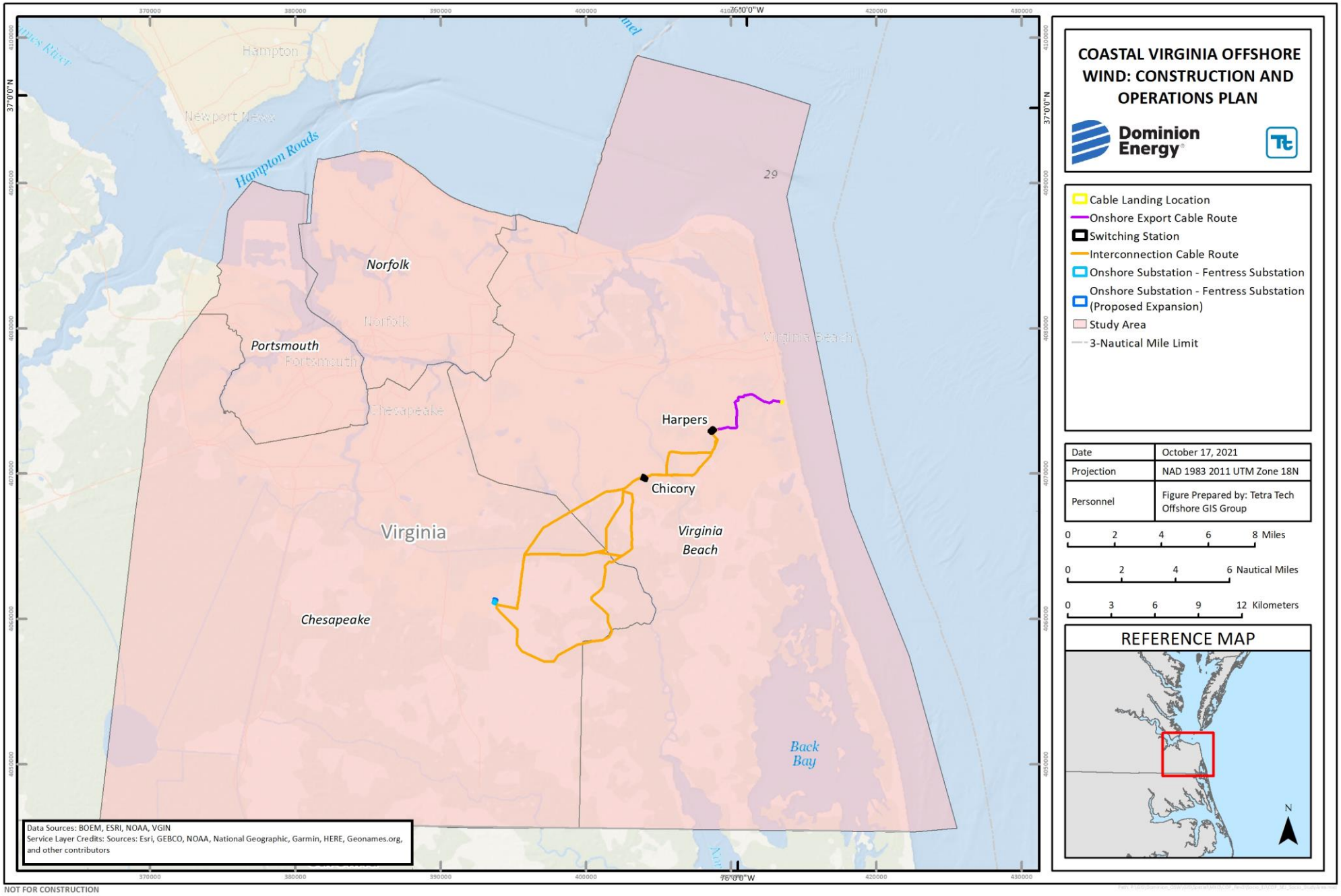


Figure 4.4-1. Socioeconomic Study Area (Population, Economy, Employment, Housing, and Public Services)

Overall, Virginia's population increased by 6.7 percent from 2010 to 2019, reaching 8.5 million in 2019. Virginia's civilian labor force exceeds 4.3 million and its unemployment rate is 4.2 percent (Table 4.4-2). The Study Area is part of the Virginia Beach-Norfolk-Newport News VA-NC Metropolitan Statistical Area (MSA) (also known as the Hampton Roads MSA), which had a total estimated population of 1,768,901 in 2019 (USCB 2020b). The Hampton Roads region is known for its maritime industry, large military installations, and tourism industry, which is dominated by cultural history and coastal recreation (HRCC 2019). Together, the four cities in the Study Area had a total estimated population of just over 1 million residents. Portsmouth had the smallest population of the four cities, at 94,398, while Virginia Beach had the largest, at 449,974. Population stayed relatively constant in Virginia Beach, Portsmouth, and Norfolk over the last decade (2010 to 2019). Chesapeake, in contrast, grew by an estimated 10.1 percent over the same period. Population densities in the Study Area cities range from about 718 persons per square mile (Chesapeake) to 4,485 persons per square mile (Norfolk), substantially higher than the state average of 216, which itself is about twice the national average (Table 4.4-2).

The Study Area had an estimated combined civilian labor force of more than 500,000 workers in 2019, with almost half (47 percent) of the total living in Virginia Beach. Unemployment rates in the four cities in 2019 ranged from 4.1 percent in Virginia Beach to 6.0 percent in Norfolk. Median household incomes ranged from $51,195 (Portsmouth) to $79,054 (Virginia Beach) compared to respective statewide and national medians of $76,456 and $65,712. Viewed by economic sector, the Study Area's largest employers are educational services; health care and social assistance; professional, scientific, management, administrative, and waste management services; and retail trade (Table 4.4-2). Section 4.4.5, Recreation and Tourism, and Section 4.4.6, Commercial and Recreational Fishing, provide information about the offshore economy in the Project Area.

Housing and Property Values

Housing resources are summarized for Virginia and the Study Area in 2019 in Table 4.4-3. The Commonwealth of Virginia had an estimated 3.5 million housing units in 2019, with an estimated vacancy rate of 10.3 percent. The U.S. Census Bureau defines a housing unit as a house, apartment, mobile home or trailer, group of rooms, or single room occupied or intended to be occupied as separate living quarters. The data summarized in Table 4.4-3 suggest that rental housing is available in Virginia Beach, Chesapeake, Norfolk, and Portsmouth, with numerous housing units also available for sale. Additional units classified for seasonal, recreational, or occasional use may also be available in the Study Area (Table 4.4-3).

Table 4.4-3. Housing Units and Vacancy Rates a/

State/City	Total Housing Units	Vacant Housing Units	Vacancy Rate	For Sale	For Rent	For Seasonal, Recreational, or Occasional Use b/
Virginia	**3,514,032**	**362,987**	**10.3%**	**31,732**	**62,285**	**87,550**
Virginia Beach	184,794	13,996	7.6%	1,831	2,864	3,430
Chesapeake	90,802	5,953	6.6%	996	1,717	113
Norfolk	97,670	9,317	9.5%	1,169	3,492	549
Portsmouth	40,907	4,537	11.1%	742	1,221	87

Sources: USCB 2019c, 2019d

a/ All estimates are annual totals developed as part of the 2015-2019 American Community Survey 5-Year Estimates.

b/ Housing units for seasonal, recreational, or occasional use are generally considered to be vacation homes. They are not included in the estimated number of housing units available for rent.

As with many coastal regions, Virginia Beach draws many visitors. In addition to the housing units reported by the U.S. Census Bureau, there are many other temporary housing options in the Study Area, including hotels, bed and breakfasts, campgrounds, and recreational vehicle sites. Rental housing options may also include other special living situations, such as short-term online home rentals (e.g., Airbnb units) and spare bedrooms in homes that residents would be willing to rent to construction workers.

Estimated median home values for owner-occupied units are shown in Table 4.4-4. The median home values for owner-occupied units in Virginia Beach and Chesapeake were higher and slightly higher than the state median, respectively. Median home values in the other cities were equivalent to 63 percent (Portsmouth) and 76 percent (Norfolk) of the state median. Median rents for renter-occupied units have a similar distribution. Median rents are higher than the state median in Virginia Beach and Chesapeake and lower than the state median in Norfolk and Portsmouth (Table 4.4-4).

Table 4.4-4. Housing Values and Rental Rates a/

State/City	Owner-Occupied Units	Renter-Occupied Units	Median Value of Owner-Occupied Units	Median Monthly Rent
Virginia	**2,087,711**	**1,063,334**	**$273,100**	**$1,234**
Virginia Beach	108,815	61,983	$280,800	$1,367
Chesapeake	60,540	24,309	$273,700	$1,279
Norfolk	38,339	50,014	$206,700	$1,059
Portsmouth	19,999	16,371	$170,900	$1,048

Source: USCB 2019c
a/ All estimates are annual totals developed as part of the 2015-2019 American Community Survey 5-Year Estimates.

Public Services

The area of Virginia affected by the Project contains numerous firefighting, law enforcement, and public welfare personnel, as well as hospitals and public schools. Table 4.4-5 provides a summary of the public services that could be utilized by the workforce during the construction, O&M, and decommissioning stages of the Project.

Table 4.4-5. Public Services in the Socioeconomic Study Area

City	Personnel			Facilities	
	Fire Department (FTE) a/	Law Enforcement (FTE) b/	Public Welfare (FTE) c/	Public Schools	Hospitals
Virginia Beach	492	908	353	87	3
Chesapeake	395	372	231	48	1
Norfolk	494	745	512	52	6
Portsmouth	224	237	165	24	2

Sources: HRCC 2019; NCES 2019; USCB 2020c
FTE - Full time equivalents = number of full-time employees that would be required to perform the agency's mission, though some actual jobs may be part-time. Example: two half-time employees equate to one full-time employee, or full time equivalent.
a/ Firefighters
b/ Persons with power of arrest.
c/ Employees engaged in all public welfare activities, include those involved in administration of public assistance programs as well as those providing direct assistance.

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For socioeconomics, the maximum design is represented by 205 WTGs with a generation capacity of approximately 3,000 MW and three Offshore Substations, which results in the greatest number of permanent structures in the Lease Area.

Construction

During construction, the potential impact-producing factors to population, economy, employment, housing, and public services may include short-term increases in Project-related spending on construction materials and services, as well as short-term increases in employment. 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 increase in spending on construction materials and services and related economic activity in the Hampton Road area and Commonwealth of Virginia;
- Short-term increase in construction-related employment and income in the Hampton Roads area and Commonwealth of Virginia;
- Short-term increase in tax revenues for state and local governments;
- Short-term increase in the demand for housing;
- Potential short-term effects to property values; and
- Short-term increase in the demand for public services.

Short-term increase in spending on construction materials and services and related economic activity in the Hampton Roads area and Commonwealth of Virginia. An economic impact analysis prepared on behalf of the Hampton Roads Alliance estimated that Project construction would involve total related spending of $8.4 billion (Mangum Economics 2020).[1] An estimated $553 million of this total would be spent in Virginia, with $329 million estimated to be spent in the Hampton Roads area.[2] These totals include estimated in-state and regional expenditures for development, manufacturing, and installation activities. The analysis prepared by Mangum Economics assumed that construction would take place over a 7-year

[1] This total includes roughly $8 billion of direct investment by Dominion Energy and a contribution of up to a $40 million from the Commonwealth of Virginia for site improvement and readiness at the Portsmouth Marine Terminal (Mangum Economics 2020).

[2] The Hampton Roads area evaluated in the economic impact analysis consists of the Virginia Beach-Norfolk-Newport News VA-NC MSA (also known as the Hampton Roads MSA), plus Southampton County and Franklin City, Virginia. The Hampton Roads MSA consists of six counties and 10 cities (county-equivalents) in Virginia, as well as three counties in North Carolina (Office of Management and Budget 2020). Impacts estimated for the Commonwealth of Virginia only include economic activity that occurs within the Virginia state borders (Mangum Economics 2020).

period from 2020 through the end of 2026. Construction-related activities were defined by Mangum Economics (2020) as follows:

- Development activities include engineering and design work; environmental, meteorological, and oceanographic studies; and legal and professional work for contracting, leasing, and permitting requirements;
- Manufacturing activities include WTGs (which account for most of the cost), WTG Foundations, Offshore Export Cables, Inter-Array Cables, Offshore Substations and other electrical network upgrades, and Onshore Project Components. In the Hampton Roads area, estimated manufacturing expenditures include those associated with the Onshore Substation and Switching Station, warehouses and O&M buildings, and a WTG assembly staging facility; and
- Installation activities include installation of the Inter-Array Cables that connect the WTGs to the Offshore Substations, the Offshore Export Cables that transmit the electricity from the Offshore Substations to shore, the Foundations for the WTGs and Offshore Substations, and the WTGs and OSSs themselves. In Hampton Roads, most of the expenditures during the installation stage would be in the construction, offshore water and air logistics, and ground transportation industries (Mangum Economics 2020).

In addition to direct impacts, these construction-related expenditures would generate economic activity elsewhere in the Hampton Roads area and Commonwealth of Virginia economies through the multiplier effect, as suppliers purchase goods and services to meet the demands of the Project and workers employed directly and indirectly by the Project spend their wages.

Using IMPLAN economic modeling software, Mangum Economics (2020) estimated the total (direct, indirect, and induced) regional and state economic impacts of Project construction. Direct impacts are those that happen at the initial source of the economic activity, which in this case include expenditures made specifically for the proposed facility, such as construction labor and materials. Indirect impacts are generated by the expenditures on goods and services by suppliers who provide goods and services to the construction project. Induced impacts are generated by the spending of households associated either directly or indirectly with the Project. Workers employed during construction, for example, will use their income to purchase groceries and other household goods and services.

Total impacts were estimated in terms of economic output, labor income, full-time equivalent (FTE) jobs, and average jobs per year (Table 4.4-6). Economic output represents the dollar value of goods and services produced. Labor income is the sum of employee compensation and proprietary (self-employed) income. FTE jobs represent employment for 2,080 hours per year; FTE jobs do not necessarily translate into the number of affected workers. Two jobs that last 6 months each, for example, count as one FTE job.

Table 4.4-6. Estimated Economic Impacts of Project Construction in the Hampton Roads Area and Virginia

Geographic Area/ Impact Type	Output ($ million) a/	Labor Income ($ million) a/	FTE Jobs a/ b/	Average Number of Jobs per Year c/
Hampton Roads Area				
Direct	328.5	152.1	2,370	339
Indirect and Induced	243.0	76.5	1,578	225
Total	**571.5**	**228.6**	**3,948**	**564**
Virginia				
Direct	584.1	261.9	3,756	537
Indirect and Induced	420.0	136.5	2,604	372
Total	**1,004.1**	**398.4**	**6,360**	**909**

Notes:
FTE = full-time equivalent
a/ Impacts are presented for the entire 7-year construction period (2020 to 2026). Output and labor income are expressed in millions of dollars.
b/ Jobs are FTE for a period of one year (1 FTE = 2,080 hours).
c/ Average number of jobs per year based on 7 years of construction.
Source: Mangum Economics 2020

Based on this analysis, Project construction expenditures are expected to result in total (direct, indirect, and induced) estimated economic output of approximately $572 million in the Hampton Roads area and $1.0 billion in Virginia over the 7-year construction period (Table 4.4-6). Viewed by year, estimated total economic output would peak in 2024 and 2025 (Figure 4.4-2).

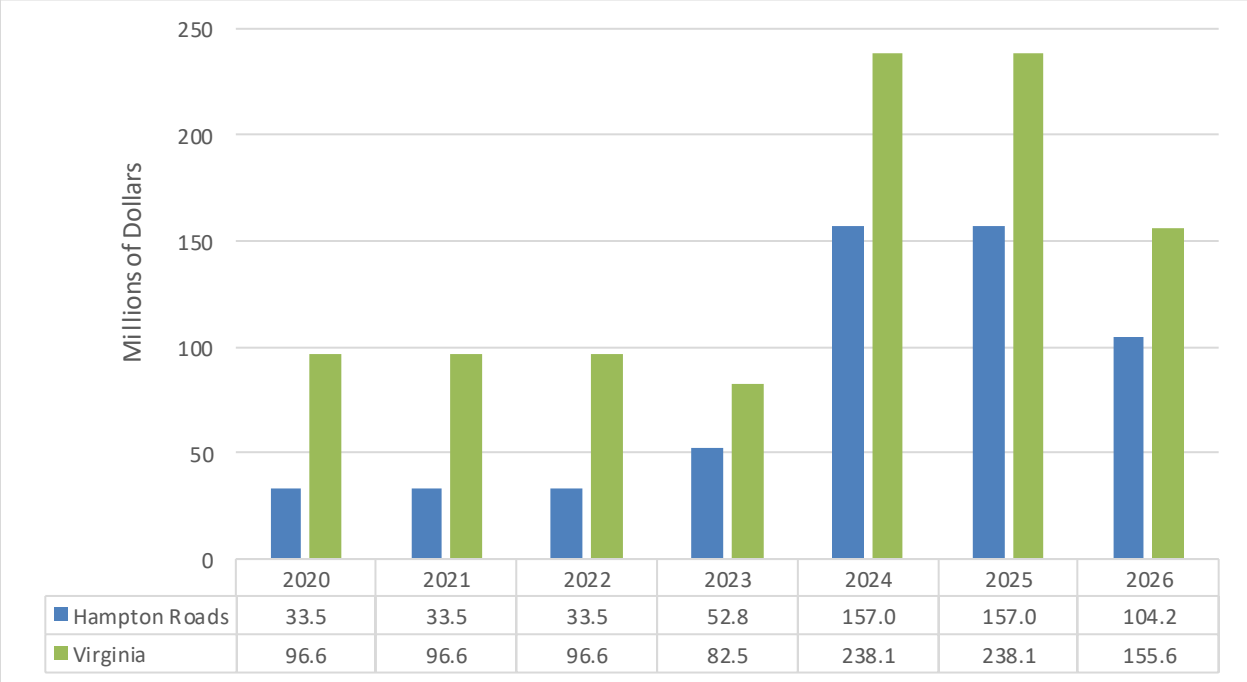
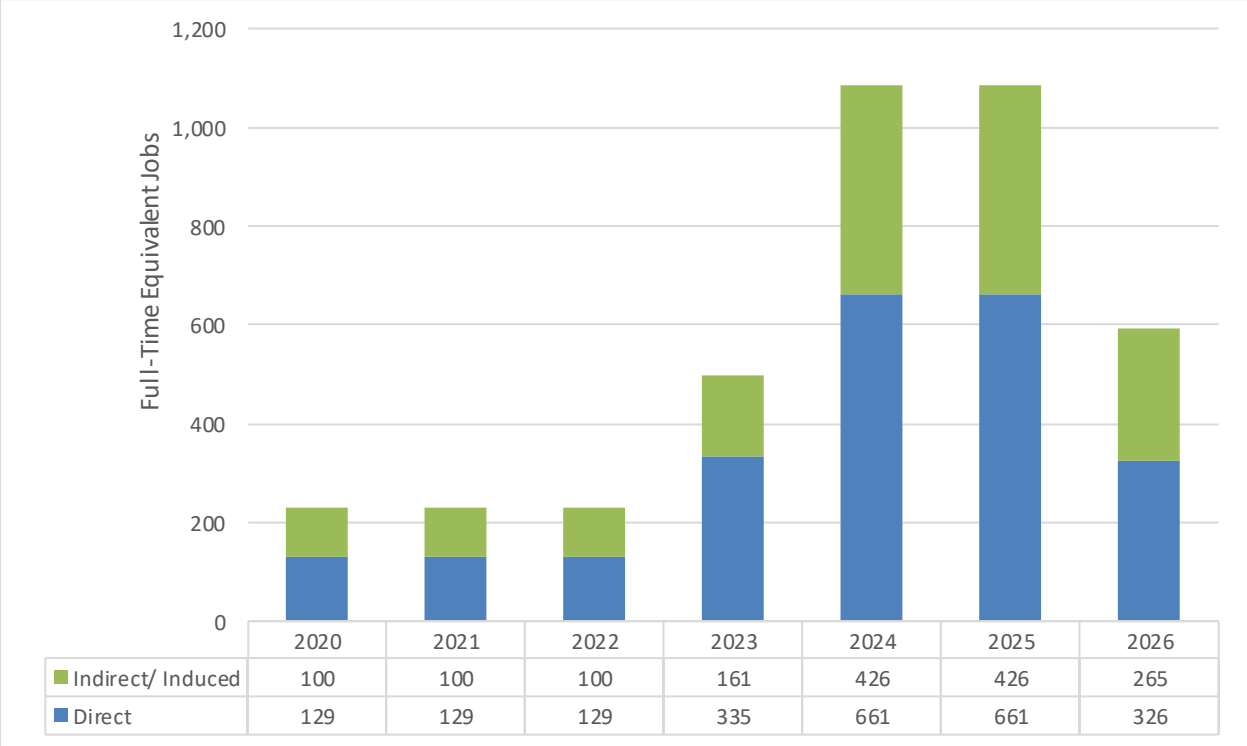


Figure 4.4-2. Estimated Total Economic Output Supported by Construction-Related Expenditures in the Hampton Roads Area and Commonwealth of Virginia

Source: Mangum Economics 2020

Short-term increase in construction-related employment and income in the Hampton Roads area and Commonwealth of Virginia. Construction-related expenditures would support jobs and income in the Hampton Roads area and Virginia. The economic impact analysis prepared on behalf of the Hampton Roads Alliance estimated that project expenditures over the 7-year construction period would support an estimated total of 2,370 direct FTE jobs or job-years in the Hampton Roads area, with 3,756 direct FTE jobs supported in Virginia. In addition to these jobs directly supported by Project construction activities, construction-related expenditures would also support an estimated 1,578 indirect/induced FTE jobs in the Hampton Roads area and 2,604 indirect/induced FTE jobs in Virginia, resulting in total (direct, indirect, and induced) employment estimates of 3,946 job-years in Hampton Roads and 6,360 job-years in Virginia (Table 4.4-6).

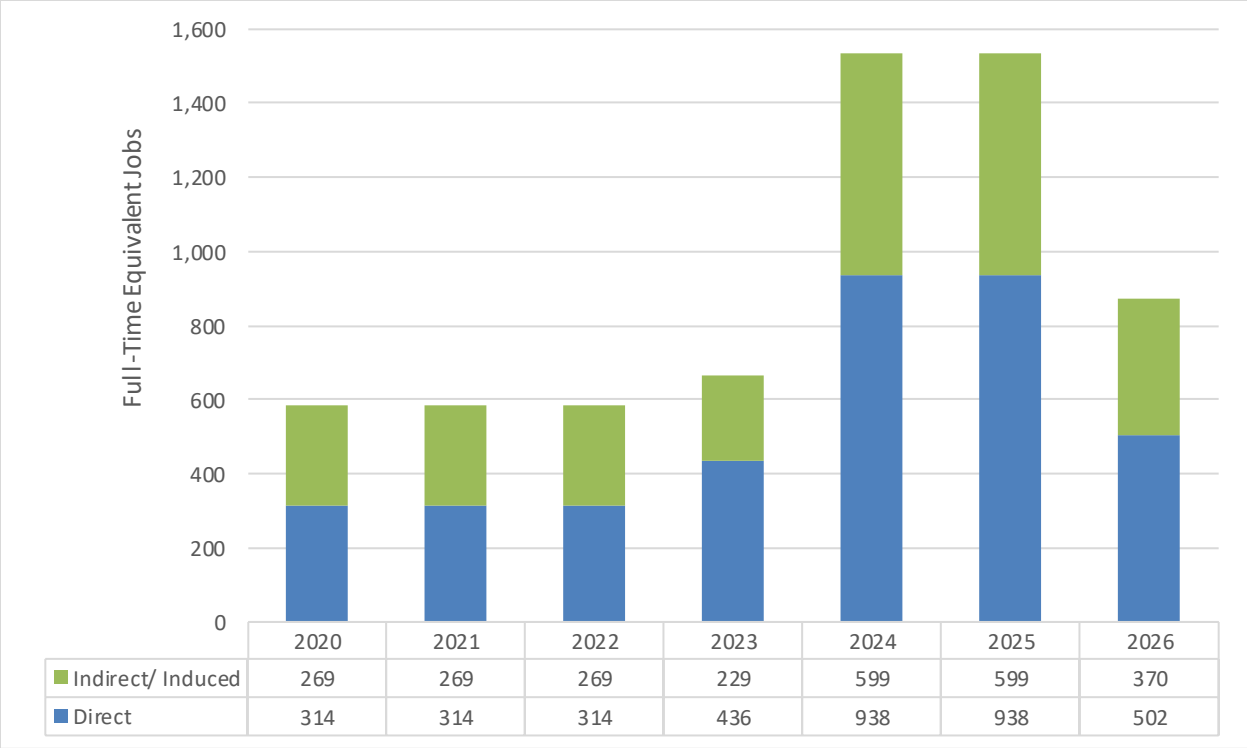
Viewed by year, the estimated direct FTE jobs supported in the Hampton Roads area would range from 129 (2020 to 2022) to 661 (2024 and 2025) (Figure 4.4-3). Estimated jobs supported in Virginia (including those in the Hampton Roads area) would follow a similar pattern, ranging from 314 (2020 to 2022) to 938 (2024 and 2025) direct FTE jobs (Figure 4.4-4).



	2020	2021	2022	2023	2024	2025	2026
Indirect/ Induced	100	100	100	161	426	426	265
Direct	129	129	129	335	661	661	326

Figure 4.4-3. Estimated Jobs Supported by Construction-Related Expenditures in the Hampton Roads Area

Source: Mangum Economics 2020

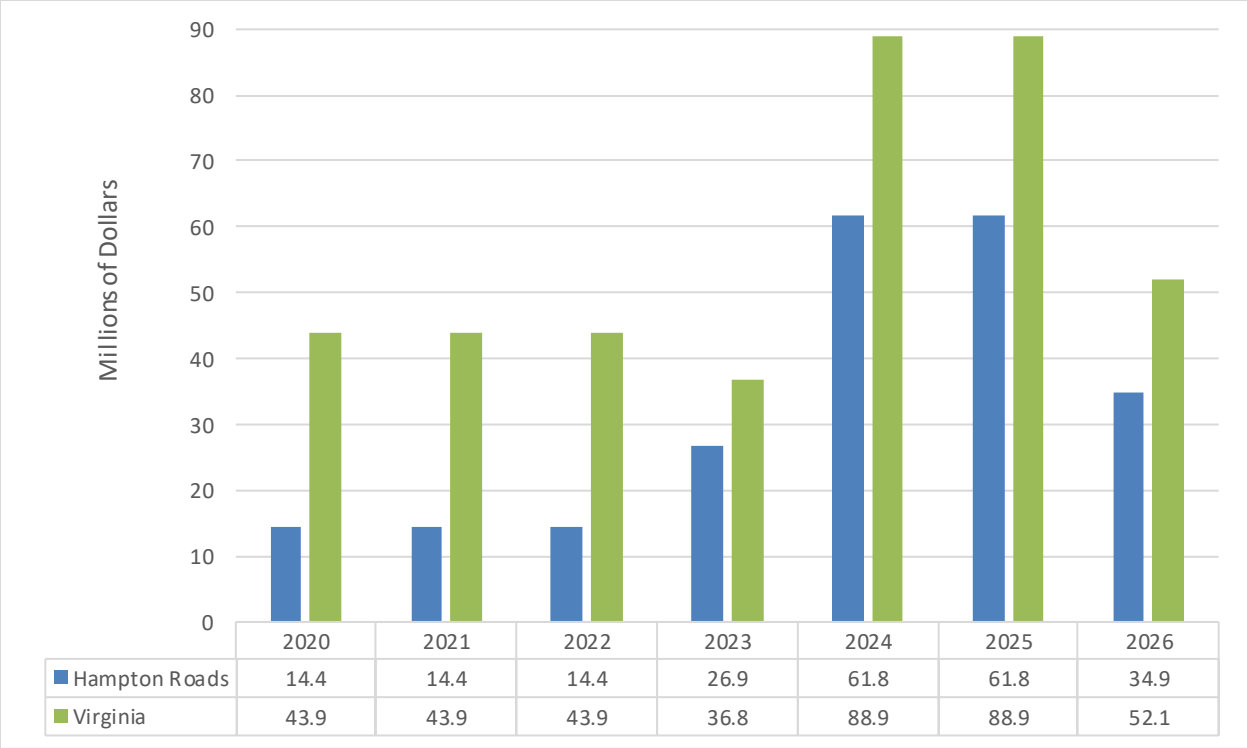


	2020	2021	2022	2023	2024	2025	2026
Indirect/ Induced	269	269	269	229	599	599	370
Direct	314	314	314	436	938	938	502

Figure 4.4-4. Estimated Jobs Supported by Construction-Related Expenditures in Virginia

Source: Mangum Economics 2020

Construction-related expenditures would also support an estimated total of $229 million in total (direct, indirect, and induced) labor income in the Hampton Roads area and $398 million in Virginia (Table 4.4-6). Estimated income would follow a similar distribution to employment over the 7-year construction period, with estimated annual totals ranging from $14.4 million to $61.8 million in the Hampton Roads area and $43.9 million to $88.9 million in Virginia (Figure 4.4-5).



	2020	2021	2022	2023	2024	2025	2026
Hampton Roads	14.4	14.4	14.4	26.9	61.8	61.8	34.9
Virginia	43.9	43.9	43.9	36.8	88.9	88.9	52.1

Figure 4.4-5. Estimated Total Income Supported by Construction-Related Expenditures in the Hampton Roads Area and Virginia

Source: Mangum Economics 2020

The preceding estimates represent jobs and income that would be supported by expenditures in the affected Hampton Roads area and the Commonwealth of Virginia. The impacts of workers hired from out of state and temporarily relocating to the Project vicinity for the duration of their employment are not captured in these estimates.

Short-term increase in tax revenues for state and local governments. From 2020 to 2026, Project construction would generate an estimated $41.7 million in tax revenues for state and local governments, with an estimated $20.4 million paid to the Commonwealth of Virginia, $10.8 million paid to local governments in the Hampton Roads area, and $10.5 million paid to local governments elsewhere in Virginia (Mangum Economics 2020). These estimates include tax revenues that would be generated as a result of Project construction-related direct, indirect, and induced economy activity.

Short-term increase in the demand for housing. The temporary relocation of workers to the Project Area would result in an increased demand for temporary housing resources. Workers temporarily relocating to the area would likely seek a range of temporary accommodations, including rental housing (houses, apartments, mobile homes), hotel/motel rooms, and RV parks/campgrounds, as well as other special living situations such as short-term online home rentals and spare bedrooms. Given the number of available units, it is unlikely that the short-term demand from workers temporarily relocating to the area would be greater than the available number of temporary housing units. Approximately 2,900 housing units were identified as available for rent in Virginia Beach in 2019, for example, with an additional 6,400 units available in the other cities in the Project Area (Table 4.4-6).

Potential short-term effects to property values. The construction of Onshore Project Components will occur largely within existing ROWs and previously developed areas, where practicable. The Switching Station will be built on private property north of Harpers Road or north of Princess Anne Road. The Onshore Substation already exists but will undergo expansion and upgrades. Based on this anticipated timing and the temporary nature of the construction activities, property values are not expected to be negatively affected during onshore construction activities. Construction of the Offshore Project Components is also not anticipated to negatively affect property values, as installation of the Offshore Export Cable nearshore will be short-term, and Project-related vessels transiting along the Offshore Export Cable Route and to the Lease Area would be consistent with existing vessel traffic off the coast of Virginia.

Short-term increase in the demand for public services. The increased workforce and associated construction activities would likely result in an increased demand for public services, including police, fire, healthcare, and educational services. The Study Area contains numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that the Project would not affect the availability of public services. As a result, this anticipated increase in demand is unlikely to create a shortage of public services available to the general public. Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project. Additional information on public health and safety is presented in Section 4.4.12, Public Health and Safety.

Operations and Maintenance

During O&M, the potential impact-producing factors to population, economy, employment, housing, and public services may include long-term increases in Project-related spending on operations and maintenance services, as well as long-term increases in employment. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

The following impacts may occur as a consequence of the factors identified above:

- Long-term increase in spending on O&M and related economic activity in the region;
- Long-term increase in O&M-related employment and income in the region;
- Long-term increase in tax revenues for state and local governments;
- Long-term increase in demand for housing;
- Long-term increase in the demand for public services; and
- Long-term change in property values due to O&M activities.

Long-term increase in spending on O&M and related economic activity in the region. The economic impact analysis prepared on behalf of the Hampton Roads Alliance assumed that all O&M-related activities and expenditures would occur in the Hampton Roads area and, as a result, separate estimates were not developed for Virginia (Mangum Economics 2020). Following construction, from 2027 onward, Mangum Economics estimates that $131.6 million would be spent annually in the Hampton Roads area to operate and maintain the Project. These expenditures would support an estimated $122.3 million in direct economic output each year, with an additional $87.5 million supported elsewhere in the regional economy (Table 4.4-7).

Table 4.4-7. Estimated Annual Economic Impacts of Project Operations and Maintenance in the Hampton Roads Area

Geographic Area/Impact Type	Output ($ million) a/	Labor Income ($ million) b/	FTE Jobs c/
Direct	122.3	19.4	200
Indirect and Induced	87.5	62.2	910
Total	**209.8**	**81.6**	**1,110**

Notes:
FTE = full-time equivalent
a/ Impacts are presented for the entire 7-year construction period (2020 to 2026). Output and labor income are expressed in millions of dollars.
b/ Jobs are FTE for a period of one year (1 FTE = 2,080 hours).
c/ Average number of jobs per year based on 7 years of construction.
Source: Mangum Economics 2020

Long-term increase in O&M-related employment and income in the region. From 2027 onward, O&M of the Project would support an estimated total of 200 direct full-time jobs each year the facility is in operation (Table 4.4-7). Direct O&M-related jobs include maintenance technicians, administrative professionals, and operations management professionals (Mangum Economics 2020). These direct jobs are estimated to result in approximately $19.4 million in labor income, which equates to an average annual salary of $97,000 per job.

Project O&M would also support economic activity elsewhere in the regional economy. Mangum Economics (2020) estimated that O&M would support an annual total of 1,110 jobs and $81.6 million in labor income in the Hampton Roads area each year the facility is in operation. These estimated totals include both direct and indirect/induced jobs and earnings (Table 4.4-7). Most of the estimated O&M-related indirect and induced jobs are expected to be in real estate services and food service (Mangum Economics 2020).

Long-term increase in tax revenues for state and local governments. From 2027 onward, Project O&M would generate an estimated $10.6 million in annual tax revenues for state and local governments, with an estimated $4.8 million paid to the Commonwealth of Virginia and $5.8 million paid to local governments in the Hampton Roads area and elsewhere in Virginia (Mangum Economics 2020). These estimates include tax revenues that would be generated as a result of Project O&M-related direct, indirect, and induced economy activity.

Long-term increase in demand for housing. Project O&M would employ an estimated 200 full-time workers from 2027 onward. Workers would either be hired locally or permanently relocate to the area. The permanent relocation of a portion of this workforce is not expected to noticeably affect local housing markets. An estimated total of 1,800 housing units were for sale in Virginia Beach in 2019, with approximately 2,900 units available for rent. Additional housing units were also available for sale and rent in the surrounding cities and county (Table 4.4-3).

Long-term increase in the demand for public services. The slight increase in workforce and operations activities would likely result in a slight increase in demand for public services. The Study Area contains numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that the Project would not impact the availability of public services (Table 4.4-5). As a result, this anticipated increase in demand is unlikely to create a shortage of public services

available to the general public. Dominion Energy would coordinate with local fire and police departments as needed throughout operation of the Project. Additional information on potential impacts and mitigation measures to health and public safety is provided in Section 4.4.12, Public Health and Safety.

Long-term change in property values due to operation and maintenance activities. Changes in property values are not expected during Project O&M. Onshore Project Components would be located underground or within previously developed areas, where practicable. Any potential visual impacts to surrounding properties will be assessed as part the Project's Visual Impact Assessment (see Appendix I).

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. 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, and potential impacts will be re-evaluated at that time.

4.4.1.3 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 4.4-8). 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 4.4-8. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term increase in spending on construction materials and services and related economic activity in the region (Hamptons Road area) and state (Virginia)	• Project-related vessels transiting to the Lease Area would be consistent with existing vessel traffic off the coast of Virginia; and • Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project.
		Short-term increase in construction-related employment and income in the region and state	
		Short-term increase in tax revenues for state and local governments	
		Short-term increase in the demand for housing	
		Potential short-term effects to property values	
		Short-term increase in the demand for public services	
Operations and Maintenance	Onshore Project Area	Long-term increase in spending on operations and maintenance (O&M) and related economic activity in the region	• Dominion Energy would coordinate with local fire and police departments as needed throughout operation of the Project.
		Long-term increase in O&M-related employment and income in the region	
		Long-term increase in tax revenues for state and local governments	
		Long-term increase in demand for housing	
		Long-term increase in the demand for public services	

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
		Long-term change in property values due to O&M activities	

4.4.2 Environmental Justice

This section provides an assessment of environmental justice (EJ) populations in the Onshore Project Area that could be affected by construction, operation, and decommissioning of the Project and the proposed Project-related measures adopted by Dominion Energy to avoid, minimize, and/or mitigate potential impacts to EJ populations. Other resources and recent assessments detailed within this COP that are related to EJ include:

- Air Quality (Section 4.1.3);
- In-Air Acoustic Environment (Section 4.1.4);
- Visual Resources (Section 4.3.4);
- Population, Economy, Employment and Housing and Property Values (Section 4.4.1);
- Land Transportation and Traffic (Section 4.4.4);
- Recreation and Tourism (Section 4.4.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Public Health and Safety (Section 4.4.12);
- Visual Impact Assessment (Appendix I); and
- Socioeconomics and Environmental Justice (Appendix EE, Environmental Justice report to be provided in Supplemental Filing).

In 1994, President Clinton signed Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which requires each federal agency to account for EJ as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The Executive Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in them, denying persons the benefits of them, or subjecting persons to discrimination because of their race, color, or national origin.

Identifying whether disproportionately high and adverse impacts on minority and/or low-income populations would occur typically involves two steps: first, identifying whether minority and/or low-income populations are present, and then if these types of populations are present, evaluating whether adverse human health or environmental effects would disproportionately affect the identified population or populations.

Guidelines provided by the Council for Environmental Quality (CEQ) (1997) and EPA (1998) indicate that a minority population may be defined as either: 1) where the minority population comprises more than 50 percent of the total population; and/or 2) where the minority population is meaningfully greater than the minority population in the general population of an appropriate benchmark region used for comparison.[3] Minority populations may consist of a group of individuals living in geographic proximity to one another, or a geographically dispersed set of individuals who would be similarly affected by the proposed action or

[3] The benchmark region used for comparison is also referred to as the "reference community" (Federal Interagency Working Group 2016). The reference community for this analysis is the Commonwealth of Virginia.

program. Further, a minority population exists if there is "more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ 1997)."[4] Definitions provided by the Virginia Environmental Justice Act use the term "population of color" and define a "community of color" as a distinct geographic area where the population of color measured as a percent of the total is higher than the population of color in the Commonwealth.[5] The Virginia Environmental Justice Act's criteria has a lower threshold than the federal guidelines and, therefore, is used to identify potential minority populations in the following analysis. Using these criteria, if the minority percentage in a geographic area is anything above the Commonwealth average, the area is considered to have a potential minority population.

The CEQ and EPA guidelines indicate that low-income populations should be identified based on the annual statistical poverty thresholds established by the U.S. Census Bureau. Like minority populations, low-income populations may consist of individuals living in geographic proximity to one another, or a geographically dispersed set of individuals who would be similarly affected by the proposed action or program. The Virginia Environmental Justice Act defines low-income as "having an annual household income equal to or less than the greater of (i) an amount equal to 80 percent of the median income of the area in which the household is located, ... and (ii) 200 percent of the Federal Poverty Level." The Act defines a "low-income community" as "any census block group in which 30 percent or more of the population is composed of people with low income." These definitions are used to identify potential low-income populations in the following analysis.

Dominion Energy is committed to ensuring that communities have a meaningful voice in our planning and development processes. Communications and outreach to foster the meaningful public participation of potential environmental justice communities is ongoing to better understand how communities may be affected. A summary of the targeted outreach to communities of color and low-income populations that Dominion Energy has conducted to date is provided in Appendix EE, Environmental Justice Screening Report (ERM 2021). Further information on the engagement that Dominion Energy has been conducting is provided in Appendix L, Summary of Agency and Stakeholder Engagement.

Virginia Environmental Justice Policy

In March 2020, as part of a larger effort to incorporate EJ into the decision-making of most state agencies, the General Assembly of Virginia passed two amendments to the Code of Virginia: one establishing the Virginia Environmental Justice Act, and the other permanently establishing the Virginia Council on Environmental Justice (the Council) (Virginia House Bill 704 / Senate Bill 406 and Virginia House Bill 1042 / Senate Bill 883) (VLIS 2020). The Virginia Environmental Justice Act states that it is the Commonwealth's policy "to promote environmental justice and ensure that environmental justice is carried out throughout the Commonwealth." The Council is established as an advisory council in the executive branch of state government. The purpose of the Council is to advise the Governor and "provide

[4] Minority populations identified by the U.S. Census Bureau include Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and Other Race, which are considered races, and persons of Hispanic or Latino origin, which is considered an ethnicity.

[5] The Virginia Environmental Justice Act defines a "population of color" as "a population of individuals who identify as belonging to one or more of the following groups: Black, African American, Asian, Pacific Islander, Native American, other non-white race, mixed race, Hispanic, Latino, or linguistically isolated."

recommendations that maintain a foundation of environmental justice principles intended to protect vulnerable communities from disproportionate impacts of pollution" (VLIS 2020).

Virginia is in the early stages of formalizing state-level agency approaches to addressing EJ. For example, in 2019, the VDEQ began to research options for developing a strategic approach to addressing EJ issues within its purview (VDEQ 2019). While the results of that effort are ongoing, VDEQ published an independent environmental justice study in October 2020 that provides recommendations to VDEQ on how to incorporate EJ goals into its regulatory authority. As such, Dominion Energy continues to monitor state agency regulations and guidance as the Commonwealth of Virginia moves forward with this mission.

4.4.2.1 Affected Environment

For the purposes of this section, the broader Environmental Justice Study Area (the Study Area) is defined as the four cities that have the greatest potential to be directly affected by the construction, operation, and decommissioning of the Project (see Section 4.4.1, Population, Economy, Employment, Housing, and Public Services). In addition, as explained below, the following analysis also includes a more detailed review of the census block groups that either include or are located within 1 mile of Project facilities.

According to the most recent Census estimates, almost two-thirds (62 percent) of the population of Virginia is White. The Black or African American population was identified as the largest minority group, accounting for about 19 percent of the total population (Table 4.4-9). The White share of the population in Virginia Beach was very similar to the state average (61.7 percent and 61.8 percent, respectively), with the corresponding percentages in the other three Study Area cities ranging from about 38 percent (Portsmouth) to 57 percent (Chesapeake). The total minority percentage of the population in Virginia Beach and Chesapeake is less than 50 percent and less than the state average and, therefore, the populations in these two cities do not meet the definition of a minority population. Potential minority populations exist in the other two cities within the Study Area (Norfolk and Portsmouth) because the total minority share of the population is greater than 50 percent in both cases (Table 4.4-9). However, while these cities are part of the Study Area, they do not contain any Project facilities and would not be directly affected by the Project.

Table 4.4-9. Race, Ethnicity, and Poverty by State and City

Geographic Area	Total Population	Percent of Total						
		White a/	Black or African American a/	Hispanic or Latino	Asian	Native American and Alaska Native	Other Race a/ b/	Total Minority c/
Virginia	**8,454,463**	**61.8**	**18.8**	**9.4**	6.3	0.2	3.5	38.2
Virginia Beach	450,201	61.7	18.4	8.2	6.6	0.2	4.9	38.3
Chesapeake	239,982	57.4	29.3	6.2	3.1	0.1	3.9	42.6
Norfolk	244,601	43.4	40.5	8.0	3.5	0.3	4.2	56.6
Portsmouth	95,097	37.7	52.2	4.5	1.4	0.4	3.9	62.3

Source: USCB 2021a

a/ Non-Hispanic only. The Federal Government considers race and Hispanic/Latino origin (ethnicity) to be two separate and distinct concepts. People identifying as Hispanic or Latino origin may be of any race. The data summarized in this table present Hispanic/Latino as a separate category.

b/ The "Other Race" category presented here includes census respondents identified as Native Hawaiian and Other Pacific Islander, Two or More Races, or Some Other Race.

c/ The total minority population is the sum of the Black or African American, Hispanic or Latino, Asian, Native American and Alaska Native, and Other Race categories shown here.

Table 4.4-10 presents median household income and the share of the population with income less than 200 percent of the federal poverty level for Virginia and the four cities in the Study Area. Median household income was higher than the state median in Virginia Beach and Chesapeake, and less than 30 percent of the populations in these cities had income below 200 percent of the federal poverty level, and therefore, the populations in these two cities do not meet the definition of a low-income population. Potential low-income populations exist in the other two Study Area cities (Norfolk and Portsmouth), because median household income is less than 80 percent of the state median and the share of the population with income below 200 percent of the federal poverty level in both cities was greater than 30 percent. However, as noted above, neither of these cities would be directly affected by the Project.

Table 4.4-10. Median Household Income and Poverty by State and City

Geographic Area	Total Population	Median Household Income		Income Below Poverty Level (%) b/
		Dollars a/	Percent of State Median	
Virginia	**8,454,463**	**74,222**	**100**	**25**
Virginia Beach	450,201	76,610	103	20
Chesapeake	239,982	78,640	106	21
Norfolk	244,601	51,590	70	39
Portsmouth	95,097	52,175	70	37

Sources: USCB 2021b, 2021c
a/ Median household income is for the past 12 months expressed in 2019 inflation-adjusted dollars.
b/ These estimates represent the share of the population with income less than 200 percent of the federal poverty level.

Larger and more populated geographic areas may have the effect of "masking" or "diluting" the presence of concentrations of minority and/or low-income populations (CEQ 1997; EPA 1998). Therefore, data was also reviewed separately for the 46 census block groups that either contain and/or are located within 1 mile of Onshore Project Components and infrastructure (Figure 4.4-6). A census block group is a statistical subdivision of a census tract, generally defined to contain between 600 and 3,000 people and 240 and 1,200 housing units. Nineteen census block groups contain or are crossed by Onshore Project Components and infrastructure; the remaining 27 census block groups considered do not contain Onshore Project Components and infrastructure but are located within 1 mile.

This review identified 14 census block groups where the total minority population was more than the statewide average (the reference community), with total shares ranging from 40 percent to 69 percent (Table 4.4-11). Five of these census block groups contain Project components and infrastructure; the remaining nine census block groups are within 1-mile. Six census block groups were identified as potential low-income populations because the share of the population in these areas with income less than 200 percent of the federal poverty level exceeded 30 percent. In addition, median household income in two of these census block groups was less than 80 percent of the state median. The six block groups with potential low-income populations are located within 1 mile; none contain Project components and infrastructure. The 18 block groups with potential EJ populations are highlighted in Figure 4.4-7. Note that the population in two of these block groups met both the minority and low-income definitions (Table 4.4-11). As discussed above, only five of the 18 block groups contain Project components and infrastructure; the remaining 13 block groups are within 1 mile.

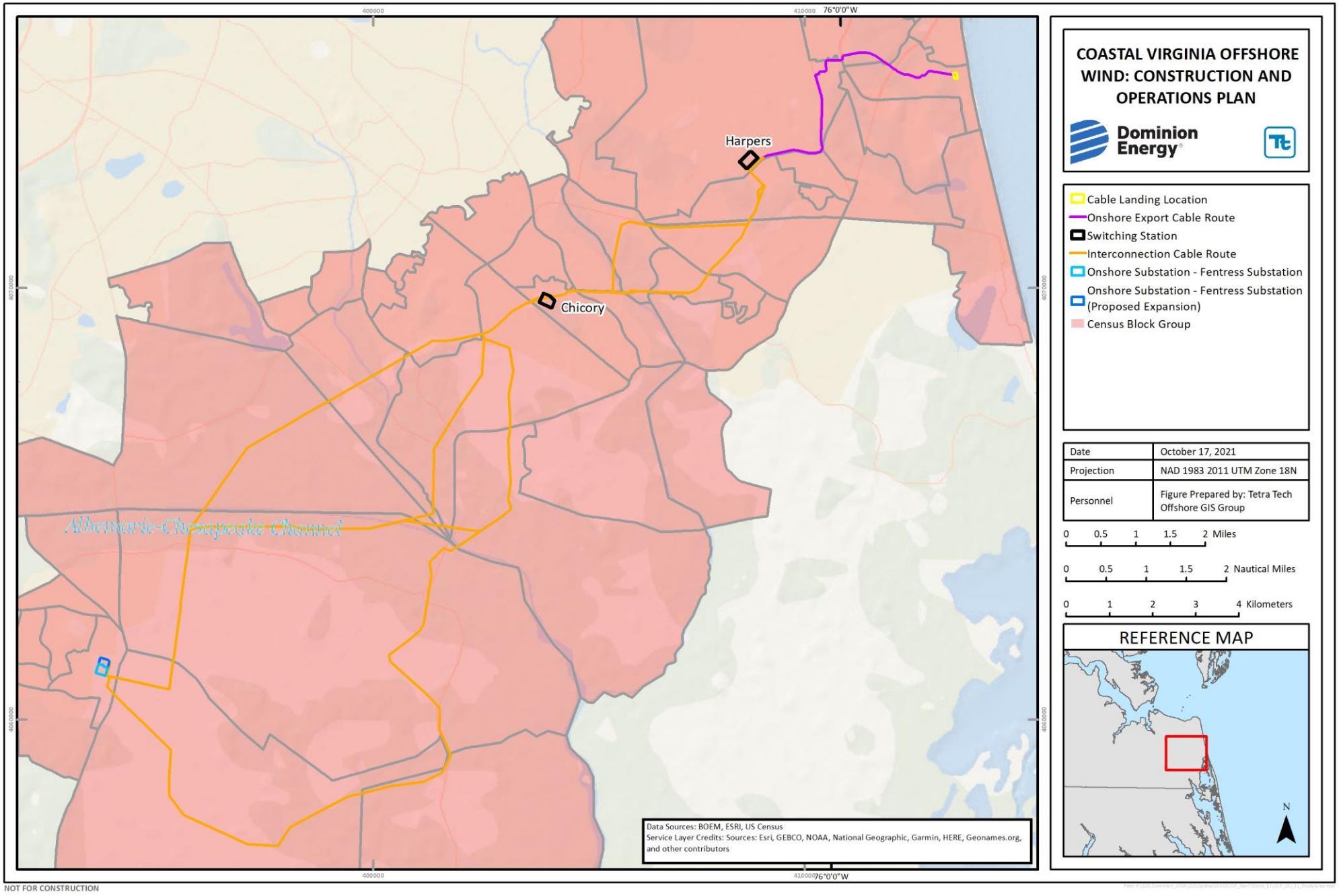


Figure 4.4-6. Environmental Justice Study Area: Census Block Groups Containing Project Facilities and Infrastructure

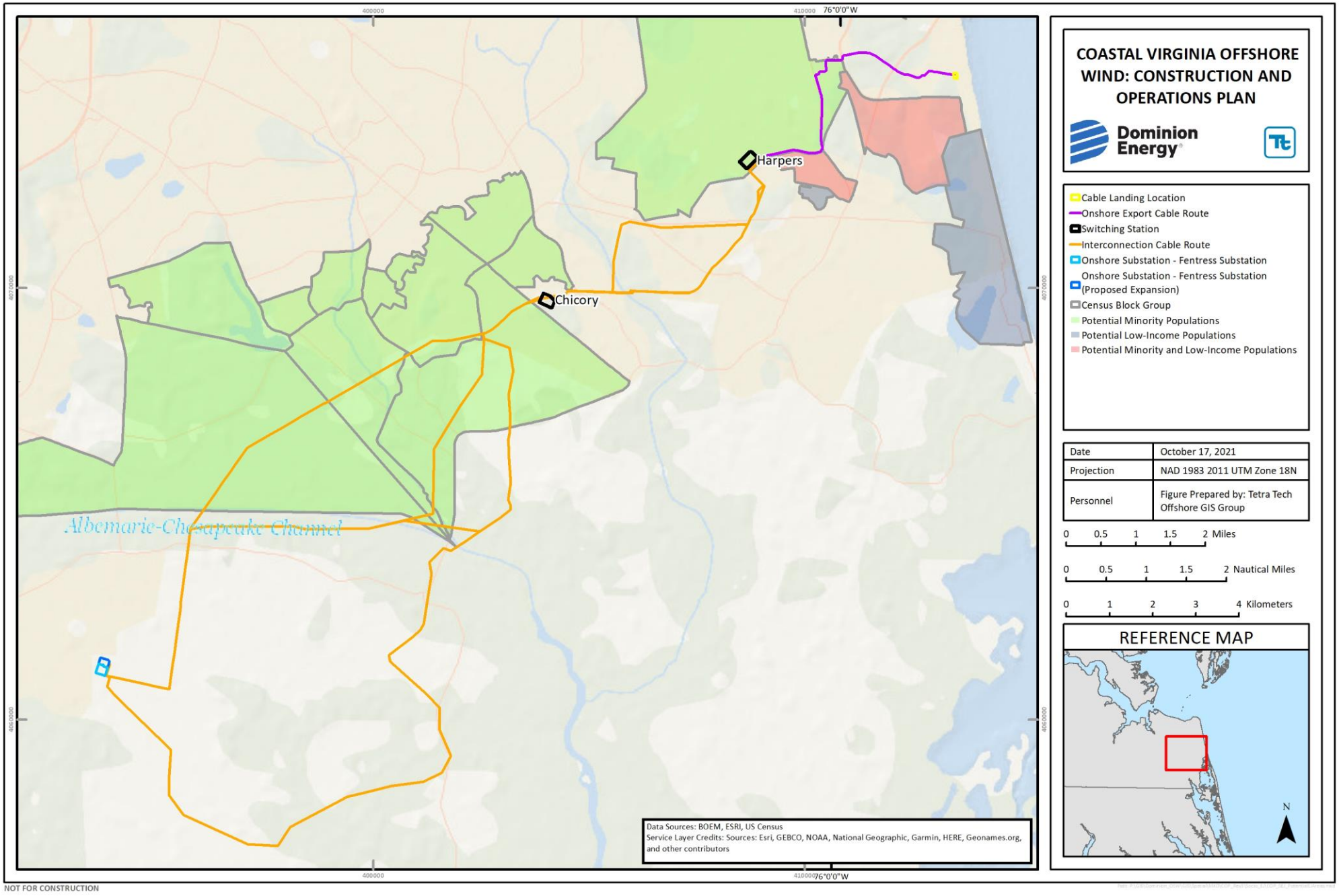


Figure 4.4-7. Potential Environmental Justice Populations

Table 4.4-11. Potential Minority and Low-Income Populations by Census Block Group

Geographic Area a/ b/	Total Minority Population (Percent) c/	Income Below Poverty Level (Percent) d/ e/
Virginia	38%	25%
Census Block Groups Crossed by Onshore Project Components		
Block Group 1, Census Tract 450	42%	0%
Block Group 2, Census Tract 454.23	55%	9%
Block Group 1, Census Tract 460.15	54%	5%
Block Group 1, Census Tract 460.16	42%	8%
Block Group 3, Census Tract 208.04	43%	20%
Census Block Groups within 1-mile of Onshore Project Components (not crossed)		
Block Group 1, Census Tract 440.03	14%	33%
Block Group 3, Census Tract 442	9%	31%
Block Group 2, Census Tract 452 *	43%	44%
Block Group 3, Census Tract 452	27%	72%
Block Group 4, Census Tract 454.06	69%	7%
Block Group 1, Census Tract 454.08 *	41%	30%
Block Group 2, Census Tract 454.08	37%	35%
Block Group 2, Census Tract 454.22	40%	16%
Block Group 2, Census Tract 460.15	43%	8%
Block Group 4, Census Tract 460.15	47%	14%
Block Group 1, Census Tract 462.16	47%	15%
Block Group 2, Census Tract 462.16	43%	3%
Block Group 2, Census Tract 462.17	61%	10%

Sources: USCB 2021a, 2021b, 2021c

a/ This table presents the results of a review of 37 census block groups. Data are only presented for those block groups identified as potential minority or low-income populations. Block Group 3, Census Tract 3208.04 is located in Chesapeake; all of the other block groups identified in this table are in Virginia Beach.

b/ Shaded cells identify the measures for each block group that indicate the potential presence of a minority and/or low-income population.

c/ The Commonwealth of Virginia is the reference community for this analysis. Census block groups with total minority populations that are higher than the state average are considered potential minority populations. See Table 4.4-9, footnote d/ for the definition of Total Minority Population used in this analysis.

d/ These estimates represent the share of the population with income less than 200 percent of the federal poverty level. Census block groups in which 30 percent or more of the population have income less than 200 percent are considered potential low-income populations.

e/ Block groups where median household income is less than 80 percent of the state median (the other low-income measure identified in the Virginia Environmental Justice Act) are identified by an asterisk.

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

Construction

During construction, the potential impact-producing factors to EJ populations may include short-term increases in Project-related construction vehicle traffic and activity as well as short-term increases in employment. 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 increase in construction vehicle traffic and activity;
- Temporary shortage of affordable temporary housing due to increased demand;
- Short-term increase in tax revenues for state and local governments;
- Short-term increase in construction-related employment and income in the region and state; and
- Short-term increase in the demand for public services.

Short-term increase in construction vehicle traffic and activity. As discussed in Section 4.4.4, Land Transportation and Traffic, an increase in Project-related construction, support, and workforce vehicle traffic along the Onshore Export Cable Route and Interconnection Cable Routes, and to and from the Switching Station and Onshore Substation sites, and to and from the port is anticipated during construction. During this time, nearby communities, including potential EJ populations, would experience an increase in construction-related activities, including a short-term increase in construction-related noise and equipment emissions. The Project would use existing roads, ROWs, and infrastructure where possible; therefore, new impacts resulting from construction activities would be minimized to the extent practicable and are anticipated to be similar in nature to other utility or road improvement works carried out in these locations. Potential public health impacts from the construction stage are discussed in Section 4.4.12, Public Health and Safety, including accidental release of hazardous material. Air quality impacts from Project-related vehicle traffic are discussed in Section 4.1.3, Air Quality. Avoidance, minimization, and mitigation measures proposed to reduce these potential impacts are summarized below. These activities are not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7.

In addition, construction activities have the potential to affect recreational and/or commercial fishing in the Offshore Project Area, including recreational or commercial fishing by EJ populations. Potential short-term impacts include displacement of fishing activity, disturbance to local commercial fish species, risk of gear entanglements on partially installed structures, and increases in vessel traffic. These potential impacts are discussed in Section 4.4.6, Commercial and Recreational Fishing, which also discusses measures to avoid, minimize, and mitigate these potential impacts.

Temporary shortage of affordable temporary housing due to increased demand. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the temporary relocation of workers to the Onshore Project Area could result in a temporary increase in demand for housing resources during the construction stage. Workers temporarily relocating to the area would likely seek a range of temporary accommodations, including rental housing (e.g., houses, apartments, mobile homes), hotel/motel rooms, and RV parks/campgrounds, as well as other special living situations such as temporarily living units and spare bedrooms. Approximately 2,400 housing units were identified as available for rent in Virginia Beach in 2018, for example, with an additional 4,600 units available in the other three cities in the Socioeconomics Study Area (Table 4.4-3). Given the number of available units, it is unlikely that the short-term demand from workers temporarily relocating to the area would be greater than the available number of temporary housing units or result in a shortage of affordable temporary housing.

Short-term increase in tax revenues for state and local governments. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, from 2020 to 2026, Project construction would generate an estimated total of $41.7 million in tax revenues for state and local governments, with

$20.4 million in state taxes, $10.8 million in local taxes in the Hampton Roads area, and $10.5 million in local taxes elsewhere in Virginia. State and local tax revenues fund many programs that may aid EJ populations. This impact would be beneficial and temporary.

Short-term increase in construction-related employment and income in the region and state. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, construction-related expenditures would support total (direct, indirect, and induced) employment estimates of 3,946 job-years in Hampton Roads and 6,360 job-years in Virginia. Construction-related expenditures would also support an estimated total of $229 million (direct, indirect, and induced) in labor income in the Hampton Roads area and $398 million in Virginia. Jobs and income would be supported throughout the local and regional economy, including positions occupied by potential EJ populations. Construction-related employment and income impacts would be beneficial and temporary.

Short-term increase in the demand for public services. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the increased workforce and associated construction activities would likely result in an increased demand for public services, including police, fire, healthcare, and educational services. The Study Area contains numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that the Project would not impact the availability of public services. The provision of public services to EJ populations is not expected to be adversely or disproportionately affected. Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project. The Project would use existing roads, ROWs, and infrastructure where possible.

Operations and Maintenance

During O&M, the potential impact-producing factors to EJ populations may include long-term presence of new fixed structures, long-term increases in O&M related vehicle traffic, as well as long-term increases in employment. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Decrease in availability of affordable long-term housing due to in-migration of operations workers;
- Long-term presence of new fixed structures in the Lease Area;
- Long-term presence of new fixed structures onshore;
- Increase in O&M-related vehicle traffic;
- Long-term increase in local and regional government tax revenues;
- Long-term increase in O&M-related employment and income in the region; and
- Long-term increase in the demand for public services.

Decrease in availability of affordable long-term housing due to in-migration of operations workers. As discussed above in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the Project would employ an estimated 200 permanent operations workers, some of whom would likely relocate to the vicinity of the Onshore Project Area. The permanent relocation of this in-migrating workforce is not expected to noticeably affect local housing markets because there were more than 4,000 vacant housing units that were for rent or sale in Virginia Beach in 2018 (Table 4.4-3).

Long-term presence of new fixed structures in the Lease Area. The presence of new fixed Offshore Project Components within the Lease Area has the positive beneficial potential to attract new and/or additional marine users to the area. The WTGs may create a new demand for sightseeing trips and charter tours (Section 4.4.5, Recreation and Tourism). It is also expected that the WTGs and Offshore Substations may alter marine recreational usage as they present new navigational hazards.

It is possible that the Offshore Project Area would be used for recreational and/or commercial fishing by EJ populations. Commercial and recreational fishing would continue to be feasible during Project operation. In addition, Dominion Energy has attempted to site the Offshore Project Area where it would have the least impact on commercial and recreational fishing. Further, the addition of new fixed substrates (WTGs and scouring) would facilitate artificial reef building which may result in increases in the abundances for some species. We anticipate this may result in benefits for the certain commercial or recreational fisheries in the area (see Section 4.4.6, Commercial and Recreational Fishing, for additional information).

Section 4.3.4, Visual Resources, identifies those areas where the proposed WTGs could potentially be visible. The visual presence of offshore WTGs is not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7.

Long-term presence of new fixed structures onshore. The Switching Station would be constructed on a parcel north of Harpers Road or north of Princess Anne Road. The Switching Station site north of Harpers Road (Harpers Switching Station) is located in a Census block group with a potential minority population (Block Group 1, Census Tract 450; see Figure 4.4-7 and Table 4.4-11). The Switching Station site north of Princess Anne Road (Chicory Switching Station) is located in a Census block group that does not meet the criteria used to identify potential minority or low-income populations (Figure 4.4-7). The Switching Station would be constructed in an area where there were previously no structures and would generate some operational noises. Potential related impacts are discussed in Section 4.1.4, In-Air Acoustic Environment and Section 4.3.4, Visual Resources. These potential impacts are not expected to have disproportionately high and adverse impacts on the potential EJ populations identified in Table 4.4-11 and Figure 4.4-7. Other new fixed structures onshore include those related to the onshore transmission line. The potential impacts of the transmission line are presently being evaluated with six alternative routes currently under consideration (see Figure 4.4-6 and Figure 4.4-7). The current set of route alternatives reflects the results of public outreach to date, and communication and outreach with potential environmental justice communities is ongoing to better understand how communities may be affected (see Appendix EE and Section 4.4.2.3).

Increase in O&M-related vehicle traffic. A small increase in Project-related vehicle traffic around the Onshore Project Area and O&M facilities is anticipated during the O&M stage. The number of workers transiting to the onshore facilities is anticipated to be low. None of this traffic is expected to add a noticeable increase to existing traffic congestion or air emissions (see Section 4.1.3, Air Quality and Section 4.4.4, Land Transportation and Traffic) or result in disproportionately high and adverse impacts on the potential EJ populations.

Long-term increase in local and regional government tax revenues. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, O&M associated with the Project would generate an estimated $10.6 million in annual tax revenues for the state and local governments, with an

estimated $4.8 million paid to the Commonwealth of Virginia and $5.8 million paid to local governments in the Hampton Roads area and elsewhere in Virginia. State and local tax revenues fund many programs that may aid EJ populations. This potential impact would be long-term and beneficial.

Long-term increase in O&M-related employment and income in the region. As discussed in Section 4.4.1 Population, Economy, Employment, Housing, and Public Services, O&M associated with the Project would support an annual total of 1,110 jobs and $81.6 million in labor income in the Hampton Roads area each year the facility is in operation. Jobs and income would be supported throughout the local and regional economy, including positions occupied by potential environmental justice populations. These potential impacts would be small and beneficial.

Long-term increase in the demand for public services. As discussed in Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, the slight increase in workforce and operations activities would likely result in a correspondingly small increase in demand for public services. The four cities in the Study Area contain numerous law enforcement stations, fire departments, hospitals, and public schools, and is thus equipped with sufficient capacity such that O&M associated with the Project would not impact the availability of public services. Dominion Energy would coordinate with local fire and police departments as needed throughout the operations period of the Project. As a result, this anticipated increase in demand is unlikely to create a shortage of public services available to EJ populations.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. Decommissioning techniques are further 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, and potential impacts will be re-evaluated at that time.

4.4.2.3 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 (Table 4.4-12). 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 4.4-12. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term increase in construction vehicle traffic and activity	• Dominion Energy would coordinate with local fire and police departments as needed throughout construction of the Project; and • The Project would use existing roads, rights-of-way, and infrastructure where possible. • Communications and outreach to foster the meaningful public participation of potential
		Temporary shortage of affordable temporary housing due to increased demand	
		Short-term increase in tax revenues for state and local governments	

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
		Short-term increase in construction-related employment and income in the region and state	EJ communities is ongoing to better understand how communities may be affected and identify related mitigation measures.
		Short-term increase in the demand for public services	
Operations and Maintenance	Onshore and Offshore Project Area	Decrease in availability of long-term housing due to in-migration of operations workers	• Dominion Energy has attempted to site the Offshore Project Area where it would have the least impact on commercial fishing. Further, the addition of Offshore Project Components (WTGs and scouring) would facilitate natural reef building which can increase overall species abundance and diversity. This may have positive benefits for the fishing industries in the area; • Dominion Energy is committed to coexistence with commercial and recreational fishing and is conducting extensive outreach and engagement with the fishing community as part of this Project, which will assist in identifying additional environmental justice populations that may rely on the Offshore Project Area for fishing and who may require additional engagement; and • Dominion Energy would coordinate with local fire and police departments as needed throughout the operations period of the Project.
		Long-term presence of Offshore Project Components in the Lease Area (e.g., wind turbine generators [WTGs] and Offshore Substations)	
		Long-term presence of Onshore Project Components	
		An increase in operations and maintenance (O&M)-related vehicle traffic	
		Long-term increase in local and regional government tax revenues	
		Long-term increase in O&M-related employment and income in the region	
		Long-term increase in the demand for public services	

4.4.3 Land Use and Zoning

This section describes land use and zoning within and surrounding the Onshore Project Area. Potential impacts to land use and zoning resulting from construction, O&M, and decommissioning of the Onshore Project Area are discussed. This section also describes avoidance, minimization, and mitigation measures, proposed by Dominion Energy. Other assessments detailed within this COP, which are related to land use and zoning include:

- Wetlands and Waterbodies (Section 4.2.1);
- Land Transportation and Traffic (Section 4.4.4);
- Recreation and Tourism (Section 4.4.5); and
- Marine Transportation and Navigation (Section 4.4.7).

For the purposes of this section, the Land Use and Zoning Study Area (henceforth "Study Area") includes a 0.25 mi (0.40 km) buffer surrounding the Onshore Project Area.

This section was prepared in accordance with the cities of Virginia Beach and Chesapeake and applicable Virginia municipal codes and zoning ordinances. In addition, public data was obtained through the cities of Virginia Beach and Chesapeake to identify land uses within the Study Area.

4.4.3.1 Affected Environment

The affected environment is defined as areas where land use and zoning are known to occur and have the potential to be directly or indirectly affected by the construction, operations, and decommissioning of the Onshore Project Components. Existing commercial ports and construction staging areas are assessed in Section 4.4.7, Marine Transportation and Navigation, and not described further below, because associated Project uses would be consistent with the activities for which these facilities were permitted and developed.

Land Use

Virginia Beach is located in the Mid-Atlantic region in the southeastern corner of Virginia, bounded by the Chesapeake Bay to the north, the Atlantic Ocean to the east, North Carolina to the south, and the cities of Norfolk and Chesapeake, Virginia to the west. Chesapeake is located similarly in the southeastern corner of Virginia, bounded by Portsmouth to the north, Virginia Beach to the east, the State of North Carolina to the south, and Suffolk to the west. Generally, existing land uses in the Onshore Project Area include a mix of open water, developed land, undeveloped land, mixed forest land, shrub/scrub, and woody wetlands (Figure 4.4-8). A full graphic with Alternatives is provided in Section 3, Description of Proposed Activity. Additional descriptions of wetlands and open space uses in this area are further described in Section 4.2.1, Wetlands and Waterbodies, and Section 4.4.5, Recreation and Tourism, respectively. Across the Onshore Project Area, the developed land is a diverse mixture of low- and medium-intensity developed land (predominantly residential), in addition to commercial, industrial, institutional, and public uses.

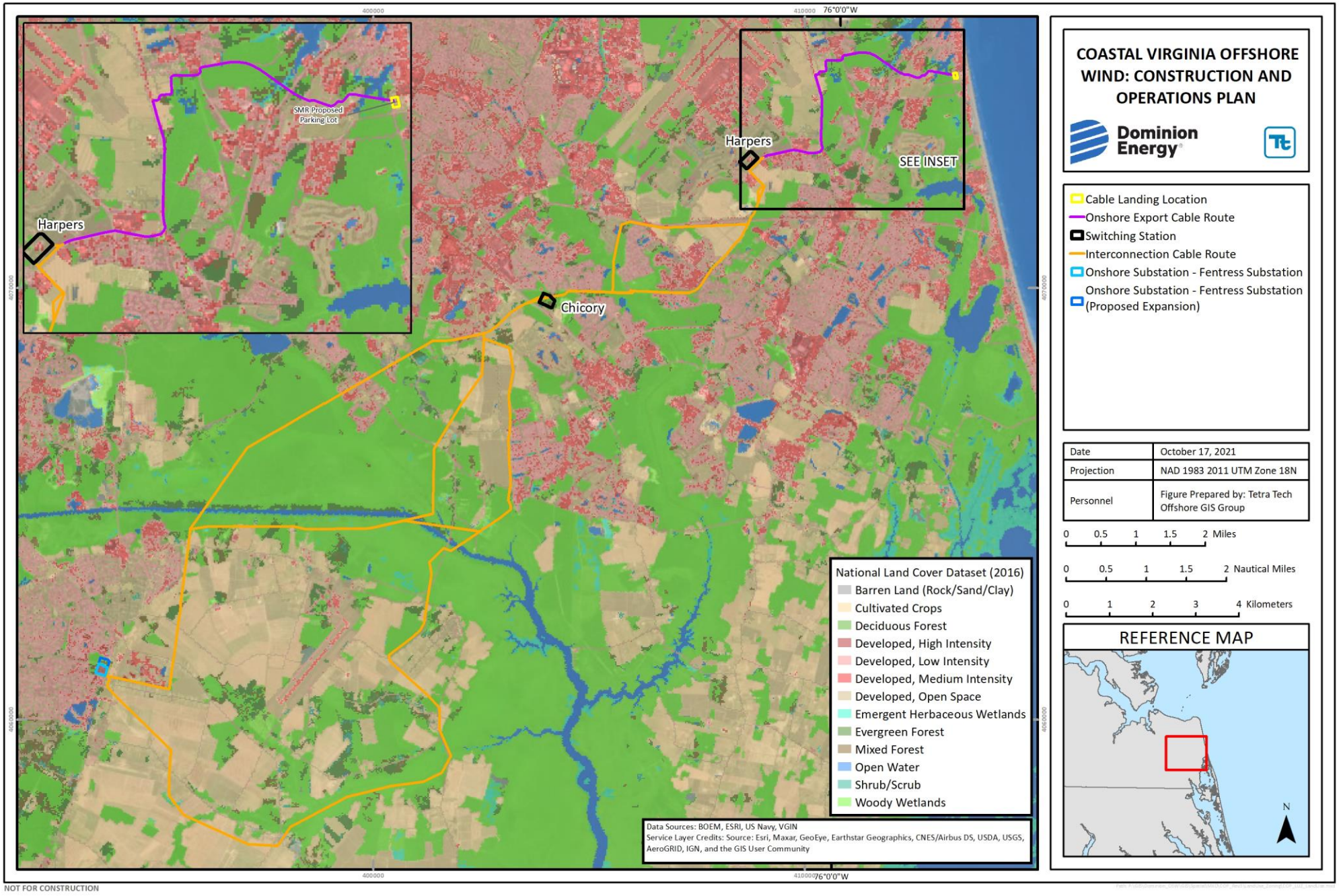


Figure 4.4-8. Land Use along the Project's Cable Landing Location, Onshore Export Cable Route, Switching Station, Interconnection Cable Route(s), and Onshore Substation

Cable Landing Location

As discussed in Section 2, Project Siting and Design Development, Dominion Energy identified the Cable Landing Location as the Proposed Parking Lot west of Firing Range at SMR. The Cable Landing Location is located on a future surface parking lot, which is designated as a commercial land use. This location would be suitable for the construction of the planned trenchless installation vaults or pits.

The SMR is a 325 ac (132 ha) site located along the Atlantic Ocean, approximately 2 mi (3 km) south of the main Virginia Beach oceanfront resort area. The SMR is owned by the Commonwealth of Virginia and is primarily used for on-site training of Virginia National Guard personnel, although it also is used by National Guard units from other states, components of the United States Armed Forces, and State and local civilian agencies when facilities are not in use by a military organization.

The Cable Landing Location is further discussed in Section 3, Description of Proposed Activity.

Onshore Export Cable Route Corridor

The Onshore Export Cable Route (all buried/underground) described in Section 3, Description of Proposed Activity, would be installed underground from the Cable Landing Location to a Common Location north of Harpers Road in Virginia Beach, Virginia. Table 4.4-13 provides conservative total acreages by land use for the Onshore Export Cable Route (illustrated in Figure 4.4-8). Onshore Project Components and the Onshore Export Cable Route were sited to avoid use of undeveloped land and maximize use of existing infrastructure to minimize impacts to the existing land uses.

The Onshore Export Cable Route would primarily traverse (or be buried within) low-intensity, medium-intensity, and open-space developed lands. In addition, the route follows relatively limited passage through cultivated cropland, deciduous forestland, emergent herbaceous wetlands, evergreen forestland, pastureland, open water, and woody wetlands. The Onshore Export Cable Route would utilize HDD below Lake Christine, General Booth Blvd. and a tidal tributary area west of General Booth Blvd., then align with existing public ROWs, to the extent practicable. A portion of Lake Christine is federally owned and part of the NAS Oceana Dam Neck Annex. See Table 4.4-13 for conservative total acreage by land use.

Table 4.4-13. Land Use Acreage for the Onshore Project Area

Route Alternative			Land Use (Acres) a/													Total Area
Onshore Project Component	Route Name	Construction Type	Cultivated Crops	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Emergent Herbaceous Wetlands	Evergreen Forest	Hay/ Pasture	Mixed Forest	Open Water	Shrub/ Scrub	Woody Wetlands	
Cable Landing Location	Cable Landing Location	Aboveground / Underground	0	0	0	0.32	0.22	2.29	0	0	0	0	0	0	0	2.83
Onshore Export Cable Route	Onshore Export Cable Route	Underground	2.03	0.62	0.00	12.59	4.42	25.81	1.23	4.21	0.31	0.47	2.30		11.99	65.98
Harpers Switching Station	Harpers Switching Station	Aboveground	0	0	0	1.44	2.16	15.88	0	0	0	0.32	0	0	0.85	20.65
Chicory Switching Station	Chicory Switching Station	Aboveground	3.05	0	0	0.54	0.00	0.24	0	4.61	0	5.56		0.52	18.17	32.68
Interconnection Cable Route	Harpers Road to Fentress Alternative 1	Overhead	75.43	1.75	0.15	13.71	2.83	37.33	0.99	6.63	2.54	4.74	1.41	1.28	105.23	254.03
	Harpers Road to Fentress Alternative 2		94.90	1.42	0.15	8.19	2.40	31.73	0.35	8.57	0.32	5.12	1.69	0.04	110.56	265.46
	Harpers Road to Fentress Alternative 3		96.21	1.42	0.15	8.04	3.46	30.19	0.55	7.24	0.32	6.63	1.69	0.04	115.55	271.51
	Harpers Road to Fentress Alternative 4		111.43	3.74	0.15	8.81	2.70	33.08	1.87	11.24	0.28	4.62	6.58	0.73	110.30	295.53
	Harpers Road to Fentress Alternative 5		149.50	2.67	0.15	7.16	1.64	28.70	3.03	4.93	2.11	2.79	0.83	0.73	138.57	342.81
	Harpers Road to Fentress Hybrid Alternative 6	Overhead/ Underground	67.60	1.76	0.15	13.98	2.60	34.55	0.99	6.75	2.38	4.75	1.41	1.28	103.15	241.35
Onshore Substation	Onshore Substation	Aboveground	0.45	0	8.74	1.37	1.87	0.10	0	0.85	0	2.34	0	0	4.84	20.56

Note: a/ Acreages provided are conservative, as they are inclusive of the full construction rights-of-way (ROW) and not just areas of actual ground disturbance.

Switching Station

The Switching Station for Interconnection Cable Route Alternatives 1 through 5 (Harpers Switching Station) is located north of Harpers Road. The parcel is located on what is currently classified as deciduous forestland, developed open space, and low- and medium-intensity development. The area surrounding the Harpers Switching Station parcel is also made up of the same land classifications, with cultivated crop land to the north, east, and west, and woody wetlands to the south.

The Switching Station for the Hybrid Interconnection Cable Route Alternative 6 (Chicory Switching Station) is located north of Princess Anne Road. The parcel is located on a what is currently classified as woody wetlands and mixed forest. The area surrounding the Chicory Switching Station parcel is also made up of woody wetlands, mixed forest, and evergreen forest with low-intensity development to the north and an existing roadway to the southwest.

Interconnection Cable Route Corridors

The six Interconnection Cable Route Alternatives that connect the Switching Station to the Onshore Substation are correspondingly referred to below as Overhead Interconnection Cable Route Alternatives 1 through 5 with a sixth Hybrid Alternative. The six Alternatives are referred to in this section as:

- Harpers Road to Fentress 1 (Overhead Interconnection Cable Route Alternative 1);
- Harpers Road to Fentress 2 (Overhead Interconnection Cable Route Alternative 2);
- Harpers Road to Fentress 3 (Overhead Interconnection Cable Route Alternative 3);
- Harpers Road to Fentress 4 (Overhead Interconnection Cable Route Alternative 4);
- Harpers Road to Fentress 5 (Overhead Interconnection Cable Route Alternative 5); and
- Harpers Road to Fentress 6 (Hybrid [Underground/Overhead] Interconnection Cable Route Alternative 6).

Interconnection Cable Route Alternatives 1 through 5 would be entirely overhead and are further described in Section 3, Description of Proposed Activity. In addition, Alternative 6 is a hybrid route; a combination of underground and overhead routes, which is also further described in Section 3.

The Study Area encompassing these alternatives lies within portions of the heavily developed cities of Virginia Beach and Chesapeake and includes portions of the Gum Swamp, associated with the North Landing River wetlands complex, and more rural areas in the south as described in Section 3, Description of Proposed Activity, and in Section 4.2.1, Wetlands and Waterbodies. It encompasses very dense residential and commercial developments, large and numerous publicly owned lands, forested wetlands, major watercourses and associated floodplains, the Intracoastal Waterway, agricultural fields, military airport facilities, sports complexes, and golf courses.

The northeast portions of the Interconnection Cable Route Alternatives start within cultivated cropland and continue through residential neighborhoods consisting of single-family homes set on approximately 0.20 ac (0.08 ha) lots. To the south and west of these neighborhoods are more densely developed residential neighborhoods, several city-owned parks, and recreation areas bisected by a number of wetlands and streams and the Intracoastal Waterway. Near the border of the cities of Virginia Beach and Chesapeake,

land use becomes less dense; to the south, there is an extensive area of forested wetlands known as Gum Swamp. Across the Intracoastal Waterway, development ceases upon entry into the City of Chesapeake as land transitions into the dense wetlands and forests of Gum Swamp and more open rural areas. Further to the southwest, less densely developed areas of the City of Chesapeake are characterized by larger residential lots and agricultural fields.

Overhead Interconnection Cable Route Alternatives

The northeast portion of Overhead Interconnection Cable Route Alternatives 1 and 2 falls within suburban residential areas and the NAS Dam Neck Annex. Overhead Interconnection Cable Route Alternatives 1 and 2 would primarily traverse cultivated cropland, open-space developments, and woody wetlands (including portions of the Gum Swamp and North Landing River) (see Table 4.4-13 for land use acreage). Both Overhead Interconnection Cable Route Alternatives 1 and 2 also would involve relatively limited passage through low- and medium-intensity developments; evergreen, deciduous, and mixed forests; open water; and emergent herbaceous wetlands. These Interconnection Cable Route Alternatives would traverse the listed land use types in slightly differing ratios, and Interconnection Cable Route Alternative 1 would additionally pass through developed, high intensity land uses, while Interconnection Cable Route Alternative 2 would not. Alternative 4 traverses through more cultivated crop land and deciduous forest than Alternative 2. It does, however, impact less hay/pastureland than Alternative 2 (see Table 4.4-13 for land use acreage). Out of all of the alternatives, Alternative 5 disturbs the most cultivated cropland, emergent herbaceous wetlands, hay/pastureland, and wooded wetlands compared to Alternatives 1 through 4.

Overhead Interconnection Cable Route Alternatives are further described in Section 3, Description of Proposed Activity.

Hybrid Interconnection Cable Route

The Hybrid Interconnection Cable Route Alternative 6 has a similar path to Route Alternative 1 and would primarily traverse cultivated cropland, developed open space, and woody wetlands (including portions of the Gum Swamp and North Landing River). This alternative would impact low- and medium-intensity developments and mixed forests to varying degrees (see Table 4.4-13 for land use acreage), and would involve relatively limited passage through open water, deciduous and evergreen forest, hay/pastureland, and emergent herbaceous and shrub/scrub wetlands. The ratios of overhead to underground cable traversing land use types are further detailed in Table 4.4-13.

Onshore Substation

The Onshore Substation site is located off of Fentress Loop on what is currently designated as low density residential. As this site already has an existing substation, the upgrades/expansion to the Onshore Substation will be consistent with the existing uses on site. The parcel is partially developed but surrounded by wooded and wetland areas to the north, east, south, and west. Forested wetlands are present in the west and north. Existing residential neighborhoods with large, single-family homes have been sited to the north, south, and west, with agricultural land to the east. There are also existing overhead transmission lines to the north and northeast of the Onshore Substation site. Notable features near the Onshore Substation include the Battlefield Golf Club and Naval Auxiliary Landing Field Fentress.

Zoning

The Cable Landing Location is located within the P-1 Preservation Zoning District of Virginia Beach (City of Virginia Beach 2008, 2017). The Onshore Export Cable Route would traverse industrial, business, residential, and agricultural districts as shown in Figure 4.4-9 and on the City Zoning Grid Reference Map (City of Virginia Beach 2008, 2017). The Harpers Switching Station is located in an Industrial District and the Chicory Switching Station is located in an Agricultural District (City of Virginia Beach 2008, 2017). In addition, the Onshore Substation parcel is also zoned A-1 Agricultural. The Interconnection Cable Route Alternatives would travel from a Common Location north of Harpers Road to the Onshore Substation, where they would traverse mainly industrial, residential, and agricultural land.

The cities of Virginia Beach and Chesapeake have developed Comprehensive Plans for their city. The Comprehensive Plans are typically implemented through zoning ordinances that dictate the type of development that is permissible in different areas of the city. In order to implement a zoning use in a district that currently does not allow a specific use, a Conditional Use Permit is typically submitted to local Zoning Department for review and approval. Under Virginia law, if a public utility is granted a Certificate of Public Convenience and Necessity from the Virginia State Corporation Commission, the Certificate of Public Convenience and Necessity approval shall be deemed to satisfy the requirements of all local zoning ordinance (§ 56-265.2). No additional discussion of local zoning or local zoning requirements is included in this document.

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

The potential impacts resulting from construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For land use, the maximum design scenario from a regional perspective is the construction associated with the Onshore Export Cable, construction of the Switching Station, installation of the Interconnection Cable, and expansion/upgrades to the Onshore Substation.

Construction

During construction of the Onshore Project Components, the impact-producing factor related to land use and zoning may include disruption to existing land uses at the Cable Landing Location, and along ROWs due to installation of the Onshore Export Cable and Interconnection Cable. 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 factor identified above:

- Short-term disruption to adjacent land uses at the Cable Landing Location and along the Onshore Export Cable Route and Interconnection Cable Route Corridors, including recreational uses associated with the SMR property within the Onshore Export Cable Route; and
- Direct disturbance during construction and installation of the Onshore Export Cable Route, Switching Station, Interconnection Cable Route, and Onshore Substation.

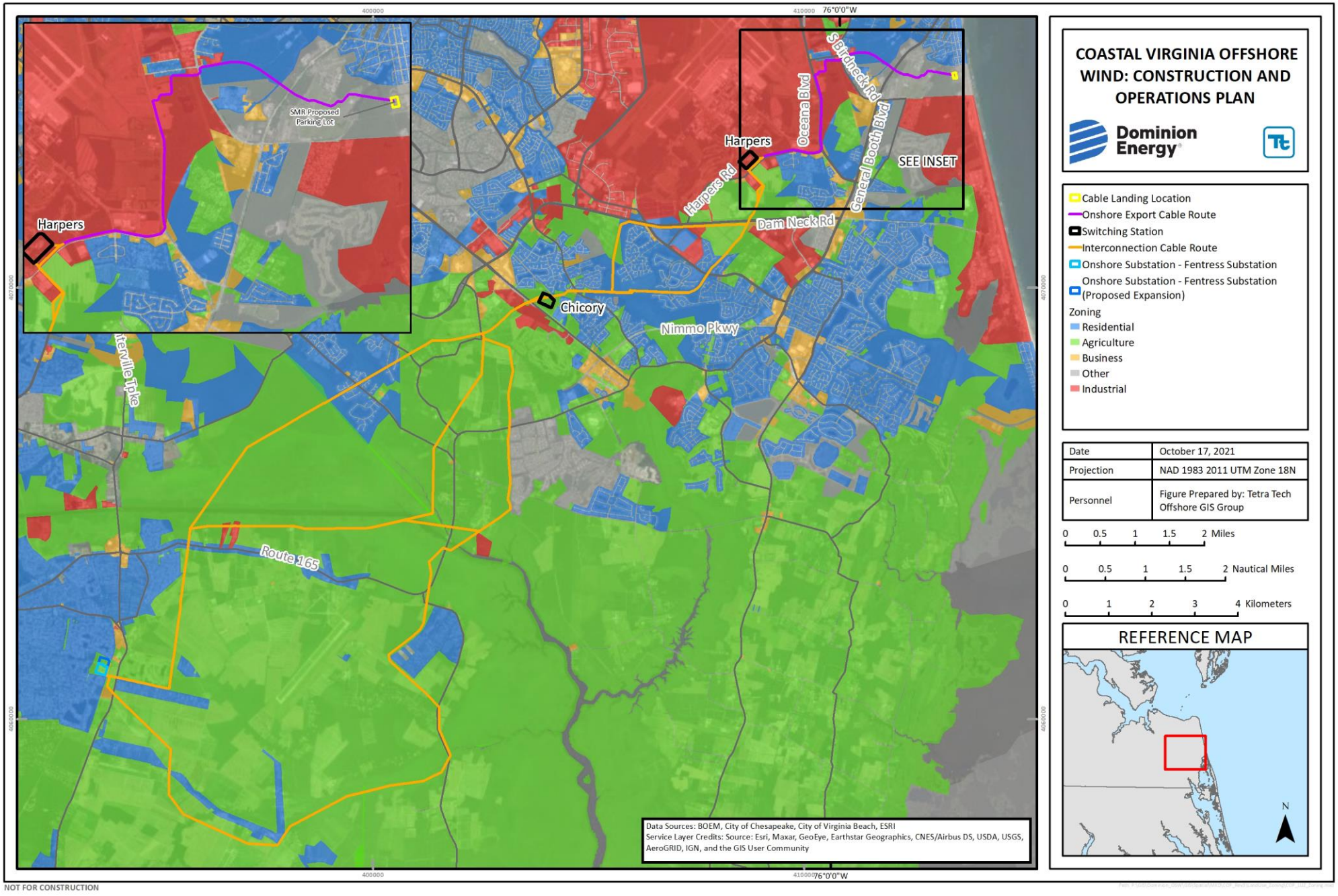


Figure 4.4-9. Zoning along the Project's Cable Landing Location, Onshore Export Cable Route, Switching Station, Interconnection Cable Route(s), and Onshore Substation

Short-term disruption to adjacent land uses at the Cable Landing Location and along the Onshore Export Cable Route and Interconnection Cable Route Corridors, including recreational uses associated with the SMR property within the Onshore Export Cable Route Corridor. The Cable Landing Location is sited at the Proposed Parking Lot west of Firing Range at SMR. Construction activities along the Onshore Export Cable Route may cause short-term impacts to beach access within the SMR during the construction period at this location. To avoid disruption of recreational uses, installation of the Onshore Export Cable would be coordinated with localities and stakeholders to avoid and minimize potential impacts to recreational and tourism uses to the extent practicable. Once construction is complete, the roads and parking lots would be restored to previous conditions.

To further minimize potential construction effects, adjacent landowners would be provided timely information regarding the planned construction activities and schedule, and work also would be coordinated with the appropriate regulatory agencies. Dominion Energy would provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools. Potential impacts to traffic are addressed in Section 4.4.4, Land Transportation and Traffic.

Temporary safety zones would be implemented around construction activities to ensure the safety of the public. As the Onshore Project Area will utilize either previously disturbed lands, or trenchless installation, impacts resulting from construction activities would be minimized to the extent practicable. Existing land uses may be temporarily restricted by the application of these safety zones; Dominion Energy would provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools. Some recreational access would be restricted within the SMR during construction. Impacts resulting from construction activities would be minimized to the extent practicable in order to limit the extent and duration of disturbance.

Direct disturbance during construction and installation of the Onshore Export Cable Route, Switching Station, Interconnection Cable Route, and Onshore Substation. The installation corridor for the Onshore Export Cable Route would be a maximum of 86.5 ft (26.4 m) wide and impact up to 66 ac (26.7 ha) of land. The Overhead Interconnection Cable Route Alternatives cross city-owned land- notably by housing, recreational facilities, and the Virginia Beach National Golf Club. The installation corridor is predominantly located within existing roadways to minimize impacts to land use and zoning; where HDD is proposed, the entry and exit pits will be located on previously disturbed lands and along roadways, where practicable. However, the Project would traverse the SMR and Dam Neck Annex, including Lake Christine, which could temporarily disturb some recreational and institutional uses on the property during HDD activities. Any additional temporary staging areas necessary to support onshore construction activities are anticipated to be located on either previously disturbed lands or within the area of disturbance for construction, to the extent practicable.

Once construction is complete, the Onshore Export Cable Route Corridor would be restored to pre-construction conditions.

Construction of the Switching Station would result in disturbance of up to approximately 32.7 ac (13.2 ha) of land. During construction, the Project would additionally involve temporary construction laydown area(s). The portion of the parcel not required for long-term operation of the Onshore Substation would be restored to previous conditions once construction is complete.

All Interconnection Cable Route Alternatives except for Route 5 have the potential to cross federal land under the jurisdiction of the USACE and the Albemarle & Chesapeake Canal Historic District, which is eligible for listing in the National Register of Historic Places. Cable Route Alternatives Route 5 crosses Navy lands associated with Naval Auxiliary Landing Field Fentress.

Operations and Maintenance

During O&M of the Onshore Project Components, the impact-producing factor related to land use and zoning may include O&M activities associated with the Onshore Export Cable, Switching Station, Interconnection Cable, and the Onshore Substation. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factor identified above:

- Long-term conversion of land for the access to facilities of Onshore Export Cable Route, Switching Station, Interconnection Cable Route, and the Onshore Substation.

Long-term conversion of land for the access facilities of Onshore Export Cable Route, Switching Station, Interconnection Cable Route, and the Onshore Substation. During O&M, it is anticipated that any long-term maintenance activities concerning the Switching Station and Onshore Substation would occur within the site boundaries, thus not impacting adjacent land uses or property. In addition, minimal impacts on land use are anticipated to occur from the maintenance of the Onshore Export Cable Route, as cabling would be located underground; therefore, adjacent land uses to the Onshore Export Cable Route Corridor would not be permanently disturbed.

Although any maintenance of underground cables within the SMR has the potential to temporarily impact recreational use, it is not anticipated that this maintenance would be extensive. As such, the existing landscape along the Onshore Export Cable Route would be preserved, and the Project would not present any excessive conflict with present or future planned uses within the Onshore Project Area.

The O&M for the Interconnection Cable from the Switching Station to the Onshore Substation would utilize existing roads and public ROWs where available and would be adjacent to existing aboveground utility cables, to the extent practicable. The Onshore Substation is an existing substation that will require upgrades and expansion; therefore, connecting to this substation would not change the existing land use or zoning of the site. It is anticipated that little to no adjacent land uses would be displaced outside the ROW and existing zoning would not need to be altered in order to allow for construction and O&M of the Interconnection Cable. While the upgrades are anticipated to occur within the existing ROW and property lines, additional land purchase may be required. As such, if necessary, permitting, regulatory actions, and other actions would be taken in the future for development of the Interconnection Route as part of the Preferred Alternative if direct land use displacement, land acquisitions, or re-zonings are required. It is important to note, however, that pursuant to Va. Code § 56-46.1(F), approval of the electric transmission line portions of the Interconnection Cable Route (i.e., the Onshore Export Cable and Interconnection Cable) under state law is "deemed to satisfy the requirements of [Va. Code] § 15.2-2232 and local zoning ordinances with respect to such transmission line[s]." Thus, while land acquisitions related to the ROW will be necessary, such actions would not require re-zoning or any local zoning approvals. Beyond the land acquisition process, Dominion Energy intends to coordinate with permitting authorities and stakeholders to identify what, if any, land use may continue within land acquired for the Interconnection Route, as well as any

additional mitigation measures that may be appropriate related to impacts to local land use and resources during construction and O&M.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. 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, and potential impacts will be re-evaluated at that time.

4.4.3.3 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 (Table 4.4-14). Dominion Energy will 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 4.4-14. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term disruption to adjacent land uses at the Cable Landing Location and along the Onshore Export Cable Route and Interconnection Cable Route Corridors, including recreational uses associated with the State Military Reservation (SMR) property within the Onshore Export Cable Route Corridor	• To avoid disruption of recreational uses, installation of the Onshore Export Cable would be coordinated with localities and stakeholders to avoid and minimize potential impacts to recreational and tourism uses to the extent practicable. Once construction is complete, the roads and parking lots would be restored to previous conditions; • To further minimize potential construction effects, adjacent landowners would be provided timely information regarding the planned construction activities and schedule, and work also would be coordinated with appropriate regulatory agencies. Dominion Energy would provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools. Potential impacts to traffic are addressed in Section 4.4.4, Land Transportation and Traffic; • Temporary safety zones would be implemented around construction activities to ensure the safety of the public; • Dominion Energy would provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools; • Any additional temporary staging areas necessary to support onshore construction activities are anticipated to be located on either previously disturbed lands or within the area of disturbance for construction, to the extent practicable; and • During construction, the Project would additionally involve temporary construction laydown area(s). The portion of the parcel not
		Direct disturbance during construction and installation of the Onshore Export Cable Route, Switching Station, Interconnection Cable Route, and Onshore Substation	

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
			required for long-term operation of the Onshore Substation would be restored to previous conditions once construction is complete.
Operations and Maintenance	Onshore Project Area	Long-term conversion of land for the access to facilities of Onshore Export Cable, Switching Station, Interconnection Cable Route, and the Onshore Substation	• If necessary, permitting, regulatory actions, and other actions would be taken in the future for development of the Interconnection Route as part of the Preferred Alternative if direct land use displacement, land acquisitions, or re-zonings are required; and • Dominion Energy intends to coordinate with permitting authorities and stakeholders to identify what, if any, land use may continue within land acquired for the Interconnection Route, as well as any additional mitigation measures that may be appropriate related to impacts to local land use and resources during construction and operations and maintenance.

4.4.4 Land Transportation and Traffic

The following section describes potential impacts to land transportation and traffic resulting from construction, O&M, and decommissioning of the Project and the proposed Project-related measures adopted by Dominion Energy to avoid, minimize, and/or mitigate potential impacts to land transportation and traffic. Other resources and recent assessments detailed within this COP that are related to land transportation and traffic include:

- Population, Economy, Employment, Housing, and Public Services (Section 4.4.1);
- Land Use and Zoning (Section 4.4.3);
- Marine Transportation and Navigation (Section 4.4.7);
- Aviation and Radar (Section 4.4.10).

4.4.4.1 Affected Environment

The affected environment is defined as the areas of the Onshore Project Area that have the potential to be directly affected by the construction, O&M, and decommissioning stages of the Project. For the purposes of this section, the Transportation and Traffic Study Area is an assessment of the areas in the immediate vicinity of the Onshore Project Area (see Figure 4.4-10 and Figure 4.4-11). Average annual daily traffic (AADT) volumes were reviewed on the Onshore Project Area roadways, where available, to gain an understanding of potential Project-related traffic impacts. Ports used for staging, construction, and/or for O&M purposes are not discussed in this section (see Section 3, Description of Proposed Activity, for a full list of potential ports).

Cable Landing Location to a Common Location north of Harpers Road—Onshore Export Cable Route

The Cable Landing Location would be located at the Proposed Parking Lot west of Firing Range at SMR. The Onshore Export Cable Route from the Cable Landing Location to a Common Location north of Harpers Road would include a HDD below Lake Christine, through SMR land, to General Booth Boulevard and Oceana Boulevard before it would proceed south, then head west along Harpers Road to the Switching Station (either north of Harpers Road [Harpers Switching Station] or north of Princess Anne Road [Chicory Switching Station], Figure 4.4-10).

The AADT volume referenced in this section is defined as an estimated average daily traffic volume used by both federal and state agencies to report traffic volumes on roadway segments. However, actual daily traffic volumes encountered on the Onshore Project Area roadways may vary from the AADT. AADT volumes are collected from traffic count stations using sensors in the roadway and are based on the yearly average for continuously counting sites or a 48-hour average volume adjusted using continuous count data (City of Virginia Beach 2020). The AADT is calculated by multiplying the 24-hour volume count by applicable month/day seasonal factors and axle-correction factors (City of Virginia Beach 2020). Considerably higher or lower values may result in areas with seasonal variation in population and activity.

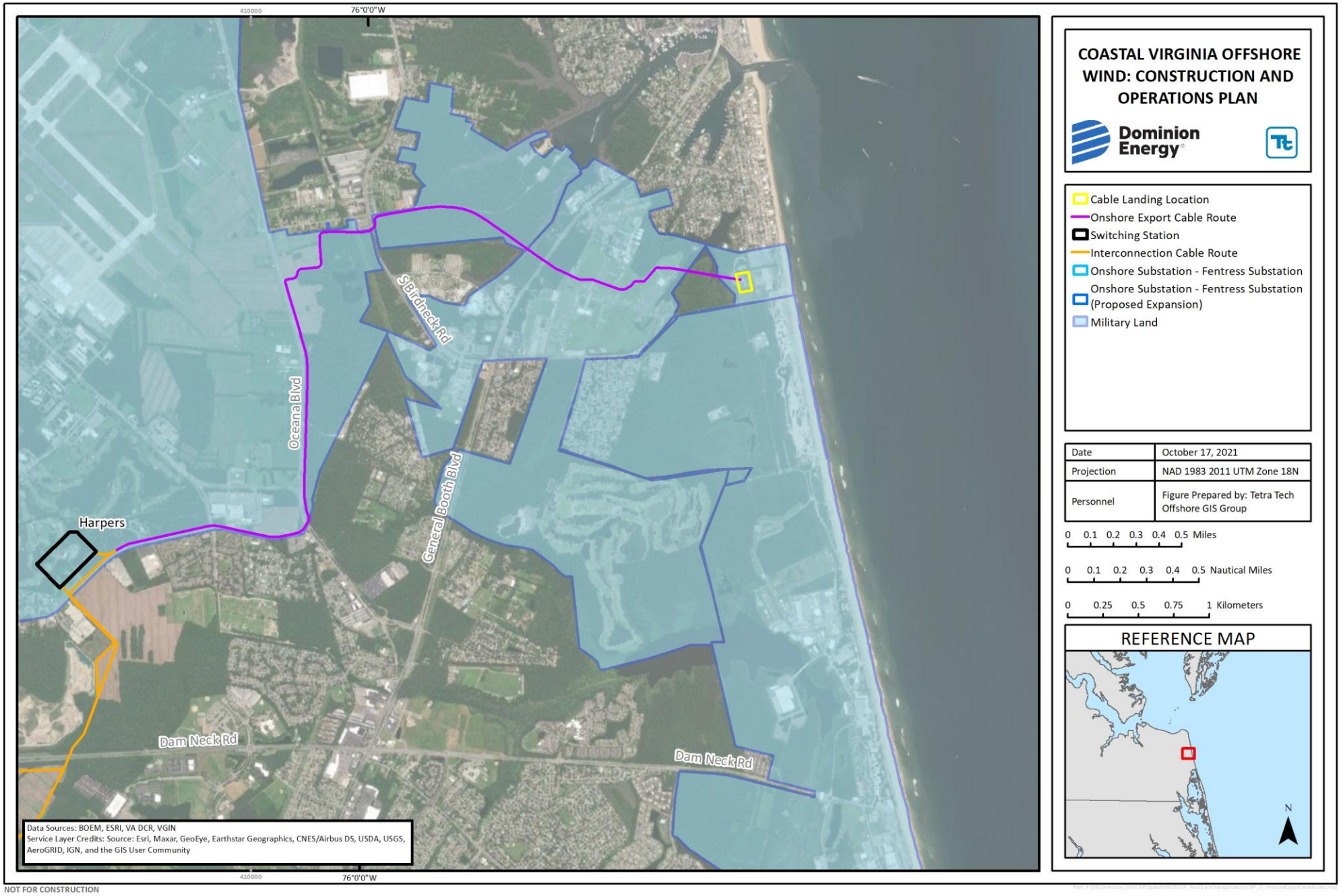


Figure 4.4-10. Onshore Project Area—Cable Landing Location to Harpers Road

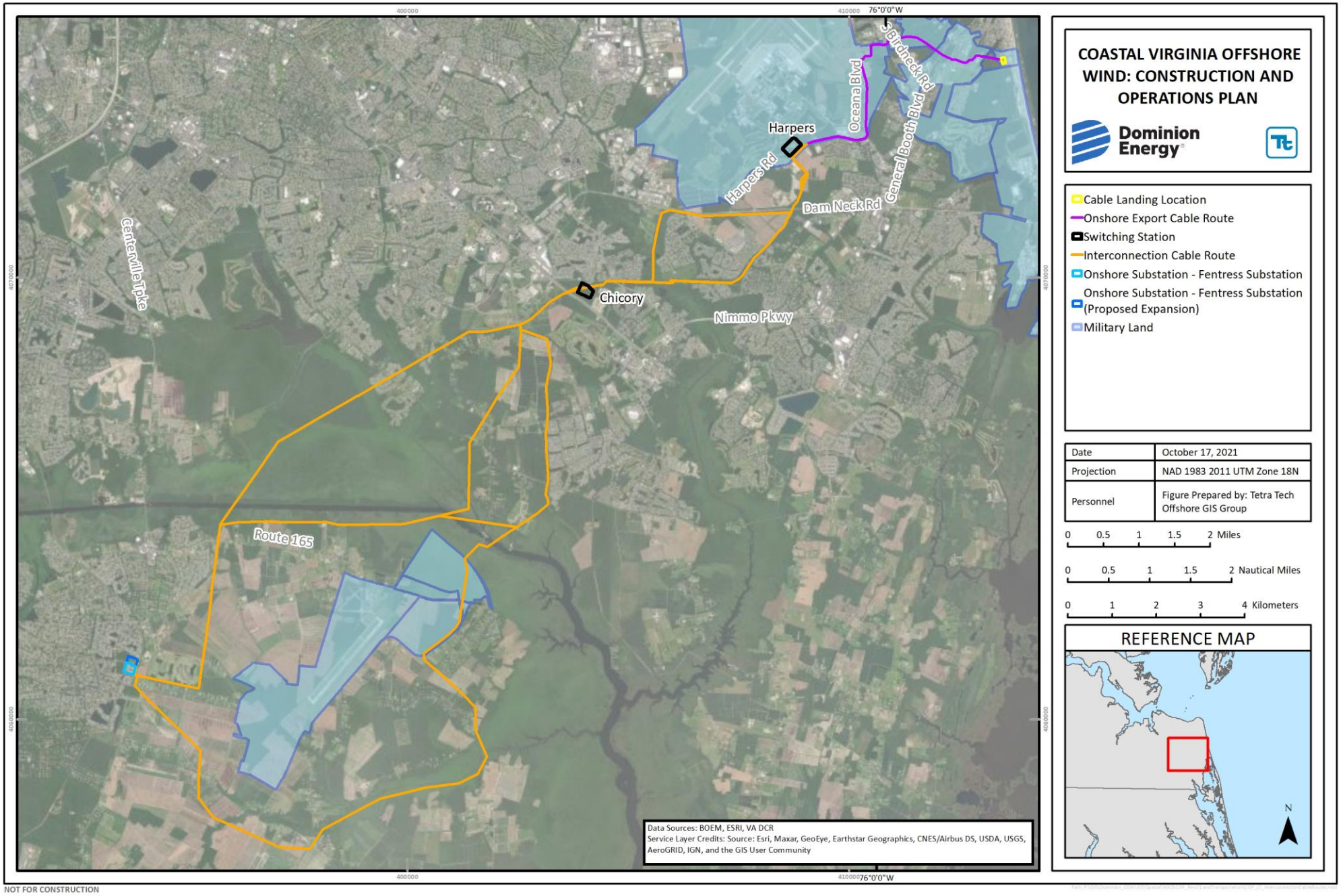


Figure 4.4-11. Onshore Project Area—Harpers Road to Onshore Substation

The AADT volumes are reported in vehicles per day (VPD) and were identified for the following roadways that may be impacted by the Onshore Export Cable Route construction:

- South Birdneck Road west of General Booth Boulevard (2019): 13,320 VPD;
- General Booth Boulevard north of South Birdneck Road (2019): 14,910 VPD; and
- Oceana Boulevard north of Harpers Road (2019): 32,320 VPD.

Harpers Road to Onshore Substation—Interconnection Cable Route

The Interconnection Cable Route will transfer the electricity from a Common Location north of Harpers Road to the Onshore Substation at Fentress (the POI) and would be overhead from the Harpers Switching Station (Interconnection Cable Route Alternatives 1 through 5) or the Chicory Switching Station (Interconnection Cable Alternative 6, Hybrid) to the Onshore Substation via one of six potential alternatives as shown in Figure 4.4-11. The Interconnection Cable Route Alternatives would either cross, or be collocated with, the roadways listed in Table 4.4-15, which also shows the AADT volumes reported in vehicles per day, identified for roadways that may be impacted by the Interconnection Cable Route construction.

Table 4.4-15. Daily Traffic Volume Summary—Interconnection Cable Route

Location	Year	AADT (VPD) a/
Dam Neck Road east of Harpers Road	2019	19,455
Dam Neck Road west of Harpers Road		36,325
Route 165 west of Nimmo Parkway		31,020
Salem Road north of Highland Drive		3,000
Landstown Road east of Salem Road		2,625
Salem Road south of Landstown Road		5,190
Route 603 north of Dewberry Lane		8,800
Route 603 between North Landing Road and West Neck Road		5,255
North Landing Road south of Route 603		10,710
Route 165 west of Fentress Airport Road		11,000
Route 165 east of Centerville Turnpike South		10,000

Note:
a/ AADT = Average annual daily traffic; VPD= Vehicles per day

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For land transportation and traffic, the maximum design scenario from a regional perspective is the construction associated with the installation of the Onshore Export Cable, construction of the Switching Station, installation of the Interconnection Cable, and upgrades/expansions to the Onshore Substation. The parameters provided in the table represent the maximum potential Project-related impacts on land transportation and traffic within the Onshore Project Area.

Construction

During construction, the potential impact-producing factors to land transportation and traffic may include construction of the Onshore Project Components within the Onshore Project Area, including duct banks and splice bays (installation techniques include open cut trenching and trenchless installation for cable crossings and/or landfall); construction of underground Onshore Export Cables and Interconnection Cables within, or alongside, existing roadways; construction of the Switching Station; and upgrades/expansions to the Onshore Substation at the POI. 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 increase in Project-related construction vehicle traffic, including workforce commuting trips; and
- The temporary modification of roadway traffic patterns because of lane closures, street closures, and travel restrictions (e.g., one-way traffic, alternating traffic).

Short term increase in Project-related construction vehicle traffic, including workforce commuting trips. An increase in Project-related construction, support, and workforce vehicle traffic along the Onshore Export Cable Route, Interconnection Cable Route, and around the Switching Station and Onshore Substation sites is anticipated during construction (for additional information on anticipated workforce see Section 4.4.1, Population, Economy, Employment, Housing, and Public Services). The potential impact of construction vehicle traffic on land transportation and local traffic during construction of the Onshore Project Components is anticipated to be negligible and similar in nature to other utility installations or road improvement work carried out within the Onshore Project Area. Dominion Energy would develop a Traffic Management Plan (TMP) in coordination with, and approved by, the affected federal, state, and local agencies as applicable to offset any anticipated traffic-related impacts associated with increased vehicle demand during construction. As part of the preparation of the TMP, Dominion Energy would coordinate with local and state transportation and public works departments to identify any planned roadway improvements that may impact traffic operations within the Transportation and Traffic Study Area. The TMP would include, but not be limited to, the development of vehicular travel routes to and from the Project construction site; provision of highly visible markings, signage, and lighting of active construction sites; provision of sufficient on-site parking; and implementation of temporary, localized construction zones to minimize areas or sections of road closure. Additionally, Dominion Energy would provide regular updates to the local community through social media, public notices, and other appropriate communications methods and schedule construction activities to minimize impacts to the summer peak tourism season to the extent practicable where appropriate and as deemed necessary by local authorities.

The temporary modification of roadway traffic patterns because of lane closures, street closures, and travel restrictions (e.g., one-way traffic, alternating traffic). Installation of the Onshore Export Cable, the Switching Station, Interconnection Cables, and upgrades/expansion to the Onshore Substation could result in the temporary closure of roads, sections of roads (e.g., traffic lanes), and/or temporary use of parking lots at various points during construction. Roadways would not be closed and/or blocked for long periods of time to allow for local vehicular traffic patterns to be maintained to the greatest extent practicable. The parking lot associated with the Cable Landing Location may be closed for the duration of construction and installation activities; however, Dominion Energy would develop a TMP that would offset any

anticipated traffic-related impacts associated with increased vehicle demand during construction in the same manner as described above for Project-related construction vehicle traffic.

Operations and Maintenance

During O&M, the potential impact-producing factors to land-based transportation and traffic uses may include O&M activities associated with the Onshore Export Cable and Interconnection Cables, Switching Station, and upgrades/expansions to the Onshore Substation. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M.

The following impacts may occur as a consequence of the factors identified above:

An increase in O&M vehicle traffic, including workforce commuting trips. An increase in Project-related vehicle traffic in the vicinity of the Switching Station and the Onshore Substation sites is anticipated during the O&M stage of the Project. Routine O&M activities along the Onshore Export Cable and Interconnection Cable Routes are not anticipated to result in a measurable increase in maintenance vehicle traffic. The number of workers traveling to the O&M Facility, Switching Station, and Onshore Substation sites is anticipated to be low and impacts to local traffic are not expected. The increase in the number of staff traveling to the O&M Facility is not expected to add a noticeable increase to traffic congestion. See Section 4.4.1, Population, Economy, Employment, Housing, and Public Services, for additional information on the anticipated workforce. The Switching Station and Onshore Substation would be unmanned during routine O&M and would only be inspected periodically. Therefore, the Switching Station and Onshore Substation are not expected to add a noticeable increase to existing traffic. Personnel would be on site as necessary for any maintenance and repairs. Dominion Energy also proposes that the Switching Station and Onshore Substation contain sufficient on-site parking to support onshore O&M workers, which would further avoid, minimize, and mitigate potential traffic and parking impacts to the public. Dominion Energy would develop a TMP that would offset any anticipated traffic-related impacts associated with increased vehicle demand during construction in the same manner as described above for Project-related construction vehicle traffic.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. 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, and potential impacts will be re-evaluated at that time.

4.4.4.3 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 4.4-16). Dominion Energy will 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 4.4-16. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term increase in Project-related construction vehicle traffic, including workforce commuting trips Temporary modification of roadway traffic patterns due to lane closures, street closures, and travel restrictions (e.g., one-way traffic, alternating traffic)	• Dominion Energy would develop a Traffic Management Plan (TMP) in coordination with, and approved by, the affected federal, state, and local agencies as applicable to offset any anticipated traffic-related impacts associated with increased vehicle demand during construction. As part of the preparation of the TMP, Dominion Energy would coordinate with local and state transportation and public works departments to identify any planned roadway improvements that may impact traffic operations within the Transportation and Traffic Study Area. The TMP would include, but not be limited to, the development of vehicular travel routes to and from the Project construction site; provision of highly visible markings, signage, and lighting of active construction sites; provision of sufficient on-site parking; and implementation of temporary, localized construction zones to minimize areas or sections of road closure: and • Dominion Energy would provide regular updates to the local community through social media, public notices, and other appropriate communications methods and schedule construction activities to minimize impacts to the summer peak tourism season to the extent practicable where appropriate and as deemed necessary by local authorities.
Operations and Maintenance	Onshore Project Area	An increase in operation and maintenance vehicle traffic, including workforce commuting trips	• Dominion Energy would develop a TMP that would offset any anticipated traffic-related impacts associated with increased vehicle demand during construction in the same manner as described above for Project-related construction vehicle traffic.

4.4.5 Recreation and Tourism

This section describes the existing and potential recreation and tourism uses within and surrounding the Project Area. The Project Area is described in detail in Section 3, Description of Proposed Activity. Potential recreation and tourism uses include recreational fishing, fishing tournaments, recreational boating, wildlife viewing, diving, beachgoing and other waterborne activities, waterfront festivals, biking, freshwater fishing, and general use of open park space. Potential impacts to these uses resulting from construction, O&M, and decommissioning of the Project are discussed. Avoidance, minimization, and mitigation measures proposed by Dominion Energy are also described in this section. Other resources and assessments detailed within this COP, which are related to recreation and tourism, include:

- Land Use and Zoning (Section 4.4.3);
- Commercial and Recreational Fishing (Section 4.4.6);
- Other Coastal and Marine Uses (Section 4.4.11); and
- Navigation Safety Risk Assessment (Appendix S).

For the purposes of this section, the Recreation and Tourism Study Area includes the City of Virginia Beach and the City of Chesapeake. The Offshore Project Area recreation and tourism uses are captured in other sections (see Section 4.4.6, Commercial and Recreational Fishing, and Section 4.4.11, Other Coastal and Marine Uses). The Study Area was designed to capture the full range of recreational and tourism industry that may be within the vicinity of the Project; additional consideration was also given to the local recreational and tourism uses within 0.25 mi (0.4 km) of the Onshore Project Components. This section draws information from several sources of data, reports, and studies in its assessment of recreation and tourism. These sources include data from the Virginia Tourism Authority and the National Ocean Economics Program specific to the Study Area.

This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3).

4.4.5.1 Affected Environment

The affected environment is defined as areas where recreation and tourism activities are known to occur in the onshore and offshore areas in Virginia that have the potential to be affected by the construction, O&M, and decommissioning of the Project. Offshore recreational and tourism uses in the Study Area include recreational fishing and fishing tournaments, recreational boating, wildlife viewing, and diving. Since offshore recreational and tourism uses in the Study Area are discussed in Section 4.4.6, Commercial and Recreational Fishing, and Section 4.4.11, Other Coastal and Marine Uses, this section focuses on onshore recreational and tourism uses. Onshore recreational and tourism uses include beachgoing and other water borne activities, waterfront festivals, biking, freshwater fishing, and general use of open park spaces (see Section 4.4.3, Land Use and Zoning, and Section 4.4.11, Other Coastal and Marine Uses, for additional information on onshore uses).

Existing recreational uses along the SMR beach include recreational fishing, swimming, sunbathing, and water borne activities. There are several existing recreational resources within the Study Area, including Ocean Breeze Waterpark, Oceana Pond, North Landing River, Virginia Beach National Golf Course,

Pocaty River, Battlefield Golf Course, West Neck Creek Scenic River, Princess Anne Athletic Complex, Intracoastal Waterway, Redwing Park, the SMR, Owl Creek Municipal Tennis Center, and multiple city parks (see Figure 4.4-12). Within the SMR, the Onshore Export Cable Route Corridor crosses under Lake Christine via HDD, which also serves as a fishing and boating area. In addition to the above-mentioned resources, there are two elementary schools near the General Booth Boulevard and South Birdneck Road intersection, which have athletic fields and passive open space on their properties. A public bikeway/trail also travels along the Onshore Export Cable Route Corridor on Oceana Boulevard (see Figure 4.4-12). As discussed below, the Project would work to minimize impacts to these recreational uses during construction.

Recreation and tourism is an integral component of the local and regional economy. The Virginia Tourism Authority commissions annual economic impact assessments on the impact of traveler spending by U.S. residents while visiting Virginia. The results of the 2019 study found that the travel industry is the sixth largest private employer in Virginia, accounting for 7.1 percent of all employment. On average, domestic travelers' expenditures amounted to $73 million per day, amounting to $26.7 billion annually and supporting 236,000 jobs in Virginia as a whole. In total, the travel industry generated $1.8 billion in state and local taxes, or an average of $4.9 million in state and local taxes generated per day. Virginia Beach had the fourth greatest domestic travel impact among the counties and independent cities of Virginia, or $1.7 billion in total expenditures, generating approximately $62.6 million and $63.7 million in local tax receipts in 2018 and 2019, respectively (Table 4.4-17). The recreation and tourism industry in Virginia continues to grow, and has shown an annual increase over the last 9 years (Virginia Tourism Authority 2019). Table 4.4-17 shows expenditures, payroll, and state and local tax receipts associated with tourism in Virginia Beach.

Table 4.4-17. Economic Impact of Domestic Travel on Virginia Beach in 2018 and 2019

Year	Expenditures ($ Millions)	Payroll ($ Millions)	Employment (Thousands)	State Tax Receipts ($ Millions)	Local Tax Receipts ($ Millions)
2018	1,630	301	14	77	62
2019	1,662	305	13	79	63

Source: Virginia Tourism Authority (2019)

In addition, the National Ocean Economics Program, which "provides a full range of the most current policy-relevant economic and demographic information available on changes and trends along the United States coast, Great Lakes, and coastal waters," identified 1,091 establishments related to the ocean economy in the tourism and recreation sector in Virginia Beach in 2018. These establishments employed 24,176 people, provided over $455 million in wages, and resulted in a Gross Domestic Product of over $928 million (National Ocean Economics Program 2018).

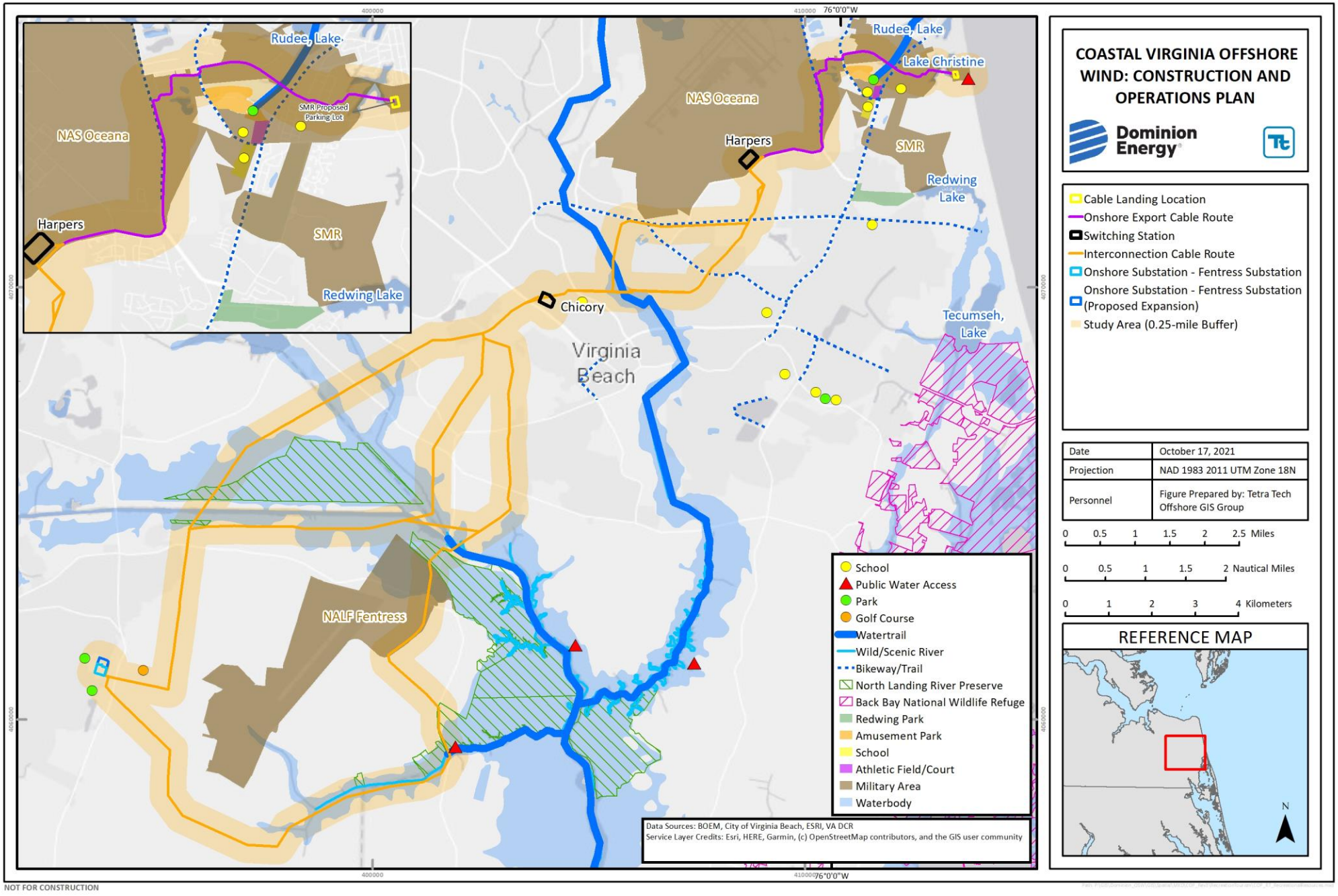


Figure 4.4-12. Recreational Facilities in the Study Area

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

The potential impacts during the construction, O&M, and decommissioning of the Project, as they relate to recreation and tourism in the Project Area, are modification and/or disruption of the recreation and tourism industry as a result of the Project.

Construction

During construction, the potential impact-producing factor to recreation and tourism would be the construction of Onshore and Offshore 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 factor identified above:

- Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures;
- Short-term displacement of recreational users onshore due to the establishment of safety zones around Project-related equipment and construction areas; and
- Minor and temporary increases to local traffic during construction for the Onshore Project Area.

Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures. Temporary disturbance to recreational marine users may occur during the construction of the Offshore Project Components through an increase in vessel traffic during construction and the implementation of safety zones. Short-term impacts also include the introduction of new potential navigational hazards, primarily the WTGs. However, these disturbances are expected to be temporary and localized. For the safety of the general public and workers associated with the Project, the safety zones would restrict vessel traffic in small portions of the Offshore Project Area where construction activities are taking place. Safety zones would be implemented within the Offshore Project Area, by which entry would be restricted to construction workers and Project-related activity. More information on navigational hazards is provided in Section 4.4.6, Commercial and Recreational Fishing, Section 4.4.7, Marine Transportation and Navigation, and Appendix S, Navigation Safety Risk Assessment. Dominion Energy would establish a Project-specific website to share information about the Project's construction progress with the community and to give guidance on the construction activities and how they may affect marine traffic in the area. Dominion Energy would also issue specific LNTM in coordination with USCG throughout the construction period. To ensure the safety of commercial and recreational mariners, temporary vessel restrictions may reduce access within the temporary WTG work areas, the Nearshore Trenchless Installation Area, Offshore Trenchless Installation Punch-Out, and along the Offshore Export Cable Route Corridor during construction. As appropriate, these areas would be marked and illuminated in accordance with USCG requirements and monitored by a safety vessel available to assist local mariners.

Short-term displacement of recreational users onshore due to the establishment of safety zones around Project-related equipment and construction areas. For the safety of the general public and the workers associated with the Project, safety zones would be implemented within the Project Areas by which entry would be restricted to construction workers and Project-related activity. Short-term temporary impacts to users of SMR Beach may occur during landfall and onshore construction activities. During landfall

activities at the Proposed Parking Lot, west of the Firing Range at SMR, recreational users may be temporarily restricted from utilizing the parking facility. Within the SMR, recreational users may be temporarily restricted from access to Lake Christine for fishing and boating activities. Dominion Energy would coordinate shoreline construction activities with localities and stakeholders to avoid and minimize conflicts with users to the extent practicable. In addition, Dominion Energy intends on coordinating construction activities with the SMR to avoid and minimize conflicts with recreational uses to the extent practicable. To avoid disruption of recreational uses, installation of the Onshore Export Cable would be coordinated with localities and stakeholders to avoid and minimize potential impacts to recreational and tourism uses to the extent practicable. Once construction is complete, the roads and parking lots would be restored to previous conditions.

Areas inland of the shore associated with the Interconnection Cable Route Alternatives, the Onshore Export Cable Route Corridor, the Switching Station, and the Onshore Substation are generally not used for recreation and tourism. In areas where the Onshore Export Cable Route Corridor or the Interconnection Cable Route Alternatives cross recreational areas, such as bikeways/trails and athletic fields, Dominion Energy intends to coordinate construction activities to minimize impacts to the extent practicable and to provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools.

Minor and temporary increases to local traffic during construction for the Onshore Project Area. An increase in local traffic around the Onshore Construction Corridor would be temporary and not expected to significantly affect the local recreation and tourism industry of the community. The expected traffic due to construction activities will be minimal in comparison to traffic in the area for other uses. Dominion Energy would not block roadways to SMR vehicular traffic for long periods of time for onshore construction activities.

Operations and Maintenance

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

- Long-term modification of existing marine uses in the Offshore Project Area; and
- Long-term displacement of recreational activities in the Onshore Project Area.

Long-term modification of existing marine uses in the Offshore Project Area. It is expected that the presence of WTGs in the Offshore Project Area may change marine recreational usage. Some of these impacts may be observed while navigating through new structures in the Offshore Project Area. These impacts are outlined in Appendix S, Navigation Safety Risk Assessment, and Section 4.4.7, Marine Transportation and Navigation. However, some of these impacts may be beneficial because WTGs have served as a tourism and recreational fishing destinations in other regions, which can lead to opportunities for tours and chartered trips (National Fisherman 2020). More information on wind farm tours and recreational fishing trends in WTGs can be found in Section 4.4.11, Other Coastal Uses, and Section 4.4.6, Commercial and Recreational Fishing. Dominion Energy would notify recreational mariners of all non-emergency Project-related maintenance activities on its website and social media sites and work in

accordance with the USCG requirements. When possible, Dominion Energy would schedule and plan maintenance activities to minimize impact and interruption to recreation and tourism activities in the Project Area. In order to maintain navigational safety for marine recreational users, Dominion Energy would place a radar beacon (RACON; radar responder) at the WTG site and light, individually mark, and maintain Private Aids to Navigation (PATON) per USCG Aids to Navigation (ATON) requirements (see Section 3.5.4, Lighting and Marking of Offshore Project Components).

Long-term displacement of recreational activities in the Onshore Project Area. The long-term presence of Onshore Project Components may displace recreational and tourism activities currently and historically occurring within those areas. However, onshore infrastructure was sited with historical stakeholder use in mind to minimize potential conflict. Displacement of recreational uses is not expected because the area is not currently used for recreation or tourism. When possible, Dominion Energy would schedule and plan maintenance activities to minimize impact and interruption to recreation and tourism activities in the Project Area.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. 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, and potential impacts will be re-evaluated at that time.

4.4.5.3 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 (Table 4.4-18). Dominion Energy intends to 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 4.4-18. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Offshore and Onshore Project Area	Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures	• Dominion Energy would establish a Project-specific website to share information about the Project's construction progress with the community and to give guidance on the construction activities and how they may affect marine traffic in the area. Dominion Energy would also issue specific Local Notices to Mariners in coordination with U.S. Coast Guard (USCG) throughout the construction period. To ensure the safety of commercial and recreational mariners, temporary vessel restrictions may reduce access within the temporary Wind Turbine Generator work areas, the Nearshore horizontal directional drilling area, and along the Offshore Installation Corridor during construction. As appropriate, these areas would be marked and illuminated in accordance with USCG requirements and
		Short-term displacement of recreational users onshore due to the establishment of safety zones around Project-related equipment and construction areas	
		Minor and temporary increases to local traffic during construction for the Onshore Project Area	

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
			monitored by a security boat available to assist local mariners; • Dominion Energy would coordinate shoreline construction activities with localities and stakeholders to avoid and minimize conflicts with users to the extent practicable. In addition, Dominion Energy intends on coordinating construction activities with the Virginia SMR to avoid and minimize conflicts with recreational uses to the extent practicable; • To avoid disruption of recreational uses, installation of the Onshore Export Cable would be coordinated with localities and stakeholders to avoid and minimize potential impacts to recreational and tourism uses to the extent practicable. Once construction is complete, the roads and parking lots would be restored to previous conditions; • Dominion Energy intends to coordinate construction activities to minimize impacts to the extent practicable and to provide regular updates to the local community through social media, public notices, and/or other appropriate communications tools; and • Dominion Energy would not block roadways to the SMR vehicular traffic for long periods of time for onshore construction activities.
Operations and Maintenance	Offshore and Onshore Project Area	Long-term modification of existing marine uses in the Offshore Project Area Long-term displacement of recreational activities in the Onshore Project Area	• Dominion Energy would notify recreational mariners of all non-emergency Project-related maintenance activities on its website and social media sites and work in accordance with the USCG requirements. When possible, Dominion Energy would schedule and plan maintenance activities to minimize impact and interruption to recreation and tourism activities in the Project Area. In order to maintain navigational safety for marine recreational users, Dominion Energy would place a radar beacon (RACON; radar responder) at the WTG site and light, individually mark, and maintain Private Aids to Navigation (PATON) per USCG Aids to Navigation (ATON) requirements; and • When possible, Dominion Energy would schedule and plan maintenance activities to minimize impact and interruption to recreation and tourism activities in the Project Area.

4.4.6 Commercial and Recreational Fishing

This section describes the regulatory environment for commercial and recreational fishing, including the state and federal bodies responsible for their management. This section also provides details on the activities Dominion Energy has taken to engage relevant stakeholders and descriptions of regional commercial and recreational fishing activities. Potential impacts to commercial and recreational fishing resulting from construction, O&M, and decommissioning of the Project are discussed. Proposed measures and BMPs are described in this section with intent to avoid, minimize, and/or mitigate potential impacts to commercial and recreational fishing as necessary. Other assessments and reports detailed within this COP related to commercial and recreational fishing include:

- Physical and Oceanographic Conditions (Section 4.1.1);
- Water Quality (Section 4.1.2);
- Underwater Acoustic Environment (Section 4.1.5);
- Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat (Section 4.2.4);
- Recreation and Tourism (Section 4.4.5);
- Marine Transportation and Navigation (Section 4.4.7);
- Essential Fish Habitat Assessment (Appendix E);
- Navigation Safety Risk Assessment (Appendix S); and
- Fisheries Communication Plan (Appendix V).

Federal waters off the coast of Virginia begin at 3 nm offshore, the limit of state jurisdictions, and extend to 200 nm, the outer boundary of the U.S. Exclusive Economic Zone (6 km out to 370 km). Within federal waters, fisheries are regulated by the eight regional fisheries management councils through the Magnuson-Stevens Fishery and Conservation Act of 1978 (16 U.S.C. §§ 1801 *et seq.*). The eight regional councils work to create FMPs for designated species and are responsible for their management and regulation. The Project is located off the coast of Virginia, including federal waters managed by the MAFMC. However, there is overlap in targeted species caught in Virginia that have FMPs with the New England Fishery Management Council and the Southeast Fishery Management Council. The Atlantic States Marine Fisheries Commission (ASMFC) coordinates the management and conservation of 27 fish species off the Atlantic coast with each state represented in the commission (ASMFC 2020).

The MAFMC regulatory zone spans from New York to Virginia and has FMPs for summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), Atlantic mackerel (*Scomber scombrus*), squid (longfin [*Doryteuthis pealeii*] and Illex [*Illex argentines*]), and butterfish (*Peprilus triacanthus*), surfclams (Mactridae) and ocean quahogs (*Arctica islandica*), bluefish (*Pomatomus saltatrix*), golden tilefish (*Lopholatilus chamaeleonticeps*), spiny dogfish (*Squalus acanthias*), and monkfish (*Lophius* spp.) (U.S. Fisheries Management Councils 2020). Since fish migrate through different management regions, summer flounder, bluefish, and black sea bass are jointly managed between the MAFMC and the ASMFC. Likewise, spiny dogfish and monkfish are jointly managed by the New England Fisheries Management Council and the MAFMC. Specific fisheries management areas are shown in Figure 4.4-13. Nearshore species (within 3 nm [6 km] of the shore) are regulated by the VMRC.

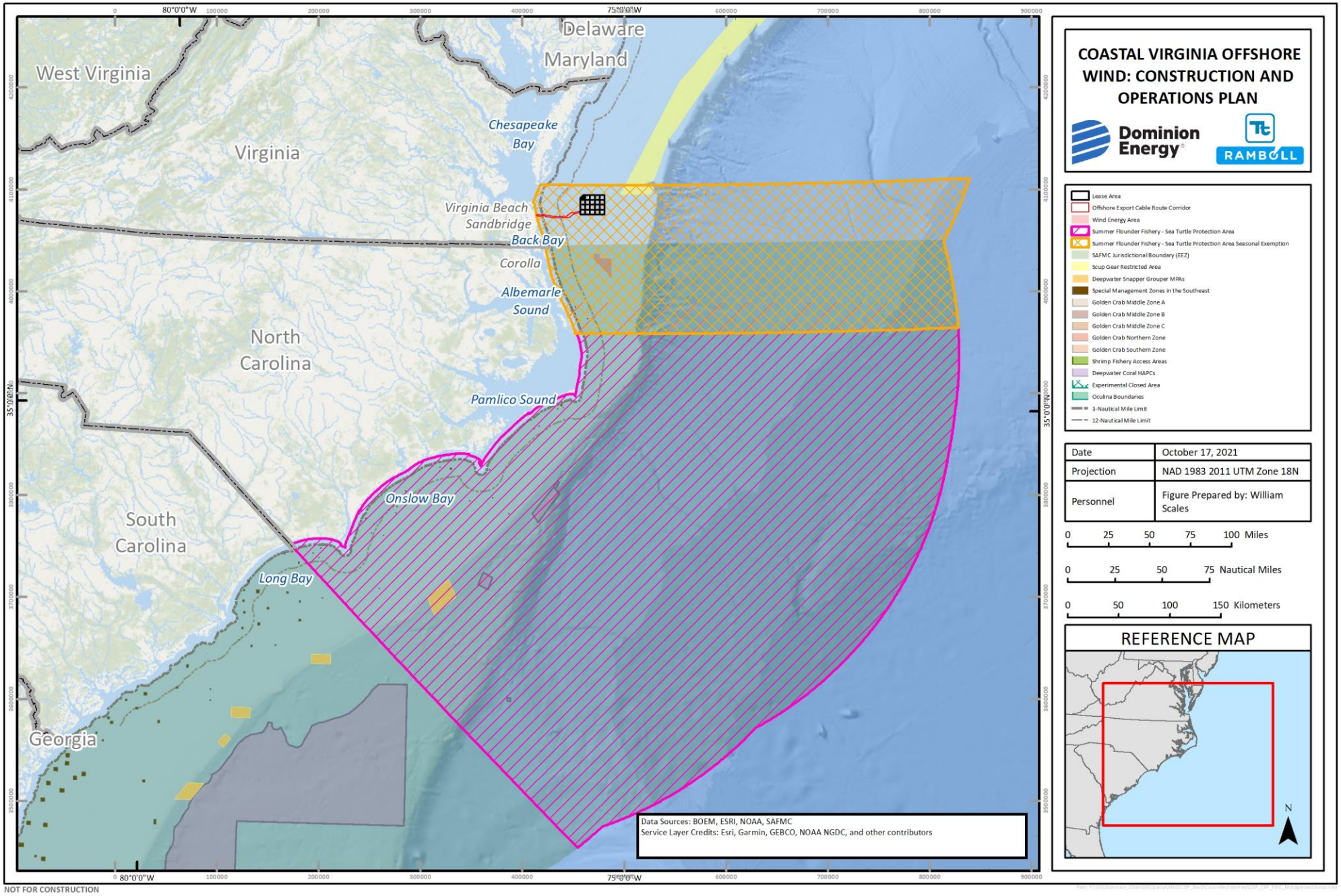


Figure 4.4-13. Fisheries Management Areas

The VMRC manages saltwater and freshwater commercial and recreational fishing and regulates saltwater hook and line fishing, recreational shellfishing and non-hook and line fishing, recreational crabbing, spearfishing, VMRC licensing, and commercial permits (VMRC 2020).

This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3) (BOEM 2019). This section also relies on data from federal and local governments as well as universities and peer-reviewed literature. This document was created using the BOEM 2020 Information Guidelines for a Renewable Energy COP as they relate to fisheries (BOEM 2020a):

- Lessees and grantees should work cooperatively with commercial/recreational fishing entities and interests to minimize potential conflicts with commercial and recreational fishing interests during construction and operation of a project;
- Lessees and grantees should review planned activities with potentially affected fishing organizations and port authorities to prevent unreasonable fishing gear conflicts;
- Lessees and grantees should minimize conflict with commercial fishing activity and gear by notifying registered fishermen of the location and time frame of the project construction activities well in advance of mobilization; they should also provide updates throughout the construction period;
- Lessees and grantees should use practices and operating procedures that reduce the likelihood of vessel accidents and fuel spills;
- Lessees and grantees should avoid or minimize impacts to the commercial fishing industry by marking applicable structures (e.g., WTGs, wave generation structures) with USCG-approved measures (e.g., lighting) to ensure safe vessel operation; and
- Lessees and grantees should avoid or minimize impacts to the commercial fishing industry by burying cables, where practicable, to avoid conflict with fishing vessels and gear operation. If cables are buried, lessees and grantees should inspect cable burial depth periodically during project operation to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity. Data used to fulfill these BOEM COP guidelines include:
  - NOAA Marine Recreational Information Program survey data;
  - Mid-Atlantic Regional Council on the Ocean (MARCO) and Northeast Ocean data portals;
  - NOAA GARFO vessel trip report (VTR) data within the Lease Area; and
  - Data collected from direct outreach to the Hampton Roads area fishing community through the Project's FLOs.

4.4.6.1 Data and Information Inputs

Commercial Fishing Vessel Monitoring System

Fisheries' regulatory bodies rely on vessel monitoring systems (VMSs) to monitor fisheries effort and location under their jurisdiction (50 CFR § 660.14). Many types of commercial vessels are required to have various types of VMSs on board depending on their region and permits. Information and data acquired from these monitoring and reporting mechanisms allow agencies (NOAA Fisheries) to make informed

management decisions. The main types of VMSs used by regulators are VTRs, VMSs, and AIS. Publicly available data derived from the Offshore Project Area is incorporated into this document and described in Table 4.4-19.

Table 4.4-19. Vessel Monitoring Systems used in the Offshore Project Area

Monitoring System	Requirements
Vessel Trip Reports	• Required by all vessels permitted by the National Oceanic and Atmospheric Administration (NOAA) Fisheries, Greater Atlantic Regional Fisheries Office (GARFO) and Southeast Regional Office (SERO) (except for American lobster permits); • Self-reported monitoring mechanism and submitted once per trip with required interval for new reports except when entertaining a new chart area or changing gear being used; and • Issued with every change in fishing area or fishing gear type (NOAA Fisheries 2020a).

Vessel Monitoring System	• Data collected using global positioning system transponders on location;
	• Required for vessels with the following NOAA GARFO permits (NOAA Fisheries, n.d. a):
	  ○ Full- or part-time limited access scallop permit;
	  ○ occasional limited access scallop permit when fishing under the scallop area access program;
	  ○ limited access monkfish, occasional scallop, or combination permit electing to provide VMS notifications;
	  ○ limited access multispecies permit when fishing on a Category A or B day at sea or catches regulated species or ocean pout while on a sector trip; a limited access multispecies small vessel category or hand gear; a vessel that fishes in multiple stock areas;
	  ○ surfclam or ocean quahog open access permit;
	  ○ Maine mahogany quahog limited access permit;
	  ○ limited access monkfish vessel electing to fish in the Offshore Fishery Program;
	  ○ limited access herring permit, an Areas 2/3 open access herring permit, or a vessel declaring a herring carrier trip via VMS;
	  ○ limited access mackerel permit;
	  ○ longfin squid/butterfish moratorium permit; and
	  ○ Illex squid moratorium permit.
	• Required for vessels with the following NOAA SERO permits (NOAA Fisheries, n.d. a):
	  ○ highly migratory species;
	  ○ South Atlantic rock shrimp; and
	  ○ Gulf reef fish.

Automatic Identification System	• Location data updated using terrestrial-based antennas and satellites up to every 2 seconds (The Navigation Center 2020); • Required for vessels > 65 feet (20 meters) in length, within 12 nautical miles (22 kilometers) of coastline; • Required for all vessels over 300 gross tonnage engaged in international voyages; • Required for all cargo vessels over 500 gross tonnage; and • Required for all passenger vessels regardless of size.

Vessel Trip Reports

VTRs are required by all vessels with a GARFO and/or Southeast Regional Office (SERO) permit except those just targeting the American lobster (*Homarus americanus*) (NOAA Fisheries 2020a). Based on the location of the Offshore Project Area, it is expected that many of the vessels transiting through the Offshore Project Area or originating from close ports will carry permits from both GARFO and SERO.

VTR is self-monitoring without the use of any automatic satellites or global positioning system (GPS) transponders. Each trip, the vessel operator must submit latitude and longitude coordinates of where most of the fishing effort occurred and for each change in fishing gear type. Since it is a self-reported mechanism, there is a margin of error regarding using the data for management decisions compared to VMS and AIS.

Both BOEM and NOAA Fisheries have pointed out the limited spatial precision of VTR locations and the need for potential error acknowledgement within the data analysis (GARFO 2018).

VTR is the primary method of characterizing commercial fishing effort and type specifically within the Lease Area, due to its widespread availability within most federally managed fisheries. Dominion Energy submitted a data request to NOAA GARFO to obtain the publicly available VTR data to capture the reported fishing effort within the Lease Area in an effort to characterize the level of "exposure" to potential impacts of development of the Lease Area within the federally managed fisheries. While some of the data requested is considered proprietary and could not be disclosed beyond the memorandum of understanding between NOAA GARFO and BOEM, the available VTR data does shed some light on the potential exposure to fisheries impacts within the Lease Area. Dominion Energy understands that a more robust dataset will be available to BOEM as part of its National Environmental Policy Act process to develop a similar level of analysis as provided in the Vineyard Wind Supplemental Environmental Impact Statement (BOEM 2020b; Benjamin Galuardi, NOAA GARFO, Personal Communication 2020).

The dataset provided to Dominion Energy by NOAA GARFO in June of 2020 as well as the NOAA Fisheries report on landing and revenue data for WEAs (NMFS 2020) modeled fishing data using conservative data buffers, thus potentially over-estimating the amount of landings from the Lease Area. Dominion Energy's Lease Area for the Project is equivalent to the "Virginia WEA" referenced in these data sources. Therefore, it should be noted that certain species represented from this report may have been caught outside of the Lease Area boundaries.

The only species recorded as caught in the Lease Area that are a part of the Northeast Multispecies FMP are white hake (*Urophycis tenuis*) and red hake (*Urophycis chuss*). Chub mackerel (*Scomber japonicus*), Atlantic mackerel, and Spanish mackerel (*Scomberomorus maculatus*) were the only species recorded as caught that are a part of the Coastal Migratory Pelagics FMP. The only FMP that had recorded landings harvested in the Offshore Project Area valued at 1 percent or higher of total landings is the summer flounder, scup, and black sea bass FMP. The expectation is that these landings are almost entirely black sea bass, based on the existing black sea bass pot fishery and the lack of trawling in the area. Values of landings for these species or species groups are provided in Table 4.4-20.

Table 4.4-20. Modeled Aggregate Value Landed Caught in the Lease Area by Fishery Management Plan

Region	Fishery Management Plan (FMP)	Value of Landings 2008-2018 (dollars)	Average Value/year (dollars)
Mid-Atlantic Fishery Management Plans	Summer flounder, scup and black sea bass	$357,748	$32,523
	Mackerel, squid and butterfish	$128,800	$11,709
	Golden and blueline tilefish	$901	$82
	Monkfish	$1,567	$142
New England Fishery Management Plans	Northeast Multispecies	$180	$16
	Sea scallop	$6,334	$576
	Skates	$472	$43
	Whiting	$301	$27
	Red crab	$2,289	$208
Southeast Fishery Management Plans	Coastal Migratory Pelagics	$2,514	$229

Region	Fishery Management Plan (FMP)	Value of Landings 2008-2018 (dollars)	Average Value/year (dollars)
Total		**$501,115**	**$45,556**

Source: Benjamin Galuardi, NOAA GARFO, June 2020 (Personal Communication), NMFS 2020

The five species with the highest-valued commercial landings deriving from the Lease Area are black sea bass, Illex squid, channeled whelk (*Busycotypus canaliculatus*), summer flounder, and Loligo squid (*Loligo forbesii)*. The values in Table 4.4-21 represent the aggregate value of all species landings within the Lease Area from 2008 to 2018, and each year varied in amount landed in the Lease Area. However, given that Illex squid are most frequently caught along the shelf break waters in depths of 492 to 902 (ft) (150 to 275 m) (NMFS 2020), their apparent "top-5" status could be a circumstance where data outside of the Lease Area might be conservatively lumped within the Lease Area data, based on the assumed variance of VTR location data. Additionally, in some years, there were no reported landings within the Lease Area according to VTR data.

Table 4.4-21. Modeled Values for the Top Five Species Landed from within the Lease Area 2008–2018

Species	Value (dollars)	Landings (pounds)
Black sea bass	$310,236	93,023
Squid (Illex)	$91,543	229,682
Channeled whelk (conch)	$58,807	15,152
Summer flounder	$47,487	28,881
Squid (*loligo*)	$33,779	31,447
Total	**$541,852**	**398,185**

Source: Benjamin Galuardi, NOAA GARFO June, 2020 (Personal Communication), NMFS 2020

The VTR data can further be broken down by port where the catch was landed. From 2008 to 2018, fish caught in the Lease Area were landed at only three ports; Norfolk, Virginia; Virginia Beach, Virginia; and Wanchese, North Carolina. Even at these closest ports, the proportion of landings at those ports that originate within the Lease Area is quite low, with none exceeding 4 percent of the total revenue of that port for any year, and a mean annual value of $67,555 for landings that originated in the Lease Area during an 11-year period. This is indicative of the relative economic impact for landings that originate within the Lease Area (see Table 4.4-22). Years with relatively high "All Others" values were highest in years with no reported catches from Virginia Beach.

Overall, the VTR data is consistent with the "lightly fished" nature of commercial fishing activity within the Lease Area (Kirkpatrick et al. 2017). Historical revenue associated with the Lease Area represented only between 2 to 4 percent of the total annual landing revenue at the ports of Virginia Beach and Norfolk combined between 2007 to 2012 and less than 0.1 percent for other regional ports combined (BOEM 2016). These relatively low percentages of total FMP catches from within the Lease Area align with the minimal overlap of VMS activity within the Lease Area, as shown in Figure 4.4-14 through Figure 4.4-21.

Vessel Monitoring System

VMSs are required by many commercial vessels engaging in fisheries with both GARFO and SERO permits. Unlike VTR, VMS is an automatic monitoring system that utilizes GPS transponders to record location. VMS is required for vessels that hold various federal permits managed by GARFO and SERO when they are fishing or transiting within the Exclusive Economic Zone (3 nm to 200 nm [6 km to 370 km]

from the coast). The VMS-required commercial fishing vessels must carry onboard transceiver units that broadcast vessel identification, location, date, and time information to satellites (NOAA Fisheries, n.d. a). VMS data is typically transmitted once per hour by commercial fishing vessels, making tracking less precise than data collected by AIS.

A substantial amount of VMS data is publicly available through the MARCO and Northeast Ocean Data Portals, as provided by GARFO and SERO. VMS heat maps of commercial fishing activity by fishery are shown in Figure 4.4-14 through Figure 4.4-21. Each of these maps is presented as the full data set available for all vessel speeds, as well as the data set filtered for speeds less than 4 knots (or 5 knots for sea scallop vessels) (7 km per hour, or 9 km per hour for sea scallop vessels) with the assumption that vessels traveling at less than these speeds are likely to be engaged in active fishing, rather than transit, although vessels slowing on approach to ports may erroneously show as "fishing." The full data set for all speeds also is important to consider with respect to transits to and from fishing grounds. VMS vessel activity for the following federally managed fisheries is included in these maps:

- Coastal Migratory Pelagics FMP (2015 to 2016);
- Multispecies FMP (groundfish) (2015 to 2016);
- Scallop FMP (2015 to 2016); and
- Squid FMP (2015 to 2016).

Through evaluation of these data and consultation with local commercial fishermen, Dominion Energy determined that the federally managed monkfish and surfclam/ocean quahog fisheries occur well outside of the Offshore Project Area and are therefore not included in these maps. It is important to note that while these heat maps are indicative of overall fishing activity, an absence of data does not indicate an absence of fishing activity or eliminate the possibility that a historical fishery (absent in recent data) will redevelop, or a new fishery will emerge, as discussed further in this Section.

Automatic Identification System

AIS is the most precise reporting mechanism outlined in this document because location signals can be recorded as frequently as every 2 seconds (The Navigation Center 2020). AIS Class A transponders are required by the International Maritime Organization for all passenger vessels and commercial vessels over 299 gross tons and travel internationally (International Maritime Organization 2020). Class B transponders are required for fishing industry vessels over 66 ft (20 m) in length, vessels that do not operate in a VTS or Vessel Movement Reporting System Area, and those engaged in dredging operations (International Maritime Organization 2020). For the fishing vessels, the AIS is only required to be active when operating within 12 nm (22 km) of the coastline. AIS signals are transmitted as very high frequency (VHF) radio signals and are sent to other nearby vessels or coastal receivers.

Data for fishing vessels transmitting AIS within the Offshore Project Area since 2016 are shown in Figure 4.4-22 through Figure 4.4-25. The AIS signals captured for fishing vessels operating in the Offshore Project Area indicate that they were in transit and not actively fishing.

Table 4.4-22. Total Revenue from Catch in the Lease Area by Port Landed

Port	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Beaufort, NC	$2,024	$0	$1,015	$277	$0	$0	$0	$0	$0	$0	$0
Cape May, NJ	$0	$0	$1,430	$1,801	$3,898	$0	$2,707	$2,298	$1,938	$0	$0
Chincoteague, VA	$0	$0	$8,217	$415	$0	$0	$0	$0	$0	$0	$0
Davisville, RI	$0	$0	$0	$0	$0	$8,610	$0	$0	$0	$0	$0
Fall River, MA	$1,525	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hampton, VA	$0	$2,463	$0	$3,874	$2,063	$3,723	$0	$0	$1,816	$8,666	$3,461
New Bedford, MA	$0	$0	$3,568	$3,251	$0	$0	$0	$0	$0	$0	$0
Newport News, VA	$12,748	$10,768	$6,460	$2,047	$1,762	$1,645	$1,836	$2,234	$547	$1,633	$0
Norfolk, VA	$0	$0	$4,112	$0	$0	$0	$0	$0	$0	$0	$0
North Kingstown, RI	$3,027	$0	$0	$17,216	$0	$0	$0	$0	$0	$0	$0
Point Judith, RI	$0	$0	$0	$314	$0	$0	$0	$226	$108	$0	$0
Virginia Beach, VA	$56,929	$30,095	$30,919	$33,155	$38,982	$0	$0	$0	$22,150	$25,157	$0
Wanchese, NC	$2,824	$3,294	$1,513	$1,093	$0	$7,195	$0	$1,764	$0	$0	$4,222
All Others	$20,093	$22,940	$18,900	$9,026	$31,310	$48,967	$61,173	$70,546	$11,900	$5,699	$47,540
Total	**$99,170**	**$69,560**	**$76,134**	**$72,469**	**$78,015**	**$70,140**	**$65,716**	**$77,068**	**$38,459**	**$41,155**	**$55,223**

Source: Benjamin Galuardi, NOAA GARFO June, 2020 (Personal Communication), NMFS 2020

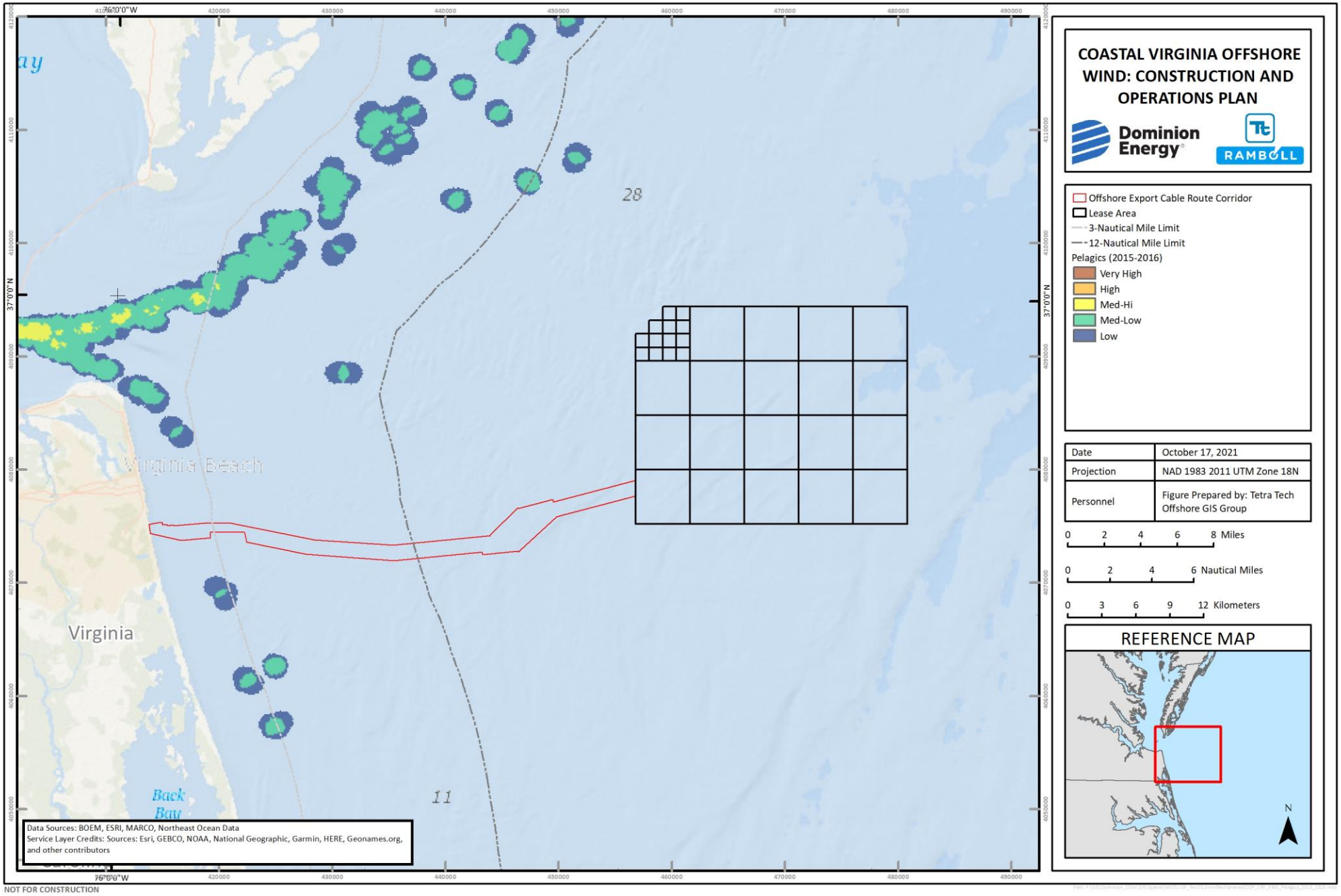


Figure 4.4-14. Coastal Migratory Pelagic Species (Herring, Mackerel, Squid) Fishing Vessel Activity, all speeds, 2015–2016

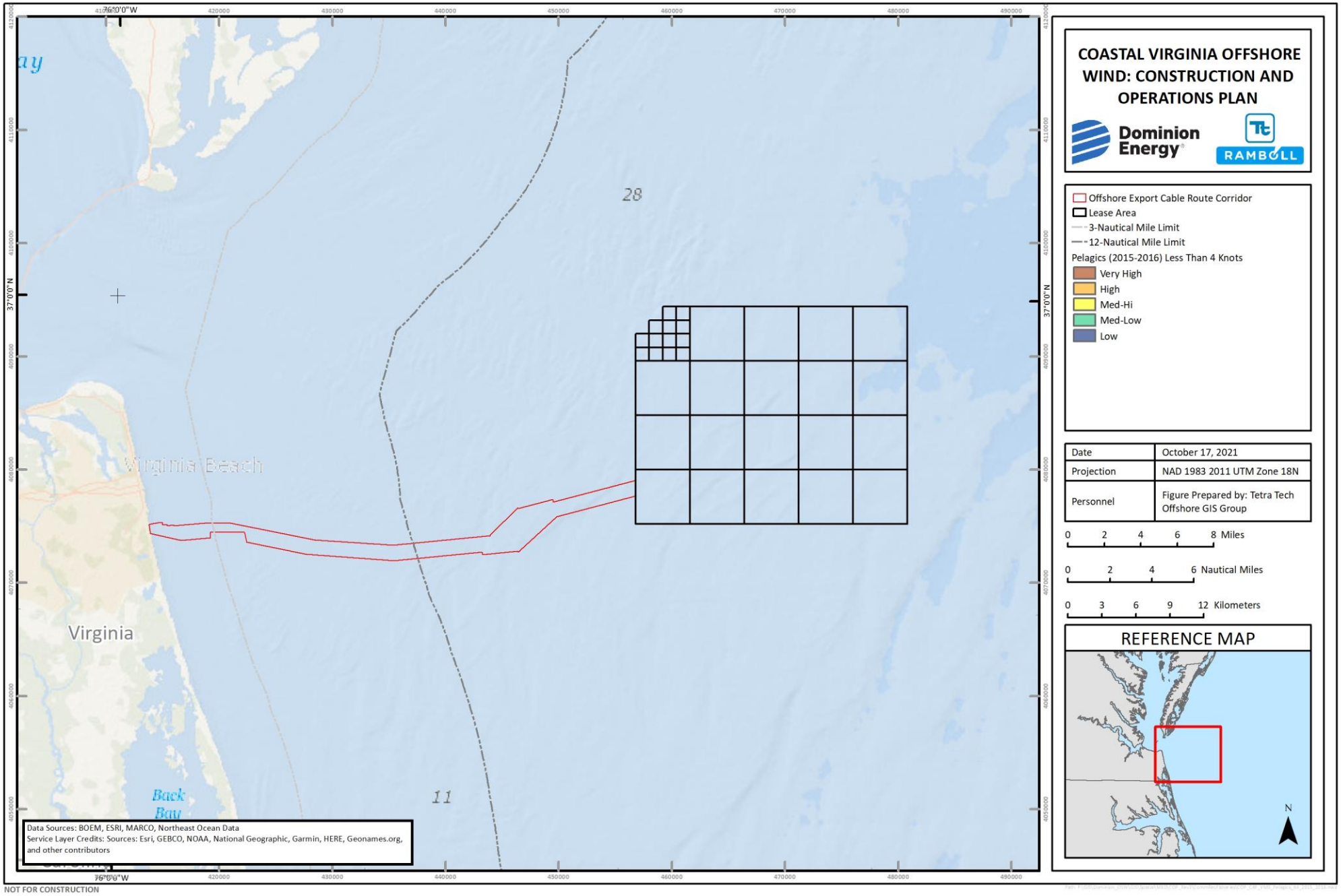


Figure 4.4-15. Coastal Migratory Pelagic Species (Herring, Mackerel, Squid) Fishing Vessel Activity <4 knots, 2015–2016 (no data within the map extent)

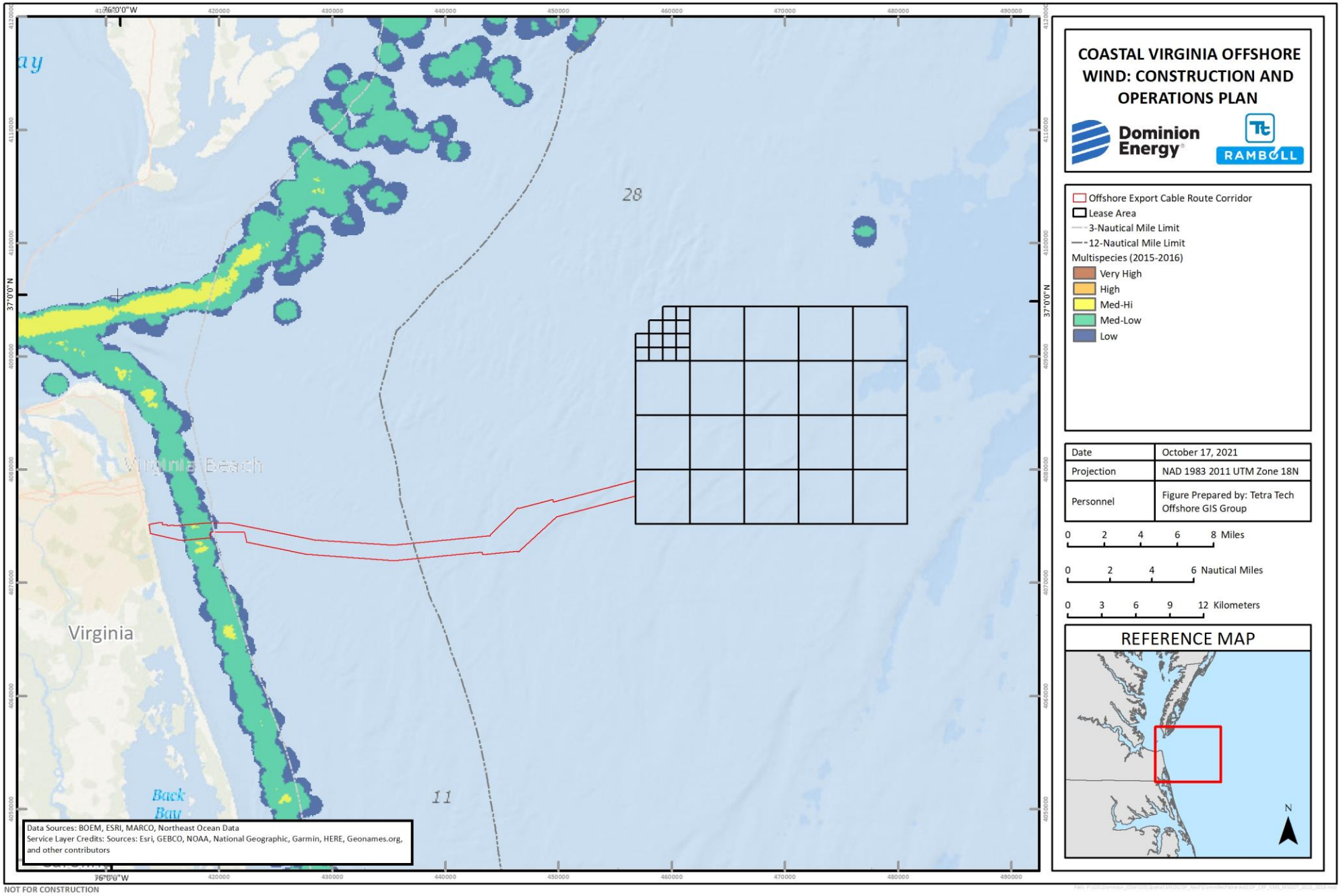


Figure 4.4-16. Multispecies Vessel Activity, All Speeds, 2015–2016

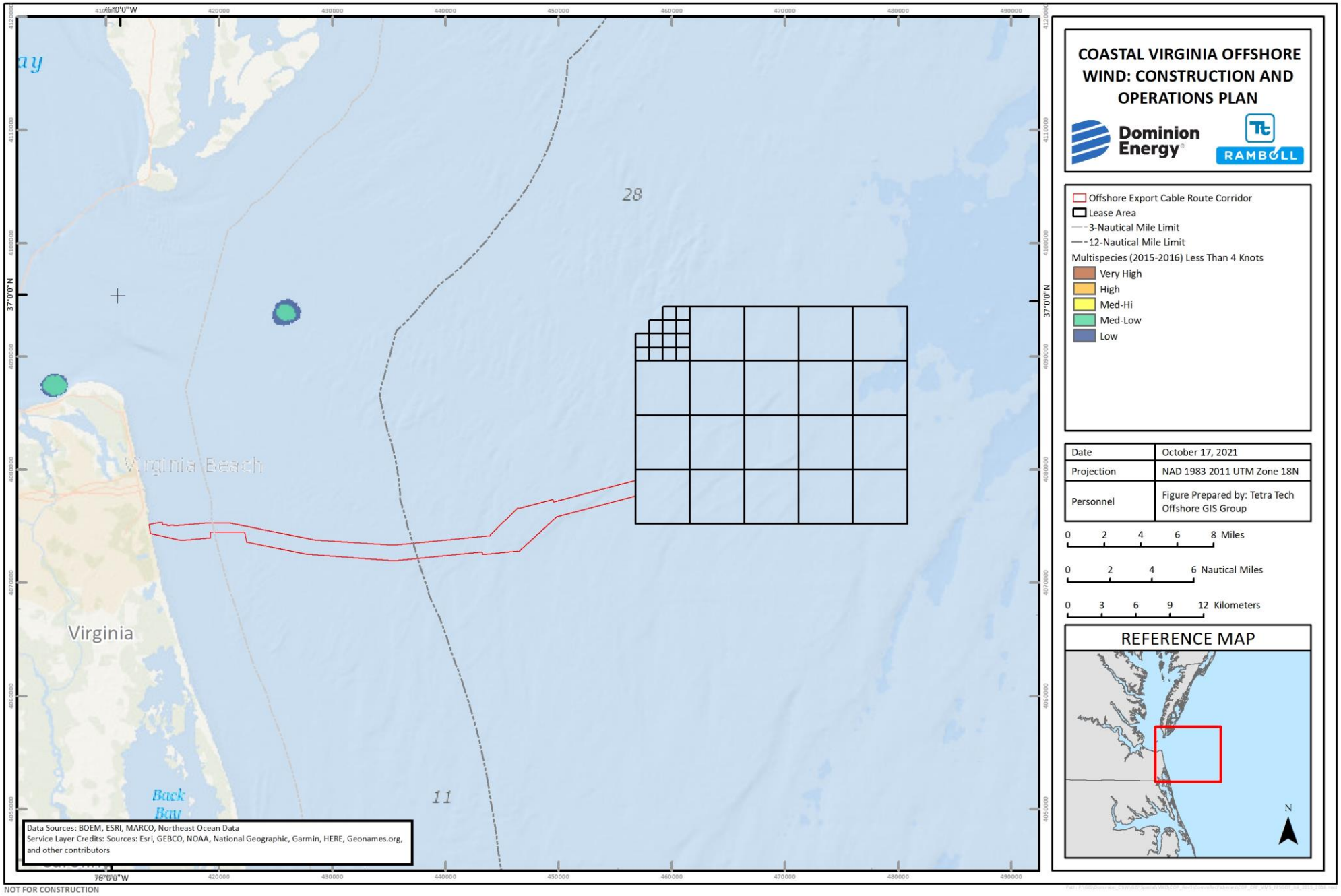


Figure 4.4-17. Multispecies Vessel Activity, <4 Knots, 2015–2016

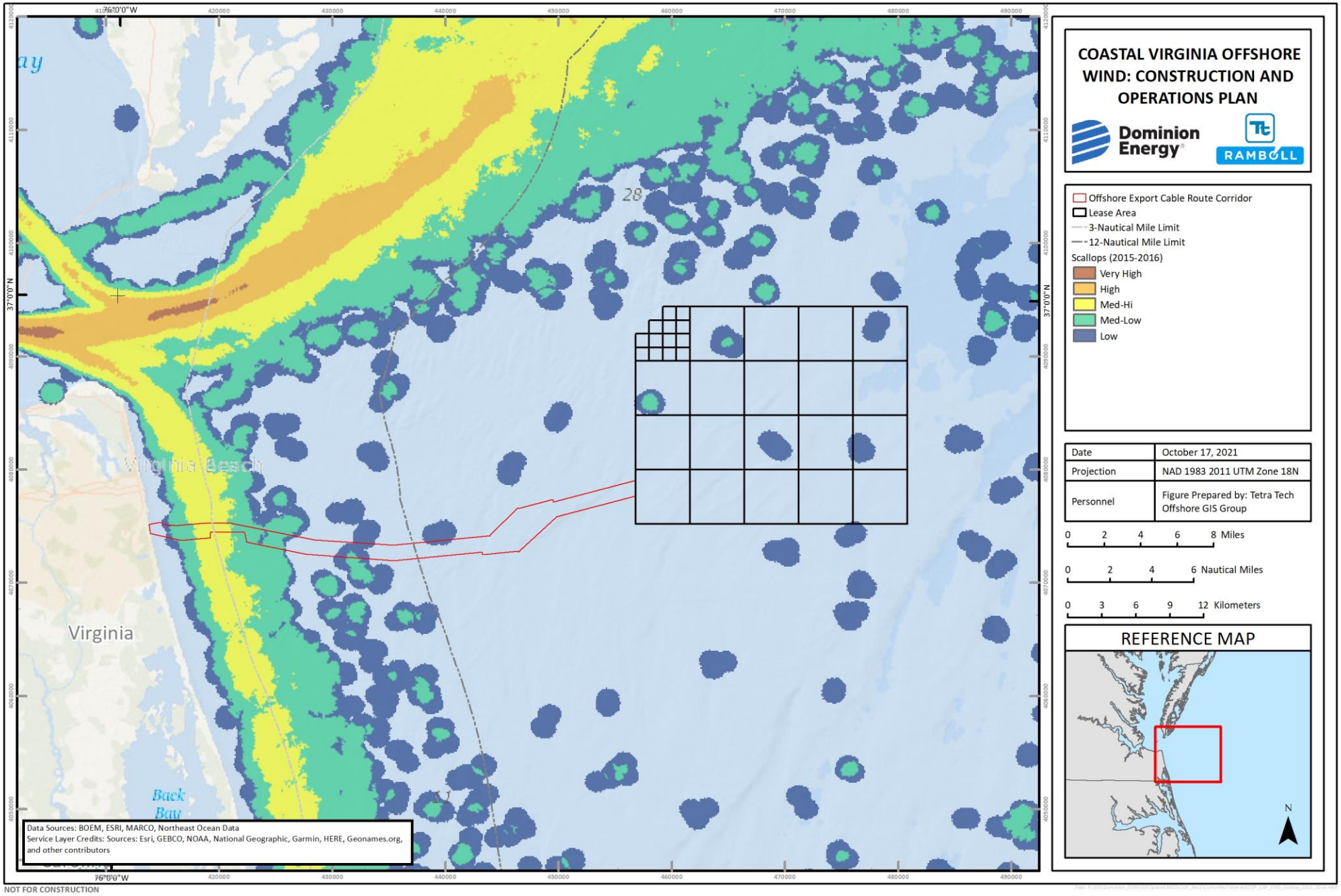


Figure 4.4-18. Scallop Fishing Vessel Activity, All Speeds, 2015–2016

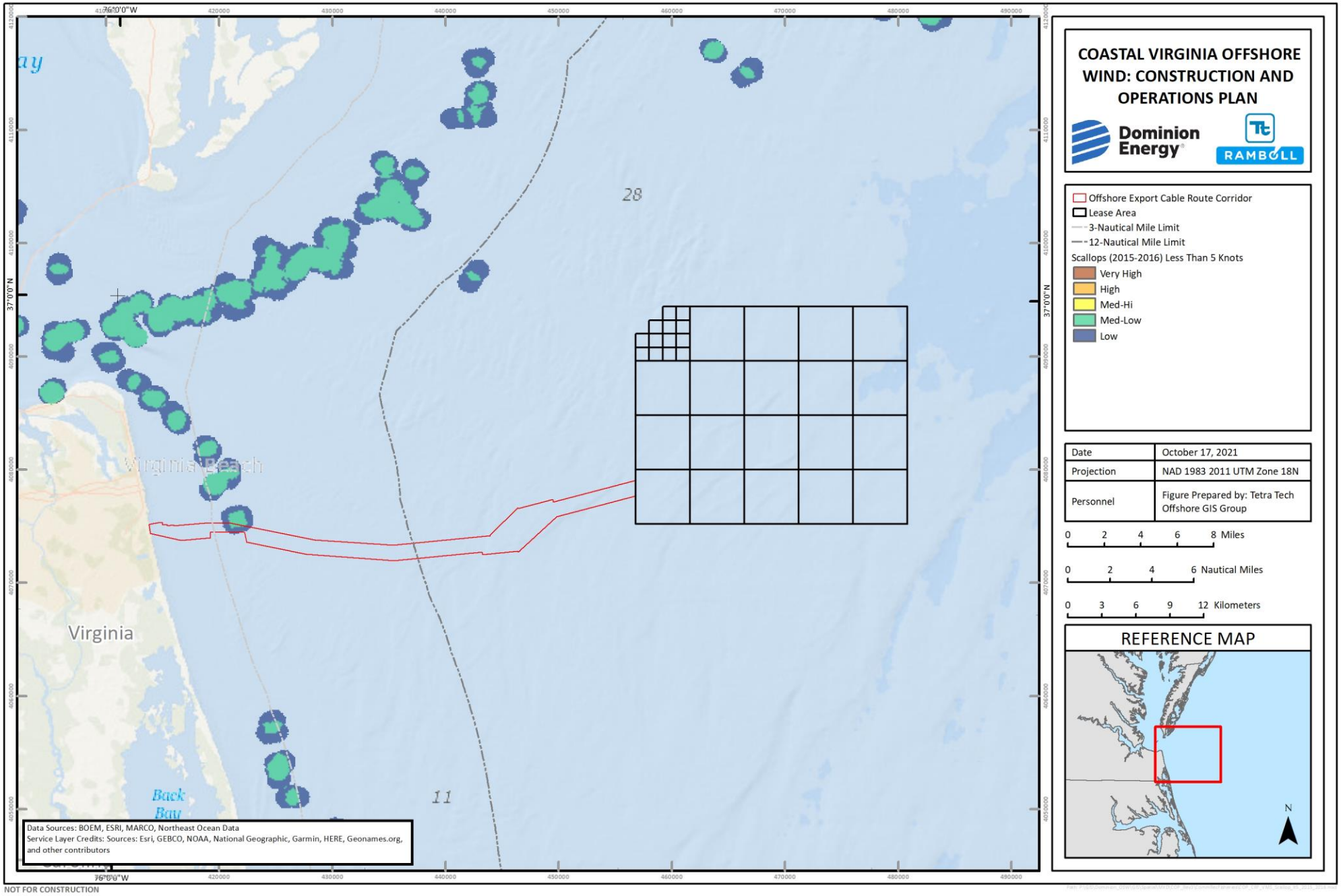


Figure 4.4-19. Scallop Fishing Vessel Activity, <5 Knots, 2015–2016 (vessels in shipping channels are likely transiting at speeds <5 knots and not actively fishing)

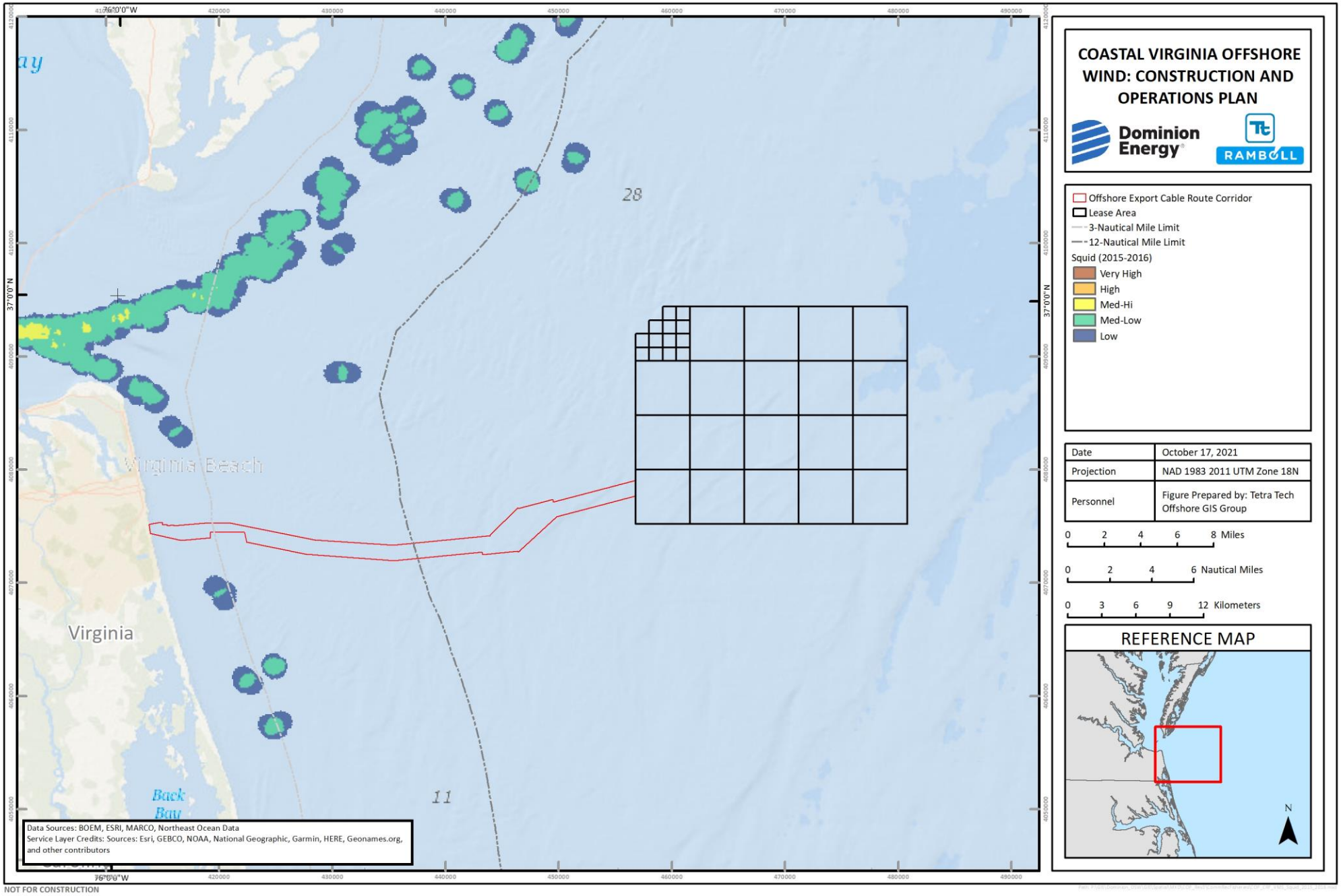


Figure 4.4-20. Squid Fishing Vessel Activity, All Speeds, 2015–2016 (vessel trip reports)

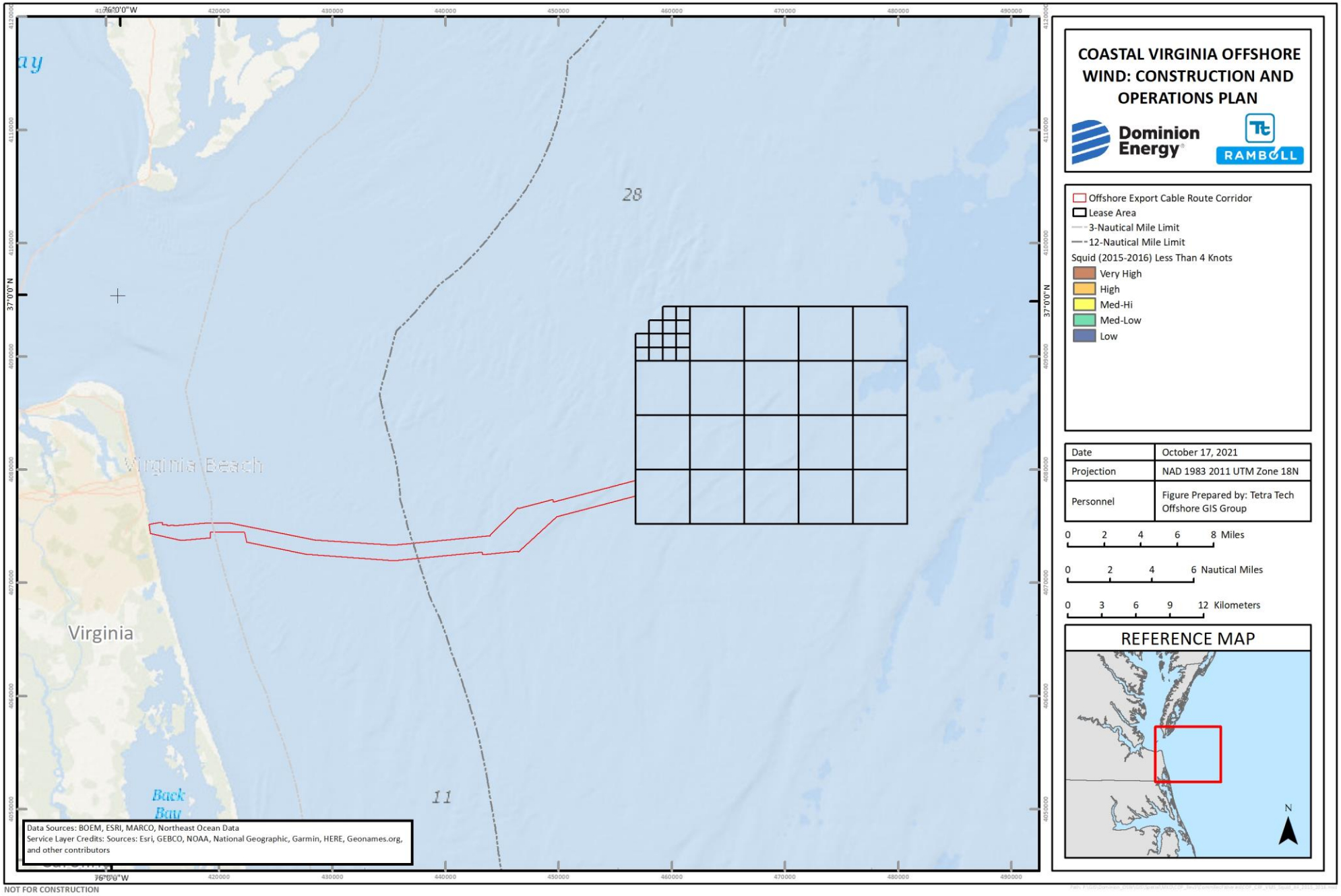


Figure 4.4-21. Squid Fishing Vessel Activity, <4 Knots, 2015-2016 (no data within the map extent)

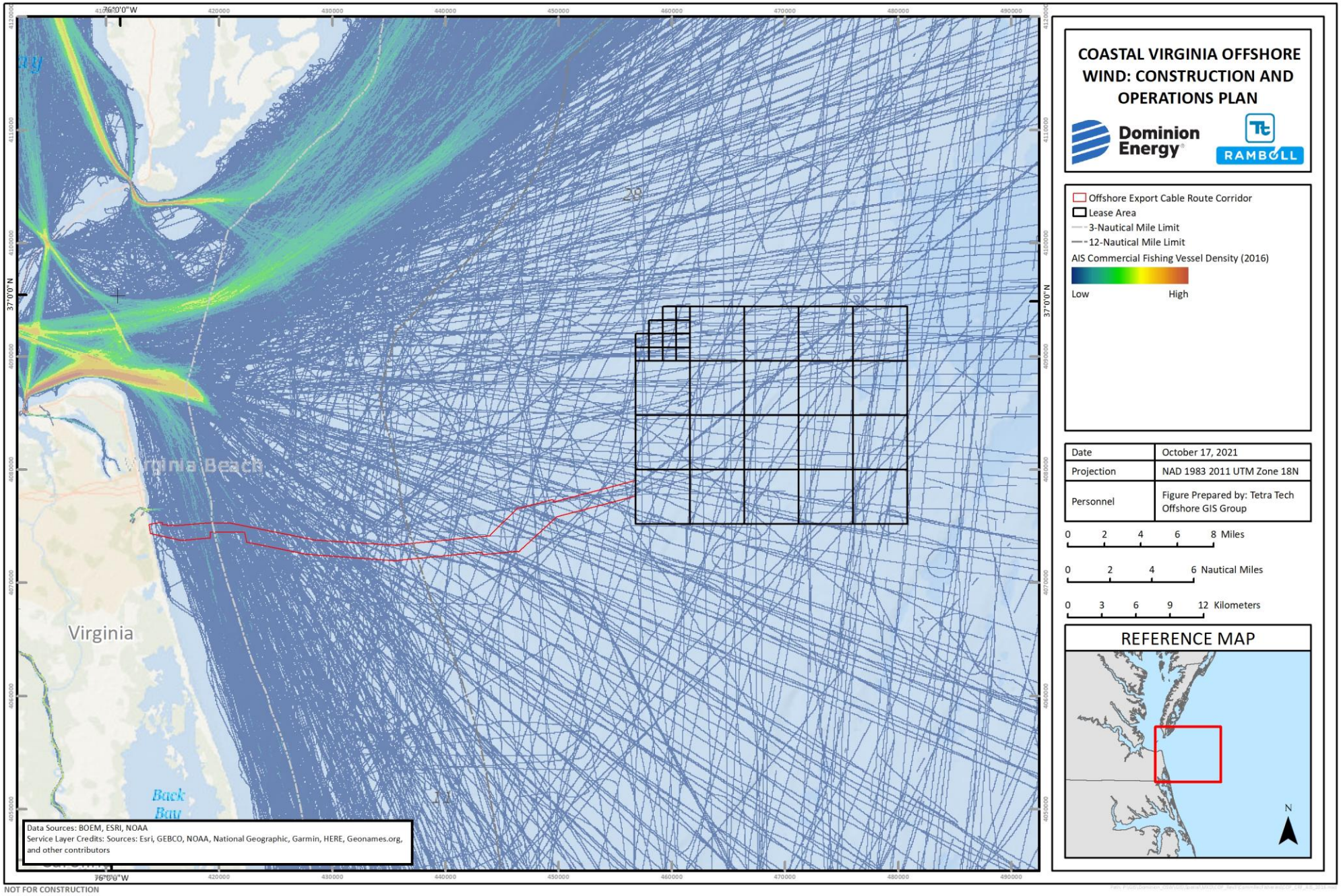


Figure 4.4-22. Automatic Identification System Fishing Vessel Transits (2016)

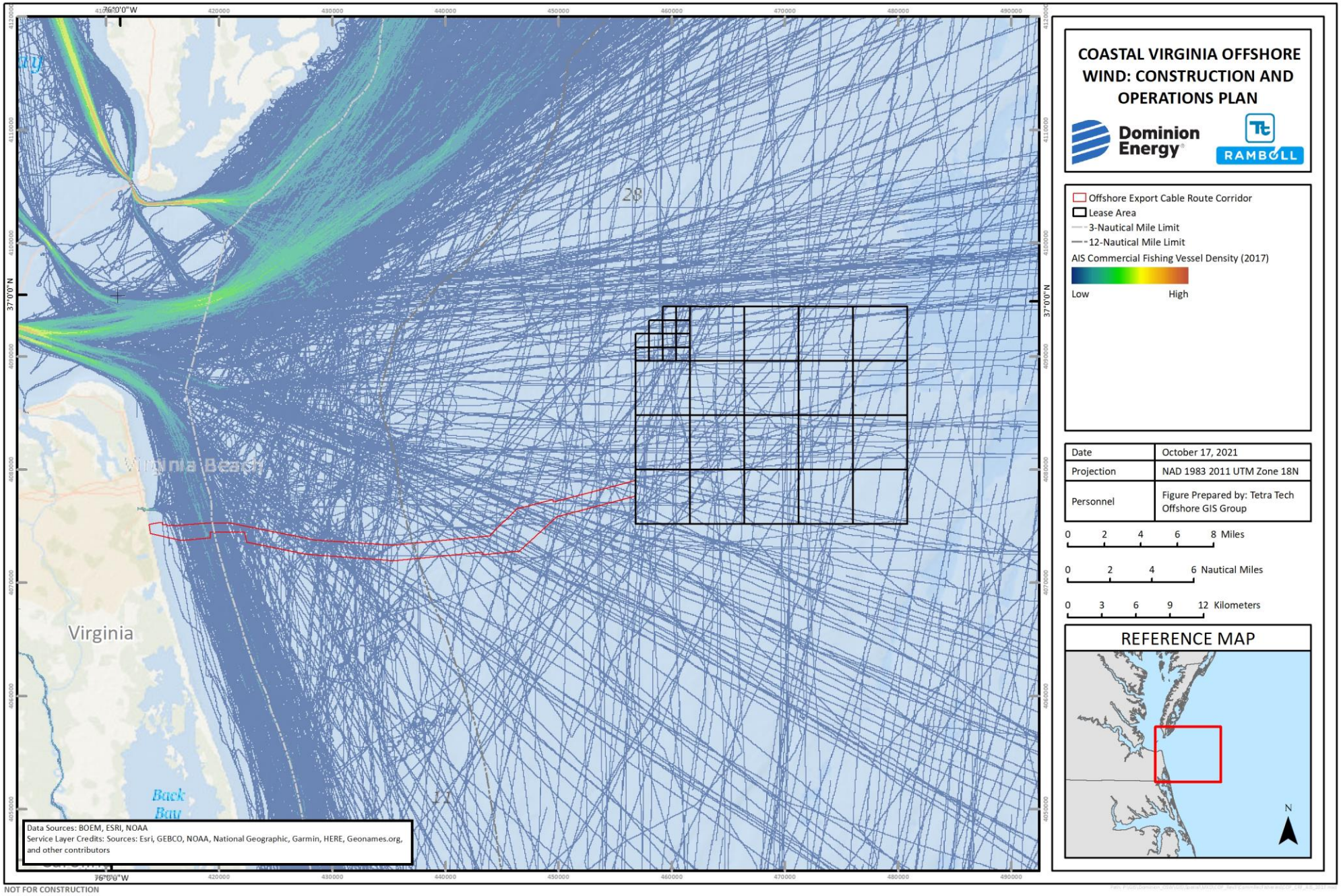


Figure 4.4-23. Automatic Identification System Fishing Vessel Transits (2017)

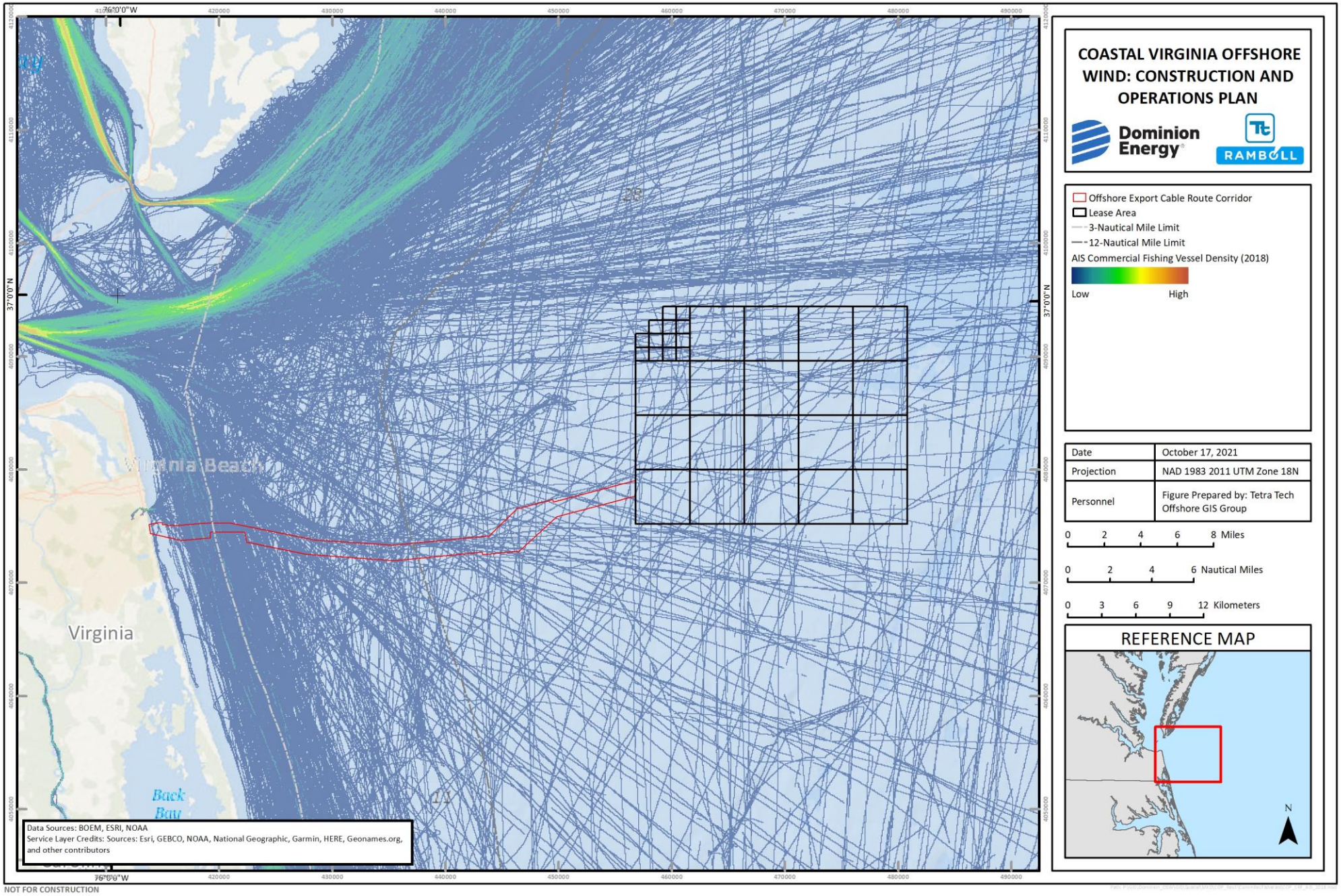


Figure 4.4-24. Automatic Identification System Fishing Vessel Transits (2018)

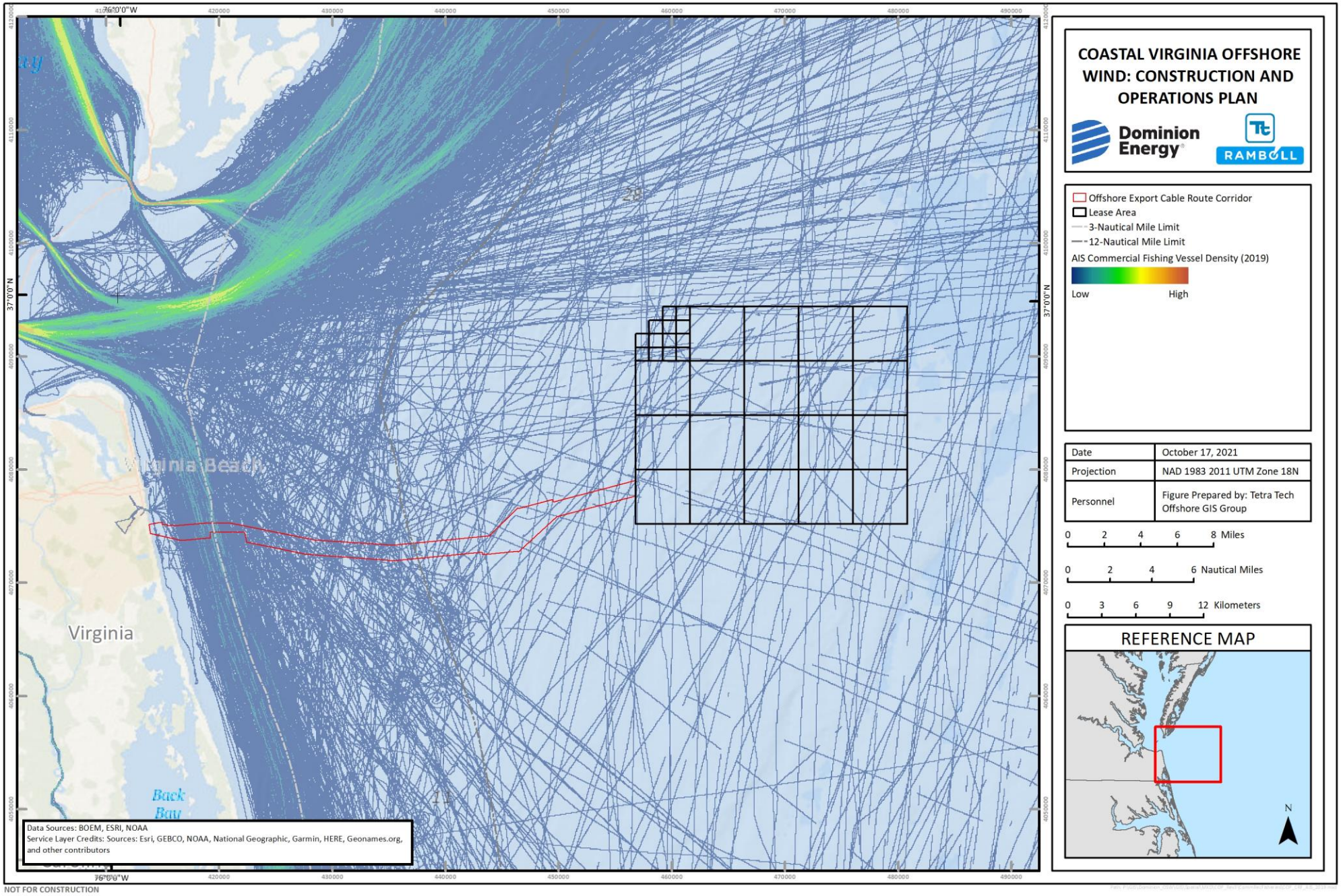


Figure 4.4-25. Automatic Identification System Fishing Vessel Transits (2019)

Outreach to the Commercial and Recreational Fishing Communities

A successful outreach strategy involves open and regular communication between Dominion Energy and the commercial and recreational fishing community starting with the survey and development stage, through permitting, construction, O&M, and decommissioning of the Project. The FLOs coordinated with fisheries stakeholders to facilitate access to regional and local fishing data that helped inform the description of the Affected Environment (Section 4.4.6.2). Direct, honest, and open communications are the foundation of Dominion Energy's FLO philosophy. Regular, open consultation is key to ensuring all parties are well informed, are able to contribute to the discussions, and can work towards the joint objective of coexistence.

As the Project evolves and more details regarding the planned layout, timing of offshore operations, and/or installation methodology become available, the ability to identify potential impacts on the fishing community also will become clearer. Throughout the Project life cycle, inclusive of permitting, survey, construction, O&M, and decommissioning, the requirements and impacts to potential fisheries may vary. The function of the FLOs is to keep the fishing community informed and coordinate activities appropriate for the specific stage in the life cycle of the Project.

Liaison activities are primarily based on best practice guidance and feedback from the fishing industry through consultation. The FLOs also draw on consultation with fisheries bodies, regulators, ports and harbors, and legislation, as well as the previous experience from the liaison activities supporting the successful installation of the CVOW Pilot Project. The best practice guidance includes, but is not limited to:

- Collaborative Fisheries Planning for Virginia's Offshore Wind Energy Area (Virginia Coastal Zone Management Program, 2016);
- Development of Mitigation Measures to Address Potential Use Conflicts between Commercial Wind Energy Lessees/Grantees and Commercial Fishermen on the Atlantic Outer Continental Shelf (BOEM 2014);
- Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (Fishing Liaison with Offshore Wind and Wet 2014);
- Fishing and Submarine Cables Working Together (International Cable Protection Committee 2009); and
- Offshore Wind BMPs Workshop (MAFMC 2014).

Dominion Energy reviewed activity associated with ports in Virginia, North Carolina, and Maryland in support of the Project. These ports were selected based on the analysis conducted in a BOEM report that identified the average commercial fishing revenue of landings at east coast ports that were caught within the Lease Area (BOEM 2016). The NEFSC further characterized the Lease Area as "lightly fished" (Kirkpatrick et al. 2017), which is consistent with the findings of Dominion Energy's outreach activities to date. Through the OCS leasing process, identification of this Lease Area was decided following thorough research and consultation regarding potential environmental and fisheries impacts to minimize potential conflicts (BOEM, n.d.).

Since 2018, fisheries outreach has included more than 125 individuals, associations, companies, and agencies in the following regional ports:

- Ocean City, Maryland;
- Cape Charles, Virginia;
- Norfolk, Virginia;
- Wanchese, North Carolina;
- Chincoteague, Virginia;
- Newport News, Virginia;
- Lynnhaven, Virginia;
- Beaufort, North Carolina;
- Wachapreague, Virginia;
- Oyster, Virginia;
- Reedville, Virginia;
- Hampton, Virginia; and
- Virginia Beach, Virginia.

Initial outreach from Dominion Energy began in 2012 with the MAFMC as part of Dominion Energy's CVOW Pilot Project and has continued in partnership with BOEM; the Virginia Department of Mines, Minerals, and Energy; Old Dominion University; and the VIMS. From 2018 to 2020, Dominion Energy attended more than 20 meetings with Fisheries Management Councils, USCG, Fishermen's Associations, Maritime Associations, federal and state agencies, and other groups and gave presentations at several of these. For more in-depth discussions regarding fishermen's concerns, coexistence, technical issues, and practical solutions, individual and small group meetings/discussions were conducted on vessels, at docks, and at fishing companies. The most intensive recreational fisheries liaison has been conducted within the areas of Hampton Roads (i.e., Norfolk, Little Creek, Lynnhaven, Rudee Inlet, and Cape Charles), focusing on nearby ports whose recreational fishermen are more likely to fish in proximity to, or transit through, the Lease Area. This outreach has included contact with various recreational fishing docks and "for hire" fishing vessels, coordination with highly migratory species (HMS) tournament organizers, and information sharing regarding the Project and 2020 survey activities. The recreational diving community, both self-contained underwater breathing apparatus (SCUBA) and free diving, also were engaged with respect to their spearfishing activities around new and existing offshore structures. Dominion Energy will continue to build on these efforts for the life of the Project. Table 4.4-23 shows all fisheries outreach and contact by state and region through the history of the Fishing Activity Survey.

Table 4.4-23. Comprehensive List of Fisheries Outreach on Behalf of Dominion Energy since 2018

Contact	Regional	VA	NC	MD	NJ	NY
American Saltwater Guides Association	✔					
Atlantic States Marine Fisheries Commission	✔					
Bureau of Ocean Energy Management	✔					
Mid-Atlantic Fisheries Management Council	✔					

Contact	Regional	VA	NC	MD	NJ	NY
New England Fisheries Management Council	✔					
National Oceanic and Atmospheric Administration (NOAA) Habitat Conservation Division	✔					
NOAA/National Marine Fisheries Service, Greater Atlantic Regional Fisheries Office (GARFO)	✔					
NOAA/National Marine Fisheries Service, GARFO Policy Analysts and Reporting Specialists	✔					
North American Submarine Cable Association	✔					
Northeast Area Monitoring and Assessment Program	✔					
Responsible Offshore Development Association	✔					
Surfside Foods	✔					
The Nature Conservancy	✔					
Woods Hole Oceanographic Institute	✔					
AquaMan Sportfishing Charters		✔				
Atlantic Scallop Company		✔				
B&C Seafood		✔				
Bays to Oceans Charters		✔				
Captain Bob's Marina		✔				
Chesapeake Bay Packing		✔				
Chincoteague Shellfish Farms		✔				
Eastern Shore Waterman's Association		✔				
Fathom Edge, LTD – Kitty Hawk Fisheries Liaison Officer		✔				
Gary Howard Seafood Co.		✔				
Great Bridge Fishermen's Association		✔				
Hampton Roads Planning District Commission		✔				
L.D. Amory and Co., Inc		✔				
Long Bay Point Bait & Tackle		✔				
Lower Chesapeake Bay Watermen's Association		✔				
Lynnhaven Dive Center		✔				
Matador Charters		✔				
Newport News Harbor Master		✔				
Norfolk Angler's Club		✔				
Ocean Fleet Services		✔				
Ocean Pearl Charters		✔				
Ocean Ventures LLC		✔				
Old Dominion University, Center for Coastal Physical Oceanography		✔				
Omega Protein, Inc.		✔				
Rudee Tours		✔				
Spot's Fish Company		✔				
Tidewater Community College		✔				
U.S. Coast Guard District 5, Virginia Sector, Waterways Management		✔				
Virginia Department of Mines, Minerals and Energy		✔				
Virginia Beach Anglers Club		✔				
Virginia Beach Anglers Club		✔				
Virginia Beach Billfish Tournament		✔				
Virginia Beach Spearfishing Club		✔				

Contact	Regional	VA	NC	MD	NJ	NY
Virginia Beach Tuna Tournament		✔				
Virginia Commonwealth University		✔				
Virginia Department of Environmental Quality – Coastal Zone Management		✔				
Virginia Department of Natural Resources		✔				
Virginia Institute of Marine Science		✔				
Virginia Marine Products Board		✔				
Virginia Marine Resources Commission		✔				
Virginia Maritime Association		✔				
Virginia Saltwater Sportfishing Association		✔				
Virginia Sea Grant		✔				
Virginia Waterman's Association		✔				
Wanchese Fish Company – Hampton, Virginia		✔				
Wine Women and Fishing – Tournament		✔				
B&J Seafood			✔			
Beaufort Inlet Seafood			✔			
North Carolina Department of Natural Resources			✔			
North Carolina Fisheries Association			✔			
United National Fishermen's Association			✔			
Wanchese Trawl and Supply			✔			
Welton's Seafood Market - Owner			✔			
Willie R. Etheridge Seafood			✔			
Garden State Seafood Association					✔	
Lund's Fisheries					✔	
New York State Department of Environmental Conservation – Fisheries						✔
New York State Energy Research Development Authority						✔
Martin Fish Company				✔		
Maryland Department of Natural Resources				✔		

Beginning in March of 2020, the Coronavirus pandemic significantly impacted the ability to conduct in-person outreach through the 2020 survey campaign. Dominion Energy continued its engagement with the fishing public via regular mariner updates distributed by email and posted on various websites and social media pages. In-person (February 2020 and October 2020) and virtual (September 2020 and April 2021) roundtable meetings were conducted, which included a specific event targeted towards the fishing community, particularly the local fisheries (e.g., black sea bass, conch, dogfish) active within the Offshore Project Area. The FLOs also maintained communications with the several active and involved stakeholders via telephone, text, video conference, and face-to-face meetings (following the necessary distancing guidelines).

Outreach to local and regional fisheries is planned to continue during the development, construction, and O&M stages of the Project. This communication would occur through direct/indirect communications as well as online webinars and meetings.

4.4.6.2 Affected Environment

The affected environment is described as the coastal and offshore areas in which recreational and commercial fishing activities occur and that may be directly or indirectly impacted or displaced by the construction, O&M, and decommissioning of the Project. The Offshore Project Area includes the Lease Area and Offshore Export Cable Route Corridor to the Offshore Trenchless Installation Punch-Out. The biology and life history of fish and invertebrate species that are commercially and recreationally fished in this region is fully described in Section 4.2.4, Benthic Resources, and Fishes, Invertebrates, and Essential Fish Habitat.

Recreational Fishing

Virginia and North Carolina recreational saltwater anglers fish in or traverse the waters in and around the Offshore Project Area while targeting several different species. Recreational fishing in the Offshore Project Area is accessed by privately owned recreational boats, for-hire boats including charter boats, and head boats (multiple parties aboard one vessel, also known as "party boats") primarily from various ports and inlets located in the Hampton Roads area of Virginia.

There are various recreational fisheries uses documented within the Offshore Project Area, particularly within the portion of the Lease Area called the "Triangle Wrecks" (also known as "Triangle Reef"), part of a designated fish haven. The Virginia Beach area ports of Rudee Inlet and Lynnhaven support a substantial fleet of recreational fishing vessels. These fishermen routinely visit the Triangle Wrecks area and other areas of known seabed structure or "hard bottom" within the Lease Area to target species that congregate there. These vessels also fish other areas of structure both east of the Offshore Project Area and east of the Lease Area. Following installation of the two CVOW Pilot Project turbines in 2020, recreational fishermen have been targeting this new structure as well.

Recreational fishing vessels fish in the Offshore Project Area, especially in the zone close to Triangle Wrecks. The VMRC maintains 23 artificial reef sites (18 inshore and 5 offshore). Triangle Reef is in the northern portion of the Lease Area. Besides the Triangle Wrecks, recreational fishermen tend to fish directly adjacent to shore in proximity to the Offshore Export Cable Route Corridor.

Vessels targeting HMS, including various species of tuna (*Thunnus* spp.) and billfish (*Istiophoridae*), as well as deep water demersal species (e.g., tilefish) transit through the Lease Area at high speed. There are various HMS tournaments that are hosted in the Virginia Beach area that result in a substantial amount of high-speed vessel traffic through the Lease Area to the offshore fishing grounds. These tournaments occur regularly from late-June to early-September and are very popular, benefitting the local economy.

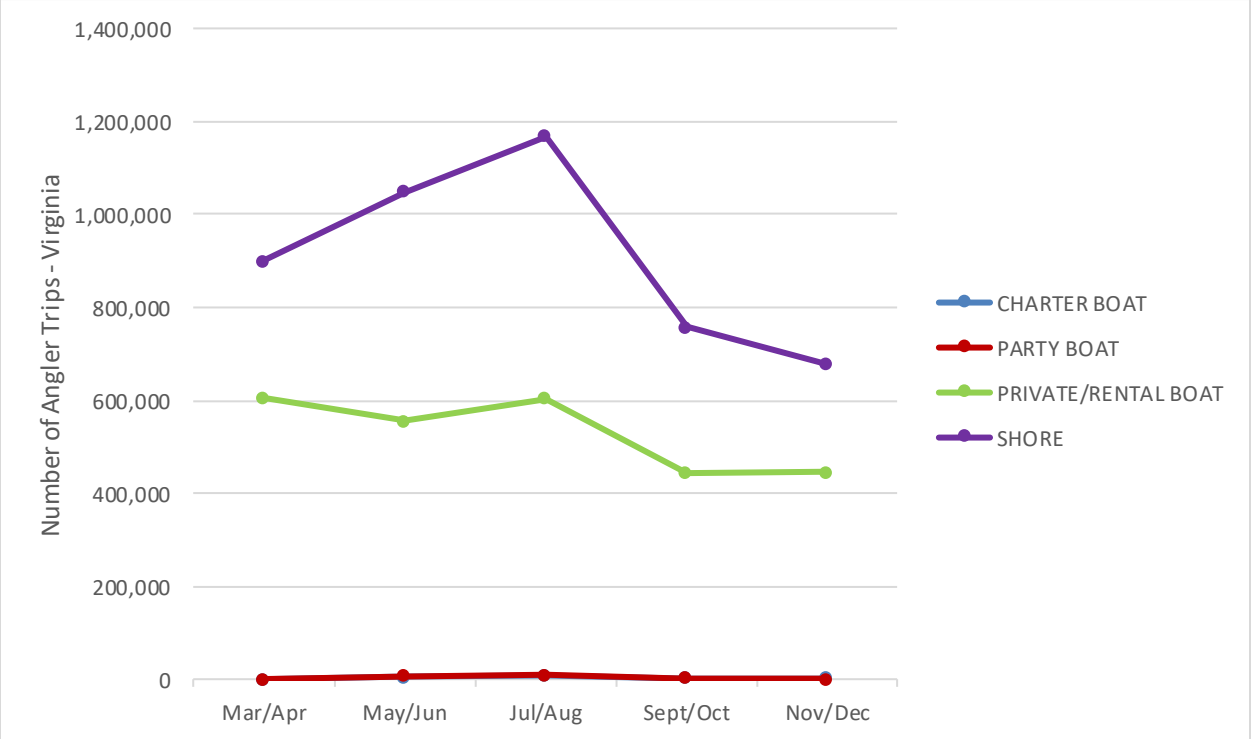
Fishermen targeting HMS species as well as deep water, demersal species found near the shelf break, who regularly transit without obstruction through the area to their offshore fishing grounds, have expressed concern that they may need to navigate around these new offshore structures. Fishermen from Rudee Inlet have suggested a clear path be considered from the inlet to the head of Norfolk Canyon. Fishermen also have expressed concern about limited access to their fishing grounds during construction, but understand that their activities will not be restricted during Project O&M. Still, some concern remains about any temporary restrictions and potential impacts to their activities during construction of the Offshore Project Components. In most cases, however, outreach suggests that recreational fishermen are expected to take advantage of the new structures created by the Project, which are likely to attract various species of fish.

More information on reef effects can be found in Section 4.2.4, Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat and Appendix E Essential Fish Habitat Assessment.

In addition to the traditional hook-and-line recreational fisheries, there are recreational divers and their associated fishery in the area. The wrecks and other structures in the Virginia Beach area support SCUBA divers as well as free divers; both use spearguns for harvesting fish during their dives. SCUBA divers capable of deeper dives would target submerged structures in the Triangle Wrecks fish haven area, while the free divers would target surface structures such as WTG Foundations and Offshore Substation Foundations. More information on recreational uses of the Offshore Project Area can be found in Section 4.4.5, Recreation and Tourism.

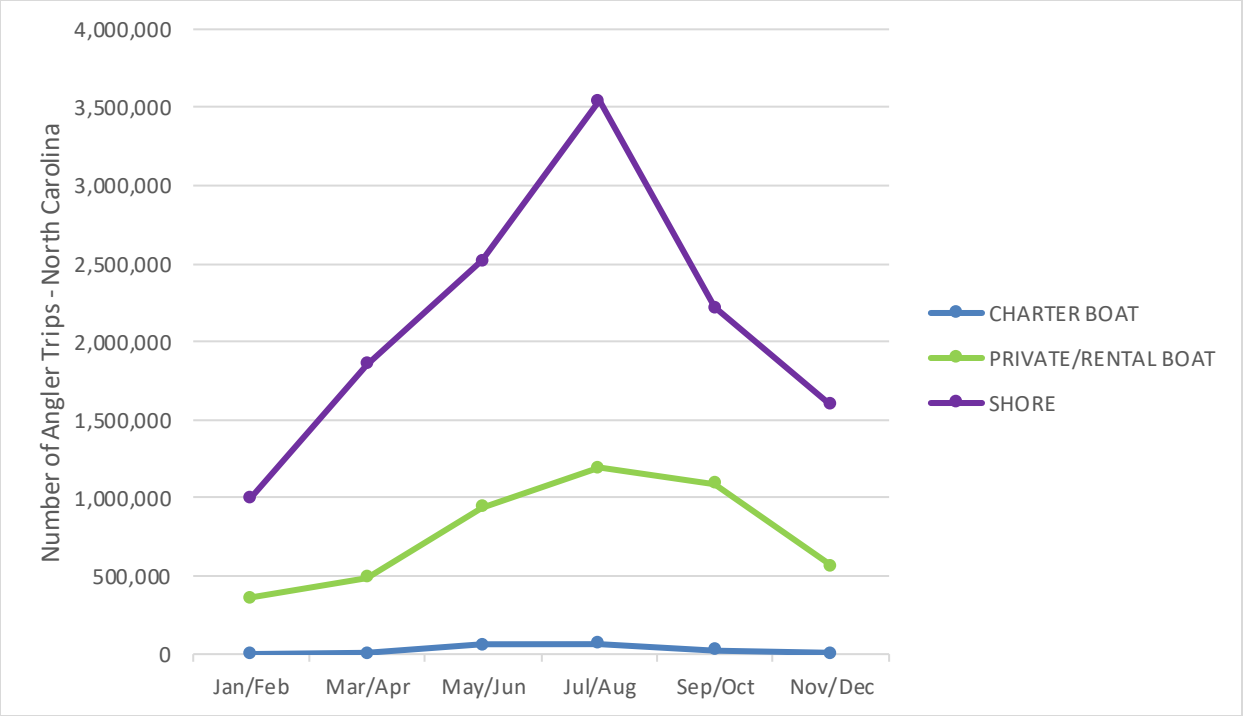
Economic Overview

The economic value associated with recreational saltwater fishing is driven by angler expenditures. In 2018, there were a total of 6.4 million recreational saltwater angler trips in Virginia, and 16.6 million recreational saltwater angler trips in North Carolina, with shore fishing representing the majority (more than half) of those trips in both states, followed by private boats (Figure 4.4-26 and Figure 4.4-27) (NOAA Fisheries 2019a). Note that North Carolina reports party boat data with charter boat data.



(Source: NOAA Fisheries 2019a)

Figure 4.4-26. Recreational Angler Trips During 2019 in Virginia



(Source: NOAA Fisheries 2019a)

Figure 4.4-27. Recreational Angler Trips During 2019 in North Carolina

Recreational saltwater fishermen travel from within, and outside of, Virginia and North Carolina to fish. Recreational saltwater fishing in this analysis includes tournaments and individual trips on pleasure boats, charter boats, or head boats, as well as surf casting and shore fishing. The trends in recreational saltwater fishing at the regional level are like those observed at the local level in Virginia and North Carolina. In 2018, recreational fishing for the mid-Atlantic region consisted primarily of shore-based fishing (60 percent), followed by private vessels/rentals (38 percent). Party/charter trips made up 2 percent of recreational saltwater fishing activities (NOAA Fisheries 2019a). Recreational saltwater fishing in the region occurs year-round but is most intensive from April through November, with a peak in the months of May and June (NOAA Fisheries 2019a).

Target Species

The most highly targeted species for recreational saltwater fishing activities in the Offshore Project Area include, but are not limited to, sciaenid drums (red drum [*Sciaenops ocellatus*], Atlantic croaker [*Micropogonias undulatus*], seatrout [*Cynoscion nebulosus*]), bluefish (*Pomatomus saltatrix*), tuna/mackerel (*Scombridae*), cartilaginous fishes (sharks, skates, and rays [*Elasmobranchii*]), porgies (*Sparidae*), jacks (*Caranx hippos*), and black sea bass (*Centropristis striata*), as shown in Table 4.4-24. Recreational shell fishing also occurs (predominantly in state waters and not in the Offshore Project Area) and commonly targets blue crabs (*Callinectes sapidus*), scallops (*Pectinidae*), quahogs (*Mercenaria mercenaria*), Atlantic surfclam (*Spisula solidissima*), and softshell clams (*Mya arenaria*). See Section 4.4.6.3 below for a discussion of habitat and potential impacts on these species and Section 4.2.4, Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat.

Table 4.4-24 Comprehensive Recreational Saltwater Catch for Virginia and North Carolina During 2019 by Number of Individuals and Type of Fishing

Virginia – 2019 Total Catch					
Species Group	**Charter Boat**	**Party Boat**	**Private/ Rental Boat**	**Shore**	**Total**
Bluefish	3,151	515	54,939	1,100,382	**1,158,987**
Cartilaginous fishes	33	336	24,872	242,874	**268,115**
Dolphins	3,805	0	20,706	0	**24,511**
Drums	1,525	64	361,794	4,196,659	**4,560,042**
Eels	1	12	0	0	**13**
Flounders	32	9	76,842	303,582	**380,465**
Grunts	0	143	37,081	110,363	**147,587**
Herrings	0	0	3,989	0	**3,989**
Jacks	0	61	127	11,040	**11,228**
Other fishes	8,240	53	59,067	20,111	**87,471**
Porgies	0	196	26,813	0	**27,009**
Puffers	0	31	1,390	39,678	**41,099**
Sea basses	0	25,140	383,749	71,685	**480,574**
Sea robins	0	10	1,964	5,236	**7,210**
Temperate basses	0	0	0	260,836	**260,836**
Toadfishes	0	43	1,983	0	**2,026**
Triggerfishes/filefishes	14	548	3,806	0	**4,368**
Tunas and mackerels	28,672	3	318,388	400,759	**747,822**
Wrasses	0	42	7,557	0	**7,599**
Total	**45,473**	**27,206**	**1,385,067**	**6,763,205**	**8,220,951**
North Carolina – 2019 Total Catch					
Species Group	**Charter Boat**		**Private/ Rental Boat a/**	**Shore**	**Total**
Barracudas	1,782		29,406	0	**31,188**
Bluefish	52,957		987,758	6,937,630	**7,978,345**
Cartilaginous fishes	8,360		221,719	1,818,660	**2,048,739**
Catfishes	143		0	7,762	**7,905**
Cods and hakes	58		0	8,204	**8,262**
Dolphins	163,998		329,374	0	**493,372**
Drums	13,957		640,036	14,664,542	**15,318,535**
Eels	71		0	0	**71**
Flounders	1,007		101,095	661,235	**763,337**
Grunts	14,863		182,364	288,881	**486,108**
Herrings	54		257,257	314,825	**572,136**
Jacks	12,432		111,499	3,414,080	**3,538,011**
Mullets	0		43,498	722,386	**765,884**
Other fishes	66,325		267,342	738,495	**1,072,162**
Porgies	9,379		298,993	4,196,379	**4,504,751**
Puffers	52		100,467	3,617,114	**3,717,633**
Sea basses	69,094		1,275,236	244,011	**1,588,341**
Sea robins	0		4,439	163,930	**168,369**
Snappers	18,785		77,632	0	**96,417**
Temperate basses	129		1,286	5,531	**6,946**

North Carolina – 2019 Total Catch				
Species Group	Charter Boat	Private/ Rental Boat a/	Shore	Total
Toadfishes	213	34,281	2,958	**37,452**
Triggerfishes/filefishes	53,377	14,745	100,776	**168,898**
Tunas and mackerels	194,071	1,203,473	1,753,351	**3,150,895**
Wrasses	118	679	598	**1,395**
Total	**681,225**	**6,182,579**	**39,661,348**	**46,525,152**

Note: a/ Virginia separates "Party Boat" from "Charter Boat"; North Carolina combines these.
Source: NOAA 2020b

Recreational Fishing Tournaments

Virginia and North Carolina host dozens of annual saltwater fishing tournaments that target a variety of species, including tuna and billfish in the waters offshore of the Offshore Project Area (American Fishing Contests 2020). There were five NOAA Fisheries-registered fishing tournaments in Virginia in 2020: the Virginia Beach Tuna Tournament; the Virginia Beach Invitational Marlin Tournament; the Wine, Women & Fishing Tournament; the Virginia Beach Billfish Tournament, and the Oceans East Swordfish Tournament (NOAA Fisheries, n.d. b). The majority of offshore recreational fishing tournaments in Virginia are held in Virginia Beach, but vessels transit offshore, through the Offshore Project Area, to catch many of these highly migratory species (Table 4.4-25).

Table 4.4-25. Location and Target Species for Highly Migratory Species-registered Virginia Fishing Tournaments

Target Species	Virginia Beach Tuna Tournament	Virginia Beach Invitational Marlin Tournament	Wine, Women, & Fishing Tournament	Virginia Beach Billfish Tournament	Oceans East Swordfish Tournament
Blue marlin		X	X	X	
White marlin		X	X	X	
Sailfish		X	X	X	
Long spearfish		X		X	
Roundscale spearfish				X	
Swordfish		X			X
Bluefin tuna	X	X	X	X	
Bigeye tuna	X	X	X	X	
Albacore tuna	X		X	X	

Tournament operators generate an average net return of $16,045 for each event, and each team participating in HMS tournaments spend, on average, $13,360 for each event (Hutt and Silva 2019). These expenditures not only benefit the tournament organizers, but the surrounding communities as well. Participants' top costs associated with HMS tournaments were boat fuel, lodging, food, and bait, which contributes to the local economy (Hutt and Silva 2019). Virginia hosts dozens of other tournaments out of Newport News and state-wide (American Fishing Contests 2020). Aside from NOAA Fisheries-registered HMS tournaments, tournaments are often expensive to compete in and can be lucrative to the tournament organizers and local communities.

Fishing Techniques

Most of the recreational saltwater fishing in Virginia occurs onshore (Table 4.4-24) typically with rods and reels (NOAA Fisheries 2020b). A report published by VIMS outlines the top recreational fish species in Virginia along with the associated fishing techniques (Kirkley and Kerstetter 1997). The most common recreational fishing methods in Virginia include:

- **Bottom fishing with bait:** Bottom fishing involves baiting a hook with live or chunk bait and using weights to set it at the bottom of the seafloor to attract target species. Often, fishermen use a specialized rig for certain demersal species (e.g., flounder, black sea bass, croaker);
- **Trolling:** Trolling involves towing a baited or lured line through the water from a boat; either on the surface, or at a specific depth;
- **Drift fishing:** Similar to trolling, drift fishing is a mobile fishing activity, typically done while the boat is drifting freely with the current;
- **Jigging:** Jigs use a weighted lure to attract fish. Usually, jigs are "dropped" vertically from the boat to a desired depth for fishing. Once the jig is at depth, vertical motion enhances the lure's movement in the water column;
- **Surf casting:** Surf casting is a common rod and reel fishing activity that involves standing on the shore and casting into the surf, using a variety of baits or lures;
- **Sight casting:** Sight casting is a method by which fishermen aim for certain spots in the water that may have fish, or a spot where they see a fish or fish activity;
- **Spearfishing:** Divers use a spear, harpoon, or other missile while completely submerged in the marine waters of the state for any species, generally excluding lobster; and
- **Shellfishing:** Participants use crab pots for blue crab, or hand digging tools for "clamming" (hard and soft clams, oysters, surfclams, bay scallops and mussels).

An activity that also was observed during the 2020 survey campaign was the use of surface buoys deployed by recreational vessels to act as a temporary structure, creating a temporary fish aggregating device to attract various species that are attracted to structures. Vessels deploy a buoy, sometimes attached to a pot on the seabed, and either fish from that temporary structure immediately or return later in the day to fish and recover the pot, which may have captured some fish during the day.

For Hire Vessels

For hire vessels, including charter and party boats, are common in recreational fishing off the coast Virginia. Charter boats are defined as a fishing vessel for hire at a set rate per trip and usually carries six or fewer fishermen (VIMS 1981). Typically, party boats can carry between 20 and 150 passengers and sail on a daily schedule for designated species. Although they are small in scale compared to shore fishing, there is a market for the experience in the area and a willingness to pay for chartered fishing excursions (VIMS 1981). This commercial-based fishery services many participants in the area, and conversations with local stakeholders determined that charter vessels typically visit the Triangle Wrecks area and are expected to utilize the WTGs and Offshore Substations once constructed. If the charter or party boats go farther offshore, they may transit through the Offshore Project Area to get to their destination. Party and boat trip densities around the Offshore Project Area are shown in Figure 4.4-28.

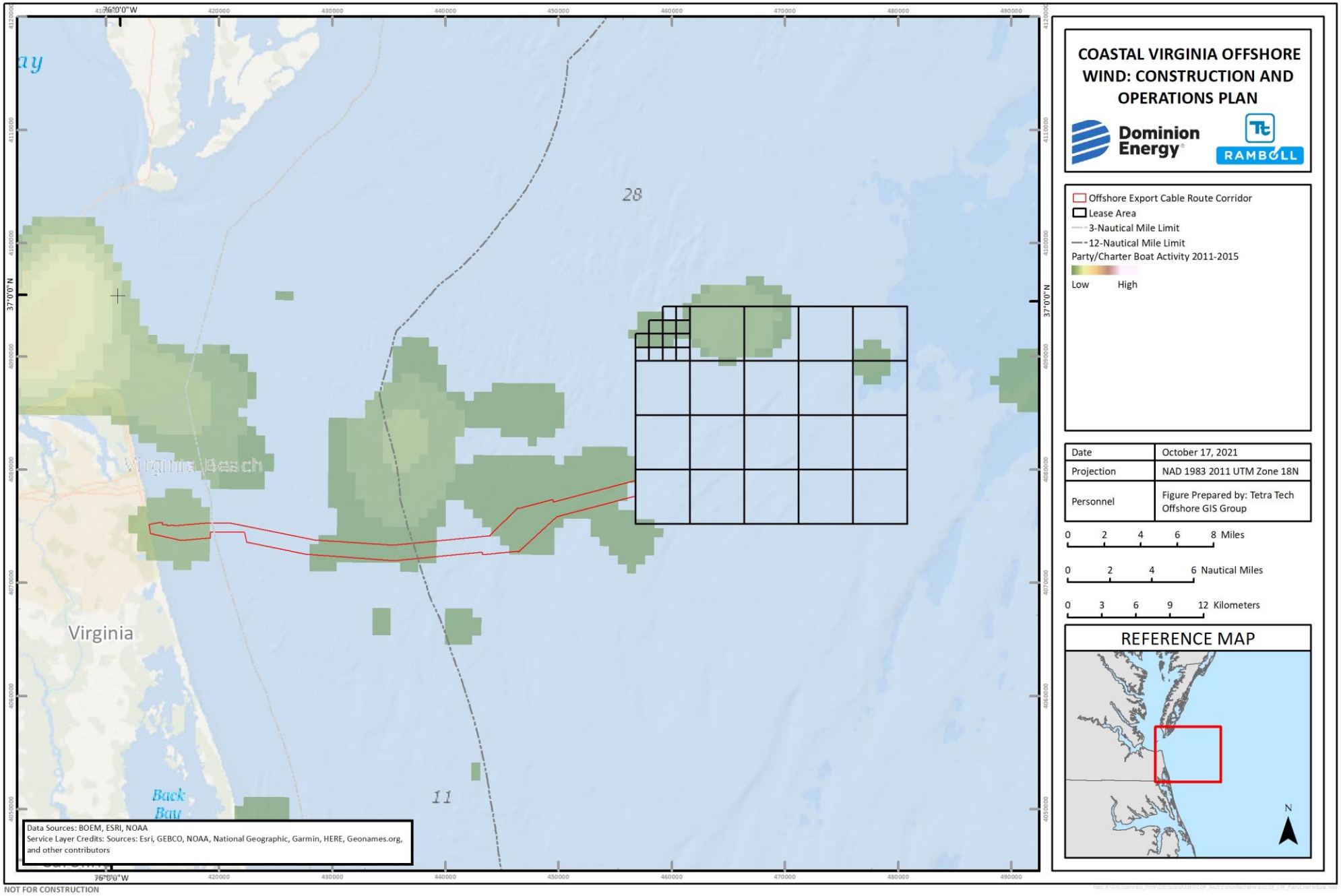


Figure 4.4-28. Party and Charter Boat Trips Counts 2011–2015 (MARCO 2020)

As shown in Figure 4.4-28, the highest concentration of party and charter boat trips off the coast of Virginia were at the mouth of the Chesapeake Bay and nearshore of Virginia Beach including the Offshore Export Cable Route Corridor with between 399 and 2,975 trips. The majority of the Offshore Project Area had between 6 and 399 trips and the eastern portion had between 2 and 6 trips. It should be expected that recreational fishing activities in the Lease Area will increase once the WTGs are in place.

Personal Vessels

Personal vessels are the most common way recreational fishermen fish when not on land. Owner-operator vessels fish in similar locations as the "for hire" vessels, including the Triangle Wrecks area and other areas of seabed relief/structure in and around the Lease Area. Their fishing activity is expected to increase in the Lease Area once the WTGs are in place.

Other

Besides fishing from for-hire or personal vessels, recreational fishermen target nearshore species by surf casting along Virginia Beach. Spearfishing is typically done in portions of the Offshore Project Area, in areas of structure from either personal vessels or charter vessels as dive platforms. Spearfishers are typically divers (SCUBA and free divers) and often target structures offshore and fish at the Triangle Wrecks, whereas surface divers typically fish at surface structures (e.g., Chesapeake Bay Light Tower, offshore buoys) (see Figure 4.4-29). The Triangle Wrecks are contained within the fish haven and are often referred to interchangeably. The CVOW Pilot Project's turbines have already become a target for these activities, and the Project attracts divers as well.

Commercial Fishing

Mid-Atlantic commercial fisheries include groundfish, pelagic species, and a variety of macroinvertebrates including lobster and scallop. These stocks attract commercial fishermen from throughout the northeast and mid-Atlantic states. However, the Lease Area itself is considered to be "lightly fished," ranking last in annual landings value ($56 per square mile [$144 per square km]) among the eight BOEM WEAs examined in 2014 (DePiper 2014; Kirkpatrick 2014). This relatively low fishing intensity was considered in BOEM's evaluation process for establishing the Virginia WEA. In contrast, the New York Call Area was valued at $4,222 per square mi ($10,937 per square km) (DePiper 2014; Kirkpatrick 2014).

Economic Overview

Commercial fishing is important to the economies of the states immediately surrounding the Offshore Project Area. In 2019, the top fishing ports (by weight and dollar value landed) that fished in the Offshore Project Area included vessels that landed their catch in Virginia, North Carolina, New Jersey, Rhode Island, and Massachusetts. The top regional ports (filtered for those five states) by landing value and weight are provided in Table 4.4-26.

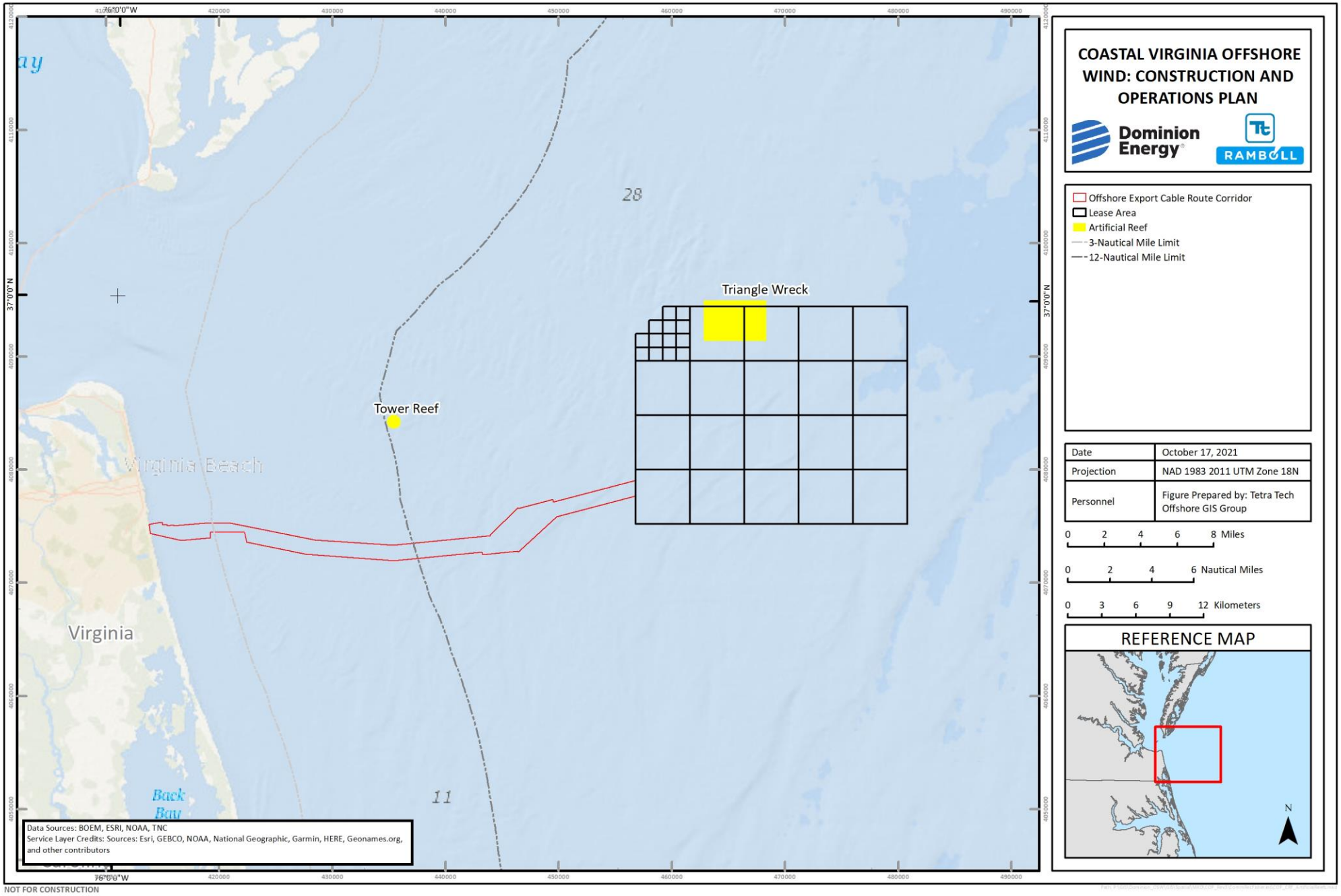


Figure 4.4-29. Artificial Reef Areas Overlaying the Offshore Project Area (MARCO 2020). Triangle Wreck is Located within the Fish Haven.

Table 4.4-26. Top Regional Fishing Ports in 2019 (filtered for Virginia, North Carolina, New Jersey, Rhode Island, and Massachusetts) by Landing Value and Weight

Top Regional Ports by Landing Value		Top Regional Ports by Landing Weight	
Port	**$ (MM)**	**Port**	**Pounds (MM)**
New Bedford, Massachusetts	450.8	Reedville, VA	364.9
Cape May-Wildwood, New Jersey	90.0	New Bedford, MA	115.8
Point Judith, Rhode Island	65.9	Cape May-Wildwood, NJ	94.5
Gloucester, Massachusetts	56.6	Gloucester, MA	50.2
Hampton Roads area, Virginia	56.1	Point Judith, RI	48.1
Reedville, Virginia	36.9	Point Pleasant, NJ	37.3
Point Pleasant, New Jersey	35.4	Atlantic City, NJ	23.5
Provincetown-Chatham, Massachusetts	32.0	North Kingstown, RI	19.2
Long Beach-Barnegat, New Jersey	24.9	Provincetown-Chatham, MA	18.8
Beaufort-Morehead City, North Carolina	24.7	Boston, MA	18.8
Wanchese-Stumpy Point, North Carolina	21.8	Wanchese-Stumpy Point, NC	17.5
Boston, Massachusetts	19.3	Hampton Roads area, VA	17.4
Atlantic City, New Jersey	17.2	Beaufort-Morehead City, NC	9.9
North Kingstown, Rhode Island	14.1	Long Beach-Barnegat, NJ	7.0
Accomac, Virginia	11.9	Engelhard-Swanquarter, NC	6.8
Total	**95.8**	**Total**	**85.0**

Source: NOAA Fisheries 2020c

As discussed in Section 4.4.6.1, research from Kirkpatrick et al. (2017) evaluated exposure of fisheries to wind farm development and associated impacts within the Lease Area. In this context, "exposure" describes "the individuals and groups likely to be affected by Lease Area development," while "impacts" describe "the magnitude and direction (gain or loss) of the Lease Area's impact on those potentially affected individuals and groups." In this COP, the two ports most "exposed" to development within the Lease Area are the ports of Virginia Beach and Norfolk, Virginia (Kirkpatrick et al., 2017). The authors also note that no other port besides Virginia Beach, Virginia, relies on the Lease Area for more than 0.1 percent of its federally reported landings; therefore, the Lease Area is characterized as lightly fished.

NOAA Fisheries data from 2010 to 2019 (NOAA Fisheries 2020b) reported total landings for Virginia, North Carolina, New Jersey, Rhode Island, and Massachusetts, as shown in Figure 4.4-30 (pounds) and Figure 4.4-31 (value). For the most recent full calendar year (2019), the top commercial fish species by weight are listed below in Table 4.4-27 dominated by the following species in each state (NOAA Fisheries 2020c):

- **Virginia:** menhaden (*Clupeidae*), blue crab, and spiny dogfish;
- **North Carolina:** blue crab, northern white shrimp (*Litopenaeus setiferus*), and whelks (*Busycon carica*);
- **New Jersey:** menhaden, shortfin Illex squid (*Illex illecebrosus*), and surfclam (*Brevoortia tyrannus*);
- **Rhode Island:** shortfin Illex squid, longfin squid (Loliginidae), and butterfish (*Peprilus triacanthus*); and

- **Massachusetts:** sea scallop, haddock (*Melanogrammus aeglefinus*), and shortfin Illex squid.

The top species based on dollar value of landings during 2019 (also listed in Table 4.4-27, below) was dominated by the following species in each state (NOAA Fisheries 2020c):

- **Virginia:** eastern oyster (*Crassostrea virginica*), sea scallop, and blue crab;
- **North Carolina:** blue crab, northern white shrimp, and flounders;
- **New Jersey:** sea scallop, menhaden, and surfclams;
- **Rhode Island:** sea scallop, longfin squid, and American lobster; and
- **Massachusetts:** sea scallop, American lobster, and eastern oyster.

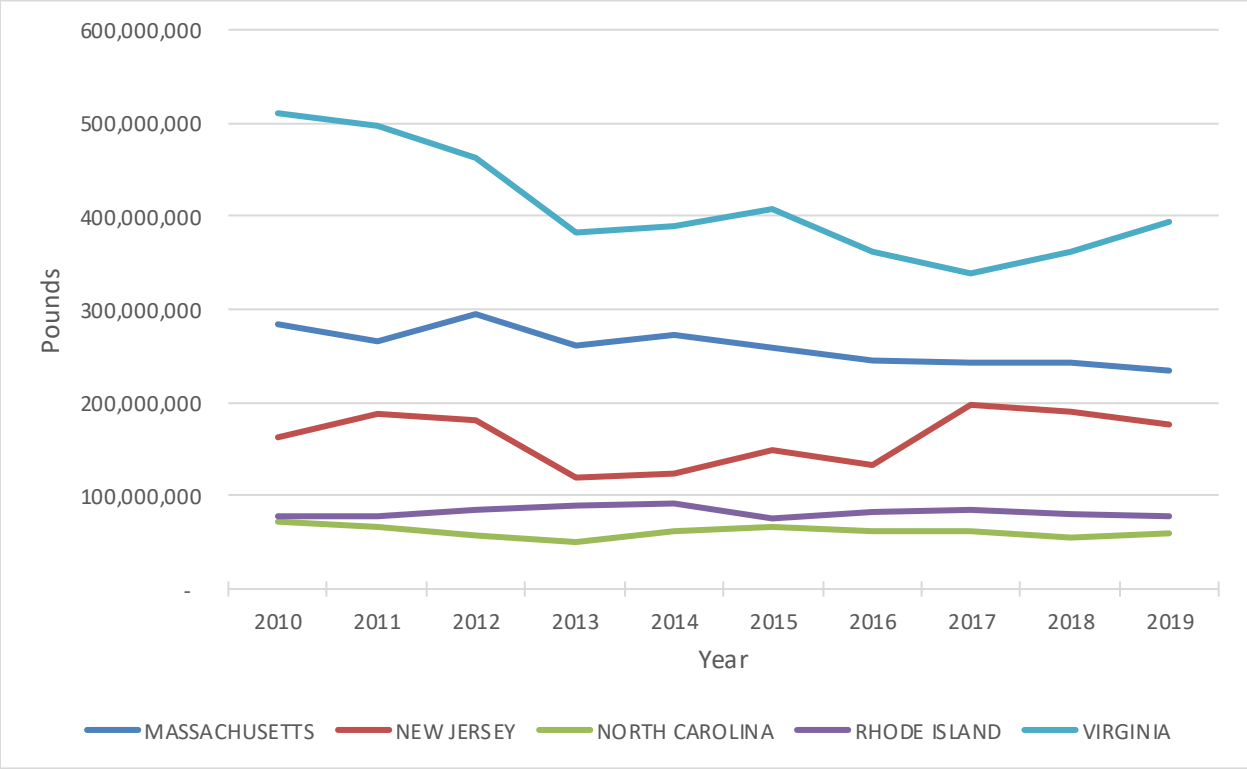


Figure 4.4-30. Total Pounds Landed by State for All Species, 2010–2019 (NOAA Fisheries 2020b)

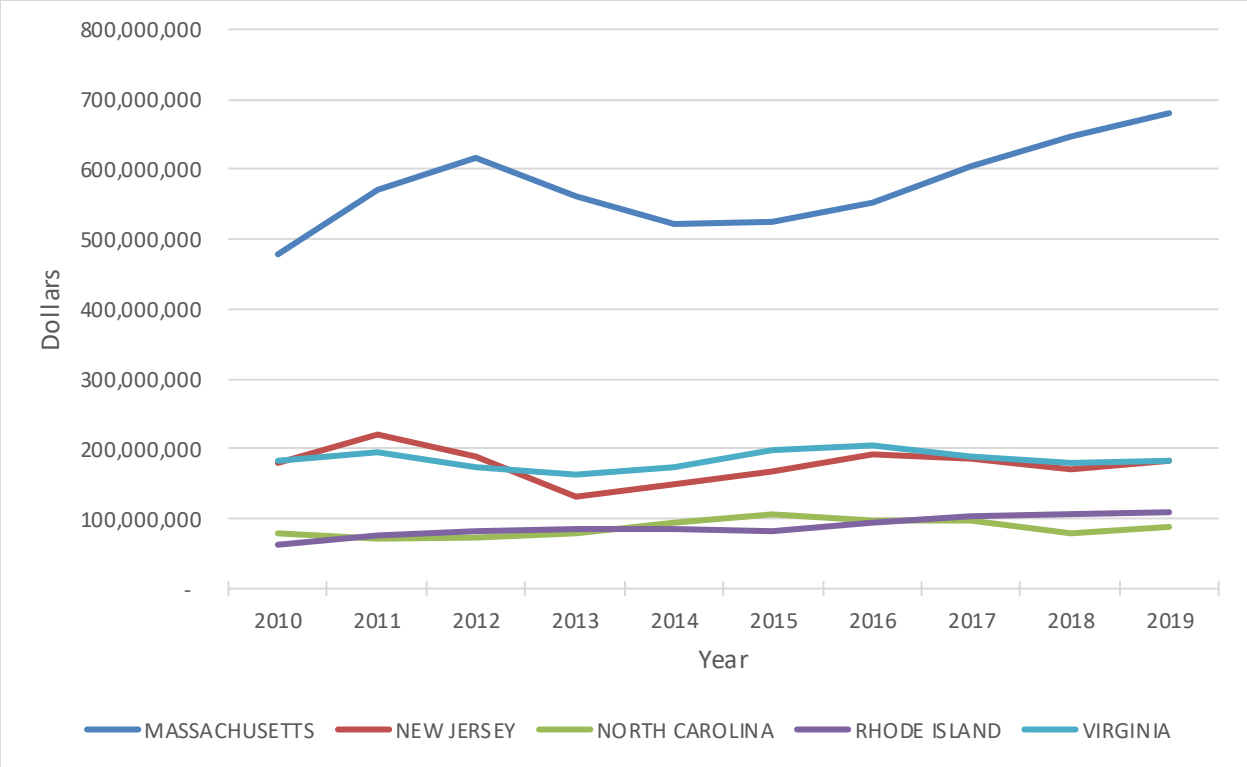


Figure 4.4-31. Total Dollar Value by State for All Species, 2010–2019 (NOAA Fisheries 2020c)

Target Species

The top 10 species by weight and by value for Virginia, North Carolina, New Jersey, Rhode Island, and Massachusetts for the most recent full calendar year available (2019) are listed in Table 4.4-27.

Table 4.4-27. Top Commercial Fish Species in Virginia, North Carolina, New Jersey, Rhode Island, and Massachusetts by Weight and by Value for 2019

Rank	Species	Weight (ponds.)	Species	Value ($)
Virginia				
1	Menhadens **	332,511,812	Oyster, eastern	$38,633,573
2	Crab, blue	27,119,477	Scallop, sea	$34,983,183
3	Shark, dogfish, spiny	6,205,723	Crab, Blue	$33,407,564
4	Scallop, Sea	3,893,803	Menhadens **	$26,921,609
5	Clam, quahog, northern	3,773,220	Clam, quahog, northern	$25,583,740
6	Oyster, eastern	3,434,635	Flounder, summer	$5,029,834
7	Catfish, blue	3,020,489	Bass, striped	$4,580,941
8	Withheld for Confidentiality	2,281,530	Spot	$2,523,285
9	Flounder, summer	1,918,045	Bass, black sea	$2,011,166
10	Bass, striped	1,389,039	Withheld for Confidentiality	$1,598,817
	Total	**385,547,773**	**Total**	**$175,273,712**
North Carolina				
1	Crab, blue	22,989,396	Crab, blue	$24,672,745
2	Shrimp, northern white	8,036,719	Shrimp, northern white	$18,875,953
3	Whelks **	7,163,887	Flounders, *Paralichthys* **	$10,373,758
4	Flounders, *Paralichthys* **	2,825,173	Oyster, eastern	$4,878,986

Rank	Species	Weight (ponds.)	Species	Value ($)
5	Shrimp, northern brown	1,493,772	Shrimp, northern brown	$2,963,329
6	Mullet, striped	1,362,150	Mackerel, king	$1,570,389
7	Croaker, Atlantic	1,277,829	Croaker, Atlantic	$1,569,081
8	Catfishes, forktail **	1,128,246	Scallop, sea	$1,478,128
9	Shark, dogfish, spiny	1,124,291	Tuna, bluefin	$1,416,363
10	Bluefish	1,107,902	Snapper, vermilion	$1,395,104
	Total	**48,509,365**	**Total**	**$69,193,836**
New Jersey				
1	Menhadens **	77,991,508	Scallop, sea	$96,385,770
2	Squid, shortfin Illex	21,593,662	Withheld for Confidentiality	$14,343,859
3	Clam, surf, Atlantic	17,573,087	Menhadens **	$13,440,282
4	Withheld for Confidentiality	17,369,469	Clam, surf, Atlantic	$11,910,084
5	Scallop, sea	10,463,754	Squid, shortfin Illex	$9,207,456
6	Mackerel, Atlantic	5,513,642	Crab, Blue	$8,031,977
7	Crab, blue	5,314,466	Squid, longfin Loligo	$7,174,649
8	Squid, longfin Loligo	4,870,487	Flounder, summer	$5,093,942
9	Goosefish	1,894,850	Bass, black sea	$2,679,234
10	Scup	1,836,807	Lobster, American	$1,689,866
	Total	**164,421,731**	**Total**	**$169,957,119**
Rhode Island				
1	Squid, shortfin Illex	18,695,754	Scallop, sea	$24,516,679
2	Squid, longfin Loligo	13,316,258	Squid, longfin Loligo	$20,164,943
3	Butterfish	6,546,135	Lobster, American	$10,988,713
4	Hake, silver	5,711,000	Squid, shortfin Illex	$10,908,240
5	Skate, little	5,576,295	Oyster, eastern	$5,728,941
6	Scup	4,583,835	Flounder, summer	$5,616,456
7	Skate, winter	4,343,749	Clam, quahog, northern	$5,364,200
8	Crab, Jonah	4,220,872	Butterfish	$4,807,987
9	Goosefish	3,159,048	Hake, silver	$3,452,806
10	Scallop, sea	2,714,022	Crab, Jonah	$3,391,499
	Total	**68,866,968**	**Total**	**$94,940,464**
Massachusetts				
1	Scallop, sea	41,851,123	Scallop, sea	$397,180,289
2	Haddock	18,727,801	Lobster, American	$94,414,921
3	Squid, shortfin Illex	17,906,382	Oyster, eastern	$30,145,498
4	Lobster, American	16,880,282	Haddock	$18,258,387
5	Clam, surf, Atlantic	15,739,550	Clam, surf, Atlantic	$16,616,040
6	Goosefish	14,024,721	Clam, quahog, northern	$8,233,267
7	Redfish, Acadian	11,626,256	Crab, Jonah	$8,137,652
8	Clam, quahog, ocean	11,070,125	Goosefish	$8,100,794
9	Skate, winter	10,046,012	Squid, shortfin Illex	$7,200,085
10	Herring, Atlantic	9,873,088	Clam, soft	$6,542,580
	Total	**167,745,340**	**Total**	**$588,286,933**

Source: NOAA Fisheries 2020c

As discussed in Section 4.4.6.1, VTR data provided by NOAA Fisheries GARFO indicates how much of the total landings in each surrounding port were caught within the Offshore Project Area. The breakdown of value landed from the Lease Area by port is available in Table 4.4-22. The top three ports with the highest amount of value landed from the Lease Area are Virginia Beach, Virginia; Newport News, Virginia; and Hampton Roads, Virginia.

The port with the highest number of landings from the Lease Area from 2008 to 2018 based on VTR data was Virginia Beach, with a total of 73,838 pounds valued at $237,387 dollars (Table 4.4-22). The fishery dollar percentage of the Port of Virginia Beach harvested in the Lease Area was 4 percent in 2008, 2010, and 2016; 3 percent in 2009 and 2017; 2 percent in 2012; and 1 percent in 2011. The Port of Newport News had the second highest value at $41,680, with 46,745 pounds of landings from 2008 to 2018 from the Lease Area, followed by the Port of Hampton Roads, valued at $26,066 and 28,045 pounds. The "All Others" port is the aggregate of 21 smaller ports across the Atlantic coast not represented as standalone ports. The ports with the most economic dependence on fishing within the Lease Area are Virginia Beach, Norfolk, and Wanchese. Four percent of the total value landed in Virginia Beach was caught in the Lease Area in 2008, 2010, and 2016, and three percent of the total value landed in Virginia Beach was caught in the Lease Area in 2009 and 2017. Two percent of the fishery dollar percentage of Wanchese landings came from the Lease Area in 2013, and two percent of the fishery dollar percentage of Norfolk landings were caught in the Lease Area in 2010. At most, the percentage of value landed from the area was only 4 percent. This further demonstrates that this area can be classified as "lightly fished", consistent with Kirkpatrick et al. (2017), since at least 96 percent of all the value landed in these ports came from outside of the Lease Area. As shown in Table 4.4-22, in some years, several of the ports had no recorded landings coming from the Lease Area based on VTR data.

Fishing Techniques

This section outlines the commercial fishing methods used within the Offshore Project Area, which include gillnets, pots and traps, bottom trawls, and shrimp trawls, and hydraulic clam dredges. Commercial fishing occurring within the Offshore Project Area can generally be categorized as either mobile- or fixed-gear fishing (Table 4.4-28). Mobile-gear fishing uses trawls or dredges towed behind a vessel and fixed gear uses stationary pots, traps, gillnets and/or longlines of baited hooks set by the vessel on the seabed. As was previously noted, the NEFSC characterized the Lease Area as "lightly used," and there has been little commercial mobile gear fishing recorded within the Lease Area during the last decade. There is some limited otter trawling that occurs near shore, outside the Lease Area but potentially over the Offshore Export Cable Route Corridor, targeting both spiny dogfish and shrimp; an experimental fishery using a light beam trawl within 3 miles from shore to target white shrimp was authorized in 2021. Exploratory fishing for surfclams in August 2021 utilizing hydraulic clam dredging identified a fishable resource several miles offshore (east) of the Lease Area that may be subject to future exploitation, according to an October 6, 2021 meeting with Surfside Foods. Pots/traps are used within the Lease Area to catch black sea bass and conch (whelk).[6] Gillnets targeting spiny dogfish are deployed along the planned Offshore Export Cable Route Corridor.

[6] Whelk are locally referred to as "conch." To ensure understanding to the reader, this section uses the terms "conch" and "whelk" interchangeably as whelk species of family *Buccinidae*, in reference to that fishery.

Table 4.4-28. Commercial and Recreational Fishing Techniques and Target Species within the Offshore Project Area

Gear Types	Target Species	
Mobile	Black sea bass	Blue crab
Otter trawl	Spiny dogfish	Horseshoe crabs
Shrimp trawl (beam or twin-trawl)	Conch (whelk)	Eastern oyster
Scallop dredge	White shrimp	Atlantic menhaden
Hydraulic clam dredge	Summer flounder	King mackerel
Purse seine	Atlantic sea scallop	Spanish mackerel
Rod and reel	Longfin (Loligo) squid	Cobia
Spearfishing	Shortfin (Illex) squid	Triggerfish
Fixed	Atlantic mackerel	Billfishes
Demersal gillnet	Atlantic croaker	Swordfish
Black sea bass pot	Atlantic surfclam	Tunas
Conch (whelk) pot	Spotted sea trout	Sharks
Crab pot	Spot	Mahi-mahi
	Bluefish	Amberjack
	Striped bass	Wahoo
	Spadefish	Redfish (red drum)
	Tautog	

A representative scaled drawing of the relative sizes of vessels that may operate in and around the Lease Area compared to the WTG rotor size (and relative turbine spacing) is provided in Figure 4.4-32.

Gillnets

A gillnet is a fishing technique that uses a wall of mesh to trap fish by their gills as they try to pass through (Figure 4.4-33) (NOAA Fisheries 2019c). The height on the gillnet and the size of the mesh determine which species will be caught. There are two types of gillnets: set gillnets and drift gillnets. Set gillnets use anchors in the seabed to prevent movements of the net and drift gillnets are kept afloat using weights and buoys (NOAA Fisheries 2019c). Gillnets can be used to target a variety of species, including groundfish, mullet, sharks, and others (NOAA Fisheries 2019c). However, in the Offshore Project Area, gillnets are typically only used to target spiny dogfish in nearshore areas (Figure 4.4-34), overlapping the Offshore Export Cable Route Corridor within the 3-nm limit of the Commonwealth of Virginia Atlantic shoreline (Code of Virginia § 28.2-315) and within federal waters. Virginia regulations on gillnetting mandate that the net cannot be more than 300 ft (91 m) in length, with a minimum 1 in bar (3 in stretch) (3 cm bar [8 cm stretch]) mesh size (Virginia Law §§ 29.1-103, 29.1-501) within the 3 nm limit of Commonwealth water. The gillnet season for spiny dogfish typically runs from November through April, closing down when the quota allocation for the Commonwealth of Virginia is reached.

There is very little, if any, gillnet fishing activity within the Lease Area (Figure 4.4-34). Kirkpatrick et al. (2017) determined that there are at least 12 gillnet permits in the region, with an average annual revenue of $34,164,385 with only $628 of landings originating from the Lease Area. This aligns with the estimated $854 annual gillnet landings originating from the Lease Area, based on the 2008–2018 VTR data (NMFS 2020).

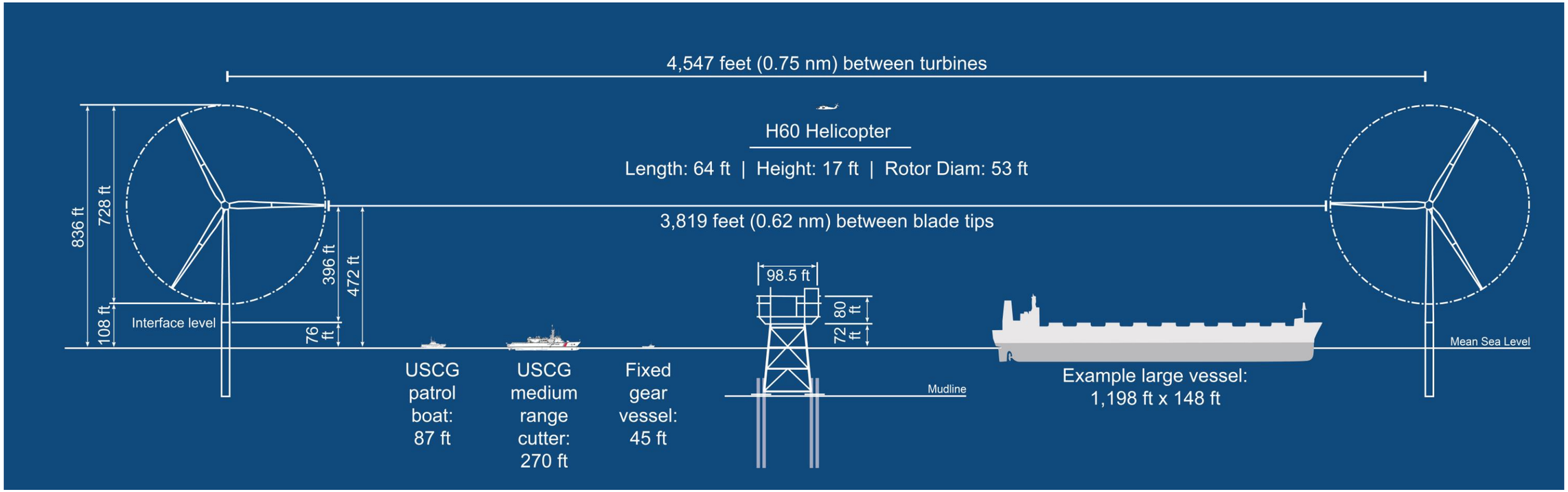


Figure 4.4-32. Scaled Representation of a Fixed Gear Fishing Vessel (and other representative vessels, for scale) Relative to Wind Turbine Generator Rotor Diameter and 0.75 nautical mile Turbine Spacing

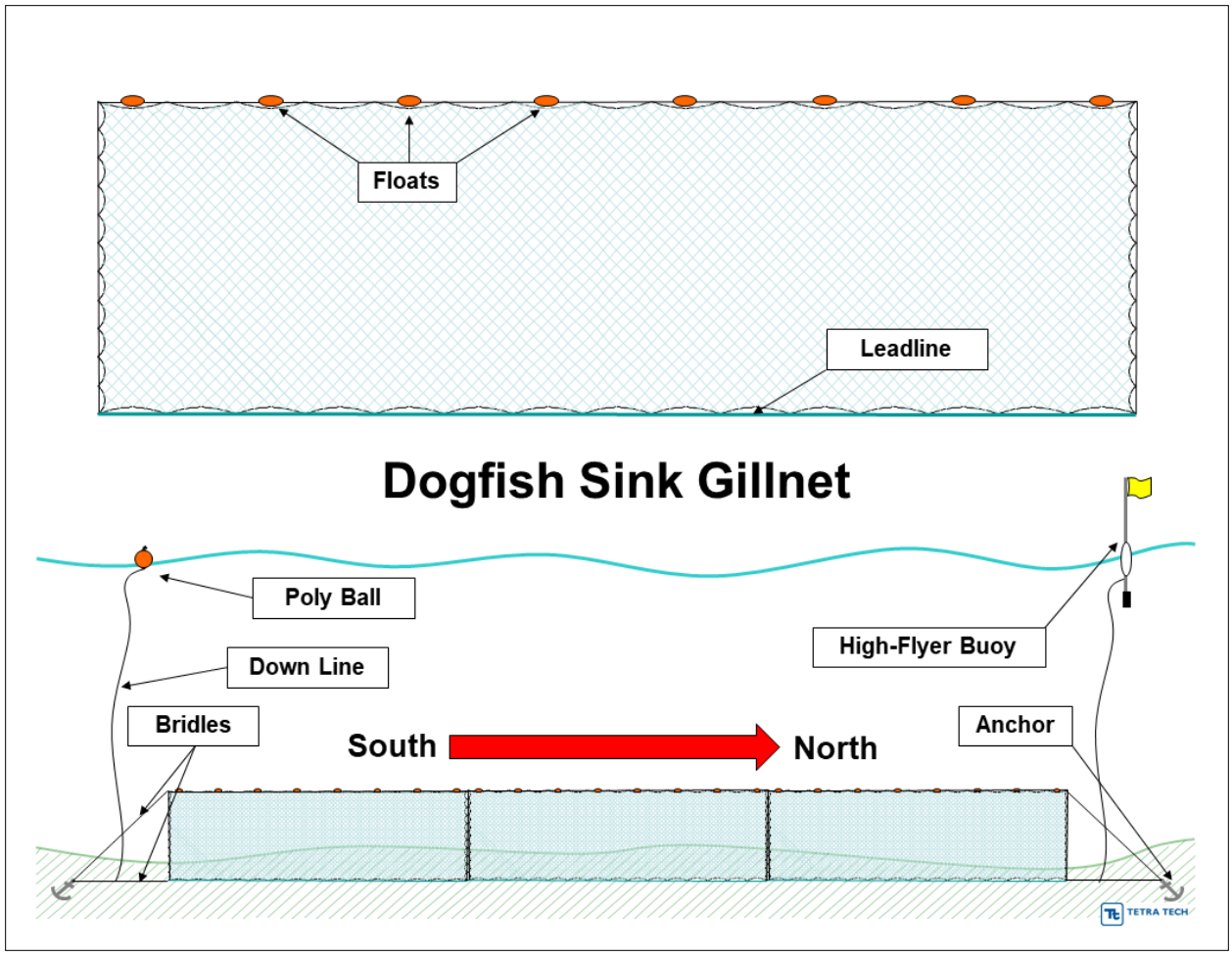


Figure 4.4-33. Drift Gillnet (top) Dogfish Sink Gillnet (bottom) Illustration (not to scale)

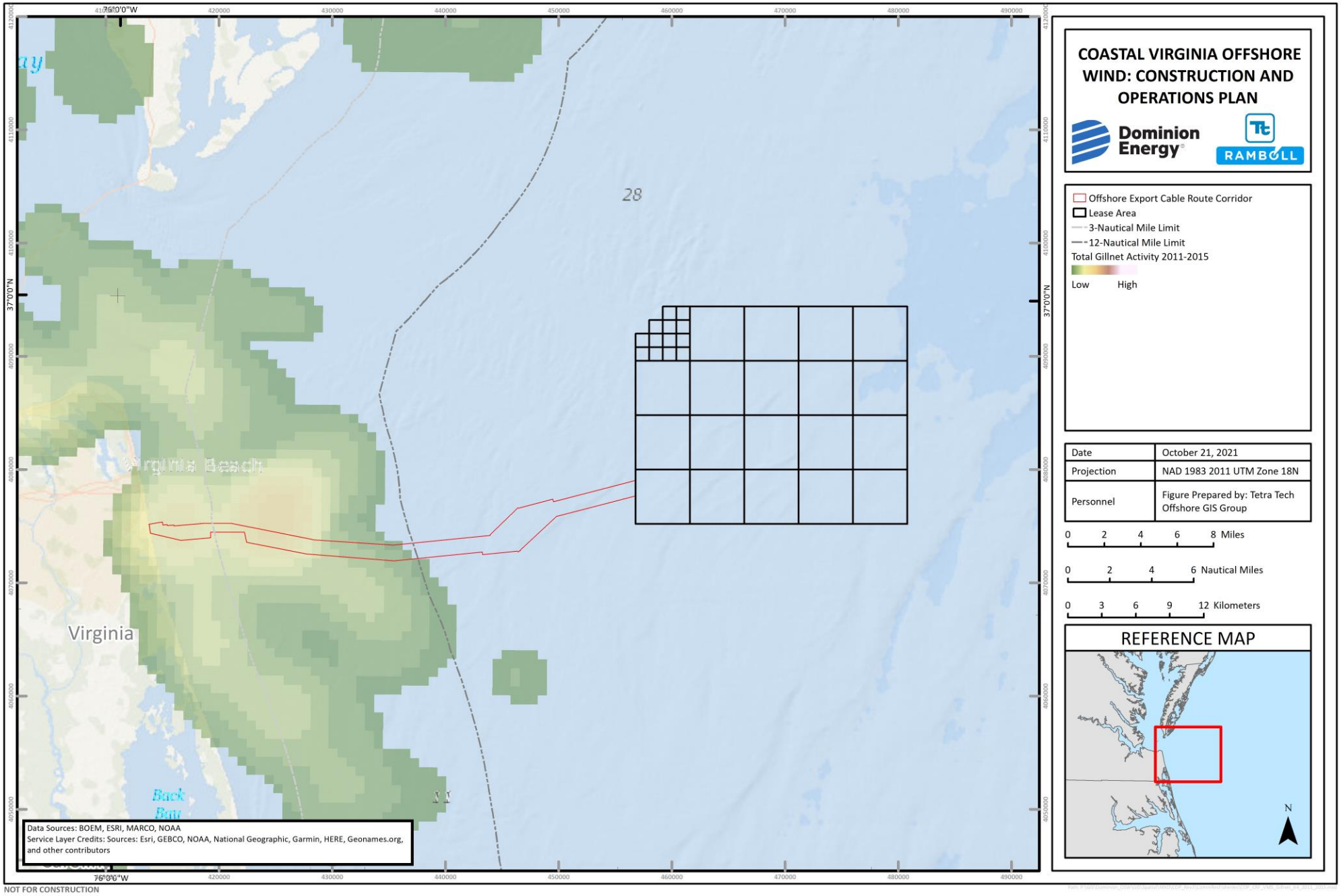


Figure 4.4-34. Total Gillnet Activity (2011–2015) in the Offshore Project Area

Most gillnet activity in the Offshore Project Area has been nearshore, targeting spiny dogfish in Virginia state waters where a federal permit is not required. This inshore fishing activity, as shown in Figure 4.4-34 would only be impacted by activities associated with the Offshore Export Cable Route Corridor. Given that the ongoing fishing activity would occur over the buried export cables and not in the Lease Area where structures would be placed, there would be only minimal, temporary disruption to this fishery during the cable survey and installation periods.

Several spiny dogfish gillnetters based in Rudee Inlet, Lynnhaven, and other Hampton Roads area ports have been consulted by the FLOs. Gillnet fishermen report very little, if any, activity within the Lease Area, with most activity in the nearshore waters where it would overlap the Offshore Export Cable Route Corridor, as supported by the data shown on Figure 4.4-34. Although some fishermen do have federal permits, allowing them to catch spiny dogfish in federal waters, some fishermen only have Commonwealth of Virginia permits and are only allowed to fish within the 3-nm limit of the Commonwealth. Considering the potential for this fishery to interact with survey equipment and cable installation activities, communications with this fleet have been established and they are on mailing lists for Project updates as part of the Fisheries Communications Plan (Appendix V) for this Project. Additionally, prominent gillnet fishermen within this fleet have been engaged by Dominion Energy to provide scout vessel services for offshore operations.

Pots and Traps

Pots and traps are submerged fishing gear that allows organisms to enter an enclosure and become trapped (NOAA Fisheries 2019d). Traps are dropped to the seafloor and are marked with buoys on the surface of the water. The bait, size, and configuration of pots determine the target species (NOAA Fisheries 2019d). Target species for pots and traps in the Offshore Project Area typically include bottom-dwelling mollusks (whelk [conch]) and fish [black sea bass]) (NOAA Fisheries 2019d).

Pots and traps may be set in "strings" or "trawls" that consist of multiple pots strung together along a "groundline" anchored to the seabed or as individual pots/traps. The gear can be rectangle, square, or cylindrical and is linked to the surface with buoy lines connected to buoys and/or highflyers (Figure 4.4-35). The anchors used to secure the gear to the seabed may consist of a range of materials, single pots are typically weighted down with bricks (Figure 4.4-36 and Figure 4.4-37). Once the gear is set, it will typically "soak" for several days. The duration of the soak is determined by the catch rate; black sea bass pot gear is known to soak for several weeks between hauls.

Black sea bass pot gear is typically set near bottom obstructions, natural or man-made, which act as reef structures to attract fish. Conch (whelk) may forage for food near the base of structures but will utilize a wide range of benthic habitat. Fishermen move conch (whelk) gear around; black sea bass gear typically stays in the same spot near a structure.

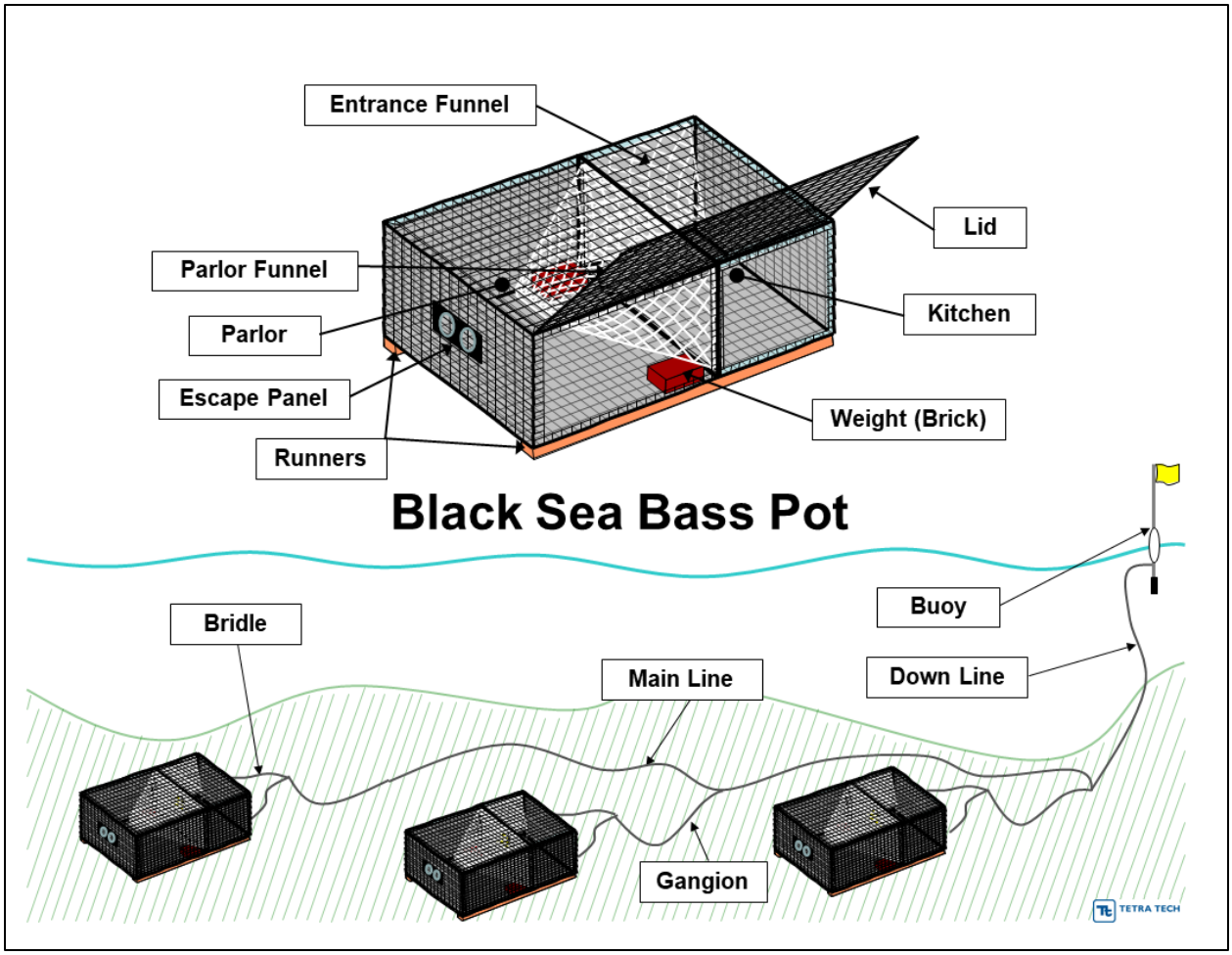


Figure 4.4-35. Black Sea Bass Pot Illustration

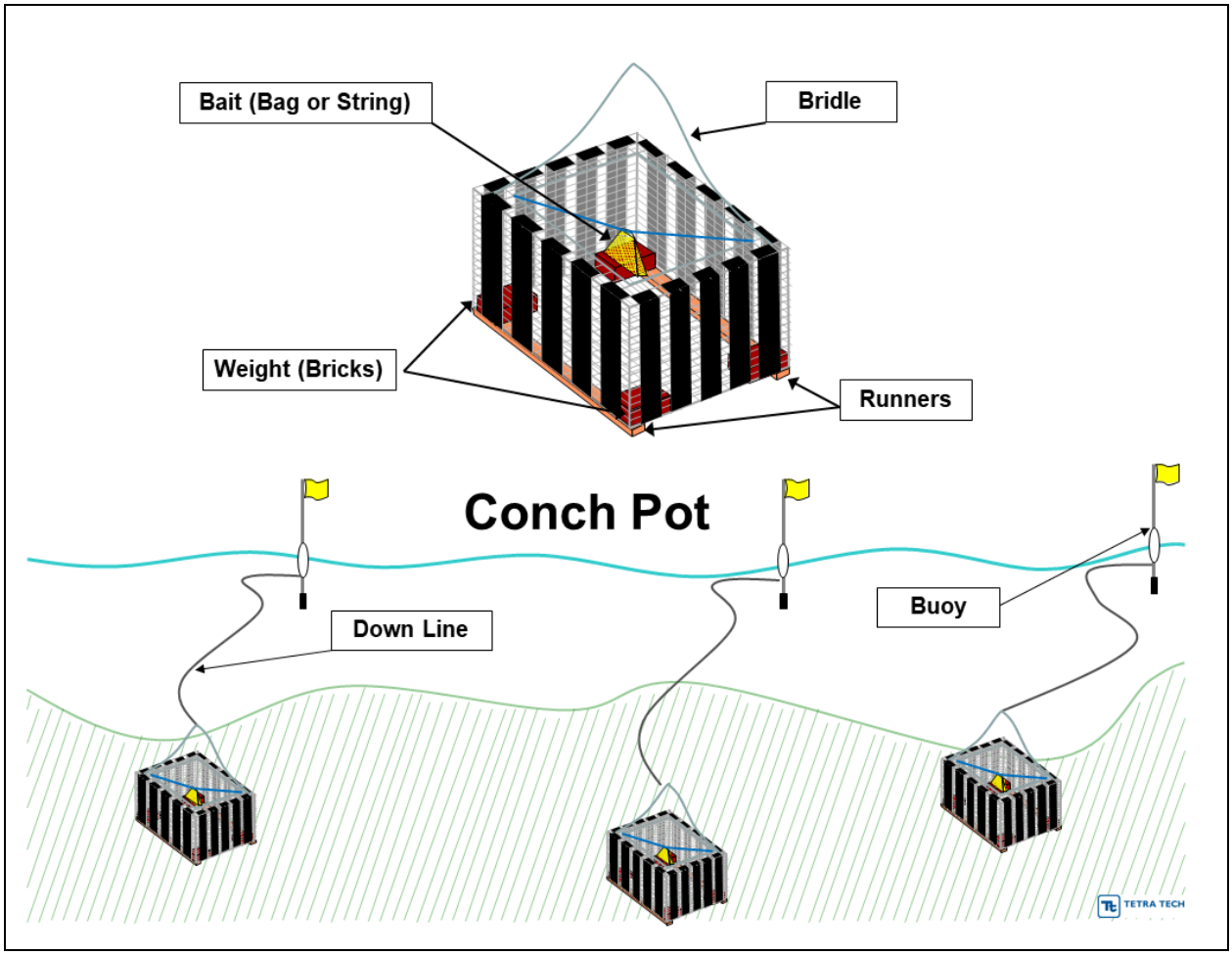


Figure 4.4-36. Conch (Whelk) Pot Illustration

Photo credit: R. Larsen, Sea Risk Solutions, LLC

Figure 4.4-37. Conch (whelk) Pot Gear, Rigged Individually, Bricks Used to Keep Pot on Seabed

The black sea bass pot gear that is fished in the area consists of roughly 16 to 18 traps per string with a string length of roughly 1,100 ft (335 m). There is typically one anchor on one end of the string and a single buoy on the other end. The conch pot gear is similar but is typically set one pot at a time, one pot per buoy, and held on the bottom by the weight in the pot (typically bricks). Some fishermen have started deploying trawls of conch pots, which can consist of as many of 60 pots spaced 200 ft (61 m) apart (FLO Personal Communication, August 2020).

Fixed gear pots and traps are used to catch a variety of species under many different regulatory regimes and management tools, with target species overlapping with other fishing methods (gillnets also are used to capture some of the same species). The Kirkpatrick et al. (2017) report determined that there are at least 19 pot permits in the region with an average annual revenue from the WEA of $41,789 between 2007 and 2012. This is higher than the estimated $8,303 annual pot-gear landings originating from the Lease Area, based on the 2008–2018 VTR data (NOAA GARFO 2020), but may just represent inter-annual variation in landings. Figure 4.4-38 depicts total pot-gear activity in the Offshore Project Area from 2011 to 2015.

The pot/trap fishery (fixed gear) for black sea bass and conch (whelk) is the primary commercial gear type utilized in the Lease Area. There is one active fisherman working black sea bass pots in the Lease Area. Outreach to this individual has resulted in confirmed gear locations which, for privacy reasons, cannot be shared. Since this gear is set on specific bottom/structure, the general location of this gear has not changed significantly over time. However, once the WTGs are installed, we can expect that this gear may shift to take advantage of the new structure.

Conch is not a federally regulated fishery and vessels targeting conch are not subject to federal vessel trip reporting requirements; therefore, their catch data is not represented in the MARCO data portal or consistently reported in other publicly available data sources. Information from fishermen indicates that they fish mainly around the Triangle Wrecks area, although they will target a wide range of benthic habitat throughout the Offshore Project Area, including over the Offshore Export Cable Route Corridor, as conch forage for food. Based on outreach with conch fishermen and dealers, the primary ports where conch landings from the Project Area would be expected include southern ports along the eastern shore of Virginia, including; Wachapreague, Willis Wharf, Oyster, Cape Charles and Virginia Beach (Rudee Inlet). Unlike the black sea bass pot gear, conch fishermen shift the location of their gear throughout the fishing season. Outreach conducted by the FLO determined that fishermen harvest conch from October through March; approximately eight vessels are known to work the Project Area. It is worth noting that the fishing effort depicted in Figure 4.4-38 and Figure 4.4-39 is consistent with the information shared by area fishermen.

Following stakeholder engagement conducted by the FLO, it was determined that the primary pot and trap fisheries within the Lease Area target black sea bass and conch (whelk). Outreach has confirmed presence of a limited black sea bass pot fishery and a conch pot fishery within the Lease Area and in the vicinity of the Offshore Export Cable Route Corridor. There is a single fisherman that currently fishes approximately ten strings of black sea bass pots within the Lease Area and about ten more strings within two miles of the eastern border of the Lease Area. This gear is typically set out in late March and fished through January of the following year. Catch rates in the summer months are slow and gear may only be hauled (fished) a few times a month before picking up in mid-to-late October. This gear is not baited; fish enter the traps for shelter and survive in the traps for several weeks.

The conch fishery has only a few participants that work within the Lease Area, typically starting north and west of the Lease Area in the mid-October timeframe and working their way south and east into the Lease Area from December through February of the following year. As previously noted, this gear will be moved around if/when catch rates slow in a particular area. These pots are baited to attract conch and are fished as weather conditions allow in the fall/winter months. Most conch fishermen will participate in other fisheries and when they enter/exit the fishery will depend on the seasons and success of the other fisheries (e.g., blue crab).

Concerns raised by fishermen include the potential short-term disruption of their fishing activities during survey and Project construction, including potential losses due to gear entanglements. Longer-term concerns include the placement of turbines on or close to very site-specific traditional fishing locations and the potential for change in resource availability at those locations and/or gear entanglement with the new structure. The fishermen have suggested that Dominion Energy consider long-term resource availability studies to identify any change to the conch and black sea bass resource in the Lease Area. Although fishermen do acknowledge that their fisheries may improve with the addition of structure, they also have requested that Dominion Energy consider mitigation measures should the data show that their catches have diminished as a result of the Project. Ongoing communication and coordination have been established with members of the pot and trap fishery within the Lease Area to further promote information sharing and cooperation.

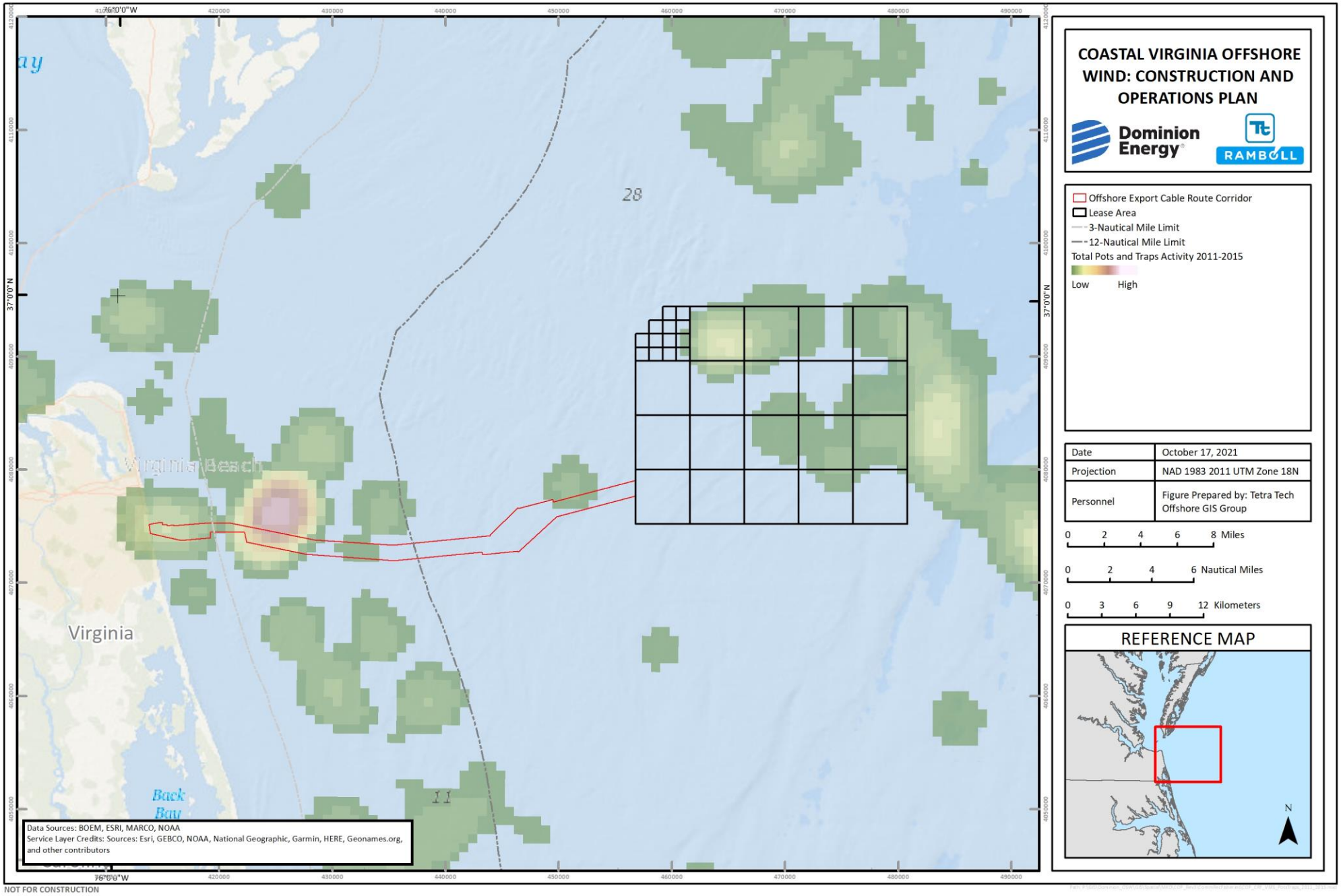
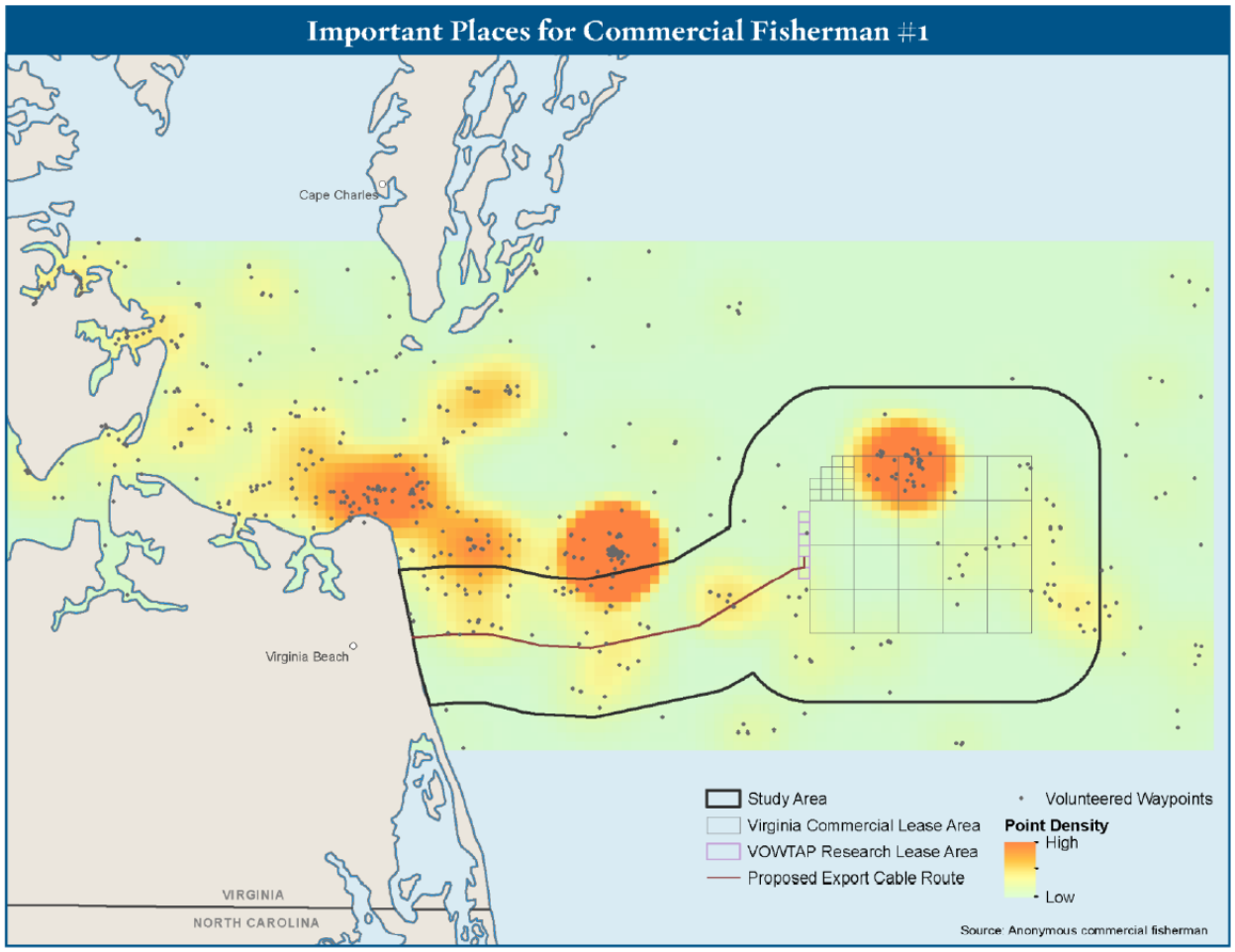


Figure 4.4-38. Total Pot-Gear Activity (2011–2015) in the Offshore Project Area



Source: BOEM 2016

Figure 4.4-39. Important Places for Commercial Fishermen

Bottom Trawl

Bottom trawling involves catching species by dragging a net across the ocean floor (Figure 4.4-40). The gear may be altered or set to target specific species. Floats are attached to the top of the trawl opening with weights attached to the bottom of the trawl opening, keeping the net open (NOAA Fisheries 2019e). As the boat moves with the trawl behind it, fish get stuck in the cod end of the net and get hauled into the boat. Target species include, but are not limited to, whiting, red hake, dogfish, crab, shrimp, and flounder (NOAA Fisheries 2019e).

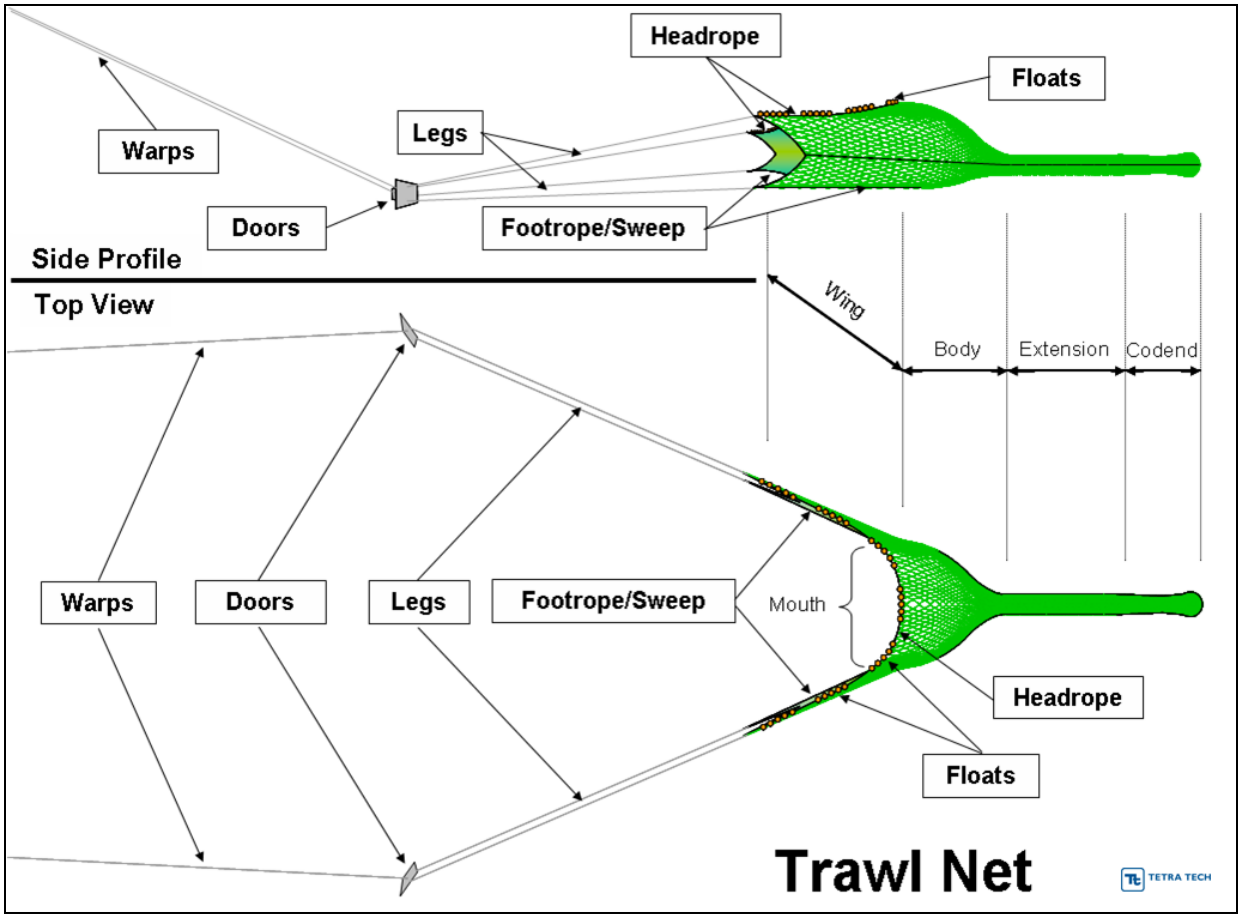


Figure 4.4-40. Bottom Trawl Illustration

There has been little, if any, recorded bottom trawling activity within the Lease Area in recent years, based on FLO outreach, although some trawling was conducted within the Lease Area in prior decades. Furthermore, there are resource surveys that utilize trawling as a sampling method, and such surveys may have randomly selected sampling stations that fall within the Lease Area. Historically, there had been minimal fishing effort in the area, likely targeting a mix of species including summer flounder, black sea bass, and croaker. Fisheries outreach yielded some anecdotal information that there are "sloughs" (also known as troughs) that exist in the Lease Area that had historically held fish and were productive tows for otter trawlers. However, there is no evidence that otter trawlers have fished these areas over the last 10 years. Additionally, while there is evidence that some smaller vessels may convert to otter trawling seasonally to target dogfish, this activity would be outside the Lease Area and potentially take place in the vicinity of the Offshore Export Cable Route Corridor. Otter trawling is prohibited within the 3-nm limit of the Commonwealth of Virginia Atlantic shoreline (Code of Virginia § 28.2-315).

Trawl fishermen engaged by Dominion Energy FLOs from Beaufort, North Carolina, to Ocean City, Maryland, including the Hampton Roads area, expressed very little concern about impacts to their fishing operations in the Lease Area, confirming that the area is not fished. There was a single comment from a veteran fisherman that noted the existence of historical tows through some of the sloughs in the area that used to hold fish. There has been no additional feedback from trawl fishermen or from the fixed-gear

fishermen actively working the area that any mobile-gear fishing has taken place within the area over the last 10 years.

Furthermore, transit patterns did not appear to be a concern because most vessels utilizing the Hampton Roads ports would enter from the north and south via shipping lanes that avoid the area. There may be some transits from the north to and/or from North Carolina, bypassing the Hampton Roads area, that may need to pass through or choose to deviate around the Offshore Project Area once built out. Similarly, there may be vessels that transit east to west from the Hampton Roads ports to offshore grounds near Norfolk Canyon. These vessels also may choose to navigate through, or transit north of, the Lease Area.

Survey vessel observations from April 9, 2020 through May 31, 2021 (over 1,400 vessel-days) did not identify any otter trawling within the Lease Area. A review of AIS data from 2017 through 2019 did not yield any vessel tracks within the Lease Area that would be consistent with otter trawl activity.

It should be noted that not all trawl activity requires VMS reporting and not all vessels are required to carry AIS. However, the lack of trawl activity based on the available VMS data, feedback from fishermen, a review of the AIS data, and lack of observations during the 2020–2021 survey campaign is consistent with the NEFSC conclusion that the area is lightly used. Kirkpatrick et al. (2017) determined that there are at least 109 bottom trawl permits in the region, with an average annual revenue of $174,094,198 with only $20,942 of those landings originating from the Lease Area. This aligns with the estimated $20,472 annual bottom trawl landings originating from the Lease Area, based on the 2008-to-2018 VTR data (NOAA GARFO 2020).

Shrimp Trawl

A limited experimental shrimp trawl fishery is present in the Offshore Project Area and is managed by the VMRC in state waters (within 3 nm [6 km] of the Atlantic shoreline). The experimental fishery utilizes beam trawls that are similar to bottom trawls. A schematic of a typical beam trawl is shown in Figure 4.4-41 and an example photograph of beam trawl is provided in Figure 4.4-42. This fishery is currently limited to eight vessels within a restricted area south of the Offshore Project Area.

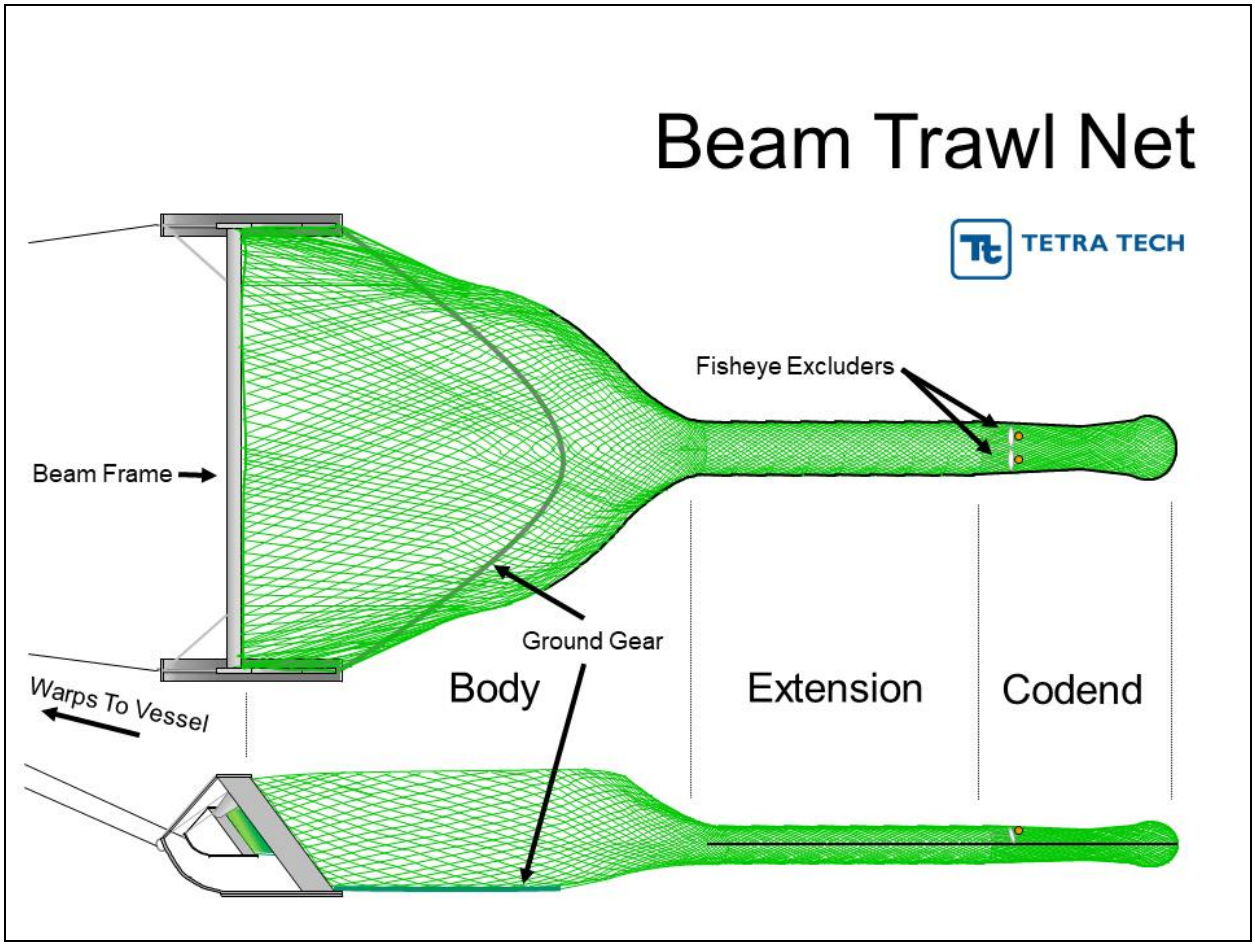


Figure 4.4-41. Schematic of a Beam Trawl

Photo Credit: R. Larsen Sea Risk Solutions, LLC

Figure 4.4-42. Beam Trawl, 16 feet in width, Secured to the Stern of a Fishing Vessel in Rudee Inlet

If the fishery continues to grow, it may expand over the Offshore Export Cable Route Corridor within 3 nm (6 km) of the Virginia shore. Effort within the experimental shrimp (white shrimp) trawl fishery within waters of the Commonwealth of Virginia begins in the October timeframe and continues into January. The fishery is currently limited in participation and location; there is no activity allowed north of Dam Neck Road, which is approximately 2 mi (3 km) south of the Cable Landing Location. Fishing is not conducted in the Lease Area; depending on the outcome of the experimental fishery (if it is further developed), there could be overlap with the nearshore portion of the Offshore Export Cable Route Corridor.

Further, since there is no federal regulation that limits the fishery outside 3 nm (6 km), traditional double-rigged shrimp trawlers have been observed working outside the 3-nm boundary. Shrimp trawlers were observed by the Dominion Energy survey vessel *Minerva Uno* working just offshore of the Virginia 3 nm (5.6 km) limit on or about October 29, 2020, and vessels remained in the area through November 30, 2020. Many of the vessels were less than 65 feet in length and their activity was visible using AIS monitoring sites. These shrimp trawl vessels have fished over the Export Cable Route Corridor offshore of the Cable Landing Location but were not observed actively fishing any further than 4.3 nm (8.0 km) offshore; it is unlikely that this shrimp resource would extend offshore to the Lease Area. This fishery is still developing in the region and warrants monitoring to see if effort changes in the area.

The recent presence of white shrimp off the coast of Virginia may be facilitated by a northward shift in the range of this species. This has been demonstrated in other fisheries that have shifted northward and into deeper waters in response to increasing water temperatures (Pinsky et al. 2013; Nye et al. 2009) and more species are predicted to follow (Kleisner et al. 2017). However, it is not clear whether this potential shift in white shrimp presence/duration in coastal Virginia waters is in response to long-term temperature changes or other factors.

Hydraulic Clam Dredge

The surfclam and ocean quahog fisheries are managed regionally as a single fishery by the MAFMC. Harvests are regulated by an Individual Transferrable Quota program; harvest quotas are set annually. Surfclams inhabit waters from the surf zone to a water depth of about 200 ft (61 m) although abundance deeper than 125 ft (38 m) is typically low. A substantial surfclam fishery once existed in the waters offshore of Virginia but the distribution of surfclams has largely shifted northward and offshore due to changing environmental conditions and other factors (Timbs et al. 2019).

The Lease Area location has not supported a commercially viable surfclam and ocean quahog fishery for over 20 years. The most recent publicly available VMS and VTR spatial data (2011-2015) indicate there is no hydraulic clam dredge fishing activity within the Offshore Project Area, therefore a map is not included in this section. Kirkpatrick et al. (2017) determined that there are only two dredge permits in the region, with average annual revenues for landings originating from the Lease Area not disclosable because with such low activity, the rule of three could not be met. This aligns with the notably absent estimated annual surfclam and ocean quahog landings originating from the Lease Area, based on the 2008–2018 VTR data (NMFS 2020). However, with suitable habitat, a year-class of clams could settle in an area currently supporting low fishing effort, only to be fished in future years once clams reach a harvestable size. This is apparently the case in an area approximately 7.5 nm (13.9 km) east of the Lease Area, where recent exploratory fishing has identified a fishable resource that is being harvested as of October 2021 according to personal communication with Surfside Foods. This area may support increasing fishing activity and will continue to be evaluated through FLO coordination with the surfclam fleet.

The Atlantic surf clam fishery utilizes hydraulic dredges/water jets to remove and capture clams from the seabed. The dredge utilizes a hydraulic pump that delivers high-pressure water at approximately 3,000 to 9,000 gallons per minute (11,356 to 34,069 cubic meters per minute) from the vessel to a manifold at the front of the dredge as shown in Figure 4.4-43. The manifold jets the water into the sand, temporarily fluidizing the sand and allowing the dredge to penetrate the sediment to approximately 1 ft (0.3 m) in depth to capture bivalves and any bivalve-sized items (rocks, debris, fish) in the process. Dredges can be up to 12 ft (4 m) wide and weigh up to 20,000 pounds (9,072 kilograms). Vessels vary in size from 60 to 160 ft (18 to 49 m) and may tow two dredges at a time. Tow speeds are typically between 3 to 4 knots, although speeds may vary based on weather, sea state, tide, and catch rate. Although the blade rides only a few inches below the skids at seabed level, the dredge liquifies and removes a layer of sediment with each pass. Vessels sometimes make repeated tows in a specific area, depending on catch rates.

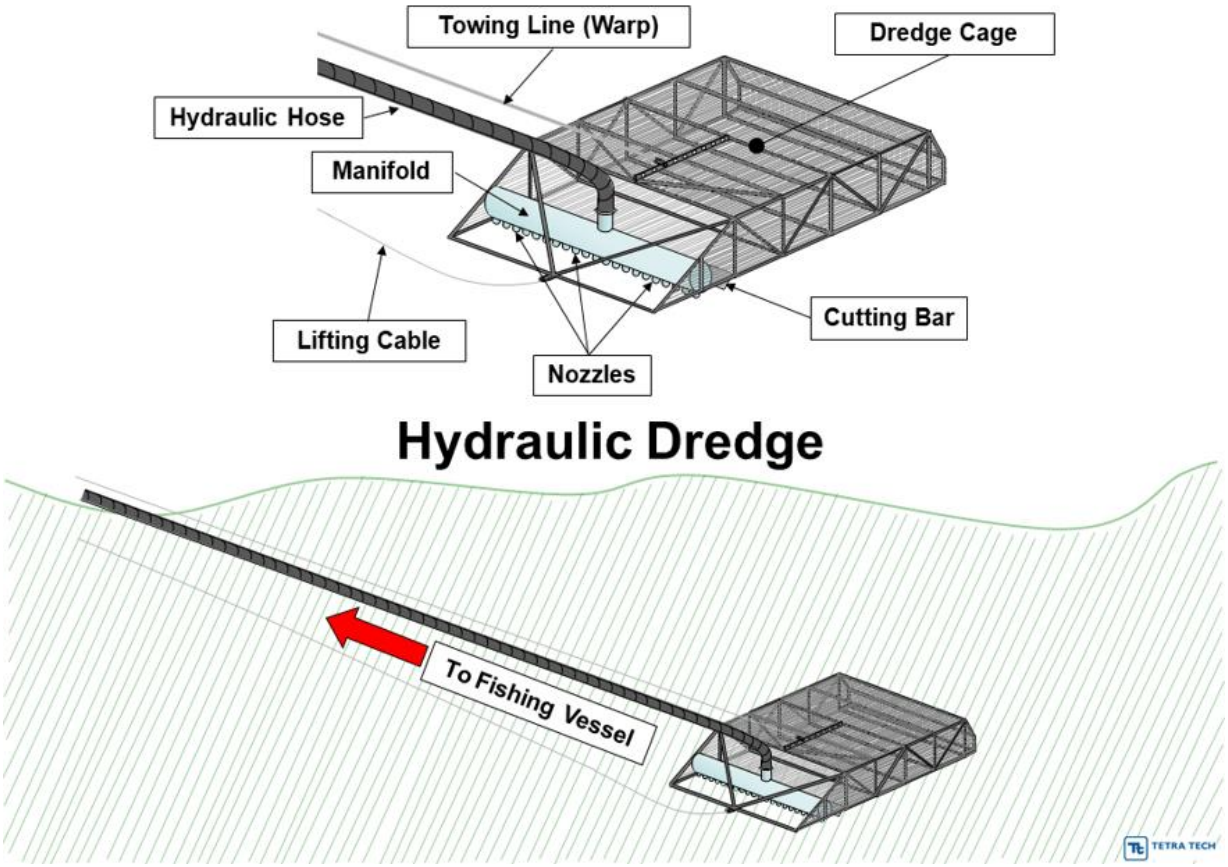


Figure 4.4-43. Schematic of a Hydraulic Clam Dredge

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

The potential impacts of construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). The design that introduces the largest number and density of WTGs and Offshore Substations, with the smallest spacing between, within the Lease Area is considered the maximum design scenario for commercial and recreational fishing. Also, for fisheries that interact with the seafloor, the design that permanently introduces the greatest number of, and length of, submarine cables (Offshore Export Cables, Inter-Array Cables) onto the seafloor within the Offshore Project Area is considered the maximum design scenario for commercial and recreational fishing.

Construction

During construction, the potential impact-producing factors to commercial and recreational fishing may include installation of the Offshore Project Components, and presence of Project-related vessels engaging in construction activities. Dominion Energy would 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:

- Potential for temporary displacement of fishing activity;

- Potential for temporary disturbance to local commercial fish species;
- Potential for risk of gear entanglements on partially installed structures; and
- Potential for increase in Project-related vessel traffic.

Potential for temporary displacement of fishing activity. During Project construction, potential impacts on commercial and recreational fishing may include short-term and localized restrictions within, and adjacent to, safety zones around construction vessels, partially installed structures, and installation activities creating temporary loss of, or access to, fishing grounds. Construction activities may result in short-term localized impacts on commercial target species due to bottom-disturbing activities associated with installation of foundations, cables, and other infrastructure.

Locations where there is high construction activity will be temporarily closed to fishing by the implementation of safety zones. However, these closures would be limited to discrete segments of the Offshore Project Components that would have restricted access on a temporary basis, while construction is active. As part of the strategy to mitigate impacts on fisheries in the Lease Area, Dominion Energy will work with fishermen ahead of marine construction operations to review operational planning and schedules in order to identify and reduce any areas where fishing operations may be temporarily displaced. Dominion Energy would also work with the USCG and make notices of area closures publicly available through LNTMs posted to Dominion Energy's website and social media. Information on risks to navigation are found in Section 4.4.7, Marine Transportation and Navigation, and Appendix S, Navigation Safety Risk Assessment. Additionally, Dominion Energy will work with those affected fishermen to minimize any potential impact. Dominion Energy remains committed to coexistence with the commercial and recreational fishing industries.

Potential for temporary disturbance to local commercial fish species. Construction activities may impact local commercial target species in the vicinity of the Offshore Project Area with increased vessel traffic, noise, and vibrations (Section 4.2.5 Marine Mammals, Section 4.2.6 Sea Turtles, and Appendix Z Underwater Acoustic Assessment). Any impacts are expected to be temporary and localized. Dominion Energy is planning to utilize underwater noise mitigation (e.g., bubble curtain or equivalent) to mitigate any noise impacts pile-driving may have on marine species. Mitigated construction noise would be within the range of naturally occurring background noise and would not negatively affect benthic or pelagic species in the Lease Area. Further, the original siting of the Lease Area by BOEM included a substantial amount of public outreach (BOEM 2016) and, as discussed throughout this section, commercial fishing occurs at relatively low levels within the Offshore Project Area. More information on impacts to benthic organisms is found in Section 4.2.4 Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat.

Potential for risk of gear entanglements on partially installed structures. During construction, the presence of partially installed project components may increase risks of gear entanglement and snagging with mobile and fixed gear. However, the temporary restrictions associated with construction activities would limit direct access to these structures. The Fisheries Communications Plan (Appendix V) developed for the Project, combined with the direct outreach activities anticipated during construction, would provide the fishing community with advance notice, prior to formal LNTM, describing the extent and duration of construction activities and locations of all fixed structures within the Offshore Project Area, including partially installed structures within the safety zones. For the safety of both mariners and Project technicians,

Dominion Energy would establish safety zones around construction activities as applicable. Dominion Energy would notify all mariners via LNTM of the presence and location of partially installed structures. More information on safety zones markings and LNTM can be found in Section 4.4.7, Marine Transportation and Navigation.

Potential for increase in Project-related vessel traffic. The number of vessels in the Offshore Project Area is expected to temporarily increase during construction of the Project. During construction, the short-term increased Project-related vessel traffic may result in increased collision risk (see Section 4.4.7, Marine Navigation and Transportation). However, relative to the existing levels of vessel traffic in the Offshore Project Area, this increase would be negligible. Project-related vessels would utilize existing transit lanes and fairways, as required, while in transit. Increased vessel activities in the Offshore Project Area would be localized and short term during each stage of construction. Dominion Energy would ensure that Project-related vessels follow appropriate navigational routes (where feasible) and communicate to other mariners via LNTM and/or radio communications to mitigate risks to the commercial and recreational fishing industries as well as other mariners.

Operations and Maintenance

During O&M of the Project, the potential impact-producing factors to commercial and recreational fishing may include the long-term presence of Offshore Project Components and the presence of Project-related vessels engaging in maintenance activities. Dominion Energy would implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Potential for loss of access to traditional fishing grounds;
- Potential for modification of habitat and displacement of target commercial species;
- Potential for increased Project-related vessel traffic;
- Potential for positive beneficial increases in species diversity and abundance; and
- Potential for impacts to marine radar/navigation instruments due to the presence of WTGs.

Potential for loss of access to traditional fishing grounds. As demonstrated in Section 4.4.6.2, Affected Environment, the Project was sited in an appropriate place regarding avoiding impacts to the commercial fishing industry. Figure 4.4-14 through Figure 4.4-21 show limited fishing within and surrounding the Offshore Project Area for nearly all federally managed species.

The Lease Area is considered the "least-fished" of the WEAs on the East Coast in terms of fishing intensity (Kirkpatrick et al. 2017). This is further supported by VTR data provided by NOAA Fisheries GARFO showing that the average yearly landings of fish species caught in the entire Lease Area was $67,555 and ranged from 0 to 4 percent of total landings by FMP from 2008 to 2018 (Table 4.4-20). Nevertheless, to the fishermen that do utilize the Offshore Project Area, these impacts are real, and Dominion Energy remains committed to minimize the extent of those impacts where feasible by working directly with fishermen to resolve potential gear conflicts. Additionally, it is expected that commercial fishing within the Lease Area would remain safe and viable once the Project is constructed and may even improve conditions for fixed-gear fishermen that utilize the area. Dominion Energy would continue to coordinate with existing commercial fishermen that utilize the Offshore Project Area (largely using fixed gear [pots/traps, and

gillnets]) to ensure they can deploy and recover their gear safely during O&M. This coordination would also include emerging fisheries, such as hydraulic clam dredging activities within or adjacent to the Offshore Project Area. Dominion will also ensure that the operational WTGs and Offshore Substations include adequate marking and lighting in accordance with USCG approved measures to ensure safe vessel operation.

VMS data, AIS data, and information from fishermen indicate that most commercial fishing vessel transits will not be impacted by the presence of the Project. Most commercial fishing vessels utilizing the Hampton Roads ports would enter from the north and south via traffic lanes that avoid the Lease Area. There are some north/south vessel transits patterns to and from North Carolina, bypassing the Hampton Roads area, that may choose to transit through or avoid the Offshore Project Area. Similarly, there may be vessels that transit east to west from the Hampton Roads ports to offshore grounds near Norfolk Canyon; these vessels also may choose to navigate through, or transit north of, the Lease Area. The vessel tracks that cross the Lease Area are infrequent and broadly distributed, as shown in Figure 4.4-22 through Figure 4.4-25.

Recreational fishing vessels, on the other hand, routinely transit within and through the Offshore Project Area to fishing grounds within the Lease Area or farther offshore. It is expected that these vessels would not need to substantially alter their historical transit patterns in order to access the Offshore Project Area or transit through (or within) the Lease Area.

Potential for modification of habitat and displacement of target commercial species. The addition of new hard substrates (e.g., steel structure, scour protection) would modify the existing pelagic water column habitat and benthic habitat on the seafloor. As shown in Section 3, Description of Proposed Activity, the maximum design scenario assumes rock or other hard material would be placed within a 115 ft (35 m) diameter surrounding each foundation, with an area of 10,387 square feet (965 square meters) of seafloor around each foundation to prevent bottom scour, for a total area of 50 ac (20 ha) within the Lease Area for all WTGs and Offshore Substations combined. This represents less than 0.05 percent of the entire Lease Area. In-water structure associated with the WTG and Offshore Substation Foundations, scour protection, and other Offshore Project Components may result in a change in the species assemblage and target species availability due to reef effects and creation of intertidal habitats surrounding the vertical structure of monopile foundations. However, this modification of habitat would be localized to the Lease Area and may enhance habitat for some commercially important species (e.g., black sea bass) within the Lease Area. See Section 4.2.4, Benthic Resources, and Finfish, Invertebrates, and Essential Fish Habitat, for more information on species displacement and interactions. Dominion Energy recognizes that the presence of monopiles and associated structures would have interactions with the marine organisms present in the Lease Area and has been working closely with agencies to gain a better understanding of those dynamics as part of the CVOW Pilot Project. To further that emphasis on research and monitoring, Dominion Energy has established partnerships with local and regional experts from institutions, including VIMS and the Virginia Aquarium to facilitate preparation of pre- and post-construction monitoring plans, driven by the stakeholders' interests and built upon existing data. This will help facilitate a better understanding of how the Project will interact with marine species and habitats, including targeted commercial and recreational species.

Potential for increased Project-related vessel traffic. During the routine O&M of the Project, it is expected that increased vessel traffic due to regular maintenance efforts would be present around the area.

Dominion Energy has completed the BOEM-required Navigation Safety Risk Assessment (Appendix S) which includes identification of possible navigation risks and potential mitigation measures. The Navigation Safety Risk Assessment indicates that any increase in vessel traffic in the Project area would be negligible compared to the traffic that is already present. In addition, Dominion Energy would continue to ensure that all Project-related vessels follow appropriate navigational routes and other USCG "rules of the road," communicate via USCG LNTM, issue regular mariner updates and/or direct offshore radio communications to help mitigate risks to the commercial and recreational fishing industry as well as other mariners.

Potential for positive beneficial increases in species diversity and abundance. The long-term presence of new fixed structures (e.g., WTGs and Offshore Substations) may result in potential long-term net benefits to species biodiversity and abundance, which could benefit both recreational and commercial fisheries in the Offshore Project Area. Research suggests that the addition of fixed substrate provided by WTG and Offshore Substation Foundations and scour protection can increase the species richness in the area (van Hal et al. 2017), provide shelter for fish species (Reubens et al. 2014), and attract fish species (Reubens et al. 2011). The presence of artificial hard substrate facilitates natural reef building (van Hal et al. 2017), which can increase overall species abundance and diversity in the vicinity of the Project. This may have positive benefits for the commercial, recreational, and "for-hire" fishing communities in the area. Charter fishing captains in Rhode Island state that the Block Island Wind Farm has had positive benefits on their respective businesses (National Fishermen 2020), and several new charter businesses solely focusing on offshore wind farm fishing have been developed (Fish the World Charters, n.d.). The area around the CVOW Pilot Project's turbines have already become a target for fishing activities, and the Project attracts divers as well.

More information on positive impacts to recreational fishing tourism can be found in Section 4.4.11, Other Coastal and Marine Uses.

Potential for impacts to marine radar/navigation instruments due to the presence of WTGs. The potential for WTGs to impact the accuracy and efficacy of marine radar is well understood following years of vessel operational experience within and near large offshore wind facilities in Europe, as discussed in the Navigation Safety Risk Assessment (Appendix S). Experience in waters near the United Kingdom has shown that mariners have become increasingly aware of any predictable radar effects as more offshore wind facilities become operational. Based on this experience, mariners can interpret the anticipated effects accurately, noting that interference effects are similar to those experienced by mariners in other environments, such as in close proximity to other vessels or structures. Effects can be mitigated through careful adjustment of radar controls and compliance with Convention on the International Regulations for Preventing Collisions at Sea regulations. A study conducted in 2009 by the USCG found that the presence of WTGs had an effect on marine radar, but the impacts were both predictable and manageable with training and technology (Minerals Management Service 2009). Dominion Energy would leverage its experience on this topic with the CVOW Pilot Project and would work with the USCG and the local fishing community to refine site-specific controls or settings that may help to mitigate potential interference of marine radar associated with the presence of Offshore Project Components.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. Decommissioning techniques are further 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, and potential impacts will be re-evaluated at that time.

4.4.6.4 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 (Table 4.4-29). 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 4.4-29. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Offshore Project Area	Potential for temporary displacement of fishing activity	• Closures would be limited to discrete segments of the Offshore Project Components that would have restricted access on a temporary basis while construction is active; • Dominion Energy would work with fishermen and the head of marine construction operations to review operational planning and schedules in order to identity any areas where fishing operations may be temporarily displaced. Dominion Energy would also work with the United States Coast Guard (USCG) and make notices of area closures publicly available through local notices to mariners (LNTM) posted to Dominion Energy's website and social media; • Dominion Energy would work with those affected fishermen to minimize any potential impact. Dominion Energy would remain committed to coexistence with the commercial and recreational fishing industries; • Dominion Energy is planning to utilize underwater noise mitigation (e.g., bubble curtain or equivalent) to mitigate temporary impacts of pile-driving on marine species; • The Fisheries Communications Plan (Appendix V) developed for the Project, combined with the direct outreach activities anticipated during construction, would provide the fishing community with advance notice, prior to formal LNTM, describing the extent and duration of construction activities and locations of all fixed structures within the Offshore Project Area, including partially installed structures within the safety zone;. • For the safety of both mariners and Project technicians, Dominion Energy would establish safety zones around construction activities as applicable. Dominion Energy would notify all mariners via LNTM of the presence and location of partially installed structures; and
		Potential for temporary disturbance to local commercial fish species	
		Potential for risk of gear entanglements on partially installed structures	
		Potential for increase in Project-related vessel traffic	

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
			• Dominion Energy would ensure that all Project-related vessels follow appropriate navigational routes and communicate to other mariners via LNTM and/or radio communications to mitigate risks to the commercial and recreational fishing industries as well as other mariners.
Operations and Maintenance	Offshore Project Area	Potential for loss of access to traditional fishing grounds	• Dominion Energy would continue to coordinate with existing commercial fishermen that utilize the Offshore Project Area (largely using fixed gear [pots/traps and gillnets]) and emerging fisheries to ensure they can deploy and recover their gear safely during operations and maintenance; • Dominion will also ensure that the operational wind turbine generators and Offshore Substations include adequate marking and lighting in accordance with U.S. Coast Guard (USCG) approved measures to ensure safe vessel operation; • Dominion Energy is in the process of establishing partnerships with local and regional experts from institutions, including the Virginia Institute of Marine Science and the Virginia Aquarium to facilitate preparation of pre- and post-construction monitoring plans, driven by the stakeholders' interests and built upon existing data; • Dominion Energy would continue to ensure that all Project-related vessels follow appropriate navigational routes and other USCG "rules of the road," communicate via USCG LNTM, issue regular mariner updates and/or direct offshore radio communications to help mitigate risks to the commercial and recreational fishing industry as well as other mariners; and • Dominion Energy would leverage its experience on this topic with the CVOW Pilot Project and would work with the USCG and the local fishing community to refine site-specific controls or settings that may help to mitigate potential interference of marine radar associated with the presence of Offshore Project Components.
		Potential for modification of habitat and displacement of target commercial species	
		Potential for increased Project-related vessel traffic	
		Potential for positive beneficial increases in species diversity and abundance	
		Potential for impacts to marine radar/navigation instruments due to the presence of WTGs	

4.4.7 Marine Transportation and Navigation

This section discusses marine transportation and navigation within and surrounding the Offshore Project Area. Potential impacts to marine transportation and navigation resulting from construction, O&M, and decommissioning of the Project are further discussed. Avoidance, minimization, and mitigation measures proposed by Dominion Energy are also described in this section. Other assessments detailed within this COP, which are related to marine transportation and navigation include:

- Recreation and Tourism (Section 4.4.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Department of Defense and Outer Continental Shelf National Security Maritime Uses (Section 4.4.8);
- Marine Energy and Infrastructure (Section 4.4.9);
- Other Coastal and Marine Uses (Section 4.4.11); and
- Navigation Safety Risk Assessment (Appendix S).

For the purposes of this section, the Offshore Project Area includes the Offshore Project Components and the areas that have the potential to be directly affected by the construction, O&M, and decommissioning stages of the Project. The Marine Transport and Navigation Study Area (Study Area) can be defined as the Lease Area, 10 nm (18.5 km) surrounding the Lease Area, the Offshore Export Cable Route Corridor, and an approximate 2 nm (3.7 km) buffer surrounding it. See Appendix S, Navigation Safety Risk Assessment for additional details on the Study Area.

In regard to offshore wind facilities, the USCG is responsible for analyzing the suitability of siting facilities near vessel traffic. The Ports and Waterways Safety Act (33 U.S.C §§ 1221, *et seq*.) requires the USCG to conduct studies to provide safe access routes for vessel traffic in federal waters. The USCG must consider all possible uses of the waterways to reconcile the need for safe access routes with the needs of all other uses of the waterways.

The USCG provides guidance on offshore wind projects in the form of a Navigation and Inspection Circular (NVIC). The current NVIC on Offshore Renewable Energy Installations is number 01-19 (USCG 2019a). This guidance includes the development of a Navigation Safety Risk Assessment. In 2011, the USCG began a Port Access Route Study for the entire Atlantic Coast to develop reasonable routing measures (where required) to provide for the safe transit of vessels near offshore wind energy developments. The final Atlantic Coast Port Access Route Study was published on March 14, 2016 (USCG 2016).

To satisfy the information requirements of 30 CFR § 585.627(a)(8) and USCG guidance, a Navigation Safety Risk Assessment was prepared for Dominion Energy in support of the COP. The Navigation Safety Risk Assessment includes a review of baseline conditions including 12 months of vessel traffic data against an assessment of deviations, displacement, increased collision (vessel to vessel) and grounding risks, and allision (vessel to structure) risk. The Navigation Safety Risk Assessment also considers impacts on communications and positioning systems, effects associated with meteorological conditions, and emergency response from an assessment of safe navigation within the Offshore Project Area. A full description of the methodology, data, and results of the analysis are presented in the Navigation Safety Risk

Assessment (Appendix S). In addition to USCG guidance (2019a) and BOEM COP Guidelines (2020), the following guidance documents were reviewed:

- Atlantic Coast Port Access Route Study Final Report (USCG 2016);
- Commandant Instruction (COMDTINST) 16003.2B (USCG 2019b); and
- MGN 543 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs)—Guidance on UK Navigational Practice, Safety and Emergency Responses (MCA 2016).

Data used to complete the Navigation Safety Risk Assessment and to inform this section includes AIS vessel traffic data, VMS data for fishing vessels, USCG maritime incident data, NOAA nautical charts, and other publicly available data. A full list of data sources is listed in the Navigation Safety Risk Assessment (Appendix S).

Data from AIS may be used to determine what types of vessels are transiting through the Offshore Project Area and how to characterize the affected environment. AIS is an automated, autonomous anti-collision and tracking system that is used extensively by commercial vessels for the exchange of navigational information between AIS-equipped vessels. Static and dynamic vessel information can be electronically exchanged between AIS receiving stations (onboard, ashore, or satellite). Since December 2004, the IMO requires all passenger vessels, as well as all commercial vessels over 299 gross tons that travel internationally, to carry a Class A AIS transponder. Smaller vessels, including many U.S. fishing vessels, can also be equipped with a Class B AIS transponder. AIS data was used to establish information on commercial shipping and military, recreational, and commercial fishing vessel activities in the Study Area.

4.4.7.1 Affected Environment

The affected environment is defined as areas where marine energy and infrastructure facilities are known to occur and have the potential to be directly or indirectly affected by the construction, O&M, and decommissioning of the Project. Project-related activities that may impact navigation capacity and vessels operating to and from ports along the coast of Virginia will be outlined in this section.

Commercial Shipping

There are several ATON, PATON, and radar transponders located throughout the Study Area. These ATON consist of lights, sound signals, buoys, and onshore lighthouses. Most are marked on NOAA nautical charts and are intended to serve as a visual reference to support safe maritime navigation. The ATON are developed, established, operated, and maintained by the USCG to assist navigators to determine their position, help navigators plan a safe route, and warn navigators of dangers and obstructions. Likewise, PATON are used to facilitate the safe and economic movement of all vessel traffic. Precautionary Areas are areas within which ships must use added caution and should follow the recommended direction of traffic flow and include TSS (DHS § 167.52). The Offshore Export Cable Route Corridor is located south of a Precautionary Area (Figure 4.4-44).

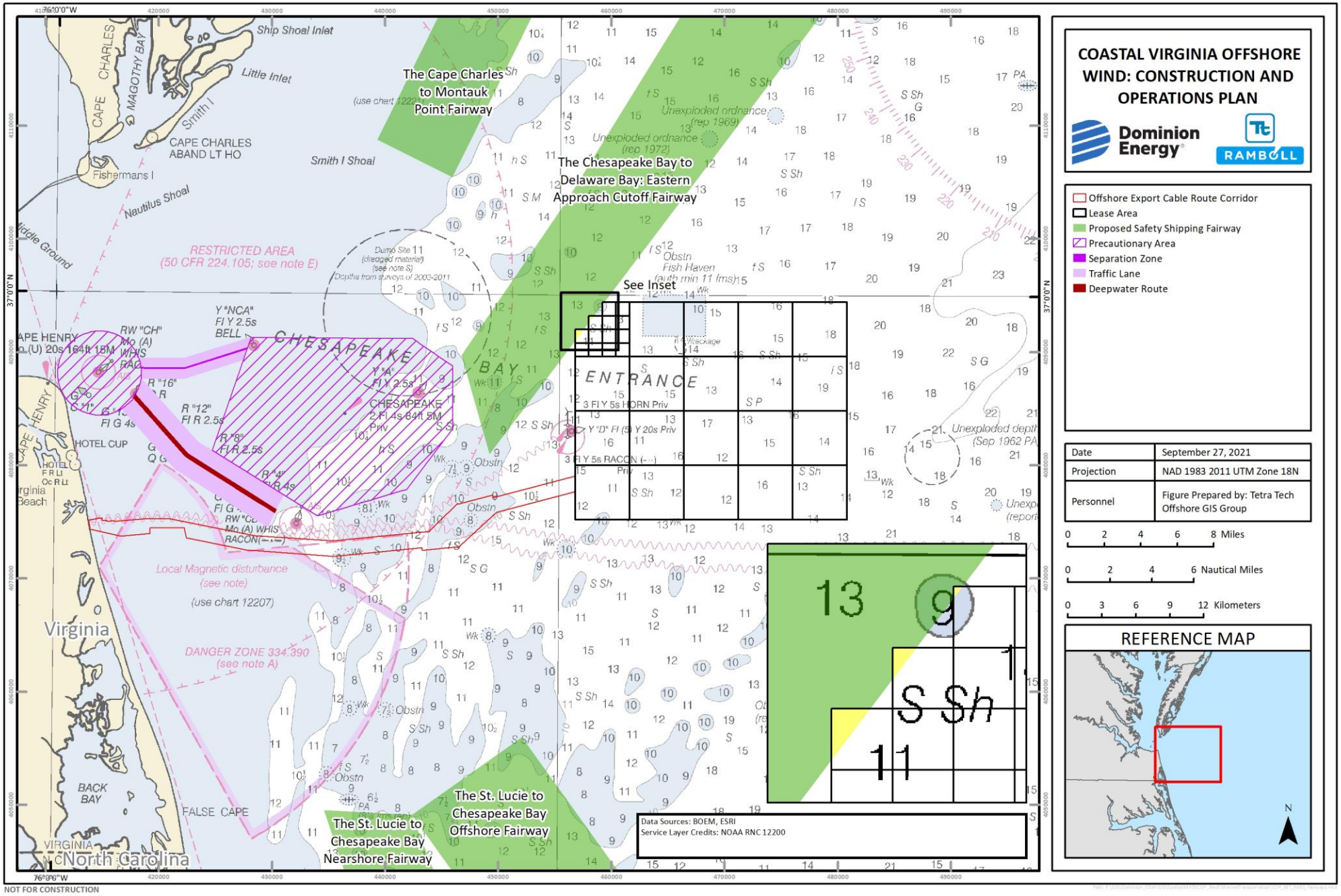


Figure 4.4-44. USCG Port Access Route Study (PARS) Potential Fairway

The Atlantic Coast Port Access Route Study, conducted by the USCG, reconciles the need for safe access routes with other reasonable waterway uses such as renewable energy sites. In an Advanced Notice of Proposed Rulemaking issued on June 19, 2020, the Coast Guard proposed "potential safety fairways" to ensure traditional navigational routes are kept free from obstructions (USCG 2020). The Lease Area is located partially within the "Chesapeake Bay to Delaware Bay: Eastern Approach Cutoff Fairway," proposed by the USCG Atlantic Coast Port Access Route Study (PARS) (Figure 4.4-44). The potential fairway is about 200 miles (322 km) long, approximately 10 nm (18.5 km) wide; however, the width narrows to approximately 4 nm (7.4 km) wide adjacent to the Lease Area and includes the customary route taken by vessels transiting between the Port of Virginia; the Port of Baltimore, Maryland; the Port of Philadelphia, Pennsylvania; and the Port of Wilmington, Delaware (USCG 2020). The proposed Chesapeake Bay to Delaware Bay: Eastern Approach Cutoff Fairway occupies a small portion of three of the northwesternmost Lease Area aliquots. The intersection of the Chesapeake Bay to Delaware Bay: Eastern Approach Cutoff Fairway and the Lease Area is approximately 135 acres (0.5 km^2), which is approximately 0.1 percent of the Lease Area. In addition, on June 16, 2021, the USCG announced a PARS for the Approaches to Chesapeake Bay, VA. The purpose of this study is to examine the east-west traffic that merges into the Atlantic Coast PARS Safety Fairways. Comments closed for this study closed on July 16, 2021, however, the results of this PARS study have not yet been published.

Under 46 U.S.C. § 70003, fairways are designated through federal regulations. Regulations governing fairways in 33 CFR Part 166 provide that fixed offshore structures are not permitted within fairways because these structures would jeopardize safe navigation. The USCG may establish, modify, or relocate existing fairways to improve navigation safety or accommodate offshore activities such as mineral exploitation and exploration (USCG 2020). It is important to note that these safety fairways have not yet been established but may interfere with the northwest portion of the Lease Area (Figure 4.4-44). In an effort to deconflict any interference, the Project's preferred layout includes a diagonal row of spare turbine positions in the northwest portion of the Lease Area. The NSRA addresses the risks and mitigations associated with vessel traffic in this northwest portion of the Lease Area.

The closest ports to the Study Area and the Cable Landing Locations are Norfolk and Newport News, Virginia. Both ports are located inside of Chesapeake Bay on the western side of the entrance. The USACE is responsible for documenting vessel and trip information of major American ports. Dry cargo vessels, tankers, and towing vessels are each typical components of vessels that traverse in and out of Norfolk Harbor and Newport News Virginia annually (USACE 2018). The Navigation Safety Risk Assessment considers commercial cargo vessels, military (a notable user of the area) vessels, towing, fishing and recreation. Descriptions of individual vessel activity by type are included below.

Commercial Cargo Vessels

Commercial cargo is defined in U.S. Code as any cargo transported on a commercial vessel, including passengers transported for compensation or hire (26 U.S.C. § 4462(a)(3)). The term "commercial cargo" does not include—(i) bunker fuel, ship's stores, sea stores, or the legitimate equipment necessary to the operation of a vessel, or (ii) fish or other aquatic animal life caught and not previously landed on shore. AIS data demonstrates that within the Lease Area, there is relatively light cargo vessel traffic through the Lease Area, with higher vessel traffic traversing the Offshore Export Cable Route. Most of the cargo vessel activity in the Lease Area consists of transits to and from the Chesapeake Bay through the middle and the

southern portion of the Lease Area as well as additional transits just outside of the northwestern corner of the Lease Area. Traffic that traverses the middle of the Lease Area moves north while traffic along the southern boundary continues east. During 2019, an average of 17 unique cargo vessels per day were recorded within the Study Area and four vessels per day within the Lease Area itself (see Appendix S, Navigation Safety Risk Assessment). Container vessels were the most frequently recorded cargo vessel type within the Study Area (43 percent) followed by bulk carriers (33 percent) and vehicle carriers (14 percent), as shown in Figure 4.4-45. The highest concentration of cargo vessels in the survey period was southwest of and through the Lease Area.

Military Vessels

Military vessels, such as aircraft carriers, destroyers, cruisers, and others, accounted for approximately nine percent of traffic within the Study Area and were the second most prolific vessel type in the Study Area. Throughout the survey period an average of two unique military vessels per day were recorded within the Study Area and one every 2 to 3 days within the Lease Area itself. The majority of military vessels were inbound or outbound from Naval Station Norfolk and the Joint Expeditionary Base–Little Creek within Chesapeake Bay. A significant proportion of this military traffic is undertaking routine training and testing, noting that the training itself is within the Virginia Capes Range Complex and Operating Area and Range Complex (VACAPES), not within the Lease Area. More information on military vessels in the Offshore Project Area can be found in Section 4.4.8, Department of Defense and Outer Continental Shelf National Security Maritime Uses.

Towing Vessels

Towing vessels (also referred to as tug/tow or push/tow vessels) are defined in U.S. Code as a commercial vessel engaged in or intending to engage in the service of pulling, pushing, or hauling alongside, or any combination of pulling, pushing, or hauling alongside (46 U.S.C. § 2101(50)). Towing vessel density was light in 2019, a maximum of 10 vessel transits throughout the Lease Area (Figure 4.4-46). The density of towing vessels is relatively uniform throughout the Lease Area. The highest vessel density is closer to shore and within Chesapeake Bay outside the Lease Area where these vessels are transiting to and from the Port of Virginia. Throughout the survey period, an average of one unique towing vessel per day was recorded within the Study Area and one unique towing vessel in 6 to 7 days within the Lease Area itself.

Tanker Vessels

Tanker or tank vessels are defined by a self-propelled tank vessel constructed or adapted primarily to carry oil or hazardous material in bulk in the cargo spaces (46 U.S.C. § 2101(48)). Like cargo ships, tanker vessels transport cargo between ports. Tank vessels carry liquid goods such as oil, gas, or chemicals. AIS 2019 data demonstrates that tankers transit the space within the southwest portion of the Lease Area. Figure 4.4-47 shows the clear pattern of tankers transiting to and from Chesapeake Bay with a light amount of vessel traffic in 2019. Tanker traffic through the Offshore Export Cable Route Corridor is consistent with the higher density closer to shore. Throughout the survey period an average of one unique tanker per day was recorded within the Study Area and one in three days within the Lease Area itself. Liquified natural gas carriers were the most frequently recorded tanker type within the Study Area (33 percent), followed by combined chemical/oil tankers (25 percent) and chemical tankers (15 percent).

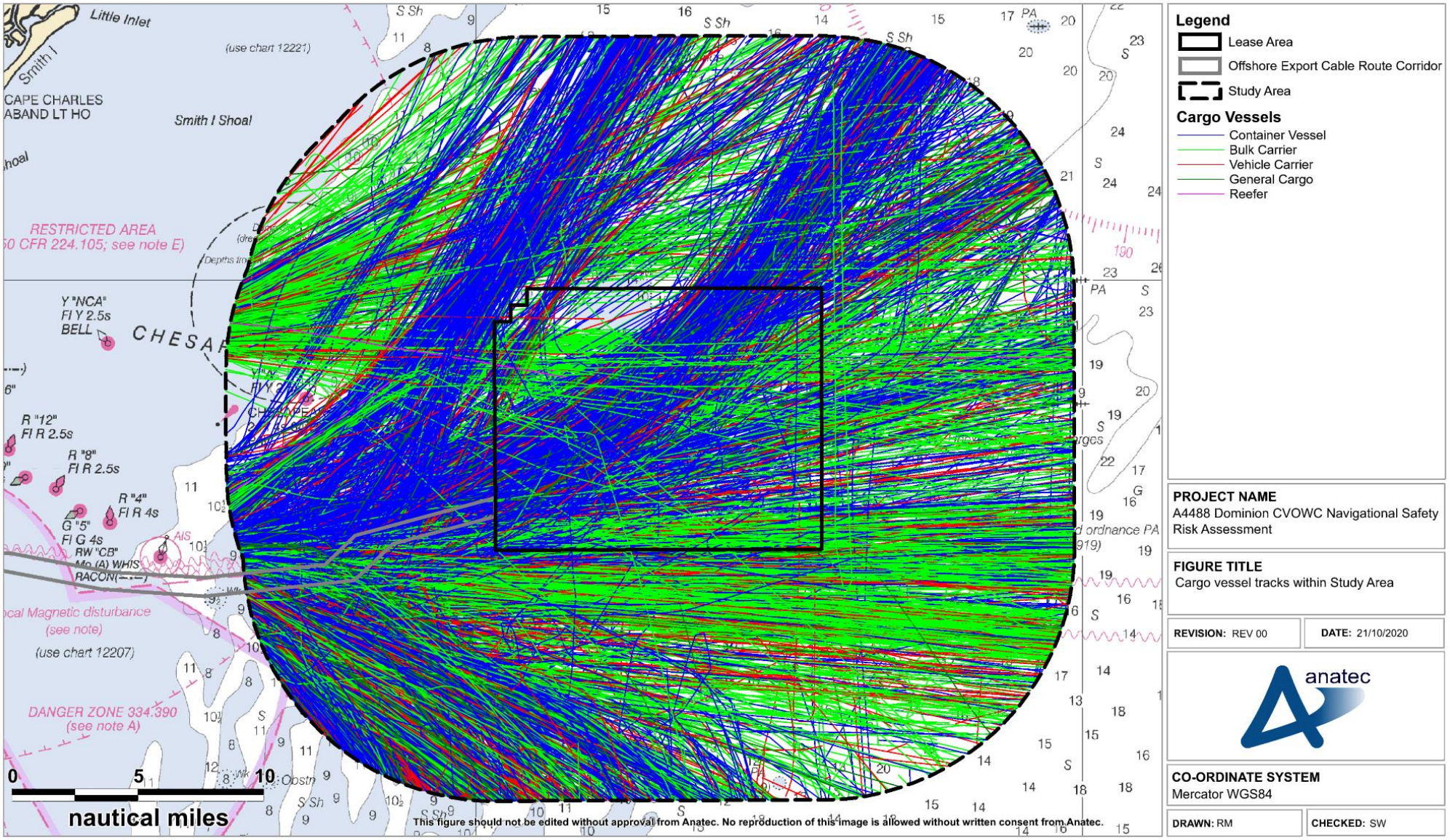


Figure 4.4-45. Cargo Vessel Density (2019)

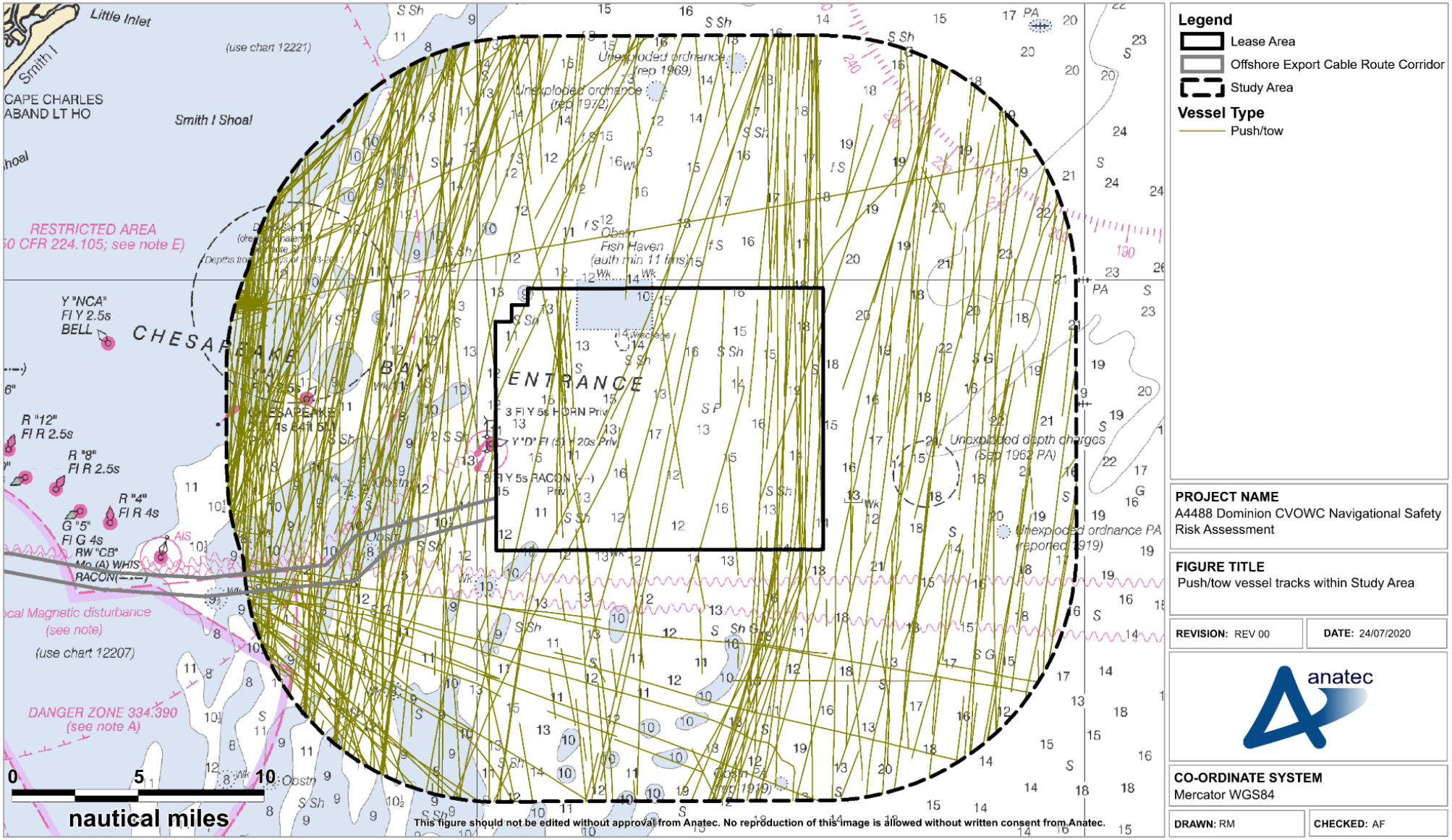


Figure 4.4-46. Towing Vessel (also referred to as Tug/Tow or Push/Tow Vessel) Density (2019)

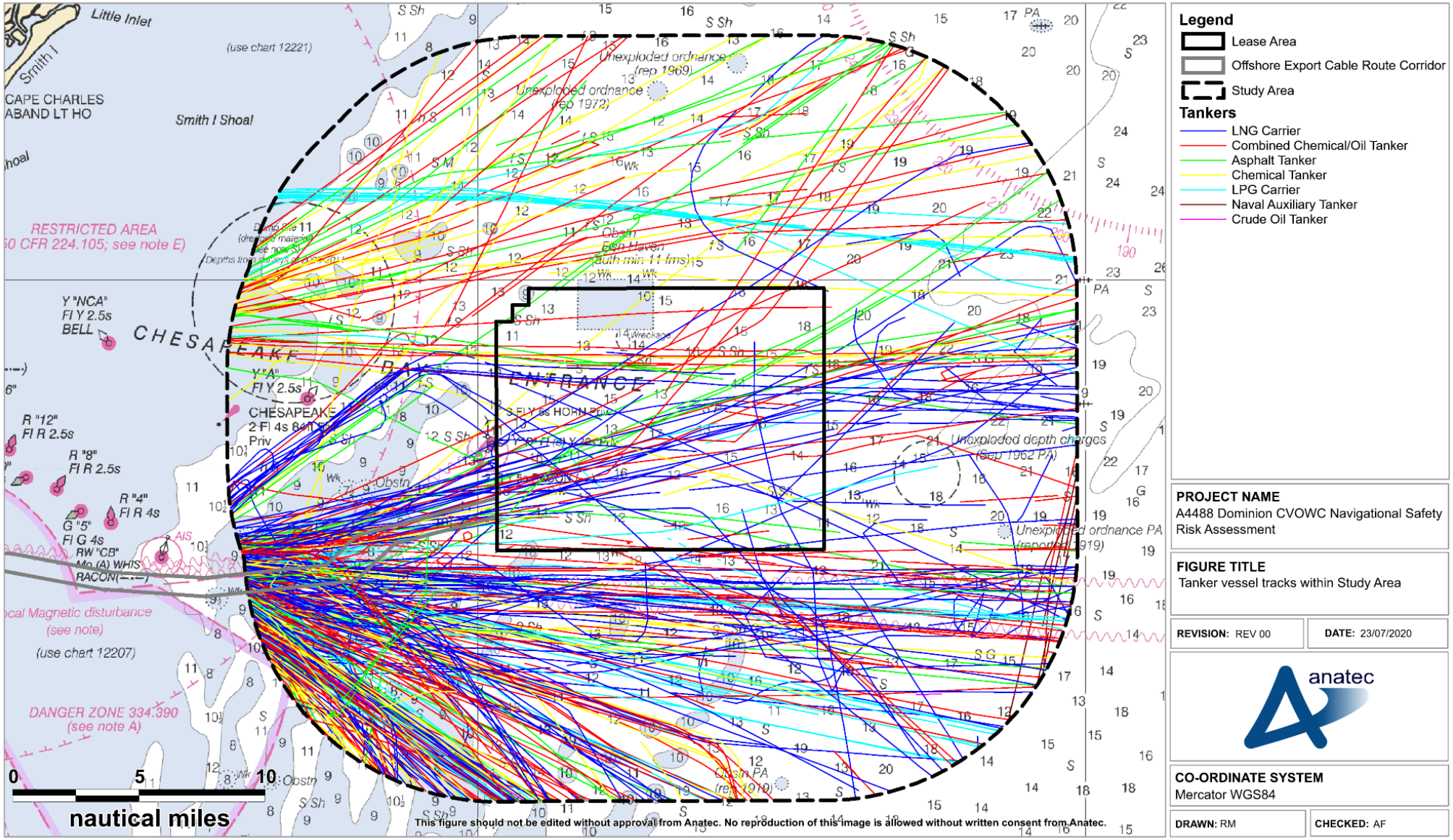


Figure 4.4-47. Tanker Vessel Density (2019)

Passenger Vessels

Passenger vessels are defined by U.S. Code Title 46 "Shipping" as a vessel of at least 100 gross tons as measured under §14502 of this title that carries more than 12 passengers, including at least one passenger for hire; is chartered and carrying more than 12 passengers; is a submersible vessel carrying at least one passenger for hire; or is a ferry carrying a passenger (46 U.S.C. § 2101(31)).

Passenger vessel navigation, which includes passenger ferries and cruise ships, was also recorded in proximity to the Offshore Project Area (Figure 4.4-48). Although there is not a high presence of passenger vessels that travel through the Lease Area, there is a heavy cruise line presence out of the Norfolk Terminal, with those vessels crossing the Offshore Export Cable Route. Carnival Cruise Lines, one of the world's largest cruise ship operators, uses Norfolk as a central hub for many of their Caribbean cruises. Approximately 12 cruise ships leave their Norfolk hub a year. Passenger vessels accounted for approximately 2 percent of traffic within the Study Area. Throughout the survey period, an average of one unique passenger vessel every three days was recorded within the Study Area, although the presence of passenger vessel within the Lease Area itself was limited.

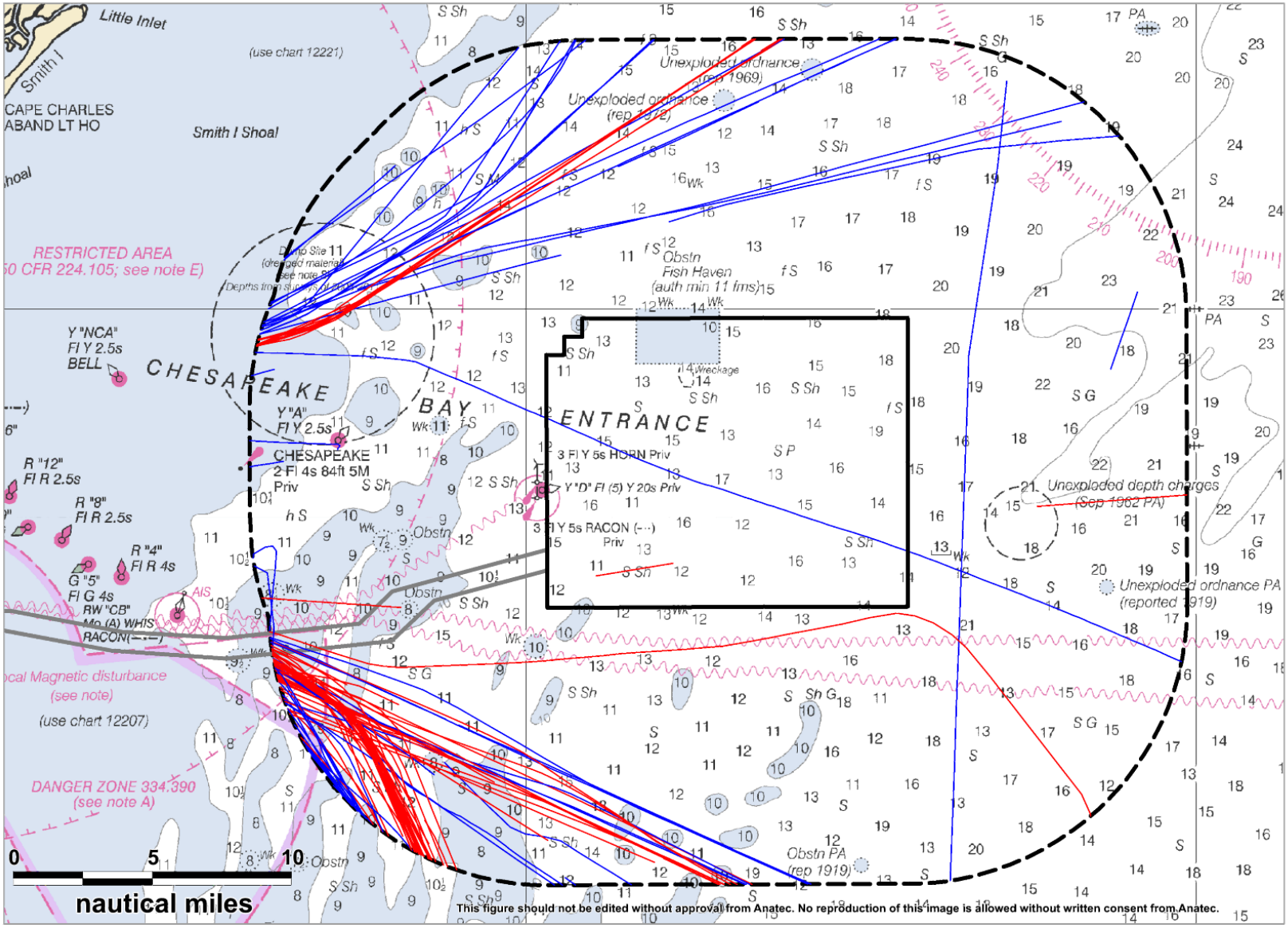
Commercial Fishing Vessels

Fishing vessels are defined in United States law as "a vessel that commercially engages in the catching, taking, or harvesting of fish or an activity that can reasonably be expected to result in the catching, taking, or harvesting of fish (46 U.S.C. § 2101(12))." AIS, VMS, and VTR data reveals that there are commercial fishing vessel transits and fishing effort through the Offshore Project Area without concentration in a specific area (Figure 4.4-49). However, most commercial fishing vessels are not required to carry AIS; therefore, data may under-represent existing vessel traffic.

More information on commercial and recreational fishing activities can be found in Section 4.4.6, Commercial and Recreational Fishing. Two ports in Virginia were among the top 30 most lucrative ports in the U.S. regarding value of fish landed: Hampton Roads Area, Virginia, valued at 56.1 million dollars, and Reedville, Virginia, valued at 36.9 million dollars in 2019 (NOAA Fisheries 2020). However, only a small proportion of the landings originate within the Lease Area, as discussed in Section 4.4.6, Commercial and Recreational Fishing.

Recreational Vessels

U.S. Code defines recreational vessels as a vessel that was manufactured or operated primarily for pleasure; or leased, rented, or chartered to another for the latter's pleasure (46 U.S.C § 2101(34)). AIS data from 2019 on pleasure craft/sailing vessel density show very low recreational activity within and directly adjacent to the Lease Area (Figure 4.4-50). Recreational vessels accounted for approximately 4 percent of AIS traffic within the Study Area. An average of one unique recreational vessel every 2 to 3 days was recorded within the Study Area and twice a month within the Lease Area itself. Most of the recreational fishing activity occurs directly adjacent to shore in proximity to the Offshore Export Cable Route Corridor, and the density decreases as vessels proceed offshore. More information on Recreation and Tourism activities within the Offshore Project Area can be found in Section 4.4.5, Recreation and Tourism. It is recognized that most recreational vessels are not required to carry AIS and that this category of vessels is likely to be underreported.



Legend

- Lease Area
- Offshore Export Cable Route Corridor
- Study Area

Passenger Vessels

- Grandeur of the Seas
- Other

PROJECT NAME
A4488 Dominion CVOWC Navigational Safety Risk Assessment

FIGURE TITLE
Passenger vessel tracks within Study Area

REVISION: REV 00 **DATE:** 23/07/2020

CO-ORDINATE SYSTEM
Mercator WGS84

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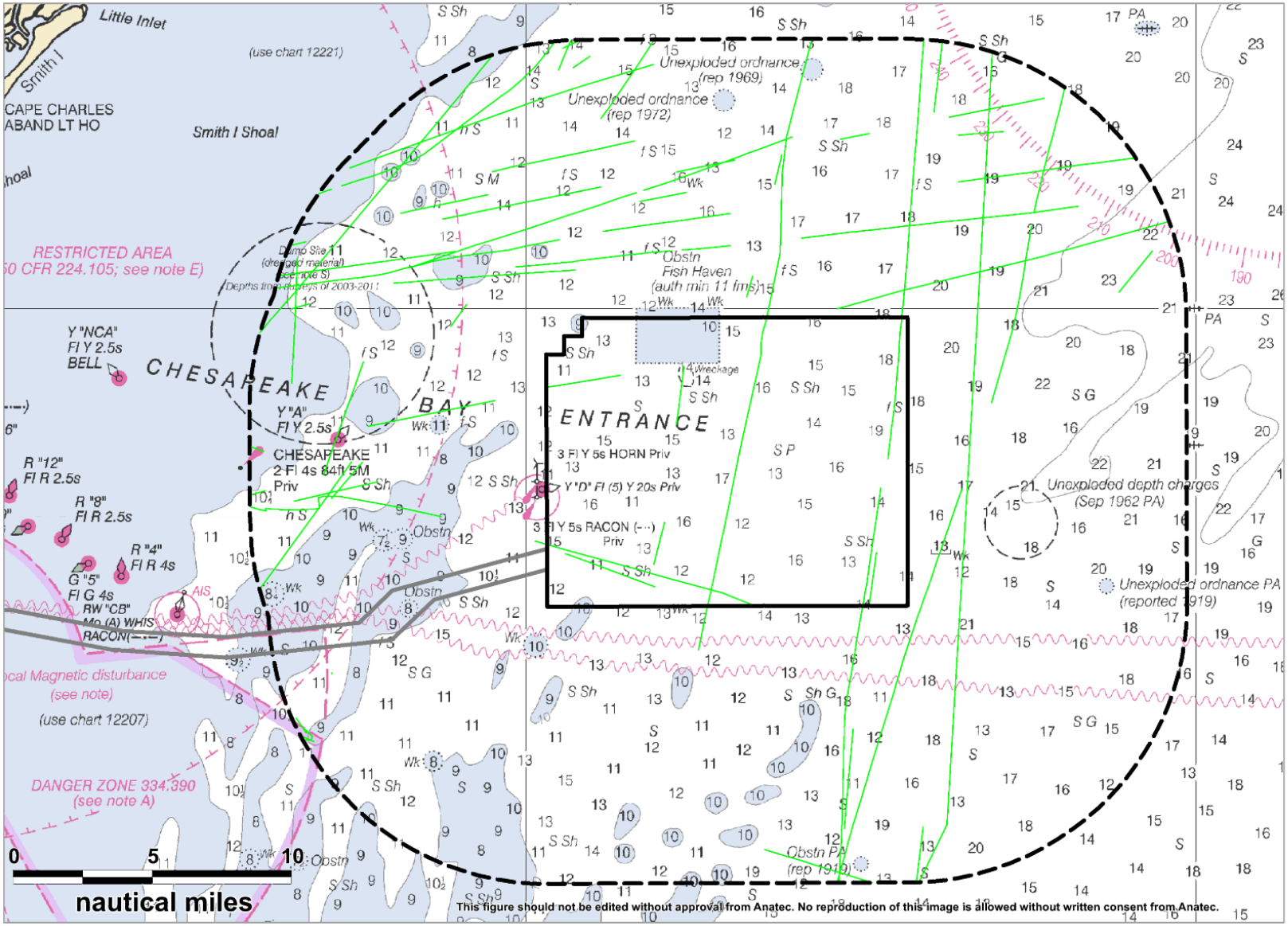
Figure 4.4-48. Passenger Vessel Density (2019)



Legend

- Lease Area
- Offshore Export Cable Route Corridor
- Study Area

Vessel Type

- Fishing

PROJECT NAME
A4488 Dominion CVOWC Navigational Safety Risk Assessment

FIGURE TITLE
Fishing vessel tracks within Study Area

REVISION: REV 01 **DATE:** 21/10/2020

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CO-ORDINATE SYSTEM
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Figure 4.4-49. Commercial Fishing Vessel Density (2019)

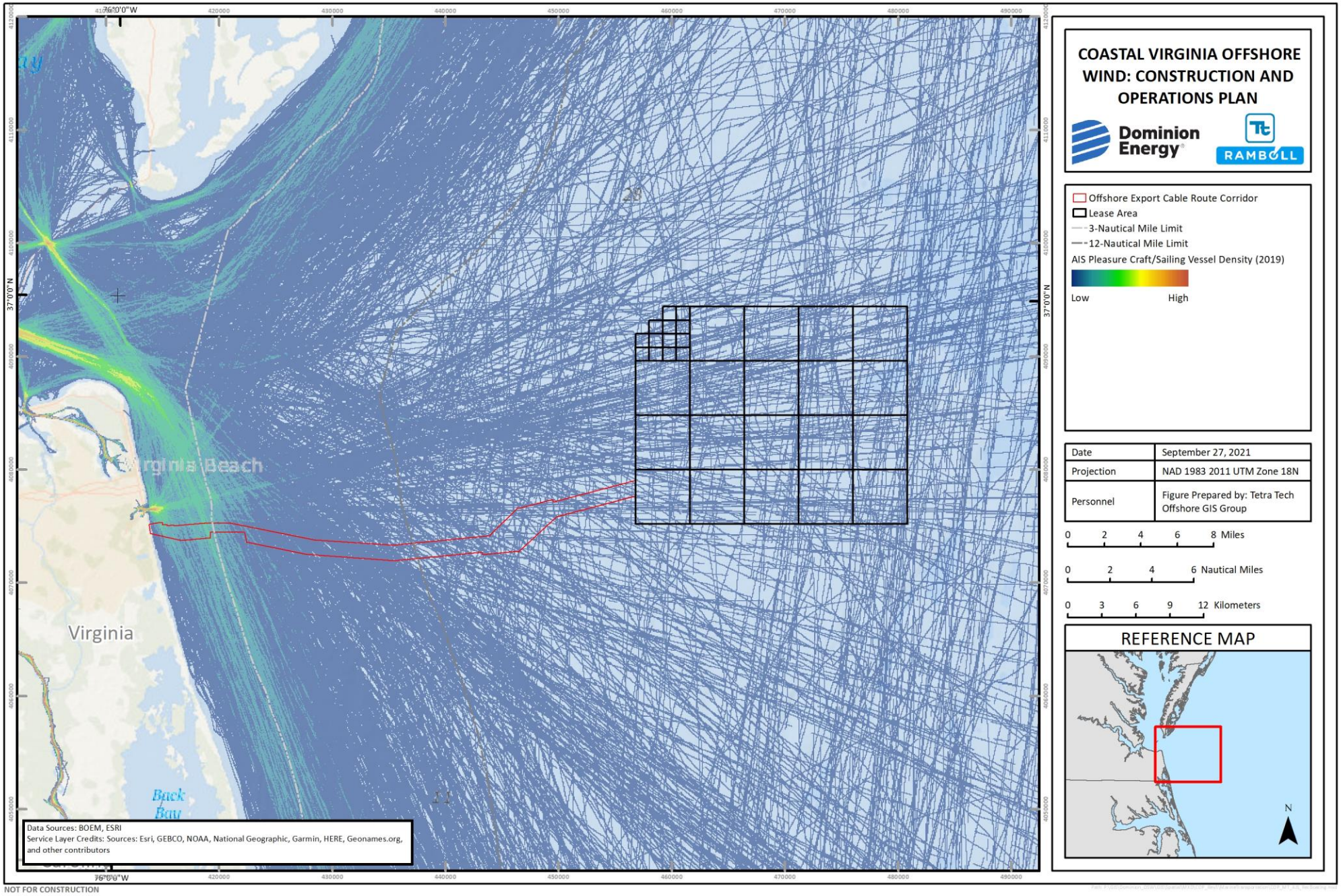

Figure 4.4-50. Recreational Vessel Activity in the Offshore Project Area (2019)

U.S. Coast Guard Incident Response

Responses by the USCG to Search and Rescue (SAR) incidents within the Mid-Atlantic Bight area falls within the Area of Responsibility of USCG District 5 units, including USCG Stations and USCG Air Stations responding within the vicinity of the Offshore Project Area. Nearby USCG Stations within Sector Virginia[7] include Cape Charles and Little Creek (Figure 4.4-51) with Air Station Elizabeth City in proximity, and the Sector is based in Portsmouth, VA (USCG, n.d.). The closest USCG station to the Lease Area is the Navy-USCG Joint Expeditionary Base Little Creek. The closest USCG air station to the Lease Area is Air Station Elizabeth City located approximately 44 nm (81.5 km) to the southwest.

Between 2010 and 2019, a total of 18 SAR incidents were recorded within the Study Area. Of these incidents, 14 involved material failure or malfunction, while 3 incidents involved injury to personnel. One serious incident occurred within the Lease Area during which an injured person was medevacked to a Norfolk hospital from a vessel located 23 nm (42.6 km) off Cape Henry.

A total of 26 SAR incidents were recorded within the Export Cable Study Area between 2010 and 2019, of which 10 involved material failure or malfunction. Five incidences of personnel injury occurred, four of which were considered serious incidents.

Special anchorage areas are described in subpart A of 33 U.S.C. § 100 by the USCG. The closest official anchorages to the Offshore Project Area are within or at the opening of Chesapeake Bay. It is not expected that anchorage areas will have an impact on the Project.

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For marine transportation and navigation, the maximum design is represented by the 205 WTGs and three Offshore Substations, and they represent the greatest number of permanent structures in the Offshore Project Area.

The Navigation Safety Risk Assessment (Appendix S) provides more information on the impacts and subsequent mitigation actions for risks to marine transportation and navigation.

Construction

During construction, the potential impact-producing factors to marine transportation and navigation may include short-term increase in Project-related construction vessel traffic, short-term presence of partially installed structures, and short-term safety zone implementation. Dominion Energy would 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:

- Temporary displacement of existing regional vessel traffic; and
- Vessel allision risk with partially installed structures.

[7] Formerly known as U.S. Coast Guard Sector Hampton Roads, the unit announced on December 10, 2019, that their name changed to "U.S. Coast Guard Sector Virginia."

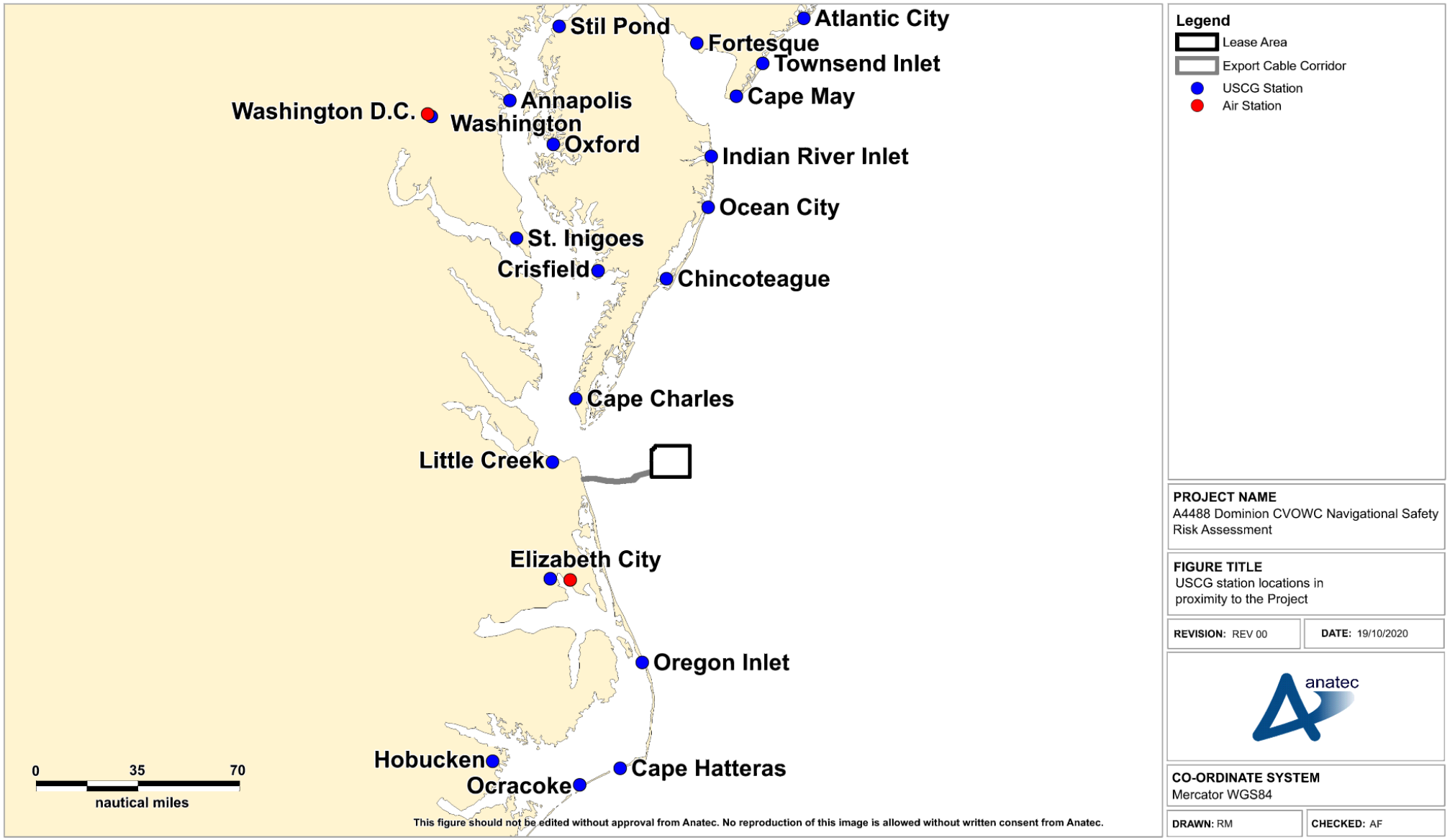

Figure 4.4-51. USCG Sectors and USCG Stations

Temporary displacement of existing regional vessel traffic. The presence of Project-related construction vessel traffic and short-term safety zone implementation may temporarily displace existing maritime users of the Offshore Project Area. The construction and installation stage of the Project would make use of both construction and support vessels to complete tasks in the Offshore Project Area. The vessels would typically be transiting to the Offshore Project Area from staging and support areas throughout the Hampton Roads area of Virginia (Section 3, Description of Proposed Activity). However, construction activities within the Offshore Project Area would be compatible with existing marine transportation uses and would not represent a substantial increase in existing vessel traffic in the region. Project-related vessel traffic would not interfere with existing marine and navigation traffic patterns as shown in Appendix S, Navigation Safety Risk Assessment. Project-related vessel traffic would follow existing transit routes to the extent practicable and Dominion Energy would coordinate with the USCG and local port authorities during the construction stage of the Project. In addition, Project-related construction and vessel activities would be communicated to the maritime community by use of LNTMs in coordination with the USCG throughout the construction stage. This information would also be posted on Dominion Energy's social media pages and website.

Vessel allision risk with partially installed structures. The presence of partially installed WTG and Offshore Substation structures during construction may increase the risk of vessel allision associated with the need for vessels to navigate around fixed structures. Dominion Energy conducted a Navigation Safety Risk Assessment that assessed the number and types of vessels that transit the Offshore Project Area to determine the level of risk associated with allision during construction of the Project. The analysis calculated the risk of collisions and allisions for both powered and drifting vessels and also investigated the risk of increased collisions for vessel-to-vessel encounters because of the presence of the Project structures. These specific hazards would be temporary and confined to designated areas during construction. To reduce the risks of vessel allision, Dominion Energy would mark potential hazards in coordination with the USCG. Dominion Energy would develop LNTMs that would include locations of partially installed structures. In addition, Dominion Energy would advise mariners of safety zones around all Offshore Project Components under construction and construction-related activities for the safety of mariners.

Operations and Maintenance

Throughout the O&M stage of the Project, the potential impact-producing factors to marine transportation and navigation may include a long-term increase in Project-related O&M vessel traffic, and long-term presence of fixed structures in the marine environment. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Long-term displacement of maritime vessels due to new fixed structures;
- Temporary diversion of maritime vessel traffic because of occasional O&M activities to the Offshore Project Components;
- Long-term vessel collision risk; and
- Long-term vessel allision risk with WTGs and Offshore Substations.

Long-term displacement of maritime vessels due to new fixed structures. The long-term presence of fixed structures (WTGs and Offshore Substations) may displace maritime vessel operators and users in the Offshore Project Area. These fixed structures may inhibit the ability of mariners to transit the area in the

same patterns as they have done historically, and they may choose to divert from transiting through the Lease Area. However, during the early planning stages of the Virginia Wind WEA, BOEM recognized some of the navigational risks associated with the Virginia WEA and removed the western portion that represented the "inclement weather diversion and USCG Category A Areas" as "Alternative E" because it avoids those areas within the Virginia WEA (Lease Area) that could otherwise pose a risk to navigational safety (BOEM 2012). This action taken early on in the Lease Area evaluation process substantially reduces the impact of the Project to marine transportation and navigation. This is further demonstrated by the separation of the northwest corner of the Lease Area from the Chesapeake Bay to Delaware Bay: Eastern Approach Cutoff Fairway (Figure 4.4-44); many vessels already follow this route (Figure 4.4-45), and vessel traffic would be further diverted from within the Lease Area to these potential fairways if approved. In addition, the WTG layout was designed to have a 397 ft (121 m) buffer to the edges of the Lease Area to ensure that no structures would be outside of the Lease Area including the blades.

Temporary diversion of maritime vessel traffic because of occasional O&M activities to the Offshore Project Components. When Dominion Energy needs to conduct O&M activities to the Offshore Project Components, maritime vessel traffic may be temporarily diverted. For example, there may be unplanned maintenance activities if one or more of the Offshore Export Cables were damaged. However, these activities would be localized, temporary, and infrequent relative to the life of the Project. In addition, Dominion Energy would provide information to the USCG for publication in the LNTM, which provides schedules and locations for all O&M activities, and would continue to coordinate with the USCG.

Long-term vessel collision risk. The presence of fixed structures within the Offshore Project Area may cause vessels to divert from the Lease Area, subsequently increasing risk of collision just outside of the southern and western edges of the Lease Area. Based on analysis conducted through the Navigation Safety Risk Assessment (Appendix S), there is a moderate to high risk of vessels deviating from their original route. In addition, there is a moderate risk of increased vessel to vessel collisions with further mitigation required. To help mitigate risks of vessel collisions in the Offshore Project Area, all Offshore Project Components (i.e., infrastructure associated with the Project) would be charted on the relevant nautical charts (electronic and print) in conjunction with NOAA. Dominion Energy would seek to have infrastructure charted prior to the start of the construction stage. This includes precise, planned Export Cable location information provided in spreadsheet and geographic information system (GIS) formats.

Long-term vessel allision risk with WTGs and Offshore Substations. The presence of fixed structures within the Lease Area may increase risks of allision and collision to mariners. Mariners may choose to divert their transit patterns to avoid the WTG array, which would concentrate vessel activity between WTGs and/or just outside of the Lease Area. The Navigation Safety Risk Assessment (Appendix S) reported a moderate risk with further mitigation needed for power vessel allisions and moderate to high risk with further mitigation needed for drifting vessel allisions. To mitigate these risks, Dominion Energy would follow all BOEM, International Association of Marine Aids to Navigation and Lighthouse Authorities, and USCG lighting and marking requirements for each WTG.

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 would be provided to the appropriate regulatory agencies for approval prior to decommissioning activities, and potential impacts would be re-evaluated at that time.

4.4.7.3 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 (Table 4.4-30). Dominion Energy will continue discussion and engagement with the appropriate regulatory agencies throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

Table 4.4-30. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Offshore Project Area	Temporary displacement of existing regional vessel traffic Vessel allision risk with partially installed structures	• Project-related vessel traffic would follow existing transit routes to the extent practicable and Dominion Energy would coordinate with the U.S. Coast Guard (USCG) and local port authorities during the construction stage of the Project; • Project-related construction and vessel activities would be communicated to the maritime community by use of Local Notices to Mariners (LNTMs) in coordination with the USCG throughout the construction stage. This information would also be posted on Dominion Energy's social media pages and website; • To reduce the risks of vessel allision, Dominion Energy would mark potential hazards in coordination with the USCG; and • Dominion Energy would develop LNTMs that would include locations of partially installed structures. In addition, Dominion Energy would advise mariners of safety zones around all Offshore Project Components under construction and construction-related activities for the safety of mariners.
Operations and Maintenance	Offshore Project Area	Long-term displacement of maritime vessels due to new fixed structures Temporary diversion of maritime vessel traffic because of occasional operations and maintenance (O&M) activities to the Offshore Project Components Long-term vessel collision risk	• The WTG layout was designed to have a 397 foot (121 meter) buffer to the edges of the Lease Area to ensure that no structures would be outside of the Lease Area including the blades; • Dominion Energy would provide information to the USCG for publication in the LNTM, which provides schedules and locations for all O&M activities, and would continue to coordinate with the USCG; • All Offshore Project Components (i.e., infrastructure associated with the Project)

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
		Long-term vessel allision risk with WTGs and Offshore Substations	would be charted on the relevant nautical charts (electronic and print) in conjunction with the National Oceanic and Atmospheric Administration. Dominion Energy would seek to have infrastructure charted prior to the start of the construction stage. This includes precise, planned Export Cable location information provided in spreadsheet and geographic information system formats; and • Dominion Energy would follow all Bureau of Ocean Energy Management, International Association of Marine Aids to Navigation and Lighthouse Authorities, and USCG lighting and marking requirements for each WTG.

4.4.8 Department of Defense and Outer Continental Shelf National Security Maritime Uses

This section describes national security maritime uses that occur within and surrounding the Offshore Project Area (see Section 3, Description of Proposed Activity). Potential impacts to or conflicts with national security uses resulting from construction, O&M, and decommissioning of the Project are discussed. This section also describes avoidance, minimization, and mitigation measures proposed by Dominion Energy. Other assessments detailed within this COP related to national security maritime uses include:

- Land Use and Zoning (Section 4.4.3);
- Marine Transportation and Navigation (Section 4.4.7);
- Aviation and Radar (Section 4.4.10);
- Other Coastal and Marine Uses (Section 4.4.11);
- Navigation Safety Risk Assessment (Appendix S); and
- Obstruction Evaluation and Additional Analysis (Appendix T).

For the purposes of this section, the Offshore Project Area was reviewed for potential impacts from construction, O&M, and decommissioning of the Project. Onshore Project Components are not located in direct proximity to DoD and Outer Continental Shelf (OCS) national security maritime uses.

This section was prepared in accordance with the following guidelines and regulations. Under 49 U.S.C. § 44718, DoD is required to study the effects of new construction of obstructions on military installations and operations including radar/WTG interference and low-level flight operations.

Additionally, the following USCG guidance documents were considered:

- Navigation and Vessel Inspection Circular 01-19, Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations (USCG 2019a);
- Atlantic Coast Port Access Route Study: Port Approaches and International Entry and Departure Transit Areas (USCG 2019b);
- Port Access Route Study: Approaches to the Chesapeake Bay, Virginia (USCG 2019c); and
- COMDINST 16003.2B, Marine Planning to Operate and Maintain the Marine Transportation System and Implement National Policy (USCG 2019d).

The following FAA, BOEM, and International Association of Marine Aids (IALA) guidelines and recommendations were considered:

- FAA Advisory Circular 70/7460-1M (FAA 2020);
- BOEM Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development (BOEM 2021); and
- IALA to Navigation and Lighthouse Authorities Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2013).

Additional data required to complete this analysis comes from navigational charts and maps as well as site-specific data collected by Dominion Energy. It is understood that certain national security activities are covert and not visible to the public. Consultations and deconfliction with the DoD began early-on in the

development of the Virginia WEA (BOEM 2012), which eventually led to establishing the Lease Area compatible with DoD activities in the OCS. Therefore, Dominion Energy has and will continue to work closely with key stakeholders within the DoD and Department of Homeland Security to maintain open communication during the development of the Project.

4.4.8.1 Affected Environment

The affected environment is defined as areas where national security maritime activities are known to occur and have the potential to be directly or indirectly affected by the construction, O&M, and decommissioning of the Project. This section does not assess ports or construction and staging areas; the Project will utilize existing facilities, and the associated Project uses will be consistent with the activities for which the existing facilities were permitted and developed. Known areas of national security maritime operations in the OCS are illustrated in Figure 4.4-52.

Virginia Capes Operating and Warning Areas

As shown in Figure 4.4-52, the Lease Area is located between the Northern Virginia Capes Operating Area (OPAREA) and the Southern Virginia Capes Operating Area, within the Virginia Capes Range Complex (VACAPES). The closest distance from the Lease Area to VACAPES is 1,805 ft (550 m).

Operations throughout VACAPES occur intermittently, with durations ranging from a few hours to several weeks and are dispersed off the coasts of Virginia and North Carolina; however, such operations are largely concentrated within VACAPES (Figure 4.4-53). The Navy uses VACAPES for various exercises and training, including "Live Fire Training," with areas designated as "Danger Zones," "Danger Areas," and "Restricted Areas" on nautical charts. Danger Zones are defined by 33 CFR § 334.2 as "a defined water area (or areas) used for target practice, bombing, rocket firing or other especially hazardous operations, normally for the armed forces." Danger Areas are defined by 33 CFR § 334.2 as "airspace of defined dimensions within which activities dangerous to the flight of an aircraft may exist at specified times." Most Danger Areas are operated by military authorities. As defined by 33 CFR § 334.2, Restricted Areas are those defined areas where public access is prohibited or limited due to general use by the U.S. Government. The Offshore Export Cable Route Corridor intersects the following areas:

- Danger Zone 334.380(a): Atlantic Ocean south of entrance to Chesapeake Bay off Dam Neck, Virginia; naval firing range;
- Danger Zone 334.390(a): Atlantic Ocean south of entrance to Chesapeake Bay; firing range; and
- SMR Danger Zone (Figure 4.4-54).[8]

The Offshore Export Cable Route Corridor is adjacent to the following areas:

- Danger Zone: Danger Area (see note B, chart #12221):
  - Area is open to unrestricted surface navigation, but all vessels are cautioned not to anchor, dredge, trawl, lay cables, bottom, or conduct any other similar type of operation because of residual danger from mines on the bottom.
- Restricted Area 334.320(a): Chesapeake Bay entrance; naval restricted area.

[8] Due to the scale of Figure 4.4-54, the SMR Danger Zone is not visible on this map.

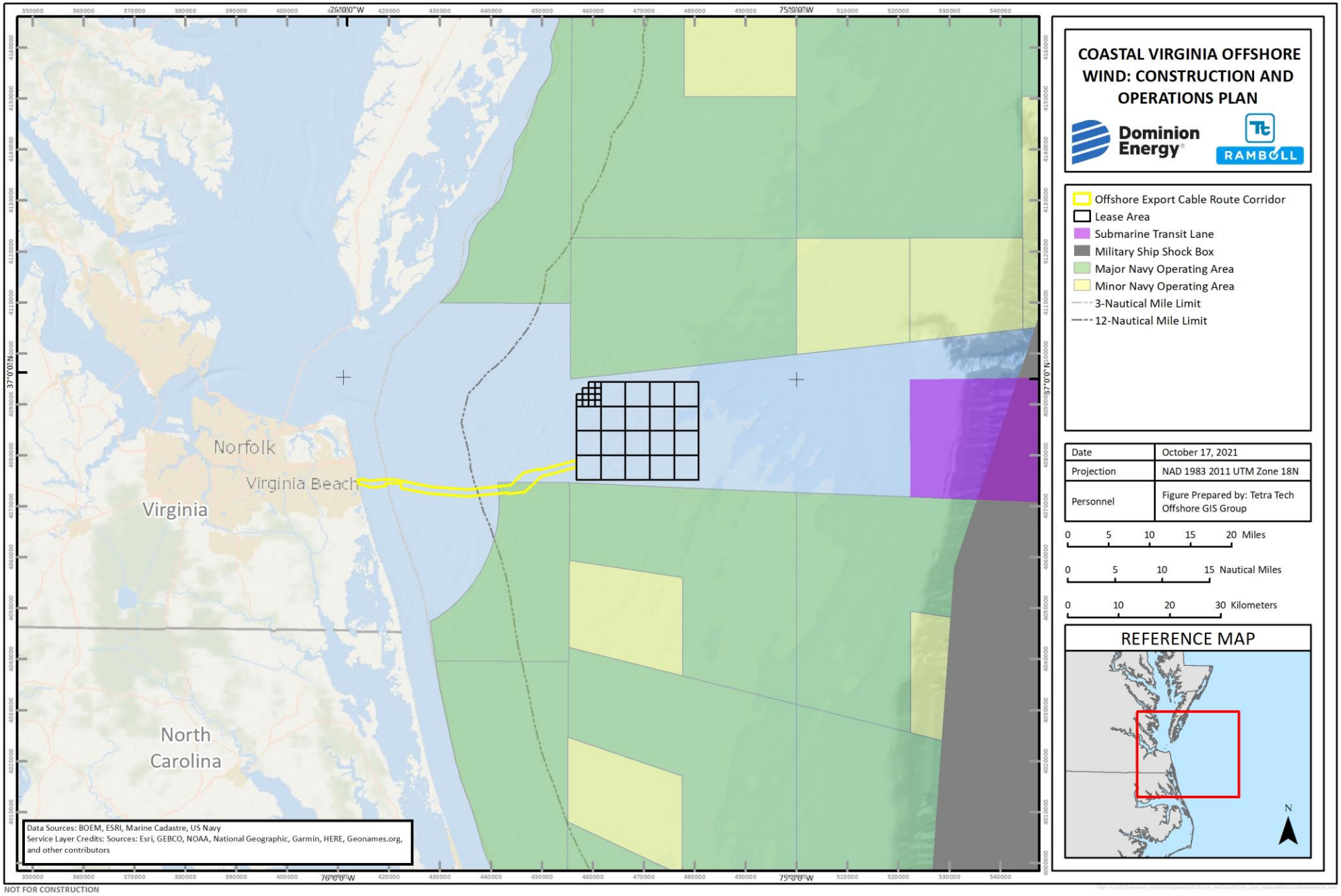

Figure 4.4-52. National Security Maritime Uses in the Offshore Project Area

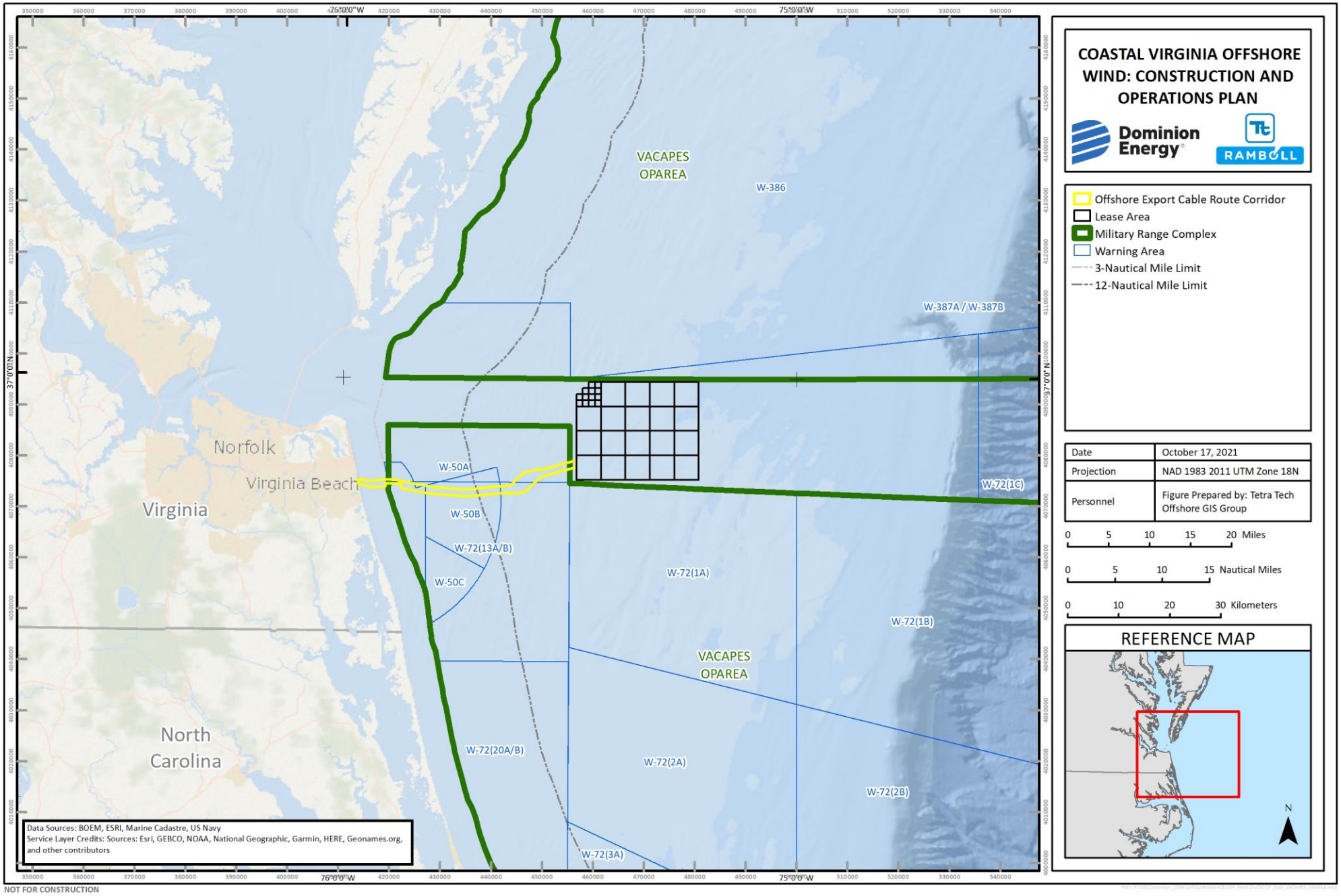

Figure 4.4-53. VACAPES Range Complex

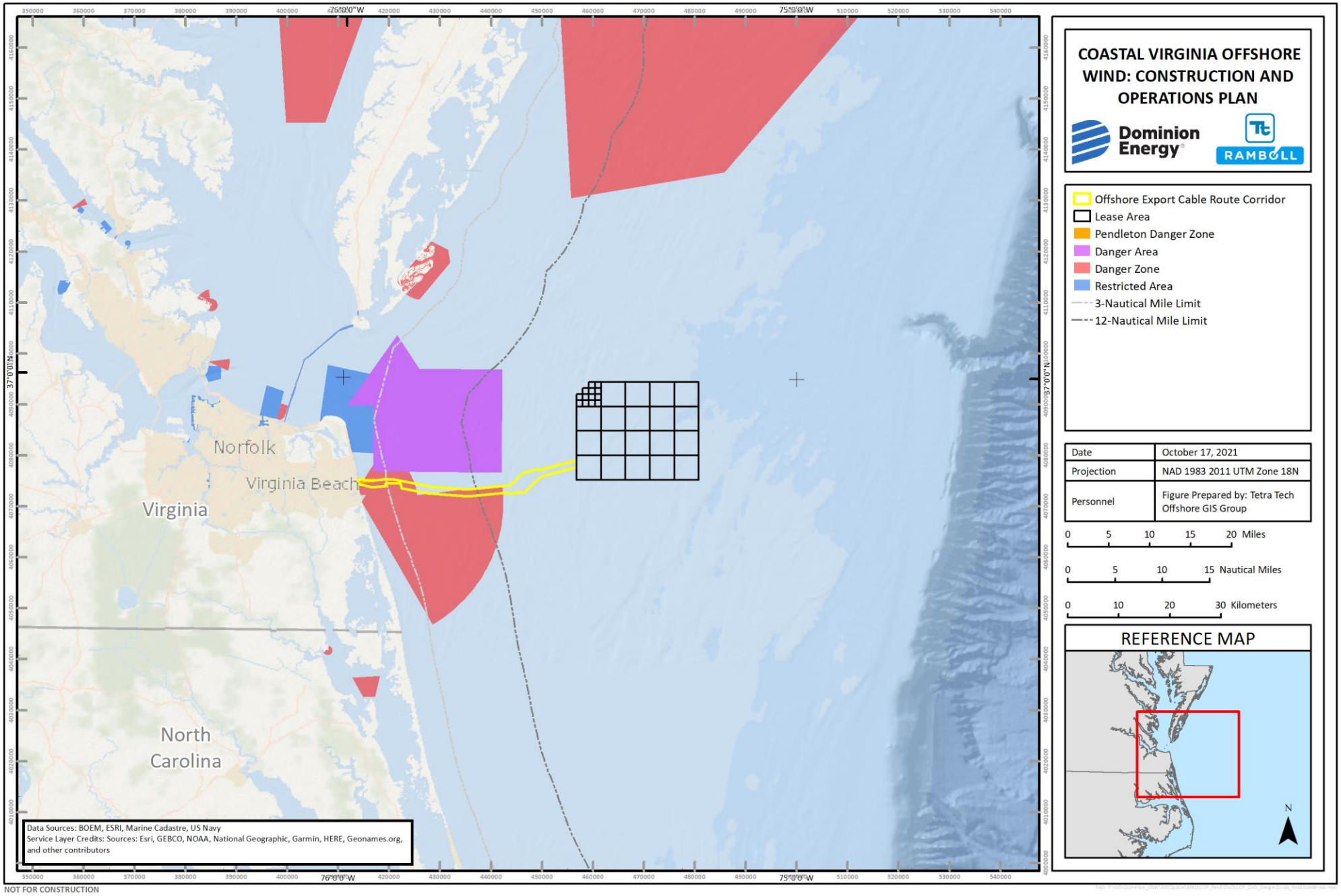

Figure 4.4-54. Danger Zones and Restricted Areas

Within VACAPES, a wide variety of military operations can occur at any given time; therefore, all survey, construction, and O&M activities would be coordinated closely with the DoD. These military operations include the following primary mission areas (with example activities) that are conducted throughout VACAPES (Navy 2018):

- Air warfare (gunnery exercises, missile exercises);
- Amphibious warfare (amphibious vessel maneuvers/landings, ship-to-shore firing exercises);
- Anti-submarine warfare (helicopter exercises, torpedo exercises, sonar activity);
- Electronic warfare (counter targeting chaff/flare exercises);
- Expeditionary warfare (dive/salvage training, personnel insertion/extraction);
- Mine warfare (mine countermeasures, mine neutralization, explosive ordnance disposal); and
- Surface warfare (bombing exercises, gunnery exercises, live fire exercises, laser targeting, missile exercises, sinking exercises).

Dominion Energy is aware of the Navy's presence in and around the Offshore Project Area and has been coordinating with the Navy throughout the Project's development, particularly in the siting (and landing) of the Offshore Export Cable Route, which intersects VACAPES through much of its length. Dominion Energy successfully coordinated with DoD in support of the CVOW Pilot Project, and any lessons learned would be incorporated into the process for the CVOW Commercial Project. If Project activities encounter military operations in the Project Area, VACAPES Fleet Area Control and Surveillance Facility (Giant Killer) would be contacted. This VACAPES facility is dedicated to supporting homeland defense and advancing the combat readiness of U.S Atlantic Fleet and Joint Forces by providing control, surveillance, management, sustainment, and ready access to assigned airspace, operating areas, training ranges, and resources.

Special Use Airspace

As shown on Figure 4.4-55, the Offshore Project Area would be located between VACAPES AIR-K and W-72 special use airspace areas. The closest regulated military airspace is 0.36 mi (0.58 km) from the Lease Area.

Naval Air Station Oceana

Naval Air Station Oceana (NAS Oceana) is located in Virginia Beach, Virginia approximately 1.6 linear mi (2.6 km) from the Cable Landing Location. NAS Oceana contains approximately 7 mi (11 km) of runways, with more than 4,000 ac (1,619 ha) of facilities to serve military air traffic on the East Coast. The mission of NAS Oceana is to support the Navy's Atlantic and Pacific Fleet Force of Strike-Fighter Aircraft and Joint/Inter-Agency Operations and to ensure readiness of the 16 homebased F/A-18 Hornet Strike Fighter Squadrons. NAS Oceana's Apollo Soucek Field has four runways, three measuring 8,000 ft (2,438 m) in length and one measuring 12,000 ft (3,658 m). NAS Oceana is also home to numerous Fleet Support units, commands, and departments (Navy 2014a).

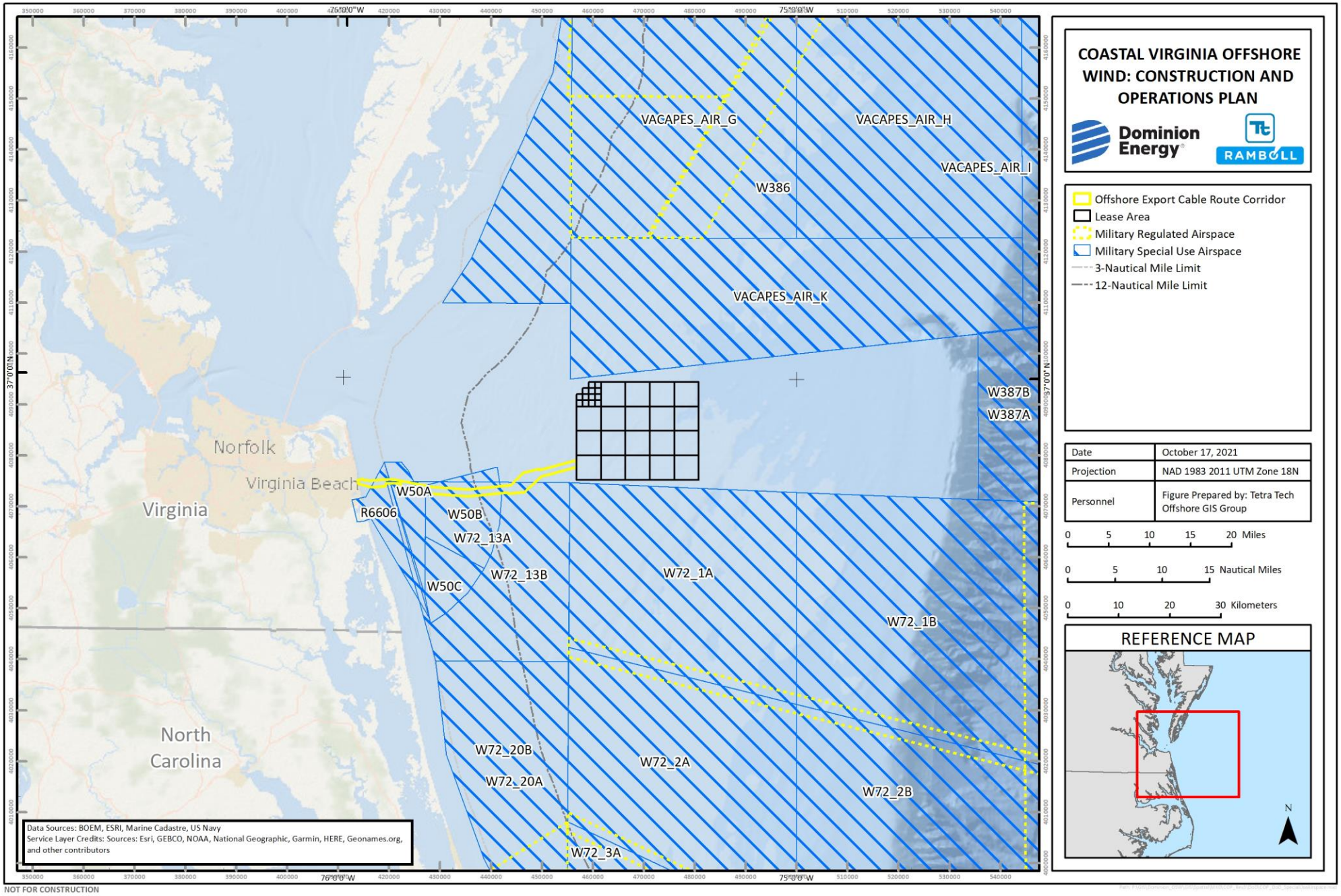

Figure 4.4-55. Special Use Airspace

A portion of the Onshore Export Cable Route runs underground through property owned by the Navy, as part of NAS Oceana, in an area that is currently managed as part of the agricultural out lease program (Navy 2014a). Dominion Energy is in the process of coordinating with NAS Oceana for the appropriate real estate leasing necessary to utilize this parcel to route the Onshore Export Cable, pending Navy approval, at this location. Additional information on the Onshore Export Cable Route is included in Section 3, Description of Proposed Activity.

State Military Reservation

The SMR, formerly known as Camp Pendleton, is located in Virginia Beach, Virginia and is used primarily for Virginia Army National Guard training activities. Facilities at the installation include a firing range in the eastern portion of the base, a reserve center along the western border, various training areas in the beaches and dunes areas, and an explosives test facility in the area. The 365 ac (148 ha) SMR is primarily used for training in special warfare, ordnance, overland assault, beach assault, and tactical air operations radar (Navy 2006). The Cable Landing Location will utilize the Proposed Parking Lot west of the Firing Range at SMR, located east of Regulus Avenue and north of Rifle Range Road. Additionally, the Onshore Export Cable Route runs underground through SMR. Dominion Energy is in the process of coordinating with SMR for the appropriate real estate leasing necessary to utilize this parcel to route the Onshore Export Cable at this location. Additional information on the Cable Landing Location and Onshore Export Cable Route is included in Section 3, Description of Proposed Activity.

Dam Neck Annex

Dam Neck Annex, which is part of NAS Oceana, is located directly south of the SMR in Virginia Beach, Virginia and includes approximately 1,900 ac (769 ha). The mission of Dam Neck Annex is to provide training in specified combat systems operation and maintenance, specialized skills training, and training systems support to operational and systems commands. Major tenants of Dam Neck Annex include; Naval Special Warfare Development Group; Tactical Training Group, Atlantic; Atlantic Targets & Marine Operations; and others. Facilities include firing ranges, weapons gunline, helicopter pad, weapons compound, and beach/dune training areas (Navy 2014b). Danger Zones associated with the installation's offshore ranges are shown in Figure 4.4-54.

Naval Auxiliary Landing Field Fentress

The Naval Auxiliary Landing Field Fentress (NALFF) is located in Chesapeake, Virginia within 1.4 linear mi (2.3 km) from the Onshore Substation (at the closest point). Strike Fighter Squadron 106 NALFF serves as a major carrier landing training facility for aircraft stationed at NAS Oceana and Chambers Field. The 329 ac (133 ha) installation includes one 8,000 ft (2,438 m) runway equipped to simulate an aircraft carrier flight deck. Operations are intended to familiarize pilots with aircraft carrier landings and are primarily conducted at nighttime (Navy 2014a). The Interconnection Cable Route Alternatives overlap with NALFF property and are 0.75 mi (1.2 km) from the actual airfield.

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

The potential impacts resulting from Project construction, O&M, and decommissioning are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). In support of the development of the Project, Dominion Energy is evaluating several WTG layouts. For the purpose of

the assessments presented within this COP, the WTG design envelope has been defined by minimum and maximum parameters that are representative of the proposed minimum and maximum number of structures to be constructed within the Offshore Project Area. Regardless of WTG size, Dominion Energy is permitting up to 205 WTG positions and 3 Offshore Substations. Within the VACAPES OPAREA, a wide variety of military operations can occur at any given time; therefore, all survey, construction, O&M, and decommissioning activities would be coordinated closely with the DoD.

Construction

During construction, the potential impact-producing factors to national security maritime uses may include short-term increases in Project-related vessel traffic during construction. Dominion Energy would implement measures as appropriate to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factor identified above:

- Short-term increase in Project-related vessel traffic due to the construction of Offshore Project Components;
- Short-term disturbance at the Cable Landing Location and along the Onshore Export Cable Route Corridor; and
- Short-term adjustments to military vessel traffic during offshore construction activities.

Short-term increase in Project-related vessel traffic due to the construction of Offshore Project Components. There may be a short-term increase in Project-related construction and support vessels due to the installation of the Offshore Project Components. This increase in vessel traffic would occur between ports and the Offshore Project Area as well as along the Offshore Export Cable Route Corridor. The potential for an increase in navigational safety risk due to Project vessel activities was studied in the Navigation Safety Risk Assessment (Appendix S). Dominion Energy would schedule and track Project-related vessels to best manage congestion and traffic flow in coordination with the USCG, DoD, and other national security stakeholders. Where practical, Project vessels would utilize transit lanes, fairways, and predetermined passage plans consistent with existing waterway uses. USCG would publish LNTMs and broadcast LNTMs to inform mariners and aviators of Project activities in the area. Additionally, Dominion Energy would publish an operations plan on the Project website to inform mariners and other interested parties on what work is being done in the Offshore Project Area.

Short-term disturbance at the Cable Landing Location and along the Onshore Export Cable Route Corridor. The Cable Landing Location is sited on a proposed parking lot west of the Firing Range at SMR, located east of Regulus Avenue and north of Rifle Range Road. The Onshore Export Cable would traverse the SMR, including Lake Christine, which could temporarily disturb some DoD activities on the property during trenchless installation activities. The Switching Station would not be located on DoD property. Construction and burial of the Onshore Export Cable through NAS Oceana would result in disturbance of up to approximately 20.7 ac (8.4 ha) of land, which is currently agricultural land, or open space. Once construction is complete, the lands, roads, and parking lots would be restored to previous conditions. To minimize potential construction effects on DoD activities, the DoD would be provided timely information regarding the planned construction activities and schedule.

Short-term adjustments to military vessel traffic during offshore construction activities. Construction and installation activities within the Offshore Project Area could result in short-term adjustments to military vessel traffic. During training and testing activities, military vessels may need to alter their course to provide necessary clearance around a cable-laying vessel that is restricted in its ability

to maneuver. Military vessels may also need to alter their course to avoid construction and installation activities within the Offshore Project Area. Activities at the Cable Landing Location in Virginia Beach, Virginia, may also require vessels to alter course around cable-laying vessels per nearshore trenchless installation operations. Dominion Energy would continue to communicate and engage with key national security stakeholders, including the USCG, DoD, and others, to coordinate installation activities. USCG would publish LNTM and broadcast LNTMs to inform mariners of Project activities. Dominion Energy would publish an operations plan on the Project website to inform mariners and aviators on Project activities in the area. In addition, Dominion Energy would establish and enforce safety zones around active construction areas. Should USCG safety zone authorities not extend beyond 12 nm (22 km) at the time of construction, Dominion Energy would utilize a combination of safety vessels, LNTMs, and Convention on the International Regulations for Prevention of Collisions at Sea (COLREGS) to promote both awareness of these activities and the safety of the construction equipment and personnel.

Operations and Maintenance

During O&M, the potential impact-producing factors to national security maritime uses may include long-term presence of Offshore Project Components and occasional vessel traffic for O&M. Dominion Energy would implement measures as appropriate to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Long-term modification of existing waterway use;
- Long-term presence of new fixed structures (e.g., Offshore Project Components) in the Offshore Project Area;
- Long-term conversion of land for the access to facilities (e.g., Cable Landing Location) in the Onshore Project Area; and
- Occasional diversion of national security maritime vessel traffic due to short-term inspection, repair, or replacement of Offshore Export Cables or Inter-Array Cables, and other such O&M activities.

Long-term modification of existing waterway use. O&M of the Project would create a new, permanent navigational pattern within the Lease Area. National security maritime users would be free to transit through the Offshore Project Area; however, no changes to existing uses for national security maritime users are expected along the Offshore Export Cable Route. Temporary safety zones (e.g., foundation locations and/or cable installation vessels) may also be implemented during O&M activities; however, the likelihood of a temporary safety zone occurring during the O&M stage in a location and time coinciding with national security marine uses is low. Dominion Energy would maintain regular communications and updates with all key national security stakeholders on timing and locations of maintenance activities in order to avoid, minimize, and mitigate impacts.

Long-term presence of new fixed structures (e.g., Offshore Project Components) in the Offshore Project Area. The presence of new fixed structures within the Offshore Project Area have the potential to disrupt military activities. The WTGs and Offshore Substations may create obstructions to national security-related transits and adjacent training activities. These structures would result in the long-term diversion of traditional vessel routes transiting past the Offshore Project Area. Dominion Energy would ensure that WTGs and Offshore Substations are properly marked and lighted in accordance with FAA Advisory Circular 70/7460-1M (FAA 2020), BOEM's Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development (BOEM 2021), and IALA's Navigation and Lighthouse

Authorities Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA 2013) (see Section 3.4.2, Lighting and Marking of Offshore Project Components for additional details on the proposed marking and lighting measures and Appendix T, Obstruction Evaluation and Additional Analysis). Dominion Energy would provide as-built information to the NOAA National Ocean Service to support necessary updates to navigation charts in coordination with other stakeholders as needed. Dominion Energy would work with the DoD and USCG to facilitate training exercises within the Offshore Project Area as requested. Dominion Energy would also provide regular communications and updates with key national security stakeholders on Project-related activities that may affect national security operations.

Long-term conversion of land for the access to facilities (e.g., Cable Landing Location) in the Onshore Project Area. During O&M, it is anticipated that any long-term maintenance activities at the Cable Landing Location would occur within the site boundaries, therefore, minimal impacts on DoD activities are anticipated to occur from the maintenance of the Cable Landing Location. Maintenance of underground cables within the SMR has the potential to temporarily impact DoD activities, it is anticipated that this maintenance would be limited to parking lot access and would not be extensive or frequent. As such, the existing DoD uses within the SMR would be maintained, and the Project would not present any excessive conflict with present or future planned uses by the DoD within the Onshore Project Area.

Beyond the land acquisition or leasing process, Dominion Energy intends to coordinate with the SMR and the NAS Oceana to identify what, if any, land use may continue within land acquired or leased for the Cable Landing Location, as well as any additional mitigation measures that may be appropriate related to impacts to DoD activities and resources during O&M.

Occasional diversion of national security maritime vessel traffic due to short-term inspection, repair, or replacement of Offshore Export Cables or Inter-Array Cables, and other such O&M activities. The Project would result in the long-term presence of O&M vessels and helicopters within the Offshore Project Area and transit to and from shoreside support locations. This would result in an increased number of Project vessel encounters with potential corresponding risk of collisions. There may be long-term encounters with national security training operations from the usage of helicopters. Dominion Energy would employ helicopters for O&M activities for the transfer of personnel and materials to the Offshore Project Area. Dominion Energy would control Project vessel and helicopter movements through the Control Center to minimize vessel encounters during training operations in and near the Offshore Project Area.

In addition, the Project may result in the potential infrequent need for a cable-laying vessel to inspect, repair, or replace either the Inter-Array Cable or Offshore Export Cables during the operational life of the Project. In the event of cable inspection, repair, or replacement, there may be the need to divert vessel traffic due to operations of the inspection/repair vessel, which would be restricted in its ability to maneuver, thus requiring a wide berth. USCG would publish LNTMs and broadcast LNTMs to inform mariners of Project activities. Dominion Energy would communicate with key national stakeholders on the timing and location of O&M activities. Dominion Energy would also follow the USCG establishment of safety zones around O&M activities.

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 during 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, and potential impacts will be re-evaluated at that time.

4.4.8.3 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 (Table 4.4-31). Dominion Energy intends to 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 4.4-31. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Offshore Project Area	Short-term increase in Project-related vessel traffic due to the construction of Offshore Project Components Short-term adjustments to military vessel traffic during offshore construction activities	• Dominion Energy would schedule and track Project-related vessels to best manage congestion and traffic flow in coordination with the U.S. Coast Guard (USCG), U.S. Department of Defense (DoD), and other national security stakeholders; • Where practical, Project vessels would utilize transit lanes, fairways, and predetermined passage plans consistent with existing waterway uses; • Dominion Energy would continue to communicate and engage with key national security stakeholders, including the USCG, DoD, and others, to coordinate installation activities; • USCG would publish local notices to mariners (LNTMs) and broadcast LNTMs to inform mariners and aviators of Project activities in the area. • Dominion Energy would publish an operations plan on the Project website to inform mariners and other interested parties on what work is being done in the Offshore Project Area; • Dominion Energy would establish and enforce safety zones around active construction areas; and • Should USCG safety zone authorities not extend beyond 12 nautical miles (nm) (22 kilometers [km]) at the time of construction, Dominion Energy would utilize a combination of safety vessels, LNTMs, and Convention on the International Regulations for Prevention of Collisions at Sea to promote both awareness of these activities and the safety of the construction equipment and personnel.
	Onshore Project Area	Short-term disturbance at the Cable Landing Location and along the Onshore Export Cable Corridor	• Once construction is complete, the lands, roads, and parking lots would be restored to previous conditions. • To minimize potential construction effects on DoD activities, the DoD would be provided timely information regarding the planned construction activities and schedule.
Operations and Maintenance	Offshore Project Area	Long-term modification of existing waterway use Long-term presence of new fixed structures (e.g., Offshore Project	• Dominion Energy may need to implement temporary safety zones (e.g., foundation locations and/or cable installation vessels) during operations and maintenance (O&M) activities;

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
		Components) in the Offshore Project Area Occasional diversion of national security maritime vessel traffic due to short-term inspection, repair, or replacement of Offshore Export Cables or Inter-Array Cables, and other such operations and maintenance (O&M) activities	• Dominion Energy would maintain regular communications and updates with all key national security stakeholders on timing and locations of maintenance activities in order to avoid, minimize, and mitigate impacts; • Dominion Energy would ensure that Wind Turbine Generators and Offshore Substations are properly marked and lighted in accordance with the Federal Aviation Administration (FAA) Advisory Circular 70/7460-1M (FAA 2020), Bureau of Ocean Energy Management's (BOEM's) Draft Proposed Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development (BOEM 2019), the International Association of Marine Aids' (IALA's) Navigation and Lighthouse Authorities Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA 2013), and referencing Appendix T, Obstruction Evaluation and Additional Analysis; • Dominion Energy would provide as-built information to the National Oceanic and Atmospheric Administration (NOAA) National Ocean Service to support necessary updates to navigation charts in coordination with other stakeholders as needed; • Dominion Energy would work with the USCG to facilitate training exercises within the Offshore Project Area as requested. Dominion Energy would also provide regular communications and updates with key national security stakeholders on Project-related activities that may affect national security operations; • Dominion Energy would employ helicopters for O&M activities for the transfer of personnel and materials to the Offshore Project Area. Dominion Energy would control Project vessel and helicopter movements through the Control Center to minimize vessel encounters during training operations in and near the Offshore Project Area; and • Dominion Energy would communicate with key national stakeholders on the timing and location of O&M activities. Dominion Energy would also follow the USCG establishment of safety zones around O&M activities.
	Onshore Project Area	Long-term conversion of land for the access to facilities (e.g., Cable Landing Location) in the Onshore Project Area	• Dominion Energy intends to coordinate with the SMR to identify what, if any, land use may continue within land acquired or leased for the Cable Landing Location, as well as any additional mitigation measures that may be appropriate related to impacts to DoD activities and resources during O&M

4.4.9 Marine Energy and Infrastructure

This section describes the existing and potential marine energy and infrastructure uses within and surrounding the Offshore Project Area. Potential marine energy and infrastructure uses in the region include electricity generation and transmission, cables, sand borrow areas, dredge disposal sites, and scientific research. Potential impacts to these uses resulting from construction, O&M, and decommissioning of the Project are discussed. Avoidance, minimization, and mitigation measures proposed by Dominion Energy are also described in this section.

Other assessments detailed within this COP that are related to marine energy and infrastructure include:

- Underwater Acoustic Environment (Section 4.1.5);
- Marine Mammals (Section 4.2.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Department of Defense and Outer Continental Shelf National Security Maritime Uses (Section 4.4.8);
- Other Coastal and Marine Uses (Section 4.4.11); and
- Navigation Safety Risk Assessment (Appendix S).

For the purposes of this section, the Offshore Project Area will be reviewed for potential impacts from construction, O&M, and decommissioning of the Project. Onshore Project Components are not located in direct proximity to the marine energy and infrastructure facilities.

In addition to the data used for the Navigation Safety Risk Assessment provided as Appendix S, data required to complete this analysis comes from NOAA charts, BOEM, USACE, the MARCO Data Portal, the Northeast Data Portal, and site-specific data collected by Dominion Energy.

4.4.9.1 Affected Environment

The affected environment is defined as areas where marine energy and infrastructure facilities are known to occur and have the potential to be directly or indirectly affected by the construction, O&M, and decommissioning of the Project. Ports and construction and staging areas are not assessed within this section because associated activities will utilize existing facilities and will be consistent with the activities for which the existing facilities were permitted and developed. Known areas of existing marine energy and infrastructure are illustrated in Figure 4.4-56 through Figure 4.4-59.

Offshore Energy

The Lease Area covers approximately 112,799 ac (45,658 ha) and is approximately 23.75 nm (43.99 km) off of the Virginia Beach coastline. The CVOW Pilot Project is adjacent to the west of the Project Lease Area in U.S. federal waters. It has an area of approximately 3.5 mi^2 (9 km^2). Lease Area OCS-A-0508 off the coast of North Carolina is directly south of (approximately 21 nm [38.9 km]) the Project and has an area of 191.1 mi^2 (495 km^2). In addition to Lease Area OCS-A-0508, BOEM identified two other Wind Energy Areas offshore of North Carolina. These are located off the southern portion of the North Carolina coast (Figure 4.4-60).

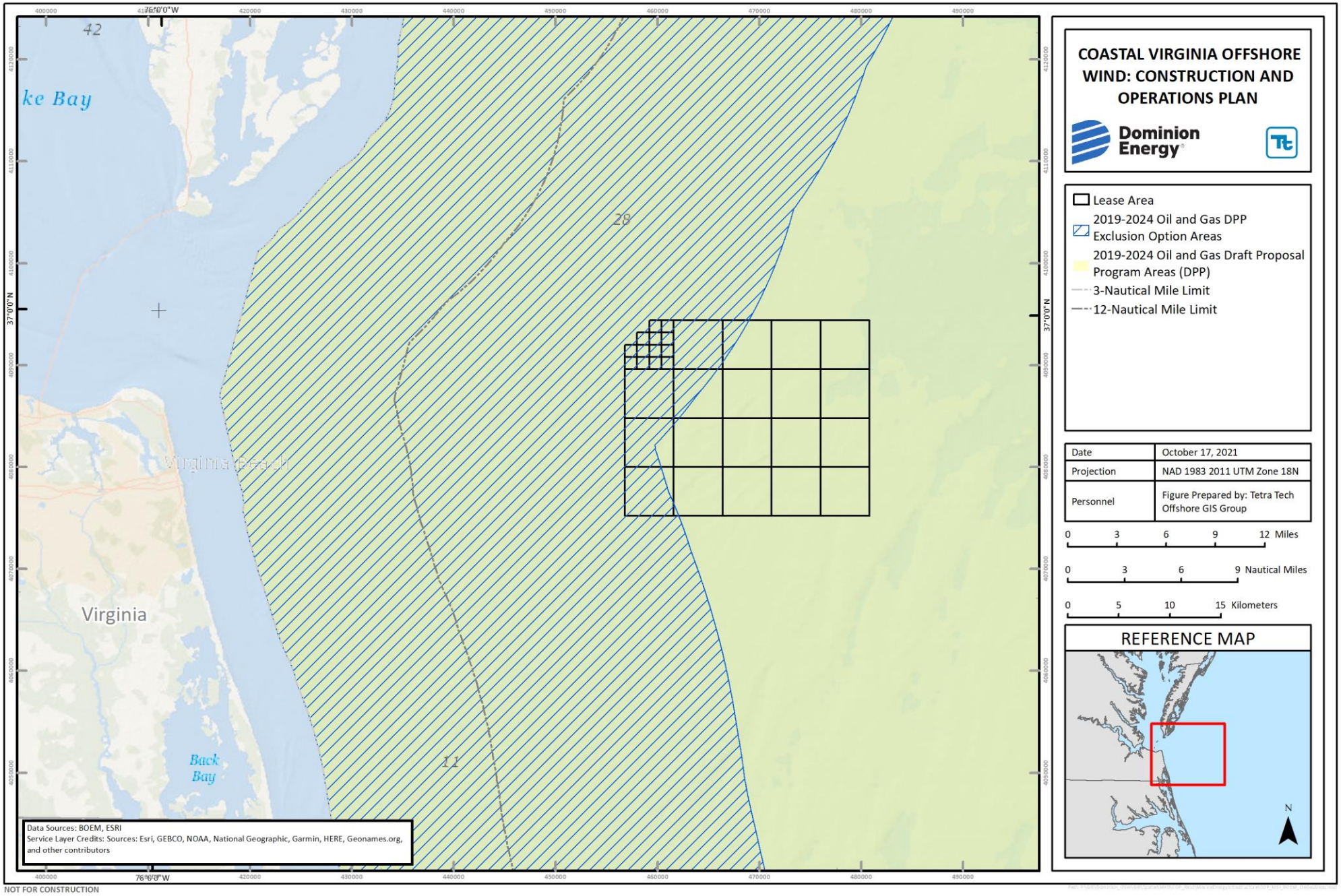

Figure 4.4-56. Bureau of Ocean Energy Management Oil and Gas Draft Program Areas and Exclusion Areas

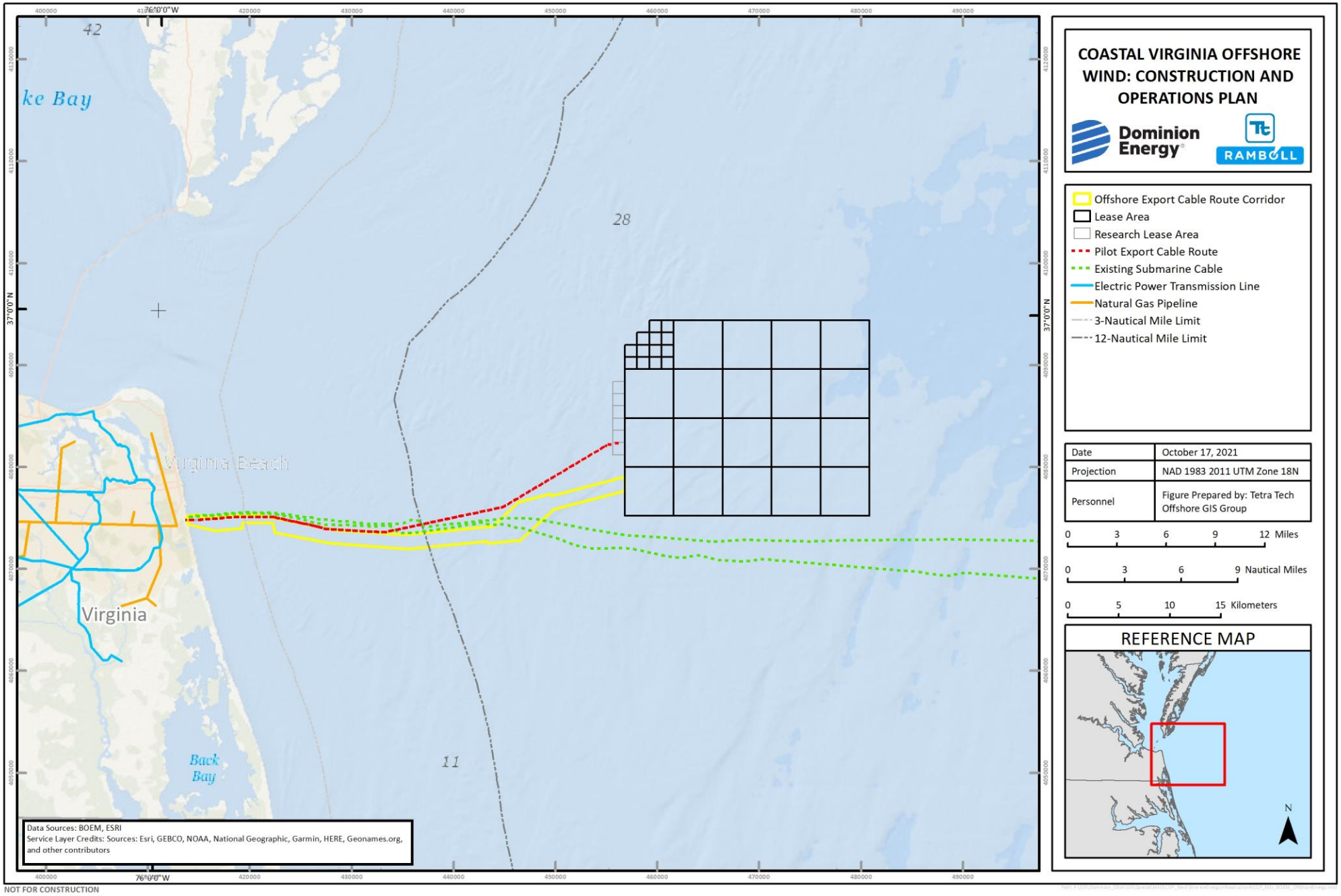

Figure 4.4-57. Existing Offshore Energy Cables and Transmission Lines

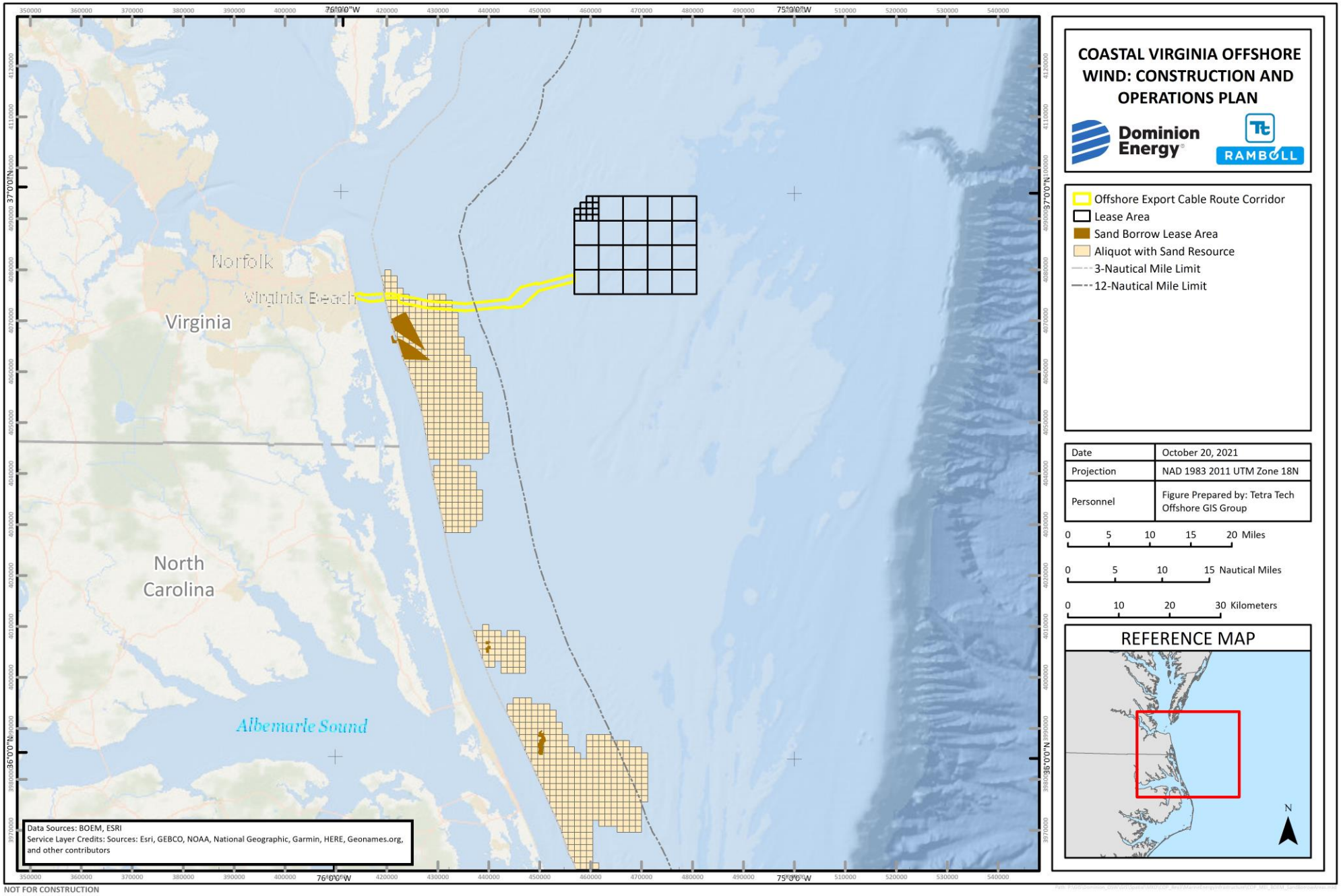

Figure 4.4-58. Bureau of Ocean Energy Management Sand Borrow Areas

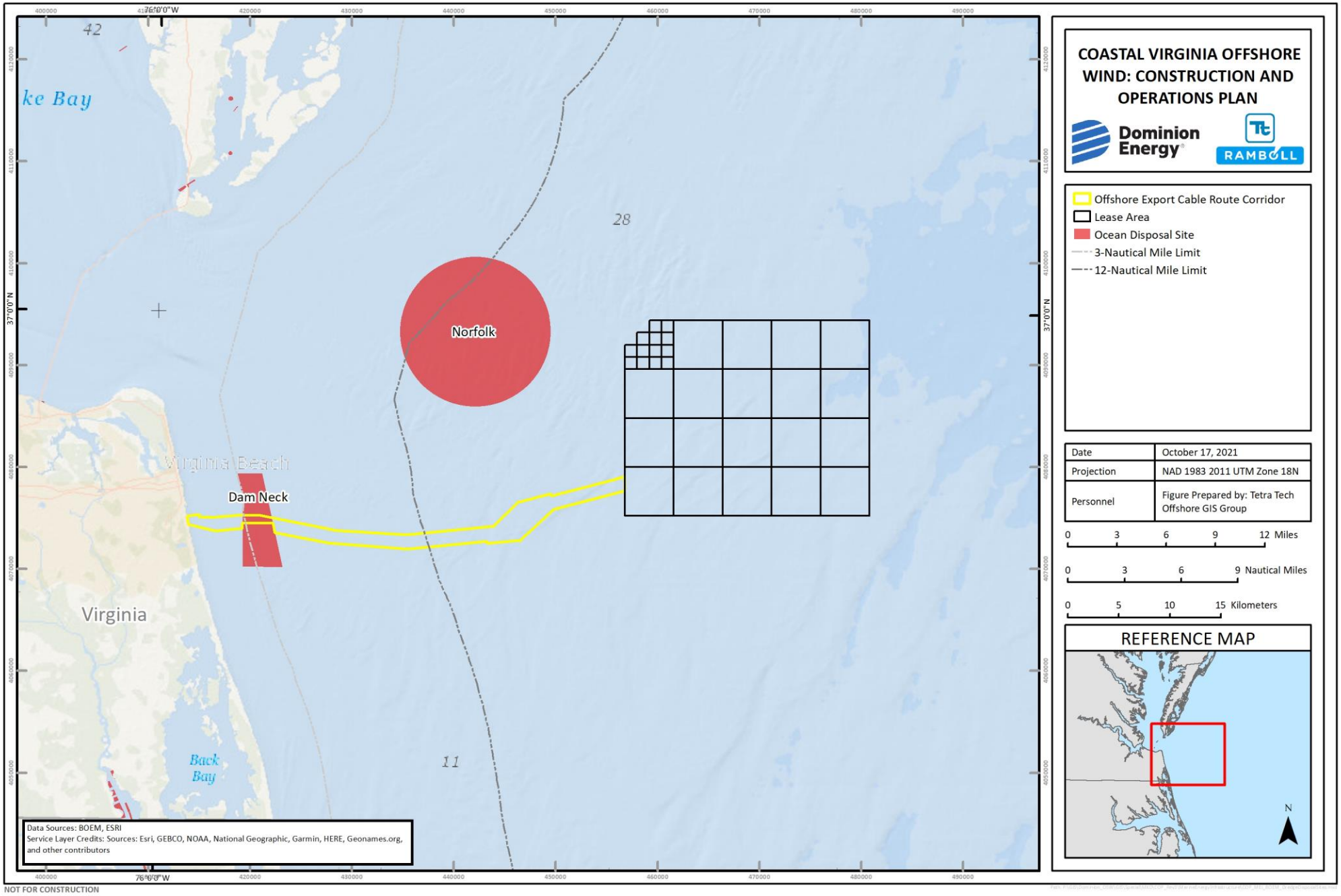

Figure 4.4-59. Ocean Dredge Disposal Sites

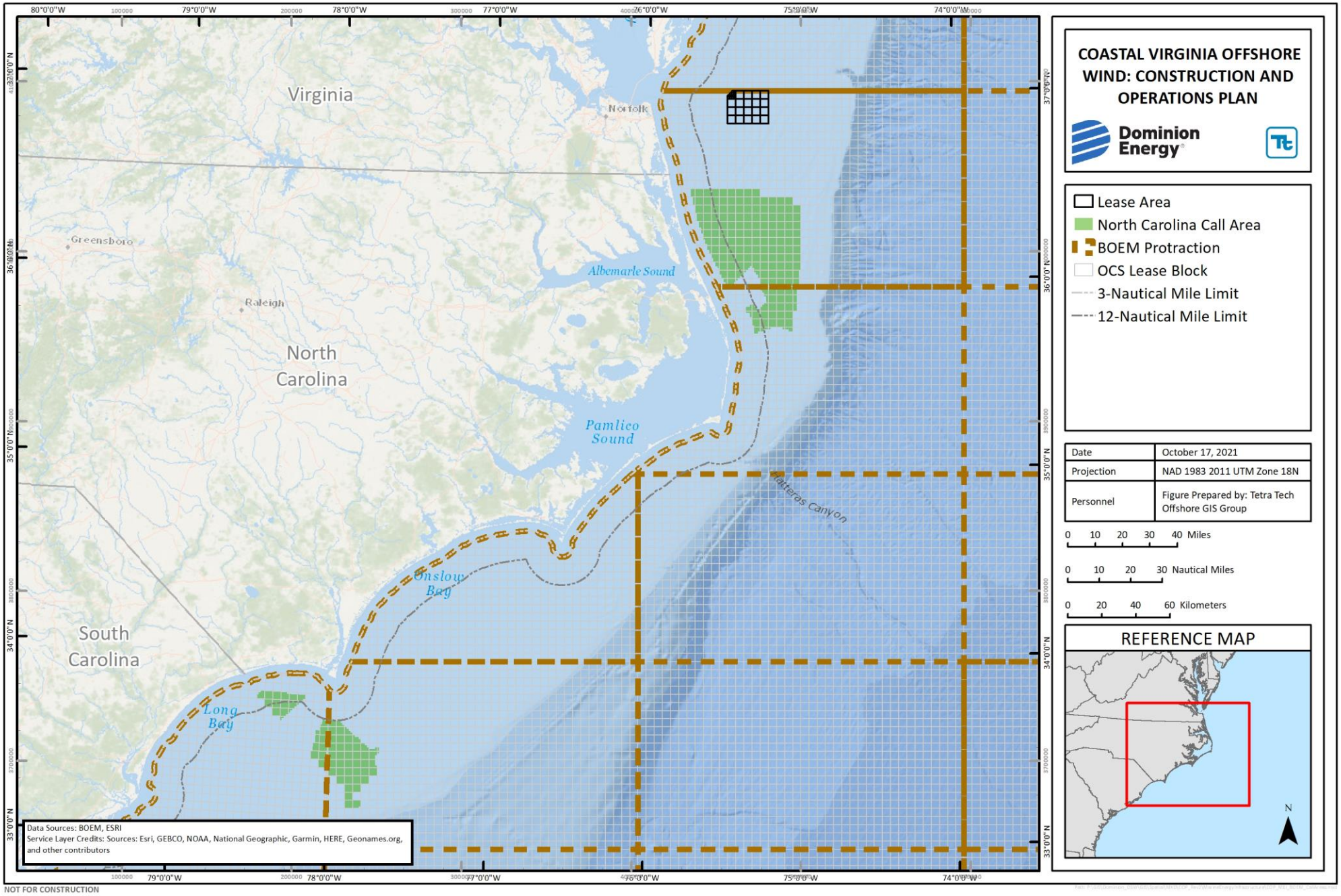

Figure 4.4-60. Bureau of Ocean Energy Management Call Areas

U.S. Offshore Oil and Gas Leasing Program

The National OCS Oil and Gas Leasing Program for oil and gas development establishes a schedule of oil and gas lease sales proposed for planning areas of the OCS (BOEM 2016). The Program specifies the size, timing, and location of potential leasing activity that the Secretary of the Interior determines will best meet national energy needs. Currently, BOEM is working under the 2017–2022 National OCS Program (BOEM 2016). However, as directed in Executive Order 13795 (April 28, 2017) and Secretary's Order 3350 (May 1, 2017), BOEM has initiated a process to develop the next National OCS Oil and Gas Leasing Program, known as the 2019–2024 National Outer Continental Shelf Oil and Gas Leasing Program. BOEM released its Draft Proposed 2019-2024 Program in January 2018 but has not yet finalized the program (BOEM 2018) (the "Draft Proposal").

Figure 4.4-56 shows oil and gas planning and exclusion areas (Northeast Ocean Data Portal). Based on the BOEM's 2017–2022 Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program, there are no active oil and gas Lease Areas located in the mid-Atlantic region under the Outer Continental Shelf Oil and Gas Leasing 5-year program (BOEM 2016). For the 2019–2024 Draft Proposal Program Areas, BOEM scheduled lease sales in all of the Atlantic region Draft Proposal Program Areas. BOEM considered a leasing option with a coastal buffer to accommodate military use concerns but did not choose this option for the Draft Proposal Program Areas. BOEM stated that this and other program options may be further analyzed in subsequent versions of the program (BOEM 2018). The Commonwealth of Virginia Legislature passed a bill in 2020 that is intended to discourage future oil and gas development off the coast of Virginia by prohibiting the issuance of leases or easements in Virginia state territorial waters for the purpose of oil and gas infrastructure, including pipelines, gathering systems, storage, and processing. (Virginia HB1016).

Cables

The MAREA, DUNANT, and BRUSA submarine cables, which are existing NOAA-charted cables, cross through the Offshore Export Cable Route Corridor; none of these cables intersects the Offshore Project Area (Figure 4.4-57). These submarine cables are telecommunication cables that make landfall at the Croatan Beach Parking Lot located in Virginia Beach, Virginia. The MAREA subsea cable consists of eight fiber pairs that extend approximately 4,000 mi (6,437 km) from Virginia Beach, Virginia, to Sopelana, Spain. The BRUSA subsea cable is approximately 6,800 mi (10,944 km) long and connects Rio de Janeiro and Fortaleza, Brazil, with San Juan, Puerto Rico, and Virginia Beach, Virginia (Submarine Cable Networks 2018; NASCA 2015). The DUNANT subsea cable consists of a 12-fiber-pair Space Division Multiplexing (SDM) design that is approximately 4,100 mi (6,600 km) long, connecting Virginia Beach, Virginia, to the Atlantic Coast of France.

The Offshore Export Cable Route Corridor easement for the adjacent CVOW Pilot Project consists of a 200 ft (60.96 m)-wide, 24 nm (38.6 km)-long corridor that is approximately 1.07 mi^2 (686 ac) in size (Figure 4.4-57). The Offshore Export Cable consists of three copper conductors with one armor layer and was installed within the easement during the summer of 2020. The cable lands at the SMR Beach Parking Lot, which is located in Virginia Beach, Virginia. While this cable does not intersect the Offshore Project Area, the Offshore Export Cable Route Corridor would likely cross the easement.

Sand Borrow Areas

BOEM's Marine Minerals Program manages sand resources on the OCS. BOEM's Marine Minerals Program identifies and manages the resources and leases for offshore sand borrow areas to replenish eroded shorelines for shore protection, beach nourishment, and wetland restoration to mitigate the effects of erosion and sea level rise from climate change (BOEM 2020). Sand resource areas represent portions of the OCS for which there is some likelihood that a usable sand resource exists, but the existence of these areas does not indicate plans to use the area in the immediate future. There are currently two active OCS lease areas for marine minerals within the region, one off the coast of Virginia and one off the coast of North Carolina (Figure 4.4-58). None of the identified sand resource areas are located in the Project Lease Area; however, the Offshore Export Cable Route Corridor would cross into portions of sand resource areas (note that approximately 23 aliquots[9] with Sand Borrow Areas are intersected by the Offshore Export Cable Route Corridor; Figure 4.4-58). The Offshore Project Area does not cross in any active Federal OCS Sand and Gravel Borrow Lease Areas (MARCO 2020).

Dredge Disposal Sites

Under the Marine Protection, Research, and Sanctuaries Act, the USACE is the federal agency that issues permits authorizing the disposal of dredged materials in the ocean (EPA 2019). The USACE relies on the EPA's ocean dumping criteria when evaluating permit requests. These criteria include the need for dumping; the environmental impact of dumping; the effect of the dumping on aesthetic, recreational, or economic values; the adverse effect of dumping on other uses of the ocean; and appropriate locations and methods of disposal or recycling. There are two USACE dredge disposal sites near the entrance to the Chesapeake Bay. These are the DNODS and the Norfolk Ocean Disposal Site. The Norfolk Ocean Disposal Site is located north of the Project Area, while the DNODS would be intersected by the Offshore Export Cable Route Corridor.

The DNODS is the closest dredge disposal site to the Project Area and is located approximately 2.4 nm (4.4 km) off the coast of Virginia Beach, Virginia. The DNODS was designated by the EPA for the ocean placement of suitable dredged material on March 31, 1988, and is still considered active today.

The Norfolk Ocean Disposal Site is located approximately 14.91 mi (24 km) off the coast of Cape Henry, Virginia, at the mouth of the Chesapeake Bay. The Norfolk Ocean Disposal Site was designated by the EPA for placement of suitable dredged material at this ocean site on July 2, 1993, and is still considered active today.

As discussed above, the Offshore Export Cable Route Corridor would cross through the DNODS but not any active Federal OCS Sand and Gravel Borrow Lease Areas (MARCO 2020). These ocean disposal sites are shown in Figure 4.4-59.

Scientific Research

Various federal, state, and educational organizations regularly conduct scientific research, including aerial- and ship-based scientific surveys, in the vicinity of the Offshore Project Area. There are numerous surveys that have been undertaken or are currently underway overlapping the Offshore Project Area that focus on fisheries, marine mammals, and benthic resources (not necessarily part of this Project, however). A map

[9] The 16 aliquots area identified as: 6154M, 6154N, 6154O, 6204A, 6204B, 6204C, 6204D, 6205A, 6204F, 6204G, 6204H, 6205E, 6205F, 6205G, 6205K, and 6205L

showing these survey locations can be found in Section 4.4.11, Other Coastal and Marine Uses. Very few geophysical and geotechnical activities for oil and gas exploration in the mid-Atlantic have been conducted due to a moratoria on Atlantic oil and gas leasing activities during most of the past 30 years. Previous surveys from the 1970s employed older technologies that are considered to be less precise than those used today. No other ongoing long-term surveys were identified within the Offshore Project Area. In addition, there is no overlap between the Offshore Project Area and oil and gas/geological and geophysical testing areas.

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). In general, these impacts include short-term impacts due to implementation of safety zones and increased construction vessel activity.

Construction

During construction, the potential impact-producing factor to marine energy and infrastructure may include installation of the Offshore Export Cables within the Offshore Project Area. 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 factor identified above:

- Short-term restricted access to portions of sand resources and dredge disposal sites due to the implementation of safety zones;
- Short-term disturbance to seafloor, including the seabed above existing submarine cables during construction;
- Short-term increase in vessel traffic during construction; and
- Short-term noise impacts during construction.

The nearest offshore wind lease, the CVOW Pilot Project, has completed construction and no other lease areas are currently within close proximity to the Offshore Project Area.

Short-term restricted access to sand resources and dredge disposal sites due to the implementation of safety zones. As the Offshore Export Cables are being installed, temporary safety zones are expected to be implemented, and increased construction vessel traffic may impact vessel traffic associated with sand borrow and dredge disposal activity. These activities may temporarily and directly restrict localized access to the sand borrow areas shown in Figure 4.4-59. Access to the DNODS shown in Figure 4.4-59 may also potentially be temporarily affected during construction or as a result of maintenance or repair of the cables. Dominion Energy would provide advance notice of construction and maintenance activities through LNTMs and broadcast LNTMs as well as on the Project website. Dominion Energy would also monitor and control Project vessel movements to minimize impacts to sand-borrowing and dredge spoil dumping activities.

Short-term disturbance to seafloor, including existing submarine cables during construction. Installation of the Offshore Export Cables could result in the temporary disturbance of the seafloor, including the area within the DNODS. Because safety zones would be implemented during construction activities, marine users are expected to be outside this potential area of effect and are therefore not anticipated to be affected by this temporary disturbance in the Offshore Project Area, other than temporarily

being restricted from accessing these areas during construction activities. Installation of the Offshore Export Cables in proximity to the four existing submarine cables (the BRUSA fiber optic cable, the MAREA fiber optic cable, the DUNANT fiber optic cable, and the CVOW Pilot export cable) would be coordinated with these asset owners to avoid impacts to any of these critical seabed assets.

Short-term increase in vessel traffic during construction. There may be a short-term increase in Project-related construction and support vessels due to the installation of the Offshore Project Components. This increase in vessel traffic would occur between ports and the Offshore Project Area as well as along the Offshore Export Cable Route Corridor from the Offshore Project Area to the Cable Landing Location. This may result in potential short-term displacement of vessels associated with sand resource activities, dredge disposal activities, and scientific and research activities within the immediate Project vicinity. Dominion Energy would schedule and track Project-related vessels to best manage congestion and traffic flow in coordination with the USCG and other maritime stakeholders. Where practical, Project vessels would utilize traffic separation schemes, fairways (should they be developed), and predetermined passage plans consistent with existing waterway uses. USCG would publish LNTM and broadcast LNTMs to inform mariners of Project activities in the area. Additionally, a Project website with the operations plan would be regularly updated so that mariners know what work is being done in the various offshore Project locations.

Short-term noise impacts during construction. During construction, short-term noise impacts could occur during the installation of the WTG Foundations and other Offshore Project Components. During the construction of the CVOW Pilot Project, Dominion Energy conducted underwater acoustic monitoring within the Offshore Project Area during pile-driving for the installation of the two turbine monopile foundations to (1) measure changes in sound pressure levels, (2) record sound levels in the water column and vibrations in the sediment, and (3) detect particle motion. Monitoring data from that effort will be compared with model results using a standard sound propagation model. More information regarding noise impacts can be found in Section 4.2.5, Marine Mammals and Section 4.1.5, Underwater Acoustic Assessment. During pile-driving of WTG Foundations, Dominion Energy would apply monitoring and exclusion zones as appropriate to underwater noise assessments and impact thresholds. Construction personnel would employ soft starts and shut-down procedures as appropriate to thresholds of noise-emitting survey equipment; soft starts would last 30 minutes at the onset of pile-driving. Dominion Energy would use commercially and technically available noise-reducing technologies as appropriate and provide marine mammal sighting and reporting training for each specific stage of construction to emphasize individual responsibility for marine mammal awareness and protection. Dominion Energy would ensure continued engagement with regulatory agencies regarding potential best practices.

The sound levels would also be compared to those collected at the Block Island Wind Farm and CVOW Pilot Project during the installation of the WTG Foundations. Further information related to acoustic monitoring can be found in the Underwater Acoustic Assessment in Appendix Z.

Operations and Maintenance

During O&M, the potential impact-producing factors to marine energy and infrastructure may include short-term presence of vessels and equipment for inspection, remedial or re-burial, and repair, if needed, and long-term presence of Offshore Export Cables and associated remedial surface cable protection. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate

impacts during Project O&M. The following impacts may occur as a consequence of the factors identified above:

- Short-term restricted access in the vicinity of inspection, survey, maintenance, or repair; and
- Long-term restricted access for inspection, maintenance, and repairs to existing cables.

Short-term restricted access in the vicinity of inspection, survey, maintenance, or repair. Routine and as-needed survey inspections may occur as part of the planned O&M of the Project. Users may be restricted from access to the area in the immediate vicinity of the inspection or maintenance operations. Repair operations or re-burial may be required along specific areas of the Offshore Export Cable Route following inspection or maintenance activity. These areas may require restricted access until the operations are complete. Should this activity be conducted near the Atlantic Ocean Channel and shipping lanes, Dominion Energy would schedule and control Project-related vessels to best manage congestion and traffic flow in coordination with the USCG, as well as DoD exercises and training activities, as appropriate. This type of coordination was successfully completed in support of the CVOW Pilot Project and any lessons learned would be incorporated into the process for the CVOW Commercial Project.

Long-term restricted access for inspection, maintenance, and repairs to existing cables. During O&M, users would be restricted from collecting sand resources from certain sand borrow areas within the vicinity of the Offshore Export Cables to avoid uncovering the buried cable or due to the presence of remedial surface cable protection. Dominion Energy has proactively sited the Offshore Export Cables to avoid active sand borrow sites and disposal sites to the extent practicable in an effort to avoid impacts. As shown on Figure 4.4-59, it is not possible to entirely avoid sand resource areas; however, in the event that existing sand resource areas are considered for designation as sand borrow areas, Dominion Energy would work with the appropriate federal and state agencies to safeguard the export cable assets.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction. Decommissioning techniques are further 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, and potential impacts will be re-evaluated at that time.

4.4.9.3 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 (Table 4.4-32). Dominion Energy intends to 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 4.4-32. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Offshore Project Area	Short-term restricted access to sand resources and dredge disposal sites due to the implementation of safety zones	• Dominion Energy would provide advance notice of construction and maintenance activities through local notices to mariners (LNTMs) and broadcast LNTMs as well as on the Project website;

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
		Short-term disturbance to seafloor, including existing submarine cables during construction	• Dominion Energy would monitor and control Project vessel movements to minimize impact to sand-borrowing and dredge spoil dumping activities; • Because safety zones would be implemented during construction activities, marine users are expected to be outside of this potential area of effect and are therefore not anticipated to be affected by this temporary disturbance in the Offshore Project Area, other than temporarily being restricted from accessing these areas during construction activities; • Installation of the Offshore Export Cables in proximity to the four existing submarine cables (the BRUSA fiber optic cable, the MAREA fiber optic cable, the DUNANT fiber optic cable, and the Commercial Virginia Offshore Wind Pilot Export Cable) would be coordinated with these asset owners to avoid impacts to any of these critical seabed assets; • Dominion Energy would schedule and track Project-related vessels to best manage congestion and traffic flow in coordination with the U.S. Coast Guard (USCG) and other maritime stakeholders; • Where practical, Project vessels would utilize traffic separation schemes, fairways (should they be developed), and predetermined passage plans consistent with existing waterway uses; • The USCG would publish LNTM and broadcast LNTMs to inform mariners of Project activities in the area. Additionally, a Project website with the operations plan would be updated so that mariners know what work is being done in the various offshore Project locations; • During pile-driving of WTG Foundations, Dominion Energy would apply monitoring and exclusion zones as appropriate to underwater noise assessments and impact thresholds; • Construction personnel would employ soft starts and shut-down procedures as appropriate to thresholds of noise-emitting survey equipment; soft starts would last 30 minutes at the onset of pile-driving; • Dominion Energy would use commercially and technically available noise-reducing technologies as appropriate and provide marine mammal sighting and reporting training for each specific stage of construction to emphasize individual responsibility for marine mammal awareness and protection; and • Dominion Energy would ensure continued engagement with regulatory agencies regarding potential best practices for noise mitigation.
		Short-term increase in vessel traffic during construction	
		Short-term noise impacts during construction	

Project Stage	Location	Impact	Avoidance, Minimization and Mitigation
Operations and Maintenance	Offshore Project Area	Short-term restricted access in the vicinity of inspection, survey, maintenance, or repair Long-term restricted access for inspection, maintenance, and repairs to existing cables	• Should this activity be conducted near the Atlantic Ocean Channel and shipping lanes, Dominion Energy would schedule and control Project-related vessels to best manage congestion and traffic flow in coordination with the USCG, as well as U.S. Department of Defense exercises and training activities, as appropriate; • Dominion Energy has proactively sited the Offshore Export Cables to avoid active sand borrow sites and disposal sites to the extent practicable in an effort to avoid impacts; and • Dominion Energy would work with the appropriate federal and state agencies to safeguard the export cable assets.

4.4.10 Aviation and Radar

This section describes the airspace and aviation radar within and surrounding the Offshore Project Area, including potential impacts resulting from the construction, O&M, and decommissioning of the Project. This section also describes avoidance, minimization, and mitigation measures proposed by Dominion Energy related to aviation and radar resources, such as airports, enroute airways, minimum vectoring altitudes, military training routes, and radar. Other assessments detailed within this COP related to aviation and radar include:

- Obstruction Evaluation and Additional Analysis (Appendix T).

The Project follows the regulatory guidance under 49 U.S.C. § 44718 and 14 CFR §77, which provides the FAA with the jurisdiction to establish requirements for developers to provide notice of certain proposed construction projects and the standards used to determine obstructions to air navigation and navigational and communication facilities within U.S. territorial waters (defined as 12 nm [22 km] measured from the low-water line along the coast) to ensure that new construction does not have adverse effects on the safety or efficient utilization of navigable airspace. Beyond 12 nm (22 km), BOEM assumes this responsibility. Structures that fall under FAA or BOEM jurisdiction are also reviewed by the DoD and the U.S. Department of Homeland Security to ensure no interference with training, operations, or radar systems.

Any structure with a height that exceeds the notice criteria in 14 CFR §77.9 within the FAA's territorial airspace must be filed with the FAA for assessment. However, the FAA requests that projects file structures within 13 nm (12 nm, plus a 1 nm buffer [24 km]) to ensure that the FAA's defined boundary for territorial airspace is being used. When reviewing applications, the FAA will then confirm that the structures are located outside of its jurisdiction. Beyond FAA territorial airspace, BOEM will consult with FAA to provide obstruction assessments and lighting/marking schemes (see Section 3, Description of Proposed Activity, for additional information on lighting and marking measures associated with the Project) (BOEM 2019).

With the exception of the Offshore Export Cables, the Offshore Project Components are not located within territorial waters (Figure 4.4-61); therefore, the FAA does not have a mandate to conduct aeronautical studies for WTGs proposed within the Offshore Project Area. Dominion Energy will solicit comments directly from the FAA and Virginia Department of Aviation (DOAv) as part of the Virginia SCC filing and during BOEM's review of the COP. Dominion Energy has run a preliminary notice criteria analysis for the onshore routes; however, engineering details for the Onshore Project Components have not yet been finalized. Once line engineering details are more complete, each proposed transmission line structure will be entered into the FAA's Obstruction Evaluation Notice Criteria Tool to identify potential hazards to air navigation that would require additional FAA Evaluation/Part 2 Notification (Notice of Proposed Construction or Alteration).

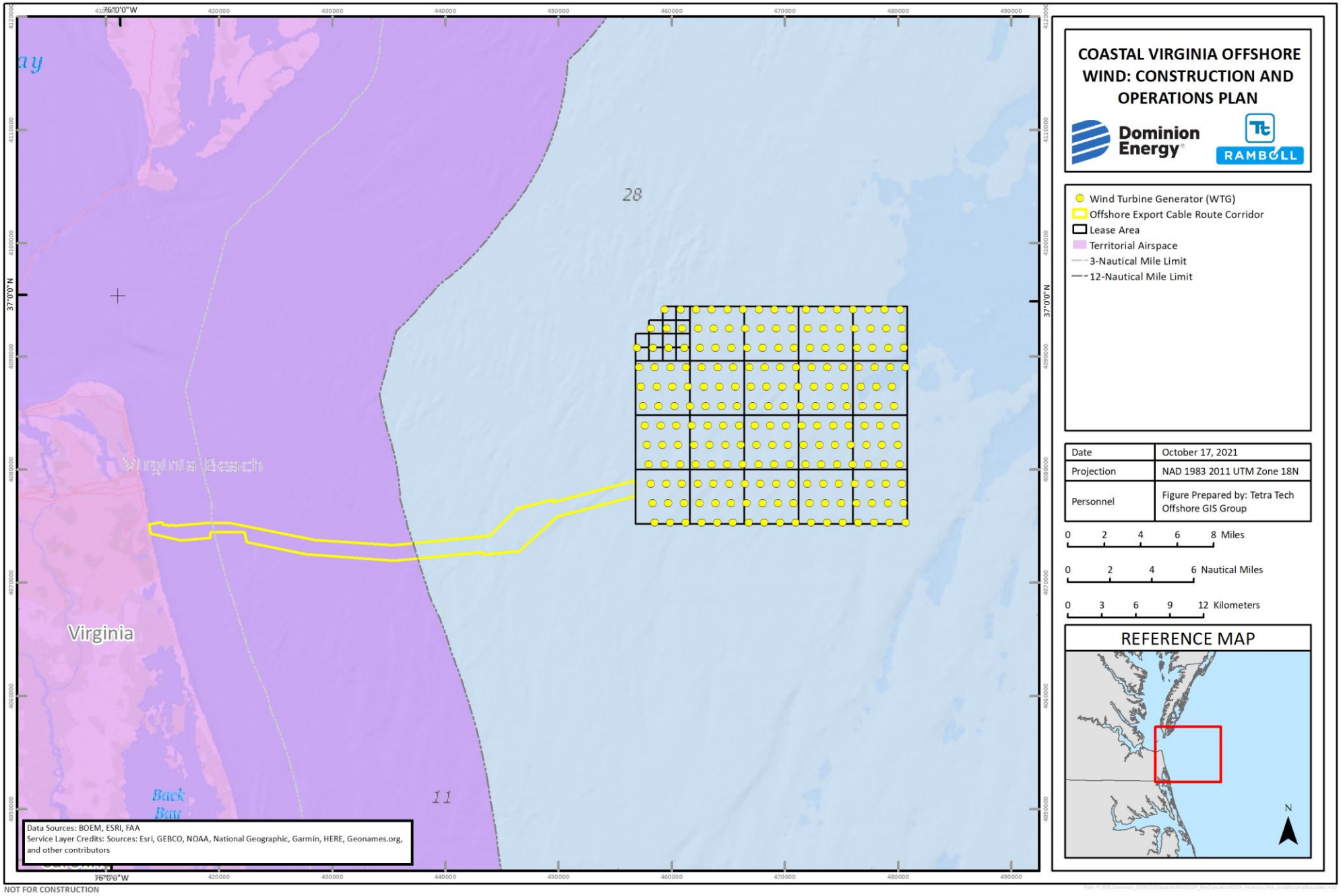

Figure 4.4-61. Territorial Airspace in Relation to the Offshore Project Area and Offshore Export Cable Route Corridor

For the purposes of this section, the Aviation Study Area (Study Area) includes the Offshore Project Area and an approximately 30 nm (46 km) buffer, as well as proximate aviation facilities, that have the potential to be directly affected by the construction, O&M, and decommissioning of the Project. Should jacked up (stationary) vessels and transitory vessel corridors be required to support construction of the Project within 13 nm (12 nm, plus a 1 nm buffer; [24 km]) of the shore, with heights that exceed the notice criteria in 14 CFR § 77.9, a Notice Criteria check (14 CFR § 77.9) would be performed. Onshore Project Components were not assessed as part of this analysis. Data required to complete this section comes from the Obstruction Evaluation and Additional Analysis (Appendix T) performed by Capitol Airspace Group (CAG). The Air Traffic Flow Analysis and Aircraft Detection Lighting System Efficacy Analysis are provided in Appendix T.

4.4.10.1 Affected Environment

An Obstruction Evaluation Analysis was conducted by CAG as a way to characterize the existing airspace surrounding the Offshore Project Area, and support the preliminary assessment of the Project's potential effects on airspace and radar (see Appendix T, Obstruction Evaluation and Additional Analysis). The purpose of the Obstruction Evaluation Analysis was to identify obstacle clearance surfaces established by the FAA that could limit the placement of WTGs with up to an 869 ft (265 m) maximum blade tip height above AMSL. This analysis informs overlays to determine the Offshore Project Area's proximity to airports (Figure 4.4-62), published instrument procedures, enroute airways, FAA minimum vectoring altitude (MVA), and minimum Instrument Flight Rules altitude charts, as well as military airspace and training routes.

Based on the results of the Obstruction Evaluation Analysis for the WTGs, CAG completed an Air Traffic Flow Analysis (Appendix T). The purpose of this analysis is to provide metrics for the Project's potential to interfere with the surrounding airspace based on the number of aircraft operations. The Air Traffic Flow Analysis evaluated one year of FAA National Offload Program data, composed of flights receiving air traffic control services from airports surrounding the Offshore Project Area. Each flight that had at least one radar return within the affected airspace was analyzed for altitude and direction trends.

In addition, an informal review of the Project was conducted, with CAG beginning discussions with different DoD entities. DoD identified several impacts including the proposed siting location of the Project, which may impact the Department of Navy as the Project lies within the Atlantic Test Range Geographical Area of Concern. This could present potential impacts to the test capabilities of the Advanced Dynamic Aircraft Measurement System at Patuxent River Naval Air Station. It was noted that the Department of Navy requests continued coordination on the undersea cable route and cable landing location, currently planned for Navy property. Additionally, the Department of Navy also requested notification if there are plans to put monitoring equipment on the undersea cable such as distributed acoustic sensing, and coordination on the use of foreign-owned or controlled vendors in the Project. Discussions with DoD are ongoing based on the findings of this informal review.

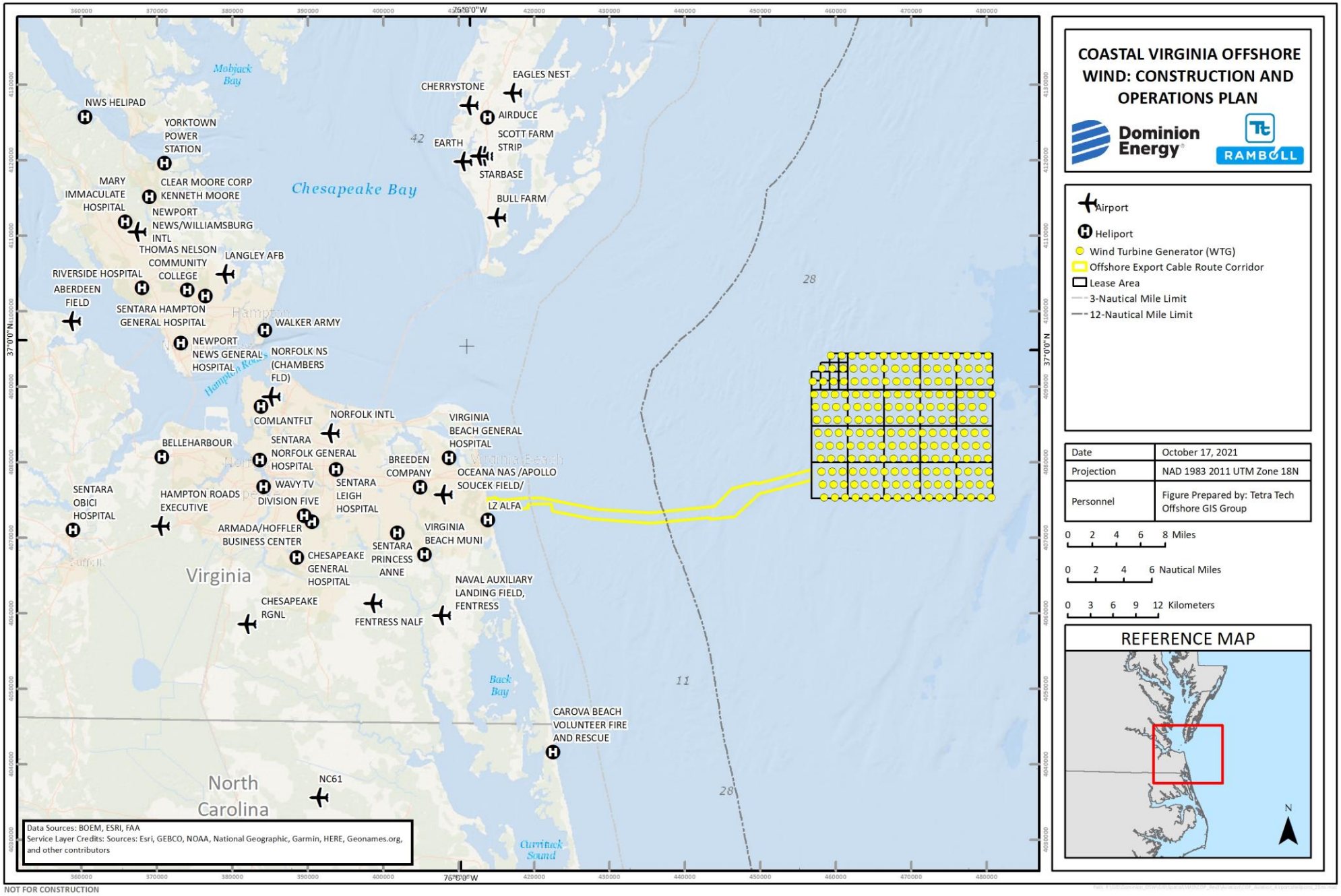

Figure 4.4-62. Public-Use, Private-Use, and Military Airports in Proximity to the Project

Airports

There are a number of public-use, private-use, and military airports and heliports outside of the Study Area (Figure 4.4-62). The closest airport is NAS Oceana/Apollo Soucek Field (Figure 4.4-63 and Figure 4.4-64). Based on the Obstruction Evaluation Analysis, there are no anticipated adverse impacts on published instrument departure or approach procedures; therefore, these are not discussed further. An evaluation of 14 CFR § 77.19 imaginary surfaces was also completed, with no impacts. Since it was determined that no military and public-use airport 14 CFR §§ 77.17(a)(2) and 77.19/21/23 imaginary surfaces overlie the Offshore Project Area, these are not discussed further (Figure 4.4-62 and Figure 4.4-65). Coordination with the FAA and DOAv will be performed to ensure that, once line engineering details are more complete, each proposed onshore structure will be entered into the FAA's Obstruction Evaluation Notice Criteria Tool for analysis as mentioned above.

At 869 ft (265 m) tall, WTGs would exceed the standards set forth in 14 CFR §77.17(a)(1)—a height of 499 ft (152 m) above ground level (AGL) at the site of the object—if applied by BOEM for areas outside of FAA territorial airspace, and would be identified as obstructions regardless of location.

Enroute Airways and Minimum Vectoring Altitudes

Proposed structures that exceed enroute airway obstacle clearance surfaces would require an increase to their minimum obstruction clearance altitudes or minimum enroute altitudes. If the increase to enroute airway minimum altitudes is anticipated to affect as few as one flight per week, it may result in FAA objections to proposed wind development. The minimum enroute altitude in the Study Area is 5,500 ft (1,676 m) AMSL. The primary area obstacle clearance surface in proximity in the Study Area is 4,500 ft (1,371 m) AMSL and is the lowest height constraint overlying most of the Study Area. However, given the height of the WTGs, they would not exceed this surface and should not require an increase to the minimum enroute altitudes.

FAA publishes MVA and minimum instrument flight rules altitude charts that define sectors with the lowest altitudes at which air traffic controllers can issue radar vectors to aircraft, based on obstacle clearance as well as minimum altitudes for airways, to ensure clearance from obstacles and terrain. FAA requires that sectors have a minimum obstacle clearance of 1,000 ft (305 m) in non-mountainous areas.

Figure 4.4-65 shows the Norfolk (noted as ORF below) Terminal Radar Approach Control (TRACON) for the closest MVA Sectors to the Project. For Sector K (ORF_MVA_FUS3_2020 and ORF_MVA_FUS5_2020), the MVA is 5,500 ft (1,676 m) AMSL. The obstacle clearance surface is 4,549 ft (1,387 m) AMSL, and is one of the lowest height constraints overlying the northeastern and southeastern sections of the Study Area. However, 869 ft (265 m) tall WTGs would not exceed this obstacle clearance surface and should not require an increase to the Sector K MVA. For Sector B (ORF_MVA_FUS3_2020 and ORF_MVA_FUS5_2020), the MVA is 1,700 ft (518 m) AMSL. The obstacle clearance surface (hatched purple, Figure 4.4-65) is 749 ft (228 m) AMSL and is the lowest height constraint overlying the western section of the Study Area. At 869 ft (265 m) tall, 48 WTGs in this area would exceed this obstacle clearance surface and require an increase to the Sector B MVA. If the increase to the Sector B MVA is anticipated to affect as few as one radar vectoring operation per week, it may result in FAA objections to proposed wind development. While these sectors partially include areas outside of FAA territorial airspace, BOEM may require consultation with the FAA during their review of the COP.

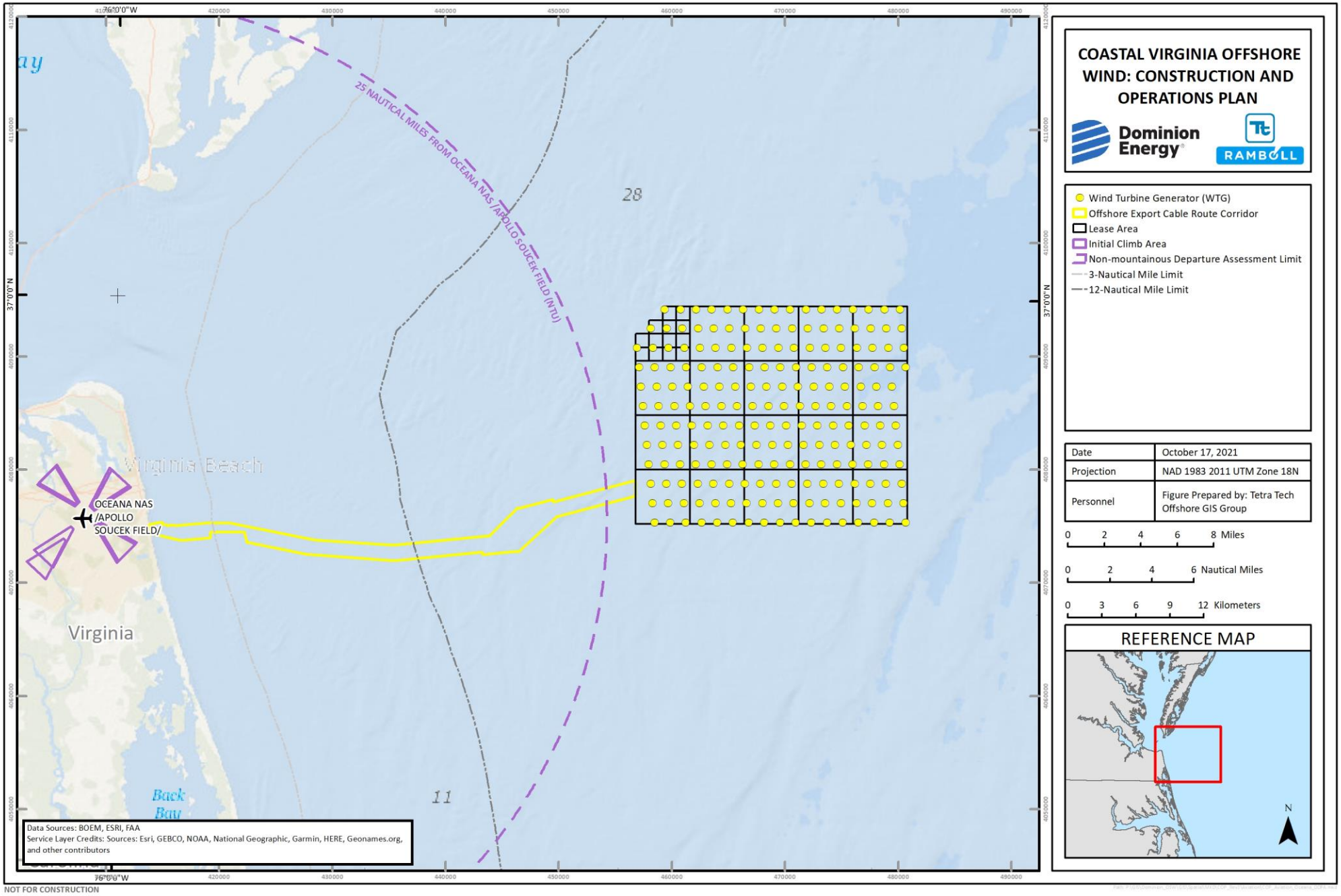

Figure 4.4-63. Oceana NAS/Apollo Soucek Field (NTU) Diverse Departure Procedure Assessment

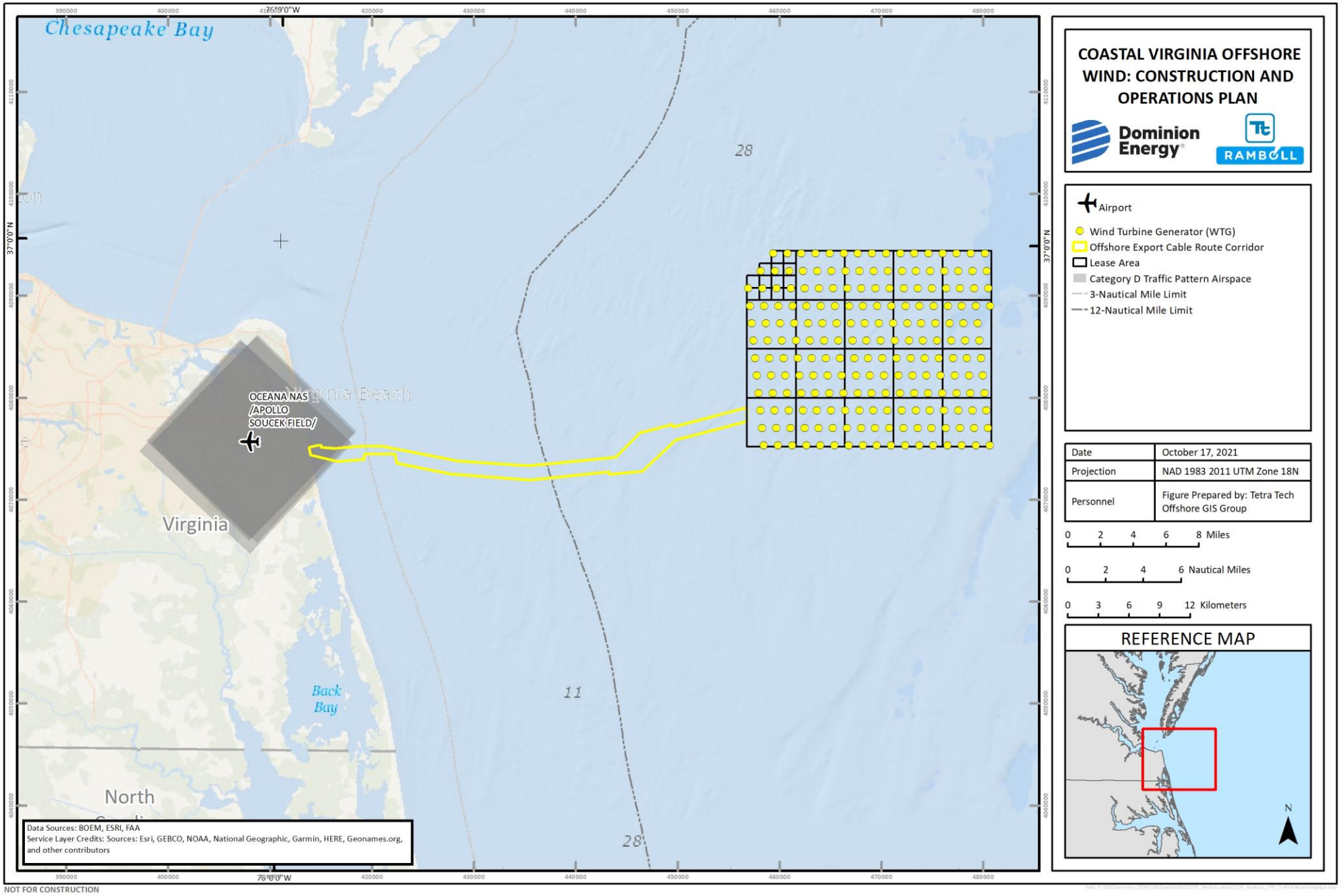

Figure 4.4-64. Visual Flight Rules Traffic Pattern Airspace in Proximity to the Project

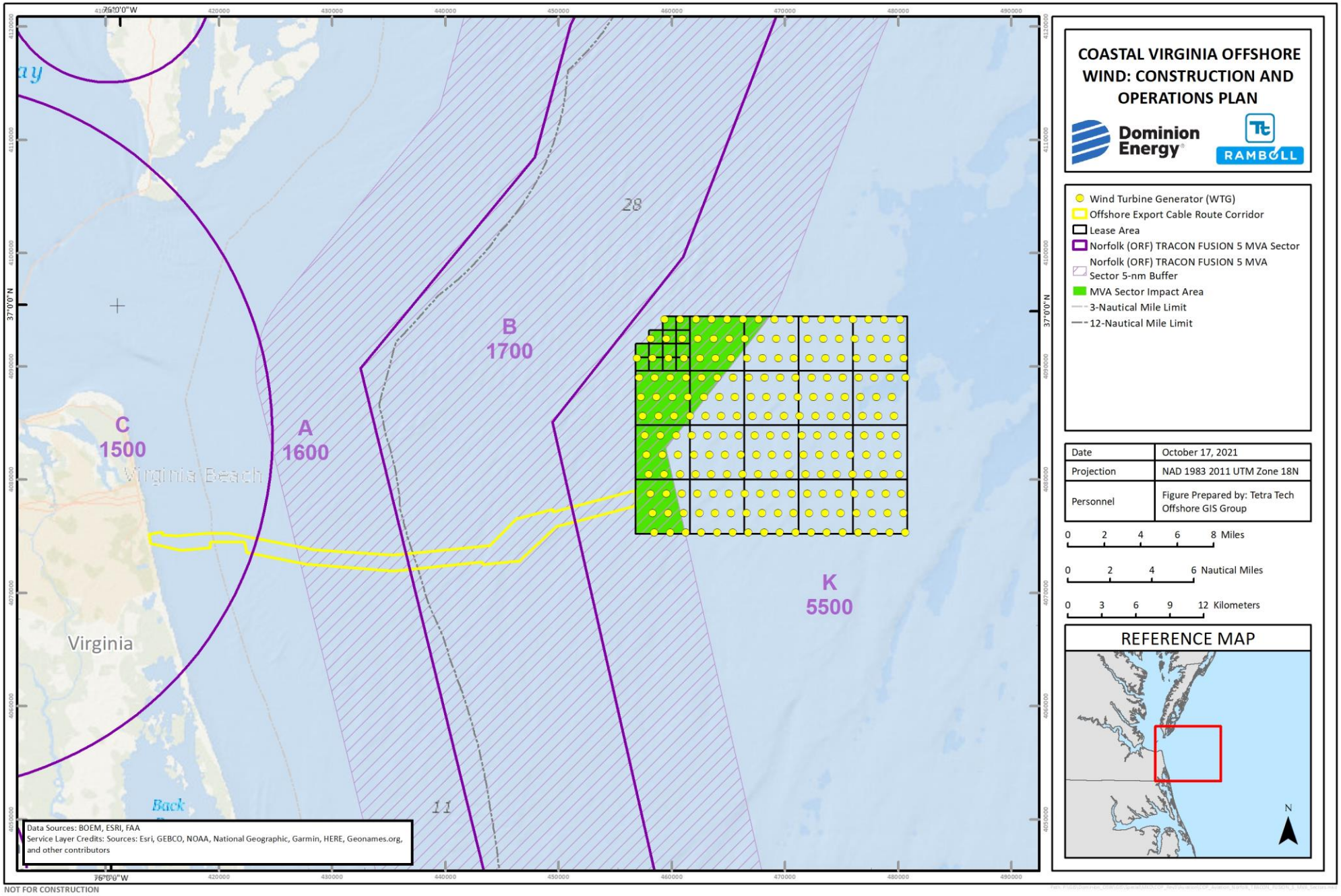

Figure 4.4-65. Norfolk (ORF) TRACON FUSION 5 Megavolt Ampere Sectors (purple) and Sector B Obstacle Evaluation Area (hatched purple)

The Project is within line-of-sight of other radar systems, including the Norfolk KAKQ weather radar and airport surveillance radar. The FAA is the owner and operator of the airport surveillance radar, but the North American Aerospace Defense Command and Department of Homeland Security are also users of the radar system.

Military Airspace, Training Routes, and Radar

Although FAA does not consider impact on military airspace or training routes, they will notify the military of proposed structures within these segments of airspace. Impact on these segments of airspace can result in military objections to the proposed development. Military airspace and training routes do not overlie the Study Area (see Figure 4.4-66). Therefore, military activities in these segments of airspace should not result in military objections to proposed wind development. There are several radar systems in the general vicinity of Project, including DoD, FAA, and NOAA radar sites, as well as HF Coastal Radar sites. Dominion Energy will continue to consult with the DoD Clearinghouse for an informal review of the Project Components.

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For airspace and aviation radar, the maximum design scenario is represented by applying the 14 MW WTG parameters, as these represent the tallest structures that would be installed in the Offshore Project Area.

Construction

During construction, the potential impact-producing factor to aviation and radar may include construction of the Offshore and Onshore Project Components. Coordination with the FAA and DOAv is ongoing as part of the Virginia SCC filing and as line engineering details become more complete. 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 factor identified above:

- Short-term interference with airspace and aviation radar systems due to the temporary presence of construction equipment offshore, as well as transportation of Offshore and Onshore Project Components to the Project Area.

Short-term interference with airspace and aviation radar systems due to the temporary presence of construction equipment onshore and offshore as well as transportation of Offshore and Onshore Project Components to the Project Area. For short-term construction or storage activities in ports and for the Onshore Substation, the Project would utilize cranes (Figure 4.4-67) for assembly and loading/unloading of materials. If the introduction of new cranes is required, a Notice Criteria check (14 CFR § 77.9) and/or additional airspace and aviation radar system assessment would be performed to determine whether there are potential airspace impacts and FAA filing is required during the storage or transit of Project materials and Offshore Project Components. It is also possible that the DoD would request to be informed through the Informal Review Process for the transit of large materials. Further coordination with the DoD will occur as a result of the findings of the Informal Review Process and any notifications requested by the DoD will be applied to the Project as needed.

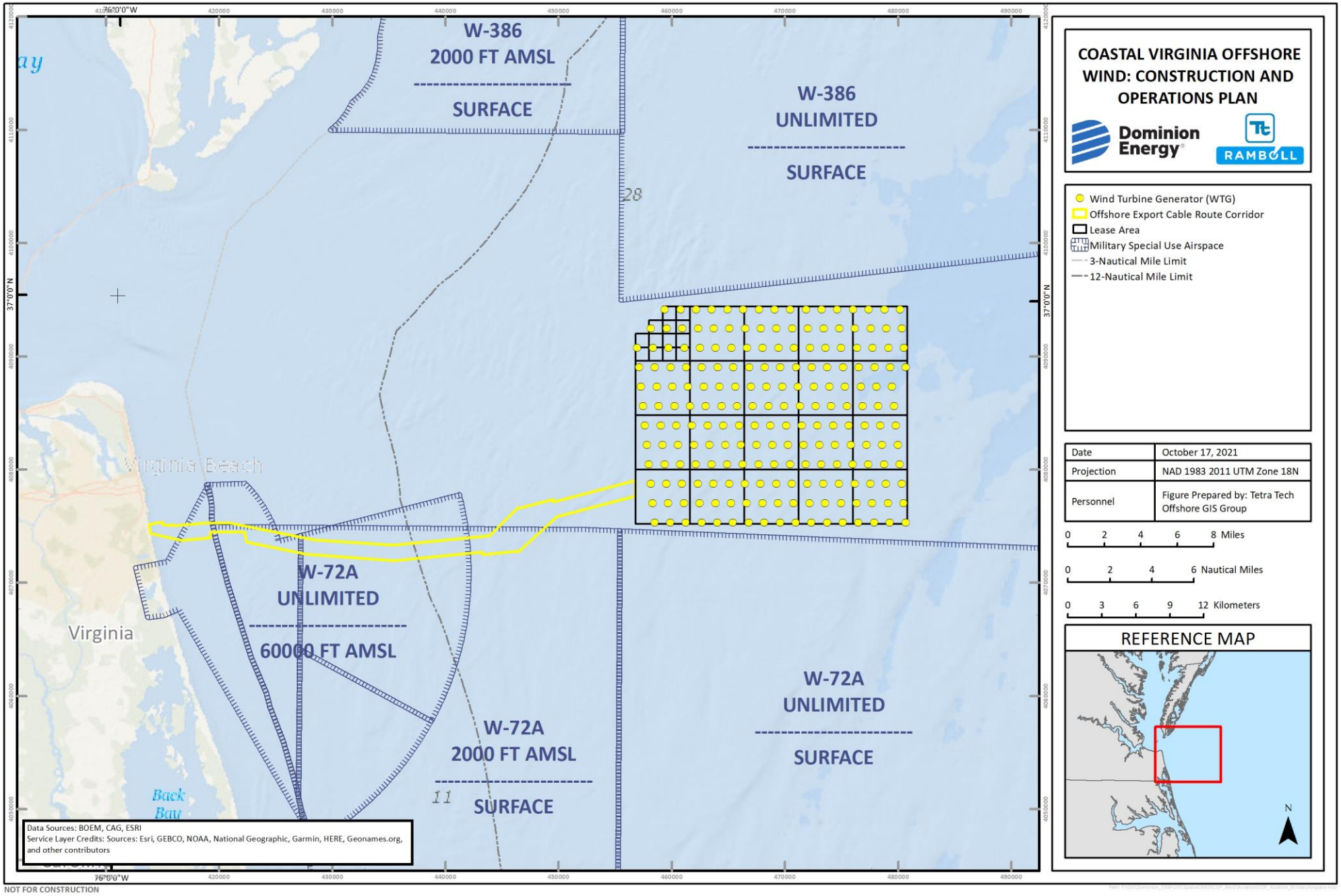

Figure 4.4-66. Military Special Use Airspace in Proximity to the Offshore Project Area

Figure 4.4-67. Example of Wind Turbine Installation Vessel

The Project has also considered impacts as a result of the presence of large construction equipment (e.g., cranes and barges) offshore. Equipment utilized for offshore construction within the Offshore Project Area would not surpass the assessed height of the 14 MW WTGs. Dominion Energy would be in direct communication with applicable agencies and personnel to alert the appropriate parties to planned construction movements and actions. All WTG Components and construction equipment would be properly lighted and marked in accordance with FAA's Advisory Circular 70/7460-1M within FAA jurisdiction and beyond, or other methods as deemed required during consultation and as applicable (see Section 3, Description of Proposed Activity and Appendix T, Obstruction Evaluation and Additional Analysis, for additional information on proposed marking and lighting measures).

Operations and Maintenance

During O&M, the potential impact-producing factor to aviation and radar may be the presence of fixed structures (e.g., Onshore and Offshore Project Components). Dominion Energy proposes to implement measures as appropriate to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factor identified above:

- Long-term interference with regulated airspace due to the presence of fixed structures (Onshore and Offshore Project Components);

- Long-term interference with regulated aviation radar systems;
- Long-term interference with military radar operations; and
- Long-term interference with HF radar systems.

Long-term interference with regulated airspace due to the presence of fixed structures (Onshore and Offshore Project Components). Structures within the Offshore Project Area would not exceed 869 ft (265 m) AMSL. The Air Traffic Flow Analysis provides flight track data regarding flights operated within the potentially affected airspace, which indicated 127,830,837 radar returns associated with 1,354,713 unique flight tracks. In order to quantify the number of radar vectoring operations potentially affected by MVA sector modifications, CAG evaluated FAA National Offload Program radar returns covering the period between January 1, 2019 and December 31, 2019. The FAA National Offload Program data contained 88,945,292 radar returns associated with 614,260 flights receiving air traffic control services.

Historical air traffic data indicates that the required changes to Norfolk (ORF) TRACON MVA Sector B should not affect a significant volume of radar vectoring operations. As a result, it is possible that Norfolk (ORF) TRACON would be willing to increase the affected MVAs in order to accommodate wind development up to 869 ft (265 m) tall. This mitigation option is subject to FAA approval (Appendix T, Air Traffic Flow Analysis).

The presence of the 14-MW WTGs in the Offshore Project Area could cause FAA to raise or change Sector B of the Norfolk TRACON, or create an isolation area with a higher segment altitude. However, this development is outside of FAA's 12 nm (22 km) territorial airspace. In order to mitigate this impact, Dominion Energy would coordinate with FAA to make this required change to the airspace as necessary. In addition, all WTGs would be properly lighted and marked in accordance with FAA's Advisory Circular number 70/7460-1M within FAA jurisdiction and beyond, or other methods as deemed required during consultation and as applicable (see Section 3, Description of Proposed Activity and Appendix T, Obstruction Evaluation and Additional Analysis, for additional information on proposed marking and lighting measures).

Details regarding the Onshore Project Components will be addressed once further design has occurred. Dominion Energy would continue to engage and coordinate with applicable military contacts to assess and address potential impacts, as needed.

Long-term interference with military radar operations. In response to a request for an informal review, the DoD provided their preliminary feedback in a letter issued on August 25, 2020. The letter indicated that the Project may have an impact on military operations in the area, specifically radar operations associated with the Advanced Dynamic Aircraft Measurement System at Naval Air Station Patuxent River and the Re-locatable Over the Horizon Radar system located at Naval Support Activity Hampton Roads, Northwest Annex in Chesapeake, Virginia. There is also a potential impact to the North American Aerospace Defense Command homeland defense radar. An initial analysis using the DoD Preliminary Screening Tool indicated that impacts to air defense and homeland security radar are likely. Dominion Energy is continuing to engage and coordinate with applicable military contacts to assess and address potential impacts as needed (see Section 4.4.8, Department of Defense and Outer Continental Shelf National Security Maritime Uses).

Long-term interference with HF radar Systems. The following HF radar systems will be within line of sight of all or some of the WTGs. This will likely present interference, including clutter in the vicinity of the proposed WTGs, possibly beyond line of sight due to the propagation of HF:

- Duck HF Radar; and
- Little Island Park HF Radar.

The following HF radar sites may experience radar effects such as clutter beyond line-of-sight due to the propagation of HF:

- Assateague Island HF Radar; and
- Cedar Island HF Radar.

Dominion Energy would continue to engage and coordinate with applicable owners and operators of these HF radar systems to assess and address potential impacts as needed.

Decommissioning

Impacts from decommissioning the Project are expected to be similar to or less than those experienced during construction. Therefore, any mitigation measures during decommissioning would be similar to those during construction. Decommissioning techniques are expected to advance during the lifetime of the Project. A full decommissioning plan will be provided to BOEM for approval prior to decommissioning activities, and potential impacts will be re-evaluated at that time.

4.4.10.3 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 (Table 4.4-33). A full decommissioning plan will be provided to the appropriate regulatory agencies for approval. 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 4.4-33. Summary of Avoidance, Minimization, and Mitigation Measures

Project Phase	Location	Impact	Avoidance, Minimization and Mitigation
Construction; Decommissioning	Onshore and Offshore Project Area	Short-term interference with airspace and aviation radar systems due to the temporary presence of construction equipment onshore and offshore as well as transportation of Project Components to the Project Area.	• Notice Criteria check (14 CFR § 77.9) and/or additional airspace and aviation radar system assessment would be performed to determine whether there are potential airspace impacts and FAA filing is required during the storage or transit of Project materials and Offshore Project Components. It is also possible that the U.S. Department of Defense (DoD) would request to be informed through the Informal Review Process for the transit of large materials. Further coordination with the DoD will occur as a result of the findings of the Informal Review Process and any notifications requested by the DoD will be applied to the Project as needed; and • Dominion Energy would be in direct communication with applicable agencies and

Project Phase	Location	Impact	Avoidance, Minimization and Mitigation
			personnel to alert the appropriate parties to planned construction movements and actions. All WTG Components and construction equipment would be properly lighted and marked in accordance with FAA's Advisory Circular 70/7460-1M within FAA jurisdiction and beyond, or other methods as deemed required during consultation and as applicable.
Operations	Onshore and Offshore Project Area	Long-term interference with regulated airspace due to the presence of fixed structures (Onshore and Offshore Project Components). Long-term interference with regulated aviation radar systems. Long-term interference with military radar operations. Long-term interference with HF radar operations	• Dominion Energy would coordinate with the FAA to make this required change to the airspace as necessary. In addition, all WTGs would be properly lighted and marked in accordance with FAA's Advisory Circular number 70/7460-1M within FAA jurisdiction and beyond; • Dominion Energy would continue to engage and coordinate with applicable military contacts to assess and address potential impacts as needed; and • Dominion Energy would continue to engage and coordinate with applicable owners and operators of these HF radar systems to assess and address potential impacts as needed.

4.4.11 Other Coastal and Marine Uses

This section discusses other coastal and marine uses that occur within and surrounding the Offshore Project Area, including marine recreation, offshore diving, wildlife viewing, and scientific surveys. This section describes other coastal and marine uses expected to occur within or adjacent to the Offshore Project Area and evaluates potential impacts resulting from construction, O&M, and decommissioning of the Project after Dominion Energy's proposed avoidance, minimization, and mitigation measures are implemented. Specific marine uses are further evaluated in the following COP sections:

- Water Quality (Section 4.1.2);
- Marine Mammals (Section 4.2.5);
- Sea Turtles (Section 4.2.6);
- Visual Resources (Section 4.3.4);
- Recreation and Tourism (Section 4.4.5);
- Commercial and Recreational Fishing (Section 4.4.6);
- Marine Transportation and Navigation (Section 4.4.7);
- Department of Defense and Outer Continental Shelf National Security Maritime Uses (Section 4.4.8);
- Marine Energy and Infrastructure (Section 4.4.9);
- Public Health and Safety (Section 4.4.12);
- Oil Spill Response Plan (Appendix Q); and
- Navigation Safety Risk Assessment (Appendix S)

4.4.11.1 Affected Environment

The affected environment is defined as areas where other marine and coastal activities are known to occur and have the potential to be directly or indirectly affected by the construction, O&M, or decommissioning of the Project. Existing commercial ports and construction staging areas are not assessed in this section because associated Project uses will be consistent with the activities for which these facilities were already permitted and developed. Known areas of other coastal and marine uses are shown in Figure 4.4-68. The description of recreational coastal and marine uses was developed from websites promoting marine and coastal recreation in Virginia Beach (Virginia Beach Convention and Visitors Bureau 2020a, 2020b); recreational diving at shipwrecks, whale, and dolphin tours (Virginia Aquarium and Marine Science Center 2017); and similar sources. Long-term and seasonal scientific surveys are conducted by NOAA Fisheries and VIMS for several regional programs (ASMFC 2020, VIMS 2020a, 2020b).

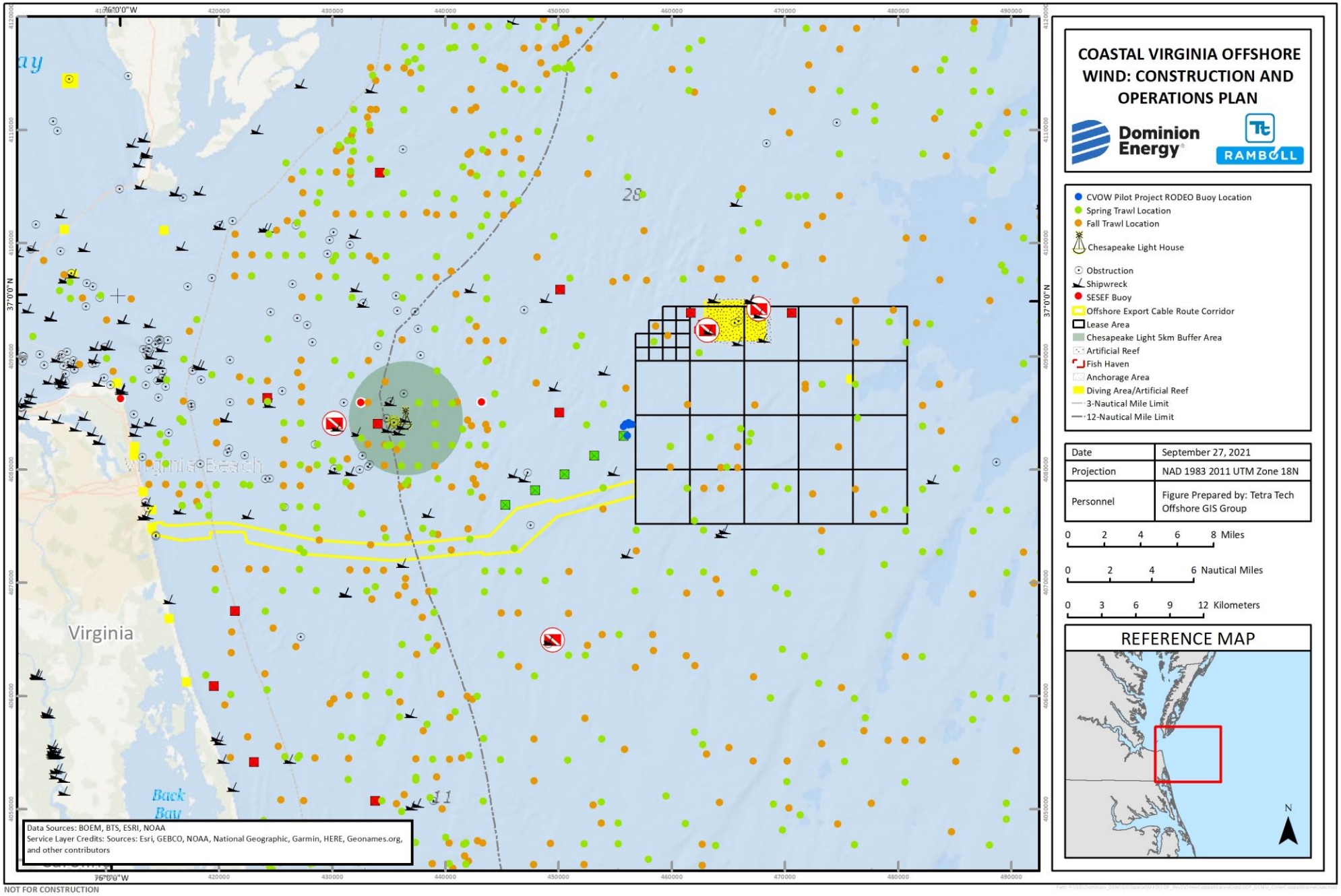

Figure 4.4-68. Other Coastal and Marine Uses Overview

Military Training and Testing

The Hampton Roads area is home to the U.S. Atlantic Fleet, which includes several onshore Navy installations (Naval Station Norfolk, Naval Air Station Oceana/Dam Neck Annex, Joint Expeditionary Base Little Creek-Fort Story, Naval Auxiliary Landing Field Fentress, and others). The Navy also has a large offshore presence, and the Lease Area is nested within the northern and southern portions of the Virginia Capes (VACAPES) Operating Area and Range Complex, where the Navy conducts many different in-water and in-air training and testing activities as part of the Atlantic Fleet military readiness program (see Section 4.4.8, Department of Defense and Outer Continental Shelf National Security Maritime Uses). Dominion Energy is cognizant of the Navy's presence in and around the Lease Area and has been coordinating with the Navy throughout the development of the Project, particularly in the siting of (and landing of) the Offshore Export Cable Route, which intersects a portion of the VACAPES Range Complex. More information on DoD and OCS National Security Maritime Uses in the area is provided in Section 4.4.8 as well.

Marine Recreation

Numerous marine recreational activities, including swimming, surfing, kayaking, paddle boarding, wind surfing, fishing, sailing/boating, occur on the Virginia coast and in nearshore waters almost year-round. These activities primarily occur nearshore in state waters. Boat launch ramps, public shoreline access, and parking areas are located along the coast of Virginia where surface marine recreational activities take place. More information on recreational activities along the coastline are provided in Section 4.4.5, Recreation and Tourism.

Pleasure craft and sailing vessel activity shown in Figure 4.4-69, is high throughout the Offshore Project Area, although activity is greater in nearshore coastal waters than farther offshore (MARCO Mid-Atlantic Ocean Data Portal). Construction and O&M vessel routes are planned to be used mostly to the north and east of where coastline recreational activities are concentrated. More information on recreational fishing activities are provided in Section 4.4.6, Commercial and Recreational Fishing. In addition, visual impacts to marine recreation activities will be outlined in Section 4.3.4, Visual Resources and Appendix I, Visual Impact Assessment.

Diving and Snorkeling

Underwater recreational activities such as diving, spearfishing, and snorkeling occur year-round in Virginia. Recreational diving along the Virginia coast is supported by several local charter dive companies in and near Virginia Beach and Norfolk, Virginia. For example, Chesapeake Bay Diving Center (2020), Lynnhaven Dive Center (2018), Underwater Adventures (2020), and Tri-State Scuba (2020) offer charters to artificial reefs, shipwrecks, ledges, and other sites of interest in the Offshore Project Area (Figure 4.4-70). Several shipwrecks and dive spots associated with the Triangle Reef shipwrecks and associated debris placed in OCS Blocks 6013, 6014, and 6065 to supplement the VMRC's artificial reef program (VMRC 2020; Lucy 1983) are also located within the charted "fish haven" portion of the Lease Area. The Offshore Export Cable Route Corridor avoids known shipwrecks and underwater dive sites.

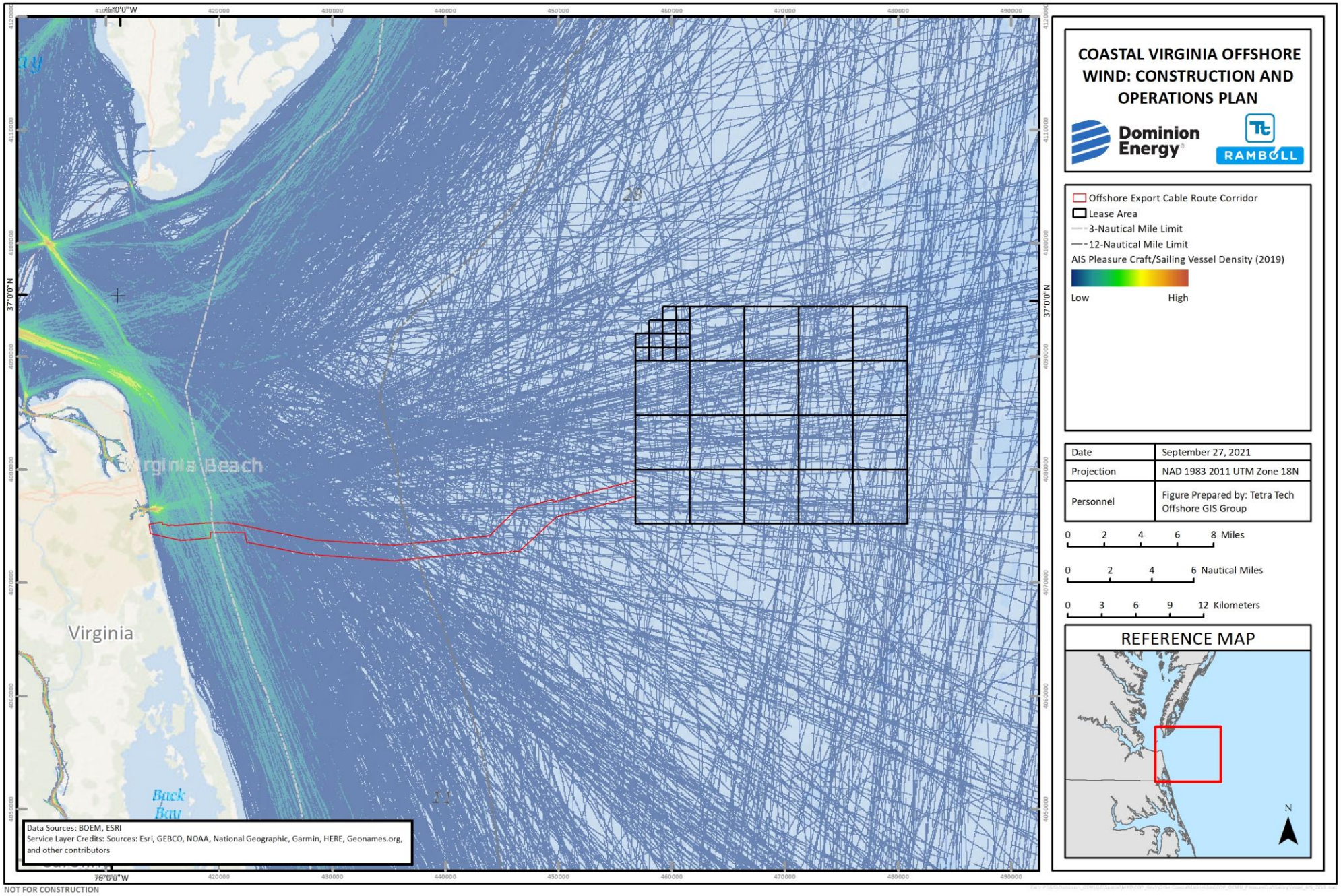

Figure 4.4-69. Pleasure Craft/Sailing Vessel Activity within and around the Offshore Project Area (MARCO 2019)

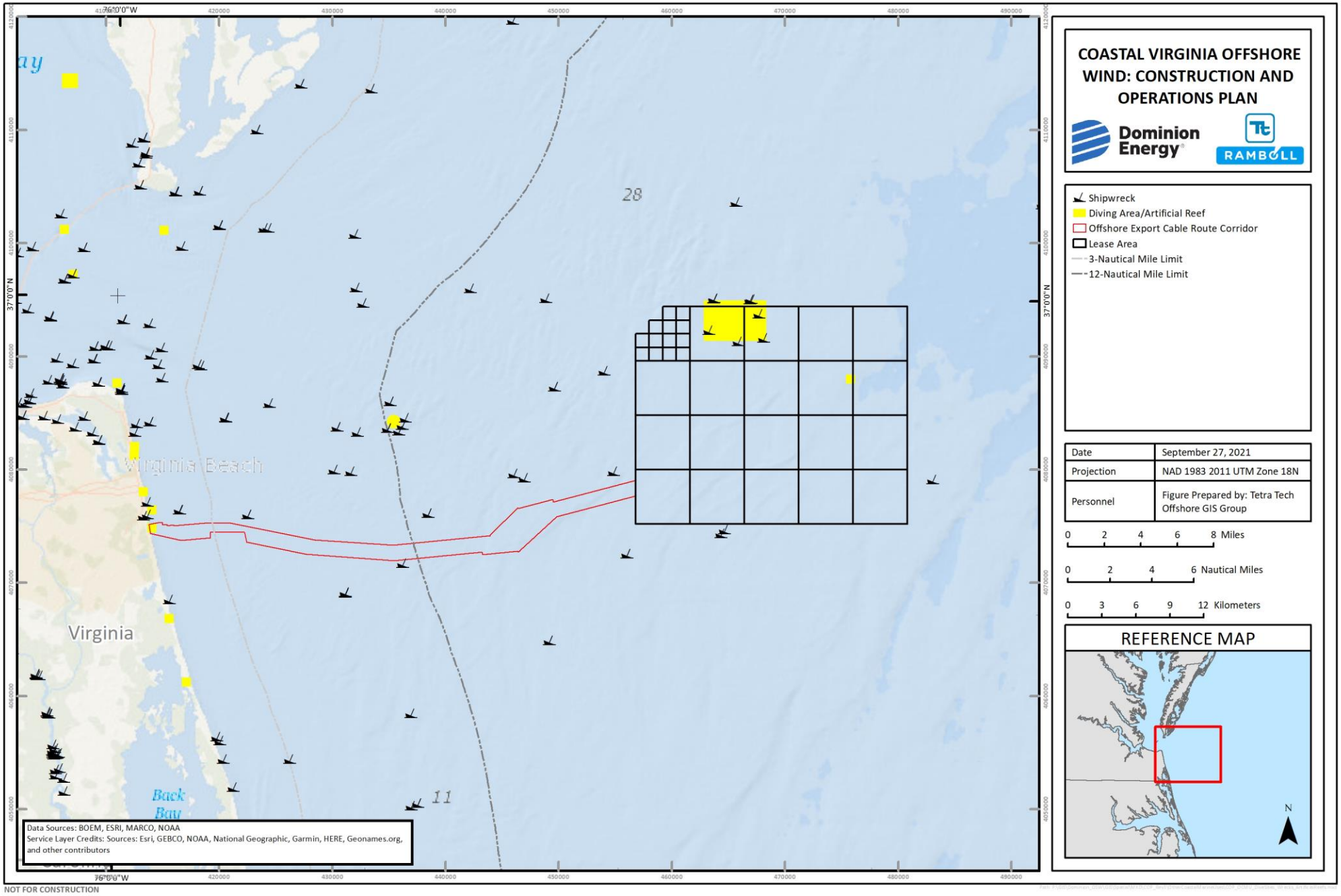

Figure 4.4-70. Underwater Wrecks, Artificial Reefs, and Other Dive Sites

Whale and Dolphin Watching

Vessels are available for whale-watching and dolphin tours throughout coastal Virginia, including Virginia Beach year-round (e.g., Virginia Aquarium and Marine Science Center [2017], Rudee Tours [2020], *Knot Wish'n* Custom Charters [n.d.]). Whale watching tours in the region usually occur between late November and March (Virginia Aquarium and Marine Science Center 2017). Dolphin tours occur between June and late October. Whale watching and dolphin tour vessels generally stay within sight of land. More information on marine mammal activity in the Offshore Project Area is provided in Section 4.2.5, Marine Mammals.

Fishing Tournaments

Virginia hosts dozens of recreational saltwater fishing tournaments targeting billfish, tuna, seabass, shark, grouper, and others (American Fishing Contests 2020). Tournaments occur year-round and attract anglers from across the eastern seaboard (Virginia Beach Billfish Tournament 2020). More information on recreational fishing tournaments is provided in Section 4.4.6, Commercial and Recreational Fishing.

Scientific Surveys

Long-term and seasonal scientific surveys are conducted in the Offshore Project Area by NOAA Fisheries and VIMS for several regional programs (ASMFC 2020, VIMS 2020a, 2020b); the most prominent surveys are listed below:

- NOAA's NEFSC:
  - Atlantic Bottom Trawl Survey (NOAA Fisheries 2020a);
  - MRIP (NOAA Fisheries 2020b); and
  - Fisheries Large Pelagics Survey (LPS) (NOAA Fisheries 2020c).
- VIMS:
  - Longline shark survey (VIMS 2020a);
  - Northeast Area Monitoring and Assessment Program (NEAMAP) survey (VIMS 2020b);
  - BOEM; and
  - Real-time Opportunity for Development Environmental Observations (RODEO) (BOEM 2020).

Fisheries-independent data are collected during these surveys to inform stock assessments, set harvest quotas, and support other fisheries management goals. Data collection methods include longlining (VIMS 2020a), trawling (NOAA Fisheries 2020a, VIMS 2020b), observation on recreational fishing vessels (NOAA 2020b, 2020c), and interviews with fishermen (NOAA Fisheries 2020b, 2020c). More information on scientific surveys is provided in Sections 4.2.4, Benthic Resources, Fishes, Invertebrates, and Essential Fish Habitat, and 4.2.5, Marine Mammals, and Figure 4.4-71.

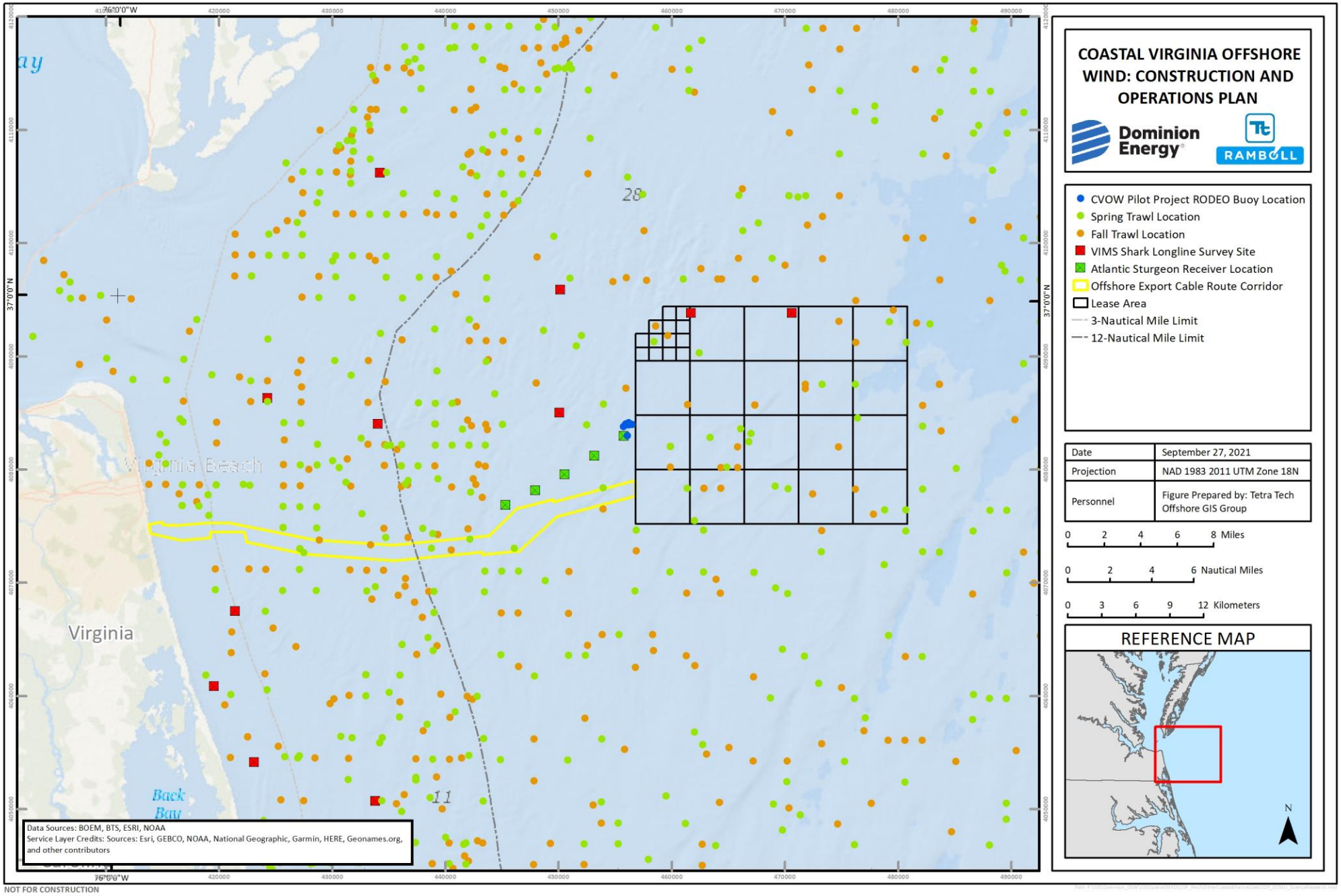

Figure 4.4-71. Science and Research Activities

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

The potential impacts of construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For the purpose of the assessments presented within this COP, the PDE has been defined by parameters, which are representative of the minimum and maximum number of structures to be constructed within the Offshore Project Area. Dominion Energy is permitting up to 205 WTG positions and two to three Offshore Substations.

Construction

During construction, potential impacts to coastal and marine uses may include installation of the Offshore Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impact may occur as a consequence of the factor identified above:

Short-term change in Project-related vessel traffic;

- Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures;
- Short-term interference with access to nearshore and beach area;
- Short-term increases in turbidity and water quality; and
- Short-term disturbance and displacement of local marine wildlife.

Short term change in Project-related vessel traffic. During construction of the Project, vessel traffic will increase in and around the Offshore Project Area. To the extent possible, Project-related vessels will use existing ports and follow charted transit lanes (as required based on vessel size class and location) to get to and from the Offshore Project Area. Construction vessel types will differ somewhat from typical fishing and charter boats as described in Section 3, Description of Proposed Activity. Additionally, with consideration to existing Navy and commercial shipping vessel activity in the Offshore Project Area, the overall density of vessels in the Offshore Project Area would not differ substantially from pre-construction conditions. Dominion Energy would take measures to minimize impacts associated with construction vessels, including transiting within existing traffic lanes to the extent feasible, regular communication with stakeholders regarding Project activity, completing construction as quickly as is safely practicable, and limiting vessel activity to necessary transits.

Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures. During the construction stage of the Project, temporary safety zones established around Project-related vessels and structures will temporarily restrict recreational use such as boating and diving. Most recreational activities (e.g., surfing, kayaking, recreational boating, and fishing) occur within sight of the shore and would be displaced only briefly during installation and armoring of the Offshore Export Cable. Wreck diving and fishing that occur within the "fish haven" portion of the Lease Area may be temporarily displaced during installation of the WTG Foundations and Inter-Array Cables. Dominion Energy would continue to coordinate with appropriate personnel from the Navy to ensure

construction activities do not conflict with training and testing activities within the VACAPES Range Complex, including transits to/from such activities. Dominion Energy would minimize displacement of other marine users by establishing restricted zones in portions of the Offshore Project Area only for the time required to complete the work. For example, the Offshore Export Cables will be installed by vessels that continuously move along the cable route. Safety zones will move along with the cable-laying vessel so that no single location remains off limits to other users for more than a few hours to days. Dominion Energy would provide regular updates of construction activity and implemented safety zones to the local marine community through the Project website, social media, and the USCG LNTM and by actively engaging other stakeholders. Impacts to other marine and coastal uses will be short term and localized.

Short-term interference with access to nearshore and beach area. Trenchless installation in the Nearshore Trenchless Installation Area and at the Cable Landing Location may interfere with recreational activities near the shore (e.g., wading, swimming, surfing, fishing, sunbathing). During installation of the nearshore portion of the cable, vessels, and other equipment will generate additional noise and engine emissions, disturbing the typical sounds of the beach and nearshore area. Small areas of the beach and nearshore will be cordoned off to restrict unauthorized public access to the construction zone; restrictions will be temporary and localized (see Section 4.4.12, Public Health and Safety). Dominion Energy would minimize the size of safety areas and duration of exclusion to reduce impacts on other users of the area. Dominion Energy is committed to keeping the coastal community informed by providing advance notice of area restrictions and regular updates to the public via local media outlets, on-site signage, social media pages, and other suitable information outlets.

Short-term increases in turbidity and water quality. Installation of the Offshore Export Cable Route in the Nearshore Trenchless Installation Area will disturb the seabed and increase suspended sediment in the immediate area. For swimmers and snorkelers, the impact on water quality would be limited to a reduction in visibility at discrete locations for several hours or days. The increased turbidity would not differ substantively from the sediment suspended during heavy storms; impacts would be temporary and localized. Construction vessels could unintentionally release fuel or oil to the water. All Dominion Energy's vessel crews would be familiar with practices to avoid and minimize accidental spills, as detailed in Dominion Energy's Marine Trash and Debris Prevention Training, Emergency Response Plan (ERP), and Oil Spill Response Plan (Appendix Q). More information on turbidity and water quality is provided in Section 4.1.2, Water Quality.

Short-term disturbance and displacement of local marine wildlife. The noise, vibration, bottom disturbance, and vessel activity in the construction area may disturb marine invertebrates, fish, sea turtles, birds, and marine mammals, causing them to temporarily relocate to areas of less activity. Recreational wildlife viewing boat tours may be displaced from their typical locations as the animals react to the disturbance. However, vessel captains would not be prevented from following the animals to their alternate locations to allow viewing during the construction period. Dominion Energy would avoid and minimize disturbance to wildlife, particularly endangered sea turtles, and marine mammals. Avoidance, minimization, and mitigation measures include soft-start pile-driving, dedicated marine mammal and sea turtle observers on vessels, and other activities detailed in Sections 4.2.5, Marine Mammals, and 4.2.6, Sea Turtles. Displacement of marine animals and the associated recreational wildlife viewing will be short term

and localized. Individual marine animals are expected to resume their typical behavior and locations shortly after construction activities are completed.

Operations and Maintenance

During O&M, potential impacts related to coastal and marine uses may include the presence of fixed structures (e.g., WTGs and Offshore Substations). Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factor identified above:

- Long-term modification of existing uses;
- Long-term changes in vessel traffic;
- Increase in diving, snorkeling, and other tourism in the Offshore Project Area; and
- Increase in recreational fishing (including tournaments) near the WTGs as artificial reefs become established on the submerged Offshore Project Components.

Long-term modification of existing uses. The presence of the Offshore Project Components may affect the way some vessel captains navigate through the area but is not expected to substantially alter other marine uses. Recreational use in the Offshore Project Area may increase, first as tourists respond to the novelty of the wind farm, and later as the WTG and Offshore Substation Foundations and associated infrastructure create artificial reef effects that aggregate some fish species and attracting divers and recreational anglers as a result.

Long-term changes in vessel traffic. During the operational stage, Dominion Energy would routinely monitor and conduct needed repairs on the infrastructure in the Offshore Project Area. The crew transfer vessel (CTV) and O&M vessels will not differ substantially from other vessels in the area, including commercial and recreational fishing vessels. Dominion Energy would minimize and mitigate impacts to other users by notifying local marine users when any major repairs are planned and reducing any necessary restriction to the extent that safety precautions allow. The CTV and O&M vessels would use established transit lanes where appropriate and will not substantially restrict other uses. No measurable impact to vessel traffic is expected.

Increase in diving, snorkeling, and other tourism in the Offshore Project Area. The presence of WTGs in other regions has resulted in offshore wind tourism centered around wind energy. The Block Island Wind Farm in Rhode Island waters is popular with sightseers attracted to the novel WTGs (Smythe et al. 2020). Private companies (e.g., Fish The World Charters [n.d.]; Block Island Ferry [n.d.]) offer tours to the Lease Area, and some economic benefits to Block Island and the town of New Shoreham have resulted from offshore wind tourism, but the long-term benefits are unknown (Smythe et al. 2020). Recreational trips to the Offshore Project Area would require some advanced planning; at a constant speed of 25 knots, the outbound trip would take about an hour from the mouth of the Chesapeake Bay or Rudee Inlet, and almost two hours from Norfolk, Virginia.

Increase in recreational fishing (including tournaments) near the WTGs as artificial reefs become established on the Offshore Project Components. Underwater structure/hardscape such as WTG and Offshore Substation Foundations and scour protection typically become encrusted with algae and

invertebrates that in turn create microstructures that increase the value of the foundation as subtidal and vertical intertidal habitat for mobile fish and invertebrates. The WTG and Offshore Substation Foundations are expected to function as artificial reefs within one to several years after installation and become favored recreational angling destinations as has happened at Block Island (Smythe et al. 2020) and in the Gulf of Mexico (van der Strap et al. 2016). In the Gulf of Mexico, where offshore oil and gas infrastructure has been in place for several decades, recreational charters commonly fish near the platforms for structure-associated bottom species (e.g., snapper, grouper) as well as for large pelagic predators such as tuna. Recreational fishing near offshore platforms has well-documented beneficial economic effects on nearby coastal communities. Recreational fishing trips to the Offshore Project Area would typically be daylong (or multi-day) activities given the distance from shore. Impacts stemming from the increase in trips to the Offshore Project Area are expected to be beneficial to the local economy as described in Section 4.4.6, Commercial and Recreational Fishing.

Decommissioning

Impacts resulting from decommissioning of the Project are expected to be similar to or less than those caused by construction. 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, and potential impacts will be re-evaluated at that time.

4.4.11.3 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and mitigate the potential adverse impact-producing factors described (Table 4.4-34). Dominion Energy will 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 4.4-34. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Offshore Project Area	Short-term change in Project-related vessel traffic	• Dominion Energy would take measures to minimize impacts associated with construction vessels, including transiting within existing traffic lanes to the extent feasible, regular communication with stakeholders regarding Project activity, completing construction as quickly as is safely practicable, and limiting vessel activity to necessary transits; • Dominion Energy would continue to coordinate with appropriate personnel from the Navy to ensure construction activities do not conflict with training and testing activities within the Virginia Capes (VACAPES) Range Complex, including transits to/from such activities; • Dominion Energy would minimize displacement of other marine users by establishing restricted zones in portions of the Offshore Project Area only for the time required to complete the work; • Dominion Energy would provide frequent and regular updates of construction activity and
		Short-term displacement of marine users due to the establishment of safety zones around Project-related vessels and structures	
		Short-term interference with access to nearshore and beach area	
		Short-term increases in turbidity and water quality	
		Short-term disturbance and displacement of local marine wildlife	

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
			implemented safety zones to the local marine community through the Project website, social media, and the LNTM and by actively engaging other stakeholders. Impacts to other marine and coastal uses will be short term and localized; • Dominion Energy would minimize the size of safety areas and duration of exclusion to reduce impacts on other users of the area. Dominion Energy is committed to keeping the coastal community informed by providing advance notice of area restrictions and regular updates to the public via local news, onsite signage, social media, and other suitable information outlets; • All Dominion Energy vessel crews would be familiar with practices to avoid and minimize accidental spills as detailed in Dominion Energy's Marine Trash and Debris Prevention Training, Emergency Response Plan (ERP), and Oil Spill Response Plan (see Appendix Q); and • Dominion Energy would avoid and minimize disturbance of wildlife, particularly endangered sea turtles and marine mammals. Avoidance, minimization, and mitigation measures include soft-start pile driving, dedicated marine mammal and sea turtle observers on vessels, and other activities.
Operations and Maintenance		Long-term modification of existing uses	• Dominion Energy would minimize and mitigate impacts to other users by notifying local marine users when any major repairs are planned and reducing any necessary restriction to the extent that safety precautions allow. The CTV and O&M vessels would use established transit lanes and will not substantially restrict other uses. No measurable impact of vessel traffic is expected.
		Long-term changes in vessel traffic	
		Increase in diving, snorkeling, and other tourism in the wind farm in the Offshore Project Area	
		Increase in recreational fishing (including tournaments) near the WTGs as artificial reefs become established on the Foundations	

4.4.12 Public Health and Safety

This section addresses the health and safety issues relevant to the Project, including accidents, public access, hazardous materials, non-routine events, and EMF. Potential impacts to public health and safety resulting from construction, O&M, and decommissioning of the Project are discussed. Other sections in which public health and safety issues are discussed include:

- Water Quality (Section 4.1.2);
- Air Quality (Section 4.1.3);
- Land Transportation and Traffic (Section 4.4.4);
- Recreation and Tourism (Section 4.4.5);
- Marine Transportation and Navigation (Section 4.4.7);
- Aviation and Radar (Section 4.4.10);
- Safety Management System (Appendix A);
- Oil Spill Response Plan (Appendix Q);
- Navigation Safety Risk Assessment (Appendix S);
- Offshore Electric and Magnetic Field Assessment (Appendix AA); and
- Onshore Electric and Magnetic Field Assessment (Appendix BB).

For the purposes of this section, the Study Area includes the Offshore and Onshore Project Areas and surrounding area. The Study Area was designed to capture the full range of public health and safety concerns that may be within the vicinity of the Project. This section draws information from several sources of data.

4.4.12.1 Affected Environment

The affected environment is defined as the Onshore Project Area and Offshore Project Area (and Project Components) that have the potential to be directly affected by the construction, O&M, and decommissioning of the Project. The Offshore Project Components will be located in federal and state waters, while the Onshore Project Components will be primarily located within public land and ROWs owned by the Commonwealth of Virginia, City of Virginia Beach, City of Chesapeake, and the Navy. Some of the Onshore Project Components may be located within, adjacent to, or have easements within privately owned parcels. The Offshore Project Area consists of open ocean and there are no surface-area permanent structures or other facilities nearby, with the exception of Dominion Energy's two turbine 12-MW offshore wind project, the CVOW Pilot Project.

The affected environment as it pertains to public health and safety depends on the location of Onshore and Offshore Project Components in relation to existing infrastructure, public areas, and user and community groups that may be affected by health and safety risks related to the Project. The Offshore Study Area is shown in Figure 4.4-72. The Onshore Study Area is shown in Figure 4.4-73.

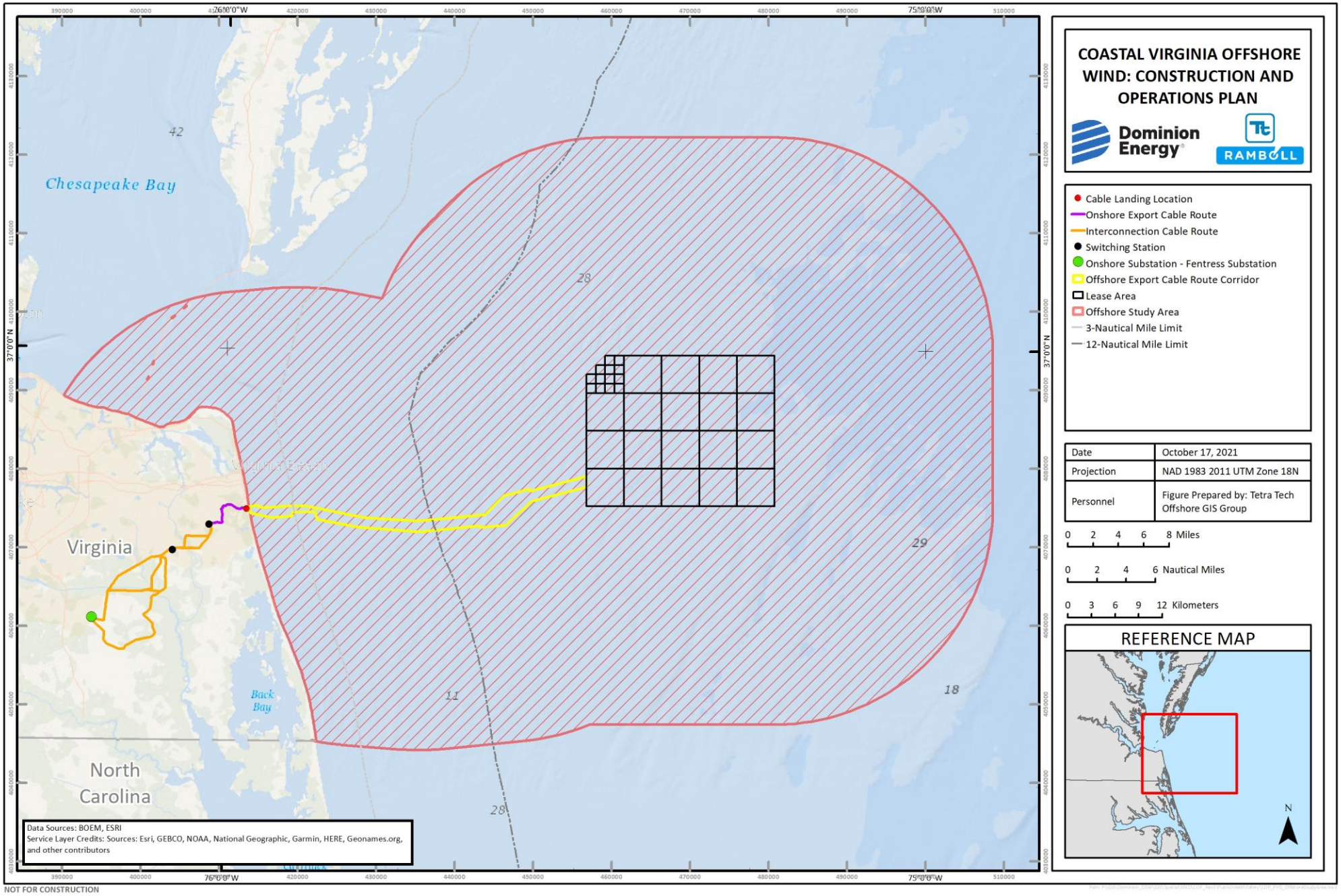

Figure 4.4-72. Offshore Study Area

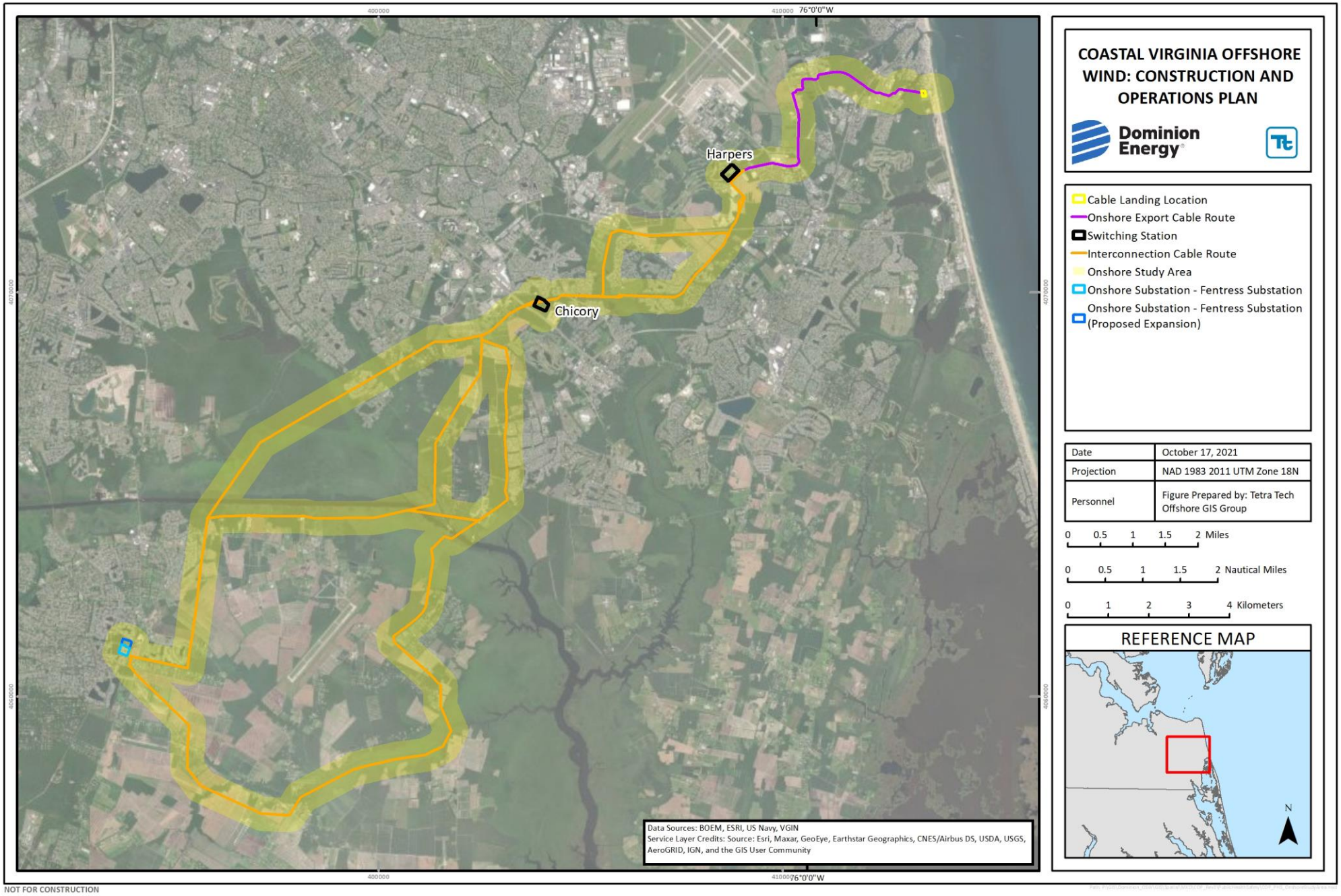

Figure 4.4-73. Onshore Study Area

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

The potential impacts resulting from the construction, O&M, and decommissioning of the Project are based on the maximum design scenario from the PDE (see Section 3, Description of Proposed Activity). For the purpose of the assessments presented within this COP, the PDE has been defined by minimum and maximum parameters that are representative of the minimum and maximum number of structures to be constructed within the Offshore Project Area and Onshore Project Area.

Construction

During construction, the impact-producing factor to public health and safety may include construction activities pertaining to the Offshore and Onshore Project Area. 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 factor identified above:

- Accidents;
- Public access to Project Components; and
- Accidental releases of hazardous materials.

Accidents. Dominion Energy is dedicated to the concept that all accidents are preventable. No task is so important as to justify injuring employees, damaging property, or harming the general public and environment. Protection of people is a management responsibility and it is expected that all subcontractors would adopt Dominion Energy's Core Value of safety. Each contractor's management is responsible to ensure that their respective employers, subcontractors, and employees engaged on the Project comply with applicable regulatory requirements as well as individual company and Project-specific requirements. Employees, customers, and vendors engaging in work on the Project would be provided a work environment that would strive to eliminate all injuries and illnesses from recognized hazards through designing, planning, training, and executing safe work BMPs.

Dominion Energy will manage the overall health and safety of the Project under a Project-specific Safety Management System (SMS) developed in accordance with 30 CFR §§ 585.810, 585.627(d), 585.614(b) and 585.651. The Project will provide active leadership and support of safety, security, occupational health, environment, fire prevention, incident management, and other related loss control activities. The overall goal of the SMS is to identify and mitigate hazards associated with the activities undertaken by employees on the Project that have the potential to affect human health or the environment. The Project SMS (see Appendix A, Safety Management System) will build on the SMS in place for the 12 MW CVOW Pilot Project and would be finalized prior to construction in consultation with relevant regulatory agencies, including but not limited to BOEM and the USCG.

A Traffic Management Plan would be developed in coordination with applicable federal agencies, state agencies, and local municipalities to ensure minimal risk of accidents associated with construction of the Onshore Export Cable and Interconnection Cable (Section 4.4.4, Land Transportation and Traffic). Additional measures to avoid, minimize, and mitigate accidents, relevant to Public Health and Safety are included in Section 4.4.7, Marine Transportation and Navigation, and Section 4.4.10, Aviation and Radar.

Public Access to Project Components. As described in Section 4.4.6, Commercial and Recreational Fishing, and Section 4.4.7, Marine Transportation and Navigation, during offshore construction, Dominion Energy would restrict temporary access along the Inter-Array Cables and Offshore Export Cables construction ROW, the work areas surrounding each Offshore Substation Foundation and WTG, and the Nearshore Trenchless Installation Area to minimize potential impacts to local mariners, including cargo vessels, fishing vessels, recreational vessels, and others. Dominion Energy will provide frequent Project updates on planned work areas, actively engage with maritime stakeholders to communicate the same, and provide information to the USCG for publication in the Local Notice to Mariners. Direct access to partially installed underwater Project Components by the general public (i.e., divers) would also be discouraged in the same manner as above water Project Components (see also Section 4.4.11, Other Coastal and Marine Uses).

Onshore work would be conducted primarily within public land and ROWs owned by the Commonwealth of Virginia, City of Virginia Beach, City of Chesapeake, and the Navy. Some of the Onshore Project Components may be located within, or adjacent to, easements within privately owned parcels. Public access to all work sites would be limited during construction activities. To ensure protection of the public during construction, all equipment would be stored within fenced onshore work areas. Roadways would not be closed or blocked for long periods of time to allow for local vehicular traffic patterns to be maintained to the greatest extent practicable. In addition, no trenches or holes would be left open or unsecured overnight (see also Section 4.4.4, Land Transportation and Traffic).

Accidental releases of hazardous materials. Construction of the Project would involve the use of small amounts of hazardous materials, including hydraulic fluids, glycol, synthetic ester transformer liquid, and diesel fuel. These materials may present a danger to public health if they are improperly managed or released into the environment. Potential impacts depend on the quantity, concentration, and characteristics of the hazardous material.

As standard practice, marine vessels involved in construction and O&M of the Project will operate under oil spill prevention and response plans that comply with USCG requirements relating to prevention and control of oil spills and the discharge of wastes (see Appendix Q, Oil Spill Response Plan). Secondary containment would be utilized for oils and greases in accordance with all state and federal regulations. Adequate spill response kit(s) will be present on site at the Construction Port. Following construction, vessel operations would include work boats transporting Project personnel, tools, and materials to and from the WTGs for ongoing maintenance and response to WTG problems or failures. At the Construction Port, a secondary containment and a spill response kit would be provided for oils and other hazardous materials in accordance with applicable state and federal regulations. The Project would minimize potential impacts through appropriate construction BMPs and compliance with the Project Spill Prevention, Control, and Countermeasures Plan and Oil Spill Response Plan (see Appendix Q) that would be provided for agency review and approval prior to construction.

Operations and Maintenance

During O&M, the potential impact-producing factor to public health and safety include Project maintenance activities. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and

mitigate impacts during Project O&M. The following impacts may occur as a consequence of the factor identified above:

- Accidents;
- Public Access to Project Components;
- Accidental Releases of Hazardous Materials;
- EMF; and
- Non-Routine Emergency Events.

Accidents. The Project SMS provided in Appendix A, Safety Management System, and the mitigations for traffic management (see Section 4.4.4, Land Transportation and Traffic) would apply to Project O&M in the same manner as described for Project construction activities above.

Public Access to Project Components. During O&M, the Offshore and Onshore Project Components will be restricted from public use. While fishing and other activities will be permitted surrounding the WTGs and Offshore Substations, direct access to these components will be prohibited and all access points will be locked at all times. Only trained and qualified personnel will have access to the Offshore Project Components. The Switching Station and Onshore Substation will be gated and locked at all times and will be monitored with security surveillance to prevent unauthorized access.

The Project's offshore and onshore cables would be buried to sufficient depths (Inter-Array Cables, Offshore Export Cables, Onshore Export Cables and Interconnection Cables) or suspended at sufficient heights (Interconnection Cables) to prevent public interaction. The Onshore Export Cable Route, from the Cable Landing Location (i.e., the Proposed Parking Lot west of Firing Range at SMR), would proceed west through the Oceana Parcel, then southwest to either the Switching Station north of Harper's Road (i.e., Harpers Switching Station) or the Switching station north of Princess Anne Road (i.e., Chicory Switching Station). The Switching Station and Onshore Substation would be surrounded by secured perimeter fencing and locked to prevent public access.

Accidental Release of Hazardous Materials. During O&M of the Project, the WTGs would contain small amount of oils, fuel, and other hazardous materials as described in Appendix A, Safety Management System. The design of the WTGs includes secondary containment designed to contain potential spills of these materials. The Switching Station and Onshore Substation equipment, including the transformer and shunt reactor, would also contain small amounts of oils, fuel, and other hazardous materials. As described in Appendix A, Safety Management System, each of these pieces of equipment would include secondary containment, as required, in accordance with applicable regulations.

Project operation vessels would include work boats transporting Project personnel, tools, and materials to and from the WTGs for ongoing maintenance and response to WTG problems or failures. Project maintenance vessels used during operations may transport hazardous materials, including primarily lubricants, hydraulic oil, and coolant; these materials would be transported in watertight containers to prevent accidental spills. As standard practice, marine vessels involved in O&M of the Project would operate under oil spill prevention and response plans that comply with USCG requirements relating to prevention and control of oil spills and the discharge of wastes. Secondary containment would be utilized

for oils and greases in accordance with all state and federal regulations. Adequate spill response kit(s) will be present on site at the Construction Port.

At the O&M facility, secondary containment and a spill response kit would be provided for oils and other hazardous materials in accordance with applicable state and federal regulations. The Project would minimize potential impacts through appropriate construction BMPs and compliance with the Project Spill Prevention, Control, and Countermeasures Plan and the Oil Spill Response Plan (see Appendix Q) that would be provided for agency review and approval prior to construction.

EMF. During O&M of the Project, the anticipated EMF associated with the Offshore Export Cables, Onshore Export Cables, and Interconnection Cables may present a risk to human health and/or safety if exposure to these fields occurs. The magnitude of these potential effects is dependent on both the field strength and the proximity to and duration of the exposure to the EMF. To support assessment of these potential effects, Dominion Energy developed Project-specific modeling of anticipated EMF exposure from the Offshore Project Components and Onshore Project Components. The results of these studies are provided in Appendix AA, Offshore Electric and Magnetic Field Assessment, and Appendix BB, Onshore Electric and Magnetic Field Assessment.

Offshore Export and Inter-Array Cables will be buried to sufficient depth beneath the seafloor and therefore will not present an opportunity for interaction with persons coming into close proximity to them. Onshore Export and Interconnection Cables will be either buried or run as overhead lines and therefore will not present an opportunity for interaction with persons coming into close proximity to those cables.

The calculated magnetic field level for the onshore portion of the Project is well below the International Committee on Electromagnetic Safety maximum permissible exposure limit of 9,040 milligauss offshore for the general population and the International Commission on Non-Ionizing Radiation Protection International Commission on Non-ionizing Radiation Protection reference level limit for whole body exposure of 2,000 milligauss (ICES 2005; ICNIRP 2010). For additional information, see Appendix AA, Offshore Electric and Magnetic Field Assessment, and Appendix BB, Onshore Electric and Magnetic Field Assessment.

Non-Routine Emergency Events. The WTGs and Offshore Substations are designed to withstand hurricane force winds, with a WTG operating range of 6.7 mph (3 m/s) to 67.1 mph (30 m/s). For wind speeds beyond this range, the WTG is designed to ramp down power output to ensure safety/protection of the equipment during such conditions (see Section 2, Project Siting and Design Development). Non-routine events may include WTG or Offshore Substation Foundation or WTG/Offshore Substation failure, damage to Offshore Export/Inter-Array Cables, response to extreme weather events, lightning strikes, and fires. However, routine inspection of Project Components will include preventative maintenance aimed at keeping the equipment in optimal condition for the life of the Project. WTG or Offshore Substation Foundation or WTG failure is extremely unlikely. In the event that a component of the WTG collapses, there are no permanent structures or facilities near the WTGs that would be affected, and the likelihood of a vessel transiting underneath a WTG at the time of collapse is extremely low.

To ensure the chances of rotor overspeed from an extreme event (e.g., extreme winds or equipment malfunction) are minimized to the maximum extent possible, the WTG controls are validated in a laboratory prior to installation using real control hardware and an environment simulator to confirm controller stability

and rotor speed command (i.e., hardware in the loop procedure). The WTGs are designed to shut down in extreme environmental conditions (e.g., extreme wind speeds, extreme low/high temperatures, etc.). The WTGs are equipped with a High Wind Ride Throughout system that is designed to slowly ramp down power output as wind speeds increase as a protection measure for the WTG and its components. The combination of external and internal protection measures incorporated into the WTG design reduces the potential damage to people and materials. The external WTG protection would be designed to handle direct lightning strikes and to conduct the lightning peak current down into the grounding system at the bottom of the WTG and Offshore Substation Foundations. The internal system minimizes damage and interference by using equipotential bonding, overvoltage protection, and electromagnetic coordination. The blades would be protected by a receptor at their tip and a conductive cable system leading to the tower and then down to the earth.

Additional O&M safety systems on each WTG include backup power, FAA- and USCG-compliant aviation and navigation obstruction lighting, fire suppression, and first aid and survival equipment. Protective relays and fusing for the onshore electrical facilities have been designed to quickly de-energize equipment under fault conditions, thereby minimizing associated electric shock and fire hazard.

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, and potential impacts will be re-evaluated at that time.

4.4.12.3 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 (Table 4.4-35). Dominion Energy will 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 4.4-35. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Offshore and Onshore Project Area	Accidents Public access to Project Components Accidental releases of hazardous materials	• Employees, customers, and vendors engaging in work on the Project would be provided a work environment that would strive to eliminate all injuries and illnesses from recognized hazards through designing, planning, training, and executing safe work best management practices (BMPs); • Dominion Energy would restrict temporary access along the Inter-Array Cables and Offshore Export Cable construction ROW, the work areas surrounding each Offshore Substation and WTG, and the offshore trenchless installation work area to minimize potential impacts to local mariners,

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
			including cargo vessels, fishing vessels, recreational vessels, and others. Dominion Energy will provide frequent Project updates on planned work areas, actively engage with maritime stakeholders to communicate the same, and provide information to the U.S. Coast Guard (USCG) for publication in the Local Notices to Mariners; • Public access to all work sites would be limited during construction activities; • The Switching Station and Onshore Substation equipment, including the transformer and shunt reactor, would also contain small amounts of oils, fuel, and other hazardous materials. As described in Appendix A, Safety Management System, each of these pieces of equipment would include secondary containment, as required, in accordance with applicable regulations. • As standard practice, marine vessels involved in construction and O&M of the Project will operate under oil spill prevention and response plans that comply with USCG requirements relating to prevention and control of oil spills and the discharge of wastes. Secondary containment would be utilized for oils and greases in accordance with all state and federal regulations. Adequate spill response kit(s) will be present on site at the Construction Port; and • The Project would minimize potential impacts through appropriate construction BMPs and compliance with the Project Spill Prevention, Control, and Countermeasures Plan and Oil Spill Response Plan (see Appendix Q) that would be provided for agency review and approval prior to construction.
Operations and Maintenance	Offshore and Onshore Project Area	Accidents Public access to Project Components Accidental releases of hazardous materials Electromagnetic fields Non-routine emergency events	• The Project's offshore and onshore cables would be buried to sufficient depths (Inter-Array Cables, Offshore Export Cables, Interconnection Cables, and Onshore Export Cables) or suspended at sufficient heights (Interconnection Cables) to prevent public interaction; • The Switching Station and Onshore Substation would be surrounded by secured perimeter fencing and locked to prevent public access; • Direct access to Project Components will be prohibited and all access points will be locked at all times; • As standard practice, marine vessels involved in O&M of the Project would operate under oil spill prevention and response plans that comply with USCG requirements relating to prevention and control of oil spills and the discharge of wastes. Secondary containment would be utilized for oils and greases in accordance with all state and federal regulations. Adequate spill response kit(s) will be present on site at the Construction Port; • The Project would minimize potential impacts through appropriate construction BMPs and compliance with the Project Spill Prevention, Control, and Countermeasures Plan and the Oil

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
			Spill Response Plan (see Appendix Q) that would be provided for agency review and approval prior to construction; • Offshore Export and Inter-Array Cables will be buried beneath the seafloor to the extent possible and therefore will not present an opportunity for interaction with persons coming into close proximity to the submarine cables. Onshore Export and Interconnection Cables will be either buried or run as overhead lines and therefore will not present an opportunity for interaction with persons coming into close proximity to those cables; • For wind speeds beyond the operating range of 6.7 mph (3 m/s) to 67.1 mph (30 m/s), the WTG is designed to ramp down power output to ensure safety/protection of the equipment during such conditions (see Section 2, Project Siting and Design Development). • WTG blades would be protected from lightning strike by a receptor at their tip and a conductive cable system leading to the tower and then down to the earth; and • Additional O&M safety systems on each WTG include backup power, Federal Aviation Administration- and USCG-compliant aviation and navigation obstruction lighting, fire suppression, and first aid and survival equipment.