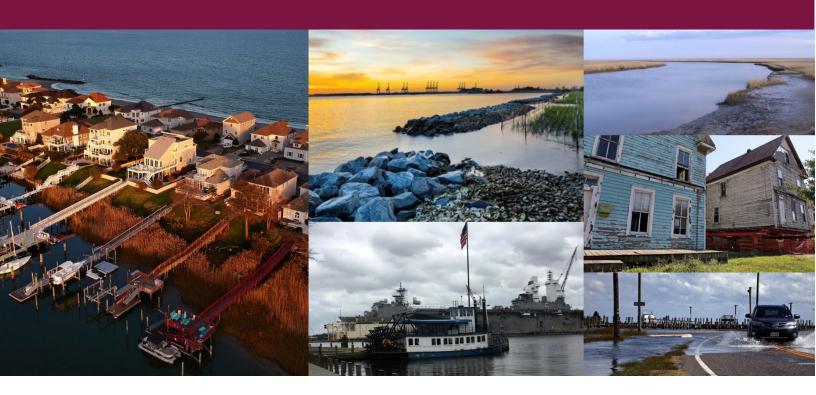# VIRGINIA COASTAL RESILIENCE MASTER PLAN

Data Product List

NOVEMBER 9, 2021

Dewberry®

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Contents

1. INTRODUCTION

This Appendix to the 2021 Virginia Coastal Resilience Master Plan Technical Study provides a simple consolidated list of study analytical and geospatial products. Products are provided for both the Coastal Hazard Framework and Impact Assessment.

Further details on the data sources and methodology for the Coastal Hazard Framework and Impact Assessment can be found in Appendix B, and Appendix C, respectively.

2. COASTAL HAZARD FRAMEWORK

COMPONENT	SUB-COMPONENT	SOURCE	DATE	PRODUCT(S)	NOTE
Epoch Adjustment Surface	None	NOAA tide gauges and 2021 Virginia Coastal Resilience Master Plan (CRMP 2021) analysis	2021	Raster	State-wide adjustment value from National Tidal Datum Epoch (NTDE) of 1992 to 2020
Sea Level Rise Scenario Values	2040, 2060, 2080	NOAA	2017	Raster	Adjusted to NTDE
Surge Amplification Factor	2060, 2080	USACE North Atlantic Coast Comprehensive Study	2015	Raster	
Water Level Data	Mean Low Water	NOAA VDATUM	2021	Raster	Elevations relative to North American Datum of 1988 (NAVD88)

Two sets of rasters are provided:

1) Values represent total stillwater (surge stillwater including wave setup)

2) Values include #1 and approximated wave effects

Raster products for 2020 and each Sea Level Rise Scenario Time Horizon.

Elevations in raster products for 2020 adjusted for tidal datum epoch changes from NTDE to 2020. |
	Mean High Water	NOAA VDATUM	2021	Raster	
	1.5x Mean Tide Range	NOAA VDATUM	2021	Raster	
	2-yr Recurrence Interval (RI) (50% Annual Exceedance Probability [AEP])	FEMA Region 3 Storm Surge Study, extrapolated by Dewberry	2013	Raster	
	5-yr RI (20% AEP)	FEMA Region 3 Storm Surge Study, extrapolated by Dewberry	2013	Raster	
	10-yr RI (10% AEP)	FEMA Region 3 Storm Surge Study	2013	Raster	
	25-yr RI (4% AEP)	FEMA Region 3 Storm Surge Study	2013	Raster	
	50-yr RI (2% AEP)	FEMA Region 3 Storm Surge Study	2013	Raster	
	100-yr RI (1% AEP)	FEMA Region 3 Storm Surge Study	2013	Raster	

COMPONENT	SUB-COMPONENT	SOURCE	DATE	PRODUCT(S)	NOTE
	500-yr RI (0.2% AEP)	FEMA Region 3 Storm Surge Study	2013	Raster	
Topographic/ Bathymetric Digital Elevation Model (DEM)	None	Various	Various	Raster	Best available topographic data from open sources, primarily LiDAR, as of April 2021. Source data resampled to 10 ft horizontal resolution Bathymetric data mostly derived from USGS Coastal National Elevation Database Project DEM, where topobathy LiDAR was not available in source topographic datasets. See Appendix B for list and location of input source data
Flood Extents / Floodplains	Mean Low Water Mean High Water 1.5x Mean Tide Range 2-yr Recurrence Interval (RI) (50% Annual Exceedance Probability [AEP]) 5-yr RI (20% AEP) 10-yr RI (10% AEP) 25-yr RI (4% AEP) 50-yr RI (2% AEP) 100-yr RI (1% AEP)	CRMP	2021	Vector, Raster	Floodplains delineated using surge-stillwater water surfaces at 10 ft resolution from DEM. Post-processing includes: Interior voids removed below tolerance of 150 x 150 ft; Exterior islands removed below area tolerance of 200 x 200 ft; Far-field hydraulically disconnected floodplain areas removed; near-field hydraulically disconnected floodplain areas remain. User should verify hydraulic connectivity to any disconnected floodplain area.

COMPONENT	SUB-COMPONENT	SOURCE	DATE	PRODUCT(S)	NOTE
	500-yr RI (0.2% AEP)				Flood protection structures not represented unless in LiDAR data.
Flood Depths	Mean Low Water	CRMP	2021	Raster	Values represent flood depth above the DEM
	Mean High Water				Two sets of rasters are provided:
	1.5x Mean Tide Range				
	2-yr Recurrence Interval (RI) (50% Annual Exceedance Probability [AEP])				1) Values represent total stillwater (surge stillwater including wave setup)
	5-yr RI (20% AEP)				2) Values include #1 and approximated wave effects
	10-yr RI (10% AEP)				
	25-yr RI (4% AEP)				Raster products for 2020 and each Sea Level Rise Scenario Time Horizon.
	50-yr RI (2% AEP)				
	100-yr RI (1% AEP)				
	500-yr RI (0.2% AEP)				

3. IMPACT ASSESSMENT

3.1. DATA CATALOG

The following table summarizes source data and descriptions for input into the Impact Assessment.

3.1.1. COMMUNITY RESOURCES THEME

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
Businesses & Employers	Agricultural Lands	Agricultural Parcels	LightBox	2021	
	Public & Commercial Structures	Agricultural Structures (Content Damages)	Multiple Sources*	--	*Data was sourced from OpenStreetMap, CityGML, Lightbox, Old Dominion University (ODU), USACE, and Hampton Roads PDC, then compiled and enhanced in targeted locations by Dewberry.
		Agricultural Structures (Exposure)	Multiple Sources*	--	
		Agricultural Structures (Structure Damages)	Multiple Sources*	--	
		Commercial Structures (Content Damages)	Multiple Sources*	--	
		Commercial Structures (Exposure)	Multiple Sources*	--	
		Commercial Structures (Structure Damages)	Multiple Sources*	--	
		Educational Structures (Content Damages)	Multiple Sources*	--	
		Educational Structures (Exposure)	Multiple Sources*	--	
		Educational Structures (Structure Damages)	Multiple Sources*	--	
		Industrial Structures	Multiple Sources*	--	

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
		(Content Damages)			
		Industrial Structures (Exposure)	Multiple Sources*	--	
		Industrial Structures (Structure Damages)	Multiple Sources*	--	
		Religious Structures (Content Damages)	Multiple Sources*	--	
		Religious Structures (Exposure)	Multiple Sources*	--	
		Religious Structures (Structure Damages)	Multiple Sources*	--	
Residential Neighborhoods	Residential Displacement	Residential Structures (Pop Displaced)	ACS	2018	
	Residential Exposure	Residential Structures (Pop Exposed)	ACS	2018	
	Residential Structures	Residential Structures (Content Damages)	Multiple Sources*	--	
		Residential Structures (Exposure)	Multiple Sources*	--	
		Residential Structures (Structure Damages)	Multiple Sources*	--	
Tribal Resources	Tribal-Owned Lands	Tribal Owned Land (Lost)	Census Bureau	2020	
		Tribal-Owned Land (Inundated)	Census Bureau	2020	

3.1.2. CRITICAL SECTOR THEME

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
Commercial & Manufacturing	Commercial	Commercial Buildings	Multiple Sources*	--	*Data is from Dewberry, Old Dominion University (ODU), USACE, Hampton Roads PDC, OpenStreetMap, CityGML and Lightbox.
		Commercial Parcels	LightBox	2021	
	Manufacturing	Biological Products Manufacturing Facilities	HIFLD – HSIP Gold 2015	2015	
		Chemical Manufacturing Facilities	HIFLD – HSIP Gold 2015		
		General Manufacturing Facilities	HIFLD	2021	This dataset represents the entire Industrial PinPointer database of manufacturing companies.
		Nitrogenous Fertilizing Plants	HIFLD – HSIP Gold 2015		
		Pharmaceutical Preparation Manufacturing Plants	HIFLD – HSIP Gold 2015		
Communications	Broadband Internet	Broadband Radio Service and Educational Broadband Service Transmitters	HIFLD	2017	The Broadband Radio Service (BRS) is a commercial service. The Educational Broadband Service (EBS), formerly known as the Instructional Television Fixed Service (ITFS), is an educational service that has generally been used for the transmission of instructional material to accredited educational institutions and non-educational institutions.
	Phone, Radio, and TV	AM Transmissions Towers	HIFLD	2018	AM transmission tower locations as recorded by the Federal Communications Commission, extracted from the FCC Licensing Database.

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
		Cellular Towers	HIFLD	2021	This dataset represents cellular tower locations as recorded by the Federal Communications Commission
		FM Transmissions Towers	HIFLD	2018	This data represents FM transmission tower locations as recorded by the Federal Communications Commission.
		Land Mobile Broadcast Towers	HIFLD	2018	This dataset represents the Land Mobile Broadcast tower locations as recorded by the Federal Communications Commission.
		Land Mobile Commercial Transmission Towers	HIFLD	2018	This dataset represents Land Mobile Commercial transmission tower locations as recorded by the Federal Communications Commission, extracted from the FCC Licensing Database.
		Microwave Service Towers	HIFLD	2021	This dataset represents Microwave Service Towers, which is a part of a communications system that uses a beam of radio waves in the microwave frequency range to transmit video, audio, or data between two locations.
		Paging Transmission Towers	HIFLD	2018	Paging transmission tower locations as recorded by the Federal Communications Commission, extracted from the FCC Licensing Database.
		TV Analog Transmitters	HIFLD	2018	This dataset represents the locations of television analog station transmitters.
Defense Industry	Defense	Department of Defense Sites Points (Public)	HIFLD	2021	This geospatial dataset contains the authoritative point locations and (where available) boundaries of Department of Defense sites, commonly referred to as installations, ranges, training areas, bases, forts, camps, armories, centers, etc. These installations are, in

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
					many cases, comprised of several subordinate sites.
		Department of Defense Federal Land (Inundated)	ESRI	2021	These lands include over 30 million acres managed by the Department of Defense.
		Department of Defense Federal Land (Lost)	ESRI	2021	These lands include over 30 million acres managed by the Department of Defense.
		National Security Government Military Facilities	HIFLD – HSIP Gold 2015		
Energy	Electricity	Electric Generating Units	HIFLD – HSIP Gold 2015		
		Electric Substations	HIFLD	2020	This feature class/shapefile represents electric power substations primarily associated with electric power transmission.
		Power Plants	HIFLD	2020	This feature class/shapefile represents electric power plants.
	Oil & Biofuel	Petroleum Ports	HIFLD	2019	This feature class/shapefile represents Petroleum Ports. This includes ports in the 50 states and the District of Columbia that handle 200 or more short tons per year in total volume (import and export) of petroleum products (URL: http://www.eia.gov/maps/layer_info-m.cfm).
		Petroleum Registered Tank Facilities	DEQ	2021	The GIS layer shows AST/UST Tank Facilities registered with DEQ.

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
		Petroleum Release Sites	DEQ	2021	The GIS layer shows confirmed petroleum releases reported to DEQ.
		Petroleum Terminals	HIFLD	2020	This feature class/shapefile represents Petroleum Terminals.
Government Facilities	Education Facilities	Child Care Centers	HIFLD	2020	This feature class/shapefile contains locations of child day care centers for the 50 states of the USA, Washington D.C., and Puerto Rico.
		Colleges and Universities	HIFLD	2020	The Colleges and Universities feature class/shapefile is composed of all Post-Secondary Education facilities as defined by the Integrated Post-Secondary Education System (IPEDS, http://nces.ed.gov/ipeds/), National Center for Education Statistics (NCES, https://nces.ed.gov/), US Department of Education for the 2018-2019 school year.
		Private Schools (Pre-K to 12th)	HIFLD	2020	This Private Schools feature dataset is composed of private elementary and secondary education facilities in the United States as defined by the Private School Survey (PSS, https://nces.ed.gov/surveys/pss/), National Center for Education Statistics (NCES, https://nces.ed.gov), US Department of Education for the 2017-2018 school year.
		Public Schools (K to 12th)	HIFLD	2020	This Public Schools feature dataset is composed of all Public elementary and secondary education facilities in the United States as defined by the Common Core of Data (CCD, https://nces.ed.gov/ccd/), National Center for Education Statistics (NCES, https://nces.ed.gov), US Department of Education for the 2017-2018 school year.

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
	Federal Government Facilities	Federal Bureau of Investigation (FBI) Offices	HIFLD – HSIP Gold 2015		
		General Services Administration (GSA) Owned or Leased Properties	HIFLD – HSIP Gold 2015		
		National Guard Readiness Centers	HIFLD – HSIP Gold 2015		
		Space Research and Technology Facilities	HIFLD – HSIP Gold 2015		
		U.S. Army Corps of Engineers (USACE) Offices	HIFLD – HSIP Gold 2015		
	State and Local Government Facilities	Courthouses	HIFLD	2019	To document the spatial location and physical address of U.S. county courthouses, state supreme courthouses, and the Supreme Court of the United States for general cartographic representation purposes on USGS mapping products at a 1:24,000 scale.
		Major State Government Buildings[1]	HIFLD	2019	This dataset represents the locations of buildings or properties that are owned or leased by state level governments.
Health & Emergency Services	Emergency Services	Emergency Medical Service Stations	HIFLD	2019	This dataset represents the EMS stations of any location where emergency medical service (EMS) personnel are stationed or based out of, or where equipment that such personnel use in carrying out their jobs is stored for ready use.

[1] All state-owned buildings with known spatial information were assessed for exposure. Only Major Government Buildings from HIFLD are included in the reported outputs of this asset type.

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
		Fire Stations	HIFLD	2020	To document the spatial location of fire stations in the U.S. for general cartographic purposes on USGS mapping products at 1:24,000 scale.
		Local Emergency Operations Centers	HIFLD	2021	HSIP Local Emergency Operations Centers in the United States "The physical location at which the coordination of information and resources to support domestic incident management activities normally takes place.
		Local Law Enforcement Locations	HIFLD	2021	This feature class/ shapefile contains law enforcement agencies as defined by the US Department of Justice - Bureau of Justice Statistics for the Homeland Infrastructure Foundation-Level Data (HIFLD) database.
	Health	Hospitals	HIFLD	2020	This feature class/shapefile contains locations of Hospitals for 50 US states, Washington D.C., US territories of Puerto Rico, Guam, American Samoa, Northern Mariana Islands, Palau, and Virgin Islands.
Transportation	Airports	Airports	FAA	2021	Airport locations.
	Freight, Ports, and Shipping Facilities	Amtrak Stations	HIFLD	2020	This dataset represents Amtrak intercity railroad passenger terminals in the United States and Canada.
		DHL Facilities	HIFLD	2017	This data set displays the physical locations of DHL facilities.
		FedEx Facilities	HIFLD	2017	This dataset displays the physical locations of FedEx facilities.

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
		Intermodal Freight Facilities - Rail TOFC/COFC	HIFLD	2020	The Major TOFC/COFC Rail Intermodal Facilities dataset is current as of December 10, 2018 and is part of the U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics' (BTS) National Transportation Atlas Database (NTAD).
		Port Facilities	HIFLD	2020	This dataset represents port facilities and provides physical information on commercial facilities at U.S. coastal, Great Lakes and inland ports.
		Port of Virginia Facilities	VEDP	2020	This layer contains locations for all active Port of Virginia facilities. These facilities are all managed by the Virginia Port Authority.
		Private Non-Retail Shipping Facilities	HIFLD	2017	The companies represented in this dataset are involved in the parcel delivery / courier service business or the freight service provider business.
		Railways	VGIN	2020	The purpose of this data is to provide a geographic representation of the location of existing rail in Virginia.
		UPS Facilities	HIFLD	2017	This dataset represents the geospatial locations of United Parcel Service (UPS) facilities across the United States.
		U.S. Postal Service (USPS) Post Offices	HIFLD – HSIP Gold 2015	2015	
		U.S. Postal Service (USPS) Processing Centers	HIFLD – HSIP Gold 2015	2015	
	Roads	Bridges & Culverts	VDOT	2014	This feature class consists of point features which represent physical structures that Interstate, Primary, Secondary and Urban roads travel under or over on all Virginia Department

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
					of Transportation maintained roadways.
		LRS Road Intersections	VDOT	2021	This feature class consists of approximately 430,000 features representing roadway intersections throughout the State of Virginia.
		VDOT Roadway Centerlines (Exposure and Depth)	VGIN/VDOT	2021	
Water, Waste & Wastewater	Waste	Hazardous Waste Generators	DEQ	2020	The Resource Conservation and Recovery Act Information System (RCRAInfo) is EPA's comprehensive information system in support of the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. It tracks many types of information about generators, transporters, treaters, storers, and disposers of hazardous waste.
		Solid Waste Facilities	DEQ	2020	The GIS layer shows Solid Waste Facilities permitted with DEQ.
	Wastewater	Biosolid Areas	DEQ	2021	Boundary of permitted sites that includes one or more land application fields and may include setback areas or other areas not authorized for land application of biosolids and/or other residuals.
		Septic Systems	VDH	--	Septic system locations.
		Wastewater Treatment Facilities	DEQ	2021	Wastewater treatment facility locations.
	Water	Drinking Water Wells	COV	--	Drinking water well locations.

3.1.3. NATURAL INFRASTRUCTURE THEME

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
Aquatic Habitat	Oyster Habitat	Oyster Habitat	VIMS	2019	VIMS developed a coverage of oyster reef restoration sites in Virginia Portions of the Chesapeake Bay. This layer also presents oyster sanctuaries along Virginia's Eastern Shore and State and private oyster leasing grounds.
	SAV Habitat	SAV Habitat	VIMS	2020	The 2019 Chesapeake Bay SAV Coverage was mapped from digital multispectral imagery with a 25cm GSD to assess water quality in the Bay.
Beaches & Dunes	Beaches & Dunes	Beaches & Dunes	VIMS	2021	This dataset displays the physical coverage of existing beach and dune features, as delineated by the VIMS CCRM Shoreline Inventory.
Tidal Habitat	Wetland Habitat Loss	Marsh Habitat	NOAA	2020	These data were created as part of the National Oceanic and Atmospheric Administration Office for Coastal Management's efforts to map the potential distribution of each wetland type based on their elevation and how

COMPONENT	SUB-COMPONENT	ASSET	SOURCE	DATE	DESCRIPTION
					frequently they may be inundated under potential future SLR scenarios.
	Wetland Migration Prevention	Marsh Migration Conflicts	NOAA	2020	This dataset represents the areas that the NOAA marsh migration mapping intersects with areas of future development (using Coastal Change Analysis Program land cover data).
Upland Habitat	Non-Tidal Marsh	Non-Tidal Marsh Habitat	VIMS	2020	This dataset displays the physical coverage of non-tidal marsh located less than 10 feet in land elevation, including scrub-shrub wetlands, forested wetlands, and emergent wetlands.
	Upland Wooded Areas and Scrub-Shrub	Upland Wooded Areas and Scrub-Shrub	VIMS	2021	This dataset displays the physical coverage of upland wooded areas and upland scrub-shrub areas located less than 10 feet in land elevation.

3.2.   DATA OUTPUTS

The following provides a list of analytical outputs for each dataset included in the Community Resources, Critical Sector, and Natural Infrastructure Theme.

In addition to the outputs listed below, geospatial grid coverages are provided to illustrate impact levels, from high to low, across the state geography. Such grids are provided as a composite representation of each theme category (Community Resources, Critical Sector, and Natural Infrastructure) and of Component and Subcomponent items listed in each theme.

3.2.1. COMMUNITY RESOURCES THEME

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNITS	TYPE	DATE	SOURCE
Businesses & Employers	Agricultural Lands	Agricultural Parcels	Annualized Inundated Acres	Acres	Parcel	2021	Lightbox
	Public & Commercial Structures	Agricultural Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Agricultural Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Agricultural Structures (Structure Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Commercial Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Commercial Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Commercial Structures (Structure Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Educational Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Educational Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Educational Structures	AAL	Dollars	Polygon	--	Multiple Sources*

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNITS	TYPE	DATE	SOURCE
		(Structure Damages)					
		Industrial Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Industrial Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Industrial Structures (Structure Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Religious Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Religious Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Religious Structures (Structure Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
Residential Neighborhoods	Residential Displacement	Residential Structures (Pop Displaced)	Population Displacement	People	Polygon	2018	ACS
	Residential Exposure	Residential Structures (Pop Exposed)	Population Displacement	People	Polygon	2018	ACS
	Residential Structures	Residential Structures (Content Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
		Residential Structures (Exposure)	ALF	%	Polygon	--	Multiple Sources*
		Residential Structures (Structure Damages)	AAL	Dollars	Polygon	--	Multiple Sources*
Tribal Resources	Tribal-Owned Lands	Tribal-Owned Land (Inundated)	Annualized Inundated Acres	Acres	Polygon	2020	Census Bureau
		Tribal-Owned Land (Lost)	Land Lost	Acres	Polygon	2020	Census Bureau

*Data is from Dewberry, Old Dominion University (ODU), USACE, Hampton Roads PDC, OpenStreetMap, CityGML and Lightbox and is described in Table 4.

3.2.2. CRITICAL SECTOR THEME

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNIT	DATA TYPE	DATE	SOURCE
Commercial & Manufacturing	Commercial	Commercial Buildings	ALF	%	Area	--	Multiple Sources*
		Commercial Parcels	ALF	%	Area	2021	Lightbox
	Manufacturing	Biological Products Manufacturing Facilities	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		Chemical Manufacturing Facilities	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		General Manufacturing Facilities	ALF	%	Points	2021	HIFLD
		Nitrogenous Fertilizing Plants	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		Pharmaceutical Preparation Manufacturing Plants	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		Food Production Facilities	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
Communications	Broadband Internet	Broadband Radio Service and Educational Broadband Service Transmitters	ALF	%	Points	2017	HIFLD
	Phone, Radio, and TV	AM Transmissions Towers	ALF	%	Points	2018	HIFLD
		Cellular Towers	ALF	%	Points	2021	HIFLD
		FM Transmissions Towers	ALF	%	Points	2018	HIFLD
		Land Mobile Broadcast Towers	ALF	%	Points	2018	HIFLD

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNIT	DATA TYPE	DATE	SOURCE
		Land Mobile Commercial Transmission Towers	ALF	%	Points	2018	HIFLD
		Microwave Service Towers	ALF	%	Points	2021	HIFLD
		Paging Transmission Towers	ALF	%	Points	2018	HIFLD
		TV Analog Transmitters	ALF	%	Points	2018	HIFLD
Defense Industry	Defense	Department of Defense Sites Points (Public)	ALF	%	Points	2021	HIFLD
		Department of Defense Federal Lands (Lost)	Land Lost	Acres	Polygon	2021	ESRI
		Department of Defense Federal Lands (Inundated)	Annualized Inundated Acres	Acres	Polygon	2021	ESRI
		National Security Government Military Facilities	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
Energy	Electricity	Electric Generating Units	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		Electric Substations	ALF	%	Points	2020	HIFLD
		Power Plants	ALF	%	Points	2019	HIFLD
	Oil & Biofuel	Petroleum Ports	ALF	%	Points	2019	HIFLD
		Petroleum Registered Tank Facilities	ALF	%	Points	2021	DEQ
		Petroleum Release Sites	ALF	%	Points	2021	DEQ
		Petroleum Terminals	ALF	%	Points	2020	HIFLD
Government Facilities	Education Facilities	Child Care Centers	ALF	%	Points	2020	HIFLD
		Colleges and Universities	ALF	%	Points	2020	HIFLD
		Private Schools (Pre-K to 12th)	ALF	%	Points	2020	HIFLD
		Public Schools (K to 12th)	ALF	%	Points	2020	HIFLD
	Federal Government Facilities	Federal Bureau of Investigation (FBI) Offices	ALF	%	Points	2014	HIFLD – HSIP Gold 2015

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNIT	DATA TYPE	DATE	SOURCE
		General Services Administration (GSA) Owned or Leased Properties	ALF	%	Points	2007	HIFLD – HSIP Gold 2015
		National Guard Readiness Centers	ALF	%	Points	2014	HIFLD – HSIP Gold 2015
		Space Research and Technology Facilities	ALF	%	Points	2015	HIFLD – HSIP Gold 2015
		U.S. Army Corps of Engineers (USACE) Offices	ALF	%	Points	2014	HIFLD – HSIP Gold 2015
	State and Local Government Facilities	Courthouses	ALF	%	Points	2019	HIFLD
		Major State Government Buildings	ALF	%	Points	2019	HIFLD
Health & Emergency Services	Emergency Services	Emergency Medical Service Stations	ALF	%	Points	2019	HIFLD
		Fire Stations	ALF	%	Points	2020	HIFLD
		Local Emergency Operations Centers	ALF	%	Points	2021	HIFLD
		Local Law Enforcement Locations	ALF	%	Points	2021	HIFLD
	Health	Hospitals	ALF	%	Points	2021	VDH
Transportation	Airports	Airports	ALF	%	Points	2021	FAA
	Freight, Ports, and Shipping Facilities	Amtrak Stations	ALF	%	Points	2020	HIFLD
		DHL Facilities	ALF	%	Points	2017	HIFLD
		FedEx Facilities	ALF	%	Points	2017	HIFLD
		Intermodal Freight Facilities - Rail TOFC/COFC	ALF	%	Points	2020	HIFLD
		Port Facilities	ALF	%	Points	2020	HIFLD
		Port of Virginia Facilities	ALF	%	Points	2020	VEDP
		Private Non-Retail Shipping Facilities	ALF	%	Points	2017	HIFLD
		Railways	ALF	%	Line	2020	VGIN
		UPS Facilities	ALF	%	Points	2017	HIFLD

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNIT	DATA TYPE	DATE	SOURCE
		U.S. Postal Service (USPS) Post Offices	ALF	%	Points	2014	HIFLD – HSIP Gold 2015
		U.S. Postal Service (USPS) Processing Centers	ALF	%	Points	2014	HIFLD – HSIP Gold 2015
	Roads	Bridges & Culverts	ALF	%	Points	2014	VDOT
		LRS Road Intersections	ALF	%	Points	2021	VDOT
		VGIN Roadway Centerlines (Depth and Exposure)	AAD, ALF	Segments, Miles, %	Lines	2021	VDOT
Water, Waste & Wastewater	Waste	Hazardous Waste Generators	ALF	%	Points	2020	DEQ
		Solid Waste Facilities	ALF	%	Points	2020	DEQ
	Wastewater	Biosolid Areas	ALF	%	Multi-polygon	2021	DEQ
		Septic Systems	ALF	%	Points	--	VDH
		Wastewater Treatment Facilities	ALF	%	Points	2021	DEQ
	Water	Drinking Water Wells	ALF	%	Points	--	VDH
*Data is from Dewberry, Old Dominion University (ODU), USACE, Hampton Roads PDC, OpenStreetMap, CityGML and Lightbox.							

3.2.3. NATURAL INFRASTRUCTURE THEME

COMPONENT	SUB-COMPONENT	ASSET	METRIC	UNIT	DATA TYPE	DATE	SOURCE
Aquatic Habitat	Oyster Habitat	Oyster Habitat	Habitat Lost	Acres	Polygon	2019	VIMS
	SAV Habitat	SAV Habitat	Habitat Lost	Acres	Polygon	2020	VIMS
Beaches & Dunes	Beaches & Dunes	Beaches & Dunes	Land Lost	Acres	Polygon	2021	VIMS
Tidal Habitat	Wetland Habitat Loss	Marsh Habitat	Habitat Lost	Acres	Raster	2020	NOAA
	Wetland Migration Prevention	Marsh Migration Conflicts	Habitat Endangered	Acres	Raster	2020	NOAA
Upland Habitat	Non-Tidal Marsh	Non-Tidal Marsh Habitat	Land Lost	Acres	Polygon	2020	VIMS
	Upland Wooded Areas and Scrub-Shrub	Upland Wooded Areas and Scrub-Shrub	Land Lost	Acres	Polygon	2021	VIMS
Recreational Areas	Public Parks and Wildlife	Public Parks and Wildlife Areas	Land Lost	Acres	Polygon	2020	DCR