CHAPTER 25: TOWN OF CAPE CHARLES

TOWN PROFILE

The Town of Cape Charles was created in 1884 as a planned community at the southern terminus of the railroad. It is located in southern Northampton County on the Chesapeake Bay and it was incorporated in 1886. An area west of the Town on the Bay was called the Sea Cottage Addition and was incorporated in 1909. The Town was designated as a Natural Historic District in 1989 due to the architectural diversity and integrity. Further annexations occurred in the southern and northern portions of the neck in the 1990s which have been undergoing significant new development and renovations (*Town of Cape Charles Comprehensive Plan*, 2016).

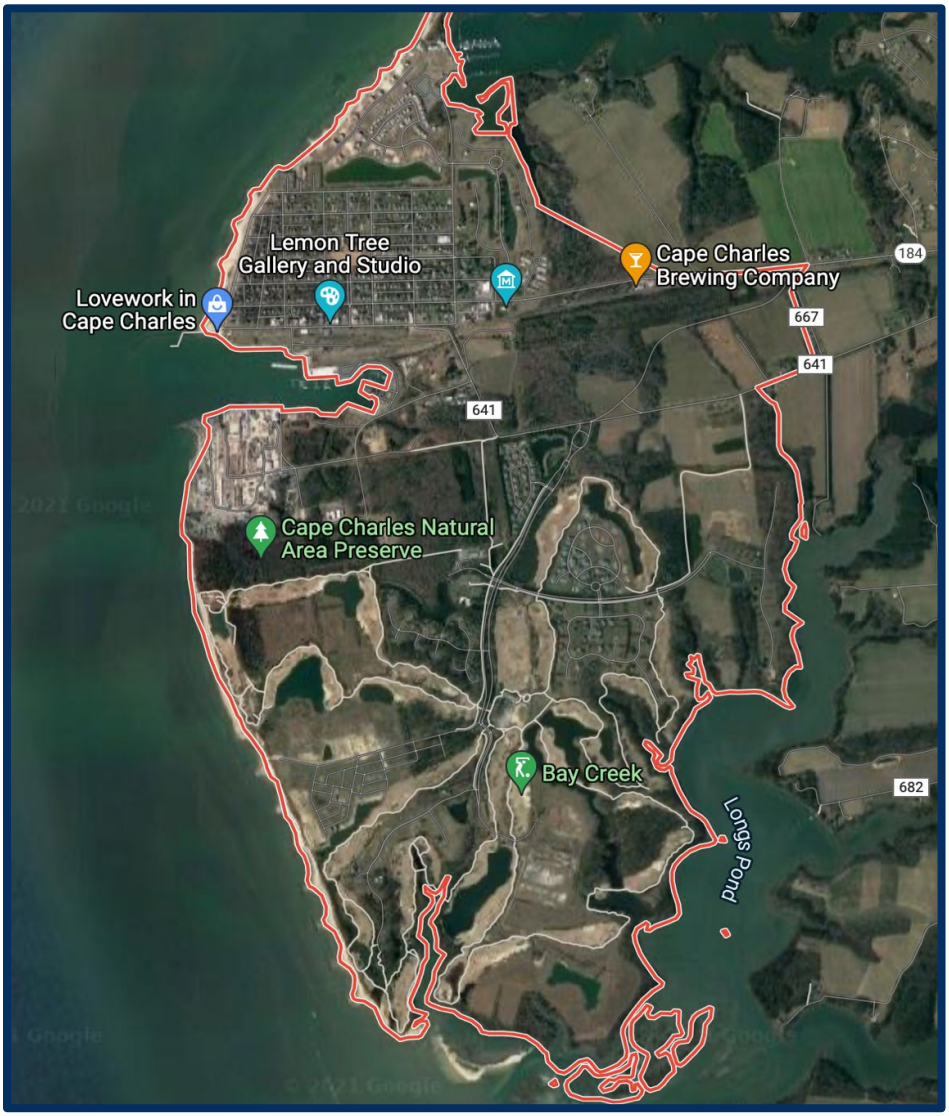


Figure 1: Cape Charles Context and Google Map

SOCIO-ECONOMIC

Part of assessing hazards in relation to their risk is understanding the people affected. Not all people are affected equally. Some are affected by the factors that relate to their ability to understand risks posed by hazards, and some by their ability to remove themselves from harm's way. Those factors include age, mobility, income, and the languages individuals speak and the languages in which individuals are able to access information.

DEMOGRAPHICS

The 2019 American Community Survey five-year estimates indicated that the Town had a population of 1,239, which is an increase of 230 since the 2010 U.S. Census (Table 1). The Town has become a popular destination for retirees, tourists, and second homeowners in the last decade and is experiencing a greater influx of seasonal residents during the warmer summer months. This trend is expected to continue to grow in the future, and the Town is planning accordingly (*Town of Cape Charles Comprehensive Plan*, 2016).

Town representatives indicated in 2015 that the year-round population estimates and Census data for 2000-2014 may be a bit high; however, they anticipated the number to grow significantly, as reflected in the 2019 estimates shown in Table 1. Owners that were previously leasing their properties have been retiring and moving to the Town as their primary residence (Personal communications, Jeb Brady, Building Official, March 23, 2021). The above average median age of 58 is nearly 20 years higher than the national median age and reflects this trend, which is anticipated to continue. According to the ACS 2019 estimates, 43.7% of the population in Cape Charles is over the age of 62. This population generally requires additional assistance and outreach in hazard preparation and mitigation education.

Table 1: Cape Charles Demographic Information

	2020	2014**	2013***	2010****	2000*****
Population	1,178	1,009	1,009	1,009	1,134
Median Age	58.0*	NA	50.6	48.7	44.2
Disability	185*	NA	62	NA	NA
Income					
Median Household Income	$54,643*	NA	$27,132	NA	$22,237
Poverty Level	21.1%*	NA	24.9%	NA	NA
Language					
Only English	95.9%*	94.8%	95.3%	95%	97.1%
Other	4.1%*	5.2%	4.7%	5%	2.9%
Spanish	0.8%*	1.5%	2%	2.3%	1.4%
Ind-Euro	2.3%*	2.8%	2%	2.2%	1.5%
Asian	1.0%*	0.0%	0.0%	0.0%	0.0%
Other	0.0%*	0.0%	0.0%	0.0%	0.0%

Source: U.S. Census 2020, *ACS, 2014-2019, **Annual Estimates of the Residential Population: 2010-2014, ***ACS 2009-2013, ****U.S. Census 2010, *****U.S. Census 2000

WORKFORCE

Employment patterns are important to examine for two reasons. It can help to identify concentrations of people for hazard information dissemination or hazard rescue and evacuation. It can also identify where disruptions in employment and income might occur in the aftermath of a disaster.

As shown in Table 2, most of the local workforce in Cape Charles works in the education, health care, and social services industry. There is also a large portion of the population working in arts, entertainment, recreation,

accommodation, and food services, which is reflective upon the large seasonal and tourist population in the Town. Between 2000 and 2010, the workforce grew significantly. The estimated values provided by the American Community Survey for 2014 would indicate a severe and rapid decline in the workforce, but Town representatives indicated that this is inaccurate and a continued increase since 2010 is more likely, which is represented by the 2019 ACS estimates. This may have come as a result of a temporary decrease in employment at Bayshore Concrete, or due to a large portion of the population in the Town retiring. Bay Shore Concrete closed for approximately 1.5 years and reopened in November 2019 as Coastal Precast Systems, creating 50-100 new jobs consisting of laborers, operators, mechanics, technicians, and journeymen (Personal communication, Jeb Brady, Building Official, March 23, 2021).

The poverty level in Cape Charles is over double that of the state of Virginia, despite the decrease seen in Table 1. Many jobs held by residents in the Town require few specialized skills and offer low wages (*Town of Cape Charles Comprehensive Plan*, 2016). This is also true with nearly all towns on the Eastern Shore of Virginia and is likely due to a lack of diverse employment options and education opportunities.

Table 2: Cape Charles Local Workforce Industry

Civilian Employed Population								
Industry	**2019***		**2014****		**2010*****		**2000******	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Agriculture, forestry, fishing/hunting, or mining	4	0.9%	15	4.5%	0	0.0%	13	2.9%
Construction	24	5.1%	21	6.3%	42	7.6%	31	7%
Manufacturing	23	4.9%	17	5.1%	37	6.7%	68	15.3%
Wholesale trade	12	2.6%	4	1.2%	9	1.6%	7	1.6%
Retail trade	46	9.8%	49	14.7%	51	9.3%	30	6.8%
Transportation and warehousing, and utilities	15	3.2%	2	0.6%	25	4.5%	31	7%
Information	16	3.4%	3	0.9%	4	0.7%	10	2.3%
Finance, insurance, real estate, and rentals	27	5.8%	15	4.5%	25	4.5%	19	4.3%
Professional, scientific, waste management	60	12.8%	52	15.6%	56	10.2%	38	8.6%
Educational and health care services	106	22.6%	85	25.5%	146	26.5%	85	19.1%
Arts, entertainment, recreation, food	82	17.5%	46	13.8%	83	15.1%	51	11.5%
Public Admin	29	6.2%	22	6.6%	41	7.5%	13	2.9%
Other	24	5.1%	2	0.6%	31	5.6%	48	10.8%
TOTAL CIVILIAN EMPLOYED POPULATION	468	-	333	-	550	-	444	-

Source: *ACS, 2014-2019, **ACS, 2010-2014, ***U.S. Census, 2010, ****U.S. Census 2000

BUSINESSES

Business data provides basic information used in projecting potential economic losses from business and employment disruption, along with wage losses to employees. It can also serve as an indicator of community recovery resources. Finally, it can help to prioritize restoration of utility and infrastructure functions following a high-intensity hazard.

Cape Charles has seen a steadily growing business market since 2000. The Bay Creek Resort and Club is the largest residential and mixed-use development in Town and also provides a variety of housing options; therefore, the Resort is a major economic impactor for the Town (*Town of Cape Charles Comprehensive Plan*, 2016). Seasonal tourism along with the Cape Charles Yacht Center and Coastal Precast Systems provide opportunities for economic growth and development. The decline in total number of employees could be related to Bayshore Concrete closing and

transitioning to Coastal Precast Systems (Personal communication, Jeb Brady, Building Official, March 23, 2021). Many of the surrounding towns in Northampton County have citizens that commute into Cape Charles to work. Town officials believe the total number of establishments displayed in Table 3 for 2019 is likely underestimated, as there have been an increasing number of new business establishments in the Town (Personal communications, Jeb Brady, Building Official, March 23, 2021).

Table 3: Cape Charles Business Establishment Types

Industry Code Description	**Total Establishments**		
	2013	**2011**	**2009**
Agriculture, Forestry, Fishing and Hunting	1	1	1
Utilities	1	1	0
Construction	3	5	9
Manufacturing	2	2	2
Wholesale Trade	5	5	5
Retail Trade	15	14	19
Transportation and Warehousing	1	1	1
Information	1	1	2
Finance and Leisure	5	3	3
Real Estate and rental and leasing	3	3	5
Professional, Scientific, and Technical Services	10	6	7
Management of companies and enterprises	0	0	1
Administrative and Support and Waste Management and Remediation Services	2	2	2
Educational Services	2	2	3
Health Care and Social Assistance	5	5	5
Arts, Entertainment, and Recreation	1	4	3
Accommodation and Food Services	18	17	19
Other Services (Except Public Admin)	8	9	8
Industries not classified	0	0	1
Total, All Establishments	83	81	96
Total Employees	587	837	864

Source: Census Zip Code Business Pattern, 2009, 2011, 2013

BUILT INFRASTRUCTURE

§201.6(d)(3) Housing units, community facilities, and transportation are all important factors when considering hazard resiliency. They provide the social services necessary during hazard events, safe cover for those wanting to stay, and a way to leave towards safety.

HOUSING UNITS

Knowledge of a community's housing base contributes to hazard and vulnerability analysis by identifying how many homes are at risk. Vehicles available to households is one indicator of a household's ability to evacuate when necessary.

According to the ACS, between 2000 and 2014 there was almost a 20% increase in housing units built in Cape Charles. This is a statement with which the Town of Cape Charles Building Official agrees, however, does not believe that there was a decrease in units between 2010 and 2014, as Table 4 indicates. Between 2014 and 2019, over 100 more units were built according to the ACS estimates. The Town consists of a historic downtown area with many older,

historic homes. Many of these homes are either renovated, seasonal homes, or they are older homes in poor condition (*Town of Cape Charles Comprehensive Plan*, 2016). There is also the Bay Creek Golf Resort which has two 18-hole golf courses as well as residential development. Although property values have increased for homeowners, this has caused an increase in rent and housing prices that create difficulties for low- and moderate-income households (*Town of Cape Charles Comprehensive Plan*, 2016).

The high number of vacant housing units are primarily for seasonal, recreational, or occasional use in Cape Charles and have decreased since 2014 due to retirees moving into their second home (Personal communications, Jeb Brady, Building Official, March 23, 2021). These kinds of vacant buildings are typically well-kept and pose less of a hazard during high wind events.

As of 2016, approximately 150 of the older homes have been redeveloped and renovated since 2000 – and there have been 90 new housing units built since 2010 (Personal communications, Jeb Brady, Building Official, March 23, 2021). Because Cape Charles has been in the SFHA for many years, new homes were built above BFE and many restorations involved raising the building and/or building new editions above BFE.

The highest density areas are in the Seabreeze complex, where the property has experienced significant erosion problems during storms in the past. These populations could be considered high-risk during an emergency situation.

Table 4: Cape Charles Housing

	2019*	**2014****	**2010*****	**2000******
Total Housing Units	1,048	936	958	740
Occupied	658	498	516	536
Vacant	390	438	442	204
Owner-Occupied	344	278	247	248
Renter-Occupied	314	220	269	288
Median Housing Value	$345,500	$356,600	NA	NA

Source: *ACS, 2014-2019, **ACS, 2010-2014, ***U.S. Census 2010, ****U.S. Census 2000

TRANSPORTATION

The local transportation system links the Town to the rest of the Region. Routes 184 and 642 are the Town's two main arterial roads, which both intersect U.S. Route 13. The historic downtown area exhibits a historic grid system. There are also many alley ways, sidewalks, and multi-use paths throughout the Town. The railroad, although now abandoned, and the harbor have both played an important role historically to the Town and continue to do so to this day (*Town of Cape Charles Comprehensive Plan*, 2016). The Southern Tip Hike & Bike Trail was converted from the abandoned railroad and is located at the Eastern Shore of Virginia Wildlife Refuge south of Cape Charles and connects to Kiptopeke State Park. There are plans underway to extend the trail north along the railroad which would connect towns and communities along Route 13. The segment of abandoned railroad in Cape Charles will be one of the firsts to be transitioned into the multi-use path as part of the Eastern Shore Rail Trail project. There is an anticipated increase in industrial activity at the Harbor due to a new Harbor Access Road, which will intersect Stone Road with a widened shoulder for pedestrians and bicyclists. This new project will aid in providing safe walkability to grocery stores and supplies before or after an emergency. Several other transportation related projects have been identified for the Town that will promote safety, increase parking, improve bicycle, pedestrian, and functional and access needs, and create an attractive and desirable environment for residents and visitors (*Town of Cape Charles Comprehensive Plan*, 2016).

While there is still potential for new development, Cape Charles Harbor currently serves Coastal Precast Systems, Cape Charles Yacht Center, United States Coast Guard, Mid-Atlantic Maritime Academy, commercial fisherman, recreational boaters, and more (Personal communications, Jeb Brady, Building Official, March 23, 2021).

There are only two roads leading into the Town, therefore, lack of accessibility is a risk factor. In the past, accidents have closed the main road leaving only one route accessible. Both roads have matured trees that could also close the road in a wind event. Ice and snow events occasionally threaten accessibility to the Town on both roads. According to the *ESVA Transportation Infrastructure Inundation Vulnerability Assessment*, roads in the historic area are more vulnerable to inundation than Bay Creek or other areas of the Town.

The measure of vehicles available to households is one indicator of a household's ability to evacuate when necessary. As of 2019, over 15% of the Town's occupied residences are estimated to not own a vehicle (ACS 2019); however, much of this may be attributed to the high percentage of second homes for which there is no locally registered vehicle. Star Transit's Yellow Lower Shore Loops Line, as well as the Red (North) and Purple (South) Lines, all serve the Town and immediate surrounding area and provides additional transportation options for residents of the Town to medical services, grocery stores, etc. Star Transit will operate during incoming hazardous events to help assist those without a vehicle and citizens with functional access needs evacuate; however, operations will cease once the hazard reaches a certain level. Shore Ride also provides transportation services up and down the Eastern Shore of Virginia and Maryland; however, this service is not likely to operate during a hazard. There are an estimated 400 golf carts in the Town (Personal communications, Jeb Brady, Building Official, March 23, 2021), which could serve as an important resource during times of emergency. The Town is considered a golf cart community and their usage is encouraged as an alternative mode of transportation (*Town of Cape Charles Comprehensive Plan,* 2016).

Table 5: Cape Charles Vehicles Available per Household

Vehicles Available	2019*	2010**	2000***
None	100	61	159
One	264	195	214
Two	242	155	118
Three or more	52	68	43

Source: *ACS, 2014-2019, **U.S. Census 2010, ***U.S. Census 2000

COMMERCIAL AREAS

The main commercial activity in Cape Charles is located within the historical core of the Town. The historical commercial core has increased and will continue to do so as the demand for goods increases with the growing population. The Town has experienced an increase in commercial activity around the harbor with several new restaurants opening as well as the new Cape Charles Yacht Center (*Town of Cape Charles Comprehensive Plan*, 2016).

COMMUNITY SERVICES AND FACILITIES

Community facilities comprise all the public services and facilities provided by the Town to all residents. Those services include public water and sewage treatment facilities, police and fire departments, wharf, parks and recreation facilities, and solid waste management.

PUBLIC SAFETY

Cape Charles has the basic services required for the safety and convenience of its citizens. The Cape Charles Police Department works in conjunction with county and state resources. The Department currently has six officers and six police vehicles (Personal communications, Jeb Brady, Building Official, March 23, 2021). The Cape Charles Volunteer Fire Company and the Cape Charles Rescue, Inc. work cooperatively with other local fire departments and rescue

squads to provide fire protection and emergency medical services (*Town of Cape Charles Comprehensive Plan*, 2016). Cape Charles Rescue Service is located outside of town limits at 22215 S Bayside Road and is staffed 24/7 with a minimum of two certified EMS personnel provided by a combination of volunteers and career personnel by Northampton County Department of EMS. Cape Charles Rescue Service has two ALS licensed ambulances.There are no paid employees at the Fire Company, but there are approximately ten auxiliary volunteers and twenty volunteer firefighters. Town employees that are also volunteers of the Fire Company are permitted to respond to calls while in paid status, which aids in improved responses. The Fire Company is equipped with two engines, two tankers, one brush truck, and no medics and/or ambulances (Personal communications, Jeb Brady, Building Official, March 23, 2021).

SCHOOLS

Cape Charles Christian School is located in the historic district, but outside of the .2%-annual-chance flood zone. The school serves pre-kindergarten through eighth grade and has about 50 students. Other schools nearby that serve Cape Charles students are Kiptopeke Elementary, Northampton Middle, and Northampton High.

PARKS AND RECREATION

Cape Charles has a variety of community facilities available including the Cape Charles Harbor, the public beach, the Fun Pier, Library, and Central Park, with recent new and expanded facilities including the Beach Club at Bay Creek, the Palace Theatre, and Kings Creek Marina (*Town of Cape Charles Comprehensive Plan*, 2016). There is also a plan to put in a divided median with lighted sidewalks on North Peach Street and lighted sidewalks from Fig to the Bay along Washington Avenue, as well as to connect the entire town with non-motorized trails (Personal communications, Jeb Brady, Building Official, March 23, 2021).

Cape Charles Beach is one of the only two public beaches on the Chesapeake Bay on the Eastern Shore of Virginia, the other being Savage Neck Dunes Natural Area Preserve in the Town of Eastville. The Cape Charles beach provides an important recreational function and vital protection against hazards. Almost half of the historic area of Cape Charles is considered to be in the 500-year flood plain, but the beach is identified as being in the VE Zone (zone of high velocity waters). The wide shallow water area, the development of the dunes, and the breakwaters are necessary to provide a storm buffer between the Chesapeake Bay and the historic housing area (*Town of Cape Charles Comprehensive Plan*, 2016).

WATER SUPPLY AND WASTEWATER

The Town's public utility systems have allowed more dense development in Cape Charles than the rest of Northampton County. The Town prohibits new private deep wells and septic systems due to them threatening the Town's water supply (*Town of Cape Charles Comprehensive Plan*, 2016). According to the Town's 2018 Drinking Water Consumer Confidence Report, the drinking water, which is drawn from two wells in the Upper and Middle Yorktown-Eastover Aquifers, there were no contaminants at violation level. With its two new wells, the Town has the capacity to provide 500,000 gallons per day of production and additional wells and filtering equipment could carry production to over one million gallons per day, when needed (*Town of Cape Charles Comprehensive Plan,* 2016).

The Cape Charles Waste Water Treatment Plant (WWTP) was upgraded in 2008 and is now capable of treating 250,000 gallons per day. Although the design flow stayed the same, the amount of discharged nutrients has subsequently decreased to about a quarter of pre-retrofit levels.

SOLID WASTE

The Town contracts with Davis Disposal for weekly residential trash collection, which is transported to a Northampton County transfer station. There is also a community cardboard recycling bin from Davis Disposal and weekly yard debris pick-up (Personal communications, Jeb Brady, Building Official, March 23, 2021).

POWER AND COMMUNICATIONS INFRASTRUCTURE

The Town does not typically have problems with long-term power outages during or following storm events. Most mobile service is consistent throughout the Town. The Town of Cape Charles is part of the Eastern Shore Broadband Network Project, and has a community network that is connected to the fiber running the length of the Shore from the Maryland state line. Eastern Shore Broadband Authority is now available to residents in every incorporated town in both Northampton and Accomack Counties.

NATURAL ENVIRONMENT

There is an abundance of natural resources in Cape Charles. Wetlands, natural areas, and the public beach are present within the Town's boundaries and provide important buffers to natural hazards. They also provide an important economic function related to tourism and recreation that provides jobs for Northampton County (*Town of Cape Charles Comprehensive Plan*, 2016).

LAND USE LAND COVER

Cape Charles consists of land which is largely developed and agricultural. The north end of the Town is where the historical, planned community exists with smaller pockets of urban development near the southern ends of the Town. The overall trend towards increasing developed lands is valid. There are many challenges that accompany increased development and increased populations, from impervious surfaces and storm water to increased demand for utility and emergency services.

HAZARD PREPAREDNESS & COMMUNITY CAPABILITIES

PREVIOUS HAZARD MITIGATION PLANS

§201.6(b)(3), §201.6(c)(3), §201.6(d)(3) Cape Charles has participated in the hazard mitigation planning process since 2006. The primary hazard for Cape Charles has been coastal flooding, storm water flooding, and winds associated with hurricanes and nor'easters. Cape Charles is currently updating its Comprehensive Plan. The previous update is from 2016, and it does not mention coastal hazards within the document. Due to the Town's participation in the hazard mitigation process, they use this document as the primary resource for preparing for coastal hazards.

The following table contains authorities, policies, programs and resources, and intentions or ability to expand to address reductions in hazard vulnerability.

Table 6 : Town of Cape Charles Hazard Mitigation Resources

	Ordinances, Plans, & Publications														Resources, Committees			
Authority	Building Code	Chesapeake Bay Act	SWMP	Hazard Mitigation Plan	Comprehensive Plan	Zoning Ordinance	Storm Water Regulations	Transportation Infrastructure Inundation Vulnerability Report	All Hazards Preparedness	Emergency Operations Plans	Mutual Aid	Neighborhood Emergency Help	Viginia Hurricane Evacuation	Oil & HazMat Response Plan; HazMat Commodity Flow	Ground Water Committee	Navigable Waterways Committee	Climate Adaptation Working Group	ES Disaster Preparedness Coalition
Local	*				*	*												
County			*															
Regional				*				*	*	*	*	*		*	*	*	*	*
State		*					*						*					
Federal		*																

NATIONAL FLOOD INSURANCE PROGRAM & HAZARD MITIGATION GRANT PROGRAM

NFIP

§201.6(c)(2)(ii), §201.6(c)(3)(ii), §201.6(d)(3) The Town joined the NFIP on February 2, 1983. The Town currently has 170 policies, a decrease of 64 since January 2016 (FEMA NFIP Data Report, 2022). The new Flood Insurance Rate Map (FIRM) is most likely the cause of the vast reduction in the number of overall policies.

Cape Charles participates in the Community Rating System (CRS) program, which provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When a community completes specified activities, the insurance premiums of these policyholders in communities are reduced. The Town received an initial score of nine as a new participant, meaning that residents receive a five percent discount on flood insurance, but anticipate a new score of 8 in the near future (Personal communications, Jeb Brady, Building Official, March 23, 2021). The highest CRS score is a one. The Town is at a five-year review and is working diligently to improve its CRS rating to earn its residents an even greater discount in the future. More information on repetitive loss properties, NFIP policies and claims, and the CRS program can be found in Chapter 6: Coastal Flooding and Chapter 9: The Region.

HMGP

The Town has not participated in the Hazard Mitigation Grant Program.

HAZARD PROFILE

PANDEMIC RESPONSE AND READINESS

The Town of Cape Charles responded to the COVID-19 pandemic in several different ways. The Town was able to use CARES Act funding and other federal funds towards public facilities such as the public beach and Central Park. Additional staff was hired in order to ensure social distancing and safety guidelines were being followed and bathrooms and other high-touch surfaces were frequently cleaned and disinfected (Personal communication, Jeb Brady, Building Official, March 23, 2021). The Town also purchased plexiglass in order to keep the Town Hall open as well as several other pandemic related items such as masks, sanitizer, cleaning products, etc. The Town was able to continue having concerts in the park for residents and guests by requiring temperature checks and placing sanitizing stations throughout Central Park and Mason Avenue (Personal communications, Jeb Brady, Building Official, March 23, 2021).

WIND

§201.6(c)(2)(i), §201.6(c)(2)(ii), §201.6(d)(3) During a 1%-chance-annual storm event, Cape Charles is estimated to sustain $10.2 million in economic loss (Hazus®), including costs from building damages, content damages, inventory, relocation, and lost income and wages. A large portion of the Town is within the wind-borne debris hazard area, which is defined as the area extending 1-mile inland from the shoreline. Hazus® estimates that about 49 buildings will be at least moderately damaged. This is over 2% of the total number of buildings in the region. There are an estimated 4 buildings that will be destroyed

In addition to direct wind damage, much of the Town has mature trees that are a potential secondary hazard to the structures in that area as well as accessibility for emergency services. As seen during Hurricane Isabel in 2003, historic

nor'easters, and other high-wind events, structures are vulnerable to being damaged by large trees that may come down. Cape Charles building stock in the older part of Town consists of larger historic homes and is more susceptible to wind damage; however, new transient residents updating older homes has improved resiliency to this area (Personal communications, Jeb Brady, Building Official, March 23, 2021).

Straight-line winds are also a threat to the Town and were credited with some of the damage incurred from the Cherrystone tornado, particularly damages to a crane at Bayshore Concrete. In mid-February 2012, the train storage building, built to withstand 110-mph gusts, sustained damages from straight line winds as well. These kinds of intense wind events may become more common with changes in the climate.

COASTAL EROSION

During the past 13 years, the Town of Cape Charles has had an aggressive plan to mitigate erosion along its entire shoreline and harbor area. Several offshore breakwaters have been built to protect the northern Marina Village, Town Beach, Harbor entrance, and the Bay Creek Beach on the south end. These have been built with both private and public funds. There are now three breakwaters at the mouth of the Harbor and the height of the two older breakwaters were increased. More breakwaters are required on the northern and central sections of the coastline. Mitigation could continue, but has been halted due to lack of funding from both public and private sources. Due to the breakwater locations being on private land, landowners can choose to continue the mitigation process, however, it is very cost intuitive (Personal communications, Jeb Brady, Building Official, March 23, 2021).

In 2015, the inner and outer harbor was dredged and the sand was used for nourishment for the Town Beach. In 2016, the Federal Channel was dredged and any sand spoil was again used to nourish the beach. Dunes have now begun to build up (Personal communications, Jeb Brady, Building Official, March 23, 2021).

FEMA's post-storm inspections show that most privately funded erosion control structures fail during storm events. FEMA notes in the Coastal Construction Manual that some communities choose to distinguish between erosion control structures that protect existing development and those that are constructed to create a buildable area on an otherwise unbuildable site. Buildings destroyed by erosion are not covered under an NFIP flood insurance policy.

During Hurricane Sandy in 2012, significant erosion occurred along the shoreline adjacent to the Seabreeze Apartment Building on Washington Avenue. These repair costs were not included in the NFIP claims. The erosion undermined the foundation of the apartment building to the extent that the building was deemed unsafe for occupancy. Seven families were displaced for several months as a result, but they are now currently inhabited (L. Cicoira, *Eastern Shore Post*, November 2, 2012). About 15-feet of land eroded in approximately 2 hours (Personal communication, Jeb Brady, Building Official, March 23, 2021). This building and the adjacent house are within 50 feet of the shoreline and at immediate danger to damage from erosion during a storm event.

During Hurricane Sandy, the water almost got into the Shanty Restaurant. All of the stationary docks were completely submerged, but the roads were not. In general, erosion to the more susceptible golf courses and beach is a higher threat to the Town than damages. There is some bulk heading to protect these areas on Nicklaus Drive and more bulkheading has occurred recently on Niklaus as well as Palmer Drive. During Hurricane Isabel in 2003 and Nor'Ida in November of 2009, many portions of the northern section of the Town were eroded (Personal communication, Jeb Brady, Building Official, March 23, 2021).

COASTAL FLOODING

The Flood Insurance Study for Cape Charles identifies that the greatest threat of flood inundation comes from hurricanes and nor'easters. In 1935, a wooden bulkhead was constructed to protect the Town from surge water. Many times, this bulkhead had to be refurbished or repaired. Dunes now protect the area of old Town from Washington Avenue to Mason Avenue from smaller floods. A series of offshore breakwaters exist off the public beach and the mouth of the harbor and are designed to prevent erosion and attenuate wave action. Further down near the golf course, riprap was used rather than bulkheading as a less expensive option (Personal communications, Jeb Brady, Building Official, March 23, 2021). These provide protection against coastal flooding and are described in greater detail in the Coastal Erosion section.

Figure 2: Cape Charles 100 Year Flood Estimates

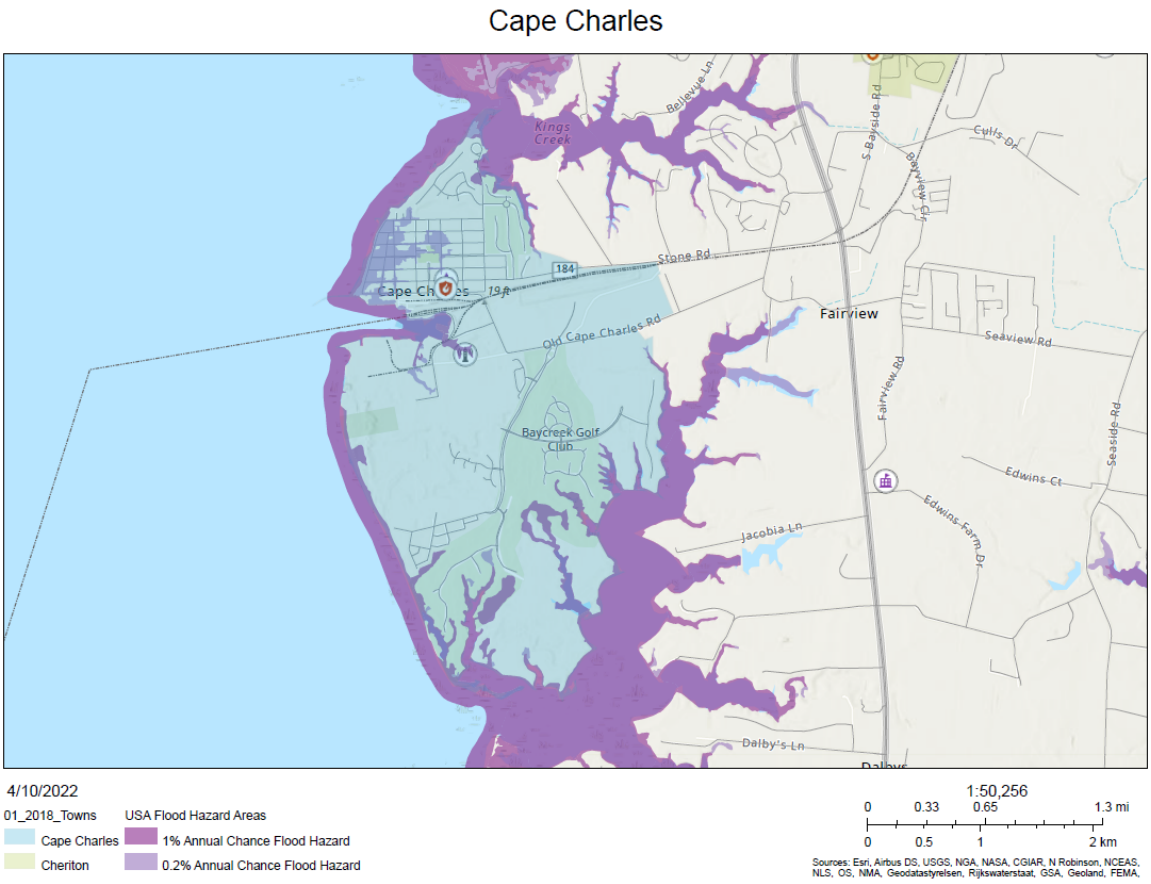
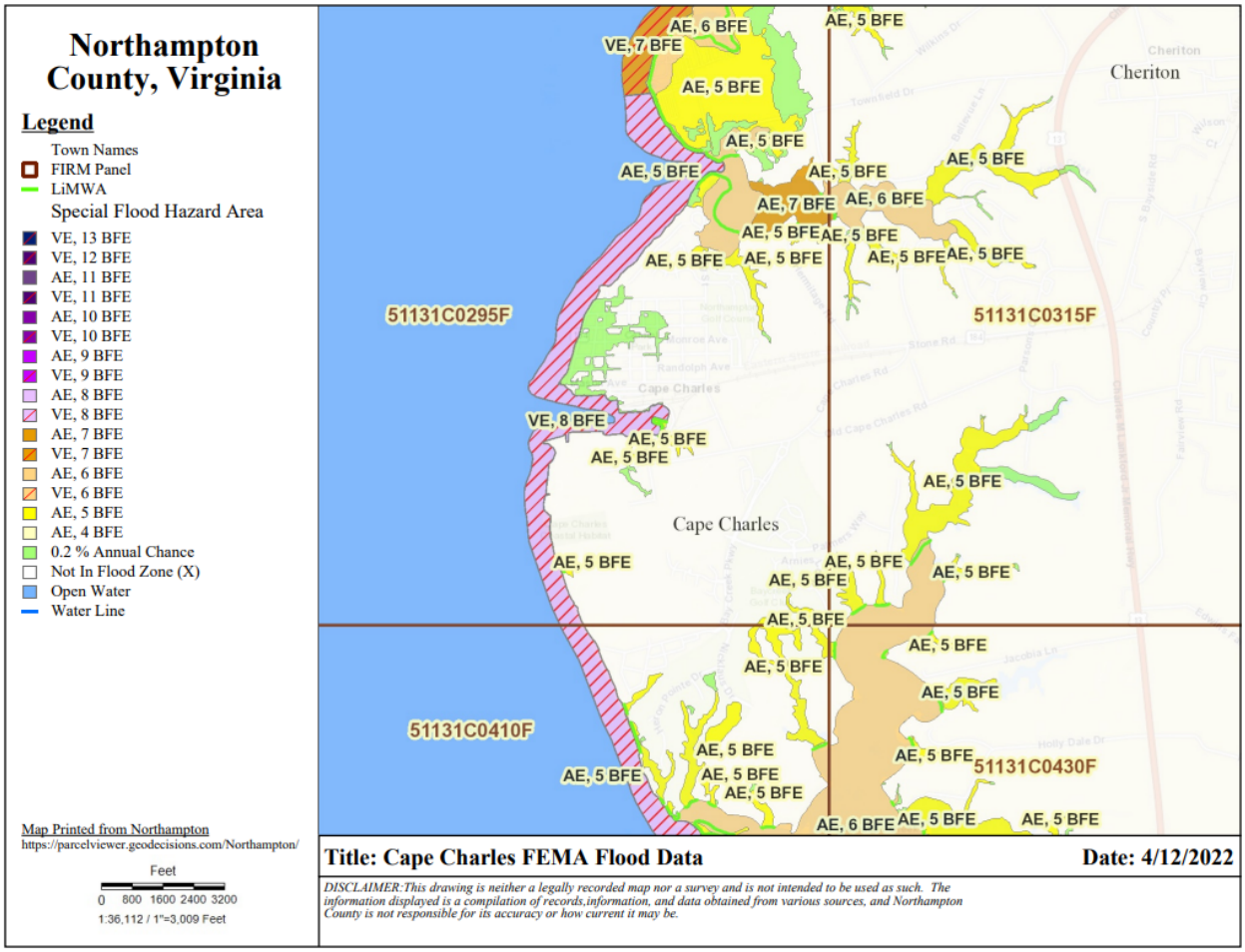


Figure 3: Cape Charles FEMA Flood Data



The 2015 FIRM removed half of a square mile of land from the Special Flood Hazard Area (SFHA), and with it, some 431 buildings. Although the V Zone total area did not change, there was a net loss of two buildings from this zone. The current estimated flood damage loss from buildings and contents just exceeds $20,000 according to Hazus®, which is a vast change from the 2011 estimated $52.9 million in structure and content damages (*ESVA Hazard Mitigation Plan*, 2011).

STORM WATER FLOODING

Several factors cause the Town of Cape Charles' storm water system to be prone to flooding during significant rain events. The Town's storm water drains from east to west, ending at the Chesapeake Bay. The southern half of the Town has surface drainage only while the northern half of Town has an underground drain system. The Town continues to work with VDOT on maintenance, but mitigation would be preferred. The responsibility of the maintenance of ditches along public streets within the Town falls on VDOT. The Peach Street and Washington Avenue intersection now drains to Crystal Lake instead of directly into the Chesapeake Bay, which seems to help with storm water flooding in this area and will help with fresh water retention and reducing runoff. During high tides, storm water has nowhere to drain, creating additional flooding issues in the Town (Personal communications, Jeb Brady, Building Official, March 23, 2021).

Storm water flooding also occurs during significant rain events at the intersection of Plum Street and Madison Avenue, as 75% of the Town's streets drain to this location (Personal communications, Jeb Brady, Building Official, March 23, 2021). During a nor'easter in 2007, storm water completely inundated the streets of the western portion of the Town due to floodwaters being unable to drain. A few homes even experienced minor flooding during this event. During a short rain event on August 2, 2016, there was significant water flowing quickly over the intersection of Tazewell Avenue and Plum Street, which appeared to be a consistent problem throughout the Historic District (Personal communications, Shannon Alexander, A-NPDC, August 3, 2016).

HAZARDS OF LOCAL SIGNIFICANCE

GROUND WATER CONTAMINATION

Contamination from saltwater intrusion has already been documented for the Town's water supply. With sea-level rise and continued drawdown of our sole-source aquifer, this is a continued concern for the Town.

SEA-LEVEL RISE

According to the *ESVA Transportation Infrastructure Inundation Vulnerability Assessment*, roads in the historic area are more vulnerable to inundation than Bay Creek or other areas of the Town, but the rail yard and harbor, two vital economic drivers, are first at risk. In addition, sea-level rise would threaten the Town beach, Coastal Precast Systems, the Coast Guard Station, and other various low-lying areas in the Town.

TORNADOES/WATERSPOUTS

Although tornadoes are somewhat uncommon in the Region, it is still extremely important to be prepared and for residents to be educated on what safety precautions to take during such a hazard. The nearby Cherrystone Campground endured a deadly tornado in 2014 that flipped campers, brought down trees, and killed three campers. Strong, fast-moving thunderstorms that frequently occur in the Region can quickly produce unexpected tornadoes or waterspouts that could potentially cause damage to the economy, infrastructure, personal property, and the lives of visitors and residents in Cape Charles.

HAZARDOUS MATERIALS

Large industrial facilities and shipping containers in the Chesapeake Bay may also pose a threat to the Town.

CRITICAL FACILITIES

The following table lists the critical facilities and their relative importance to the Town.

Table 7: Town of Cape Charles Critical Facilities

Facility	HMP 2021	Hazards	No of People Affected	Loss potential	Relocation Potential	Retrofit Potential
Town-Owned Facilities						
Waste Water Treatment Plant and Water Tower	X	Flooding, Wind	1,239+	Devastating	No	Yes
Police Departments & Municipal Building	X	Flooding, Wind	1,239+	Devastating	No	Yes
Central Park	X	Flooding, Wind	1,239+	Inconvenience	No	Yes
Town Beach	X	Flooding, Wind, Erosion, Waterspouts	1,239+	Major Disruption	No	Yes
Town Pier	X	Flooding, Wind, Erosion	1,239+	Major Disruption	No	Yes
Town Harbor	X	Flooding, Wind	44,558+	Devastating	No	Yes
Pump Stations (4 in the old Town, 1 in the marina, 3 more in Bay Creek - those 3 are vacuum stations)	X	Flooding	1,239+	Major Disruption	No	Yes
Town Wells	X	Salt Water Intrusion, Contamination	1,239+	Major Disruption	Yes	Yes
Public Works and Utility Buildings (behind Rayfield's Pharmacy) and vehicles (~30 including tractors)	X	Flooding, Wind	1,239+	Minor Disruption	Yes	Yes
Other Critical Facilities						
Post Office	X	Flooding, Wind	1,239+	Major Disruption	No	Yes
Riverside Medical Center	X	Flooding, Wind	1,239+	Inconvenience	No	Yes
Pharmacy	X	Flooding, Wind	1,239+	Major disruption	No	Yes
Volunteer Fire	X	Flooding, Wind	11,885+	Major Disruption	No	Yes
Dredge Spoil Basin (Federally owned)	X	Erosion	1,239+	Minor Disruption	No	No
Coast Guard Station	X	Flooding, Wind	11,885+	Major disruption	No	Yes
Cape Charles Christian School	X	Flooding, Wind	500+	Inconvenience	No	Yes
Civic Center	X	Flooding, Wind	1,239+	Inconvenience	Yes	Yes
Museum & Welcome Center	X	Flooding, Wind	1,239+	Inconvenience	Yes	Yes
Cape Charles Memorial Library	X	Flooding, Wind	1,239+	Inconvenience	No	Yes

FINDINGS

1. The 2015 FIRM shows a reduction of 431 structures now located in the 100-year flood zone. This may increase a false sense of security in the Town regarding flooding.

2. The Town has 234 flood insurance policies, a decrease of 82 policies since 2011, but still 51 policies more than in 2003. The new FIRM is most likely the cause of the vast reduction in the number of overall policies; however, as of January 2016, there were still 150 low-risk policies, indicating that residents would still like to be prepared for flood events.

3. The most reasonable worst-case scenario for the Town is a storm that pushes water towards Cape Charles and increase the tidal elevation.

4. The older historic homes were built with "basements" where the boiler was housed. Due to the high-water table these basements could not be very deep, therefore, the first floor above grade is generally above the flood level.

5. Most critical facilities are subject to flooding and high wind.

6. Multifamily dwellings at Washington Avenue are highly susceptible to damages during storm events, as evident by damages during Hurricane Sandy.

7. Transient population increase and updates to the older homes make them more resilient to damages.

8. Cape Charles is located on a peninsula with only two roads entering or leaving Town. If evacuation prior to a hurricane is delayed, a blocked road could preclude persons in hazard areas from taking refuge outside the Town. The official evacuation route is to the north parallel to the coast with at least 90-miles before an inland access is available. Early evacuation could be across two bridge-tunnel complexes and westward to higher ground.