



Dorchester County
Maryland

2022

Flood Mitigation Plan

APPENDIX L FLOOD MITIGATION PLAN

The Flood Mitigation Plan is an appendix to the 2022 All-Hazards Mitigation Plan. This Flood Mitigation Plan also serves as the Dorchester County Nuisance Flood Plan.

Dorchester County Emergency Services
829 Fieldcrest Road
Cambridge, MD 21613

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Chapter 1 Introduction

1.1 Introduction & Purpose

The Flood Mitigation Plan (FMP) will articulate a comprehensive strategy for implementing technically feasible flood mitigation activities for the area affected by the plan. The outcome of the project will result in a FEMA-approved and adopted Flood Mitigation Plan that complies with the requirements of 44 CFR Part 78. At a minimum, the plan will include the following required elements:

- Description of the planning process and public involvement. Public involvement may include workshops, public meetings, or public hearings.
- Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.
- Identification and description of floodplain management goals for the area covered by the plan.
- Identification and evaluation of cost-effective and technically feasible mitigation actions considered.
- Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.
- Documentation of formal plan adoption by the legal entity submitting the plan (e.g., County Executive).

The purpose of a Flood Mitigation Plan is to assist State and local governments in funding cost-effective actions that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other insured structures. The long-term goal of Flood Mitigation Assistance (FMA) is to reduce or eliminate claims under the National Flood Insurance Program (NFIP) through mitigation activities. The program provides cost-shared grants for three purposes: Planning Grants to States and communities to assess the flood risk and identify actions to reduce that risk; Project Grants to execute measures to reduce flood losses; and Technical Assistance Grants that States may use to assist communities to develop viable Flood Mitigation Assistance (FMA) applications and implement FMA projects. FMA also outlines a process for development and approval of Flood Mitigation Plans.

In addition to the required elements for the Flood Mitigation Plan complying with 44 CFR Part 78, the **2022 Dorchester County Flood Mitigation Plan Update** also includes the three critical components for Nuisance Flood Plan pursuant to Maryland House Bill 1427 (2019), §3-1018(b) and (c).

- Inventory of know tidal areas where nuisance flooding occurs.
- Identification of thresholds/water levels/conditions that lead to tidal nuisance flooding.
- A mechanism to document tidal nuisance flood events and response activities 2020-2025.

The definition of flooding in accordance with §3-1001 of the Natural Resource Article of the Maryland Annotated Code is “high tide flooding that causes a public inconvenience.”

Through this planning effort, Dorchester County has developed a plan address nuisance flooding with the assistance of [Nuisance Flood Plan Development Guidance, Maryland, October 2019](#). Furthermore, this plan will be updated on a five-year schedule and published on the County website. A copy of this plan has been provided to various state and federal agencies.

- Maryland Department of Emergency Management
- Maryland Department of Natural Resources
- Maryland Department of Planning
- Federal Emergency Management Agency



1.2 Hazard Mitigation Planning Initiatives

The **2022 Dorchester County Flood Mitigation Plan** has been developed in conjunction with the Hazard Mitigation Plan (HMP) Update completed in September of 2022. While the HMP update process included both coastal hazards and flood chapters, along with flood-related mitigation strategies, the intent of the FMP is not to duplicate the information within the HMP. The Flood Mitigation Plan compliments and expands upon the HMP and includes tidal nuisance flooding. The FMP further develops and refines flood mitigation data, analysis, and mitigation strategies.

In addition, Dorchester County is also engaged in the Cultural Resources Hazard Mitigation planning process completed in 2017. This planning effort once again compliments the HMP and FMP, however the focus of the Cultural Resources Hazard Mitigation Plan was on historic and cultural resources at-risk to flood hazards and mitigation measures specific to these resources.

1.3 Plan Integration

The Dorchester County Hazard Mitigation Plan (HMP) planning process started and was completed in 2022. The HMP planning process overlapped with the development of the Dorchester County Flood Mitigation Plan (FMP). Flood mitigation ideas presented within the HMP were reviewed and in some cases, as applicable, have been expanded within the Flood Mitigation Plan.

Additional planning tools that interface and impact the FMP include, but are not limited to the following:

- 2021 Dorchester County Comprehensive Plan;
- 2011 City of Cambridge Comprehensive Plan;
- Zoning Ordinance;
- Subdivision of Land;
- Hoopersville Resiliency Study;
- 2022 Dorchester County Hazard Mitigation Plan; and,
- 2017 Dorchester County Cultural Resources Hazard Mitigation Plan.
- 2022 Make Cambridge Resilient- Flood Mitigation Plan

Make Cambridge Resilient Flood Mitigation Project Manager, Larry White, presented at the May 24th meeting. In addition, a brief update on the Hoopersville Resiliency Study was provided. These efforts were integrated into this plan update.

1.4 Planning Process

This planning process was initiated to coincide with the 2022 Dorchester County All-Hazard Mitigation Plan Update. Flood and coastal hazard information introduced and presented within the All-Hazard Mitigation Plan have been further developed and refined during this Flood Mitigation Plan Update planning process. The flood mitigation plan does not duplicate the information within the overall All-Hazard Mitigation Plan, but rather compliments and expands the scope and breadth of the flood risk and impacts to Dorchester County. In addition to the Hazard Mitigation Planning Committee and meetings held for the 2022 Dorchester County All-Hazard Mitigation Plan Update, additional flood hazard specific meetings were held specifically for this plan update.

1.4.1 Core Planning Team

A Core Planning Team (CPT) was formed to help guide the development of the Flood Mitigation Plan. Core Planning Team (CPT) members were identified by the Department of Emergency Services to assist in the development of the 2022 Flood Mitigation Plan. Departments, agencies, and organizations who received meeting invitations, meeting notes and materials, questionnaires, and opportunities to review and comment on the plan included:

- Town of Galestown
- Town of Hurlock
- Town of Secretary
- Town of Vienna
- Town of Brookview
- City of Cambridge
- Town of Church Creek
- Town of East New Market
- Town of Eldorado
- Dorchester County Volunteer Fire Association
- Dorchester County Erosion Group
- Heart of Chesapeake Country Heritage Area
- Twin Point Cove Resiliency Study Planning Group
- Hoopersville Resiliency Study Planning Group
- Nanticoke Watershed Alliance
- Chamber of Commerce
- University of Maryland Anthropology Department
- University of Maryland Extension
- ShoreRivers
- Taylors Island Volunteer Fire Company
- Salisbury University
- Maryland Department of Planning
- Maryland Department of Emergency Management
- Dorchester County Council
- Dorchester County Emergency Services
- Dorchester County Planning & Zoning
- Dorchester County Public Works
- Dorchester County Sanitary District
- Dorchester County Sheriff's Office
- Dorchester County Finance
- Dorchester County Economic Development
- Dorchester County Emergency Communications Division
- Dorchester County Health Department
- Dorchester County Environmental Health
- Dorchester County Department of Social Services
- Dorchester County Board of Education

The Core Planning Team met in-person several times during the plan development process, May 26th and September 12th of 2022. In addition, CPT members completed questionnaires, received, and reviewed meeting notes and content on the project [website](#), and reviewed and commented on the draft plan. Meeting notes for each in-person CPT meeting have been uploaded to the project website and are included in the Attachment 1.

May 26th Core Planning Team in-person meeting participants included the following participants:

- Dozia Rahilly, Department of Emergency Services
- James Windsor, Department of Emergency Services
- Larry White, City of Cambridge- Make Cambridge Resilient
- Gary McQuitty, Hoopersville Resiliency Planning Team Member
- Susan Webb, Department of Planning and Zoning
- Jason Boothe, Department of Planning and Zoning
- Bill Hildebrand, Maryland Department of Emergency Management
- Bill Forlifer, Dorchester County Health Department
- Susan Banks, Dorchester County Economic Development Department
- Kate McClure, University of Maryland Sea Grant Extension Program
- Jen Dindinger, University of Maryland Sea Grant Extension Program

This meeting included a presentation on the Make Cambridge Resilient Flood Mitigation Plan, and an update on the Hoopersville Resiliency Study.

September 12th Core Planning Team in-person meeting participants included the following participants:

- Dozia Rahilly, Department of Emergency Services
- James Windsor, Department of Emergency Services
- Susan Banks, Dorchester County Economic Development Department
- Jason Boothe, Department of Planning and Zoning
- Bill Forlifer, Dorchester County Health Department
- Larry White, City of Cambridge- Make Cambridge Resilient
- Gary McQuitty, Hoopersville Resiliency Planning Team Member
- Kate McClure, University of Maryland Sea Grant Extension Program

This meeting included information on the Dorchester County Hazard Mitigation Plan, and recommendations on the Hoopersville Resiliency Study.

1.4.2 First Responder Survey

To obtain community specific information, a first responders' survey was distributed to each fire district within the County. The following companies completed the survey.

- Taylors Island VFC
- Neck District VFC
- Eldorado-Brookview VFC
- Linkwood Salem VFC
- Secretary VFC
- Cambridge Rescue Fire Company
- East New Market VFC
- Hurlock VFC
- Vienna VFC
- Madison VFC
- Church Creek VFD
- Elliott Island VF

Finding of the survey included:

- Flooded roadways identified included evacuation routes.
- Ingress/Egress issues identified- Taylors Island, Neck District, Secretary (Green Point Road), Elliott Island (Elliott Island Road), From Henry's Cross Road to Elliott Island.

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First Responder Survey

Please take a moment to provide information regarding flood-related issues within your fire district.

1. Point of Contact

Name

Fire Department

Address

City/Town

Email Address

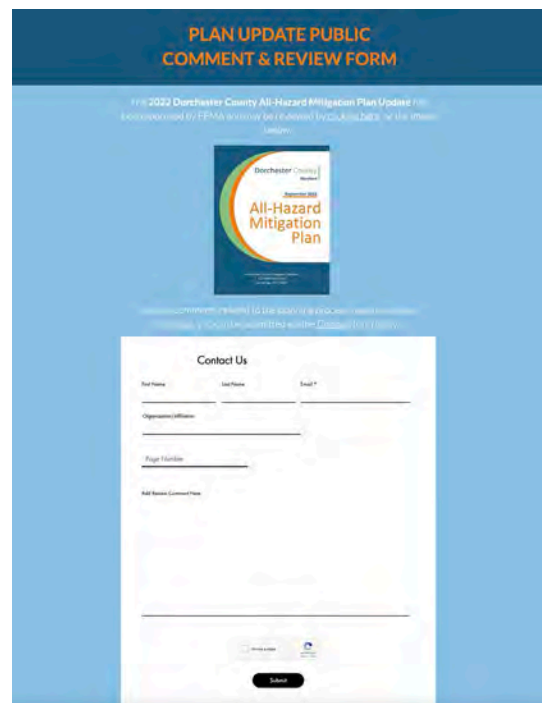
Phone Number

- Drainage issues identified.
- Additional concerns provided:
 - Taylor’s Island VFC- Access, medical devices during power loss, evacuation
 - Neck District VFC- It would help to make sure all drainage ditch(s) are clear, and culverts cleaned out.
 - Secretary VFC- The condos on Water Street sometimes get water under the units.
 - Cambridge Rescue Fire Company- FDs are not equipped for inland-flood based rescues.
 - Church Creek VFC- Shorter’s Creek up to Maple Dam
 - Elliott Island VFC- Shore Erosion
- Properties within Fire District that experience repeated flood issue:
 - Taylor’s Island VFC- Too many to list
 - Neck District VFC- Most of the Neck District
 - Cambridge Rescue Fire Company- Waterfront properties
 - Madison VFC- Properties along Susquehanna Road, Madison Canning House Road, Old Madison Road, Route 16 end of White Marsh Road, Brooks Road, Deep Point Road.
 - Elliott Island VFC- Right past Elliott Island bridge-first culvert, Poplar Island-water comes right on road from bay, old ditch, Cow Creek, Pokota Creek to Savanna Lake, and low spots all the way to Henry’s Crossroads.

As in the 2017 Flood Mitigation Plan, the First Responder Survey assisted in identifying areas of mitigation interest for the plan update.

1.4.3 Project Website

The [project website](#) includes a separate tab for information specific to the flood mitigation plan. Both Core Planning Team meeting notes and presentations have been uploaded to the project website for public review. In addition, the draft plan was uploaded to the project website. Finally, the project website includes a public review and comment form.



1.5 Addition of Nuisance Flood Plan

As part of this plan update, incorporation of elements necessary for nuisance flood plan using the State of Maryland Nuisance Flood Plan Guidance were developed and integrated within. The Core Planning Team and First Responder Survey results assisted with the identification of nuisance flood areas, specifically roadways. Materials presented at the September 12th Core Planning Team meeting were discussed and further refined. Mitigation goals and actions specific to nuisance flooding were identified and prioritized along with goals and actions specific to other flood sources. However, nuisance flood goals and actions were added as a new component during the plan update.

1.6 Plan Review & Adoption

Following the completion of the working draft plan, Core Planning Team members reviewed the plan and provided comments. Following the review and working draft plan revisions, the draft plan was uploaded to the project website for public review and comment in October of 2022.

The 2022 Dorchester County Flood Mitigation Plan Update is an appendix to the 2022 Dorchester County All-Hazard Mitigation Plan. The 2022 All-Hazard Mitigation Plan was adopted by the Dorchester County in December of 2022, and included the Dorchester County Flood Mitigation Plan Update, which also serves as the Dorchester County Nuisance Flood Plan.

Chapter 2 Community Profile

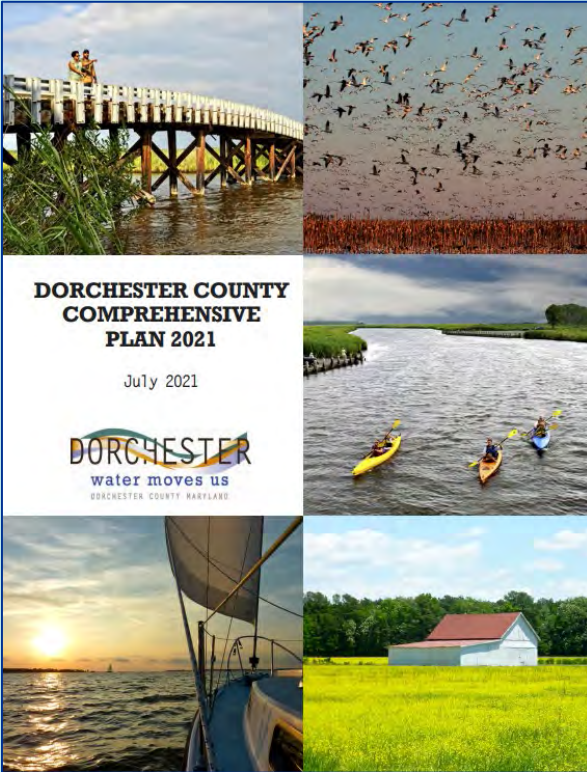
2.1 Location & Background

Located in the central lower portion of the eastern shore along the Chesapeake Bay and adjacent to Talbot, Caroline and Wicomico Counties in Maryland and Sussex County in Delaware, Dorchester County also shares a boundary through the Chesapeake Bay with Somerset, Calvert, and St. Mary's Counties. Dorchester County is the largest of Maryland's twenty-four (24) counties, encompassing over 983 square miles of land and water territory combined. It has the third largest land area with 558 square miles. Additionally, Dorchester County is situated between the Choptank and Nanticoke Rivers and is on the Blackwater and Transquaking Rivers, which drains into Fishing Bay and Marshyhope Creek, which drains into the Nanticoke River. Other major water bodies include the Little Choptank and Hoga Rivers.

Map 2-1



2021 Dorchester County Comprehensive Plan- County Background Excerpt



Dorchester County was formed in 1669 and named for the Earl of Dorset, a family friend of the Calverts (the founding family of the Maryland colony). The County is located on Maryland's Eastern Shore, approximately 75 miles from Baltimore and 90 miles from Washington, DC. Dorchester is the largest county, water and land combined, in the State (see Figure 1.1 - Regional Location). Dorchester County uses the slogan, "The Heart of Chesapeake Country", due to its geographical location and the heart-like shape of the County on a map. The County is comprised of mainly rural communities. Approximately half of Dorchester County's population live within incorporated municipalities in the County, which include Brookview, Cambridge, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary, and Vienna. The City of Cambridge is the cultural, economic, and political hub of the County.

With over 1,700 miles of shoreline and a deep channel commercial port in Cambridge, the maritime history is an essential part of the County's heritage. The County is characterized by its history and heritage, which are marked by significant places and people that are important to the local and regional story as well as national history. Most notably, the County was the birthplace of Harriet Tubman, who escaped from slavery and afterwards worked to guide other refugee slaves to freedom in the north. The County is also characterized by a rural lifestyle and its pristine, natural setting with environmental features that serve many important ecological, social, recreational, and economic benefits. The fluvial, nutrient rich soils provide some of the best agricultural lands in Maryland. The wetlands are the richest and most biodiverse regions in the nation and provide habitats for a wide diversity of plants and animals. Many residents of Dorchester County have historically made their living as farmers or working on the water. The Chesapeake Bay and its tributaries provide harvests of crabs, oysters, and many fish species to both commercial and recreational fishermen.

Dorchester County has been strengthening its economy by building upon its long-established agricultural, seafood and manufacturing industries while also moving toward a more diverse, modern economy. Economic gains in recent years have been driven by increases in tourism, accommodations, retail, food services, healthcare, and education and research.

Dorchester County is a special place with a unique rural character, maritime culture and history that distinguishes it from other places throughout the country. The future of Dorchester County depends on the continuing trends of protecting and promoting its history, diversifying its economy, and conserving rural and natural areas. It further depends on maximizing efficient use of public investments by guiding infill development and redevelopment towards designated growth areas and away from environmentally sensitive and high-risk hazard areas.

2.2 County Comprehensive Plan

One of the nine major themes of the 2021 Dorchester County Comprehensive Plan, which reflects an overall comprehensive direction for the County to capitalize on the key opportunities and overcome the priority issues includes **Sea level rise, high hazard, and flood mitigation areas**. The following is an excerpt from the Comprehensive Plan specific to this theme.

Sea level rise, high hazard, and flood mitigation areas

- Dorchester County is currently one of the most vulnerable areas to flooding on the eastern seaboard.
- Planning for the protection of sensitive areas requires an understanding of both the present day and the long-term threats. Such concerns are eroding shorelines, increasing precipitation events and intensity, expanding high tide areas and floodplains, and increasing storm surge and flood hazards. The County's land use policies generally guide growth away from flood prone areas and low-lying wetland areas, and therefore enhance the region's resilience to sea-level rise and climate change. The County will need to conduct cost/benefit analyses when planning for repetitive loss properties and when maintaining and investing in public infrastructure and facilities. A cost/benefit analysis will help to evaluate alternatives to infrastructure investment and mitigation options. There are numerous studies and plans that evaluate sea level rise vulnerabilities within Dorchester County, and that set forth adaptation strategies towards improving the area's physical, economic, and ecological resiliency. These plans are integrated and carried forward in this 2021 Comprehensive Plan. The County will need to continue to review, evaluate, update, and implement County studies/plans that address sea level rise resiliency, and coordinate with Federal, State, and non-profit organizations to ensure consistency in adaptation and mitigation efforts.

2.3 Municipalities and Planning

The County seat, the City of Cambridge is a regional economic center. The County comprises a mix of residential development and small villages and a strong desire to preserve its agricultural and cultural resources. The County contains nine (9) municipalities:

- Brookview;
- Cambridge;
- Church Creek;
- East New Market;
- Eldorado;
- Galestown;
- Hurlock;
- Secretary; and,
- Vienna.

Interjurisdictional coordination is a feature of planning in Maryland and has been practiced in Dorchester County for many years. Incorporated municipalities that exercise planning and zoning authority through the adoption of their own comprehensive plans include City of Cambridge, Church Creek, East New Market, Hurlock, Secretary and Vienna. Apart from

Church Creek, these municipalities oversee their own zoning and subdivision regulations as well as Critical Area review. Brookview, Eldorado, and Galestown do not exercise planning and zoning authority. The County reviews and issues building permits for all the towns except for Cambridge, Hurlock, and Secretary. All nine municipalities were included on the Core Planning Team (CPT) for this plan update.

The following information is specific to the nine municipalities of Dorchester County and land use planning. Please note that the Towns of Brookview, Eldorado, and Galestown do not exercise planning and zoning authority. In addition, these towns do not develop separate comprehensive plans, but rather are included under the County plan.

Cambridge- 2011 Comprehensive Plan

According to the *Cambridge Comprehensive Plan*, the expansion of City limits is no longer needed through the foreseeable future, however there are a few exceptions. The general policy adopted and encouraged by the Comprehensive Plan is that annexations are to be discouraged and are disfavored. The Plan states that sufficient undeveloped, under-utilized, or under-developed property exists within the current corporate boundaries of the City of Cambridge. However, if a development opportunity arises which warrants annexation, the City retains the right to reject any request for annexation, even if the proposed annexation meets all requirements (refer to the *2011 Cambridge Comprehensive Plan* for a list of all conditions).

The *2011 Cambridge Comprehensive Plan* is slated for an update in 2023. In addition, the City of Cambridge has recently completed the *2022 Make Cambridge Resilient Flood Mitigation Plan*.

Church Creek- 2005 Comprehensive Plan

According to the 2010 U.S. Census, a total of 67 housing units were located within the Town. However, projected growth is to occur beyond the northeast and southwest municipal limits.

East New Market- 2010 AMD- 2012 Comprehensive Plan

In 2000, a total of 107 housing units were located within the corporate limits, and of those housing units, 90 were constructed prior to 1970. According to the 2010 U.S. Census, East New Market has 197 housing units. The *2010 Comprehensive Development Plan* estimates land capacity within current Town boundaries, which were provided by the Town's consulting engineers (ARRO Engineering), as well as the Maryland Department of Planning (MDP). There is room for significant infill development within current Town boundaries. The estimates range from 100 units to an upper estimate of 327 units. Upon review of the data, the Town determined that infill capacity would be limited to a maximum of 171 equivalent dwelling units, in order to achieve consistency with the Town's Comprehensive Plan including protection of the Town's character.

The overall land use goal is to encourage the well-planned, managed growth of East New Market.

Hurlock- 2009 Comprehensive Plan

In terms of growth areas, the Town of Hurlock is considering two growth areas, located northwest of the municipal limit, and the western and southern portions of the municipal limit.

Secretary- 2010 Comprehensive Plan

The Town of Secretary is 1.6% of the County's total population and is projected to receive a proportionate share of the County's projected growth. Therefore, the Town of Secretary is planning for three growth areas. The first growth area is located east of the town boundaries, while the second, is planned to occur directly north of the first growth area. The last growth area includes the properties located directly adjacent to the first and second growth areas.

Vienna- 2003 Comprehensive Plan

As for development, future growth is projected for two areas. Annexation is being considered for the West Vienna neighborhood and the Larmore/Phillips area south and southwest of Town. It is estimated that growth, primarily through new subdivision development in annexed areas, will occur at a rate of 5-10 units, or 10-25 additional persons, per year. This assumes that the new Larmore/Phillips residential development, which the Town is working on, will be implemented.

The Towns of Brookview, Eldorado and Galestown do not have Comprehensive Plans; therefore, future growth patterns could not be analyzed. However, population was analyzed utilizing the U.S. Census' 2010 and 2020 data. All three Towns have a minimal change in population as well as housing units over the last decade. An assumption could be made that the anticipated growth Dorchester County is expected to receive would be limited within these towns.

2.4 Demographics

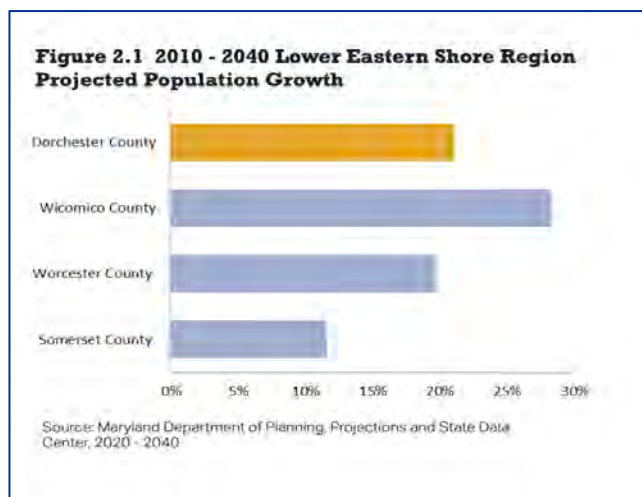
According to the *2020 United States Census*, the population of Dorchester County is 32,531 people, a slight decrease, approximately 0.3 percent, from the reported population of 32,618 people in 2010. Based on the census data, the population of Dorchester County has plateaued during the previous decade (2010-2020). The reported 2010 and 2020 populations of Dorchester County are the highest reported populations within the last four decades.

Table 2-1

	1990 Census	2000 Census	2010 Census	2020 Census
Dorchester County	30,236	30,674	32,618	32,531

Source: *Maryland Manual On-Line*

<https://msa.maryland.gov/msa/mdmanual/01glance/html/pop.html>



2021 Dorchester County Comprehensive Plan

- 50% of county residents live in incorporated municipalities
- The land area of Dorchester County in square miles is 558, corresponding to a population of 58.3 persons per square mile. The population per square mile for the State of Maryland is 594.8 persons.

The following table provides additional demographic data specific to Dorchester County.

Table 2-2

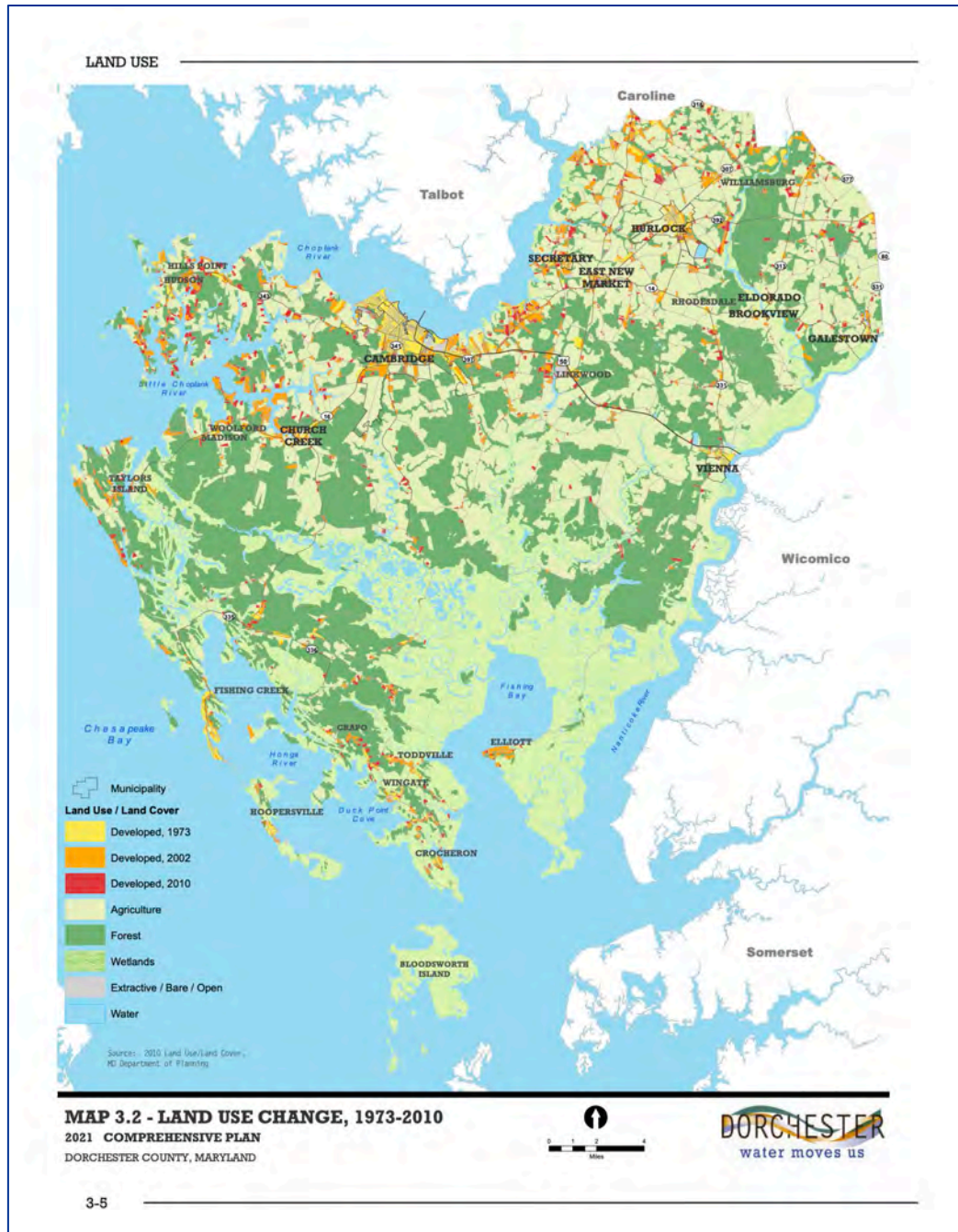
PEOPLE		
<i>Source: 2020 United States Census; Quick Facts, Dorchester County, Maryland- https://www.census.gov/quickfacts/dorchestercountymaryland</i>		
	Dorchester County	State of Maryland
Age		
Persons under 5 years, percent	5.3%	6.0%
Persons 65 years and over, percent	22.5%	5.9%
Housing		
Owner-occupied housing unit rate, 2016-2020	67.5%	67.1%
Median value of owner-occupied housing units, 2016-2020	\$187,300	\$325,400
Median selected monthly owner cost- with mortgage, 2016-2020	\$1,405	\$2,038
Median gross rent, 2016-2020	\$865	\$633
Family & Living Arrangements		
Households, 2016-2020	13,433	2,230,527
Persons per household, 2016-2020	2.34	2.64
Language other than English spoken at home, percent of persons 5 years+, 2016-2020	6.3%	19.0%
Education		
High school graduate of higher, percent of persons 25+, 2016-2020	87.0%	90.6%
Bachelor's degree or higher, percent of persons 25+, 2016-2020	19.9%	40.9%
Health		
With a disability, under age 65 years, percent, 2016-2020	12.6%	7.6%
Economy		
In civilian labor force, total, percent of population 16years+, 2016-2020	60.7%	66.9%
Income & Poverty		
Median household income (in 2020 dollars), 2016-2020	\$52,799	\$87,063
*Persons in poverty, percent	14.9%	9.0%
Transportation		
Mean travel time to work (minutes), workers age 16 years+, 2016-2020	27.3	33.0
*The Census Bureau poverty definition - Following the Office of Management and Budget's (OMB) Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps)		

2.5 Summary of Land Use Trends

According to the 2021 Dorchester County Comprehensive Plan land use trends include:

- The rate of development increase was faster than population increase but has become more aligned in recent years.
- Large lot development continues to be the predominant type of development, comprising 70% of developed lands.
- While the County has lost resource land over the years, the rate of loss has decreased in recent years.
- Three quarters of the County’s total land area are protected lands or wetlands.

Figure 2-2



The following land use goals and strategies within the *2021 Dorchester County Comprehensive Plan* align with flood risk reduction strategies within this plan.

Resource Conservation

- Conservation of natural resources such as tidal and non-tidal wetlands and forests as well as agriculture.
- Encourage voluntary land conservation programs to protect sensitive areas and prime natural resources.
- Explore transfer of development rights programs so that property owners can realize their property value while developing in less vulnerable areas.

Village Conservation

- Limit development to existing lots of record.
- Partner with FEMA and MDEM to participate in the voluntary “buy-out” program.
- Tighten existing Village zoning boundaries to the built environment and outside areas that face environmental constraints, such as periodic flooding and coastal erosion and subsidence.
- Ensure that the Village’s waterfront is reserved for low-impact maritime businesses and associated uses.
- Encourage development that conserves and enhances the area’s maritime and recreational character and connection to the Bay.
- Recognize the vulnerabilities and sensitivities of the unique coastal environment and reinforce appropriate safeguards to minimize risks to flood hazards and coastal changes.

Chapter 3 Sources of Flooding

3.1 Introduction

Dorchester County is susceptible to flooding from various sources. Information contained within the following chapters has been updated and, in some cases, new information has been added. For instance, nuisance flooding has been added as a source of flooding, and a new plan chapter has been developed as part of this planning process.

3.2 Sources of Flooding

Flooding within Dorchester County is known to occur from multiple sources, including:

- **Flooding** – When streams and rivers exceed the capacity of their natural or constructed channels to accommodate water flow and water overflows the banks, spilling out into adjacent low-lying, dry land. Coastal flooding normally occurs when dry and low-lying land is submerged by seawater. The range of a coastal flooding is a result of the elevation of floodwater that penetrates the inland which is controlled by the topography of the coastal land exposed to flooding.

In Dorchester County, flood origins include riverine flooding from a plethora of rivers, creeks and streams and coastal flooding from the Chesapeake Bay. Riverine flooding sources include the Choptank River, the Nanticoke River, Marshyhope Creek, Miles Branch, Honga River, Chicamacomico River, Blackwater River, Transquaking River, Hunting Creek, Gales Creek, Chicone Creek, Writes Millpond Branch, Otter Pond Branch, Davis Millpond Branch, South Davis Millpond Branch, and North Davis Millpond Branch.

- **Coastal Storm** – The shoreline and tidal areas of the County are subject to flooding from rainfall, tidal changes, and storm surges. Hurricanes and nor'easters can cause dramatic changes in tidal water levels. During hurricanes and severe northeasters, intense winds, and low-pressure cause water to pile up higher than normal, causing what is known as a storm surge. These surges are generally the source of the worst flooding.
- **Sea Level Rise** – Rising sea level provides a higher base upon which storm surges build, and thereby increases the risk of severe flooding. Moreover, loss of wetlands from sea level rise can remove a storm surge buffer. Extreme high tides during new and full moons can flood areas that are above the normal high tide. Rising sea level elevates all the tides, allowing spring tide flooding to reach farther inland. Low-lying coastal areas often flood during severe thunderstorms because they drain very slowly. Rising sea level further slows the rate at which low-lying areas drain.
- **Nuisance Flooding** – Dorchester County is susceptible to a situational type of coastal flooding referred to as **nuisance flooding** anytime during the year, but generally from March to September. Nuisance flooding often occurs when water levels at high tide cause public inconvenience. This type of flooding is primarily due to the County's location as a coastal community.
- **Dam Failure** – Dams present risks but they also provide many benefits, including irrigation, flood control, and recreation. Dams have been identified as a key resource of our national infrastructure that is vulnerable to terrorist attack. According to FEMA, dams can fail for several reasons, including overtopping caused by floods, acts of sabotage, upstream dam

failure (i.e., the failure of another nearby dam), structural failure of materials used in dam construction, or earthquakes.

The topography of Dorchester County is relatively flat and near sea level resulting in high flood vulnerability. Nearly 75% of land in the County has an elevation under 20 feet above sea level and 55% of the land within the County lies within the 1-percent-annual-chance floodplain (100-year flood). Historically, flooding problems in the county are largely the result of impacts from major thunderstorms, hurricanes, or tropical storms during the summer and fall seasons. Notable recent major flood events include Hurricane Isabel in 2003 and Hurricane Irene in 2011. Hurricane Isabel was technically downgraded to a tropical storm by the time it hit Maryland, however, its sustained winds (combined with high tides) created a storm surge reaching over eight feet in some areas of Dorchester County. The storm caused extensive damage in Dorchester County, including major damage to the Hoopers Island bridge and approach road, and throughout most of the low-lying communities in the coastal areas of the County. The Maryland Department of Planning determined that 123 properties in Dorchester County incurred damage or loss to structures during the storm. Hurricane Irene was also downgraded to a tropical storm as it made landfall. The County Council of Dorchester County declared a state of emergency, and public shelters were made available. Dorchester County sustained massive power outages, many fallen trees, several damaged roads and a few damaged buildings. The Dorchester General Hospital in Cambridge was evacuated due to wind and water damage.

To understand and address current flood hazards and future risk, numerous planning documents have been developed. In 2022, the County prepared an update to the 2017 Hazard Mitigation Plan (HMP) and this planning effort is an update to the 2017 Flood Mitigation Plan (FMP). The FMP complements and expands upon the HMP by specifically identifying cost-effective actions that reduce or eliminate the long-term risk of flood damage. While critical facilities and general building stock were the focus of both the overall HMP and the FMP, the 2018 County Historic and Cultural Resources Mitigation and Risk Plan specifically considered flood hazard risk and vulnerability to cultural and historic resources throughout Dorchester County.

Chapter 4 Flood, Coastal Storm, & Sea Level Rise Risk & Vulnerability

4.1 Introduction



This chapter includes risk and vulnerability from **flood, coastal storm, and sea level rise**. Information contained within this chapter has been updated and, in some cases, new information has been added. In addition to the county-wide mapping, further discussion and small area mapping products have been completed for all municipalities and for unincorporated areas of the County that have a history of flooding.

This chapter has been organized as follows:

- Dorchester County Risk & Vulnerability
 - Flood
 - Coastal Storm
 - Sea Level Rise
 - Erosion, Sediment Control, and Expansive Soils.
- Municipal Risk & Vulnerability
 - Town of Brookview
 - City of Cambridge
 - Church Creek
 - East New Market
 - Eldorado
 - Galestown
 - Hurlock
 - Secretary
 - Vienna
- Other Flood Prone Communities Risk & Vulnerability
 - Neck District (Hills Point & Hudson)
 - Fishing Creek
 - Taylors Island
 - Hoopersville
 - Crocheron
 - Toddville
 - Wingate



Note: Flood and coastal hazard information introduced and presented in the Hazard Mitigation Plan (HMP) has been further developed and refined in this Flood Mitigation Plan planning process. The Flood Mitigation Plan does not duplicate the information within the overall HMP, but rather compliments and expands the scope and breadth of the flood risk and impacts to Dorchester County.

4.2 Flood

Identifying where a flood will occur does not necessarily convey flood risk; the most common method in determining flood risk and vulnerability is to determine both **probability** and **consequences**. The probability of a flood is the likelihood that a flood will occur; the consequences of a flood are the estimated impacts associated with the flood occurrence. Through Risk MAP, FEMA provides communities with updated Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) Reports that focus on the probability of floods and show where flooding may occur, as well as the calculated 1-percent-annual-chance flood elevation. The 1-percent-annual-chance flood, also known as the base flood, has a 1% chance of being equaled or exceeded in any given year.

Digital Flood Insurance Rate Maps (DFIRM) illustrate flood inundation areas that are depicted as flood zones. Flood zones include Zones A, AE, VE, and X.

Table 4-1

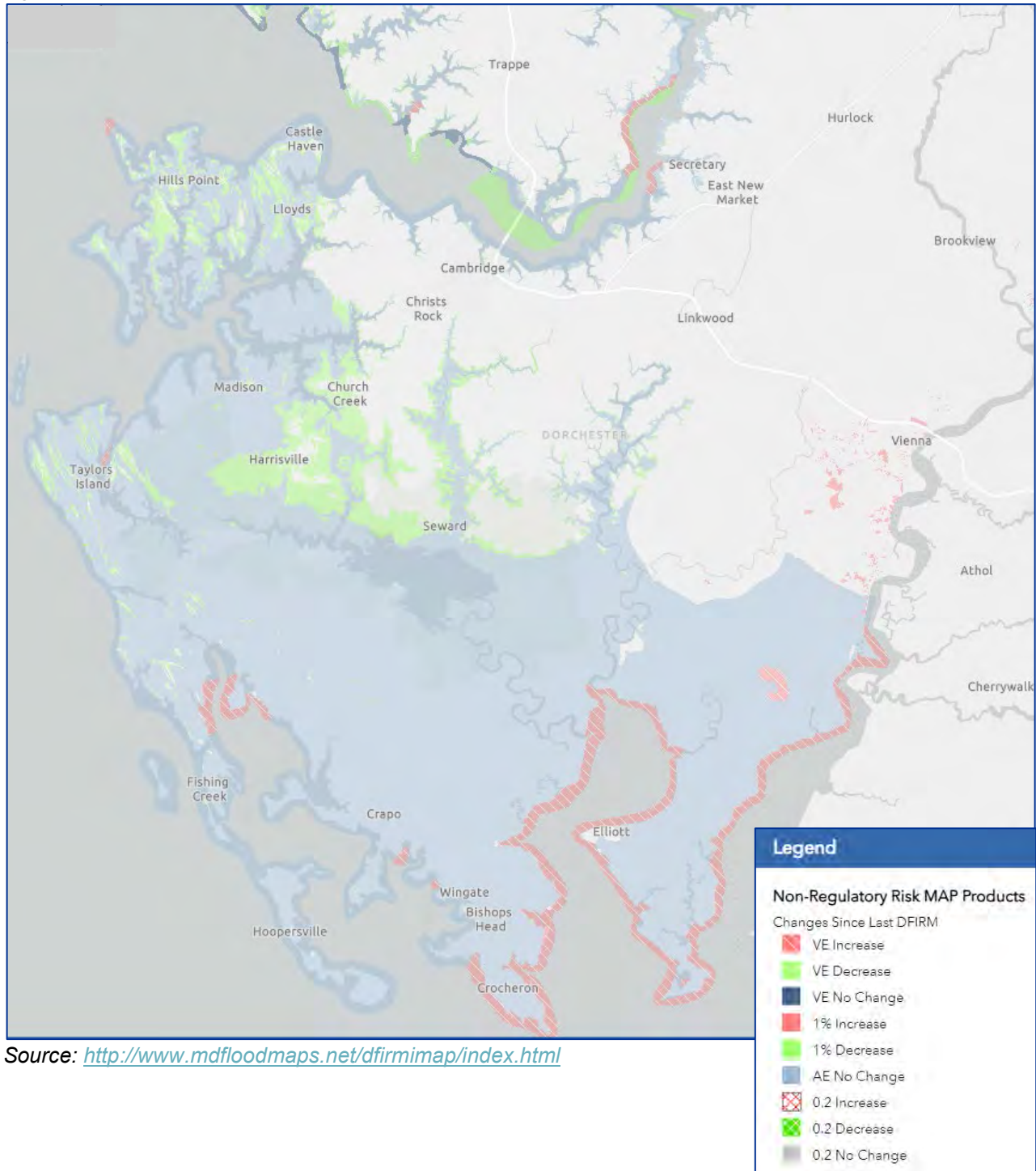
Flood Zone		Description
SFHA-High Risk Areas		
1% Annual Chance Flood Hazard	A	Areas with a 1% or greater annual chance of flooding and at least a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
	AE	Areas with a 1% or greater annual chance of flooding and at least a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
	VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
	AO	River or stream flood hazard area, and areas with a 1-percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1-3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage.
Minimum Risk Areas		
0.2% Annual Chance Flood Hazard	Zone X Shaded	Areas outside the 1% annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

- 0.2-percent-annual-chance flood: The flood elevation that has a 0.2-percent chance of being equaled or exceeded each year. Sometimes referred to as the 500-year flood.
- 1-percent-annual-chance flood: The flood elevation that has a 1-percent chance of being equaled or exceeded each year. Sometimes referred to as the 100-year flood.

4.2.1 Changes Since Last FIRM

Data indicating changes in both the Special Flood Hazard Area (SFHA) and the floodway boundary since the previous FIRM was developed to quantify land area increases and decreases to the SFHA and floodway, as well as areas where the flood zone designation has changed (e.g., Zone A to AE, AE to VE, shaded Zone X protected by levee to Zone AE for de-accredited levees).

Figure 4-1



Source: <http://www.mdfloodmaps.net/dfirmimap/index.html>

Special Flood Hazard Area (SFHA) boundaries within Dorchester County were updated due to new engineering analysis performed and presented within the FEMA Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in some areas and leverage recently developed LiDAR-based topographic data. Data presented in this section reflects a comparison between the previous effective FIRM and the new FIRM.

- Previous FIRM effective date: May 24, 2011
- Current FIRM effective date: March 16, 2015

The table below summarizes the increases, decreases, and net change of SFHA's, Floodways, and Coastal High Hazard Areas (CHHAs) for Dorchester County.

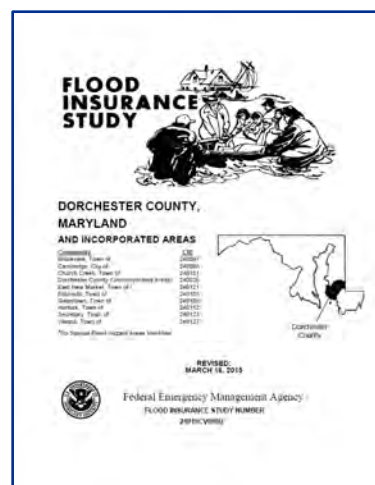


Table 4-2

Area of Study	Total Area (mi ²)	Increase (mi ²)	Decrease (mi ²)	Net Change (mi ²)
Within SFHA	348.7	1.4	27.8	-26.4
Within CHHA (Zone VE or V)	20.2	<0.1	0	<0.1

Source: FEMA Flood Risk Report-Dorchester County, Maryland Coastal Study, January 20, 2016

4.2.2 Floodplain Management Overview

The information below provides an overview of the County's floodplain management program.

Table 4-3

Community Name	Total Community Population	Total Community Land Area (sq. mi)	Participation NFIP	CRS Rating
Dorchester County (Unincorporated Areas)	16,612	964.99	Yes	6
City of Cambridge	12,326	12.95	Yes	N/A
Town of Church Creek	125	0.34	Yes	N/A
Town of Eldorado	59	0.08	Yes	N/A
Town of Galestown	138	0.26	Yes	N/A
Town of Hurlock	2,092	2.89	Yes	N/A
Town of Secretary	535	0.9	Yes	N/A
Town of Vienna	271	0.76	Yes	N/A

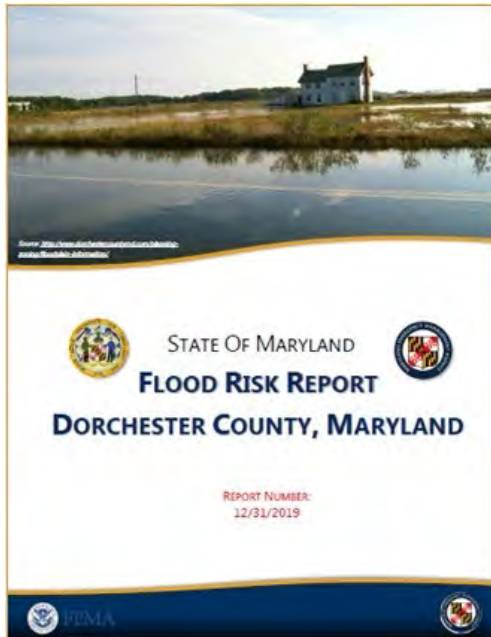
Source: State of Maryland Flood Risk Report-Dorchester County, Maryland, December 31, 2019

Note: The Towns of Brookview and East New Market are not included since there are no structures located within the regulatory 1-percent-annual-chance Special Flood Hazard Areas (SFHAs). Additionally, Federalsburg (a multi-county community located in both Caroline and Dorchester Counties) has no structures within Dorchester County and is therefore not included.

4.2.3 Flood Vulnerability

Information from FEMA Risk Map Products were integrated into this planning document. The previous *2017 Dorchester County Flood Mitigation Plan* integrated the February 20, 2016, Flood Risk Report. This plan update integrated the most recent FEMA Flood Risk Report, published December 31, 2019.

In addition, the **2022 Dorchester County All-Hazards Mitigation Plan** includes flood loss estimates for residential and commercial properties. This information was presented for the County's unincorporated areas and the municipalities. Flood loss estimates for the unincorporated areas of Dorchester County are included on the following page, as well as information for flood-prone facilities.



The Federal Emergency Management Agency's (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program provides states, tribes, and local communities with flood risk information and tools that they can use to increase their resilience to flooding and better protect their citizens. By pairing accurate floodplain maps with risk assessment tools and planning and outreach support, Risk MAP has transformed traditional flood mapping efforts into an integrated process of identifying, assessing, communicating, planning for, and mitigating flood-related risks.

This Flood Risk Report (FRR) provides non-regulatory information to help local or tribal officials, floodplain managers, planners, emergency managers, and others better understand their flood risk, take steps to mitigate those risks, and communicate those risks to their citizens and local businesses.

The unincorporated areas of Dorchester County's 1% annual chance flood vulnerability analysis incorporate results from a FEMA HAZUS analysis (Version 3.1 (Riverine) and Version 2.2 (Coastal) for Flood Risk Project Refined Data),-which accounts for areas 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Unincorporated Areas of Dorchester County: Estimated Potential Losses for Flood Event Scenario

Table 4-4

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	2161	\$410,600,000	93%	\$28,300,000
Commercial Building & Contents	46	\$11,600,000	3%	\$1,000,000
Other Building & Contents	67	\$21,200,000	5%	\$3,500,000
Total Building & Contents ²	2274	\$443,400,000	100%	\$32,800,000
Business Disruption ³	N/A	N/A	N/A	\$1,200,000
TOTAL⁴	2274	\$443,400,000	100%	\$34,000,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

Critical and/or public facilities within the FEMA flood zones were assessed in the **2022 Dorchester County All-Hazards Mitigation Plan**. Assessment results indicated that five (5) critical facilities are located within the 1% annual chance flood event and are vulnerable to flooding. These facilities are considered essential as they provide services to the community in the event of a disaster.

- Taylors Island Volunteer Fire Company, Taylors Island – 1.1'
- Hoopers Island Volunteer Fire Company, Fishing Creek – 3.3'
- Madison Volunteer Fire Company, Madison – 0.8'
- EMS Station 500, Madison – 0.5'
- Lakes and Straits Fire Company, Wingate – 2.6'

Hoopers Island Volunteer Fire Company is at the greatest risk with the possibility of over 3-feet of floodwaters from the structure's lowest adjacent grade. During the modeled flood event, floodwaters would completely encompass the fire department as well as the surrounding area.

Note: Mitigation of floodprone fire departments has been identified as a Project, Chapter 15 Mitigation Strategies - Mitigation Project 1, within the 2022 Dorchester County HMP.

Loss estimations for critical and/or public facilities located within in the 1% annual chance flood event were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer were utilized to calculate the loss estimations for public facilities. Critical facilities loss estimates were derived from the [2019 Dorchester County Flood Risk Report](#). Total loss estimations by facility type include:

• County:	\$1,358,200
• Education:	\$2,466,200
• Emergency:	\$206,764
• Miscellaneous:	\$6,174,490
• Municipal:	\$952,400
• Utility:	\$300,000
Total:	\$11,458,054

Note: For a listing of all critical and public facilities within FEMA Flood Zones and detailed loss estimations, please refer to the 2022 Dorchester County All-Hazard Mitigation Plan.

Additional Flood Risk Report (FRR) Hazus Analysis- Debris Generation & Projected Shelter Needs

- A total of 7,828 tons of debris will be generated in the County from the 1-percent-annual-chance flood event. Of the total amount, Finishes comprise 77% of the total, structures comprise 9% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require **313 truckloads (@25 tons/truck) to remove the debris generated by the flood.**
- Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates **1,112 households will be displaced** due to the flood. Displacement includes households evacuated from within, or very near, to the inundated area. Of these, **1,737 people (out of a total population of 32,618) will seek temporary shelter in public shelters.**

Essential facilities, sometimes called “critical facilities,” are those whose impairment during a flood could cause significant problems to individuals or communities. For example, when a community’s wastewater treatment is flooded and shut down, not only do contaminants escape and flow into the floodwaters, but backflows of sewage can contaminate basements or other areas of the community. Similarly, when a facility such as a hospital is flooded, it can result in a significant hardship on the community not only during the event but long afterwards as well.

Reasons these facilities are considered essential include:

- Costly and specialized equipment may be damaged and need to be replaced.
- Impairments to facilities such as fire stations may result in lengthy delays in responding and a focus on evacuating the facility itself.
- Critical records and information stored at these facilities may be lost.

Source: Dorchester County, Maryland Coastal Study - FLOOD RISK REPORT

4.2.4 Repetitive Loss Properties

Evidence of actual flood losses can be one of the most compelling factors for increasing a community’s flood risk awareness. One indicator is claims through the NFIP. A total of 54 FEMA Designated Repetitive Loss Properties and 3 Severe Repetitive Loss Properties have been identified in the unincorporated portions of Dorchester County and the City of Cambridge. According to information gathered from the First Responder Surveys conducted during this

planning process, repetitive flooding occurs between the communities of Toddville and Crocheron due to road elevation issues. Several repetitive loss properties are also located in this vicinity and was designated as part of the repetitive loss area. Another area containing several critical and public facilities as well as repetitive loss properties and has been identified for repetitive flooding is the area between communities Honga and Hoopersville. Tidal flooding affects roadways in this area, which is concerning since these roadways are evacuation routes.

Due to the sensitivity of public disclosure for flood insurance claims, Repetitive and Severe Repetitive Loss Properties are only acknowledged herein but are not captured. The 2022 Dorchester County Hazard Mitigation Plan, Appendix K, a redacted “for official use only” includes National Flood Insurance Program (NFIP) and Repetitive and Severe Repetitive Loss Properties (RL & SRL) detailed information.

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.

A SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

(a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000;

(b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.

4.3 Storm Surge

According to the National Hurricane Center-Storm Surge Overview, **storm surge** is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 20 feet or more in some cases.

Figure 2-1: Storm Surge Overview

Storm surge

Cyclone winds can be deadly, but surging water levels can also threaten life

- High winds push sea water towards the coast



Source: NOAA, Met Office

- The cyclone makes landfall, water has nowhere to go but inland



© AFP

The southern portion of Dorchester County along with the Towns of Brookview, Church Creek, Eldorado, Vienna, Galestown, Secretary, and the City of Cambridge are affected by storm surge. In addition, unincorporated areas vulnerable to storm surge include the Neck District, Fishing Creek, Taylors Island, Hoopersville, Crocheron, Toddville, and Wingate.

The most recent Major Disaster Declaration for Maryland as a result a hurricane was in 2020.

President Joseph R. Biden, Jr. Approves Major Disaster Declaration for Maryland

Release Date:

February 4, 2021

WASHINGTON -- FEMA announced federal disaster assistance has been made available to the state of Maryland to supplement state and local recovery efforts in the areas affected by Tropical Storm Isaias from Aug. 3-4, 2020.

Federal funding is available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the Tropical Storm Isaias in Calvert, Dorchester, and St. Mary's counties.

Federal funding is also available on a cost-sharing basis for hazard mitigation measures statewide.

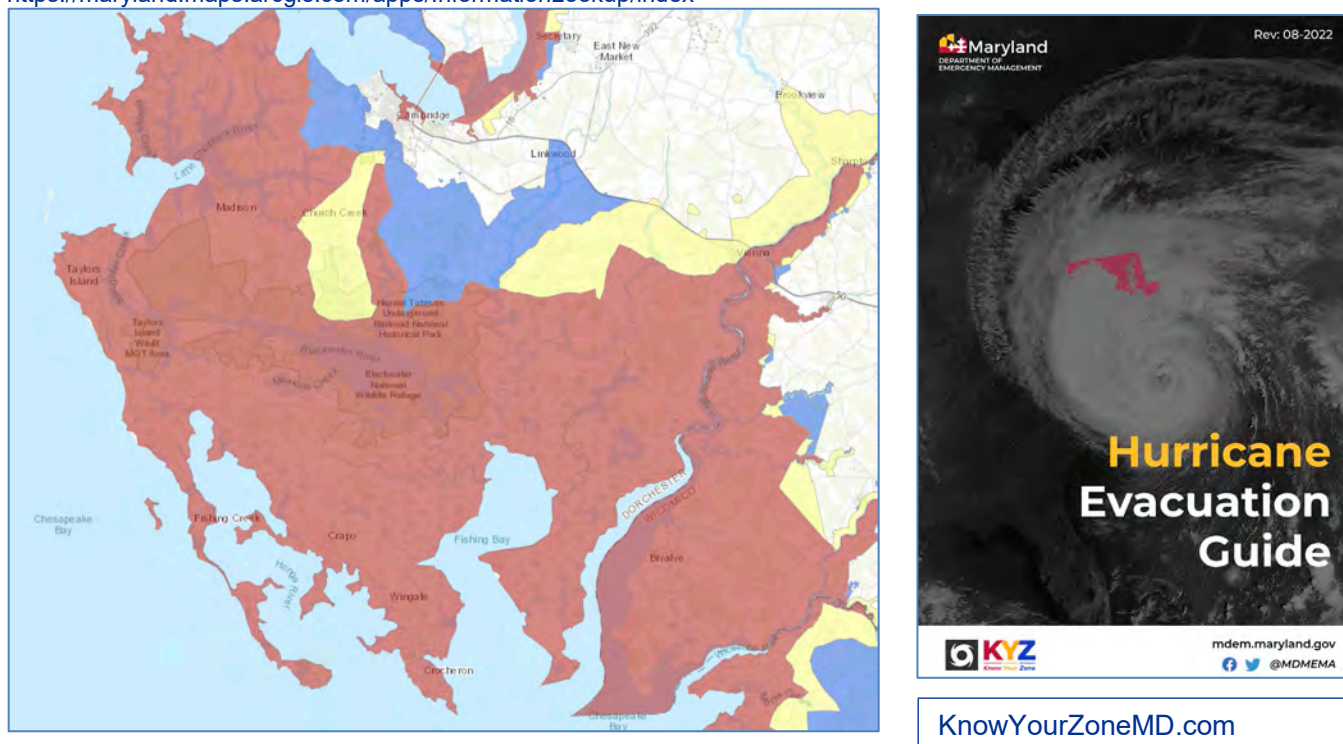
4.3.1 Storm Surge Risk

Dorchester County participates in the “Know Your Zone” evacuation initiative as part of Maryland’s Hurricane Evacuation Study. In the event that the Dorchester County Department of Emergency Services issues evacuation orders, zones to be evacuated would be announced by various media outlets. Zones are designated A through C and provide residents with clarity on whether they should evacuate in an emergency or shelter at home, based on their physical street address and the nature of the emergency event.

The three evacuation zones are from greatest to least risk of threat from wind speed, storm intensity, and storm surge. **Zone A, in red**, identifies the area’s most at risk, Zone B, yellow, are areas with a moderate risk, and Zone C, blue, are areas least at risk. Areas further inland that are not color coded are not expected to evacuate in any storm scenario. A local map of the Dorchester County evacuation zones can be found at www.knowyourzonemd.com.

Tiered evacuation zones were developed in close coordination with local emergency managers throughout these **high-risk areas**, based on the most current engineering data for their regions.

Figure 4.2: Maryland Hurricane Evacuation Lookup Tool
<https://maryland.maps.arcgis.com/apps/InformationLookup/index>



4.3.2 Storm Surge Vulnerability

The **2022 Dorchester County All-Hazards Mitigation Plan**, Chapter 6 Coastal Hazards, contains extensive information on hurricane storm surge inundation areas, including vulnerability and risk. The 2022 HMP identified 138 critical and/or public facilities by facility type within the storm surge risk area as follows:

- County: 10
- Education: 7

• Emergency:	11
• Medical:	1
• Miscellaneous:	83
• Municipal:	16
• Utility:	10
Total:	138

Thirty-seven (37) critical and/or public facilities located within the City of Cambridge are at-risk to storm surge while seventeen (17) facilities within the Town of Vienna are at-risk. The Town of Church Creek contains eleven (11) at-risk critical and/or public facilities. The remaining seventy three (73) critical and/or public facilities are located throughout the County, specifically in the southern portion.

Loss estimations for critical and/or public facilities located within each Storm Surge inundation area were calculated within the 2022 HMP. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer were utilized to calculate the loss estimations for critical and public facilities at risk to storm surge. Total loss estimations for hurricane categories are as follows:

• Category 1:	\$13,282,890
• Category 2:	\$5,238,100
• Category 3:	\$8,765,760
• Category 4:	\$22,182,160
Total:	\$49,468,910

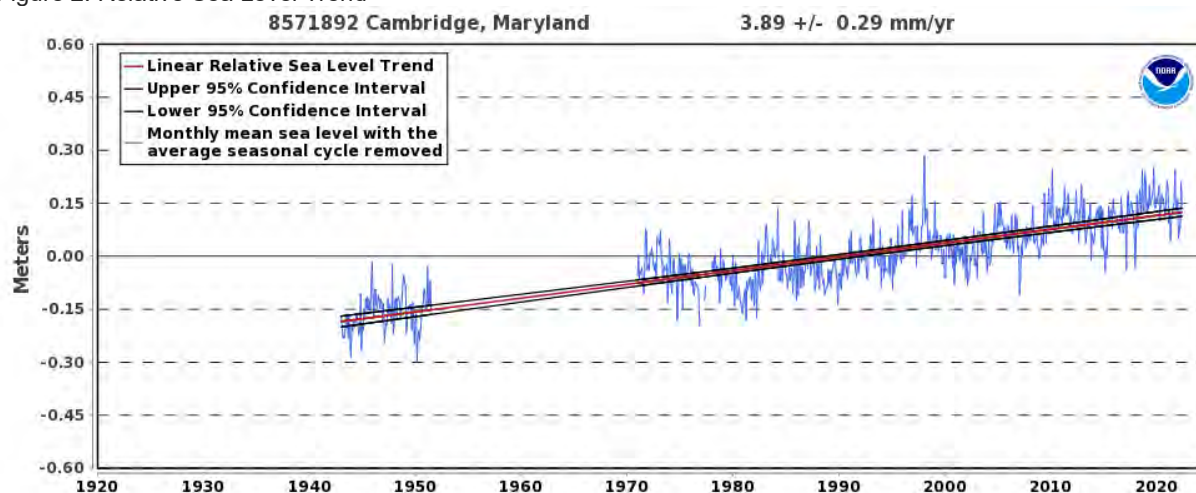
Note: If a Category 1 Hurricane impacts a facility, then higher Hurricane Categories would impact it as well.

4.4 Sea Level Rise

In the past, flood mitigation planning for Dorchester County focused primarily on current conditions. This focus assumes that weather and tidal conditions will fall within the known historical range, which includes a stable sea level. Rising sea level, while perceived as a future condition, affects planning for both today and tomorrow. According to the [2018 Sea-level Rise Projections for Maryland](#), rates of sea-level rise increasingly depend on the future pathway of global emissions of greenhouse gases during the next sixty years. If emissions continue to grow well into the second half of the 21st century, the “likely” range of sea level rise experienced in Maryland is 2.0 to 4.2 feet over this century. This range of sea level rise is concerning for the future of Dorchester County, with its low-lying coastal area, much of which is at or near sea level.

Likely means a two-thirds chance of sea-level rise within that range.

Figure 2: Relative Sea Level Trend



The relative sea level trend is 3.89 millimeters/year with a 95% confidence interval of +/- 0.29 mm/yr based on monthly mean sea level data from 1943 to 2021 which is equivalent to a change of 1.28 feet in 100 years.

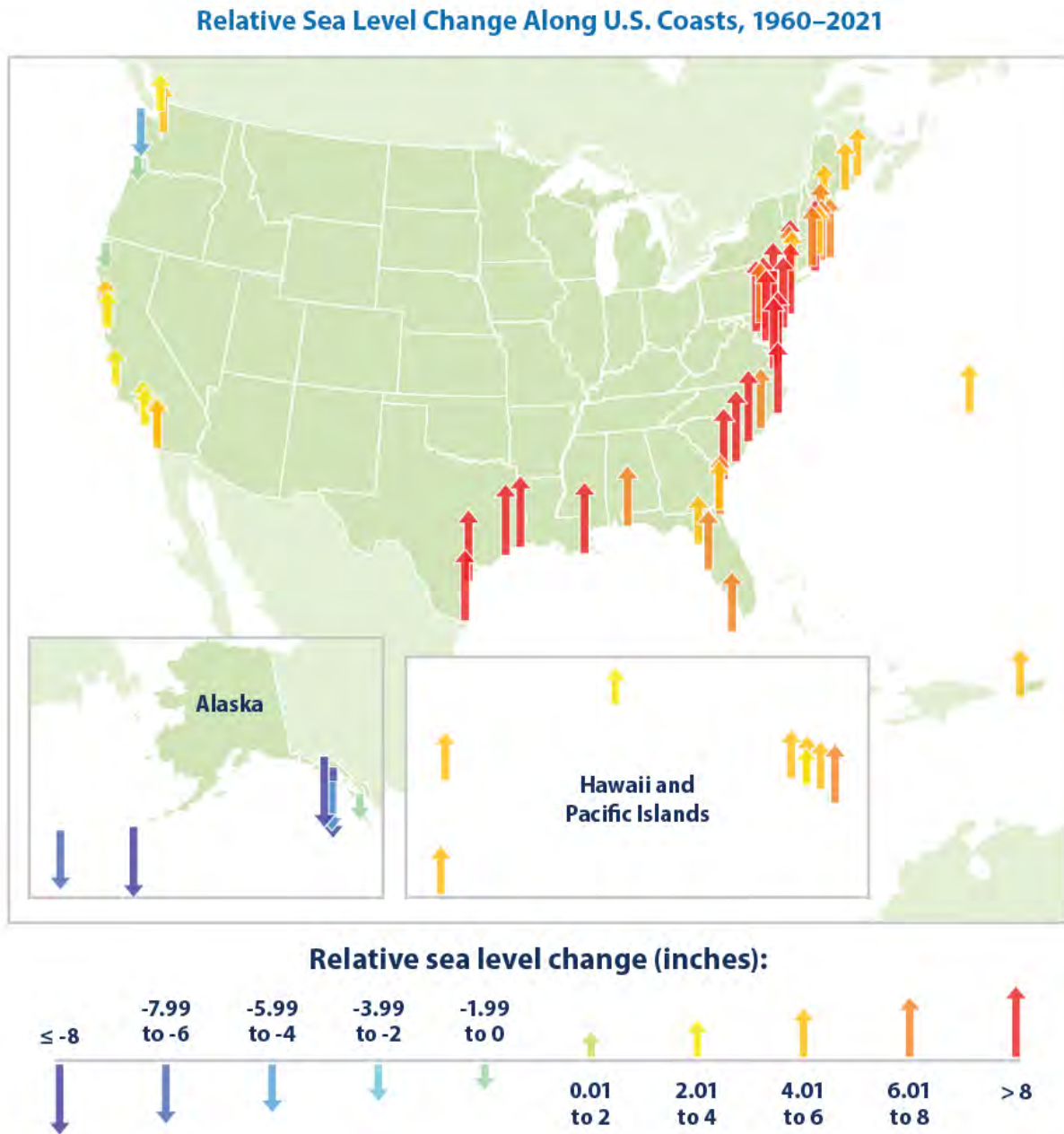
Source: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8571892

According to the Climate Institute, the protection of natural barrier islands, are the first line of defense against storm surge. Areas that no longer have these natural barriers may consider reconstruction or artificial breakwaters. As an example, New York City has erected artificial breakwaters offshore, which also serve as artificial reefs for marine life if oceanic conditions permit. Other mitigation options include artificial seawalls and levee structures, as well as the importance of shoreline and wetland restoration for flood mitigation.

Higher sea levels pose a threat to both the natural and built environment. With higher sea levels coastal erosion, seawater inundation of wetlands and low-lying residential areas, and an increase to the risk of damaging storm surges are expected. Buildings, transportation networks and infrastructure are all at-risk. Areas inundated in the past by floodwaters, that rise and then recede, may in the future become areas of permanent inundation, completely submerged due to sea level rise.

Source: *Climate Institute*

Figure 3: Relative Sea Level Change along US Coasts, 1960-2021



Data source: NOAA (National Oceanic and Atmospheric Administration). 2022 update to data originally published in: NOAA. 2009. Sea level variations of the United States 1854–2006. NOAA Technical Report NOS CO-OPS 053. www.tidesandcurrents.noaa.gov/publications/Tech_rpt_53.pdf.

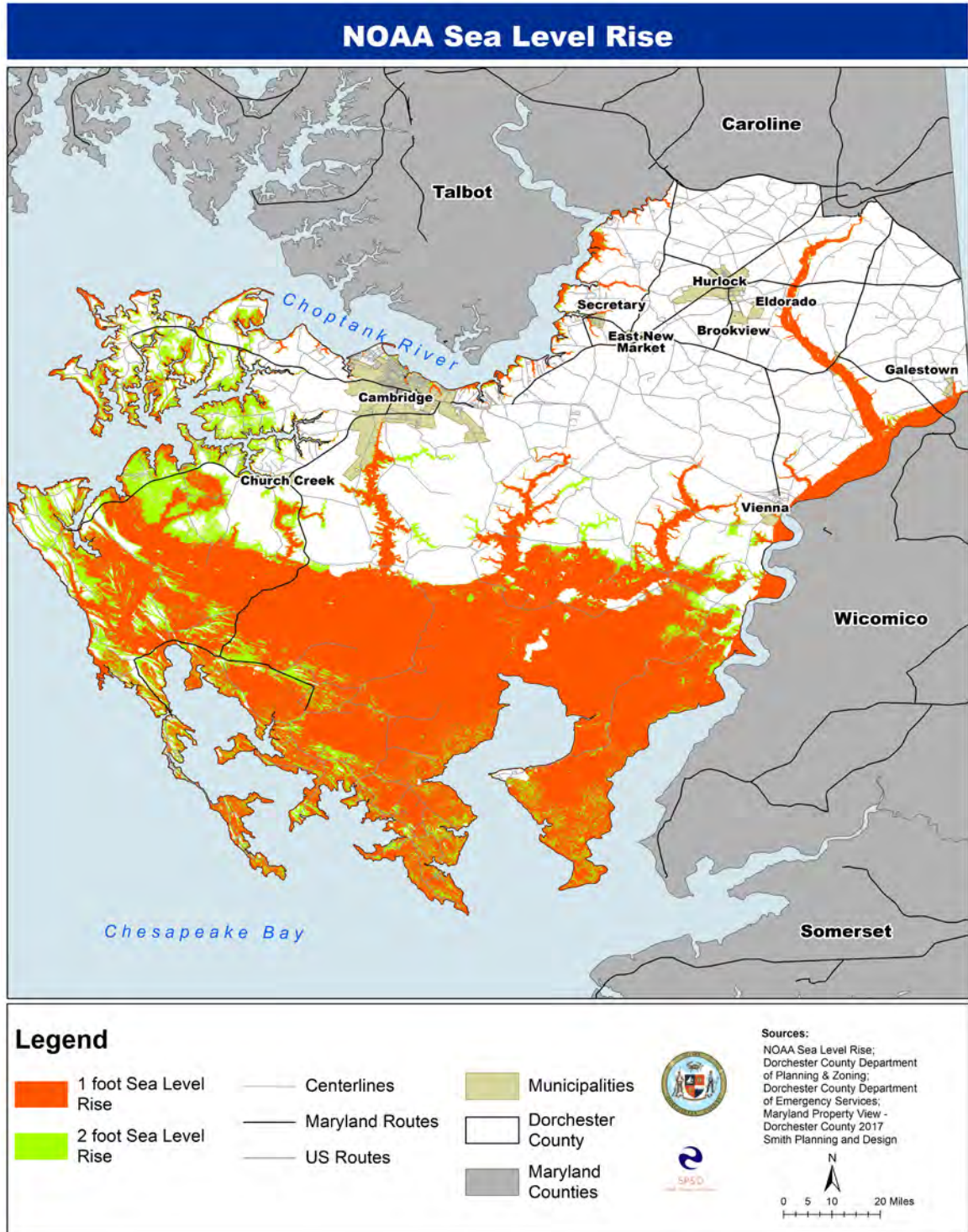
For more information, visit U.S. EPA’s “Climate Change Indicators in the United States” at www.epa.gov/climate-indicators.

The Union of Concerned Scientists is working in partnership with several environmental justice organizations to contribute scientific information and collaboratively develop policy recommendations that will help communities on the front lines of climate change prepare for and cope with its effects—from dangerous storms to repeated tidal flooding. Dorchester County was one of the five highlighted communities by the Union of Concerned Scientists along the U.S. East and Gulf Coasts that face the growing threats from sea level rise and storm surge.

Dorchester’s low-lying landscape of tidal marshes, narrow peninsulas, and county roads linking isolated communities is threatened by rising seas and sinking land. More than a foot of sea-level rise projected 2045 will worsen saltwater intrusion, damage roads, bridges, and infrastructure; and harm the region’s agriculture and seafood industry.

Source: Union of Concerned Scientist

4.4.1 Sea Level Rise Risk



4.4.2 Sea Level Rise Vulnerability

The **2022 Dorchester County All-Hazards Mitigation Plan**, Chapter 13 Climate Change, contains extensive information on sea level rise, including vulnerability and risk. For the vulnerability assessment, sea level rise projections provided in the 2018 Sea Level Projections for Maryland for 2050, ranging from 0.8 to 1.6 feet and the 2019 NOAA Sea Level Rise data were used. NOAA's 1 foot and 2 feet of sea level rise data layers were used for the vulnerability assessment.

The 2022 HMP identified 62 critical and/or public facilities by facility type within the 1- and 2-foot sea level rise inundation areas as follows:

- County: 1
- Emergency: 4
- Miscellaneous: 56
- Municipal: 1
- Total: 62**

Loss estimations for critical and/or public facilities located within sea level rise inundation areas were calculated within the 2022 HMP. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer were utilized to calculate the loss estimations for critical and public facilities at risk to sea level rise. Total loss estimations are as follows:

- County: \$18,900
- Emergency: \$1,065,300
- Miscellaneous: \$2,269,100
- Municipal: \$95,100
- Total: \$3,448,400**

Note: 1 and 2 feet of sea level rise were used for the vulnerability assessment. These sea level rise depths reflect permanent flood inundation area(s), they do not account for increased storm activity or storm surge.

4.5 Erosion, Sediment Control & Expansive Soils

Erosion occurs along stream banks and shorelines when the volume and velocity of water flow or wave action destabilize and wash away the soil. Additionally, surface water runoff can erode soil from construction sites, sending sediment into downstream waterways. Sediment tends to settle when the water flow slows down and can clog storm sewers, culverts and ditches leading to reductions in water transport and storage capacity of rivers, stream channels, and wetlands. The Dorchester County Soil Conservation District has the authority to review, approve, exempt, or waive an erosion and sediment control plan prior to the issuance of a grading permit or building permit.

The lower two-thirds of Dorchester County is characterized by nearly level lowlands composed of loosely consolidated, windblown materials overlying alluvial and marine deposits. Soil types have an important role in determining how flooding will affect the landscape, and whether erosion will be a significant risk. Seventeen (17) soil types found within Dorchester County are susceptible to the effects of sea level rise. Eleven of these soils possess K factors, the soil-erodibility factor, greater than 0.35 in the upper two feet of their profiles: Chicone, Elkton, Hambrook, Keyport, Matapeake, Mattapex, Nanticoke, Othello, Kentuck, Sassafra, and Sunken. The potential for erosion increases since each of these soils has a high K factor.

Erosion and sediment control regulations are contained within the County Code-Chapter 10 Grading, Erosion, and Sediment Control. In addition, Chapter 133 of the County Code contains regulations of Shore Erosion Control Districts. Any property within the County that abuts or borders a body of water constitutes the shore erosion control district. In these areas shore erosion control measures must be constructed/ implemented to prevent erosion into the Chesapeake Bay and its tributaries or by any other stream or body of water in Dorchester County.

Soil types belonging to Group D soils, have a very slow infiltration rate (high runoff potential) when wet. These consist primarily of clays that have high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water

EXPANSIVE SOILS

Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When they absorb water, they increase in volume. The more water they absorb, the more their volume increases. Expansions of ten percent or more are not uncommon. This change in volume can exert enough force on a building or other structure to cause damage.

Cracked foundations, floors, and basement walls are typical types of damage done by swelling soils. Damage to the upper floors of the building can occur when motion in the structure is significant.

Expansive soils will also shrink when they dry out. This shrinkage can remove support from buildings or other structures and result in damaging subsidence. Fissures in the soil can also develop. These fissures can facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling which places repetitive stress on structures.

The American Society of Civil Engineers estimates that 1/4 of all homes in the United States have some damage caused by expansive soils. In a typical year in the United States, they cause a greater financial loss to property owners than earthquakes, floods, hurricanes, and tornadoes combined.

Source: [geology.com/articles/expansive-soil.shtml](https://www.geology.com/articles/expansive-soil.shtml)

transmission. The soils highlighted in blue are soils that experience frequent flooding and are subject to the effects of sea level rise.

Table 4-5

Expansive Soils			
Soil Type	Rating	Acres in County	Percent of County
Beaches	D	92.3	0%
Bestpitch and Transquaking Soils	D	29,315.9	4.7%
Chicone Mucky Silt Loam	D	1,659.4	0.3%
Fluvaquents	D	2,561.5	0.4%
Honga Peat	D	46,142.2	7.4%
Keyport Silt Loam	D	5,107.0	0.8 %
Nanticoke & Mannington Soils	D	1,041.5	0.2%
Othello and Kentuck Soils	D	17,939.4	2.9%
Puckum Muck	D	7,192.3	1.1%
Sunken Mucky Silt Loam	D	19,858.0	3.2%
Total	D	130,909.5	21.0%

MUNICIPALITIES

Flood, Storm Surge, and Sea Level Rise risk and vulnerability discussion and mapping for reach municipality are presented on the following pages. In addition, the following data table has been included as an overview of flood (coastal and riverine.) The *State of Maryland Flood Risk Report, Dorchester County, Maryland published December 31, 2019*, for **coastal and riverine flood** report the following information.

Community Name	# of Buildings Impacted	1% Flood Loss Estimate ¹	Flood Losses Per Capita	% of Total Countywide Flood Loss Estimate
Dorchester (Unincorporated Areas)	2,274	\$34,000,00	\$2,047	92%
Brookview	0	0	0	0
Cambridge	126	\$2,650,000	\$215	7%
Church Creek	7	\$60,000	\$480	<1%
East New Market	0	0	0	0
Eldorado	5	\$20,000	\$339	<1%
Galestown	2	\$10,000	\$72	<1%
Hurlock	4	\$40,000	\$19	<1%
Secretary	18	\$90,000	\$168	<1%
Vienna	4	\$240,000	\$886	<1%
Total	2,440	\$37,110,000	\$1,138	100%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

Note: The Towns of Brookview and East New Market are not included in this report since they have no buildings with measurable flood losses within the regulatory 1-percent-annual-chance Special Flood Hazard Areas (SFHAs). Additionally

4.6 Town of Brookview

Brookview is a small town located in northeastern Dorchester County along Marshy Hope Creek, a tributary to the Nanticoke River. It is located at the intersection of Maryland State Routes 14 and 260, near the Town of Eldorado.

Note: Town of Brookview flood risk and vulnerability mapping is presented on the following pages.

4.6.1 Flood Risk and Vulnerability

The Town of Brookview does not contain at-risk structures within the regulatory 1% annual chance Special Flood Hazard Areas (SFHAs). The Town of Brookview contains an area of risk, however the risk area is 0.1 square miles, and no structures were within the 1% annual chance flood scenario according to the Hazus flood model.

The State of Maryland Flood Risk Report, Dorchester County, Maryland published December 31, 2019,

4.6.2 Storm Surge Risk and Vulnerability

Storm surge mapping for the Town of Brookview indicates that while many parcels are located within the hurricane storm surge inundation areas, the majority of the properties, building footprints (all and/or partially located), are located outside of this area, towards the street-side front footage, with the exception of the following.

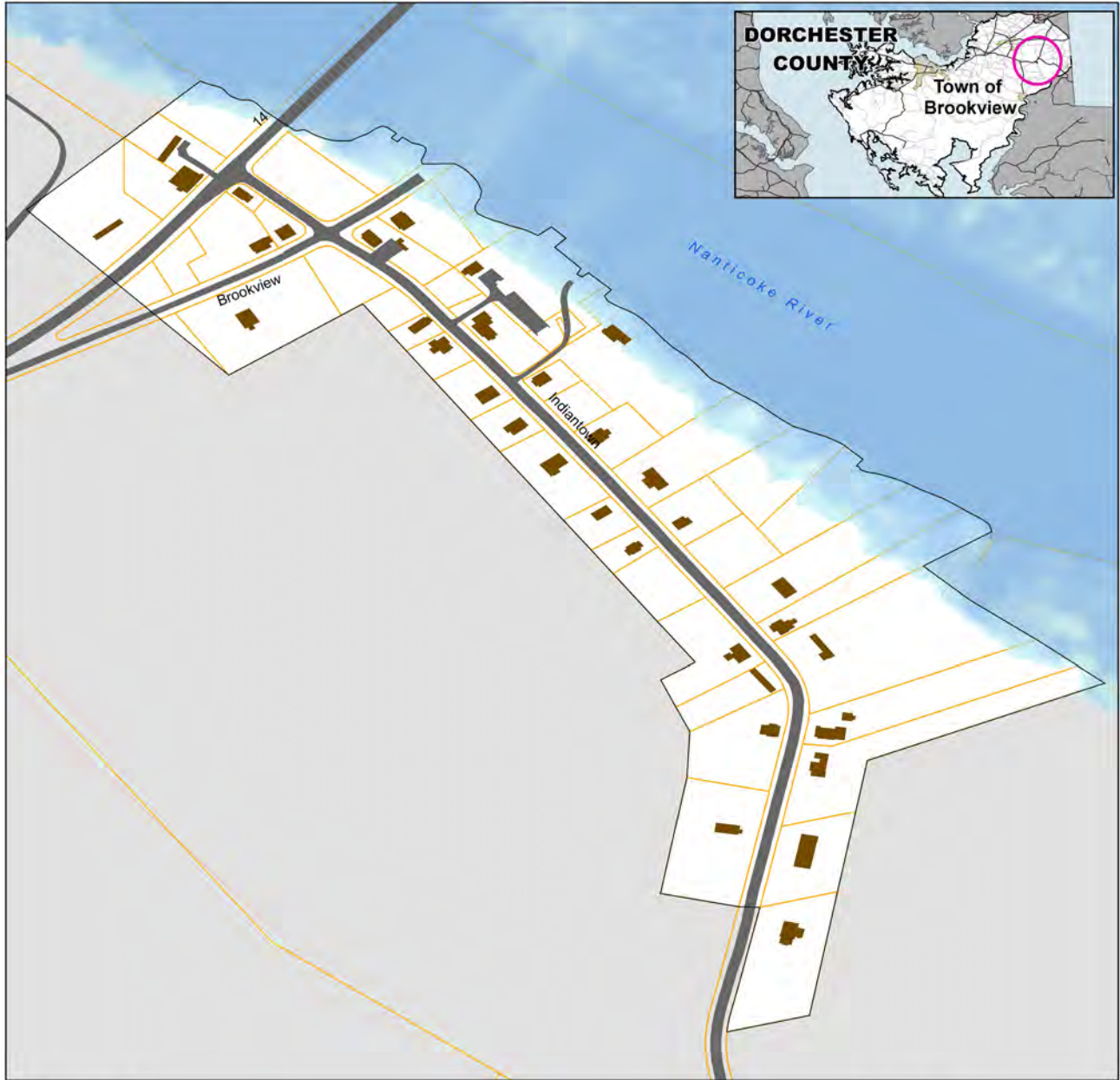
- Hurricane Category 1: (0)
- Hurricane Category 2: (1) Building
- Hurricane Category 3: (3) Buildings
- Hurricane Category 4: (5) Buildings
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (9)

4.6.3 Sea Level Rise Risk and Vulnerability

Both sea level rise projected inundation areas, 1-and 2-foot, crosses town limits and into several parcels, however the inundation area does not affect any buildings. The sea level rise map illustrates inundation areas from the Nanticoke River in the northeastern portion of the Town.

Note: Town of Brookview flood risk and vulnerability mapping is presented on the next few pages.

1% Annual Chance Flood - Town of Brookview



Legend

**1% Annual
Chance Flood
Hazard Area**

Flood Depth
High : 54.3'
Low : 0.5'

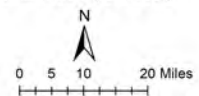
 Buildings
Footprints
 Parcels
 Town of
Brookview

 Streets
 US Routes
 Dorchester
County

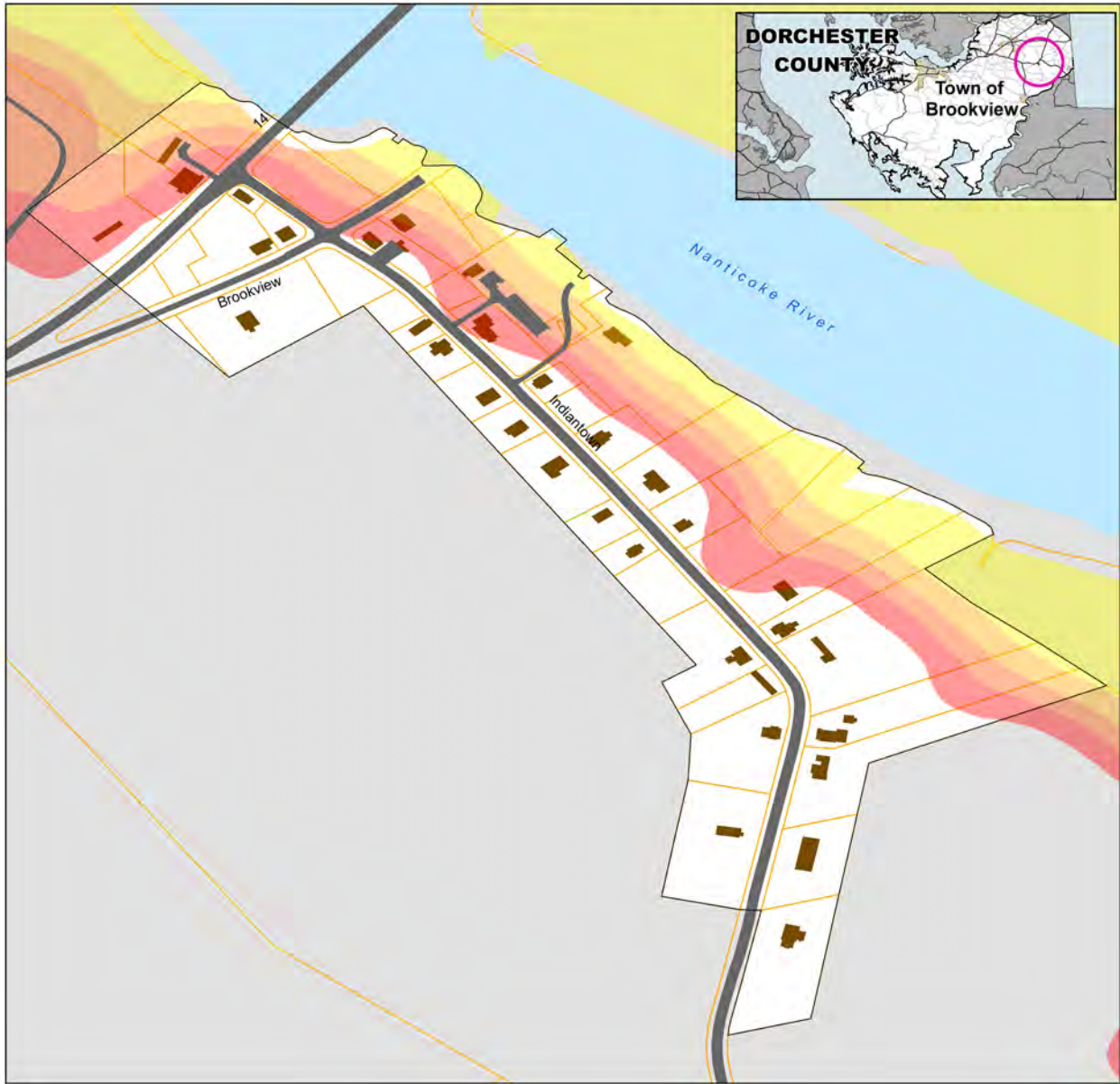


Sources:

FEMA Depth Grids;
Dorchester County Department
of Planning & Zoning;
Dorchester County Department
of Emergency Services;
Maryland Property View -
Dorchester County 2017
Smith Planning and Design



Storm Surge - Town of Brookview



Legend

Storm Surge

Hurricane Categories

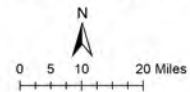
- Category 1
- Category 2
- Category 3
- Category 4

- | | |
|---|--|
| Buildings Footprints | Streets |
| Parcels | US Routes |
| Town of Brookview | Dorchester County |

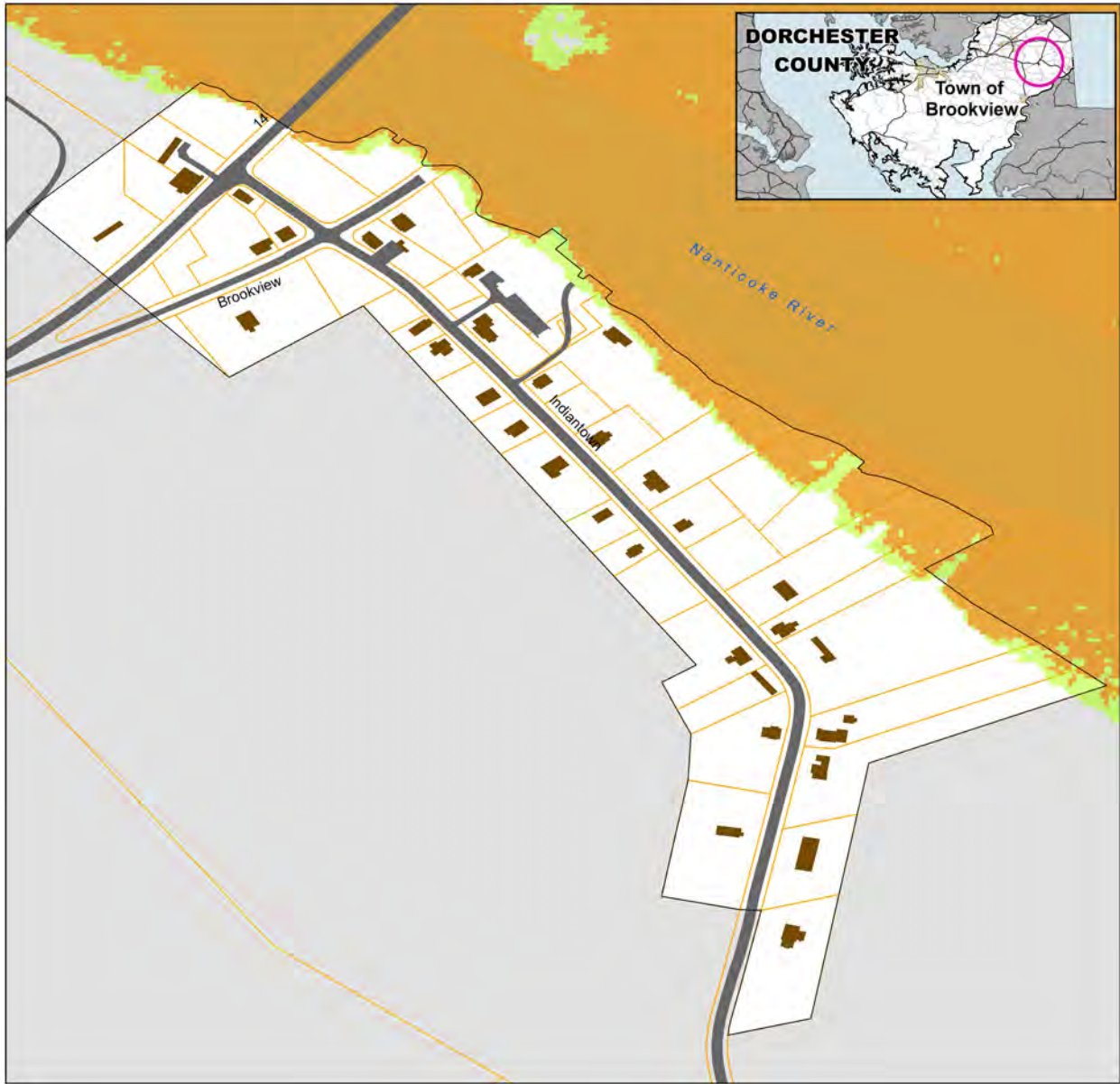


Sources:









NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



Sea Level Rise - Town of Brookview



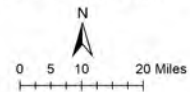
Legend

- | | | | |
|---|-----------------------|---|-------------------|
|  | 1 foot Sea Level Rise |  | Town of Brookview |
|  | 2 foot Sea Level Rise |  | Streets |
|  | Buildings Footprints |  | US Routes |
|  | Parcels |  | Dorchester County |



Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



4.7 City of Cambridge

The City of Cambridge is the largest incorporated community in Dorchester County and serves as the County seat. It is located in the northern part of the County on the Choptank River. U.S. Route 50 provides access to the town from areas north and west of the city.

4.7.1 Flood Risk and Vulnerability

The Town of Cambridge's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 2.2 (Coastal) for Flood Risk Project Refined Data), which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

City of Cambridge: Estimated Potential Losses for Flood Event Scenario

Table 4-6

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	115	\$25,900,000	73%	\$1,500,000
Commercial Building & Contents	7	\$3,200,000	9%	\$700,000
Other Building & Contents	4	\$6,200,000	18%	\$400,000
Total Building & Contents ²	126	\$35,300,000	100%	\$2,600,000
Business Disruption ³	N/A	N/A	N/A	\$50,000
TOTAL ⁴	126	\$35,300,000	100%	\$2,650,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

The City of Cambridge's projected growth area is to occur beyond the southeast corporate limit. Diverting growth toward the southeast mitigates development in the 100-year floodplain.

4.7.2 Storm Surge Risk and Vulnerability

Hurricane Storm Surge has the potential to impact a large portion of the City of Cambridge. The entire southern portion of Cambridge is at-risk to hurricane storm surge. Structures within hurricane storm surge categories throughout the City of Cambridge include:

- Hurricane Category 1: (132) Buildings
- Hurricane Category 2: (197) Buildings
- Hurricane Category 3: (304) Buildings
- Hurricane Category 4: (1,194) Buildings
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (1,827)

Buildings. Totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

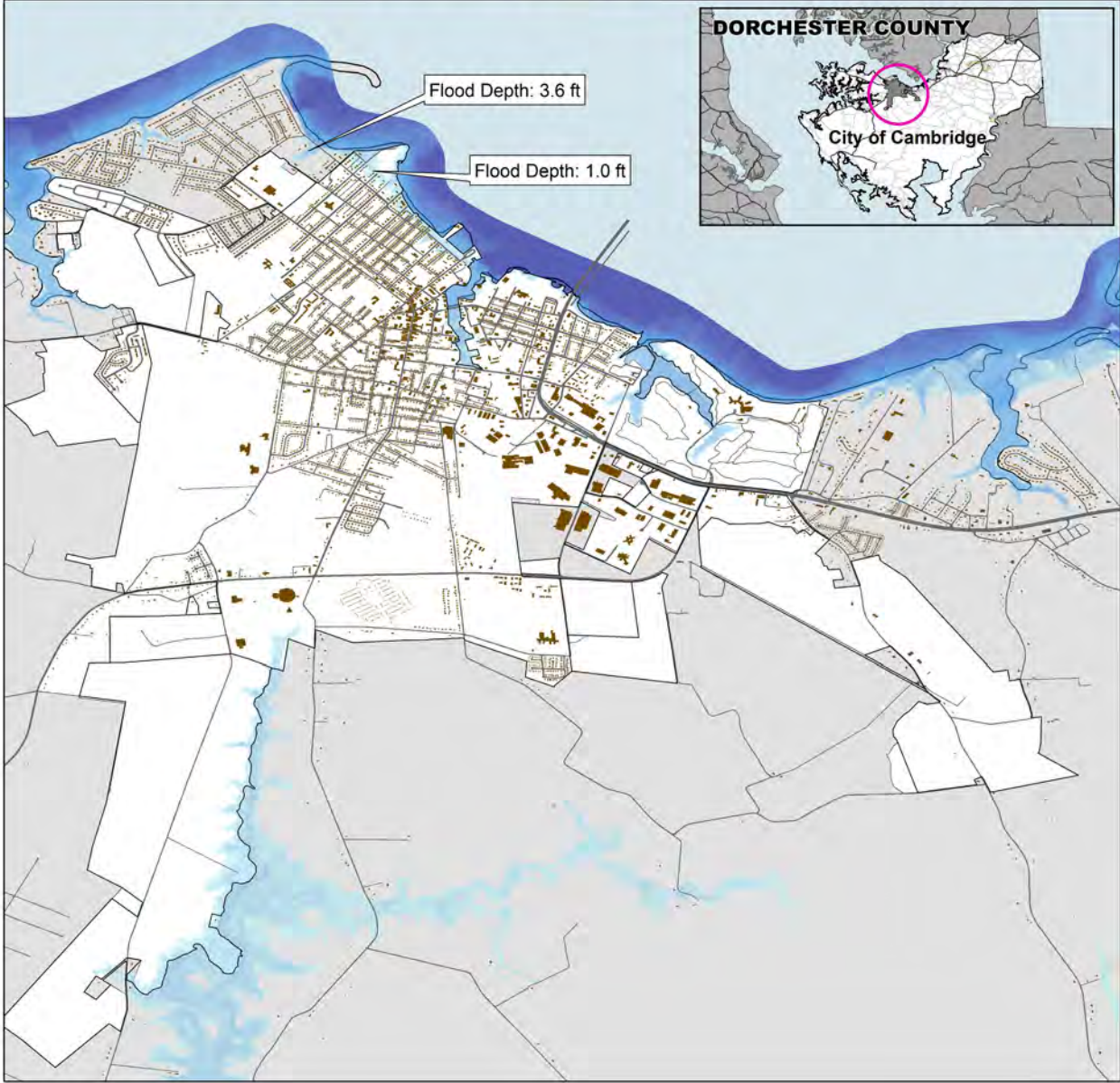
4.7.3 Sea Level Rise Risk and Vulnerability

NOAA's 1- and 2- foot sea level rise inundation areas have the potential to impact portions of the City of Cambridge, mainly along the Choptank River. Structures within 1- and 2-foot sea level rise inundation areas throughout the City of Cambridge include:

- 1-Foot Sea Level Rise: 7 Buildings (4 Residential & 3 Commercial)
- 2-Foot Sea Level Rise: 56 Buildings (51 Residential & 5 Commercial)

Note: City of Cambridge flood risk and vulnerability mapping is presented on the following pages.

1% Annual Chance Flood - City of Cambridge



Legend

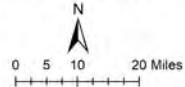
**1% Annual
Chance Flood
Hazard Area**

Flood Depth
High : 54.3'
Low : 0.5'

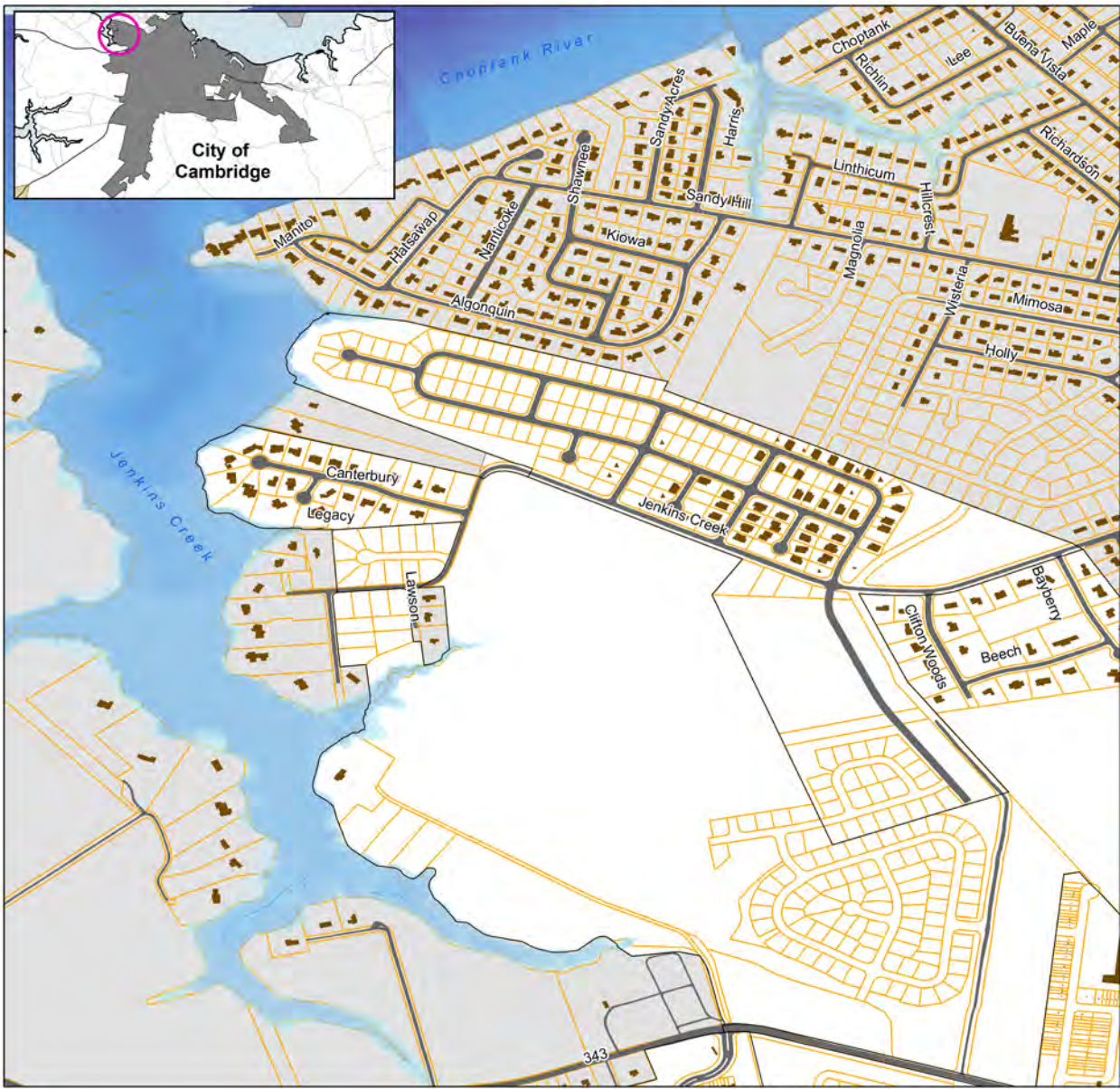
- Buildings Footprints
- City of Cambridge
- Streets
- US Routes
- Dorchester County



Sources:
FEMA Flood Zones;
Dorchester County Department
of Planning & Zoning;
Dorchester County Department
of Emergency Management Agency;
Maryland Property View -
Dorchester County 2013
Smith Planning and Design



1% Annual Chance Flood - City of Cambridge



Legend

1% Annual Chance Flood Hazard Area

Flood Depth
 High : 54.3'
 Low : 0.5'

	Buildings Footprints		Streets
	Parcels		US Routes
	City of Cambridge		Dorchester County




Sources:
 FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design

N



1% Annual Chance Flood - City of Cambridge



Legend

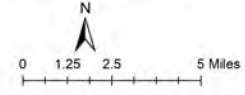
1% Annual Chance Flood Hazard Area

Flood Depth
 High : 54.3'
 Low : 0.5'

- Buildings Footprints
- Parcels
- City of Cambridge
- Streets
- US Routes
- Dorchester County

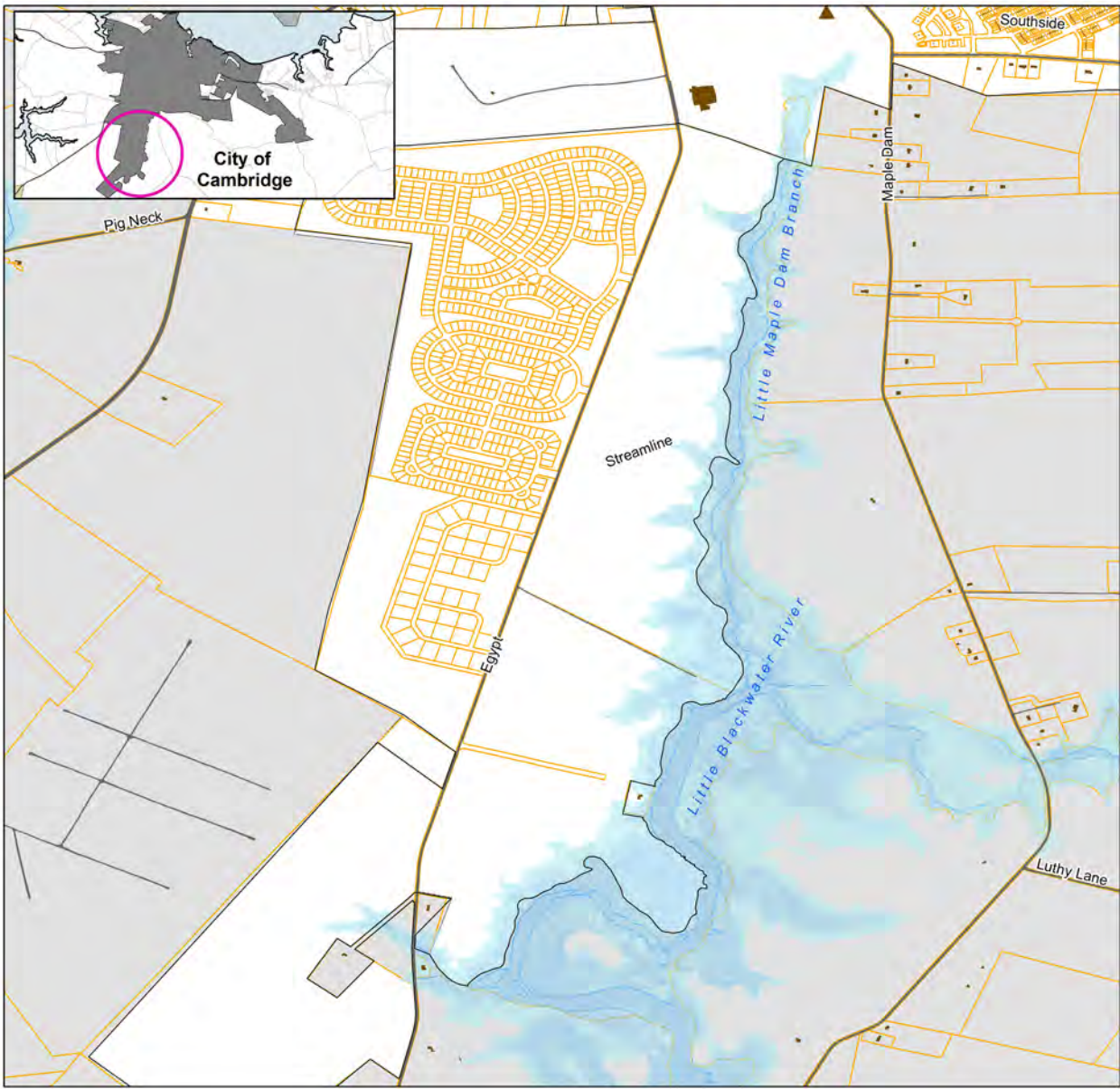


Sources:
 FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Management Agency;
 Maryland Property View - Dorchester County 2013
 Smith Planning and Design



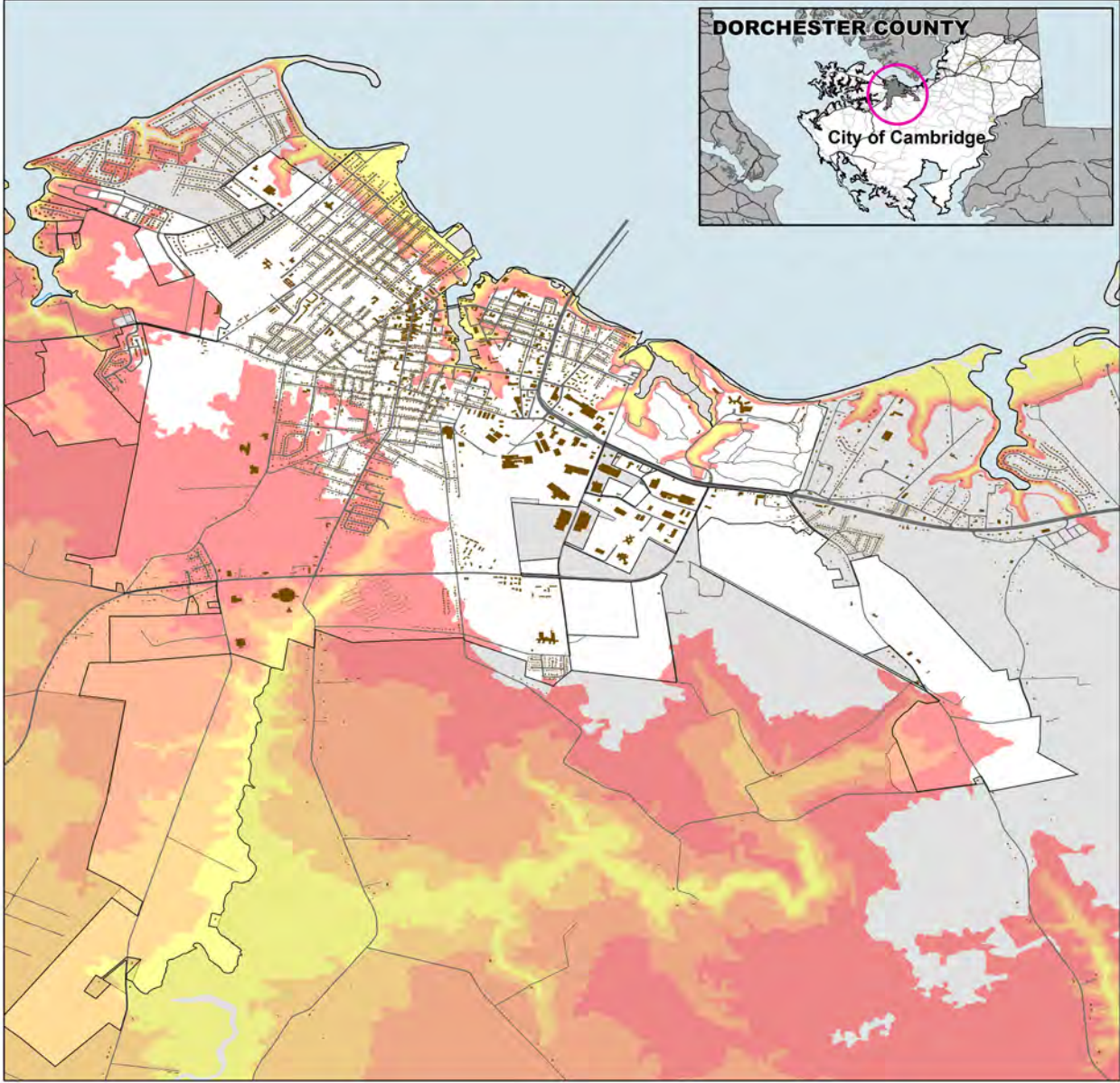


1% Annual Chance Flood - City of Cambridge



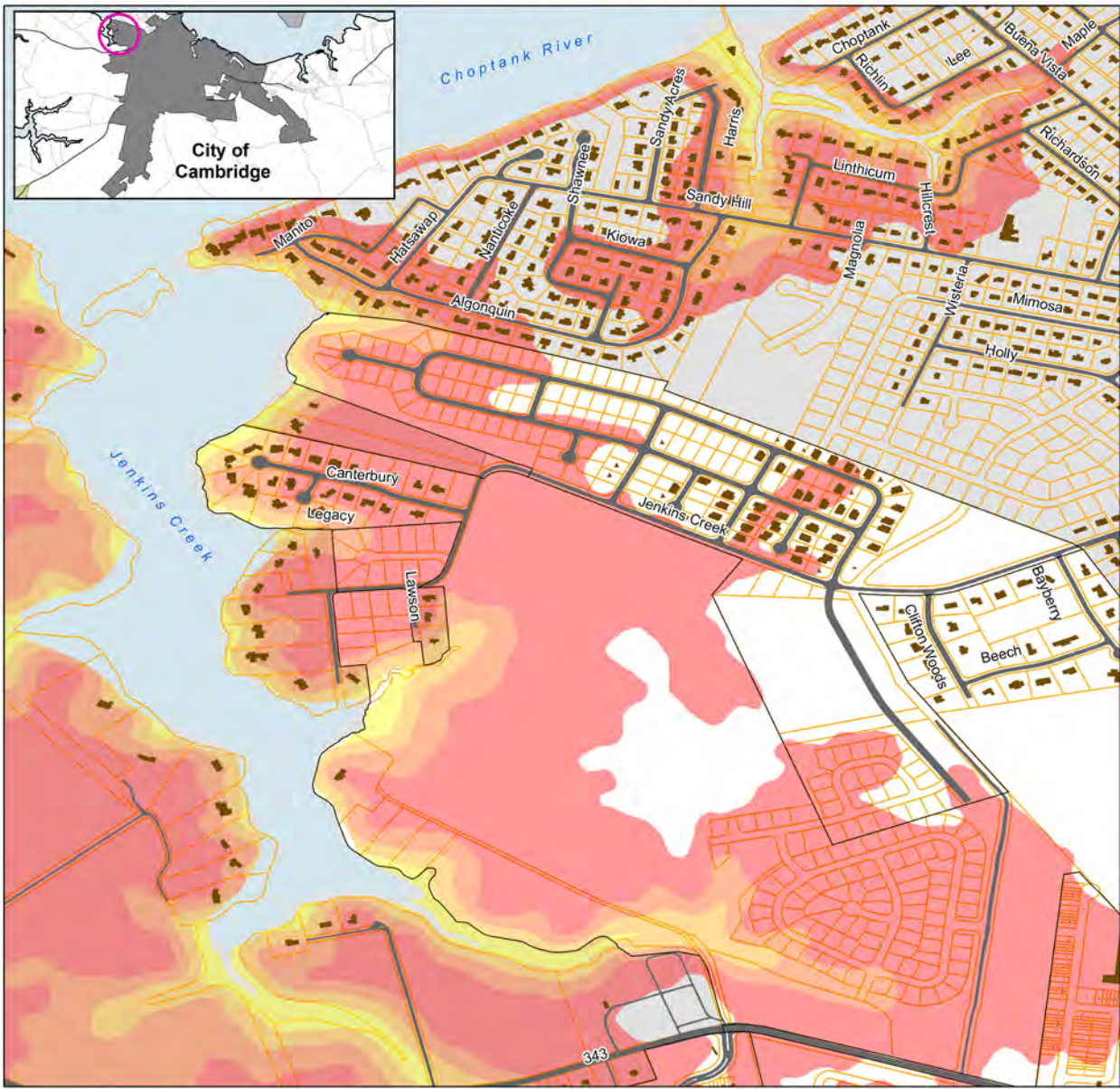
<p>Legend</p> <p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth High : 54.3' Low : 0.5'</p>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> Buildings Footprints</td> <td style="width: 50%;"> Streets</td> </tr> <tr> <td> Parcels</td> <td> US Routes</td> </tr> <tr> <td> City of Cambridge</td> <td> Dorchester County</td> </tr> </table>	 Buildings Footprints	 Streets	 Parcels	 US Routes	 City of Cambridge	 Dorchester County	 	<p>Sources: FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design</p> <div style="text-align: center;"> </div>
 Buildings Footprints	 Streets								
 Parcels	 US Routes								
 City of Cambridge	 Dorchester County								

Storm Surge- City of Cambridge



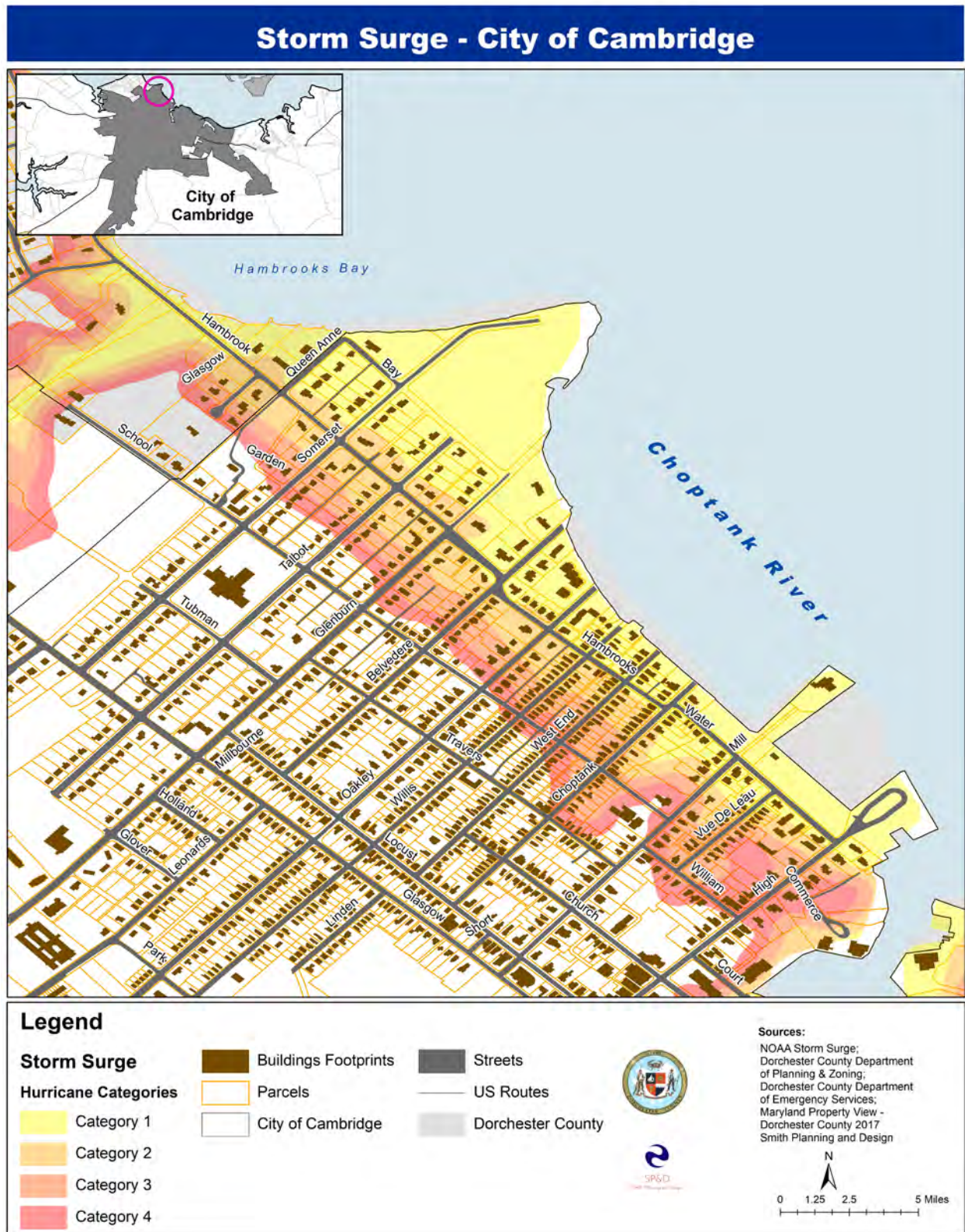
Legend				
Storm Surge	Buildings Footprints	Streets		Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
Hurricane Categories	City of Cambridge	US Routes		
Category 1		Dorchester County		
Category 2				
Category 3				 0 5 10 20 Miles
Category 4				

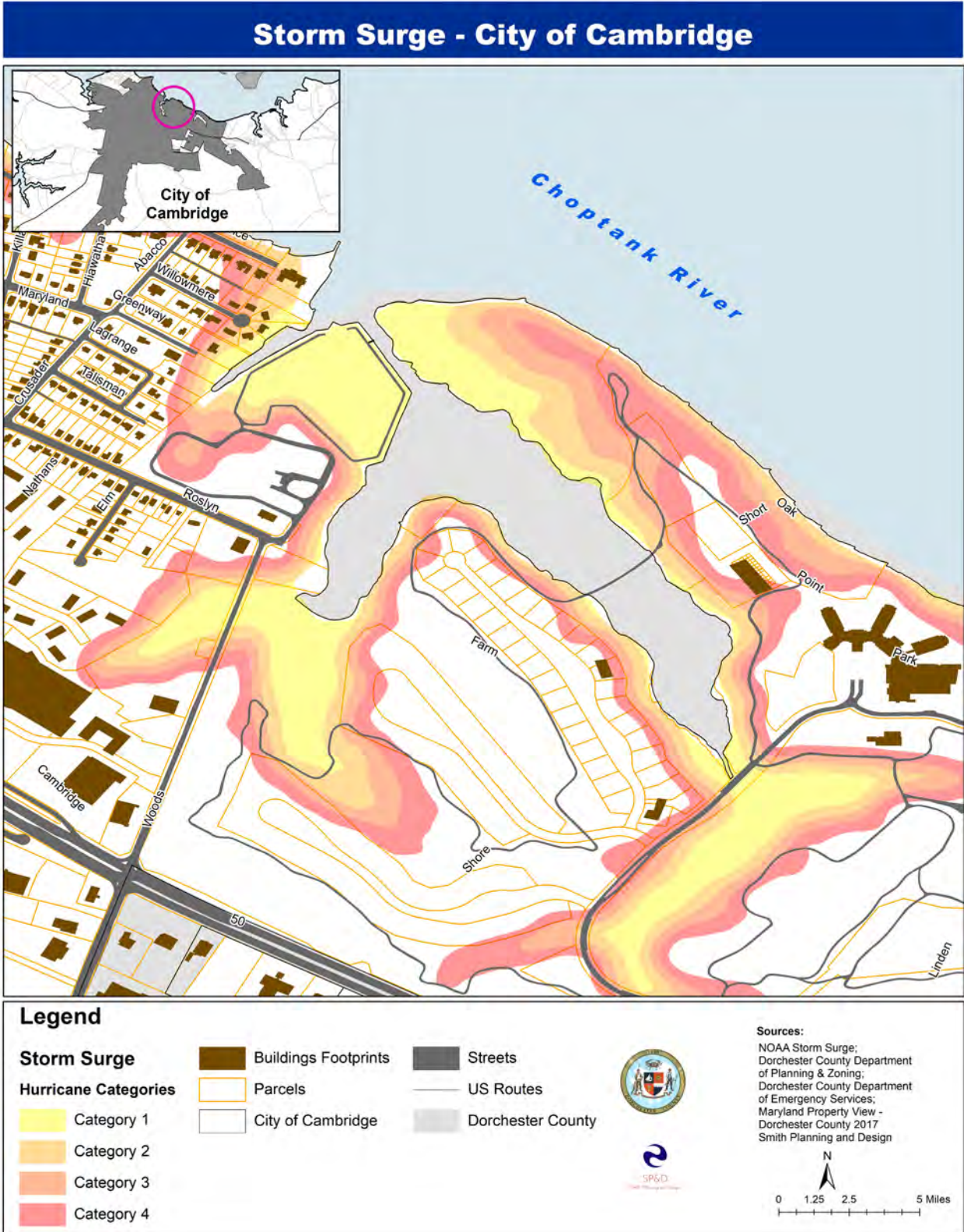
Storm Surge - City of Cambridge



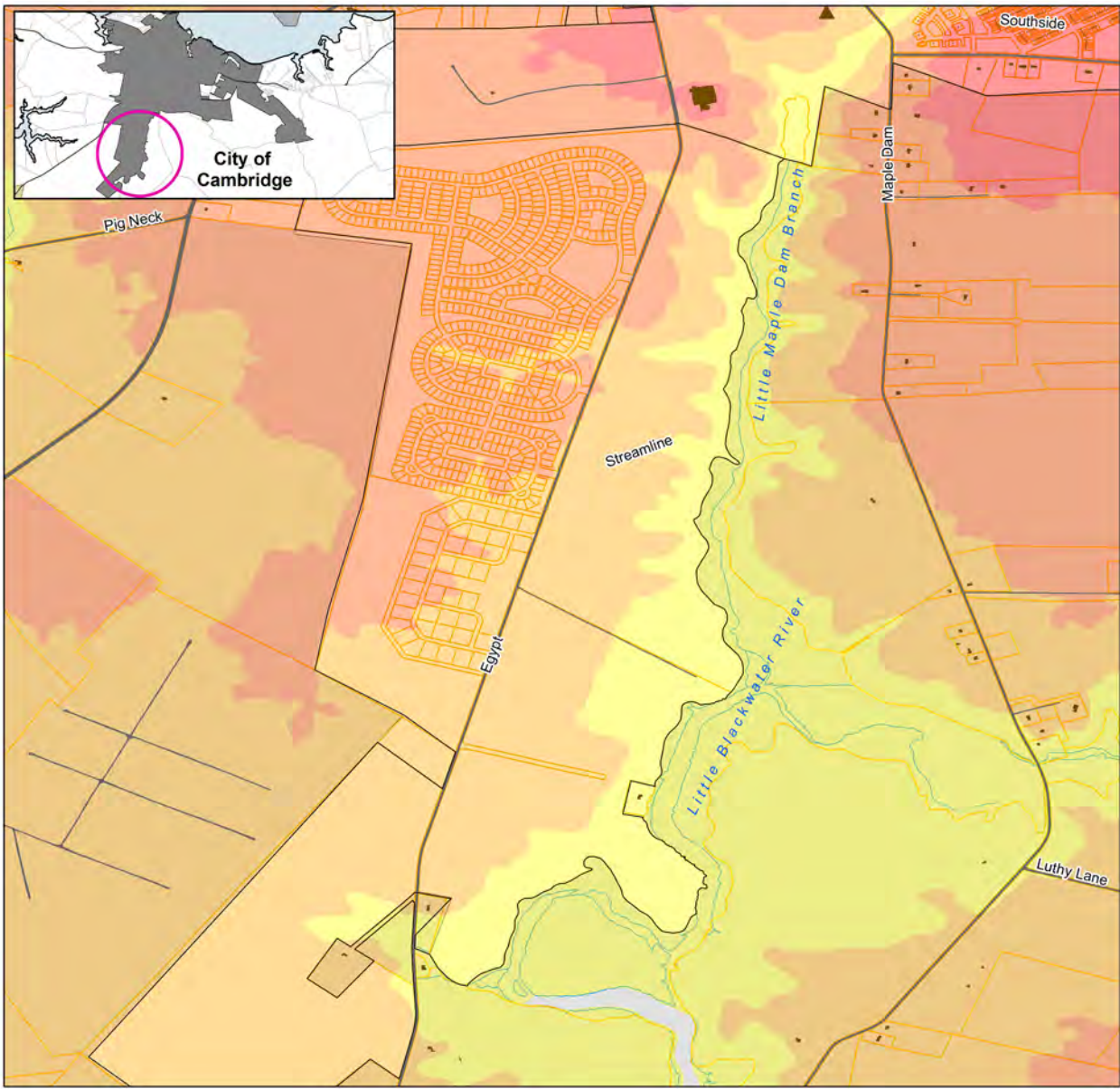
Legend			
Storm Surge	Buildings Footprints	Streets	  <small>Smith Planning and Design</small>
Hurricane Categories	Parcels	US Routes	
Category 1	City of Cambridge	Dorchester County	
Category 2			
Category 3			 
Category 4			

Sources:
 NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



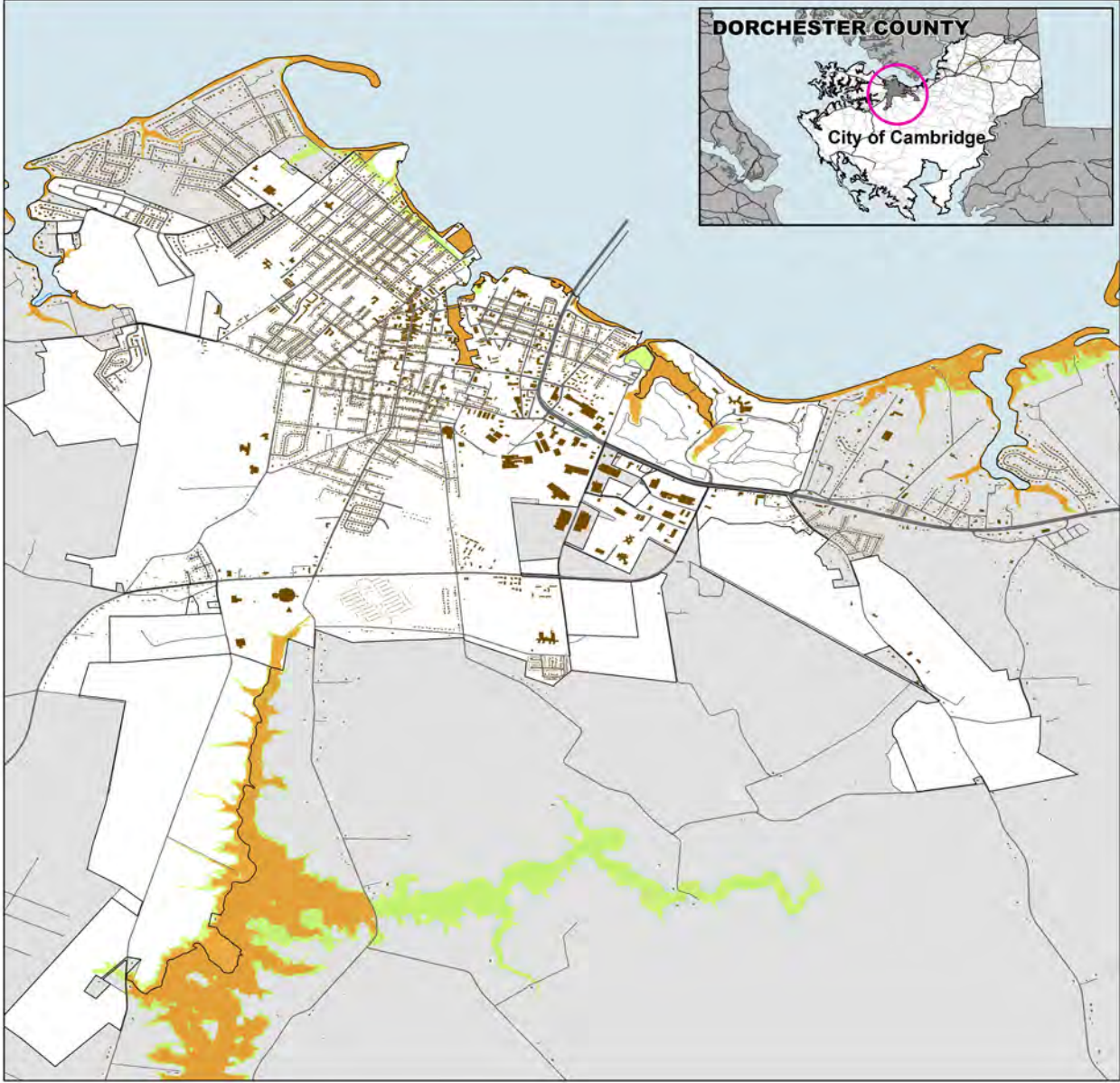


Storm Surge - City of Cambridge










Legend				
Storm Surge	 Buildings Footprints	 Streets		Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
Hurricane Categories	 Category 1	 US Routes		
	 Category 2	 Dorchester County		
	 Category 3			
	 Category 4	 City of Cambridge		
		 Parcels		
		 City of Cambridge		
				 

Sea Level Rise - City of Cambridge



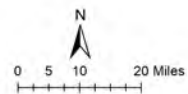
Legend

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|---|-----------------------|---|-------------------|
|  | 1 foot Sea Level Rise |  | City of Cambridge |
|  | 2 foot Sea Level Rise |  | Streets |
|  | Buildings Footprints |  | US Routes |
| | |  | Dorchester County |

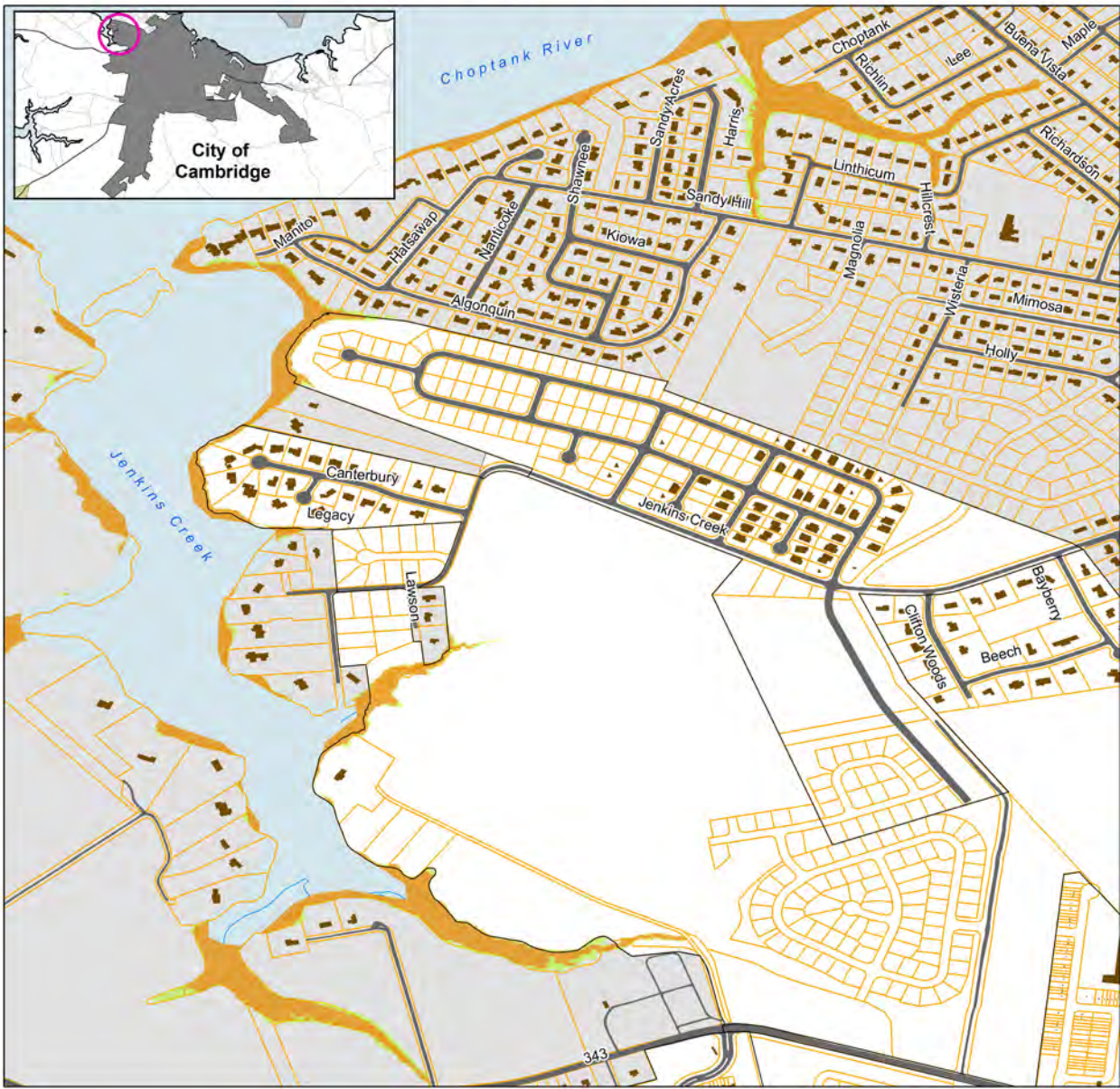


Sources:

NOAA Sea Level Rise;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Smith Planning and Design



Sea Level Rise - City of Cambridge











Legend		  <small>Smith Planning and Design</small>	Sources: NOAA Sea Level Rise; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
<ul style="list-style-type: none"> 1 foot Sea Level Rise 2 foot Sea Level Rise Buildings Footprints Parcels 	<ul style="list-style-type: none"> City of Cambridge Streets US Routes Dorchester County 		

Sea Level Rise - City of Cambridge



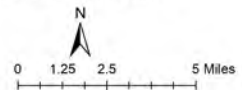
Legend

- | | |
|---|---|
|  1 foot Sea Level Rise |  City of Cambridge |
|  2 foot Sea Level Rise |  Streets |
|  Buildings Footprints |  US Routes |
|  Parcels |  Dorchester County |

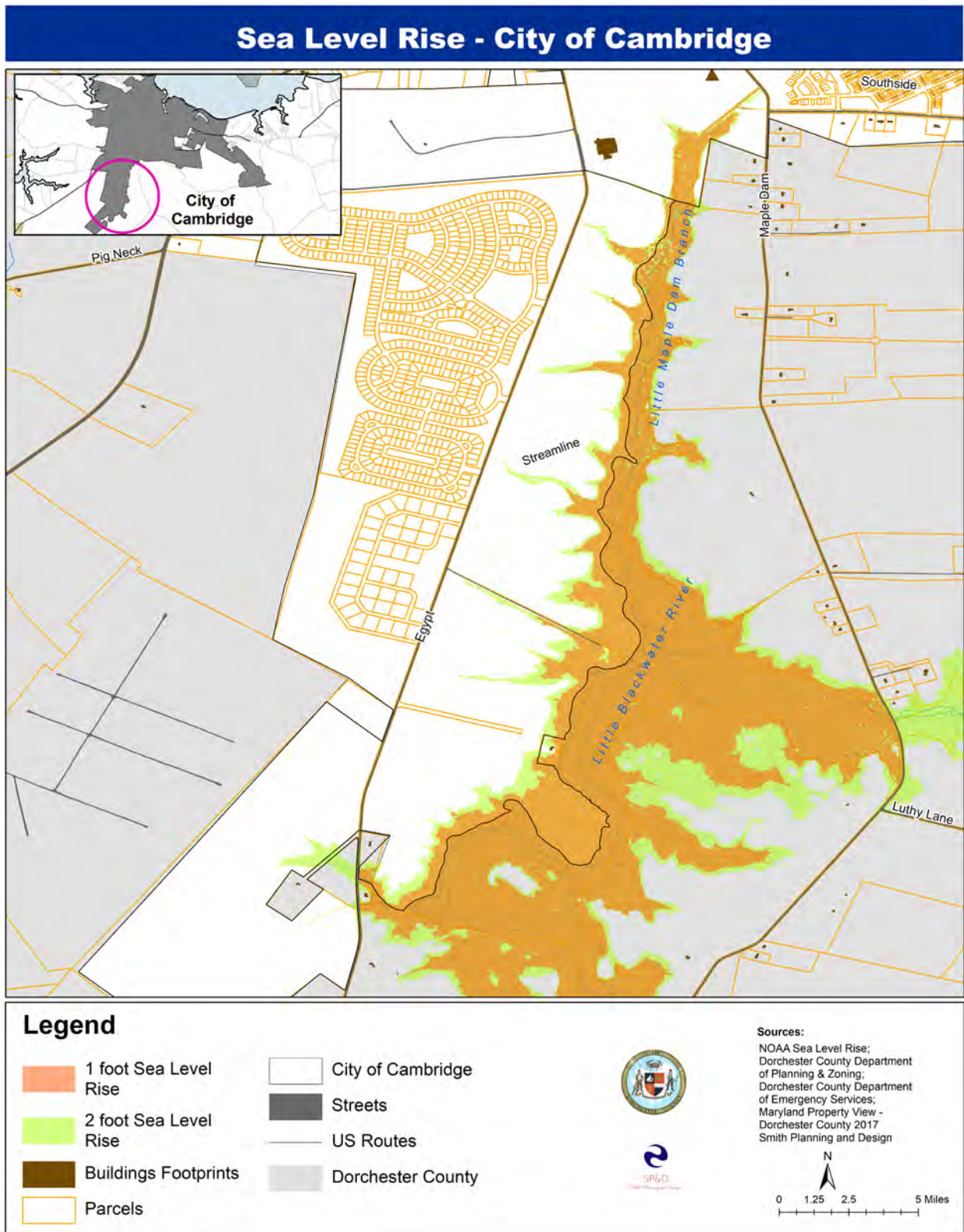


Sources:

NOAA Sea Level Rise;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design







4.8 Church Creek

The Town of Church Creek is a small community in Northwestern Dorchester County on a river of the same name. Church Creek lies at the intersection of State Routes 16 and 335.

4.8.1 Flood Risk and Vulnerability

The Town of Church Creek's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 2.2 (Coastal) for Flood Risk Project Refined Data), which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Church Creek: Estimated Potential Losses for Flood Event Scenario

Table 4-7

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	6	\$1,000,000	93%	\$60,000
Commercial Building & Contents	1	\$80,000	7%	\$0
Other Building & Contents	0	\$0	0%	\$0
Total Building & Contents ²	7	\$1,080,000	100%	\$60,000
Business Disruption ³	N/A	N/A	N/A	\$0
TOTAL ⁴	7	\$1,080,000	100%	\$60,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

The Town of Church Creek's projected development is to occur beyond the southwest corporate boundary. The Town is subject to storm surge and is located within the 100-year floodplain. The Town of Church Creek should evaluate future growth areas and their proximity to natural hazards during their planning process.

4.8.2 Storm Surge Risk and Vulnerability

The entirety of Church Creek is located within the Hurricane Storm Surge Inundation Areas.

- Hurricane Category 1: (23) Buildings
- Hurricane Category 2: (52) Buildings
- Hurricane Category 3: (0)
- Hurricane Category 4: (0)
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (75)

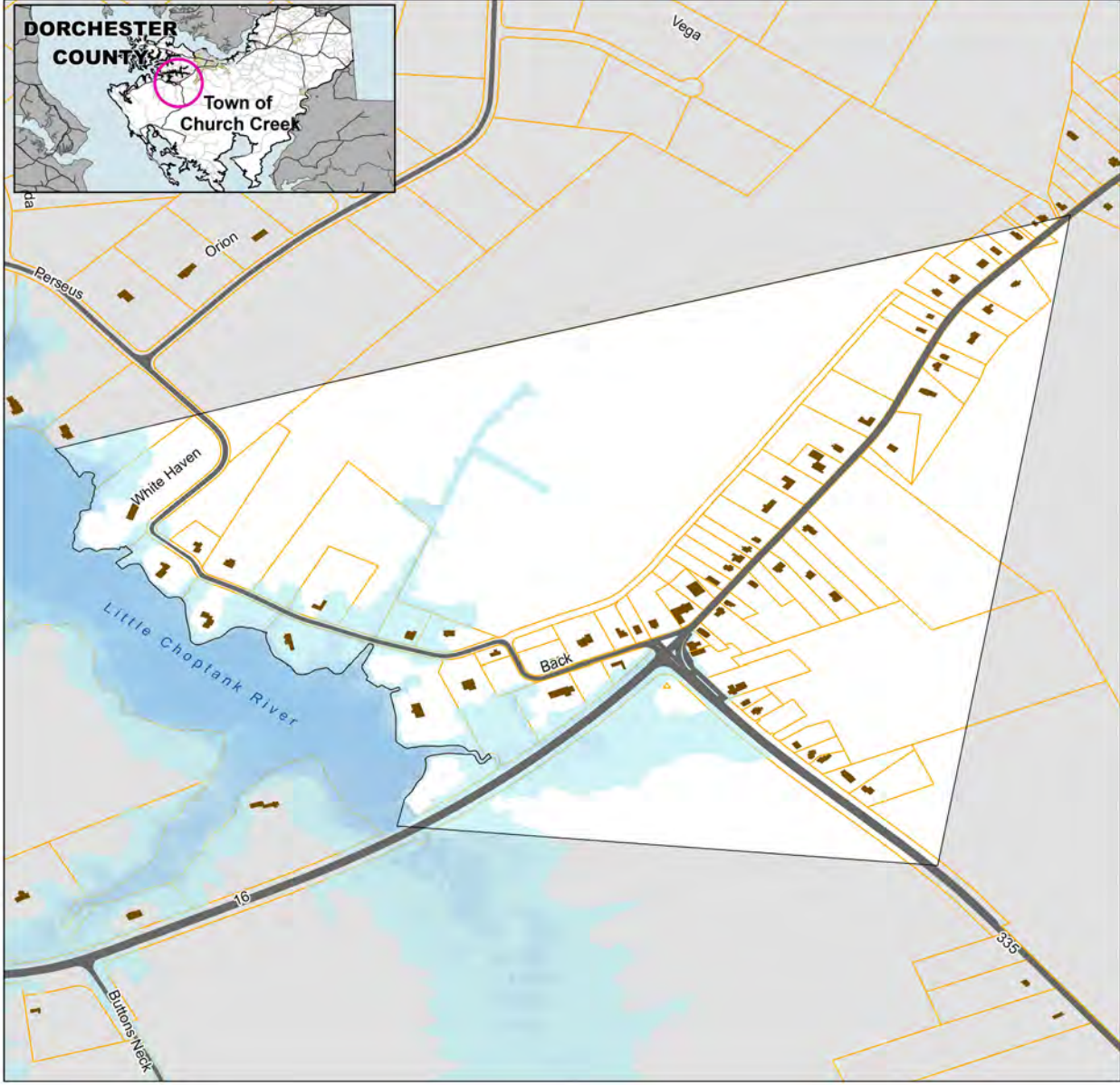
Building totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

4.8.3 Sea Level Rise Risk and Vulnerability

One (1) and two (2) foot of sea level rise inundation areas traverse the town limits however the 1-foot sea level rise inundation area does not impact any structures. A total of four (4) residential structures are located within the 2-foot sea level rise inundation area.

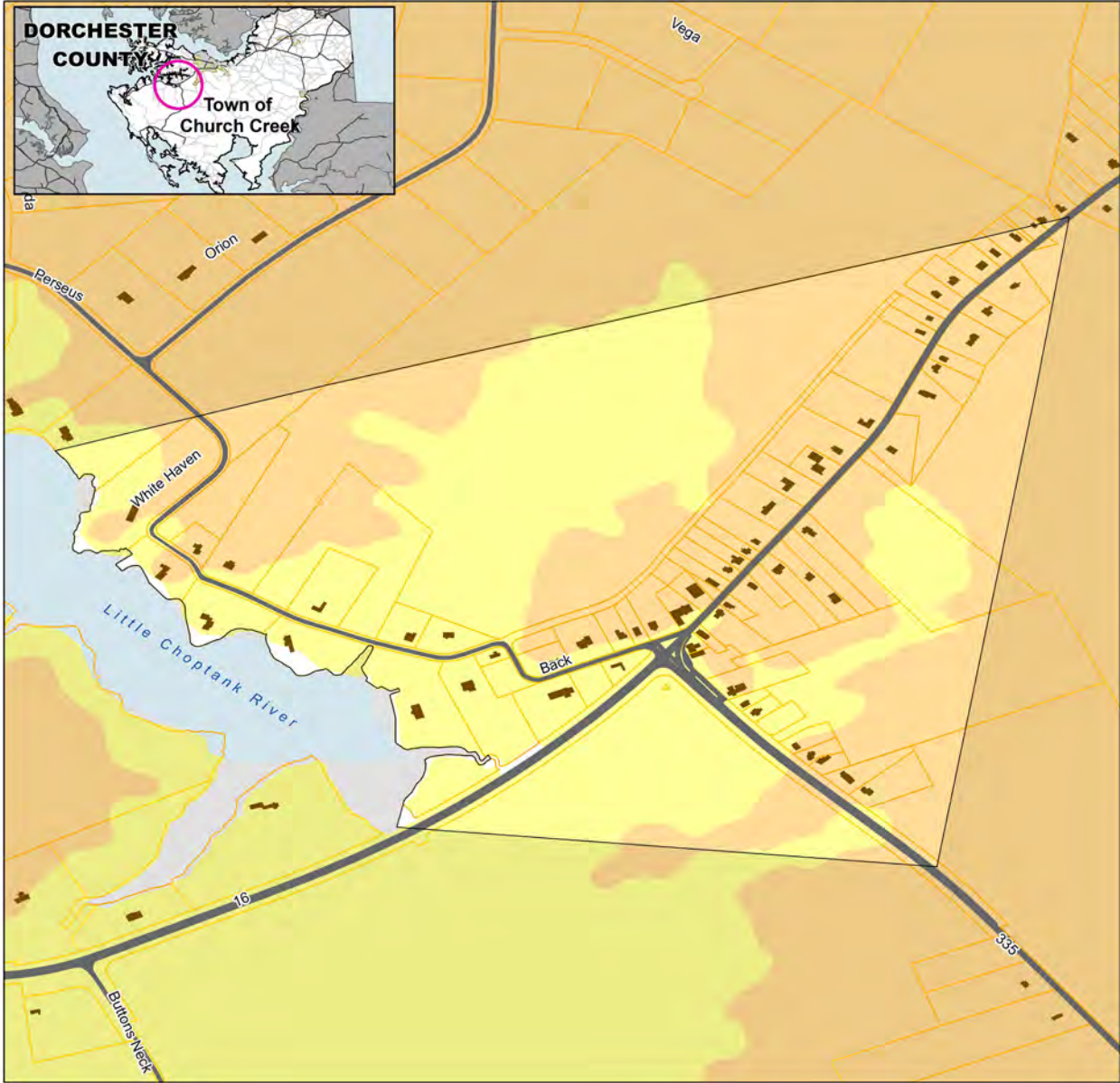
Note: The Town of Church Creek flood risk and vulnerability mapping is presented on the next few pages.

1% Annual Chance Flood - Town of Church Creek



<p>Legend</p> <p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth High : 54.3' Low : 0.5'</p>	<ul style="list-style-type: none"> Buildings Footprints Parcels Town of Church Creek 	<ul style="list-style-type: none"> Streets US Routes Dorchester County 	<p>Sources:</p> <p>FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design</p> <div style="text-align: center;">    </div>
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Storm Surge - Town of Church Creek



Legend

Storm Surge

Hurricane Categories

- Category 1
- Category 2
- Category 3
- Category 4

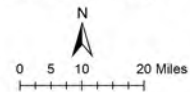
- Buildings Footprints
- Parcels
- Town of Church Creek

- Streets
- US Routes
- Dorchester County

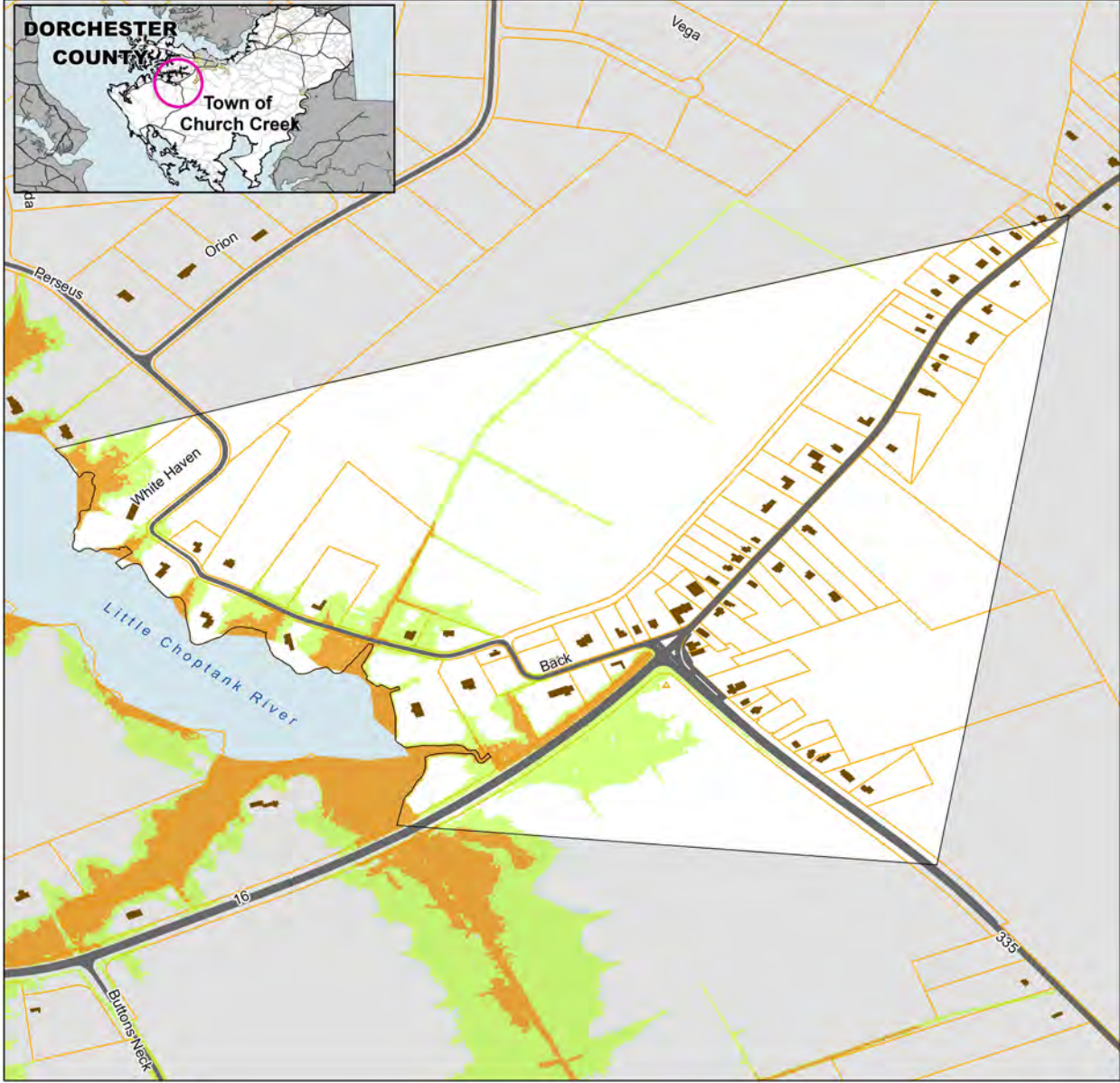


Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



Sea Level Rise - Town of Church Creek



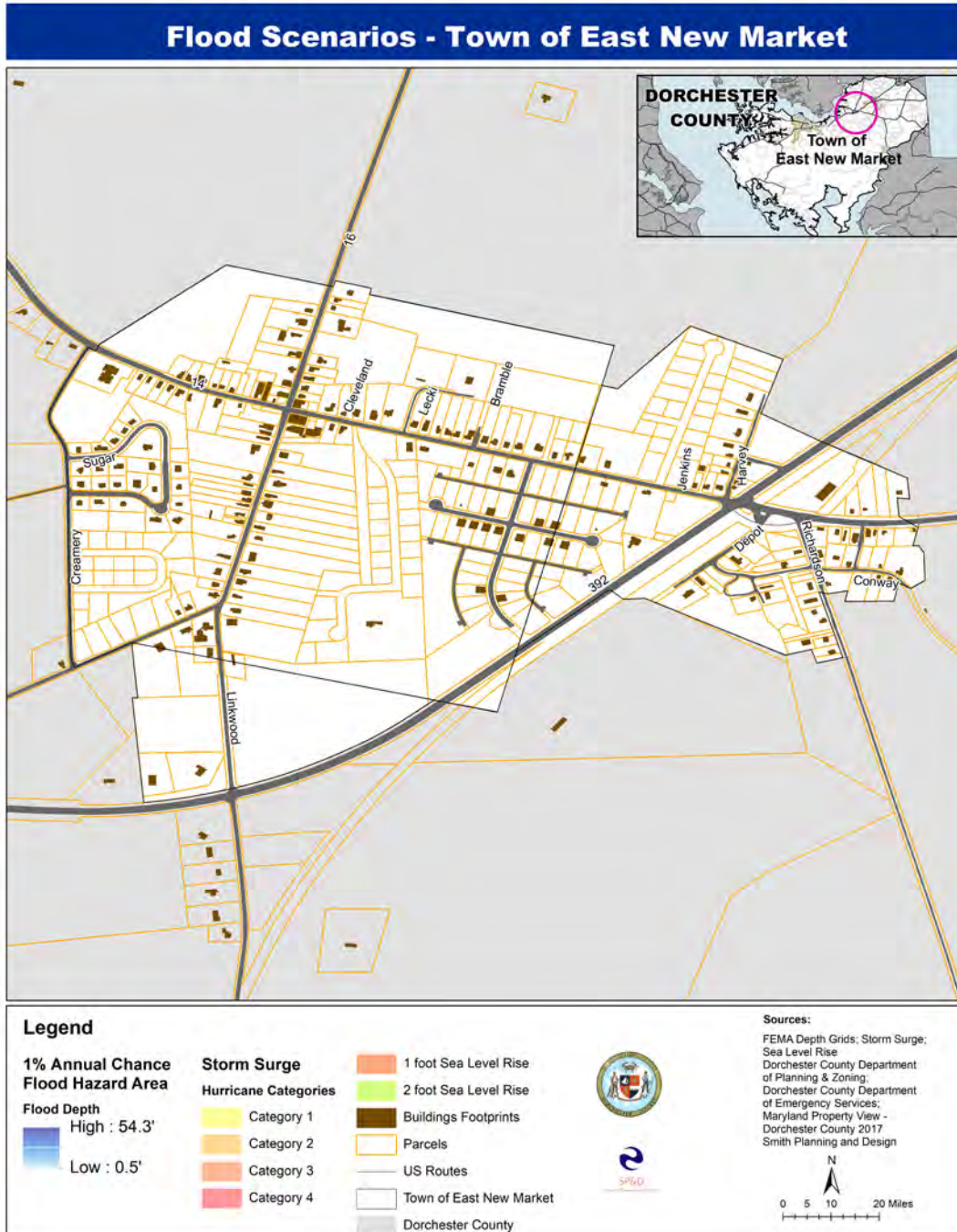
Legend		  <small>SP&D Smith Planning and Design</small>	Sources: NOAA Sea Level Rise; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
 1 foot Sea Level Rise	 Town of Church Creek		
 2 foot Sea Level Rise	 Streets		
 Buildings Footprints	 US Routes		
 Parcels	 Dorchester County	 	

4.9 East New Market

The Town of East New Market is a small community located in the northeastern portion of Dorchester County. The future growth boundaries for the Town of East New Market are proposed south of the municipal border.

4.9.1 Risk and Vulnerability

Projected future growth from a hazard risk perspective is not a concern considering that neither the 100-year floodplain, storm surge or sea level rise inundation areas occur near the Town. Hurricane Storm Surge and Sea Level Rise mapping indicates that East New Market is not within the identified risk areas.



4.10 Eldorado

The Town of Eldorado is located in northeastern Dorchester County adjacent to Marshy Hope Creek, a tributary of the Nanticoke River. The town has two major roads going through it, Maryland State Routes 14 and 313. It is near the Town of Brookview, which is located on the opposite side of Marshy Hope Creek.

4.10.1 Flood Risk and Vulnerability

The Town of Eldorado's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 2.2 (Coastal) for Flood Risk Project Refined Data), which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Eldorado: Estimated Potential Losses for Flood Event Scenario

Table 4-8

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	5	\$400,000	100%	\$20,000
Commercial Building & Contents	0	\$0	0%	\$0
Other Building & Contents	0	\$0	0%	\$0
Total Building & Contents ²	5	\$400,000	100%	\$20,000
Business Disruption ³	N/A	N/A	N/A	\$0
TOTAL ⁴	5	\$400,000	100%	\$20,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

The eastern and southern portions of Eldorado are located within the FEMA regulated floodplain.

4.10.2 Storm Surge Risk and Vulnerability

The entirety of Eldorado is located within the Hurricane Storm Surge Inundation Areas.

- Hurricane Category 1: (10) Buildings
- Hurricane Category 2: (19) Buildings
- Hurricane Category 3: (7) Buildings
- Hurricane Category 4: (1) Buildings
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (37)

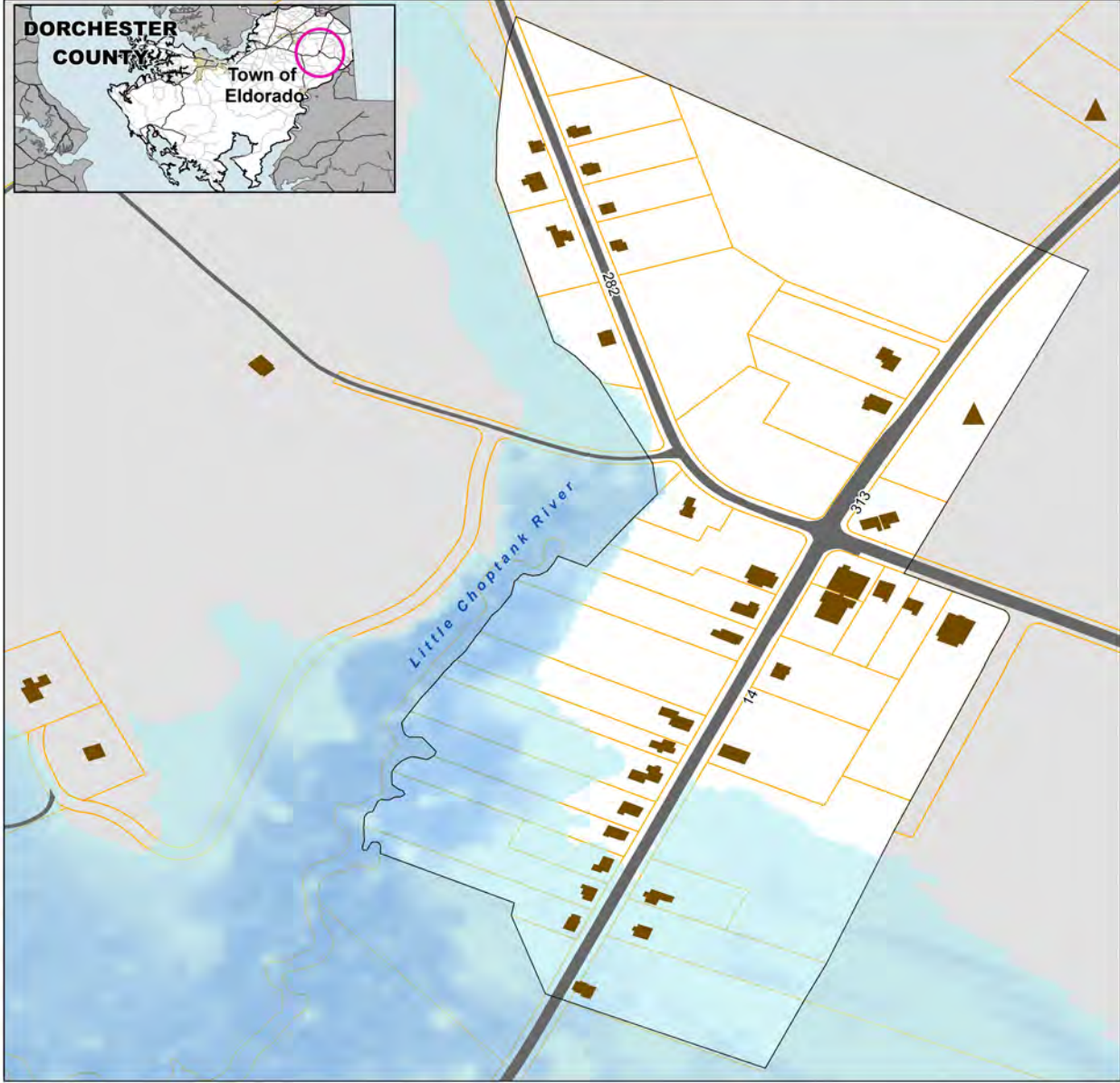
Building totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

4.10.3 Sea Level Rise Risk and Vulnerability

The Town of Eldorado does not contain at-risk structures within the 1- and 2-foot sea level rise inundation areas. The Town contains an area of risk; however the risk area intersects with several parcels but does not impact any structures.

Note: The Town of Eldorado flood risk and vulnerability mapping is presented on the next few pages.

1% Annual Chance Flood - Town of Eldorado



Legend

1% Annual Chance Flood Hazard Area

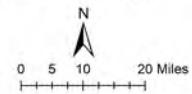
Flood Depth
 High : 54.3'
 Low : 0.5'

- Buildings Footprints
- Parcels
- Town of Eldorado
- Streets
- US Routes
- Dorchester County

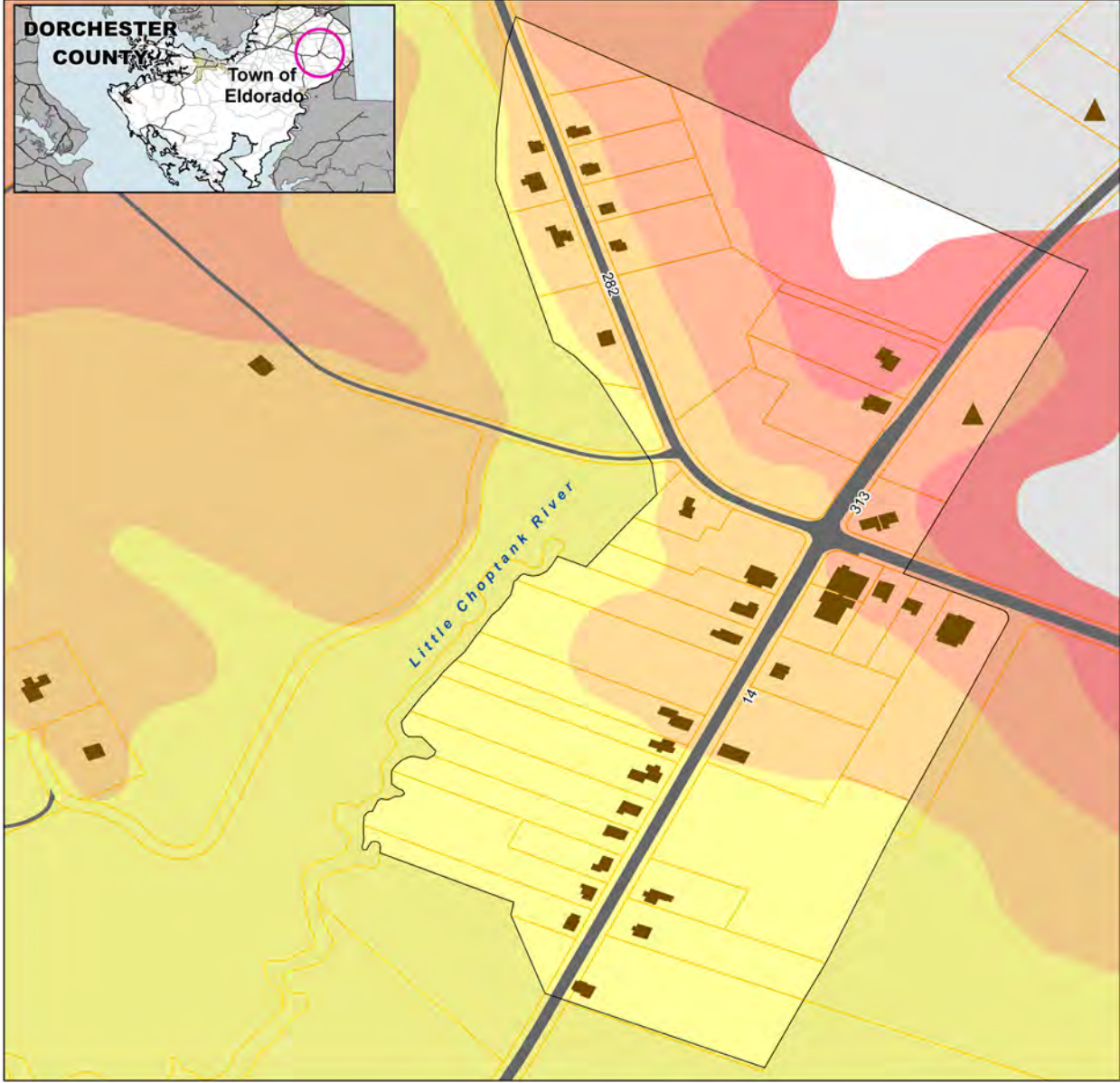


Sources:

FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design



Storm Surge - Town of Eldorado











Legend			
<p>Storm Surge</p> <p>Hurricane Categories</p> <ul style="list-style-type: none"> Category 1 Category 2 Category 3 Category 4 	<ul style="list-style-type: none"> Buildings Footprints Parcels Town of Eldorado 	<ul style="list-style-type: none"> Streets US Routes Dorchester County 	<p>Sources:</p> <p>NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design</p> <div style="text-align: center;">    </div>

Sea Level Rise - Town of Eldorado

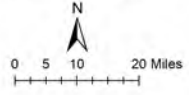


Legend

- | | |
|---|---|
|  1 foot Sea Level Rise |  Town of Eldorado |
|  2 foot Sea Level Rise |  Streets |
|  Buildings Footprints |  US Routes |
|  Parcels |  Dorchester County |



Sources:
 NOAA Sea Level Rise;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design



4.11 Galestown

The Town of Galestown is located in northeastern Dorchester County near the confluence of Gales Creek and the Nanticoke River. Although no major roads go through the town, it is located near Maryland Route 313.

4.11.1 Flood Risk and Vulnerability

The Town of Galestown's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 3.1 (Riverine) and Version 2.2 (Coastal) for Flood Risk Project Refined Data), which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Galestown: Estimated Potential Losses for Flood Event Scenario

Table 4-9

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	1	\$80,000	89%	\$10,000
Commercial Building & Contents	1	\$10,000	11%	< \$5,000
Other Building & Contents	0	\$0	0%	\$0
Total Building & Contents ²	2	\$90,000	100%	\$15,000
Business Disruption ³	N/A	N/A	N/A	\$0
TOTAL ⁴	1	\$90,000	100%	\$15,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

4.11.2 Storm Surge Risk and Vulnerability

The entirety of Galestown is located within the Hurricane Storm Surge Inundation Areas.

- Hurricane Category 1: (0)
- Hurricane Category 2: (13) Buildings
- Hurricane Category 3: (54) Buildings
- Hurricane Category 4: (11) Buildings
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (78)

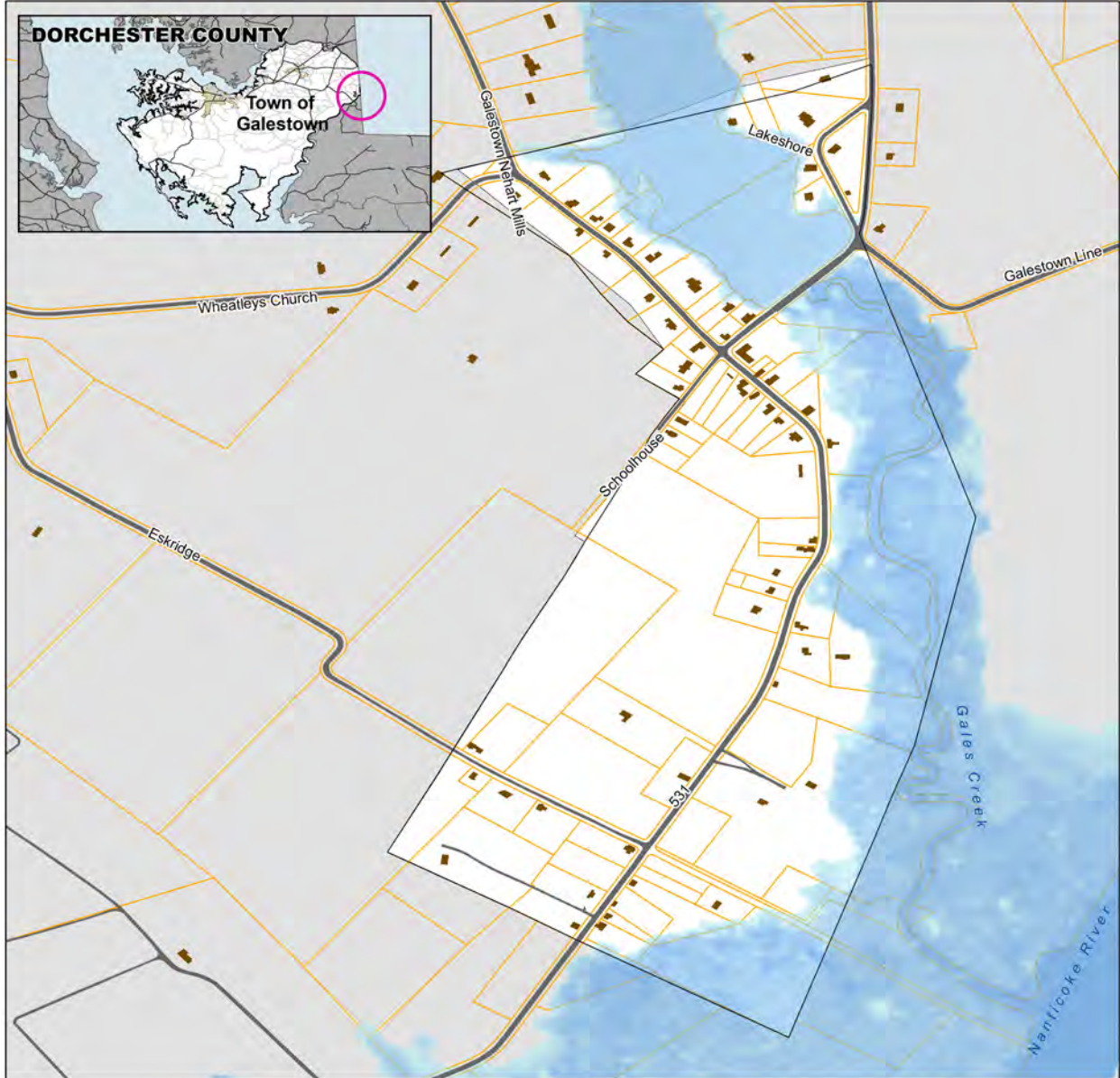
Building totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

4.11.3 Sea Level Rise Risk and Vulnerability

NOAA's projected 1- and 2-foot sea level rise inundation areas are within Town limits and intersect with parcels, however they do not intersect with any building footprints. Mapping depicts sea level rise inundation areas along Gales Creek, along the eastern and southern portions of the town.

Note: The Town of Eldorado flood risk and vulnerability mapping is presented on the next few pages.







1% Annual Chance Flood - Town of Galestown



Legend

1% Annual Chance Flood Hazard Area

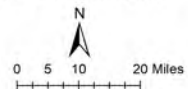
Flood Depth
 High : 54.3'
 Low : 0.5'

-  Buildings Footprints
-  Parcels
-  Town of Galestown
-  Streets
-  US Routes
-  Dorchester County

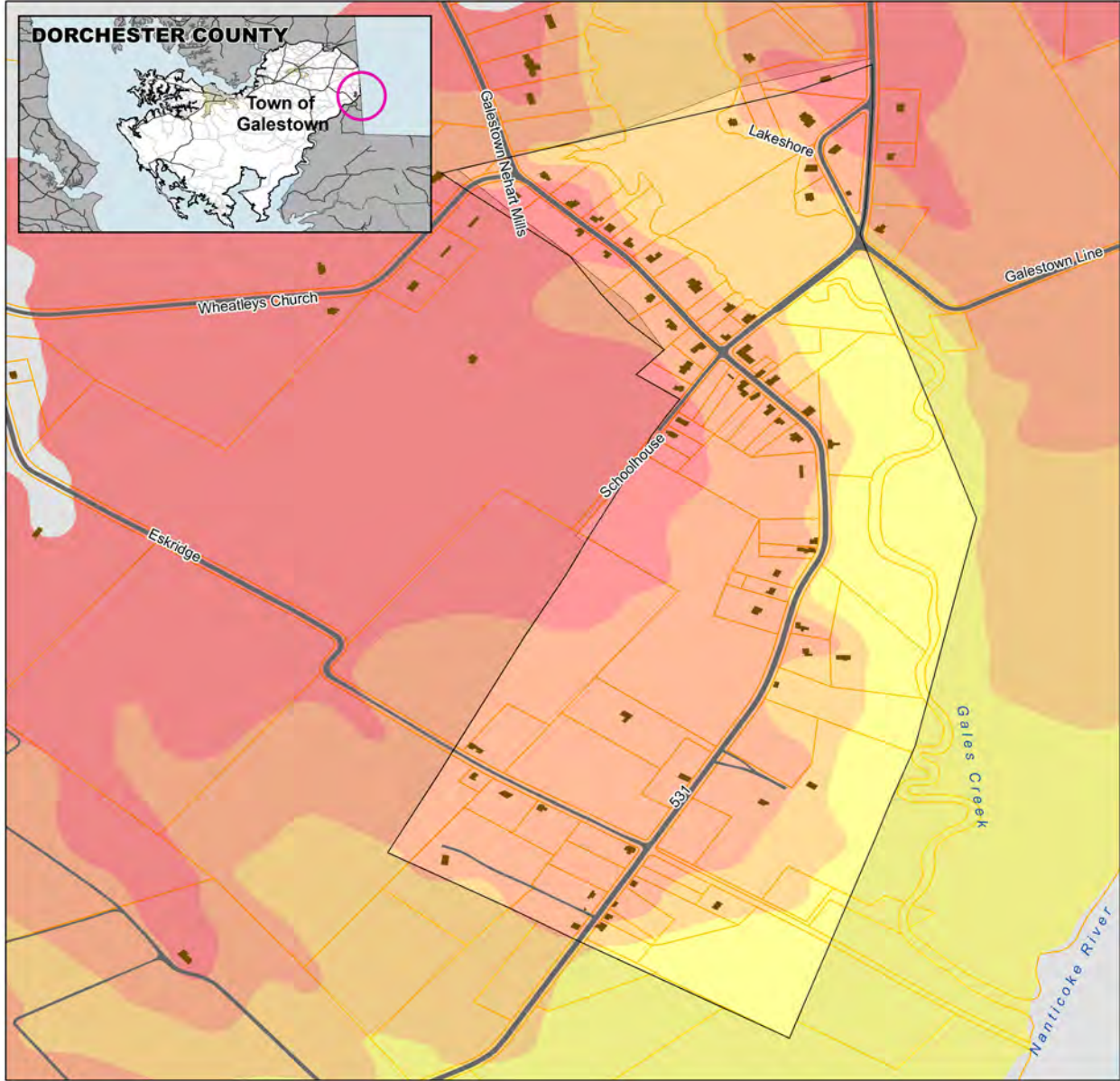


Sources:

FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design



Storm Surge - Town of Galestown



Legend

Storm Surge

Hurricane Categories

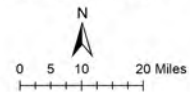
- Category 1
- Category 2
- Category 3
- Category 4

- Buildings Footprints
- Streets
- Parcels
- US Routes
- Town of Galestown
- Dorchester County



Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



4.12 Hurlock

The Town of Hurlock is located in northeastern Dorchester County. It consists of 2.89 square miles along State Highway 392. The primary potential flooding source in the town is along Wrights Branch.

4.12.1 Flood Rise Risk and Vulnerability

The Town of Hurlock's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 3.1 (Riverine) for Flood Risk Project Refined Data),-which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Hurlock: Estimated Potential Losses for Flood Event Scenario

Table 4-10

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	2	\$100,000	20%	\$20,000
Commercial Building & Contents	2	\$400,000	80%	\$10,000
Other Building & Contents	0	\$0	0%	\$0
Total Building & Contents ²	4	\$500,000	100%	\$30,000
Business Disruption ³	N/A	N/A	N/A	\$10,000
TOTAL ⁴	4	\$500,000	100%	\$40,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

The projected growth for the Town of Hurlock is located beyond the northwestern municipal boundary as well as the southwestern boundary. Both growth areas would not be subjected to storm surge or the 100-year floodplain.

3.12.2 Storm Surge Sea Level Rise Risk and Vulnerability

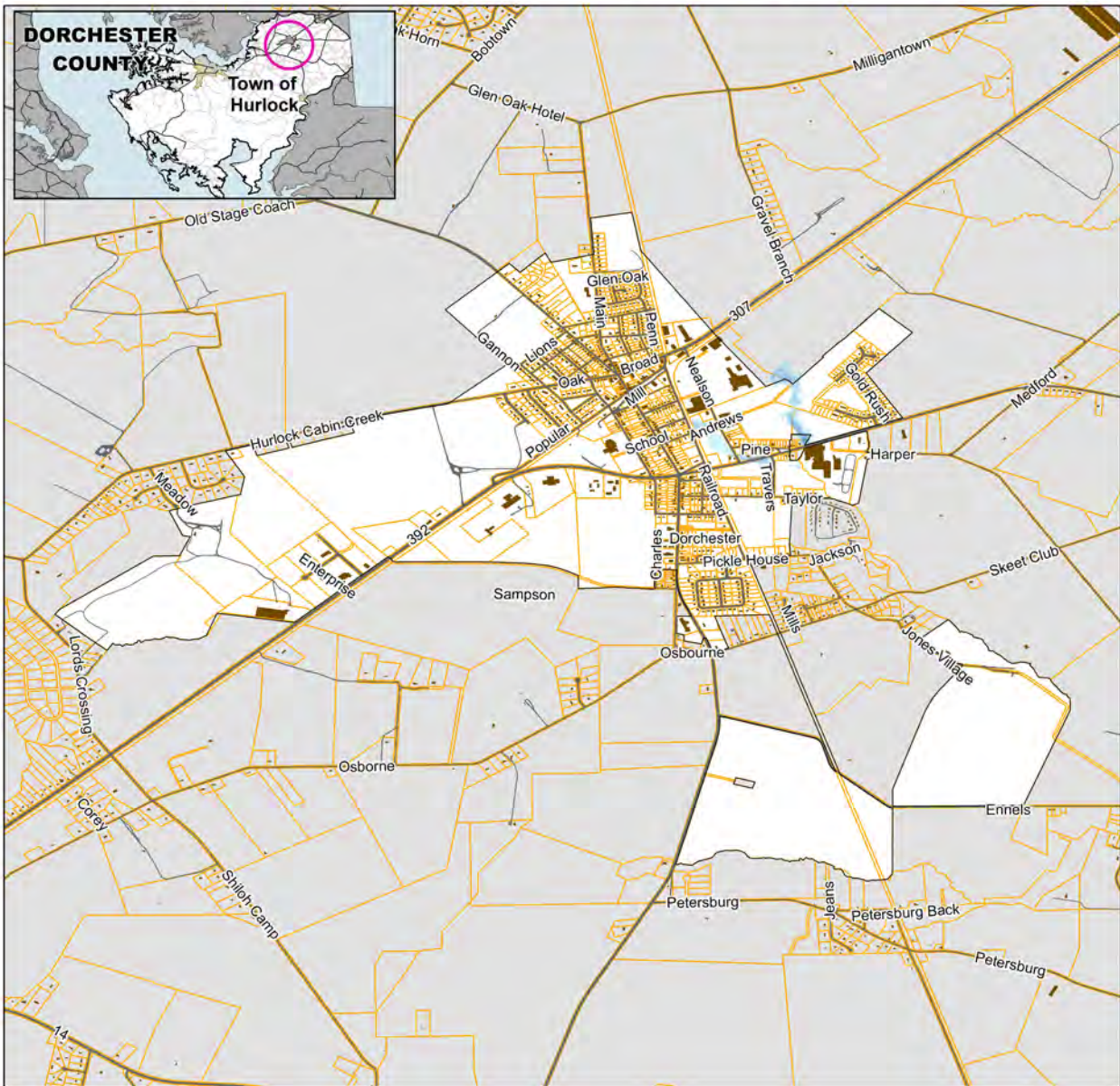
Hurricane Storm Surge mapping indicates that Hurlock is not within the identified risk areas.

3.12.3 Sea Level Rise Risk and Vulnerability

Mapping shows that sea level rise 1- and 2-foot inundation areas are not within Town limits.

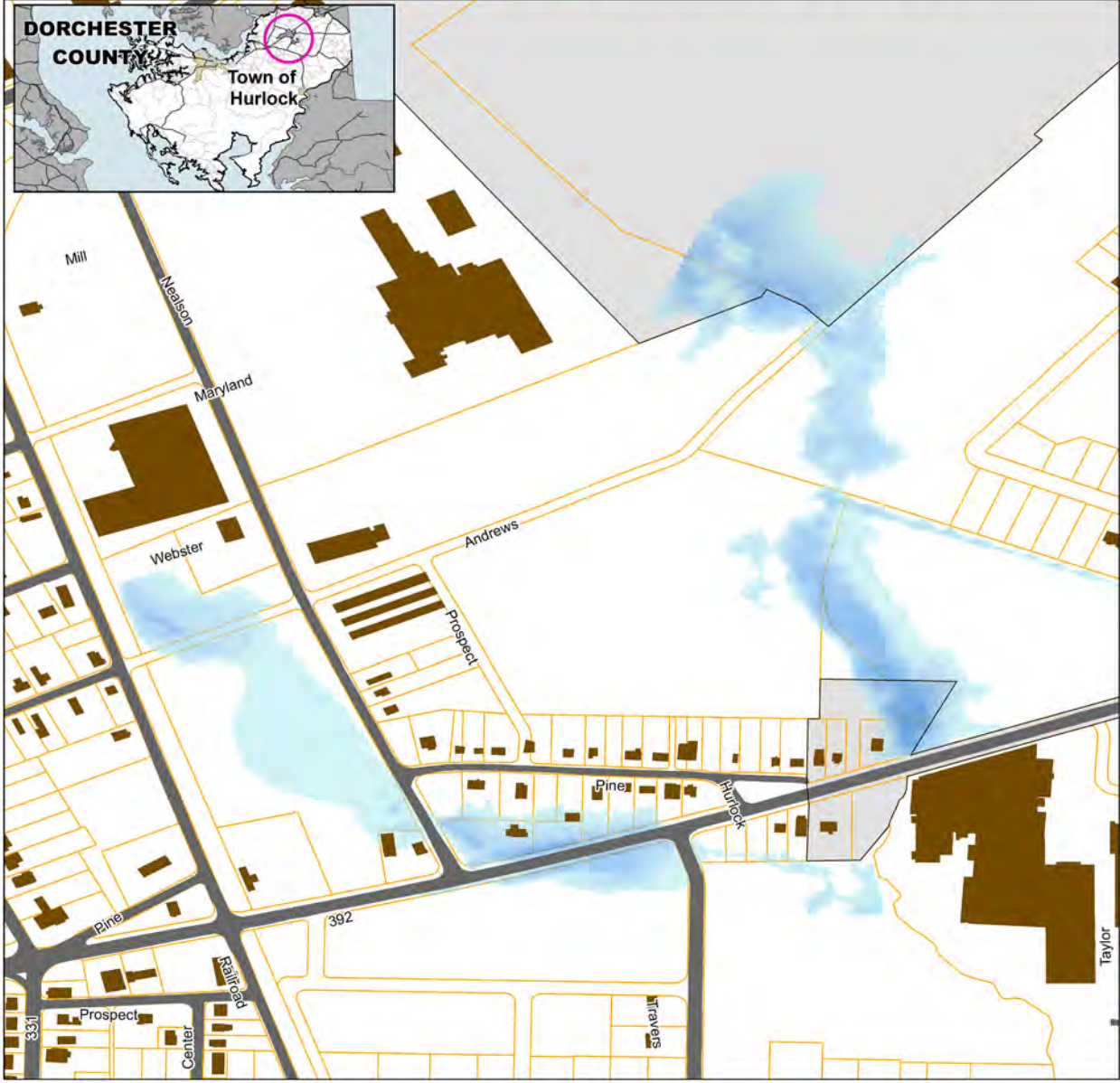
Note: The Town of Hurlock flood risk and vulnerability mapping is presented on the next few pages.

1% Annual Chance Flood - Town of Hurlock



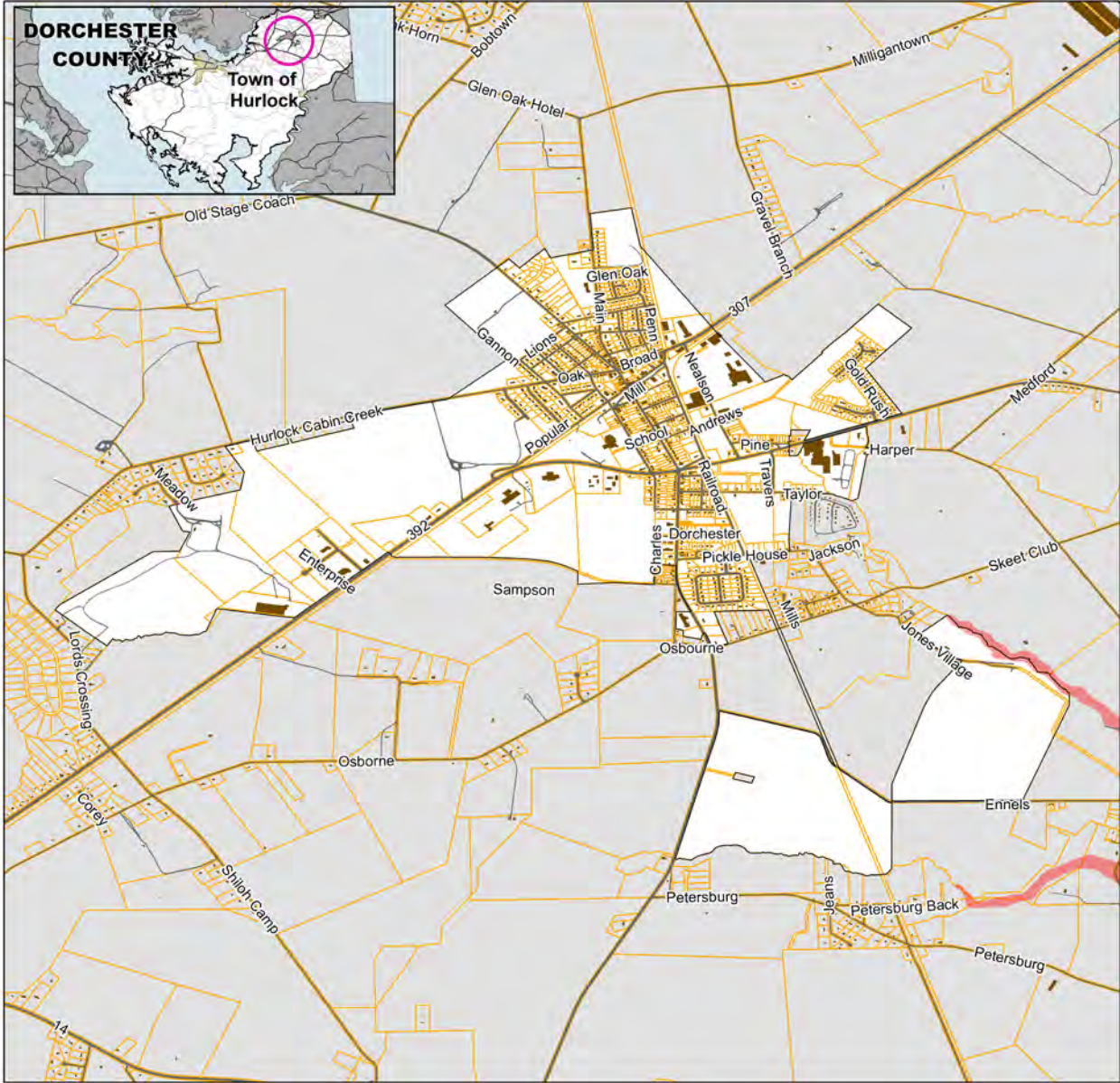
<p>Legend</p> <p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth High : 54.3' Low : 0.5'</p>	<ul style="list-style-type: none"> Buildings Footprints Parcels Town of Hurlock Streets US Routes Dorchester County 	<p>Sources:</p> <p>FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design</p>	 <p>N</p> <p>0 5 10 20 Miles</p>
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1% Annual Chance Flood - Town of Hurlock



Legend			
1% Annual Chance Flood Hazard Area	Buildings Footprints	Streets	
	Parcels	US Routes	
Flood Depth	Town of Hurlock	Dorchester County	Sources: FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
High : 54.3'			
Low : 0.5'			 0 5 10 20 Miles

Storm Surge - Town of Hurlock



Legend

Storm Surge

Hurricane Categories

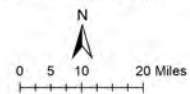
- Category 1
- Category 2
- Category 3
- Category 4

- Buildings Footprints
- Streets
- Parcels
- US Routes
- Town of Hurlock
- Dorchester County

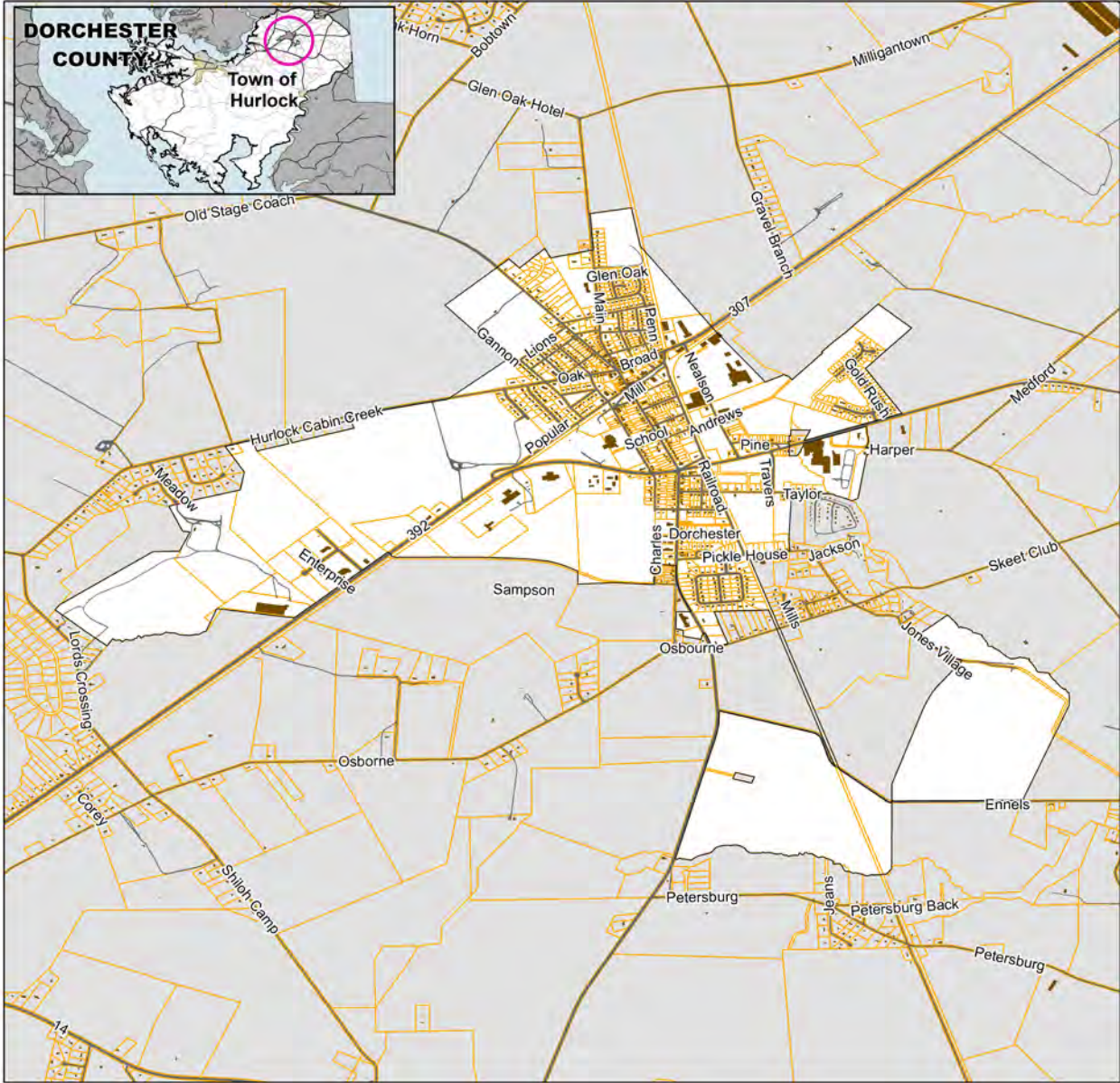


Sources:









NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



Sea Level Rise - Town of Hurlock

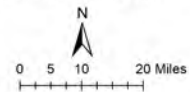


Legend

- | | |
|---|---|
|  1 foot Sea Level Rise |  Town of Hurlock |
|  2 foot Sea Level Rise |  Streets |
|  Buildings Footprints |  US Routes |
|  Parcels |  Dorchester County |

Sources:

NOAA Sea Level Rise;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



4.13 Secretary

The Town of Secretary is located in northern Dorchester County on the Warwick River, a small tributary of the Choptank River. Maryland Route 14 is the only Maryland roadway that goes through the town.

4.13.1 Flood Risk and Vulnerability

The Town of Secretary's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 2.2 (Coastal) for Flood Risk Project Refined Data),-which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Secretary: Estimated Potential Losses for Flood Event Scenario

Table 4-11

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	17	\$2,900,000	97%	\$50,000
Commercial Building & Contents	0	\$0	0%	\$0
Other Building & Contents	1	\$100,000	3%	\$20,000
Total Building & Contents ²	18	\$3,000,000	100%	\$70,000
Business Disruption ³	N/A	N/A	N/A	\$20,000
TOTAL ⁴	18	\$3,000,000	100%	\$90,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

The Town of Secretary is proposing growth areas to extend the municipal boundaries to the east. The Warwick River borders the western municipal boundary; therefore, by developing to the east, new structures will not be affected by the 100-year floodplain or the storm surge areas.

4.13.2 Storm Surge Risk and Vulnerability

A large portion of land area within the Town of Secretary is located within the Hurricane Storm Surge Inundation Areas.

- Hurricane Category 1: (8) Buildings
- Hurricane Category 2: (30) Buildings
- Hurricane Category 3: (44) Buildings
- Hurricane Category 4: (43) Buildings
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (125)

Building totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

4.13.3 Sea Level Rise Risk and Vulnerability

Mapping indicates that four (4) buildings are at-risk to NOAA's sea level rise projections 1- and 2-foot inundation areas. One (1) building is at-risk to the 1- and 2-foot inundation areas, while three (3) building are at-risk to the 2-foot inundation area.

Note: The Town of Secretary flood risk and vulnerability mapping is presented on the next few pages.







1% Annual Chance Flood - Town of Secretary



Legend

1% Annual Chance Flood Hazard Area

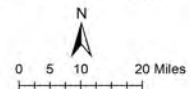
Flood Depth
 High : 54.3'
 Low : 0.5'

-  Buildings Footprints
-  Parcels
-  Town of Secretary
-  Streets
-  US Routes
-  Dorchester County

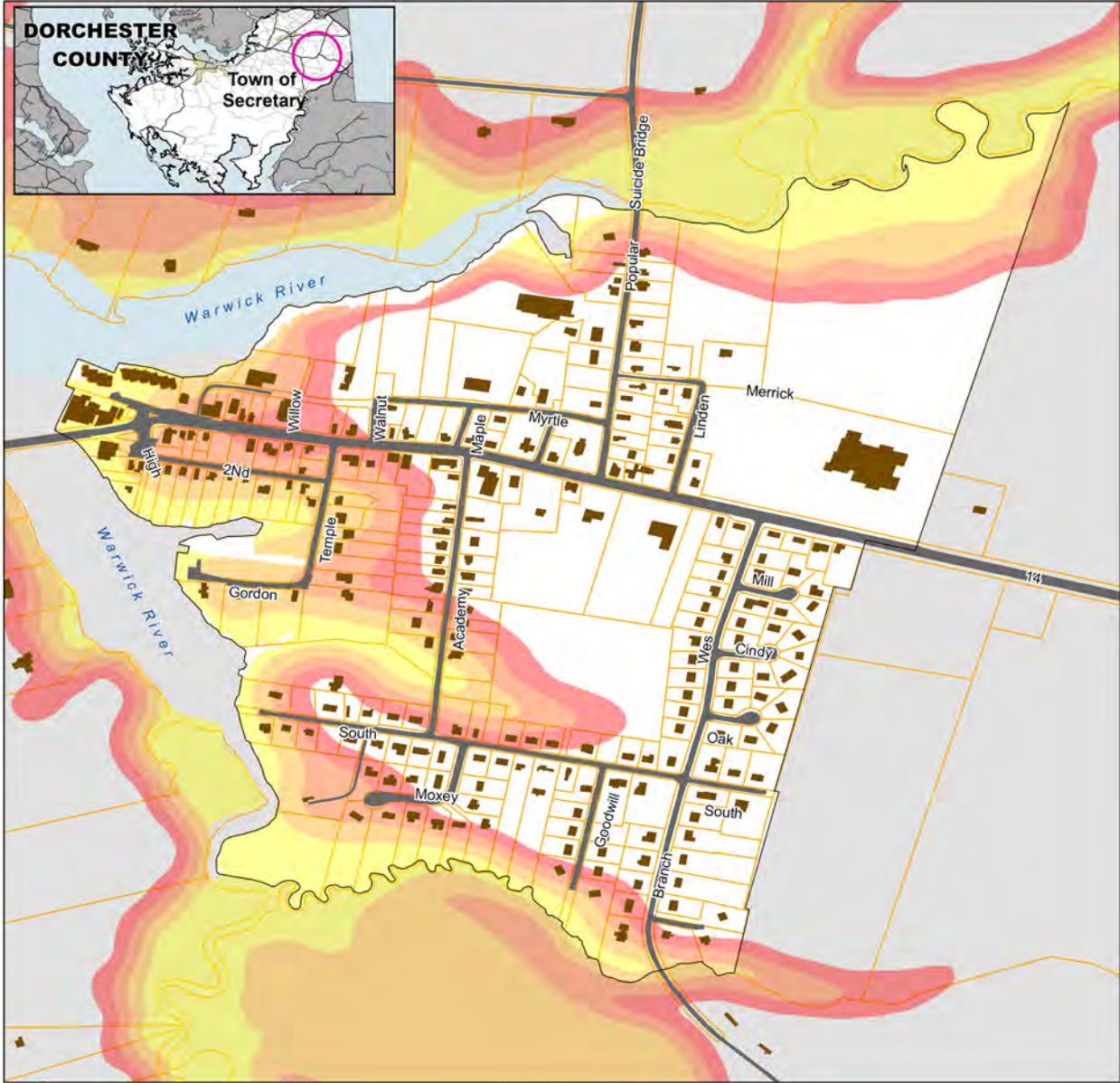


Sources:

FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design



Storm Surge - Town of Secretary



Legend

Storm Surge

Hurricane Categories

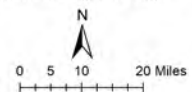
- Category 1
- Category 2
- Category 3
- Category 4

- Buildings Footprints
- Parcels
- Town of Secretary
- Streets
- US Routes
- Dorchester County



Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



4.14 Vienna

The Town of Vienna is located in eastern Dorchester County on the Nanticoke River. Vienna is located close to U.S. Highway 50, which connects it to the larger urban centers of Cambridge to the west and Salisbury to the east.

4.14.1 Flood Risk and Vulnerability

The Town of Vienna's 1% annual chance flood vulnerability analysis incorporates results from a FEMA HAZUS analysis (Version 2.2 (Coastal) for Flood Risk Project Refined Data),-which accounts for areas of the 1-percent-annual-chance flood event. Potential losses were computed using state-level tax data (parcel centroids from the Maryland Department of Planning) and local building footprints provided by Dorchester County to estimate loss ratios for the 1% annual chance flood scenario.

Town of Vienna: Estimated Potential Losses for Flood Event Scenario

Table 4-11

Flood Risk Refined Losses				
Type	# of Impacted Buildings	Inventory Estimated Value	% Of Total	1% (100-yr) Dollar Losses ¹
Residential Building & Contents	1	\$200,000	33%	\$40,000
Commercial Building & Contents	0	\$0	0%	\$0
Other Building & Contents	3	\$400,000	67%	\$200,000
Total Building & Contents ²	4	\$600,000	100%	\$240,000
Business Disruption ³	N/A	N/A	N/A	\$0
TOTAL ⁴	4	\$600,000	100%	\$240,000

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

¹Losses shown are rounded to nearest \$10,000 for values under \$100,000 and to the nearest \$100,000 for values over \$100,000.

²Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

³Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

⁴Total = Total Building and Contents + Business Disruption

In the past several years, the Town of Vienna has developed its waterfront area by demolishing dilapidated structures, adding new landscaping, and building new docks, a river walk, and a pavilion. A portion of Vienna's projected future growth is to occur south and southwest of the Town. The Town borders the Nanticoke River; therefore, it is evident that the Town is within the 100-year floodplain and is also affected by storm surge. To mitigate flooding issues, the Town should consider developing toward the west or north beyond the corporate limits.

4.14.2 Storm Surge Risk and Vulnerability

Almost the entirety of Vienna is located within the Hurricane Storm Surge Inundation Areas.

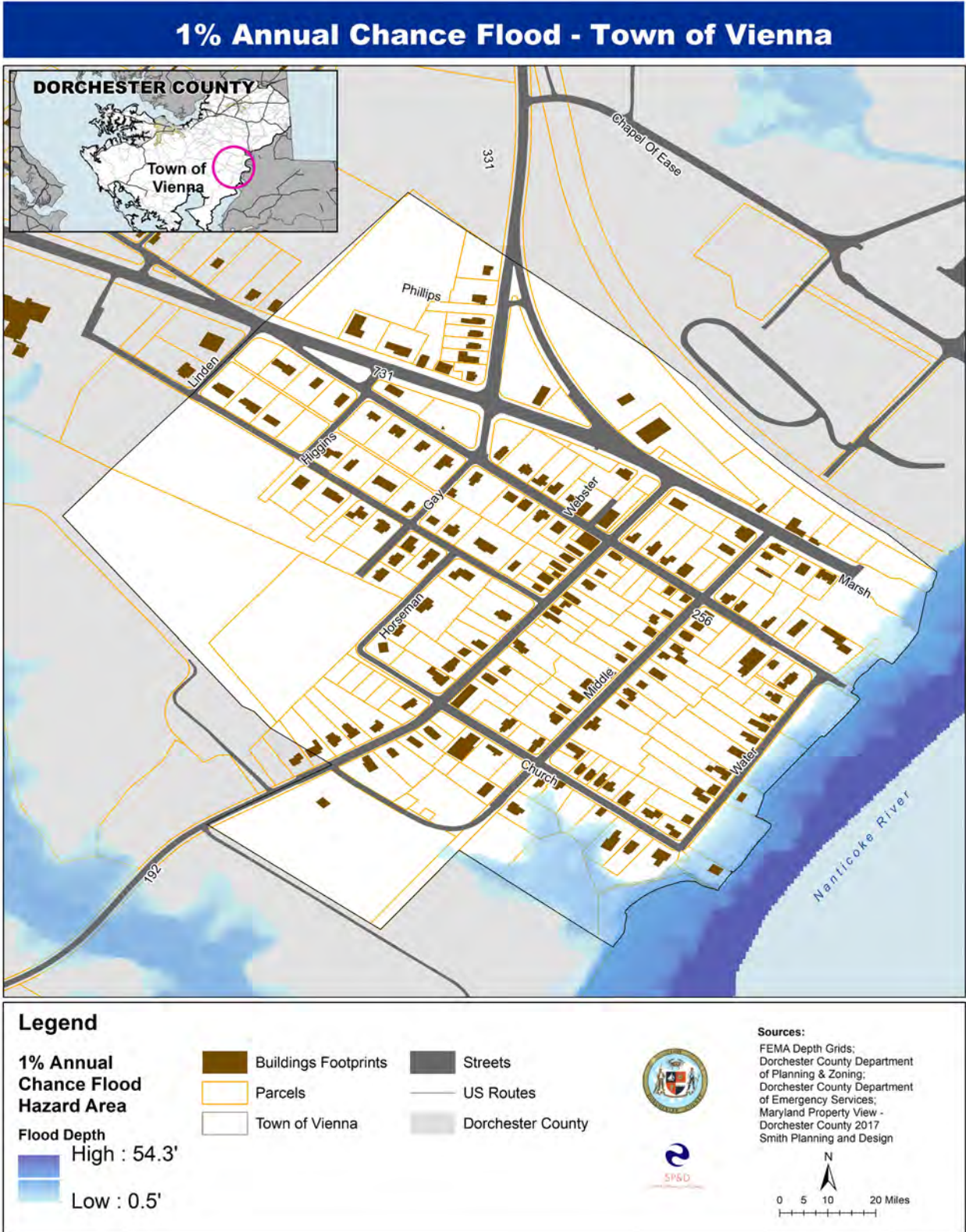
- Hurricane Category 1: (2) Buildings
- Hurricane Category 2: (37) Buildings
- Hurricane Category 3: (150) Buildings
- Hurricane Category 4: (0)
- Total Properties located within Hurricane Storm Surge Inundation Area(s): (189)

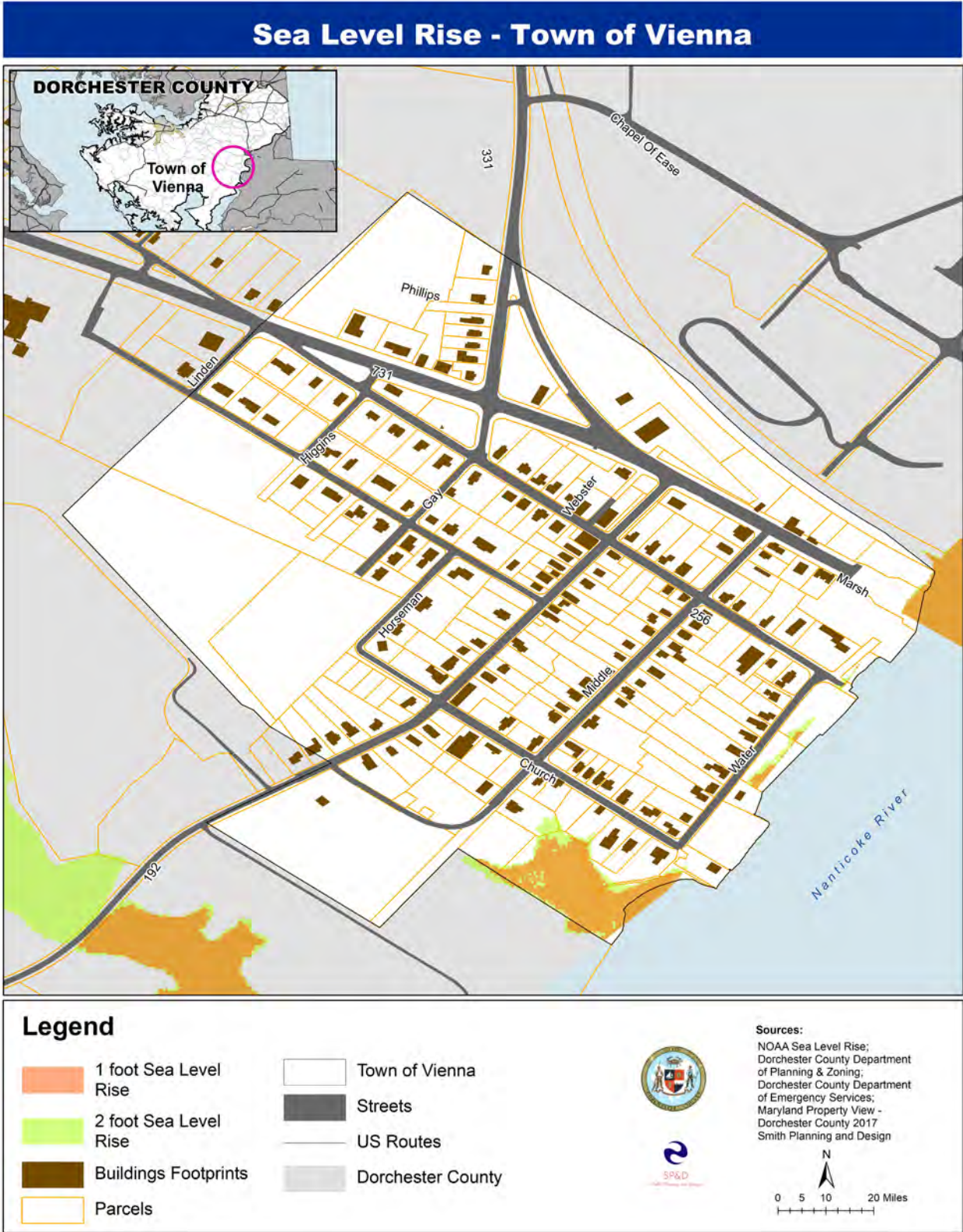
Building totals for each hurricane category represent buildings located within the specific hurricane storm surge inundation area shown in shaded colors on storm surge mapping.

4.14.3 Sea Level Rise Risk and Vulnerability

Only a small portion of the southern portion of the Town is potentially affected by the projected 1-and 2-foot sea level rise inundation areas. Mapping indicated no buildings are located within this area.

Note: The Town of Vienna flood risk and vulnerability mapping is presented on the next few pages.





**UNINCORPORATED FLOOD PRONE
AREAS
RISK & VULNERABILITY**

4.15 Unincorporated Areas of Dorchester County

According to the **2021 Dorchester County Comprehensive Plan**, between 1970 and 2018, an average of 48% of the County's population lived in municipalities and 52% lived in unincorporated areas. The municipalities that experienced the highest population increase within these years were Hurlock, East New Market and Secretary, while Brookview, Church Creek and Eldorado experienced population decrease.

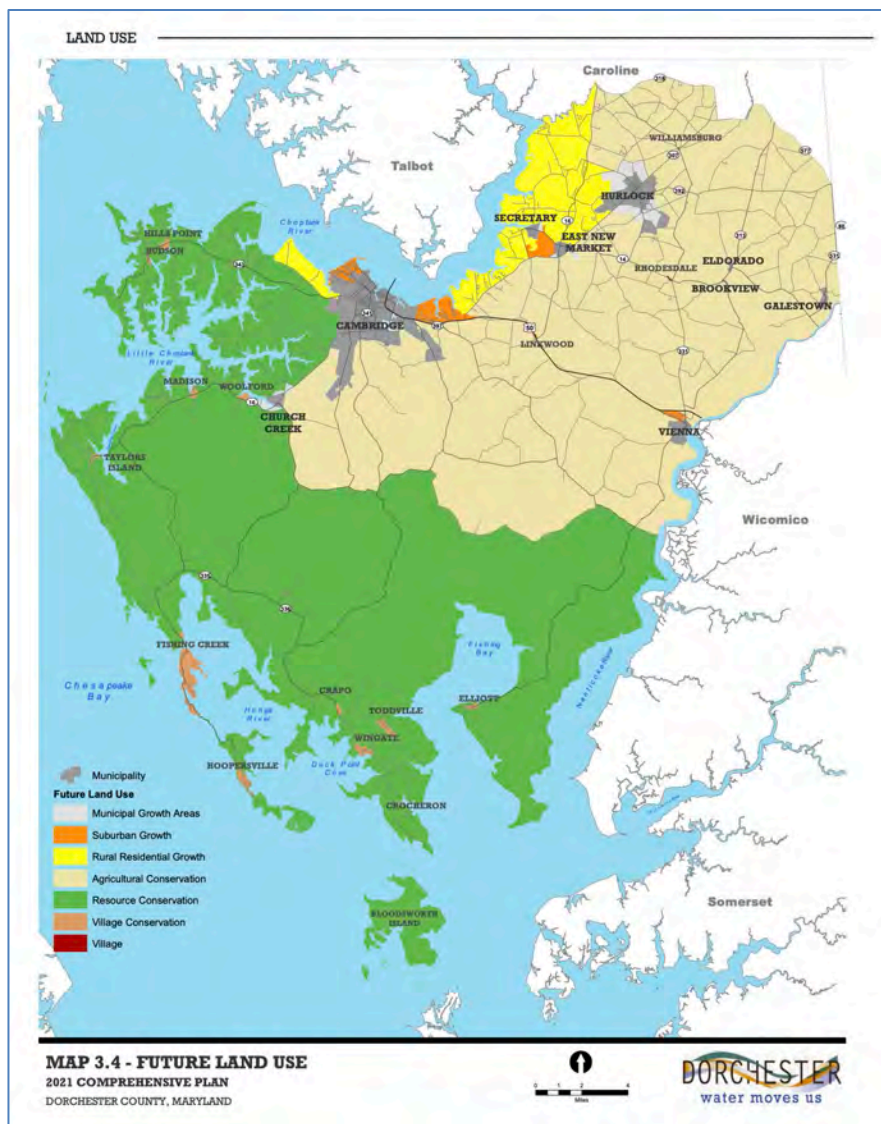
In addition to municipalities, various flood-prone communities exist with Dorchester County and include:

- Neck District (Hills Point & Hudson),
- Fishing Creek,
- Taylors Island,
- Hoopersville,
- Crocheron,
- Toddville,
- and Wingate.

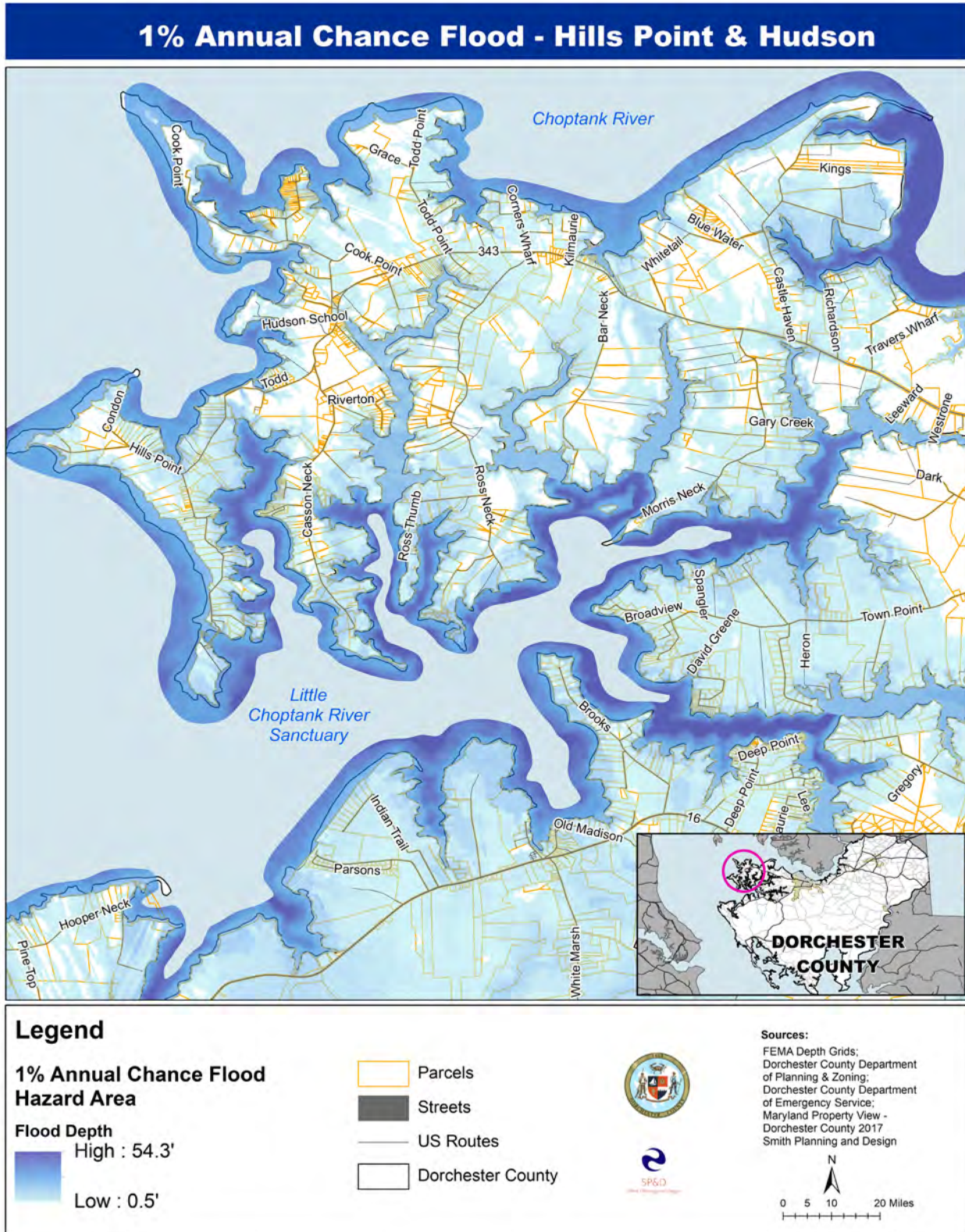
In terms of land use, the **2021 Dorchester County Comprehensive Plan Land Use Plan** provides for development to locate in designated growth areas and establishes the policy basis for more compact development that uses the land efficiently and that will help reduce the long-term impacts of unmanaged growth on infrastructure investment and on a natural resource-based economy. This Plan divides the County into different land use areas for purposes of establishing public policies and for

recommending implementation strategies to achieve the desired land use goals. As shown on the Future Land Use Map, these flood-prone communities have a designed future land use as "resource conservation." Resource conservation land use goals include:

- Conservation of natural resources such as tidal and non-tidal wetlands and forests as well as agriculture.
- Encourage voluntary land conservation programs to protect sensitive areas and prime natural resources.
- Explore transfer of development rights programs so that property owners can realize their property value while developing in less vulnerable areas.



The following maps depict both the FEMA Special Flood Hazard Area (SFHA) with Depth Grids for the following communities: Neck District, Fishing Creek, Taylors Island, Hoopersville, Crocheron, Toddville, and Wingate. In addition, both Storm Surge vulnerability maps and Sea Level Rise vulnerability maps have been produced for each community, as applicable.



Storm Surge - Hills Point & Hudson



Legend

Storm Surge

Hurricane Categories

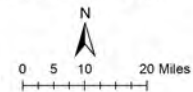
- Category 1
- Category 2
- Category 3
- Category 4

- Parcels
- US Routes
- Streets
- Dorchester County



Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Service;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



Sea Level Rise - Hills Point & Hudson

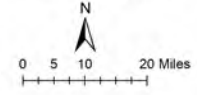


Legend

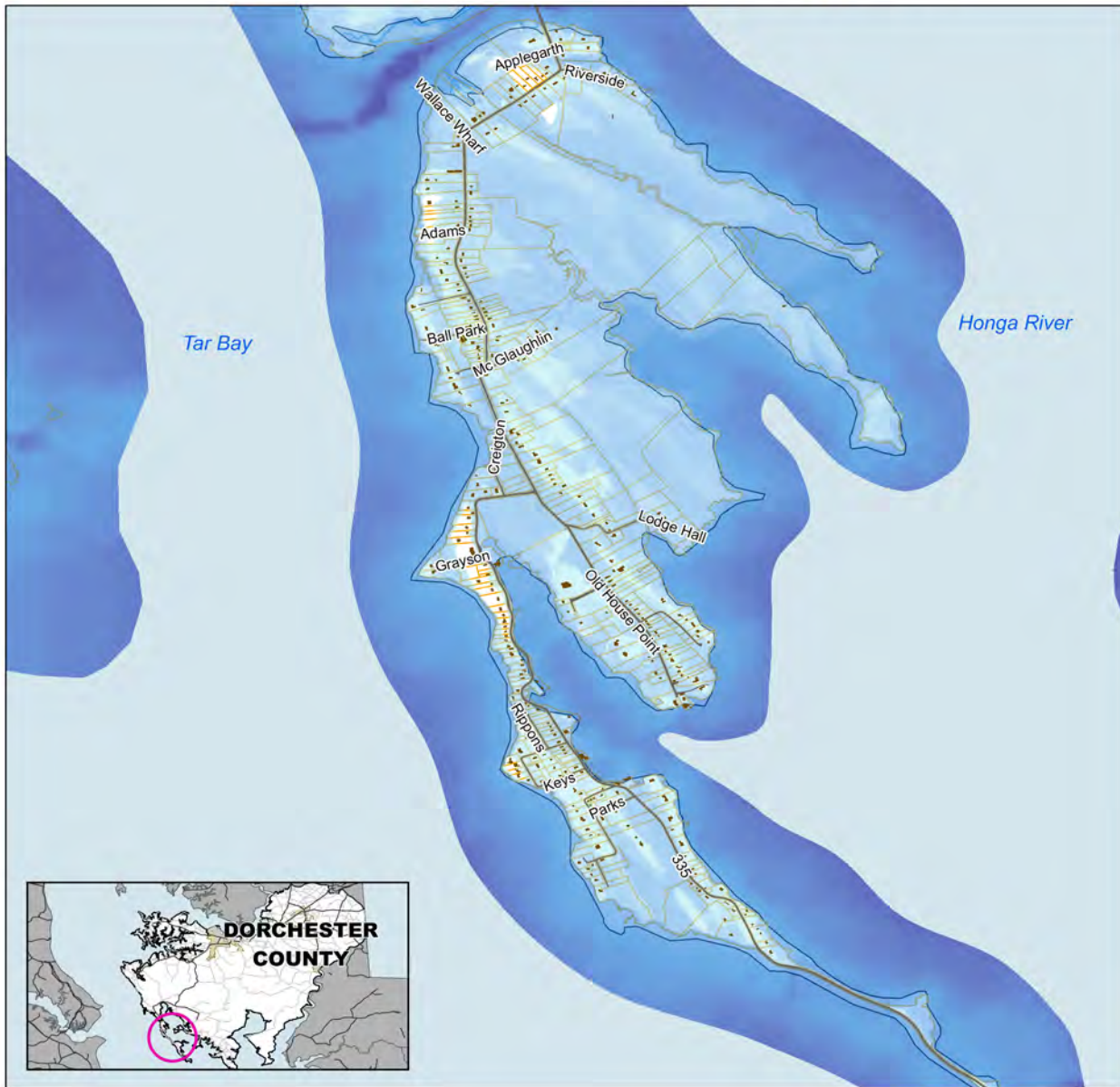
- 1 foot Sea Level Rise
- 2 foot Sea Level Rise
- Parcels
- Streets
- US Routes
- Dorchester County



Sources:
 FEMA Depth Grids;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Service;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



1% Annual Chance Flood - Fishing Creek



Legend

1% Annual Chance Flood Hazard Area

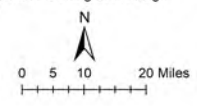
Flood Depth
 High : 54.3'
 Low : 0.5'

Buildings Footprints
 Parcels

Streets
 US Routes
 Dorchester County



Sources:
 FEMA Depth Grids;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design



Storm Surge- Fishing Creek



Legend

Storm Surge

Hurricane Categories

- Category 1
- Category 2
- Category 3
- Category 4

Buildings Footprints

Parcels

Streets

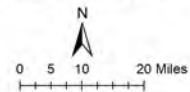
US Routes

Dorchester County



Sources:

NOAA Storm Surge;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Services;
 Maryland Property View -
 Dorchester County 2017
 Smith Planning and Design



Sea Level Rise - Fishing Creek

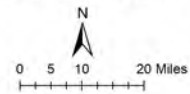


Legend

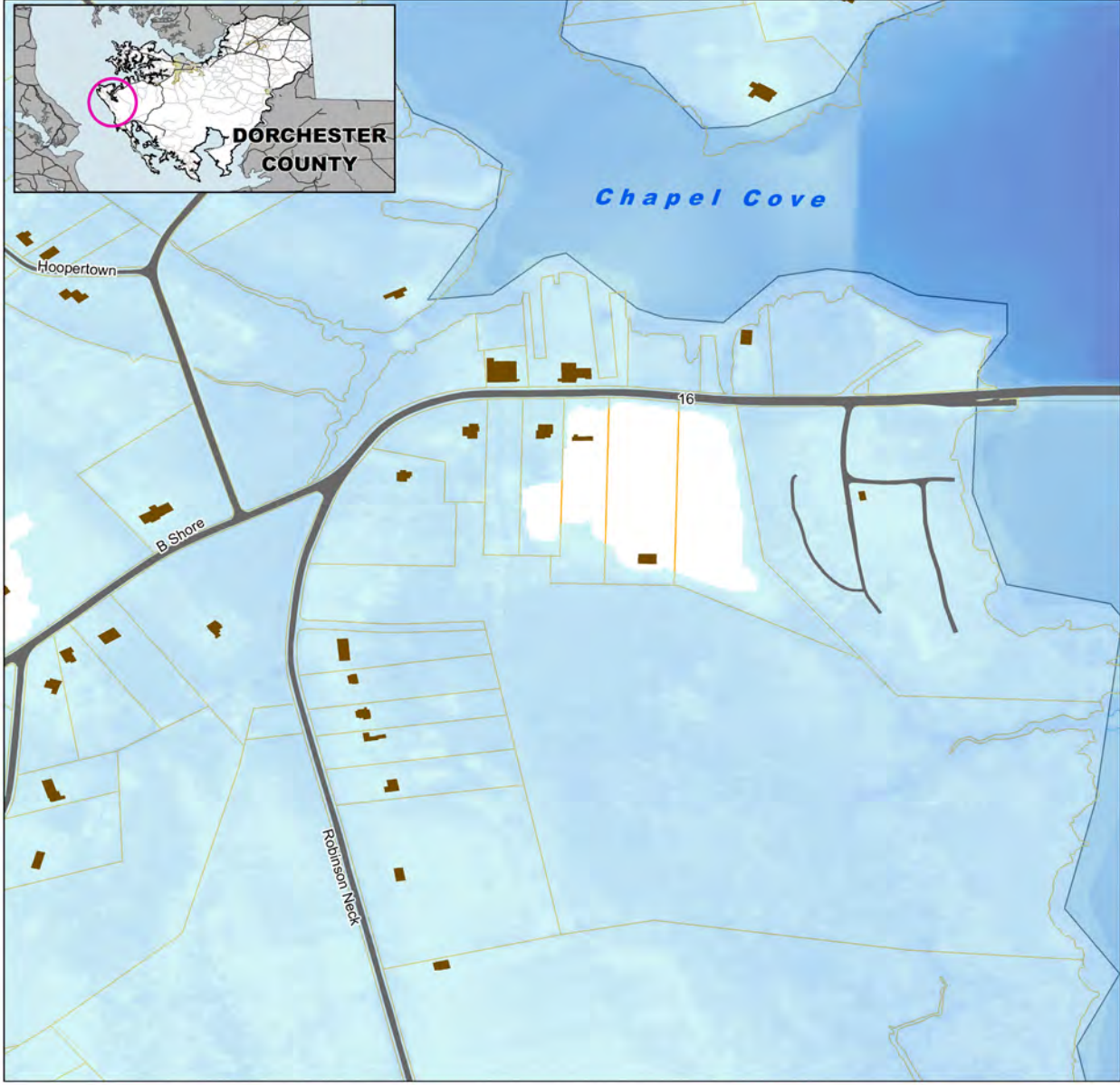
- | | |
|---|---|
| 1 foot Sea Level Rise | Streets |
| 2 foot Sea Level Rise | US Routes |
| Buildings Footprints | Dorchester County |
| Parcels | |



Sources:
 NOAA Sea Level Rise;
 Dorchester County Department of Planning & Zoning;
 Dorchester County Department of Emergency Services;
 Maryland Property View - Dorchester County 2017
 Smith Planning and Design

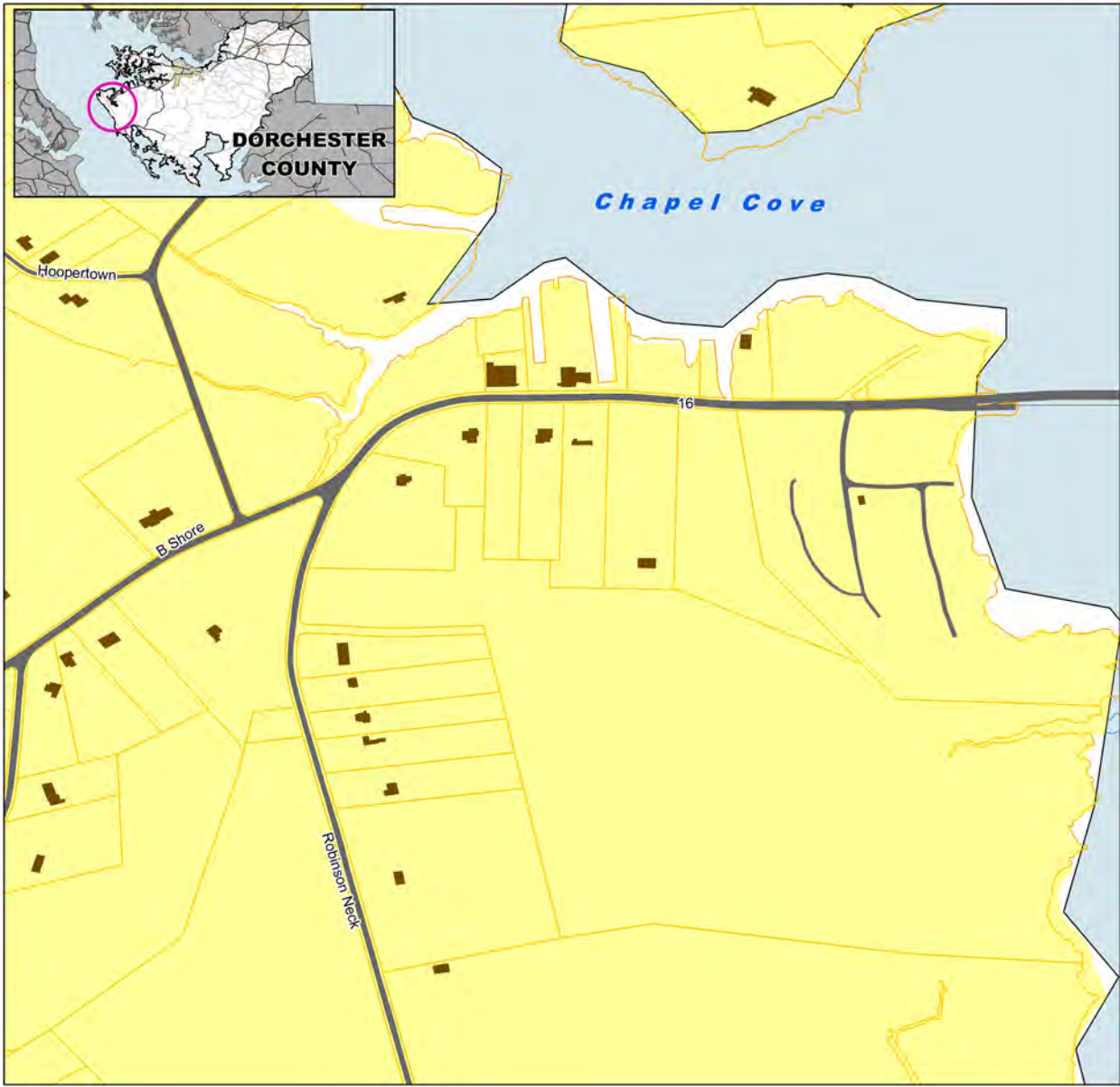


1% Annual Chance Flood - Taylors Island



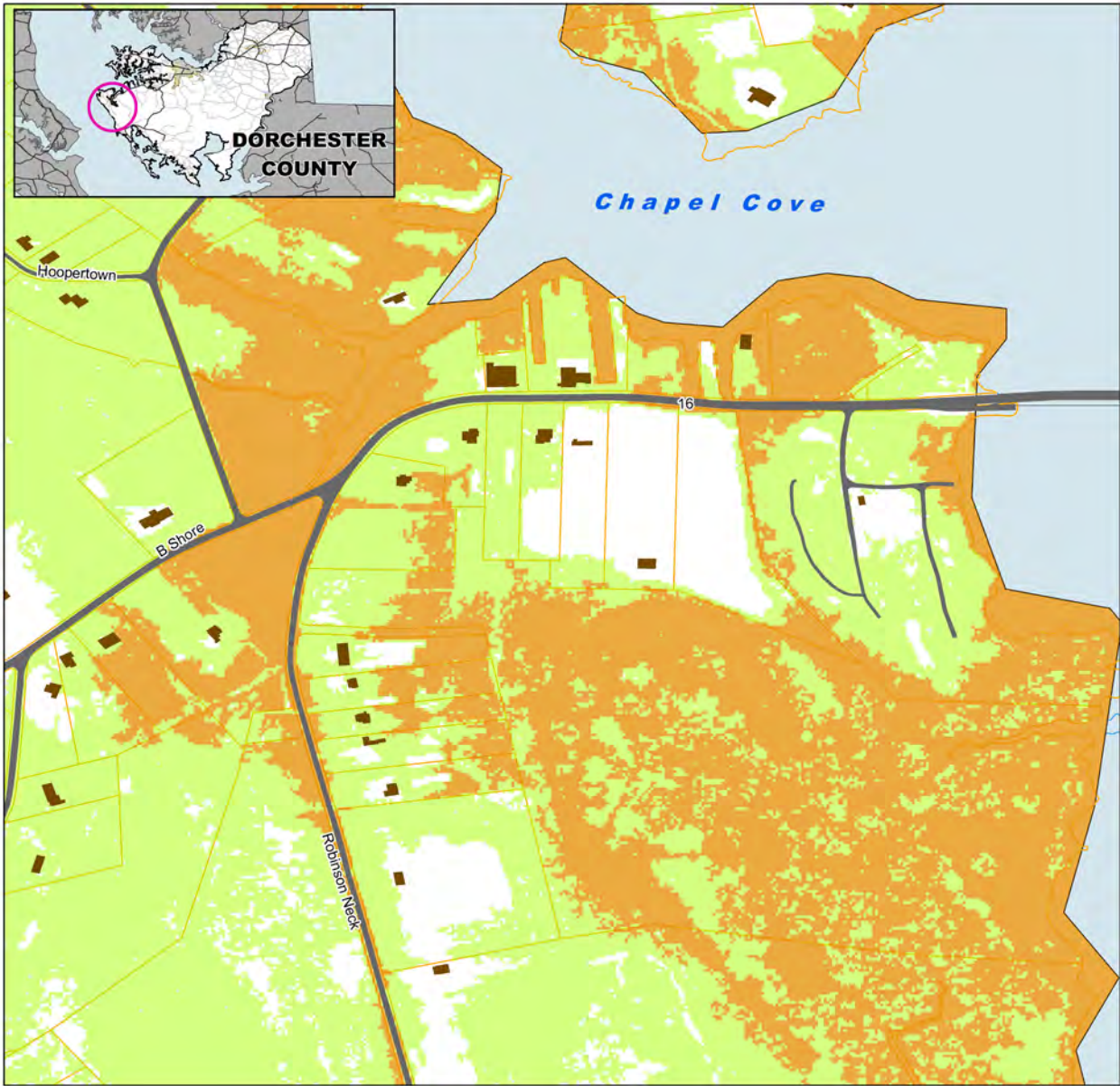
<p>Legend</p> <p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth</p> <p>High : 54.3'</p> <p>Low : 0.5'</p>		<p> Buildings Footprints</p> <p> Parcels</p>	<p> Streets</p> <p> US Routes</p> <p> Dorchester County</p>	 	<p>Sources:</p> <p>FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design</p> <p style="text-align: center;">N 0 5 10 20 Miles </p>
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Storm Surge - Taylors Island



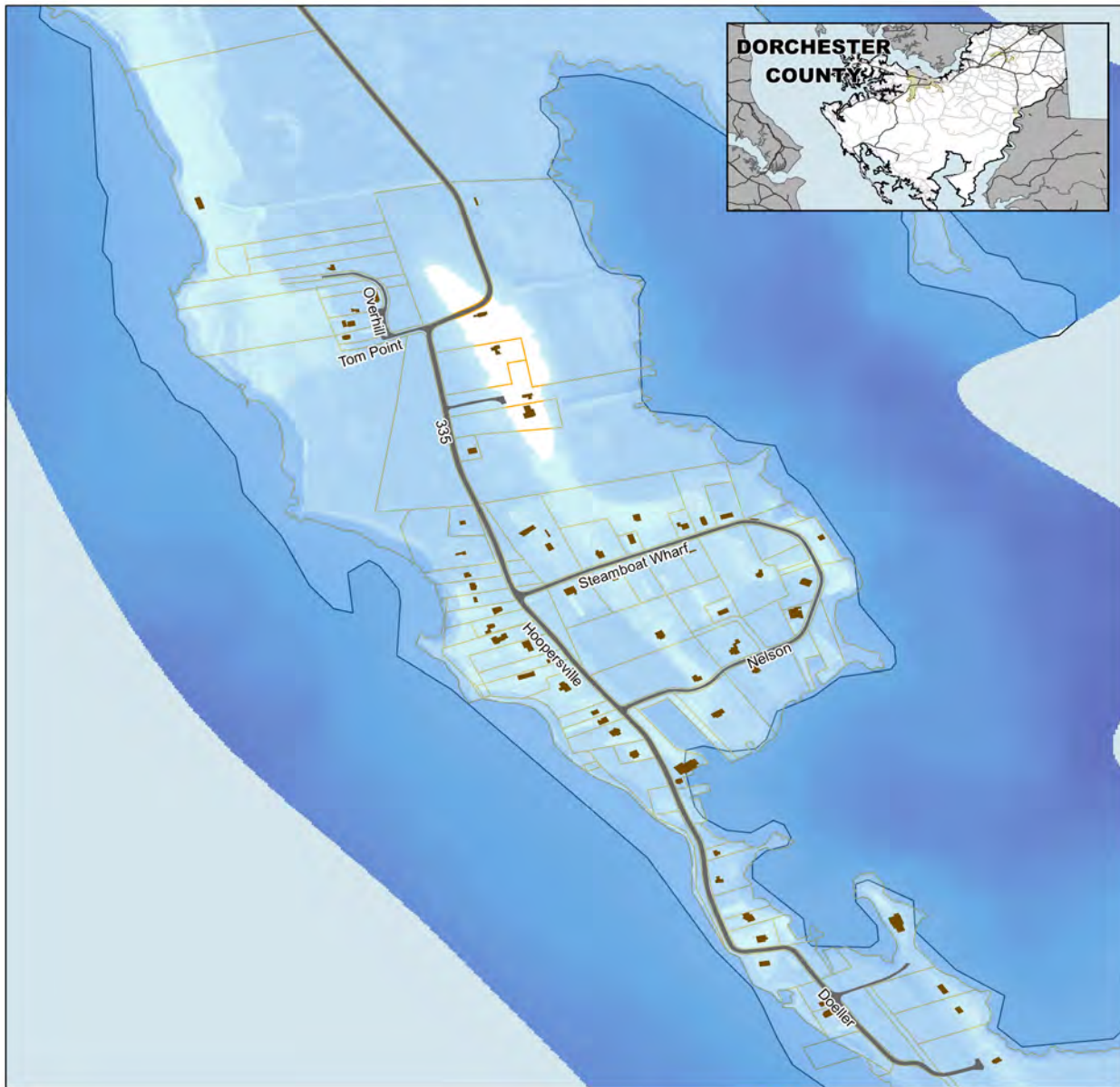
Legend			
Storm Surge Category 1 Category 2 Category 3 Category 4	Buildings Footprints Parcels	Streets US Routes Dorchester County	 
			Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
			 0 5 10 20 Miles 

Sea Level Rise - Taylors Island



Legend		 	Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Services; Maryland Property View - Dorchester County 2017 Smith Planning and Design
<ul style="list-style-type: none"> 1 foot Sea Level Rise 2 foot Sea Level Rise 	<ul style="list-style-type: none"> Buildings Footprints Parcels Streets US Routes Dorchester County 		

1% Annual Chance Flood - Hoopersville



Legend

1% Annual Chance Flood Hazard Area

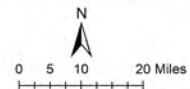
Flood Depth
 High : 54.3'
 Low : 0.5'

-  Buildings Footprints
-  Parcels
-  Streets
-  US Routes
-  Dorchester County



Sources:

FEMA Depth Grids;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Management Agency;
 Maryland Property View -
 Dorchester County 2013
 Smith Planning and Design

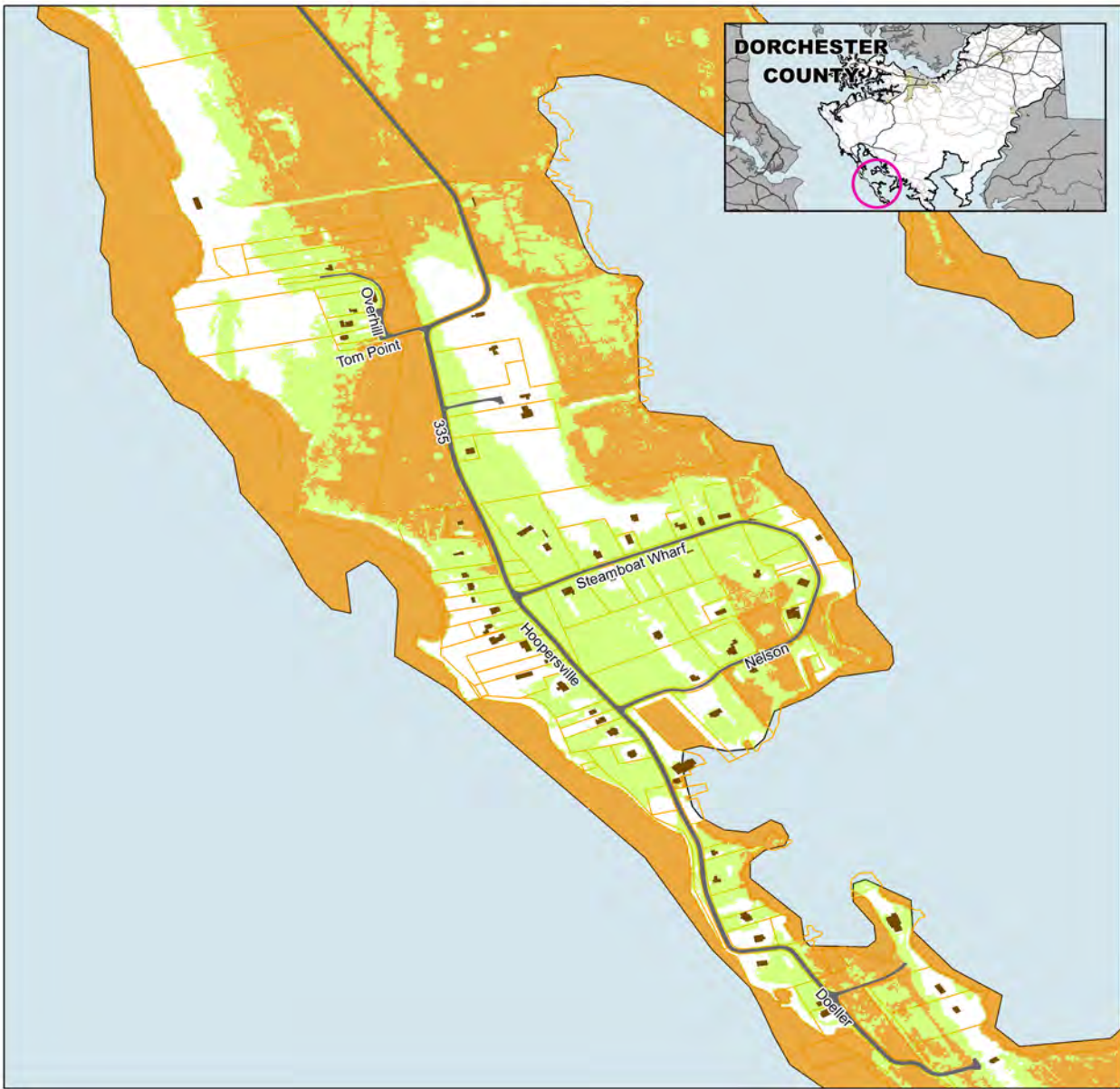


Storm Surge - Hoopersville



Legend				
Storm Surge	Buildings Footprints	Streets		Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design
Hurricane Categories	Parcels	US Routes		
Category 1		Dorchester County		
Category 2				
Category 3				
Category 4				
			 0 5 10 20 Miles 	

Sea Level Rise - Hoopersville



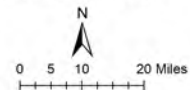
Legend

- | | |
|---|---|
| 1 foot Sea Level Rise | Streets |
| 2 foot Sea Level Rise | US Routes |
| Buildings Footprints | Dorchester County |
| Parcels | |

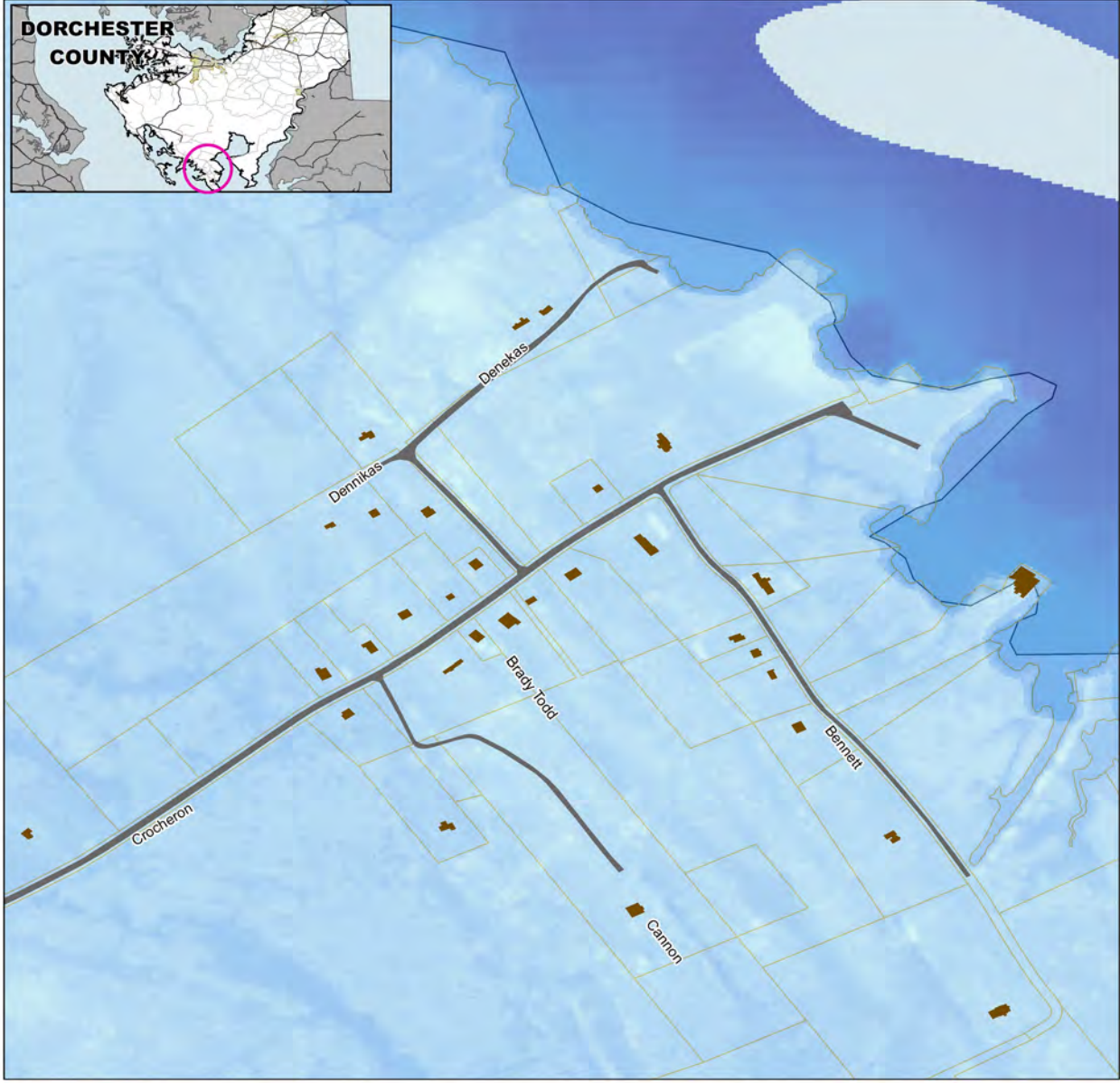


Sources:

NOAA Sea Level Rise;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Management Agency;
 Maryland Property View -
 Dorchester County 2013
 Smith Planning and Design

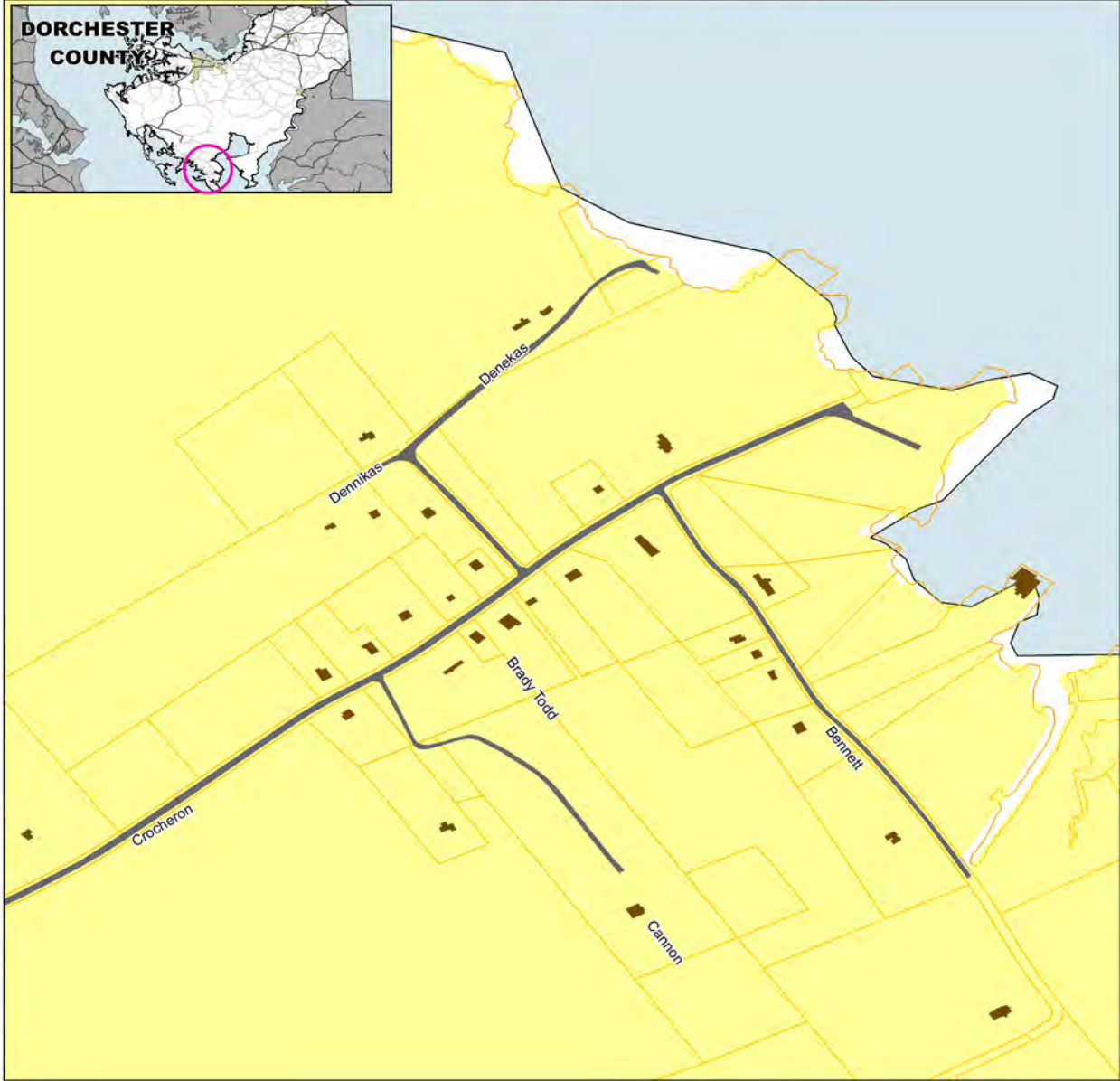


1% Annual Chance Flood - Crocheron



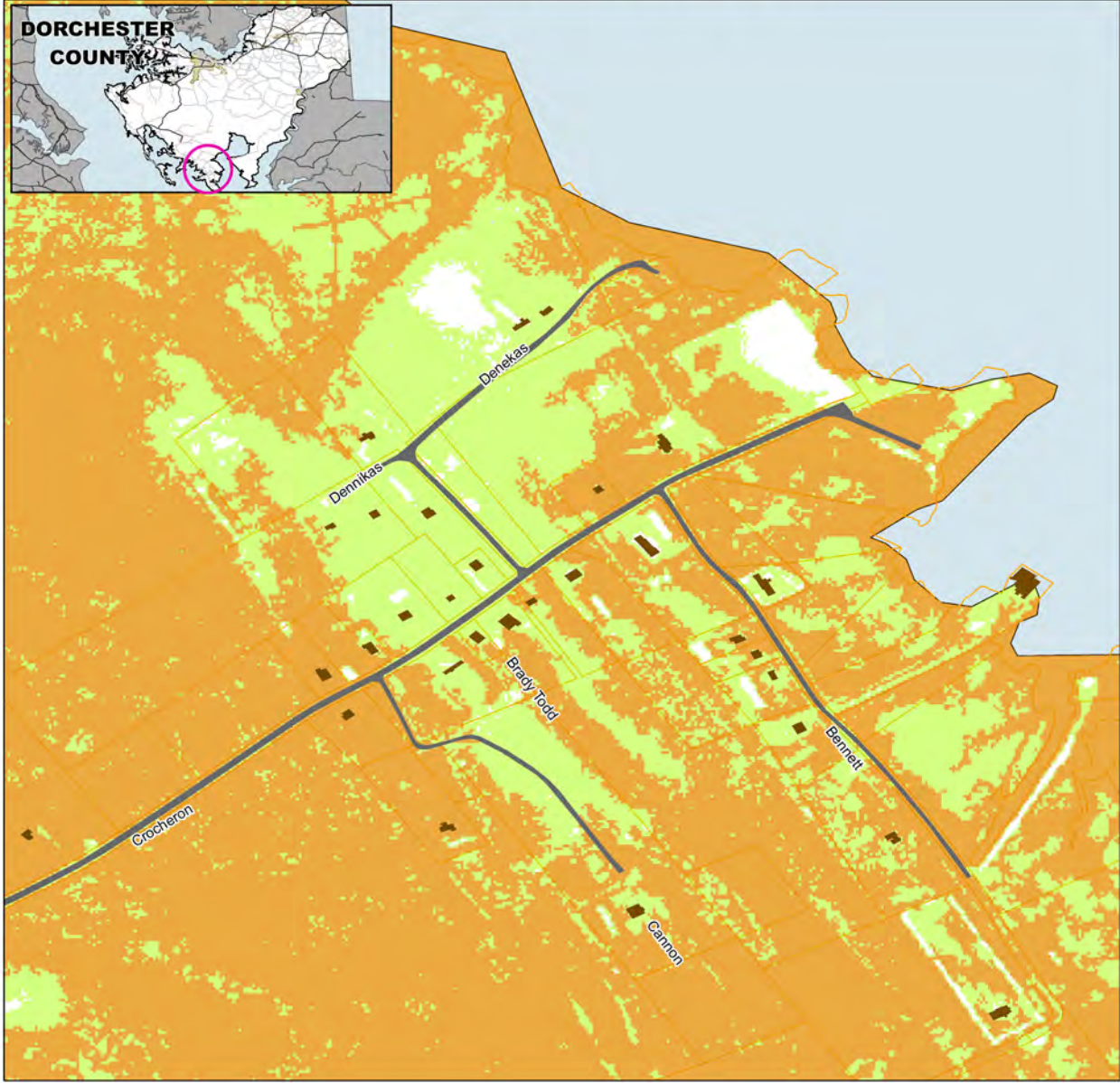
Legend		 	Sources:
<p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth High : 54.3' Low : 0.5'</p>	<ul style="list-style-type: none"> Buildings Footprints Parcels Streets US Routes Dorchester County 		<ul style="list-style-type: none"> FEMA Depth Grid; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design
		 	

Storm Surge - Crocheron



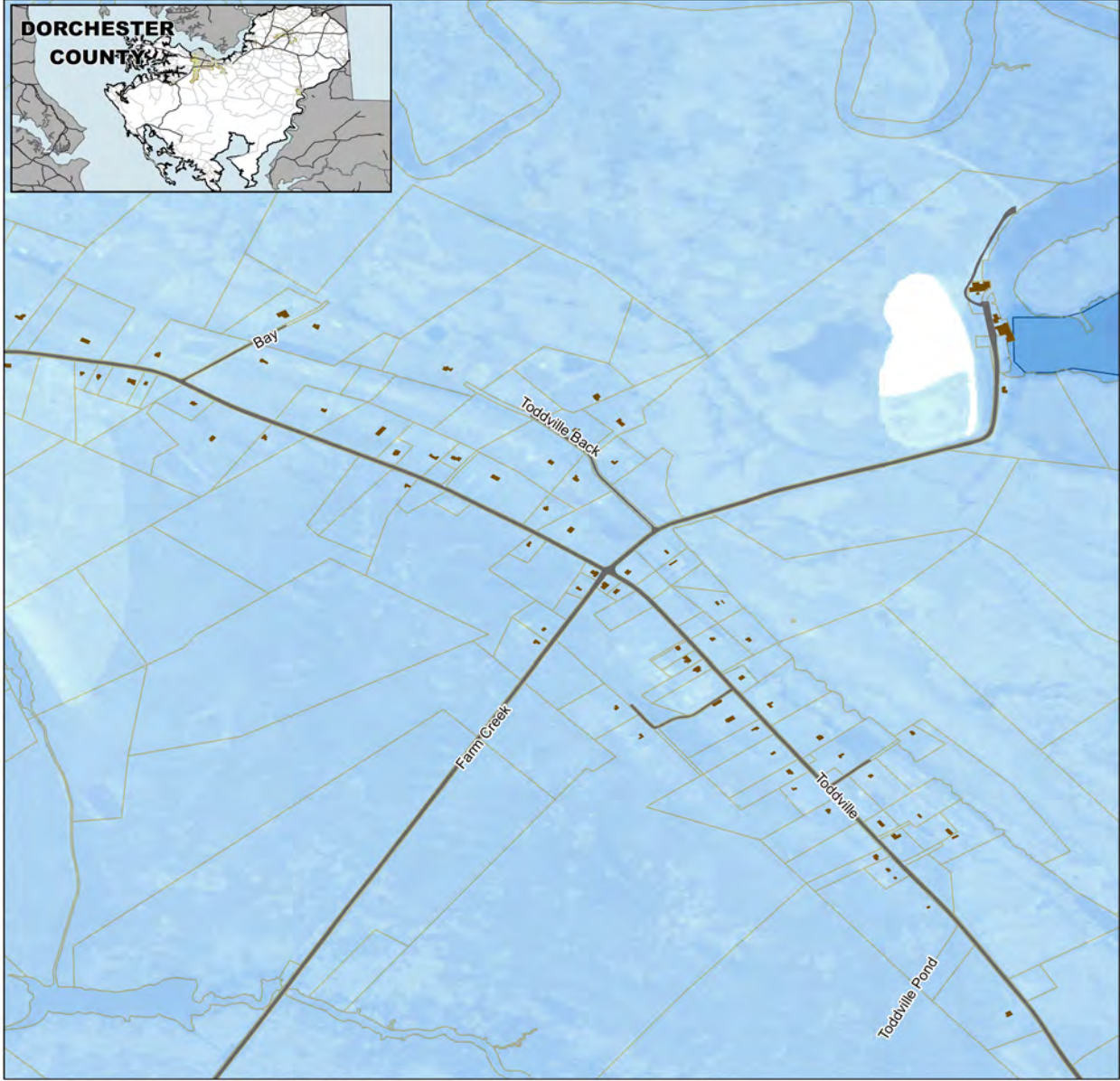
Legend				
<p>Storm Surge</p> <p>Hurricane Categories</p> <ul style="list-style-type: none"> Category 1 Category 2 Category 3 Category 4 	<ul style="list-style-type: none"> Buildings Footprints Parcels 	<ul style="list-style-type: none"> Streets US Routes Dorchester County 	 	<p>Sources:</p> <p>FEMA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design</p> <div style="text-align: center;"> 0 5 10 20 Miles </div>

Sea Level Rise - Crocheron



Legend		  <small>Smith Planning and Design</small>	Sources: NOAA Sea Level Rise; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design
 1 foot Sea Level Rise	 Buildings Footprints		
 2 foot Sea Level Rise	 Streets	 US Routes	 
	 Dorchester County		

1% Annual Chance Flood - Toddville



Legend

1% Annual Chance Flood Hazard Area

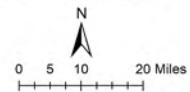
Flood Depth
 High : 54.3'
 Low : 0.5'

-  Buildings Footprints
-  Parcels
-  Streets
-  US Routes
-  Dorchester County

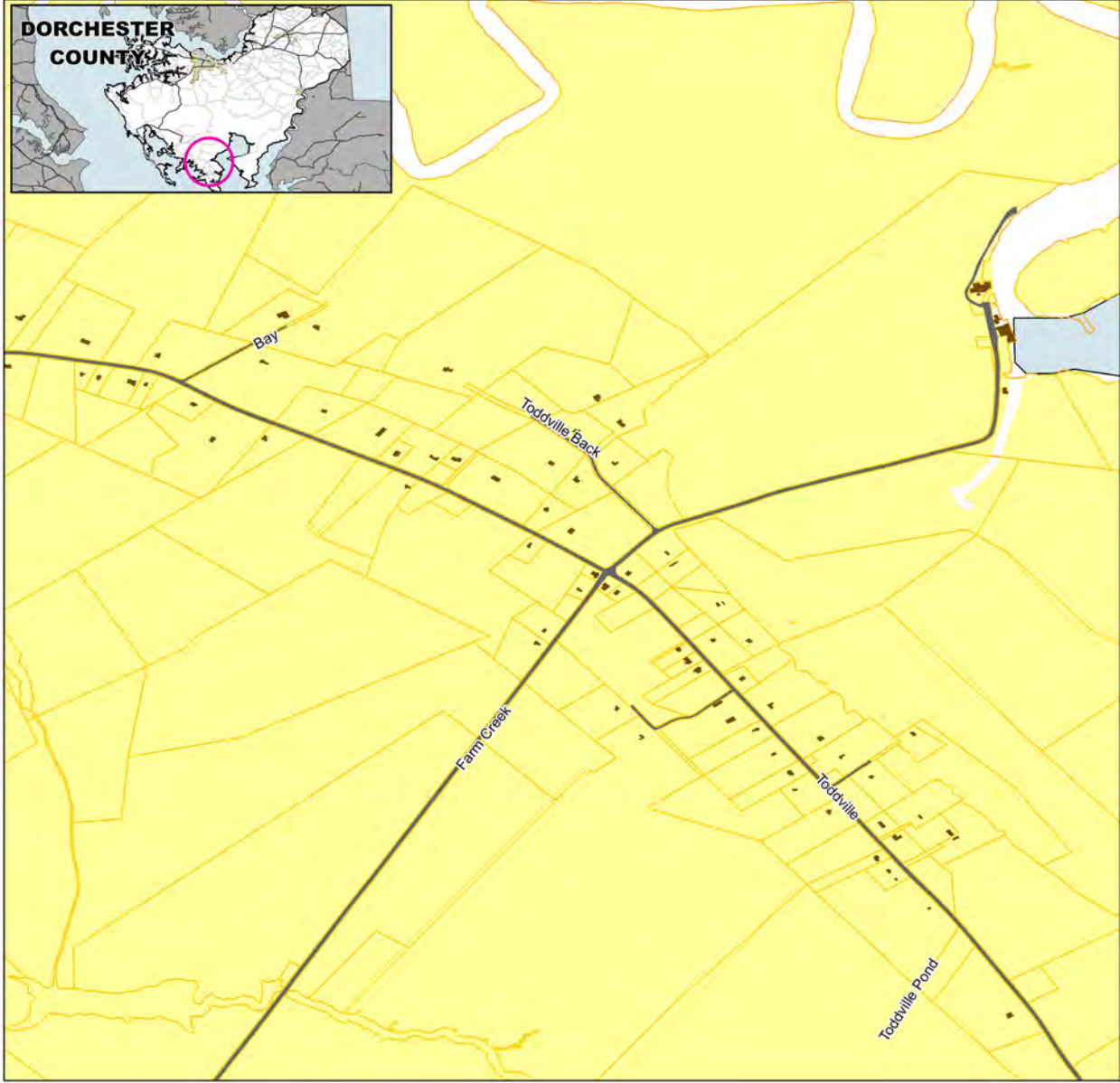


Sources:

FEMA Depth Grids;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Management Agency;
 Maryland Property View -
 Dorchester County 2013
 Smith Planning and Design

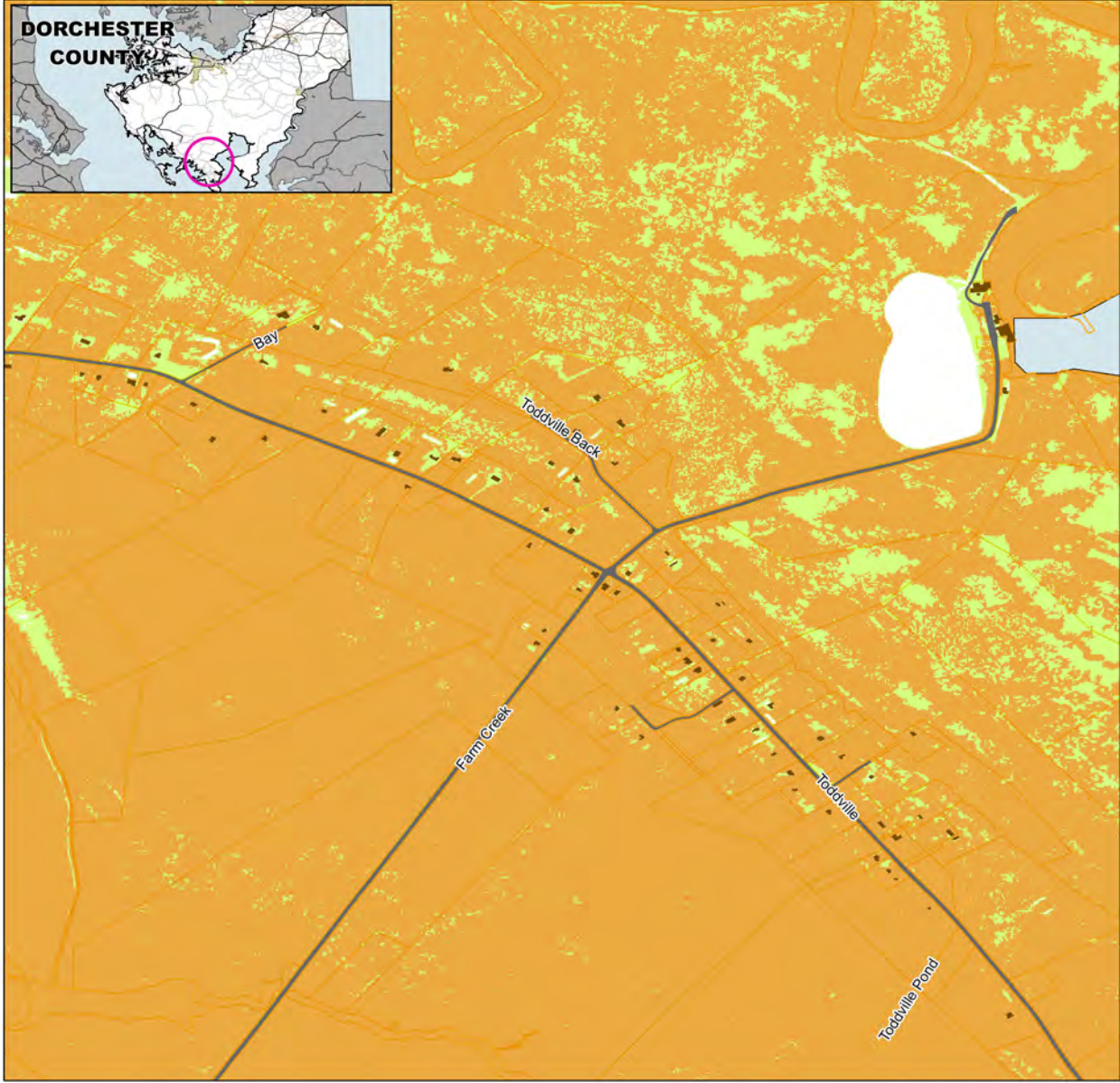


Storm Surge - Toddville



Legend				
<p>Storm Surge</p> <p>Hurricane Categories</p> <ul style="list-style-type: none"> Category 1 Category 2 Category 3 Category 4 	<ul style="list-style-type: none"> Buildings Footprints Parcels 	<ul style="list-style-type: none"> Streets US Routes Dorchester County 	 	<p>Sources:</p> <p>NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design</p> <div style="text-align: center;"> 0 5 10 20 Miles </div>




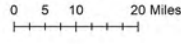
Sea Level Rise - Toddville



Legend		  <small>SP&D Smith Planning and Design</small>	Sources: NOAA Sea Level Rise; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design
 1 foot Sea Level Rise	 Streets		
 2 foot Sea Level Rise	 US Routes		
 Buildings Footprints	 Dorchester County		
 Parcels		 	

1% Annual Chance Flood- Wingate



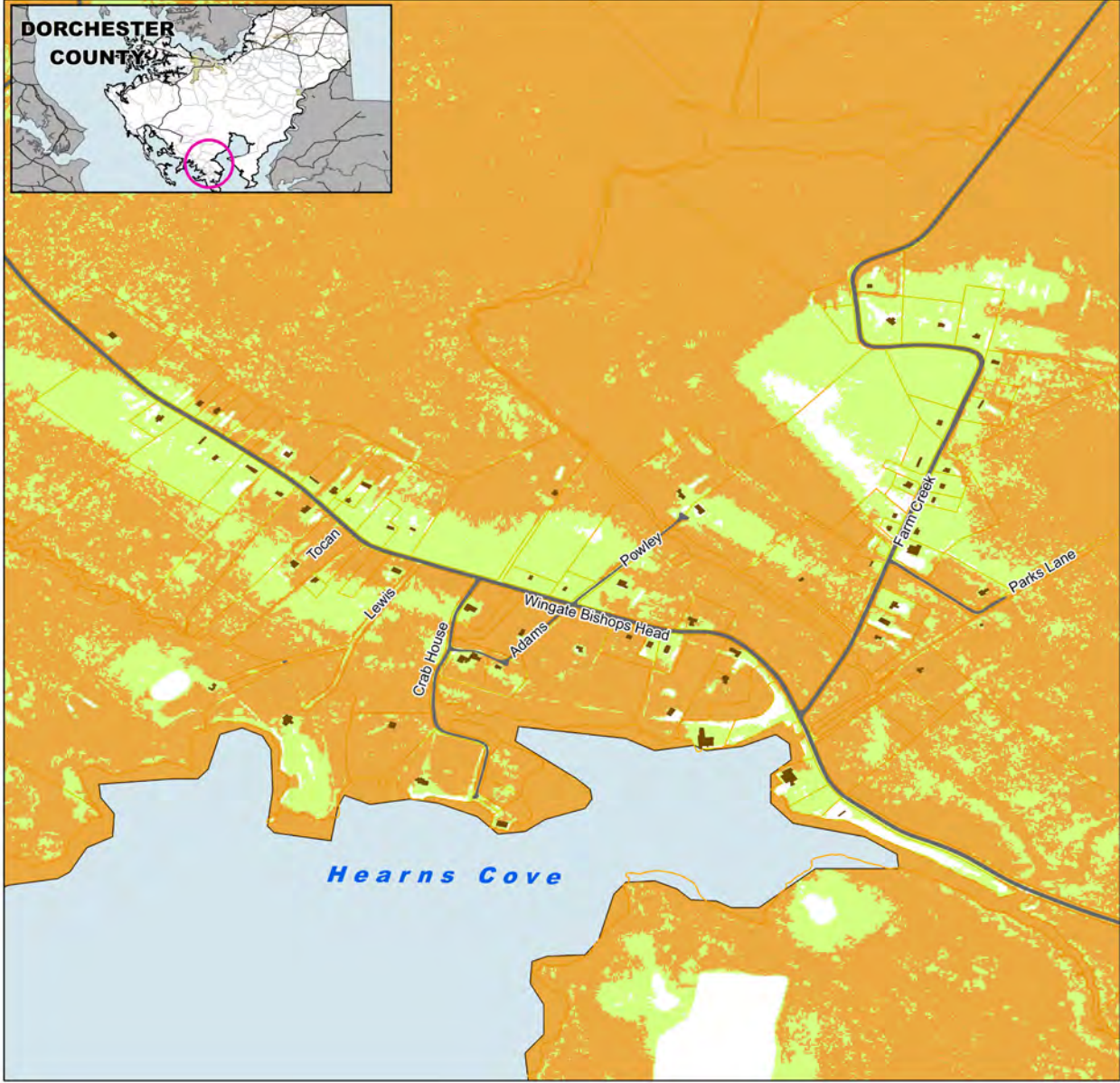
<p>Legend</p> <p>1% Annual Chance Flood Hazard Area</p> <p>Flood Depth High : 54.3' Low : 0.5'</p>	<ul style="list-style-type: none"> Buildings Footprints Parcels Streets US Routes Dorchester County 	 	<p>Sources: FEMA Depth Grids; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design</p> <div style="text-align: center;">   </div>
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Storm Surge - Wingate



Legend				
Storm Surge	Buildings Footprints	Streets	 	Sources: NOAA Storm Surge; Dorchester County Department of Planning & Zoning; Dorchester County Department of Emergency Management Agency; Maryland Property View - Dorchester County 2013 Smith Planning and Design
Hurricane Categories	Category 1	US Routes		
	Category 2	Dorchester County		
	Category 3			
	Category 4			
	Parcels			 0 5 10 20 Miles

Sea Level Rise - Wingate

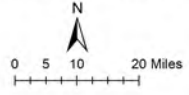


Legend

- | | |
|---|---|
| 1 foot Sea Level Rise | Streets |
| 2 foot Sea Level Rise | US Routes |
| Buildings Footprints | Dorchester County |
| Parcels | |



Sources:
 NOAA Sea Level Rise;
 Dorchester County Department
 of Planning & Zoning;
 Dorchester County Department
 of Emergency Management Agency;
 Maryland Property View -
 Dorchester County 2013
 Smith Planning and Design



Chapter 5 Nuisance Flooding

5.1 Nuisance Flood Risk

Dorchester County is experiencing flooding outside mapped floodplains with increasing frequency, including both nuisance and urban flooding. There is recognition by Maryland lawmakers, local and state governments, and citizens that tidally driven nuisance flood events are happening with more frequency. While nuisance flooding may not pose a serious threat or result in major damage, it interrupts and causes impacts to daily routines and can negatively impact commerce. Pursuant to Maryland House Bill 1427 (2019), §3-1018(b) and (c), on or before Oct. 1, 2020, a local jurisdiction that experiences nuisance flooding (NF) shall develop a plan to address nuisance flooding. In addition, a local jurisdiction shall update the plan every five years; publish the plan on the local jurisdiction’s website; and shall submit a copy of the plan to the Maryland Department of Planning. This legislation is an update to Senate Bill 1006 and House Bill 1350 (2018).

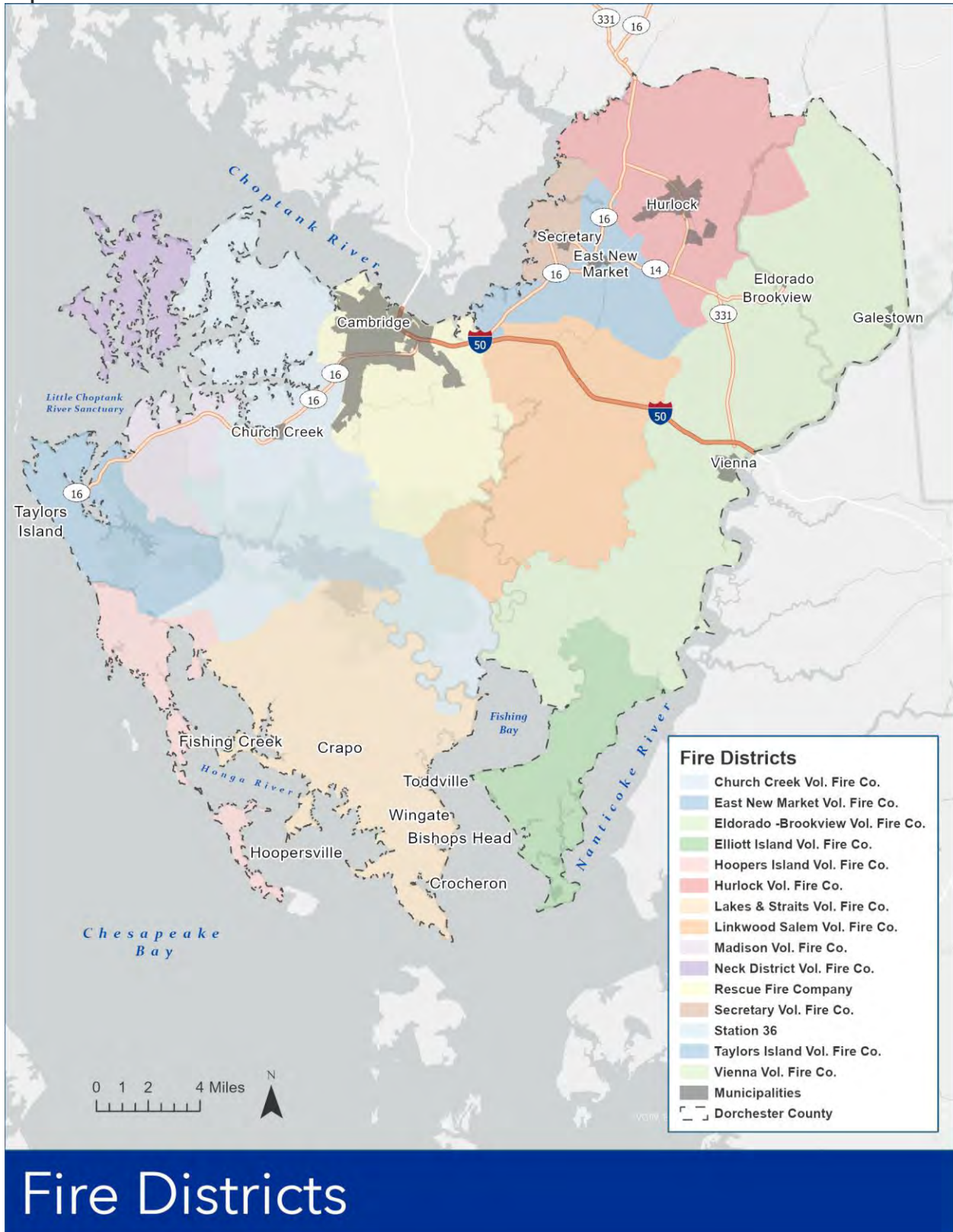
The definition of nuisance flooding in accordance with §3-1001 of the **Natural Resource Article of the Maryland Annotated Code** is “high tide flooding that causes a public inconvenience.”

Nuisance Flooding	Urban Flooding
<p>Nuisance flooding is associated with high tides that flow back through the stormwater system, increasing/raising the level of groundwater, and overtopping the banks and edge of waterways. Nuisance flooding is an indicator of rising water levels in the Chesapeake Bay and its tributaries. Areas that were previously dry now flood during high tides because the water elevation is high enough to lap over the banks of waterways and to enter stormwater systems through outfalls that were previously high enough to prevent backflow, while allowing outflow.</p>	<p>Urban flooding is due to a variety of issues related to development: increased impervious surface, disruption of natural watershed flows and functions, undersized and aged stormwater infrastructure, and changing weather patterns which exacerbate the inadequacies of older stormwater systems and the fragmented watersheds. Urban flooding reflects decades of development that has outstripped the capacity of stormwater infrastructure and disrupted the natural flow and discharge of watersheds. Additionally, many stormwater systems are beyond their expected useful life and in need of repair and replacement.</p>

Challenges from both nuisance and urban flooding are compounded by what is becoming the new normal: an increase in the frequency and intensity of storms caused by higher global temperatures that increase evaporation in the ocean and atmosphere, creating more favorable conditions for heavier and more frequent precipitation. Increased runoff can contribute more nutrients, contaminants (e.g., oil, gasoline, antifreeze, among others) and sedimentation into the waterways and ultimately the Bay.

As an initial step in the data gathering process, a survey was distributed to each fire department requesting the identification of roadways that frequently flood (Map 5.1). In addition, roadways identified in the 2022 Hazard Mitigation Plan were also integrated into the overall listing. MyCoast reports were reviewed, and roadways identified were included.

Map 5.1



5.1.1 NOAA High Tide Flooding

NOAA maintains and operates tidal gauge and meteorological stations throughout the region. The closest NOAA gauge to Dorchester County is in Cambridge. The Cambridge Tide Gauge is located on the Bill Burton Fishing Pier (SE of US-50 bridge on the South side of the Choptank River) (picture on the right). The tide gauge was installed on May 5, 1997. This gauge records a plethora of information such as tides/water levels, tide predictions, sea level trends, extreme water levels, and various other meteorological observations.



According to The National Oceanic and Atmospheric Administration (NOAA) Technical Report NOS CO-OPS 086: [Patterns And Projections Of High Tide Flooding Along The U.S. Coastline Using A Common Impact Threshold](#), NOAA has established three coastal flood severity thresholds for forecasting purposes to ensure public safety. The thresholds are based upon water level heights empirically calibrated to NOAA tide gauge measurements from years of impact monitoring by its Weather Forecast Offices (WFO) and emergency managers. When minor (more disruptive than damaging), moderate (damaging) or major (destructive) coastal flooding is anticipated (not associated with tropical storms), NOAA issues either a flood advisory (for minor) or warning (for moderate or major). According to NOAA, the intention of the report is to provide an objective and nationally consistent set of impact thresholds for minor/moderate/ major coastal flooding.

All derived NOAA coastal flood thresholds share a common pattern based upon the local tide range (possibly in response to systematic development ordinances). Based upon this statistical (regression-based) relationship, a 'derived' set of flood threshold proxies for minor, moderate or major impacts are permissible for almost any location along the U.S. coastline. Derived thresholds are obtained by solving the regression equations for a particular location. For example, y (the minor derived flood threshold for a location) = $1.04 x$ (the local GT tidal datum) + 0.50 m. The primary emphasis of the report to use the derived threshold for minor flooding, which is refer to as 'high tide' flooding (also known as 'nuisance', 'sunny day' and 'recurrent tidal' flooding), to assess nationally how exposure—and potential vulnerability—to high tide flooding has and will continue to change with changing sea levels.

The NOAA high tide flooding data layer depicts low-lying coastal areas prone to flooding during extreme high tides. Extreme high tides occur a few times per year when the sun, moon, and earth align, or during storm events. Rainfall or wind pushing water over land can increase flooding levels. Annual occurrences of high tide flooding—exceeding local thresholds for minor impacts to infrastructure—have increased 5- to 10-fold since the 1960s in several U.S. coastal cities. In a sense, today's flood will become tomorrow's high tide, as sea level rise will cause flooding to occur more frequently and last for longer durations of time.

NOAA High Tide Flooding - Shallow Coastal Flooding Areas

The purpose of this dataset is to depict the extent of flood-prone coastal areas based on predicted water levels exceeding specific tidal heights as issued by local National Weather Service offices.

The official NOAA coastal flood thresholds based upon heights above the local tide range or more specifically, the great diurnal (GT) tidal datum as defined by NOAA (Gill and Schultz, 2001), which is the height difference between the MHHW tidal datum and the mean lower low water (MLLW) tidal datum. The GT datum can be closely approximated as the average difference between daily highest and lowest water levels over a 19-year tidal epoch (1983–2001 is the current NOAA epoch). The GT datum, which is based upon observed water levels that form in response to tidal forcing, seasonal cycles in mean sea level and to a lesser degree storm surge climatologies, is closely related to the variance/standard deviation in daily highest water levels relative to mean sea level.

NOAA tide gauge information and ‘official’ NOAA and derived (in the technical report) coastal flood severity thresholds for Cambridge are:

- NOAA Flood Threshold (m, MHHW)
 - Minor – 0.45 (1.48 feet)
 - Moderate – 0.60 (1.97 feet)
 - Major – 0.75 (2.46 feet)
- Derived Threshold (m, MHHW)
 - Minor – 0.52 (1.71 feet)
 - Moderate – 0.82 (2.69 feet)
 - Major – 1.19 (3.90 feet)

Minor – more disruptive than damaging
Moderate – damaging
Major – destructive

Mean High High Water (MHHW) - the average height of the highest tide recorded at a tide station each day during the recording period.

Source: [Patterns And Projections Of High Tide Flooding Along The U.S. Coastline Using A Common Impact Threshold](#)

Note: The community should rely on [NOAA Inundation Dashboard - Observed Water Levels at 8571892, Cambridge MD](#). Water and associated flood thresholds are available in real time and are based on local tide gages and are not derived from the comparison of different tide gages - regression based tidal thresholds.

The flood thresholds used in Map 5.2 for generalized planning purposes are derived national flood thresholds from NOAA’s Technical Report. The derived thresholds used here provide a national definition of coastal flooding and impacts for quantifying and communicating risk. These thresholds may deviate from National Weather Service (NWS) impact thresholds, which take into account local flood risk and are used to issue NWS coastal flood watches, warnings, and advisories.

The orange layer in the map represents areas currently subject to tidal flooding (minor flood threshold), often called “[recurrent or nuisance flooding](#).”

Map 5.2



NOAA High Tide Flooding

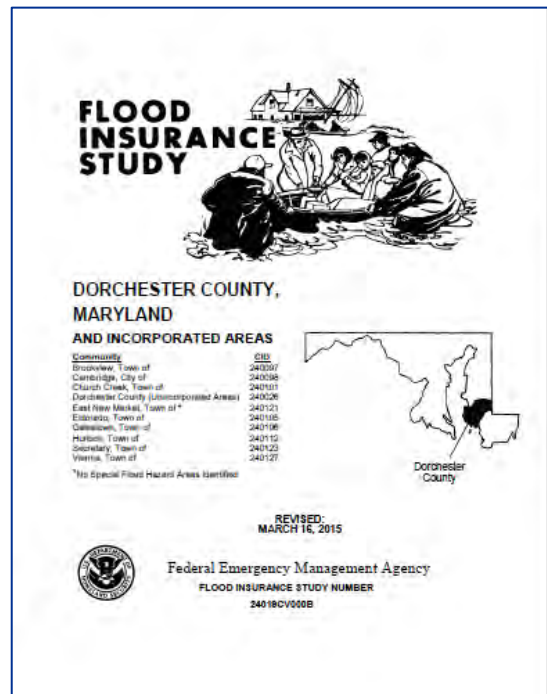
Source: NOAA Coastal Flood Exposure Mapper – High Tide Flooding Explanation

<https://coast.noaa.gov/floodexposure/#-8430205,4725770,10z/eyJiljoic3RyZWV0IiwiaCI6ImhpZ2hUaWRIRmxvb2Rpbmd8MXwiLCJyIjpmYWxzZX0=>

5.1.2 Dorchester County Flood Insurance Study

According to the 2015 Dorchester County Flood Insurance Study, storm damage in the County has resulted from severe thunderstorms that traverse east over the Chesapeake Bay and from tropical storms and hurricanes that follow a northbound route along the Atlantic coastline. The low-lying, relatively undisturbed topography, high seasonal water tables, and poor drainage-high runoff soils combine to provide a high flooding potential.

In addition, the Choptank River is a tidally influenced river which flows into the Chesapeake Bay. Tidal surges extend up the river as far as Greensboro, Maryland, with average tides between 0.4 and 1.6 feet. The severity of tidal flood damage depends on various factors, such as topography, the rate floodwater rises, depth and duration, wave action exposure, and quantity and type of structures or infrastructure within the floodplain.



The tidal surge for those estuarine areas affected by Chesapeake Bay and Tangier Sound affect the entire shoreline within Dorchester County. The entire open coastline, from the confluence with the Choptank River to Fishing Bay, is more prone to damaging wave action during high wind events due to the significant fetch over which winds can operate. Inland from the mouths of these water bodies, as well as Little Choptank River, Honga River, Hooper Strait and the Nanticoke River, river widths narrow considerably as they converge with nontidal tributaries. In this area, the fetch over which winds can operate for wave generation is significantly less.

5.2 Nuisance Flood Vulnerability

Following the collection of repetitive flooded roadways from the fire district surveys, MyCoast reports 2022 Dorchester County Hazard Mitigation Plan, and during the September Workshop nuisance and urban flooding data table was developed. The data table is a compilation of various sources of information and includes ninety-three (93) locations. Data collection results are presented on Table 5-1 and Map 5-3.

Information gathered and presented on Table 5-1: Repetitive Flooded Roadways consists of the following information:

- **ID #** – The identification number assigned to each site. This number correlates to the ID numbers on mapping products.
- **Location Name** – This provides the specific roadway affected by flooding.
- **Source of Flooding** –
 - Nuisance flooding is associated with high tides that flow back through the stormwater system, increasing/raising the level of groundwater, and overtopping the banks and edge of waterways.
 - Urban flooding is due to a variety of issues related to development: increased impervious surface, disruption of natural watershed flows and functions, undersized and aged stormwater infrastructure, and changing weather patterns which exacerbate the inadequacies of older stormwater systems and the fragmented watersheds.
- **Flood Related Issue** – The cause of flooding provided in the first responder survey or denoted in the 2022 HMP.
- **Current Condition: Nuisance Flooding Depth of Flood** – Core Planning Team members provided depth of flood information based on their experience from living and/or working in Dorchester County. Depth of flooding used the following scale: less than 1 foot, 1-2 feet, or greater than 2 feet. Members identified depths that occur during the fall season when tides are highest and most problematic.
- **Current Condition: 1% Annual Chance Depth of Flood** – Where available, coastal, and riverine Depth Grids (DG) were utilized to determine the deepest flood depth on the roadway. Flood Depth Grids were created for all mapped 1-percent-annual-chance floodplains in the county, whereby flood depth is a function of the difference between the calculated water surface elevation (including overland wave propagation for coastal areas) and the ground.
 - Note that separate flood depth grids are created for riverine and coastal flood hazards, as engineering analyses and regulatory FIRM updates for each study type were separately performed.
- **Current Condition: NOAA High Tide Flooding** – Each roadway located within the low-lying coastal areas prone to flooding during extreme high tides were denoted. See Map 5.1.
- **Future Condition: NOAA Sea Level Rise** – NOAA’s 2-foot sea level rise data layer was utilized to determine vulnerability to projected sea level rise.
- **Future Condition: CoastSmart Climate Ready Action Boundary (CRAB) Flood Depth** - Where available, the CRAB Depth Grid (DG) was utilized to determine the deepest flood depth on the roadway. The depth grid for each county a freeboard depth grid representing the depth of flood waters above the existing ground elevation given a 3-foot increase in water level. Essentially the CRAB Depth Grid represents current conditions with potential future conditions.
- **Evacuation Issue** – All state roads were identified as evacuation routes. Roads that are the only ingress and egress from residential areas were noted as well. Included on 5.2.

Map 5.3 depicts repetitive flooded roadways, while Maps 5.4 to 5.15 illustrates impacted roadways within each fire district.

Table 5.1

Repetitive Flooded Roadways								
ID #	Location Name	Source of Flooding	Flood Related Issue	Nuisance Flooding Depth of Flood	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOAA 2ft. Sea Level Rise	CRAB Scenario Depth of Flood
1	MD 331_North Main St	Urban	Will Flood With 1 or More of Rain Per Hour Rainfall - SWM issues	N/A	N/A	No	No	N/A
2	MD 336	Nuisance	Tidal Flooding	1-2 feet	3.0	Yes	Yes	6.4
3	MD Route 14 (Eldorado Road)	Nuisance	Tidal Flooding	Less than 1 foot	4	Yes	Yes	6.0
4	Wesley Church Road	Nuisance	Tidal Flooding	1-2 feet	3.7	Yes	Yes	7.4
5	Elliott Island Road	Nuisance	Tidal Flooding/Floods during storms	Greater than 2 feet	6.2	Yes	Yes	8.5
6	Maple Dam Road	Nuisance	Tidal Flooding - low road elevation	Greater than 2 feet	3.5	Yes	Yes	6.9
7	White Haven Road	Nuisance	Tidal Flooding		1.8	Yes	Yes	6.0
8	Middletown Branch	Urban	Rainfall - SWM issues	N/A	0.5	No	No	3.1
9	Galestown Newhart Mill Road	Nuisance	Rainfall		3.4	Yes	No	5.9
10	Puckum Road	Urban	Rainfall- SWM issues	N/A	3.1	No	No	N/A
11	Drawbridge Road	Nuisance	Tidal Flooding	Greater than 2 feet	0.5	No	No	3.3
12	Steele Neck Road	Nuisance	Tidal Flooding	1-2 feet	4.2	Yes	Yes	8.2
13	Griffith Neck Road	Nuisance	Tidal Flooding	Greater than 2 feet	4.7	Yes	Yes	7.7
14	Cook Point Road	Nuisance	Tidal Flooding	1-2 feet	4.3	Yes	Yes	7.0
15	Palmer Mill Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	1.0
16	Hip Roof Road	Nuisance	Tidal Flooding	1-2 feet	3.1	Yes	Yes	7.0
17	Windsor Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A
18	Church Home Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A
19	Shiloh Camp Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A
20	Payne Road	Urban	Rainfall/High Tide Flooding - SWM issues	N/A	N/A	No	No	N/A
21	Ennals Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A

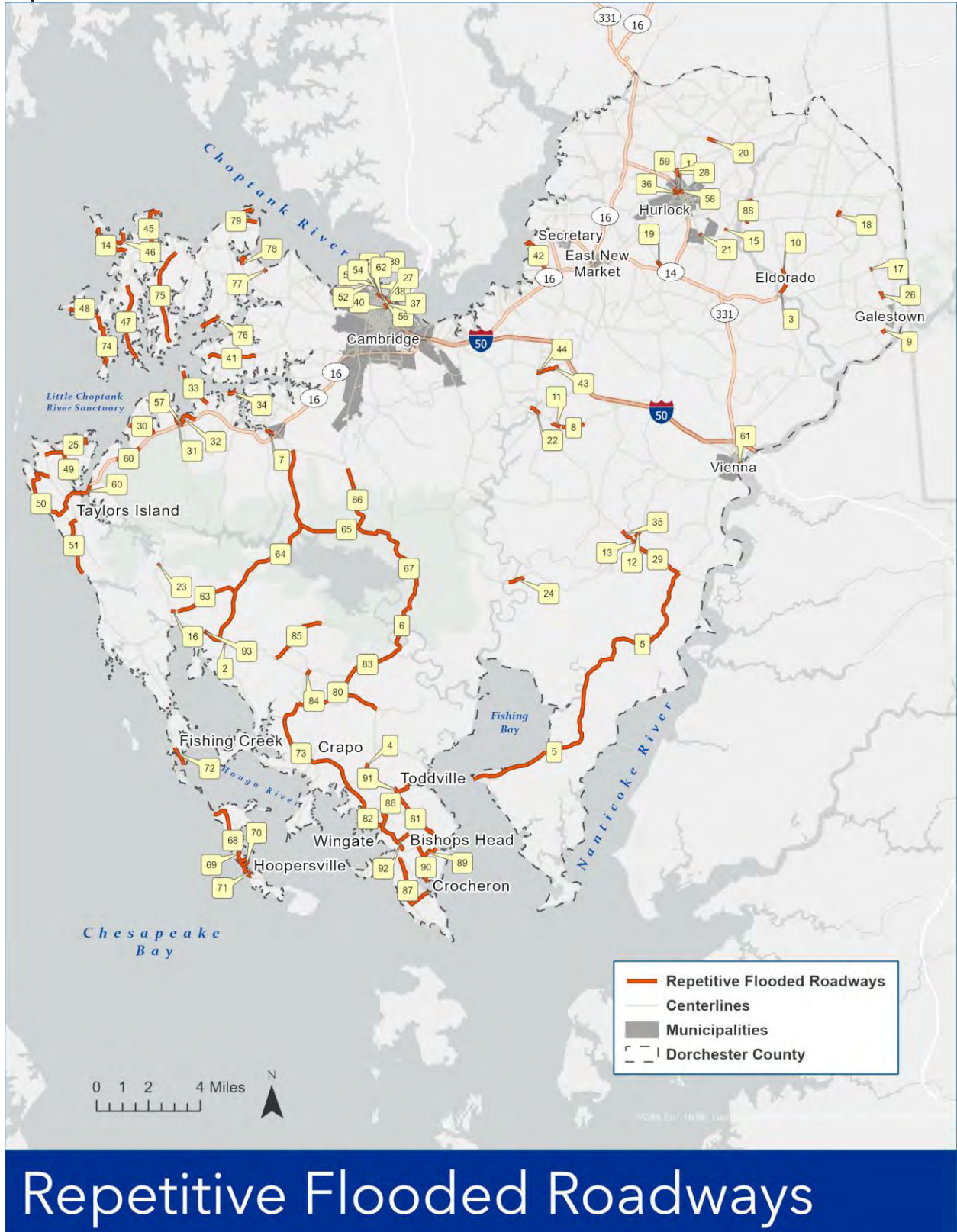
ID #	Location Name	Source of Flooding	Flood Related Issue	Nuisance Flooding Depth of Flood	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOAA 2ft. Sea Level Rise	CRAB Scenario Depth of Flood
22	Drawbridge Road	Urban	Heavy Rain - SWM issues	N/A	2.0	Yes	Yes	6.4
23	Smithville Road	Nuisance	Tidal Flooding	1-2 feet	3.6	Yes	Yes	7.2
24	Bestpitch Ferry Road	Nuisance	Tidal Flooding	1-2 feet	5.0	Yes	Yes	6.8
25	Hooper Neck Road	Nuisance	Tidal Flooding	1-2 feet	4.1	Yes	Yes	7.0
26	Galestown Newhart Mill Road	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A
27	Water Street - Cambridge	Nuisance	Tidal Flooding	Less than 1 foot	2.8	Yes	No	7.3
28	Glen Oak Hotel Road - Hurlock	Urban	Rainfall - SWM issues	N/A	N/A	No	No	N/A
29	Henrys Cross Road	Nuisance	Hurricane, King tides, water on road on most high tides.	Greater than 2 feet	4.1	Yes	Yes	7.6
30	Susquehanna Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	1-2 feet	2.5	Yes	No	6.0
31	Madison Canning House Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	1-2 feet	2.0	Yes	Yes	6.4
32	Old Madison Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	1-2 feet	2.3	Yes	Yes	6.5
33	Brooks Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	1-2 feet	1.9	Yes	Yes	5.6
34	Deep Point Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	1-2 feet	2.0	Yes	No	5.3
35	Drawbridge Road	Nuisance	Tidal Flooding	1-2 feet	5.0	Yes	Yes	7.7
36	Oak Street - Hurlock	Urban	storm water issues during heavy rainfall	N/A	N/A	No	No	N/A
37	High Street	Nuisance	Potential for flooding during various weather events	1-2 feet	2.1	Yes	No	6.2
38	Queen Anne Avenue	Nuisance	Potential for flooding during various weather events	1-2 feet	2.3	Yes	Yes	6.7

ID #	Location Name	Source of Flooding	Flood Related Issue	Nuisance Flooding Depth of Flood	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOAA 2ft. Sea Level Rise	CRAB Scenario Depth of Flood
39	Bay Street	Nuisance	Potential for flooding during various weather events	1-2 feet	2.7	Yes	Yes	6.5
40	Court Lane	Urban	Potential for flooding during various weather events - SWM issues	N/A	N/A	No	No	4.9
41	Town Point Road	Nuisance	Potential for flooding during various weather events		3.0	Yes	Yes	6.3
42	Green Point Road	Nuisance	Tidal Flooding		3.5	Yes	Yes	6.5
43	Linkwood Road	Urban	Heavy rains - SWM issues	N/A	N/A	No	No	N/A
44	Beaver Neck Village Road	Urban	Heavy rains occasionally	N/A	N/A	No	No	N/A
45	Todds Point Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Less than 1 foot	2.7	Yes	Yes	6.8
46	Twin Point Cove Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	1-2 feet	0.7	No	Yes	5.7
47	Casson Neck Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.		3.2	Yes	Yes	6.8
48	Hills Point Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	1-2 feet	3.0	Yes	Yes	6.6
49	Pine Top Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.		2.6	Yes	No	5.0
50	Bay Shore Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Greater than 2 feet	3.7	Yes	Yes	5.3
51	Punch Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Greater than 2 feet	4.6	Yes	Yes	5.7
52	Hambrooks Blvd (Pinks Pond Area)	Nuisance	Potential for flooding during various weather events	1-2 feet	2.8	Yes	Yes	6.2
53	Somerset Avenue	Nuisance	Potential for flooding during various weather events	1-2 feet	2.5	Yes	Yes	6.7
54	Belvedere Avenue	Nuisance	Potential for flooding during various weather events	1-2 feet	2.9	Yes	No	7.2
55	Talbot Avenue	Nuisance	Potential for flooding during various weather events	1-2 feet	1.2	Yes	No	6.4

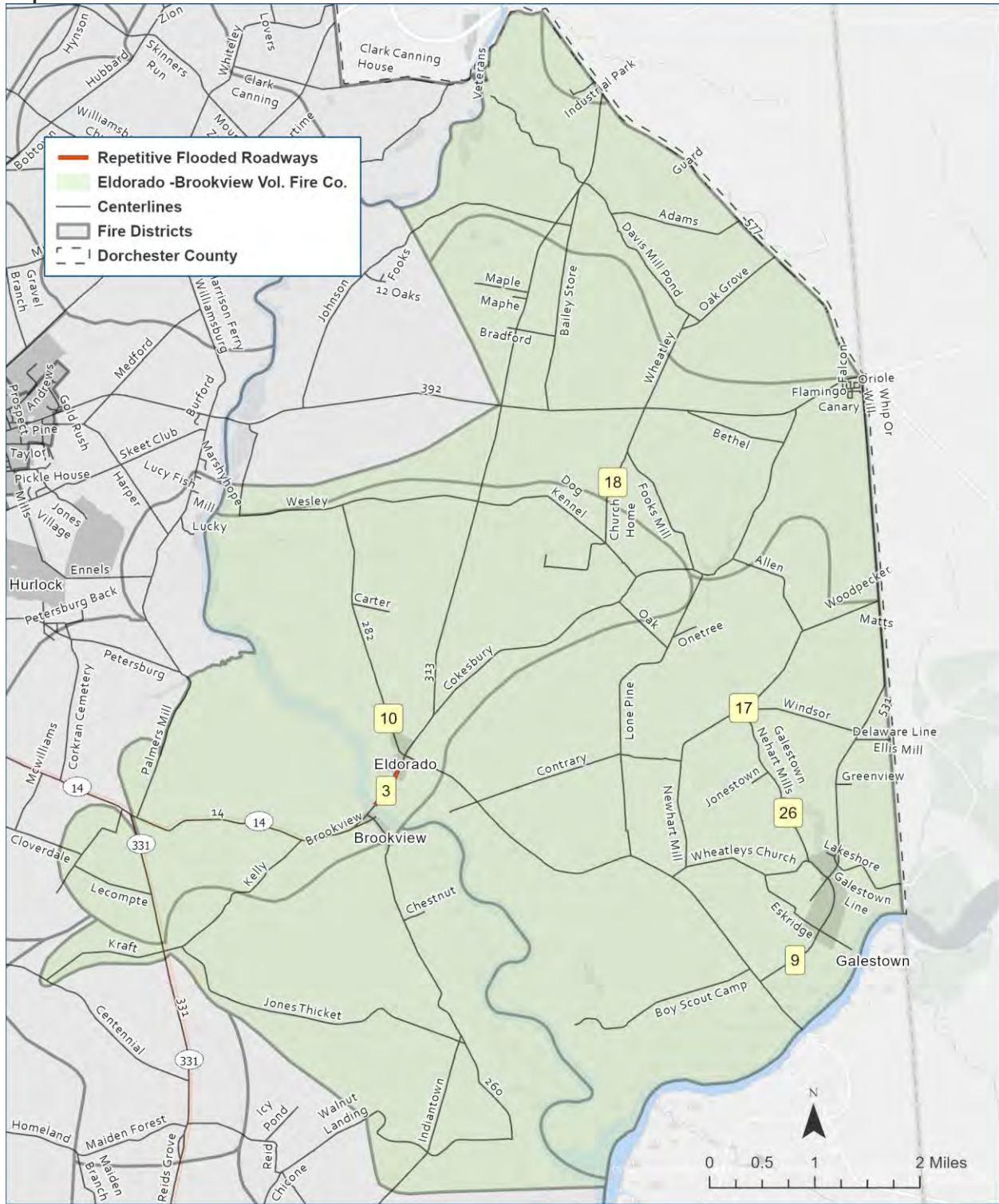
ID #	Location Name	Source of Flooding	Flood Related Issue	Nuisance Flooding Depth of Flood	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOAA 2ft. Sea Level Rise	CRAB Scenario Depth of Flood
56	Oakley Street - Cambridge	Nuisance	Potential for flooding during various weather events	1-2 feet	3.3	Yes	Yes	7.6
57	Route 16 end of White Marsh Rd	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Greater than 2 feet	N/A	No	No	3.1
58	Legion Drive	Urban	Storm water issues during heavy rainfall	N/A	N/A	No	No	N/A
59	Wrights Avenue	Urban	Storm water issues during heavy rainfall	N/A	N/A	No	No	N/A
60	Taylor's Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Greater than 2 feet	2.3	Yes	Yes	5.2
60	Taylor's Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Greater than 2 feet	2.9	Yes	Yes	3.4
61	Water Street - Vienna	Nuisance	Tidal Flooding		1.1	No	No	5.7
62	Hambrooks Avenue	Nuisance	Potential for flooding during various weather events	Less than 1 foot	0.5	No	Yes	5.6
63	Hip Roof Road	Nuisance	Tidal Flooding		3.6	Yes	Yes	6.5
64	Golden Hill Road (RT 335)	Nuisance	Tidal Flooding	1-2 feet	3.3	Yes	Yes	3.3
65	Key Wallace Drive	Nuisance	Tidal Flooding - low road elevation	Greater than 2 feet	2.8	Yes	No	5.7
66	Egypt Road	Nuisance	Tidal Flooding	1-2 feet	N/A	No	No	4.2
67	Maple Dam Road	Nuisance	Tidal Flooding- low road elevation	Greater than 2 feet	2.8	Yes	Yes	6.3
68	Hoopersville Road - Causeway South	Nuisance	Tidal Flooding	1-2 feet	4.4	Yes	Yes	6.5
69	Tom Point Road	Nuisance	Tidal Flooding	1-2 feet	3.7	Yes	Yes	7.5
70	Steamboat Wharf Road	Nuisance	Tidal Flooding	1-2 feet	3.6	Yes	Yes	6.8
71	Doeller Road	Nuisance	Tidal Flooding	1-2 feet	4.5	Yes	Yes	7.2
72	Old House Point Road at Hoopers Island Road	Nuisance	Tidal Flooding	1-2 feet	3.9	Yes	No	7.0
73	Lakesville-Crapo Road South to Crocheron	Nuisance	Tidal Flooding	1-2 feet	4.1	Yes	Yes	6.5

ID #	Location Name	Source of Flooding	Flood Related Issue	Nuisance Flooding Depth of Flood	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOAA 2ft. Sea Level Rise	CRAB Scenario Depth of Flood
74	Ragged Point Road	Nuisance	Tidal Flooding	1-2 feet	4.0	Yes	Yes	7.3
75	Ross Neck Road	Nuisance	Tidal Flooding	1-2 feet	2.1	Yes	Yes	6.3
76	Morris Neck Road - End of Road	Nuisance	Tidal Flooding	1-2 feet	4.4	Yes	Yes	7.3
77	Travers Wharf Road - End of Road	Nuisance	Tidal Flooding	1-2 feet	1.5	Yes	No	6.0
78	Richardson Road - End of Road	Nuisance	Tidal Flooding	1-2 feet	4.7	Yes	Yes	8.1
79	Castle Haven Road - End of Road	Nuisance	Tidal Flooding	1-2 feet	2.6	Yes	Yes	5.5
80	Andrews Road (whole road)	Nuisance	Tidal Flooding	Greater than 2 feet	4.4	Yes	Yes	6.8
81	Toddsville Road from Farm Creek to end of road	Nuisance	Tidal Flooding - low road elevation	1-2 feet	4.7	Yes	Yes	7.7
82	Wingate Bishopville Road	Nuisance	Tidal Flooding - low road elevation	1-2 feet	4.4	Yes	Yes	7.5
83	Maple Dam Road in Robbins	Nuisance	Tidal Flooding - low road elevation	Greater than 2 feet	3.4	Yes	Yes	6.8
84	Edgar Road - sections of the road	Nuisance	Tidal Flooding - low road elevation	Greater than 2 feet	3.2	Yes	Yes	7.1
85	Blackwater Road	Nuisance	Tidal Flooding - low road elevation	Greater than 2 feet	2.6	Yes	Yes	5.8
86	Farm Creek Road	Nuisance	Tidal Flooding - low road elevation		3.7	Yes	Yes	7.2
87	Crocheron Road	Nuisance	Tidal Flooding - low road elevation		3.5	Yes	Yes	6.7
88	Wesley Road	Nuisance	Tidal Flooding - low road elevation		0.5	No	No	2.8
89	Goose Creek Road - sections of the road	Nuisance	Tidal Flooding - low road elevation		4.6	Yes	Yes	7.6
90	East Tedious Creek Road	Nuisance	Tidal Flooding - low road elevation		5.0	Yes	Yes	7.5
91	Toddsville Back Street	Nuisance	Tidal Flooding - low road elevation		4.8	Yes	Yes	7.9
92	Buck Ridge Road	Nuisance	Tidal Flooding - low road elevation		4.3	Yes	Yes	7.5
93	Intersection of Rt 335 and Rt 336	Nuisance	Tidal Flooding - low road elevation		4.4	Yes	Yes	8.2

Map 5.3



Map 5.4



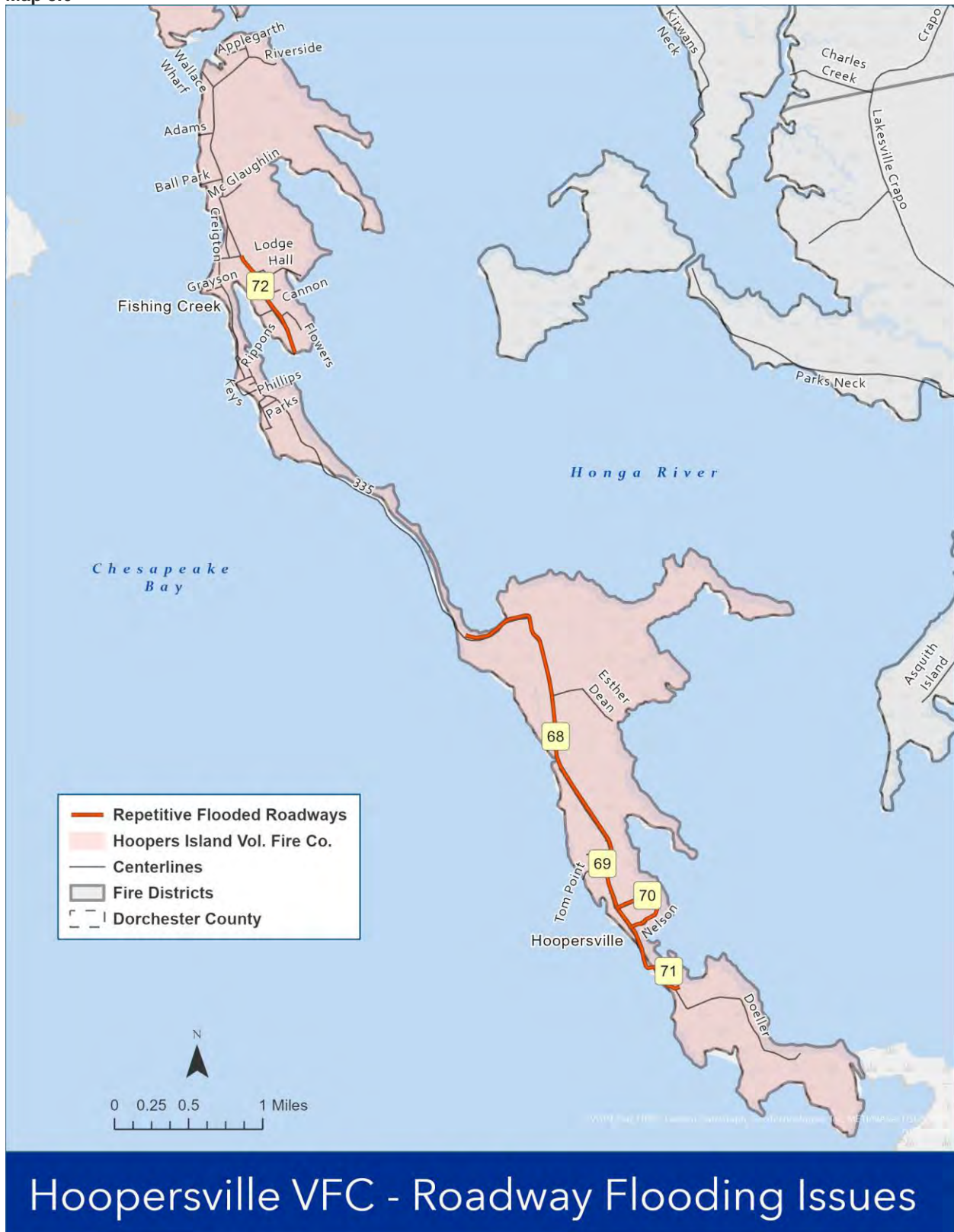
Eldorado-Brookview VFC - Roadway Flooding Issues

Map 5.5

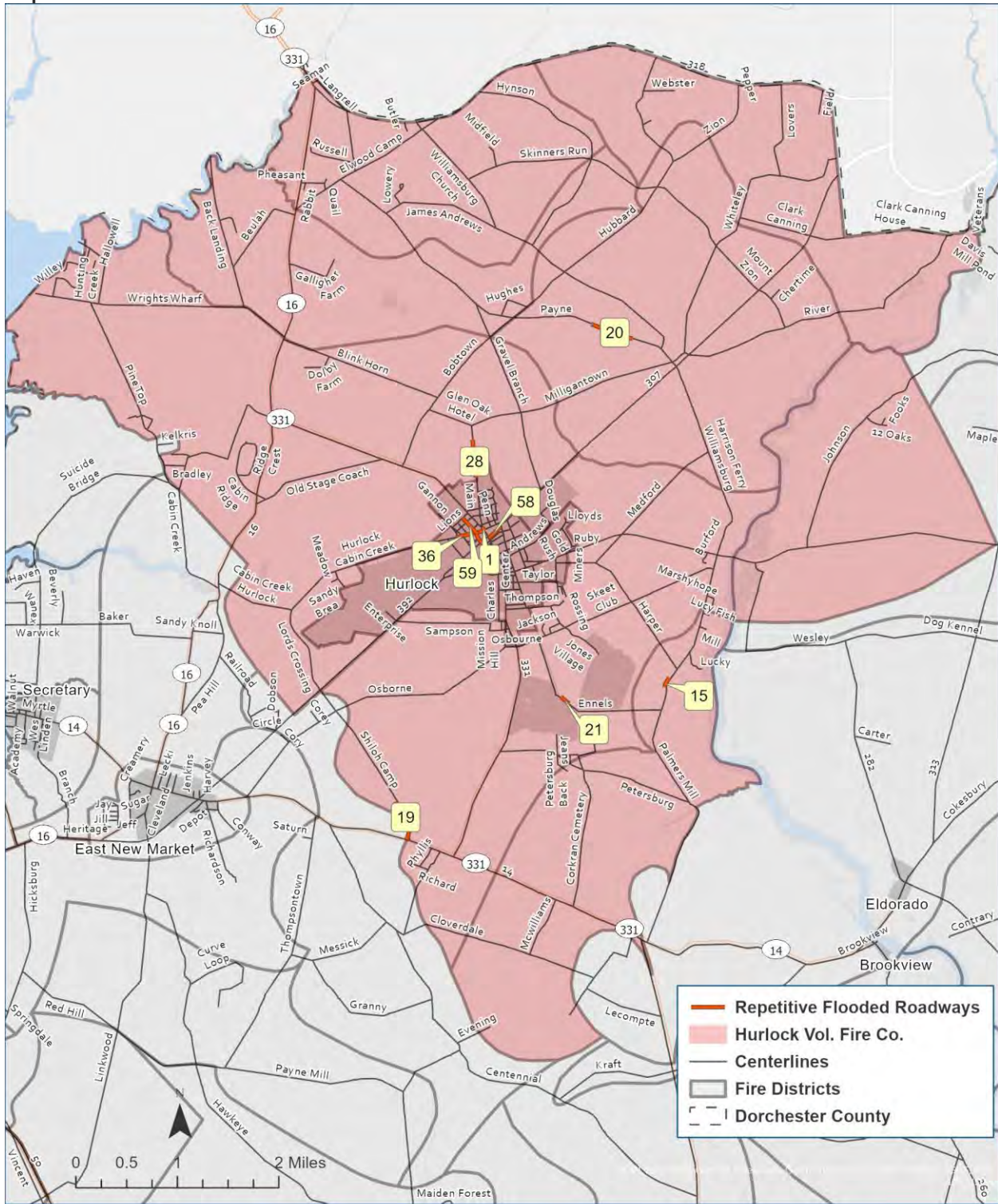


Elliott Island VFC - Roadway Flooding Issues

Map 5.6

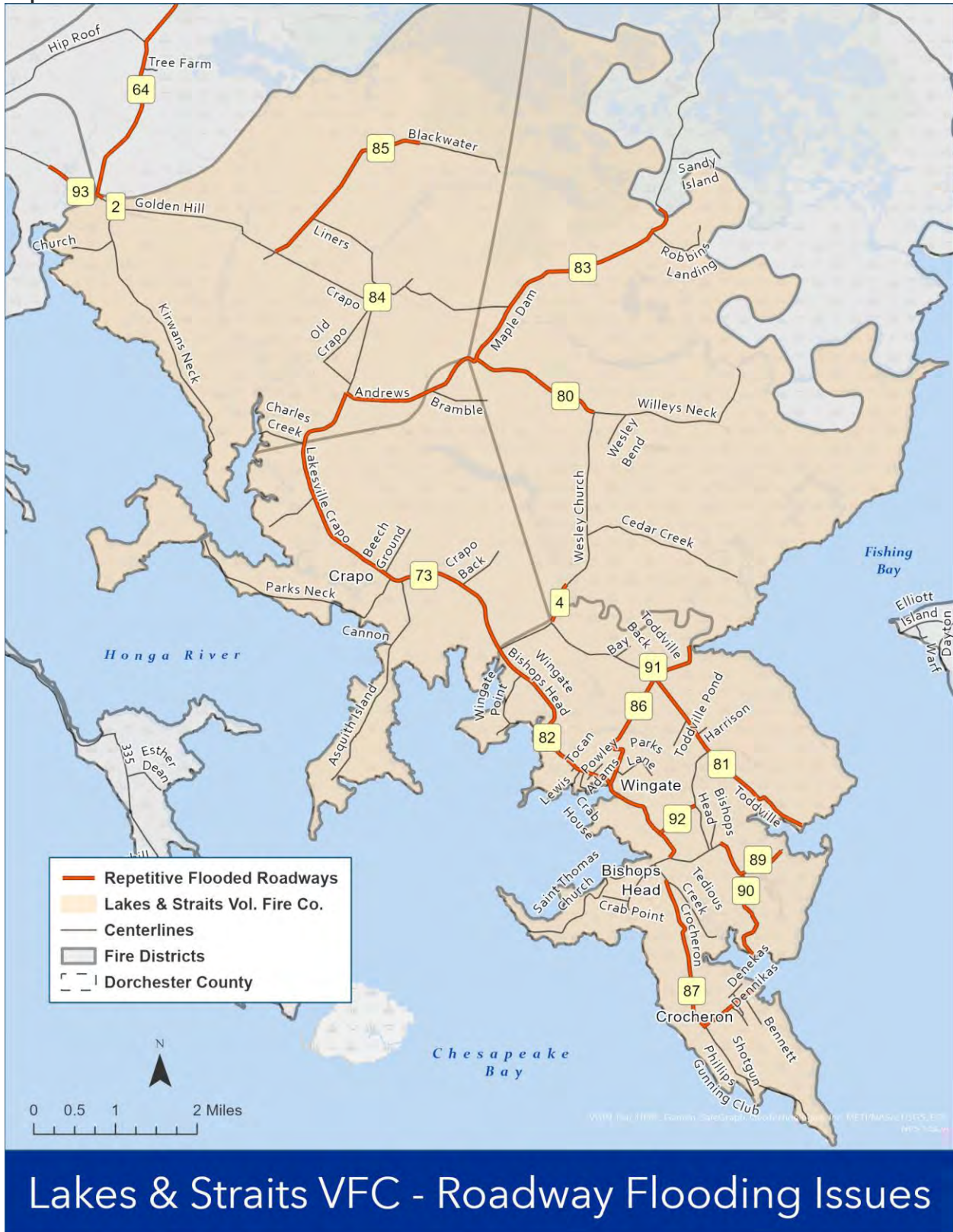


Map 5.7

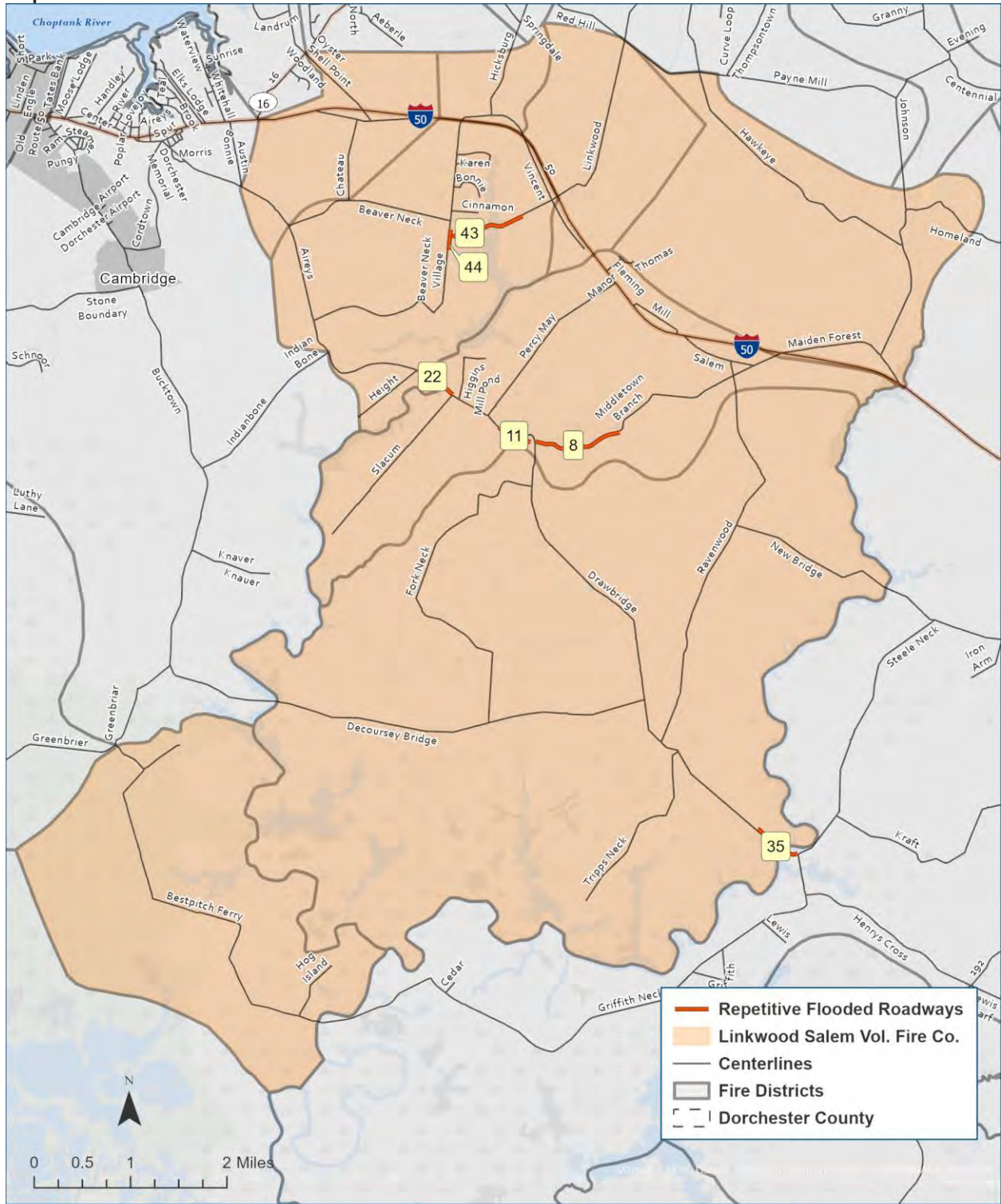


Hurlock VFC - Roadway Flooding Issues

Map 5.8

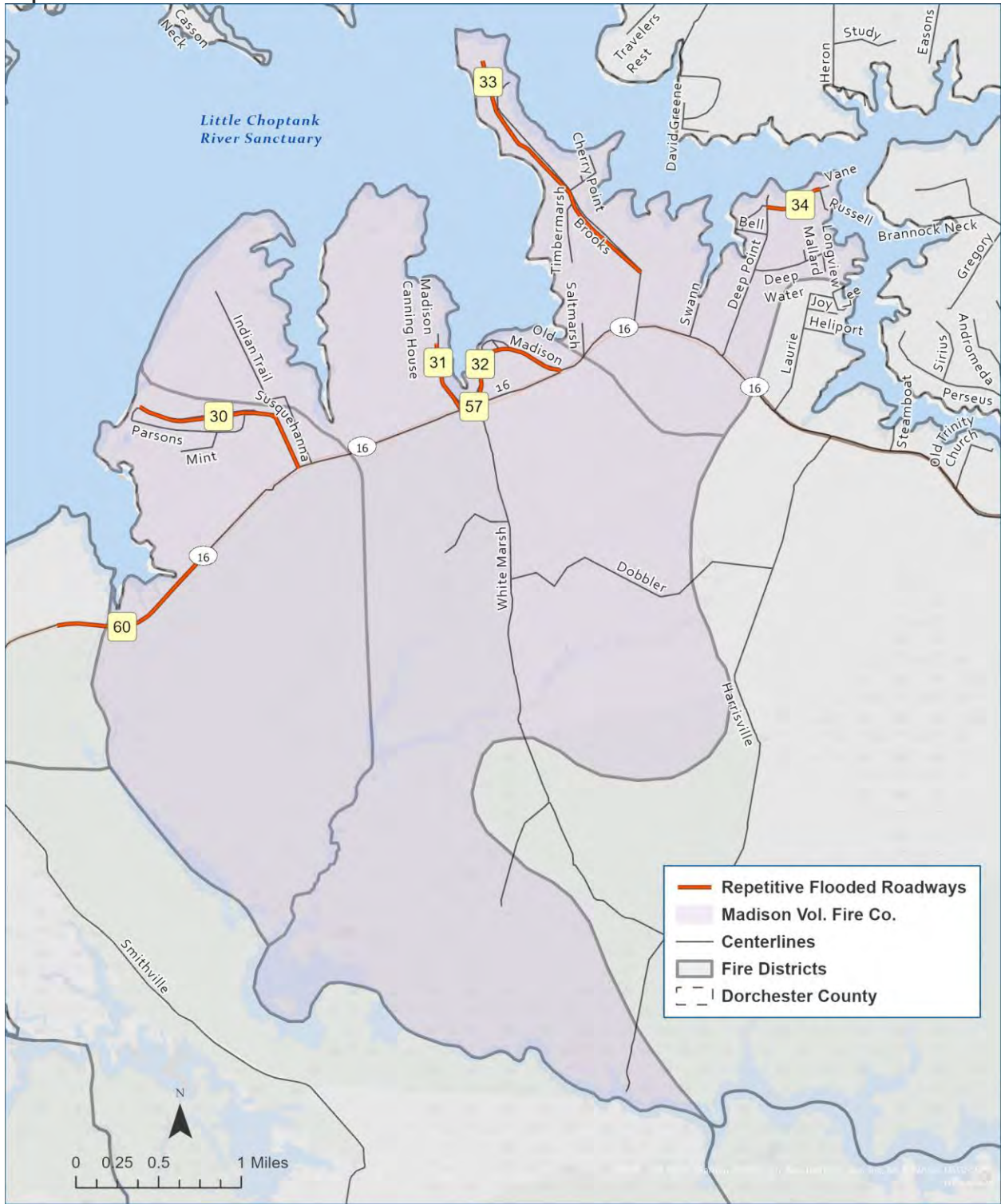


Map 5.9



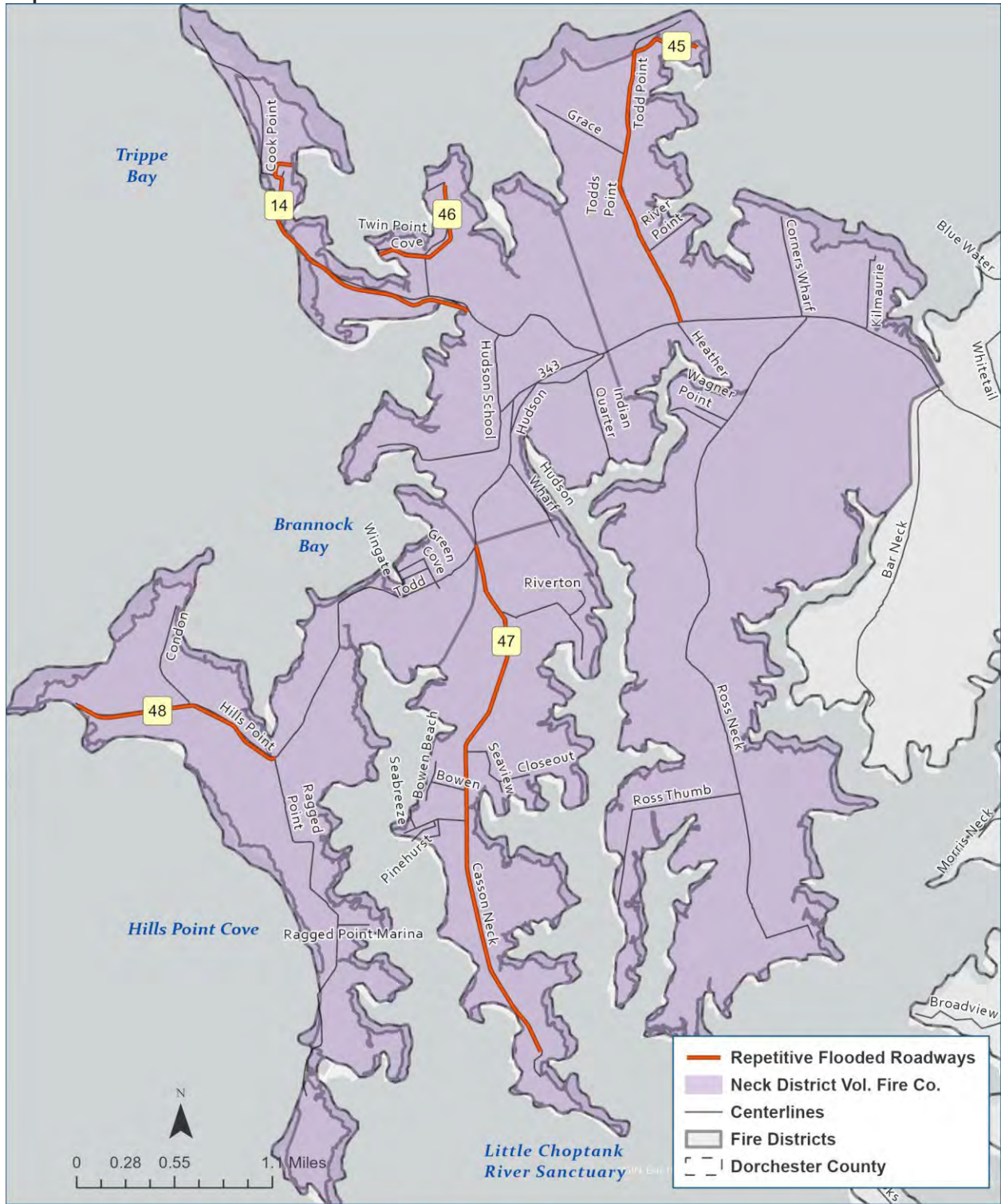
Linkwood Salem VFC - Roadway Flooding Issues

Map 5.10



Madison VFC - Roadway Flooding Issues

Map 5.11

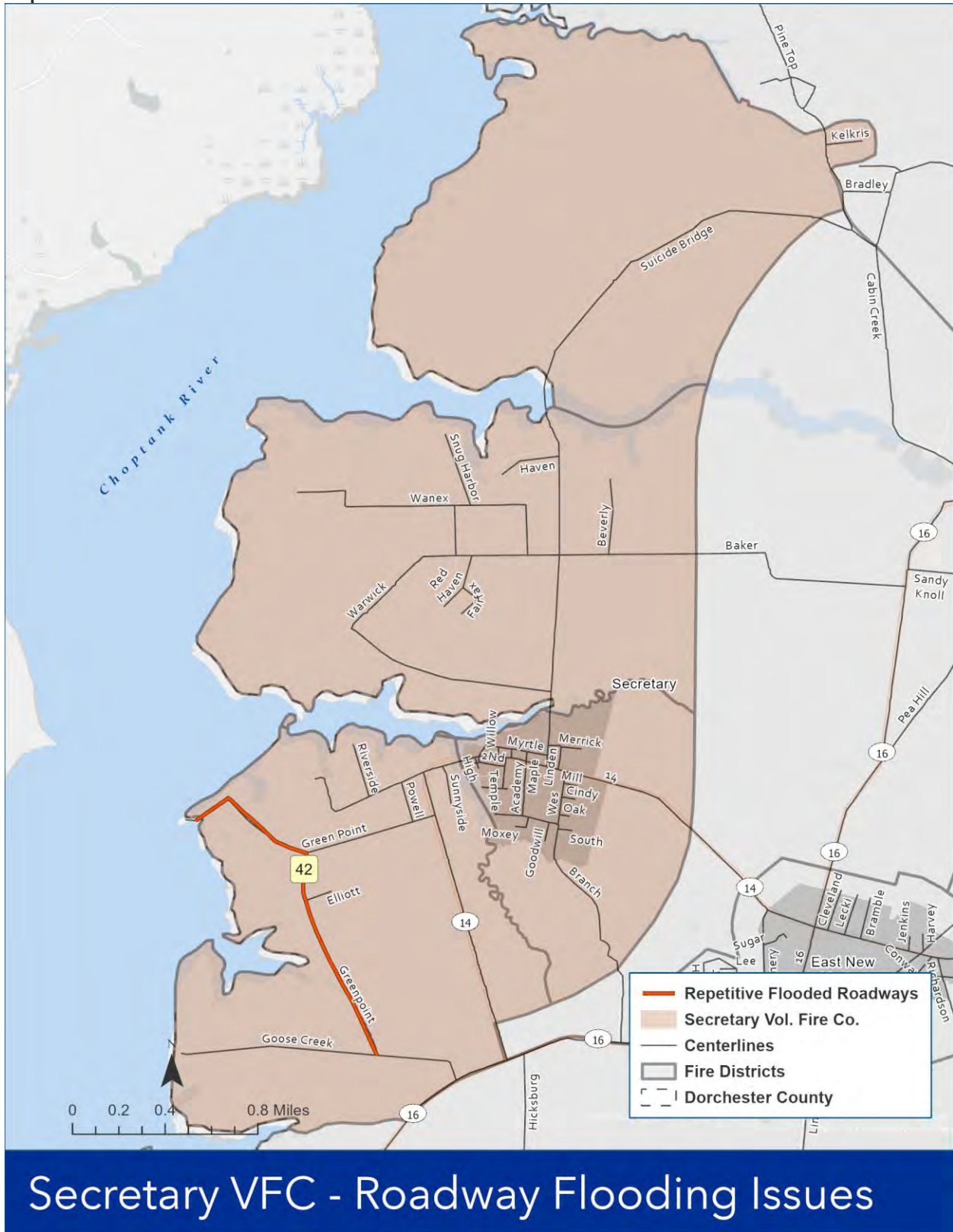


Neck District VFC - Roadway Flooding Issues

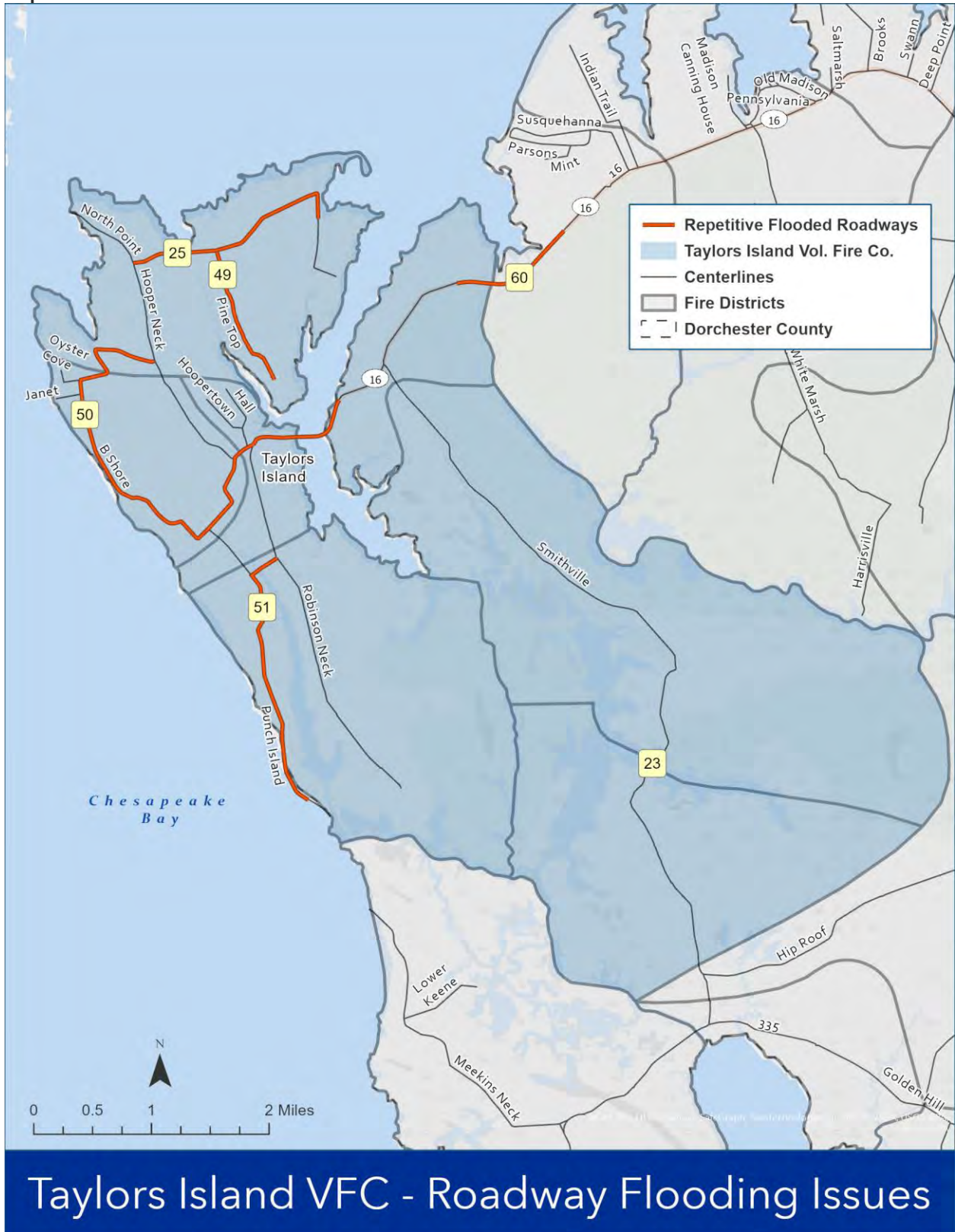
Map 5.12



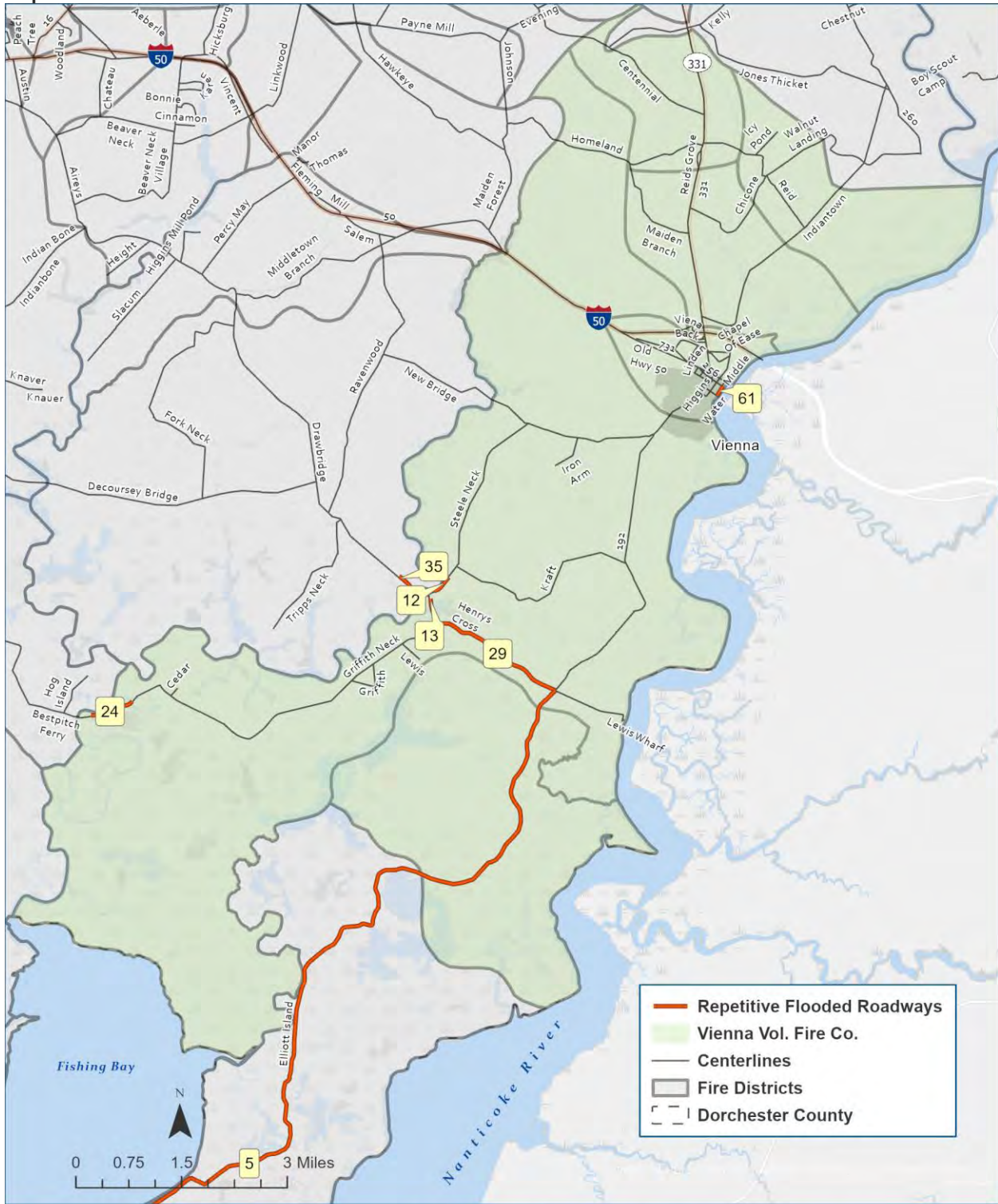
Map 5.13



Map 5.14



Map 5.15



Vienna VFC - Roadway Flooding Issues

5.3 Nuisance Flood Impacts

Roadways that frequently flood create ingress and egress and/or evacuation issues not only for the residents but also for first responders. Ingress and egress issues were identified in the 2022 first responder survey results. Roadways identified with ingress and egress issues include Taylors Island, Neck District, Secretary (Green Point Road), Elliott Island (Elliott Island Road, From Henry's Cross Road to Elliott Island).

In addition to the data compiled on Table 5.1, an additional step in this analysis was conducted. Table 5.2 includes information from Table 5.1, however, only nuisance flood roadways that potentially could pose evacuation issues have been included. Emergency response times may be affected as rerouting or slow driving time due to flooding are experienced. Future projections indicate that sea level rise and increased storm severity will exacerbate these issues.

Table 5.2

Repetitive Flooded Roadways									
ID #	Location Name	Source of Flooding	Flood Related Issue	Evacuation Issue	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOA Sea Level Rise	CRAB Flood Depth	Priority
2	MD 336	Nuisance	Tidal Flooding	Yes	3.0	Yes	Yes	6.4	High
3	MD Route 14 (Eldorado Road)	Nuisance	Tidal Flooding	Yes	4	Yes	Yes	6.0	
4	Wesley Church Road	Nuisance	Tidal Flooding	Yes	3.7	Yes	Yes	7.4	
5	Elliott Island Road	Nuisance	Tidal Flooding/Floods during storms	Yes	6.2	Yes	Yes	8.5	High
6	Maple Dam Road	Nuisance	Tidal Flooding	Yes	3.5	Yes	Yes	6.9	High
7	White Haven Road	Nuisance	Tidal Flooding	Yes	1.8	Yes	Yes	6.0	
14	Cook Point Road	Nuisance	Tidal Flooding	Yes	4.3	Yes	Yes	7.0	
16	Hip Roof Road	Nuisance	Tidal Flooding	Yes	3.1	Yes	Yes	7.0	High
25	Hooper Neck Road	Nuisance	Tidal Flooding	Yes	4.1	Yes	Yes	7.0	High
30	Susquehanna Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Yes	2.5	Yes	No	6.0	
31	Madison Canning House Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Yes	2.0	Yes	Yes	6.4	High
33	Brooks Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Yes	1.9	Yes	Yes	5.6	
34	Deep Point Road	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Yes	2.0	Yes	No	5.3	
41	Town Point Road	Nuisance	Potential for flooding during various weather events	Yes	3.0	Yes	Yes	6.3	High
42	Green Point Road	Nuisance	Tidal Flooding	Yes	3.5	Yes	Yes	6.5	

ID #	Location Name	Source of Flooding	Flood Related Issue	Evacuation Issue	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOA Sea Level Rise	CRAB Flood Depth	Priority
45	Todds Point Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	2.7	Yes	Yes	6.8	
46	Twin Point Cove Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	0.7	No	Yes	5.7	
47	Casson Neck Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	3.2	Yes	Yes	6.8	
48	Hills Point Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	3.0	Yes	Yes	6.6	
49	Pine Top Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	2.6	Yes	No	5.0	
50	Bay Shore Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	3.7	Yes	Yes	5.3	High
51	Punch Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	4.6	Yes	Yes	5.7	
57	Route 16 end of White Marsh Rd	Nuisance	Tide water on higher-than-normal high tides and storms that push water in the river	Yes	N/A	No	No	3.1	
60	Taylors Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	2.3	Yes	Yes	5.2	High
60	Taylors Island Road	Nuisance	Tidal flooding, from storms, and abnormal high tides.	Yes	2.9	Yes	Yes	3.4	High
64	Golden Hill Road (RT 335)	Nuisance	Tidal Flooding	Yes	3.3	Yes	Yes	3.3	High
65	Key Wallace Drive	Nuisance	Tidal Flooding	Yes	2.8	Yes	No	5.7	High
66	Egypt Road	Nuisance	Tidal Flooding	Yes	N/A	No	No	4.2	

ID #	Location Name	Source of Flooding	Flood Related Issue	Evacuation Issue	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOA Sea Level Rise	CRAB Flood Depth	Priority
67	Maple Dam Road	Nuisance	Tidal Flooding	Yes	2.8	Yes	Yes	6.3	High
68	Hoopersville Road at Causeway South	Nuisance	Tidal Flooding	Yes	4.4	Yes	Yes	6.5	High
69	Tom Point Road	Nuisance	Tidal Flooding	Yes	3.7	Yes	Yes	7.5	
70	Steamboat Wharf Road	Nuisance	Tidal Flooding	Yes	3.6	Yes	Yes	6.8	
71	Doeller Road	Nuisance	Tidal Flooding	Yes	4.5	Yes	Yes	7.2	
72	Old House Road	Nuisance	Tidal Flooding	Yes	3.9	Yes	No	7.0	High
73	Lakesville-Crapo Road (RT 336)	Nuisance	Tidal Flooding	Yes	4.1	Yes	Yes	6.5	
74	Ragged Point Road	Nuisance	Tidal Flooding	Yes	4.0	Yes	Yes	7.3	
75	Ross Neck Road	Nuisance	Tidal Flooding	Yes	2.1	Yes	Yes	6.3	
76	Morris Neck Road - End of road	Nuisance	Tidal Flooding	Yes	4.4	Yes	Yes	7.3	
81	Toddville Road from Farm Creek Road to end	Nuisance	Tidal Flooding	Yes	4.7	Yes	Yes	7.7	
82	Wingate Bishop Head Road	Nuisance	Tidal Flooding	Yes	4.4	Yes	Yes	7.5	
87	Crocheron Road	Nuisance	Tidal Flooding	Yes	3.5	Yes	Yes	6.7	
89	Goose Neck Road	Nuisance	Tidal Flooding	Yes	4.6	Yes	Yes	7.6	
90	East Tedious Creek Road	Nuisance	Tidal Flooding	Yes	5.0	Yes	Yes	7.5	
92	Buck Ridge Road	Nuisance	Tidal Flooding	Yes	4.3	Yes	Yes	7.5	
93	Intersection of RT 335 & 336	Nuisance	Tidal Flooding	Yes	4.4	Yes	Yes	8.2	

5.4 2022-2027 Nuisance Flood Response & Events Matrix

Documenting the extent and impacts of nuisance and urban flooding is critical to public safety and the long-term resilience of Dorchester County. This information will be documented and updated on a regular basis for emergency planning purposes. A review of flood documentation should provide Dorchester County a comprehensive view of trends in flooding over time.

The following factors will be recorded by Dorchester County DES and DPW for tracking and archived by County GIS staff. This includes instances of nuisance flooding addressed by SHA and communicated over the radio.

- Date, time, and location of nuisance flooding
- Impacts (e.g., “x amount of water on the roadway,” “ditch overflow,” “docks underwater,” etc.)
- Agency notified and action taken

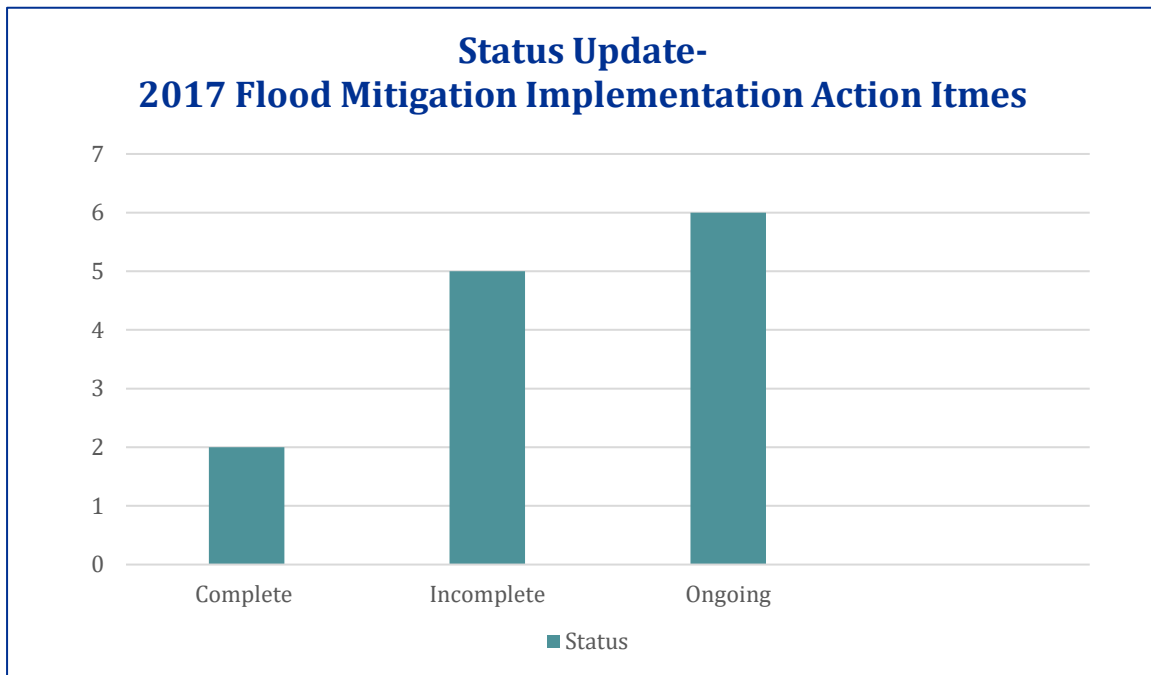
The Dorchester County’s 2022-2027 Nuisance Flood Response & Events Matrix is below.

2022-2027 Nuisance Flood Response & Events Matrix									
Date	Time	Caller's Name	Caller's Phone	Dispatcher	Location Information	Impacts	Agency Notified	Agency Staff Notified (Name)	Action Taken (if known)/ Notes

Chapter 6 Implementation

6.1 Status Update

As part of this planning process, the implementation action items from the previous plan version were reviewed. Planning committee members provided status updates for each of the thirteen (13) items.



For detailed status update information, the 2017 implementation status table has been included in Attachment 2.

6.2 Implementation Projects

The flood mitigation plan process culminated in the development of thirteen (13) cost-effective and technically feasible mitigation implementation projects. These action items were reviewed, developed, and discussed, by the core planning team over several meetings and various email correspondence. Several of these projects were carried over from the previous plan, while others were newly developed projects. This chapter includes an implementation matrix followed by detailed implementation projects. Each item includes a project discussion, measurable outcome(s), responsible agency, and potential funding source(s).

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency	Project Completion Yearly Review (Yes/No)				
			Short Term (0-2 years)	Long Term (0-5 years)		Year 1	Year 2	Year 3	Year 4	Year 5
1	Install signage with lights and sensors <i>New</i>	Improve safety conditions at high hazard nuisance flood locations through the installation of signage with lights and sensors.	✓		Public Works-Highway Division & Municipalities Emergency Management Agency					
2	Black Mold Remediation Outreach <i>Carried over from 2017 Plan</i>	Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados.	Ongoing (Emphasis on Post Disaster)		Health Department Emergency Management Agency Economic Development					
3	Water Infrastructure Best Practices <i>Carried over from 2017 Plan</i>	Repair, rehabilitate, and replace aging water infrastructure and natural water storage capacity through best practices.		✓	Planning and Zoning					
4	Maryland MyCoast <i>New</i>	Promote the usage of MyCoast App for data collection and integration into Nuisance Flood Plan Update in 5 years.		✓	Planning and Zoning Emergency Management Agency					

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency	Project Completion Yearly Review (Yes/No)				
			Short Term (0-2 years)	Long Term (0-5 years)		Year 1	Year 2	Year 3	Year 4	Year 5
5	Prioritize and Upgrade Flooded Roadway Infrastructure <i>New</i>	Upgrade and mitigate evacuation routes prone to nuisance flood and other flood hazards identified in Nuisance Flood Plan- Chapter 5. *Include in Capital Improvement Plan. Prioritize and include post disaster public assistance declarations.		✓	Public Works					
6	Green Infrastructure Plan <i>New</i>	Apply for grant funding to develop and complete a Green Infrastructure Plan. Identify contiguous flood prone properties for acquisition that may be used for open space and community amenities.		✓	Planning and Zoning Emergency Management Agency					
7	Taylor's Island Flood and Sea Level Rise Mitigation <i>Carried over from 2017 Plan</i>	Study Taylor's Island flood issues and identify mitigation opportunities and alternatives as a pilot project.	✓		Department of Public Works					
8	Private Sector Integration Plan Program <i>Carried over from 2017 Plan</i>	Initiate local Private Sector Integration Plan Program and include flood mitigation as a primary topic.	✓		Emergency Management Agency Economic Development					

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency Project	Completion Yearly Review (Yes/No)				
			Short Term (0-2 years)	Long Term (0-5 years)		Year 1	Year 2	Year 3	Year 4	Year 5
9	Construct treatment wetlands, where possible. <i>New</i>	Install treatment wetlands, which are one of the most effective ways to absorb stormwater runoff and the nutrients and pollutants that it carries.	✓		Dept. of Public Works Planning and Zoning					
10	Review and modify Floodplain Ordinance <i>Carried over from 2017 Plan</i>	Expand the regulatory floodplain to include areas of future flood risk.	✓		Planning and Zoning					
11	Municipal Participation in CRS <i>Carried over from 2017 Plan</i>	Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS).	✓		Planning and Zoning					
12	River Friendly Yards <i>New</i>	Work with River Keepers to educate property owners on river friendly yards.	✓		Department of Public Works					
13	Organize Roadway and Drainage Easements <i>Carried over from 2017 Plan</i>	Organize roadway and drainage easements.	✓		Department of Public Works GIS Specialist					

PROJECT #1 INSTALL SIGNAGE WITH LIGHTS AND SENSORS

DISCUSSION: Improve safety conditions at high hazard nuisance flood locations through the installation of signage with lights and sensors.

Core Planning Team members agreed to include signage with lights and sensors as a new mitigation action item.

Proposed locations for installation of these types of signage include:

- Maple Dam Road
- Key Wallace at Maple Dam Road – 2 miles before high tide flooding
- Taylor’s Island before the Bridge
- Each end of Key Wallace Road
- Elliot Island at Henrys Cross Road
- Cambridge – Water Street, Hambrook Blvd., Choptank Avenue

Continue to review roadways listed in Chapter 5 Nuisance Flood Plan for additional signage locations. Roadways are prioritized in terms of flood vulnerability and whether or not roadway is an evacuation route.

MEASURABLE OUTCOME: Over the course of the next five (5) years, complete the installation of signage at the locations specified in this project (prior to next FMA plan update).

FUNDING SOURCES:

- FEMA Hazard Mitigation Grant Program (HMGP) under Warning and Notification
- FEMA Flood Mitigation Assistance Program (FMA)

RESPONSIBLE AGENCY:

- Dorchester County Department of Public Works- Highway Division
- Dorchester County Emergency Management Agency



PROJECT #2 BLACK MOLD REMEDIATION OUTREACH

DISCUSSION: Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados. Mold growth is a common occurrence in flood-damaged homes and damp environments. Mold can become a problem in a home if there is enough moisture available to allow mold to thrive and multiply. Dampness in basements, walls, carpets, and wood provides an environment for mold to flourish.

Microscopic organisms are found everywhere and develop easily into mold in the presence of water or dampness. Mold discoloration comes in a variety of colors from white to orange and from green to brown or black. Whatever color, it characteristically gives off a musty or earthy smell.



Symptoms include:

- **Respiratory problems** - wheezing, asthma attacks, etc.
- **Nasal and sinus congestion or dry, hacking cough**
- **Eye irritation** - burning, watery, redness
- **Nose or throat irritation** - sneezing fits, bloody noses
- **Skin irritations** - rashes or hives
- **Nervous system** - headaches, memory loss, mood changes
- **Aches and pains**

People with pre-existing respiratory conditions also may be susceptible to more serious lung infections. It is important to identify mold early and take steps to clean it up and prevent more mold activity.

Health officials say problems from exposure can follow if mold is disturbed through cleanup procedures. Also, mold is easily transferred from one surface to another. Infants, children, immune-compromised patients, pregnant women, individuals with existing respiratory conditions (allergies, multiple chemical sensitivities, and asthma) and the elderly appear to be at higher risks for adverse health effects from mold.

More information: U.S. Environmental Protection Agency

<http://www.epa.gov/iaq/molds/moldresources.html> U.S. Department of Health and Human Services / Centers for Disease Control and Prevention

<http://www.bt.cdc.gov/disasters/mold/protect.asp>

The more serious health problems have been associated with the toxic black mold, *Stachybotrys atra*. The mold is greenish-black and slimy, resembling tar or black paint. *Stachybotrys* typically grows only on repeatedly wetted materials that contain cellulose - from paper to ceiling tiles, and any kind of wood. In most cases, this mold can be removed by a thorough cleaning with a 10% bleach solution. Severe mold infestations may require the assistance of a professional with experience in dealing with *Stachybotrys*.

Source: FEMA Dealing with Mold & Mildew in Flood Damaged Home

STRATEGY: Identify previously flood damaged or flood-prone homes (damage assessment reports should be used for identification). Some items must be removed, others can be cleaned.

- Control the moisture problem. The source of the water must be identified and corrected.
- Porous materials with extensive mold growth should be discarded (e.g., drywall, carpeting, paper, and ceiling tiles). For heirloom rugs and hardwood furniture, contact a professional cleaner. Most furniture today is made of composite materials, which must be discarded.
- Water can wick up higher than the visible water line. The best practice is to remove the wallboard at least two feet above the water line. Check local building codes for specific guidance.
- Fix leaks in pipes, and any damp areas around tubs and sinks, so that biological pollutants don't have growing environments.
- Rebuild, or retrofit, with water-resistant building materials such as tiles, stone, deep-sealed concrete, galvanized or stainless-steel hardware, indoor/outdoor carpeting, waterproof wallboard, water resistant glues, and so on.
- Prevent seepage of water from outdoors into your house. Rainwater from gutters or the roof needs to drain away from the house. The grades around the house needs to slope away to keep basement and crawlspace dry.
- Cover dirt in crawlspaces with plastic to prevent moisture from coming from the ground. Ventilate the area as much as possible.
- Appliances such as refrigerators, freezers, cooking stoves, dishwashers, hot water heaters, washing machines and driers contain insulation, which may harbor mold spores without visible evidence should be discarded.
- Heating and air-conditioning filters need to be changed and a professional should inspect the system ductwork. Unless the system is away from the flooded area and hasn't been operated, it may have to be replaced.
- Non-porous surfaces, including glass, ceramic, metal and plastic, may be cleaned. A 10 percent solution of household bleach and soap or detergent may be used to wash down walls, floors and other mold-contaminated areas. Follow directions on containers.

MEASURABLE OUTCOME: Development of a Public Outreach campaign and canned messaging for dissemination following heavy rain, severe storm, and flood events. Information should be targeted to both residents and the business community. A partnership between both the public and private sector would enhance public outreach efforts. Emergency Management, Economic Development, and the Health Department are the primary leads for this effort. Data will be collected by the Health Department on the calls related to mold issues. This information will be used to help determine scope of the problem and areas for targeted outreach efforts.

The Department of Planning and Zoning will include mold related public outreach materials in annual mailers that are distributed to residents and businesses within the Special Flood Hazard Area(s).

FUNDING SOURCES:

- **FEMA Flood Mitigation Assistance Program (FMA)**
- **Environmental Protection Agency-Outreach Materials**
- **Maryland Department of Housing and Community Development**

RESPONSIBLE AGENCY:

- **Dorchester County Health Department**
- **Dorchester County Emergency Management Agency**
- **Dorchester County Economic Development**

PROJECT #3 WATER INFRASTRUCTURE BEST PRACTICES

DISCUSSION: Repair, rehabilitate, or replace aging or failing water infrastructure to include flood-resilient designs and practices that will ensure uninterrupted operations and emergency access during and after extreme weather events. By incorporating higher stormwater flows from increasingly intense rainstorms, this strategy will improve climate adaptation. Improvements to enhance the resilience of water systems can reduce disaster losses and insurance costs. Moreover, reduced cost for facility operations, maintenance, and insurance can help support loan repayment. Through a new program authorized under the Water Infrastructure Finance and Innovation Act of 2014 (WIFIA), the Environmental Protection Agency will be providing direct credit assistance for resilience and innovative water infrastructure projects. Among the criteria for selection for the new finance opportunity, projects will be evaluated for resilience against extreme weather events, such as floods or hurricanes, as well as the impacts of climate change.

The eighteen (18) water service areas in Dorchester County correspond to the eighteen election districts in the County. This was done because of general local familiarity with election districts and because of the wealth of socio-economic and population data available for projection purposes on an election district basis. Numbers of election districts and service areas are the same.

Other water resources planning tools from the Proposed Dorchester County Phase II Water Implementation Plan (WIP):

- County Master Water and Sewer Plan, Water Resources Element and local development regulations: Addresses planning for orderly expansion and utilization of water resources and public sewer for future development. Current stormwater regulations are likely to improve water quality on redevelopment sites. Program is administered by the County Planning and Zoning Department.
- Vegetative Buffers: County forest replacement program funded by development fees in lieu of tree replacement. Limited funding and no dedicated staffing. Administered by the County Department of Planning and Zoning.
- Areas outside of the City and town limits do not have piped public stormwater facilities.
- Almost all County road drainage is to a vegetated roadside drainage ditch.
- Only the County and City of Cambridge manage administration of local stormwater management ordinances with respect to review of development plans.
- Wetland creation-goal of 50 acres by 2025. *Estimated credit from wetlands creation associated with living shoreline restoration projects.*
- Impervious Urban Surface Reduction: 1,156 acres by 2025.

Property Tax Credit - Erosion Control Measures - Nonstructural and Structural Shoreline Stabilization-SB 108

Requiring that, except under specified circumstances, specified erosion control measures that qualify for a specified property tax credit authorized against the county or municipal corporation property tax meet specified shoreline stabilization standards; and applying the Act to tax years beginning after June 30, 2017.

Approved by the Governor-Chapter 128.

MEASURABLE OUTCOME: Implementation actions from the Dorchester County WIP:

- Complete a net increase of 4.5 acres of riparian shoreline buffers;
- Complete 4 acres of forest area restoration;
- Increase cover crop; and,
- Track and report those properties that received Tax Credit for hardened and living shorelines.

Update the County Water and Sewer Plan and include resiliency against extreme weather events with special attention to the project development portion of the plan.

FUNDING SOURCES:

- **Environmental Protection Agency – Water Infrastructure Finance and Innovation Act of 2014**

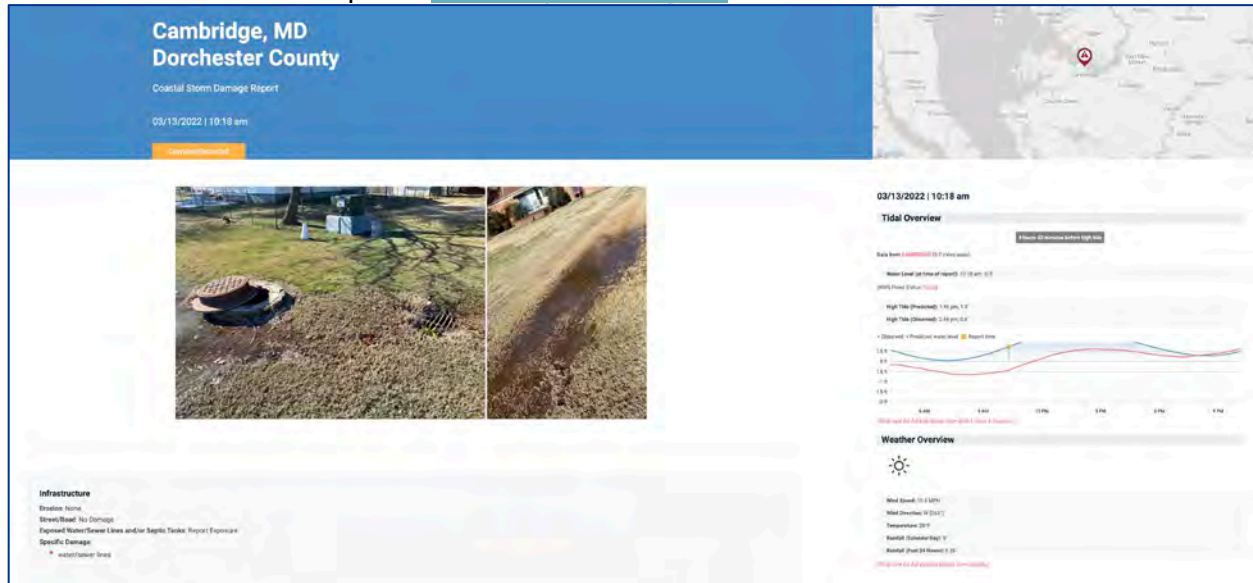
RESPONSIBLE AGENCY:

- **Dorchester County Planning and Zoning**

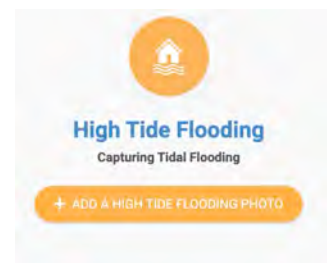
PROJECT #4 MYCOAST MARYLAND

DISCUSSION: MyCoast Maryland allows users to communicate flooding and storm damage in their own community. It is a portal to collect and analyze photos which are linked to precipitation, riverine, and tidal data to create reports that help government agencies, business owners, and residents understand impacts to the community and encourage action to reduce localized flooding.

Feature Coastal Storm Reports- <https://mycoast.org/md>



Promoting the use of the MyCoast App locally will assist in the collection of flood data over the next several years. This data, particularly the high tide flooding data will be integrated into the next plan update. ***High-tide floods, also known as nuisance floods, sunny-day floods and recurrent tidal floods, occur “when tides reach anywhere from 1.75 to 2 feet above the daily average high tide and start spilling onto streets or bubbling up from storm drains”***



High Tide Flooding, also known as nuisance flooding or sunny day flooding is coastal flooding that occurs at high tide and interrupts day to day activities leading to a public inconvenience such as road closures, and overwhelmed storm drains. A combination of sea level rise and land subsidence is leading to more frequent tidal nuisance flood events in our coastal communities. Higher than normal tides typically occur during a new or full moon and when the moon is in a perigee or during specific seasons. We are most likely to experience nuisance flooding during the winter and spring. In 2018 **Cambridge**, Baltimore and Annapolis tied or broke the record for days recorded of high tide flooding. NOAA issues a seasonal high tide bulletin to report regionally when higher than normal high tides can be expected. Local conditions such as precipitation, wind direction, and other short-term meteorological events may lead to nuisance flood events.

The project website provides a direct link to the Maryland MyCoast website; however, a social media campaign should be undertaken locally to encourage community participation.

FUNDING SOURCES: N/A

RESPONSIBLE AGENCY:

- **Dorchester County Planning and Zoning**
- **Dorchester County Emergency Management Agency**

PROJECT #5 PRIORITIZE AND UPGRADE FLOODED ROADWAY INFRASTRUCTURE

DISCUSSION: Core Planning Team members undertook a multi-step process to review and refine the repetitive roadway flooding data table. This information was integrated into the new Chapter- Nuisance Flood during this plan update process. The upgrading and mitigating of flood-prone evacuation routes and repetitive flooding areas has been prioritized.

Roadways that frequently flood create ingress and egress and/or evacuation issues not only for the residents but also for first responders. Ingress and egress issues were identified in the 2022 first responder survey results. Roadways identified with ingress and egress issues include Taylors Island, Neck District, Secretary (Green Point Road), and Elliott Island (Elliott Island Road, From Henry's Cross Road to Elliott Island). Emergency response times may be affected as rerouting or slow driving time due to flooding are experienced. Future projections indicate that sea level rise and increased storm severity will exacerbate these issues.

Nuisance flood roadways that could potentially pose evacuation issues were prioritized during this planning process and include:

ID #	Location Name	Evacuation Issue	1% Annual Chance Depth of Flood	NOAA High Tide Flooding	NOA Sea Level Rise	CRAB Flood Depth	Priority
2	MD 336	Yes	3.0	Yes	Yes	6.4	High
5	Elliott Island Road	Yes	6.2	Yes	Yes	8.5	High
6	Maple Dam Road	Yes	3.5	Yes	Yes	6.9	High
16	Hip Roof Road	Yes	2.3	Yes	Yes	7.0	High
25	Hooper Neck Road	Yes	4.1	Yes	Yes	7.0	High
31	Madison Canning House Road	Yes	2.0	Yes	Yes	6.4	High
41	Town Point Road	Yes	3.0	Yes	Yes	6.3	High
50	Bay Shore Road	Yes	3.7	Yes	Yes	5.3	High
60	Taylors Island Road	Yes	2.3	Yes	Yes	5.2	High
60	Taylors Island Road	Yes	2.9	Yes	Yes	3.4	High
64	Golden Hill Road (RT 335)	Yes	3.3	Yes	Yes	3.3	High
65	Key Wallace Drive	Yes	2.8	Yes	No	5.7	High
67	Maple Dam Road	Yes	2.8	Yes	Yes	6.3	High
68	Hoopersville Road at Causeway South	Yes	4.4	Yes	Yes	6.5	High
72	Old House Road	Yes	3.9	Yes	No	7.0	High

Note: he table above is an excerpt from Chapter 5, the detailed listing is on Table 5-2 of this plan.

MEASURABLE OUTCOME: Review and include these road projects within the County's Capital Improvement Plan, which would increase the opportunity for flood mitigation grant funding.

Use grant funding, such as Community Development Block Grant (CDBG) to complete flood and drainage improvements projects on roadways, specifically Elliot's Island Road.

FUNDING SOURCES:

- **Community Development Block Grant (CDBG)**
- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
- **U.S. Economic Development Administration, Public Works & Development Facilities**

RESPONSIBLE AGENCY:

- **Dorchester County Public Works- Highway Division**

PROJECT #6 GREEN INFRASTRUCTURE PLAN

DISCUSSION: Apply for grant funding to develop and complete a Green Infrastructure Plan. Identify contiguous flood prone properties for acquisition that may be used for open space and community amenities. Development of a Green Infrastructure Plan using a modern methodology will enable the prioritization of land according to resource value and a tool that will enable County leaders to make informed conservation and land-use decisions.

Green infrastructure encompasses natural assets that form a system of interconnected ecological activities that protect native species while providing the community with clean air and water along with significant economic benefits. Therefore, green infrastructure planning assists decision makers and the public to collaborate on preserving and linking natural assets, such as open spaces, wildlife habitats, and other natural areas that improve and support the community's quality of life, economy, and hazard loss avoidance.

Types of Green Infrastructure

- Rain Gardens. The word rain garden is generally used to describe planted areas that collect rainwater.
- Infiltration Basins.
- Stormwater Green streets.
- Green Roofs.
- Blue Roofs.
- Permeable Paving.
- Subsurface Detention Systems.

Green infrastructure reduces flood risks and bolsters the climate resiliency of communities by **capturing rain where it falls and keeping it out of sewers and waterways.**

MEASURABLE OUTCOME: Completion of a county-wide Green Infrastructure Plan.

FUNDING SOURCES:

- [Green Infrastructure Resilience](#) is supported by funding from the Environmental Protection Agency and helps local communities understand and plan for stormwater and riparian flooding hazards. For information about designing and implementing resilience projects, please see the [Resiliency through Restoration Initiative](#). Projects are solicited annually through the [Chesapeake and Coastal Service's Grants Gateway](#) - please see outcomes 1 and 2 for more information.

RESPONSIBLE AGENCY:

- Dorchester County Planning and Zoning

The science of green infrastructure provides a model for sustainable growth and conservation, such as:

- ✓ **Protection of the Environment:** Green infrastructure protects the health and diversity of wildlife and maintains natural systems that deliver critical, life-sustaining services.
- ✓ **Contributing to a thriving economy:** Green infrastructure benefits property values, lowers health care costs, boosts tourism, and helps communities make smarter investments in grey infrastructure.
- ✓ **An enhanced quality of life:** Green infrastructure ensures people can connect with nature; have access to clean air and water; and live healthier, happier lives.

Source: Green Infrastructure: Map and Plan the Natural World with GIS, 2019

PROJECT #7 TAYLORS ISLAND FLOOD AND SEA LEVEL RISE MITIGATION

DISCUSSION: Study Taylors Island flood issues and identify mitigation opportunities and alternatives as a pilot project. The **First Responder Survey** conducted during this planning process identified the following issues specific to Taylor's Island:

- Ingress/egress issues- Access, medical devices during power loss, evacuation
- Repetitive flooding issues affecting both roadways and properties.

The following letter obtained during the development of the 2017 Flood Mitigation, accompanied the Taylors Island Fire District Survey:

April 4, 2017

At the March meeting of the Taylors Island Volunteer Fire Company, we discussed the Fire District Survey Form and we decided that all residents of Taylors Island are greatly impacted during high tide events.

It's one way on and off the Island and despite the County's best efforts we still have a main road that floods and side roads that are often too flooded to attempt to drive on safely.

The County School Buses will not drive in the standing water, and this leaves parents forced to find alternative transportation for their child or miss a day of school. Or, in the afternoon if the water rises during the school day, parents must make sure they can pick up their child at the foot of the Slaughter Creek Bridge because the buses won't bring the kids to their homes.

Many of our roads are flooded to the level that you cannot distinguish between the road and the ditches, and we have a current of water running atop them.

Our residents are often forced to leave vehicles on higher ground and walk in the water to their homes or catch a ride from a passing neighbor.

I have lived on Taylors Island all my life and I never remember the constant and chronic widespread flooding on our roads that we have been experiencing the last few years.

If anyone would like to discuss this in more detail with me or our fire company members, please feel free to contact me.

Many thanks,

Patti Tieder

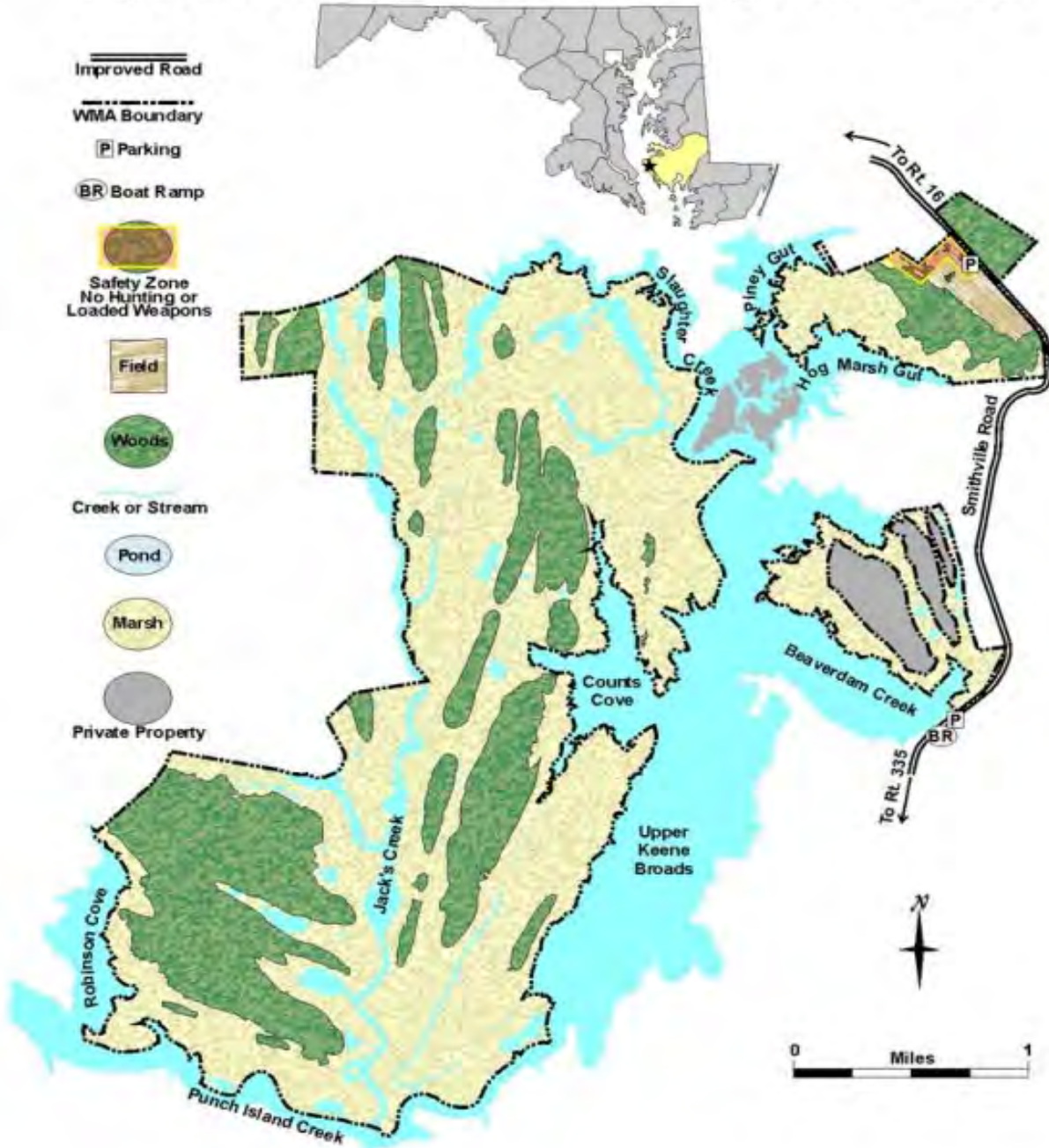
Taylors Island Volunteer Fire Company President

Taylors Island is located in western Dorchester County on the eastern shore of the Chesapeake Bay. It is separated from the mainland on the east by Slaughters Creek. Taylors Island is an unincorporated community.

The tidal marshes of Taylors Island have been relatively untouched by the development of small towns and villages on the nearby shores. This large island in western Dorchester County is a classic illustration of Chesapeake Bay tidal marsh habitat. Encompassing 1,120 acres, Taylors Island Wildlife Management Area (WMA) is a mix of marsh, forests and fallow fields.

Map of Taylors Island Wildlife Management Area

Taylors Island Wildlife Management Area



MEASURABLE OUTCOME: Completion of Taylors Island flood mitigation study.

FUNDING SOURCE:

- **FEMA Flood Mitigation Assistance Program (FMA)- Advanced Assistance Program (up to \$250K available for this type of Study)**
- **DNR Community Resiliency Grant**

RESPONSIBLE AGENCY:

- **Department of Public Works**
- **Department of Emergency Services**

PROJECT #8 PRIVATE SECTOR INTEGRATION PLAN PROGRAM

DISCUSSION: Initiate local Private Sector Integration Plan Program and include flood mitigation as a primary topic. Getting back to business after a disaster depends on preparedness planning done today. Small business owners invest a tremendous amount of time, money and resources to make their ventures successful. While the importance of emergency planning may seem obvious, the task may get put off in the face of more pressing concerns. For small business owners, being prepared can mean staying in business following a disaster.

Public Sector Integration Plan Program (PSIP)

The Maryland Department of Emergency Management (MDEM) is committed to incorporating the private sector into the emergency management framework to provide a voice to the business community during emergencies and increase information sharing between the private and public sectors. MDEM has built the Private Sector Integration Program (PSIP) to effectuate this goal. The PSIP will include a Business Operations Center (BOC) housed within the State Emergency Operations Center (SEOC) to better facilitate communication, situational awareness, and information sharing.

Business Resources available on the Maryland Department of Emergency Management Website include but are not limited to the following:

- Protect Your Business From Disasters;
- Emergency Management Guide for Business & Industry;
- Small Business Emergency Preparedness and Disaster Assistance;
- FEMA Small Business Continuity Plan Template; and,
- Maryland Electronic Resources for Businesses.

Benefits of the PSIP Program include:

- ✓ Preparedness Resources;
- ✓ Up-To-Date Emergency Alerts;
- ✓ Access to Business Operations Center during Activations;
- ✓ Virtual Business Operations Center access;
- ✓ Training and Exercise Opportunities, and,
- ✓ Interactions with State, Local, and Federal Emergency Managers and Private Sector Colleagues.

 **Plus Access to These Tools...**



The Maryland Virtual Business Operations Center
Members of MDEM's Private Sector Integration Program (PSIP) can access the Maryland Virtual Business Operations Center at any time during an emergency activation for situational awareness, incident-specific documents, and access to government officials staffing the State Emergency Operations Center.



The Business Operations Center
COVID-19 PSIP Update: Maryland Business Emergency Operations Center Delivers Crucial Intelligence, Guidance to Maryland Businesses During Global Pandemic
The Business Operations Center is the operational component of the PSIP, housed within the State Emergency Operations Center. It is responsible for communicating with the private sector during emergencies and supports OSPREY Business. The goal is to provide PSIP members with information appropriate to the private sector in order to assist them in making decisions regarding business operations and continuity.

One of the prioritized mitigation action strategies within the *2022 Dorchester County Hazard Mitigation Plan* include public outreach and specifically the establishment of an up-to-date calendar identifying training, outreach events, and exercises. PSIP program events should be added to the overall calendar distributed to the business community.

MEASURABLE OUTCOME: Enroll ten (10) businesses in PSIP Program over the next five (5) years, two (2) annually.

FUNDING SOURCE: County Staff Resources

RESPONSIBLE AGENCY:

- Dorchester County Department of Emergency Services
- Dorchester County Economic Development

PROJECT #9 CONSTRUCT TREATMENT WETLANDS

DISCUSSION: Install treatment wetlands, which are one of the most effective ways to absorb stormwater runoff and the nutrients and pollutants that it carries.

Constructed wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality. The following documents provide additional information about constructed treatment wetlands.

- [Constructed Treatment Wetlands \(PDF\)](#) (2 pp, 269 K, [About PDF](#))
- [Guiding Principles for Constructed Treatment Wetlands: Providing Water Quality and Wildlife Habitat \(PDF\)](#) (25 pp, 704 K, [About PDF](#))

The Coastal Wetlands Initiative was established by the EPA in response to the loss of coastal wetland acreage identified through the U.S. Fish & Wildlife Service's and National Oceanic and Atmospheric Administration - National Marine Fisheries Service's [Status & Trends of Wetlands in the Coastal Watersheds of the Eastern United States \(PDF\)](#) (36 pp, 8.7 MB) .

Coastal wetlands in the eastern United States were lost at an average rate of 59,000 acres per year between 1998 and 2004, even while inland wetlands acreage across the United States was increasing. From 2004 to 2009, wetlands were lost at an average rate of about 80,000 acres per year in the coastal watersheds of the Atlantic, Pacific, the Gulf of Mexico and the Great Lakes. The initiative addresses the need to enhance conservation of coastal wetlands. The map below, from the National Wetland Inventory is available online at <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>



MEASURABLE OUTCOME: 1) Identification of locations for wetland creation and/or restoration
2) grant application submittal(s) 3) Design and constructions/plantings

FUNDING SOURCE:

- **Maryland Department of the Environment Non-Tidal Wetlands Award Program**
- **Chesapeake Bay Trust- Watershed assistance**
- **Department of Natural Resources Community Resiliency Grant**

RESPONSIBLE AGENCY:

- **Dorchester County Planning and Zoning**
- **Dorchester County Department of Public Works**
- **Eastern Shore Land Conservancy**

PROJECT #10 MODIFY FLOODPLAIN ORDINANCE

DISCUSSION: Expand the regulatory floodplain to include areas of future flood risk. Flood risk mapping products from FEMA (i.e., digital flood insurance rate maps, or DFIRMs) analyze only historical flood statistics; they do not include additional risks from rising sea levels. To account for forward-looking risks, jurisdictions have authority to designate the extent of the floodplain to be regulated via their floodplain ordinances. The minimum standard is to regulate in anticipation of the 1% chance (100-year) flood. Forward-looking jurisdictions are amending floodplain ordinances to prepare for the 0.2% chance (500-year) flood. Extending the strongest protection measures out to the 500-year floodplain and raising flood protection elevations to the 500-year flood height will prepare buildings, residents, and businesses for the flood conditions that will be likely by 2050, a meaningful time horizon given the duration of many mortgages or loans. This action will provide additional protections against changing flood risks and the limitations of backwards-looking risk maps from FEMA.

For example, following destructive riverine flooding statewide from Tropical Storm Irene in 2011, Vermont took even greater action to protect life and property in the floodplain. For properties not subject to municipal regulation, the state prohibited new development in the 1% chance (100-year) floodplain.¹

The 0.2% chance (500-year) floodplain is already mapped by FEMA for Dorchester County. The extent of the 500-year floodplain will be compared to Scenario 3 (2050 sea level + Cat 1 storm surge). Other counties in Maryland have found these two extents to be similar. If this is true in Dorchester County, adopting the 500-year floodplain as the regulatory floodplain is a defensible risk reduction strategy. If the two extents are not similar, the County may wish to adopt a reasonably forward-looking regulatory floodplain extent delineated by Scenario 3.

MEASURABLE OUTCOME: 1) Adopt the 0.2% chance (500-year) floodplain as the regulatory floodplain and the 500-year flood elevation as the flood protection elevation. 2) Update the floodplain ordinance to tighten the amount and/or type of new development to be permitted in the floodplain.

FUNDING SOURCE:

- **Department of Natural Resources Community Resiliency Grant**
- **Maryland Department of the Environment- Comprehensive Flood Management Grant program**
- **County Funding**

RESPONSIBLE AGENCY:

- **Dorchester County Planning and Zoning**

¹ Vermont Agency of Natural Resources, Department of Environmental Conservation. *Vermont Flood Hazard Area and River Corridor Rule*, effective March 1, 2015.

PROJECT #11 MUNICIPAL PARTICIPATION IN CRS

DISCUSSION: Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS).

At this time Dorchester County has a CRS rating of 6. None of the seven (7) municipalities participate in CRS, however all participate in the NFIP. With the exception of Galestown, each municipality includes flood insurance policyholders. The City of Cambridge has the greatest number of policyholders totaling 216.

Community Name	Percent of Population in County (Coastal)	Total Land Area (sq. mi)	Percent of Land Area in County (Coastal)	Participation NFIP	CRS Rating
Brookview	100	0.1	100	Yes	10
Cambridge	100	10.3	100	Yes	10
Church Creek	100	0.3	100	Yes	10
Eldorado	100	0.1	100	Yes	10
Galestown	100	0.2	100	Yes	10
Secretary	100	0.3	100	Yes	10
Vienna	100	0.2	100	Yes	10
Dorchester Co. (Unincorporated Areas)	98	556.1	98	Yes	6

Source: FEMA Flood Risk Report-Dorchester County, Maryland Coastal Study, December 2019

FEMA NFIP Insurance Report – Maryland

Federal Emergency Management Agency NFIP Insurance Report MARYLAND					
COMMUNITY NAME	TOTAL PREMIUM	NO. POLICIES	TOTAL COVERAGE	TOTAL CLAIMS SINCE 1978	TOTAL PAID SINCE 1978
Brookview	\$686	1	\$302,500	0	0
City of Cambridge	\$84,009	173	\$45,003,300	310	\$6,661,490
Church Creek	\$4,552	8	\$2,170,000	57	\$775,970
East New Market	\$0	0	\$0	21	\$291,747
Eldorado	\$774	1	\$149,100	0	\$0
Galestown	\$0	0	\$0	0	\$0
Hurlock	\$5,359	8	\$1,761,200	0	\$0
Secretary	\$11,463	21	\$5,147,200	1	\$40,201
Vienna	\$3,138	4	\$1,050,000	1	\$11,084
Dorchester County	\$959,264	1,170	\$295,256,000	493	\$15,933,937
County Total:	\$1,069,245	1,386	\$350,839,300	883	\$16,467,282

Source: FEMA National Flood Insurance Report, April 2022

A “community” as defined by the National Flood Insurance Program-Community Rating System is a political entity that has the authority to adopt and enforce floodplain ordinances for the area under its jurisdiction.

MEASURABLE OUTCOME: A minimum of one (1) municipality will participate in CRS during the 5-year planning cycle.

FUNDING SOURCE:

- **FEMA Hazard Mitigation Grant Program (HMGP)**

RESPONSIBLE AGENCY:

- **Dorchester County Planning and Zoning**

PROJECT # 12 RIVER FRIENDLY YARDS

DISCUSSION: Work with Shore Rivers to educate property owners on river friendly yards.

STEPS TO A RIVER-FRIENDLY YARD

1) Attend (Or Host!) A Shorerivers Workshop

Fill out an interest form on our website to schedule or attend a River-Friendly Yards workshop where ShoreRivers staff members will discuss local water quality, explain what a River-Friendly Yard is, and show a variety of practices that homeowners can implement.



2) ANALYZE YOUR PROPERTY AND CREATE A BASIC SITE PLAN

It's important to understand the conditions of your property first in order to successfully implement a River-Friendly Yard. Ask yourself questions such as:

- Where is water flowing on my property? Are there problem areas (i.e. standing water, erosion, flooding basement, etc.)
- What do I want to accomplish? (Pollinator habitat, bird habitat, low maintenance, privacy, etc.)
- What are my current soil conditions? Contact your local Extension office for a soil test.
- How much shade/sun does my property receive?

Then sketch out a basic site plan showing the flow of water and identifying problems areas and areas you would like to work on. ShoreRivers staff are available for free consultations for your property to provide recommendations and site plans.

3) RESEARCH NATIVE PLANTS THAT WILL WORK FOR YOUR PROPERTY

While native plants are generally hardier than non-native ornamental plants, it is still important to select the appropriate kinds of plants for your specific site conditions. Use your basic site plan to identify some species of plants that would work for your site, considering factors such as soil type, sun/shade, height and spread, and longevity (annual vs. perennial). Check out our [list of native species](#) on the previous page.

4) VISIT A LOCAL NURSERY THAT STOCKS NATIVE PLANTS

Almost all local nurseries carry some native plants and have staff available to answer questions about what species to plant and how to care for them. Most can order specific species if they do not have them available. Look for the ShoreRivers logo at our local garden center partners for certified River-Friendly Yards native plants.

5) CONTACT AN EXPERT FOR SPECIFIC INFORMATION ABOUT IMPLEMENTING YOUR PRACTICE

There are a variety of local experts who can guide you through implementing your River-Friendly Yards, including ShoreRivers staff. These experts can answer questions about landscape design, maintenance, selecting species, and more. Check our Partners tab for local nurseries and experts to contact.

6) IMPLEMENT YOUR RIVER-FRIENDLY PRACTICE!

After all of your hard work and research it's time to put these practices in the ground! Visit a local nursery to purchase materials and supplies and then install them on your property. When you purchase your plants...

7) MAINTAIN YOUR PRACTICES FOR OPTIMAL GROWTH AND SUCCESS

While river-friendly practices generally require less maintenance than traditional practices once established, it is still important to properly maintain them to ensure years of benefits. Consult the resources used during the research phase for recommended maintenance. If multiple practices are installed it may be helpful to come up with a maintenance plan to keep track of everything.

8) ENJOY YOUR CONTRIBUTION TO IMPROVING LOCAL WATER QUALITY AND HABITAT

Thank you for taking the time to make a difference in the health of our waterways! These practices will increase habitat and food sources for native species while also helping to improve local water quality. Enjoy the beauty of these practices and keep a look out for the different kinds of insects, birds, and other animals that will be attracted to them. Please send us any great pictures of your practices, and any animals or people enjoying them for a chance to be our Featured River-Friendly Yard!

9) TELL A FRIEND AND KEEP ADDING TO YOUR RIVER-FRIENDLY YARD

ShoreRivers' data shows that the majority of pollution comes from within our own watersheds, which provides the opportunity for every person to make a positive impact to improve the health of our waterways. By installing these practices, you can now help be a voice that encourages friends, family, and neighbors to do the same. Let them know about this program and encourage them to contact us. Together we will clean these rivers!

MEASURABLE OUTCOME: Hosting ShoreRivers Workshops. Including this information in outreach campaigns.

RESPONSIBLE AGENCY:

- **Dorchester County Department of Planning and zoning**
- **Dorchester County Department of Emergency Services**

PROJECT # 13 ORGANIZE ROADWAY AND DRAINAGE EASEMENTS

DISCUSSION: Organize roadway and drainage easements.

The County's road and stormwater drainage rights-of-way are currently stored in paper format in storage boxes and file folders by road name. Road rights-of-way are obtained one (1) or two (2) parcels at a time when subdivision plats are reviewed by Public Works. Most drainage easements are either outdated, vague, and/or incomplete. As a result, conducting research of these right-of-way documents is very difficult and time-consuming.

The existing road and stormwater drainage easements should be scanned into digital format and mapped in GIS. Research would be much easier using a computer to search for files, as well as a GIS map to see where rights-of-way have been obtained and where there are gaps. The County would be able to identify needed rights-of-way very easily for any road improvement or storm drainage improvement projects. Maintenance responsibilities would be quickly identified to expedite the resolution of any road or storm drainage related issues.

MEASURABLE OUTCOME: Identify gaps in mapping products and associated database for which right-of-way and/or drainage easements do not currently exist.

FUNDING SOURCE:

- **In-House Staff Resources**

RESPONSIBLE AGENCY:

- **Dorchester County Department of Public Works**
- **Dorchester County GIS Specialist**

Plan Maintenance

The implementation of the plan includes the completion of the thirteen (13) mitigation projects that were identified by the planning committee. An extensive listing of potential funding sources available to assist in the implementation of the identified mitigation projects has been included Appendix H of the Dorchester County All-Hazards Mitigation Plan.

Monitoring, evaluating, and updating the Plan are critical to maintaining its relevance. Effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future.

Dorchester County Department of Emergency Services will be the permanent entity responsible for maintaining the Plan and for monitoring, evaluating, and updating it. The *2022 Dorchester County All-Hazard Mitigation Plan* recommends retaining the Hazard Mitigation Planning Committee (with representation from all participating municipalities). The retention and continuation of the planning committee has been met with resounding approval. This committee will continue to meet annually, at a minimum. The Emergency Planner from Emergency Services will lead the Committee in conjunction with the Director of Emergency Services.

The committee will oversee the progress made on the implementation of the identified mitigation projects and update the Plan, as needed, to reflect changing conditions. The planning committee will therefore serve as the focal point for coordinating countywide mitigation efforts. The planning committee will serve in an advisory capacity to Dorchester County Department of Emergency Services.

Evaluation of the plan should include not only checking on whether or not mitigation projects have been implemented, but also assessing their degree of effectiveness. This will be accomplished through a review of the qualitative and quantitative benefits (or avoided losses) of the mitigation activities. These would then be compared to the goals that the Plan was intended to achieve. The planning committee will also evaluate mitigation projects to see if they need to be modified or discontinued in light of new developments during their annual meetings. Emergency Management in cooperation with the planning committee will involve the public during the evaluation and update of the Plan through public education activities. The County's website will serve as a means of communication by providing information about mitigation initiatives.

ATTACHMENT 1

Meeting Notes



DORCHESTER COUNTY
FLOOD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1
May 26, 2022 10:00 AM

The following Core Planning Team (CPT) members were present at Meeting #1:

Name	Organization/Department
Dozia Rahilly	Department of Emergency Services
James Windsor	Department of Emergency Services
Susan Banks	Economic Development
Bill Forlifer	Health Department - Environmental Health
Larry White	Cambridge – FEMA/FMA Project Manager
Gary McQuitty	Hoopersville Group
Kate McClure	Maryland Extension
Jen Dindinger	Maryland Extension
Bill Hildebrand	Maryland Emergency Management Agency (MEMA)

Agenda

- ✓ Hazard Mitigation Plan Status
- ✓ Plan Integration
- ✓ Flood Risk Reduction Planning Projects
- ✓ 2017 Flood Mitigation Plan Review
- ✓ 2017 Flood Mitigation Action Items Status
- ✓ Next Steps

Flood Mitigation Plan and the Hazard Mitigation Plan Update

During the meeting, members were informed that the **Flood Mitigation Plan** is an addendum to the Hazard Mitigation Plan.

The 2022 Dorchester County All-Hazard Mitigation Plan is available for review on project website: www.dorchestermdhazardplans.org. The Plan has been submitted to the Maryland Department of Emergency Management (MDEM) and the Federal Emergency Management Agency (FEMA). Upon completion of FEMA’s review, an Approval Pending Adoption (APA) letter will be sent to the county. At that time, the county and its municipalities will go through the adoption process.

Plan Integration

Many planning initiatives are underway in Dorchester County. SP&D will be integrating this information, as developed, into the Flood Mitigation Plan. Mitigation strategies (action items & projects) from the following related planning documents will be integrated into the Flood Mitigation Plan.

- Cambridge Shoreline Resilience Project
- Coastal Community Resiliency Studies – Hoopersville & Twin Points Cover

Members were asked to provide any additional planning initiatives, projects, mitigation actions for inclusion in Flood Mitigation Plan.

Flood Risk Reduction Planning Projects

Cambridge Shoreline Resilience Project

Mr. Larry White, Project Manager of the Cambridge Shoreline Resilience Project, provided an overview of the project and current concept designs; presentation attached. Mr. White explained the concept design is a hybrid engineered nature-based flood mitigation project and consisted of three (3) types of flood mitigation measures:

- Integrated living shoreline – earth/rockfill embankment flood protection;
- Integrated engineered/nature-based stormwater management system; and,
- Evolving green infrastructure projects.

Each mitigation measure was discussed in relation to the project areas.



Coastal Community Resiliency Studies for Hoopersville & Twin Points Cove

Mr. Gary McQuitty, Hoopersville Group, provided a status on the Hoopersville Resiliency Plan. Mr. McQuitty stated the plan is completed and was presented to Dorchester County Council the previous week. The main mitigation measure determined for the project is a living shoreline. Mr. McQuitty mentioned funding sources were being sought at this time. Therefore, a list of



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Federal, State, and Foundation Grants that may assist in implementing mitigation projects has been included with the minute notes. This listing is included in the 2022 Hazard Mitigation Plan, Appendix H.

Flood Mitigation Plan Review & Update

The Flood Mitigation Plan (FMP) is being developed in conjunction with the Hazard Mitigation Plan (HMP) Update. This same process was used in 2017 for the HMP and previous FMP. While the HMP update process includes both coastal hazards and flood chapters, along with flood-related mitigation strategies, the intent of the FMP is not to duplicate the information within the HMP. The Flood Mitigation Plan compliments and expands upon the HMP. **The FMP further develops and refines flood mitigation data, analysis, and mitigation strategies.**

During the meeting, members were asked to provide input on the direction of plan update. Discussions topics included:

- First Responder Survey
- Priority Funding Areas
- Sea Level Rise
- Areas of Concern

The First Responder Survey used in 2017 was reviewed and modified based meeting participant feedback; attached. Digital and hard copies surveys will be provided to James Windsor, DES , for distribution to fire departments.

Priority Funding Areas (PFAs) are existing communities and places designated by local governments indicating where they want state investment to support future growth. PFAs will be noted in the Flood Mitigation Plan Update as part of the community profile section. However, this section will be abbreviated and included as part of the development trends section.

For planning purposes, CPT members were asked if a particular source or level/year for Sea Level Rise was being used by Dorchester County. After discussion it was decided the new Sea Level Rise Guidance developed by Maryland DNR Chesapeake & Coastal Service would be used to assist Dorchester County in this process. Kate McClure will provide the current guidance to SP&D.



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Areas of Concern identified in the 2017 Flood Mitigation Plan included:

- Municipalities
- Unincorporated Areas
 - Bishops Head
 - Crappo
 - Crocheron
 - Fishing Creek
 - Hoopersville
 - Neck District
 - Taylors Island
 - Toddville
 - Wingate

Members discussed reviewing new areas that currently do not have projects and areas in need of natural protection, such as living shorelines.

Finally, the Maryland MyCoast reports will also be reviewed, and areas of repetitive nuisance flooding will be examined.

2017 Flood Mitigation Action Items Status

A status of mitigation actions from the 2017 FMP is needed. To that end, members are asked to review each project and denote whether the project is complete, partial, incomplete, or ongoing and a status, if applicable.

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency	2022 Status			
			Short Term (0-2 years)	Long Term (0-5 years)		Complete	Partial	Incomplete	Ongoing
1	Encourage Property Owners to Elevate Structures <i>High Priority</i>	Encourage property owners to elevate their building's lowest floor above predicted flood elevations by additional height (above the National Flood Insurance Program (NFIP) minimum height requirements and local code requirements.)	Ongoing		Planning and Zoning Emergency Management Agency				
Status:									
2	Black Mold Remediation Outreach	Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados.	Ongoing (Emphasis on Post Disaster)		Health Department Emergency Management Agency Economic Development				
Status:									

Partial – Some Work Completed
Incomplete – No Work Completed



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The mitigation action item status form will be a fillable PDF and provided to Core Planning Team members for completion. In addition to the status form, project sheets associated with each action item will be attached for reference.

Next Steps

- Meeting #1 Notes - distributed to all Core Planning Team members and uploaded to project website.
 - The link to the project website: www.dorchestermdhazardplans.org.
- Fillable Mitigation Status PDF form distributed to Core Planning Team members for completion in June 2022.
- Meeting #2: July 2022



DORCHESTER COUNTY FLOOD MITIGATION PLAN UPDATE CORE PLANNING TEAM WORKSHOP September 12, 2022 10:00 AM

The following Core Planning Team (CPT) members were present at the Workshop:

Name	Organization/Department
Dozia Rahilly	Department of Emergency Services
James Windsor	Department of Emergency Services
Susan Banks	Economic Development
Jason Boothe	Department of Planning & Zoning
Bill Forlifer	Health Department - Environmental Health
Larry White	Cambridge – FEMA/FMA Project Manager
Gary McQuitty	Hoopersville Group
Kate McClure	University of Maryland Sea Grant Extension Program

Agenda

- ✓ Hazard Mitigation Plan Status
- ✓ Nuisance Flood Plan
- ✓ Plan Integration
- ✓ 2022 First Responders Survey
- ✓ Flood Mitigation Status Report
- ✓ Workshop
- ✓ New Mitigation Ideas
- ✓ Next Steps

Flood Mitigation Plan and the Hazard Mitigation Plan Update

During the meeting, members were informed that the **Flood Mitigation Plan** is an addendum to the Hazard Mitigation Plan. In addition, the 2022 Flood Mitigation Plan contains a new chapter, Chapter 6 Nuisance Flood Plan.

The 2022 Dorchester County All-Hazard Mitigation Plan is available for review on project website: www.dorchestermdhazardplans.org. The Plan was submitted to the Maryland Department of Emergency Management (MDEM) and the Federal Emergency Management Agency (FEMA). FEMA sent an Approval Pending Adoption (APA) letter to the county. As a final step, the county and participating municipalities need to formally adopt the plan.

Nuisance Flood Plan



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CORE PLANNING TEAM WORKSHOP

September 12, 2022 10:00 AM

The following three main components of a nuisance flood plan per the State’s guidance, were discussed.

- Inventory of known tidal areas where nuisance flooding occurs.
- Identification of thresholds/water levels/conditions that lead to tidal nuisance flooding.
- A mechanism to document tidal nuisance flood events and response activities 2020-2025.

In addition, SP&D explained that documentation and tracking is important to catalog the number of occurrences and severity over time to catalyze response and risk reduction actions. The tracking system was discussed in further detail during the workshop.

Plan Integration

Many planning initiatives are underway in Dorchester County. SP&D has been integrating this information into the Flood Mitigation Plan. Mitigation strategies (action items & projects) from the following related planning documents have been integrated into the Flood Mitigation Plan.

- Cambridge Shoreline Resilience Project
- Hoopersville Coastal Resiliency Study

Information about the Twin Point Cove Coastal Resiliency Study was requested. Jason Boothe, Department of Planning and Zoning stated he would obtain a status on the plan.

Coastal Community Resiliency Study for Hoopersville

The Implementation Plan included in the plan was reviewed. The implementation plan is meant to focus efforts on the areas most in need and/or projects that will have the greatest benefits. Projects were developed that could address multiple coastal resiliency stressors or help multiple areas during a single implementation event.

Based on the Vulnerability Assessment and applying the preferred alternatives, the Implementation Plan was divided into three categories, as defined below:

- Immediate Implementation – Action to recognize benefits in 0 – 5 years
- Short Term Implementation – Action to recognize benefits in 5 – 10 years
- Long Term Implementation – Action to recognize benefits in +10 years

The proposed immediate implementation project, figure below, depicts the engineering recommendation for this area. If funding limitations exist, at a minimum, the shoreline protection of stone sill and breakwaters should be implemented to reduce the erosion

occurring along this area. The function of the shoreline protection is improved with additional sand fill and marsh. The sand fill and marsh also add habitat and water quality benefits.

The concept plan for this project is provided in Figure 52.

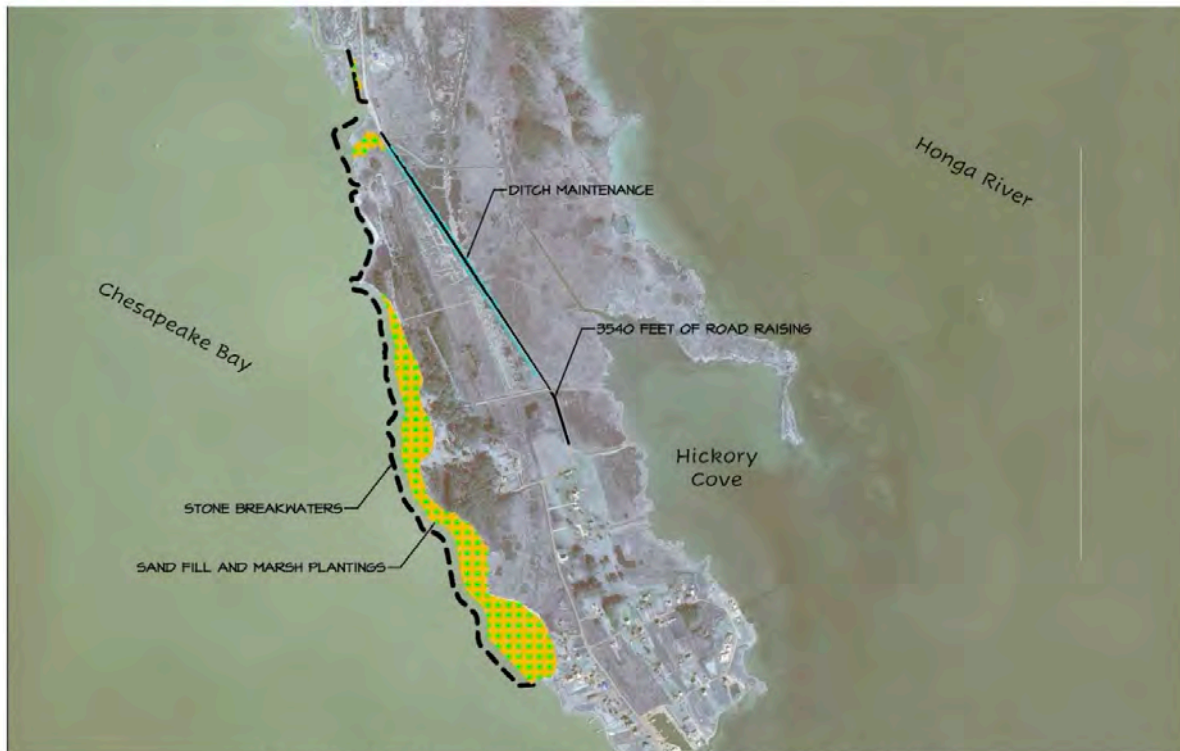


Figure 52 - Immediate Implementation Concept Plan

Another proposed project is to provide marsh nourishment to the marshes along western shoreline of the island. The area includes the marshes in the Northwest Marsh and Village District. These areas have experienced the most significant erosion and are at the greatest risk of continued erosion and marsh drowning. The proposed project includes beneficially using dredged material in order to take advantage of an available resource as well as achieve multiple benefits from project construction. This project would allocate dredged material to create, restore and preserve habitat as well as act as a placement site for local dredging projects.

SP&D explained the importance of integrating these projects into the Flood Mitigation Plan for grant eligibility, specifically for FEMA grant funding. FEMA's grant application explicitly ask if the project was included in the Hazard Mitigation or Flood Mitigation Plans.



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First Responders Survey

The First Responder Survey was distributed to all fire departments. A total of 12 fire departments participated in the survey. Survey highlights were reviewed and include the following:

- Flooded roadways identified included evacuation routes.
- Ingress/Egress issues identified- Taylors Island, Neck District, Secretary (Green Point Road), Elliott Island (Elliott Island Road, From Henry's Cross Road to Elliott Island)
- Drainage issues identified.
- Additional concerns provided:
 - Taylor's Island VFC- Access, medical devices during power loss, evacuation.
 - Neck District VFC- It would help, to make sure all drainage ditch(s) are clear, and culverts cleaned out.
 - Secretary VFC- The condos on Water St. sometimes get water under the units.
 - Cambridge Rescue Fire Company- FDs are not equipped for inland-flood based rescues.
 - Church Creek VFC- Shorter's Creek up to Maple Dam.
 - Elliott Island VFC- Shore Erosion.
- Properties within Fire District that experience repeated flood issues-
 - Taylor's Island VFC- too many to list
 - Neck District VFC- Most of the Neck District
 - Cambridge Rescue Fire Company- waterfront properties
 - Madison VFC- properties along Susquehanna Road, Madison Canning House Road, Old Madison Road, RT16 end of White Marsh Road, Brooks Road, Deep Point Road.
 - Elliott Island VFC- Right past Elliott Island bridge, first culvert, poplar Island, water comes right on road from bay, old Ditch , cow Creek, Pokota creek to Savanna Lake ,and low spots all the way to Henrys Cross Road
- Properties with Fire District that are vacant-
 - Taylor's Island VFC- too many to list
 - Eldorado-Brookview VFC- (1) Jones Thicket & a couple on Eldorado-Federalburg Road.
 - Vienna VFC- vacant homes on Old Route 50, Back Street and several in the Griffiths Neck area on Elliott Island.
 - Madison VFC- (2) properties on Taylors Island Road.



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Flooded roadway information obtained through the survey was integrated into Chapter 6 Nuisance Flood.

2017 Flood Mitigation Action Items Status

Proceeding the May meeting, members were asked to review each 2017 mitigation action item/project and denote whether the project is complete, partial, incomplete, or ongoing and a status, if applicable.

As a result, more than half the 2017 mitigation action item projects were completed or ongoing. Only 5 mitigation action item projects were incomplete and will be carried over into the 2022 Flood Mitigation Plan. These 5 projects include:

- Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados.
- Repair, rehabilitate, and replace aging water infrastructure and natural water storage capacity through best practices.
- Study Taylors Island flood issues and identify mitigation opportunities and alternatives as a pilot project.
- Initiate local Private Sector Integration Plan Program and include flood mitigation as a primary topic.
- Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS).

Workshop

The workshop portion of the meeting focused on Chapter 6 of the Flood Mitigation Plan, Nuisance Flood. Core Planning Team members worked through 3 steps to review and refine or add to the 67 repetitive flooded roadways included in the plan.

Step 1:

- Distribute and review Chapter 6: Nuisance Flooding.
- Review Table 6.1, pages 6-9 thru 6-12 and Maps 3-14, pages 6-13 thru 24.
 - ✓ Note: Table 6.1 includes data from 2022 HMP Update, First Responder Survey, and MyCoast Reports.
- Are we missing any roadways?
- Review Flood Related Issues that correspond to each identified location for accuracy and completeness. For instance, open ditch- maintenance, lack of ditches, undersized



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pipes/culverts, low road elevation, backwater issues-pipe outfalls. Please modify by writing directly on handout.

- ✓ Table 6.1 Columns 1 thru 4. Note we will continue to work on additional information within Table 6.1 in the next step.

Step 2

- Review Page 6-7 that provides details on Table 6.1 data columns 5 thru 9.
- Populate Table 6.1, Column 5, Nuisance Flooding- Depth of Flood using the following scale:
 - Less than 1 foot
 - 1-2 feet
 - Greater than 2 feet
- ✓ Please consider the highest depth of flooding observed on roadway, typically low points. Expand upon location information in Column 2, if available.

Step 3

- Review and discuss Table 6.2, and text on page 6-25.
 - ✓ Please consider the highest depth of flooding observed on roadway from nuisance flooding. In addition, consider other sources of flooding and future conditions. Finally, consider the impacts to travel, evacuation, and ingress/egress.
- Please add any additional nuisance flood roadways that would pose an evacuation issue or are on a designated evacuation route, if any.
- Individually identify your top five most vulnerable roadways on Table 6.2, Pages 6-26 to 6-27, marking an "X" in the last column "Priority."

Documentation and tracking is important to catalog the number of occurrences and severity over time for response and risk reduction actions. Members stated the Department of Emergency Services, Department of Public Works and 9-1-1 Communications would maintain the tracking sheet provided at the end of Chapter 6.

During the workshop, members also discussed impacts experienced due to nuisance flooding. Some impacts to residents, businesses owners, workers, and visitors discussed include:

- Septic/Well Issues
- Economic Loss
- School Delays or Early Dismissal
- Business Closures



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- Health/Bacterial Issues
- Mold Issues

New Mitigation Ideas

Findings from updated data tables, completed at workshop, will be used to develop new mitigation actions, specifically areas denoted as priority. In addition, potential ditch assessment, culvert replacement, stormwater management best practice or other specific mitigation actions based on additional information collected under “Flood Related Issues” during this workshop will be developed into mitigation action items.

SP&D reviewed the potential of a watershed study or analysis as a new mitigation idea. The watershed study defines the sources and locations of flooding on a watershed basis and generates mitigation measures (or concepts) that can be applied to reduce the impacts from flooding in a community.

Core Planning Team members agreed to include signage with lights and sensors as a new mitigation action item. Proposed locals for installation of these types of signage include:

- Maple Dam Road
- Key Wallace at Maple Dam Road – 2 miles before high tide flooding
- Taylor’s Island before the Bridge
- Each end of Key Wallace Road
- Elliot Island at Henrys Cross Road
- Cambridge – Water Street, Hambrook Blvd., Choptank Avenue

Additional mitigation actions items to be included:

- Continued promotion of the MyCoast App for data collection.
- Work with RiverKeepers to educate property owners on river friendly yards.
- Develop Green Infrastructure Plan for Dorchester County.
- Construct treatment wetlands where possible. Treatment wetlands are one of the most effective ways to absorb stormwater runoff and the nutrients and pollutants that it carries.



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Next Steps

- Workshop Notes - distributed to all Core Planning Team members and uploaded to project website.
 - The link to the project website: www.dorchestermdhazardplans.org.
- Updated NFP- Chapter 6 distributed to Core Planning Team.
- Review and development of mitigation ideas discussed at the Workshop. Distributed for Core Planning Team review and comment.
- Draft Plan

ATTACHMENT 2

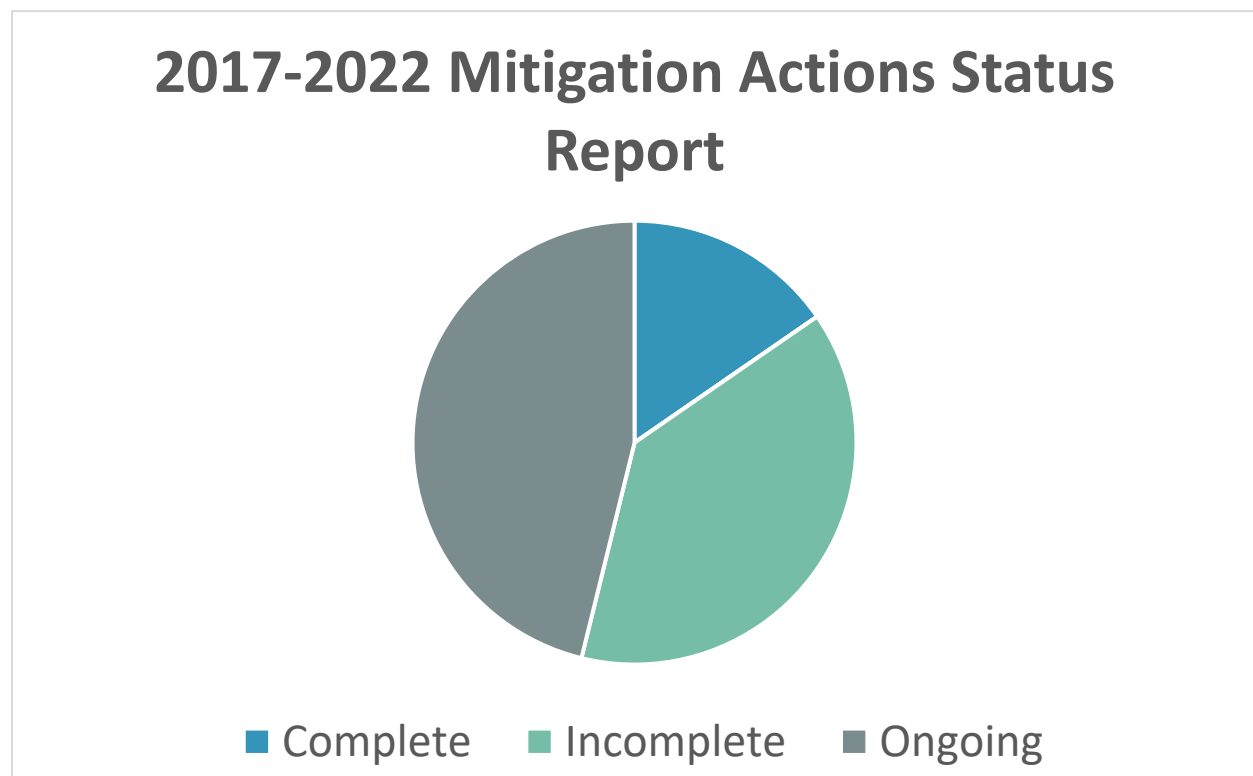
Mitigation Action Status Report

2017-2022 Mitigation Action Status Report

Core Planning Team members were asked to review each 2017 mitigation action item/ project and denote whether the project is complete, partial, incomplete, or ongoing and a status, if applicable.

As a result, more than half the 2017 mitigation action item projects were completed or ongoing. Only 5 mitigation action item projects were incomplete and will be carried over into the 2022 Flood Mitigation Plan. These 5 projects include:

- Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados.
- Repair, rehabilitate, and replace aging water infrastructure and natural water storage capacity through best practices.
- Study Taylors Island flood issues and identify mitigation opportunities and alternatives as a pilot project.
- Initiate local Private Sector Integration Plan Program and include flood mitigation as a primary topic.
- Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS).



Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency	2022 Status			
			Short Term (0-2 years)	Long Term (0-5 years)		Complete	Partial	Incomplete	Ongoing
1	Encourage Property Owners to Elevate Structures High Priority	Encourage property owners to elevate their building's lowest floor above predicted flood elevations by additional height (above the National Flood Insurance Program (NFIP) minimum height requirements and local code requirements.)	Ongoing		Planning and Zoning Emergency Services				●
Status: Planning & Zoning – Elevations are encouraged for flood mitigation by the Department of Planning and Zoning and are required for building permit issuance for all properties within the floodplain.									
2	Black Mold Remediation Outreach	Mitigate black mold health hazards. Mold can create serious health problems for residents previously impacted by and/or recovering from severe storms, flooding, and tornados.	Ongoing (Emphasis on Post Disaster)		Health Department Emergency Services Economic Development			●	
Status: Economic Development – Incomplete									
3	Water Infrastructure Best Practices	Repair, rehabilitate, and replace aging water infrastructure and natural water storage capacity through best practices.		✓	Planning and Zoning Public Works				
Status:									
4	Prioritize Flood-Prone Vacant Property for Hazard Mitigation	Prioritize flood-prone, vacant, and blighted property for hazard mitigation flood acquisition and open space project(s).	✓		Planning and Zoning Emergency Services				●
		Complete prioritized mitigation projects.		✓					

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency	Project Completion Yearly Review (Yes/No)			
			Short Term (0-2 years)	Long Term (0-5 years)		Complete	Partial	Incomplete	Ongoing
5	Prioritize and Upgrade Flooded Roadway Infrastructure	Upgrade and mitigate flood-prone evacuation routes and repetitive flooding areas. *Include in Capital Improvement Plan. Prioritize and include post disaster public assistance declarations.		✓	Public Works				●
Status: Public Works – Ongoing – Paved several roadways.									
6	Potential Acquisition and Open Space High Priority	Identify contiguous properties for acquisition that may be used for open space and community amenities following project completion.	✓		Core Planning Team				●
		Mitigate prioritized flood-prone properties that meet criteria developed by flood mitigation planning committee.		✓	Emergency Services				
Status: Town of East New Market – Ongoing									
7	Taylor's Island Flood and Sea Level Rise Mitigation	Study Taylor's Island flood issues and identify mitigation opportunities and alternatives as a pilot project.	✓		Public Works			●	
Status: Public Works is currently not involved in this project.									
8	Private Sector Integration Plan Program	Initiate local Private Sector Integration Plan Program and include flood mitigation as a primary topic.	✓		Emergency Services Economic Development			●	
Status: Economic Development – Incomplete									

Project #	Project Title	Goal	Implementation Timeframe		Responsible Agency Project	Completion Yearly Review (Yes/No)			
			Short Term (0-2 years)	Long Term (0-5 years)		Complete	Partial	Incomplete	Ongoing
9	Sea Level Rise Vulnerability Study High Priority	Map future flood risk areas and inventory vulnerable communities, infrastructure, and assets.	✓		Planning and Zoning Emergency Services Eastern Shore Land Conservancy	●			
<p>Status: This project was completed during the update process of the 2022 Dorchester County All-Hazards Mitigation Plan. Sea level rise was addressed in Chapter 13 Climate Change. A vulnerability assessment was conducted using NOAA’s 2019 sea level rise data. For the vulnerability assessment, both the sea level rise projections provided in the 2018 Sea Level Projections for Maryland for 2050, ranging from 0.8 to 1.6 feet and the 2019 NOAA Sea Level Rise data were used. sea level projections between 1 and 2 feet were mapped and critical and public facilities at risk were identified.</p>									
10	Modify Floodplain Ordinance	Expand the regulatory floodplain to include areas of future flood risk.	✓		Planning and Zoning				●
<p>Status: Planning & Zoning – The floodplain ordinance is updated as needed. Dorchester County currently has a 2-foot freeboard requirement. The County will make necessary changes to account for sea level rise and/or increased storm activity and severity as needed.</p>									
11	Municipal Participation in CRS High Priority	Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS).	✓		Planning and Zoning			●	
<p>Status: Planning & Zoning – The County has not been contacted, however, will provide assistance if needed.</p>									
12	Bestpitch Ferry Road Bridge Replacement	Complete redesign and construction of Bestpitch Ferry Road Bridge Replacement.	✓		Public Works	●			
<p>Status: Public Works – Complete. Bridge repairs have been completed and the bridge is open.</p>									
13	Organize Roadway and Drainage Easements	Organize roadway and drainage easements.	✓		Public Works GIS Specialist				●
<p>Status: Public Works – Ongoing</p>									