Dorchester County Emergency Management Agency

Dorchester County 2017 - 2020 Hazard Mitigation Plan Update





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FOREWARD

The *2017 Dorchester County All-Hazard Mitigation Plan* was developed in collaboration with broad cross-section of hazard mitigation and resiliency stakeholders.

Overarching themes of the *2017 Dorchester County All-Hazard Mitigation Plan* include:

- Integration with other planning initiatives including the *2017 Dorchester County Flood Mitigation Plan* and *2017 Dorchester County Historic & Cultural Resources Hazard Mitigation & Risk Plan,* both of which will be included in the appendix section of the All-Hazard Mitigation Plan*,* upon completion*.*
- Incorporation of the Safe Growth Audit resulting in recommendations for hazard mitigation plan integration with other County plans and tools, specifically the County Comprehensive Plan.
- Inclusion of regional planning groups such as the *Eastern Shore Climate Adaptation Partnership (ESCAP)* and the *Eastern Shore Emergency Planners Workgroup* provided opportunities to share information, data sources, and best practices.
- Update and expansion of the critical & public facilities geodatabase, including flood depths at lowest adjacent grade for at-risk structures and storm surge inundation areas were completed.
- Identification of repetitive loss properties and areas of concern for targeted mitigation strategies;
- Emphasis on natural hazards that are most likely to impact Dorchester County now and in the future, providing an opportunity for a focused risk analysis and prioritization of mitigation strategies; and,
- Intense effort between all stakeholders to maximize opportunities for collaboration and excitement over future hazard mitigation opportunities to ensure the safety of Dorchester County's citizens, protection of property, environmental sustainability, community resiliency, and the preservation of cultural and historic resources for future generations.

The Plan is organized into three separate sections as follows:

- Section 1 Introduction;
- Section 2 Hazard Analysis; and,
- Section 3 Mitigation Strategies.

A new plan chapter, Chapter 14: Profile Integration, and a new appendix, Appendix G: NFIP &CRS were added as a result of the plan update process.

The plan was developed, reviewed, and adopted by Dorchester County and participating municipalities and will serves as a guide for hazard mitigation implementation over the next five years.

Grant funding for the development of the *2017 Dorchester County All-Hazard Mitigation Plan* was provided by the Federal Emergency Management Agency-Unified Hazard Mitigation Grant Program.

This Document has been completely updated. The 2017 Dorchester County Hazard Mitigation Plan Update is compiled into three sections; Introduction, Hazard Analysis and Mitigation Strategies. The chapters within correspond to each specific section. Additionally, all figures, tables and maps incorporated within each chapter are updated and have been integrated in with the text.

Chapter	*Overview Revisions*
Section 1: Introduction	
Chapter 1 Introduction	The subsection *Dorchester County* has been revised to reflect current US Census data.
Chapter 2 County Profile	Climate data was updated to reflect up-to-date information. Population trends were updated to reflect current US Census data. Housing trends were also updated using housing permit data utilizing the 2016 Maryland Hazard Analysis. Municipal perspectives were update considering the nine municipalities of Dorchester County are the centers for most residential and commercial activity in the County. The following municipalities were updated with current US Census Data and reflecting up-to-date Comprehensive Plans & Maps: *Town of Vienna 2009 Municipal Growth Element & Water Resource Element, 2011 Cambridge Comprehensive Plan, Adopted Town of Secretary 2010 Comprehensive Plan, and Town of East New Market 2010 Comprehensive Plan with a 2012 Land Use Map Amendment.* Future trends was updated with current US Census Data and details susceptibility for each municipality.
Chapter 3 Planning Process	The subsection *Plan Process* was updated with current dates, Hazard Mitigation Planning Committee (HMPC) members, and a step by step explanation of the 2016 planning process, and municipal and public participation. In addition, the subtopic *Organization of the Plan*, was update to provide a better understanding on how the *2016 Dorchester Hazard Mitigation Plan* was outlined.
Section 2: Hazard Analysis *In regards to the Hazard Analysis section, each hazard was reviewed, analyzed and loss estimations were calculated utilizing the updated 2016 Critical and Public Facilities listing which can be found in Appendix B and is discussed in Chapter 5. Furthermore, Chapters 6-11 which provide information pertaining to the identified hazards, have 3 basic subsections for each chapter: Profile, Vulnerability Assessment, and Loss Estimations*	
Chapter 4 Hazard Identification	The first step in the Plan update process for Dorchester County involved the identification of various hazards and the risk associated with each hazard. Upon completion of the hazard identification process, the HMPC rated each hazard according to their perspective. Therefore, Hazard Identifications were updated to reflect the 2016 State perspective and the 2016 Hazard Mitigation Planning Committee's perspectives. The Municipal perspectives and how they differed from the hazard identification and ranking were updated by the overall HMPC. Concluding this chapter is the updated Composite Score for each identified hazard.
Chapter 5 Critical & Public Facilities	In order to assess the current vulnerability of the communities, an inventory of critical and public facilities in the County was reviewed for modification and/or additions. Chapter 5 provides details pertaining to the critical and public facilities located within Dorchester County. The methodology utilized to determine which facilities would be classified as critical and public was provided within this chapter as well as within *Appendix A: Data Methodology*. The *2016 Critical and Public Facilities* map was included to illustrate the facilities' location. Critical and Public Facilities mapping for municipalities was included in the plan update.

Chapter 6 Coastal Events	Chapter 6 was formatted to include: *Hurricane, Nor'easter, Coastal Flooding, Sea Level Rise* and *Shoreline Erosion*. Profiles and historical events for each hazard were updated to reflect current data. Hurricane, Nor'easter and Coastal Flooding were grouped together in the beginning of the chapter considering the relationship between all three. Hurricanes are rated by intensity using the Saffir-Simpson Scale, which gives an estimate of the potential damage that a hurricane may cause based on wind speed and surface pressure. Therefore, the *Saffir-Simpson Hurricane Intensity Categories* table was included to help provided clarity on the five hurricane categories. The National Weather Service's SLOSH Model released in 2014 was utilized to determine vulnerability and loss estimations. Coastal Flooding is a new section within the chapter. In order to analyze coastal flooding, the Flood Risk Report was used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area. The FEMA Hazus program was also utilized to determine coastal flood losses for the 1-percent-annual-chance flood event. Loss estimates were generated for critical and public facilities as well as residential, commercial and other structure located within the coastal flood risk area. Sea Level Rise and Shoreline Erosion were discussed together in the later section of the chapter. Each hazard was profiled and a depiction showing the change in Dorchester County's shorelines surrounding Cambridge was provided. Updated shoreline erosion rates based on Maryland Geological Survey (MGS) data were added. Additionally, soil types have an important role in determining how flooding will affect the landscape, and whether erosion will be a significant risk. Updated information pertaining to the soils found in Dorchester County were analyzed, especially those whose properties are more subjective to the effects of sea level rise. A 100-foot risk zone was created to determine critical and public facilities located within the risk zone and may be susceptible to damage caused by flooding but also exacerbate the effects of shoreline erosion. The chapter concluded with the vulnerability analysis of critical facilities that are at-risk to two or if not all three of the following hazards: storm surge, coastal flooding and the 100-foot risk zone.
Chapter 7 Riverine Flooding	The profile for Riverine flooding was revised as well as the historical events table to include up-to-date information. Furthermore, information provided by the National Flood Insurance Program Report were updated. With that in mind, Repetitive Loss Properties were also updated with the most current available data. Additionally, during a HMPC meeting, committee members were asked to provide updated information and locations on repetitive flooding issues within the roadways. Two new locations were identified and have been included on the flood related issues table located in Section 3, page 138. A revised map depicting these locations was included in this Chapter. Revised Digital Flood Insurance Rate Map (DFIRM) maps were released in March 2015 for Dorchester County. The DFIRMs were utilized to analyze the 2016 critical and public facilities that are affected by high risk FEMA Flood Zones; A, AE, VE. An updated table provided the information on the critical and public facilities located within the high risk Flood Zones A and VE and updated loss estimates were also then calculated for these facilities. As a conclusion for this chapter, critical and public facilities that are within close approximation to HMPC identified roadway flood issues were analyzed and mapped.

Chapter 8 Winter Weather	The Winter Weather profile was modified by updating snow totals and the historical event table. Critical and public facilities' vulnerability to winter storms depends on the age of the building (and the building codes in effect at the time it was built), type of construction, and condition of the structure (how well it has been maintained). Therefore, the vulnerability analysis for Winter Weather was conducted utilizing the updated 2016 critical and public facilities. The facilities built prior to 1960, before the International Building Code was enforced, may be at a higher risk due to age of construction and lack of building codes during the time period. The conclusions for the vulnerability analysis and loss estimates were updated to reflect current facility data.
Chapter 9 Thunderstorm, Hail, Wind & Tornado	Chapter 9 consists of Thunderstorm, Hail, Wind and Tornadoes since they are associated with one another. Wind was new to this chapter and therefore a profile and vulnerability section detailing wind was included. The profiles for thunderstorm, hail and tornado were revised along with the update of the historical events tables.
Chapter 10 Extreme Heat, Drought & Wildfires	Extreme Heat, Drought and Wildfires typically occur together, therefore all were discussed within one chapter; Chapter 10. The profile for extreme heat were updated to reflect current temperature data as well as historical events table. Information pertaining to Drought was revised in the profile section and historical events were updated. The Extreme Heat conclusion is new the chapter. The Wildfire profile was revised and updated. The wildfire vulnerability analysis utilized the urban-wildland interface fire, which is defined as a fire that occurs where structures and other human development meet or intermingle with wildland. Therefore, utilizing the GIS woodland layer provided by Dorchester County, analysis could be conducted to determine which critical and public facilities are at high risk from wildfires. 2016 Critical and public facilities at risk to wildfires were provided.
Chapter 11 Human Impacted Hazards	*Major Fire/Explosion*, *On-Site HazMat Incident*, *Transportation HazMat Incident*, and *Epidemic*. Major Fire/Explosion's profile was revised while the vulnerability assessment now includes information obtained by the United States Fire Administration. Age groups that are at relative risk of dying in a fire were included. On-Site HazMat Incident profile was updated to include several notable Maryland hazmat incidents. Transportation HazMat Incident was updated by discussing the vulnerability of daily traffic volumes. The final subtopic of this chapter, Epidemic, was reviewed and revised. Additional statics for Hepatitis A & B were included in the profile discussion. Also this section was updated to include data obtained through the Maryland Epidemiology & Disease Control Program for the vulnerability analysis.
Section 3: Mitigation Strategies *In regards to the Mitigation Strategies section, Goals and Objectives for the County were reviewed and modified. New mitigation actions items were developed and discussed in Chapter 13 and provided in the new Appendix H. A new chapter, Chapter 14: Plan Integration, was included in this section during the 2017 Plan Update.*	
Chapter 12 Goals and Objectives	Chapter 12 was reviewed and revised. By completing the vulnerability analysis in the previous chapters, the 2016 Hazard Mitigation Planning Committee (HMPC) was able to develop new goals and objectives as part of the mitigation strategies which are denoted in red within this chapter.

Chapter 13 Mitigation Actions	The introduction of this chapter was revised to include FEMA's six (6) mitigation action categories: Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects. 2016 Mitigation Action Items were discussed and ranked. Results were provided in table format as well as discussion for action items ranked "High" in the Dorchester County 2016 Projects Listing section. The 2011 Mitigation Actions table were reviewed and status updates were provided and are denoted in red. Also, the information obtained regarding repetitive flood locations was included in the chapter in a table format and ranked as well. This chapter is concluded with the *Community Capability Overview* which was revised and updated. Each sub topic was individually reviewed for accuracy and modifications/additions were made accordingly.
Chapter 14 Plan Integration	This chapter is new to the 2017 Plan Update. This chapter includes a Safe Growth Audit, which is a way to assess how well the existing planning tools address hazard risks and community resiliency. A conclusion providing recommendations for plan integration was included at the end of the chapter.
Chapter 15 Plan Maintenance & Implementation	Text within this Chapter was revised and updated to reflect how this Plan will be implemented and monitored for the next five years. Responsible agencies for maintaining the Plan are also established and discussed within the *Plan Update and Public Involvement* section.
Appendices *In regards to the Appendices, Appendix A to F were updated to reflect the 2011-2017 planning process and information utilized during this timeframe. However, two (2) new appendices have been included: Appendix G: National Flood Insurance Program (NFIP) & Community Rating System (CRS) and Appendix H: Mitigation Strategy Session Results.*	
Appendix G	Appendix G: NFIP & CRS is for Official Use Only and therefore will be not be available for public review. Appendix G was developed to satisfy the hazard mitigation planning requirements under 44 CFR Part 201, which are consistent with the Community Ration System (CRS) 10-step planning process found within Activity 510 of the CRS Coordinators Manual. Completing Activity 510 Floodplain Management Planning enables Dorchester County to improve their CRS rating, which may subsequently lower the National Flood Insurance Program (NFIP) premiums for the entire community.
Appendix H	HMPC members developed hazard mitigation ideas and actions during two (2) meetings: August 10, 2016 and September 7, 2016. During the initial meeting, ideas were captured on Mitigation Action Implementation Worksheets. The second meeting was a work session to further refine the mitigation ideas and actions. As a result of this process, twelve (12) Mitigation Action Implementation Worksheets were developed by the committee members and are provided in the new Appendix H.

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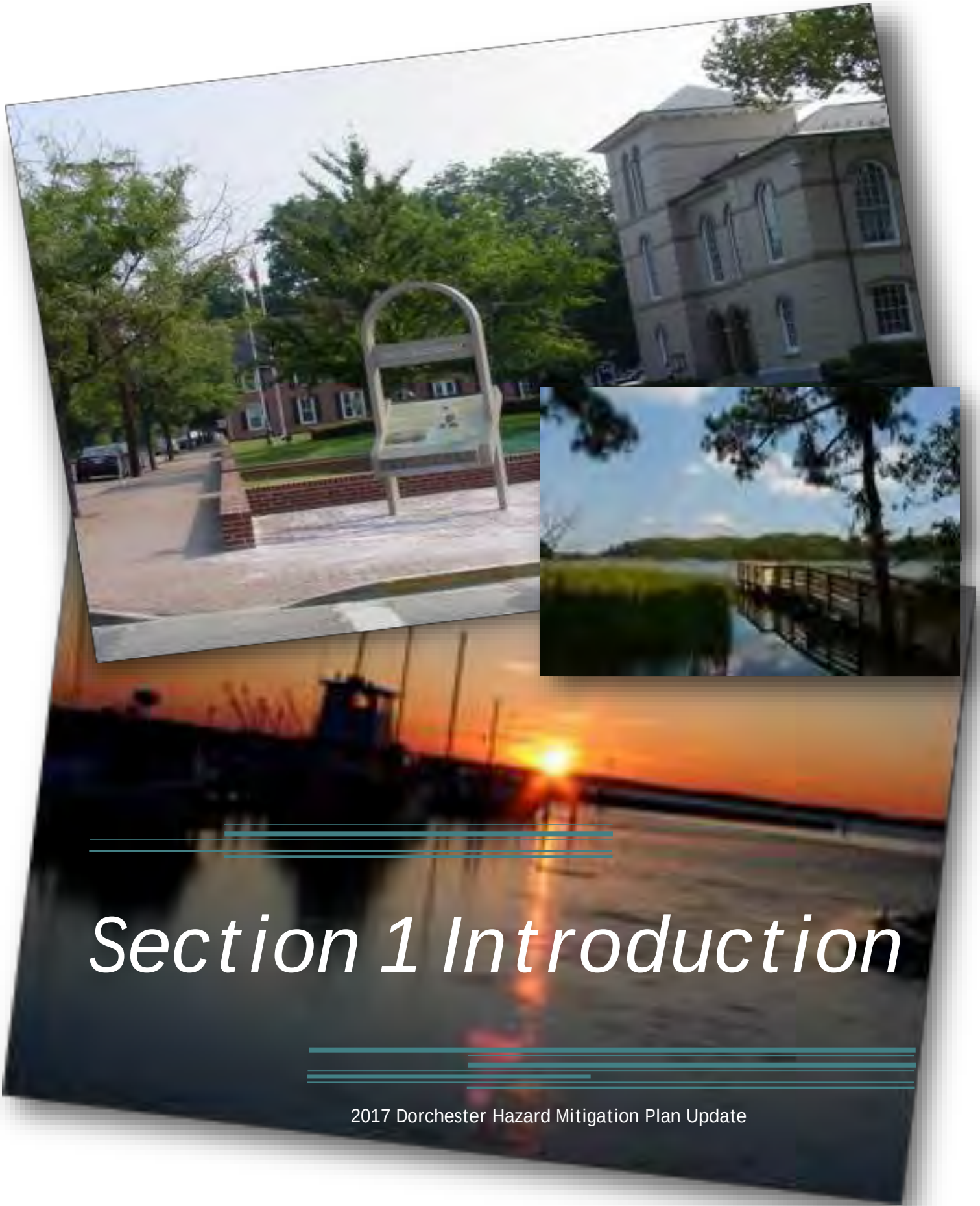


Section 1 Introduction

2017 Dorchester Hazard Mitigation Plan Update

Chapter 1 Introduction

Introduction & Purpose

Dorchester County and its nine municipalities present the *2017 Dorchester County Hazard Mitigation Plan Update*. The purpose of this plan is to prevent or reduce loss of life and injury and to limit damage costs from various hazards through the development of mitigation methods which lessen or eliminate future damage. This was accomplished by reviewing, assessing and updating the communities' vulnerabilities to natural hazards. As a result, a long-term strategy to address these hazards in an effort to prevent future damage and loss of life of Dorchester County residents was prepared.

This document was the product of extensive participation from County and municipal officials, residents, business owners, and other agencies.

Dorchester County

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 also shares a boundary through the Chesapeake Bay with Somerset, Calvert and St. Mary's Counties. Dorchester County was named for the Earl of Dorset, a family friend of Lord Calvert, and was created prior to 1669. Dorchester is the largest of Maryland's twenty-four counties, containing over 983 square miles of land and water territory. 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 Honga Rivers.

Dorchester County's population has experienced a slight increase over the past decade and now consists of a total of 32,618 persons according to 2010 US Census Bureau data. The City of Cambridge, the County seat, is the most populated municipality and contains slightly more than 38 percent of the County's total population (12,326 persons in 2010).

Acccording to data from the Maryland Department of Planning: *2015 US Census Bureau Estimates*, Dorchester County's population decreased to 32,384 persons. The 2015 population figure represents a 0.7 percent decrease in population since the 2010 U.S. Census.

The nine incorporated communities within Dorchester County includes: the City of Cambridge and the Towns of Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary, and Vienna.

Map 1

Dorchester County Location

Source: Smith Planning and Design and Dorchester Planning and Zoning

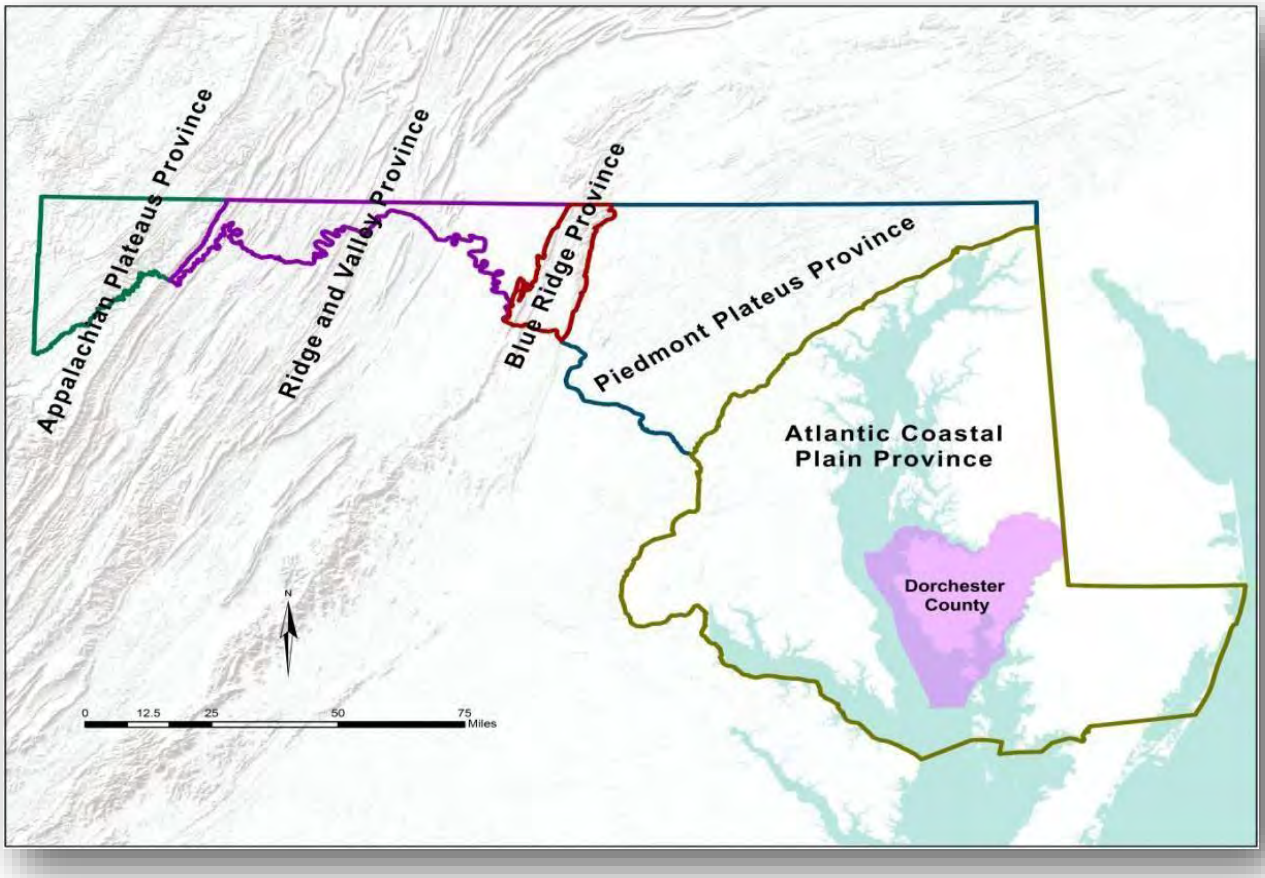
Chapter 2 County Profile

Geology, Slope, Groundwater and Soils

Dorchester County contains 558 square miles of land, it is characterized by open, natural, agricultural and forested areas. According to the Maryland Department of Planning, the ratio of preserved land to developed land is 4.77:1 and the resource land preserved is 31.4:1. Dorchester County is located within the Coastal Plain Physiographic Province.

Map 2

Maryland's Physiographic Provinces



Source: Smith Planning and Design and iMaps

The highest elevation in the County is approximately 57 feet above sea level, resulting in a relatively flat land surface. The rock units that make up the County's surface are primarily unconsolidated alluvial deposits of relatively recent age. The oldest exposed material is of Tertiary age and is confined to a small area north and west of Cambridge. The youngest surface materials are of Pleistocene age and are found primarily north of Route 50 and east of Cambridge. The southern boundary of these deposits is in close alignment with the limits for coastal storm surge. Older coastal plain sediments are found at some depth below this surface and provide the source of most fresh water used in the County. These sediments are recharged primarily from sources on the western shore and are subject to contamination by pollutants both in Dorchester County and from areas outside the County. Salt-water intrusion is also possible when aquifers are drawn down significantly.

According to Arthur Strahler's Physical Geography text, the Chesapeake Bay is an estuary that was formerly the river valley for the Susquehanna River and its tributaries. During the peak period of glaciations, sea level was approximately 400 feet lower than today. As sea level has risen over the past 10,000 years, the Chesapeake has grown and essentially created the features associated with a shoreline of submergence. This produces a highly irregular, embayed shoreline typical of the eastern shore. In geologic terms the Bay shoreline is still in youthful form with small bays, long peninsulas and offshore islands. Eventually, as the sea level continues to rise, these bays, peninsulas and islands will be submerged, leaving a smoother, nearly straight shoreline.

Most soils types in Dorchester County are formed on unconsolidated material and are sandy in nature. The low-lying areas are poorly drained and are susceptible to erosion along the coast and in tidal estuaries. Shore erosion and land subsidence are most prevalent along the southern coastal islands where the beach front has retreated noticeably during the past 50 years. In the southern part of the County, areas inland that were once in agricultural production are now marshland. Well drained areas, to the north on the Pleistocene deposits, contain soils that are well suited for agricultural uses.

Climate

Due to the nearly level terrain and low elevation (sea level to approximately 57 feet), Dorchester County is susceptible to high winds and rain during summer thunderstorms and to heavy damage from storm surge and wind during the passage of hurricanes or nor'easters either on or near the eastern shore. The County is also susceptible to tornadoes that are occasionally spawned by thunderstorms or hurricanes. Precipitation averages between 40 and 48 inches annually.

Table 1

Average Rainfall													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Inches	3.82	3.22	4.04	3.69	4.07	4.34	4.34	3.72	3.45	3.06	3.41	3.68	44.1

Source: VIENNA, DORCHESTER COUNTY data derived from NCEI Data Tools: 1981-2010 Normal.

According to the National Center for Environmental Information (NCEI), Dorchester County receives and annual average rainfall of 44.1 inches, as shown above in Table 1. Most of this snow falls during the passage of the occasional mid-latitude winter storm. Due to its southern location and its proximity to the Atlantic Ocean, Dorchester receives less snowfall on average than counties to the north and west.

Temperatures usually average 5-10 degrees warmer in Dorchester County than on the western shore throughout the year. The average summer temperate is 77.1°, while the average winter temperatures are 38.9°. Additionally, the County has to deal with fog conditions approximately 10-15 times a year, similar to the rest of the eastern shore.

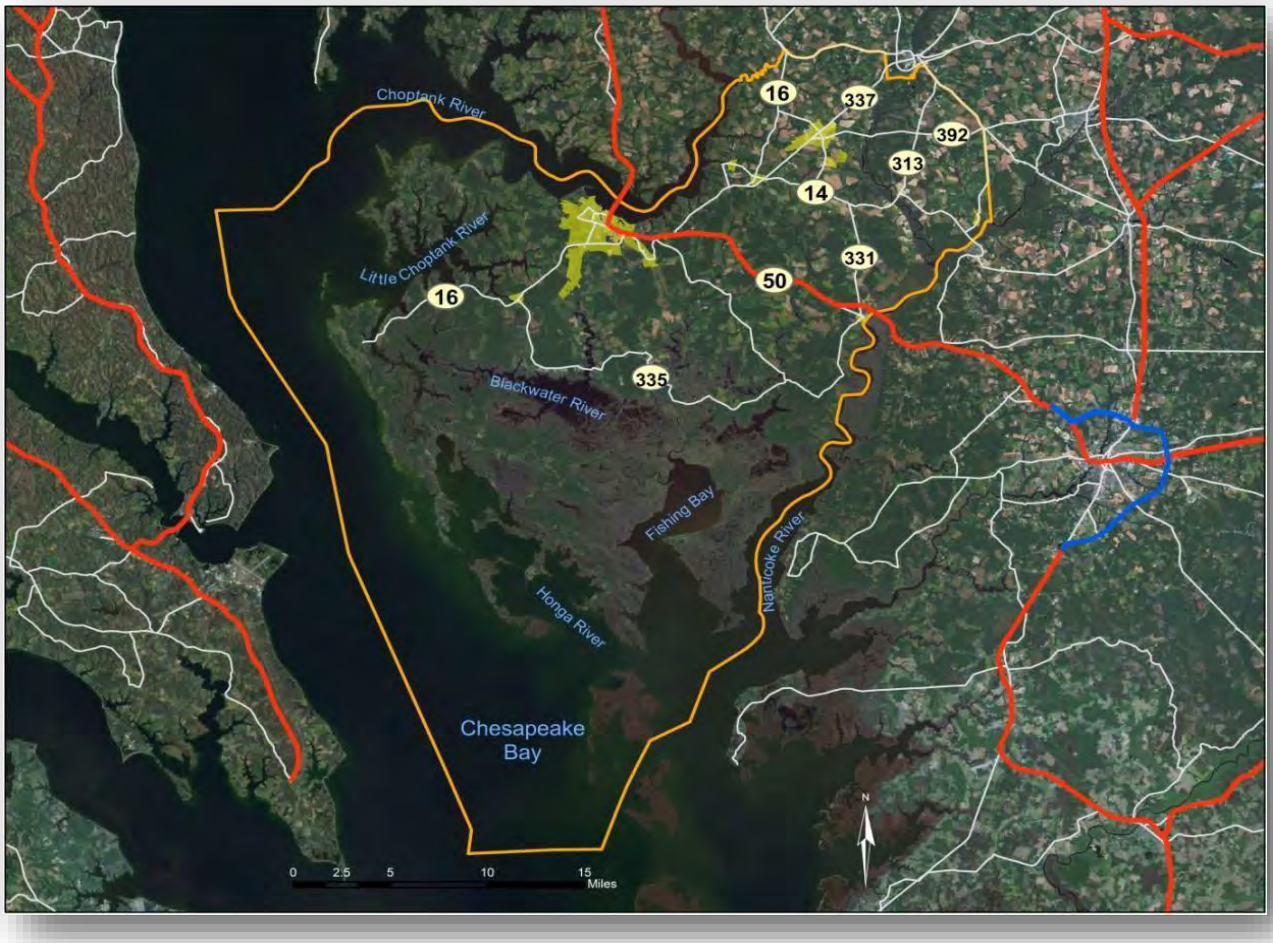
Transportation

Since the opening of the Bay Bridge in the mid-1950's, US Route 50 has served as the major east-west transportation corridor on the eastern shore. Route 50 is also the major transportation corridor through Dorchester County and is complemented by State Route 16 and several other highways that connect Cambridge with smaller communities to the north and east. The southern portion of the County is served primarily by County roads. Other transportation routes include the Maryland and Delaware Railroad which connects Cambridge with Hurlock, however, Federalsburg transport is suspended from Hurlock to Cambridge. The Cambridge-Dorchester Airport is located just to the southeast of Cambridge near Route 50. Local bus service is provided by the Dorchester Development Unit using funding provided by the Maryland Department of Transportation and Federal Grant programs.

With Cambridge's strategic location on the Bay, it has historically been a seaport and has a 25-foot-deep channel to the bay proper. Although commercial barge and tanker traffic has been discontinued, a number of marinas operate in the Cambridge area and on other tributaries of the Choptank and Nanticoke Rivers.

Map 3

Transportation Routes



Source: Smith Planning and Design and ESRI

Population

Population Trends

Dorchester County's population growth has mirrored the economic periods with higher rates of growth occurring during the early settlement of the County and the industrial boom of the early 20th Century. According to the 2010 US Census, Dorchester County had a population of 32,618, an increase of 1,944 from the 2000 population. In 2010, the incorporated towns in the County had populations ranging from 60 in Brookview to 12,326 in Cambridge.

Dorchester County has a high percentage, compared to other Maryland jurisdictions, of residents of Hispanic or Latino origin and a higher than average percentage of residents over the age of 65. The racial makeup of the county is 67.7% white, 28.5% African American, 4.9% Hispanic or Latino, 1.2% Asian, 0.5% American Indian, and 2.0% from two or more races. A significant number of these residents live in the storm surge areas of the County and are considered "at risk" populations. The 2010 US Census shows a Hispanic or Latino population of 1,130 in Dorchester County and a population of 5,771 for the age group of 65 and older. However, according to the American Community Survey Demographic and Housing Estimates (ACS), 2010-2014, the Hispanic population was estimated to be 1,317 persons. Additionally, this population represents increases during the summer months. The age group of 65 and older increased by 13% between the years 2010 and 2015. The African American and Hispanic population is concentrated in Cambridge and the Hurlock to East New Market corridor. The 65 and older population is primarily concentrated in Cambridge and Hurlock, however there is a high percentage of this population located within the vicinity of Taylors Island, Hoopers Island, Elliotts Island as well as in the Lake and Straits areas. Utilizing the 2010 US Census, Dorchester County's overall population increased by 1,944 persons between the years 2000 and 2010.

Table 2

Population Trends					
	1980	1990	2000	2008	2010
Brookview	78	64	65	62	60
Cambridge	11,703	11,514	10,911	11,777	12,326
Church Creek	124	113	85	78	125
East New Market	230	153	167	266	400
Eldorado	93	49	60	57	59
Galestown	142	123	101	97	138
Hurlock	1,690	1,706	1,874	2,048	2,092
Secretary	487	528	503	487	535
Vienna	300	234	280	319	271
Unincorporated Areas	15,776	15,722	16,628	16,807	16,612
Total	30,623	30,236	30,674	31,998	32,618

Source: U.S. Census

Population Projections

According to the Maryland Department of Planning, Dorchester County's population is projected to grow to 39,900 persons by the year 2025. However, according to the *2009 Dorchester County Comprehensive Plan Water Resources Element,* County population

is expected to reach approximately 42,050 by the year 2030. The County's projections differ from the 2008 Maryland Department of Planning's. Due to the past rates of housing permits and other measures of development, the County predicts higher population growth will be experienced then the State has forecasted.

Table 3

Population Projections

							Change, 2007-2030		
	2008	*2010*	*2015*	*2020*	*2025*	*2030*	*Number*	*Percent*	*Annual Increase*
Population	31,998	33,200	35,400	37,600	39,900	42,050	10,204	32%	1.2%

Source: 2009 Dorchester County Comprehensive Plan Water Resources Element

Housing

Housing Trends

According to the US Census, the County's residents were housed in 16,554 units in 2010, while the estimated total of housing units for July 2009 were 16,814. In terms of at-risk housing, American FactFinder estimated 1,410 mobile homes being located in Dorchester County in 2010. In 2014, the estimated number of mobile homes in the County slightly decreased to 1,378. Considering the high number of mobiles homes, it is crucial all regulations pertaining to mobile home installation are followed to ensure stability of these structures during a hazard event. Virtually, the entire housing stock in the southern portion of the County is susceptible to flooding from storm surge events. The southern portion is comprised of the following unincorporated communities: Bishops Head, Crapo, Crocheron, Fishing Creek, Hog Island, Honga, Hoopersville, Toddville and Wingate. The only unincorporated community located in the southern portion still experiencing development is Fishing Creek. The table below outlines approved permits for the unincorporated portions of Dorchester County and the municipalities. The municipalities are located in the northern portion of the County.

Table 4

Approved Permits by Jurisdiction

Year	Type	Dorchester County	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
2003	Commercial	0	0	2	0	0	0	0	2	0	0
	Residential	28	0	68	2	36	0	0	37	0	3
2004	Commercial	3	0	3	0	0	0	0	1	0	0
	Residential	58	0	102	5	38	0	0	35	10	11
2005	Commercial	2	0	2	0	0	0	0	1	0	0
	Residential	42	0	218	4	30	0	0	28	3	3
2006	Commercial	1	0	4	2	0	0	0	0	0	0
	Residential	26	0	147	1	18	0	0	33	0	1
2007	Commercial	2	0	1	0	1	0	0	0	0	0
	Residential	19	0	87	2	13	0	01	29	3	5
2008	Commercial	2	0	4	1	1	0	0	1	0	0
	Residential	14	0	97	0	15	0	2	150	2	0
2009	Commercial	0	0	2	0	0	0	0	0	0	0
	Residential	8	0	28	3	0	0	1	19	1	0
2010	Commercial	0	0	0	0	0	0	0	0	0	1
	Residential	4	0	7	0	3	0	0	11	0	2
2011	Commercial	0	No Data	0	0	0	No Data	0	0	0	0
	Residential	4	No Data	6	1	3	No Data	1	15	8	2
2012	Commercial	0	No Data	0	0	0	No Data	0	0	0	0
	Residential	8	No Data	5	0	2	No Data	0	5	6	0
2013	Commercial	0	No Data	0	2	1	No Data	0	1	0	1
	Residential	6	No Data	3	0	1	No Data	1	4	7	1
2014	Commercial	0	No Data	1	0	1	No Data	0	0	1	1
	Residential	8	No Data	7	1	4	No Data	0	4	3	1
2015	Commercial	0	No Data	2	0	0	No Data	0	0	0	0
	Residential	9	No Data	7	1	5	No Data	0	9	5	5
May 31, 2016	Commercial	0	No Data	1	0	0	No Data	0	0	0	0
	Residential	4	No Data	5	1	1	No Data	1	2	3	1

Source: Dorchester County Office of Planning & Zoning: 2003- 2015 and Dorchester County's Municipalities
Note: Residential housing included: manufactured homes, mobile homes, modular homes, and single family dwellings.

Housing Projections

According to the *2009 Dorchester County Comprehensive Plan Water Resources Element,* housing units are projected to increase 6,153 by the year 2030. This is an annual increase of 1.5 % between the years 2007-2030, or an overall 40% increase. The projected housing growth is greater than the projected population growth due to the decline in household sizes.

Municipal Perspectives

The nine municipalities of Dorchester County are in large part still the centers for most residential and commercial activity in the County with the exception of the corridor between Cambridge and Hurlock. Cambridge is by far the largest municipality with 12,326 residents, while Hurlock has nearly 2,092 residents.

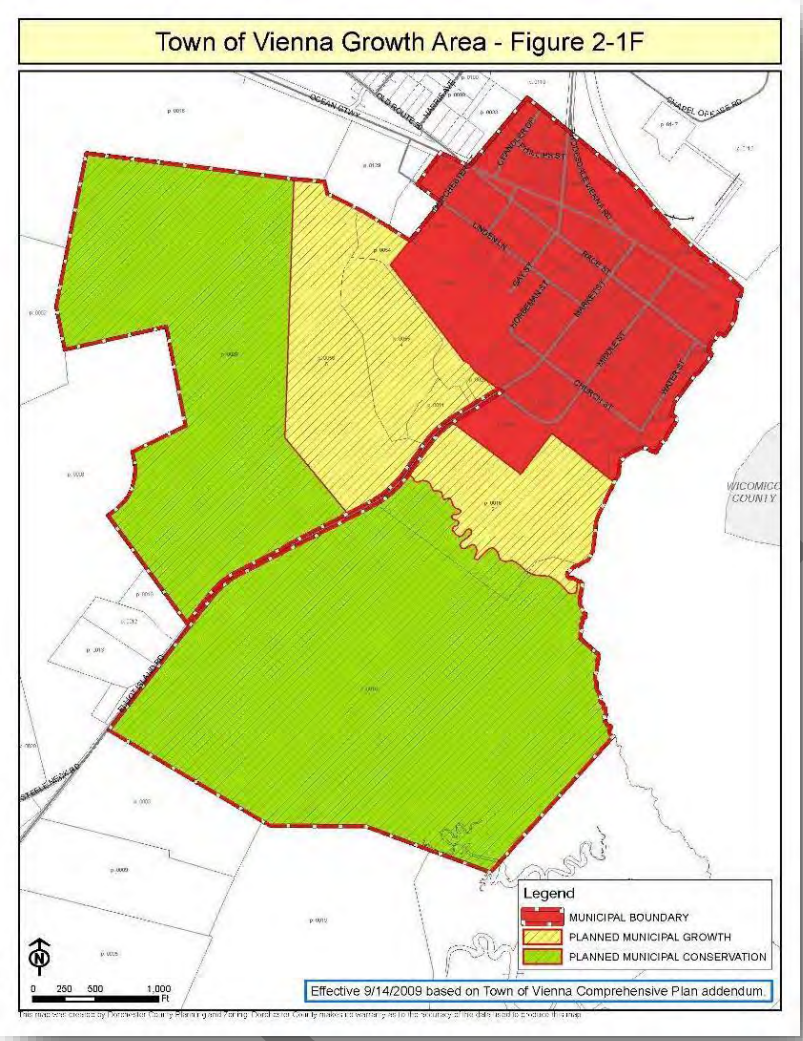
Of the seven remaining municipalities, all but Church Creek and Vienna are in the northern part of the County may eventually face the same type of development pressure that is now occurring in the Cambridge-Hurlock corridor. In fact, Secretary and East New Market lie between Cambridge and Hurlock and their future is essentially tied to the two larger communities. Even though they are small in population, the other municipalities continue to serve as hubs for community activities and have commercial activities that serve the surrounding countryside. Brookview, Eldorado and Galestown are all located north of Route 50 and east of Hurlock. While Vienna is located just south of Route 50 at the Wicomico County border and Church Creek is located southwest of Cambridge on Route 16.

Vienna

According to the 2010 US Census, the Town of Vienna's population in April of 2010 was 271 persons, a decrease of -0.03% from its population of 280 at the time of the 2000 Census. The *2009 Amendment to the Vienna Municipal Growth Element* projects populations of 333 in 2020 and 355 in 2030.

Figure 1

*Town of **Vienna's** Growth Boundary Map*



Source: 2012 Municipal Growth Map Admendment

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.

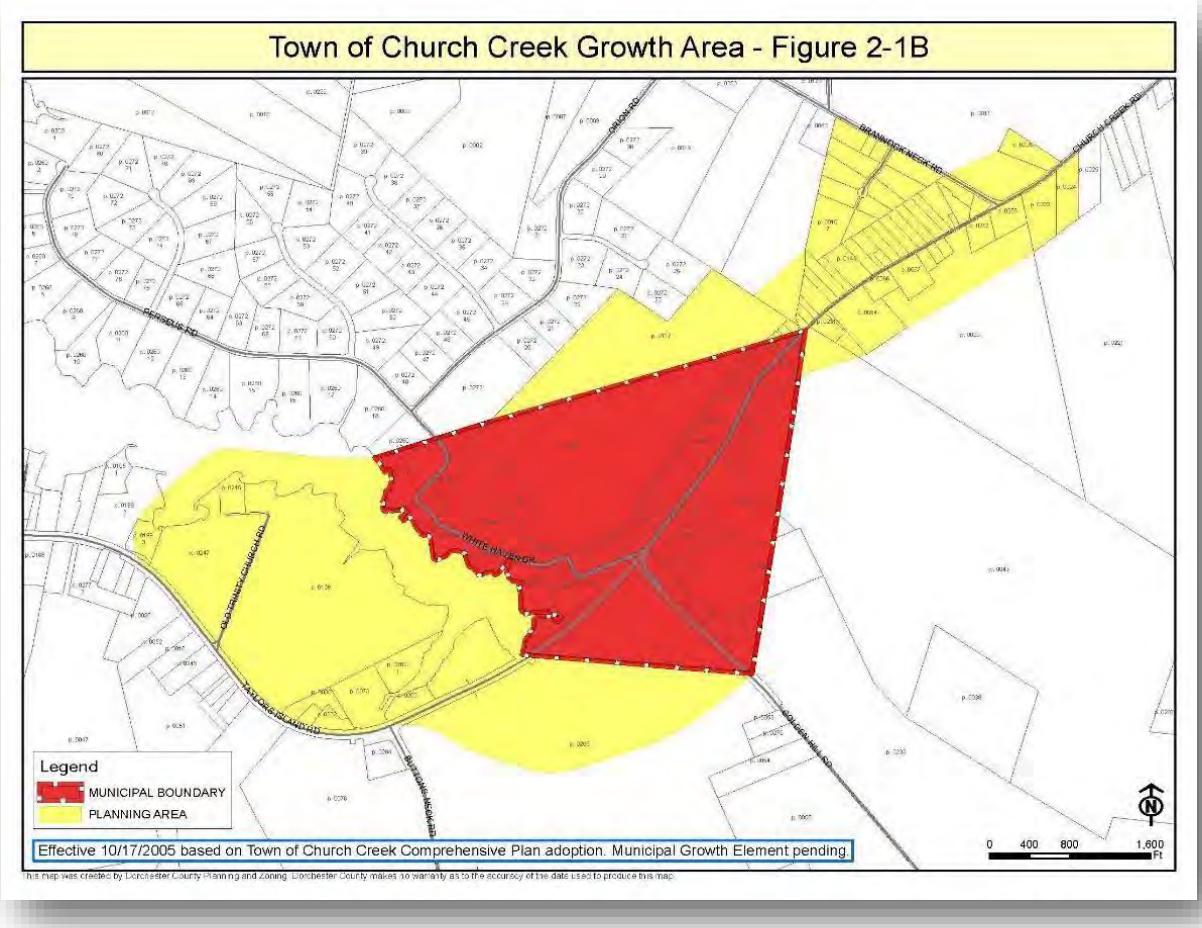
Church Creek

According to the *2005 Church Creek Comprehensive Development Plan*, the population has declined over the past 50 years. In 1950 the population peaked at 187, however to this date there has been a 50% population decline. Between 1990 and 2000, the Town's population dropped by roughly 25%. According to the 2010 US Census, the population of Church Creek is 125.

According to the 2010 US Census, a total of 67 housing units were located within the Town. However, the Planning Area Map, Figure 2, illustrates the projected growth to occur beyond the northeast and southwest municipal limits.

Figure 2

Town of Church Creek's Planning Area Map



Source: 2012 Municipal Growth Map Admendment

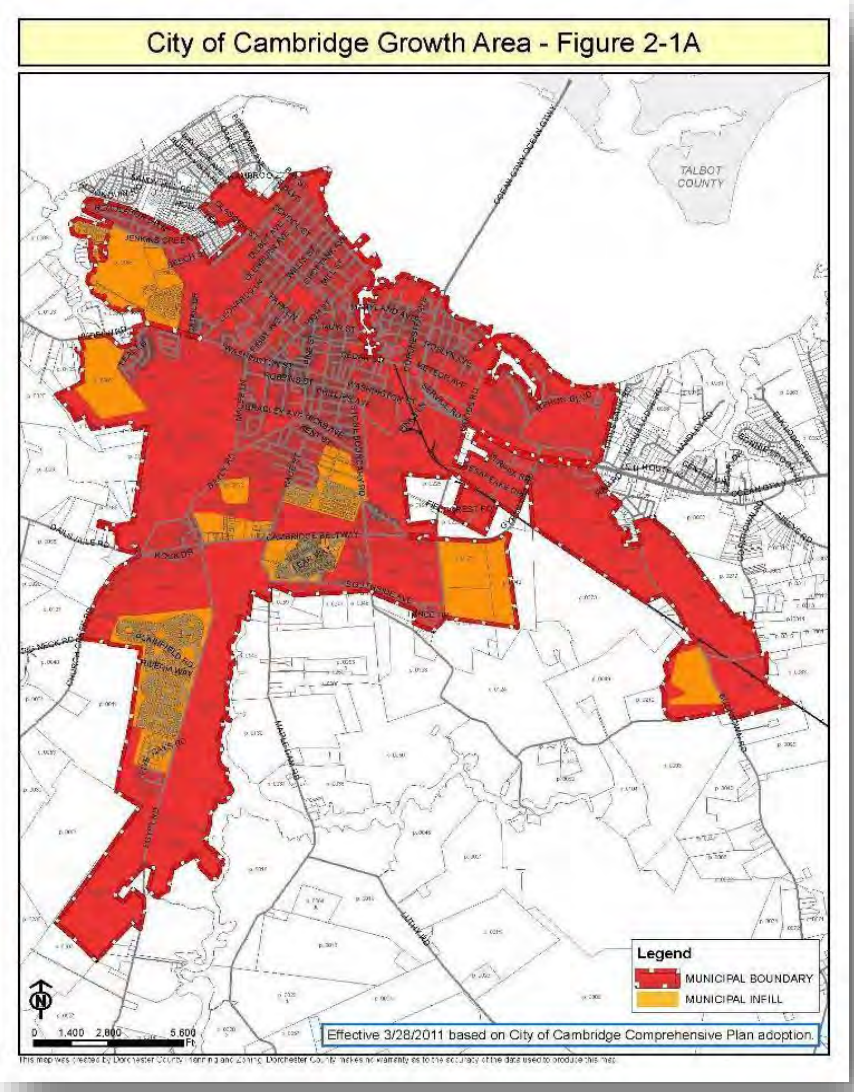
Cambridge

According to the 2010 US Census, the total population in 2010 for Cambridge was 12,326 persons. The City of Cambridge experienced an increase of 1,415 persons between 2000 and 2010. According to the *2011 Cambridge Comprehensive Plan*, recent population increase mirrors an increase in jobs in Cambridge and Dorchester County.

In 2010, Cambridge consisted of 6,228 housing units. Of these housing units, approximately 28% were constructed prior to 1940 and 60% prior to 1960.

Figure 3

*Town of **Cambridge's** Growth Area Map*



Source: 2012 Municipal Growth Map Admendment

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, in the event that 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).

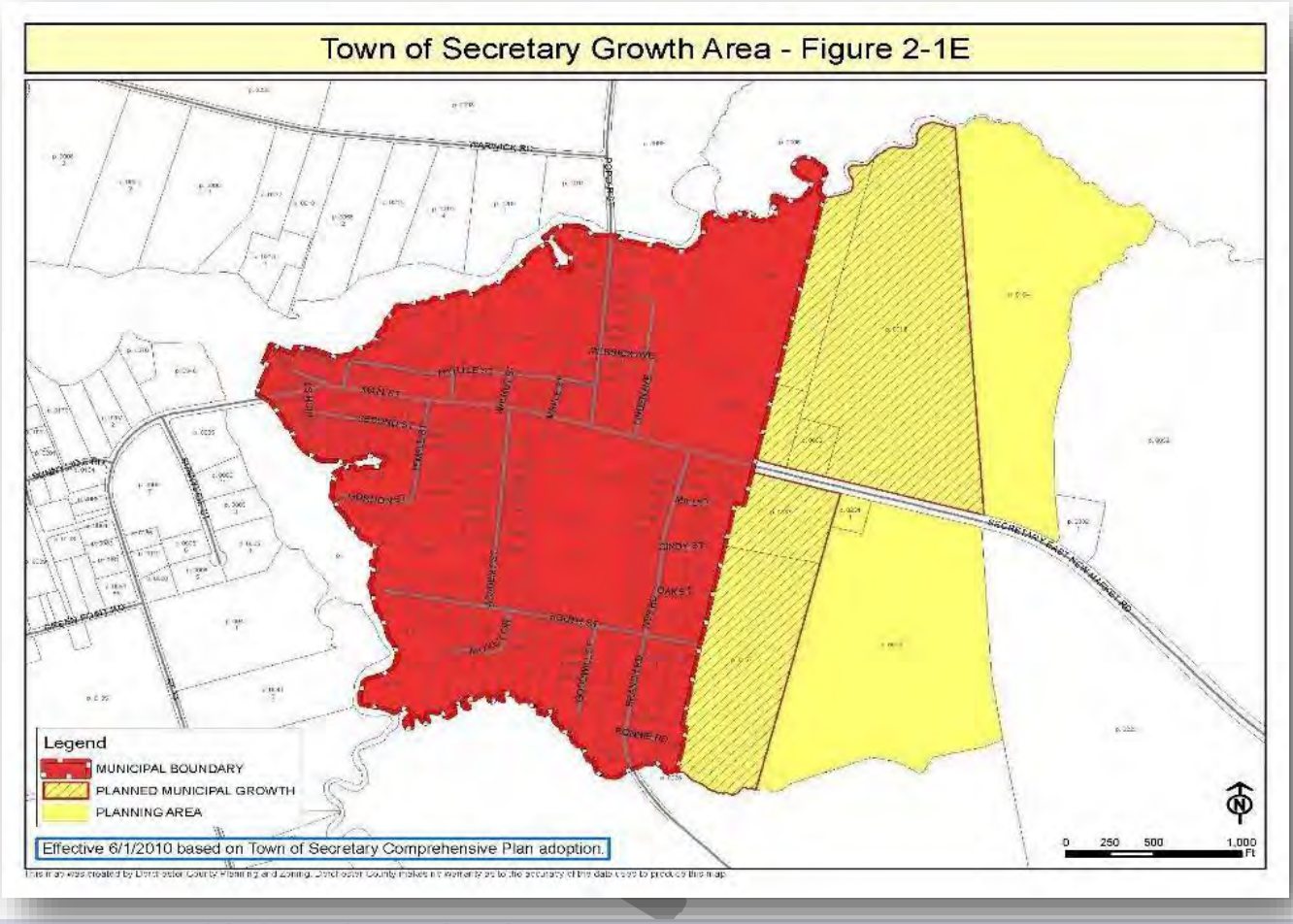
Secretary

According to the *Town of Secretary: 2010 Comprehensive Plan and the 2010 US Census*, Secretary's population has increased 0.6% from 503 in 2000 to 535 in 2010. According to the 2010 US Census, the Town of Secretary experienced an increase of 32 persons between 2000 and 2010.

Furthermore, according to the Comprehensive Plan, in 2010 there were a total of 234 housing units in the Town of Secretary. Approximately 41.8% of Secretary's housing units were constructed prior to 1970. Only 18 housing units (9.1%) were built between 1990 and 2000.

Figure 4

*Town of **Secretary's** Growth Area Map*



Source: 2012 Municipal Growth Map Admendment

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 (GA1) is located east of the Town boundaries, while the second, GA2 is planned to occur directly north of GA1. The last growth area, GA3 would include the properties located directly adjacent to GA1 and GA2.

East New Market

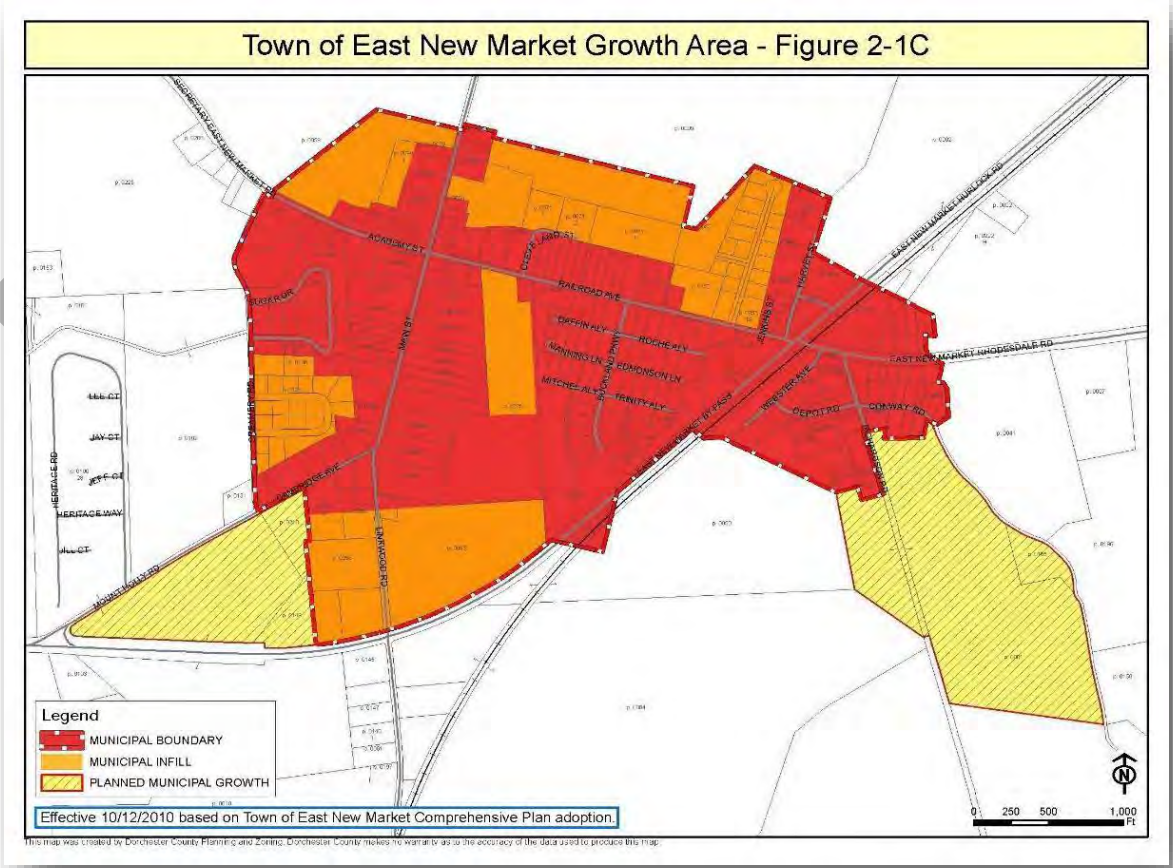
According to *the 2010 Comprehensive Development Plan and the 2012 Land Use Amendment for East New Market, Maryland*, population in the Town had remained relatively stable for 50 years prior to 1990. In 1980 the population totaled 230 persons

while in 1990 the population was 153, a 33.5% decline. In 2000 the population for the Town of East New Market had rebounded with a total of 167 persons. However, according to the 2010 US Census the population soared to 400, a 58% increase from 2000 to 2010.

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 US Census, East New Market has 197 housing units. The *2010 Comprehensive Development Plan* estimates of land capacity within current Town boundaries 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 a high of 327 units. Upon review of the data, the Town determined that infill capacity will 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.

Figure 5

*Town of East New **Market's** Growth Area Map*



Source: 2012 Municipal Growth Map Admendment

Hurlock

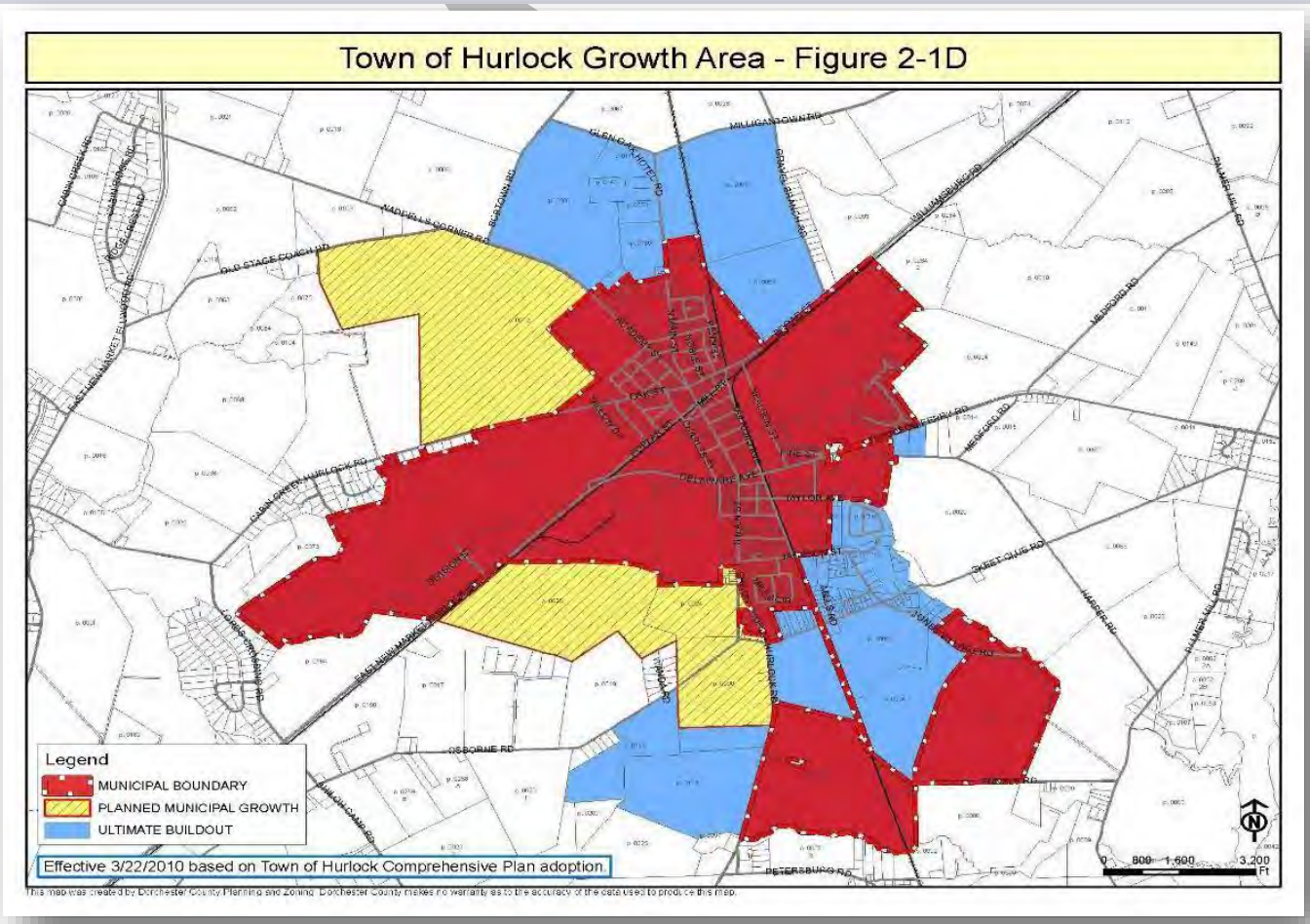
According to the *Town of Hurlock, Maryland – 2009 Comprehensive Plan,* the Town has experienced an increase in population over the past 30 years, resulting in a 77.5% net increase. The 2010 US Census population count totaled 2,092 persons, a 218 person increase from the 2000 US Census population total, 1,874.

In terms of housing units, there were 710 households in 2000 while in 2009 the Town had 609 households. According to the 2010 US Census, there were 903 housing units in Hurlock.

In terms of growth areas, the Town of Hurlock is considering two areas, Growth Area 1 and Growth Area 2. Growth Area 1 (GA 1) is located northwest of the municipal limit, while Growth Area 2 (GA 2) is proposed to the western and southern portions of the municipal limit.

Figure 6

*Town of **Hurlock's** Growth Area Map*



Source: 2012 Municipal Growth Map Admendment

Future Trends

As noted earlier in Population Trends, the 2010 US Census and the Maryland Department of Planning (MDP) shows Dorchester County to have a population of 32,618 in 2010, and projects a population of 31,450 by 2020. However, the *2009 Dorchester County Comprehensive Plan Water Resources Element* stated that the County projects the population total in 2020 to be approximately 37,600 persons. These projections differ from the MDP's projections due to the past rates of housing permits as well as other development interest known to the County. Therefore, with the County's significant amount of floodplain land, it is extremely important that new development not add to the County's already considerable amount of housing within storm surge areas.

The County Comprehensive Plan projects that most of the population growth and associated urban development will continue to be centered in and around designated growth areas around the Cambridge-Hurlock corridor where a large portion of the land is outside the storm surge area. However, the Cambridge-Hurlock corridor is susceptible to flooding associated with heavy rain events due to low lying areas.

According to the Maryland Department of Planning's *Maryland Priority Funding Area* (*Source: http://mdpgis.mdp.state.md.us/pfa/)*, Dorchester County has a limited amount of Priority Funding Areas (PFA). The PFA is primarily located within the each municipal boundary. Small sections of the PFA are located beyond the municipal boundary for East New Market, Church Creek, Hurlock and Cambridge. In regards to the municipalities, it is advantageous for projected growth to occur within the PFAs, however consideration needs to be taken in regards to the 100-year floodplain, storm surge areas as well as the Chesapeake Bay Critical Area.

The Town of Church Creek's projected development is to occur beyond the southwest corporate boundary, Figure 2. The Town is subjected to storm surge and is located within the 100-year floodplain. Also 53% of the Town is located within the Chesapeake Bay Critical Area, which regulates the development with 1,000 feet of tidal waters and all waters and land under the Chesapeake Bay and its tributaries. Therefore, the Town of Church Creek needs to be cautious of future growth areas and their proximity to natural hazards.

The City of Cambridge's projected growth area is to occur beyond the southeast corporate limit. Diverging growth toward the southeast mitigates development in the 100-year floodplain; however development would still be impacted by storm surge.

A portion of Vienna's projected 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.

The Town of Secretary is proposing their growth areas to extend the municipal boundaries to the east. The Warwick River borders the eastern municipal boundary; therefore, by developing to the west, new structures will not be affected by the 100-year floodplain nor the storm surge areas.

The future growth boundaries for the Town of East New Market are proposed south of the municipal border. This would not be a concern considering the neither the100-year floodplain or the storm surge areas occur near the Town.

The project 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.

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 US Census' 2000 and 2010 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 not occur within these Towns.

Chapter 3 Planning Process

Hazard Mitigation Plan

Reason for Plan

In response to continuing large-scale federal outlays of disaster funds to states and communities during the decade of 1990, Congress passed the Disaster Mitigation Act of 2000. Section 322 of this Act requires that all states and local jurisdictions develop and submit Mitigation Plans designed to meet the criteria set forth in 44 CFR Part 201- Hazard Mitigation Planning. Beginning in 2002, states were provided funding under this act to carry out the planning process.

Additional funding is being made available to counties to develop Hazard Mitigation Plans for local communities. Each incorporated community has the option of joining its county government in the preparation of this plan. As an incentive for State and local governments to develop hazard mitigation plans, the federal government requires mitigation planning as a condition of eligibility for hazard mitigation project funding. This requirement reinforces the importance of proactive mitigation planning and emphasizes planning for disasters before they occur. The *2015 Hazard Mitigation Assistance Unified Guidance,* produced by the Federal Emergency Management Agency (FEMA), states that mitigation plans are the foundation for effective hazard mitigation. As such, local jurisdictions must have a FEMA-approved local hazard mitigation plan at the time of obligation of grant funds in order to be eligible for grant funding under the unified Hazard Mitigation Assistance (HMA) programs.

Plan Requirements

Local Mitigation Plans follow a planning methodology that includes public involvement, a risk assessment for various hazards, an inventory of critical facilities and other at-risk structures, a mitigation strategy for high risk hazards, and a method to maintain and update the Plan. Therefore, the requirements of a local hazard mitigation plan include the development of a hazard identification and risk assessment which leads to the development of a comprehensive mitigation planning strategy for reducing risks to life and property. Additionally, the mitigation strategy section identifies a range of specific mitigation actions and projects that reduce the risks to new and existing buildings and infrastructure. The mitigation strategy also includes an action plan describing how identified mitigation activities will be prioritized, implemented, and administered.

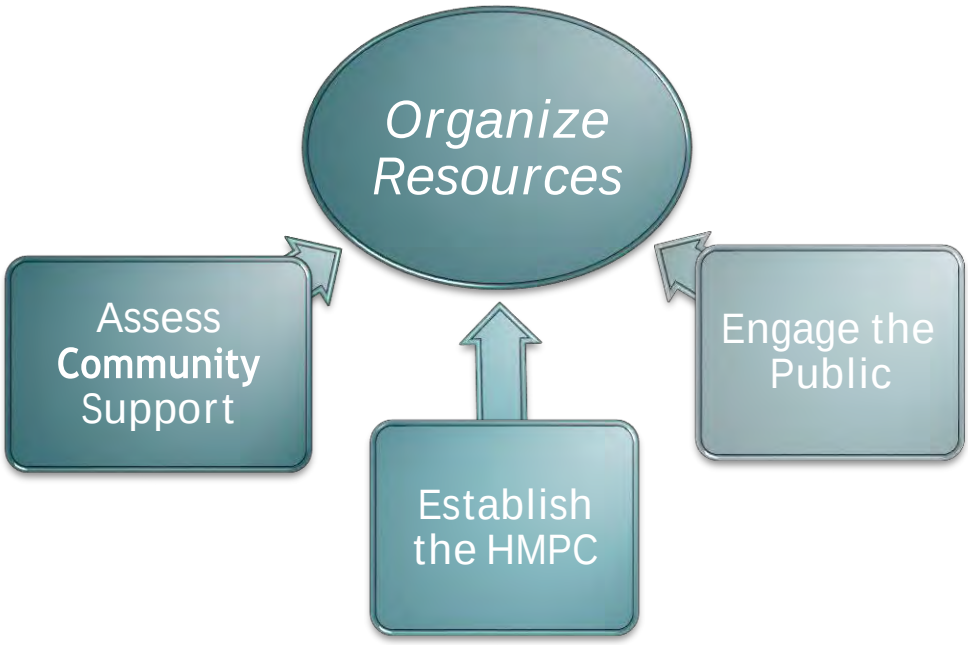
Plan Process

In order to satisfy the Plan Requirements, four basis steps were utilized: **Organize Resources**, **Assess Risks**, **Review the Plan and Plan Revisions**, and **Implement the Plan and Monitor Progress**.

Organize Resources

The first step, Organizing Resources, requires the County to organize their resources, which will ensure adequate technical assistance and expertise to form a planning committee. As a result, Dorchester County developed a Hazard Mitigation Planning Committee (HMPC), which was formed in July 2016 and composed of representatives from various County and municipal agencies, including Emergency Services, Planning, Public Works, GIS, Health, Emergency Medical Services, Utilities, Roads, Fire and Police, and Education. Additionally, community organizations were invited to participate in the planning process, resulting in representatives from the Fire Chiefs Committee, Dorchester Erosion Group and the Eastern Shore Land Conservancy being included within the HMPC. The Dorchester County Department of Emergency Services was the lead agency for the Plan update process and technical support was provided by Smith Planning and Design.

Figure 7



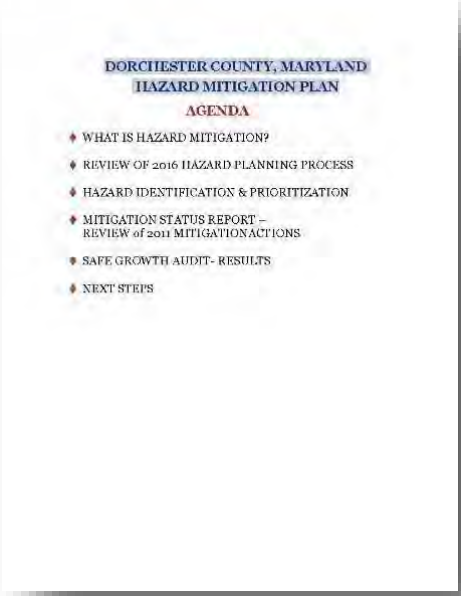
Thus the Hazard Mitigation Planning Committee (HMPC) was tasked with assisting in the completion of the Plan update. The following listing includes the members of the committee and the agencies they represent:

Table 5

Hazard Mitigation Planning Committee Members

Member Name	Agency/Department
Steve Garvin	Dorchester Emergency Services – Emergency Management Coordinator
Anna Sierra	Dorchester Emergency Services – Director
Sandra Tripp-Jones	City of Cambridge – City Manager
Odie Wheeler	City of Cambridge – Public Works Director
Joyce Spratt	Mayor Town of Hurlock
John Avery	Town of Hurlock – Town Manager
Bob Phillips	City of Cambridge – Public Works
Tom Moore	Dorchester Public Works – Director
Steve Dodd	Dorchester Planning & Zoning – Director
AmandaFenstermaker	Dorchester Tourism – Director
Katie Clendaniel	Dorchester Tourism
Chris Hauge	Board of Education
Ron Marvil Jr.	Chair of Dorchester Fire Chiefs Committee
Bruce Coulson	Dorchester Erosion Group
Brice Strang	Dorchester County Health Department
Jeremy Goldman	Dorchester County Manager
Brian Ambrette	Eastern Shore Land Conservancy
Mark James	MEMA
Bill Carroll	MEMA

Source: 2016 Hazard Mitigation Planning Committee


DORCHESTER COUNTY, MARYLAND
HAZARD MITIGATION PLAN
AGENDA
- WHAT IS HAZARD MITIGATION?
- REVIEW OF 2016 HAZARD PLANNING PROCESS
- HAZARD IDENTIFICATION & PRIORITIZATION
- MITIGATION STATUS REPORT – REVIEW of 2011 MITIGATION ACTIONS
- SAFE GROWTH AUDIT- RESULTS
- NEXT STEPS

Additionally, in order to develop the Hazard Mitigation Plan, a data collection effort was conducted. During the kick-off meeting, various data sources were identified and pertinent information pertaining to natural hazards including past occurrences, projected frequencies of future occurrence/the anticipated risk where available, and inventory information, specifically new information from 2011 to present were discussed. Immediately following the kick-off meeting, policy and regulatory information from each of the communities and the County was collected. This included comprehensive plans including the new water resources elements and municipal growth elements, as well as zoning ordinances, development ordinances, and building codes and other relevant documents.

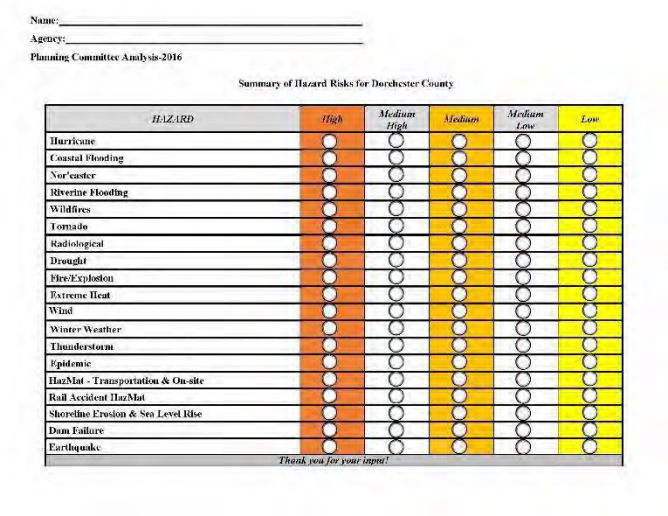
Information was collected from public works, planning, emergency management, and GIS departments. Additionally, each municipality was asked to complete the following forms: Hazard Identification Risk

Assessment, Permit Data, Capability Assessment, and Local Repetitive Flood Locations. Furthermore, data and information from several State and Federal agencies was obtained including the Maryland Emergency Management Agency, Maryland Department of Natural Resources, the Federal Emergency Management Agency, Maryland Department of the Environment, and the U.S. Army Corps of Engineers. A listing of resources gathered and utilized throughout the Plan can be found in *Appendix E: Sources*.

Assess Risks

The next step in the planning process was to Assess Risks, which involved identifying, and profiling hazards as well as assessing the County's vulnerability to each hazard. The HMPC analyzed the County's greatest hazard threats and determined its most significant vulnerabilities. At the Hazard Mitigation Planning Committee kick-off meeting, 13 July 2016, an overview of the hazards identified and profiled in the *2011 Dorchester County Multi-Hazard Mitigation Plan* and the *2015 Maryland Local Hazard Mitigation Plan Guidance* was presented to the Committee. During the meeting, the HMPC reviewed the list of identified hazards, and were given an opportunity to discuss hazard prioritization for the 2016 Plan. The Committee decided that hazard ranking Adobe fillable worksheets would be distributed to HMPC members and all municipalities. Results were complied, tabulated and presented at the second Hazard Mitigation Planning Committee meeting held on 10 August 2016. Additional agenda items for the second HMPC meeting included:

- Draft Section 1: Chapters 1-3;
- 2016 Critical and Public Facilities Listing;
- Risk and Vulnerability Assessment;
- Mitigation Status Report; and
- RL & SRL Property Listing.



Name:_____

Agency:_____

Planning Committee Analysis-2016

Summary of Hazard Risks for Dorchester County

HAZARD	High	Medium High	Medium	Medium Low	Low
Hurricane					
Coastal Flooding					
Nor'easter					
Riverine Flooding					
Wildfires					
Tornado					
Radiological					
Drought					
Fire/Explosion					
Extreme Heat					
Wind					
Winter Weather					
Thunderstorm					
Epidemic					
HazMat - Transportation & On-site					
Rail Accident HazMat					
Shoreline Erosion & Sea Level Rise					
Dam Failure					
Earthquake					

Thank you for your input!

Review of the Plan & Plan Revisions

The next step was to assess the current mitigation capabilities of Dorchester County and its municipalities. A Capability Assessment and Safe Growth Audit was provided to the HMPC during the kick-off meeting and distributed to all municipalities in order to obtain information on the existing programs and policies in the County and municipalities' ordinances that address natural hazards. The Committee reviewed the

Mitigation Capability Assessment Matrix which is included within Appendix C. During the third HMPC meeting, September 7, 2016, the Committee also worked to identify mitigation strategies for countywide mitigation efforts, which represent the County and municipal perspectives for disaster resistance and resiliency. Following the third meeting, the HMPC members were asked to review new mitigation strategy implementation worksheets and prioritize using the standard ranking method.

HMPC meetings were scheduled to coincide with key phases of the planning process. The first meeting was introductory in nature, to explain the overall process being used in developing the plan. This meeting also allowed committee members to review hazards and their impacts to the County. The second meeting was designed to review and discuss hazard rankings, hazard profiles and provide an updated status of the 2011 mitigation actions. The third meeting included a further review of the vulnerability of various critical and public facilities in the County and allowed each HMPC member to participant in the development of mitigation actions that the County may undertake to lessen the impacts from each hazard. Through the HMPC meetings, development of an effective and current Countywide Hazard Mitigation Plan was achievable.

Implement the Plan & Monitor Progress

The County will implement the Plan and continue to perform periodic reviews and revisions to the Plan through on-going Hazard Mitigation Planning Committee meetings. The Committee will be entrusted with the responsibility to meet annually to review the plan and also hold public meetings to solicit citizen input.

Municipal Participation

The nine county municipalities, which all participated in the previous planning process, were invited again to participate in the update planning process and have their mitigation concerns made part of the County Plan. These municipalities include: Cambridge, Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary and Vienna. Data collection and municipal input was sought throughout the planning process. Municipalities were invited to various HMPC meetings and municipal outreach packets were distributed digitally and hard copy to all municipalities.

Public Participation & Plan Adoption

Public meetings coincided with the plan adoption process for the draft Hazard Mitigation Plan. During the open Council work session, a PowerPoint Presentation detailing the

planning process and the overall involvement of the HMPC was presented. Additionally, specific steps that the community could take in order to become more disaster resistant and resilient were discussed. Citizens were encouraged to provide comments. Following the work session, a public review and comment period took place. Finally, a public hearing was held in which the formal adoption of the plan occurred with a unanimous vote by County Council. The minutes from both meetings are provided in Appendix F: Public Meeting Minutes.

Media announcements advertising the public meetings were provided via local newspapers and the County website. An overview of the planning process and the mitigation measures being considered were included. Additionally, the website for the Department of Emergency Services stated that a copy of the draft Plan may be obtained at the Dorchester County Department of Emergency Services' main office on Fieldcrest Drive or the Dorchester County Council Office on Court Lane. These advertisements for the Public Hearings can also be found within Appendix F: Public Meeting Minutes.

Organization of the Plan

The *2017 Dorchester County Hazard Mitigation Plan* is comprised of three sections: *Section 1 Introduction*, *Section 2 Hazard Analysis*, and *Section 3 Mitigation Strategies*. Each section is comprised of Chapters that specifically corresponds to that particular Section. Section 1 includes *Chapter 1 Introduction*, *Chapter 2 County Profile* and *Chapter 3 Planning Process*. Section 2 provides specific information, such as Hazard Identification and Ranking, Hazard Profiles, Vulnerability Analysis and Loss Estimations, on each identified hazard and is composed of Chapters 4-11. Section 3 is comprised of Chapters 12-15 with Chapter 12 detailing the Goals and Objectives of the Plan. Chapter 13 lists Mitigation Actions that address the goals and objectives. Chapter 14 provides the Plan Integration. Finally, Chapter 15 provides the Plan Maintenance and Implementation Plan summary. An appendix including information from the meetings, data methodology, critical and public facilities and a detailed description potential funding sources. In addition, a new appendix, NFIP & CRS, was developed during the 2017 Plan update process.

Section 2 Hazard Analysis

2017 Dorchester County Hazard Mitigation Plan Update

Chapter 4 Hazard Identification

Introduction

Four major steps are required to revise and update the Hazard Mitigation Plan. The four major steps are: **Hazard Identification**, **Hazard Profiles**, **Vulnerability Assessment**, and **Loss Estimations**. In this chapter, hazards that may affect Dorchester County are identified.

Step 1- Hazard Identification

The first step in the Plan update process for Dorchester County involves the identification of various hazards and the risk associated with each hazard. The hazard identification process for Dorchester County involved investigating various types of natural hazards experienced by the County over the past several decades including new information collected since the adoption of the last Plan (2011-Present). The State Perspective was reviewed by the Hazard Mitigation Planning Committee (HMPC) as well as the hazards identified in the 2011 Plan. Upon completion of the hazard identification process, the 2016 HMPC rated each hazard according to their perspective.

State Perspective

The *2017 Dorchester County Hazard Mitigation Plan* utilized information from the *2016 Maryland Hazard Mitigation Plan*. The following hazards were updated and added to the listing: Coastal, Drought, Flood, Thunderstorm, Tornado, Wildfire, Wind, and Winter Storm.

Table 6

Summary of Risk for Dorchester County, MD Maryland Hazard Mitigation Plan, 2016					
HAZARD	High	Medium High	Medium	Medium Low	Low
Coastal Hazard:	X				
Hurricane					
Tropical Storm & Depression					
Nor'easter					
Sea-Level Rise					
Shoreline Erosion					
Drought			X		
Flood:		X			
Riverine					
Coastal					
Thunderstorm:			X		
Hail					
Lightning					
Tornado			X		
Wildfire/Brush Fire			X		
Wind		X			
Winter Storm			X		

Source: 2016 Hazard Mitigation Planning Committee

According to the *2016 Maryland Hazard Mitigation Plan*, Dorchester County ranked "High" for the risk of Coastal Hazards; and "Medium High" for the risk of Flood and Wind. The County ranked "Medium" for the risk of Drought, Thunderstorm, Tornado, Wildfire, and Winter Storm.

HMPC Perspective

During the preparation of the County's Hazard Mitigation Plan, one of the first steps taken by the Hazard Mitigation Planning Committee (HMPC) was to perform a Risk Assessment exercise. During this assessment, conducted on 13 July 2016, Hurricane, Nor'easter, Coastal Flooding and Shoreline and Sea Level Rise were rated as having the highest risks, while Riverine Flooding, Winter Weather, Wind, Thunderstorm, and Extreme Heat were rated as "Medium-High" risks. The HMPC rated Drought, Tornado, Radiological, Wildfires, and Fire/Explosion as "Medium" risks. Epidemics and Hazardous Material Incident – Transportation & On-site were rated as a "Medium-Low" risk and Rail Accident Hazmat, Dam Failure, and Earthquake were rated as "Low" risks.

Table 7

Dorchester County Hazard Mitigation Planning Committee Risk Analysis, 2016

HAZARD	High	Medium High	Medium	Medium Low	Low
Hurricane	X				
Nor'easter	X				
Coastal Flooding	X				
Shoreline & Sea Level Rise	X				
Riverine Flooding		X			
Winter Weather		X			
Wind		X			
Drought			X		
Tornado			X		
Radiological			X		
Thunderstorm/Hail		X			
Epidemics				X	
Wildfires			X		
Hazardous Material Incident Transportation & On-site				X	
Extreme Heat		X			
Rail Accident Hazmat					X
Fire/Explosion			X		
Dam Failure					X
Earthquake					X

Source: 2016 Hazard Mitigation Planning Committee

Municipal Perspective

The following municipal perspectives on hazard identification and ranking differed from the hazard identification and ranking completed by the overall HMPC.

Table 8

Municipal Perspective

Municipality / HAZARD	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
Hurricane		H		L		MH	M		
Nor'easter		H		L		ML	M		
Coastal Flooding		H		L		M	L		
Shoreline & Sea Level Rise		H		L		L	L		
Riverine Flooding		H		L		ML	L		
Winter Weather		H		M		MH	MH		
Wind		MH		M		M	MH		

Municipality / HAZARD	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
Drought		L		M		ML	M		
Tornado		M		M		M	M		
Radiological		M		ML		L	L		
Thunderstorm/ Hail		M		MH		MH	MH		
Epidemics		L		L		ML	L		
Wildfires		L		ML		M	L		
Hazardous Material Incident Transportation & On-site		ML		M		L	MH		
Extreme Heat		MH		MH		M	M		
Rail Accident Hazmat		L		M		L	MH		
Fire/Explosion		M		M		M	M		
Dam Failure		L		L		MH	L		
Earthquake		L		L		M	M		

Source: 2016 Hazard Mitigation Planning Committee

Steps 2-4

Chapters 5-11 cover the three remaining steps in the Risk Assessment for each hazard identified by the Hazard Mitigation Planning Committee (HMPC), wherein Step 2 discusses the nature of the hazard, history of previous occurrences, and the impact, including potential severity of an occurrence. Steps 3 and 4 of the Risk Assessment, Vulnerability Assessment and Loss Estimations, will also be discussed in each identified hazard chapter.

In Step 2 it is assumed that hazards experienced by the County in the past may be experienced in the future, therefore identified hazard profiles include a history for each hazard and their occurrences. Information of past hazards was based on history and research from historical documents and newspapers, specifically Dorchester County's main newspaper, the Star Democrat; County plans and reports; 2016 Hazard Mitigation Planning Committee Members, and Internet websites. Data and maps that were available online included sources such as the United States Geological Survey (USGS) and the National Weather Service.

Table 9

Composite Score			
	Event / Rating	*Impact*	*Composite*
Coastal Hazards:	3	5	8
Coastal Flooding			
Nor'easter			
Shoreline & Sea Level Rise			
Riverine Flooding	4	3	7
Winter Weather	4	3	7
Thunderstorm:	2	3	5
Lightning			
Hail			
Tornado	1	5	6
Wind	5	1	6
Extreme Heat	1	3	4
Drought	1	3	4
Wildfires/Brush Fires	5	3	8
Radiological	1	5	6
Hazardous			
Material Incident Transportation & On-	3	3	6
Fire/Explosion	3	1	4
Rail Accident	1	1	2
Dam Failure	1	3	4
Epidemics	1	1	2
Earthquake	1	1	2
*Impact for DC			

The information obtained within **Step 2 – Hazard Profiles**, frequency and probability of future events, their impact, analyzed. This assessment of probability and impact results in the determination of a composite risk score for each hazard identified, as shown on the table below.

Events/Year Risk Rating * Events/Year Risk Rating

The events per year risk rating were determined by calculating the average number of occurrences per year and assigning the corresponding risk rating as follows:

0-0.49 events per year = 1
0.5-0.99 events per year = 2

1.5-1.99 events per year = 4
2.0 + events per year = 5

Impact Rating

The impact rating was determined by the potential damage and losses that would result from each hazard

1 = Low Impact
3 = Medium Impact
5 = High Impact

****Composite Scores:***
7-10 High; 5-6 Medium; 1-4 Low

Source: 2016 Hazard Mitigation Planning Committee

Based on the hazard history and profiles of the aforementioned hazards, they have been ranked as low, medium, or high priority. The hazards that have a high frequency of occurrence and have caused significant damage to the area will be assessed in the following chapters for their vulnerability.

Chapter 5 Critical & Public Facilities

Critical & Public Facilities

In order to assess the current vulnerability of the community, an inventory of critical and public facilities in the County was performed. Critical and public facilities are those facilities that warrant special attention in preparing for a disaster and/or are of vital importance in maintaining the functioning of the community.

During the 2017 Plan Update process, the 2011 Critical and Public Facility database was reviewed and updated by the Hazard Mitigation Planning Committee (HMPC). Updated GIS data was obtained from Gary Baxter, Dorchester County Planning and Zoning and Maryland Property View. Changes since the 2011 Plan were incorporated into the updated listing. Additional attribute columns were added and included:

- Designated between Critical and Public Facility Type;
- Flood Depth; and
- Facilities built in 1965 or prior.

This database was used throughout the various hazard vulnerability analysis sections within the Plan.

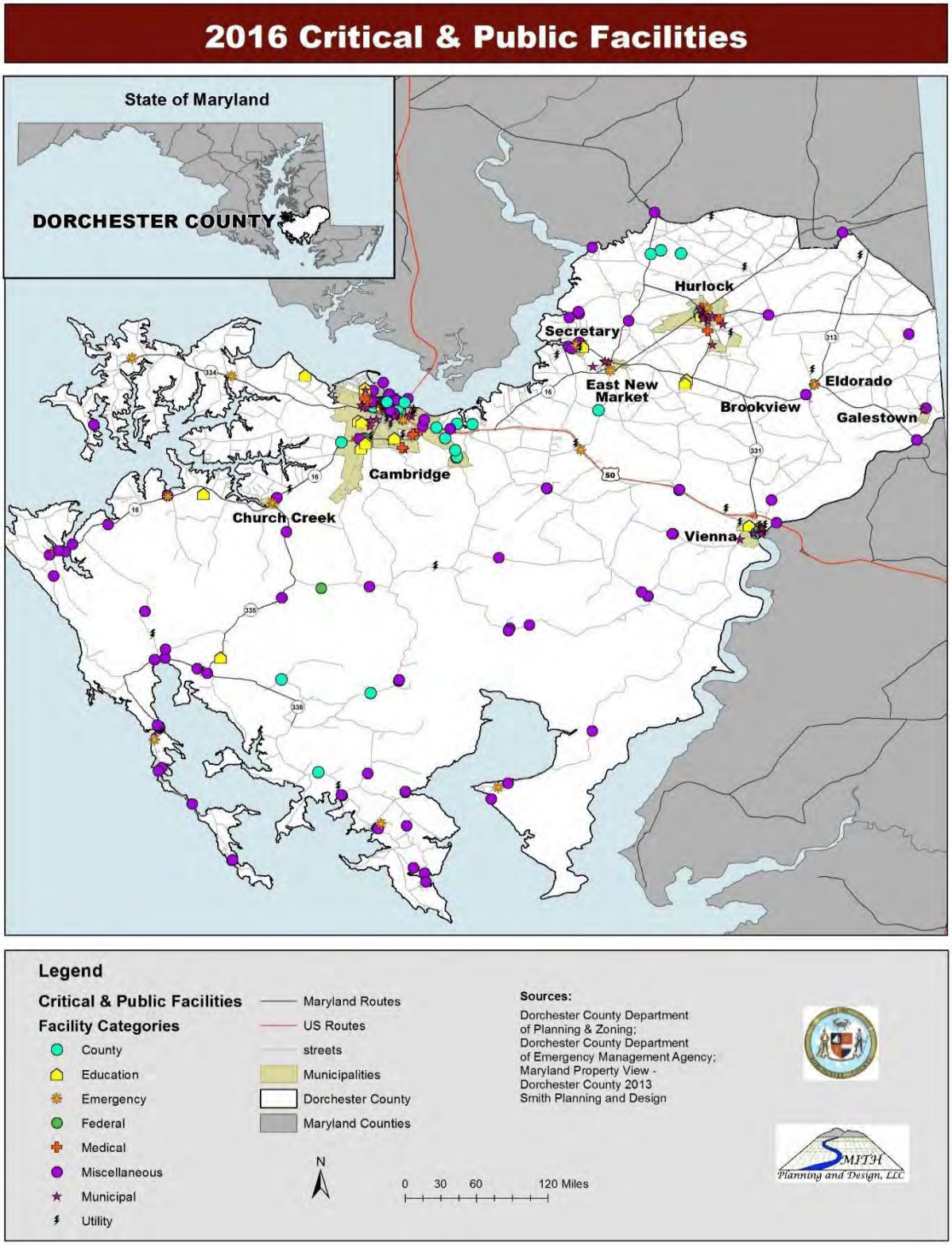
The inventory of critical and public facilities for the *2017 Dorchester County Hazard Mitigation Plan* includes:

Table 10

Critical and Public Facilities Descriptions		
Facility Category	*Facility Types*	*Number of Facility*
County	Airport	4
	County Government	24
Education	Public & Private Schools	17
	College	2
Emergency	Fire Department	15
	EOC	1
	Police Station	3
	EMS Station	4
Medical	Nursing Home	2
	Hospital Medical	3
		13
Miscellaneous	Marina/Dock	19
	Boat Ramp	18
	Museum	4
	Community Center	3
	Park	4
	Transportation	1
	Bridge	44
Municipal	Municipal Government	61
	Library	2
Utility	Utility	26
	Communication	6

Source: Smith Planning and Design and 2016 Hazard Mitigation Planning Committee

Map 4


2016 Critical & Public Facilities
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Maryland Routes
US Routes
streets
Municipalities
Dorchester County
Maryland Counties
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
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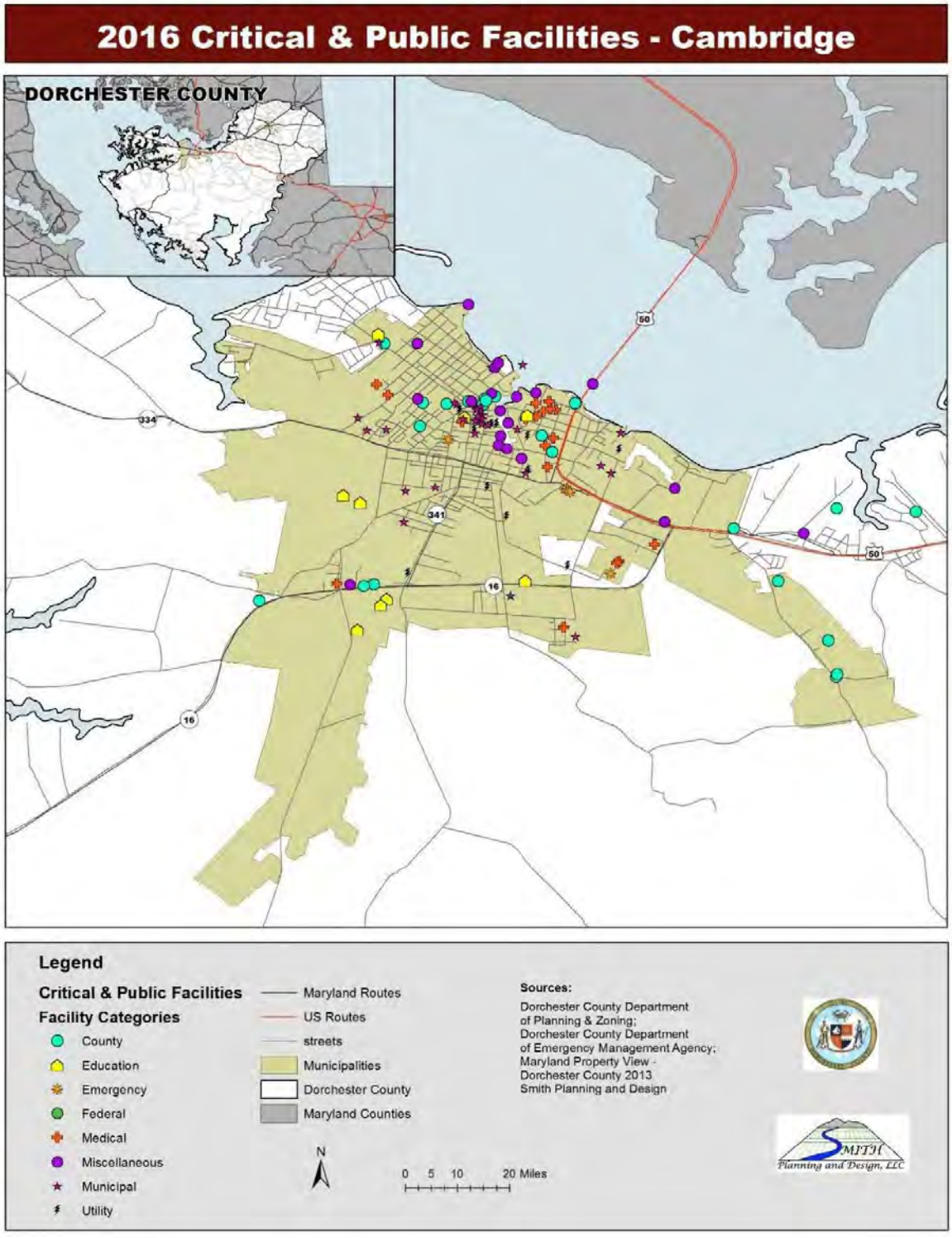
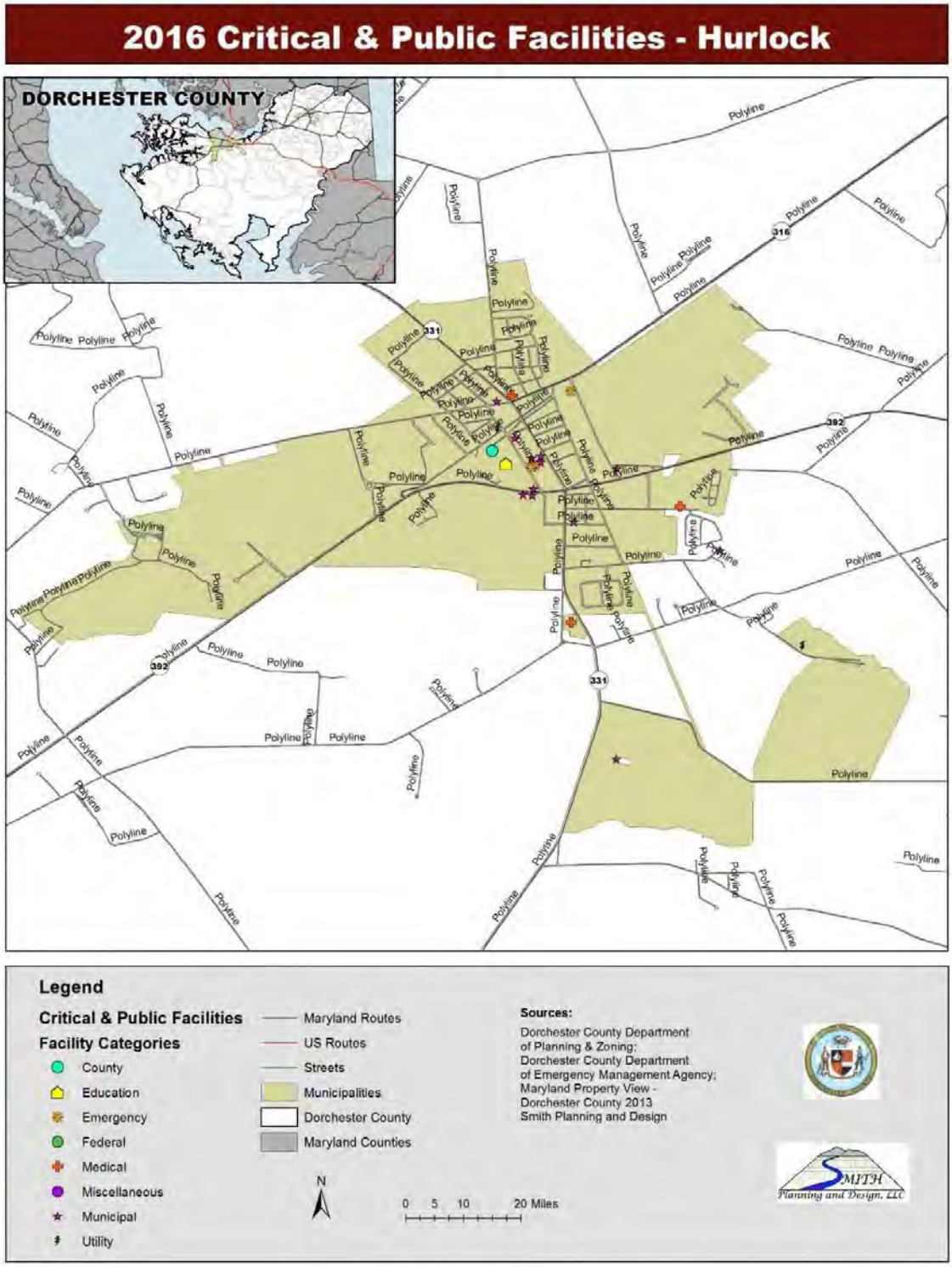
SMITH
Planning and Design, LLC

Map 5


2016 Critical & Public Facilities - Cambridge
DORCHESTER COUNTY
50
334
341
16
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Maryland Routes
US Routes
streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
SMITH
Planning and Design, LLC

Map 6


2016 Critical & Public Facilities - Hurlock
DORCHESTER COUNTY
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
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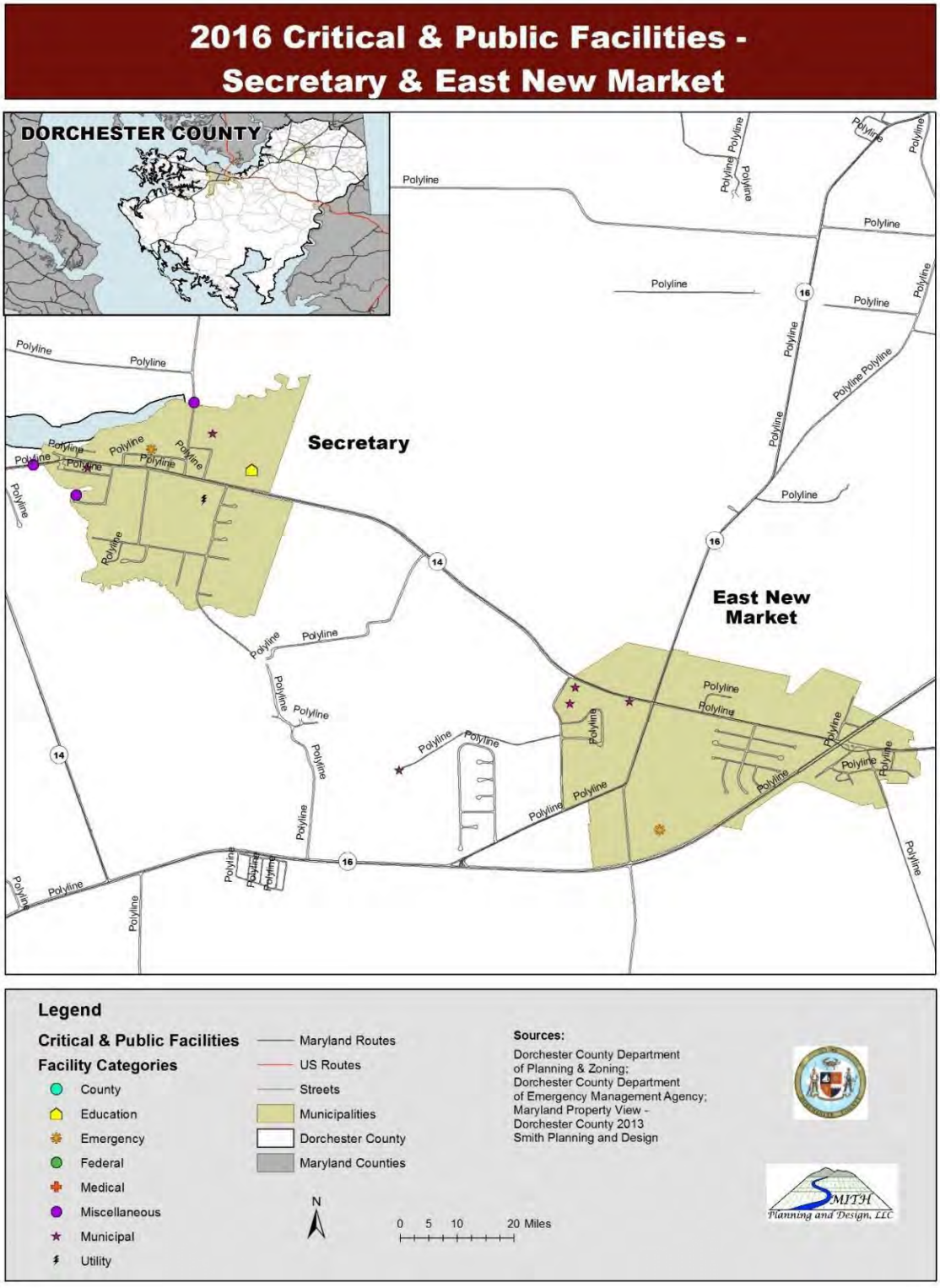
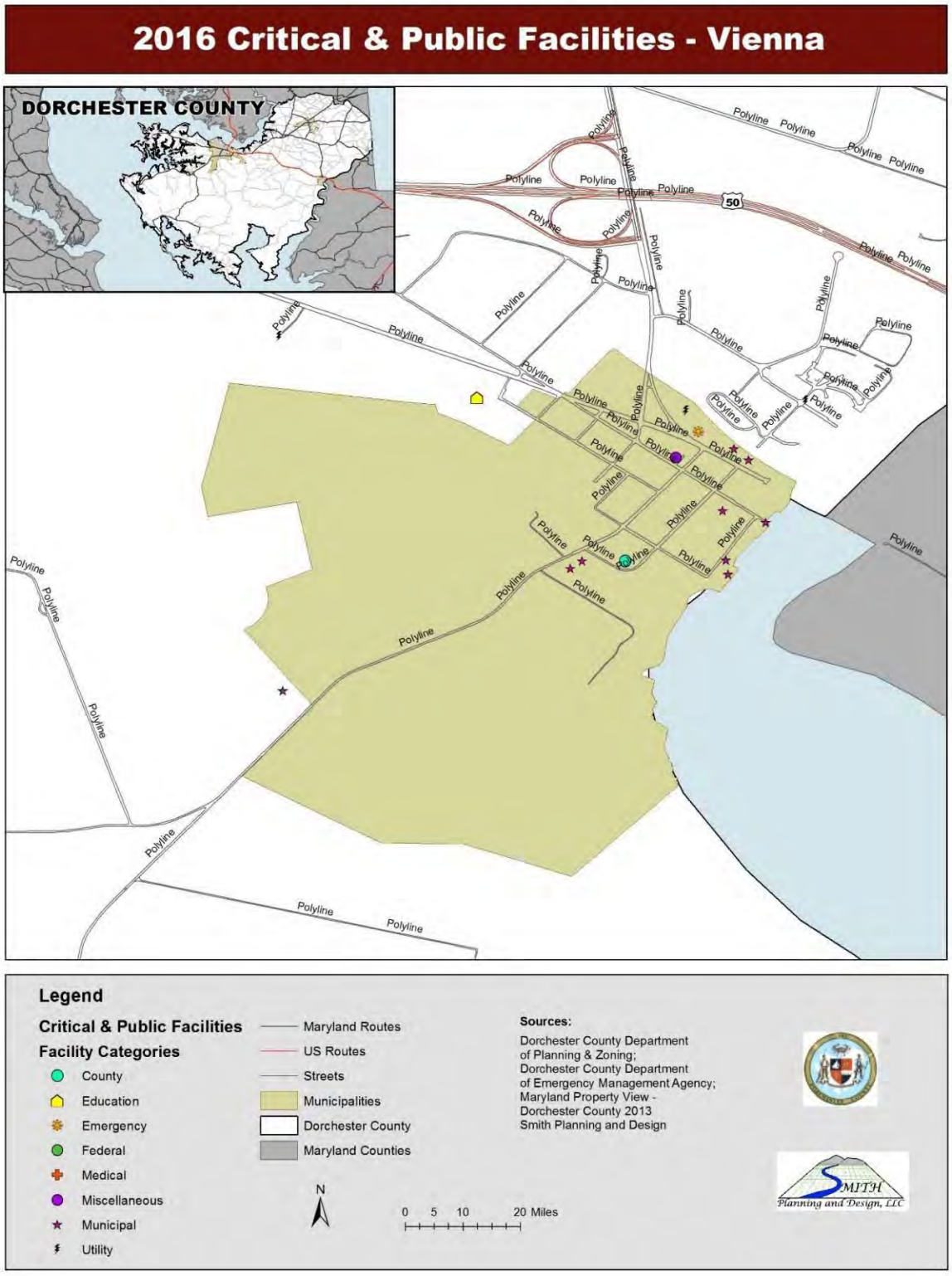
SMITH Planning and Design, LLC

Map 7


2016 Critical & Public Facilities -
Secretary & East New Market
DORCHESTER COUNTY
Secretary
East New Market
Polyline
14
16
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
SMITH
Planning and Design, LLC

Map 8


2016 Critical & Public Facilities - Vienna
DORCHESTER COUNTY
50
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
SMITH
Planning and Design, LLC

Chapter 6 Coastal Events

Hurricane & Nor'easter

Profile

According to Strahler's Physical Geography text, a hurricane is essentially a tropical cyclone which develops over oceans in latitudes between 8 and 15 degrees North and South of the equator where the water temperature is normally over 80 degrees Fahrenheit. Warming of the air at low levels creates instability, and along with an easterly "wave" creates a deep circular low pressure area. Once formed, the storm moves north and west in the northern hemisphere. The diameter of a hurricane may be 100-300 miles with wind velocities greater than 73 miles per hour and the barometric pressure in the center or "eye" of the storm commonly falling to 965 mb or lower.

Hurricanes, tropical storms, and tropical depressions are all examples of tropical cyclones. Their categories and associated characteristics are as follows:

- **Hurricane:** maximum sustained surface wind speed exceeds 73 mph;
- **Tropical Storm:** maximum sustained surface wind speed from 39-73 mph;
- **Tropical Depression:** maximum sustained wind speed is less than 38 mph.

Hurricanes are rated by intensity using the Saffir-Simpson Hurricane Wind Scale, which gives an estimate of the potential damage that a hurricane may cause based on wind speed and surface pressure.

Category 1 Hurricanes and/or tropical storms are most likely to impact Maryland. These storms tend to lose their intensity as they travel from their point of origin up the Atlantic coastline. More often than not these storm events are downgraded by the time they reach Maryland.

Table 11

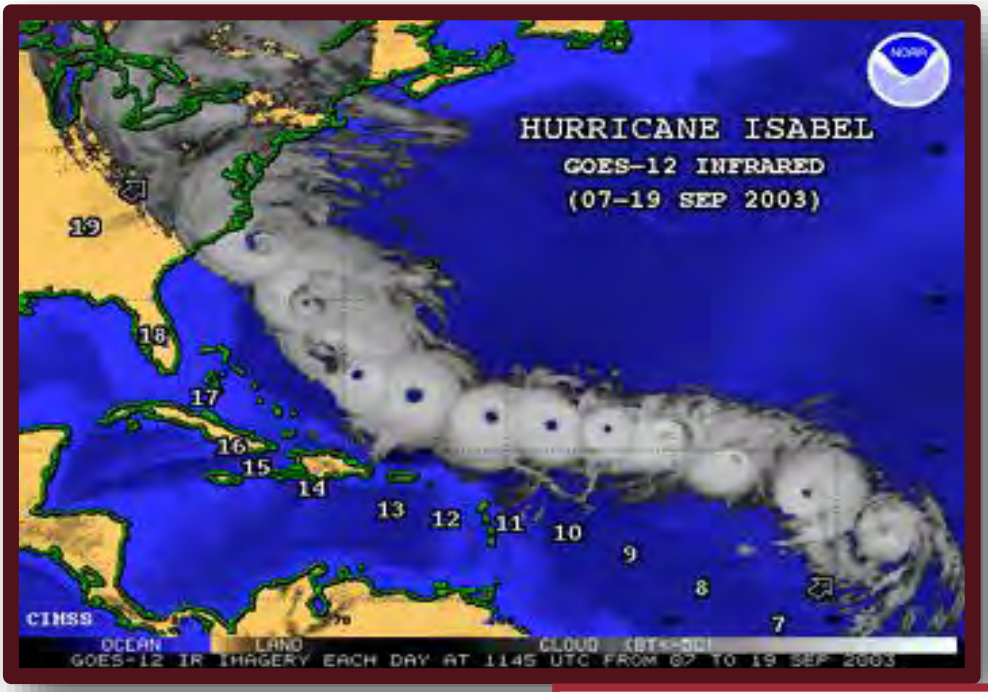
Saffir-Simpson Hurricane Wind Scale

Category Wind Speed	*Effects*
Category 1-Weak 74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, and vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
Category 2-Moderate 96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
Category 3-Major 111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
Category 4-Major 130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possible months. Most of the area will be uninhabitable for weeks or months.
Category 5-Major >157 mph	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months

Source: National Hurricane Center, 2012

Dorchester County has been affected over the years by the passage of hurricanes, including an unnamed hurricane in 1933, Hurricane Hazel in 1954, Hurricane Isabel in 2003, and most recently, Hurricane Irene in 2011. As shown on Map 9, hurricanes can affect Dorchester County from either the Gulf of Mexico or the Atlantic. Normally the greatest damage results from hurricanes that come ashore in the tidewater area of Virginia or the Carolina Capes as was the case with Hurricane Isabel.

Figure 8



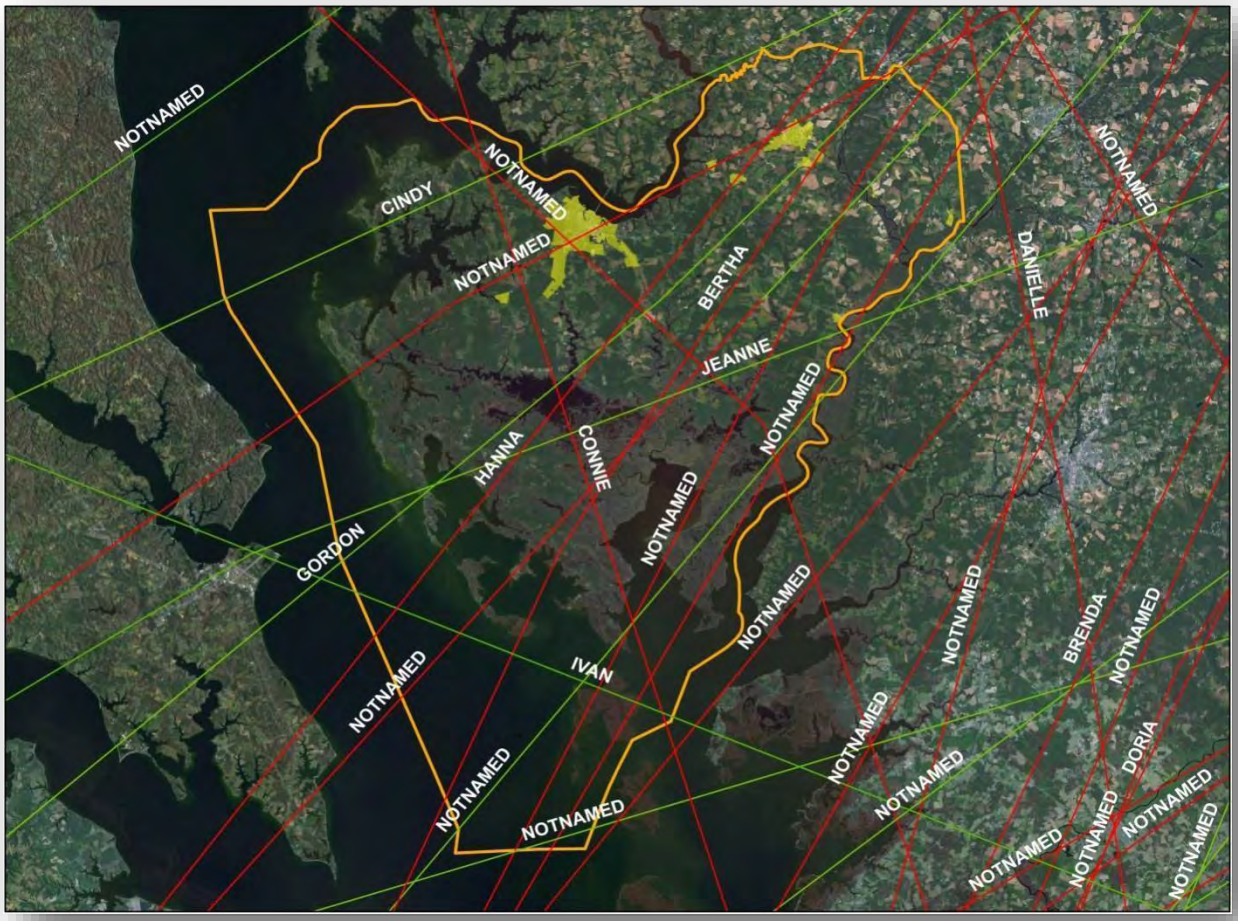
A montage of Hurricane Isabel was created with infrared images from the GOES-12 at 11:45 UTC from each of the thirteen days, September 7–19, 2003. The sequence shows the evolution and track of Hurricane Isabel in one figure.
Source: Gary Wade, NOAA, at SSEC

According to the *City of Cambridge 2011 Comprehensive Plan*, with a Category 4 Hurricane, storm surge flooding may cover most of the Cambridge area extending south of the diagonal line connecting Jenkins Creek in the northwest to the Woods Road/MD Route 16 intersection in the southeast. The storm surge associated with a Category 3 Hurricane would cover less area but still inundate parts of the MD Route 16 corridor, including the Cambridge-South Dorchester High School. For Cambridge, storm surge flooding associated with smaller storm events is limited to the riparian areas and their

associated tributary drainage ways. However, storm surge inundation extends beyond standard floodplains within the City of Cambridge.

Map 9

Hurricane/Tropical Storm Tracks: 1851-2009



Source: Smith Planning and Design and

In terms of number of occurrences, the National Weather Service (NWS), National Center for Environmental Information (NCEI) listed a total of eight (8) hurricane and tropical storm events affecting Dorchester County from 1996-2016. Therefore, Dorchester County experiences 0.38 hurricane and/or tropical storm events per year.

Table 12

Historical Hurricane Events				
Storm Event	*Date*	*Narrative*	*Property Damage*	*Crop Damage*
Hurricane Bertha	July 13, 1996	One confirmed tornado was spawned by the hurricane near Madison in Dorchester county. Numerous trees and power lines blown down resulted in scattered property damage and power outages. Rainfall amounts generally ranged from 3.0 to 5.0 inches and caused some street flooding.	$100,000	$15,000
Hurricane Fran	September 6, 1996	A storm surge of 4 to 6 feet inundated portions of the communities of Taylors Island, Hoopers Island, and Madison in Dorchester county along the Chesapeake Bay. Many roads were flooded with some homes receiving water damage at the time of high tide. Dorchester county officials reported approximately $925,000 in damage from Fran. Many roads were flooded with some homes receiving water damage at the time of high tide. In some locations, nearly 10 feet of shore was lost due to surge effects.	$1 Million	Not Available
Tropical Storm Josephine	October 8, 1996	1.5 to 3.5 inches of rain resulting in flooding of several roads. Several trees and power lines were blown down resulting in some minor structural damage and scattered power outages.	$100,000	Not Available
Hurricane Floyd	September 15 to September 16, 1999	Storm surge flooding of 5 to 7 feet occurred over central portions of the Chesapeake Bay inundating sections of Dorchester and Somerset counties. Few trees and power lines were blown down across the Lower Maryland Eastern Shore resulting in scattered power outages. Rainfall amounts generally ranged from 3 to 6 inches across much of the Lower Maryland Eastern Shore and caused some crop damage and street flooding.	$278,000	$575,000
Tropical Storm Isabel	September 18 to September 19, 2003	The highest gusts recorded were 62 mph at Hurlock in Dorchester county. The lowest sea level pressure recorded was 1003 mb at Cambridge Maryland. The wind uprooted many thousands of trees, downed many power lines, damaged hundreds of houses, and snapped thousands of telephone poles and cross arms. Hundreds of roads, including major highways, were blocked by fallen trees. Local power companies reported many thousands of customers were without power. Rainfall amounts ranged from 1 to 3 inches across the Lower Maryland Eastern Shore.	$2.5 Million	Not Available
Tropical Storm Hanna	September 6, 2008	Few trees were downed. Rainfall amount of 2.32 inches was recorded about three miles north of Vienna. Storm total rainfall ranged from around 1 to 3 inches. Coastal storm tides of 1 to 3 feet above astronomical tide levels were common, with only minor beach erosion reported. Storm winds knocked down several trees and power lines, as well as caused minor structural damage. No fatalities or injuries were attributed to the winds.	$5,000	Not Available

Hurricane Irene	August 27 to August 28, 2011	Tropical storm force winds knocked down several trees and power lines, as well as caused some substantial property damage. In addition, heavy rains contributed to significant crop damage. The highest sustained wind of 37 knots (43 mph) with a peak gust of 52 knots (60 mph) was recorded at Cambridge Marine site. A peak gust of 44 knots (51 mph) was recorded at CGE (Cambridge Airport). Storm total rainfall generally ranged from six to eleven inches.	$100,000	$500,000
Tropical Storm Hermine	September 2 to September 5, 2016	Rain bands associated with Tropical Storm Hermine produced generally 0.25 inch to 1 inch of rainfall across the county. Cambridge (1.4 WNW) reported 0.87 inch of rain. Vienna (5 WNW) reported 0.83 inch of rain. East New Market reported. 0.26 inch of rain. Wind gust of 34 knots was measured at Cambridge. Coastal storm tides of 1 to 1.5 feet above astronomical tide levels were common, with only minor beach erosion reported. The maximum storm tide reached 3.45 feet MLLW at Cambridge, which resulted in minor coastal flooding early Monday morning. The maximum storm tide reached 3.53 feet MLLW at Bishops Head, which resulted in minor coastal flooding Sunday afternoon into early Sunday evening.		

SOURCE: NWS, NCEI (NOAA

In addition to hurricane events, Dorchester County has been impacted by Nor'easter and coastal flood events. Nor'easters, which are named for the strong northeast winds they produce, are an extra tropical storm occurring during the late fall to early spring period affecting the east coast. For a Nor'easter to occur in Maryland, an arctic air mass, a high pressure that builds over New England and flows south, has to occur. This dense cold air is unable to move west over the Appalachian Mountains, therefore, it funnels south down the valleys and along the Coastal Plain. The intense winds around the Nor'easter's center builds large waves that thrash against the coastlines and force water inland causing coastal flooding and shoreline erosion. A Nor'easter differs from a hurricane since hurricanes usually come and go within one tide cycle. The nor'easter can linger through several tides, with each tide delivering more water on shore, dragging sand away from the beaches and depositing it into the Bay.

Table 13

*Historical **Nor'easter** & Coastal Flooding Events*			
Location	*Date*	*Event Narrative*	*Property Damage*
Cambridge	January 27 to January 28, 1998	A Nor'easter produced heavy rain and strong winds across the Lower Maryland Eastern Shore. Rainfall totals ranged from 3 to 5 inches. This rainfall caused street flooding and flooding of poor drainage areas throughout the region.	Not Available
Cambridge	February 4 to February 6, 1998	A Nor'easter produced heavy rain and strong winds across the Lower Maryland Eastern Shore. Rainfall totals ranged from 2 to 4 inches. Heavy rain caused some urban flood/poor drainage flood problems with a few roads closed due to high water.	Not Available
Dorchester (Coastal Flood)	November 12 to November 14, 2009	The peak tide height at Cambridge was 3.69 feet above MLLW, which was 1.67 feet above the astronomical tide. Several streets, homes and businesses were flooded in low lying areas of the county close or directly exposed to the Chesapeake Bay. An intense Nor'easter produced moderate to severe coastal flooding across portions of the Lower Maryland Eastern Shore.	$100,000
2017 HMP Update			
Dorchester (Coastal Flood)	October 29 to October 30, 2012	Water levels reached 3.0 feet to 4.0 feet above normal adjacent to the Chesapeake Bay resulting in moderate to severe coastal flooding. Cambridge reached a tide height of 4.55 feet MLLW. Many roads in the southern half of Dorchester county were inundated and rendered impassable during the height of Sandy. Homes and businesses experienced flooding and associated water damage. However, the flooding and damage were less than that experienced during Hurricane Isabel in 2003.	$750,000
Dorchester (Coastal Flood)	December 21, 2012	Water levels reached 3.0 feet to 4.0 feet above normal adjacent to the Chesapeake Bay resulting in moderate to severe coastal flooding. Cambridge reached a tide height of 4.7 feet MLLW at high tide and spent nearly 7 hours above 4.0 feet MLLW. Bishops Head reached a tide height of 4.12 feet MLLW and spent 2 hours at or above 4.0 feet MLLW. Many roads were flooded in Cambridge including Water Street, Main Street, and Oakley Street. Also, Great Marsh Park in Cambridge was underwater. Ambulance driver reported 8-10 inches of water on Taylors Island Road.	$200,000
Dorchester (Coastal Flood)	October 3 to October 4, 2014	Tidal anomalies between 1.5 feet to around 2.0 feet above normal produced moderate flooding along portions of the Lower Maryland Eastern Shore adjacent to the Chesapeake Bay. Cambridge recorded a maximum storm tide of 4.21 feet MLLW at 1242 am October 4th, and 4.14 feet MLLW at 1148 am through 1200 pm October 4th. Bishops Head recorded a maximum storm tide of 4.03 feet MLLW at 1012 pm October 3rd, and 4.22 feet MLLW at 1030 am October 4th. Many roads in the southern half of Dorchester county were flooded with a foot or more of water. In addition, several streets bordering the Choptank River in Cambridge were also flooded during the Saturday high tide.	0

Dorchester (Coastal Flood)	October 4 to October 5, 2015	A tidal departure of 2 to 2.5 feet resulted in moderate flooding along the Chesapeake Bay.	0
Dorchester (Coastal Flood)	January 10, 2016	A tidal departure of 1.5 to 2.5 feet resulted in moderate coastal flooding along the Chesapeake Bay in Maryland. The peak water level at Cambridge was 4.19 feet at 412 pm on January 10. The peak water level at Bishops Head was 3.82 feet at 136 pm on January 10.	0
Dorchester (Coastal Flood)	February 9 to February 10, 2016	Minor to Moderate coastal flooding occurred across much of Dorchester county. Water levels reached 3.8 feet MLLW at Bishops Head MD. No property damage was reported, but a few roads in southern Dorchester county were flooded as a result of the high tide.	
Dorchester (Coastal Flood)	September 30, 2016	Tides of 2 feet above normal caused moderate flooding on the middle portions of the Chesapeake Bay. Water levels reached nearly 3.9 feet MLLW at Bishops Head MD. No damage was reported.	

Hurricane Vulnerability Analysis

In terms of number of occurrences, the NWS, NCEI listed a total of ten (10) Nor'easter and Coastal Flooding events affecting Dorchester County from 1996-2016. Therefore, Dorchester County experiences 0.42 Nor'easter and Coastal Flooding events per year.

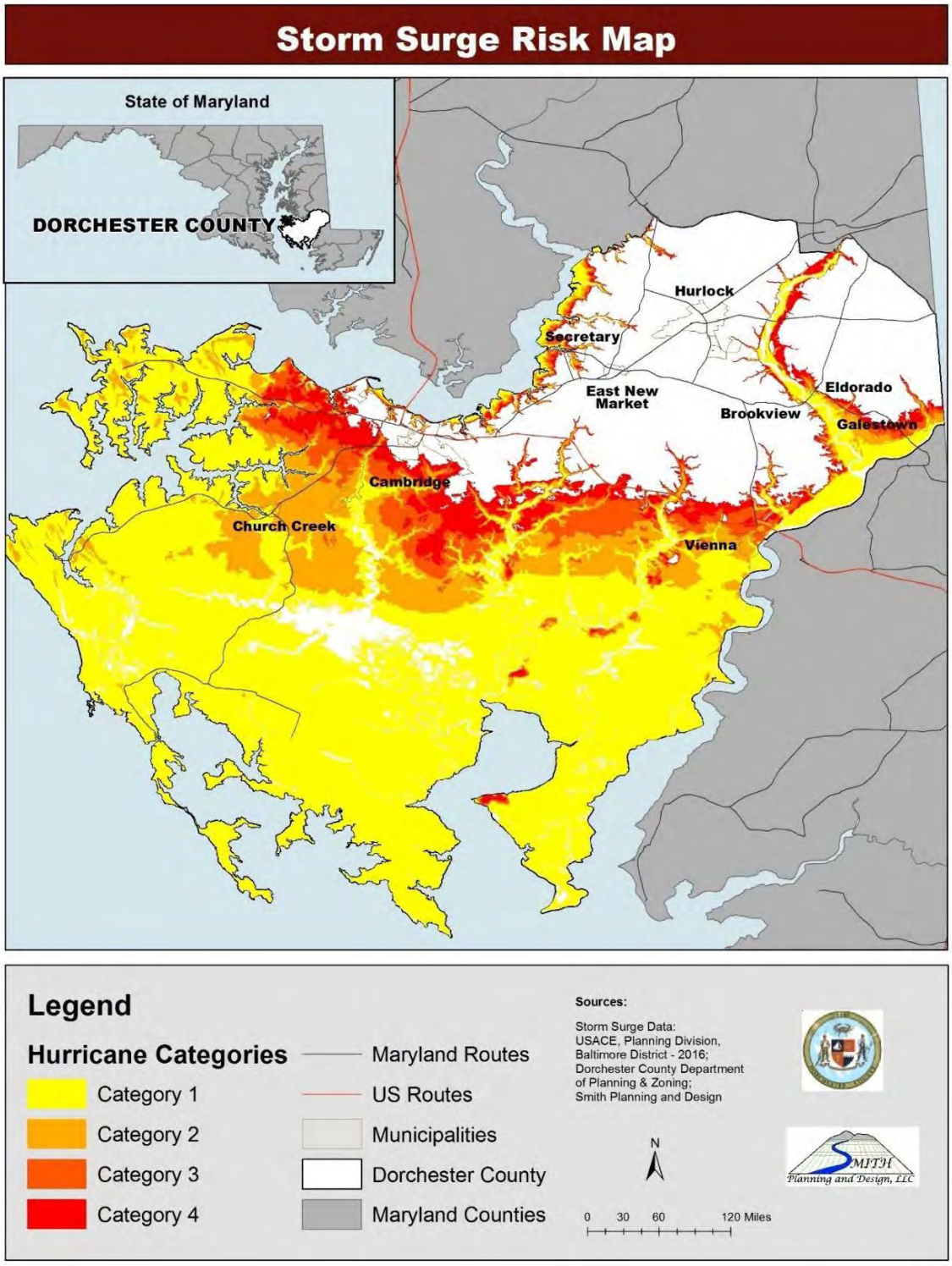
In terms of associated impacts, high winds, heavy rain, lightning, tornados, hail, and storm surge are all associated with hurricanes. Although high winds and excessive amounts of precipitation are common and cause tremendous damage, the most serious effect of hurricanes is coastal destruction caused by wind, storm waves, or surge.

Several techniques are utilized to model storm surge including one technique which involves the use of the National Weather Service's (NWS) Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. This model is used to predict storm surge heights based on hurricane categories. The classification of the surge inundation area is based on the hurricane category causing the flooding. As the category of the storm increases, more land area will become inundated. Storm surge is a major component of nor'easter storms along the East Coast of the U.S. since winds are moving in a north and/or eastward position. These winds move across the ocean towards the shore and form large waves.

Storm surge data utilized for analysis reflects areas with a risk of storm tide flooding from hurricanes, based on potential storm tide heights calculated by the National Weather Service's SLOSH Model. The SLOSH Basin used for mapping was Chesapeake Bay

(CP5), released in 2014. This data was prepared by the U.S. Army Corps of Engineers, Baltimore District, and Planning Division in January 2016. SLOSH storm tide elevations used for the mapping were based on the Maximum of Maximums (MOM) SLOSH output dataset. The MOM output elevations represent the highest calculated storm tide values based on thousands of SLOSH simulations using different combinations of approach direction, forward speed, landfall point, astronomical tide, and intensity (Category 1 through Category 4). Categories 1 through 4 refer to the Saffir- Simpson scale of hurricane intensity. The mapping does not reflect the expected storm tide flooding for every hurricane, or for any one particular type of hurricane. Instead the data depicts an overall footprint of the area that has some risk of storm tide flooding from hurricanes, based on the MOM output dataset.

Map 10


Storm Surge Risk Map
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Brookview
Eldorado
Galestown
Cambridge
Church Creek
Vienna
Legend
Hurricane Categories
Category 1
Category 2
Category 3
Category 4
Maryland Routes
US Routes
Municipalities
Dorchester County
Maryland Counties
Sources:
Storm Surge Data:
USACE, Planning Division,
Baltimore District - 2016;
Dorchester County Department
of Planning & Zoning;
Smith Planning and Design
N
0 30 60 120 Miles
SMITH
Planning and Design, LLC

Utilizing the 2016 SLOSH model and the updated 2016 critical and public facilities, a vulnerability analysis was conducted to determine at-risk facilities. In the 2011 planning cycle a total of 114 critical and public facilities were within one or more of the Hurricane Categories: 1, 2, 3 or 4. In the 2016 analysis, 110 critical and public facilities were within one or more of the hurricane categories. This difference is due to the remodeling of the storm surge that was prepared by the U.S. Army Corps of Engineers, Baltimore District, and Planning Division in January 2016. Table 14 shows the slight difference between critical and public facilities vulnerable to storm surge.

Table 14

Critical & Public Facilities Totals within Storm Surge Risk Area

Facility Category	2011	2016
County	12	12
Education	6	9
Emergency	12	12
Medical	1	1
Miscellaneous	51	50
Municipal	19	14
Utility	13	12
Total Facilities	114	110

SOURCE: SMITH PLANNING AND DESIGN

The following table, Table 15, lists all critical and public facilities are within the Storm Surge inundation areas. The southern portion of the county along with the Towns of Church Creek, Vienna, Galestown and the City of Cambridge are affected by storm surge. As listed in the table below, thirty-nine (39) critical and public facilities located in the City of Cambridge would be impacted by storm surge while seventeen (17) facilities within Vienna would be affected. The Town of Church Creek contained ten (10) critical and public facilities located within one of the storm surge categories. The remaining forty-four (44) critical and public facilities are located throughout the county, specifically the southern portion.

Note: If a facility is impacted by a Category 1 Hurricane, then it would be impacted by higher Hurricane Categories as well.

Table 15

Critical and Public Facilities in the Storm Surge Inundation Areas					
Facility Category	*Facility Type*	*Facility Detail*	*Address*	*City*	*Hurricane Category*
County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge	4
County	County Government	Parks & Recreation	Dailsville Road	Cambridge	3
County	County Government	Dorchester County Office On Aging	2470 Cambridge Beltway	Cambridge	4
County	County Government	Hospital Related Facility	2474 State Route 16	Cambridge	4
County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge	2
County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge	3
County	County Government	County Facility	2543 Lakesville Crapo Road	Crapo	1
County	County Government	Public Works	3186 Shorters Wharf Road	Crapo	1
County	County Government	Beulah Landfill	New Market Elwood Road	Hurlock	4
County	County Government	Parks & Recreation	Middle Street	Vienna	3
County	County Government	Dorchester Circuit Court	206 High Street	Cambridge	4
Education	Public School	Maple Elementary School	0 Egypt Road	Cambridge	4
Education	Public School	Cambridge-South Dorchester High School/DCTC	2475 Cambridge Beltway	Cambridge	4
Education	Public School	Mace's Lane Middle	1101 Maces Lane	Cambridge	4
Education	Public School	Choptank Elementary	1099 Maces Lane	Cambridge	4
Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek	1
Education	Public School	Vienna Elementary	4905 Ocean Gateway	Vienna	2

Facility Category	Facility Type	Facility Detail	Address	City	Hurricane Category
Emergency	Fire Department	Lloyds Volunteer Fire Department	1616 Hudson Road	Cambridge	1
Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge	2
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek	1
Emergency	Fire Department	Church Creek Volunteer Fire Company	1902 Church Creek Road	Church Creek	2
Emergency	Fire Department	Eldorado- Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Rhodesdale	3
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island	1
Emergency	Fire Department	Elliotts Volunteer Fire Company	2317 Elliott Island Road	Vienna	4
Emergency	Fire Department	Vienna Volunteer Fire Department	301 Ocean Gateway	Vienna	3
Emergency	Fire Department	Lakes and Straits Fire Company	2103 Farm Creek Road	Wingate	1
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison	1
Emergency	EMS Station	Station 500	1154 Taylors Island Road	Madison	1
Emergency	EMS Station	Station 200	5752 Rhodesdale Eldorado Road	Rhodesdale	3
Medical	Medical	Special Home II	6 Patamoke Way	Cambridge	4
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island	1
Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek	1

Facility Category	Facility Type	Facility Detail	Address	City	Hurricane Category
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge	1
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek	1
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek	1
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge	1
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate	1
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville	1
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville	1
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville	1
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge	1
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge	1
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison	1
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna	1
Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna	1
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge	1
Miscellaneous	Boat Ramp	Smithville Bridge Boat Ramp	Smithville Road	Taylors Island	1
Miscellaneous	Bridge	N/A	N/A	N/A	1
Miscellaneous	Bridge	N/A	N/A	N/A	1
Miscellaneous	Bridge	N/A	N/A	N/A	1
Miscellaneous	Bridge	N/A	N/A	N/A	1
Miscellaneous	Bridge	N/A	N/A	N/A	1
Miscellaneous	Bridge	N/A	N/A	N/A	2
Miscellaneous	Bridge	N/A	N/A	N/A	2
Miscellaneous	Bridge	N/A	N/A	N/A	3
Miscellaneous	Bridge	N/A	N/A	N/A	3
Miscellaneous	Bridge	N/A	N/A	N/A	3

Facility Category	Facility Type	Facility Detail	Address	City	Hurricane Category
Miscellaneous	Bridge	N/A	N/A	N/A	4
Miscellaneous	Community Center	Cambridge MAC Senior Center	2450 Cambridge Beltway	Cambridge	4
Miscellaneous	Marina/Dock	N/A	6325 Snug Harbor Road	East New Market	1
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge	1
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island	1
Miscellaneous	Marina/Dock		Wingate Bishops Head	Wingate	1
Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek	1
Miscellaneous	Marina/Dock	N/A	Doeller Road	Fishing Creek	1
Miscellaneous	Marina/Dock	N/A	Hoopers Island Road	Church Creek	1
Miscellaneous	Marina/Dock	N/A	Mill Street	Cambridge	1
Miscellaneous	Marina/Dock	N/A	Tedious Creek Road	Toddville	1
Miscellaneous	Marina/Dock	N/A	2100 Wingate Bishops Head Road	Wingate	1
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head	Wingate	1
Miscellaneous	Marina/Dock	N/A	2343 Farm Creek Road	Toddville	1
Miscellaneous	Marina/Dock	N/A	Maple Dam Road	Cambridge	1
Miscellaneous	Marina/Dock	N/A	Byrn Street	Cambridge	1
Miscellaneous	Marina/Dock	N/A	Cedar Street	Cambridge	1
Miscellaneous	Marina/Dock	N/A	6304 Suicide Bridge Road	Hurlock	1
Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge	2
Miscellaneous	Marina/Dock		205 Cedar Street	Cambridge	3
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island	1
Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna	3
Miscellaneous	Park	Church Creek Community Park	4663 Golden Hill Road	Church Creek	2

Facility Category	Facility Type	Facility Detail	Address	City	Hurricane Category
Miscellaneous	Park	Sailwinds Park	200 Byrn Street	Cambridge	3
Municipal	Municipal Government	Cambridge-Public Works	Governors Avenue	Cambridge	4
Municipal	Municipal Government	Cambridge-Public Works	Woods Road	Cambridge	2
Municipal	Municipal Government	Cambridge-Public Works	Abocoo Lane	Cambridge	2
Municipal	Municipal Government	Cambridge-Public Works	Mill Street	Cambridge	1
Municipal	Municipal Government	Secretary Town Hall	122 Main Street	East New Market	3
Municipal	Municipal Government	Galestown Community House	5538 Wheatley Church Road	Rhodesdale	3
Municipal	Municipal Government	Vienna-Public Works	Vienna Henrys Crossroads Road	Vienna	2
Municipal	Municipal Government	Vienna Town Hall	214 Market Street	Vienna	3
Municipal	Municipal Government	Vienna-Public Works	Middle Street	Vienna	3
Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water Street	Vienna	1
Municipal	Municipal Government	Vienna-Public Works	Race Street	Vienna	3
Municipal	Municipal Government	Vienna-Parks & Recreation	113 Ocean Gateway	Vienna	3
Municipal	Municipal Government	Vienna-Parks & Recreation	115 Ocean Gateway	Vienna	3
Utility	Communication Tower	Bucktown Tower	2946 Greenbrier Road	Cambridge	3
Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison	1
Utility	Communication Tower	County Tower	Smithville Road	Church Creek	1
Utility	Communication Tower	Vienna Tower	4710 Ocean Gateway	Vienna	4
Utility	Utility	Transfer Station	1957 Brannock Neck Road	Cambridge	2
Utility	Utility	Choptank Electric Cooperative	Race Street	Cambridge	4
Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge	3
Utility	Utility	Verizon	2837 Hoopers Island Road	Church Creek	1
Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek	1

Facility Category	Facility Type	Facility Detail	Address	City	Hurricane Category
Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo	1
Utility	Utility	Vienna Wastewater Treatment Plant	113 Levin Dorsey Road	Vienna	3
Utility	Utility	TeleCom Communication Tower	4873 Old Ocean Gateway	Vienna	3
Utility	Utility	Vienna Power Plant	0 Chapel of Ease Road	Vienna	3

Source: 2016 Hazard Mitigation Committee

Hurricane Loss Estimations

Loss estimates for critical and public facilities located within each Storm Surge inundation area were calculated. Loss estimates constitute the total loss of the assessed value for the structure. These calculations were derived from Maryland Tax Assessment values. Total loss estimates for Category 1 is $19,089,680, Category 2 is $5,107,500, Category 3 is $16,224,7201 and Category 4 equals $74,722,020. Loss estimations are detailed in the table below.

Table 16

2016 Loss Estimations for Critical & Public Facilities

Facility Category	Loss Estimates			
Storm Surge Category	1	2	3	4
County	$244,200	$1,358,200	$2,760,400	$1,236,760
Education	$2,466,200	$1,576,700	$1,700,000	$34,360,000
Emergency	$1,507,000	$606,400	$398,600	$202,100
Medical	$0	$0	$0	$635,500
Miscellaneous	$5,974,890	$584,600	$1,598,900	$2,622,900
Municipal	$303,600	$155,100	$526,600	$3,000
Utility	$564,100	$65,000	$1,977,860	$65,000
Total	$19,089,680	$5,107,500	$16,224,720	$74,722,020

Source: 2013 Maryland Tax Assessment

Coastal Flooding

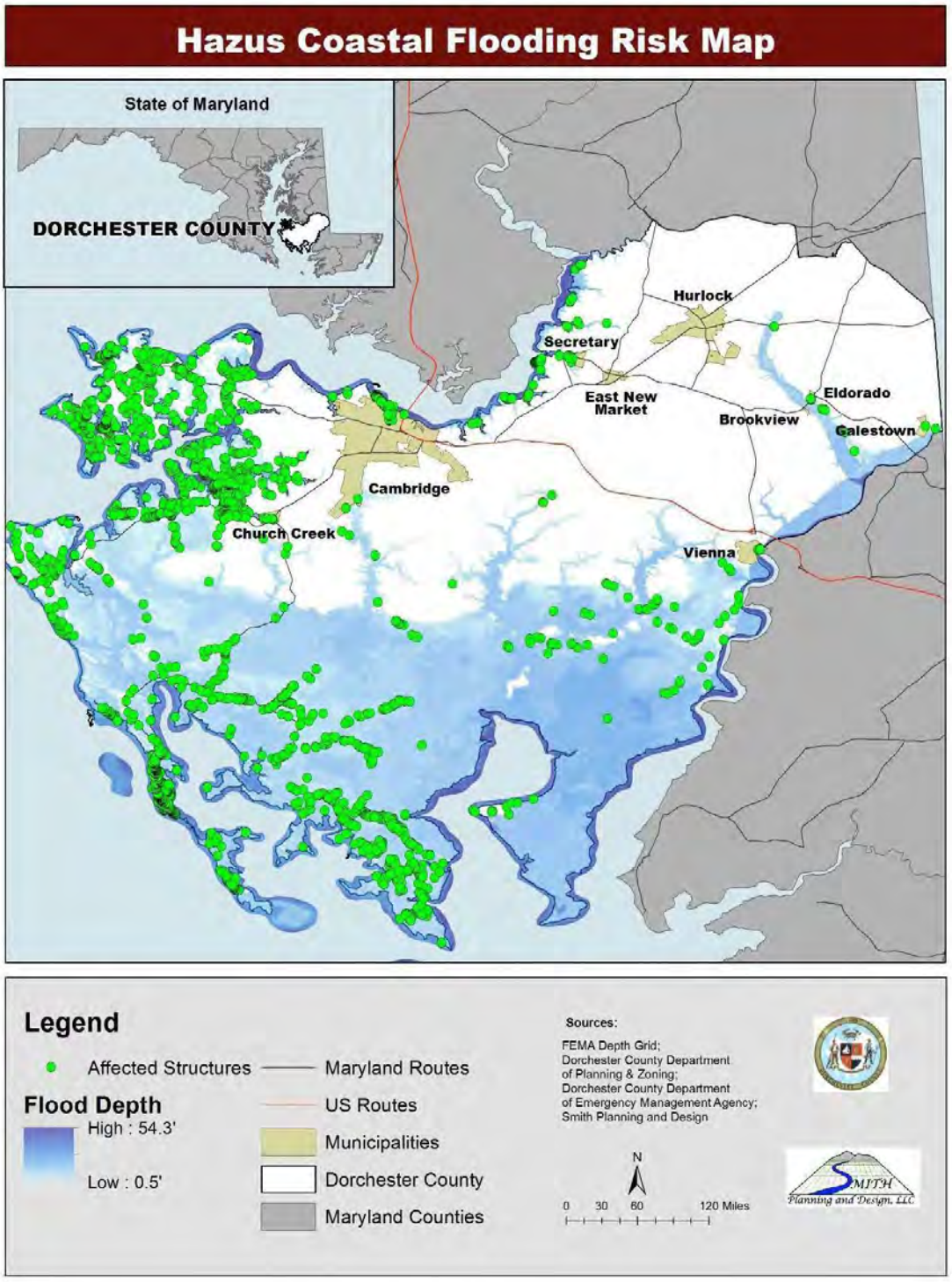
Profile

Coastal flooding occurs when normally dry, low-lying land is flooded by seawater. The extent of coastal flooding is a function of the elevation inland floodwaters penetrate which is controlled by the topography of the coastal land exposed to flooding.

FEMA, in partnership with the Maryland Department of Environment (MDE) and Maryland Emergency Management Agency (MEMA), developed Non-Regulatory Coastal Flood Risk Product for jurisdictions located within the coastal area of the Chesapeake Bay. This planning initiative was intended to assist local communities with increasing their resiliency to flooding and to better protect their citizens. Results provided in a Flood Risk Report (FRR) are not intended to be regulatory or the final authoritative source of all flood risk data in the project area. The report is intended to be used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area.

FEMA's Hazus program was utilized to determine coastal flood losses for the 1-percent-annual-chance flood event. In order to accurately calculate loss estimates, user defined data was imported into Hazus for the coastal flood risk product. First, depth grids were developed using the high resolution digital elevation model (DEM) and FIRM Zones AE and VE with a static base flood elevation (BFE) for the approved Digital Flood Insurance Rate Maps (DFIRM). Flood depths were obtained by subtracting the water surface from the ground elevation; hence depth grids. Next, the user defined facility inventory was developed. User defined inventory includes: residential, commercial and other (industrial, agriculture, religion, government and educational). Building footprints were utilized to determine which structures were located within the flood zone. The lowest adjacent grade was determined for each structure within the flood risk area to depict where the flood will be the highest on each structure affected. Additionally, information from the 2013 Maryland Property View Database was incorporated to ensure all necessary attributes were captured in order to obtain more accurate loss estimates. By inputting user defined data and inventory into the Hazus program, site-to-site results versus an aggregated table of damages and losses was provided. Map 11 below depicts the depth grid and user defined structures located within the coastal 100-year floodplain.

Map 11


Hazus Coastal Flooding Risk Map
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Legend
Affected Structures
Flood Depth
High : 54.3'
Low : 0.5'
Maryland Routes
US Routes
Municipalities
Dorchester County
Maryland Counties
Sources:
FEMA Depth Grid;
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Smith Planning and Design
N
0 30 60 120 Miles
SMITH Planning and Design, LLC

Coastal Flooding Vulnerability Analysis

A total of 2,431 structures are located within the coastal flood risk area. The majority of these structures are residential; 2,301 principal structures. The remaining 130 structures are comprised of commercial (55 structures) and other (religion, government, education and industrial). As depicted on Map 11, affected structures (depicted as green dots) are concentrated along the northwestern and southern portions of the County. Affected structures located in the northwestern portion of the county are located within the following communities: Hills Point, Thomas, Wrights, Lloyds, Dailsville, Madison, Woolford, Smithville and Taylors Island. In the southern portion of the county, the large concentration of structures within the 100-year floodplain are located in the following communities: Honga, Fishing Creek, Hoopersville, Crocheron, Bishops Head, Wingate, Toddville, Crapo, Crossroads, Blackwater and Lakesville.

The Non-Regulatory coastal flood risk analysis incorporates results from the HAZUS Coastal Flood analysis which accounts for newly modeled areas in the Coastal Flood Risk Project and newly modeled depths for the 1-percent-annual-chance flood event. Potential losses were compared with state-level tax data and locally-provided building footprints to estimate loss estimations for the 1-percent-annual-chance flood scenario. Table 17 provides the overall cost summary for structures located within the flood prone areas.

Table 17

Cost Summary of Structures within Coastal Flood Risk Area

Location	Total Cost	Total Residential Cost	Total Commercial Cost	Total Other Cost
Dorchester County Unincorporated Areas	440,083,550.00	408,816,600.00	11,579,000.00	19,687,950.00
Town of Brookview	0.00	0.00	0.00	0.00
City of Cambridge	35,171,650.00	25,729,050.00	3,229,400.00	6,213,200.00
Town of Church Creek	1,427,850.00	1,346,250.00	81,600.00	0.00
Town of East New Market	0.00	0.00	0.00	0.00
Town of Eldorado	381,000.00	381,000.00	0.00	0.00
Town of Galestown	11,600.00	0.00	11,600.00	0.00
Town of Hurlock	0.00	0.00	0.00	0.00
Town of Secretary	4,699,450.00	3,113,700.00	0.00	1,585,750.00
Town of Vienna	582,250.00	160,050.00	0.00	422,200.00
Total	482,357,350.00	43,9546,650.00	14,901,600.00	27,909,100.00

Source: FEMA Hazus Coastal Flooding Analysis

Note there are no cost summaries for the Towns East New Market and Hurlock since there is no Coastal Special Flood Hazard Areas within these municipalities. Furthermore, the Town of Brookview contains $0.00 values because no structures were within the coastal flood risk area according to the Hazus model. The Town of Brookview contains an area of risk, however this risk area 0.1 square miles.

In terms of critical and public facilities, Table 18 provides the listing of these facilities that are located in the coastal flood risk area. The depth of flooding for each structure is provided. The depth of flood was measured at the structures' lowest adjacent grade.

Table 18

Critical and Public Facilities in the Coastal Flood Risk Area					
Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge	1.8
County	County Government	County Facility	Lakesville Crapo Road	Crapo	1.6
Emergency	Fire Department	Lakes and Straits Fire Company	2103 Farm Creek Road	Wingate	2.6
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek	1.9
Emergency	Fire Department	Lloyds Volunteer Fire Department	Cambridge Hudson Road	Cambridge	1.2
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island	1.2
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison	0.8
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville	6.4
Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna	4.2
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville	4.0
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek	3.8
Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge	3.5
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate	3.5
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge	3.2
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island	3.1
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge	2.9
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna	2.8
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville	2.7
Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek	2.6
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge	2.6
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison	1.5

Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge	1.4
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek	.0
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge	0.9
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary	0.5
Miscellaneous	Bridge	RT 335/Honga River/Bay	N/A	N/A	5.5
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	N/A	N/A	5.5
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	N/A	N/A	5.3
Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	N/A	N/A	5.2
iscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	N/A	N/A	4.8
Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	N/A	N/A	4.8
Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	N/A	N/A	4.8
Miscellaneous	Bridge	RT 14/Marshyhope Creek	N/A	N/A	4.7
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	N/A	N/A	4.6
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	N/A	N/A	4.5
Miscellaneous	Bridge	RT 313/Artificial Path	N/A	N/A	4.5
Miscellaneous	Bridge	Shore Drive/Shoal Creek	N/A	N/A	4.3
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	N/A	N/A	4.1
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	N/A	N/A	4.0
Miscellaneous	Bridge	RT335/Artificial Path (Off of Honga River)	N/A	N/A	4.0
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	N/A	N/A	4.0
Miscellaneous	Bridge	RT 14/Artifical Path (Off of Warwick River)	N/A	N/A	3.6
Miscellaneous	Bridge	State-Market Street/Cambridge Creek	N/A	N/A	3.5
Miscellaneous	Bridge	RT 335/ Wallace Creek	N/A	N/A	3.4
Miscellaneous	Bridge	State-Vienna Bridge	N/A	N/A	24.3
Miscellaneous	Bridge	RT 16/Parsons Creek	N/A	N/A	2.8
Miscellaneous	Bridge	RT 16/Slaughter Creek	N/A	N/A	2.7
Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	N/A	N/A	2.2
Miscellaneous	Bridge	State-Choptank River Bridge	N/A	N/A	16.5
Miscellaneous	Bridge	D-001Hoopers Island Road/Honga River	N/A	N/A	12.3
Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	N/A	N/A	1.4
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	N/A	N/A	1.0
Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	N/A	N/A	0.5
Miscellaneous	Bridge	RT 335/Artificial Path	N/A	N/A	0.5

Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	N/A	N/A	0.5
Miscellaneous	Bridge	RT 335/Blackwater River	N/A	N/A	0.5
Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	N/A	N/A	0.5
Miscellaneous	Bridge	RT 335/Buttons Creek	N/A	N/A	0.5
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	N/A	N/A	0.5
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	N/A	N/A	0.5
Miscellaneous	Bridge	RT 50/Chicamacomico River	N/A	N/A	0.5
Miscellaneous	Bridge	RT 50/Chicamacomico River	N/A	N/A	0.5
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	N/A	N/A	0.5
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	N/A	N/A	0.5
Miscellaneous	Marina/Dock	N/A	N/A	N/A	6.0
Miscellaneous	Marina/Dock	N/A	N/A	N/A	4.6
Miscellaneous	Marina/Dock	N/A	6304 Suicide Bridge Road	Hurlock	3.9
Miscellaneous	Marina/Dock	N/A	Farm Creek Road	Toddville	3.7
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head Road	Wingate	3.6
Miscellaneous	Marina/Dock	N/A	Maple Dam Road	Cambridge	3.2
Miscellaneous	Marina/Dock	N/A			2.6
Miscellaneous	Marina/Dock	N/A	Hoopers Island Road	Church Creek	1.8
Miscellaneous	Marina/Dock	N/A	Doeller Road	Fishing Creek	1.7
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge	1.3
Miscellaneous	Marina/Dock	N/A	6325 Snug Harbor Road	East New Market	0.9
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head Road	Wingate	0.8
Miscellaneous	Marina/Dock	N/A			0.7
Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek	0.6
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island	0.5
Miscellaneous	Marina/Dock	N/A	2100 Wingate Bishops Head Road	Wingate	0.5
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island	1.9
Municipal	Municipal Government	Vienna-Parks & Recreation	Water Street	Vienna	6.0
Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna	4.9
Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge	2
Municipal	Municipal Government	Cambridge-Parks & Recreation	96 High Street	Cambridge	12.8
Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water Street	Vienna	1.7

Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge	1.7
Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo	2.7
Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo	2.2
Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek	1.1
Utility	Utility	Verizon	2837 Hoopers Island	Church Creek	0.5

Coastal Flooding Loss Estimations

The Hazus Coastal Flood Model allows users to estimate flood losses due to depth of flooding. Table 19 provides the loss estimations for structures located within the coastal flood risk area.

Table 19

Loss Estimates for Structures within Coastal Flood Risk Area				
Location	Total Loss Estimations	Total Residential Loss	Total Commercial Loss	Total Other Loss
Dorchester County Unincorporated Areas	33,807,643.00	28,298,273.00	1,024,795.00	3,328,191.00
Town of Brookview	0.00	0.00	0.00	0.00
City of Cambridge	2,689,899.00	1,525,708.00	670,675.00	441,325.00
Town of Church Creek	75,364.00	73,936.00	612.00	0.00
Town of East New Market	0.00	0.00	0.00	0.00
Town of Eldorado	15,017.00	15,017.00	0.00	0.00
Town of Galestown	2,482.00	0.00	1,299.00	0.00
Town of Hurlock	0.00	0.00	0.00	0.00
Town of Secretary	300,931.00	46,484.00	0.00	157,117.00
Town of Vienna	212,246.00	41,079.00	0.00	171,167.00
Total	37,103,582.00	30,000,497.00	1,697,381.00	4,097,800.00

Source: FEMA Hazus Coastal Flooding Analysis

In regards to critical and public facilities, loss estimates for critical and public facilities located within the coastal flood zone were calculated. Loss estimates constitute the total loss of the assessed value for the structure. These calculations were derived from Maryland Tax Assessment values. Total loss estimates for equals $10,261,790.

Table 20

Loss Estimations for Critical & Public Facilities

Facility Category	Loss Estimates
County	$1,602,400
Emergency	$1,232,500
Miscellaneous	$6,174,490
Municipal	$952,400
Utility	$300,000
Total	$10,261,790

Source: Smith Planning and Design & HMPC

It is important to note the emergency facilities located in the coastal flood risk area. These facilities are considered critical facilities since they are intended to provide services to the communities in the event of a disaster. These are critical facilities and include:

- Lakes and Straits Fire Company – Flood Depth: 2.8 feet;
- Hoopers Island Volunteer Fire Company – Flood Depth: 1.9 feet;
- Lloyds Volunteer Fire Department – Flood Depth: 1.2 feet;
- Taylors Island Volunteer Fire Company – Flood Depth: 1.2 feet; and
- Madison Volunteer Fire Company – Flood Depth: 0.8 feet.

Furthermore, several county and municipality structures are at-risk to coastal flooding. These public facilities include:

- County Board of Education – Flood Depth: 2.4 feet;
- County Department of Tourism – Flood Depth: 1.8 feet;
- County Facility – Flood Depth: 1.6 feet;
- Vienna Public Works – Flood Depth: 4.9 feet; and
- (2) Cambridge Public Work Facilities – Flood Depth: 2 feet and 1.7 feet.

Mitigation efforts should be focused on these facilities in order to ensure services are not disrupted during an event.

Sea Level Rise and Shoreline Erosion

Profile

On Maryland's Eastern Shore, particularly on the Chesapeake Bay side, storm surge is also related to rising sea level and shoreline subsidence. Counties fronting on the east side of the Bay are facing shoreline submergence that has been ongoing since the last glacial period when sea level was approximately 400 feet lower than today. While the process has been continuing for approximately 10,000 years, sea level is still rising at a rate of one foot or so every century. This rise in sea level will certainly affect the relative height of future storm surge events.

The *A Sea Level Rise Response Strategy for the State of Maryland* report stated that the average rate of sea level rise on Maryland coastlines has been approximately 3-4 mm/yr., or one foot per century. According to the *2013 Updating Maryland's Sea-Level Rise Projections* report, sea levels may rise as much as 3.7 to 5.7 feet in the Chesapeake Bay by 2100. Ongoing research suggests that land subsidence, which occurs from large amounts of groundwater being excessively withdrawn from aquifers in the region and post-glacial crust movement are contributing factors to the increased rate of sea level rise in Maryland. Approximately 260 acres of tidal shoreline are lost each year to shoreline erosion. This degrades water quality in the Bay by adding about 5.7 million pounds of nitrogen and 4.2 million pounds of phosphorus.

According to the *2008 Sea Level Rise: Technical Guidance for Dorchester County*, with the scientists' prediction of the Antarctic ice shelf melting due to global warming, the increase in water volume will have to be accommodated by either the flow of water moving horizontally across low-lying shorelines, or rising vertically within waterways bordered by high banks. The horizontal movement of water across low-lying landscapes will lead to inland encroachments by the tide, which is also depended upon topography. The encroachments can range from a few inches if the profile is mountainous to several hundred feet if the topography is fairly flat, which will proceed to inundate areas further inland and expose these areas to tidal action. Depending upon the soils and vegetation types located in relatively flat areas, the amount of water inundation may be decreased for a time, however ultimately the landscape will give way to the effects of inundation with new shorelines being formed farther inland.

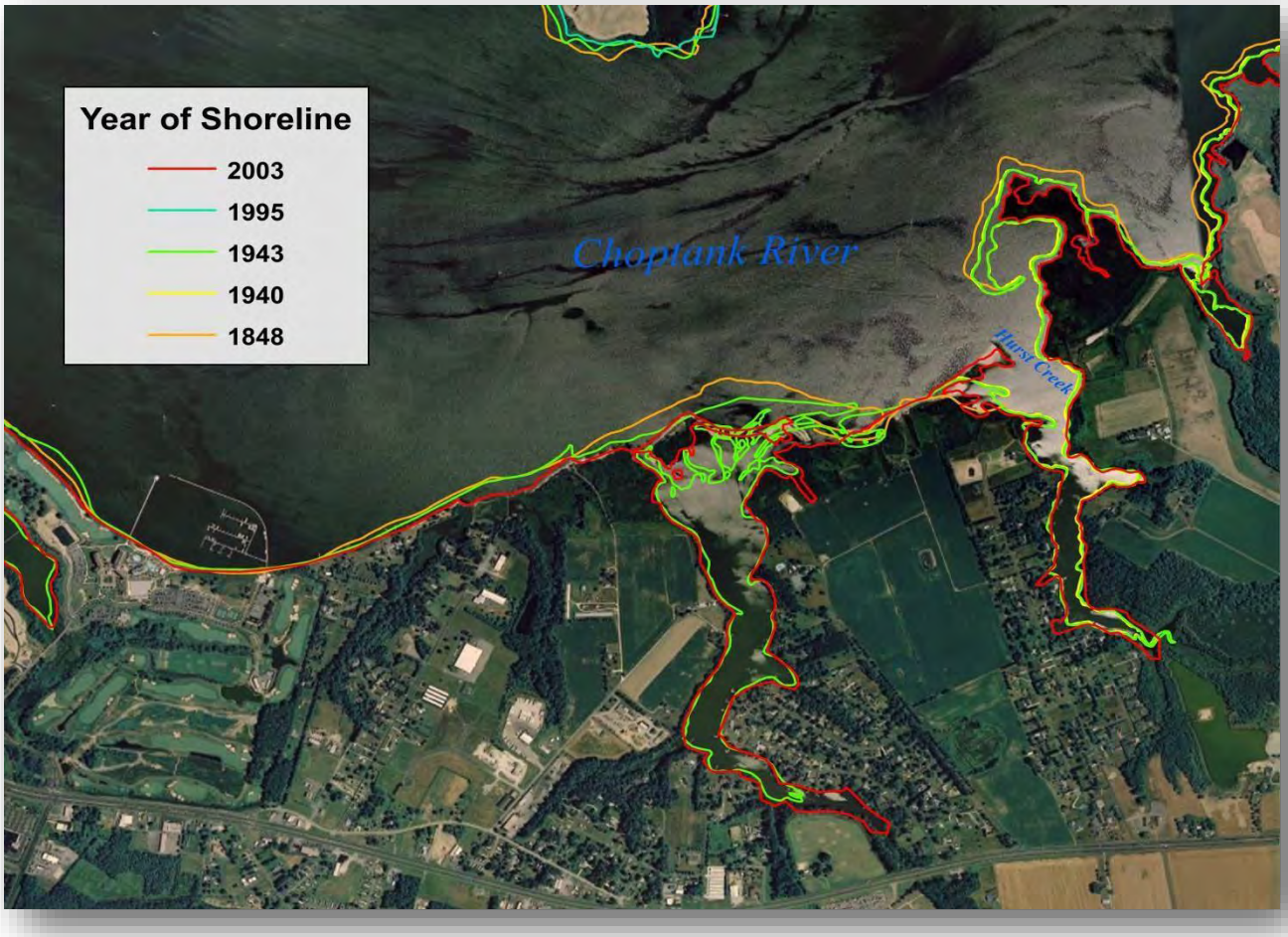
Furthermore, the 2008 Technical Guidance states that the vertical movement of rising waters will lead to increased saturation of soils at the base of banks, which will weaken and eventually result in bank erosion. Due to the effects of wave action slashing away soils at higher points along the shoreline, bank failure will be the result. Theconsequence of repeated bank failures is the landward withdraw of the upland/shoreline edge.

Through the Maryland Geological Survey and the Coastal & Estuarine Geology Program,

Shoreline Change Map Data for Tidewater Maryland depicts the shoreline changes in Maryland from 1848 to 1995. The map below illustrates the change in the shorelines surrounding the City of Cambridge between the years 1848 to 2003.

Map 12

*City of **Cambridge's** Sea Level Rise: 1848-2003*



Source: Maryland Geological Survey

Shoreline erosion results from both storm surge and sea level rise. Studies conducted by the U.S. Army Corps of Engineers estimate that 31% of the State's 4,360 miles of tidal shoreline currently experience some degree of erosion. Approximately 54% of

Dorchester County's tidal shoreline has experienced some degree of erosion. To date, a minimal amount of structures have been affected by this shoreline erosion.

Information was requested from the U.S. Army Corps of Engineers, Baltimore District and updated shoreline erosion rates were provided by Andrew Roach, Planning Division, presented in Table 21 below.

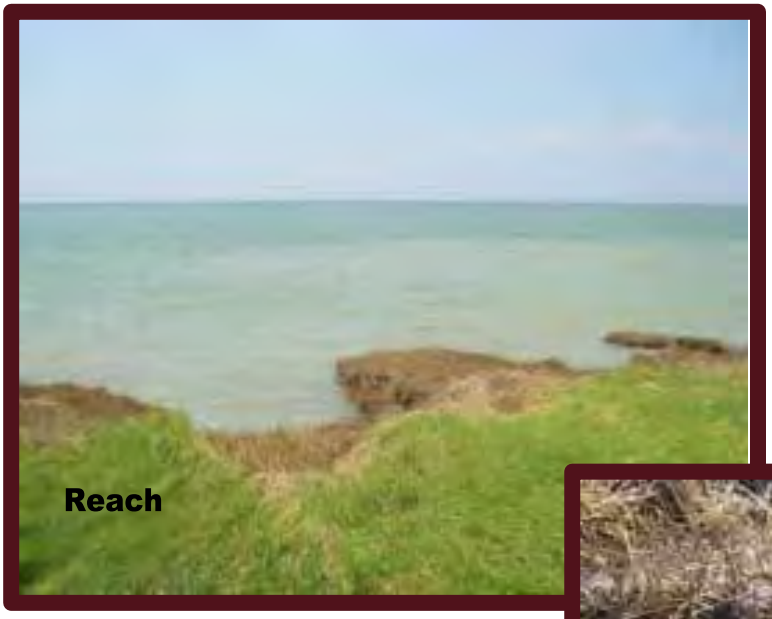
Table 21

Rate of Shoreline Erosion					
Dorchester County			Maryland (16 coastal counties and Baltimore City, excluding Smith Island, South Marsh Island, Poplar Island, Bloodsworth Island, and several other large Bay Islands)		
Erosion Category	*Average Erosion Rate (ft/yr)*	*Shoreline Length (Miles)*	*Erosion Category*	*Average Erosion Rate (ft/yr)*	*Shoreline Length (Miles)*
Accretion	+0.5	22	Accretion	+0.5	294
Protected	0	70	Protected	0	978
No Change	0	1,063	No Change	0	3,851
Slight	-1	176	Slight	-1	1,157
Low	-3	54	Low	-3	182
Moderate	-6	23	Moderate	-6	59
High	-11	7	High	-11	11
Unknown	0 or -1	7	Unknown	0	65
Total		1,422	*Total*		6,597

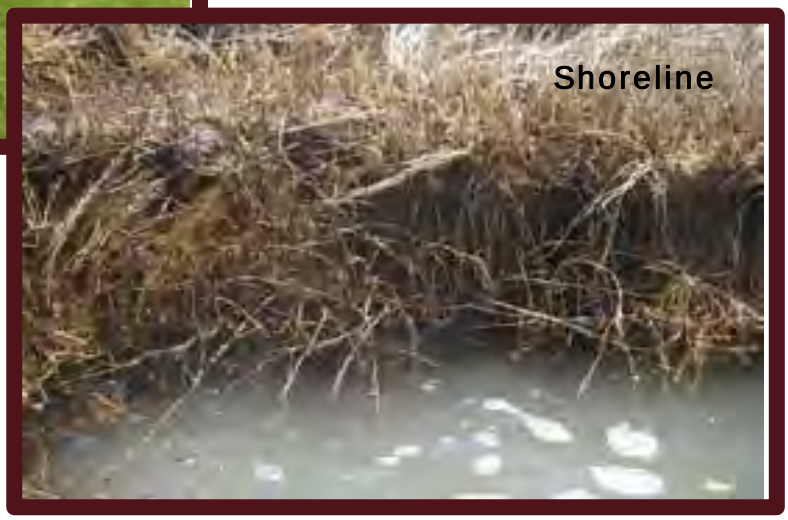
Source: U.S. Army Corps of Engineers, 2016

According to the U.S. Army Corp of Engineers Planning Division, the erosion categories have been changed, and due to different mapping techniques, the measured shoreline has changed. The Virginia Institute of Marine Science (VIMS) produced the updated shorelines and erosion rates based on Maryland Geological Survey (MGS) data.

Using a series of recent shorelines (1988-1995), the Maryland Geological Survey (MGS) produced a recent shoreline coded with erosion rates. The shoreline was updated by the Center for Coastal Resources Management (CCRM), Virginia Institute of Marine Science to reflect the current status (2002-2006) of shoreline protection ("protected" category) and improve on the shoreline segments previously classified as "unknown" or "no data".



A sample of shoreline erosion is depicted in the photos to the left and bottom. The photos are of an eroding marsh located in the middle of Hoopers Island at a site referred to as Richland Point, according to a Maryland DNR Bruun Profile Study. This site is an eroding marsh with an underlying clay layer. It is a convoluted marsh face with an actively undercut bank.



The bank is a direct drop into approximately 2 feet of water. Approximately 20 meters of shoreline loss has been noted since the last survey of this site in 2001. The marsh extends to the south and wraps around the point of Southern Hooper Island.

Source: Maryland Department of Natural Resources Interactive Mapping: Maryland Shorelines Online: http://www.dnr.state.md.us/map_template/coastalmaps/shorelines.html?a greecheck=on

According to the *2008 Sea Level Rise: Technical Guidance for Dorchester County*, the lower two-thirds of the 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. The Technical Guide listed 17 soils types within Dorchester County whose properties are more subjective 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, Sassafras, and Sunken. The potential for erosion increases since each of these soils have a high K factor.

Additionally, the following soil types belong to Group D soils, which have a very slow infiltration rate (high runoff potential) when wet. These consist chiefly of clays that have a 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 transmission. The soils highlighted in blue are soils that experience frequent flooding and are subject to the effects of sea level rise.

Table 22

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%

Source: USDA, Natural Resources Conservation Service

Sea Level Rise & Shoreline Erosion Vulnerability Analysis

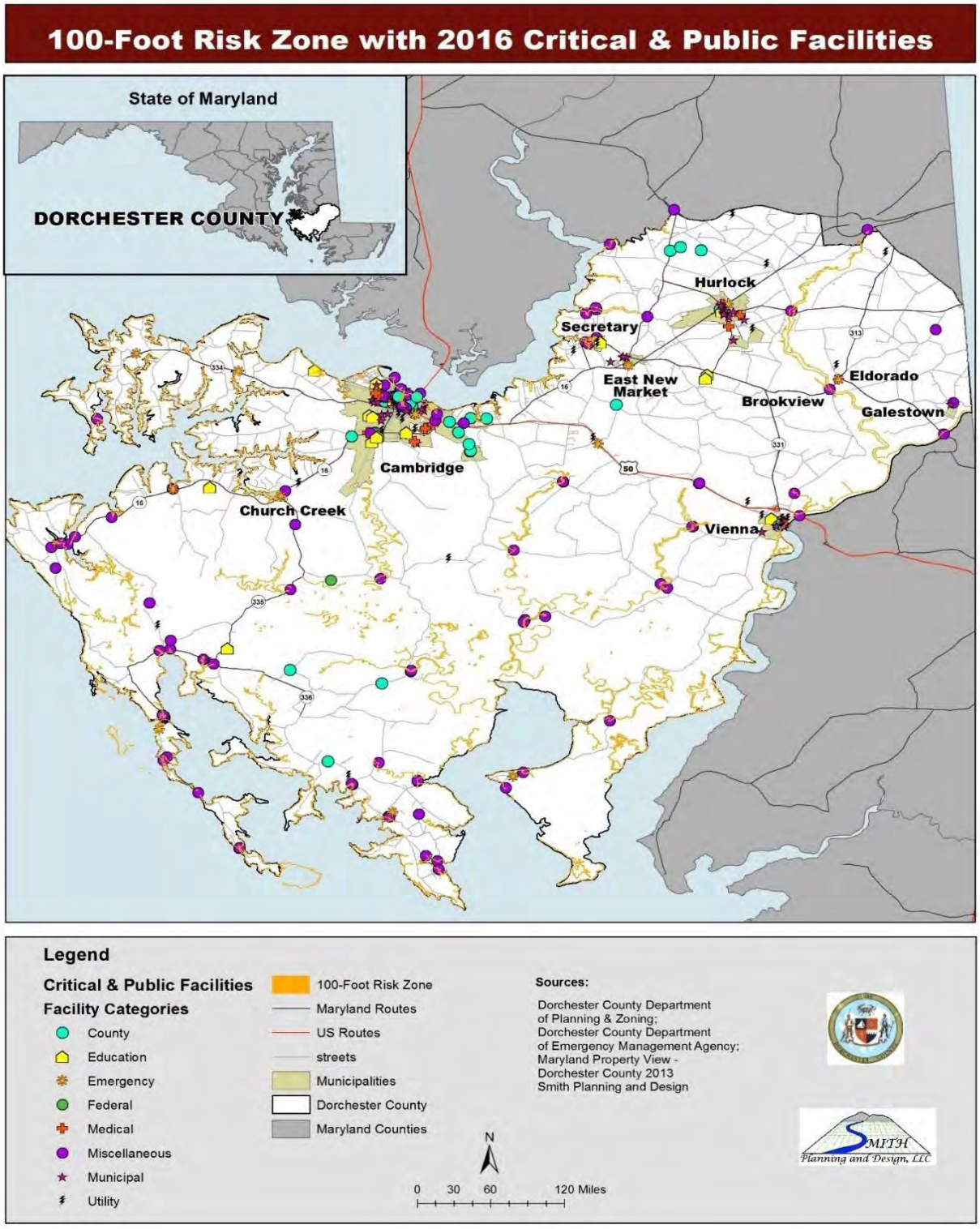
With 60% of the County located within the tidal floodplain and over 50% of the land laying below the elevation of 4.9 feet above sea level, Dorchester County is highly susceptible to sea level rise and shoreline erosion. Therefore, by utilizing Geographic Information System (GIS) layers provided by Maryland Geological Survey, an analysis has been conducted to determine the vulnerability of critical and public facilities that are within close proximity to the shoreline.

In order to determine the appropriate risk area size, several sources of information were reviewed. For instance, according to *Local Government Assistance Guide: Lot Coverage*, the definition of lot coverage is as follows: "the percentage of a total lot or parcel that is: 1) occupied by a structure, accessory structure, parking area, driveway, walkway, or roadway; or 2) covered with gravel, stone, shell, impermeable decking, a paver, permeable pavement, or any manmade material." This amendment also states the lot coverage within a 100-foot buffer is not permitted; "amendments to the law also clarify that there is no allowable, by right, percentage of lot coverage within the 100-Foot Buffer." However, there are grandfathering provisions that address existing lots developed within the buffer.

Additionally, the *Local Government Assistance Guide: Critical Area Buffer*, COMAR 27.01.09.01, defines a buffer as "the area immediately adjacent to the mean high water line of tidal waters, the edge of each bank of tributary streams and the landward edge of tidal wetlands. It includes areas that are not naturally vegetated and may be developed or disturbed." The regulation also states the buffer measurement is expanded when "highly erodible soils and hydric soils to the landward edge of the soil or 300-feet (which include the minimum 100-foot Buffer), whichever is less." This regulation applies to all new development effective of March 8, 2010, however an alternate method for buffer expansion for parcels that existed prior to January 1, 2010 with highly erodible soils; "a development activity may be located in the expansion area, without a variance, provided that the Buffer and any expansion for hydric or highly erodible soils occupies at least 75 percent of the lot or parcel and mitigation occurs at a 2:1 ratio based on the lot coverage of the proposed development activity."

Therefore, a 100-foot risk zone was placed around the current shoreline displayed on Map 13. Structures located within the 100-foot risk zone may need to implement mitigation measures in order to minimize the effects of shoreline erosion. Critical and public facilities located within this 100-foot risk zone are not only susceptible to damage caused by flooding but also can exacerbate the effects of shoreline erosion.

Map 13


100-Foot Risk Zone with 2016 Critical & Public Facilities
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
100-Foot Risk Zone
Maryland Routes
US Routes
streets
Municipalities
Dorchester County
Maryland Counties
Sources:
Dorchester County Department of Planning & Zoning;
Dorchester County Department of Emergency Management Agency;
Maryland Property View - Dorchester County 2013
Smith Planning and Design
N
0 30 60 120 Miles
SMITH Planning and Design, LLC

Critical and public facilities located within the 100-foot risk zone include one (1) County government facility, two (2) fire departments, one (1) EMS Station, fifteen (15) boat ramps, seventeen (17) bridges, fourteen marinas/docks, three (3) municipal facilities, and one (1) utility facility. These critical and public facilities are outlined in Table 23.

Table 23

Critical and Public Facilities in the 100-Foot Risk Zone				
Facility Category	*Facility Type*	*Facility Detail*	*Address*	*City*
County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	EMS Station	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Emergency	EMS Station	Station 500	1154 Taylors Island Road	Madison
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road	N/A
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road	N/A
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road	N/A
Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	Maple Dam Road	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335	N/A
Miscellaneous	Bridge	RT335/Artificial Path (off of Honga River)	RT335	N/A
Miscellaneous	Bridge	RT 335/Artifical Path	RT 335	N/A
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	Bestpitch Ferry Road	N/A
Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road	N/A
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road	N/A
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road	N/A
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road	N/A
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	Drawbridge Road	N/A
Miscellaneous	Bridge	RT 14/Artifical Path (off of Warwick River)	RT 14	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road	N/A
Miscellaneous	Marina/Dock	N/A	Maple Dam Road	Cambridge
Miscellaneous	Marina/Dock	N/A	Cedar Street	Cambridge
Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge
Miscellaneous	Marina/Dock	N/A	Mill Street	Cambridge
Miscellaneous	Marina/Dock	N/A	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock	N/A	6325 Snug Harbor Road	East New Market
Miscellaneous	Marina/Dock	N/A	Doeller Road	Fishing Creek
Miscellaneous	Marina/Dock	N/A	Hoopers Island Road	Fishing Creek
Miscellaneous	Marina/Dock	N/A	2343 Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head	Wingate
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head	Wingate
Miscellaneous	Marina/Dock	N/A	Tedious Creek Road	Toddville
Miscellaneous	Marina/Dock	N/A	6304 Suicide Bridge Road	Hurlock
Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna
Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water Street	Vienna
Municipal	Municipal Government	Vienna-Parks & Recreation	Water Street	Vienna
Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge

Source: 2016 Hazard Mitigation Planning Committee

Note: 100-foot risk zone does not differentiate between natural shoreline and hardened shorelines.

Sea Level Rise & Shoreline Erosion Loss Estimations

Utilizing structure values derived from the *2013 Maryland Tax Assessment*, loss estimates were calculated for critical and public facilities located within the 100-foot risk zone. The total loss estimation was $8,743,470.

Table 24

Loss Estimations for Critical & Public Facilities	
Facility Category	*Loss Estimate*
County	$2,581,800
Emergency	$505,700
Miscellaneous	$5,529,070
Municipal	$126,900
Utility	$0
Total	$8,743,470

Source: 2013 Maryland Tax Assessment

Coastal Events Conclusion

In reviewing the vulnerability analysis for storm surge, coastal flooding and the 100-foot risk zone, multiple critical facilities are at-risk to two or if not all three of these hazards. Critical facilities affected by all three hazards include: Taylors Island Volunteer Fire Company, Madison Volunteer Fire Company and EMS Station 500. Facilities affected by storm surge and coastal flooding only include: Lakes and Straits Fire Company, Hoopers Island Volunteer Fire Company, and Lloyds Volunteer Fire Department.

Table 25 lists all critical and public facilities affected by two or more coastal events (hurricane, coastal flooding, and sea level rise and shoreline erosion).

Table 25

Critical & Public Facilities affected by Multiple Coastal Events				
Facility Detail	*Critical or Public Facility*	*Hurricane Category (Storm Surge)*	*Coastal Flooding - Flood Depth*	*Within 100-Foot Risk Zone (from shoreline)*
Taylors Island Volunteer Fire Company	Critical	1	1.2	Yes
Madison Volunteer Fire Company	Critical	1	0.8	Yes
EMS Station 500	Critical	1	0.8	Yes
Lakes and Straits Fire Company	Critical	1	2.6	No
Hoopers Island Volunteer Fire Company	Critical	1	1.9	No
Lloyds Volunteer Fire Department	Critical	1	1.2	No
Dorchester County Office Building	Public	3	0.0	Yes
County Department of Tourism	Public	2	1.8	No
County Board of Education	Public	1	2.4	No
Vienna Public Works	Public	1	4.9	Yes
Source: Smith Planning and Design				

Note: 100-foot risk zone does not differentiate between natural shoreline and hardened shorelines.

As listed in Table 25, six (6) critical and four (4) public facilities are vulnerable to two or more coastal events. These facilities may have been constructed to mitigate flooding, however; surrounding roads may cause evacuation issues. Additional mitigation measure may be necessary to ensure service provided by these facilities is not disrupted, especially during a hazard event.

Chapter 7 Riverine Flooding

Profile

The FEMA definition for flooding is "a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters or the rapid accumulation of runoff of surface waters from any source." Floods can be caused by the passage of frontal storms, thunderstorms, hurricanes, snow melt or any combination of the above events. According to the National Flood Insurance Program (NFIP), flooding is the most common natural disaster in the United States. The NFIP has paid nearly $52 billion for flood insurance claims and related costs. From 2006 to 2015, total flood insurance claims averaged $1.9 billion per year. Historically, the greatest riverine flooding events in Maryland were the 1936 flood on the Potomac River and the 1972 flood resulting from Hurricane Agnes.

Man-made activities such as timbering and road building can cause increased runoff that makes downstream areas more susceptible to damage from natural occurring events. Since local climatic conditions can produce large amounts of precipitation at any time of the year, the potential for flooding is not limited to any particular season. Historically, however, most major floods have occurred during heavy thunderstorm activity or in late summer or early fall during the hurricane season.

Table 26

Heavy Rain Events		
Location	*Date*	*Event Narrative*
Hurlock	October 24 to October 27,	Rainfall amounts averaged between 2 to 3 inches across the County.
Vienna	December 10 to December 12, 2008	Rainfall amounts between 1 to 4 inches occurred across the County. 3.01 inches was measured at Vienna.
Cambridge	November 11 to November 13, 2009	Rainfall amounts ranged between three and six inches across the County.
2017 HMP Update		
Vienna	March 29, 2010	Rainfall amounts of one to three inches occurred across the county.
Toddville	September 30, 2010	Rainfall amounts of two to seven inches occurred across the county. Blackwater reported 5.74 inches of rain. Toddville reported 5.65 inches of rain.
Vienna	November 9 to November 10, 2015	Rainfall amounts generally ranged between 1.3 inches and 2.5 inches across the county. Vienna (5 WNW) reported 2.03 inches of rain. Wingate (1 N) reported 1.43

Mount Holly	June 28, 2016	Rainfall total of 1.55 inches was measured at 3 miles east of Cambridge.
East New Market	July 29, 2016	Over two inches of rain fell in one hour and minor street flooding occurred on July 28.
East New Market	September 19, 2016	Rainfall totals generally ranged from 1 inch to 5 inches across the county. East New Market reported 5.34 inches of rain. Bucktown (3 WSW) reported 4.32 inches of rain. Linkwood (2 SE) reported 4.30 inches of rain. Cambridge (3 E) reported 3.48 inches of rain. Wingate (1 N) reported 1.34 inches of rain.
East New Market	September 28, 2016	Rainfall totals generally ranged from 1 inch to 5 inches across the county. East New Market reported 4.76 inches of rain. Cambridge (2.1 ESE) reported 3.89 inches of rain. Cambridge (1 NW) reported 3.81 inches of rain. Bucktown (3 WSW) reported 3.47 inches of rain.
Bucktown	October 8, 2016	Rainfall totals generally ranged from 2 to 4 inches across the county.

Source: NWS, NCEI (NOAA)

In terms of number of occurrences, the National Weather Service listed a total of (11) eleven heavy rainfall events affecting Dorchester County from 2007-2016. Using the information, Dorchester County experiences 0.85 heavy rainfall events per year.

According to records kept by the US Geological Survey, the lower eastern shore has been affected by several 100-year flood events since the mid 1960's and by a number of 25-50-year flood events. While there are only a few gauging stations in the lower eastern shore area, Dorchester County has been affected to some extent by these events.

Table 27

Flood Events		
Location	*Date*	*Event Narrative*
Cambridge	June 20,1996	Three inches of rain in one hour produced flooding of several streets in the city of Cambridge.
Dorchester	October 25, 2004	Front yards and roads were flooded across southern portions of the County. Strong southerly winds occurring at high tide caused the rising waters.
Cambridge	June 25,2006	High water along Route 50
		2017 HMP Update
Cambridge	August 27 to August 28, 2011	Heavy rains associated with Hurricane Irene produced widespread low-land flooding across much of the county, including roadways which were washed out or closed. Storm total rainfall generally ranged from six to eleven inches. Cambridge reported 8.50 inches of rain. Vienna reported 8.19 inches of rain.
Andrews	October 29, 2012	Numerous roads were closed due to flooding. Storm total rainfall ranged from three to seven inches across the county.

SOURCE: NWS, NCEI (NOAA)

According to the National Centers for Environmental Information (NCEI), there have been a total of (5) five flood events affecting Dorchester County since 1996. Using this information, Dorchester County experiences 0.24 flood events per year.

Flash floods, as the name suggests, occur suddenly after a brief but intense downpour. They move fast and terminate quickly. Although the duration of these events is usually brief, the damages can be quite severe. Flash floods are more likely to occur in places with steep slopes and narrow stream valleys, and along small tributary streams. Flash floods could also be a result of improper stormwater drainage. Flash floods can also be associated and/or contributed to by rapid snow melt accompanied by a significant rain event.

Table 28

Flash Flooding Events		
Location	*Date*	*Event Narrative*
Cambridge	June 20, 1996	Three inches of rain in one hour produced flooding of several streets in the city of Cambridge.
Cambridge	July 15, 2000	Several roads closed due to flooding.
Bucktown	July 3, 2000	Numerous secondary roads closed in central and northern Dorchester county due to heavy rain.
Vienna	August 1, 2004	Numerous streets reported flooded.
Hurlock	June 25, 2006	Several basements and numerous streets flooded. Torrential rain caused numerous roads between Hurlock and East New Market and Sharptown and Galestown to be either partially damaged or washed out due to flash flooding. Total rainfall reports were of 9 to 10 inches in the northeast portion of the county.
Galestown	June 28, 2006	Heavy rain caused flash flooding and closure of several roads. Basement flooding also reported.
2017 HMP Update		
Eldorado	September 8, 2011	Many roads were closed due to flooding from heavy rain in the Eldorado and Galestown areas.
Cambridge	June 7, 2013	Heavy rainfall between five and six inches resulted in widespread flooding across the county. City officials reported several roads closed and impassable around Cambridge. County officials reported numerous roads flooding from Hurlock to Secretary.
Cambridge	June 18, 2013	Heavy rainfall resulted in minor street flooding in Cambridge. Indian Bone Road was impassable due to high water.

SOURCE: NWS, NCEI (NOAA)

As for occurrences, the NWS, NCEI listed a total of (9) nine flash flood events affecting Dorchester County from 1996-2016. As a result, Dorchester County experiences 0.45 flash flood events per year.

Vulnerability Analysis

Dorchester County is prone to various forms of flooding including riverine flooding and flash flooding. Therefore, a Digital Flood Insurance Rate Map (DFIRM) Database published by the Federal Emergency Management Agency (FEMA) for Dorchester County was utilized to depict flood risk areas. The DFIRM is the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP). FEMA's new Flood Insurance Rate Maps (FIRM) for Dorchester County became effective in March 2015. As a result of the revised flood maps, new flood zones and new flood rates apply to flood insurance policies. Many properties experience insurance premium relief due to Dorchester County's effort by participating in the Community Rating System.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Dorchester County property owners currently earn a 10% discount on all flood insurance premiums.

The following table, Table 29, provides information on how floodplains are categorized into flood zones. Map 14 depicts the geographic areas that FEMA has defined according to their varying levels of flood risk.

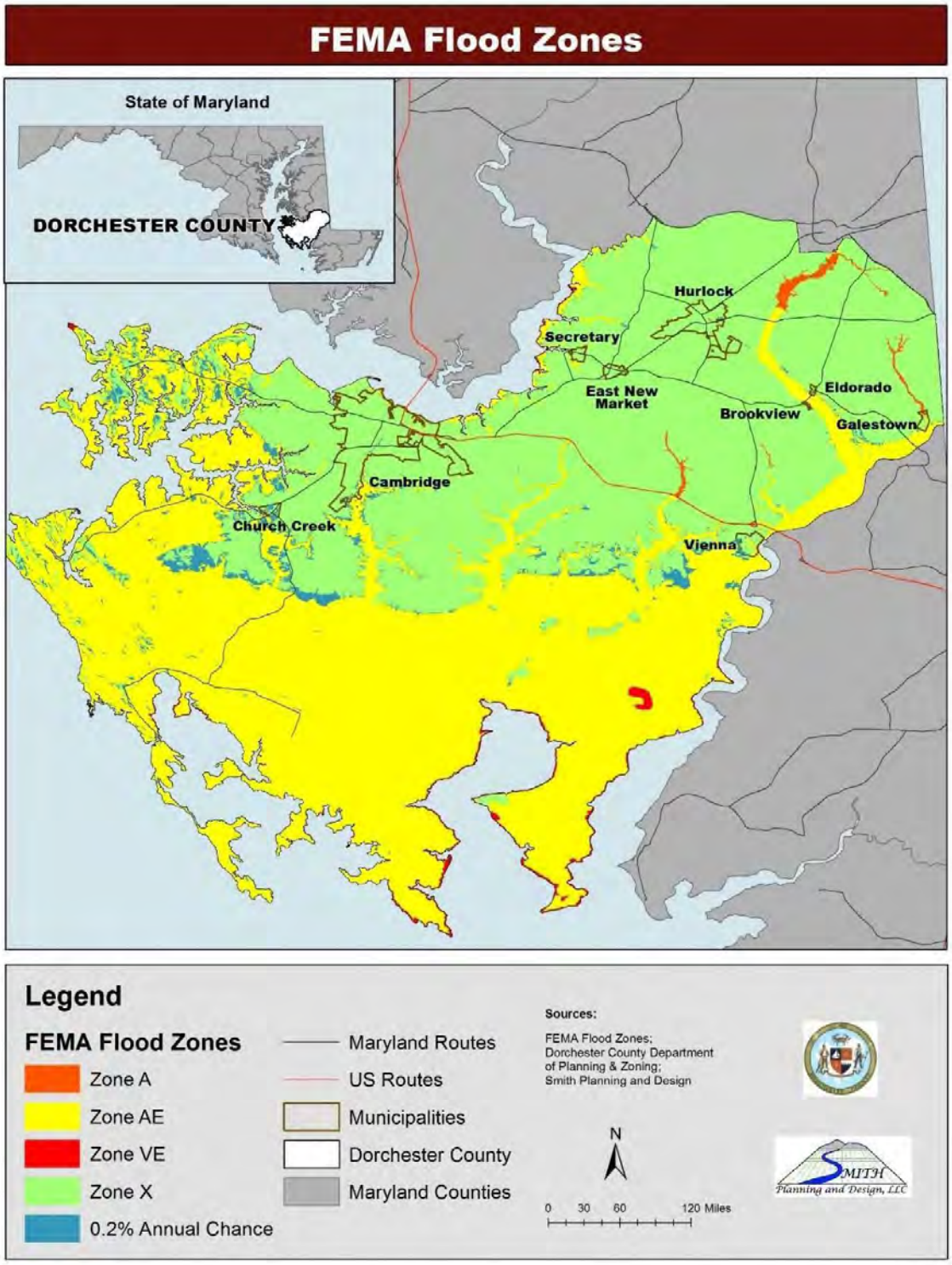
Table 29

FEMA Flood Zones	
Flood Zone	*Description*
High Risk Areas	
A	Areas with a 1% annual chance of flooding and 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	The base floodplain where base flood elevations are provided for a 100-year flood event. 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.
Moderate Risk Areas	
0.2% Annual Chance Flood Hazard	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.
Minimum Risk Areas	
X	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone X is the area determined to be outside the 500-year flood and/or protected by levee from 100-year flood.

Source: FEMA: Definitions of FEMA Flood Zone Designations

Dorchester County Flood Insurance Study indicates areas of Limit of Moderate Wave Action (LiMWA). LiMWA is defined as: Inland limit of the area affected by waves greater than 1.5 feet during the base flood. Base flood conditions between the VE Zone and the LiMWA will be similar to, but less severe than those in the VE Zone. According to 2015 Code: § 155-37 Floodplain Management District, Dorchester County, by resolution, agreed to meet the requirements of the National Flood Insurance Program and was accepted for participation in the program on October 15, 1981. As of that date, the initial effective date of the Dorchester County Flood Insurance Rate Map, all development and new construction as defined herein, are to be compliant with these regulations.

Map 14


FEMA Flood Zones
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Legend
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
Municipalities
Dorchester County
Maryland Counties
Sources:
FEMA Flood Zones;
Dorchester County Department of Planning & Zoning;
Smith Planning and Design
N
0 30 60 120 Miles
SMITH
Planning and Design, LLC

A report from the National Flood Insurance Program (NFIP) dated 30 June 2016 indicated a total of 1,572 flood insurance policies were filed for Dorchester County and its nine municipalities.

Table 30

NFPI Insurance Policies				
Location	Number of Policies		Total Insured Value	
	2011	20116	2011	2016
Cambridge	196	212	$44,598,400	$51,556,400
Church Creek	18	6	$2,337,000	$995,300
Eldorado	1	2	$135,500	$304,500
Galestown	2	0	$70,000	0
Hurlock	5	6	$1,470,000	$1,575,000
Secretary	21	27	$2,788,000	$5,295,100
Vienna	4	4	$1,189,300	$995,600
Dorchester County (Unincorporated)	1,400	1,315	$286,839,800	$305,486,000
Total	1,742	1,572	$353,546,800	$366,207,900

SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY NFIP INSURANCE REPORT, MARYLAND, 30 JUNE 2016

Of the nine municipalities in Dorchester County, six are located within close proximity to the floodplain of major waterbodies. These include Cambridge and Secretary next to the Choptank River, Eldorado and Brookview near Marshyhope Creek and Galestown and Vienna next to the Nanticoke River.

In comparing the information provided on Table 30, insurance policies increased within several municipalities, while decreasing in the unincorporated portions of Dorchester County. Notably, the number of policies holders in Church Creek have decreased by half. This may be attributed to the new DFIRM release. A majority of Church Creek was within Zone AE, however with the release of new DFIRMS in 2015, the municipality has been reassigned as Zone X. Properties owners may have reassessed the need for flood insurance and therefore, there is a decrease in the number of insurance policies by 50%.

Note: Flood insurance is available to anyone in the County and even those structures outside of the 100-year mapped floodplain area. Therefore, in some cases, the number of policies includes structures that are outside the 100-year mapped floodplain.

The June 2016 NFIP information provided the total claims reported since 1978, captured in and 2016, a slight increase has occurred in the unincorporated portions of Dorchester County and the City of Cambridge.

Table 31

NFPI Total Claims Since 1978				
Location	Number of Policies		Total Claims Value	
	2011	20116	2011	2016
Cambridge	56	59	$993,992	$1,004,029.08
Church Creek	4	4	$54,511	$54,511.22
Eldorado	0	0	$135,500	0
Galestown	0	0	0	0
Hurlock	0	0	0	0
Secretary	4	4	$76,526	$76,526.13
Vienna	0	0		0
Dorchester County (Unincorporated)	802	864	$15,353,290	$15,744,498.96
Total	885	931	$16,655,222	$16,879,565.39

SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY NFIP INSURANCE REPORT, MARYLAND, 30 JUNE 2016

Considering the amount of flood insurance policies and the number of claims that have been reported, identifying areas of repetitive loss within a community is a good indicator to use in determining areas of high flood damage vulnerability. While flood damage is not necessarily limited to these areas, repetitive loss data provides location indicators for areas where structures are experiencing recurring and costly flooding damage.

FEMA defines a repetitive loss property as:

- A property for which two or more claims of more than $1,000 have been paid by the NFIP within a ten-year period since 1978;
- A property 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; or
- A property 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.

As of June 2016, 46 repetitive properties containing single-family and commercial structures were located within Dorchester County and are as follows:

Bowen Road, Cambridge	(2) Bar Neck, Cambridge
Hudson Road,Cambridge	Heron Road, Cambridge
(2) Ragged Point Road, Cambridge	Ross Neck Road, Cambridge
Town Point Road, Cambridge	Twin Point Road, Cambridge
(2) Twin Point Cove Road, Cambridge	Casson Neck Road, Cambridge
Morris Neck Road, Cambridge	Ross Thumb Road, Cambridge
(2) Seabreeze Road, Cambridge	(2) Hoopers Island Road, FishingCreek
(2) David Greene Road, Cambridge	Creighton Road, Fishing Creek
Old House Point Road, Fishing Creek	Steamboat Wharf Road, Fishing Creek
Lodge Hall Road, Fishing Creek	Hoopersville Road, Hoopersville
Steamboat Wharf Road, Hoopersville	Taylors Island Road, Madison
Madison Canning House Road, Madison	Brooks Road, Madison
Old Madison Road, Madison	Parsons Drive, Madison
Hall Road, Taylors Island	(2) Hoopers Neck Road, Taylors Island
Taylors Island Road, Taylors Island	Wingate Road, Toddville
(2) Toddville Road, Toddville	Tedious Creek Road, Toddville
Wingate Point Road, Wingate	Taylors Island Road, Woolford
Lee Terrace, Woolford	Deep Water Road, Woolford
Vanada Way, Woolford	Brooks Road, Woolford

Note: There are no Severe Repetitive Loss Structures (SRL) located within Dorchester County.

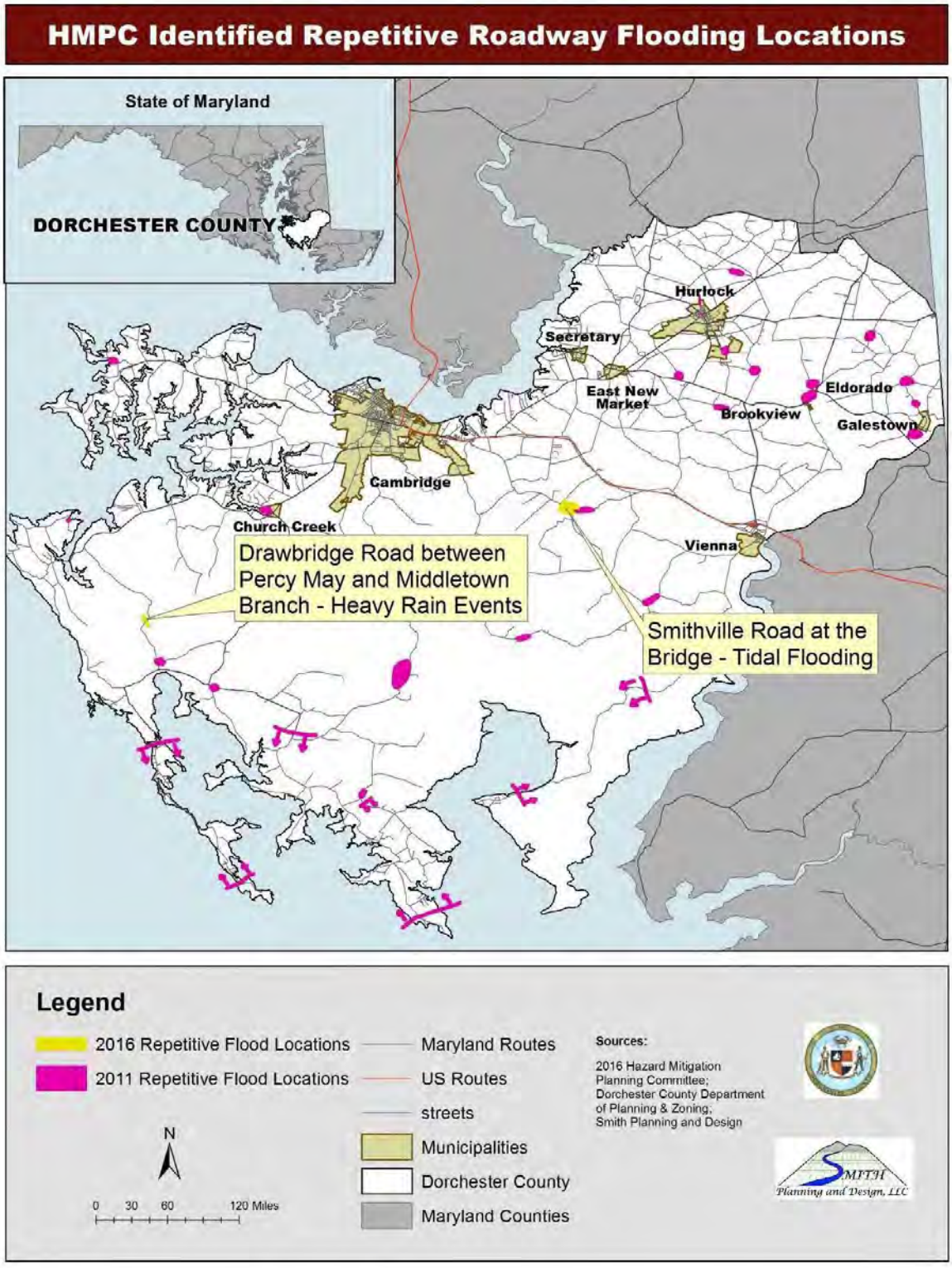
Coastal and riverine flooding are not the only hazards affecting the County and its municipalities. Several areas in the county and towns experience flooding due to water ponding along roadways and in low lying areas during heavy rain events. For example, the Town of Hurlock experiences this problem frequently during stormwater and road elevation issues.

In 2011, HMPC members were asked to provide information and locations on flooding issues within roadways. Members also ranked the listing of roadways according to priority. During the 7 September 2016 HMPC Meeting, Committee members were asked to review the previous roadway listing and provide modifications if necessary. Members were also requested to provide information and locations on any new roadway flooding issues. The 2016 HMPC committee identified two (2) new issues: flooding on

Drawbridge Road, which occurs during heavy rain events; and flooding on Smithville Road at the bridge which is caused by tidal flooding.

The following map illustrates each location identified as a repetitive flooding issue. Roadway issues identified in 2011 are denoted in pink, while the two (2) flood issues are denoted in yellow. A complete listing can be found in *Section 3 Mitigation Strategies: Chapter 13 Mitigation Actions*.

Map 15


HMPC Identified Repetitive Roadway Flooding Locations
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Drawbridge Road between Percy May and Middletown Branch - Heavy Rain Events
Smithville Road at the Bridge - Tidal Flooding
Legend
2016 Repetitive Flood Locations
2011 Repetitive Flood Locations
Maryland Routes
US Routes
streets
Municipalities
Dorchester County
Maryland Counties
N
0 30 60 120 Miles
Sources:
2016 Hazard Mitigation Planning Committee;
Dorchester County Department of Planning & Zoning;
Smith Planning and Design
SMITH
Planning and Design, LLC

An analysis was completed to determine critical and public facilities within the FEMA Flood, specifically those affected by high risk Flood Zones; A, AE, and VE. This vulnerability analysis concluded that five (5) critical facilities are located within Zone AE and are vulnerable to flooding. These facilities are considered critical facilities since they are intended to provide services to the communities in the event of a disaster, namely volunteer fire departments.

The fire departments include:

- Taylors Island Volunteer Fire Company – Flood Depth: 1.2 feet,
- Hooper's Island Volunteer Fire Company – Flood Depth: 3.0 feet,
- Lloyds Volunteer Fire Company – Flood Depth: 1.2 feet,
- Madison Volunteer Fire Company – Flood Depth: 0.8 feet; and
- Lake and Straits Volunteer Fire Company – Flood Depth: 2.6 feet.

During review of this information, HMCP members discussed the flood prone fire departments. Hooper's Island Volunteer Fire Company is at the greatest risk with the possibility of 3.0 feet of flooding during an event. As depicted below, the blue shading represents the flood waters that encompass the fire department as well as the surrounding area. The portion of the structure that the will have the highest flood depth is denoted as a red dot. The possible depth of flood at this point is measured at 3.0 feet.

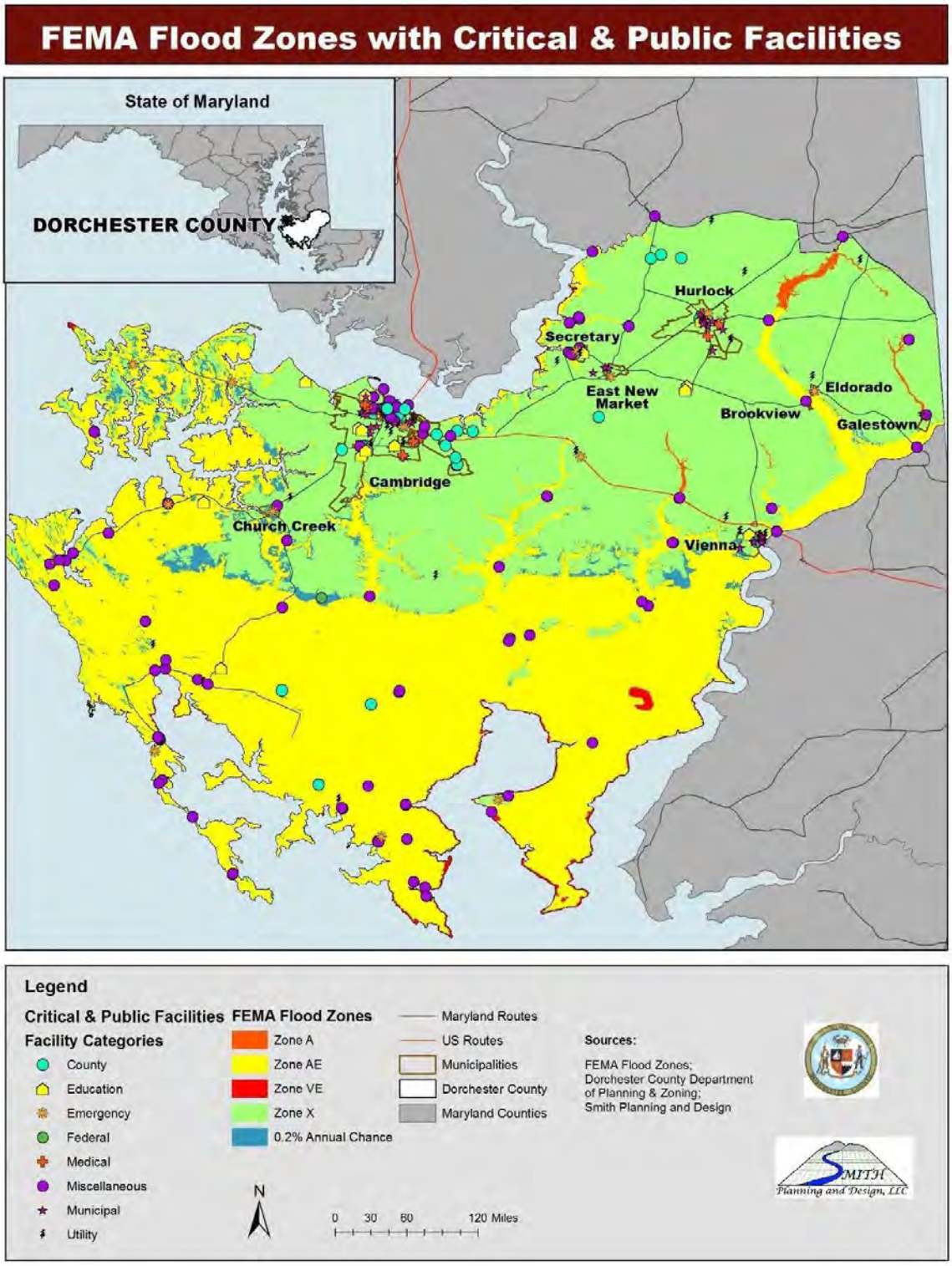
*Figure 9 - **Hooper's** Island Volunteer Fire Company*

The Madison Volunteer Fire Company/EMS Station 500 is affected by the lowest flood depth, however, precautions are taken during a flood event to ensure the Company is able to respond to an emergency. The County EMS staff moves the ambulance to higher ground during a heavy rain or tidal flood event. This happens when less than a foot of flooding occurs during a heavy rain event.

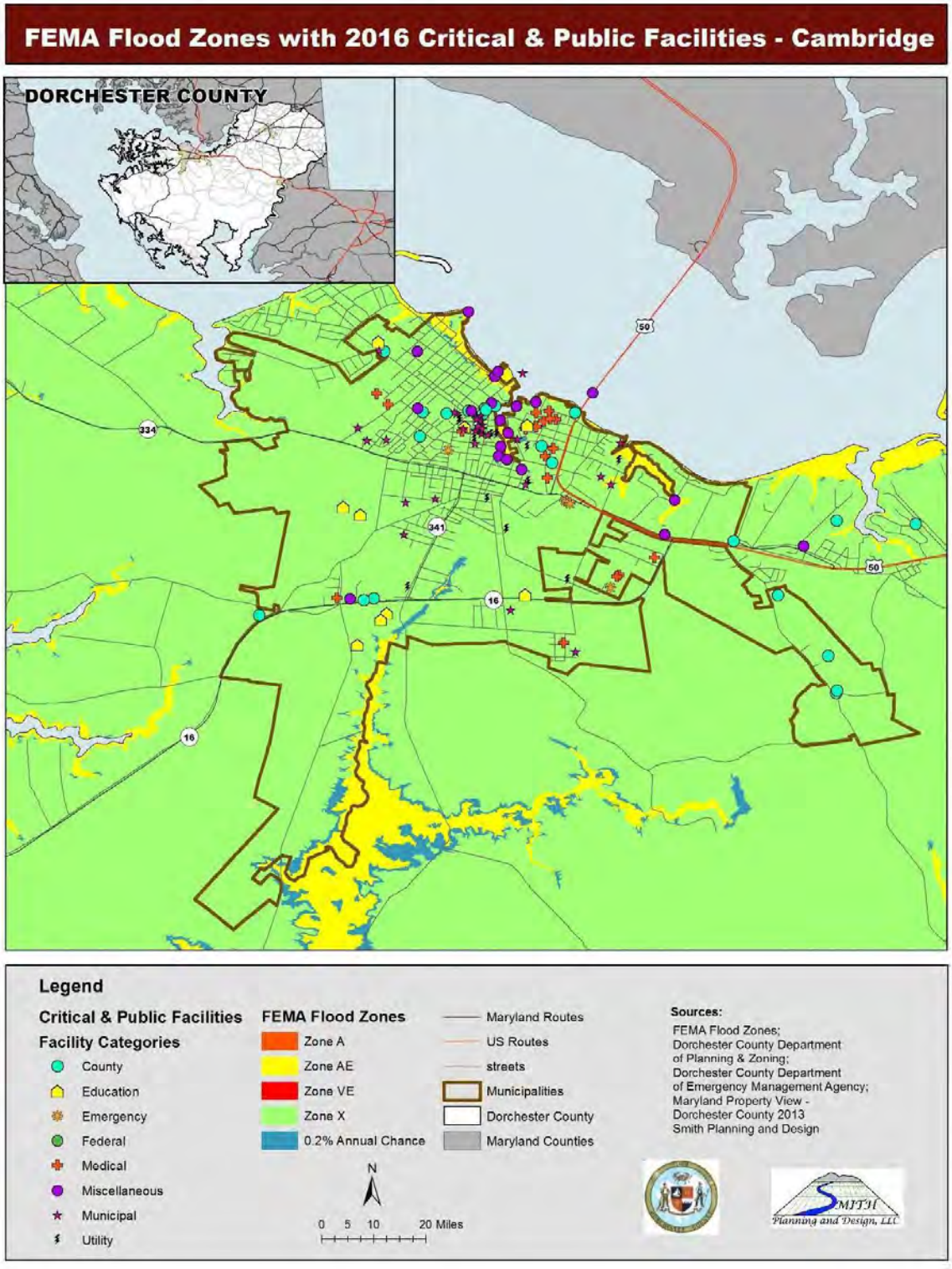
Figure 10 - Madison Volunteer Fire Company

The following maps, Maps 16-20 depicts the relation between FEMA Flood Zones and critical and public facilities. As seen on Map 16, the southern portion of the county is at highest risk for flooding. The northern section of Cambridge is affected due to the close proximity to the Choptank River. The majority of critical and public facilities are located within this area resulting in eleven (11) facilities being affected by Zone AE; Table 33.
Map 18 illustrates FEMA flood zones affecting the Town of Hurlock. Hurlock has minimal areas containing Flood Zones A, AE and 2-percent annual chance. The Town of East New Market however does not have flood zones located within the Town's corporate limits, Map 19. This map also depicts the Town of Secretary's proximity to FEMA Flood Zone AE. This flood zone surrounds a majority of the Town's border. The Town of Vienna contains Flood Zones AE and 2-percent annual chance; however, no public or critical facilities are affected; Map 20.

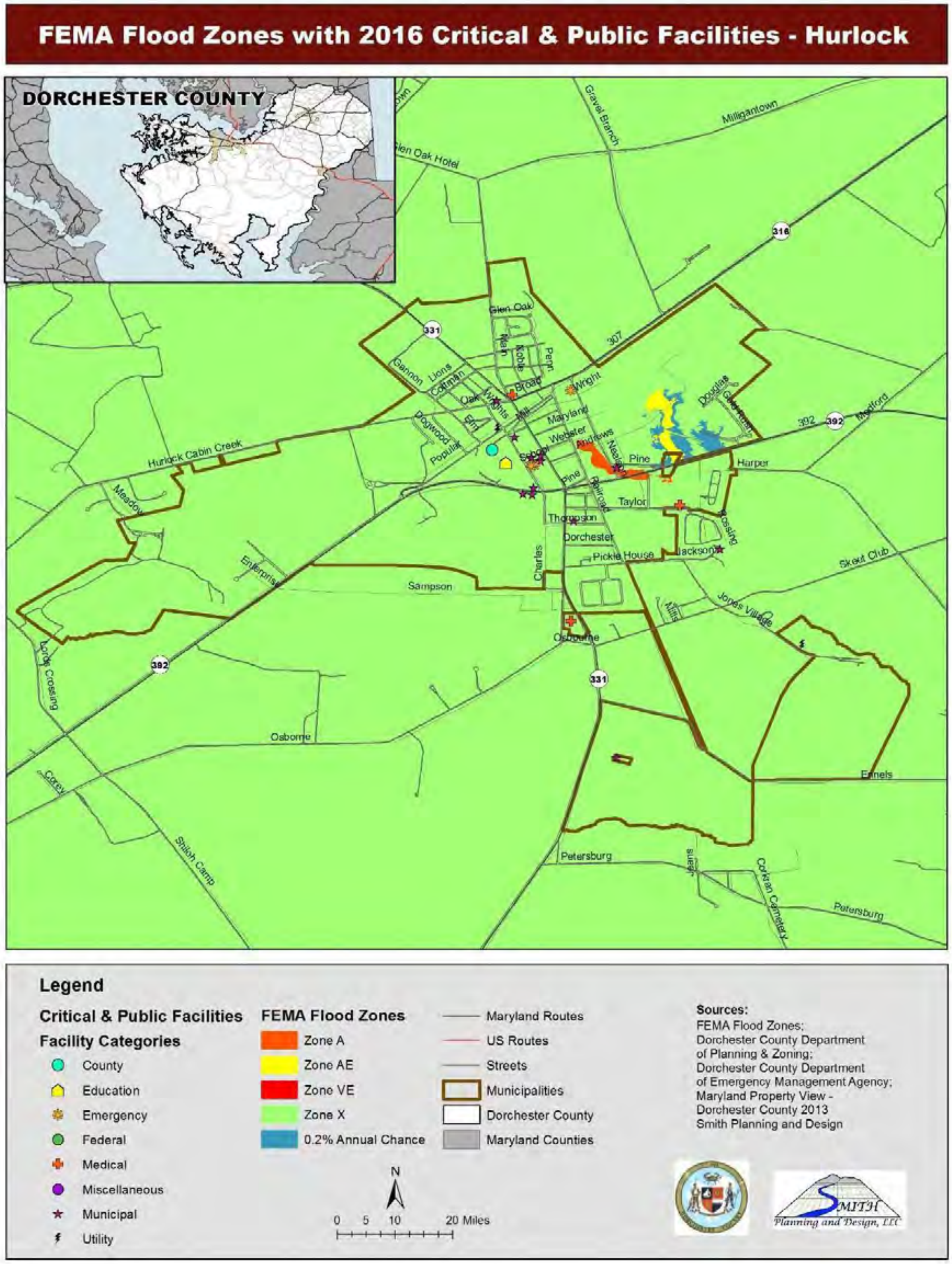
Map 16


FEMA Flood Zones with Critical & Public Facilities
State of Maryland
DORCHESTER COUNTY
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Cambridge
Church Creek
Vienna
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
Municipalities
Dorchester County
Maryland Counties
Sources:
FEMA Flood Zones;
Dorchester County Department of Planning & Zoning;
Smith Planning and Design
N
0 30 60 120 Miles
SMITH
Planning and Design, LLC

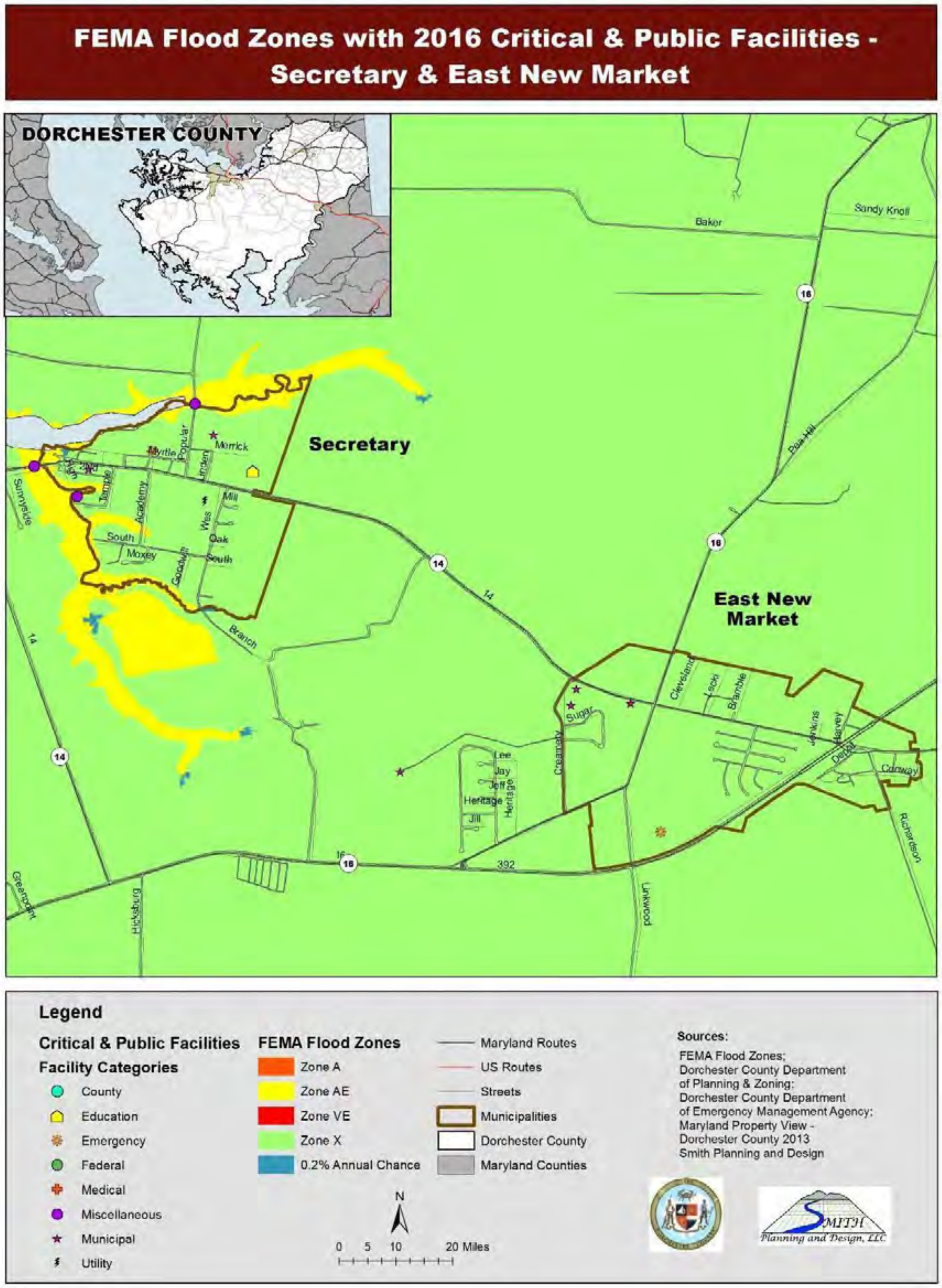
Map 17


FEMA Flood Zones with 2016 Critical & Public Facilities - Cambridge
DORCHESTER COUNTY
50
334
341
16
16
50
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
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
SMITH
Planning and Design, LLC

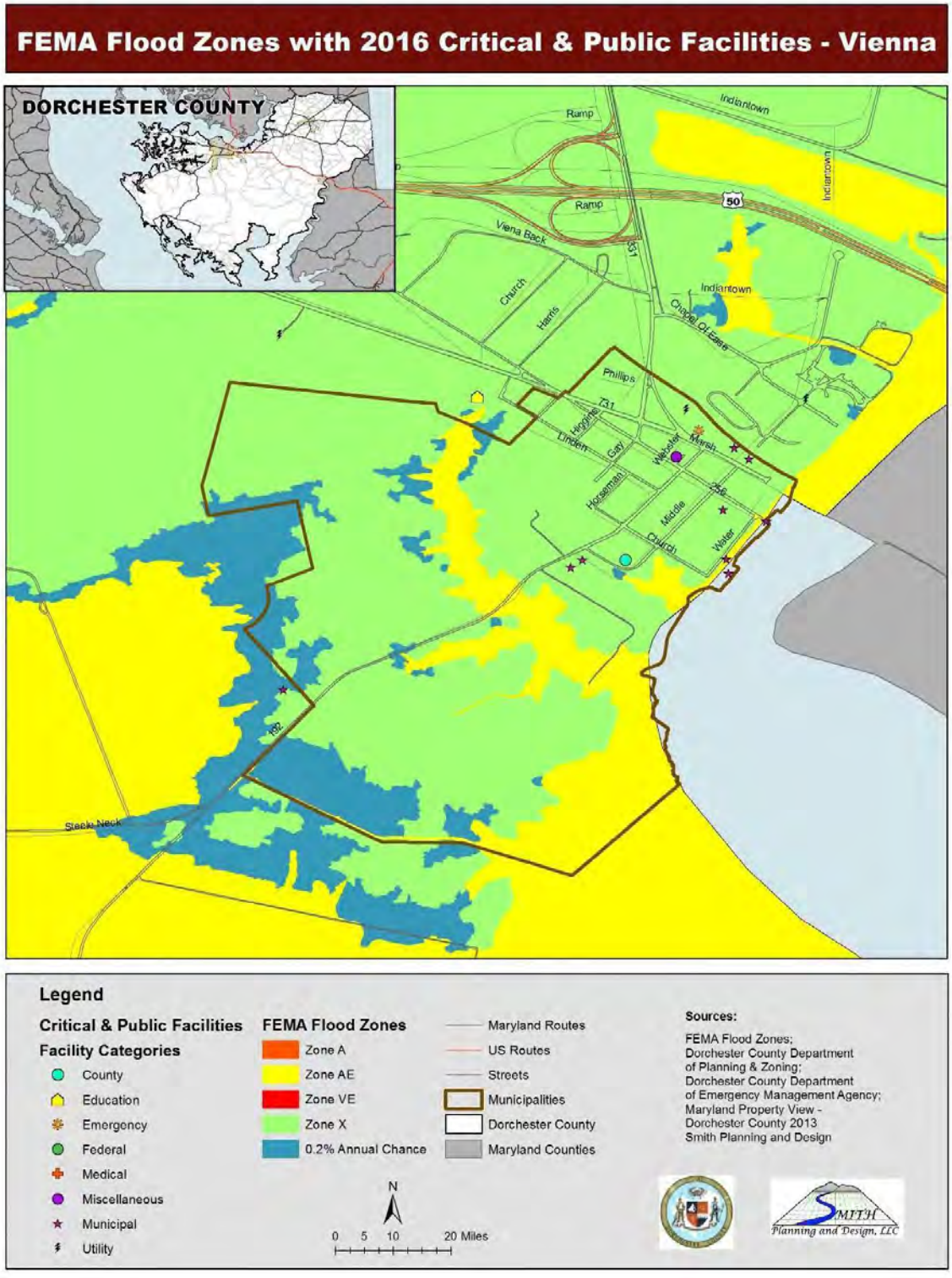
Map 18


FEMA Flood Zones with 2016 Critical & Public Facilities - Hurlock
DORCHESTER COUNTY
Gravel Branch
Milligantown
Glen Oak Hotel
316
331
Glen Oak
307
Gannon
Lions
Main
Noble
Penn
Broad
Wright
Oak
Maryland
Webster
Andrews
Dogwood
Poplar
School
Pine
Douglas
392
Medford
Harper
Hurlock Cabin Creek
Meadow
Taylor
Thompson
Dorchester
Pickle House
Jackson
Crossing
Skeet Club
Enterprise
Sampson
Charles
Jones Village
Osborne
Petersburg
Shiloh Camp
Corkran Cemetery
Ennels
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
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
SMITH Planning and Design, LLC

Map 19


FEMA Flood Zones with 2016 Critical & Public Facilities -
Secretary & East New Market
DORCHESTER COUNTY
Secretary
East New Market
Baker
Sandy Knoll
Pea Hill
Merrick
Myrtle
Poplar
Linden
Academy
Temple
Mill
Wes
Oak
South
Moxey
Goodwin
Branch
Sunnyside
Cleveland
Sugar
Bramble
Jenkins
Harvey
Conway
Richardson
Lee
Jay
Jeff
Heritage
Jill
Creamery
Linkwood
Hicksburg
Greenpoint
392
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
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

Map 20


FEMA Flood Zones with 2016 Critical & Public Facilities - Vienna
DORCHESTER COUNTY
Ramp
Indiantown
Ramp
50
Viena Back
Church
Harris
Indiantown
Chapel Of Ease
Phillips
731
Higgins
Linden
Gay
Webster
Marsh
Horseman
Middle
Church
Water
Steele Neck
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
FEMA Flood Zones
Zone A
Zone AE
Zone VE
Zone X
0.2% Annual Chance
Maryland Routes
US Routes
Streets
Municipalities
Dorchester County
Maryland Counties
N
0 5 10 20 Miles
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
SMITH
Planning and Design, LLC

The following table provides information on all 2016 critical and public facilities located within the high risk Flood Zones A, AE and VE.

Table 32

Critical and Public Facilities Located within FEMA Flood Zone A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	RT 531/Gales Creek	RT 531	N/A

Source: 2016 Hazard Mitigation Planning Committee

Table 33

Critical and Public Facilities Located within FEMA Flood Zone AE

Facility Category	Facility Type	Facility Detail	Address	City
County	County Government	Board of Education	Blackwater Road	Church Creek
County	County Government	County Facility	Lakesville Crapo Road	Crapo
County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge
Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek
Emergency	EMS	Station 500	1154 Taylors Island Road	Madison
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek
Emergency	Fire Department	Lloyds Volunteer Fire Department	Cambridge Hudson Road	Cambridge
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Emergency	Fire Department	Lakes and Straits Fire Company	2103 Farm Creek Road	Wingate
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	N/A	N/A
Miscellaneous	Bridge	RT 335/Honga River/Bay	N/A	N/A
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	N/A	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	N/A	N/A
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	N/A	N/A
Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	N/A	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	N/A	N/A
Miscellaneous	Bridge	RT335/Artificial Path (Off of Honga River)	N/A	N/A
Miscellaneous	Bridge	RT 335/Artifical Path	N/A	N/A
Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	N/A	N/A
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	N/A	N/A
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	N/A	N/A
Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	N/A	N/A
Miscellaneous	Bridge	RT 335/Blackwater River	N/A	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	N/A	N/A
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	N/A	N/A
Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	N/A	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	N/A	N/A
Miscellaneous	Bridge	RT 335/Buttons Creek	N/A	N/A
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	N/A	N/A
Miscellaneous	Bridge	RT 16/Parsons Creek	N/A	N/A
Miscellaneous	Bridge	State-Vienna Bridge	N/A	N/A
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	N/A	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	N/A	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	N/A	N/A
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	N/A	N/A
Miscellaneous	Bridge	RT 313/Artificial Path	N/A	N/A
Miscellaneous	Bridge	Shore Drive/Shoal Creek	N/A	N/A
Miscellaneous	Bridge	RT 14/Marshyhope Creek	N/A	N/A
Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	N/A	N/A
Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	N/A	N/A
Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	N/A	N/A
Miscellaneous	Bridge	Langrell Road/Hunting Creek	N/A	N/A
Miscellaneous	Bridge	State-Market Street/Cambridge Creek	N/A	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	N/A	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	N/A	N/A
Miscellaneous	Bridge	RT 14/Artifical Path (Off of Warwick River)	N/A	N/A
Miscellaneous	Marina/Dock		6325 Snug Harbor Road	East New Market
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island
Miscellaneous	Marina/Dock		Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek
Miscellaneous	Marina/Dock	N/A	Doeller Road	Fishing Creek
Miscellaneous	Marina/Dock	N/A	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock	N/A	2100 Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	N/A	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	N/A	Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	N/A	Maple Dam Road	Cambridge
Miscellaneous	Marina/Dock	N/A	N/A	N/A
Miscellaneous	Marina/Dock	N/A	N/A	N/A
Miscellaneous	Marina/Dock	N/A	6304 Suicide Bridge Road	Hurlock
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island
Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge
Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge
Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water St	Vienna
Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo
Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo
Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek
Utility	Utility	Verizon	2837 Hoopers Island	Church Creek

Source: 2016 Hazard Mitigation Planning Committee

Table 34

Critical and Public Facilities Located within FEMA Flood Zone VE

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville
Miscellaneous	Marina/Dock	N/A	N/A	N/A

Source: 2016 Hazard Mitigation Planning Committee

The southern portion of the County is most at-risk to flooding due to low elevations.

Loss Estimations

Loss estimates were calculated for critical and public facilities utilizing structure values derived from the *2013 Maryland Tax Assessment*, the most recent data available. Total losses estimated for critical and public facilities located with Flood Zones A, AE and VE equaled $12,145,290.

Table 35

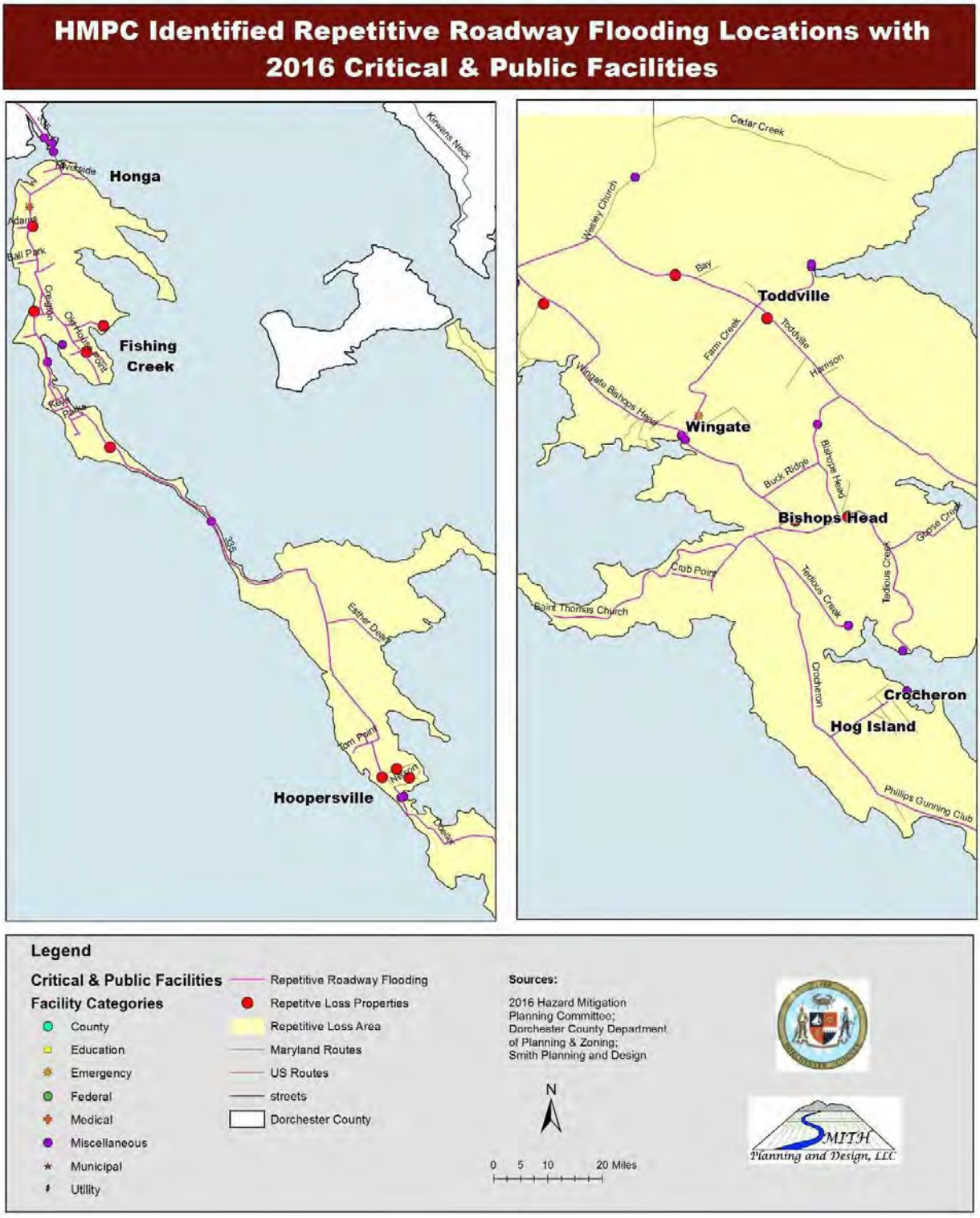
Loss Estimations for Critical and Public Facilities		
Facility Category	*Loss Estimate*	
	2011	*2016*
County	$244,200	$1,602,400
Education	$2,2466,200	$2,466,200
Emergency	$1,811,600	$1,507,000
Miscellaneous	$5,531,040	$5,966,090
Municipal	$952,400	$303,600
Utility	$564,100	$300,000
Total	$31,571,551	$12,145,290.00

Source: 2013 Maryland Tax Assessment

Overall, the loss estimate for critical and public facilities has decreased since 2011. This decrease is due to the revised DFIRMS released in March 2015, which decreased the land area within FEMA Flood Zones countywide. According to the FEMA Flood Risk Report, January 2016, the Special Flood Hazard Area for Dorchester County decreased by 26.4 square miles.

Furthermore, in reviewing critical and public facilities that are within close approximation to HMPC identified roadway flood issues, several facilities are located in areas of concern. According to HMPC members, 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 has been 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. The following map, Map 21, depicts these areas of concern.

Map 21


HMPC Identified Repetitive Roadway Flooding Locations with 2016 Critical & Public Facilities
Honga
Fishing Creek
Hoopersville
Kirwans Neck
Cedar Creek
Wesley Church
Bay
Toddville
Farm Creek
Harrison
Wingate Bishops Head
Wingate
Buck Ridge
Bishops Head
Bishops Head
Goose Creek
Crab Point
Tedious Creek
Point Thomas Church
Crocheron
Hog Island
Phillips Gunning Club
Legend
Critical & Public Facilities
Facility Categories
County
Education
Emergency
Federal
Medical
Miscellaneous
Municipal
Utility
Repetitive Roadway Flooding
Repetitive Loss Properties
Repetitive Loss Area
Maryland Routes
US Routes
streets
Dorchester County
Sources:
2016 Hazard Mitigation Planning Committee;
Dorchester County Department of Planning & Zoning;
Smith Planning and Design
N
0 5 10 20 Miles
SMITH
Planning and Design, LLC

Chapter 8 Winter Weather

Profile

The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. According to the Maryland State Archives, the average seasonal snowfall total for Maryland is 20.6 inches. Snowfall ranges from 10 inches on the lower Eastern Shore to 110 inches in Garrett County annually. One of the highest snowfalls ever recorded in a single winter in Maryland was during the winter of 2009-10, when 262.5 inches of snow fell at Keyser's Ridge in Garrett County. In comparison, Dorchester County averages13 inches of snowfall annually, according to the National Weather Service.

The most recent severe winter storm affecting Maryland occurred on January 22-24, 2016. FEMA Emergency Assistance was provided for a period of 48 hours for (17) seventeen counties and the City of Baltimore. Dorchester County was not designated for assistance. According to NOAA, Dorchester County had 5-13 inches of recorded snowfall across the county. While the above is true for much of the state, winter storms in the County occur with less frequency and are usually less severe in terms of cold temperature, snow accumulation and the amount of time snow is on the ground. As noted in the County Profile, Dorchester County normally receives between 12 and 15 inches of snow per season.

While each winter season brings with it the possibility of major snow and ice storms, some winter storms in Maryland do stand out for their severity and duration. Storms that stand out include the winter storm of 1979, which dropped morethan two feet of snow in Ocean City and the President's Day storm in 2003 that resulted in more than 19 inches of snow in Cambridge. As far as cold weather is concerned, in 1912, temperatures dropped to nearly -20° F over much of the State. During a prolonged cold spell in 1977, much of the Chesapeake Bay froze over for an extended period of time.

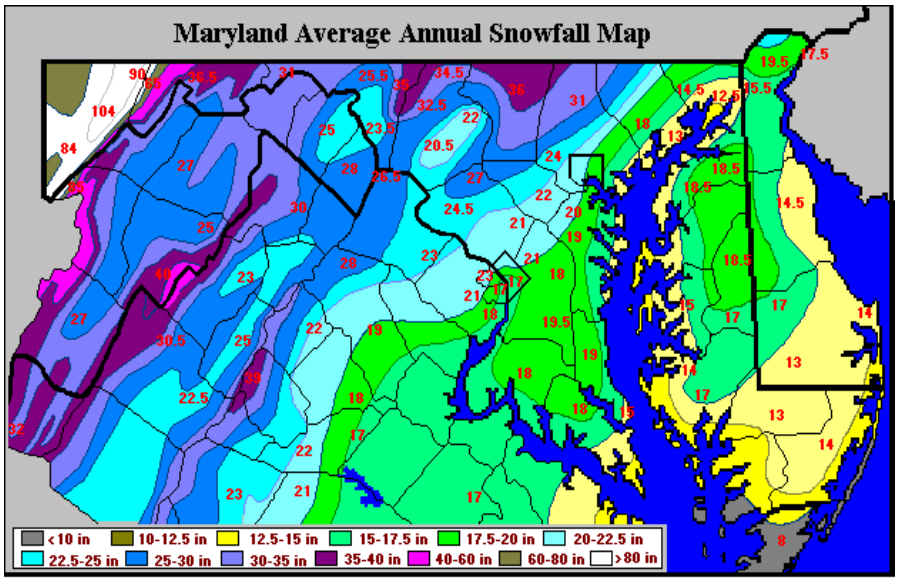


Figure: 11
Source: NOAA

Heavy snowfall and extreme cold can be detrimental to an entire region by immobilizing emergency vehicles or closing evacuation routes. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold, which can result in not only in closed highways but also flooding, storm surge, downed power lines and hypothermia.

Table 36

Winter Storm Events		
Date	*Event*	*Event Narrative*
December 28, 1993	Heavy Snow	No Report
January 6, 1996	Winter Storm	A major winter storm (popularly known as the "blizzard of "96) affected much of the mid-Atlantic region during the weekend of January 6-8, 1996.
February 2, 1996	Winter Storm	Winter storm tracked northeast from the gulf coast states to off the Virginia coast. It spread heavy snow across the lower Maryland eastern shore from early Friday morning into Sunday afternoon. Snow amounts generally ranged from 12 to 24.
February 8, 1997	Winter Storm	Dorchester County, 3 to 4.5 inches of snow accumulated.
December 23, 1998	Ice Storm	The heavy ice accumulations on trees and power lines caused numerous power outages across the region. Many accidents occurred due to slippery road conditions, especially bridges and overpasses. Many secondary roads were impassable due to fallen tree limbs and in a few cases, whole trees.
March 9, 1999	Winter Storm	Dorchester County, 3 to 4.5 inches of snow accumulated.
January 20, 2000	Winter Storm	The highest totals were recorded in the northwestern sections of the County. Snow fell heavily for several hours during the early morning, creating hazardous conditions on area highways.
January 25, 2000	Winter Storm	A significant winter storm affected Dorchester County with between 9 and 14 inches of snow. Snow mixed with sleet and freezing rain during the morning and early afternoon hours.
February 22, 2001	Winter Storm	Cambridge reported 5". Local law enforcement agencies reported numerous accidents, some of which involved injuries. Schools were dismissed early and most were closed the following day due to slippery road conditions.
December 4, 2002	Winter Storm	Cambridge in Dorchester County 4.5". Local law enforcement agencies reported numerous accidents. Most schools were closed Thursday, December 5th and Friday, December 6th due to very slippery road conditions.
January 3, 2002	Winter Storm	Dorchester County 5-6"
January 16, 2003	Winter Storm	Winter storm produced 3 to 5 inches of snow. Schools were closed Friday, January 17th due to very slippery road conditions.
February 6, 2003	Winter Storm	A winter storm produced 3 to 7 inches of snow across Dorchester County.
February 15, 2003	Winter Storm	Far north portion of Dorchester County 15", Cambridge in Dorchester County 13", Southern portion of Dorchester County 10". Local law enforcement agencies reported numerous accidents. Schools were closed Monday, February 17th due to very slippery road conditions.
February 8, 2003	Winter Storm	Cambridge and Hurlock in Dorchester County received 3".
January 22, 2005	Winter Storm	A mixture of snow, sleet and freezing rain produced two to four inches of snow, and 1/8 to 1/4 of an inch. The mixture of precipitation caused numerous power outages, and roadways were very slippery resulting in many accidents. The highest snow amounts were reported in Cambridge in Dorchester County 4", Vienna in Dorchester County 3.5".
December 5, 2005	Winter Storm	A winter storm produced three to as much as six inches of snow and sleet. The snow caused hazardous driving conditions, which resulted in numerous accidents. Dorchester County received 4-6".
February 12, 2006	Winter Storm	A winter storm produced four to as much as seven inches of snow across Dorchester County. The snow caused hazardous driving conditions, which resulted in numerous accidents. The highest amounts were reported in Hurlock 7.5", and Cambridge 7".

Date	Event	Event Narrative
March 1, 2009	Winter Storm	Snowfall amounts were generally between four and eleven inches across the County. Church Creek reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
December 18, 2009	Winter Storm	Snowfall amounts were generally between four and fourteen inches across the County. Cambridge reported 14.0 inches of snow. Eldorado reported 9.0 inches of snow.
January 30, 2010	Winter Storm	Snowfall amounts were generally between six and thirteen inches across the County. Toddville reported 13.0 inches of snow. Vienna reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
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January 30 to January 31, 2010	Winter Storm	Snowfall amounts were generally between six and thirteen inches across the county. Toddville reported 13.0 inches of snow. Vienna reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
February 5 to February 6, 2010	Winter Storm	Snowfall amounts were generally between ten and twenty inches across the county. Hurlock reported 20.0 inches of snow. Toddville reported 18.0 inches of snow. Cambridge reported 16.0 inches of snow.
February 9 to February 10, 2010	Blizzard	Snowfall amounts were generally between six and fifteen inches across the county. Toddville reported 15.0 inches of snow. Cambridge reported 12.0 inches of snow. Snow, heavy at times, occurred with northwest winds 30 to 40 mph with gusts to 50 mph, resulting in poor visibilities and even whiteout conditions.
December 16, 2010	Winter Weather	Snowfall amounts were generally between one inch and three inches across the county. Toddville reported 1.8 inches of snow.
December 25 to December 27, 2010	Winter Storm	Snowfall amounts were generally between four and seven inches across the county. Cambridge reported 5.0 inches of snow.
January 26 to January 27, 2011	Winter Weather	Snowfall amounts generally ranged between one half inch and two inches across the county. Cambridge reported 1.5 inches of snow.
March 27, 2011	Winter Weather	Snowfall amounts were generally between one and two inches across the county.
February 11 to February 12, 2012	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Cambridge reported 1.5 inches of snow.
February 19 to February 20, 2012	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Toddville reported 1.5 inches of snow.
January 17 to January 18, 2013	Winter Weather	Snowfall amounts were generally around one inch across the county.
January 24, 2013	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Cambridge reported 1.5 inches of snow.
December 8, 2013	Winter Weather	Freezing rain produced between 0.10 inch and 0.20 inch of ice accumulation. This resulted in slick roadways and scattered power outages.
January 2 to January 3, 2014	Winter Storm	Snowfall amounts were generally between three inches and five inches across the county. Cambridge reported 5.0 inches of snow.
January 21 to January 22, 2014	Winter Storm	Snowfall amounts were generally between two inches and five inches across the county. Vienna reported 4.5 inches of snowfall. Linkwood reported 2.2 inches of snowfall.
January 28 to January 29, 2014	Winter Storm	Snowfall of 5.5 inches was reported in Toddville and 5.0 inches of snow was reported at Cambridge.
February 12 to February 13, 2014	Winter Weather	Snowfall amounts were generally between one inch and four inches across the county. Cambridge reported between 2.0 inches and 4.0 inches of snow.
March 3, 2014	Winter Storm	Snowfall amounts were generally between three inches and five inches across the county. Cambridge received between 3.0 inches and 5.0 inches.
March 16 to March 17, 2014	Winter Storm	Snowfall of 6.0 inches occurred 3 miles south of Cambridge and snowfall of 5.0 inches occurred in Cambridge.

Date	Event	Event Narrative
March 25, 2014	Winter Weather	Between 2.0 inches and 4.0 inches of snowfall was reported throughout the county. Snowfall reported of 5.5 inches occurred in East New Market with 3.0 inches reported in Cambridge.
February 16 to February 17, 2015	Winter Storm	Snowfall amounts were generally between four inches and seven inches across the county. Cambridge (3 S) reported 7.2 inches of snow.
February 26, 2015	Winter Storm	Snowfall amounts were generally between three inches and seven inches across the county. Vienna reported 7.0 inches of snow. Cambridge (3 S) reported 3.0 inches of snow.
March 1, 2015	Winter Weather	Ice accumulations ranged from a trace to .10 inch. Cambridge (3 ESE) reported .10 inch of ice.
March 3, 2015	Winter Storm	Snowfall amounts were generally between three inches and six inches across the county. Cambridge reported 4.0 to 5.0 inches of snow.
January 22 to January 23, 2016	Winter Storm	Strong Low Pressure moving from the Southeast United States northeast and off the Mid Atlantic Coast produced between three and thirteen inches of snow and strong winds across the Lower Maryland Eastern Shore. Snowfall totals were generally between 5 inches and 13 inches across the county. Cambridge (3 S) reported 13.0 inches of snow.

SOURCE: NWS, NCEI (NOAA)

The *NWS, NCEI* listed a total of 44 substantial winter storm events affecting Dorchester County from 1993-2016. Therefore, Dorchester County experiences 1.83 substantial winter storm events per year.

Vulnerability Analysis

Critical and public facilities' vulnerability to winter storms depends on the age of the building (and the building codes in effect at the time it was built), type of construction, and condition of the structure (how well it has been maintained).

The following critical and public facilities were built prior to 1960, before the International Building Code was enforced, and may be at a higher risk due to age of construction and lack of building codes during the time period.

Table 37

Critical and Public Facilities Constructed Prior to 1960

Facility Category	Facility Type	Facility Detail	Address	City
County	County Government	Dorchester County Circuit Court House	206 High Street	Cambridge
County	County Government	Board of Education	Blackwater Road	Church Creek
County	County Government	Board of Education	610 Glasgow Street	Cambridge
County	County Government	St. Clair Head Start/Day Care Center	824 Fairmount Ave	Cambridge
County	County Government	County Facility	Lakesville Crapo Road	Crapo
Education	College	Chesapeake College-Cambridge Center	0 High Street	Cambridge
Education	Public School	Cambridge Christian Academy	207 Maryland Ave	Cambridge
Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek
Emergency	Fire Department	Lloyds Volunteer Fire Department	Cambridge Hudson Road	Cambridge
Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek
Emergency	Fire Department/EMS	Hurlock Volunteer Fire Company	301 Charles Street	Hurlock
Emergency	Fire Department/EMS	Eldorado-Brookview Volunteer Fire Comany	5752 Rhodesdale Eldorado Road	Rhodesdale
Medical	Hospital	Dorch General Hospital	300 Byrn Street	Cambridge
Medical	Hospital	Choptank Community Health System	503 Muir Street	Cambridge
Medical	Medical	HUMBERTO A ROSSI. M.D.PA	305 Maryland Ave	Cambridge
Medical	Medical	MS SHARIFF M.D.PA	105 Aurora Street	Cambridge
Medical	Medical	SPECIAL HOME	210 Henry Street	Cambridge
Medical	Medical	MARY ANN D. MOORE MDPA	300 Dorchester Ave	Cambridge
Medical	Medical	ROSE HILL FAMILY PHYSICIANS LLC	319 Dorchester Ave	Cambridge

Facility Category	Facility Type	Facility Detail	Address	City
Medical	Medical	Delmarva Community Services	6210 Shiloh Church Hurlock Road	Hurlock
Medical	Nursing Home		311 Glenburn Ave	Cambridge
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Community Center	Dorchester Family YMCA	201 Talbot Ave	Cambridge
Miscellaneous	Community Center	Cokesbury Community Center	5957 Cokesbury Road	Federalsburg
Miscellaneous	Marina/Dock			
Miscellaneous	Museum	Dorchester Arts Center	120 High Street	Cambridge
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island
Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna
Miscellaneous	Museum		321 High Street	Cambridge
Municipal	Municipal Government	Cambridge Utilities	312 High Street	Cambridge
Municipal	Municipal Government	East New Market Housing Authority	40 Academy Street	East New Market
Municipal	Municipal Government	Cambridge-District Court	310 Gay Street	Cambridge
Municipal	Municipal Government	Secretary Town Hall	122 Main Street	East New Market
Municipal	Municipal Government	Mayor & Council of Hurlock		
Municipal	Municipal Government	Hurlock-Office Building	220 S Main Street	Hurlock
Municipal	Municipal Government	Cambridge-Public Works	100 Brohawn Avenue	Cambridge
Municipal	Municipal Government	Vienna-Parks & Recreation	113 Ocean Gateway	Vienna
Municipal	Municipal Government	Galestown Community House	5538 Wheatley Church Road	Rhodesdale
Municipal	Municipal Government	East New Market Town Office	10 Academy Street	East New Market
Utility	Communication	Tower #11	4814 Madison Canni House Road	Madison
Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo
Utility	Utility	Municipal Utilities Commission	105 Brohawn Ave	Cambridge
Utility	Utility	Vienna Power Plant	0 Chapel of Ease Ro ad	Vienna
Utility	Utility	Water Treatment Plant	3723 Greenpoint Road	East New Market

Source: 2016 Hazard Mitigation Planning Committee

Loss Estimations

The possible loss estimates for critical and public facilities that could be damaged during a winter storm totaled $38,064,850. This estimate was calculated utilizing the *2013 Maryland Tax Assessment*.

Table 38

Loss Estimations for Critical and Public Facilities

Facility Category	Loss Estimate
County	7954300
Education	13268300
Emergency	2362200
Medical	2863200
Miscellaneous	5140470
Municipal	3877680
Utility	2598700
Total	$38,064,850

Source: 2013 Maryland Tax Assessment

All critical and public facilities within the County are vulnerable to severe winter storms through the potential of disruption in services and transportation systems as well as possible structure failure due to heavy snow loads. However, the following facilities built prior to 1960 should have a higher importance considering their significance to the well-being of Dorchester County residents.

- Lloyds Volunteer Fire Department
- Neck District Volunteer Fire Company
- Hurlock Volunteer Fire Company
- Madison Volunteer Fire Company
- Eldorado-Brookview Volunteer Fire Company
- Taylors Island Volunteer Fire Company
- Hoopers Island Volunteer Fire Company
- Dorchester General Hospital
- Choptank Community Health System

Chapter 9 Thunderstorm, Hail, Wind & Tornado

Thunderstorm

Profile

Thunderstorms are usually high intensity storms of short duration originating in a warm moist air mass that either is forced to rise by mountainous terrain or by colliding with a cooler dense air mass. The process of convection in the atmosphere brings about the release of moisture from the warm air mass as it raises, cools and condenses. This condensation proceeds until most of the moisture in the air mass has been released as precipitation. Since the motion of the air is nearly vertical and attains high velocities, rainfall is intense and generally concentrated over a small area in a short time frame. Thunderstorms can be 10-15 miles in diameter and normally last 20-30 minutes. Lightning, high winds, hail, and occasionally tornadoes are associated with thunderstorms.

When wind speeds exceed 58 mph, thunderstorms are considered severe. A downburst of cold air during a severe thunderstorm can result in straight line winds up to 134 mph. One of the most extreme hazards from thunderstorms is lightning strike. Lightning has been known to strike up to 6-10 miles from the center of a storm. It is estimated that more than 30,000,000 points on the ground in the continental 48 states are hit by lightning every year.

Table 39

Lightning (Strikes)			
Location	Date	Event Narrative	Property Damage
Woolford	July 24, 1995	House set on fire by lightning. No significant damage reported.	Not Available
Cambridge	June 29, 2008	Lightning strike produced a fire which destroyed a home on Higgins Mill Road in Cambridge.	$100,000
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Cambridge	July 23, 2014	Lightning strike caused a fire which produced electrical damage to an apartment on Willis Street in Cambridge.	$20,000
Cambridge	July 23, 2014	Lightning strike caused a fire which produced extensive structural damage to a house on Castle Haven Road in Cambridge.	$100,000

SOURCE: NWS, NCEI (NOAA)

A total number of (4) four lightning events affecting the County between 1995 and 2016 were listed in the *NWS, NCEI* database. Therefore, the probability of occurrences is 0.2 lightning events per year for Dorchester County.

Vulnerability Analysis

Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water. Intense thunderstorms can produce rapid runoff, particularly in the headwaters of small stream basins. In urban areas runoff from stormwater is a problem for downstream property owners when new construction occurs upslope from existing developed areas.

The municipalities of Dorchester County face the same threat from thunderstorms as the County in terms of stormwater issues. In some cases, in older developed areas, inadequate stormwater management contributes to ponding from runoff in low lying residential areas or in older residential areas down slope from new construction.

Hail

Profile

Source: NOAA

Hail is a form of solid precipitation that mostly consists of water and has been measured between 0.20 inches to 5.9 inches in diameter. The larger hail stones come from severe thunderstorms and can occur within two miles of the parent thunderstorm.

Thunderstorms provide the strong, upward motion of air and lower heights for freezing from which hail is formed. The hail stones are suspended in the air by the strong upward motion of air until the weight of the hail overcomes the updraft and falls to the ground. The velocity at which hail falls to the ground is dependent on several factors: size of the stone, friction in the air, motion of the wind, collisions with other precipitation, and the melting factor. A hail stone measured at 0.39 inches falls at a rate of 20 mph while a larger stone, 3.1 inches in diameter, falls at a rate of 110 mph.

Since 1958, (25) twenty-five hail events have affected Dorchester County. One of the largest recorded event occurred in the Town of Church Creek with golf ball to tennis ball sized hail, in 2002. Damaging hail events have been reported between March and September; however, the majorities of these has occurred during the month of May and occur countywide. More recently, another event occurred in 2009 in Drawbridge, with golf size hail. During the planning cycle 2011-2016, two hail events occurred with quarter size hail.

Table 40

Historical Hail Events

Location	Date	Event Narrative	Magnitude
Dorchester	5/4/1958	No Report	1.75 in.
Dorchester	5/10/1990	No Report	1.75 in.
Taylors Island	8/16/1996	No Report	0.88 in.

Location	Date	Event Narrative	Magnitude
Cambridge	3/29/1997	No Report	0.75 in.
East New Market	6/2/1998	No Report	1.00 in.
Cambridge	6/26/1998	No Report	0.75 in.
Cambridge	4/9/1999	No Report	1.00 in.
Secretary	4/23/1999	No Report	2.00 in.
Toddville	7/14/2000	No Report	1.00 in.
Vienna	5/22/2001	No Report	1.00 in.
Hudson	5/22/2001	No Report	1.75 in.
Madison	7/4/2001	No Report	1.00 in.
Cambridge	7/4/2001	Widespread 3/4 inch hail.	1.00 in.
Cambridge	7/5/2001	No Report	1.00 in.
Linkwood	7/5/2001	No Report	1.75 in.
Church Creek	4/28/2002	Golf ball to tennis ball size hail. Largest hail was either egg shaped or disk shaped.	2.50 in.
Bucktown	8/29/2003	No Report	0.75 in.
Crapo	9/20/2005	No Report	0.88 in.
Wingate	6/12/2007	Quarter size hail fell in Wingate.	1.00 in.
Cambridge	6/12/2007	Penny to quarter size hail fell in Cambridge.	1.00 in.
Cambridge	8/26/2007	Penny size hail was reported by a deputy in Cambridge.	0.75 in.
Drawbridge	5/9/2009	Golf ball size hail reported in Cokeland.	1.75 in.
Hurlock	5/29/2009	Penny size hail was reported.	0.75 in.
		2017 HMP Update	
Cambridge	7/28/2012	Quarter size hail was reported.	1.00 in.
Cambridge	7/28/2012	Quarter size hail was reported.	1.00 in.

SOURCE: NWS, NCEI (NOAA)

The *NWS, NCEI* listed a total of (25) twenty-five hail events affecting Dorchester County between 1958 and 2017. Therefore, Dorchester County experiences 0.43 hail events per year.

Vulnerability Analysis

A severe weather warning is issued for hail stones that have reached a damaging size, since serious damage to man-made structures and farmers' crops can be the result. Therefore, the National Weather Service will issue a severe thunderstorm warning when hail stones are 1" or greater in diameter. Damage to any of the critical and public facilities could be detrimental to the County, especially if the Emergency Services facilities were affected. Additionally, the damage to crops during a hail event is a significant concern for the agricultural community.

Multi-peril crop insurance is a valuable risk management tool that allows growers to insure against losses due to adverse weather conditions. Crop insurance policies are available for at least one commodity in every county in Maryland, with a total of 20 agricultural enterprises represented across the state. Field crops covered include corn, corn silage, soybeans, wheat, barley, spring oats, grain sorghum, forage seeding, forage production (including pasture), and tobacco. Field crops account for 99% of all the acres covered by crop insurance in Maryland and represent about 80% of the value of insurance protection sold on a per acre basis.

Farmers have a wide range of crop insurance policies from which to choose from. Catastrophic crop insurance (CAT) was introduced in 1995 to replace ad hoc disaster assistance programs enacted by Congress with an insurance-based producer safety net that reflects farmers' actual production history. Two Federal Disaster Assistance Programs are the Noninsured Disaster Assistance Program (NAP) and Supplemental Revenue Assistance Payments (also known as SURE; it is the new crop disaster assistance program authorized under the 2008 Farm Bill).

- **Noninsured Disaster Assistance Program (NAP)**
  The Noninsured Crop Disaster Assistance Program (NAP) provides benefits to producers of commercial agricultural products for which multi-peril crop insurance coverage is not available. NAP is designed to reduce financial losses when natural disasters cause catastrophic reduction in production. NAP provides coverage that is very similar to that provided by CAT policies available through crop insurance agents. NAP coverage is available through your local USDA Farm Service Agency office. To purchase NAP coverage, you pay a fee of $250 per crop per county (with fees capped at $750 per producer per county, but not to exceed a total of $1,875 for producers growing crops in multiple counties). Sign up deadlines for NAP vary by crop; contact your local FSA office for more information.

- **Supplemental Revenue Assistance Payments (SURE)**
  Some farmers have not purchased crop insurance coverage because they self-insure with other risk management tools. Many producers have not taken advantage of the minimal levels of protection provided by CAT or NAP coverage because they feel that if a catastrophic event occurs, the U.S. government will offer them disaster assistance. However, recent changes under the 2008 Farm Bill require participation in these programs in order to maintain eligibility for disaster assistance. The 2008 Farm Bill created a crop permanent disaster assistance program to replace the "ad hoc" crop disaster programs (CDP) of past years. This new program is known as Supplemental Revenue Assistance

Payments (SURE). It is a revenue based program that uses a formula to compare the expected revenue to actual revenue for the entire farming operation.

Wind

Profile

According to the hazards that are identified within *the Maryland Local Mitigation Plan Guidance*, wind is the motion of air past a given point caused by a difference in pressure from one place to another. The effects can include blowing debris, interruptions in elevated power and communications utilities and intensified effects of winter weather. Two basic types of damaging wind events other than tropical systems affect Maryland; synoptic-scale winds and thunderstorm winds. Synoptic-scale winds are high winds that occur typically with cold frontal passages or Nor'easters.
Downbursts cause the high winds in a thunderstorm.

Table 41

Wind Events

Location	Date	Event	Even Narrative	Magnitude	Property Damage
Cambridge	6/22/2010	Thunderstorm Wind	Wind gust of 53 knots (61 mph) was measured at Cambridge AWOS.	53kts	$1,000
Cambridge	6/22/2010	Thunderstorm Wind	Tree was downed on Sloop Road.	50kts.	$1,000
Wingate	6/24/2010	Thunderstorm Wind	Shingles were blown off a roof and a trampoline was thrown into a field.	50kts.	$2,000
Cornersville	8/5/2010	Thunderstorm Wind	Power poles and power lines were downed on Twin Point Cove Road.	50kts.	$2,000
Bucktown	8/12/2010	Thunderstorm Wind	Power lines were downed which caused power outages in Bucktown.	50kts.	$2,000
Cabin Creek	6/17/2011	Thunderstorm Wind	Trees were downed on Route 16 near Cabin Creek.	50kts.	$2,000
Hurlock	6/17/2011	Thunderstorm Wind	Trees and power lines were downed throughout town.	50kts.	$2,000

Location	Date	Event	Even Narrative	Magnitude	Property Damage
Cambridge	2/24/2012	Thunderstorm Wind	Scattered severe thunderstorms moved from west to east across Dorchester county from 350 pm through 415 pm. The first areas of damage occurred from Maple Dam Road to Pintail Point just west and south of Cambridge. The wind damaged several homes and businesses in downtown Cambridge, and at least 2 homes were condemned due to roof damage. Roofing membranes were peeled off of several businesses downtown and numerous windows were blown in. A tractor trailer was overturned while driving east on the Senator Malkus Bridge. Winds in Cambridge averaged between 70 and 85 mph based on tree and structural damage. The severe storms continued east along the river then striking Secretary, New East Market and Hurlock. Wind damage was evident along the entire stretch of East New Market Road from near Highway 50 to Shiloh Church Road. Several farm buildings along the river on Goose Creek Road were heavily damaged. Along Highway 14 and Highway 16, numerous power poles were snapped and trees uprooted. Two barns were heavily damaged to destroy along East Market Highway near Thompsontown Road. Numerous two foot diameter pines were snapped along Shiloh Camp Road of which fell into a large building destroying the structure. Along Shiloh Church Road, numerous trees were knocked down and twenty seven power poles were snapped. Wind speeds around Secretary and East New Market were estimated around 85 mph based on the severity of tree and power pole damage. A tree fell onto the East New Market Town Hall causing some damage. Minor wind damage continued into Hurlock.	74kts.	$1,000,000
Christs Rock	2/24/2012	Thunderstorm Wind	Along Maple Dam Road, several homes experienced minor damage and one horse stable was destroyed along with several outbuildings. One horse suffered minor injuries. A local resident who heard the warning measured a 77 mph wind.	67kts.	$100,000

Location	Date	Event	Even Narrative	Magnitude	Property Damage
Cambridge	6/29/2012	Thunderstorm Wind	Numerous trees were downed and an awning was blown off a residence in Cambridge Creek.	50kts.	$5,000
Dorchester	10/29/2012	High Wind	The very strong winds downed trees, produced minor structural damage, and caused scattered power outages. Wind gust of 61 knots (70 mph) was measured at Bishops Head.	61kts.	$10,000
Dorchester	3/6/2013	High Wind	Wind gust of 52 knots (60 mph) was measured at Crocheron. Roof damage was reported in Vienna.	52kts.	$10,000
Taylors	6/13/2013	Thunderstorm Wind	Emergency managers reported widespread tree damage across much of the county. The most significant damage was observed on Taylor's Island where several buildings and structures were damaged. A tree also fell onto a home on Hooper Island on Hooper Island Road. A large quonset hut was blown 200 yards near Crapo. Several trees were blocking highways including Liners Road near Andrews and US-50 near Salem. In addition to widespread downed trees, several power lines were downed.	50kts.	$50,000
Hurlock	6/28/2013	Thunderstorm Wind	Two trees were downed in Hurlock blocking roads.	50kts.	$2,000
Hurlock	6/28/2013	Thunderstorm Wind	Numerous trees were downed near Skinners Run Road and Route 307.	50kts.	$2,000
Dailsville	2/21/2014	Thunderstorm Wind	Trees were downed on Dark Road.	50kts.	$2,000
Church Creek	5/22/2014	Thunderstorm Wind	Widespread trees were downed around Church Creek. One house lost some shingles as well as siding.	50kts.	$5,000
Sewards	5/22/2014	Thunderstorm Wind	Numerous trees were downed around Maple Dam.	50kts.	$2,000
Elliott	5/22/2014	Thunderstorm Wind	Trees were downed across Elliott Island. Trees were downed at Blackwater Wildlife Refuge.	50kts.	$2,000
Christs Rock	7/14/2014	Thunderstorm Wind	Trees were downed at Route 343 and Horns Point Road.	50kts.	$2,000
Finchville	7/14/2014	Thunderstorm Wind	Numerous trees were downed and blocking a roadway near the intersection of Eldorado Road and Harrison Ferry Road just east of Hurlock.	50kts.	$2,000
Wingate	7/15/2014	Thunderstorm Wind	Numerous trees were downed on Farm Creek Road between Toddville and Wingate.	50kts.	$2,000
Taylors	6/18/2015	Thunderstorm Wind	Trees were downed on Taylors Island.	50kts.	$2,000
Cambridge	6/23/15	Thunderstorm Wind	Wind gust of 52 knots (60 mph) was measured at Eaton Point Light in Cambridge.	52kts.	$1,000

Location	Date	Event	Even Narrative	Magnitude	Property Damage
Hawkeye	6/23/2015	Thunderstorm Wind	Numerous large trees and power lines were downed from Cambridge to southeast of Hurlock. Shingles were blown off roofs.	50kts.	$3,000
Hawkeye	8/4/2015	Thunderstorm Wind	Numerous trees were downed in the Linkwood area.	50kts.	$2,000
Church Creek/ Hurlock	4/2/2016	Thunderstorm Wind	Roofing was ripped off of the Church Creek Post Office. Also, several trees were downed. Trees were also down near Hurlock.	50kts.	$12,000
Hurlock	8/17/2016	Thunderstorm Wind	Trees were downed in northern Dorchester county.	50kts.	$4,000

SOURCE: NWS, NCEI (NOAA)

The *NWS, NCEI* listed a total of (28) twenty-eight wind events affecting Dorchester County between 2010 and 2016. Therefore, Dorchester County experiences 4 events per year.

Vulnerability Analysis

High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.

Tornado

Profile

A tornado is defined by Strahler in his Physical Geography Text as a violently rotating column of air extending from a thunderstorm to the ground. Normally thunderstorms and associated tornadoes developing warm, moist air in advance of strong eastward moving cold fronts in late winter and early spring. Tornadoes can also occur along a "dryline" which separates very warm, moist air to the east from hot, dry air to the west. Both of these scenarios are common in the Central Plains. Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore.

Tornadoes can be ranked by intensity using the Fujita Scale devised by Dr. Theodore Fujita at the University of Chicago in 1971. This scale is broken into 6 categories from F-0 to F-5. F-0 relates to a tornado having a wind speed up to 72 miles per hour, while an F-5 tornado would have winds up to 318 mph.

Table 42

Fujita Scale

F-Scale	Tornado Intensity	Damage Intensity	Wind Speed	Typical Damage
F0	Weak	Gale Tornado	35-63 kts (40-72 mph)	Tree branches broken, chimneys damaged, shallow-rooted trees pushed over; sign boards damaged or destroyed, outbuildings and sheds destroyed.
F1	Weak	Moderate	64-97 kts (73-112 mph)	Roof surfaces peeled off, mobile homes pushed off foundations or overturned, moving autos pushed off the roads, garages may be destroyed.
F2	Strong	Significant	98-136 kts (113-157 mph)	Roofs blown off frame houses; mobile homes demolished and/or destroyed, train boxcars pushed over; large trees snapped or uprooted; airborne debris can cause damage.
F3	Strong	Severe	137-179 kts (158-206 mph)	Roofs and walls torn off well-constructed houses; train cars are overturned; large trees are uprooted, can knock down entire forest of trees; heavy cards lifted off the ground and thrown.
F4	Violent	Devastating	180-226 kts (207-260 mph)	Well-constructed frame houses leveled, but debris remains close by: structures with weak foundations blown off some distance; automobiles thrown and disintegrated, large airborne objects can cause significant damage.
F5	Violent	Incredible	227-276 kts (261-318 mph)	Brick, stone, and cinder-block buildings destroyed, most debris is carried away by tornadic winds, large and heavy objects can be hurled in excess of 300 feet, trees debarked, asphalt peeled off of roads, steel reinforced concrete structures badly damaged.

Source: NWS, NCEI (NOAA)

Tornadoes can occur in every state, although the mid-west states have by far the greatest potential for this type of event. According to the NCEI data, since 1984, Dorchester County has experienced (11) eleven tornado events.

Figure 12

The tornado that originated near La Plata, Maryland, tracked through Charles and Calvert Counties, eventually crossing the Chesapeake Bay into Dorchester County. Damage was rated from F1 to F3 across Dorchester County. Large hail was also observed.

Source: NOAA - http://www.erh.noaa.gov/er/akq/wx_events/severe/April28severe.html

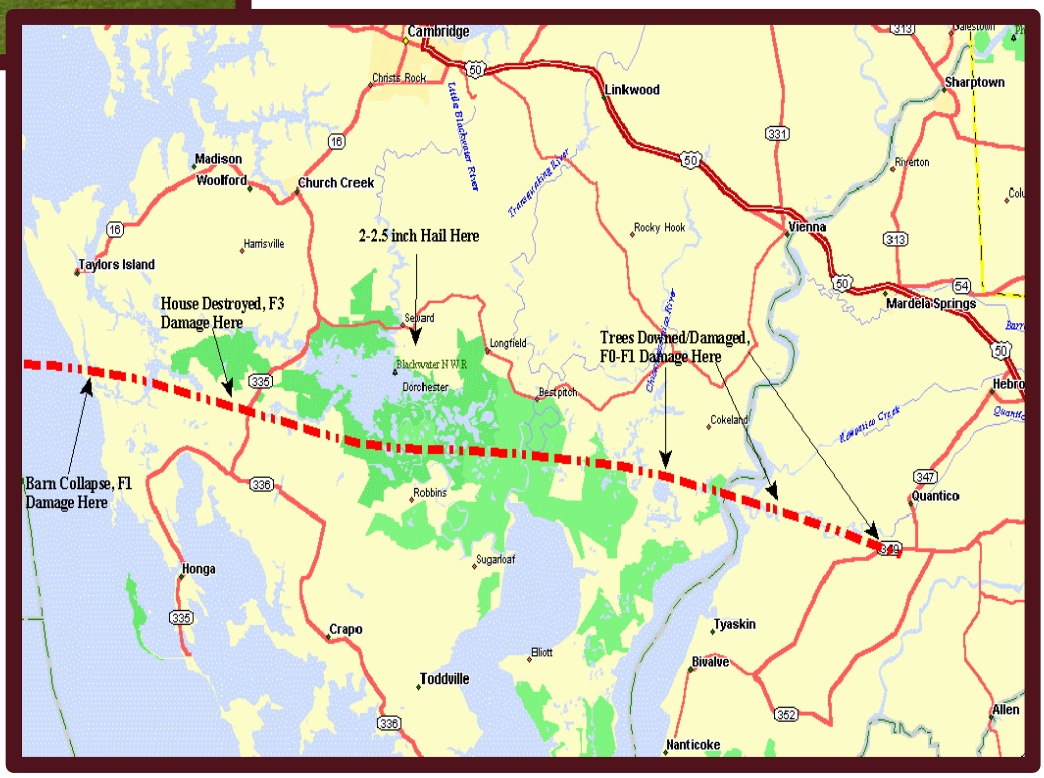


Table 43

Tornado Events

Location	Date	Event Narrative	Magnitude	Width	Property Damage	Injuries
Dorchester	May 8, 1984	No Report	F1	150 Yards	$2.5M	6
Dorchester	May 8, 1984	No Report	F1	100 Yards	$2.5M	8
Dorchester	August 28, 1982	No Report	F0	7 Yards	$0	0

Location	Date	Event Narrative	Magnitude	Width	Property Damage	Injuries
Madison	July 13, 1996	Small tornado damaged a home and numerous trees were damaged or destroyed in the area of Indian Trail Acres near Madison.	F0	50 Yards	$40,000	0
Madison	July 4, 2001	Several trees down. One tree fell on home. Recreational trailer overturned onto its side against a tree. Several chimneys broken off houses. Winds estimated between 70 and 80 mph.	F1	50 Yards	$20,000	0
Taylors Island	April 28, 2002	Tornado path length 16-18 miles. One house and several outbuildings destroyed near Hip Roof Road. Most of the damage along tornado path rated F0 to F1.	F3	150 Yards	$150,000	0
Church Creek	September 2, 2003	Small tornado briefly touched down. No damage.	F0	50 Yards	$0	0
Cambridge	October 14, 2003	F0/weak F1 tornado damaged several homes, outbuildings, a garage, 2 cars, 3 chicken houses, and 2 businesses. Also, numerous trees down or damaged.	F1	150 Yards	$500,000	0
Honga	September 30, 2004	Waterspout came onshore south of Taylors Island, and continued across a marshy area before dissipating.	F0	30 Yards	$0	0
Cambridge	October 16, 2004	F0 tornado occurred near David Green Road and caused minor damage to a couple bird houses and trailer, along with one tree downed.	F0	25 Yards	$2,000	0
Elliott Island	July 24, 2009	An apparent waterspout moved on shore. The tornado then overturned a 24 foot travel trailer 3 times at the extreme west end of Elliott Island. There was also some damage to trees and other vegetation. Winds were estimated at the high end of an EF0.	F0	N/A	$10,000	2
No Updates since last HMP						

SOURCE: NWS, NCEI (NOAA)

There were (4) four reported touchdowns of tornadoes in Dorchester County between 1984 and 2016. Two of these events were rated Class F-0 and two were rated F-1.

Since 1996, seven other events have been reported, including the Class F-3 in the Taylors Island vicinity. A total of (11) eleven tornado events have affected Dorchester County. Therefore, the County experiences 0.42 tornado events per year. These events occurred throughout the County.

Vulnerability Analysis

In assessing the critical and public facilities' vulnerability to tornadoes, the major factor to consider is the possibility of these structures failing when subjected to wind loads that exceed their design or to flying debris that penetrates the building. In general, building damages can range from cosmetic to complete structural failure, depending on wind speed and location of the building with respect to the tornado path and can be analyzed by a structural engineer.

Mobile homes are particularly susceptible to tornado damage. There are a total of 1,300 estimated mobile homes according to American Fact Finder in 2014. In terms of new mobile homes and/or replacements, the Dorchester County Office of Planning and Zoning's permit data listed a total of (5) five permits were given for new mobile homes and a total of (26) twenty-six were given for mobile home replacements between 2011 and 2016. According to Dorchester County Permit Data, the area in which the majority of permits issued for mobile homes and/or replacements are located is within and/or around the Town of Hurlock.

Considering there are no standard loss estimation models or tables for tornadoes currently, estimated losses are difficult to calculate. In terms of calculating human losses, shelters throughout the community should be assessed for their locations, capacity, and wind speed strength in order to ensure they are able to house residents and withstand wind speeds generated by tornadoes. Additionally, the County needs to ensure the enforcement of building codes for wind speed. The ordinances need to be enforced in order to ensure mobile homes are utilizing tie-downs.

Chapter 10 Extreme Heat, Drought & Wildfires

Extreme Heat

Profile

According to the *National Weather Service*, when temperature and humidity together exceed certain levels (85° F and 100% humidity, 90° F and 70% humidity, or 110° F and 30% humidity) heatstroke is likely if exposure continues for many hours. Such conditions, which can create a heat index temperature of 105° F or greater, are encountered in Maryland virtually each summer. For example, Baltimore normally has 32 days per year with temperatures over 90 degrees while the humidity is in the 70% range.

Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. This translates into a similar number of days for inland areas with a heat index above 105 degrees F. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.

Using the heat index, possible heat disorders that may manifest are shown on the table below:

Table 44

Heat Disorders on High Risk Groups

Heat Index	Possible Heat Disorders
130 or Higher	Heatstroke/sunstroke highly likely with continued exposure.
105-130	Sunstroke, heat cramps or heat exhaustion likely and heatstroke possible with prolonged exposure and/or physical activity.
90-105	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
80-90	Fatigue possible with prolonged exposure and/or physical activity.

SOURCE: NOAA

The *NWS, NCEI* listed a total of (2) two extreme heat events affecting Dorchester County between 1996 and 2016. Using the data, Dorchester County experiences 0.1 events per year.

Table 45

Extreme Heat Events	
Date	*Event Narrative*
May 18 to May 21, 1996	An early-season four-day heat wave produced record or near record high temperatures across the lower Maryland eastern shore. High temperatures were in the 80s across the region on May 18th. Then on May 19th, 20th and the 21st higher temperatures occurred.
2017 HMP Update	
July 21 to July 23, 2011	An extended period of excessive heat and humidity occurred across most of the Lower Maryland Eastern Shore from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the mid-70s to mid-80s.

SOURCE: NWS, NCEI (NOAA)

Vulnerability Analysis

Children under (5) five years of age and persons (65) sixty-five year and older are oftentimes considered vulnerable to extreme heat conditions. According to 2010 Census Data – Community Facts, 6.2% of the population in Dorchester County are (5) five year of age and under, while 17.7% of the population is (65) sixty-five years of age and older.

Drought

Profile

A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Droughts may be short term, a few weeks to a month, or long term, several months to several years. A long term drought may be interrupted by occasional precipitation without breaking the drought cycle. The Midwestern states are prone to cyclic long term droughts that last several years. Beginning in 1930, the states in the Great Plains began a long term drought that lasted most of the decade of the 1930's and led to the abandonment of farms and ranches on a scale not seen in this country since that time. This same drought affected Maryland in 1930 and early 1931. During the 15 months from December 1929 through February 1931, rainfall was 21.5 inches below normal for much of the state. Other

drought periods that have affected the state include 1953-56, 1968-71, 1980-83, 1994-98 and in 2001-2002.

Table 46

Drought Events

Date	Event Narrative	Crop Damage
September 1 to September 30, 1995	Dry conditions, which began in July, continued into early September before welcome rains began falling. Some water use and outdoor burning restrictions were still in effect. Crops such as soybeans were severely impacted by the drought.	Not Available
November 1 to November 30, 1998	A very dry period from July through November resulted in drought-like conditions across much of the Lower Maryland Eastern Shore. This caused significant crop damage and other drought-related problems throughout much of the area.	$6 Million

No Updates since last HMP Update

SOURCE: NWS, NCEI (NOAA)

The *NWS, NCEI* listed a total of (2) two drought events affecting Dorchester County between 1995 and 2016. Therefore, Dorchester County experiences 0.1 events per year.

Vulnerability Analysis

Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County. Some small community water supplies may be adversely affected by even moderate drought conditions and the effect of long term drought on the County's agriculture community could be detrimental.
The municipalities in the County rely on groundwater for their supply. Since the aquifers underlying the Eastern Shore have their recharge areas primarily to the west of the Chesapeake Bay, localized drought conditions have little effect on the water supply. However, long term draw-down of these aquifers combined with drought on the western shore could adversely affect water supply on the eastern shore.

According to the *2009 Dorchester County, Maryland Comprehensive Plan Water Resources Element,* the limited drinking water capacity of the confined aquifers that serve Dorchester County is increasingly strained by new development within the Delmarva Peninsula. Additionally, on November 5, 2010 the U.S. Department of Agriculture designated 22 counties, including Dorchester County as natural disaster

areas due to losses caused by drought and excessive heat that occurred between 1 June and 31 August, 2010.

Conclusion

A drought can make a hot day hotter, while a heat wave can make dry conditions even drier. Now scientists are making the case that heat waves and droughts have become more likely to overlap throughout most of the United States.

An article published September 17, 2015 entitled “Global Warming’s One-Two Punch: Extreme Heat and Drought” further discusses the connection between extreme heat and drought. Omid Mazdiyasni and Amir AghaKouchak takes a fresh look at this topic. In the past few years, research looking into the connection between warming planet and more extreme weather has found more conclusive connections. Instead of just looking at heat waves or just looking at precipitation, they looked for concurrent events.
Droughts can be caused by reduced precipitation. Hot weather speeds evaporation and damages the environment. But droughts and high temperatures can happen at the same time. These concurrent-event droughts are particularly harmful, they can set in fast and severely.

Omid Mazdiyasni, doctoral student, who published a paper in the Proceedings of the National Academy of Sciences was asked about what makes his study unique, he stated “to determine whether there has been a significant change in concurrent droughts and heatwaves, we used a statistical model new to hydrology. Our results show that although there is no statistical change in droughts individually, there is significant change in concurrent droughts and heatwaves. The effects of this concurrent climatic event can greatly increase the damage on human health, air quality, agriculture, society, and the environment”.

Wildfires

Profile

A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. In the United States more than 2 million acres burn each year as a result of wildfire.
Between 1960 and 1999, more than 6 million acres have been consumed during 8 fire seasons; more than 8 million acres in 2000, and nearly 7 million acres in 2002.
Estimated fire suppression costs for Federal agencies topped $1 billion in 2000. Most of the acreage involved and the accompanying suppression efforts are in the western states on land managed by the US Forest Service, the Bureau of Land Management,

the Bureau of Indian Affairs, the US Fish and Wildlife Service and the National Park Service. Unfortunately, in recent years, more private property has been affected by wildfires as urban development encroaches on forest land.

Occasionally brush fires threaten urban development where homes are built in close proximity to forest or brush covered land. As more former agriculture land reverts to brush, this problem will become more prevalent.

Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern. With more than 57,000 acres owned by the State of Maryland and the Federal Wildlife Administration, the State Department of Natural Resources and the Federal government take a leading role in fire suppression throughout the County. According to records kept by DNR, Dorchester County reported 127 fires recorded during 1995, 78 fires recorded in 2001, 48 fires recorded in 2005, and only 11 fires recorded in 2015. During 2002, Dorchester County experienced a large fire that consumed more than 2,000 acres in a wetland area; no structures were reported as being affected by this fire. Starting in 2009, thirty or less fires were reported per year, showing a downward trend in the number of fires.

In terms of number of occurrences, the Maryland Forest Service listed a total of 1,408 wildfire events affecting the County from 1988-2015. Using the data, Dorchester County experiences 78.2 wildfire events per year.

Table 47

Wildfire Events		
Year	*Number of Fires*	*Acres Burned*
1988	75	5,812.3
1989	45	1,754.8
1990	43	1,613.7
1991	94	5,335.3
1992	39	1,154.2
1993	84	1,678.7
1994	77	1,139.1
1995	127	3,783.8
1996	17	429.4
1997	47	1,034.6
1998	70	780.2
1999	68	1,359.5
2000	30	162.2

2001	78	4,087.8
2002	75	2,187.2
2003	11	1126.9
2004	37	2,811.7
2005	48	3,827.5
2006	72	5,295.5
2007	74	4,292.5
2008	65	1,797.4
2009	30	4,313.4
2010	15	1,056
2011	26	6,046.9
2012	12	165.4
2013	10	13.9
2014	28	1,591.2
2015	11	502
Total	1408	65,153.1

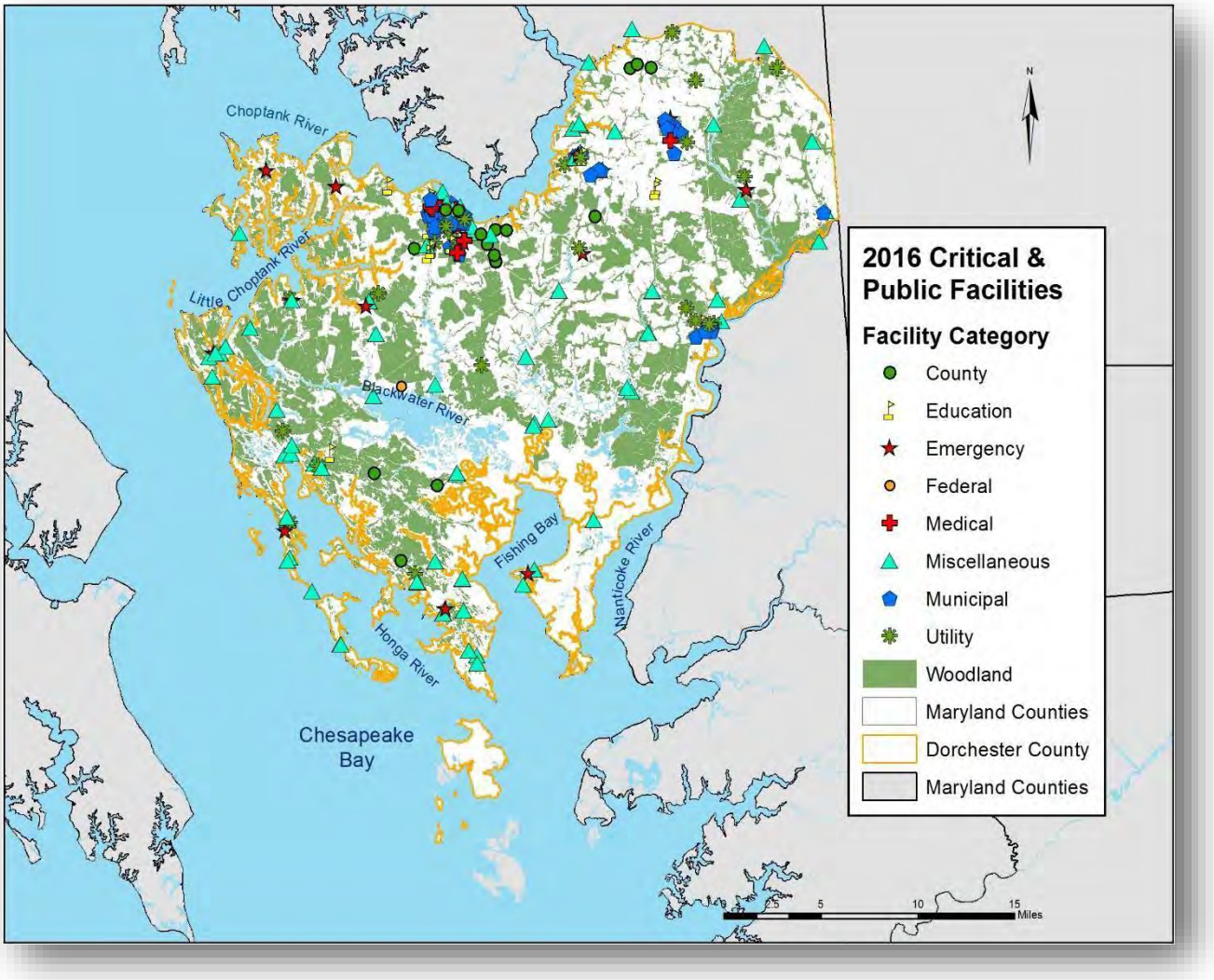
SOURCE: MARYLAND FOREST SERVICE

Vulnerability Analysis

An urban-wildland interface fire is defined as a fire that occurs where structures and other human development meet or intermingle with wildland. Therefore, utilizing the GIS woodland layer provided by Dorchester County, analysis could be conducted to determine which critical and public facilities are at high risk from wildfires.

Map 22

Woodlands & Critical and Public Facilities



Source: Smith Planning and Design and Dorchester County Planning & Zoning

There are both critical and public facilities are at risk to wildfires, due to the urban – wildland interface. As shown on Map 22, facilities such as government buildings, utilities, a school, and one fire department are in close proximity to forested areas. Additional efforts should be considered for Mace's Lane Middle School and Hoopers Island Volunteer Fire Company to ensure these facilities are protected from damage to wildfire.

Chapter 11 Human Impacted Hazards

Major Fire/Explosion

Profile

In this document fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Fire is defined as the state, process, or instance of combustion in which fuel or other material is ignited and combined with oxygen, giving off heat, light and flame. An explosion is defined as an expansion with violent force of materials through a chemical change or through decomposition. According to the Maryland State Fire Marshall's Office, to prevent deaths, injuries, and property damage due to fires, it investigates arsons, and provides instruction on fire safety. Manufacturers, dealers, and users of explosives are regulated by the State Fire Marshal.

An example of a recent major fire and explosion event occurred in Silver Spring, Maryland in August of 2016. This event resulted in two deaths, thirty-four injuries, and displaced approximately one hundred people. The cause of the massive fire explosion was a natural gas leak at a large apartment complex. In 2013, a cargo train carrying chemicals derailed near Baltimore. The blast from the explosion was felt nearly on mile away and the fire sent a thick plume of dark smoke in and above the wreckage site.

Vulnerability Analysis

Dorchester County is no different than other rural counties throughout the Country, having a network of volunteer fire companies whose primary role historically has been to suppress fires and minimize damage to life and property as a result of these fires.
Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.

According to the *United States Fire Administration (2005-2014)* many regional factors affect fire issues in the United States, such as climate, poverty, education and demographics, however, one of the most useful ways to compare fire fatalities across

groups of people is to look at their relative risk of dying in a fire. The following age groups were examined:

- Ages 0-4:
  "Although the relative risk of dying in a fire in 2014 for children under the age of 5 was lower than the overall U.S. population, children ages 0 to 4 had the highest fire death rates compared to children of all ages and, as a result, had a higher relative risk of dying in a fire compared to older children."
- Ages 5-9:
  "The fire death rate trend for children ages 5 to 9 decreased 51 percent over the 10-year period. In 2014, the relative risk of dying in a fire for this group was 60 percent less than that of the general population."
- Ages 10-14:
  "Children ages 10 to 14 had the lowest relative risk of dying in a fire compared to children of all ages. This group's relative risk of dying in a fire was 70 percent less than the general population. This age group enjoyed the largest decline in the child fire death rate trend from 2005 to 2014 with a decrease of 49 percent."
- Ages 65 and over:
  "The fire death rate trend for older adults (ages 65 and older) decreased 23 percent from 2005-2014. Although the trend in fire death rates has decreased for the older adult population, older adults face the greatest relative risk of dying in a fire. In 2014, older adults had a 2.6 times greater risk of dying in a fire than the population as a whole."

In looking at the data reported into the Maryland Fire Incident Reporting System for 2015, one hundred and ninety three (193) civilians and two hundred and ninety (290) firefighters were injured as a direct result of fire incidents. The Maryland State Fire Marshal's Office reports statistics on fire deaths for each County and is provided below.

Table 48

Fire Deaths										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dorchester	3	0	0	0	2	2	1	0	2	0
	2010	2011	2012	2013	2014	2015				
	0	0	2	1	0	0				

Source: Maryland State Fire Marshalls Office

Conclusion

Outreach materials should be targeted to the two highest risk factor populations. This includes children ages 0-4 and persons 65 year of age and older.

On-Site HazMat Incident

Profile

A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. A release may occur by spilling, leaking, emitting toxic vapors, or any other process that enables the material to escape its container, enter the environment and create a potential hazard. Several common HazMats include materials that are explosive, flammable or combustible, poisonous or radioactive. Related combustible HazMats include oxidizers and reactive materials, while toxins produced by etiological (biological) agents are types of poison that can cause disease.

There are several notable Maryland HazMat incidents. According to the US National Regulatory Commission, in 2002, an on-site HazMat event occurred in Mason Springs, Maryland. The event forced an evacuation after a chemical mishap at the Mattawomen Waterwaste Treatment Plant in Charles County, resulting in a cloud of poisonous gas that overwhelmed seven (7) people and forced twenty-two (22) Mason Springs' residents from their homes. In 2007, an on-site HazMat event occurred in Elkton, Maryland at Teruma Vascular Systems. Thirty-five (35) employees were sent to the hospital after complaining of either headache or tightness in the chest.

Source: Dorchester County Emergency Management Agency - http://www.dorchestercntymd-ema.com/radiological.htm

Vulnerability Analysis

On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas. Another concern is the Calvert

Cliffs Nuclear Power Station located across the Bay in Calvert County and the Liquid Gas Conversion Plant located just to the south of Calvert Cliffs. According to the Dorchester County Emergency Management Agency, if an incident occurred at the Power Plant, the two zones involved may require protective actions to be taken. The first zone is the 10-mile radius 'Plume" zone that would affect Taylors's Island. The second 50-mile radius zone, 'Ingestion" zone, would affect the water, agriculture and livestock.

Restrictions may be placed on their use in order to protect the citizens from long-range effects of radiation.

Transportation HazMat Incident

Profile

The release of HazMats while in transit is of great concern to the US Department of Transportation. While most hazardous materials are stored and used at fixed sites, these materials are usually produced elsewhere and shipped to the fixed facility by rail car, truck, or onboard hips or barges. While these vehicles are identified by signs denoting the hazard, the possibility of release is present at any time. Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries.

Vulnerability Analysis

The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.

The annual average daily traffic volume for Route 50 in Cambridge is 37,431 in 2015. Also, Route 16 at the Cambridge traffic count station, within the Town of East New Market, experiences approximately 6,632 vehicles daily, while Route 331 has a daily average of 3,863 travelers through the Town of Hurlock. Therefore, critical and public facilities located within the City of Cambridge, the Town of East New Market and the Town of Hurlock may be more susceptible to a transportation hazmat incident.

Epidemic

Profile

Epidemics can be considered as part of a broad hazard category that could be termed "public health emergencies." In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. Epidemics may also be secondary to some other disaster such as flood, tornado, and hurricane or HazMat incident. According to the US Centers for Disease Control, in 2013, an estimated 2,168 adults and adolescents were diagnosed with HIV in Maryland and Maryland ranked 7th in the number of HIV diagnoses in the county. In addition, Maryland ranks 5th in rates of primary and secondary syphilis, 20th in Chlamydial infections and 21st in gonorrheal infections among 50 states. Incidence of Hepatitis A&B are the lowest recorded due to the availability of safe and effective vaccines. However, there is no vaccine for Hepatitis C virus, and chronic Hepatitis B virus and Hepatitis C virus account for more than 50% of new cases of chronic liver disease. In Maryland, between 2009 and 2013:

- Reported rates of acute hepatitis A decreased by 38%
- Reported rates of acute hepatitis B decreased by 46%
- Reported rates of acute hepatitis C increased by 125%

The State's Department of Health and Mental Hygiene (DHMH) maintains counts for 85 diseases, conditions, outbreaks, and unusual manifestations as reported by health care providers and 43 diseases notifiable by laboratories in Maryland. The surveillance and reporting of these diseases is the responsibility of the local health department, which investigates and completes reporting both electronically and manually as per DHMH regulations. Notifiable diseases include measles, Hepatitis B, AIDS, salmonellosis, giardiasis, malaria, Lyme disease and rabies.

Vulnerability Analysis

The Maryland Department of Health and Mental Hygiene provides fact sheets for various illness and diseases. Statistics collected over the past ten years is provided in Table 49.

Table 49

Reported Conditions										
Condition	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Amebiasis	0	0	0	0	1	0	0	0	0	0
Animal Bites	82	108	92	128	132	122	127	100	99	100
Campylobacteriosis	2	1	4	4	5	0	4	2	9	9
Chlamydia	140	207	146	216	193	245	166	167	214	248
Cryptosporidiosis	0	0	0	0	1	1	0	0	0	0
Ehrlichiosis	2	0	0	1	0	0	1	9	1	0
Encephalitis - non-Arboviral	0	0	0	0	1	0	0	1	0	0
Giardiasis	0	0	1	0	0	1	0	2	1	2
Gonorrhea	51	123	112	42	31	81	77	52	50	68
H. influenzae - Invasive Disease	1	1	0	1	1	0	2	0	0	0
Hepatitis A (Acute-Symptomatic)	0	0	0	2	0	1	0	0	0	0
Hepatitis B (Acute-Symptomatic)	1	1	0	0	1	0	0	1	1	1
Hepatitis C (Acute-Symptomatic)	0	1	0	0	0	1	0	2	2	2
Legionellosis	0	0	1	0	0	0	0	0	0	1
Lyme Disease	5	1	3	20	6	14	14	30	12	11
Malaria	1	0	0	0	0	0	0	0	0	0
Meningitis, Aseptic	6	1	1	0	1	0	1	0	0	0
Meningococcal Invasive	0	0	0	0	1	0	0	0	0	0
Mumps (Infectious Parotitis)	0	0	1	1	0	0	0	0	0	0
Mycobacteriosis, Other than TB & Leprosy	0	0	0	6	5	4	3	7	2	6
Rabies - Animal	2	7	15	6	10	7	8	7	5	6
Salmonellosis - Other than Typhoid Fever	10	10	11	4	8	8	13	19	10	11
Septicemia in Newborns	0	2	0	0	0	N/A	0	0	N/A	N/A
Shiga toxin producing E. coli (STEC)	0	0	0	0	0	0	0	0	1	0
Shigellosis	1	1	0	1	0	0	0	0	0	0
Strep Group A - Invasive Disease	0	1	0	0	0	1	0	0	2	0
Strep Group B - Invasive Disease	3	1	6	1	3	1	2	5	5	7

Condition	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Syphilis - Primary and Secondary	1	0	1	1	0	1	2	0	1	0
Tuberculosis	1	1	0	0	3	0	0	0	0	0
Vibriosis (Non-Cholera)	0	0	2	0	0	2	0	1	1	2

Source: Maryland Department of Health and Mental Hygiene

Additional information is available to the public on the Dorchester County Health Department's website including:

- Emergency Preparedness
- Terrorism Preparedness
- Health & Disease Information
- Food Protection
- Individual Water Supply
- Rabies Control

The website provides not only health related topics, but also information on how to prepare and prevent various types of disasters. The Dorchester County Emergency Management Agency's website also provides resourceful information on disaster mitigation, preparedness and recovery.

Section 3 Mitigation Strategies

Chapter 12 Goals and Objectives

Introduction

Upon completing the review of the goals and objectives established in the *2011 Hazard Mitigation Plan* and the development of additional objectives for the *2017 Hazard Mitigation Plan*, mitigation actions were identified and evaluated. These actions ranged from construction projects—retrofitting existing structures to resist floods and high winds—to non-construction related projects such elevation of vulnerable structures and implementation of educational awareness programs. The Hazard Mitigation Planning Committee (HMPC) rated all projects that were not completed during the previous Plan cycle (2010-2016) and new projects identified during the 2017 Plan update process.

By completing the plan update process, the Hazard Mitigation Planning Committee (HMPC) was able to develop new objectives as part of the mitigation strategies, which are denoted in red. The goals and objectives serve as the basis for implementing mitigation action items, which aid in mitigating the hazards described in Chapters 6-11 of the Plan.

Upon review of goals and objectives, the HMPC determined which of the six broad categories the new mitigation action items would be associated with. These categories include Prevention, Property Protection, Public Education and Awareness, Natural Resources Protection, Emergency Services, and Structural Protection. The HMPC has identified and prioritized nearly twenty (20) separate mitigation action items that address one or more of the plan goals.

Goals as identified in this Plan are broad-based and long-term. The following goals identify what the community expects to accomplish through mitigation actions during the next five years. Objectives as identified in this Plan are more specific and narrow in scope than goals. They expand upon goals and provide more details on how to accomplish them. A new goal and associated objectives specific to plan integration were added during the update process.

Note: *These goals, objectives, and mitigation action items apply to municipal participants as well as the unincorporated parts of the County.*

Goals and Objectives

GOAL 1 Maintain and enhance Dorchester County's Department of Communications and Emergency Service's capacity to continuously make Dorchester County less vulnerable to hazards.

Objective 1.1 Institutionalize hazard mitigation.
Objective 1.2 Improve organizational efficiency.
Objective 1.3 Maximize utilization of best technology.
Objective 1.4 Maximize utilization of GIS software.

GOAL 2 Build and support municipal capacity and commitment to become continuously less vulnerable to hazards.

Objective 2.1 Increase awareness and knowledge of hazard mitigation principles and practice among local and municipal public officials.
Objective 2.2 Provide assistance to municipal officials and help municipalities obtain funding for mitigation planning and project activities.
Objective 2.3 Prepare technical reports for critical facilities as necessary.

GOAL 3 Improve coordination and communication with other relevant organizations.

Objective 3.1 Establish and maintain lasting partnerships.
Objective 3.2 Streamline policies to eliminate conflicts and duplication of effort.
Objective 3.3 Incorporate hazard mitigation into activities of other organizations.

GOAL 4 Increase public understanding, support, and demand for hazard mitigation.

Objective 4.1 Identify hazard specific issues and needs.
Objective 4.2 Heighten public awareness of natural hazards.
Objective 4.3 Publicize and encourage the adoption of appropriate hazard mitigation actions.
Objective 4.4 Increase the number of businesses that have developed a business risk reduction plan.
Objective 4.5 Increase the proportion of businesses and residences that have flood insurance.

GOAL 5 Protect existing and future properties (residential, commercial, public, and critical facilities).

Objective 5.1 Utilize the most effective approaches to protect buildings from hazards, including acquisition and elevation.

Objective 5.2 Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from riverine flooding, storm surge or the threat of wildfire at the urban/forest interface.

Objective 5.3 Review and update Building Codes to ensure that manufactured housing, including mobile homes, are constructed and installed in a manner to minimize wind and storm surge damage.

Objective 5.4 Reduce the number of houses in the floodplain that are subject to flooding.

Objective 5.5 Increase the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 100 year flood event.

Objective 5.6 Ensure existing high risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding.

GOAL 6 Ensure that public funds are used in the most efficient manner.

Objective 6.1 Prioritize new mitigation projects, starting with sites facing the greatest threat to life, health, and property.

Objective 6.2 Use public funding to protect public services, and critical and public facilities.

Objective 6.3 Use public funding on private property where benefits exceed costs.

Objective 6.4 Maximize the use of outside funding sources.

Objective 6.5 Encourage property-owner self-protection measures.

GOAL 7 Promote sustainable development to improve the quality of life.

Objective 7.1 Establish open space parks and recreational areas in flood hazard areas.

Objective 7.2 Provide for the conservation and preservation of natural resources.

Objective 7.3 Limit additional housing (especially elderly and high density) in areas of high hazard risk.

GOAL 8 Prevent destruction of forests and structures in the Urban Wildland Interface.

Objective 8.1 Improve communications capability between municipal and county emergency management and law enforcement personnel.

Objective 8.2 Identify specific high hazard areas in the Urban Wildland Interface and notify residents of means to protect their property from wildfire damage.

Objective 8.3 Develop evacuation procedures to enable residents near forested areas to evacuate safely.

GOAL 9 Protect public infrastructure, especially evacuation routes.

Objective 9.1 Upgrade or replace public roads and stormwater management features to include mitigation into the project design and construction.

Objective 9.2 Improve evacuation routes utilized in flood hazard events to mitigate life-threatening road conditions and road closures.

Objective 9.3 Mitigate problem road sections within the County and municipalities.

NEW 2017 GOAL

GOAL 10 Integrate plan and policies across disciplines and agencies within the County through the consideration of potential hazards and future development.

Objective 10.1 Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.

Objective 10.2 Solicit participation and offer opportunities for various departments to work together on a regular basis.

Objective 10.3 Clearly define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resiliency.

Chapter 13 Mitigation Actions

Introduction

Mitigation actions address the goals and objectives developed by the Hazard Mitigation Planning Committee. These actions form the core of the *2017 Dorchester County Hazard Mitigation Plan*. The mitigations actions were grouped into the following six broad categories.

1. **Prevention.** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

2. **Property Protection.** Actions that involve the modification of existing critical and public facilities, buildings, structures, and public infrastructure to protect them from hazards. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and infrastructure modification.

3. **Public Education and Awareness.** Actions to inform and educate citizens, elected officials, and property owners about potential ways to mitigate for hazards that can occur in the County. Such actions include outreach programs, projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

4. **Natural Resource Protection.** Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural protection systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration preservation.

5. **Emergency Services.** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems and emergency response services.

6. **Structural Projects.** Actions that involve the construction of structures to reduce the impact of a hazard event. Such structures include dams, levees, floodwalls, seawalls, retaining walls, barrier islands, and safe rooms.

2017 MITIGATION ACTION ITEMS

In order to develop Hazard Mitigation ideas and actions, two (2) meeting were held with the Hazard Mitigation Planning Committee (HMPC). Mitigation ideas were generated at the August 10, 2016 HMPC meeting. Those ideas were captured on the Mitigation Action Implementation Worksheet. To further refine those idea, a work session was held during the September 7, 2016 HMPC meeting. The HMPC was divided into small groups to further enhance information gathered at the August, 2016 meeting and develop any addition actions that reflect the goals and objectives of the Plan.

As a result of this process, twelve (12) Mitigation Implementation Actions were developed. In an effort to prioritize the twelve (12) actions developed by the committee members, a fillable PDF form was provided to each member for ranking purposes (Appendix H). Results indicated there were six (6) High, four (4) Medium, and two (2) Low.

The table below provides actions, priority ranking, and associated plan goal(s) and objective(s).

Table 50

2017 Mitigation Implementation Actions		
Actions	*Priority*	*Goals*
#1 Best Practice Success Story – Elevation Project Press Release	Medium	5, 6
#2 Plan Integration	Medium	10
#3 Obtain contracts for on-call services and generators for emergency power back-up	High	2, 3, 5, 6
#4 Consistent Public Outreach	High	2
#5 Support barrier island restoration projects	High	7
#6 Substantial damage/improvement – clarification of calculation and adoption of "cumulative" standard to prevent circumvention of goal of requiring compliance with Floodplain Ordinances by submitting multiple permit applicants which individually do not trigger substantial improvement/damage	Medium	4, 5
#7 Complete Coastal Aquifer Study	Medium	4, 6
#8 Permanent Emergency Generator	High	5, 6
#9 Roadway Related Repetitive Flood Issues	High	6, 9
#10 Drought Mitigation	Medium	4, 6
#11 Stormwater Retrofits	Medium	6, 9
#12 Critical Facility Property Protection	High	5, 6
Incomplete 2011 Mitigation Actions ranked "High" and Relevant for 2017 Plan		
Update the 1996 Dorchester County Comprehensive Plan	High	1, 3
Upgrade and mitigate evacuation routes when funding from Federal or State sources is available.	High	6, 9

Source: 2016 Hazard Mitigation Planning Committee

2011 MITIGATION ACTION RATINGS AND 2017 STATUS UPDATE

The following table lists the mitigation action items that were set forth in the *2011 Dorchester County Multi-Hazard Mitigation Plan*, along with their status. Those actions associated with flooding that may be addressed and documented for the National Flood Insurance Program (NFIP) – Community Rating System have an CRS beside their action.

The table also lists which goals and objectives are met by each item, gives the time frame for completion (ongoing, short or long), the hazard(s) being addressed by the mitigation action and the rating establish by the 2016 HMPC. The Committee members rated each action item as low, medium or high priority. The mitigation table shows a composite of the committee's rankings. The location for each mitigation action is identified within *Mitigation Action* column. However, if a specific location is not provided then it should be considered as a County-wide action.

The 2011 Mitigation Actions were assessed during the plan update process. Information updates were completed by the Hazard Mitigation Planning Committee. Results indicated that 55% of the 2011 mitigation actions have been completed, 36% are incomplete, and 9% are ongoing, as shown on the chart below.

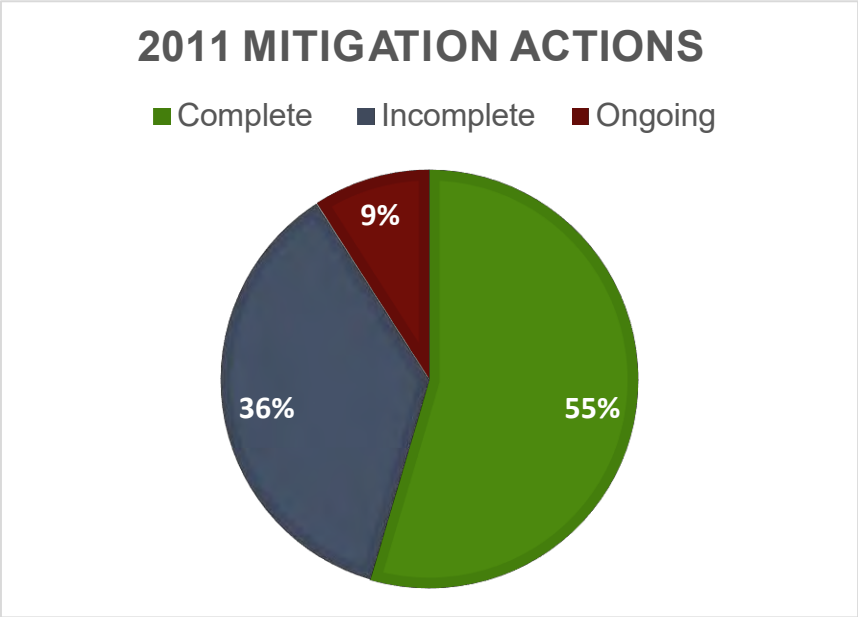


Table 51: 2011 Mitigation Action Status Updates

Action Status	Mitigation Action	Goals	Objectives	Timeframe	Rating
Prevention					
Incomplete	Update the *1996 Dorchester County Comprehensive Plan* in order to properly monitor development patterns within Dorchester County and its nine municipalities to ensure future development is not susceptible to the identified hazards. On 6 October 2009, the *Dorchester County Water Resources Element* was adopted. This element is an amendment to the 1996 Comprehensive Plan. The plan discusses water recharge in regards to the aquifers being utilized. New development is placing a strain on available water. Therefore, during a drought event, available water is further limited. Furthermore, a comprehensive rezoning update would need to occur concurrently with the update of the comprehensive plan. Additionally, partner with the Planning and Zoning Department for the update of the Comprehensive Plan in order to cross reference of goals, objectives and actions, which will ensure hazard mitigation will be addressed.	1 3	1.2 3.1; 3.2; 3.3	Long	High
	Status Update: The County Comprehensive Plan has not been updated, however, Municipal Growth Elements and Water Resources Elements have been included as addendums to the Plan.				
In progress	Utilizing GIS Mapping, update parcels database to reflect changes in development. Access Spatial in Dorchester County is updating the parcels database for the next two years, however after the two-year contract; the County will be responsible for updating the database.	1 5	1.3; 1.4 5.1; 5.4	Long	Medium
Property Protection					
Incomplete	∗Consider acquiring flood prone properties that are currently on the market and that cannot be mitigated for flooding. Convert these properties into open space.	5 6 7	5.1; 5.4 6.1; 6.3; 6.4 7.1	Long	Medium
Completed - 2017 HMP Update Process	Assess the capabilities of existing multilevel structures, such as, hospitals, schools, and apartment complexes, against high winds. The ordinance currently states buildings must be constructed to withstand wind loads of 90-100 mph.	4 5 6	4.1; 4.4 5.1; 5.3 6.5	Short	Medium
Completed - 2017 HMP Update Process	Identify pre-FIRM structures located within the 100-year floodplain and determine the mitigation measures that are needed to reduce flooding.	4 5	4.1 5.2; 5.4; 5.6	Short	Medium
Completed - 2017 HMP Update Process	∗Utilizing the National Flood Mitigation Data Collection Tool (FEMA 497), a database should be developed containing information on each "at-risk" property. The data collected should include structure type, condition, foundation type, number of stories, square footage, depth of flooding, flash flooding occurrence, flood velocity, and structure location within the floodway. This database could be utilized in prioritizing the structures most at-risk and in need of mitigation.	1 5 6	1.3 5.1; 5.5 6.1	Short	Medium

Table 51: 2011 Mitigation Action Status Updates

Action Status	Mitigation Action	Goals	Objectives	Timeframe	Rating
	Status Update: A flood study was conducted by Dr. Scott of Salisbury University utilizing Hazus. The **program's** default data was used to determine loss estimates for the County.				
Completed - 2017 HMP Update Process	Identify cemeteries that are located within close proximity of the shorelines and are "at-risk" for erosion. Identify necessary applications to be completed for historic cemeteries to be landmarked and placed on the registry. Research for appropriate mitigation measures to prevent erosion.	3 4 5 6	3.3 4.1 5.1 6.2; 6.3; 6.4; 6.5	Short	Low
Public Education and Awareness					
Incomplete	Provide a fact sheet to the public highlighting expected impacts from sea level rise. Pertinent information for the fact sheet can be obtained from the *Sea Level Rise: Technical Guidance for Dorchester County*.	4	4.2	Short	Medium
Incomplete	Educate waterfront property owners about the purpose of greenways. Provide information on how to construction a greenway and proper plant species to be utilized.	4 7	4.1 7.1; 7.2	Ongoing	Low
Incomplete	Distribute information concerning HazMat Transportation to highly commercialized areas that are located within the transportation route, specifically to the facilities located along Route 50 between Choptank Bridge and Bucktown.	4 6	4.4 6.5	Ongoing	Low
Structural Projects					
Incomplete	Upgrade and mitigate evacuation routes when funding from Federal or State sources is available.	6 9	6.4 9.2	Long	High
	Status Update: All evacuation routes are posted on state roads.				
Incomplete	Implement necessary mitigation measures to alleviate flooding issues listed in the table below.	9	9.1; 9.2; 9.3	Long	High

Table 52: Repetitive Roadway Flooding Issues

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	Flooding: Occasional or Repetitive	State, County, or Municipal	Ranking (High, Medium, Low)	
					2011	2017
MD 307, MD 331 intersection/ North Main Street: will flood with 1" or more of rain per hour – rainfall	Yes	SWM	Repetitive	State (culvert on State road)	High	High

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	Flooding: Occasional or Repetitive	State, County, or Municipal	Ranking (High, Medium, Low)	
					2011	2017
Multiple Roads in Hoopers Island, Crapo, Wingate, Bishops Head, Crocheron, and Toddville – tidal flooding	Yes	Elevation	Repetitive	County	High	High
Wesley Church Road (below Farm Creek Bridge) – tidal flooding	Yes	Elevation	Repetitive	County	High	High
Elliott Island Road – tidal flooding	Yes	Elevation	Repetitive	County	High	High
Maple Dam Road (across marsh) – tidal flooding	Yes	Elevation	Repetitive	County	High	High
MD 336 (between Goote's Marina & Kirwan Neck Road – tidal flooding	Yes	Elevation	Repetitive	State	High	High
White Haven Road – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium
Middletown Branch Road – rainfall	No	SWM	Repetitive	County	Medium	Medium
Galestown Newhart Mill Road (near MD Route 313) – rainfall	No	SWM	Repetitive	County	Medium	Medium
Galestown Newhart Mill Road (near Wheatly Church Road) – rainfall	No	SWM	Repetitive	Municipal – Galestown	Medium	Medium
MD Route 14 (east if Marshyhope Creek Bridge) – tidal flooding	Yes	Elevation	Repetitive	State	Medium	Medium
Puckum Road – rainfall	No	SWM	Repetitive	County	Medium	Medium
Drawbridge Road (just south of Draw Bridge) – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium
Steeles Neck Road – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium
Griffith Neck Road – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium
Glen Oak Hotel Road (Hurlock's North Main Street) – rainfall	Yes	SWM	Repetitive	Municipal - Hurlock	Medium	Medium
Cooks Point Road – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	Flooding: Occasional or Repetitive	State, County, or Municipal	Ranking (High, Medium, Low) 2011	2017
Palmer Mill Road (at Harper Road) - rainfall	Yes	SWM	Repetitive	County	Medium	Medium
Hip Roof Road – tidal flooding	Yes	Elevation	Repetitive	County	Medium	Medium
Windsor Road – rainfall	No	SWM	Repetitive	County	Low	Low
Church Home Road – rainfall	No	SWM	Repetitive	County	Low	Low
Shiloh Camp Road – rainfall	No	SWM	Repetitive	County	Low	Low
Payne Road – rainfall	No	SWM	Repetitive	County	Low	Low
Ennals Road – rainfall	No	SWM	Repetitive	County	Low	Low
Water Street – tidal flooding	No	Elevation	Repetitive	Municipal - Cambridge	Low	Low
New 2017 Flood Issues						
Drawbridge Road between Percy May and Middletown Branch - heavy rain	No		Repetitive	County	N/A	High
Smithville Road at the bridge – tidal flooding	No	Elevation	Repetitive	County	N/A	High

Table 53: 2011 Mitigation Actions Completed/Ongoing

Action Status	Mitigation Action	Goals	Objectives	Timeframe	Rating
Prevention					
Ongoing	Encourage cluster development in the southern portion of Dorchester County specifically near the 100-year floodplain.	5 7	5.2; 5.4 7.2; 7.3	Ongoing	Medium
	Status Update: Very little development has occurred within the 100-year floodplain.				
Complete	Consider development restrictions for vacant parcels located in hazards areas.	7	7.3	Long	Medium
	Status Update: A parcels of record are legally entitled for development, however, parcels are subject to the **County's** Floodplain Management Ordinance.				

Action Status	Mitigation Action	Goals	Objectives	Timeframe	Rating
Ongoing	Consider working with DNR, Delmarva Power, Choptank Electric, Verizon and other utilities to identify areas where underground lines can be installed in order to mitigate power outages.	3	3.3	Long	Medium
	Status Update: 58% of Choptank **Electric's** coverage area in Dorchester County is underground utilities; transfer pads can handle **9"-12"** of water depth; and all underground cable can withstand laying in water. Choptank Electric provides service to 5,341 customers. Delmarva Power currently provides service to 13,590 customers. 58.7% of the utilities are overhead or above ground while 41.3% is underground.				
Complete	*The NFIP requires the first floor elevation of structures located within the 100-year floodplain be determined. By partnering with the building inspectors and the GIS specialist, a database could be produced and utilized for forecasting structure vulnerability during a specific hazard event.	1 4 5	1.3; 1.4 4.1 5.1	Long	High
	Status Update: As part of the CRS requirement, elevation certificates are now available online.				
Complete	Install a generator, a transfer switch and necessary wiring in order to utilize an alternate power source at each shelter, the new North Dorchester High School and South Dorchester High School.	1 3 4	1.1 3.3 4.3	Short	High
	Status Update: A new generator was recently installed at South Dorchester High School which will operate the entire school, if needed. Community Block Grant funds were obtained and utilized to purchase and install the generator. A new North Dorchester High School is under design. A transfer switch will be installed at the new facility to accommodate a large generator to run the complex when necessary.				
Ongoing	Utilizing the updated Critical Facilities Listing within this Plan, determine which facilities are in most need of a generator.	2 4 5	2.3 4.1 5.1	Short	Medium
	Status Update: Generators have been installed at the following facilities: County Office Building, County Department of Public Works, and the North Dorchester Middle and High **School's** well system.				
Complete	Require all new non-agriculture development to submit for approval Sedimentation and Erosion Control Plans in order to reduce shoreline erosion.	7	7.2	Ongoing	Medium
	Status Update: In order to issue a grading permit, a sediment and erosion plan is required for disturbances over 5,000 square feet.				
	Public Education and Awareness				
Ongoing	*Target residents located within the 100-year floodplain with literature on flood related issues and protection measures that can be taken.	4 6	4.1; 4.2; 4.5 6.5	Ongoing	Medium
	Status Update: During the CRS annually recertification process, Dorchester County identifies repetitive loss areas and sends notices to those property owners. The notice includes information on flood related issues and protection measures that can be implemented.				
Complete	Improve the County's website to include hazard related documents or links to documents such as the *Sea Level Rise: Technical Guidance for Dorchester County*.	1 4	1.3 4.1; 4.2	Short	Medium
	Status Update: A floodplain link has been added to the **County's** website – homepage; http://docogonet.com/index.php?page=floodplain.				
Complete	Include an interactive GIS Map on the County's website to allow residents to determine their FIRM Zone as well additional hazards that may impact their property.	1 4	1.3; 1.4 4.2	Short	Medium
	Status Update: New DFIRMs became effective for Dorchester County in the Spring of 2015. Residents can utilize the **County's** interactive GIS site to determine their flood risk: https://choosecambridge.maps.arcgis.com/apps/webappviewer/index.html?id=f769cf3c5113408db7e729b809ca2284.				

Action Status	Mitigation Action	Goals	Objectives	Timeframe	Rating
Ongoing	Conduct an annual Speaker's Bureau that specifically relates to the identified hazards impacting Dorchester County and mitigation measures that can be conducted.	4	4.1; 4.2; 4.3	Ongoing	Medium
	Status Update: Planning and Zoning staff conducts annual **speaker's** bureau. Emergency Management also conducts preparedness presentations and incorporates mitigation measures into presentation.				
Emergency Services					
Complete	Utilize the Notification system or the State-wide System as a warning system for Wildfire dangers.	8	8.2	Ongoing	Medium
	Status Update: In the event of an incident, the Department of Emergency Services would utilize the **County's** Emergency Notification System-Everbridge.				
Ongoing	Within the Notification system, update the geocoded information to include cell phone numbers.	1	1.2; 1.3	Ongoing	High
	Status Update: Residents are encouraged to utilize the self-registration portal to complete the necessary forms to be submitted to Emergency Management. Emergency Management will input the information on the forms into the system.				
Structural Projects					
Complete	New roads within the County should be developed with open sections, which will better disperse stormwater and alleviate flooding issues.	5	5.1; 5.2	Ongoing	Medium
	Status Update: All newly constructed county roads are open section.				

Dorchester County 2017 Projects Listing

The following listing was derived from the Dorchester County Mitigation Implementation Action Items that were ranked "High" by the Hazard Mitigation Planning Committee during the third meeting. A total of eight (8) action items were ranked "High" and therefore are of a priority for potential mitigation projects. Note: Of the eight (8) action items rated as "High" priority actions during the 2017 update, three (3) were brought forward from the 2011 Plan. For a complete listing of 2017 mitigation action items refer to Appendix H.

Contracts for On-Call Services and Generators

ACTION: Obtain contracts for on-call services and generators for emergency power back-up.

DISCUSSION: While many facilities have generators, the possibility of needing additional generators for back-up and/or back-fill still exists. Ensuring power to the critical and public facilities alleviates duration of down-time during a disaster event. Municipalities may be able to "piggy-back" on County contracts.

Project/ Action	*Responsible Organizations*	*Estimated Costs*	*Possible Funding Sources*	*Approximate Timeline*
Contract for On-Call Services and Generators	Department of Emergency Management Agency	Based upon activation of contract during emergency event	Declaration of Emergency – Declared Emergency	Implementation – Short Term Going Forward – Ongoing

Consistent Public Outreach

ACTION: Conduct consistent public outreach regarding activities being provided by the county.

DISCUSSION: While public outreach activities have been undertaken, a schedule of activities and more frequent outreach efforts may prove beneficial. Specifically, adding new locations/groups to current efforts and adding additional public outreach activities. Outreach efforts would increase public awareness and life safety. Ideas for outreach include: ALICE (Alert, Lockdown, Inform, Counter, Evacuate) training for civic groups, flood mitigation ideas presentation, and first aid and personal preparedness

presentations. The County should work with Facility Community of Practice (FCOP) to coordinate messaging about public outreach activities.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline
Consistent Public Outreach	Department of Emergency Management Agency	$10,000	State Homeland Security Program Hospital Preparedness Program Red Cross Active Shooter Grant	Ongoing

Barrier Island Restoration Projects

ACTION: Support the Barrier Island restoration projects.

DISCUSSION: These projects are focus on restoring/expanding island habitat to provide hundreds of acres of wetland and terrestrial habitat for fish, shellfish, reptiles, amphibians, birds, and mammals through the beneficial use of dredged material. This will provide direct benefits of improved health, richness, and sustainability to aquatic and wildlife species. In addition, it will provide indirect benefits of navigational safety, education, and passive recreation and perhaps, increased tourism. The conceptual plan for the feasibility study proposes 55 percent wetland and 45 percent upland habitats. Habitat may include submerged aquatic habitat, mudflat, low marsh, high marsh, islands, ponds, channels and upland areas.

These projects will also decrease localized island erosion as well as decreases Dorchester County shoreline erosion by reducing wave heights.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline
Support barrier island restoration projects	Port of Baltimore Army Corps of Engineers	$1.5 Billion	Federal & State Funding	Long Term

Permanent Emergency Generator

ACTION: Install a permanent emergency generator at new North Dorchester High School; currently under construction. The school is expected to be completed in 2018.

DISCUSSION: The new North Dorchester High School will be equipped with transfer switch, exterior plug and equipment pad for portable emergency generator. However, a permanent generator will mitigate this issue. School will be used as emergency shelter by multiple agencies in the event sheltering is required.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline
Permanent Emergency Generator	Dorchester County Government	$380,000.00	Pre-Disaster Mitigation Grant	Long Term

Roadway Related Repetitive Flood Issues

ACTION: Upgrade and mitigate evacuation routes when funding from Federal or State sources is available. Also implement necessary mitigation measures to alleviate flooding issues listed in Table 52.

DISCUSSION: During the 8 November 2010 Meeting, the Hazard Mitigation Planning Committee ranked the flooding issues on Table 44. The following projects were ranked "High."

- North Main Street
- Tidal Flooding in the Southern Portion
- Wesley Church Road
- Elliott Island Road
- Maple Dam Road
- MD 336

From the listing of 29 identified roads that experience repetitive flooding issues, the six roads listed above were ranked as high importance for mitigation by the HMPC. Inclusion of these roads in the County's Capital Improvement Plan would increase the opportunity for mitigation.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline
Repetitive Flooding Roads Project	Department of Public Works	To be determined during the Conceptual Design Phase Process	Hazard Mitigation Grant Program; Pre-Disaster Mitigation Grant Program; Emergency Advance Measures for Flood Prevention	2-4 years

Critical Facility Property Protection

ACTION: For the critical facilities listed as having a high vulnerability and identified by the Planning Committee as high priority, a technical report should be completed to provide information on the first floor and base flood elevations. Mitigation alternatives and a detailed benefit/cost analysis should be completed.

DISCUSSION: The following Volunteer Fire Departments (VFD) are located within the special flood hazard area:

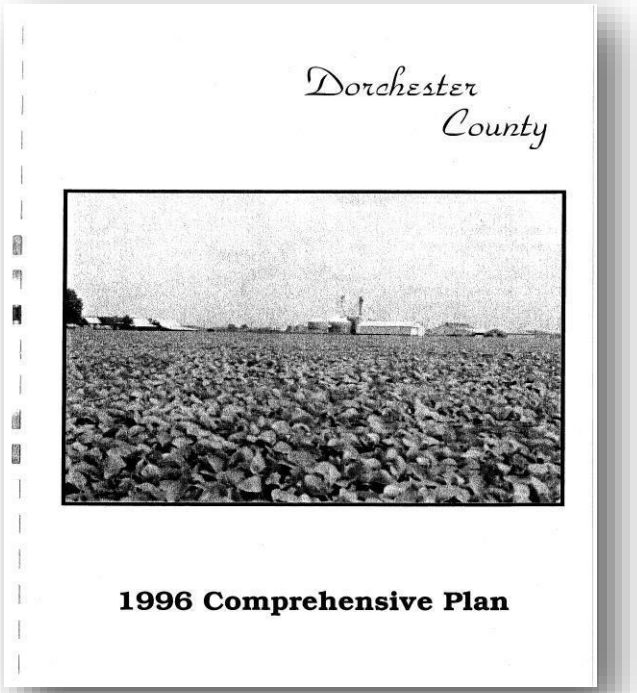
- **Lakes and Straits Fire Company**
  2103 Farm Creek Road
  Flood Depth: 2.6 feet
- **Hooper's Island Volunteer Fire Company**
  2756 Hooper's Island Road
  Flood Depth: 3.0 feet
- **Taylors Island Volunteer Fire Company**
  510 Taylors Island Road
  Flood Depth: 1.2 feet
- **Lloyds Volunteer Fire Department**
  1616 Hudson Road
  Flood Depth: 1.2 feet
- **Madison Volunteer Fire Company**
  1154 Taylors Island Road
  Flood Depth: 0.8 feet

During a hazard event, Volunteer Fire Companies are essential factors for aiding residents within their respective vicinity. Therefore, it is crucial that these fire departments be operational at all times in order to respond to an emergency.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline
Fire Department Relocation/Retrofitting Project(s)	Each Individual Volunteer Fire Department	Dependent upon individual structure and necessary retrofitting/relocation	Hazard Mitigation Grant Program; Flood Mitigation Assistance, Pre-Disaster Mitigation Grant	2 or more years

1996 Dorchester County Comprehensive Plan Update

1996 Dorchester County Comprehensive Plan



ACTION: Update the *1996 Dorchester County Comprehensive Plan* in order to properly monitor development patterns within Dorchester County and its nine municipalities to ensure future development is not susceptible to the identified hazards. On 6 October 2009, the *Dorchester County Water Resources Element* was adopted. This element is an amendment to the 1996 Comprehensive Plan. The plan discusses water recharge in regards to the aquifers being utilized. New development is placing a strain on available water. Therefore, during a drought event, available water is further limited.

DISCUSSION: The *1996 Dorchester County Comprehensive Plan* needs to be updated in order to properly monitor development patterns within Dorchester County and its nine

municipalities. Additionally, during the update process, the Department of Emergency Management should partner with the Planning and Zoning Department to ensure cross referencing goals, objectives and actions are addressed.

When funding becomes available, the Dorchester County Comprehensive Plan should be updated to reflect population and housing trends as well as provide information on growth areas. Additionally, during the update process, goals, objectives and actions should be cross referenced with this plan and the Flood Mitigation Plan. Staff members from the Emergency Services Department should work with the Department of Planning and Zoning to ensure goals and actions pertaining to hazards events are addressed.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline (year)
Dorchester County Comprehensive Plan Update	Planning and Zoning; Emergency Management Agency	Staff Time	None	1-2

Mitigate Repetitive Loss Properties

ACTION: CRS Elevate or acquire repetitive loss properties affected by flooding when funding from State and Federal sources is available.

DISCUSSION: There are 46 insured repetitive loss properties located within Dorchester County; 44 residential and 2 commercial structures. These properties not only cost the County or Town money but also the resident(s) who resided within that structure. The strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. Depending on the severity of flooding at this location, another possibility is to mitigate the structure so it is well above the base flood elevation. Therefore, by acquiring buildings and removing them from the floodplain is not only the most effective flood protection measure available, it is also a way to convert a problem area into a community asset and obtain environmental benefits.

An acquisition budget should be based on the median price of similar properties in the community, plus $10,000 to $20,000 for appraisals, abstracts, title opinions, relocation benefits, and demolition. Costs may be lower after a flood. For example, the community may have to pay only the difference between the full price of a property and the amount of the flood insurance claim received by the owner.

Consider the acquisition, reconstruction, relocation, and/or elevation of the most vulnerable flood-prone properties within the County, including but not limited to repetitive loss properties. This acquisition process would include: contacting the property owner and determining the willingness to sell, obtaining property assessment information, and eventually applying for funding. Once property is acquired, the County should ensure the removal of all structures located on the property and remains as open space in perpetuity. Green infrastructure could be incorporated on the acquired property. This would assist water management with protecting, restoring, or mimicking the natural water cycle. Green infrastructure is effective, economical, and enhances community safety and quality of life.

Project/ Action	Responsible Organizations	Estimated Costs	Possible Funding Sources	Approximate Timeline (years)
Flood Acquisitions	Planning & Zoning; Public Works; Emergency Management Agency; MDE; FEMA	Median Price of Similar Properties in the Community plus $10,000-20,000 for additional costs	Hazard Mitigation Grant Program; Flood Mitigation Assistance	1-2

Community Capability Overview

Through its Department of Emergency Services' Office, Dorchester County has developed a network of trained agency and volunteer personnel through the Maryland MEMAC, a statewide mutual aid agreement to mitigate and respond to a variety of hazards. This network includes state agencies such as the Maryland State Police, Department of Natural Resources, Department of the Environment, Department of Health and Mental Hygiene, State Highway Administration and the Maryland Emergency Management Agency. County agencies include the Highway Division, Sanitary Commission, Planning and Zoning Department, General Services, Board of Education, the Community Action Agency, the Sheriff's Office and the County HazMat team.

The County has verbal mutual aid agreements with surrounding counties and has also developed working relationships with volunteer organizations including the fire and rescue units that are active in incorporated communities and in rural areas. The County has mutual agreements with the American Red Cross and other local response groups that may be called upon in special circumstances. In addition, the county has agreements to coordinate mitigation activities with private utility companies, including

Delmarva Power, Choptank Electric and Verizon and with private transportation companies, such as the Maryland and Delaware Railroad, for rail transportation HazMat events.

Through its Planning and Zoning Department, Dorchester County has developed a system to regulate land use in sensitive areas, including 100-year floodplains, stream buffer areas, wetlands and Critical Areas. The County also has Subdivision Regulations for the creation of new lots and a zoning ordinance. Most municipalities have similar regulations that are administered locally.

Weather Related Events

Winter Storm Capability

Dorchester County receives approximately 13 inches of snow annually. The County Highway Division, the School Board and local municipalities, along with the State Highway Regional Office are equipped to deal with the occasional snow storm. As mentioned in the County Profile, the County also has to deal with the occasional ice storm during the winter months and the occurrence of fog on days when low hanging clouds hamper visibility.

In addition to the County Highway Division and State Highway Administration, the Department of Emergency Services' Office has close ties with Delmarva Power, Choptank Electric and the Verizon Corporation which provide electrical and telephone service to the citizens of the County. These utility companies' clear dead or overhanging trees from utility rights-of-way during summer months so that ice and wind damage is lessened during winter storms.

With respect to new construction, the County's Building Code has wind and snow loading requirements for buildings and mobile homes.

Tornado, Hurricane, Coastal and Riverine Flooding Capability

During major weather events, including thunderstorms, tornadoes and the passage of hurricanes, most of the agency and volunteer groups mentioned in the overview are called upon for assistance by the Maryland Emergency Management Agency.
Dorchester County's capabilities are similar to other coastal counties that deal with hurricanes and storm surge flooding. Usually local roads are blocked to some extent and when warranted, residents are asked to evacuate in the storm surge area. During the Hurricane Isabel event, Emergency Management officials decided not to attempt an evacuation during night time hours for fear that citizens would panic and become disoriented on roads that were partially submerged. Given the timing and height of the

storm surge this was the right decision and no one was injured or killed during the event.

Emergency Management has a plan which coordinates evacuation activities with the County's Highway Division and State Highway Administration and with local police, fire and rescue units, the Health Department and the Red Cross. While Dorchester County makes a great effort to mitigate flood events, the character of the natural environment along with the huge storm surge inundation areas, lends itself to further mitigation efforts particularly that of moving people and structures from harm's way.

The County also has the capability to mitigate future flood losses through its Subdivision Regulations, its Floodplain Management Ordinance and its Building Code. The Floodplain Ordinance has been modified to require the base elevation for new structures to be 2 foot above the base flood level. The Building Code has wind loading requirements for new structures and tie-down requirements for mobile homes. Finally, as noted in the section on Previous Mitigation Efforts, the County participates in the National Flood Insurance Program to allow property owners to purchase insurance through this federally sponsored program.

Heat and Drought Capability

As noted in the Hazard Profile, heat and drought are normally not a severe problem in Dorchester County. However, when dry conditions disrupt water service in an area of the County, the Department of Emergency Services can request the Maryland Emergency Management Agency to ask the National Guard to bring in water storage tanks for emergency use. Additionally, the Health Department monitors well development through the building permit process and has access to well records through the Department of the Environment to monitor ground water use and replenishment. The Department of Agriculture also monitors soil moisture conditions and provides farmers with information on crop development through the Soil Conservation District during low soil moisture conditions.

Epidemic Capability

As noted in the Epidemic Profile, the Maryland Department of Health and Mental Hygiene administers the County Health Department. This administrative setup allows the full capabilities of the state to be utilized to mitigate an epidemic or other outbreak of disease in Dorchester County.

TECHNOLOGICAL OR OTHER EVENTS

Fire or Explosion Capability

Fire prevention measures such as regulatory requirements mandated through the County's Building Code and the dissemination of public information through the State Fire Marshall's office have become routine. Safety requirements for explosive materials in containers being shipped by rail or truck are enforced by the Department of Transportation.

Wildfire Capability

The Department of Natural Resources Forest Service is the lead agency in wildfire suppression and works with local fire departments in training related to wildfire suppression. In addition, the Department of Natural Resources and Health Department have strict requirements for burning in outdoor areas to help prevent forest and brush wildfires.

Transportation/HazMat Capability

As noted in the Hazard Profile, Dorchester County has a HazMat team that can be called upon in the event of a HazMat incident. The State Department of the Environment is also on call to assist in the cleanup of hazardous materials. The State Department of Transportation would be called upon to assist with a major transportation accident or transportation HazMat incident. In addition, the County's hazard warning system can be activated in the event of a nuclear release at the Calvert Cliffs Nuclear Power Station.

Chapter 14 Plan Integration

Plan Integration

Integrating hazard mitigation planning and implementation actions into existing Dorchester County planning mechanisms (comprehensive plan, capital budget, ordinances, etc.) and vice versa is essential to building a safer and more resilient community. Integration of planning documents results in consistency and collaborative ideas within the local planning structure.

Generally described as the routine consideration and management of hazard risks in your community's existing planning framework – plan integration is the collection of plans, policies, codes, and programs that guide development in your community, how those are maintained and implemented, and the roles of people, agencies, and departments in evaluating and updating them. Effective integration of hazard mitigation occurs when your community's planning framework leads to develop patterns that do not increase risks from known hazards or leads to redevelopment that reduces risk from known hazards.

Safe Growth Audit

During the preparation of the *2017 Dorchester County Hazard Mitigation Plan*, Safe Growth Audit was conducted.

Performing a Safe Growth Audit is a way to assess how well the existing planning tools address hazard risks and community resiliency. Safe Growth Audit questions provide a systematic way to review local planning tools and identify the presence of, or need for, hazard-related actions.

The goal of the *SAFE GROWTH is to build environments that are safe for current and future generations and to protect building, transportation, utilities, and the natural environment from damage.*

Safe Growth Audit Recommendations

Upon completion of the Safe Growth Audit, a list of recommendations was developed as follows:

- Review Priority Funding Areas and other areas designated for future growth. Overlay with hazard areas and natural resources. Identify areas within designated growth areas that are not suitable. This is not a parcel level review, but rather an overlay analysis.
- Include goas and policies of the 2017 Hazard Mitigation Plan into the County Comprehensive Plan and Municipal Growth Plans.
- Identify natural hazard areas on future land-use maps.
- Identify movement systems that are designed to function under disaster conditions (e.g., evacuation).
- Update Sensitive Areas Element of the 1996 Dorchester County Comprehensive Plan.
- Encourage environmental policies to provide incentives to development that is located outside of protective ecosystems.
- Review all capital projects to determine hazard vulnerability and potential impacts. Discourage and limit projects that will encourage development in areas vulnerable to natural hazards.

Local documents reviewed during the Safe Growth Audit include:

- 1996 Comprehensive Plan with 2012 Municipal Growth Map Amendment;
- 2011 City of Cambridge Comprehensive Plan,
- 2009 Water Resource Element,
- Zoning Ordinance;
- Subdivision of Land;
- 2011 Hazard Mitigation Plan; and
- FY2015 Annual Report – Dorchester Water Makes Us.

There are nine (9) municipalities within Dorchester County. Municipalities that exercise planning and zoning authority are denoted in blue.

Municipalities	*Current Plan/Adoption Date*
Brookview	Does not exercise planning and zoning authority
Cambridge	CMP-2011
Church Creek	CMP-2005
East New Market	CMP-2010 Amendment-2012
Eldorado	Does not exercise planning and zoning authority
Galestown	Does not exercise planning and zoning authority
Hurlock	CMP-2009
Secretary	CMP-2010
Vienna	CMP-2003 MGE_WRE-2009

The following Safe Growth Audit questions were used to identify gaps in existing growth planning and mechanisms within the County and to identify areas for improvement that could be made to reduce vulnerability to future development.

Table 54: Safe Growth Audit

Plan	Location
COMPREHENSIVE PLAN	
LAND USE	
Does the future land-use map clearly identify natural hazard areas?	No. Amendments to *1996 Dorchester County Comprehensive Plan* Chapter 2, Land Use, Land Use Plan Page 2-2 in amendment adopted in 2012 does not clearly identify natural hazard areas. The amended maps only detail municipality's boundaries and infill.
Do the land-use policies discourage development or redevelopment within hazard areas?	Yes. *1996 Dorchester County Comprehensive Plan* Chapter 2: Land Use 5) Natural Resource Areas Pg. 2-17 through 2-19 Chapter 7: Environmentally Sensitive Areas 1992 Maryland Planning Act requires that jurisdictions adopt measures to protect environmentally sensitive areas. Pg. 7-1 through 7-18
Does the Plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes. 1996 Dorchester County Comprehensive Plan Chapter 2: Land Use 5) Natural Resource Areas Pg. 2-17 through 2-19 Chapter 7: Environmentally Sensitive Areas Pg. 7-1 through 7-18
TRANSPORTATION	
Does the transportation plan limit access to hazard areas?	No.
Is the transportation policy used to guide growth to safe locations?	Yes. 1996 Dorchester County Comprehensive Plan Chapter 5: Transportation Goal: Develop a coordinated transportation system which enables the safe and efficient movement of people and goods. Pg. 5-1 through 5-20
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	No, movement systems designed to function under disaster conditions are not captured in Chapter 5: Transportation.
ENVIRONMENTALMANAGEMENT	
Are environmental systems that protect development from hazard identified and mapped?	Yes. 1996 Dorchester County Comprehensive Plan Chapter 7: Environmentally Sensitive Areas Figure 7-1: Watershed Figure 7-2: Groundwater Protection Zones Figure 7-3: 100 Year Floodplain Also noted: Steep Slopes, Forest Conservation, and the Chesapeake Bay Critical Area. Pg. 7-1 through 7-18

	2009 City of Cambridge Water Resource Element The City of Cambridge Water Resource Element contains mapped datasets on soils, wetlands, riparian areas, flood prone areas, habitat, forested areas, and Chesapeake Bay Critical Areas. Analyzed individual datasets and selected specific attributes based on their potential to influence the ability of the landscape to recover from disturbance, that is – whether they are critical to the area's long-term ecological stability and integrity. In addition, these attributes were assigned a suitability value. Valuation was determined on a scale whereby the higher the potential to influence the ecological stability and integrity of a site, the higher the value. Pg. 43
Do environmental policies maintain and restore protective ecosystems?	Yes. 1996 Dorchester County Comprehensive Plan The 1992 Maryland Planning Act requires that jurisdictions adopt measures to protect environmentally sensitive areas. Under this Act, environmentally sensitive areas include: 1) Streams and their buffers; 2) 100-year floodplains; 3) habitats of threatened and endangered species; and 4) steep slopes. Pg. 7-1 through 7-18
Do environmental policies provide incentives to development that is located outside of protective ecosystems?	No.
PUBLIC SAFETY	
Are the goals and policies of the comprehensive plan related to the FEMA Local Hazard Mitigation Plan?	Yes. 1996 Dorchester County Comprehensive Plan Chapter 7: Environmentally Sensitive Areas Chesapeake Bay Critical Area Pg. 7-1 through 7-18 The Critical Area Law was passed by the Maryland General Assembly in 1984 because of concern about the decline of certain natural resources of the Chesapeake Bay. Dorchester County adopted its program in 1988, and it is updated on a four year basis.
Is safety explicitly included in the plan's growth and development policies?	Yes. 1996 Dorchester County Comprehensive Plan Chapter 7: Environmentally Sensitive Areas Chesapeake Bay Critical Area Pg. 7-1 through 7-18 Chapter 2: Land Use Amended Maps– 2012 Identify future growth areas for the City of Cambridge and the incorporated Towns of Hurlock, East New Market, Secretary, Vienna, and Church Creek. They act as and are intended to provide more detail to the growth and development area known as "areas adjoining the towns". Pg. 2-2 Chapter 5: Transportation Goal: Develop and coordinated transportation system which enables the safe and efficient movement of people and goods. Pg. 5-1 through 5-20 2011 City of Cambridge Comprehensive Plan Environmental Stewardship Plan

	Cambridge embraces a responsibility to ensure that the area's natural resource and sensitive areas, the beauty they contain, and the roles they play in sustaining public well-being are protected and sustained for future generations. The goals are: • To restore, protect, and preserve natural and environmentally sensitive areas found throughout the Cambridge planning area.
Is safety explicitly included in the plan's growth and development policies? Continued	• To protect public health and safety by directing development away from flood prone areas and from locations where certain land uses and land management lead to water pollution. • To incorporate land conservation into the fabric, use, and enjoyment of the City; connecting people with nature. • To encourage development strategies within 1,000 feet of the Choptank River that promote water quality improvements. • To promote environmentally sound development practices in all new developments. To promote energy efficiency and energy conservation
Does the monitoring and implementation section of the plan cover safe growth objectives??	Yes. 1996 Dorchester County Comprehensive Plan Chapter 11: Government and Implementation Pg. 8-11 through 8-18 This chapter lists implementation strategies that contain key actions only. For explanatory detail refer to the strategy in the relevant chapter which is listed after each strategy.
ZONING ORDINANCE	
Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	Yes. Dorchester Zoning Ordinance Chapter 155: Zoning § 155-38 CA Critical Area Protection District. [1] A. Statement of intent. It is the intent hereof to provide, as authorized by the Natural Resources Article, the Annotated Code of Maryland, § 8-1801 et seq., necessary land use and development controls for a designated critical area so as to protect water quality and natural habitat associated with the Chesapeake Bay.
Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	Yes. *Dorchester Zoning Ordinance* Chapter 155: Zoning § 155-38 CA Critical Area Protection District. [1] H. Resource conservation areas. The following regulations shall apply to development within resource conservation areas: [Amended 5-25-1999 by Ord. No. 62; 7-18-2000 by Ord. No. 286; 9-14-2004 by Bill No. 2004-13] 3. Commercial, institutional, industrial, and agricultural facilities in the resource conservation area shall be as follows: (d) Intensification or expansion of existing industrial, commercial, and institutional facilities and uses may be permitted in the RCA by the Planning Commission. A variance, in accordance with § 155-38M, must be granted if such expansion or intensification involves a use which the Planning Commission determines does not conform with the provisions of the Dorchester County Critical Area Program and the Critical Area Overlay Zone.

SUBDIVISION REGULATIONS	
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Yes, conditional basis intrafamily transfers. *Dorchester Subdivision Regulations* Chapter 140: Subdivision Regulations § 140-10.1 Approvals within Critical Area. [Added 3-2-2010 by Bill No. 2010-6] No approval, permit, variance or special exception for any property located within the Critical Area as regulated by this chapter shall be issued, unless the person seeking the permit, approval, variance, or special exception has: A.Fully paid all administrative, civil, and criminal penalties imposed by this chapter for violation for the subject property within the Critical Area; and B.Prepared a restoration or mitigation plan, approved by the County to abate impacts to water quality or natural resources as a result of the violation for the subject property within the Critical Area; and C.Performed the abatement measures in the approved plan in accordance with the County's Critical Area Program, for the subject property, under this chapter; and D.Satisfaction of all conditions specified under this section shall be a condition precedent to the issuance of any permit, approval, variance, or special exception for the affected property; and E.Unless an extension of time is appropriate because of adverse planting conditions, within 90 days of the issuance of a permit, approval, variance, or special exception for the affected property, any additional mitigation required as a condition of approval for the permit, approval, variance, or special exception shall be completed. Chapter 140: Subdivision Regulations § 140-65Subdivision of land partially located within the critical area. A.When a portion of land proposed for subdivision is located within the critical area, the applicant may conduct some or all of the afforestation or reforestation required by this article on that portion of the parcel located within the critical area. B.For purposes of calculating the minimum afforestation or reforestation requirements of this article, the applicant may consider the entire acreage of the parcel, including land within the critical area, rather than only the area being proposed for subdivision. In such an instance, the term "net tract area" shall be construed to mean the entire parcel, and a forest stand delineation and a forest conservation plan must be prepared for the entire parcel. C.The requirements for afforestation or reforestation in this section shall be construed to be considered in addition to, rather than in lieu of, any requirements for afforestation or reforestation pursuant to the Dorchester County Critical Area Protection Program and attendant ordinances. D.When more than 50% of the area being subdivided lies within the critical area, the Department may allow the applicant to extend critical area forest protection measures in lieu of meeting the requirements of this article. [Added 11-24-1998 by Ord. No. 258]

Do the regulations allow density transfer where hazard areas exist?	No.
CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES	
Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	Yes. Annual Report FY 2015 – Dorchester Water Moves Us Emergency Management • Continued to discuss with Delmarva Emergency Task Force and Maryland Emergency Management Agency evacuation routes and procedures for a major evacuation of the Eastern Shore. Engineering • Performed routine grading permit, storm water management and subdivision road construction inspections Planning and Zoning • Sought and received Council's approval to enter into an agreement with the Mayor and Commissioners of the Towns of Vienna, Brookview, Eldorado, Galestown and Church Creek in which the Town officials adopt the County's Floodplain Ordinance which authorizes County staff to enforce this ordinance within those municipal limits • Implemented a variety of regulatory and land use planning functions at local level
Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	No.

Source: 2016 Hazard Mitigation Planning Committee

Plan Integration Conclusion

Integrating hazard planning into the County's planning framework will lead to development patterns and redevelopment that decreases hazard risk and vulnerability. In order to achieve and facilitate integration, Dorchester County should review the safe growth audit and conduct an evaluation on how planning documents, policies, codes and programs are maintained and implemented, and the roles of people, agencies, and departments in evaluating and updating them. This depth of review will enable the County to identify opportunities for plan integration, resulting in effective ways to reduce hazard vulnerability in Dorchester County.

The development of a more in-depth inventory will enable the county to identify further gaps and overlaps between the current hazard mitigation plan and the larger planning framework including the County's future Comprehensive Plan. Identifying existing tools may lead to opportunities for integration. The identification of gaps will lead to the consideration of capacity specific to county and municipal staffing and resources.
Finally, the systematic planning process will yield a roadmap displaying steps that are available to, and achievable by, Dorchester County. The *2011 City of Cambridge Comprehensive Plan* recognizes that development decisions in Cambridge are

interconnected with natural resources well beyond municipal boundaries. In addition, *2011 City of Cambridge Comprehensive* recommends that future development be concentrated in those areas that have the least vulnerability to hazards that impact the City of Cambridge, such as floodprone areas. A final highlighted recommendation of the 2001 Plan includes the promotion of energy efficiency and energy conservation.

The recommendations highlighted may be applied to the County as a whole. Working together and in cooperation with Dorchester County will enhance planning efforts and lead to opportunities for integration and collaboration, benefitting both the City of Cambridge and the County. Using a systematic planning process will yield a roadmap displaying steps that are available to, and achievable by, Dorchester County and its municipalities.

Chapter 15 Plan Maintenance & Implementation

Plan Adoption

The Disaster Mitigation Act of 2000 requires that local Hazard Mitigation Plans and any updates be formally adopted by the County Commissioners following review by the Maryland Emergency Management Agency and FEMA. The Plan and any updates will be subject to a public hearing prior to adoption by the Commissioners.

Plan Update and Continued Public Involvement

The Disaster Mitigation Act of 2000 requires local Hazard Mitigation Plans to be monitored, evaluated, and updated during a five-year cycle. The County's Hazard Mitigation Planning Committee, which was instrumental in developing the Hazard Mitigation Plan, will continue to meet annually during the five-year cycle to monitor and evaluate mitigation projects and to keep the plan current. Annual status reports will be submitted to the County Council, Maryland Emergency Management Agency (MEMA), and the Federal Emergency Management Agency (FEMA) to update that group on the progress of various mitigation activities. Copies of these reports will be made available to the general public via the County's website.

The annual status report will detail mitigation activities undertaken over the course of the year and will highlight completed activities. The report will also address the following points:

- Evaluate the goals and objectives to ensure they address current and expected conditions.
- Determine if the nature or magnitude of risk has changed.
- Evaluate whether current resources are adequate for implementing the plan.
- Document any technical, legal or coordination issues.
- Document agency and partner participation along with public involvement.

Copies of the annual status report will be made available to Planning Committee members, LEPC members, local governments, participating agencies and partners and citizens.

The Hazard Mitigation Plan is to be updated and readopted at the end of each five-year cycle. In the event of a significant disaster or any substantial changes in land use or regulations that impact mitigation efforts, more frequent updates may be necessary.

The Planning Committee and the Emergency Management Agency will be responsible for overseeing the update to the Hazard Mitigation Plan. The process used to update the plan would follow the procedure used to prepare the original plan. This would include participation by the Planning Committee and would also include municipal and citizen involvement. Public comments will be reviewed and discussed by Planning Committee and the Emergency Management Agency. These comments will be recorded and where applicable incorporated into the Plan. Public meetings will be advertised in the local newspaper and on the County website. The Plan will be available for public review through the County's website. Copies of the Plan may also be obtained directly through the Dorchester County Emergency Management Agency's office.

Implementation

The Disaster Mitigation Act of 2000 also requires that the County implement the Plan through existing programs. This can be accomplished through inclusion of mitigation measures in the Comprehensive Plan, the Land Use and Building Codes, the Floodplain Ordinance and through Federal grant programs, which are identified in the previous section. As these documents are updated, reference to the mitigation measures included in the Hazard Mitigation Plan can be amended into various plans and regulations.

APPENDIX A
DATA METHODOLOGY

DATA METHODOLOGY

The 2010 Dorchester County HMP included Critical Facilities listing that S&S Planning and Design utilized for that document. For the 2017 HPM Update, S&S Planning and Design included additional critical facility types and public facilities in the Vulnerability Analysis.

Step 1. The 2016 Hazard Mitigation Plan Committee reviewed the listing for modifications and/or additions.

Step 2. For any new facilities or facilities lacking necessary information, the 2013 Maryland Property View Database was utilized to extrapolate information such as: account number, address, city, improved value, and facilities descriptions.

Step 3. New Attributes Columns added in 2017 Plan Update Process:

- Flood Depth
- Built 1965 & Prior

Step 4. Upon completion of the critical and public facilities database, facilities were included on hazard inundation mapping and utilized in tables for the Vulnerability Analysis.

Critical Facilities Descriptions

Facility Category	*Facility Types*	
County	Airport County Government	
Education	Public Schools College	
Emergency	Fire Department EOC	Police Station EMS Station
Medical	Nursing Home Hospital Medical	
Miscellaneous	Marina/Dock Boat Ramp Museum	Community Center Park Transportation
Municipal	Municipal Government Library	
Utility	Utility Communication	

APPENDIX B
CRITICAL & PUBLIC FACILITIES

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1014009051	County	Airport	Cambridge-Dorchester Airport	Airport Road	Cambridge	1982	1159300	No	Yes	0.0
1014009442	County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge	1998	69300	No	Yes	0.0
1014009442	County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge	1998	69300	No	Yes	0.0
1014007725	County	Airport	Cambridge-Dorchester Airport	5303 Bucktown Road	Cambridge		1500	No	Yes	0.0
1015011831	County	County Government	Beulah Landfill	New Market Elwood Road	Hurlock		2000	No	Yes	0.0
1015011831	County	County Government	Beulah Landfill	Galligher Farm Road	Hurlock		2000	No	Yes	0.0
1007173792	County	County Government	Board Of Education	610 Glasgow Street	Cambridge	1940	1734200	No	Yes	0.0
1007173830	County	County Government	Board Of Education	1405 Glasgow Street	Cambridge	1975	707700	No	Yes	0.0
1005076072	County	County Government	County Facility	Lakesville Crapo Road	Crapo	1957	207000	No	Yes	1.6
1007172427	County	County Government	Department Of Tourism	2 Rose Hill Drive	Cambridge	1999	1358200	No	Yes	1.8
1007174489	County	County Government	Dorchester County Circuit Court House	206 High Street	Cambridge	1864	4142100	No	Yes	0.0
1007174551	County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge	1968	2581800	No	Yes	0.0
1007191715	County	County Government	Dorchester County Office On Aging	2470 Cambridge Beltway	Cambridge	1996	132560	No	Yes	0.0
1007154461	County	County Government	Dorchester Health Department	316 Cedar Street	Cambridge	1980	1024000	No	Yes	0.0
1007145640	County	County Government	Hospital Related Facility	2474 State Route 16	Cambridge	1996	963600	No	Yes	0.0
1007150776	County	County Government	Museum Parking	605 Locust Street	Cambridge		12300	No	Yes	0.0
1007158513	County	County Government	Parks & Recreation	Dailsville Road	Cambridge	1975	144100	No	Yes	0.0
1007174543	County	County Government	Parks & Recreation	Park Lane	Cambridge		68200	No	Yes	0.0
1003046222	County	County Government	Parks & Recreation	Middle Street	Vienna		34500	No	Yes	0.0
1015000244	County	County Government	Parks & Recreation	200 Gay Street	Hurlock		55100	No	Yes	0.0
1007174497	County	County Government	Parks & Recreation	Lecompte Street	Cambridge		30500	No	Yes	0.0
1014008691	County	County Government	Public Works	Handley Road	Cambridge	1962	373100	No	Yes	0.0
1002029383	County	County Government	Public Works	3960 Linkwood Red Hill Road	East New Market		6000	No	Yes	0.0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1014008772	County	County Government	Public Works	5501 Mallard Lane	Cambridge		28500	No	Yes	0.0
1007192169	County	County Government	Public Works	Old Route 50	Cambridge		6500	No	Yes	0.0
1007173857	County	County Government	St. Clair Head Start/Day Care Center	824 Fairmount Avenue	Cambridge	1953	1833800	No	Yes	0.0
1015024429	County	County Government	Warehouse	6898 Gravel Branch Road	Hurlock	2002	143600	No	Yes	0.0
1007164548	Education	College	Chesapeake College-Cambridge Center	0 High Street	Cambridge	1950	245600	Yes	No	0.0
1007175264	Education	Public School	Cambridge Christian Academy	207 Maryland Avenue	Cambridge	1881	2152900	Yes	No	0.0
1007177275	Education	Public School	Cambridge-South Dorchester High	2475 Cambridge Beltway	Cambridge	1976	16809500	Yes	No	0.0
1007173725	Education	Public School	Choptank Elementary School	1101 Maces Lane	Cambridge	1997	7757300	Yes	No	0.0
	Education	Public School	Dorchester Career and Tech Center	2475 Cambridge Beltway			0	Yes	No	0.0
1015011742	Education	Public School	Hurlock Elementary	209 Charles Street	Hurlock	1986	5370700	Yes	No	0.0
1007173725	Education	Public School	Mace's Lane Middle	1101 Maces Lane	Cambridge	1997	6929700	Yes	No	0.0
1007164378	Education	Public School	Maple Elementary School	0 Egypt Road	Cambridge		64300	Yes	No	0.0
1002029405	Education	Public School	North Dorchester High School	5875 Cloverdale Road	Hurlock	1974	8606300	Yes	No	0.0
	Education	Public School	North Dorchester Middle				0	Yes	No	0.0
	Education	Public School	Ridge School Of The Eastern Shore	821 Fieldcrest Road	Cambridge		0	Yes	No	0.0
1007173660	Education	Public School	Sandy Hill Elementary	1503 Glasgow Street	Cambridge	1974	4245500	Yes	No	0.0
1005076366	Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek	1953	2466200	Yes	No	0.0
1003046168	Education	Public School	Vienna Elementary	4905 Ocean Gateway	Vienna	1964	1576700	Yes	No	0.0
1002031590	Education	Public School	Warwick Elementary	155 Main Street	Secretary	1976	2907600	Yes	No	0.0
1007194676	Emergency	EOC	EOC	829 Fieldcrest Road	Cambridge	1991	12573300	Yes	No	0.0
1009199993	Emergency	Fire Department	Church Creek Volunteer Fire Company	1902 Church Creek Road	Church Creek	1970	185800	Yes	No	0.0
1002021420	Emergency	Fire Department	East New Market VFD	4020 E New Market Bypass	East New Market	2010	901700	Yes	No	0.0
1001001264	Emergency	Fire Department	Eldorado-Brookview Volunteer Fire Com	5752 Rhodesdale Eldorado Road	Rhodesdale	1985	196600	Yes	No	0.0
1018000075	Emergency	Fire Department	Elliotts Volunteer Fire Company	2317 Elliott Island Road	Vienna	1970	202100	Yes	No	0.0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1006095747	Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek	1960	263700	Yes	No	1.9
1015007192	Emergency	Fire Department	Hurlock Volunteer Fire Company	302 S Main Street	Hurlock		15600	Yes	No	0.0
1010006414	Emergency	Fire Department	Lakes And Straits Fire Company	2103 Farm Creek Road	Wingate	1993	295900	Yes	No	2.6
1014008861	Emergency	Fire Department	Linkwood Salem Volunteer Fire Dept	3905 Ocean Gateway	Linkwood	1962	345500	Yes	No	0.0
1007174756	Emergency	Fire Department	Lloyds Volunteer Fire Department	Cambridge Hudson Road	Cambridge	1950	167200	Yes	No	1.2
1016004499	Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison	1954	274500	Yes	No	0.8
1008184216	Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge	1950	272200	Yes	No	0.0
1002029820	Emergency	Fire Department	Secretary Volunteer Fire Company	115 Myrtle Street	Secretary	1985	161500	Yes	No	0.0
1004059646	Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island	1960	231200	Yes	No	1.2
1003047946	Emergency	Fire Department	Vienna Volunteer Fire Department	301 Old Us Route 50	Vienna	1992	202000	Yes	No	0.0
1007202725	Emergency	Fire Department/EMS	Cambridge Company 1	8 Washington Street	Cambridge	2007	5398500	Yes	No	0.0
1015011920	Emergency	Fire Department/EMS	Hurlock Volunteer Fire Company	301 Charles Street	Hurlock	1945	338200	Yes	No	0.0
1001001108	Emergency	Fire Department/EMS	Station 200	5752 Rhodesdale Eldorado Road	Rhodesdale	1955	148400	Yes	No	0.0
1007173598	Emergency	Police Station	Cambridge Police Department	615 Pine Street	Cambridge	2001	507600	Yes	No	0.0
1015001984	Emergency	Police Station	Hurlock Police Department	200 Nealson Street	Hurlock	2016	167700	Yes	No	0.0
1007169795	Medical	Hospital	Choptank Community Health System	503 Muir Street	Cambridge	1950	780300	Yes	No	0.0
1007197152	Medical	Hospital	Dorch General Hospital/Michael Moran	300 Byrn Street	Cambridge	1900	635500	Yes	No	0.0
1007199325	Medical	Hospital	Eastern Shore Hospital Center	5262 Woods Road	Cambridge		0	Yes	No	0.0
1007179731	Medical	Medical	Blackwater Medical Associates /Dr. Vinodrai Mehta	408 And 402 Byrne Street	Cambridge	1977	493500	No	Yes	0.0
1007195834	Medical	Medical	Chesapeake Bay Orthopedics	828 Airpax Drive	Cambridge	1993	2005900	No	Yes	0.0
1015016302	Medical	Medical	Delmarva Community Services	6210 Shiloh Church Hurlock Road	Hurlock	1957	1103800	Yes	No	0.0
1007152655	Medical	Medical	Dr. Eyup Tanman	15 Franklin Street	Cambridge	1963	70100	No	Yes	0.0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1007286538	Medical	Medical	Edmund J. Maclaughlin Md Llc	10 Aurora Street	Cambridge	1966	110200	No	Yes	0.0
1007108141	Medical	Medical	Humberto A Rossi. M.D.Pa	305 Maryland Avenue	Cambridge	1910	70900	No	Yes	0.0
1007204469	Medical	Medical	Lois A. Narr D.O. Llc	100 Bramble Street	Cambridge	2001	1202800	No	Yes	0.0
1007130724	Medical	Medical	Mary Ann D. Moore Mdpa	300 Dorchester Avenue	Cambridge	1935	224100	No	Yes	0.0
1007147554	Medical	Medical	Ms Shariff M.D.Pa	105 Aurora Street	Cambridge	1920	147400	No	Yes	0.0
1007199287	Medical	Medical	Potomac Ridge Behavioral Health Syste	821 Fieldcrest Road	Cambridge	1999	5229200	Yes	No	0.0
1007112157	Medical	Medical	Rose Hill Family Physicians Llc	319 Dorchester Avenue	Cambridge	1948	620900	No	Yes	0.0
1007137125	Medical	Medical	Special Home	210 Henry Street	Cambridge	1925	55700	No	Yes	0.0
1007192509	Medical	Medical	Special Home Ii	6 Patamoke Way	Cambridge	1985	78100	No	Yes	0.0
1007193599	Medical	Nursing Home	Cheasapeake Woods Center	525 Glenburn Avenue	Cambridge	1992	3275900	Yes	No	0.0
1007179448	Medical	Nursing Home	Signature Healthcare at Mallard Bay	520 Glenburn Avenue	Cambridge	1976	4633800	Yes	No	0.0
1007117361	Medical	Nursing Home		311 Glenburn Aveue	Cambridge	1925	343600	No	Yes	0.0
1011001572	Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge		103600	No	Yes	2.6
1010006325	Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville		19400	No	Yes	6.4
1018000148	Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna		178200	No	Yes	4.2
1006086608	Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek	1915	61720	No	Yes	1.0
1010006333	Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville		10000	No	Yes	2.7
1007175183	Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge		183100	No	Yes	3.5
1016004421	Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison		64600	No	Yes	1.5
1006095852	Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek		17200	No	Yes	3.8
1017000020	Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna	1920	154350	No	Yes	2.8
1008185204	Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge		328300	No	Yes	1.4
1005075432	Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge		0	No	Yes	3.2
1004059581	Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Islandd		182600	No	Yes	3.1
1010005434	Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville	1940	61200	No	Yes	4.0
1013000964	Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge		13120	No	Yes	2.9

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1007146213	Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge		262800	No	Yes	0.9
1002029456	Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary		159300	No	Yes	0.5
1005071321	Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek	1964	349400	No	Yes	2.6
1010003431	Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate		0	No	Yes	3.5
	Miscellaneous	Bridge	D-001hoopers Island Road/Honga River				0	No	Yes	12.3
	Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek				0	No	Yes	1.4
	Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek				0	No	Yes	0.5
	Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek				0	No	Yes	0.5
	Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek				0	No	Yes	0.5
	Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River				0	No	Yes	4.8
	Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek				0	No	Yes	1.0
	Miscellaneous	Bridge	D-015 Key Wallace Drive/ Little Blackwater River				0	No	Yes	2.2
	Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River				0	No	Yes	0.5
	Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek				0	No	Yes	4.8
	Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River				0	No	Yes	0.5
	Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River				0	No	Yes	5.3
	Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River				0	No	Yes	4.6
	Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/ Windmill Island Creek				0	No	Yes	4.1
	Miscellaneous	Bridge	D-026 Decoursey Bridge Roa d /Transquaking River				0	No	Yes	4.5
	Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek				0	No	Yes	5.2
	Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek				0	No	Yes	0.5
	Miscellaneous	Bridge	D-035 New Bridge Road/ Chimamacomico River				0	No	Yes	0.5

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
	Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek				0	No	Yes	4.0
	Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek				0	No	Yes	5.5
	Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek				0	No	Yes	4.0
	Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek				0	No	Yes	4.8
	Miscellaneous	Bridge	Langrell Road/Hunting Creek				0	No	Yes	0.0
	Miscellaneous	Bridge	RT 14/Artifical Path (Off Of Warwick River)				0	No	Yes	3.6
	Miscellaneous	Bridge	RT 14/Marshyhope Creek				0	No	Yes	4.7
	Miscellaneous	Bridge	RT 16/Parsons Creek				0	No	Yes	2.8
	Miscellaneous	Bridge	RT 16/Slaughter Creek				0	No	Yes	2.7
	Miscellaneous	Bridge	RT 16-New Market Road/Cabin Creek				0	No	Yes	0.0
	Miscellaneous	Bridge	RT 313/Artificial Path				0	No	Yes	4.5
	Miscellaneous	Bridge	RT 313/Marshyhope Creek				0	No	Yes	0.0
	Miscellaneous	Bridge	RT 335/ Wallace Creek				0	No	Yes	3.4
	Miscellaneous	Bridge	RT 335/Artifical Path				0	No	Yes	0.5
	Miscellaneous	Bridge	RT 335/Blackwater River				0	No	Yes	0.5
	Miscellaneous	Bridge	RT 335/Buttons Creek				0	No	Yes	0.5
	Miscellaneous	Bridge	RT 335/Honga River/Bay				0	No	Yes	5.5
	Miscellaneous	Bridge	RT 50/Chicamacomico River				0	No	Yes	0.5
	Miscellaneous	Bridge	RT 50/Chicamacomico River				0	No	Yes	0.5
	Miscellaneous	Bridge	RT 50/Shoal Creek				0	No	Yes	0.0
	Miscellaneous	Bridge	RT 531/Gales Creek				0	No	Yes	0.0
	Miscellaneous	Bridge	RT335/Artificial Path (Off Of Honga River)				0	No	Yes	4.0
	Miscellaneous	Bridge	Shore Drive/Shoal Creek				0	No	Yes	4.3
	Miscellaneous	Bridge	State-Choptank River Bridge				0	No	Yes	16.5
	Miscellaneous	Bridge	State-Market Street/Cambridge Creek				0	No	Yes	3.5

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
	Miscellaneous	Bridge	State-Vienna Bridge				0	No	Yes	24.3
1007193602	Miscellaneous	Community Center	Cambridge MAC Senior Center			1998	2622900	No	Yes	0.0
1001009931	Miscellaneous	Community Center	Cokesbury Community Center	5957 Cokesbury Road	Federalsburg	1953	95000	No	Yes	0.0
1007173776	Miscellaneous	Community Center	Dorchester Family YMCA	201 Talbot Avenue	Cambridge	1929	3248100	No	Yes	0.0
1007123981	Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge	1976	584600	No	Yes	0.0
1007174454	Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge	1979	1102500	No	Yes	1.3
1006086837	Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek	1988	344400	No	Yes	0.6
1004058461	Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island	1975	343800	No	Yes	0.5
1006093043	Miscellaneous	Marina/Dock					25300	No	Yes	6.0
1010000270	Miscellaneous	Marina/Dock				1945	58400	No	Yes	4.6
1015007176	Miscellaneous	Marina/Dock		6304 Suicide Bridge Road	Hurlock	1993	1231800	No	Yes	3.9
1010006368	Miscellaneous	Marina/Dock		Farm Creek Road	Toddville		6100	No	Yes	3.7
1010006341	Miscellaneous	Marina/Dock		Wingate Bishops Head Road	Wingate		38700	No	Yes	3.6
1013003963	Miscellaneous	Marina/Dock		Maple Dam Road	Cambridge		12300	No	Yes	3.2
1007156162	Miscellaneous	Marina/Dock					134200	No	Yes	2.6
1006095836	Miscellaneous	Marina/Dock		Hoopers Island Road	Church Creek		243900	No	Yes	1.8
1006094341	Miscellaneous	Marina/Dock		Doeller Road	Fishing Creek		4800	No	Yes	1.7
1002022125	Miscellaneous	Marina/Dock		6325 Snug Harbor Road	East New Market		41500	No	Yes	0.9
1005076153	Miscellaneous	Marina/Dock		Wingate Bishops Head Road	Wingate		183100	No	Yes	0.8
1007178735	Miscellaneous	Marina/Dock					100200	No	Yes	0.7
1010007194	Miscellaneous	Marina/Dock		2100 Wingate Bishops Head Road	Wingate	1995	59500	No	Yes	0.5
1007128169	Miscellaneous	Marina/Dock				1988	427900	No	Yes	0.0
1007181078	Miscellaneous	Marina/Dock					168100	No	Yes	0.0
1007174519	Miscellaneous	Museum	Dorchester Arts Center	120 High Street	Cambridge	1900	186500	No	Yes	0.0
1004059522	Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island	1920	95100	No	Yes	1.9
1003040992	Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna	1927	65500	No	Yes	0.0

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1007168756	Miscellaneous	Museum		321 High Street	Cambridge	1930	406300	No	Yes	0.0
1009199918	Miscellaneous	Park	Church Creek Community Park	4663 Golden Hill Road	Church Creek		0	No	Yes	0.0
1007177720	Miscellaneous	Park	Dorchester County Pool	107 Virginia Avenue	Cambridge	1975	758500	No	Yes	0.0
1007140711	Miscellaneous	Park	Dorchester County Recreation & Parks	434 Willis Street	Cambridge	1975	188600	No	Yes	0.0
1007174772	Miscellaneous	Park	Sailwinds Park	200 Byrn Street	Cambridge	1963	1105500	No	Yes	0.0
1014008926	Miscellaneous	Transportation	SHA	2954 Old Route 50	Cambridge	2015	708300	No	Yes	0.0
1007174470	Municipal	Library	Dorchester Central Libray	303 Gay Street	Cambridge	1973	1580100	No	Yes	0.0
1015012005	Municipal	Library	Hurlock Free Library	222 S Main Street	Hurlock	1972	356700	No	Yes	0.0
1007176228	Municipal	Municipal Government	Cambridge City Hall	Academy Street	Cambridge	1979	988300	Yes	No	0.0
1007176791	Municipal	Municipal Government	Cambridge Housing Authority	Cornish Drive	Cambridge	1972	6087200	No	Yes	0.0
1007175205	Municipal	Municipal Government	Cambridge Housing Authority	Bradley Avenue	Cambridge	1975	1739500	No	Yes	0.0
1007174438	Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge	1935	253200	No	Yes	2
1007174233	Municipal	Municipal Government	Cambridge Utilities	312 High Street	Cambridge	1900	196500	No	Yes	0.0
1007175175	Municipal	Municipal Government	Cambridge-City Council	305 Gay Street	Cambridge	1940	212700	No	Yes	0.0
1007174799	Municipal	Municipal Government	Cambridge-District Court	310 Gay Street	Cambridge	1917	1119700	No	Yes	0.0
1007176120	Municipal	Municipal Government	Cambridge-Office Building	Race Street	Cambridge		17000	No	Yes	0.0
1007120672	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		6300	No	Yes	0.0
1007176333	Municipal	Municipal Government	Cambridge-Parking Lot	Muir Street	Cambridge		42900	No	Yes	0.0
1007175388	Municipal	Municipal Government	Cambridge-Parking Lot	311 Gay Street	Cambridge		13600	No	Yes	0.0
1007175353	Municipal	Municipal Government	Cambridge-Parking Lot	604 Glasgow Street	Cambridge		13700	No	Yes	0.0
1007175361	Municipal	Municipal Government	Cambridge-Parking Lot	610 Glasgow Street	Cambridge		17100	No	Yes	0.0
1007175434	Municipal	Municipal Government	Cambridge-Parking Lot	420 Race Street	Cambridge		16600	No	Yes	0.0
1007175469	Municipal	Municipal Government	Cambridge-Parking Lot	423 Race Street	Cambridge		29000	No	Yes	0.0
1007176104	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		7500	No	Yes	0.0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1007176112	Municipal	Municipal Government	Cambridge-Parking Lot	Academy Street	Cambridge		30800	No	Yes	0.0
1007176198	Municipal	Municipal Government	Cambridge-Parking Lot	Academy Street	Cambridge		11700	No	Yes	0.0
1007176899	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		5400	No	Yes	0.0
1007174462	Municipal	Municipal Government	Cambridge-Parks & Recreation	96 Hight Street	Cambridge		552300	No	Yes	12.8
1007174217	Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge		20000	No	Yes	1.7
1007174284	Municipal	Municipal Government	Cambridge-Public Works	100 Brohawn Avenue	Cambridge	1930	235800	No	Yes	0.0
1007174241	Municipal	Municipal Government	Cambridge-Public Works	Stone Boundary Road	Cambridge		262000	No	Yes	0.0
1007174381	Municipal	Municipal Government	Cambridge-Public Works	Abocoo Lane	Cambridge		20000	No	Yes	0.0
1007139160	Municipal	Municipal Government	Cambridge-Public Works	309 Gay Street	Cambridge		9000	No	Yes	0.0
1007175396	Municipal	Municipal Government	Cambridge-Public Works	530 Race Street	Cambridge		24600	No	Yes	0.0
1007175493	Municipal	Municipal Government	Cambridge-Public Works	Governors Avenue	Cambridge		3000	No	Yes	0.0
1007175809	Municipal	Municipal Government	Cambridge-Public Works				1200	No	Yes	0.0
1007176945	Municipal	Municipal Government	Cambridge-Public Works	Woods Road	Cambridge		48000	No	Yes	0.0
1007192908	Municipal	Municipal Government	Cambridge-Public Works	Shane Circle	Cambridge		32000	No	Yes	0.0
1007174330	Municipal	Municipal Government	Cambridge-Public Works	Glasgow Street	Cambridge		51800	No	Yes	0.0
1007174225	Municipal	Municipal Government	Cambridge-Public Works	Nathans Avenue	Cambridge		247700	No	Yes	0.0
1007174403	Municipal	Municipal Government	Cambridge-Public Works	High Street	Cambridge		5000	No	Yes	0.0
1007175132	Municipal	Municipal Government	City Of Cambridge DPW	705 Leonards Lane	Cambridge	1978	468700	No	Yes	0.0
1002032015	Municipal	Municipal Government	East New Market Housing Authority	40 Academy Street	East New Market	1912	1168800	No	Yes	0.0
1002029871	Municipal	Municipal Government	East New Market Town Office	10 Academy Street	East New Market	1960	3800	No	Yes	0.0
1002029685	Municipal	Municipal Government	East New Market-Parks & Recreation/WA	Creamery Road	East New Market	1976	224300	No	Yes	0.0
1001010034	Municipal	Municipal Government	Galestown Community House	5538 Wheatley Church Road	Rhodesdale	1945	95400	No	Yes	0.0
1015016434	Municipal	Municipal Government	Hurlock City Hall	311 Charles Street	Hurlock	1983	339700	No	Yes	0.0

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1015011769	Municipal	Municipal Government	Hurlock-Office Building	220 S Main Street	Hurlock	1927	123800	No	Yes	0.0
1015016582	Municipal	Municipal Government	Hurlock-Office Building	47 Delaware Avenue	Hurlock	1990	69500	No	Yes	0.0
1015003138	Municipal	Municipal Government	Hurlock-Public Works	300 Pine Street	Hurlock		190000	No	Yes	0.0
1015015691	Municipal	Municipal Government	Hurlock-Public Works	49 Delaware Avenue	Hurlock		10000	No	Yes	0.0
1015011955	Municipal	Municipal Government	Hurlock-Public Works	106 Gay Street	Hurlock		80500	No	Yes	0.0
1015012021	Municipal	Municipal Government	Hurlock-Public Works	4820 Jackson Street	Hurlock		18300	No	Yes	0.0
1015011947	Municipal	Municipal Government	Hurlock-Public Works	103 Oak Street	Hurlock		5000	No	Yes	0.0
1015011963	Municipal	Municipal Government	Hurlock-Public Works	100 Thompson Street	Hurlock		5500	No	Yes	0.0
1015015853	Municipal	Municipal Government	Mayor & Council Of Hurlock			1920	103720	No	Yes	0.0
1002029804	Municipal	Municipal Government	Secretary Town Hall	122 Main Street	East New Market	1920	60200	No	Yes	0.0
1002029472	Municipal	Municipal Government	Secretary-Parks & Recreation	Popular Street	Secretary		63100	No	Yes	0.0
1002278669	Municipal	Municipal Government	Secretary-Public Works				3700	No	Yes	0.0
1003047229	Municipal	Municipal Government	Vienna Town Hall	214 Market Street	Vienna	1981	146300	No	Yes	0.0
1003046532	Municipal	Municipal Government	Vienna-Parks & Recreation	Water Street	Vienna		4600	No	Yes	6.0
1003046540	Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water Street	Vienna	1964	30400	No	Yes	1.7
1003042812	Municipal	Municipal Government	Vienna-Parks & Recreation	113 Ocean Gateway	Vienna	1930	197200	No	Yes	0.0
1003043630	Municipal	Municipal Government	Vienna-Parks & Recreation	115 Ocean Gateway	Vienna	1940	18400	No	Yes	0.0
1003044602	Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna		91900	No	Yes	4.9
1003046311	Municipal	Municipal Government	Vienna-Public Works	Middle Street	Vienna		4500	No	Yes	0.0
1003046656	Municipal	Municipal Government	Vienna-Public Works	Race Street	Vienna		4600	No	Yes	0.0
1003047431	Municipal	Municipal Government	Vienna-Public Works	Vienna Henrys Crossroads Road	Vienna		87100	No	Yes	0.0
1016003727	Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison	1937	564100	No	Yes	0.0
1014009620	Utility	Communication	Tower #13	3829 Vincent Road	Linkwood	1975	583800	No	Yes	0.0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1013001839	Utility	Communication	Bucktown Tower	2946 Greenbrier Road	Cambridge		45860	No	Yes	0.0
1001003119	Utility	Communication	Tower #29	6840 Eldorado Road	Federalsburg	1975	19070	No	Yes	0.0
1003039161	Utility	Communication Tower	Vienna Tower	4710 Ocean Gateway	Vienna		0	No	Yes	0.0
1004058607	Utility	Communication Tower	County Tower	Smithville Road	Church Creek		0	No	Yes	0.0
1007177747	Utility	Utility	Cambridge Wastewater Treatment Plant	1010 Roslyn Avenue	Cambridge	1973	255300	No	Yes	0.0
1007174268	Utility	Utility	Cambridge Water Tower	Woods Road	Cambridge		678100	No	Yes	0.0
1007176015	Utility	Utility	Cambridge Water Tower	Trenton Street	Cambridge		165800	No	Yes	0.0
1005070228	Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek		0	No	Yes	1.1
1007179383	Utility	Utility	Choptank Electric Cooperative	Race Street	Cambridge		0	No	Yes	0.0
1007160097	Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge		0	No	Yes	0.0
1007154445	Utility	Utility	Delmarva Power & Light Electric Substation	302 Boundary Ave	Cambridge		0	No	Yes	0.0
1007110669	Utility	Utility	GAS Chesapeake Utilities	516 Race Street	Cambridge		0	No	Yes	0.0
1007159056	Utility	Utility	GAS Chesapeake Utilities	405 Cherry Street	Cambridge		0	No	Yes	0.0
1015011971	Utility	Utility	Hurlock Wastewater Treatment Plant	6200 Jones Village Road	Hurlock		0	No	Yes	0.0
1007174276	Utility	Utility	Municipal Utilities Commission	105 Brohawn Avenue	Cambridge	1959	85400	No	Yes	0.0
1002032309	Utility	Utility	Secretary Water Tower	Main Street	Secretary		69400	No	Yes	0.0
1012007566	Utility	Utility	TELECOM Communication Tower				11900	No	Yes	0.0
1012003927	Utility	Utility	TELECOM Communication Tower				6700	No	Yes	0.0
1001017802	Utility	Utility	TELECOM Communication Tower	5865 Puckum Road	Rhodesdale		7900	No	Yes	0.0
1003048322	Utility	Utility	TELECOM Communication Tower	4873 Old Ocean Gateway	Vienna		26000	No	Yes	0.0
1009197354	Utility	Utility	Transfer Station	1957 Brannock Neck Road	Cambridge		0	No	Yes	0.0
1005076021	Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo	1900	18300	No	Yes	2.7
1005070198	Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo		0	No	Yes	2.2
1006087817	Utility	Utility	Verizon	2837 Hoopers Island	Church Creek		0	No	Yes	0.5

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value	Critical	Public	Flood Depth (ft)
1007159129	Utility	Utility	Verizon	413 High Street	Cambridge		0	No	Yes	0.0
1007159110	Utility	Utility	Verizon	415 High Street	Cambridge		0	No	Yes	0.0
1007159153	Utility	Utility	Verizon	Goodwill Avenue	Cambridge		0	No	Yes	0.0
1015001704	Utility	Utility	Verizon	201 Poplar Street	Hurlock		0	No	Yes	0.0
1003039714	Utility	Utility	Vienna Power Plant	0 Chapel of Ease Road	Vienna	1960	1906000	No	Yes	0.0
1003047849	Utility	Utility	Vienna Wastewater Treatment Plant	113 Levin Dorsey Road	Vienna		0	No	Yes	0.0
1002029995	Utility	Utility	Water Treatment Plant	3723 Greenpoint Road	East New Market	1960	43200	No	Yes	0.0

APPENDIX C
FEDERAL & STATE GRANTS

Note: Updated January 2017.

The following is a list of Federal and State Grants that may assist in implementing local All Hazard Mitigation Plans. *This information is subject to change at any time, contact the federal or state agency for current grant status.*					
Grant Program Name	**Address and Telephone Contact Information**	**Eligible Activities**	**Federal, State and Local Cost Share Requirements**	**Other Program Characteristics**	**Grant Application Due Date**
Federal Emergency Management Agency, Hazard Mitigation Grant Program (HMGP)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	All Hazards Mitigation Planning. Acquisition, relocation, elevation and flood-proofing of flood-prone insured properties, flood mitigation planning, wind retrofit, stormwater improvements, education and awareness.	Federal - 75% Non-Federal - 25%	Local government must be in compliance with the National Flood Insurance Program to be eligible. Projects must be cost effective, environmentally sound and solve a problem. Repetitive loss properties are a high priority.	After a Presidential Disaster Declaration
Federal Emergency Management Agency, Pre Disaster Mitigation Grant Program (PDM)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.	Federal - 75% Non Federal - 25%	PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.	Annual-Spring/Summer
Federal Emergency Management Agency, Flood Mitigation Assistance Program (FMA)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Assist States and communities to implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.	RL: Federal - 90% Non Federal - 10% SRL: Federal - 100% Non Federal - 0%	Available once a Flood Mitigation Plan has been developed and approved by FEMA.	Annual-Spring/Summer
National Flood Insurance Program (NFIP)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Provides financial protection by enabling persons to purchase insurance against floods, mudslide or flood related erosion.	Varies	Includes Federally backed insurance against flooding, available to individuals and businesses that participate in the NFIP	Anytime

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Increased Cost of Compliance	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	ICC coverage provides payment to help cover the cost of mitigation activities that will reduce the risk of future flood damage to a building. If a Flood Insurance Policy Holder suffers a flood loss and is declared to be substantially or repetitively damaged, ICC will pay up to 30,000 to bring the building into compliance with State or community floodplain management laws or ordinances. Usually this means elevating or relocating the building so that it is above the base flood elevation (BFE).	Varies	Once the local jurisdiction determines the building is substantially or repetitively damaged, the policy holder can contact insurance agent to file an ICC claim.	Anytime
U.S. Economic Development Administration, Economic Adjustment Program	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	Improvements and reconstruction of public facilities after a disaster or industry closing. Research studies designed to facilitate economic development.	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and proposing a project that is consistent with a Comprehensive Economic Development Strategy are important funding selection criteria.	Anytime
U.S Economic Development Administration, Public Works and Development Facilities	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	Water and sewer, Industrial access roads, rail spurs, port improvements technological and related infrastructure	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and projects that is consistency with a Comprehensive Economic Development Strategy are important funding selection criteria.	Quarterly Basis
Small Business Administration (SBA) Pre-disaster Mitigation Loan Program	James Rivera, Office of Disaster Assistance, Small Business Administration, 409 3rd Street, SW, STE 6050 Washington, DC 20416;202-205-6734	Activities done for the purpose of protecting real and personal property against disaster related damage.	No information	The mitigation measures must protect property or contents from damage that may be caused by future disasters and must conform to the priorities and goals of the state or local government's mitigation plan.	

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Community Development Block Grants / States Program	U.S Department of Housing and Urban Development, Office of Block Grant Assistance, 451 7th Street SW., Washington, DC 20410-7000;202-708-1112	Used for long-term recovery needs, such as: rehabilitation residential and commercial building; homeownership assistance, including down-payment assistance and interest rate subsidies; building new replacement housing; code enforcement; acquiring, construction, or reconstructing public facilities.	No information	Citizen participation procedures must be followed. At least 70 percent of funds must be used for activities that principally benefit persons of low and moderate income. Formula grants to States for non-entitlement communities.	After a Presidential Disaster Declaration
Fire Suppression Assistance Program	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024 ; 202-646-2500.	Provides real-time assistance for the suppression of any fire on public (non-Federal) or privately owned forest or grassland that threatens to become a major disaster.	Federal - 70% Local - 30%	The State must first meet annual floor cost (if percent of average fiscal year fire costs) on a single declared fire. After the State's out-of-pocket expenses exceed twice the average fiscal year costs, funds are made available for 100 percent of all costs for each declared fire.	Funds from President's Disaster Relief Fund for use in a designated emergency or major disaster area.
Historic Preservation: Repair and Restoration of Disaster-Damaged Historic Properties	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024 ; 202-646-4621.	To evaluate the effects of repairs to, restoration of, or mitigation hazards to disaster-damaged historic structures working in concert with the requirements of the Stafford Act.	Federal - 75% Local - 25%	Eligible to State and local governments, and any political subdivision of a State. Also, eligible are private non-profit organizations that operate educational, utility, emergency, or medical facilities.	After a Presidential Disaster Declaration
Transportation: Emergency Relief Program	Federal Transit Authority, FHWA, DOT, 1200 New Jersey Avenue Washington, DC 20590; 202-366-4043	Provides aid for the repair of Federal-aid roads and roads on Federal lands.	Federal - 100%	Application is submitted by the State department of transportation for damages to Federal-aid highway routes, and by the applicable Federal agency for damages to roads on Federal lands.	After serious damage to Federal-aid roads or roads on Federal lands caused by a natural disaster or by catastrophic failure.
Animals: Emergency Haying and Grazing	Emergency and Non-insured Assistance Programs, FSA, USDA, 1400 Independence Ave, SW, Washington, DC 20013; 202-720-4053	To help livestock producers in approved counties when the growth and yield of hay and pasture have been substantially reduced because of a widespread natural disaster.	No information	Assistance is provided by the Secretary of Agriculture to harvest hay or graze cropland or other commercial use of forage devoted to the Conservation Reserve Program (CRP0 in response to a drought or other similar emergency.	Anytime

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Emergency Watershed Protection Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	Implementing emergency recovery measures for runoff retardation and erosion prevention to relieve imminent hazards to life and property created by a natural disaster that causes a sudden impairment of a watershed.	Federal - 75% Local - 25%	It cannot fund operation and maintenance work or repair private or public transportation facilities or utilities. The work cannot adversely affect downstream water rights and funds cannot be used to install measures not essential to the reduction of hazards.	TBD
Watershed Protection and Flood Prevention Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in watersheds.	Varies due to project type.	Watershed area must not exceed 250,000 acres. Capacity of a single structure is limited to 25,000 acre-feet of total capacity and 12,500 acre-feet of floodwater detention capacity.	TBD
Watershed Surveys and Planning	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related programs in watersheds and river basins. Emphasis is on flood damage reduction, erosion control, water conservation, preservation of wetlands and water quality improvements.	No information	These watershed plans form the basis for installing needed works of improvement and include estimated benefits and costs, cost-sharing, operation and maintenance arrangements, and other information necessary to justify the need for Federal assistance in carrying out the plan.	Anytime
Emergency Advance Measures for Flood Prevention	USACE 441 G Street, NW, Washington DC 20314; 202-761-0011	To perform activities prior to flooding or flood fight that would assist in protecting against loss of life and damages to property due to flooding.	No information	There must be an immediate threat of unusual flooding present before advance measures can be considered. Any work performed under this program will be temporary in nature and must have a favorable benefit cost ratio.	Governor of State must request assistance
Emergency Streambank and Shoreline Protection	USACE 441 G Street, NW, Washington DC 20314; 202-761-0011	Authorizes the construction of emergency streambank protection measures to prevent damage to highways, bridge approaches, municipal water supply systems, sewage disposal plants, and other essential public works facilities endangered by floods or storms due to bank erosion.	No information	Churches, hospitals, schools, and other non-profit service facilities may also be protected under this program. This authority does not apply to privately-owned property or structures.	TBD

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Small Flood Control Projects	USACE 441 G Street, NW, Washington DC 20314; 202-761-0011	Authorizes the construction of small flood control projects that have not already been specifically authorized by Congress.	No information	There are two general categories of projects: structural and nonstructural. Structural projects may include levees, floodwalls, diversion channels, pumping plants, and bridge modifications. Nonstructural projects have little or no effect on water surface elevations, and may include flood proofing, the relocation of structures, and flood warning systems.	TBD
Flood: Emergency Advance Measures for Flood Prevention	USACE 441 G Street, NW, Washington DC 20314; 202-761-0011	To mitigate, before an event, the potential loss of life and damages to property due to floods.	No information	Assistance may consist of temporary levees, channel cleaning, preparation for abnormal snowpacks, etc.	Governor of State must request assistance
Continuing Authorities Program (CAP)	USACE 441 G Street, NW, Washington DC 20314; 202-761-0011	Initiates a short reconnaissance effort to determine Federal interest in proceeding. If there is interest, a feasibility study is preformed.	Federal - 65% Local-35%	A local sponsor must identify the problem and request assistance. Small flood control projects are also available.	Anytime
Hazardous Materials: State Access to the Oil Spill Liability Trust Fund	Director, USCG National Pollution Funds Center, U.S. Coast Guard Stop 7605 2703 Martin Luther King Jr. Avenue, SE Washington, DC 20593-7605 202-795-6000	To encourage greater State participation in response to actual or threatened discharges of oil.	No information	Eligible to States and U.S. Trust Territories and possessions.	Anytime

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Emergency Management Assistance (EMA)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Funds may be used for salaries, travel expenses, and other administrative cost essential to the day-to-day operations of State and Local emergency management agencies. Program also includes management processes that ensure coordinated planning, accountability for progress, and trained qualified staffing.	Federal - 50%	EMA funded activities may include specific mitigation management efforts not otherwise eligible for Federal funding. Management Assistance program funds may not be used for construction, repairs, equipment, materials or physical operations required for damage mitigation projects for public or private buildings, roads, bridges, or other facilities.	Anytime

APPENDIX D
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APPENDIX E

HMPC MEETING MINUTES

Dorchester County, Maryland
Hazard Mitigation Planning Committee

Minutes

Meeting:	**2016 Hazard Mitigation Planning Committee**		
Date of Meeting:	13 July 2016	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Steve Garvin, Emergency Management Planner	**Location:**	Emergency Management Agency

Meeting Topics Discussed

Agenda Topics

- ✓ What is Hazard Mitigation?
- ✓ Review of the 2016 Hazard Mitigation Planning Process
- ✓ Hazard Identification & Prioritization
- ✓ Mitigation Status Report
- ✓ Safe Growth Audit Draft
- ✓ Next Steps

Attendees

Name	Organization	Name	Organization
Steve Garvin	Dorchester Emergency Management	Steve Dodd	Dorchester Planning & Zoning
Anna Sierra	Dorchester Director of Emergency Services	Katie Clendaniel	Dorchester Tourism
John Avery	Town of Hurlock – Town Manager	Brian Ambrette	Eastern Shore Land Conservancy
Tom Moore	Dorchester Public Works		

What is Hazard Mitigation?

Steve Garvin opened the meeting. All meeting participants were introduced including the consulting firm hired by Dorchester County to complete the Hazard Mitigation Plan Update, Smith Planning and Design.

The 2011 Multi-Hazard Dorchester County Hazard Mitigation Plan is in the plan update process. In order to complete the Plan update, various stakeholders, including the nine municipalities are invited to participate in the process. Plan update information will be distributed throughout the planning process.

Meeting participants were provided with the handout "What is hazard mitigation?" Excerpts from the

handout include the following:

Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. The Hazard Mitigation Plan Update is Dorchester County's roadmap to evaluating hazards, identifying resources and capabilities, selecting appropriate actions, and implementing mitigation measures to eliminate or reduce future damage from those hazards.

Disaster Mitigation Act of 2000
DMA 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments.

Review of the 2016 Hazard Mitigation Plan Update Process

The following planning committee meetings have been scheduled in order to complete a draft hazard mitigation plan by October of 2016.

- Kick-Off Meeting-July 13, 2016
- Mid-Point Meeting-August 10, 2016
- Mitigation Strategies Meeting: September 7, 2016

In order to complete the Plan Update in a timely manner, while allowing plenty of time for review and comment, the draft Plan Update components will be distributed at least one week prior to each meeting date via email as read ahead materials.

In addition, in order to facilitate municipal participation Plan Update materials and requests for information will be distributed following each meeting via email and regular mail to each of the municipal points of contact and the Circuit Rider.

Hazard Identification & Prioritization

Meeting participants reviewed and discussed the hazards identified and ranking results from the *2011 Dorchester County Multi-Hazard Mitigation Plan.* In order to update the Plan, the 2016 planning committee must identify and rank hazards. To that end, a Hazard Identification and Ranking Adobe Fillable PDF has been prepared for planning committee members to complete. Results of the process will be reviewed at the August 10th meeting. In addition, Smith Planning and Design will provide data on past hazard occurrences for committee review and discussion. A separate Hazard Identification and Ranking Adobe Fillable PDF will be sent to each municipality, which will be included under a municipal perspective portion of the Plan Update.

Mitigation Status Report

Mitigation actions and projects identified in the *2011 Dorchester County Multi-Hazard Mitigation Plan* were reviewed and discussed by committee members during the meeting. Each action item will need a status update for inclusion into the 2016 Plan. An Adobe Fillable PDF will be distributed, which will provide planning committee members with an opportunity to provide status updates for any of the mitigation action items. Results will be compiled and presented at the August 10th meeting.

Safe Growth Audit-New Plan Integration Chapter

A new Chapter entitled *"Plan Integration"* will be added to the 2016 Update. This chapter will include the results of the Safe Growth Audit. The new *State of Maryland Hazard Mitigation Planning Guidance* request that all local hazard mitigation plans updates include plan integration as a topic within the Plan. Recommendations for integration with other County planning documents will be included as part of the 2016 Plan.

Next Steps

- Completion of Hazard Identification & Ranking Process-Results will be used to update Section II, Chapter 4 of the Plan;
- Mitigation Status Report Results;
- Update of Critical & Public Facility Database;
- Results of the Safe Growth Audit and Recommendations;
- Update of Section 1-Chapters 1-3 of Plan; and,
- Hazard Mitigation Planning Committee Mid-Point Meeting.

Meeting Date(s)

- Hazard Mitigation Planning Committee Meeting Date: **August 10, 2016**
  Location: **Dorchester County**
  Emergency Management Agency
  929 Fieldcrest Road, Cambridge
  Time: **10:00 AM**

Dorchester County, Maryland
Hazard Mitigation Planning Committee

Minutes

Meeting:	**2016 Hazard Mitigation Planning Committee**		
Date of Meeting:	10 August 2016	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Steve Garvin, Emergency Management Planner	**Location:**	Emergency Management Agency

Meeting Topics Discussed

Agenda Topics

- ✓ Review of July 13th Meeting Minutes
- ✓ Hazard Identification & Prioritization
- ✓ Review of Draft Plan Chapters 1-3
- ✓ Update of Critical & Public Facilities
- ✓ Coastal Risk & Vulnerability
- ✓ Mitigation Status Report & New Mitigation Ideas
- ✓ Next Steps

Attendees

Name	Organization	Name	Organization
Steve Garvin	Dorchester Emergency Management	Steve Dodd	Dorchester Planning & Zoning
Anna Sierra	Dorchester Director of Emergency Services	Katie Clendaniel	Dorchester Tourism
John Avery	Town of Hurlock – Town Manager	Bruce Coulson	Dorchester Erosion Group
Tom Moore	Dorchester Public Works	Bill Forlifer	Health Department
Ed Werkheiser	MEMA	Ginny Smith & Michele King	SP&D

Review of the 13 July 2016 Meeting Minutes

Minutes were discussed as a review for those who were unable to attend the July 13th HMPC meeting. There were no comments or corrections.

Hazard Identification & Prioritization

In order to update the Plan, the 2016 planning committee needed to identify and rank hazards. Steve Garvin distributed the Hazard Identification and Ranking Adobe Fillable PDF to planning committee

members for completion. Results of the process were reviewed at the August 10th meeting. A separate Hazard Identification and Ranking Adobe Fillable PDF was sent to each municipality, and those results will be included under a municipal perspective portion of the Plan Update.

Preliminary results of the HMPC Hazard ID & Ranking were compiled and provided to the HMPC members for review. Those hazards denoted in red changed in ranking since previous planning cycle. Hazards in black were ranked the same as 2011 rankings.

Mr. Garvin provided additional forms to SP&D staff for inclusion. Final results will be tabulated and presented within the Draft Plan.

Review of Section 1-Chapter 1-3

Mr. Garvin indicated that rough draft plan chapters are being distributed to HMPC members as they are prepared for review and comment. Due to the aggressive plan development schedule, these chapters have not been reviewed prior to submittal to the HMPC, and therefore will contain mistakes. Mr. Garvin instructed that HMPC members should provide all comments to him at their earliest convenience. Modifications have been made to chapters 1-3 and new chapters will be provided to HMPC members for review and comment over the next several weeks.

Update of Critical & Public Facilities

Ms. King, SP&D discussed updates and modifications that have been made to the database listing. Additions included the following new attributed columns: Built 1965 & Prior, Critical or Public Facility, and Depth of Flooding.

Coastal Risk & Vulnerability PowerPoint

Ms. King, SP&D presented a PowerPoint to HMPC members displaying HAZUS results for Dorchester County. She began the presentation by explaining the difference between a Basic Hazus and an Enhanced Hazus Analysis. Results from the Enhanced Hazus , conducted as part of the 2016 plan update, included structures within flood inundation areas and depth of flooding. Depth of flooding was based upon water surface elevation from the 100-year storm event minus the lowest adjacent grade of flood-prone structure. Loss estimations developed as part of the Enhanced Hazus Analysis were provided and discussed by the committee.

Mitigation Status Report & New Mitigation Ideas

Mitigation actions and projects identified in the *2011 Dorchester County Multi-Hazard Mitigation Plan* were updated and a status, if available, was added to the Mitigation Action Table. HMPC members reviewed the status updates.

New mitigation ideas were discussed during the final portion of the meeting. HMPC members developed a handful of new ideas that will be further developed during the next HMPC meeting in

September. In addition, mitigation actions that were not addressed from the 2011 Hazard Mitigation Plan will be reviewed for either elimination as they are no longer relevant or for inclusion in the new 2016 Mitigation Strategies section of the Plan.

Next Steps

- Update & Review of new Plan Update Chapters,
- New NFIP & CRS Chapter,
- September Mitigation Strategies HMPC Meeting

Meeting Date(s)

- Hazard Mitigation Planning Committee Meeting Date: **September 7, 2016**
  Location: **Dorchester County**
  Emergency Management Agency
  929 Fieldcrest Road, Cambridge
  Time: **10:00 AM**

Dorchester County, Maryland
Hazard Mitigation Planning Committee

Minutes

Meeting:	**2016 Hazard Mitigation Planning Committee**		
Date of Meeting:	7 September 2016	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Steve Garvin, Emergency Management Planner	**Location:**	Emergency Management Agency

Meeting Topics Discussed

Agenda Topics

- ✓ Review of August 10th Meeting Minutes
- ✓ Review of Goals and Objectives
- ✓ Mitigation Strategies Work Session
- ✓ Next Steps

Attendees

Name	Organization		Name	Organization
Steve Garvin	Dorchester Emergency Management		Steve Dodd	Dorchester Planning & Zoning
Anna Sierra	Dorchester Director of Emergency Services		Brice Strang	Dorchester County Health Department
John Avery	Town of Hurlock – Town Manager		Bruce Coulson	Dorchester Erosion Group
Brian Ambrette	Eastern Shore Land Conservancy		Chris Hauge	Dorchester Board of Education
Ed Werkheiser	MEMA		Ginny Smith Michele King	SP&D

Review of the 10 August 2016 Meeting Minutes

Minutes were discussed as a review for those who were unable to attend the August 10, 2016 HMPC meeting. There were no comments or corrections.

Review of Goals and Objectives

Goals and objectives from the 2011 Plan were reviewed. A new goal and associated objectives were added to the 2016 Plan, as follows:

Integrate plan and policies across disciplines and agencies within the County through the consideration of potential hazards and future development.

- Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.

- Solicit participation and offer opportunities for various departments to work together on a regular basis.
- Clearly define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resiliency.

Mitigation Strategies Work Session

This portion of the meeting included small group discussions. Twelve (12) Mitigation Actions were developed, as follows:

1. Best Practice Success Story – Elevation Project Press Release
2. Plan Integration
3. Obtain Contracts For On-call Services and Generators for Emergency Power Back-up, specifically Hurlock
4. Consistent Public Outreach
5. Support Barrier Island Restoration Projects
6. Substantial Damage/Improvement (clarification of calculation and adoption of "cumulative" standard to prevent circumvention of goal and requiring compliance with FP Ordinances by submitting multiple permit applicants which individually do not trigger substantial improvement/damage).
7. Complete Coastal Plan Aquifer Study
8. Permanent Emergency Generators
9. Roadway Repetitive Flood Issues
10. Drought Mitigation
11. Stormwater Retrofit
12. Critical Facility Property Protection

The twelve (12) Mitigation Actions will be prioritized by the Hazard Mitigation Planning Committee (HMPC). A fillable PDF will be distributed to the HMPC members for priority ranking.

Next Steps

- Draft Plan – September, 2016
- Mitigation Actions Priority Ranking – September, 2016
- HMPC Review – October, 2016
- MEMA Review – October, 2016

Meeting Date(s)

- Hazard Mitigation Planning Committee Meeting Date: **October 26, 2016**
  Location: EOC
  Time: 10:00 A.M.

Dorchester County, Maryland
Hazard Mitigation Planning Committee

Minutes

Meeting:	**2016 Hazard Mitigation Planning Committee**		
Date of Meeting:	26 October 2016	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Steve Garvin, Emergency Management Planner	**Location:**	Emergency Management Agency

Meeting Topics Discussed

Agenda Topics

- ✓ Review of September 7th Meeting Minutes
- ✓ Hazard Mitigation Plan Update
- ✓ Flood Mitigation Plan
- ✓ Next Steps

Attendees

Name	Organization	Name	Organization
Steve Garvin	Dorchester Emergency Management	Steve Dodd	Dorchester Planning & Zoning
Anna Sierra	Dorchester Director of Emergency Services	Nicolas Ward	Dorchester Planning & Zoning
Bob Phillips	City of Cambridge – Public Works	Ginny Smith	SP&D
Ed Werkheiser	MEMA	Michele King	SP&D

Review of the 7 September 2016 Meeting Minutes

Minutes were discussed as a review for those who were unable to attend the September 7th HMPC meeting. Minutes were approved as read.

Hazard Mitigation Plan Update

Draft Hazard Mitigation Plan Update review comments were discussed. *Appendix H: NFIP & CRS* was provided to the group during the meeting for review. The repetitive loss area determination process was explained to members. Steve Dodd conducted an outreach effort to residents within the Repetitive Loss Area on October 1, 2016. Issues with outreach effort were discussed. Issues such as vacant homes, no mailbox, deceased owner and vacant parcels without structures were identified. This information and further analysis will be used for the new Flood Mitigation Plan.

Draft Plan review comment period was extended to 4 November 2016. All HMPC members were requested to review the plan and provide comment. MEMA review will occur concurrently. Revisions

will be incorporated into the Plan with the goal of FEMA submittal in December 2016.

In terms of plan adoption, the Hazard Mitigation Plan Update will be presented to the Council following receipt of FEMA's Approval Pending Adoption (APA) letter. Municipal resolutions sought and incorporated. Sample resolutions will be provided to municipalities.

Flood Mitigation Plan

The Hazard Mitigation Planning Committee will continue to meet periodically to develop the new Flood Mitigation Plan. Anna Sierra will reach out to the Department of Tourism to ensure the Historic/Cultural Resources Plan is incorporated into the Flood Mitigation Plan. The plan will expand on the flood hazard and mitigation ideas will be focused on specific areas of concern.

Mrs. Smith discussed with group how Priority Funding Areas (PFA) could be utilized as an overlay on properties in order to provide justification for realignment of the PFA, which in return would provide property protection for those structures within the flood hazard area. By group's approval, Smith P&D will further analysis the PFA and flood hazard area intersection. The County's and municipal growth areas will also be analyzed. Nick Ward will provide the necessary growth area data to Smith P&D.

The committee identified the most vulnerable or areas of concern in regards to flooding. Areas identified were: Cambridge (first two blocks from Choptank River), Neck District and South Dorchester.

Meeting Date(s)

- Hazard Mitigation Planning Committee Meeting Date: **January 11, 2017**
  Location: **Dorchester County**
  Emergency Management Agency
  929 Fieldcrest Road, Cambridge
  Time: **10:00 AM**

APPENDIX F

PULBIC MEETING MINUTES

Public meetings coincided with the plan adoption process for the draft Hazard Mitigation Plan. During the open Council work session, a PowerPoint Presentation detailing the planning process and the overall involvement of the HMPC was presented. Additionally, specific steps that the community could take in order to become more disaster resistant and resilient were discussed. Citizens were encouraged to provide comments. Following the work session, a public review and comment period took place. Finally, a public hearing was held in which the formal adoption of the plan occurred with a unanimous vote by County Council. The minutes from both meetings are provided this Appendix.

Media announcements advertising the public meetings were provided via local newspapers and the County website. An overview of the planning process and the mitigation measures being considered were included. Additionally, the website for the Department of Emergency Services stated that a copy of the draft Plan may be obtained at the Dorchester County Department of Emergency Services' main office on Fieldcrest Drive or the Dorchester County Council Office on Court Lane. These advertisements for the Public Hearings can also be found within this Appendix.

County Council of Dorchester County
Regular Meeting Minutes
August 1, 2017

The County Council of Dorchester County met in regular session on August 1, 2017 with the following members present: Ricky C. Travers, President; Tom C. Bradshaw, Vice President; William V. Nichols; Rick M. Price and Don B. Satterfield. Also present were E. Thomas Merriweather, County Attorney; Jeremy Goldman, County Manager; and Donna Lane, Executive Administrative Specialist.

REGULAR SESSION

INVOCATION AND PLEDGE OF ALLEGIANCE

Councilman Bradshaw led the invocation and the pledge of allegiance.

CALL FOR ADDITIONS OR DELETIONS TO AGENDA

The Council approved the following addition: Tax Sale Certificate Offer-Blackwater Road Property.

APPROVAL OF MINUTES- JULY 18, 2017

The Council approved the minutes of July 18, 2017.

APPROVAL OF DISBURSEMENTS

The Council approved the vouchers with additions as presented.

FINANCIAL REPORT: CASH AND INVESTMENTS

Councilman Travers reported total cash and investments as $5,544,763.24.

CLOSED SESSION SUMMARY

The Council adjourned from a Regular Session and convened in a Closed Session pursuant to Title 3 of the General Provisions Article of the Maryland Annotated Code, pursuant to §3-305(b)(1) to discuss the appointment, employment, assignment, promotion, discipline, demotion, compensation, removal, resignation, or performance evaluation of appointees, employees, or officials over whom it has jurisdiction; pursuant to §3-305(b)(7) to consult with counsel to obtain legal advice on a legal matter on August 1, 2017 at 5:00 p.m. in Room 110, County Office Building, 501 Court Lane, Cambridge, Maryland 21613.

Councilman Travers announced that the Council convened into a Closed Session at 4:30 p.m. on August 1, 2017 to conduct a personnel hearing pursuant to §3-305(b)(1).

Action taken at the Closed Session on August 1, 2017 that began at 5:00 p.m.: 1) agreed to hire an individual to fill the Airport Director position by a 5 to 0 vote; 2) discussed a personnel matter relating to a County department; 3) discussed an offer relating to a tax sale certificate-agreed to discuss in open session; 4) discussed with legal counsel a payment in lieu of taxes proposal-agreed to discuss in open session.

The purpose of the Closed Session is also set forth in the Written Statement of Closing a Meeting Under the Open Meetings Act, which will be provided upon request. Voting in favor of the Closed Session were all of the present Council members.

REGULAR SESSION

BLACKWATER NATIONAL WILDLIFE REFUGE UPDATE

Marcia Pradines, Project Leader, Chesapeake Marshlands National Wildlife Refuge Complex, said it has almost been a year since she has been in her position. She introduced the new Deputy Refuge Manager, Annji Bagozzi, who begin her employment at the end of January 2017. She recognized that Matt Whitbeck, Supervisory Biologist, is also present.

She provided an update on the Blackwater National Wildlife Refuge, which is attached. She also referred to a map she provided the Council of the Refuge's latest addition, a "Kentuck Swamp" parcel consisting of 132 acres along Old Field Road.

Ms. Pradines said a small advisory group was established to provide feedback on a proposed forest management plan for the Refuge which included Dan Rider, Maryland Forestry; Scott Daniels, Forester; Lin Spicer, a local forester and Beth Hill from Dorchester Lumber. She advised that: 1) bids were sought for pulp wood removal from the "Burton" tract to no avail due to the market; 2) various meetings with companies were held afterwards to identify ways to improve the outcome of future bid attempts; 3) permits are currently being obtained; 3) pre-commercial thinning is necessary for which limited funding is available; and, 4) staff is working with local companies with a goal of allowing them to perform commercial thinning in exchange for the thinning of pine trees and young trees to release hardwoods.

She said they are working with the County to rehabilitate the road to the Chesapeake Bay Foundation's Karen Noonan Environmental Education Center with the Refuge supplying stone and the County providing labor. She stated that they will continue to find ways to assist with this project.

Ms. Pradines explained that Refuge staff worked with the County's Tourism Department to obtain Maryland Office of Tourism grant funding through the Friends of Blackwater for a marketing package for the Harriet Tubman Visitor Center during the off season. She noted that the Refuge is busy during the off season.

She advised that as a result of public input at the February 2017 neighbor meeting about hunting at the Refuge the following decisions were made: 1) boat access will continue to be provided; 2) an additional early scouting date will be added this season; 3) the late January shotgun season, which was new last year, will be maintained. Ms. Pradines said the next neighbor meeting is on September 27th.

She noted that 143 adult and 6 youth hunters participated in the successful Spring turkey hunt and 65 children attended the June 3, 2017 youth fishing event.

Councilman Bradshaw questioned whether borings have been taken on the older Pine and Oak trees on Refuge property. Mr. Whitbeck advised that Jamie Kellum, Forester, did borings in various areas which indicated some salt stress. He noted that a comprehensive survey has not been conducted. Ms. Pradines said some of the individuals from the forestry companies that viewed property provided them their observations. She stressed that forestry management is necessary and will benefit wildlife.

Ms. Pradines thanked the Council for the opportunity to provide an update.

2017 HAZARD MITIGATION PLAN AND FLOOD MITIGATION ANNEX PRESENTATION-EMERGENCY SERVICES

Anna Sierra, Emergency Services Director, presented the attached power point which provides an overview of the goals of the 2017 Hazard Mitigation Plan and Flood Mitigation Annex Presentation, the update process and results. She explained that the adoption of the Hazard Mitigation plan is required by the Federal Emergency Management Agency in order for the County to be eligible for various funding streams. She said she will not seek adoption of the plan for several weeks in order to allow Council the opportunity to review the plan and ask any questions they may have. She explained that once the plan has been adopted by the Council she will seek each municipality's adoption of the plan.

Councilman Bradshaw noted that during the presentation Ms. Sierra talked about road flooding. He asked Ms. Pradines for a status on the marsh road on Shorters Wharf from a hydrological survey standpoint. Ms. Pradines explained that Federal Land Access Program funding to conduct an engineering study has been received. She noted that the projects with costs of $1 million or more will be eligible for funding under the new Federal Highway bill. She said she will provide updates.

Councilman Travers thanked Ms. Sierra.

MANAGERS COMMENTS

DORCHESTER CENTER FOR THE ARTS-REQUEST TO USE PORTION OF SHARED PARKING LOT-ART IN THE ALLEY EVENT

The Council approved the request of Barbara J. Seese, Executive Director, to use a portion of the shared parking lot behind the Dorchester Center for the Arts building for an "Art in the Alley" event to be held on August 13, 2017 which will include Downtown Frame of Mine and LivAgain, local businesses.

ASSIGNMENT OF LEASE REQUEST-INTERSTATE CORRPACK

The Council approved the request of Pierre Khattar, Chief Financial Officer, Interstate Resources, to execute a letter of consent of change of control from Interstate Resources, parent company of Interstate Container to DS Smith, which has partially acquired this company. Jeremy Goldman, County Manager, said E. Thomas Merryweather, County Attorney, and staff from the Economic Development Administration, which provided grant funding, are in favor of executing the document.

RESOLUTION-CHESAPEAKE COUNTRY BYWAY-TOURISM

Mr. Goldman noted that at its December 4, 2012 meeting, the Council agreed to support the Corridor Management Plan for the Michener Chesapeake Country Byway and requested that a proposed resolution be submitted for its review and consideration. He said Amanda Fenstermaker, Tourism Director, has submitted a resolution and clarified that the byway is now known as the "Chesapeake Country Byway." The Council adopted the resolution of support.

RENTAL ASSISTANCE PROGRAM GRANT AWARD ACCEPTANCE-GRANT MONITOR

The Council approved the request of Cindy Smith, Grant Monitor, to accept a Department of Housing and Community Development Rental Assistance Grant Award in the amount of $40,000, with no local match, for emergency rental assistance to individuals at risk of losing their homes. The Council acknowledged that this standard annual pass through grant is administered by Delmarva Community Services.

FY18 GOVERNOR'S OFFICE OF CRIME CONTROL & PREVENTION GRANT AWARDS-SHERIFF'S OFFICE-GRANT MONITOR

The Council approved the request of Ms. Smith to accept the following FY18 Governor's Office of Crime Control & Prevention (GOCCP) Grant Awards, with no County match, with the understanding that for the purposes of the Sheriff's Office these hours are exempt from the County's overtime policy: 1) Domestic Violence, entry of protective orders, $3,000; 2) Stop Gun Violence-targeted patrols, gun/pawn shop checks, illegal guns, $4,000; 3) Heroin Coordinator-entry of opioid incidents, $48,700; 4) School Bus

Safety-following buses/enforcement violation-$26,000; and, 5) Sex Offender Registry-monitoring, $9,384.

TRAFFIC SAFETY COMMITTEE RECOMMENDATIONS

Mr. Goldman advised that the Traffic Safety Committee met on July 21, 2017 regarding four requests. He said the Committee members recommend the following: 1) no action be taken on the request for a weight restriction on Creighton Road due to truck utilization since limited resources are available to enforce any restrictions or upgrade the road: 2) to place a 25 mph speed limit sign on Eskridge Road travelling south into Galestown where the road transitions from dirt to pavement to curb speeding; 3) to obtain Council's input on fishing from County bridges before taking any action on a request for "no fishing" signs on the Hart-Hayward Bridge, Wesley Church Road due to narrow bridge, lack of pull-off areas and vehicle speeds; and, 4) to change the Hambrooks Boulevard-Bay View Avenue intersection into a two or three stopping intersection to address issues relating to speeding since the roads are extensively used by runners, walkers and children on bicycles. He clarified that the Committee members recommend obtaining Council's input on fishing from County bridges since although safety is a concern so is public access to waterways.

Councilman Price made a motion to approve the Committee members' recommendation. Councilman Bradshaw seconded the motion for discussion. He expressed concern about the condition of Creighton Road which should be used by local citizens and not large commercial vehicles. Tom Moore, Public Works Director, said there is a main road that can be utilized instead, noting Council can abandon the road. Councilman Satterfield stressed that locals use the road. Ms. Sierra said she spoke to a resident who lives on the corner of the road who advised that a truck delivery driver indicated to her it is less of a hard right turn than on the main road. Councilman Bradshaw concurred. Mr. Moore said he believes individuals use Creighton Road to pass slow vehicles.

Councilman Bradshaw said he believes fishing from the Hart Hayward Bridge is a safety hazard. He noted that on Route 335, a State Highway, fishing from the ditches and ponds has increased from Gun Swamp to Riggins Corner. Ms. Sierra volunteered to gather the emergency response data from that area. Mr. Goldman expressed his understanding that the majority of the concerns about fishing from areas alongside roads are relating to the impediment of the traffic flow. Councilman Bradshaw said the same thing occurs on Elliott's Island Road. Councilman Price advised that the Committee members questioned whether there are more speeders or local individuals fishing from the bridge as well if there are any other issues relating to fishing on bridges in the County. Councilman Bradshaw expressed his understanding that the majority of the locals fish off a dock at Farm Creek. Mr. Moore said due to the amount of marsh in that area motorists only have two parking options - on a private property located by the bridge or on the road. He explained that the Committee members recognized that there is a safety issue; however, they did not want to create a policy regarding public access to areas for fishing without seeking the consent of the Council. Rebecca White, Executive Assistant, said for the last two years safety on bridges and how to acquire land for public access for fishing has been

included in the last two County Recreation Plans. Councilman Bradshaw queried whether Department of Natural Resources Program Open Space (POS) funding would be available to create parking areas. Mr. Goldman expressed his understanding that POS monies can be utilized; however, it will take three to five years to garner funds for this purpose.

Pursuant to the request of Councilman Travers, Councilman Price rescinded his motion so Council can address each request individually.

The Council agreed to take no action on the Creighton Road request with Councilmen Travers and Satterfield opposing. The Council approved the Committee members' recommendation to place a sign on Eskridge Road.

Based on a motion made by Councilman Price, the Council agreed to accept the recommendation of the Committee members to take no action on the request for "no fishing" signs on the Hart Hayward Bridge. Councilmen Satterfield and Nichols opposed.

The Council agreed to defer to staff for additional study the possibility of changing the intersection of Hambrooks Boulevard and Bay View Avenue into either a two way or a three way stop intersection.

Councilman Travers expressed his belief that staff should conduct an inventory of the bridges in the County on which people fish to identify those which are a safety hazard. Councilman Bradshaw said the Hart Hayward Bridge is narrower than other bridges. Councilman Price noted that the Committee members are seeking Council's comments so they can continue discussing regarding fishing from bridges at a future meeting. Mr. Moore said placing a speed counter on the road was also considered by the Committee members. The Council acknowledged that the Traffic Safety Committee will address this matter at a future meeting.

FY19 WATERWAY IMPROVEMENT FUND GRANT-PUBLIC WORKS

The Council approved the request of Tom Moore, Public Works Director, to submit a FY19 Waterway Improvement Fund Grant for the following projects: Taylors Island Bulkhead, $80,000; Elliott's Island Jetty Construction, $300,000; and Ragged Point Boat Ramp, $50,000.

REQUEST TO SOLE SOURCE-VEHICLE PURCHASE-PUBLIC WORKS

The Council approved the request of Mr. Moore to sole source and purchase under the State of Maryland's current year contract with Sport Automotive a 2017 Chevy Silverado that can equipped with a snow plow and a self-contained bed mounted salt/sander unit for the use by the Highway Division at the cost of $28,608. The Council acknowledged that the plow and salt spreader will be purchased separately at a later date.

PAYMENT IN LIEU OF TAXES PROPOSAL-ONEENERGY DORCHESTER SOLAR, LLC

Mr. Goldman said Council received a Payment in Lieu of Taxes (PILOT) proposal from OneEnergy Dorchester Solar, LLC for a 26.1 MG solar photovoltaic project in Linkwood for a 35 year period. He noted this is the first request for a PILOT since legislation was passed at the April 4, 2017 meeting which repealed and re-enacted with amendments Section 144-46 of Article XIII and Section 144-48 of Article XIV of the Code of Dorchester County, Maryland relating to the taxation of machinery and equipment used to generate electricity for sale. Mr. Goldman said the Council has had the opportunity to review the agreement.

The Council agreed to accept Scenario B under which: 1) $100,000 will be paid in the first year; 2) in years 2 to 7 a pilot of $2,500 per MWAc will be paid; and, 3) in years 8 to 35 a pilot of $4,000 per MWAc will be paid. Councilman Price opposed, citing concerns about setting precedence prior to the update of the County's Comprehensive Plan. Councilman Travers said about $2.6 million will be received over a 35 year period as well as additional property taxes.

POLL CONFIRMATIONS

The Council confirmed its decisions in the interim between meetings, by means of a poll to: 1) approve the request of Joseph Hughes, Director of Corrections, to contract with C. Albert Matthews, the lowest bidder among the quotes obtained, to replace an air conditioning unit at the Detention Center utilizing FY18 Building Maintenance by a 5 to 0 vote; and, 2) agreed to send a letter of support for the mini-grant application of the Nause Waiwash Band of Indians, Inc. to the Heart of the Chesapeake Country Heritage Area for $4,000 to offset the cost of its 25th annual festival, pursuant to the request of Chief Donna Wolf Mother Abbott, by a 4 to 1 (no answer) vote.

TAX SALE CERTIFICATE OFFER-BLACKWATER ROAD PROPERTY

Mr. Goldman advised that:1) pursuant to Cindy Smith, Grant Monitor, as a result of the 2017 tax sale auction, the County owns the tax sale certificate on 3424 Blackwater Road, Church Creek, Maryland; 2) Mr. Jeff Riebling has made an offer to purchase the tax sale certificate for the amount due on the date of the auction plus all interest accumulated as of the date the transfer will take place; and, 3) Michael Spears, Finance Director, has advised that the County must approve any transfer of a certificate after the sale is concluded. The Council accepted the offer.

OTHER

Mr. Goldman recognized that Mr. Moore will be leaving County employment effective August 11, 2017. He commended him for working with limited resources.

PUBLIC COMMENTS

Tracy Whitby Farrell, resident, representing Linkwood Salem Fire Department, invited the Council to the 60th anniversary of the volunteer fire company to be held on November 4, 2017. She said they will receive official invitations.

COUNCIL'S COMMENTS/ADJOURNMENT

Councilman Nichols said it has been a pleasure working with Mr. Moore. He thanked him for serving as Public Works Director and answering his inquires. He wished him well in his retirement.

Councilman Satterfield echoed Councilman Nichols comments about Mr. Moore, noting he also answered his inquiries. He encouraged emergency responders and law enforcement to be cautious during times of excessive heat.

In response to a query from Councilman Price, Mr. Moore said copies of the draft updated Solid Waste Management Plan will be available for public review at the Hurlock Library and at the Public Works Department.

Pursuant to another query from Councilman Price, Mr. Moore advised that the Public Works Department does not have the appropriate equipment to address trees that are protruding on the travel portion of County roads. He said another issue is the lack of right-of-ways to perform such work. Mr. Moore said staff currently use a pole saw to address some areas. Councilman Price said Skinners Run Road and Hubbard Road are the areas he has received inquiries on. A discussion ensued between Council and Mr. Moore regarding issues relating to this matter.

Councilman Price thanked Mr. Moore for his service and wished him well. He noted that it is National Night Out and commended organizers of events observing this community-police awareness event. He said tonight is the beginning of the Caroline Dorchester County 4H Fair.

Councilman Bradshaw said he spoke to Jeannie Riccio, Chief of Staff, Governor's Office, regarding enforcement concerns about the Maryland Department of Transportation Commercial Enforcement Division relating to farm vehicles. He noted that she has talked to the Superintendent of the State Police about this matter. He said it has been a pleasure working with Mr. Moore and expressed his appreciation for his service. Councilman Bradshaw stated that issues relating to trees are not unique to the County, citing Wicomico County as an example.

Councilman Travers thanked Mr. Moore and wished him well in his retirement.

Councilman Travers announced: 1) The next Council meeting will be held on August 15, 2017; 2) the Council reserves the right to meet in closed session prior to regular session; and, 3) Members of the Council will attend the Maryland Association of Counties Summer Conference

County Council of Dorchester County
Regular Meeting Minutes
September 5, 2017

The County Council of Dorchester County met in regular session on September 5, 2017 with the following members present: Ricky C. Travers, President; Tom C. Bradshaw, Vice President; Rick M. Price and Don B. Satterfield. Also present were E. Thomas Merryweather, County Attorney; Jeremy Goldman, County Manager; and Donna Lane, Executive Administrative Specialist.

REGULAR SESSION

INVOCATION AND PLEDGE OF ALLEGIANCE

Councilman Satterfield led the invocation and the pledge of allegiance.

CALL FOR ADDITIONS OR DELETIONS TO AGENDA

The Council approved the following additions to the agenda: Eastern Shore Innovation Center-License Agreement.

APPROVAL OF MINUTES-AUGUST 15, 2017

The Council approved the minutes of August 15, 2017.

APPROVAL OF DISBURSEMENTS

The Council approved the vouchers as presented.

FINANCIAL REPORT: CASH AND INVESTMENTS

Councilman Travers reported total cash and investments as $5,808,727.72.

CLOSED SESSION SUMMARY

The Council adjourned from a Regular Session and convened in a Closed Session pursuant to Title 3 of the General Provisions Article of the Maryland Annotated Code, pursuant to §3-305(b)(1) to discuss the appointment, employment, assignment, promotion, discipline, demotion, compensation, removal, resignation, or performance evaluation of appointees, employees, or officials over whom it has jurisdiction; pursuant to §3-305(b)(7) to consult with counsel to obtain legal advice on a legal matter on September 5, 2017 at 5:00 p.m. in Room 110, County Office Building, 501 Court Lane, Cambridge, Maryland 21613.

Action taken at the Closed Session: 1) approved the request of the Director of Corrections to promote several Correctional Officers and to reclass a Correctional Officer by a 5 to 0 vote; 2) confirmed the hiring by the State's Attorney of an individual as a Safe Streets

Grant Attorney to fill a vacancy by a 5 to 0 vote; and, 3) discussed a personnel matter relating to a County department.

The purpose of the Closed Session is also set forth in the Written Statement of Closing a Meeting Under the Open Meetings Act, which will be provided upon request. Voting in favor of the Closed Session were all of the present Council members.

REGULAR SESSION

MANAGER'S COMMENTS

ANNOUNCEMENT-NEW AIRPORT DIRECTOR

Jeremy Goldman, County Manager, introduced Amber Hulsey, the new Airport Director.

REQUEST FOR USE OF CIRCUIT COURT GROUNDS-HARRIET TUBMAN ORGANIZATION-NANTICOKE HISTORIC PRESERVATION ALLIANCE

The Council approved the request of Margret Ingersol, Committee Chair, and Bill Jarmon, Committee Member, for the use the Court House grounds on Friday, October 13th from 6:30 p.m. to 8:30 p.m. for a program being presented by the Museum and the Nanticoke Historical Preservation Alliance as part of "The Slave Dwelling Project." The Council acknowledged that: 1) Brett Wilson, Circuit Court Judge, has no objection to the requested use; 2) the organizations will use an outlet, Spring Valley, the band stand platform, Court House steps; and, 3) a sign will be placed on the property announcing the event.

REQUEST TO SOLE SOURCE AND PURCHASE VEHICLES-LANDFILL-PUBLIC WORKS

The Council approved the request of Ryan White, Public Works Director, to sole source and purchase two Chevrolet 2500 Silverado trucks from Sports Automotive under this year's State of Maryland Blanket Purchase Order at the cost of $66,194, which is $1,194 over budgeted FY18 funds. The Council also approved his request to move $1,750 in unused funding allocated for the purchase of equipment from the FY17 Capital Budget to the FY18 Capital Budget to cover the overage.

PROPOSAL FOR ENGINEERING SERVICES-PHASE II AND III PERMIT APPLICATION-LANDFILL-PUBLIC WORKS

A motion made by Councilman Travers to defer the request of Greg LeBlanc, Engineer, to accept a proposal for professional engineering services from Geosyntec to continue its design and permitting of the proposed Dorchester County Municipal Landfill directly adjacent to existing Beulah Landfill died due to the lack of a second. Councilman Bradshaw made a motion to accept the proposal which Councilman Satterfield seconded. In response to an inquiry from Councilman Travers, Mr. White confirmed that this will allow the project to begin sooner. Mr. White explained that the engineering services are

for the planning phase of the new cell. The Council agreed to accept the proposal for engineering services from Geosyntec, which Councilman Price opposed.

REQUEST TO AWARD BITUMINOUS MATERIALS-HIGHWAY DIVISION-PUBLIC WORKS

The Council approved the request of Mr. White to award the bid for bituminous materials to Slurry Pavers, Inc., dba Asphalt Emulsions.

REQUEST TO RE-ADVERTISE FOR PROPOSALS-DRAINAGE PIPE-HIGHWAY DIVISION-PUBLIC WORKS

Mr. White said he is seeking the Council's approval to re-advertise for proposals for aluminized and HDPE drainage pipe in order to allow staff the opportunity to revise the original specifications to provide a clearer understanding of the products the Highway Division requires. He explained that the current bidders' proposals were for two different types of pipe that did not meet the needs of this Division. In response to a question from Jeremy Goldman, County Manager, Mr. White advised that there are sufficient quantities of pipe on hand and if necessary, the current vendor is willing to extend its contract for an additional three months. The Council approved Mr. White's request.

MARYLAND HISTORICAL TRUST EXTENSION REQUEST-HAZARD MITIGATION GRANT-TOURISM-GRANT MONITOR

The Council approved the request of Cindy Smith, Grant Monitor, to extend the project deadline for a Maryland Historical Trust Hazard Mitigation Grant to complete an inventory of historic sites at risk for sea level rise and other natural disasters.

FY18 MANAGEMENT GRANT AWARD-TOURISM-GRANT MONITOR

The Council approved the request of Ms. Smith to accept a FY18 Maryland Heritage Area Authority Management Grant in the amount of $100,000 to continue the operation of the local Heritage Area office. The Council acknowledged that there are monies included in the grant for the employment of three on-site personnel: Director, Program Administrator, and Outreach Coordinator.

FY18 MARYLAND HERITAGE AREAS AUTHORITY MARKETING GRANT AWARD ACCEPTANCE-TOURISM-GRANT MONITOR

The Council approved the request of Ms. Smith to accept the FY18 Maryland Heritage Areas Authority Marketing grant award of $45,000 with a cash match of $40,000 from the Tourism General Advertising budget. a mini-grant match from the local community and in the form of in-kind services.

REQUEST TO ADVERTISE FOR PROPOSALS-CONSULTANT-COUNTY COMPREHENSIVE PLAN-PLANNING AND ZONING

The Council discussed the request of Rodney Banks, Assistant Finance Director, to advertise for proposals for a consultant for the update of the County's Comprehensive Plan. Mr. Goldman explained that this item was delayed for one meeting in order to seek input from other Departments. The Council approved the request pending comments from the Planning Commission with the understanding that additional changes may be necessary based on the comments recently submitted by Anna Sierra, Emergency Services Director.

FY17 EMERGENCY MANAGEMENT PERFORMANCE GRANT AWARD-EMERGENCY SERVICES

The Council approved the request of Ms. Sierra to execute a FY 2017 Sub-recipient Agreement which serves as the formal Grant Award Notice for the FY 2017 Emergency Management Performance Grant award of $71,468.00. The Council acknowledged that the County's 100% match is covered through the 911 surcharge/expenses and that no General Funds are required.

REQUEST TO ADOPT 2017 HAZARD MITIGATION PLAN-EMERGENCY SERVICES

Pursuant to the request of Ms. Sierra, the Council agreed to adopt the 2017 Hazard Mitigation plan which she presented at the Council's August 1, 2017 meeting by resolution. The Council acknowledged that the adoption of plan is necessary in order for the County to be eligible for several Federal Emergency Management Agency grants. Ms. Sierra advised that the plan will now be presented to each municipality for approval.

TRAVEL REQUEST-EMERGENCY SERVICES

Ms. Sierra said she is seeking Council's approval for herself and several employees to attend an annual user conference held by Spillman, a Computer Aided Design vendor, which was recently purchased by Motorola, in Utah from September 18 to September 22, 2017. The Council approved Ms. Sierra's request for her, Kim Vickers and Loreal Vaughn to attend this conference. The Council acknowledged that all costs will be borne by Spillman

BOARD APPOINTMENTS

The Council recognized that there are vacancies on several County Boards and Committees. The Council approved the request of Daniel McDermott, Executive Director, to appoint Dion Banks as a private sector representative for Dorchester County on the Upper Shore Workforce Investment Board. The Council also approved the request of Lisa Hartman, Director, Dorchester County Department of Social Services, to reappoint the following individuals to the Adult Guardianship Review Board for another term: Larraine Caldwell, Lay Individual; Dr. Evangeline Garica, Physician; and Dr.

James McAnulty, Physician. The Council also approved Ms. Hartman's request to appoint Mary Denard Turner as the Dorchester County Senior Council representative and Darlene Sampson, representative of Hurlock Methodist Church on the Adult Guardianship Review Board.

POLL CONFIRMATIONS

The Council, confirmed its following decisions, in the interim between meetings, by means of a poll to: 1) allow the boat owned by Walter Kersey, who leases slip 6 at the Ragged Point Marina, to remain on land at the marina until the ramp is repaired by a 4 to 1 (no answer) vote; and, 2) approve the request of Cindy Smith, Grant Monitor, to accept a FY17 Interlocal Agreement-Byrne Justice Assistance Grant Program Award of $10,729, of which the City and County will each receive 50%, by a 4 to 1 (no answer) vote.

LICENSE AGREEMENT-EASTERN SHORE INNOVATION CENTER

The Council agreed to enter into a License Agreement with IES Diagnostics for Suite No. 028 for a 24 month period commencing September 1, 2017 to August 31, 2019 with monthly installments being based on licensed square foot due on or before first day.

PUBLIC COMMENTS

Gloria Dolan, resident, referred to the Council's earlier approval of a proposal for engineering services for the design and permitting of a proposed landfill. Pursuant to her inquiry, Mr. Goldman said this will be for a horizontal expansion. Ms. Dolan questioned whether the public will have the opportunity to provide comments during the Comprehensive Plan update. Mr. Goldman explained that the request for proposals for a consultant for this plan includes public hearing and public comment requirements.

COUNCIL'S COMMENTS/ADJOURNMENT

Councilman Satterfield expressed concern about the potential impact to the County if Hurricane Irma moves toward the area. He said he hopes that the conflict between the United States and Korea can be resolved peacefully. He thanked law enforcement and emergency services personnel for their service. He recognized that Joey Hughes, Director of Corrections, is present. He commended him for his performance, based on positive comments he has received from other individuals.

Councilman Price said his thoughts are with those who have been impacted by Hurricane Harvey. He applauded the immediate response from individuals to rescue people and animals. He noted that September is Emergency Preparedness Month.

Councilman Bradshaw encouraged motorists to pay attention when meeting and/or behind school buses which may stop frequently. He said Governor Lawerence "Larry" Hogan is proposing $68 million in cuts to cover a State shortfall. He cited his concern

regarding a proposed reduction for Preservation Maryland Grants. He explained that this year was the first year in the several during which these grants were funded. He referenced the preservation of cultural and historic sources of the County, noting that these grants provide funding to survey sites and identify ways to preserve them from hazards, such as floods. Based on his motion, the Council agreed to send a letter in opposition to a budget cut for these grants. Councilman Bradshaw referred to prior hurricanes in the County, including Isabe, and commended people in the areas affected by recent hurricanes for coming together to assist others. Councilman Bradshaw said his thoughts and prayers are with those who have been impacted by them. He expressed his hope Irma will not travel up the coast and enter into the Chesapeake Bay.

Councilman Travers referred to the potential impact of Irma to the County and said his prayers are with those in its path. He announced that the next Council meeting is scheduled for September 19, 2017 and the Council reserves the right to meet in closed session prior to regular session.

With no further business to discuss, the Council adjourned.

ATTEST:

Jeremy Goldman
County Manager

DORCHESTER COUNTY COUNCIL:

Ricky C. Travers, President

Tom C. Bradshaw, Vice President

William V. Nichols

Rick M. Price

Don B. Satterfield

Approved the 19th day of September, 2017.

on August 16 to August 19, 2017 at the Roland Powell Convention Center in Ocean City, Maryland.

With no further business to discuss, the Council adjourned.

ATTEST:

Jeremy Goldman
County Manager

DORCHESTER COUNTY COUNCIL:

Ricky C. Travers, President

Tom C. Bradshaw, Vice President

William V. Nichols

Rick M. Price

Don B. Satterfield

Approved the 15th day of August, 2017.

APPENDIX G

NFIP & CRS

Appendix G - National Flood Insurance Program & Community Rating System

OFFICIAL USE ONLY

NATIONAL FLOOD INSURANCE PROGRAM & COMMUNITY RATING SYSTEM

Please note the Privacy Act protects the information within Appendix G of this Plan. Therefore, Appendix G is for Official Use Only not for public dissemination. If there is interest in the National Flood Insurance Program or Community Ratings System, please contact:

Stephen I. Garvin, MDPEMP
Dorchester County Emergency Management Agency
Emergency Management Planner / LEPC Chairperson / CERT Coordinator
829 Fieldcrest Road
Cambridge, Maryland 21613
(Voice) 410-228-1818
(Cell) 443-477-3189
(Fax) 410-228-1216

APPENDIX H

Mitigation Strategy Session Results

A work session was held during the September 7, 2016 HMPC meeting new mitigation ideas were generated. Those ideas were captured on the Mitigation Action Implementation Worksheet. As a result, the following twelve (12) Mitigation Implementation Actions were developed. In an effort to prioritize the twelve (12) actions developed by the committee members, a fillable PDF form was provided to each member for ranking purposes (below).

Location:	Properties within the special flood hazard areas
Mitigation Action/Project Title:	**#1 Best practice success story - Elevation Project Press Release**
Background/Issue:	Property owners who voluntarily participated in elevating their homes located in the county's special flood hazard area may be willing to allow the County to use photos of their elevation project as an example of "Best Practice." Documenting the various steps taken to complete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding.
Ideas for Integration:	Disseminate "Elevation Best Practices" publication in the Planning and Zoning office as well as flood insurance agencies.
Responsible Agency:	Dorchester County Emergency Services Dorchester County Planning & Zoning
Partners:	Maryland Emergency Management Agency
Cost Estimate:	Publication Development - Staff time Printing $250
Benefits: (Losses Avoided)	Encourage voluntary participation in elevation pre-FIRM structures to be the current flood protection elevation.
Timeline:	Short Term

Location:	Countywide
Mitigation Action/ Project Title:	**#2 Plan Integration**
Background/Issue:	During the 2016 HMP update, a Safe Growth Audit was conducted. Recommendations of the Safe Growth Audit included: • Review Priority Funding Areas and other areas designated for future growth. Overlay with hazard areas and natural resources. Identify areas within designated growth areas that are not suitable. This is not a parcel level review, but rather an overlay analysis. • Include goas and policies of the 2016 Hazard Mitigation Plan into the County Comprehensive Plan and Municipal Growth Plans. • Identify natural hazard areas on future land-use maps. • Identify movement systems that are designed to function under disaster conditions (e.g., evacuation). • Update Sensitive Areas Element of the 1996 Dorchester County Comprehensive Plan. • Encourage environmental policies to provide incentives to development that is located outside of protective ecosystems. • Review all capital projects to determine hazard vulnerability and potential impacts. Discourage and limit projects that will encourage development in areas vulnerable to natural hazards.
Ideas for Integration:	Include hazard mitigation into planning document updates: • 1996 Comprehensive Plan with 2012 Municipal Growth Map Amendment; • 2011 City of Cambridge Comprehensive Plan, • 2009 Water Resource Element, • Zoning Ordinance; • Subdivision of Land; • 2011 Hazard Mitigation Plan; and • FY2015 Annual Report - Dorchester Water Makes Us.
Responsible Agency:	Planning and Zoning Dorchester County Municipalities
Partners:	City of Cambridge, East New Market, Hurlock, and Vienna Public Works Department Environmental Health Dorchester Erosion Group
Potential Funding:	County/Municipal
Cost Estimate:	Staff Time
Benefits: (Losses Avoided)	Identification of gaps and area for improvement in existing planning.
Timeline:	Ongoing

Location:	Countywide including municipalities, specifically Hurlock
Mitigation Action/ Project Title:	**#3 Obtain contracts for on-call services and generators for emergency power back-up.**
Background/Issue:	While many facilities have generators, the possibility of needing additional generators for back-up and/or back-fill still exists.
Ideas for Integration:	Municipalities may be able to piggy-back on County contracts.
Responsible Agency:	Dorchester County Department of Emergency Services
Partners:	Municipalities & Agencies
Potential Funding:	Declaration of Emergency - Declared Emergency
Cost Estimate:	Based upon activation of contract during emergency event.
Benefits: (Losses Avoided)	Alleviates duration of down-time during disaster event.
Timeline:	Implementation - Short Term Going Forward - Ongoing

Location:	Countywide
Mitigation Action/ Project Title:	**#4 Consistent Public Outreach**
Background/Issue:	While public outreach activities have been undertaken, a schedule of activities and more frequent outreach efforts may prove beneficial. Specifically, adding new locations/groups to current efforts and adding additional public outreach activities.
Ideas for Integration:	ALICE (Alert, Lockdown, Inform, Counter, Evacuate) Infectious Disease Work with Facilitate Community of Practice (FCOP) to coordinate messaging
Responsible Agency:	Department of Emergency Services
Partners:	Employee's State Insurance Corporation Dorchester County Board of Education Dorchester County Health Department Red Cross Dorchester County Planning and Zoning Local Civic Groups
Potential Funding:	State Homeland Security Program Hospital Preparedness Program Red Cross Active Shooter Grant
Cost Estimate:	$10,000
Benefits: (Losses Avoided)	Increased public awareness and life safety
Timeline:	Ongoing

Location:	Barren Island – James Island
Mitigation Action/ Project Title:	**#5 Support barrier island restoration projects**
Background/Issue:	These projects are focus on restoring/expanding island habitat to provide hundreds of acres of wetland and terrestrial habitat for fish, shellfish, reptiles, amphibians, birds, and mammals through the beneficial use of dredged material. This will provide direct benefits of improved health, richness, and sustainability to aquatic and wildlife species. In addition, it will provide indirect benefits of navigational safety, education, and passive recreation and perhaps, increased tourism. The conceptual plan for the feasibility study proposes 55 percent wetland and 45 percent upland habitats. Habitat may include submerged aquatic habitat, mudflat, low marsh, high marsh, islands, ponds, channels and upland areas. These projects will also decrease localized island erosion as well as decreases Dorchester County shoreline erosion by reducing wave heights.
Ideas for Integration:	Continue to explore additional opportunities for barrier island restoration to protect Dorchester County.
Responsible Agency:	Port of Baltimore Army Corps. of Engineers
Partners:	Shoreline erosion group Dorchester County Port of Baltimore
Potential Funding:	Federal & State Funding
Cost Estimate:	$1.5 Billion
Benefits: (Losses Avoided)	Environmental, economic port, local jobs, and protection of shoreline from wave action and continued erosion.
Timeline:	Long-term

Location:	Countywide
Mitigation Action/ Project Title:	**#6 Substantial damage/improvement - clarification of calculation and adoption of "cumulative" standard to prevent circumvention of goal of requiring compliance with Floodplain Ordinances by submitting multiple permit applicants which individually do not trigger substantial improvement/damage.**
Background/Issue:	Dorchester County adopted a floodplain ordinance that included substantial damage/improvement and the FEMA Substantial Damage Guidebook. However, clarification is sought on how property damage and restoration calculation is documented. At this time, homeowners provide information that oftentimes lacks proper documentation. Develop an independent third-party source for determining "value" of damage/improvement.
Ideas for Integration:	Amend County Floodplain Ordinance
Responsible Agency:	Dorchester County Planning & Zoning
Partners:	Hazard Mitigation Planning Committee
Potential Funding:	N/A
Cost Estimate:	Staff Time
Benefits: (Losses Avoided)	Full compliance with the intent of substantial damage definition.
Timeline:	Short Term

Location:	Countywide
Mitigation Action/ Project Title:	**#7 Complete Coastal Aquifer Study**
Background/Issue:	Policies and implementation strategies that the County should pursue according to the *Dorchester County Water Resource Element*. • *Use the results to guide future decisions regarding groundwater withdrawals.* • *Work with MDE to identify new sources of drinking water, specifically by evaluating the quality and quantity of water in the County's deeper and less frequently used aquifers.* • *Update the County's building and land development codes to require water-conserving fixtures and appliances for all new development and retrofits.*
Ideas for Integration:	Dorchester County Comprehensive Plan
Responsible Agency:	Dorchester County Planning and Zoning
Partners:	Dorchester County Public Works Dorchester County Environmental Health
Potential Funding:	Natural Resources Conservation Service - Watershed Survey and Planning
Cost Estimate:	$100,000
Benefits: (Losses Avoided)	Groundwater preservation specifically during seasonal fluctuations.
Timeline:	Short Term

Location:	North Dorchester High School - Primary Shelter
Mitigation Action/ Project Title:	**#8 Permanent Emergency Generator**
Background/Issue:	The new North Dorchester High School is equipped with transfer switch, exterior plug and equipment pad for portable emergency generator. However, a permanent generator will mitigate this issue.
Ideas for Integration:	School used as emergency shelter by multiple agencies in event sheltering is required.
Responsible Agency:	Dorchester County Government
Partners:	Department of Emergency Management Agency Maryland Department of Health & Mental Hygiene Maryland Emergency Management Agency Department of Human Resources Department of Social Services Dorchester County Board of Education
Potential Funding:	Hazard Mitigation Program Grant Pre-Disaster Mitigation Grant
Cost Estimate:	$380,000
Benefits: (Losses Avoided)	Permanent backup power
Timeline:	Long Term

Location:	Countywide
Mitigation Action/ Project Title:	**#9 Roadway Related Repetitive Flood Issues**
Background/Issue:	Twenty-nine (29) roads were identified as to having experienced repetitive flooding issues by the HMPC. Prioritize theses roads for inclusion in the County's Capital Improvement Plan would increase the opportunity for mitigation.
Ideas for Integration:	Dorchester County Capital Improvement Plan
Responsible Agency:	Dorchester County Public Works
Partners:	Dorchester County Planning and Zoning Dorchester County Emergency Management Agency Maryland Emergency Management Agency Federal Emergency Management Agency
Potential Funding:	Hazard Mitigation Grant Program Pre-Disaster Mitigation Grant Program Emergency Advance Measures for Flood Prevention
Cost Estimate:	Determined during the Conceptual Design Phase Process.
Benefits: (Losses Avoided)	Alleviate repair costs to roads that experience repetitive flooding, specifically evacuation routes.
Timeline:	2-4 years

Location:	Countywide
Mitigation Action/ Project Title:	**#10 Drought Mitigation**
Background/Issue:	Ideas: • Study the re-use of wastewater to recharge the County's aquifers and address saltwater intrusion into the County's aquifers. The County plans to study the feasibility of a water reuse system with MDE. As the largest municipal WWTP in the County, Cambridge should participate in this study. In addition, some of Hurlock is used for spray irrigation. The rest is discharged to Wrights Branch: 1.6 Mg/Day. • Work with partners to host educational programs on low cost methods to reduce and slow stormwater flows (for example: rain barrels, tree planting, and rain gardens). • Work with partners to identify potential ways to reduce water consumption. • Development is concentrated in those areas that will have the least impact on the natural environment, thereby protecting those areas that provide filtering of stormwater runoff.
Ideas for Integration:	Include in Capital Projects and planning documents. Provide educational fact sheet and information to Board of Education.
Responsible Agency:	County
Partners:	Maryland Department of Environment Hurlock and City of Cambridge Health Department Board of Education
Potential Funding:	Natural Resources Conservation Service - Watershed Survey and Planning
Cost Estimate:	$150,000
Benefits: (Losses Avoided)	Lessen the economic, environmental and social impacts caused by drought.
Timeline:	Short Term

Location:	Countywide
Mitigation Action/ Project Title:	**#11 Stormwater Retrofits**
Background/Issue:	According to the Dorchester County Water Resource Element, stormwater retrofits can help to reduce nonpoint source pollution, particularly in more densely developed areas. The County should identify locations where such retrofits could address concentrations of nonpoint source pollution ("hot spots"), or where retrofits can help to protect environmentally sensitive areas. Future retrofit funds and implementation activities should be targeted to these priority areas.
Ideas for Integration:	Integrate planning and project planning with municipalities.
Responsible Agency:	Dorchester County Planning and Zoning Dorchester County Public Works
Partners:	Maryland Department of Planning Maryland Department of Environment
Potential Funding:	Natural Resources Conservation Service - Watershed Survey and Planning
Cost Estimate:	Dependent upon necessary retrofits; cost can range from $20,000 - $150,000.
Benefits: (Losses Avoided)	Stormwater retrofitting decrease the volume of runoff during storms and therefore, reduces flooding and possible property damage.
Timeline:	Short Term

Location:	Countywide
Mitigation Action/Project Title:	**#12 Critical Facility Property Protection**
Background/Issue:	The following Volunteer Fire Departments (VFD) are located within the flood hazard area: • **Lakes and Straits Fire Company** 2103 Farm Creek Road Flood Depth: 2.6 feet • **Hooper's Island Volunteer Fire Company** 2756 Hooper's Island Road Flood Depth: 3.0 feet • **Taylors Island Volunteer Fire Company** 510 Taylors Island Road Flood Depth: 1.2 feet • **Lloyds Volunteer Fire Department** 1616 Hudson Road Flood Depth: 1.2 feet • **Madison Volunteer Fire Company** 1154 Taylors Island Road Flood Depth: 0.8 feet
Responsible Agency:	Each Individual Volunteer Fire Department
Partners:	Dorchester County Emergency Management Agency Maryland Emergency Management Agency Dorchester County Planning & Zoning Dorchester County Public Works
Potential Funding:	Hazard Mitigation Program Grant Flood Mitigation Assistance Pre-Disaster Mitigation Grant
Cost Estimate:	Dependent upon individual structure and necessary retrofitting/relocation
Benefits: (Losses Avoided)	This will not only assist in protecting the facilities and associated equipment but also ensures each department's ability to aid residents within their respective area.
Timeline:	2 or more years