SALISBURY CITY COUNCIL
WORK SESSION AGENDA

AUGUST 15, 2016
COUNCIL CHAMBERS, ROOM 301
GOVERNMENT OFFICE BUILDING

4:30 p.m.	Dedication of the Feldman's Riverwalk Right-of-Way Agreement – Jack Lenox
4:45 p.m.	PTV Capital Partners Salisbury, LLC / Dagsboro Rd. Annexation – William Holland
5:15 p.m.	Accepting the Hazardous Mitigation Plan for Wicomico County – Julia Glanz
4:45 p.m.	Council discussion
5:00 p.m.	Adjournment

Times shown are approximate. Council reserves the right to adjust the agenda as circumstances warrant.
The Council reserves the right to convene in Closed Session as permitted under the Annotated Code of Maryland 10-508(a).

Posted: 8/11/16

BOHLER™
ENGINEERING

18958 Coastal Highway
Suite D
Rehoboth Beach, DE 19971
PHONE 302.644.1155
FAX 302.703.3173

August 11, 2016
Via Email

City of Salisbury
Department of Building, Permitting & Inspections
125 N. Division Street
Salisbury, MD 21801

Attention: William T. Holland
Director

RE: Proposed Grocery Access
MD Route 13 & Dagsboro Road
Map 20, Parcel 184
Wicomico County
City of Salisbury, Maryland
BEPC # DE160007

Dear Mr. Holland:

Pursuant to feedback received at the City Council Work Session on Monday 8/1/16 regarding the above-referenced site, we have deliberated extensively with our client and the perspective tenant and respectfully request that the proposed access points remain as originally presented to the City Council. Specifically, the proposed access configuration is a drastic improvement from what is currently existing on-site as the proposed application will be eliminating one (1) access point on Route 13 and increasing the separation distance between the first Dagsboro Road entrance and Route 13. In addition, we offer the following summary outlining each discussion point identified by the City Council:

1. Traffic Study:
    a. The Traffic Impact Analysis is being finalized for the upcoming City Council Work Session on 8/15/16;
    b. Our traffic consultant, Betty Tustin from the Traffic Group, will be in attendance to present her findings and field traffic related inquiries;
2. Peak Hours for the proposed grocery use are:
    a. Weekdays: 4:00pm – 6:00pm;
    b. Saturday: 10:00am – 1:00pm;
3. Alternate driveway configurations have been considered, but would not permit the site to function as originally intended. Specifically, the proposed full-movement access point closest to Route 13 has been included within the plan to provide patron access to the proposed grocery store and allow truck traffic to enter the site and access the loading dock (see attached Concept Plan

depicting truck turning movement). The second access point has been aligned with Dickerson, at the request of the City, and allows vehicles to access the rear of the site and the future cross-access to parcels located to the north of the proposed site.

4. Building Location: We have reviewed the possibility of pushing the building forward toward Route 13; however, that layout does not work for this particular tenant. In addition, this layout would place our client at a competitive disadvantage.

We ask that you please review the attached information for consideration at the 8/15/16 City Council Work Session. Upon your review of the above, should you have any questions or require additional information, please do not hesitate to contact this office at (302) 644-1155. Thank you.

Sincerely,

BOHLER ENGINEERING VA, LLC

Christopher A. Mondoro
Asst. Project Manager

David M. Kuklish, P.E.
Project Manager

cc: C. Ted Donald, PTV Capital Partners Salisbury, LLC (w/ encl.)
D. Edward Baker, PTV Capital Partners Salisbury, LLC (w/ encl.)
Betty Tustin, The Traffic Group

CAM/cl

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DRAFT

REPORT OF ANNEXATION PLAN

for the

PTV CAPITAL PARTNERS – DAGSBORO ROAD ANNEXATION TO THE CITY OF SALISBURY

July 27, 2016

This Annexation Plan is consistent with the Municipal Growth Element of the City of Salisbury's adopted Comprehensive Plan. The following are milestones in the public review and consideration of the proposed Annexation.

- At a work session on April 18, 2016, the Salisbury City Council reviewed the proposed annexation request.

- On July 21, 2016 the City of Salisbury / Wicomico County Planning Commission reviewed the proposed annexation and approved a favorable recommendation to the Salisbury City Council for the proposed zoning of the Property.

- At a Salisbury City Council work session on August 1, 2016, the City Council reviewed the draft annexation agreement and the draft version of this Annexation Plan and directed that an Annexation Resolution be drafted for review.

- A City Council meeting held on (*date to be inserted*) the Council formally reviewed this Annexation Plan and the Annexation Resolution and directed that a date for a public hearing be established. The Council further directed that the Annexation Plan be forwarded to the Maryland Department of Planning and the Wicomico County Council for comment within 30 days of the public hearing as provided for by State law.

1.0 GENERAL INFORMATION AND DESCRIPTION

1.1 Petitioners

The petitioner is Mr. James W. Taylor, III of 941 West Isabella Street, Salisbury, Maryland 21801 who has an agreement with PTV Capital Partners, LLC at 1563 Woodward Drive Extension, Greenberg, Pennsylvania. This entity has an equitable interest in the annexation property, granted by Mr. Taylor, and is acting as the developer.

1.2 Location

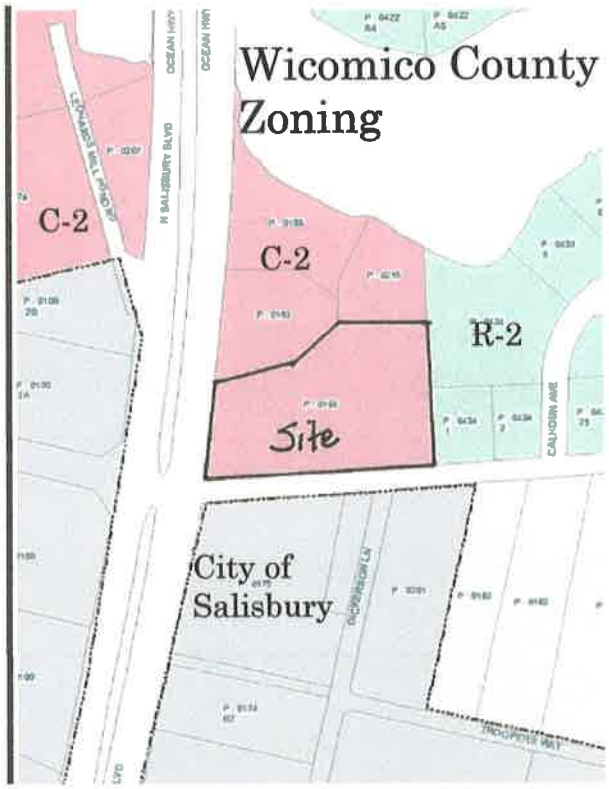
The Property is located at the intersection of Dagsboro Road and U.S. Route 13. The image below is an aerial photograph of the immediate vicinity. The right-of-way of Dagsboro Road along the Property's full frontage will also be annexed since the City's current limits stop at the south side of Dagsboro Road.

1.3 Property Description

Attachment 1 shows the survey of the Property. The site, the location of a former gasoline service station and convenience store, is 2.51 acres in size. The Property description is Tax Map 20, Parcel 184, and Grid 24. The entire annexation area includes the right-of-way of Dagsboro Road along the full frontage of the Property.

1.4 Existing Zoning

The Property is now zoned C-2, General Commercial under the Wicomico County Code as shown on the excerpt from the Wicomico County Zoning Map below. The Property adjoins C-2 zoned properties to the north and a R-20 (Residential) zone to the east.



2.0 LAND USE PATTERN PROPOSED FOR THE AREA TO BE ANNEXED

2.1 Comprehensive Plan

The City of Salisbury adopted the current Comprehensive Plan in 2010. The Annexation Property is located within the City's designated municipal growth area[1].

The Comprehensive Plan's goal as it pertains to annexations is as follows: "To encourage the orderly growth and expansion of the City of Salisbury by annexing selected areas and by providing public services to newly developing areas without overburdening these facilities while continuing to maintain a high level of services to existing developments and residents of the City".

2.2 Proposed Zoning

Upon annexation, the Property is proposed to be zoned General Commercial. Per Section 17.36.010 of the City Zoning Ordinance, the purpose of the District is "to provide a wide range of functional and attractive regional retail, office, service, wholesale, storage, distributing and light manufacturing activities." In a letter to the Mayor and City Council dated July 22, 2016 transmitting the Planning Commission's favorable recommendation for the General Commercial District classification, the City of Salisbury – Wicomico County Department of Planning, Zoning and Community Development noted that the zoning is consistent with the County's General Commercial zoning district and the Comprehensive Plan's recommendation for commercial development in this area.

2.3 Proposed Land Use

The petitioners propose to develop the Property with a grocery store of approximately 18,000 to 19,000 square feet in size.

[1] Note due to an error in the production of the comprehensive plan mapping this property and several others were mistakenly designated with a recommended land use of low density residential. An amendment to the City's Comprehensive Plan correcting this error was presented by the Department of Planning, Zoning and Community Development to the Salisbury Wicomico County Planning Commission on July 21, 2016 and the approval of such amendment is proceeding ahead of or concurrent with this requested annexation. The corrected land use designation is "commercial".

3.0 THE PUBLIC FACILITIES AND SERVICES NEEDED BY THE DEVELOPMENT AND THE METHODS TO PROVIDE SUCH FACILITIES AND SERVICES TO THE ANNEXED PARCEL

3.1 Roads

Dagsboro Road and U.S. 13 would provide access to the Property via commercial driveways. Access to U.S. 13 would be changed from the current two points of access to just one. Along Dagsboro Road where access to the site is now wide open, access would be restricted to two formal commercial entrances, including one opposite Dickerson Lane. The City Department of Public Works will ultimately evaluate and make a determination about this proposed access configuration upon the developer's submittal of a site development plan for review. An inter-parcel roadway connection would also be provided connecting the Property to the adjoining properties to the north, which may be developed in the future.

Sidewalks built to City standards would be located along the full road frontages around the perimeter of the site and internal to the site connecting the Property to the adjoining properties on the north side. The Annexation Agreement between the City and the Petitioner provides that the developer would also install crosswalks on Dagsboro Road at its intersection with Dickerson Lane. The State Highway Administration will require a traffic study when a development plan is eventually submitted to the City.

3.2 Water and Wastewater Treatment

Development of Property in keeping with its conceptual development plan would create a demand of about 1,000 gallons per day. The developer would connect at its expense to existing public water and sewerage facilities in the area at the direction of the City Department of Public Work and there are no Public Works concerns about the feasibility or capacity to serve this Property upon its development. There is adequate capacity to serve the Property. The City's allocation of water and sewer taps will be dictated by the City's allocation plan.

3.3 Schools

As a non-residential use, the Property would not generate pupil enrollment and have no impact of school capacity.

3.4 Parks and Rec.

As a non-residential use in this case, the Property would have no impact on park and recreational facilities or generate a demand for them.

3.5 Fire, E.M., and Rescue Services	The Salisbury Fire Department provides fire suppression, technical rescue, special operations, and advanced life support (ALS-EMS) emergency medical treatment and transport services to residents of the Salisbury Fire District. It would provide services to the Property.
3.6 Police	The City of Salisbury Police Department would provide services to the Property.
3.7 Stormwater Management:	Stormwater management is governed by the Maryland Stormwater Management regulations administered locally.
3.8 Waste Collection	Commercial development in the City is served by independent waste haulers.

4.0 HOW DEVELOPMENT OF THE ANNEXED PARCEL WOULD RELATE TO EXISTING/PLANNED LAND USE DEVELOPMENT, STREETS, PUBLIC FACILITIES AND SERVICES, OPEN SPACES AND NATURAL AREAS.

The Property is located at the intersection of Dagsboro Road and U.S. 13 at the northern gateway to the Salisbury Boulevard commercial corridor. Its proposed commercial use is consistent with the overall plan for this area of Salisbury. The Property is in the City's Municipal Growth Area and is eligible for annexation. The proposed grocery store use would serve existing and future residents in this growing part of the City and create about 30 to 40 jobs.

Attempts have been made to secure a development scenario that would be accessible by walking and would promote greater accessibility overall. An entrance to the site along Dagsboro Road would be located opposite Dickerson Lane and this road connection would continue through the site to the adjoining properties to the north. The developer would install a significant architectural element on the building façade and/or roof such as a cupola or clock tower opposite Dickerson Lane to help orient the building to the street and create a strong and attractive focal point where the view from Dickerson Lane would terminate. Sidewalks would be provided along the perimeter of the site and crosswalks would be placed at the intersection of Dickerson Lane and Dagsboro Road to improve safety and accessibility.

The applicant would be required to connect the Property by road and by pedestrian way to the northern adjoining properties. Marked and designated walkways and pedestrian zones from these properties and from Dagsboro Road would be installed to lead pedestrians directly to the front door of the grocery store.

The thoughtful use of landscape design would enhance the quality of the streetscape in this area and certainly improve it over existing conditions. For example, the developer would install an enhanced landscaping feature at the intersection of U.S. 13 and Dagsboro Road recognizing the location as part of the northern gateway into the City and install street trees.

The site lies adjacent to residentially zoned properties to the east. The developer would install a vegetated buffer along the eastern edge of the site to buffer the site from the residential use and partially protect the woods on the site.

The Property is located within the City's designated Paleochannel District, which is intended to protect and conserve the water resources of the Paleochannel, an ancient riverbed at a depth of 100 to 200 feet below the surface estimated to hold approximately 7 billion gallons of water. Development projects in the Paleochannel District are required to undergo site plan review and approval by the Planning Commission and certain protection performance standards.

Attachment 1: Annexation Survey

City of Salisbury
Jacob R. Day, Mayor

Memorandum

To: Tom Stevenson, City Administrator

CC: Julia Glanz, Asst. City Administrator

From: William T. Holland

Date: July 22, 2016

Ref: PennTex – Dagsboro Road Annexation

Attached is a draft of the PennTex – Dagsboro Road Annexation Agreement and zoning recommendation along with other documents for the City Council work session scheduled for Monday, August 1. At this time the annexation package doesn't include the Report of Annexation Plan or the Concept Development Plan which I expect to have sometime next week.

Let me know if you have any questions.

Department of Building, Permitting & Inspections
125 N. Division St., Rm. B13 Salisbury MD 21801
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FAX 302.703.3173

March 29, 2016
Via Hand Delivery

City of Salisbury
Department of Building, Permitting & Inspections
125 N. Division Street
Salisbury, MD 21801

Attention: William T. Holland
Director

RE: Annexation Petition
Proposed Commercial Site
MD Route 13 & Dagsboro Road
Map 20, Parcel 184
Wicomico County
City of Salisbury, Maryland
BEPC # DE160007

Dear Mr. Holland:

Bohler Engineer, on behalf of PTV Capital Partners Salisbury, LLC, is pleased to submit the above referenced project (located at the corner of Route 13 and Dagsboro Road) for consideration of Annexation within the City of Salisbury jurisdiction. The site measures approximately 2.51± acres, is zoned Commercial in the Wicomico County jurisdiction, is contiguous to the City of Salisbury boundary, and is currently a vacant gas station. The proposed project consists of an 18,875 ± retail store with site amenities and improvements inclusive of parking, access roadways, lighting, landscaping, utilities, and stormwater management facilities.

In regard to the City of Salisbury and Annexation Team meeting, please find enclosed the following material for your review:

- One (1) copy of the "City of Salisbury- Petition for Annexation"
- One (1) Site Plan, prepared by Hampshire, Hampshire & Andrews, Inc., dated July 23, 2012.
- One (1) Concept Development Plan, prepared by Bohler Engineering, dated March 29, 2016.
- One (1) Check payable to "City of Salisbury" in the amount of $2,000.00

Upon your review of the above, should you have any questions or require additional information, please do not hesitate to contact this office at (302) 644-1155. Thank you.

Sincerely,

BOHLER ENGINEERING VA, LLC

Christopher A. Mondoro
Asst. Project Manager

David M. Kuklish, P.E.
Project Manager

cc: C. Ted Donald, PTV Capital Partners Salisbury, LLC (w/ encl.)
D. Edward Baker, PTV Capital Partners Salisbury, LLC (w/ encl.)

CAM/cl

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CITY OF SALISBURY

PETITION FOR ANNEXATION

To the Mayor and Council of the City of Salisbury:

I/We request annexation of my/our land to the City of Salisbury.

Parcel(s) # 184

Map # 20, Grid # 24

SIGNATURE (S)

	March 31, 2016 Date
	Date
	Date
	Date

City of Salisbury
Jacob R. Day, Mayor

CERTIFICATION

U. S. ROUTE 13 & DAGSBORO ROAD

ANNEXATION

This is to certify that I have verified the petitions for the annexation and that to the best of my knowledge the persons having signed the petition represent at least 25% of the registered voters residing in the area to be annexed and are the owners of at least 25% of the assessed valuation of real property located in the area to be annexed.

Leslie C. Sherrill
Surveyor

Date: 6/27/2016

US Route 13 – Dagsboro Rd - Certification

Office of the Mayor
125 N. Division St., #304 Salisbury, MD 21801
410-548-3100 (fax) 410-548-3102
www.salisbury.md

JAKUBIAK
TOWN + CITY PLANNING

MEMORANDUM

To: Thomas Stevenson, City Administrator
From: Christopher Jakubiak, AICP
Date: July 19, 2016
Re: Fiscal Impact, Malone – Snow Hill Road Annexation

The PTV Capital Partners - Dagsboro Road Annexation would add 2.51 acres to the City zoned for commercial use. The annexation is expected to have an overall net positive fiscal impact to the City estimated to be $12,300 annually. This memorandum summarizes the costs and revenues associated with the Annexation.

Cost

Cost projections are based on a snapshot marginal cost approach. The current level of service (derived from the approved FY 2016 Budget) is used to project new costs, using demand unit multipliers, which reflect how responsive a cost is to demand—that is, how much the City's cost of providing a service is likely to vary with each additional household or job and in the present case, solely jobs since the project is entirely commercial. Some portion of all City services is fixed and therefore will remain constant in light of new development; this portion of the cost therefore is not assigned to new development. The estimated annual cost to the City is $21,100.

Revenues

When land is annexed into Salisbury it is subject to the municipal real property tax. The property tax rate is applied to the value of land and improvements (structures) thereon. The rate is $0.937 per $100 of assessed value. Since the assessed value of the proposed units is unknown, this study estimates assessed values by computing the average assessed value of multiple comparable properties in the City of Salisbury. The source for the assessed values is the Maryland Department of Assessments and Taxation.

Under the proposed concept development plan, the Annexation Property would be developed with a 18,750+/- square foot grocery store at the intersection of Route 13 and Dagsboro Road with highway access to Route 13. With an estimated assessed value of $3.5 million, the total expected revenue from full development on the annexation parcel is $33,400.

It is difficult to make reliable projections about the activities of future businesses that may occupy new development projects. For this reason, the personal property tax receipts likely to accrue from future businesses with annexation area are also not included in our analyses. Therefore, in this respect, the study undercounts revenue potential from the Annexation.

It is also important to note that upon annexation of a property, the City of Salisbury could begin receiving some property tax revenues from the parcel. These revenues, which typically would occur prior to actual development (and hence, the provision of standard municipal services, i.e. costs) are not included.

Lastly, the City collects user fees, license fees, and permitting fees. These are charged to applicants for permits and/or users of certain city services. These revenues are small relative to the property tax revenue and are not included in this study.

Conclusion

The PTV Partners - Dagsboro Road Annexation upon its proposed development would have a positive fiscal impact to the City of about $12,300 per year in constant 2016 dollars[1].

[1] This study takes into account only "direct" costs and revenues that can be tied directly to each household. "Indirect" costs

PTV Capital Partners, LLC
1563 Woodward Drive Extension
Greensburg, PA 15601
T: (724) 420-5367
F: (724) 420-5369

LETTER OF INTENT

July 7, 2016

Mr. Tom Stevenson, City Administrator
City of Salisbury Government Office Building
P.O. Box 870
Salisbury, Maryland 21803-0870

RE: Dagsboro Rd –PTV Capital Partners Annexation

Dear Mr. Stevenson:

Pursuant to that certain Option Agreement to Purchase Real Property (the "**Agreement**") effective January 8, 2016, by and Between **PTV Capital Partners, LLC,** a limited liability company organized and existing under the laws of the Commonwealth of Pennsylvania and authorized to do business in the State of Maryland, located 1563 Woodward Drive Extension, Greensburg, PA 15601, its successors and assigns (the "**Optionee**"), and **James W. Taylor, III**, an individual, with a mailing address of 941 West Isabella Street, Salisbury, MD 21801, his heirs, successors, beneficiaries and assigns (hereinafter called "**Optionor**"), Optionee has an equitable interest in the property located and described as 30248 Dagsboro Road, Salisbury, MD 21802, Tax Map: 0020 Grid: 0024 Parcel: 0184 – Tax Account #: 05-073642 (the "**Property**"). Optionee provides this letter, in conjunction with the attached petition from the Optionor, as indication that the parties mutually intend to move forward with the annexation of the Property based on the draft annexation agreement.

Furthermore, Optionee shall enter into the final Annexation Agreement (the "**Annexation Agreement**") and shall be granted all authority and permission to do so by the Optionor and the Agreement.

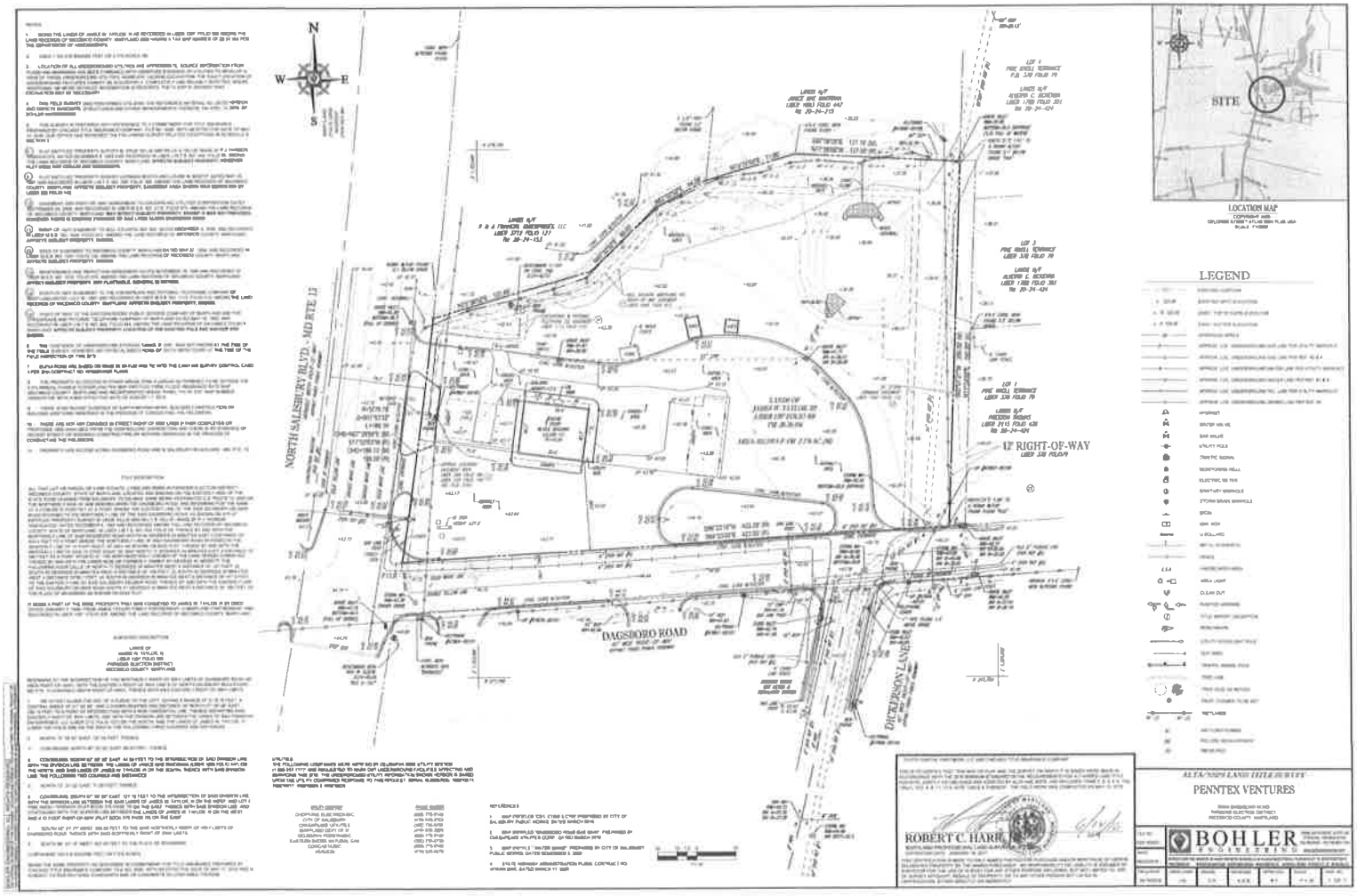
Sincerely,

PTV Capital Partners, LLC

By: Timothy H. Wenman

Enclosures

C/c James W. Taylor, III


NORTH SALISBURY BLVD. - MD RTE 13
DAGSBORO ROAD
DICKERSON LANE
17' RIGHT-OF-WAY
LOCATION MAP
SITE
LEGEND
ROBERT C. HARR
PENNTEX VENTURES
BOHLER ENGINEERING

City of Salisbury – Wicomico County

DEPARTMENT OF PLANNING, ZONING AND COMMUNITY DEVELOPMENT
P.O. BOX 870
125 NORTH DIVISION STREET, ROOMS 203 & 201
SALISBURY, MARYLAND 21803-4860
410-548-4860
FAX: 410-548-4955

JACOB R. DAY
MAYOR

TOM STEVENSON
CITY ADMINISTRATOR

BOB CULVER
COUNTY EXECUTIVE

R. WAYNE STRAUSBURG
DIRECTOR OF ADMINISTRATION

July 22, 2016

Mr. Chris Monduro
Bohler Engineering
18958 Coastal Highway, Suite D
Rehobeth Beach, DE 19971

RE: ANNEXATION ZONING – Dagsboro Road Annexation – 2.51 acres; M-20; G-24; P-184.

Dear Mr. Monduro:

The Salisbury Planning Commission at its July 21, 2016, meeting, forwarded a **FAVORABLE** recommendation to the Mayor and City Council for this property to be zoned **General Commercial** upon annexation. The Commission also found that the proposed zoning is consistent with the Wicomico County Zoning, and the Comprehensive Plan recommendation for Commercial development in this area.

The Commission recommendation is contingent upon the Mayor and City Council approval of the recommended amendment to the 2010 Salisbury Comprehensive Plan for this property.

If you have any questions concerning this matter, please don't hesitate to contact Gloria Smith or myself at 410-548-4860.

Sincerely,

John F. Lenox, AICP
Director
Salisbury/Wicomico Planning & Zoning

cc: Mike Moulds, Director of City Public Works Department
Bill Holland, Director of Building, Permits, and Inspections Department
Assessments

City of Salisbury – Wicomico County
DEPARTMENT OF PLANNING, ZONING AND COMMUNITY DEVELOPMENT
P.O. BOX 870
125 NORTH DIVISION STREET, ROOMS 203 & 201
SALISBURY, MARYLAND 21803-4860
410-548-4860
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JACOB R. DAY
MAYOR

TOM STEVENSON
CITY ADMINISTRATOR

BOB CULVER
COUNTY EXECUTIVE

R. WAYNE STRAUSBURG
DIRECTOR OF ADMINISTRATION

STAFF REPORT

MEETING OF JULY 21, 2016

NAME:	**PTV Capital Partners – Dagsboro Road Annexation**
APPLICANT:	The City of Salisbury - Referral
LOCATION:	Northeasterly side of the City of Salisbury, on the northeasterly corner of U.S. Route 13 and Dagsboro Road. Tax Map #20, Parcel #184, Grid #24
REQUEST:	**Annexation Zoning** – 2.51 acres

I. BACKGROUND DATA:

A. Introduction.

The City Administration has referred the PTV Capital Partners – Dagsboro Road annexation located on the northeasterly side of Salisbury to the Planning Commission for review and recommendation of an appropriate zoning designation. The property is located on the northeasterly corner of U.S. Route 13 and Dagsboro Road and consists of 2.51 acres. **(See Attachments #1 - 4.)**

Under the procedures established by the Mayor and City Council in 1987, the zoning classification of the area will be included in the resolution that annexes the property to the City. Prior to this policy, annexations were conducted by resolution and the zoning category established by a separate ordinance on a separate time schedule. This policy now puts the zoning classification and annexation on the same schedule.

B. Area Description.

This annexation area consists of one parcel 2.51 acres in size that is currently developed with an inactive convenience store/fuel station. **(See Attachment #5.)**

II. ZONING ANALYSIS.

A. Existing Zoning.

The annexation area and the adjoining area to the north is zoned C-2 General Commercial under the County Code. **(See Attachments #6 and 7.)**

B. Zoning History.

The proposed annexation area was zoned Commercial by the County on April 1, 1968. During the most recent Comprehensive Rezoning in September 2004, the area remained zoned C-2 General Commercial.

C. County Plan.

Wicomico County's Comprehensive Plan was adopted on February 3, 1998. This site is located within the area designated as "Metro Core".

The Draft County Comprehensive Plan designates this area as "Commercial".

D. Zoning for Annexed Areas.

1. Introduction.

Current City policy requires that all areas to be annexed shall be submitted to the Salisbury-Wicomico Planning Commission for review and recommendation of an appropriate zoning district. The Zoning Code does not establish specific procedures for zoning lands to be annexed to the City of Salisbury. The classification of future City areas, therefore, is conducted consistent with local adopted plan recommendations and Maryland Annexation Law.

2. Adopted Plans.

The Planning Commission is a jointly established agency for both the City of Salisbury and Wicomico County. One of its basic charges is to prepare and recommend various plans guiding the long-range development of both jurisdictions.

The information below summarizes the legal status of the plans currently in effect for Wicomico County and the City of Salisbury.

a. The Salisbury Comprehensive Plan - The Salisbury City Council adopted the current Comprehensive Plan on July 12, 2010. That document includes land use policies for all lands within the Corporate Limits as well as a Municipal Growth Element addressing growth areas outside the Corporate Limits. The Land Use Map of the City Plan designates this area as a "Low-density residential". A proposed amendment to the Comprehensive Plan is included on this agenda to correct this mistaken designation.

b. The Wicomico County Comprehensive Plan - The Wicomico County Council adopted its Plan on February 3, 1998. The

Land Use Map of the County Comprehensive Plan designates this area as "Metro Core." The Draft 2014 County Plan designates this area as "Commercial".

3. **Maryland Law.**

House Bill 1141 made two changes to Annexation Procedures that became effective October 1, 2006. They are:

1. **The Five-Year Rule**. First, the rule is applied solely on zoning. In the past, the five-year rule could be applied whenever a proposed new zoning classification was substantially different from the use envisioned "in the current and duly adopted master plan." The reference to the master plan is now gone and the issue becomes the degree of change from the current county zoning classification to the proposed municipal classification following the annexation. When the zoning change is from one residential zone to another, "substantially different" is now defined as a density change. The five-year rule will not kick in for a density change unless the proposed zoning is more dense by 50 percent.
2. **Annexation Plans Required.** An annexation plan is required that replaces the "outline" for the extension of services and public facilities prior to the public hearing for an annexation proposal. This section contains no additional language for the content of the annexation plan to be adopted, but does require it to be consistent with the municipal growth element for any annexations that begin after October 1, 2009. The Plan must be provided to the county and the State (the Maryland Department of Planning) at least 30 days prior to the hearing.

III. DEVELOPMENT SCENARIO.

A. Proposed Use.

As previously noted, the property is developed with a convenience store with fuel islands. The property is proposed for redevelopment with a grocery store.

B. Access.

The property currently has two access points on Route 13 and two on Dagsboro Road. Upon redevelopment, the plan indicates one access points on Route 13 at the northerly corner and two on Dagsboro Road. One entrance aligns with the Maryland State Police barrack driveway and the other with Dickerson Lane.

C. Configuration and Design

The annexation area is irregular in shape. A portion of Dagsboro Road will need to be included in the annexation to make it contiguous with the City boundary.

D. Estimated Development Impacts.

The development impact assessment traditionally pertains to a proposal for a residential development. This site is developed with a commercial facility and proposed for redevelopment as a retail use.

Among other things, the City staff has recommended that the proposed building be moved closer to Route 13 and the parking be moved to the rear of the building; that an access connection to the north adjoining property be included; and that the entrance on Dagsboro Road be aligned with Dickerson Lane.

This site is located in the Paleochannel District. Review and approval of the Final Site Plan by the Planning Commission will be required by the Code.

VI. RECOMMENDATION.

The specific purpose of the Planning Commission's review is to make a zoning recommendation for the annexation area that is currently zoned Commercial in the County.

The adopted Salisbury Comprehensive Plan designates this area as "Low density residential. General Commercial zoning is proposed for the property upon annexation to the City. An amendment to the Salisbury Comprehensive Plan will be required and has been included on this agenda. The text of the General Commercial District is included as **Attachment #8**.

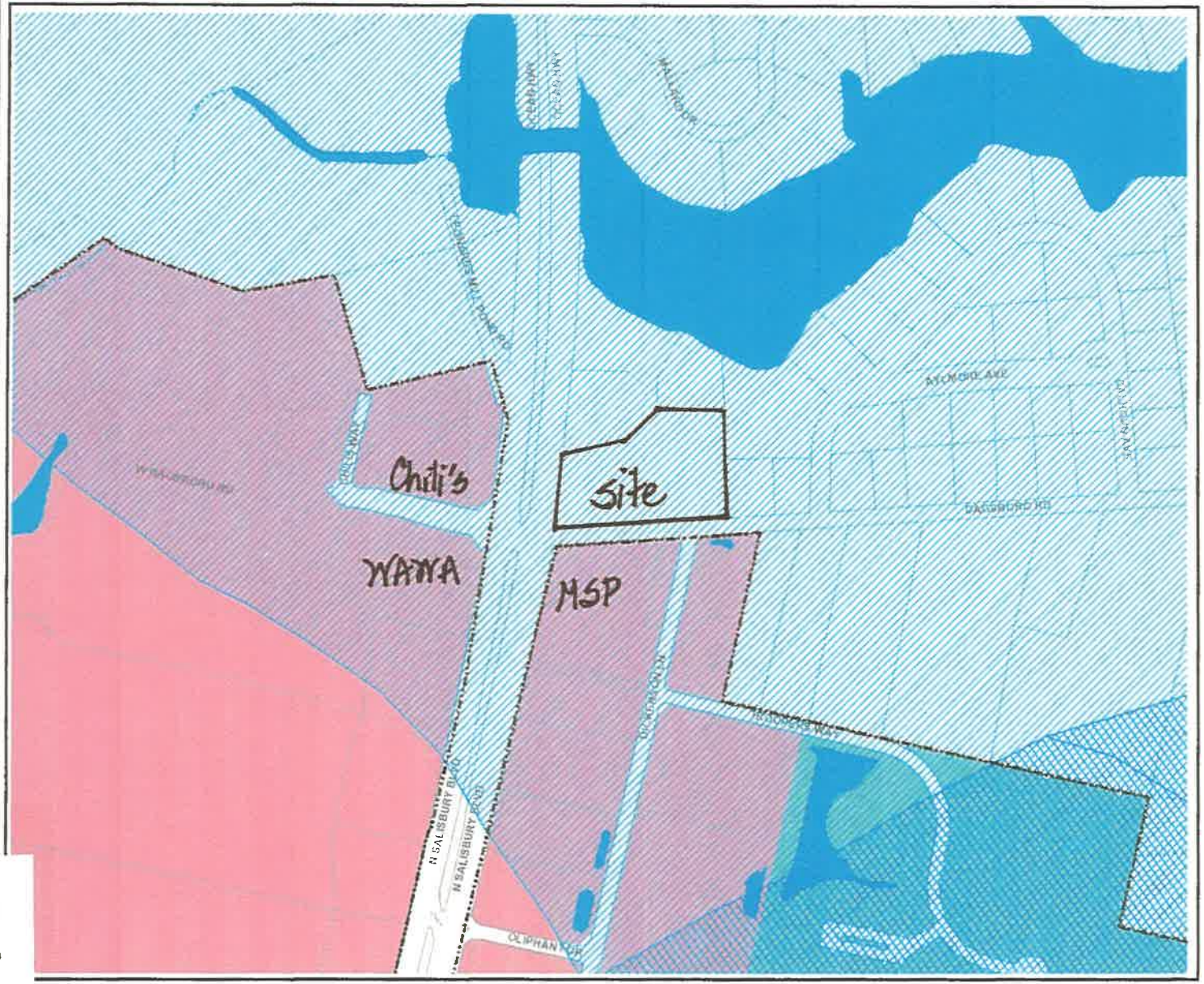
Staff recommends that the Planning Commission determine that the proposed zoning is consistent with the existing Wicomico County zoning in this area. Further, that the Commission forward a **Favorable** recommendation to the Mayor and City Council for this property to be zoned **General Commercial** upon annexation, contingent upon adoption of the associated Comprehensive Plan amendment.

COORDINATOR: Gloria Smith, Planner
DATE: July 12, 2016

Dagsboro Road Annexation

Attachment #5

CITY OF SALISBURY



112 ft

SalisburyWicomico GIS

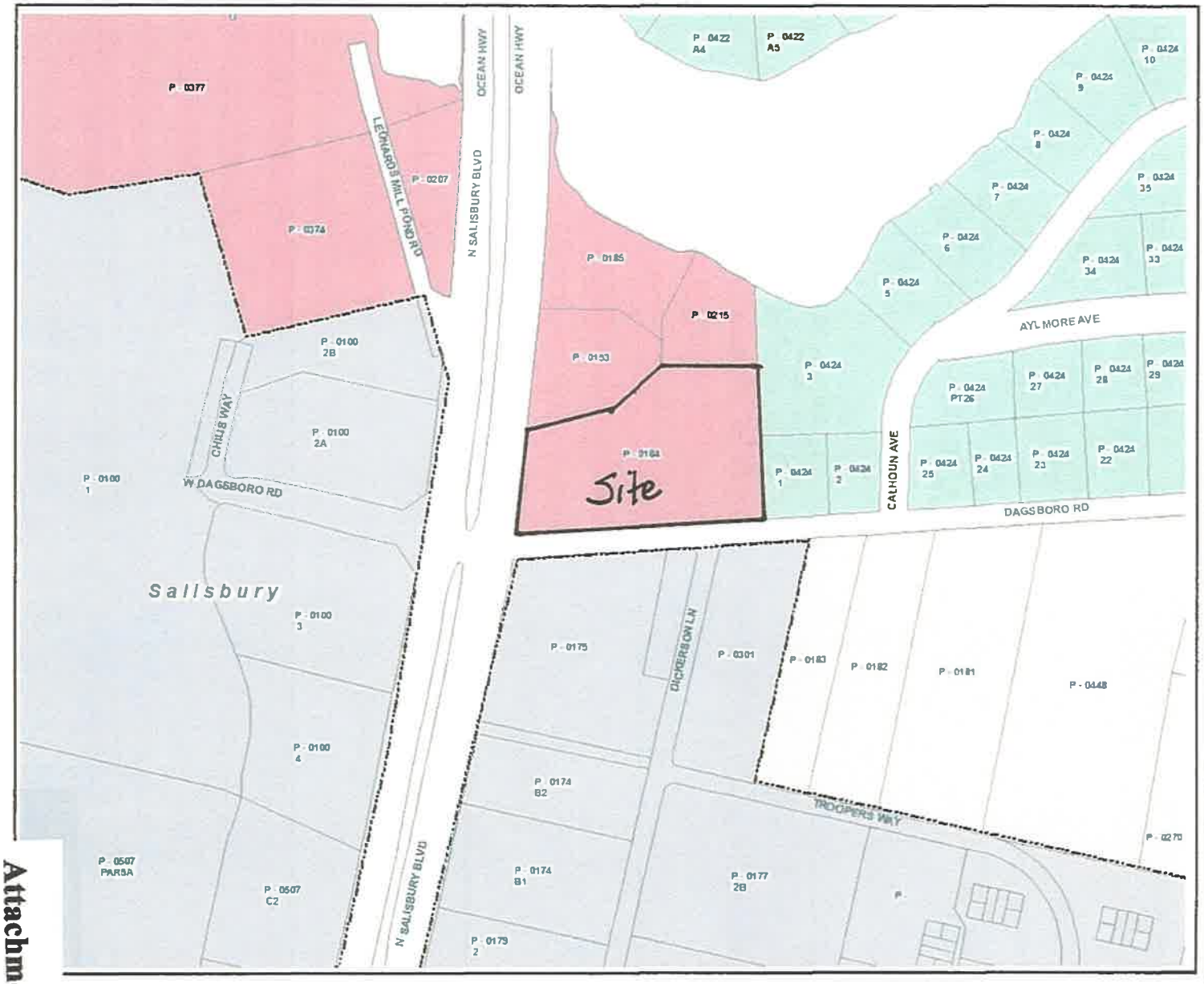
Dagsboro Road Annexation - City Zoning

Attachment #6

Salisbury Zoning

- Paleochannel
- Wellhead Protection Area
- Streams
- Water Bodies
- Street Numbers
- Municipal Areas
  - CAD
  - Delmar
  - Fruitland
  - Hebron
  - Mardela
  - Pittsville
  - Salisbury
  - Sharptown
  - Willards
- Railroads
- Parcels
- Critical Area
- Historic Districts
  - Dist_Name
    - Camden Historic District
    - Downtown Historic District
    - Newtown Historic District
- Salisbury Zoning
  - CITY_ZON
    - College & University
    - Conservation
    - CBD
    - LBI
    - General Commercial
    - Reg Comm
    - MUNR
    - Select Commercial
    - Hospital
    - Ind
    - Ind Park
    - L Ind
    - Neighborhood Business
    - OSH
    - OSR
    - PDD
    - PRD
    - R - 5
    - R - 5 A
    - R - 8
    - R - 8 A
    - R - 10
    - R - 10 A
    - Riverfront Redevelopment
- Street Centerlines

WICOMICO COUNTY ZONING MAP



77 ft

Dagsboro Road Annexation - County Zoning

Bridges
Chesapeake Bay Critical Area
Historic Districts
8000 ft Turning Radius
Airport Overlay District
Neighborhood Preservation District
Salisbury Critical Area
WicomicoCounty Boundary
Wicomico SDE Railroads
Wicomico SDE Airport_Runways_Taxiways
Wicomico SDE Municipal_Areas
Wicomico BZA Activity
Parcels
Municipal Names
Street Centerlines
Wicomico Zoning

- A - 1 Agricultural - Rural
- Airport Business Park
- C - 1 Select Commercial
- C - 2 General Commercial
- C - 3 Regional Commercial
- CID Corporate Industrial District
- I - 1 Light Industrial
- I - 2 Heavy Industrial
- LB - 1 Light Business & Institutional
- LB - 2 Light Business & Residential
- R - 8 Residential
- R - 15 Residential
- R - 20 Residential
- R - 30 Residential
- REC Residential, Educational & Cultural
- TT Town Transitional
- VC Village Conservation
- Municipality

Attachment #7

Chapter 17.36

GENERAL COMMERCIAL DISTRICT

Sections:

17.36.010 Purpose.

The purpose of the General Commercial district is to provide a wide range of functional and attractive regional retail, office, service, wholesale, storage, distributing and light manufacturing activities.

To alleviate problems with traffic congestion and unnecessary turning movements, unified access and consolidation of businesses is encouraged. Because of the potential impact of these types of activities, special landscaping and screening requirements are established for certain uses.

The following uses, standards and area regulations have been established consistent with this purpose. (Ord. 1599 Section 1 (part): Prior Code Section 150-65)

17.36.020 Permitted uses.

A. Permitted uses shall be as follows:

1. Apartment units, in accordance with Chapter 17.168.;
2. Bank;
3. Bakery;
4. Boardinghouse/rooming house;
5. Business center in accordance with the requirements of Chapter 17.172, provided that each individual lot shall have a minimum of six thousand (6,000) square feet of land area;
6. Carpenter, sheet metal, sign, blacksmith and welding shop, provided that all activities are confined within a building;
7. Church and other place of worship;
8. Club, lodge and fraternal organization;
9. Cultivation of land;
10. Cultural uses such as museum, library or art gallery;

Attachment #8

11. Dry-cleaning plant;

12. Eating and drinking establishments, including tavern, dance hall, nightclub and restaurants, all types;

13. Firehouse;

14. Equipment sales, rental, service, repair or maintenance facility for industrial, automotive, marine, office, construction, household, business or farm equipment;

15. Greenhouse, florist and nursery;

16. Hotel, motel or motor hotel;

17. Laboratory and establishment for production, sale, fitting or repair of eyeglasses, hearing aids and prosthetic appliances;

18. Light industrial uses, as listed in the Light Industrial District, completely confined within a building with no outside storage of raw materials or finished products;

19. Lumber and building supplies;

20. Marina;

21. Medical care facility;

22. Medical and dental office and clinic;

23. Police station or substation;

24. Parking garage, public or private;

25. Mixed use building as defined in Section 17.04.120 in this Chapter in accordance with a Comprehensive Site Plan, as approved by the Planning Commission, with a mandatory five-foot-wide landscaping area abutting all property lines and parking lots. Signage shall be the same as required for a shopping center;

26. Neighborhood shopping center not exceeding thirty thousand (30,000) gross square feet of building area, in accordance with the requirements of Chapter 17.212;

27. Office or office building for more than one office;

28. Radio or television broadcasting station or studio;

29. Retail sales;

30. School of special instruction;

31. Service, rental or repair establishment, such as laundry or laundromat, automobile rental, gasoline and service station, car wash, appliance repair, equipment or instrument repair or rental, dry-cleaning pickup station, hairdresser shop, pet-grooming shop, excluding outdoor runs, upholstery shop, funeral home, tailor and other uses of similar nature;

32. Taxi and limousine service;

33. Theater, excluding drive-in theater;

34. Wholesale business, warehouse, moving, storage and distribution establishment, including wholesale sales. (Ord. 1599, Section 1 (part), 1995; Prior Code Section 150-66)

35. Group domiciliary care facility. **(Added 11/13/00 by Ord. No. 1786)**

17.36.030 Uses permitted by special exception.

Uses permitted by special exception shall be as follows:

A. Animal hospital or kennel or any other facility for the treatment of animals with outside pens or runs;

B. Bus terminal;

A. Shopping centers, neighborhood, over thirty thousand (30,000) gross square feet of floor area, commercial and regional shopping centers in accordance with Chapter 17.212;

B. Trucking and freight stations, terminals, and storage yards, excluding the above ground storage of flammable liquids, except for servicing vehicles owned or used in the conduct of the business;

C. Recreational establishment, indoor. (Ord. 1599 Section 1 (part) Prior Code Section 150-67)

17.36.040 Uses permitted by ordinance permit.

Uses permitted by ordinance permit shall be as follows:

A. Commercial auction;

B. Communication tower, over seventy-five (75) feet in height or any other electronic communications facilities with more than one sending or receiving disk in accordance with Chapter 17.220;

C. Liquor stores and dispensaries (off-sale);

D. Public or private utility building and uses;

E. Recreational establishment, outdoor;

F. Utility substation, in accordance with Chapter 17.220;

G. Compact concrete dispenser as an accessory use to a use listed in Section 17.36.020, Permitted uses, and/or Section 17.36.030, Uses permitted by special exception. (Ord. 1599 Section 1 (part) Prior Code Section 150-68)

17.36.050 Accessory uses and structures.

Accessory uses and structures shall be as follows

A. Off-street parking lot or structure;

B. Off-street loading and unloading facilities;

C. Underground storage of flammable liquids for vehicles used in the conduct of the business of the principal use;

D. Communication towers for broadcasting and receiving, not exceeding seventy-five (75) feet in height;

E. Other accessory uses and structures clearly incidental to, customary to and associated with the permitted use;

F. Day-care services for employees or patrons of a permitted use. (Prior Code Section 150-69)

17.36.060 Development standards.

Development standards for the General Commercial District shall be as follows:

A. Minimum Lot Requirements. All lots hereafter established shall meet the following minimum requirements:

1. Lot area: ten thousand (10,000) square feet;

2. Interior lot width: eighty (80) feet;

3. Corner lot width: one hundred (100) feet.

B. Minimum yard requirements shall be as follows:

1. Front: twenty-five (25) feet;

2. Rear: fifteen (15) feet;

3. Side: two, not less than twenty (20) feet total in any combination.

4. Corner, side: same as front yard.

C. The height limitation shall be fifty (50) feet.

D. Parking, loading and unloading areas shall be provided for all uses in accordance with Chapter 17.196.

E. Access. Direct access onto a street or major highway shall be reduced or eliminated wherever the City Department of Public Works determines that alternate or unified points of access are available to a site resulting in better traffic flow and less traffic congestion. Service drives and loading and unloading areas shall be located so that in the process of loading or unloading no truck will block the passage of other vehicles on the service drive or extend into any public street or private drive used for traffic circulation.

F. Lighting shall be designed so as not to throw glare on surrounding properties. Flashing lights are prohibited.

G. Signs. Signs shall be in accordance with Chapter 17.216.

H. Storage. All necessary outside storage of parts, materials, heavy equipment and inoperable vehicles accessory to uses permitted herein

shall be in accordance with Chapter 17.220. Open, unenclosed storage of parts, materials, heavy equipment and inoperable vehicles is prohibited.

I. Landscaping and Screening.

1. Either landscaping or screening shall be provided for all uses in accordance with the provisions of Chapter 17.220;

2. In addition to the requirements of Chapter 17.220, all areas not devoted to building or required parking areas shall be landscaped as defined in Section 17.220.080, provided that a landscaped area of at least three feet shall be required abutting all property lines where a zero setback is not provided. (Ord. 1599, Section 1 (part), 1995; Prior Code Section 150-70)

PTV Capital Partners- Dagsboro Road Annexation

ANNEXATION AGREEMENT

THIS AGREEMENT is made this ___ day of _____, 2016, by and between the **City of Salisbury**, a municipal corporation of the State of Maryland (hereinafter, "the City"), and the Owner **Mr. James W. Taylor, III** of 941 West Isabella Street, Salisbury, Maryland 2180AND **PTV-Capital Partners, LLC** with the principal address of at 1563 Woodward Drive Extension, Greenberg, Pennsylvania15601, (hereinafter jointly, "the Owner").

RECITALS

WHEREAS, the Owner is the record owner of certain real property, of 2.51acres in size, located in Wicomico County, Maryland, (hereinafter, "the Property"), and more particularly described in Attachment "A-1" attached hereto and made a part hereof; and

WHEREAS, the Owner desires to construct upon the Property a commercial building and associated site improvements and/or to facilitate the development of the Property for commercial use;

WHEREAS, the Property is not presently within the corporate boundaries of the City and is therefore ineligible to receive certain municipal services, including the municipal water and wastewater services, that the Owner desires to obtain for the Property; and

WHEREAS, the Owner desires that the City annex the Property and the City desires to annex the Property, provided that certain conditions are satisfied; and

WHEREAS, pursuant to the authority contained in the Local Government Article, subtitle 4-400 of the Annotated Code of Maryland, the Owner and the City have agreed that the following conditions and circumstances will apply to the annexation proceedings and to the Property.

WITNESSETH:

1. **WARRANTIES AND REPRESENTATIONS OF CITY:**

A. The City of Salisbury, the Salisbury-Wicomico County Planning Commission and staff will be guided by this Agreement throughout the review of any development plans submitted for the Property to ensure that the provisions of this Agreement are specifically implemented. Any approval granted to a development plan by any commission, board, body, or agent of the City shall be in substantial compliance with the terms and conditions of this Agreement.

B. The parties understand and agree that the City's herein provided covenant of support is not intended, nor could it be construed, to legally prohibit the City from enacting such future ordinances or charter provisions or engineering standards or amendments deemed necessary to protect the public health, safety and welfare of the residents of the City, nor from applying such ordinances or charter provisions to the development of the Property, provided such application does not operate to divest prior approvals, nor interfere with the Owner's vested rights to any greater extent than the impact of such ordinances and charter resolutions upon other similarly-situated properties within the City's boundaries.

2. **WARRANTIES AND REPRESENTATIONS OF THE OWNER:**

A. This Agreement constitutes the formal written consent to annexation by the Owner as required by the Local Government Article of the Maryland Code, Section 4-403 (b)(1) and (2). The Owner acknowledges that it will receive a benefit from annexation and agrees, as a bargained-for condition and circumstances applicable to the annexation, that it waives and completely relinquishes any right to withdraw its consent to annexation from the date of execution of this Agreement by all parties. The Owner further agrees that it will not petition the Annexation Resolution to referendum and that, in the event of a referendum in which it is permitted to vote, that it shall vote in favor of the Annexation Resolution.

B. The Owner warrants and represents that it have the full authority to sign this Agreement and is in fact the sole owner of the real property encompassed in the annexation area and more particularly described in Attachment "A-1", and that there is no action pending against it involving it that would in any way affect its right and authority to execute this Agreement.

C. The Owner warrants and represents that it has the full power and authority to sign this Agreement and Consent and is, in fact, collectively the sole owner of not less than Twenty-five Percent (25%) of the assessed valuation of the real property within the annexation area.

3. APPLICATION OF CITY CODE AND CHARTER

From and after the effective date of the Annexation Resolution implementing this Agreement, all provisions of the Charter and Code of the City shall have full force and effect within the Property except as otherwise specifically provided herein.

4. MUNICIPAL ZONING

Upon the effective date of the Annexation Resolution implementing this Agreement and Approval by the Mayor and City Council, the Property will be zoned General Commercial.

5. MUNICIPAL SERVICES

Upon the effective date of the Annexation Resolution implementing this Agreement, the City will make the Property eligible to receive all applicable municipal services to the extent that the necessary public facilities exist to provide such services. Any allocation of capacity and/or services will be made by the City according to adopted allocation plans which may be in effect at the time the Owner makes request for such capacity and/or services.

6. STANDARDS AND CRITERIA

Should any environmental, engineering, or other similar standard or criteria specifically noted in this Agreement be exceeded by any local, State, or Federal standard, criteria or regulation, which may be adopted subsequent to the execution of this Agreement, the newer stricter standard, criteria or regulation shall apply.

7. CITY BOUNDARY MARKERS

The Owner will fund and install City Boundary Markers at the boundary lines to the newly enlarged City boundaries resulting from this annexation and will provide receipt of such work completed to the City within 90 days of expiration of the 45-day referendum period. The Owner agrees that failure to comply with this provision will subject the Owner to payment of a fee to the City of Salisbury made payable at end of the 90-day period in amount of $10,000.00 or the cost for the City's surveyor to complete the work, whichever is more.

8. DEVELOPMENT CONSIDERATIONS

A. Costs and Fees: The Owner agrees that it will pay the costs of annexation to the City, including but not limited to the City's costs for legal fees, planning, and other consulting fees in connection with the preparation of this Agreement and/or the necessary annexation resolution and related documents, for publication of any required notices, and for any other cost or expense reasonably related, in the City's sole judgment, to the annexation.

B. The Owner and City agree that the Property will be developed consistent with the regulations of the zoning district classification referenced in the Annexation Resolution.

C. Contribution to Area Improvement: The Owner agrees as part of the development of the Property to install sidewalks along the full public road frontage of the Property and crosswalks at the intersection of Dagsboro Road and Dickerson Lane to provide a strong and safe pedestrian orientation/amenity area between the site and the opposite side of Dagsboro Road.

D. Contributions to the Re-investment in Existing Neighborhoods: The Owner agrees to pay a development assessment to the City in the amount of $18,876.00 prior to the issuance of a building permit. Such development assessment is understood by the parties to be intended for use by the City in its sole discretion for beautification, restoration, and revitalization improvements to existing neighborhoods in the City and which development assessment is understood by the parties to be in addition to and independent of the City's water and sewer comprehensive connection charges, any impact fees imposed by Wicomico County or the City, and any assessments that may be required to be paid elsewhere in this Agreement.

E. Escalation of Development Assessment: The lot assessment set forth in paragraph D above is subject to adjustment to reflect inflation. Beginning January 1, 2017 the assessment shall be adjusted for inflation and this adjustment shall take place annually thereafter on the first day of January, for any assessment that remains unpaid. The assessment shall be adjusted by the percent change in the CPI during the previous 12-month period. The CPI to be used is the Consumer Price Index-U, All City Average, and Unadjusted, published by the Bureau of Labor Statistics.

F. Community / Environmental Design: The Owner agrees that the development plan for the site will feature strong pedestrian functional and visual relationships from the street and sidewalk to the front door of the store, enhanced site landscaping that recognize the "gateway" character of site and feature the use of a brick knee-wall at the corner of U.S. Route 13, streetscape enhancements along Dagsboro Road featured street trees in addition to the sidewalks, and buffer plantings and forest retention to provide a buffer between the developed portion of the site and the adjoining residentially zoned properties.

The Owner further agrees to achieve LEED credit points in collaboration with the Salisbury/Wicomico Planning Commission for any development using the rating system established by the United States Green Building Council's LEED Standards for Building Design New Construction, as updated from time to time. The City and Owner/Assignee acknowledge that certain points under the rating system are unattainable because of the project's location and existing available services. Understanding this, and in order to establish a baseline, the City and Owner/Assignee will first agree to the total sum of LEED points unattainable due to these factors that are beyond the control of the Owner. The sum of

these points will then be deducted from the total points possible; the difference then divided by the total points possible to arrive at a baseline quotient. Prior to development approval, the Owner shall submit specific findings, accepted by the Director of Planning, to demonstrate to the satisfaction of the Salisbury/Wicomico Planning Commission that the project has achieved, or would achieve upon development, the credit points needed for LEED Silver Certification when multiplied by the baseline quotient. In keeping with this provision, the Owner/Assignee agrees specifically to adhere to the following energy and environmental performance standards:

- Site lighting fixtures shall be energy efficient and, where possible, shall utilize LED lamps for energy efficiency and long lamp life. Streetlights if used shall also be selected for highest efficiency but recognizing that streetlights may ultimately be owned and maintained by the City of Salisbury, the selection of streetlights shall be made in conjunction with the City of Salisbury Department of Public Works.

- Roadway and parking lot construction shall be accomplished mainly using recycled aggregates and base materials in addition to conventional aggregates and paving materials when acceptable recycled materials meeting the required physical properties of the design engineer are locally available.

- The HVAC systems in all building(s) on the Property shall be high-efficiency units. Air conditioning compressors will be 17 SEER, minimum unless and until higher federal, state, or local standards are required.

- Water-saving plumbing fixtures shall be used in all buildings on the Property.

- Building roofing materials on the Property shall be selected for energy efficiency and to minimize the heat island effect of dark roof coverings.

- Building finish materials that have high-recycled content shall be selected where possible. Low VOC (Volatile Organic Compound) paints and finishes shall be used.

G. The Owner, at its sole expense, agrees to extend public water and sewer services to the Property governed by the alignment, specification, sizing, and area wide coordination and system requirements and guidance provided by the City Department of Public Works recognizing that such facilities shall be sized larger than that required by the Property alone; such work to undertaken though a Public Works Agreement approved by the City.

H. The parties acknowledge and agree that the obligations set forth herein on the part of both parties pertain to the Property, unless otherwise expressly stated herein.

9. **RECORD PLAT:**

The Owner will provide the City with a copy of the final record plat for any development of the Property.

10. **MISCELLANEOUS:**

A. The obligations of the parties hereto set forth herein are contingent upon the adoption of an Annexation Resolution effecting the annexation of the Property by the Mayor and City Council of the City of Salisbury and shall be void in the event the City fails to effect such annexation or such annexation is invalidated by referendum or otherwise.

B. The use of singular verb, noun and pronoun forms in this Agreement shall also include the plural forms where such usage is appropriate; the use of the pronoun "it" shall also include, where appropriate "he" or "she" and the possessive pronoun "its" shall also include, where appropriate, "his" "hers" and "theirs."

C. From time to time after the date of this Annexation Agreement, the parties, without charge to each other, will perform such other acts, and will execute, acknowledge and will furnish to the other such instruments, documents, materials and information which either party reasonably may request, in order to effect the consummation of the transactions provided for in this Agreement.

D. This Agreement, which includes all exhibits, schedules and addenda hereto, each of which is incorporated in this Agreement by this reference, shall be recorded among the Land Records of Wicomico County and shall run with the land and be binding upon and inure to the benefit of the parties, their heirs, successors and assigns, and embodies and constitutes the entire understanding, representations, and statements, whether oral or written, are merged in this Annexation Agreement. The parties may renegotiate the terms hereof by mutual agreement, subsequent to the effective date of any Annexation Resolution adopted by the City pursuant hereto, provided that neither this Agreement nor any provisions hereof may be waived, modified or amended unless such modification is in writing and is signed by the party against whom the enforcement of such waiver, modification or amendment is sought, and then only to the extent set forth in such instrument.

E. The parties hereto acknowledge that, in entering into this Agreement, neither party has been induced by, nor has relied upon, nor included as part of the basis of the bargain herein, any representations or statement, whether express or implied, made by any agent, representative or employee, which representation or statement is not expressly set forth in this Agreement.

F. This Agreement shall be construed according to its plain meaning without giving regard to any inference or implication arising from the fact that it may have been drafted in whole or in part by or for any one of the parties hereto.

G. This Agreement, its benefit and burden, shall be assignable, in whole or in part, by the Owner without the consent of the City or of its elected officials, employees or agents, to any purchasers or contract purchasers of the property or any party thereof. However, the Owner will not transfer or pledge as security for any debt or obligation, any interest in all or part of the Annexation Area, without first obtaining the written consent and acknowledgement of the transferee or pledgee to the Annexation Agreement and to the complete observance hereof. The Owner shall provide the City with copies of all documents of transfer or assignment, including exhibits when the documents are fully executed, regardless of recordation.

H. The captions in any Agreement are inserted for convenience only, and in no way define, describe or limit the scope of intent of this Agreement or any of the provisions hereof.

I. The laws of the State of Maryland shall govern the interpretation, validity, and construction of the terms and provisions of this Agreement. If any term or provision of this Agreement is declared illegal or invalid for any reason by a court of competent jurisdiction, the remaining terms and provisions of this Agreement shall, nevertheless, remain in full force and effect. Any suit to enforce the terms hereof or for damages or other remedy for the breach or alleged breach hereof shall be brought exclusively in the Courts of the State of Maryland in Wicomico County and the parties expressly consent to the jurisdiction thereof and waive any right that they might otherwise have to bring such action in or transfer or remove such action to the courts of any other jurisdiction.

J. All notices and other communications under this Agreement shall be in writing and shall be sent either by first class mail, postage prepaid, or by personal delivery, addressed to the parties as provided below. Notice shall be deemed given on the date delivered or attempted to be delivered during normal working hours on business days.

K.

IF TO THE CITY:	Thomas Stevenson, City Administrator 125 North Division Street Salisbury, Maryland 21801
WITH A COPY TO:	S. Mark Tilghman, City Attorney 1185 Broad Street, P.O. Box 910 Salisbury, Maryland 21803
IF TO THEOWNER:	PTV-Capital Partners, LLC 1563 Woodward Drive Extension, Greenberg, Pennsylvania 15601
WITH A COPY TO:	_____

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first written above.

WITNESS: **THE CITY OF SALSBURY, MARYLAND**

_____

_____ By: _____

WITNESS/ATTEST: **OWNER:**

_____ By: _____

APPROVED AS TO FORM:

_____

S. Mark Tilghman, City Attorney

STATE OF MARYLAND
COUNTY OF _____, to wit:

I HEREBY CERTIFY, that on this _____ day of _____, ____, before me, a Notary Public in and for the State aforesaid, personally appeared_____, who has been satisfactorily proven to be the person whose name is subscribed to the within instrument, who acknowledged himself to be a duly elected official of the City of Salisbury, a municipal corporation of the State of Maryland, and that said official, being duly authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the municipal corporation as such official.

WITNESS my hand and notarial seal.

_____(SEAL)
Notary Public

My Commission Expires:_____

I HEREBY CERTIFY, that on this _____ day of _____, ____, before me, a Notary Public in and for the State aforesaid, personally appeared _____, who has been satisfactorily proven to be the person whose name is subscribed to the within instrument, who acknowledged himself to be Member of PVT, Capital Partners, LLC, and that, being duly authorized so to do, he executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation as a Member.

WITNESS my hand and notarial seal.

_____(SEAL)
Notary Public

My Commission Expires:_____

I HEREBY CERTIFY that the foregoing instrument was prepared by or under the supervision of an attorney duly admitted to practice before the Court of Appeals of Maryland.

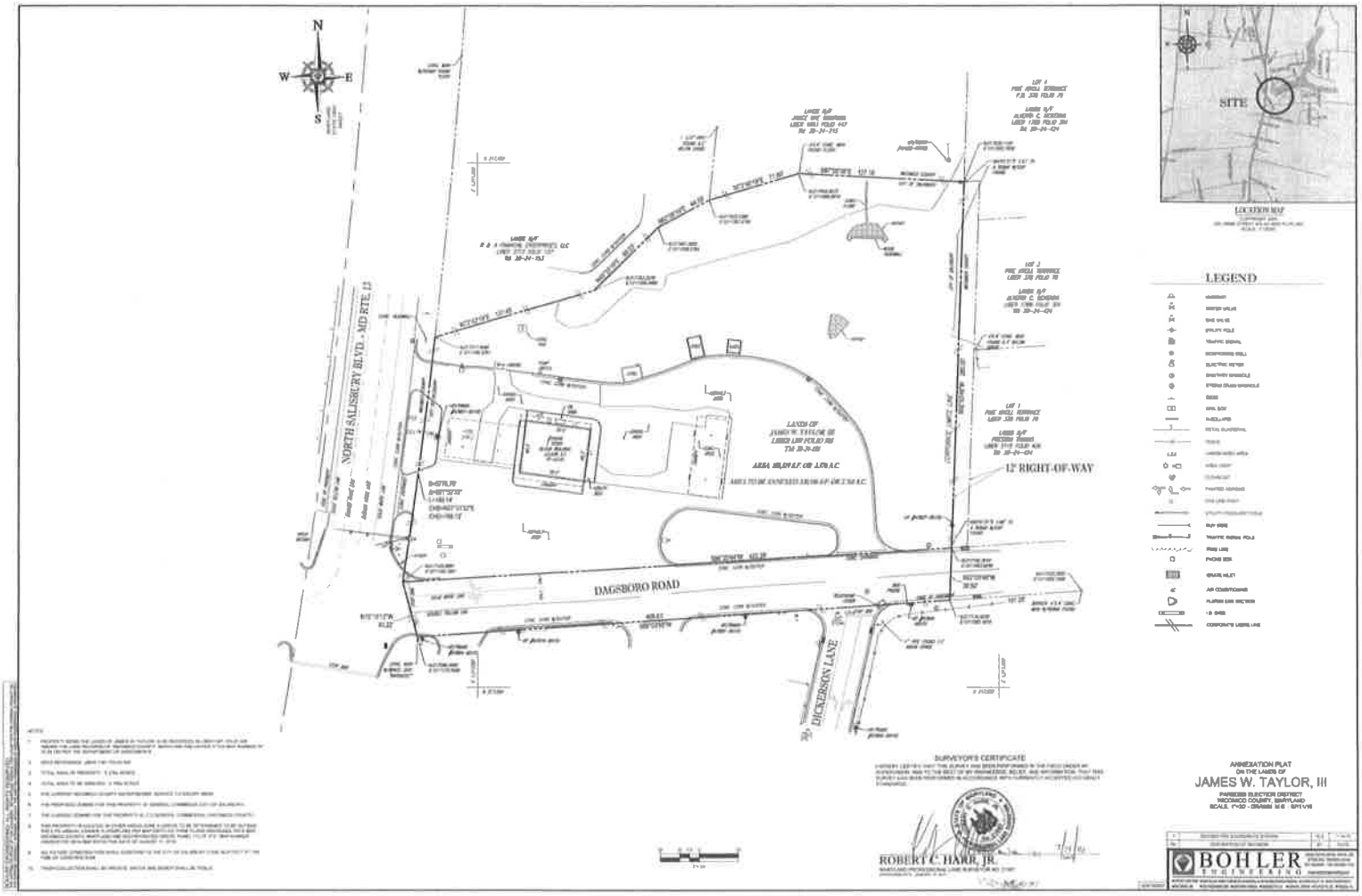
_____
_____, City Attorney

Attachment 1
(*Annexation survey plat to be inserted*)

EXHIBIT "A"

PENNTEX – DAGSBORO ROAD ANNEXATION

A CERTAIN AREA OF LAND, contiguous to and binding upon the northerly Corporate Limit of the City of Salisbury to be known as "PennTex – Dagsboro Road Annexation" beginning for the same at a point on the Corporate Limit, said point lying on the southerly side of Dagsboro Road, North eighty-six degrees three minutes fifty-five seconds East (N 86° 03' 55" E) a distance of four hundred nine decimal six, one (409.61) feet from a City of Salisbury Brass Cap labeled "BARRACKS" X 1,211,582.19, Y 217,116.41; thence crossing the said Dagsboro Road North two degrees three minutes forty-eight seconds East (N 2° 03' 48" E) thirty-nine decimal nine, two (39.92) to a point at the southeast corner of the parcel being annexed X1,211,583.62, Y 217,156.30; thence North two degrees three minutes forty-eight seconds East (N 2° 03' 48" E) two hundred eighty decimal zero, zero (280.00) feet to a point X 1,211,593.71, Y 217,436.12; thence North eighty-seven degrees five minutes thirty-eight seconds West (N 87° 05' 38" W) one hundred twenty-seven decimal one, eight (127.18) feet to a point X 1,211,466.69, Y 217,442.57; thence South seventy-three degrees forty minutes nineteen seconds West (S 73° 40' 19" W) seventy-one decimal six, zero (71.60) feet to a point X 1,211,397.97, Y 217,422.44; thence South sixty-two degrees five minutes nineteen seconds West (S 62° 05' 19" W) forty-four decimal five, nine (44.59) feet to a point X 1,211,358.58, Y 217,401.57; thence South forty-five degrees thirty-five minutes nineteen seconds West (S 45° 35' 19" W) sixty-nine decimal zero, three (69.03) feet to a point X 1,211,309.27, Y 217,353.26; thence South seventy-three degrees forty-two minutes nineteen seconds West (S 73° 42' 19" W) one hundred twenty-seven decimal four, five (127.45) feet to a point on the easterly right of way line of U. S. Route 13 X 1,211,186.94, Y 217,317.50; thence by and with the said line of U.S. Route 13 and a curve to the right, having a radius of five thousand seven hundred seventy-six decimal seven, six (R = 5,776.76) feet and a length of one hundred eighty-nine decimal one, four (L = 189.14), a chord bearing of South seven degrees thirty-one minutes thirty-two West (S 7° 31' 32" W) a chord distance of one hundred eighty-nine decimal one, three (189.13) feet to a point where the easterly right of way line of U. S. Route 13 intersects the northerly right of way line of Dagsboro Road X 1,211,162.17, Y 217,130.00; thence crossing the said Dagsboro Road South fifteen degrees fifteen minutes twelve seconds East (S 15° 15' 12" E) forty-three decimal two, two (43.22) feet to a point at the corner of the Corporate Limit being the aforementioned "BARACKS" Brass Disk X 1,211,173.54, Y 217,088.30; thence running by and with the said Corporate Limit North eighty-six degrees three minutes fifty-five seconds East (N 86° 03' 55" E) four hundred nine decimal six, one (409.61) feet to the point of beginning and containing 2.768 acres, being the lands of James W. Taylor, III, Parcel 184 shown on Tax Map 20, and a portion of Dagsboro Road. All bearings and coordinates are referenced to the Maryland State Coordinate System, 1927 datum.


N
W
E
S
NORTH SALISBURY BLVD. - MD RTE. 13
DAGSBORO ROAD
DICKERSON LANE
12' RIGHT-OF-WAY
LANDS OF JAMES W. TAYLOR, III
LEGEND
SITE
LOCATION MAP
SURVEYOR'S CERTIFICATE
ROBERT C. HARR, JR.
ANNEXATION PLAT
ON THE LANDS OF
JAMES W. TAYLOR, III
PARISSEE ELECTION DISTRICT
WICOMICO COUNTY, MARYLAND
SCALE: 1"=50' - DRAWN: M.E. - SHT1 V16
BOHLER
ENGINEERING

INTER

OFFICE

MEMO

OFFICE OF THE MAYOR

To: Tom Stevenson, City Administrator
From: Julia Glanz, Assistant City Administrator
Subject: Adopting the Wicomico County Multi-Hazard Mitigation Plan
Date: August 11, 2016

Attached you will find a resolution for consideration by the City Council to officially adopt the Wicomico County Hazard Mitigation Plan. The following information is offered to provide a brief background regarding the development of this plan.

Congress enacted the Disaster Mitigation Act of 2000 in response to large-scale outlays of federal funding to local jurisdictions during the 1990s. Section 322 of this act requires states and local jurisdictions to develop and submit mitigation plans designed to meet the criteria of 44 CFR Part 201 (local planning requirements) and Part 206 (state planning requirements. These plans are designed to prevent, or reduce, the loss of life and damage from various hazards including winter storms, river flooding, hurricanes, tornadoes, thunderstorms, fires, epidemics, soil movement, drought, extreme heat, hazardous materials, wildfires, explosions, and transportation accidents. In 2002, states were provided federal funding to initiate this planning process. Additional funding was made available to develop Hazard Mitigation Plans for local communities with the option provided for those local communities to participate with their county government in the preparation of this plan. Plan development followed a planned methodology that included public involvement, risk assessment for various hazards throughout the region, an inventory of critical and other at-risk facilitates, a vulnerability analysis, a mitigation strategy for each identified high-risk hazard, and a methodology to maintain and update the plan.

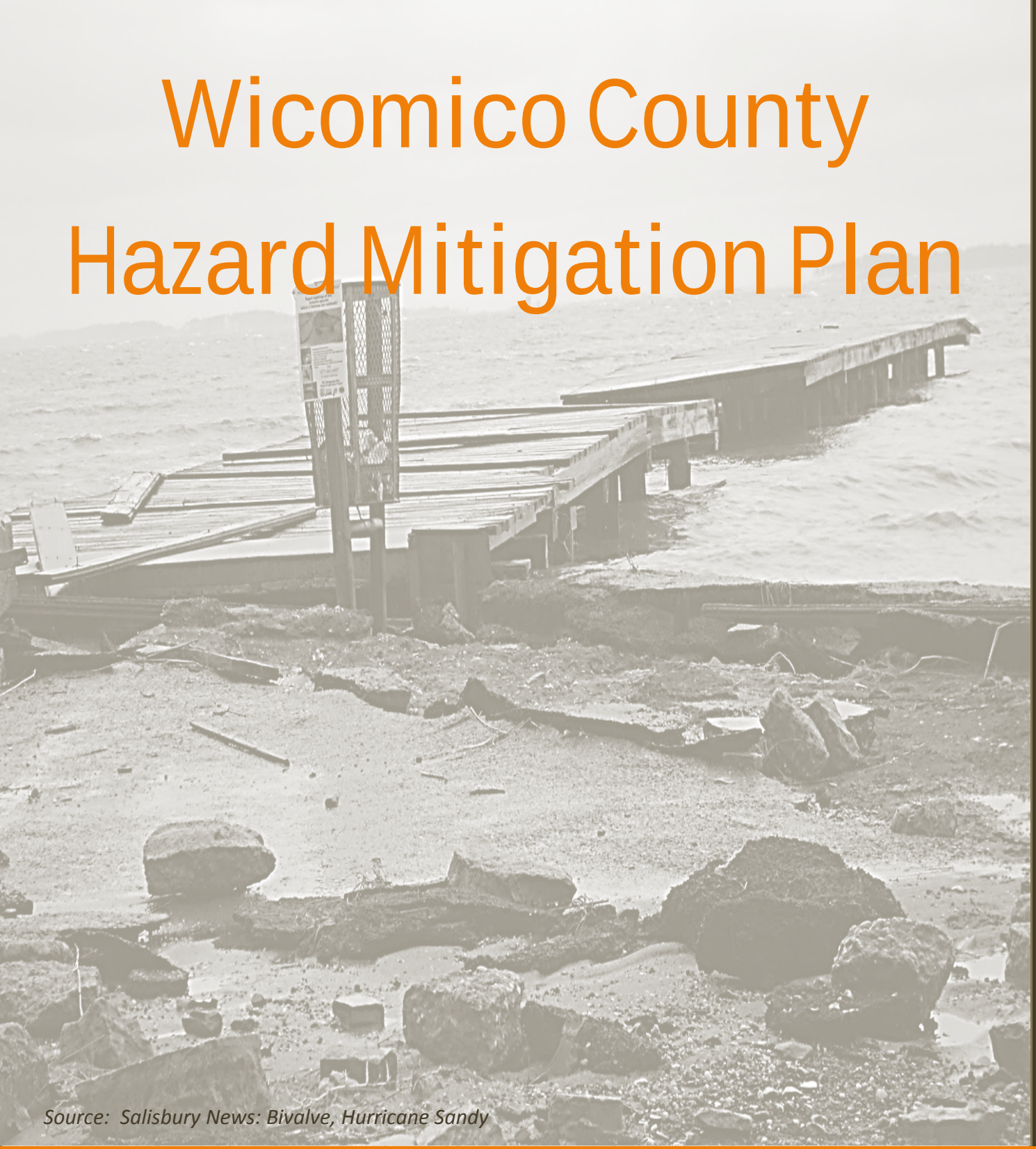
A private consulting firm contracted by the county and working with Wicomico County Emergency Services developed the Wicomico County Hazard Mitigation Plan. The Local Emergency Planning Committee (LEPC) composed of representatives from various county and municipal agencies, and private industry, served as the plan's review body. Public meetings were conducted to provide the public with an opportunity to review and participate in the adoption of the plan. The eight (8) municipalities (Delmar, Fruitland, Hebron, Mardela Springs, Pittsville, Salisbury, Sharptown, and Willards) in Wicomico County accepted the opportunity to participate in the process. This also means that each of the municipalities will not be required to develop its own "stand alone" multi-hazard mitigation plan, but must only adopt that of the

county.

Adoption of this plan is but another avenue in which we continue to cooperate effectively with the county to ensure the safety of our citizens. Should you have any questions or require additional information, please feel free to contact me immediately.

Attachment

Wicomico County Hazard Mitigation Plan



Source: Salisbury News: Bivalve, Hurricane Sandy

2016

Wicomico County
Dept. of Emergency Services
411 Naylor Mill Road
Salisbury, MD 21801

S&S Planning and Design
76 Baltimore Street
Cumberland, MD 21502

RECORD OF CHANGE

PAGE NUMBER	SECTION AFFECTED AND COMMENTS	DATE OF CHANGE

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CHAPTER 1-INTRODUCTION

INTRODUCTION AND PURPOSE

The 2016 Hazard Mitigation Plan has been prepared for Wicomico County, Maryland, and its eight incorporated communities. The purpose of this plan is to identify, plan, and implement cost-effective hazard mitigation measures through a comprehensive approach known as hazard mitigation planning. This document is the result of participation from a cross-section of community members including County and municipal officials, residents, business owners and other agencies.

PLANNING REQUIREMENTS

The 2016 Hazard Mitigation Plan forms the foundation for Wicomico County and its municipality's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage.

To that end, in January 2015, S&S Planning and Design was contracted to update the *2011 Wicomico County Hazard Mitigation Plan* and develop the *2016 Wicomico County Hazard Mitigation Plan*, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, and 44 CFR Part 201-Hazard Mitigation Planning.

As an incentive for State and local governments to develop hazard mitigation plans, the federal government requires mitigation planning as a component of eligibility for hazard mitigation project funding. The 2013 *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. This requirement reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.

2016 PLAN UPDATE

Following the review of the *2011 Wicomico County Hazard Mitigation Plan*, FEMA provided a list of recommendations for inclusion in the 2016 Plan Update. Emphasis was placed on FEMA recommendations for improvement as described in Table 1.1.

Table 1.1 – FEMA Recommendations for Improvements

2011 FEMA RECOMMENDATIONS	ADDRESS IN 2016 PLAN
1. When the plan is updated next, a better integration with other existing planning mechanisms needs to be included in the plan. For example, the County Comprehensive plan should be analyzed to determine how this all hazard mitigation plan can be incorporated into the existing planning mechanism and how the comprehensive plan can be incorporated into the hazard mitigation plan.	Chapter 12 – Plan Integration was added during 2016 plan update. A safe growth audit was completed in cooperation with Planning, Zoning, and Community Development staff.
2. The lowest floor elevation of the most vulnerable structures could be determined and kept as an annex to the plan.	Based flood elevation certificates are currently filed in the Planning, Zoning, and Community Development Office. The Land Development Coordinator is in the process of reviewing elevation certificates and imputing data into a master database as recommended in the *2011 Wicomico County Hazard Mitigation Plan.* Additionally, the Enhanced HAZUS Coastal Flood Analysis utilized user defined facilities point data, located on the lowest adjacent grade in relation to the structure and analyzed to obtain loss estimations based on depth of flooding (refer to Chapter 4 and Appendix J).
3. The annual meetings of the planning committee should be held and documentation of those annual meetings needs to be placed in the updated plan. As well as more legible depictions of the Public Notice meeting announcements.	During the 2011-2015 planning cycle the LEPC annually reviewed the plan and provided status updates, as appropriate. High resolution scans of public meeting notices are within Appendix F.
4. A thorough reporting of the progress to implement mitigation projects needs to be included when the plan is updated.	Appendix H includes detailed status updates on all 2011 Mitigation Strategies. A Mitigation Implementation Progress Report was completed and added to Chapter 14 – Mitigation Strategies.

2011 FEMA RECOMMENDATIONS	ADDRESS IN 2016 PLAN
	New Floodplain Management Ordinance adopted in 2015, includes two (2) foot freeboard requirement.
5. In the next plan update, the plan could include information on how the NFIP is managed in each of the jurisdictions. Information that could be included in the plan; process to ensure new construction is complaint with the local floodplain ordinances, how residents are assisted in mapping issues, how substantially damaged structures are managed to ensure compliance with the latest floodplain ordinance.	Appendix G – NFIP and CRS section includes a Hazard Mitigation and CRS Planning Requirements Comparison Table. Hazard mitigation planning requirements under 44 CFR Part 201 are consistent with the Community Ration System (CRS) 10-step planning process found within Activity 510 of the CRS Coordinators Manual. Appendix G details Activity 510 Floodplain Management Planning and enables Wicomico County to improve their CRS rating, which may subsequently lower the National Flood Insurance Program (NFIP) premiums for the entire community. This appendix is a new section added during the Plan Update.
6. In the next plan update try to acquire dollar figures with the associated hazards on Tables 23 & 24, this will allow for better references of what damages can be expected with certain flood heights and areas affected.	Enhanced HAZUS for both coastal flood and hurricane wind was completed during the Plan Update. Loss estimates were provided on Tables 4.5-4.9. Debris generated and shelter needs projected by HAZUS were included in Plan Update. In addition, loss estimates were provided in Chapter 6 – Shoreline Erosion and Sea-Level Rise, Tables 6.4-6.5.
7. Shoreline Erosion – develop a mitigation action to identify all structures within the 100 foot risk zone noted in the plan.	During the Plan Update, all critical facilities located with the 100-foot risk zone were identified and loss estimations were provided in Chapter 6 – Shoreline Erosion and Sea-Level Rise.
8. Flood – although the county already has a One-Foot of Free Board requirement develop as initiative to change it to 18 inches or 2 feet due to prior indications noted in the plan of sea level rise.	New 2015 Floodplain Ordinance adopted, which included 2-feet freeboard requirement.

Source: FEMA and the Wicomico County Hazard Mitigation Planning Committee

The 2016 Plan update process started with a comprehensive review of the following:

- *2011 Wicomico County Hazard Mitigation Plan*;
- *2014 Wicomico County Comprehensive Plan – Draft;*
- *2010 Wicomico County Comprehensive Water and Sewerage Plan*;
- *Zoning Codes;*
- *Wicomico County Critical Area Program and Ordinance;*
- *Wicomico County Critical Area Implementation Ordinance;*
- *Delmarva Avian Influenza Task Force Interim Guidance for Implementation; and,*
- *The Chesapeake Bay Critical Area Resource Protection Publication.*

Updated and new items added in the 2016 Plan included:

- HAZUS Level II Enhanced Analysis for Hurricane Wind and Coastal Flood (Appendix I: HAZUS Hurricane Wind Global Report and Appendix J: Non-Regulatory Coastal Flood Risk Report);
- Chapter 4 Coastal Storm expanded to include three (3) vulnerability assessments: HAZUS Hurricane Wind, HAZUS Coastal Flood and Storm Surge;
- Climate Change – Chapter 5;
- Human Impact Hazards – Chapter 11 expanded to include dam condition information, hazardous material commodities on waterways and additional epidemic information;
- Plan Integration Chapter 12 - Safe Growth Audit;
- Community Capability and Resilience – Chapter 13;
- Mitigation Implementation Progress Report – Chapter 14; and
- NFIP and CRS – Appendix G.

PLANNING PROCESS

In compliance with hazard mitigation planning requirements, extensive public participation was sought and encouraged throughout the mitigation plan update process. A Hazard Mitigation Planning Committee (HMPC) was formed in February 2015, and was comprised of various County agencies, non-profit organizations, members of the County's Local Emergency Planning Committee (LEPC), and representatives from each of the participating communities. A series of regular HMPC meetings resulted in the development of an effective and current Countywide Hazard Mitigation Plan.

The HMPC was actively involved in reviewing previously identified hazards within the communities identified in the *2011 Wicomico County Hazard Mitigation Plan* and in the review of the new hazard data gathered during the Plan update process. Hazard data coupled with local knowledge from various committee members was utilized to assess the County's vulnerabilities to hazards. Following this assessment, the Committee reviewed the status of the 2011 Mitigation Strategies recommendations to reduce and prevent potential damage from these hazards. Mitigation action items identified in the 2011 Plan were reviewed and updated bi-annually during the 2011-2015 planning cycle. Following the Mitigation Strategies review, the HMPC then worked together to update, review, and select the most appropriate and feasible mitigation measures to address the County's hazards for the 2016 Hazard Mitigation Plan.

The planning process commenced in January 2015 and a draft plan was submitted to the State for review in December 2015.

Figure 1.1 – Organizing Resources

Source: S&S Planning and Design and FEMA Guide 386-4

The planning process involved four basic steps:

1. Organize Resources

The first step of the hazard mitigation plan update process is for the County to organize their resources and ensure that they have adequate technical assistance and expertise to form a hazard mitigation committee. The committee included representatives from key County departments such as Emergency Services, Recreation and Tourism, Planning, Zoning and Community Development, Public Works and representatives from the Towns of Delmar, Mardela Springs, Hebron, Pittsville, Sharptown, Willards, and the cities of Salisbury and Fruitland. Additionally, non-governmental representatives were included on the Planning Committee and include: Peninsula Regional Medical Center, American Red Cross, Chesapeake Utilities, Choptank Electric Corp. and Fire Chiefs Association. This is a continuation of participants from the previous Plan, however additional participation was sought and new committee members were added during the Plan update process. In addition, S&S Planning and Design provides technical support for the Plan update process.

Thus the Hazard Mitigation Planning Committee (HMPC) is tasked with completing the Plan update. This committee was selected by the Director of Emergency Services for Wicomico County. The following listing includes the members of the committee and the agencies they represent:

Wicomico County Hazard Mitigation Planning Committee

Source: S&S Planning and Design, July 2015

Source: S&S Planning and Design, July 2015

Table 1.2 – Wicomico County, Maryland Hazard Mitigation Planning Committee

HAZARD MITIGATION PLANNING COMMITTEE MEMBERS	
Member Name	**Agency/Department**
David Shipley	Emergency Services
Lorenzo Cropper	Emergency Services
Steve Schweikert	Emergency Services
Steven Warren	Town of Willards
Mike Gibbons	City of Fruitland
Tom Stevenson	City of Salisbury
Mike Moulds	City of Salisbury
Amanda Pollack	City of Salisbury
David Insley	City of Salisbury Fire/EMS
Lt. Eric Cramer	City of Salisbury Fire/EMS
Sheila Adkins	Town of Sharptown
John Redden	Department of Public Works
Weston Young	Department of Public Works
Frank McKenzie	Planning, Zoning and Community Development - GIS
Dave Mathers	Planning, Zoning and Community Development
Marilyn Williams	Planning, Zoning and Community Development
Tom Bowden	Fire Chiefs Association
Mark Wagner	Sheriff's Office
John Brenner	American Red Cross
Ray Hudson	Board of Education
Captain Cheryl Rantz	Police Department
Danny Drew	Health Department
Dennis Dicintio	Health Department
Tom Anderson	Peninsula Regional Medical Center
Bo Kennedy	Peninsula Regional Medical Center
Anfham Tull	Peninsula Regional Medical Center
Tom Jones	County Shelter Manager
Ed Werkheiser	MEMA
Mark James	MEMA
Robert Ward	MEMA
Charles Russell	Chesapeake Utilities
Chad Grosch	Chesapeake Utilities
Bobby Franklin	Choptank Electric Corp.
Jimmy Banks	Wicomico County Department of Social Services
Julie Mason	Wicomico County Department of Social Services
Mark Richards	Wicomico County Parks Division
Larry Anderson	Tri-County Council

Source: S&S Planning and Design & Wicomico County Division of Emergency Services

Data Collection

The first step in the plan development process begins with data collection. Emergency Services staff met with S&S Planning and Design on 25 February 2015 to discuss the 2016 Plan update timeline and milestones. Following the staff meeting, a kick-off meeting was held on 2 April 2015 with the HMPC. Various data sources were identified and pertinent information pertaining to hazards including past occurrences, projected frequencies of future occurrence, the anticipated risk where available, and critical facility 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, zoning ordinances, development ordinances, building codes and other relevant documents.

Information was collected from county and municipal public works, planning, emergency management, and GIS departments. Additionally, data and information from several State and Federal agencies were collected including the Maryland Emergency Management Agency (MEMA), Maryland Department of Natural Resources (DNR), the Federal Emergency Management Agency (FEMA), Maryland Department of the Environment (MDE), and the U.S. Army Corps of Engineers (USACE). Sources and the hazard analysis methodology are provided in Appendix D.

2. Assess Risks

The next step in the planning process is to identify and profile hazards and assess the County's vulnerability to these hazards. This process involves the HMPC in analyzing the County's greatest hazard threats and determining its most significant vulnerabilities. The Hazard Identification and Vulnerability Assessment is performed in large part using GIS data from the County and State sources. At the first HMPC meeting held on 2 April 2015, an overview of the hazards identified and profiled in the *2011 Wicomico County Hazard Mitigation Plan* and the *2011 Maryland Hazard Analysis* specific to Wicomico County, as well as, current hazard data tables, were presented to the Committee. At this meeting, the HMPC members reviewed the list of identified hazards, and were given an opportunity to prioritize these hazards for the 2016 Plan. The HMPC then confirmed the ranking of their identified hazards for the 2016 Plan update by filling out a Hazard Identification Ranking Sheet. The second HMPC meeting was held on 21 July 2015. At this meeting, the HMPC reviewed the results of the Hazard Identification and Ranking process and were provided with an explanation of the hazards, a brief history and profile of each hazard, and areas vulnerable to various hazards. Included in the 2016 Vulnerable Assessment process was the completion of a HAZUS Level II, commonly referred to as Enhanced HAZUS Analysis. Information regarding sheltering needs, debris generation, and potential damage estimates provided a more complete understanding of hazards and potential impacts to Wicomico County and its municipalities. This information aided HMPC members in the discussion of mitigation ideas and strategies.

3. Vulnerability Assessments

Enhanced HAZUS results for both coastal risk and hurricane wind were presented at the July 21, 2015 HMPC meeting. The Coastal Vulnerability Assessment included an Enhanced HAZUS Hurricane Wind Analysis. This analysis included loss estimations, debris generation and potential shelter needs. The Non-Regulatory Coastal Flood Risk Product developed by the State of Maryland for Wicomico County was incorporated into the 2016 Update. Both the Zones AE and VE and high resolution digital elevation model were utilized to develop depth grids. This product included both mapping products and loss estimations based upon extent and depth of flooding. Finally, new storm surge inundation areas were analyzed and new mapping was added to the plan. Loss estimations as a result of storm surge were calculated.

Shoreline vulnerability was assessed utilizing a 100-foot risk zone for the *Wicomico County Hazard Mitigation Plan Update.* This shoreline erosion risk assessment examines Wicomico County's critical and publically owned/operated facilities along tidal shorelines located within the 100-foot risk zone identified for this planning project.

In order to assess riverine flood vulnerability, the new 2015 Digital Flood Insurance Risk Maps (FIRM) developed for Wicomico County. FIRMs are transitioning from a paper product to various digital products. Through the utilization of Geographic Information System (GIS) data sets and digital topography, georeferenced HEC-RAS model for most of the riverine flood models were developed. The result of this model is an enhance riverine (non-tidal) mapping process that provides updated riverine floodplain models in both detailed Zone AE and approximate study Zone A areas. The updated flood vulnerability assessment provided more accurate results due to the improved FEMA FIRM mapping products.

In addition, a draft of the Safe Growth Audit and other mapping products were developed in cooperation with Planning, Zoning and Community Development staff and the HMPC. A new chapter was added to the Plan update as a result of this process. Chapter 12 – Plan Integration provides Wicomico County with an opportunity to 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 and build a resilient Wicomico County.

4. Review of the Plan & Plan Revisions

Draft chapters were distributed to the HMPC members for review prior and following each planning committee meetings. Upon completion of all plan chapters, a cohesive draft plan was distributed for final review and comment by HMPC members in November 2015. Comments and modifications were made to the Plan prior to submittal to the Maryland Emergency Management Agency in December 2015.

5. Implement the Plan and Monitor Progress

Since the 2011 adoption of the plan, the Local Emergency Planning Committee annually reviewed the mitigation actions and provided status updates, as available. The status table has been included in Appendix H and Chapter 14 - Mitigation Strategies includes the mitigation implementation process report.

MUNICIPAL INVOLVEMENT

Municipal packets of Plan update information including a questionnaire and request for data was distributed at HMPC meetings. For those municipalities unable to attend HMPC meetings, the information was provided periodically throughout the planning process. Participating municipalities provided hazard rankings, capabilities, municipal level data and perspective. These participation culminated into municipal mitigation action items and projects.

PUBLIC INVOLVEMENT

Two public meetings were held during the Plan develop process. In addition to the public meetings, on ??, a meeting with the County's Local Emergency Planning Committee (LEPC) was held in order to update them on the Plan's status. Public meetings minutes are included in *Appendix F*.

AGENCY REVIEW

The Maryland Emergency Management Agency (MEMA) serves as the State review agency and clearing house. The following agencies also received a draft of the plan for review and comment:

- Federal Emergency Management Agency (FEMA), Region III;
- Maryland Department of Natural Resources (DNR); and,
- Maryland Department of the Environment (MDE).

The Maryland Emergency Management Agency conducted the State review of the *2016 Wicomico County Hazard Mitigation Plan* in December of 2015.

ORGANIZATION OF THE REPORT

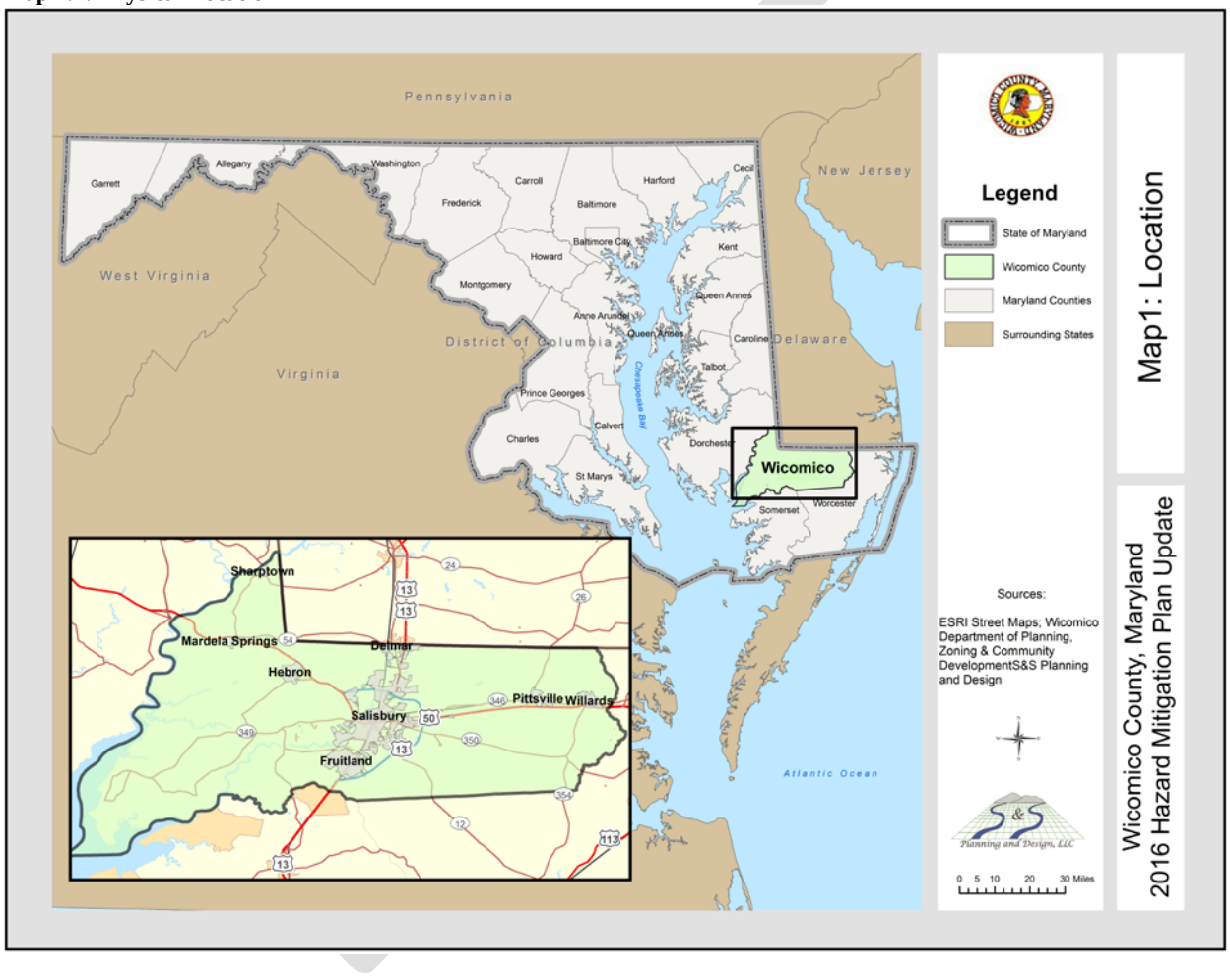
The following chapters comprise the *2016 Wicomico County Hazard Mitigation Plan*. Chapter 2 includes the County Profile, while Chapter 3 details the Hazard Identification and Ranking Assessment (HIRA). Chapters 4-11 comprise the Vulnerability Analysis for those hazards identified by the 2016 Hazard Mitigation Planning Committee as "Medium", "Medium High", or "High". New chapters added during the update process include, Chapter 5 – Climate Change and Chapter 12 – Plan Integration. Chapter 13 - Community Capability and Resilience and Chapter 14 - Mitigation Strategies were updated and new information was added. Chapter 14 provides a Mitigation Action Status report of actions and projects completed during the planning cycle. Also goals, objectives vulnerability assessment methodology, and 2015 mitigation action items along with the HMPC priority ranking for each action. Finally, Chapter 15 - Plan Maintenance and Implementation, details how the Plan will be maintained and implemented over the next five year plan cycle. There are nine (9) appendices, which include information from the meetings, questionnaires, HAZUS reports to even a detailed description of potential project funding sources.

CHAPTER 2 - WICOMICO COUNTY PROFILE

LOCATION

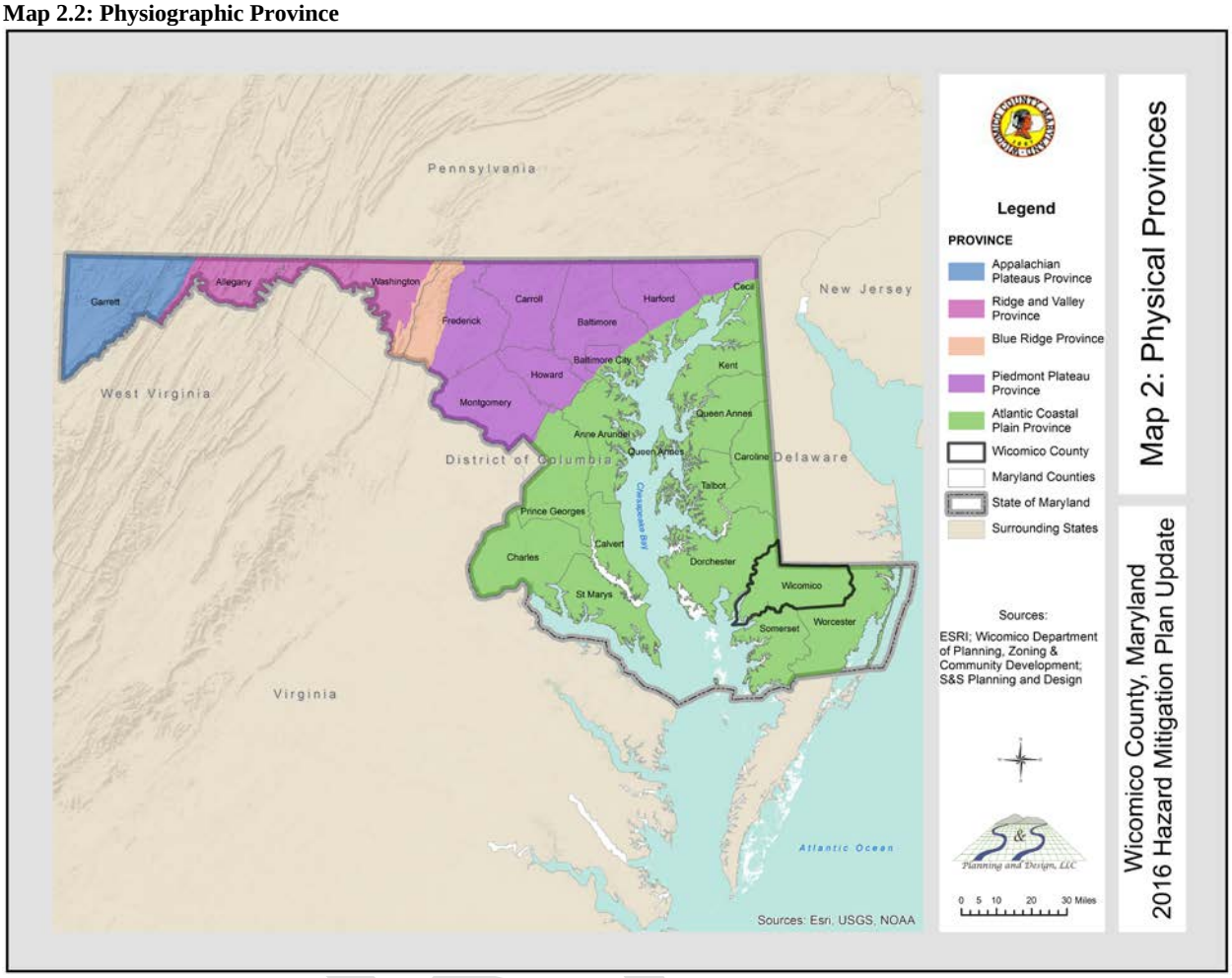
Wicomico County is located in the southern part of Maryland's eastern shore and is adjacent to Dorchester, Somerset, and Worcester Counties in Maryland, and Sussex County, Delaware. Wicomico is one of the smaller counties in Maryland, containing 400 square miles of land, and 23 square miles of water, including the Nanticoke and Wicomico Rivers, and the Chesapeake Bay.

Map 2.1: Physical Location



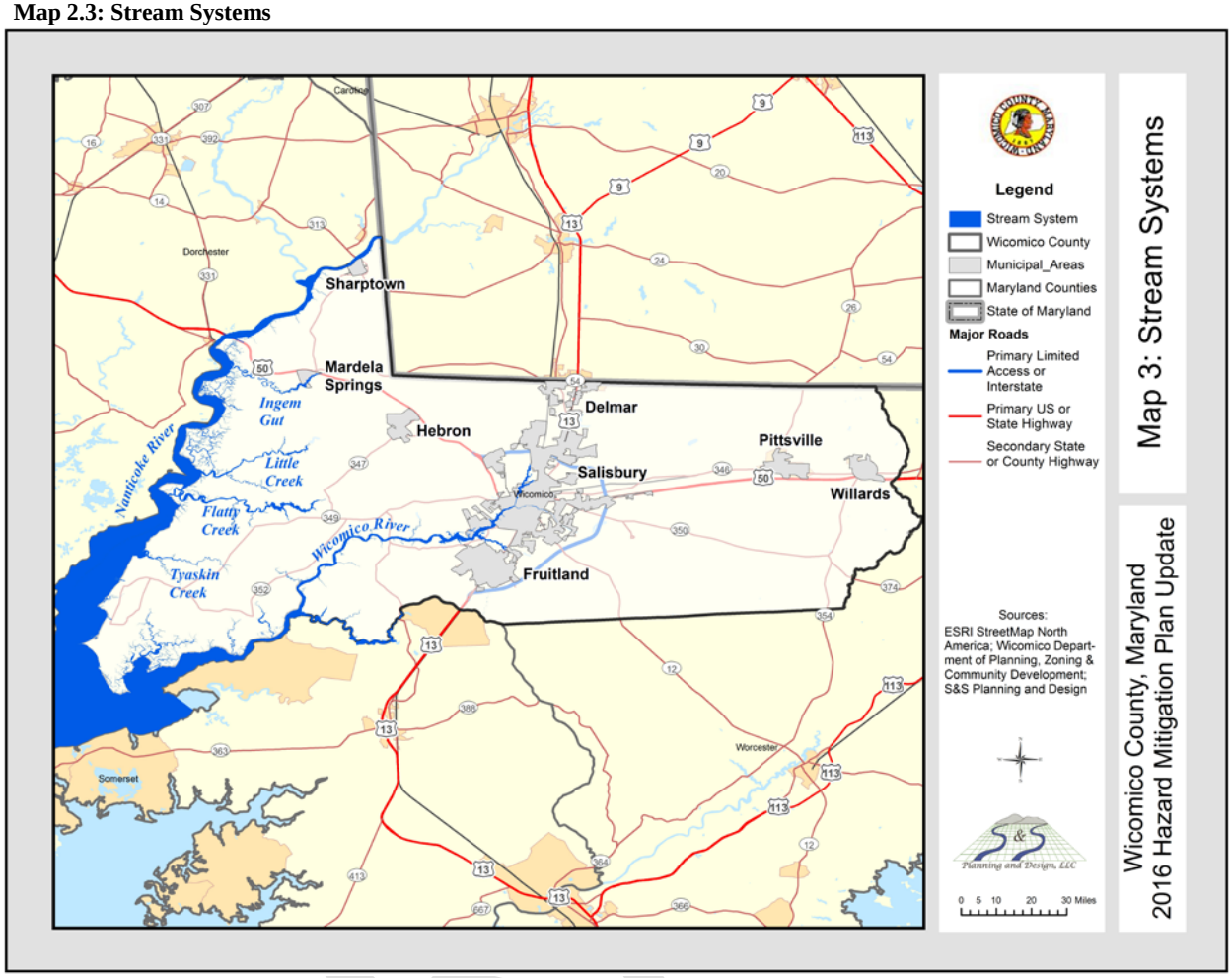
Wicomico County is located within the Delmarva Peninsula Region of the Coastal Plain Physiographic Province.

Map 2.2: Physiographic Province



The County is situated on the Nanticoke and Wicomico Rivers, which flow into Tangier Sound and the Pocomoke River, which flows into Pocomoke Sound.

Map 2.3: Stream Systems



HISTORY

Wicomico County was founded in 1867, created from neighboring Somerset and Worcester Counties. Named for the Wicomico Indian Tribe who had inhabited the area, the word "Wicomico" is derived from the American Indian words "wicko" and "mekee" meaning "a place where houses are built." Wicomico County's seat, Salisbury, dates back to 1732.

CLIMATE

The topography of Wicomico County consists of nearly level terrain and low elevations ranging from sea level to 75 feet. The County is susceptible to high winds and rain during summer thunderstorms and to damage from storm surge and wind during the passage of nor'easters either on or near the eastern shore. Precipitation averages 46 inches annually. Snowfall averages are less than 12 inches per year with snowfall mainly resulting from the passage of an occasional mid-latitude winter storm. Due to its southern location and proximity to the Atlantic Ocean, Wicomico receives less snowfall on average than counties to the north and west.
The average high temperature for Salisbury, Maryland is 65.9°F and the average low temperature is 45.9°F.

Table 2.1: Average Temperature by Month

SALISBURY, MARYLAND: AVERAGE TEMPERATURE BY MONTH											
Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
46 H	49 H	57 H	67 H	76 H	83 H	87 H	85 H	80 H	70 H	60 H	50 H
28 L	30 L	37 L	44 L	54 L	63 L	68 L	67 L	60 L	48 L	40 L	32 L
2016 HMP UPDATE											
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
44H	47H	55H	65H	74H	82H	87H	84H	78H	68H	59H	48H
27L	28L	35L	43L	52L	62L	67L	65L	58L	46L	38L	30L

Source: 2010 U.S. Climate Data- http:www.usclimatedata.com & 2015 U.S. Climate Data - http:www.usclimatedata.com

POPULATION

According to the US Census Bureau, the 2010 Population for Wicomico County indicates a total population of 98,733 persons. This is an increase of 14,089 persons or 17% from the 2000 US Census figures. In addition, the projections for 2015 indicates of total population of 102,950 persons. This is an increase of 4,217 or 4.3% from the 2010 US Census figures.

The following table details the 2010 US Census, the 2000 US Census figures, and the Draft 2014 Wicomico County Comprehensive Plan municipality's population projections for the eight incorporated communities within Wicomico County.

Table 2.2: Population Figures

Census	Delmar	Fruitland	Hebron	Mardela Springs	Pittsville	Salisbury	Sharptown	Willards
2000 Census	1,859	3,774	807	364	1,182	23,743	649	938
2010 Census	3,003	4,866	1,084	347	1,417	30,343	651	958
Rate of Change 2000-2010	+1,144	+1,092	+277	-17	+235	+6,600	+2	+20
% of Change 2000-2010	↑ 62%	↑ 29%	↑ 34%	↓ 5%	↑20%	↑28%	↑0%	↑2%
2016 HMP UPDATE								
2030 Populations Projections	4,975	7,300	1,575	542	1,625	40,085	900	1,405
% of Change 2010-2030	65.7%	50.0%	45.3%	56.2%	14.7%	32.1%	38.2%	46.7%

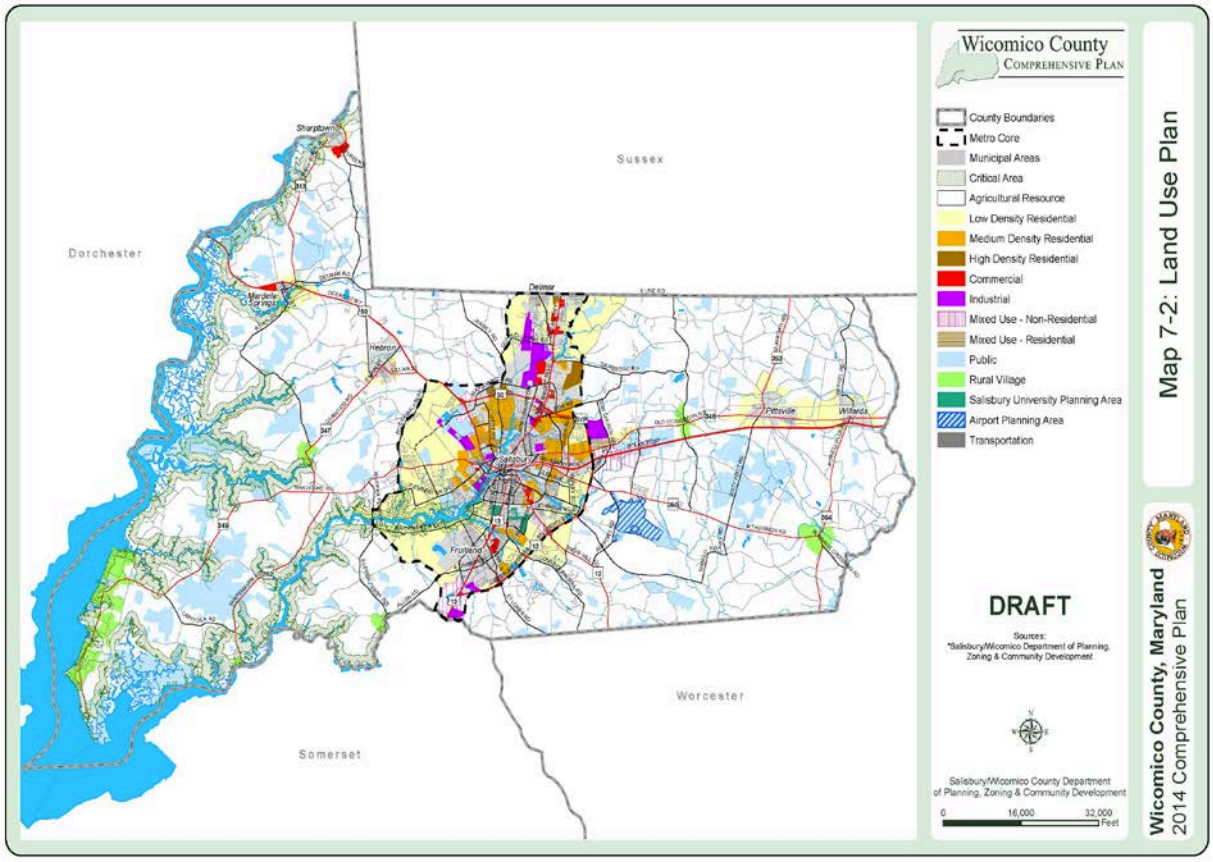
Source: US Census Bureau, Census 2010 and 2000 Census, PL94-171 release & Draft 2014 Wicomico County Comprehensive Plan

Population projections indicate that all municipalities within Wicomico County will experience an increase in population. Delmar, Mardela Springs, Fruitland, and Willards are projected to experience the highest percent of change between the years 2010 to 2030.

LAND USE

Currently, Wicomico County is in the process of updating the Wicomico Comprehensive Plan. The draft *2014 Wicomico County Comprehensive Plan* is available and was reviewed during this plan update process. According to the Department of Planning and Zoning, "Designated Growth Areas" continue to be those areas in and around the eight existing communities. A special emphasis for designated growth continues to be the areas within or in close proximity to the cities of Salisbury and Fruitland known as the "Metro Core".

Figure 2.1: Metro Core Map



Source: 2014 Draft Wicomico County Comprehensive Plan

By concentrating growth in previously developed communities, primarily Salisbury, Fruitland, and Delmar, the vast majority of land in Wicomico County will remain in one of the following land use categories: agriculture, forest use, or wetland.

PERMIT DATA

Permit data has been obtained from the Wicomico County Department of Planning, Zoning and Community Development. As shown on the table below, permits issued in Wicomico County have decreased substantially since 2006. For the 2016 Plan Update, data was gathered from January 2010 to July 2015.

Table 2.3: Permit Data

WICOMICO COUNTY PERMIT DATA		
YEAR	**RESIDENTIAL**	**COMMERCIAL**
2004	340	67
2005	296	67
2006	215	52
2007	131	62
2008	101	49
2009	61	58
2016 HMP UPDATE		
2010	70	3
2011	79	1
2012	64	4
2013	76	2
2014	78	4
2015	56	0

Source: Wicomico County Department of Public Works

In 2011, permit data was provided by the following Wicomico County municipalities: Salisbury, Pittsville, Hebron, Willards, Fruitland, and Mardela Springs. During the 2016 Plan Update, County permit data was obtained. The County processes permits for the Towns of Pittsville, Hebron and Mardela Springs. Therefore, updated permit data for these municipalities has been included in Table 2.4.

Table 2.4: Municipal Permit Data

Year	Type	Town of Salisbury	Town of Pittsville	Town of Hebron	Town of Willards	Town of Fruitland	Town of Sharptown	Town of Delmar	Town of Mardela Springs
2003	**Commercial**	24	---	0	---	0	0	0	---
	Residential	238	---	27	6	28	0	51	---
2004	**Commercial**	22	---	0	---	2	1	3	---
	Residential	215	62	9	0	84	0	129	5
2005	**Commercial**	23	---	0	---	2	1	2	---
	Residential	342	65	N/A	4	106	3	84	8
2006	**Commercial**	19	---	0	---	1	0	10	---
	Residential	216	71	0	3	99	1	168	5
2007	**Commercial**	12	---	0	---	2	0	0	---
	Residential	26	49	1	3	58	7	22	8
2008	**Commercial**	12	---	0	---	0	0	1	---
	Residential	87	29	2	3	38	0	11	6
2009	**Commercial**	11	---	0	---	1	0	0	---
	Residential	38	19	3	5	36	2	4	10
2016 HMP UPDATE									
2010	**Commercial**	6	0	0	0	0	0	---	0
	Residential	19	0	0	1	51	1	---	0
2011	**Commercial**	6	0	0	0	2	0	---	0
	Residential	12	0	0	1	22	1	---	0
2012	**Commercial**	6	0	0	0	1	0	---	0
	Residential	13	4	0	2	22	0	---	1
2013	**Commercial**	12	0	0	1	1	0	---	1
	Residential	29	3	0	3	31	0	---	1
2014	**Commercial**	6	0	0	0	0	0	---	0
	Residential	11	1	2	5	30	1	---	1
2015	**Commercial**	4	0	0	0	0	0	---	0
	Residential	12	1	0	4	10	0	---	0

Source: Wicomico County Department of Public Works

According to the permit data received, both municipal and county permits declined following the year 2008, as shown on Table 2.3 and 2.4. The Towns of Salisbury and Fruitland account for the predominate majority of both commercial and residential permits. Since 2010, the quantity of permits issued for both County and municipal projects have remained relatively stable.

TRANSPORTATION

U.S. Route 50 is the major east-west highway corridor through Wicomico County and connects the area with Cambridge, Easton, and the Chesapeake Bay Bridge to the west and Ocean City to the east. U.S. Route 13 is the major north-south corridor through Wicomico County and connects the area with Dover, Delaware to the north and Princess Anne and Pocomoke City to the south. This highway also connects the eastern shore of Maryland and Delaware with the Philadelphia area to the north and with Virginia and the Norfolk area through the Bay-Bridge Tunnel to the south. Both U.S. Route 50 and U.S. Route 13 are complemented by a number of other state highways and County roads, which connect Salisbury with smaller communities.

Other transportation routes include the Norfolk Southern rail line which runs parallel to U.S. Route 13 through Delaware, Maryland and Virginia. The Wicomico Salisbury Airport, which serves the County, is located south and east of Salisbury off the U.S. Route 13 bypass on U.S. Route 50.

CHAPTER 3 – HAZARD IDENTIFICATION

INTRODUCTION

In order to revise and update the *2011 Wicomico County Hazard Mitigation Plan*, the four major steps in developing a risk assessment for Wicomico County must be completed during the revision process. The four major steps include: Hazard Identification, Hazard Profiles, Vulnerability Assessment, and Loss Estimation (Figure 3.1). This Chapter comprises the first step in the risk assessment process, wherein hazards that may affect Wicomico County are identified. The nature of the hazard, history of previous occurrences, and the impact including potential severity of an occurrence has been documented as part of Step 2 Hazard Profiles. Steps 3 and 4 of the Risk Assessment (vulnerability assessment and loss assessment) will be discussed in the Chapters 4-11 that follow.

Figure 3.1 – Risk Assessment

Source: S&S Planning & Design/FEMA Guide 362-4

HAZARD INDENTIFICATION PROCESS

The hazard identification process for Wicomico County involved investigating various types of hazards faced by the County over the past several decades including new information collected from 2011-Present. Since it is assumed that hazards experienced by the County in the past may be experienced in the future, the hazard identification process includes a history and an examination of various hazards and their occurrences.

During the preparation of the update to the Wicomico County Hazard Mitigation Plan, one of the first steps taken by the Hazard Mitigation Planning Committee was to perform a Hazard Identification and Ranking exercise.

HAZARD MITIGATION PLANNING COMMITTEE

The *2016 Wicomico County Hazard Mitigation Plan* utilized the Hazard Mitigation Planning Committee (HMPC) to identify and assess the risk of various hazards that impact Wicomico County. In order to update the Hazard Identification for purposes of completing the *2016 Wicomico County Hazard Mitigation Plan*, a new planning committee was established and included a cross-section of private and public sector members. One of the initial tasks of the HMPC was to complete a hazard analysis based upon their agency and/or community perspective. Hazards that were ranked “High” or “Medium High” during this assessment process

included **coastal hazards, winter storm, and high winds.** Results of this assessment are shown below on Table 3.1.

IDENTIFIED HAZARDS AND HMPC RANKINGS

Table 3.1: Summary of Risk by Wicomico County Hazard Mitigation Planning Committee Analysis, 2015 Ranking

HAZARD	*High*	*Medium High*	*Medium*	*Medium Low*	*Low*
Flood (Riverine & Flash)			X		
Tornado (High Winds and Funnel Clouds)			X		
Earthquake					X
Epidemic			X		
High Wind		X			
Coastal Hazard					
• Coastal Flooding		X			
• Coastal Storms		X			
• Storm Surge			X		
• Hurricane/Tropical Storm		X			
• Nor'easter		X			
• Shoreline Erosion			X		
• Sea Level Rise(Land Subsidence & Erosion)				X	
Winter Storm					
• Winter Storm		X			
• Extreme Cold			X		
• Nor'easter (Snowfall)			X		
Drought					
• Drought			X		
• Extreme Heat			X		
Thunderstorm (Lightning & Hail)					
• Thunderstorm			X		
• Lightning			X		
• Hail			X		
Wildfire					
• Wildfire			X		
• Brush Fire			X		
• Conflagration				X	

Source: Wicomico County - 2015 HMPC

While the HMPC identified hazards for the 2016 update as shown on Table 3.1, additional issues were discussed. Both infrastructure failure and impediments to waterways and navigability were identified. The ranking process yielded results indicating that bridges and dam failure as "Medium", all others were ranked as "Low", as shown below.

Table 3.2: HMPC Ranking Results – Medium to Low Risk

HAZARD	*High*	*Medium High*	*Medium*	*Medium Low*	*Low*
Infrastructure Failure					
• Dams			X		
• Bridges			X		
• WWTP					X
• WTP					X
• Utilities					X
• Airport					X
• Railroad					X
Waterways					
• Ice					X
• Dredging					X

Source: Wicomico County - 2015 HMPC

MUNICAPAL PERSPECTIVE

In addition to the risk assessment exercise performed by the HPMC, the eight incorporated municipalities within Wicomico County were asked to complete the exercise as well. The top hazards, defined by a hazard ranking of "Medium" to "High" for each of the incorporated municipalities are listed below.

Table 3.3: Municipal Hazard Ranking

	Fruitland	Delmar	Willards	Hebron	Salisbury	Sharptown	Pittsville	Mardela Springs
Flood(Riverine & Flash)			X	X	X	X		
Tornado(High Winds and Funnel Clouds)		X			X		X	
Earthquake								
Epidemic								
High Wind			X	X	X	X		X
Coastal Hazard								
• Coastal Flooding	X				X	X		
• Coastal Storms					X	X		
• Storm Surge					X	X		
• Hurricane/Tropical Storm	X		X	X	X	X		X
• Nor'easter	X		X	X	X	X	X	X
• Shoreline Erosion						X		
• Sea Level Rise								
Winter Storm								
• Winter Storm	X	X	X	X	X	X		X
• Extreme Cold	X	X	X		X	X		X
• Nor'easter (Snowfall)	X	X	X	X	X	X	X	X
Drought								
• Drought	X			X		X		
• Extreme Heat	X				X	X		X
Thunderstorm(Lightning & Hail)								
• Thunderstorm	X		X	X	X	X	X	X
• Lightning	X		X	X	X	X	X	X
• Hail	X		X		X		X	
Wildfire								
• Wildfire								
• Brush Fire	X							
• Conflagration								

Source: Wicomico County – 2015 HMPC

STATE PERSPECTIVE

The current State Hazard Mitigation Plan was published in 2011 by the Maryland Emergency Management Agency. This Plan included the probability and impact of various hazards that occur across the state. Compared to other Maryland counties, Wicomico ranked among the highest for both coastal hazards and flooding by the State.

Table 3.4: State Hazard Ranking

HAZARD	High	Medium High	Medium	Medium Low	Low
Coastal Hazards	X				
Drought		X			
Flooding	X				
Landslide				X	
Thunderstorm(Lightning and Hail)				X	
Tornado			X		
Wildfire			X		
High Winds		X			
Winter Storm			X		
Karst/Sinkholes				X	
Earthquake				X	

Source: *2011 Maryland State Hazard Mitigation Plan Update*

While the *2011 Maryland State Hazard Mitigation Plan Update* was completed to provide a comparison assessment and analysis of Maryland's vulnerability to the natural hazards, this same process was conducted at a County level in order to assess and analyze Wicomico County's vulnerability to natural hazards from a local perspective.

CONCLUSION

Probability and Impact

The information obtained from available hazard event data pertaining to frequency and probability of future events, their impact, and factors that may affect severity were reviewed for hazards that have impacted Wicomico County in the past. Therefore, data availability for past occurrences was readily available for analysis (Flood, Coastal Storm, Tornado, Winter Storm, High Wind, Thunderstorm, Drought, and Wildfire). 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.

Table 3.5: Composite Score for Hazards with Past Occurrences

HAZARD	Events/ Year Risk Rating	Impact Rating	Composite Score
Flood	2	5	**7**
Coastal Storm (Coastal Hazard)	1	5	**6**
Tornado	1	5	**6**
Winter Storm	4	3	**7**
High Wind	5	3	**8**
Thunderstorm (Lightning/Hail)	3	1	**4**
Drought	1	3	**4**
Wildfire	5	1	**6**

Source: NCDC Data

***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
1.0-1.49 events per year = 3
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 event.
1 = Low Impact
3 = Medium Impact
5 = High Impact
*****Composite Scores: 7-10 High; 5-6 Medium; 1-4 Low*****

Sea Level Rise and Shoreline Erosion were part of the Coastal Hazard category and were ranked by the HMPC on Table 3.1. Considering Climate Change is linked to Sea Level Rise and Shoreline Erosion, the HMPC was in consensus to include this hazard in the Plan Update. The future probability and impacts from Sea Level Rise, Shoreline Erosion, and Climate Change were analyzed as well, however, data availability for past occurrences is not as readily available. All three (3) hazards are likely to impact Maryland, specifically Wicomico County. The impacts of these hazards include:

Table 3.6: Future Hazards Probability and Impacts

HAZARD	Sea Level Rise	Shoreline Erosion	Climate Change
Probability	Likely	Likely	Likely
Types of Impacts	• Urban Development • Increase in Storm Surge • Loss of Bays, Peninsulas & Islands • Loss of Coastal Habitats	• Urban Development • Increased Risk of Flooding • Water Quality Degradation	• Average Temperature Increases • Rain Event Increases Coastal Flooding Event Increases • Sea Level Rise Increase • Environmental & Economic

Source: Smith Planning and Design

Based on the hazard history and hazard profiles discussed in the following chapters the aforementioned hazards 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 as a part of the County's Hazard Vulnerability Analysis.

Chapters include: Coastal Storm, which is part of the Coastal Hazard category and discuss Hurricane/ Tropical Storm, Coastal Flooding and Storm Surge; Climate Change; Shoreline Erosion and Sea Level Rise; Severe Weather, which discusses thunderstorms, tornados, lightning, hail and wind; Flooding; Winter Storms, Drought and Wildfires; and Human Impacted

Hazards, which discusses dams, transportation and fix-site HazMat, major transportation, and epidemic.

CHAPTER 4 – COASTAL STORM PROFILE AND VULNERABILITY ASSESSMENT

INTRODUCTION

Coastal Storm was listed under the Coastal Hazard category on Table 3.1 in Chapter 3. Coastal Storm was identified and ranked as "Medium High" by the HMPC. Therefore, updates have been made to the Coastal Storm profile, which include the Saffir-Simpson Hurricane Wind Scale and new hazard history information was added to Table 4.2 Hurricane Events. Additions to the Coastal Vulnerability Assessment included an Enhanced HAZUS Hurricane Wind Analysis. This analysis included loss estimations, debris generation and potential shelter needs. The Non-Regulatory Coastal Flood Risk Product developed by the State of Maryland for Wicomico County was incorporated into the 2016 Update. Both the Zones AE and VE and high resolution digital elevation model were utilized to develop depth grids. This product included both mapping products and loss estimations based upon extent and depth of flooding. Finally, new storm surge inundation areas were analyzed and new mapping was added to the plan. Loss estimations as a result of storm surge were calculated.

HAZARD CHARACTERIZATION

Hurricane, tropical storm, and tropical depression are all examples of a tropical cyclone. The 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; and
- Tropical Depression: maximum sustained wind speed is less than 38 mph.

Tropical cyclones, a general term for tropical storms and hurricanes, are low pressure systems that usually form over the tropics, referred to as "cyclones" due to their rotation. Tropical cyclones are among the most powerful and destructive meteorological systems on earth. In terms of impact, high winds, heavy rain, lightning, tornados, hail, and storm surge are all associated with tropical cyclones. In addition, as tropical cyclones move inland, they can cause severe flooding, downed trees and power lines, and structural damage.

Hurricanes are rated for intensity by using the Saffir-Simpson Scale, which provides an estimate of the potential damage that a hurricane may cause. This scale is based upon both wind speed and surface pressure. Scale categories range from Category One to Five, with Category One having winds from 74-95 mph and pressure greater than 980 mb, while a Category Five hurricane may have winds in excess of 157 mph and pressure of less than 920 mb. The Table 4.1 depicts the five categories of hurricane strength.

Table 4.1: Saffir-Simpson Hurricane Wind Scale

Saffir-Simpson Hurricane Wind Scale	
Category Wind Speed	**Effects**
Category 1 74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, 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 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

Some notable hurricanes that have affected Maryland include Hazel in 1954; Donna in 1960; Camille in 1969; David in 1979; Fran in 1996; Floyd in 1999; and Isabel in 2003.

The most common coastal storms that impact Wicomico County are Category One Hurricanes and Tropical Storms. While at sea notable hurricanes have been classified as Category Four or Five, they typically are downgraded to a Category One or Tropical Storm by the time they make landfall in Wicomico County. The inland communities of Mardela Springs, Salisbury and northern Fruitland are mainly concerned with the flooding aspect of a coastal storm. Heavy rain from Category One hurricanes and tropical storms have been known to cause 500-year floods (which have a 0.2% chance of occurring each year) and greater flooding in inland communities. In addition, coastal erosion can also be a major problem created from coastal storms. Coastal erosion may impact man-made structures and human activities such as shore protection structures and dredging.

Although high winds and excessive amounts of precipitation are common and may cause tremendous damage, the most serious effect of hurricanes is coastal destruction caused by storm waves or storm surge. In India more than 300,000 people died in 1737 as a result of a 40-foot storm surge accompanying a severe tropical cyclone in the Bay of Bengal. If a hurricane strikes at high tide, the storm surge can be devastating as was the case in Galveston, Texas in 1900 when more than 6,000 people drowned in a sudden hurricane generated storm surge. Damage estimates for the 1900 Galveston hurricane topped $30,000,000 in 1998 dollars.

On Maryland's eastern shore, particularly on the Bay side, storm surge is also related to rising sea level and to 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 plus one foot or so every century. This rise in sea level will certainly affect the relative height of future storm surge events.

Various factors point to the potential for increased danger from severe tropical cyclones in Maryland such as, population growth and continuing near-shore development, which is increasing the risk of human injury and property loss. Additionally, there is a widespread agreement among climatologists that gradual global warming is occurring. Potential effects include the melting of polar ice, expansion of the oceans, and an overall rise in sea levels. The slow sinking of land in the Chesapeake region, due to the combined effects of ground water withdrawal and post-glacial rebound, effectively doubles the global rate of sea level rise in Maryland's coastal areas. These factors increase the vulnerability to potential long storm hazards such as: sea level rise, erosion, and increased storm activity and severity.

HAZARD RISK & HISTORY

Wicomico County has been affected over the years by the passage of recent hurricanes, tropical storms and tropical cyclones as shown on Table 4.2. Older hurricanes that have occurred in the County include: unnamed hurricanes of 1929, 1934, 1936 and Hurricane Connie in 1955. Hurricanes can affect Wicomico County from either the Gulf of Mexico or the Atlantic Ocean. Normally the greatest damage results from hurricanes that come ashore in the Tidewater area of Virginia and the Carolina Capes as was the case with Isabel.

Table 4.2: Recent Hurricane Events

Storm Event	Date	Event Narrative	Property Damage	Crop Damage
Hurricane Bertha	July 13, 1996	The highest wind speed recorded was 23 mph at Salisbury. 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	The highest sustained wind speed recorded was 22 mph at Salisbury with the highest gust at 35 mph. 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-September 16, 1999	The highest sustained wind speed recorded at Salisbury was 32 mph. The highest gusts recorded were 48 mph at Salisbury. 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

Storm Event	Date	Event Narrative	Property Damage	Crop Damage
Tropical Storm Isabel	September 18 - September 19, 2003	The highest sustained wind speed recorded was 37 mph at Salisbury. 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. Storm surge values near 4 to 5 foot surge values reported on the Wicomico and Nanticoke Rivers. Rainfall amounts ranged from 1 to 3 inches across the Lower Maryland Eastern Shore. There were more than 15 deaths indirectly attributed to the storm.	$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 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.	$500,000	Not Available
2016 HMP Update				
Tropical Storm Irene	August 27-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 40 knots (46 mph) with a peak gust of 53 knots (61 mph) was recorded by SBY (Salisbury-Wicomico Airport). Storm total rainfall generally ranged from six to ten inches.	$100,000	$1,000,000
Tropical Cyclone Sandy	October 29-October 30, 2012	Tropical Cyclone Sandy moved northward well off the Mid Atlantic Coast then northwest producing very strong northeast winds which caused coastal flooding. Water levels reached 3-4 feet above normal. Salisbury experienced the worst flooding due to the combination of storm surge and excessive rainfall runoff. A number of privately owned docks and bulkhead were damaged or destroyed in the Nanticoke area.	$250,000	$0

Source: NWS, NCDC (NOAA)

In terms of number of occurrences, as listed in Table 4.2, the National Weather Service - National Climatic Data Center listed a total of 7 hurricane and tropical storm events affecting Wicomico County from 1996-2015. Therefore, Wicomico County experiences 0.37 hurricane and tropical storm events per year.

VULNERABILITY

In order to access the vulnerability of Wicomico County to the coastal storm risk, three probable hazard impacts were analyzed. These include:

1. Hurricane Wind;
2. Coastal Flood Risk in Areas; and
3. Storm Surge Areas.

As part of the 2016 update, an Enhanced HAZUS Analysis for hurricane wind was conducted. Additionally, the State of Maryland completed a Non-Regional Coastal Flood Risk product in 2015, which has been updated using information from the FEMA flood risk report. Finally, an

updated storm surge map product was added to enhance understanding of the County's overall vulnerability to coastal storms.

1. Hurricane Wind – Enhanced HAZUS Analysis

The FEMA HAZUS Hurricane Model was utilized to conduct an Enhanced HAZUS Analysis on Hurricane Wind. The Hurricane Model allows practitioners to estimate the economic and social losses from hurricane winds. The information provided by the model will assist state and local officials in evaluating, planning for, and mitigating the effects of hurricane winds. The Hurricane Model provides practitioners and policy makers with a tool to help reduce wind damage, reduce disaster payments, and make wise use of the nation's emergency management resources. Although the software offers users the opportunity to prepare comprehensive loss estimates, it should be recognized that, even with state-of-the-art techniques, uncertainties are inherent in any such estimation methodology. The next major hurricane to affect Wicomico County may be quite different than any "scenario hurricane" anticipated as part of a hurricane loss estimation study. Hence, the results of a scenario analysis should not be looked upon as a *prediction* but rather as an indication of what the future may hold.

HAZUS provides different levels of analysis based on the level of effort and expertise employed by the user. Users can improve the accuracy of HAZUS loss estimates by furnishing more detailed data about their community, or engineering expertise on the building inventory. An Enhanced HAZUS analysis provides a more accurate loss estimates due to the inclusion of detailed information on local hazard conditions and/or by replacing the national default inventories with more accurate local inventories of buildings, essential facilities and other infrastructure. The Enhanced HAZUS Analysis, conducted by S&S Planning and Design, utilize integrated user-supplied data in order to yield more accurate loss estimates and risk assessments for the *2016 Wicomico County Hazard Mitigation Plan Update*.

Input parameters were updated utilizing the Wicomico County Geodatabase which was acquired from the Wicomico County Department of Planning, Zoning and Community Development. The geodatabase contained current shapefiles for all critical facilities within the County. The attribute tables attached to the shapefiles were edited to included additional and updated data to the existing tables. The additional and updated data was obtained from the 2012 Maryland Property View Database for Wicomico County. Examples of data extracted from the 2012 Maryland Property View Database included: building stories, year built, structure value and square footage. The complete methodology for the Enhanced HAZUS Analysis is located in Appendix D.

The table below illustrates the discrepancy between the HAZUS default data and the County data utilized in this Enhanced HAZUS Analysis. As shown, the accuracy of results are exponentially increased by utilizing County data and running the Enhanced HAZUS Analysis.

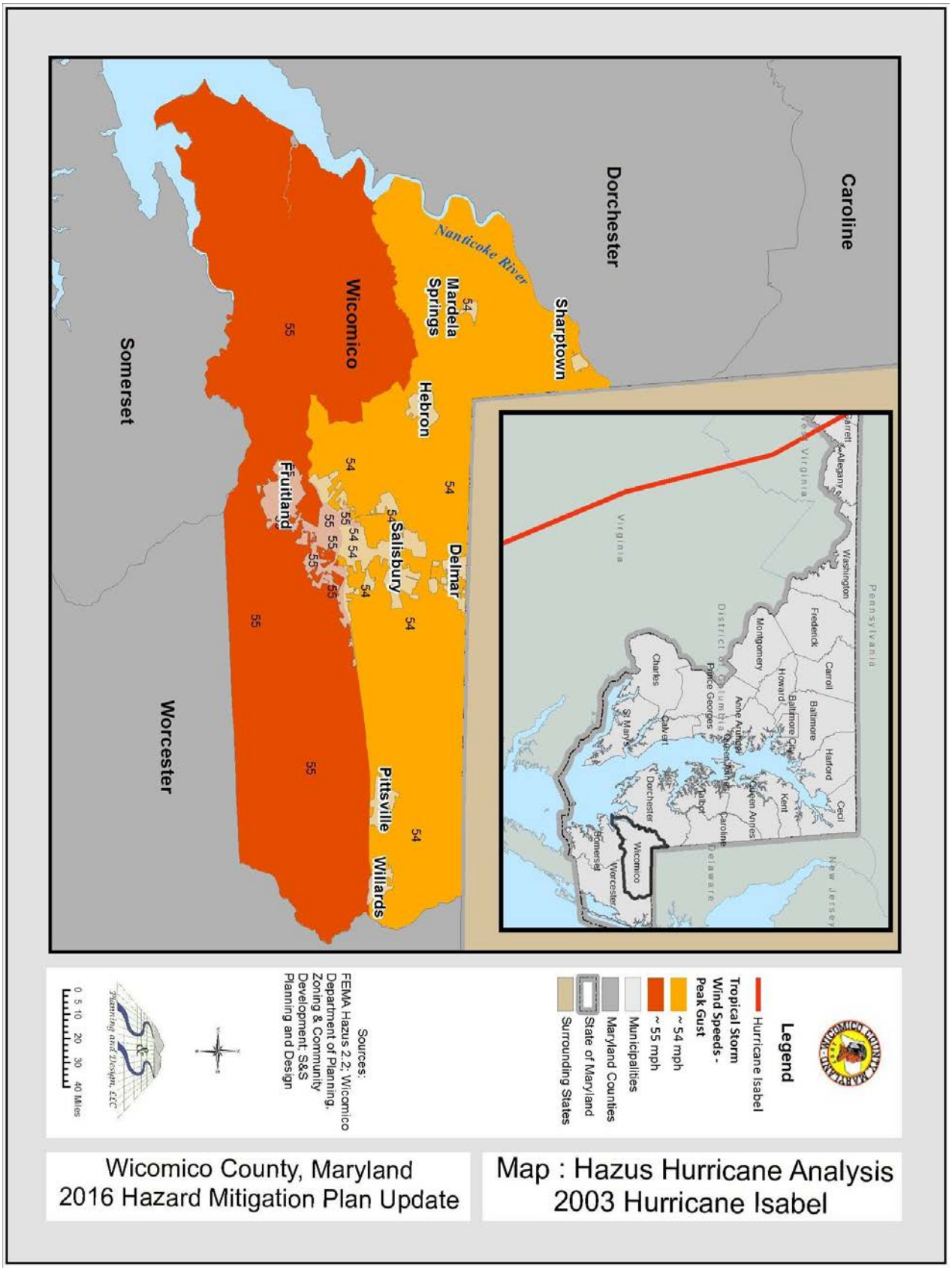
Table 4.3: HAZUS Default and County Data

Critical Facility Type	HAZUS Default Data	County Data Utilized for Enhanced HAZUS Analysis
Fire stations/EMS	9	12
Police Stations	4	6
Schools	42	42
EOC	0	1
Medical	3	4

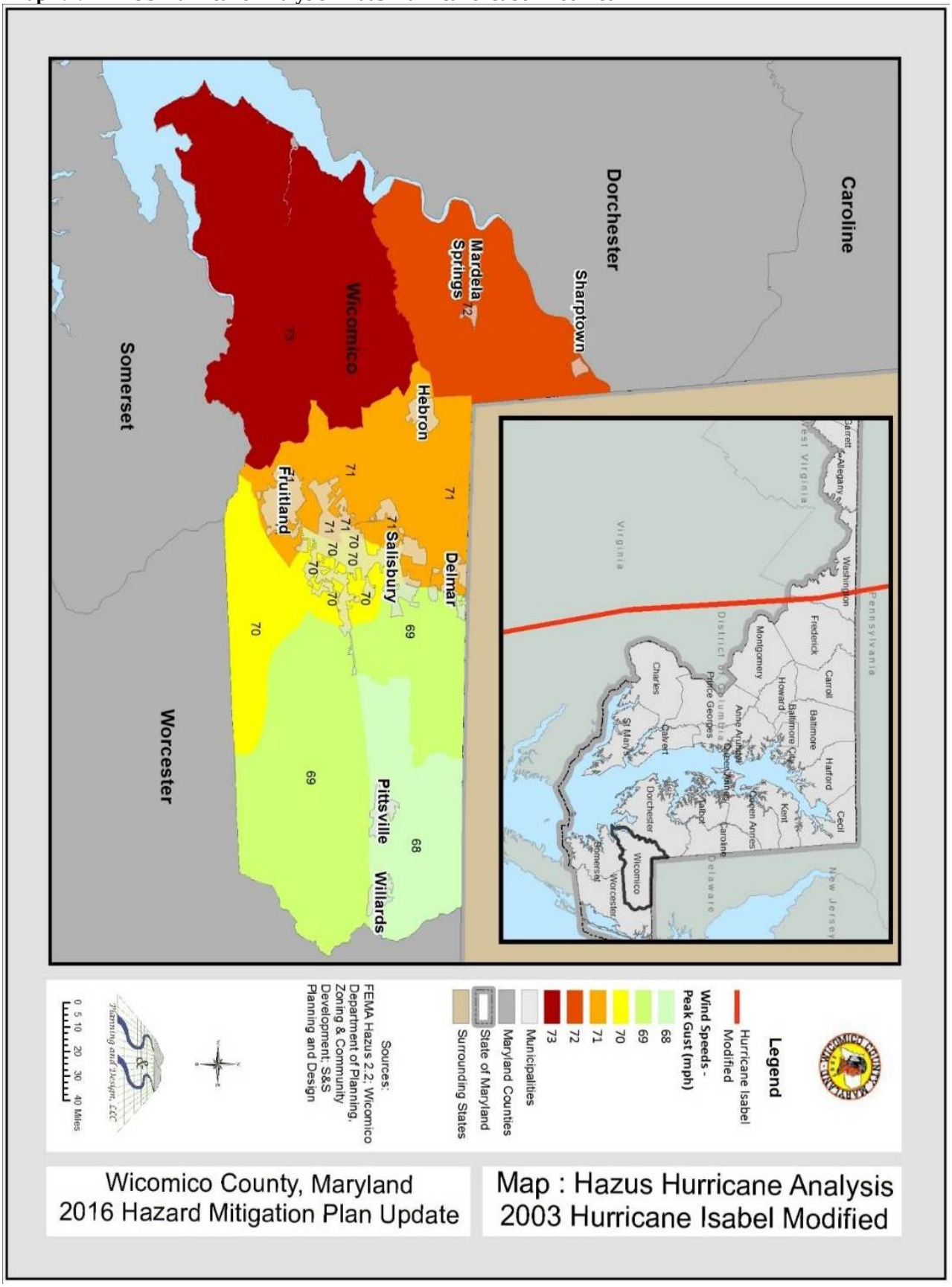
Source: FEMA, Wicomico County and S&S Planning and Design

For the Hurricane Wind – Enhanced HAZUS Analysis, a historical storm analysis was initially modeled. In 2003, Hurricane Isabel impacted Maryland significantly and was Presidenital Declared a disaster on September 19, 2003. Individual and public assisstance was provided in Wicomico County. Considering the severity of damage and impact Hurricane Isabel had on Wicomico County, this storm was utilized as the base storm for the Huricane Wind – Enhanced HAZUS Analysis. However, modifications to the storm track were made to increase the impact to Wicomico County in the user defined storm analysis. These modifications included: alterations to the coordinates so the hurricane track was in closer proximity to Wicomico County and the severity of the storm was increased from a Tropical Storm to a Category One. Hurricane in excess of peak wind gusts for tropical storms are 55 mph, while peak gusts for the Category One storm are 73 mph. Map 4.1 depicts the historic Hurricane Isabel model, while Map 4.2 illustrates the modified Hurricane Isabel used in the analysis.

Map 4.1: HAZUS Hurricane Analysis – 2003 Hurricane Isabel



Map 4.2: HAZUS Hurricane Analysis – 2003 Hurricane Isabel Modified

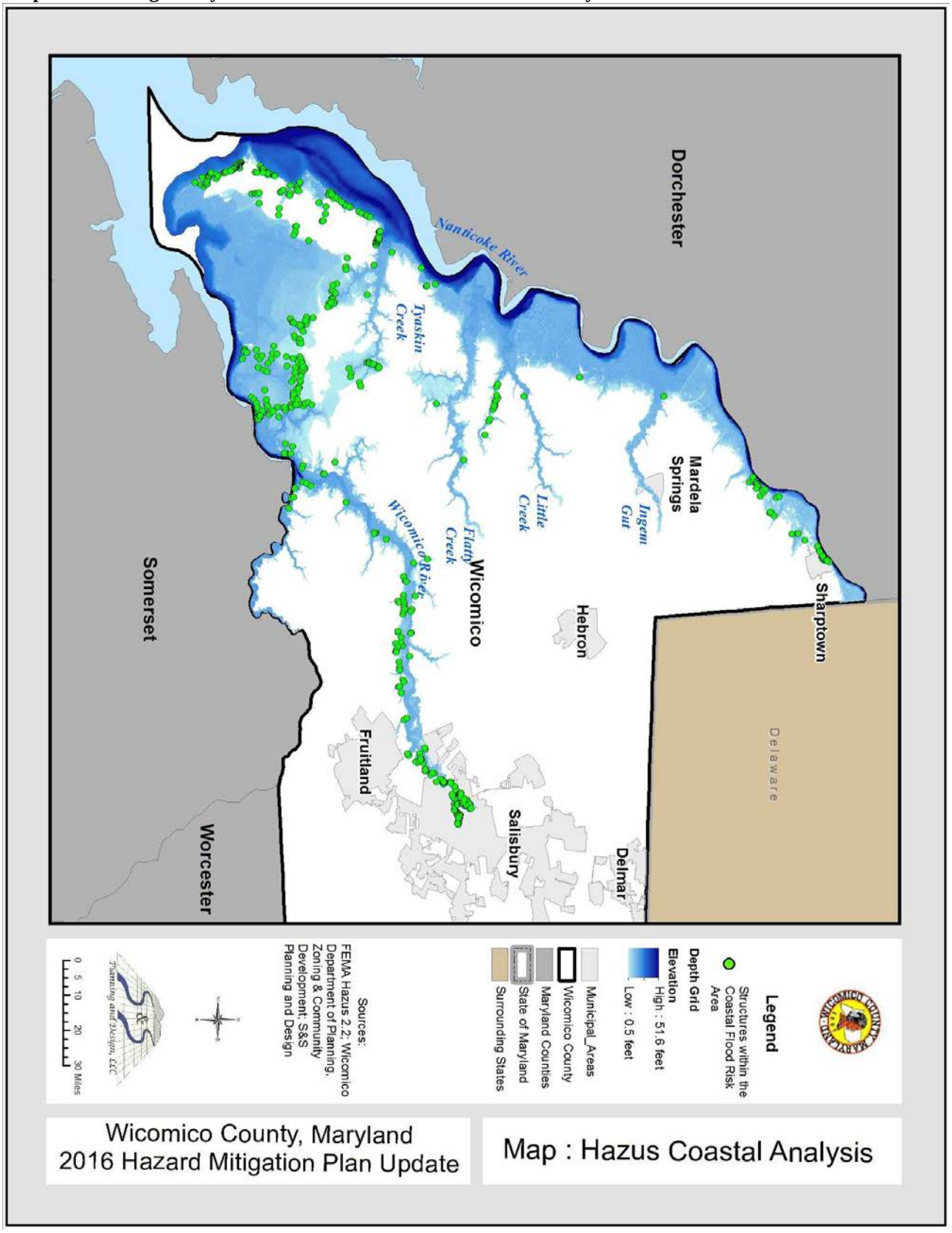


2. Non-Regulatory Coastal Flood Risk Product

The Maryland Department of Environment (MDE) and Maryland Emergency Management Agency (MEMA) are developing Non-Regulatory Coastal Flood Risk Product for jurisdictions located within the coastal area of the Chesapeake Bay. This planning initiative is intended to assist local communities with increasing their resiliency to flooding and to better protect their citizens. Results are provided in a Flood Risk Report (FRR), which is 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 2012 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 is provided. Map 4.3 below depicts the depth grid and user defined structures located within the coastal 100-year floodplain.

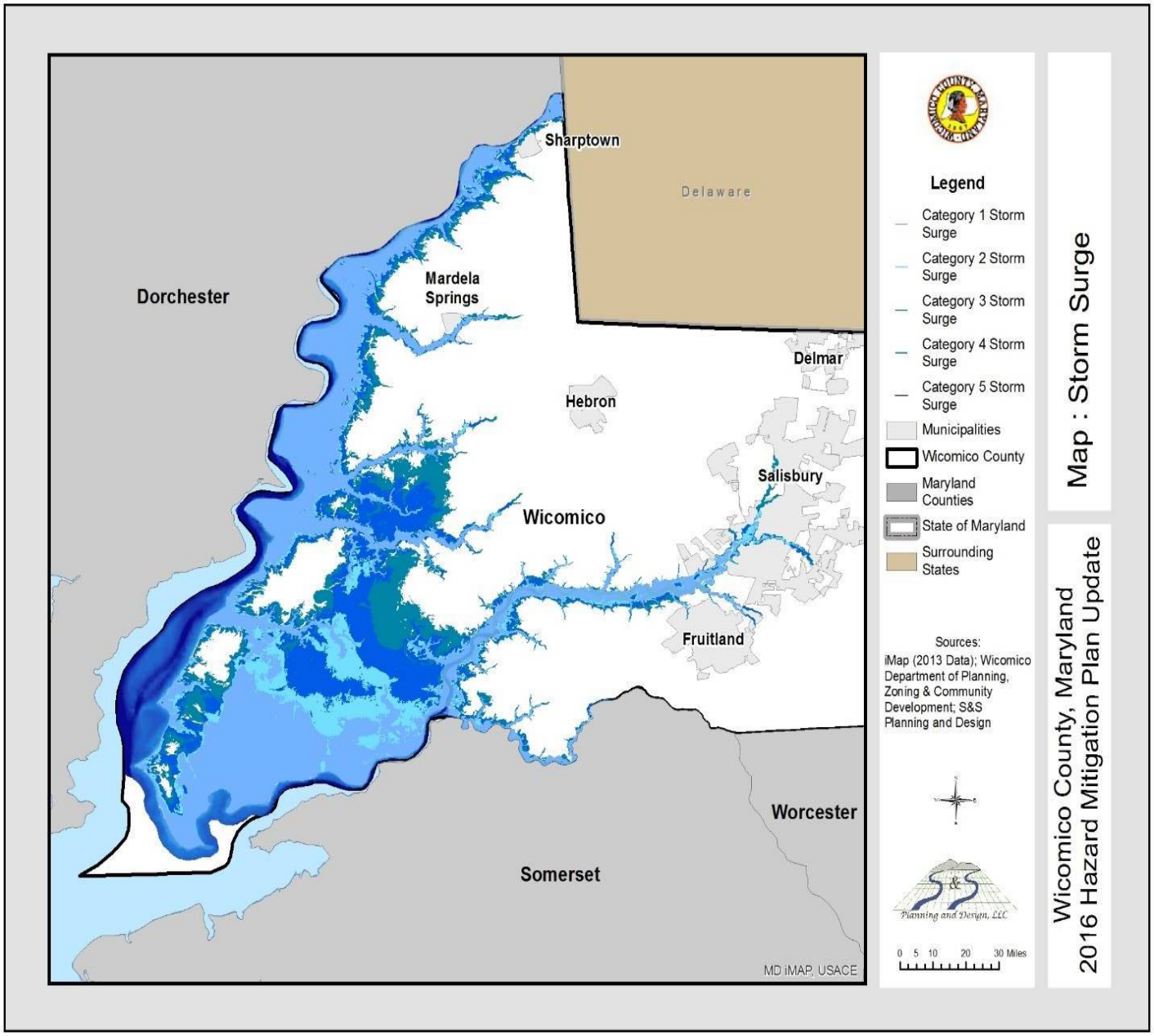
Map 4.3: Non-Regulatory Coastal Flood Risk – HAZUS Coastal Analysis



3. Storm Surge

Wicomico County is located in southeastern Maryland and is bordered by Delaware. The southwest portion of the county is most vulnerable to storm surge inundation. Areas along the Nanticoke River and the Wicomico River are prone to storm surge. Storm surge inundation areas include the municipalities of Sharptown, Mardela Springs, Fruitland and Salisbury.

Map 4.4: Storm Surge



FACILITIES AT RISK

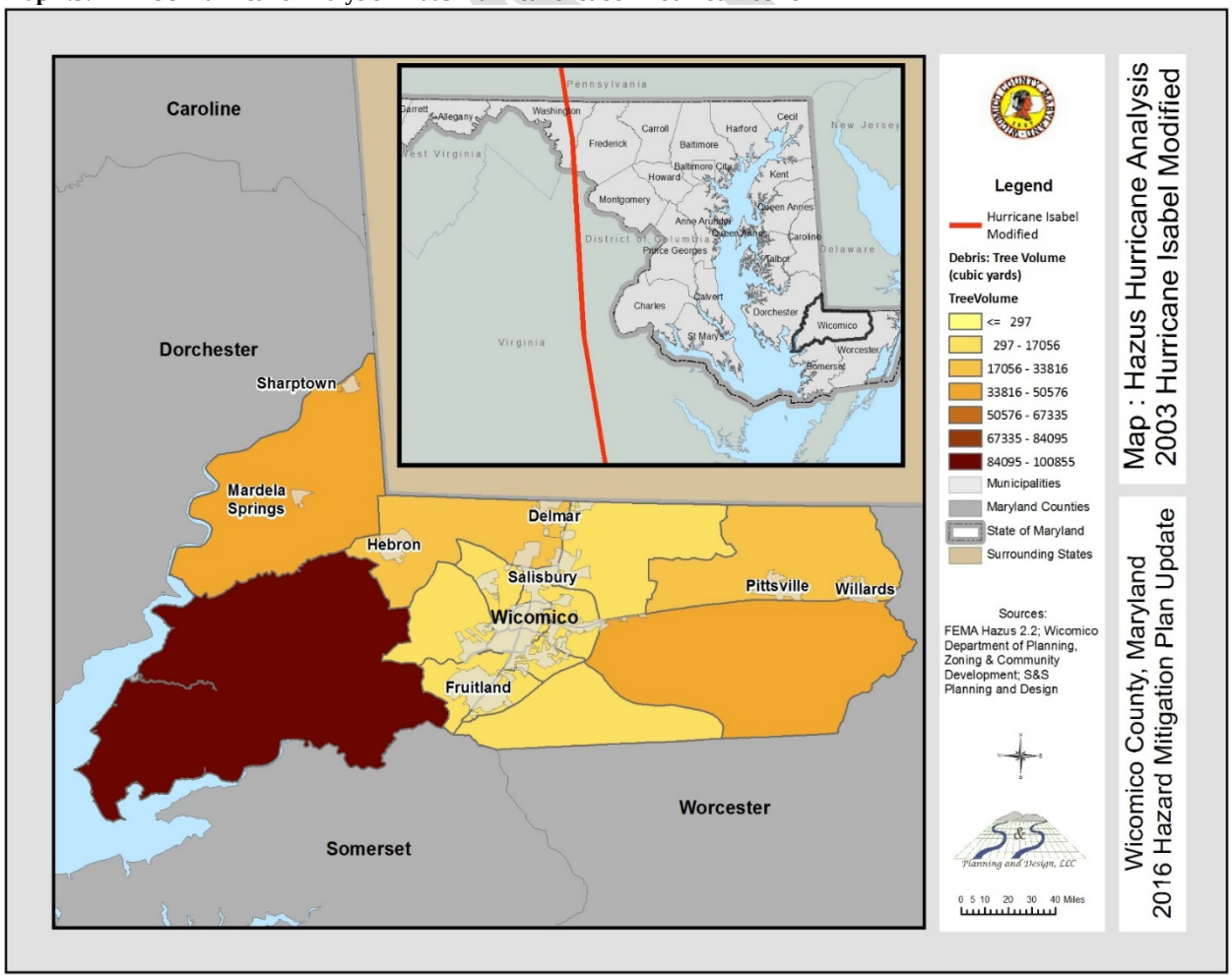
1. Hurricane Wind – Enhanced HAZUS Analysis

In Wicomico County, the current building code for wind is 100 mph. Structures built prior to this building code are most vulnerable to hurricane wind events. According to the enhanced HAZUS analysis results for the modified hurricane event, one essential facility would be affected by this event, the Peninsula Regional Medical Center. There is a probability of the structure sustaining less than 50% percent damage. This structure was constructed in 1980 and is comprised of 5 building stories.

Results for the Enhanced HAZUS Analysis determined residential structures would be affected by the hurricane more so than other occupancy types such as commercial or industrial. Also, wood as a building material is more susceptible to damage than masonry, concrete or steel.

In terms of debris, the model estimates that a total of 27,837 ton of debris will be generated. If debris tonnage is converted to an estimated number of truckloads, it will require 28 truckloads (@25 tons/truck) to remove the debris generated by the hurricane. In addition, 3,442 tons of debris is eligible tree debris, which could be chopped and/or chipped.

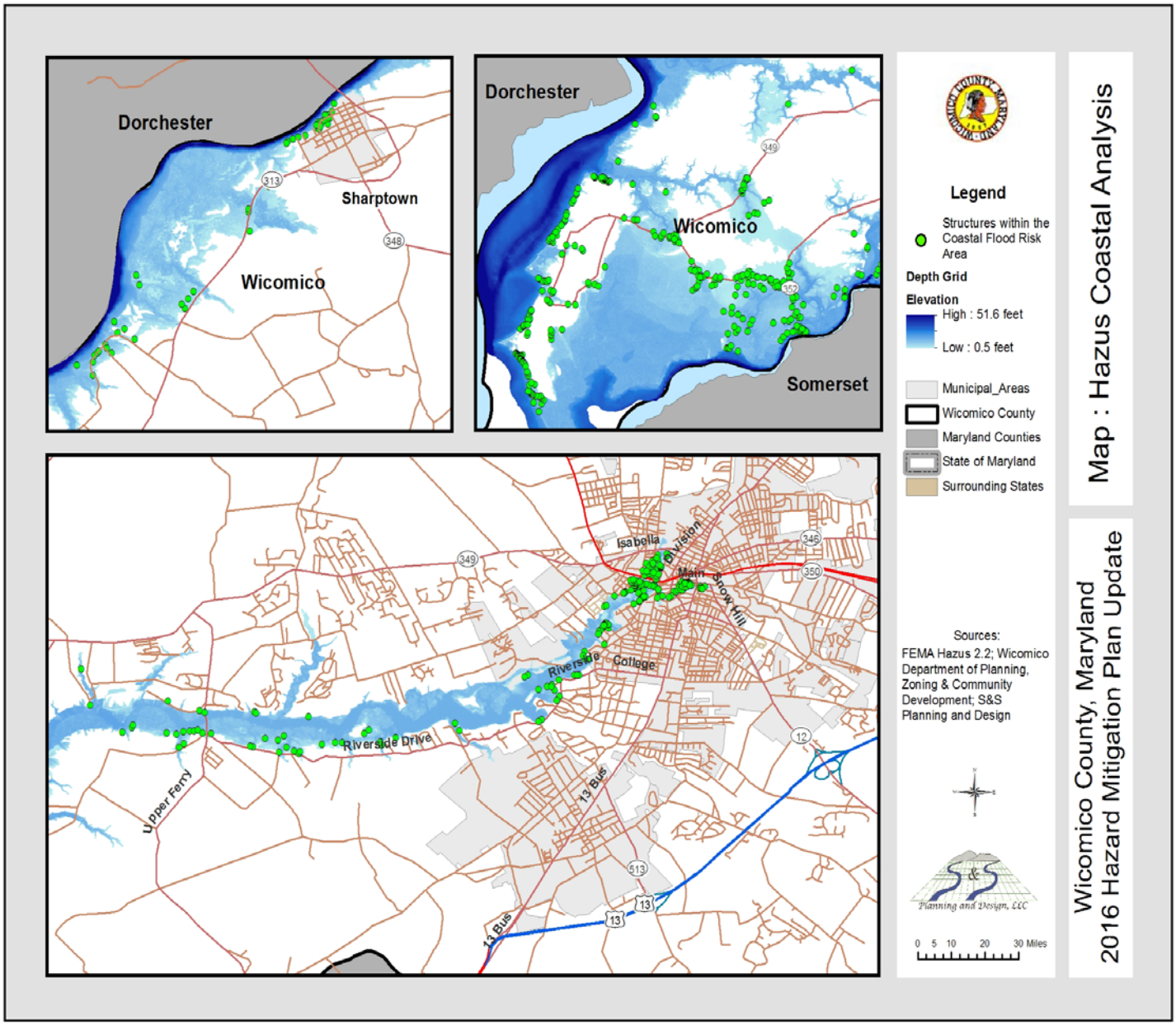
Map 4.5: HAZUS Hurricane Analysis – 2003 Hurricane Isabel Modified Debris



2. Non-Regulatory Coastal Flood Risk Product

A total of 619 structures are located within the coastal flood zone. As depicted in Map 4.6, affected structures are concentrated in three locations: Town of Sharptown, City of Salisbury and the unincorporated south western portion of the County. The Town of Sharptown comprises 3% of structures located within the coastal floodplain, while the City of Salisbury contains 25% and the remaining 72% are within the unincorporated areas of the County. A total of 516 structures affected by coastal flooding are residential. The remaining structures are comprised of structures such as commercial, industrial, etc.

Map 4.6: Non-Regulatory Coastal Flood Risk – Affected Structures



3. Storm Surge

Critical and public facilities are facilities that are critical to the health and welfare of the population and are important to the type of hazard event such as shelters, police and fire stations, and hospitals. These facilities warrant special attention in preparing for a disaster and are of vital importance in maintaining the function of the community.

In 2013, storm surge mapping was updated by the National Weather Service. In preparing the 2016 Plan Update, critical and public facilities located in the storm surge categories were updated utilizing the new mapping product. Category One storm surge has the most likelihood of occurrence based on historical data. Table 4.4 lists the critical and public facilities located within the each of the storm surge areas. Map 4.7 illustrates the location of the critical facilities within storm surge areas.

Table 4.4: Critical and Public Facilities in Storm Surge Areas

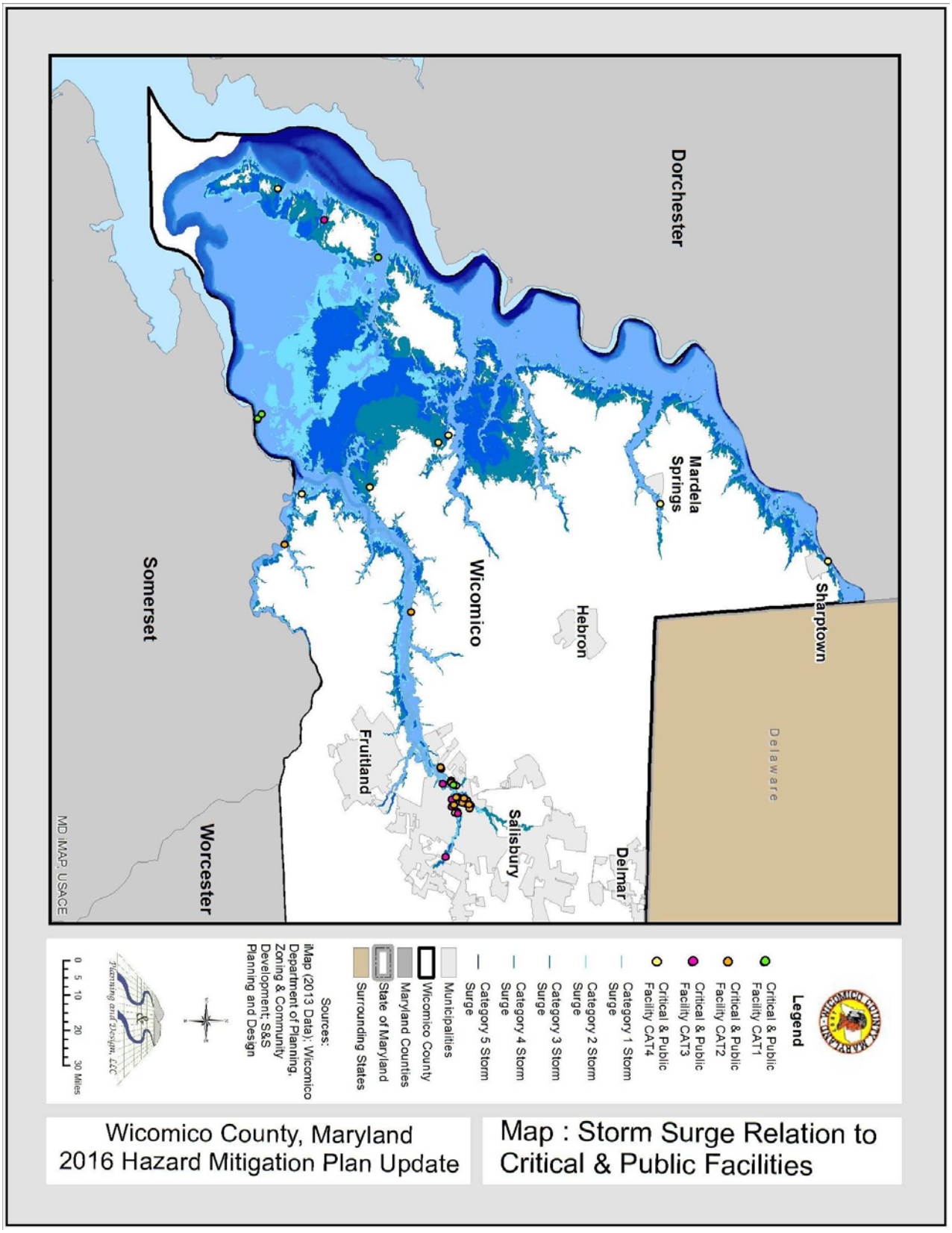
Facility Category	Number of Facilities	Detail of Facility	Address	Category			
County Owned	2	Other	4701 WHITEHAVEN ROAD				4
		Health Department	302 W CARROLL ST			3	
Educational	2	Whitehaven Heritage Society Old School Building	2740 CHURCH ST	1			
		University of Maryland	24094 NANTICOKE ROAD				4
Emergency	1	City of Salisbury Fire Department Station No. 16	325 CYPRESS ST		2		
Marina/Dock	7	Whitehaven Ferry	23865 RIVER ST	1			
		Whitehaven Marina	23851 RIVER ST	1			
		Wetipquin Harbor	WETIPQUIN ROAD	1			
		Upper Ferry	5420 N UPPER FERRY ROAD		2		
		Wikander Yacht Yard	3180 WINDROWS WAY		2		
		Port of Salisbury	506 W MAIN ST		2		
		Wicomico Yacht Club	3344 YACHT CLUB ROAD				4
Medical	4	Private Medical Building	312 W CARROLL ST		2		
		Private Medical Building	205 S DIVISION ST				4
		Private Medical Building	545 RIVERSIDE DR			3	
		Private Medical Building	533 RIVERSIDE DR			3	
Municipally Owned	3	Salisbury Public Works Utilities Branch	400 W ISABELLA ST			3	
		Salisbury Parking Garage	115 E MARKET ST			3	
		Salisbury Parking Garage	101 E MARKET ST				4

Table 4.4: Critical and Public Facilities in Storm Surge Areas – Cont'd

Facility Category	Number of Facilities	Detail of Facility	Address	Category			
Storage Tanks	21	Underground storage tank	710 FITZWATER ST	1			
		Underground storage tank	223 LAKE ST		2		
		Industry Tank Farm	313 LAKE ST		2		
		Industry Tank Farm	FITZWATER ST		2		
		2 underground storage tanks	20669 NANTICOKE ROAD				4
		2 underground storage tanks	3344 YACHT CLUB ROAD				4
		Industry Tank Farm	3828 TEXAS ROAD			3	
		Industry Tank Farm	1132 MARINE ROAD		2		
		3 underground storage tanks	24090 NANTICOKE ROAD				4
		1 underground storage tank/ 7 AGST	800 FITZWATER ST				4
		Industry Tank Farm	FITZWATER ST		2		
		Underground storage tank	608 W MAIN ST		2		
		2 underground storage tanks	241 CYPRESS ST		2		
		Industry Tank Farm	LAKE ST		2		
		Industry Tank Farm	325 LAKE ST		2		
		Industry Tank Farm	317 LAKE ST		2		
		Industry Tank Farm	333 LAKE ST		2		
		Industry Tank Farm	418 MILL ST		2		
		4 Above Ground Storage Tanks	337 LAKE ST			3	
		Industry Tank Farm	EXXON ROAD				4
		2 underground storage tanks	24948 OCEAN GATEWAY				4
Utility	4	Salisbury Southside Pumping Station	611 RIDGE ROAD			3	
		Sharptown Sewer Plant	LITTLE WATER ST				4
		Salisbury Northside Pumping Plant	100 DELAWARE AVE				4
		Salisbury Park Water Treatment Plant	N PARK DRIVE			3	
Total Facilities:	**44**						

Source: S&S Planning and Design

Map 4.7: Storm Surge Relation to Critical & Public Facilities

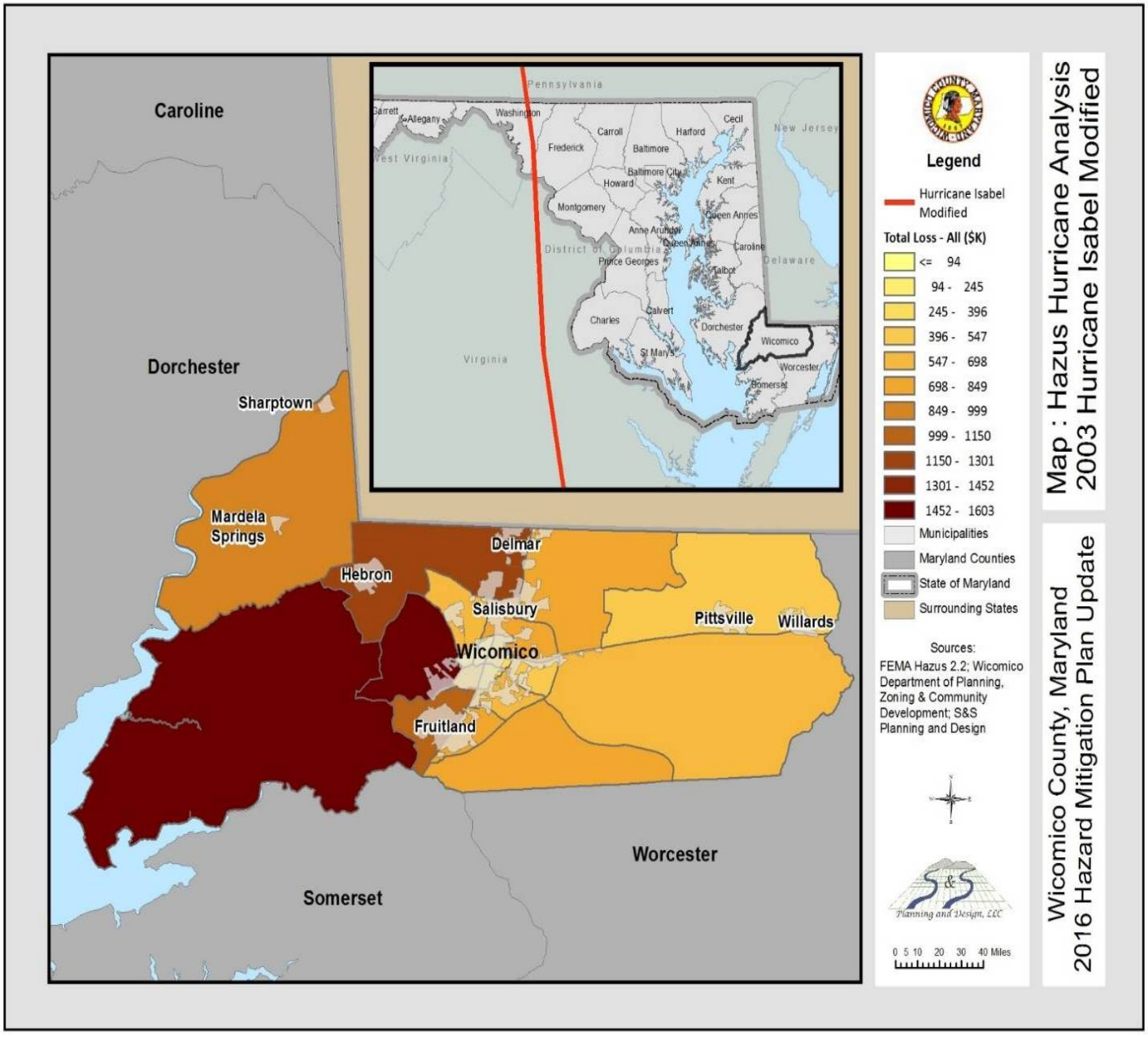


LOSS ESTIMATES

1. Hurricane Wind – Enhanced HAZUS Analysis

There is over 35,000 buildings in the County with an estimated replacement value of $11,170 million dollars. The economic loss for this event is $13.7 million with 98% of this loss consisting of residential occupancy loss. Map 4.8 illustrates total loss estimations.

Map 4.8: HAZUS Hurricane Analysis – 2003 Hurricane Isabel Modified Total Loss Estimations



HAZUS Hurricane Wind estimates that approximately 4 residential structures will be moderately damaged due to wind during an event such as this. A total of 113 residential structures and 4 commercial structures are expected to experience minor building damage; Appendix I – Hazus Hurricane Wind Report, page 6. Table 4.5 details the total estimated loss specific to wind for Wicomico County if a hurricane event of this magnitude occurred.

Table 4.5: HAZUS Hurricane Analysis – 2003 Hurricane Isabel Modified – Building-Related Loss Estimations

Building Type	Loss Estimations
Residential	$10,419,570.00
Commercial	$193,990.00
Industrial	$31,290.00
Other	$41,150.00
Total	**$10,686,000.00**

Source: FEMA HAZUS

2. Non-Regulatory Coastal Flood Risk Product

The Non-Regulatory coastal flood risk analysis incorporates results from a 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. The following tables provide the overall cost of structures within the flood prone areas and their associated loss estimates.

Table 4.6: Non-Regulatory Coastal Flood Risk – User Defined Facilities within Affected Area

Political Area	Total Cost	Total Residential Cost	Total Commercial Cost	Total Other Cost
Wicomico County Unincorporated Areas	$95,771,000.00	$92,601,200.00	$2,308,000.00	$861,800.00
Town Of Delmar	$0.00	$0.00	$0.00	$0.00
Town Of Fruitland	$0.00	$0.00	$0.00	$0.00
Town Of Hebron	$0.00	$0.00	$0.00	$0.00
Town Of Mardela Springs	$0.00	$0.00	$0.00	$0.00
City Of Salisbury	$62,149,200.00	$15,604,200.00	$4,505,800.00	$21,978,200.00
Town Of Sharptown	$2,620,400.00	$2,582,200.00	$38,200.00	$0.00
Town Of Pittsville	$0.00	$0.00	$0.00	$0.00
Town Of Willards	$0.00	$0.00	$0.00	$0.00
Wicomico County, Maryland Coastal Study	**$160,540,600.00**	**$110,787,600.00**	**$6,852,000.00**	**$22,840,000.00**

Source: FEMA HAZUS

Note: Municipalities containing $0.00 value losses did not contain structures within the coastal risk area according to Hazus model. Both Fruitland and Mardela Springs contain areas of risk, however these risk areas are 3.8 and 0.4 square miles, respectively. Refer to Appendix J – Non-Regulatory Coastal Flood Risk Product, page 25.

Table 4.7: Non-Regulatory Coastal Flood Risk – Loss Estimations

Political Area	Total Cost	Total Residential Cost	Total Commercial Cost	Total Other Cost
Wicomico County Unincorporated Areas	$7,068,228.00	$6,109,036.00	$518,629.00	$115,173.00
Town Of Delmar	$0.00	$0.00	$0.00	$0.00
Town Of Fruitland	$0.00	$0.00	$0.00	$0.00
Town Of Hebron	$0.00	$0.00	$0.00	$0.00
Town Of Mardela Springs	$0.00	$0.00	$0.00	$0.00
City Of Salisbury	$3,320,396.00	$695,004.00	$2,056,446.00	$568,946.00
Town Of Sharptown	$188,280.00	$177,818.00	$10,462.00	$0.00
Town Of Pittsville	$0.00	$0.00	$0.00	$0.00
Town Of Willards	$0.00	$0.00	$0.00	$0.00
Wicomico County, Maryland Coastal Study	**$10,576,904.00**	**$6,981,858.00**	**$2,585,537.00**	**$684,119.00**

Source: FEMA HAZUS

3. Storm Surge

Loss estimates for critical and public facilities located within storm surge categories were calculated. These calculations were derived from Maryland Tax Assessment values. Total loss estimates were $20,838,600.

Loss estimates in dollars for all facilities, including critical facilities by land use were also calculated from Maryland Tax Assessment values. Land use category estimates were separated out by storm surge category.

Table 4.8: Storm Surge Loss Estimates for Critical & Public Facilities

Facility Type	Loss Estimates			
Hurricane Category	**CAT 1**	**CAT 2**	**CAT 3**	**CAT 4**
County Owned	0	0	1,312,900	123,900
Educational	17,100	0	0	131,400
Emergency	0	6,425,200	0	0
Marina/Dock	118,800	1,032,200	0	575,100
Medical	0	524,800	860,900	142,500
Municipally Owned	0	0	2,601,600	2,410,500
Storage Tanks	592,500	983,000	70,100	2,617,000
Utility	0	0	113,500	185,600
Total	**$ 728,400**	**$ 8,965,200**	**$ 4,959,000**	**$ 6,186,000**

Source: Maryland Property View and S&S Planning and Design

Table 4.9: Storm Surge - Loss Estimates for All Facilities by Land Use

Land Use	Loss Estimates by Storm Surge Category			
Hurricane Category	**CAT 1**	**CAT 2**	**CAT 3**	**CAT 4**
Agricultural	6,536,830	8,790,320	17,003,510	29,867,320
Apartments	0	0	192,600	4,867,900
Commercial	0	878,500	2,359,000	21,247,700
Commercial Condominium	0	0	0	954,700
Commercial Residential	0	0	334,000	334,000
Exempt	0	139,000	139,000	1,598,070
Exempt Commercial	473,000	603,100	1,855,000	15,171,200
Industrial	592,500	1,158,300	1,344,200	3,174,300
Marsh Land	35,790	35,790	35,790	35,790
Residential	29,225,480	40,208,990	75,287,690	200,806,740
Residential Condominium	608,400	608,400	1,622,240	8,304,930
Town House	0	0	0	254,910

Source: Maryland Property View and S&S Planning and Design

CONCLUSION

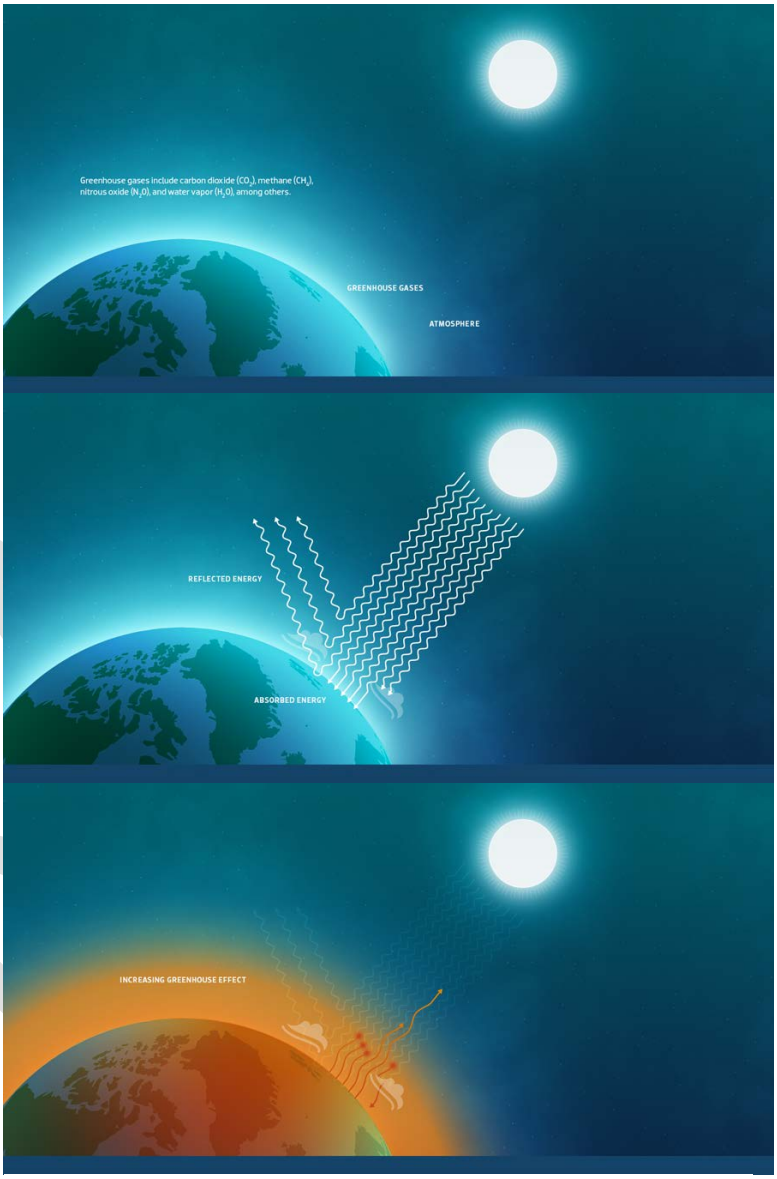
Review of the various vulnerability assessments conducted in this chapter indicates the areas most vulnerable to Coastal Storm events include: City of Salisbury, Sharptown, and the unincorporated south western portion of the county. Critical Facilities at risk due to hurricane wind damage include the Peninsula Regional Medical Center. In addition, the Salisbury Fire Station No. 16 is at risk during a Category 2 Storm Surge and Coastal Flood. This facility was identified in both the Storm Surge and Coastal Flood risk vulnerability assessments. Finally, there are several marinas/docks and underground storage tanks located within both storm surge and coastal flood risk areas. The majority of these facilities are located in or in close proximity to the City of Salisbury.

CHAPTER 5 – CLIMATE CHANGE

HAZARD CHARACTERIZATION

According to the Environmental Protection Agency (EPA), Climate change is caused by both natural and human factors. Natural factors include earth's orbit, solar activity or volcanic eruptions. The major human factor affecting climate change is greenhouse gases. The earth's temperature is a balance between energy being absorbed (heating) and released (cooling). Greenhouse gases cause heat to be retained, therefore prohibiting energy to be released and allowing the earth to cool. According to the EPA, most of the observed warming since the mid-20th century is due to the human caused greenhouse gas emissions. Figure 5.1 demonstrates how greenhouse gases are absorbing the energy emitted from the earth's surface, preventing heat from escaping hence causing the energy to be re-emitted and warming the earth's surface.

Figure 5.1: Role of Greenhouse Gases



Source: http://www.epa.gov/climatechange/science/causes.html

HAZARD RISK & HISTORY

The 2013 Maryland Greenhouse Gas Reduction Plan Executive Summary reports that The Intergovernmental Panel on Climate Chance concluded that we cannot deny that the earth is warming, and that most of the observed increases in temperatures are related to increases in greenhouse gas emissions over the last 50 years (IPCC 2007). Long-term temperature data show that average temperatures in Maryland have risen in the last century and will continue to rise in the future (NCDC 2012). Marylanders around the State are already noticing warmer winter days, more intense heat and humidity in the summer, and more damage due to storms.

According to the Maryland Department of Natural Resources (DNR), over the next century, Maryland expects increased winter-spring precipitation and run-off, warmer air and water

temperatures, and relative sea level rise of at least 3.7 feet. One hundred years of data confirms that Maryland is warming on average by 1.8 degrees Fahrenheit and by as much as 3.6 degrees Fahrenheit in the winter. Wetter conditions have become prevalent in March and September, while July and August have become drier. These trends will impact the success and efficiency of restoration practices along our dynamic coast.

Permit data was obtained from the Wicomico County Department of Planning, Zoning and Community Development. Data was gathered from January 2010 to July 2015. Within the data, permits for solar panel projects was extrapolated. As shown on Table 5.1, solar panel installs have increased significantly since 2010.

Table 5.1: Solar Panel Projects

WICOMICO COUNTY PERMIT DATA	
YEAR	**SOLAR PANEL PERMITS ISSUED**
2010	1
2011	14
2012	10
2013	26
2014	74
2015	80

Source: Wicomico County Permit Data, August 2015

VULNERABILITY

According to the EPA, the climate for the northeast has changed with an average temperature rise of 2 degrees Fahrenheit and an increase of 4 degrees Fahrenheit in winter temperatures. Precipitation events have also increased in magnitude and frequency. Rain events now exceed snow events for the northeast region of the United States. With an increase in rain events, influences to sea level rise are likely to increase as well. Sea level rise, storm surge, erosion, and the destruction of important coastal ecosystems will likely contribute to an increase in coastal flooding events, including the frequency of the current "100-year flood" levels.

Maryland is among the states most vulnerable to climate change (Maryland Commission on Climate Change, 2008). Rising sea levels, along with increased storm intensity, will have devastating and far-reaching environmental and economic impacts on the Chesapeake Bay and on the quality of life Marylanders enjoy. Maryland's sizable farming community could suffer costly losses during extreme droughts and heat waves. Marylanders everywhere will face increased risk of flooding and significant property damage as a result of heavier precipitation and other extreme weather events. Children, the elderly, and other sensitive populations are vulnerable to the effects of heat waves and increased air pollution (Boicourt and Johnson 2010).

CONTRIBUTING FACILITIES

In terms of implementing the Greenhouse Gas Reduction Plan, as an example, options for reductions in the energy sector have been reviewed. Electricity consumption is one of the highest factors contributing to greenhouse gas emissions. Electricity supply sector accounts for greenhouse gas emissions occurring as a result of the combustion of fossil fuels at electricity-

generating facilities located within the State. The majority of power plants in Maryland are using fossil fuels such as coal, which adds carbon dioxide and other pollutants into the air. Reducing energy use is a major part of the Greenhouse Gas Reduction Plan. Therefore, three important programs within the energy sector target the reduction of carbon dioxide emissions from electricity generating plants. These programs include:

- Regional Greenhouse Gas Initiative (RGGI);
- EmPOWER Maryland Initiative; and
- Renewable Portfolio Standard.

MITIGATING GREENHOUSE GAS

In Wicomico County, INGENCO's operates a gas-to-energy power plant at the County's Newland Park Landfill, which generates 6 megawatts (MW) of electricity daily for local use. The process of generating energy in the form of electricity and/or heat from the incineration of waste. The process used by this power plant involves the incineration of waste, which generates energy in the form of electricity and/or heat. This process of generating energy reduces the release of carbon dioxide, helping to reduce greenhouse gases.

Additionally, Maryland's *Climate Action Plan* includes two climate change adaptation strategies that are currently being used to guide state-level adaptation planning efforts. The first strategy (Phase 1) addresses the impacts associated with sea level rise and coastal storms. The second strategy (Phase II), released as a complement to the Climate Action Plan, addresses changes in precipitation patterns and increased temperature, and the likely impacts to human health, agriculture, forest and terrestrial ecosystems, bay and aquatic environments, water resources, and population growth and infrastructure. Together, more than 100 experts from the governmental, nonprofit, and private sectors participated in a series of meetings from the purpose of interpreting the most recent climate change literature, evaluating adaptation options, and recommending strategies to reduce Maryland's overall climate change vulnerability.

CHAPTER 6 – SHORELINE EROSION AND SEA-LEVEL RISE

HAZARD CHARACTERIZATION

Shoreline erosion hazard in Wicomico County is influenced by natural conditions, which include soil composition, weather, topography, water depth, fetch, surface water/groundwater conditions. Shores consisting of very fine or unconsolidated silts, clays, or lighter organic material, such as marshes are particularly at risk. As shown in the most recent *2007 Wicomico County Soil Survey*, 21.4% of the County is composed of expansive soils, which contribute to erosion rates along shorelines.

Expansive soils 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.

Table 6.1: Soils

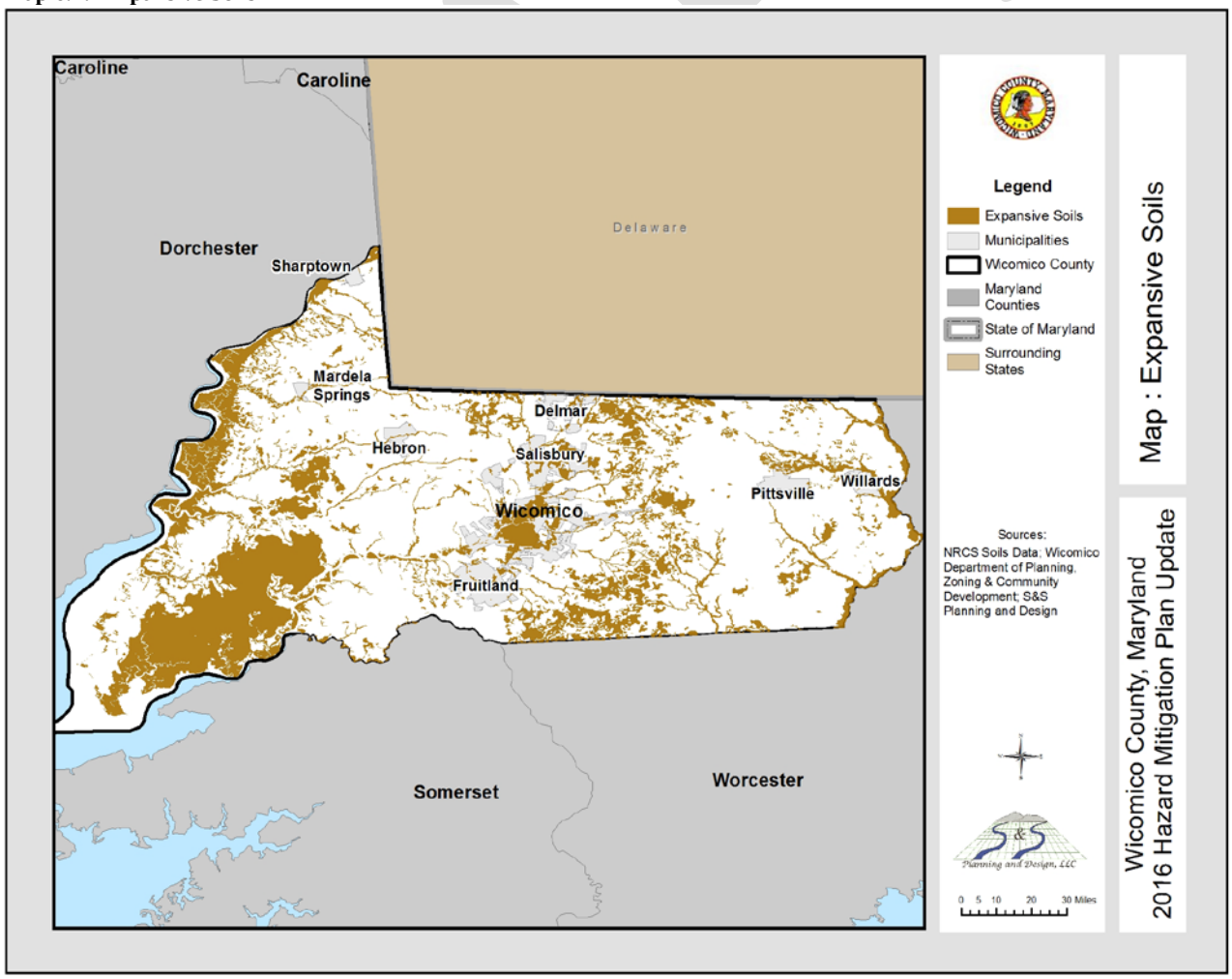
Map Unit Symbol	Map Unit Name	Acres in County	Percent of County
AsA	Askecksy loamy sand, 0 to 2 percent slopes	5,883.5	2.3
Be	Beaches	50	0
Ho	Honga peat, very frequently flooded, tidal	1,653.7	.6
LfA	Lenni sandy loam, 0 to 2 percent slopes	6,890.8	2.7
LgA	Lenni loam, 0 to 2 percent slopes	6,171.2	2.4
LO	Longmarsh and Indiantown soils, frequently flooded	2,967.5	1.2
Ma	Manahawkin muck, frequently flooded	2,611.1	1
NM	Nanticoke and Mannington soils. very frequently flooded, tidal	1,350.6	0.5
OKA	Othello and Kentuck soils, 0 to 2 percent slopes	781.3	0.3
OtA	Othello silt loam, 0 to 2 percent slopes	16,546.9	6.4
Pk	Puckum muck, frequently flooded	2,246.1	0.9
SuA	Sunken mucky silt loam, 0to 2 percent slopes, occasionally flooded, tidal	983.7	0.4
TP	Transquaking and Mispillion soils, very frequently flooded, tidal	983.7	0.4
Up	Urban land	2,085.9	0.8
UrB	Urban land-Evesboro complex, 0 to 5 percent slopes	195.9	0.1
UsB	Urban land-Fort-Mott complex, 0 to 5 percent slopes	682.8	0.3
UtB	Urban land-Rockawalkin complex, 0 to 5 percent slopes	318.3	0.1
UuB	Urban land-Runclint complex, 0 to 5 percent slopes	36.8	0
UwB	Urban land-Udorthents complex, 0 to 5 percent slopes	183.2	0.1
Zk	Zekiah silt loam, frequently flooded	2,318.9	0.9
Total		**54,941.9**	**21.4**

Source: Wicomico County Soil Survey 2007

As shown in Map 6.1, expansive soils located along the shorelines of the Nanticoke and Wicomico Rivers that experience wave action have a high risk of accelerated erosion rates. Sea level rise is another factor contributing to shore erosion in Maryland. Sea level rise contributes to shoreline erosion by influencing and exacerbating on-going coastal processes, making coastal areas more vulnerable to extreme events. The rise in sea level creates a higher baseline for storm surge. In fact, a 1 meter rise in sea level would turn 15 year flood areas into 100 year flood areas (Kana et al., 1984; Leatherman, 1984). Tide gauge measurements in the Chesapeake Bay show that sea level rates are rising almost twice as fast as the global average.

Homes built on expansive soils have the possibility of being structurally damaged due to the shrink-swell properties of this soil type. Expanding soils can cause foundation problems such as; cracks and walls pushed inwards due to outside pressure. Best Management Practices (BMPs) for building on expansive soils include: monitoring for extreme changes in soil moisture content and planting trees 15 to 30 feet away from foundations. It is important to note that no documentation/data exists stating that residential, commercial or other facilities in Wicomico County have had damaged due to shoreline erosion. However, as a result of Hurricane Sandy in 2012, Public Assistant funding was received for dune replacement in the Roaring Point Park, which is located along the Nanticoke River.

Map 6.1: Expansive Soils



Although shoreline erosion is a natural process, man-made factors can exacerbate its effects. These factors include, land use, shoreline reinforcement activities, surface water usage, ground water usage, and the placement of buildings, roads, and other infrastructure. In general, erosion problems tend to be the greatest where sediments are unconsolidated, fetch is greater than one mile, upland areas generate significant runoff of saturated soils and adjacent shorelines are hardened with protective structures.

HAZARD RISK & HISTORY

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 sea level continues to rise, these bays, peninsulas and islands will be submerged, leaving a smoother, nearly straight shoreline.

The average rate of sea level rise on Maryland coastlines has been approximately 3-4 mm/yr, or one foot per century. Scientists predict that with global warming, sea levels may rise as much as 2-3 feet in the Chesapeake Bay by 2100. Considering the climate changes that results in greater frequencies and intensities in storms, sea level rise has occurred. According to the EPA, during the 20th century, global sea level rose by roughly seven inches. Subsiding land in the Chesapeake Bay area is projected to worsen the effects of relative sea level rise, increasing the risk of flooding in communities, inhabited islands, and tidal wetlands. According to NOAA's Chesapeake Bay Office, sea level in the Chesapeake Bay is rising at an average rate of 0.14 inches per year. This rate is almost 0.08 inches faster than the global average due to the land subsiding around the Chesapeake Bay. Ongoing research suggests that land subsidence in the region due to post-glacial crust movement and groundwater withdraws is the contributing factor 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 approximately 5.7 million pounds of nitrogen and 4.2 million pounds of phosphorus into the Bay. Table 6.2 provides the results of a study, conducted by the U.S. Army Corps of Engineers, which calculated the erosion rates for the State of Maryland's coastal counties.

Table 6.2: Erosion

Area	Erosion Rate 0-2 feet/year	Erosion Rate 2-4 feet/year (miles)	Erosion Rate > 4 feet/year (miles)	Total Eroding Shoreline (miles)	Total County Shoreline (miles)
Wicomico County	13	6	1	20 (22%)	89
Maryland (16 coastal counties)	955	234	142	1,341 (34%)	4,360

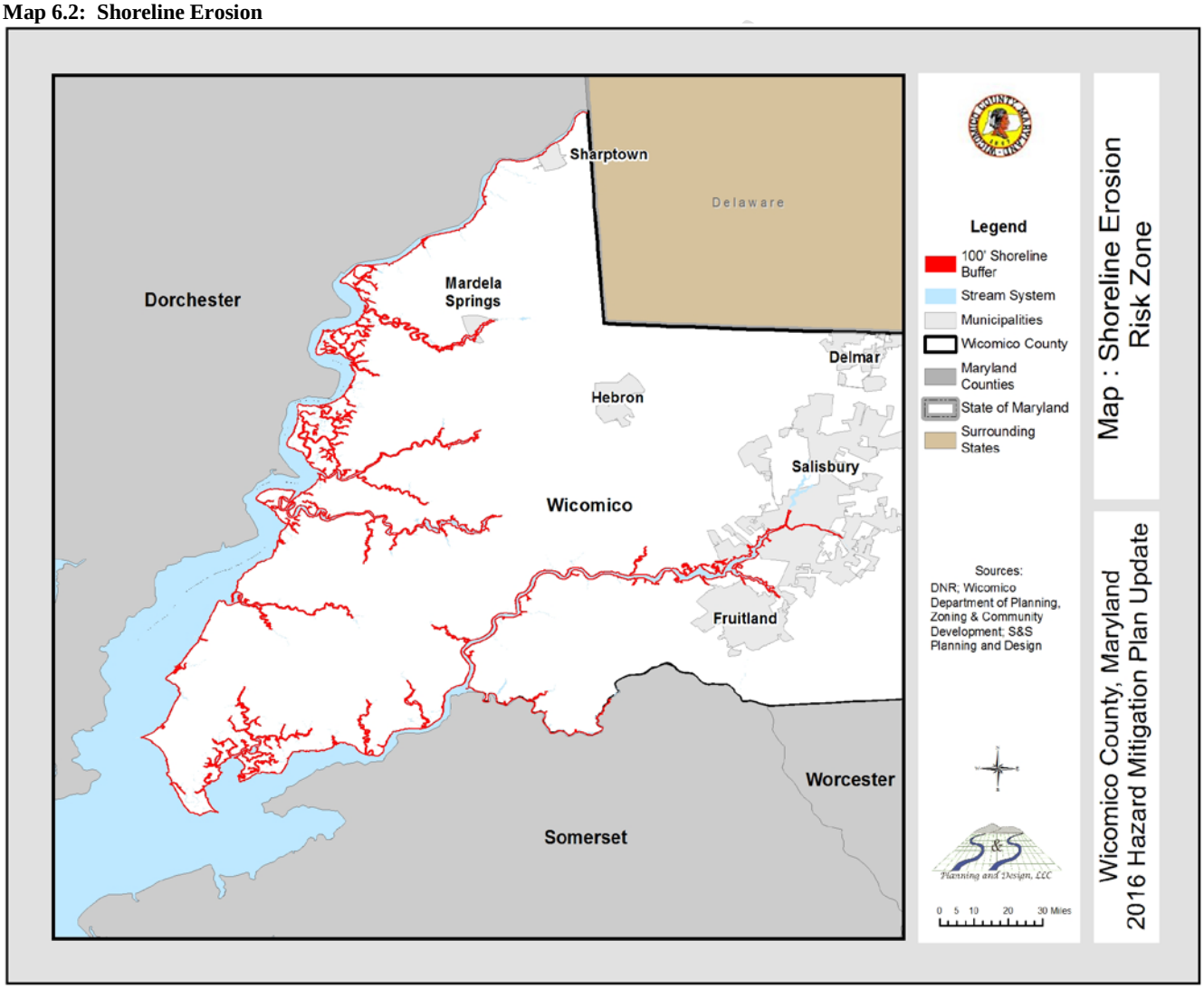
Source: U.S. Army Corps of Engineers, 1990

VULNERABILITY

1. Shoreline Erosion

In order to access vulnerability to shoreline erosion, a 100 foot risk zone, was developed for the *2016 Wicomico County Hazard Mitigation Plan Update.* This shoreline erosion risk assessment examines Wicomico County's critical and publically owned/operated facilities along tidal shorelines located within the 100-foot risk zone identified for this planning project.

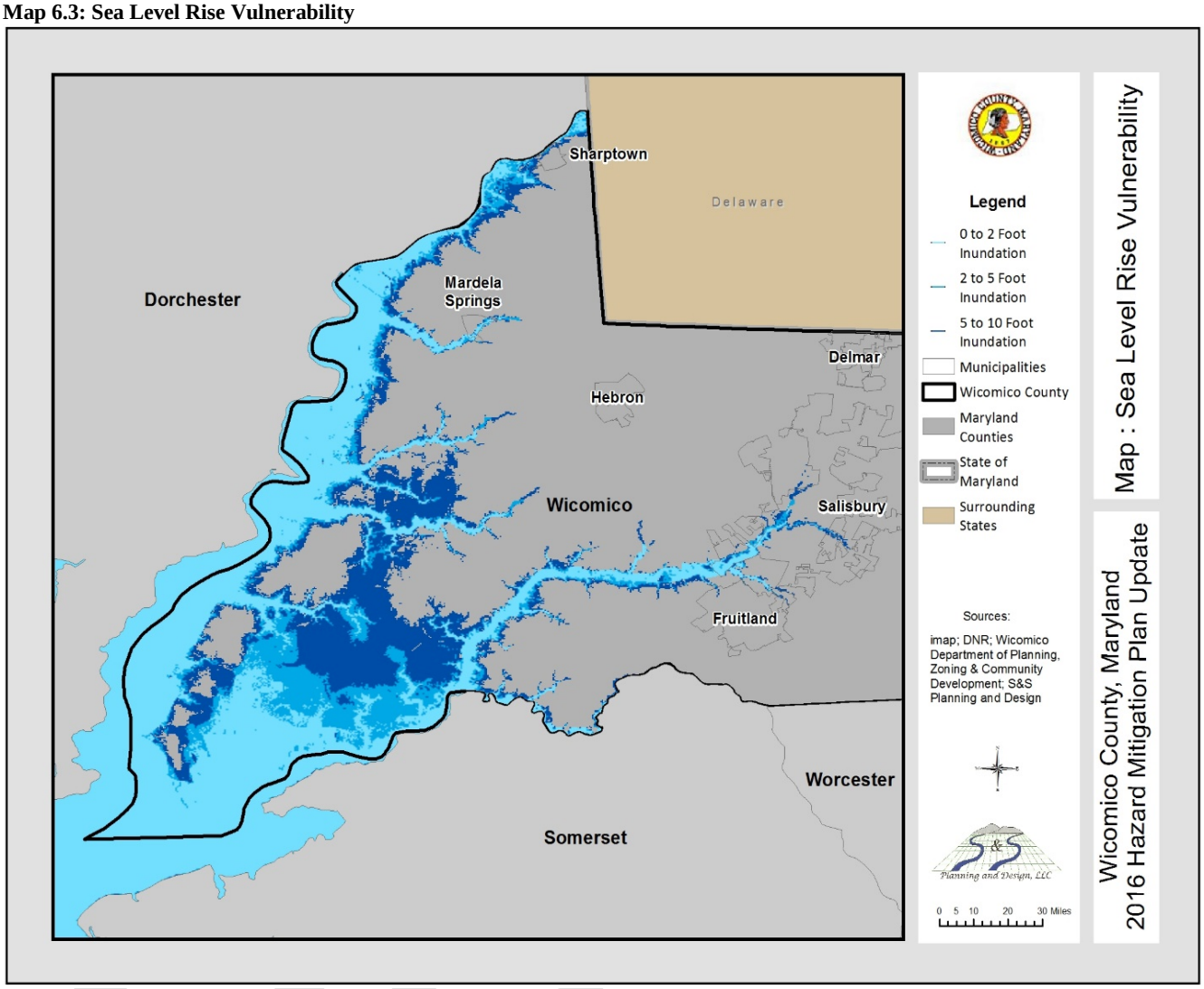
Map 6.2: Shoreline Erosion



2. Sea Level Rise

Map 6.3 illustrates the possible levels of inundation due to sea level rise. The sea level rise inundation data is derived from high-resolution topographic data (LiDAR), which the State of Maryland in cooperation with local and federal agencies acquired to identify areas vulnerable to inundation and flooding.

Map 6.3: Sea Level Rise Vulnerability



FACILITIES AT RISK

Critical facilities are facilities that are critical to the health and welfare of the population and are important to the type of hazard event as such shelters, police and fire stations, and hospitals. These facilities warrant special attention in preparing for a disaster and are of vital importance in maintaining the function of the community.

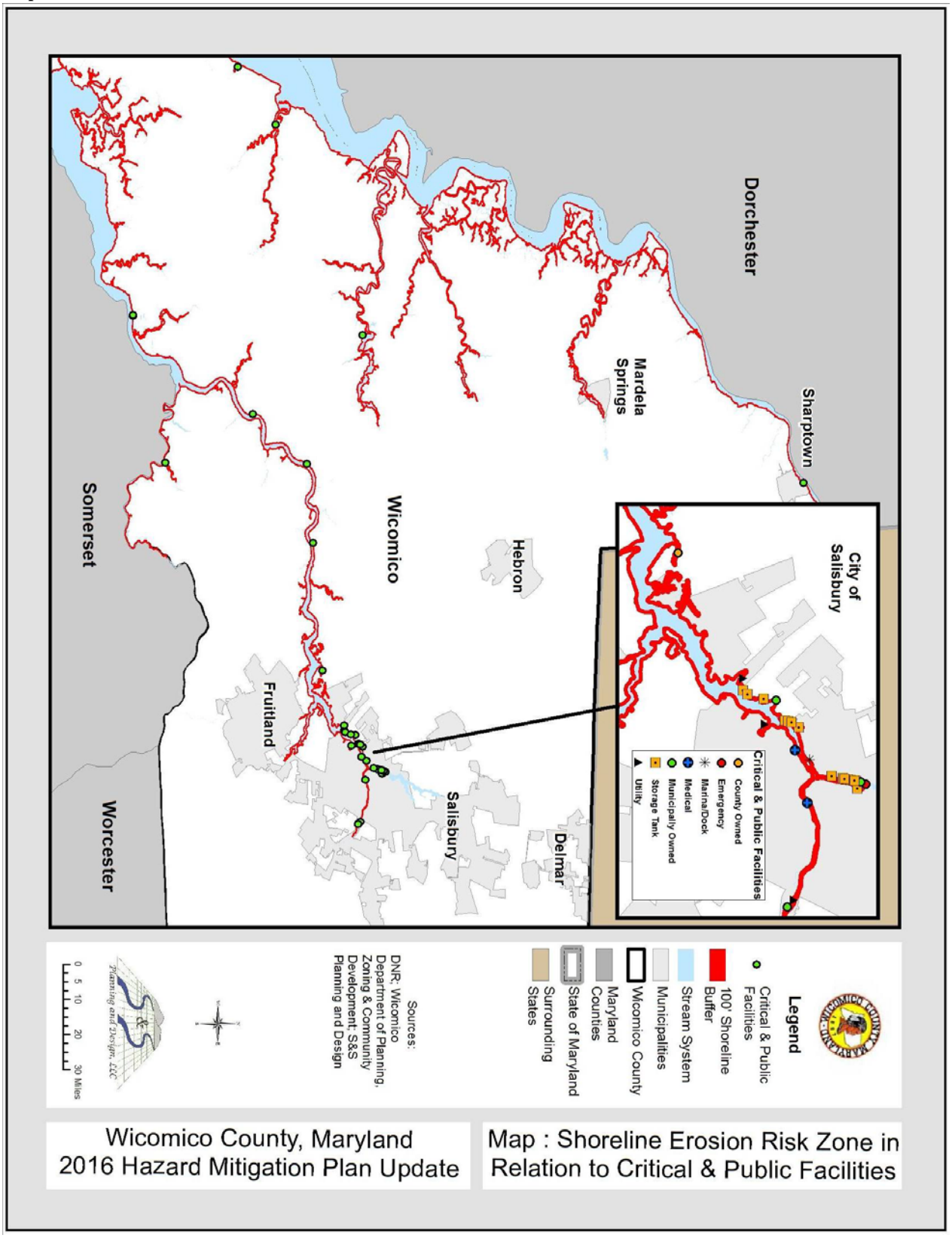
Critical and public facilities located in the 100-foot risk zone identified for this plan document. These facilities included emergency, shelter, medical, utility, airport, County owned, municipally owned, and miscellaneous facilities. During the Plan Update process, 4 new critical facilities were identified and added to the critical facilities listing. However, these facilities are not located within the 100-foot risk zone.

Table 6.3: Critical and Public Facilities within 100 Foot Risk Zone

Facility Type	Number of Facilities	Detail of Facility	Address of Facility
County Owned	3	Pirates Wharf Park	4701 WHITEHAVEN ROAD
		Cedar Hill Park	20945 HARBOR VIEW ROAD
		Recreational Property	5561 PLANTATION LANE
Marina/Dock	6	Wetipquin Harbor	WETIPQUIN ROAD
		Whitehaven Ferry	23865 RIVER ST
		Whitehaven Marina	23851 RIVER ST
		Boat Marina	3180 WINDROWS WAY
		Port of Salisbury	506 W MAIN ST
		Upper Ferry	5420 N UPPER FERRY ROAD
Medical	2	Private Medical Building	205 S DIVISION ST
		Private Medical Building	560 RIVERSIDE DR
Municipally Owned	2	Salisbury Public Works Utilities Branch	400 W ISABELLA ST
		Salisbury Zoo and Park	501 S PARK DR
Storage Tanks	17	2 underground storage tanks	5469 WHITEHAVEN ROAD
		3 underground storage tanks	24090 NANTICOKE ROAD
		Underground storage tank/ 7 Above Ground Storage Tanks	800 FITZWATER ST
		Industry Tank Farm	317 LAKE ST
		Industry Tank Farm	FITZWATER ST
		Industry Tank Farm	1132 MARINE ROAD
		Underground Storage Tank	710 FITZWATER ST
		Industry Tank Farm	MARINE ROAD
		Industry Tank Farm/13 AGST	MARINE ROAD
		Industry Tank Farm	FITZWATER ST
		Industry Tank Farm	418 MILL ST
		Industry Tank Farm	325 LAKE ST
		Industry Tank Farm	LAKE ST
		Industry Tank Farm	313 LAKE ST
		4 Above Ground Storage Tanks	337 LAKE ST
		Industry Tank Farm	333 LAKE ST
		Underground storage tank	223 LAKE ST
Utility	4	Salisbury Wastewater Treatment Plant	1142 MARINE ROAD
		Sharptown Sewer Plant	LITTLE WATER ST
		Salisbury Southside Pumping Station	611 RIDGE ROAD
		Salisbury Park Water Treatment Plant	PARK DR
Total Facilities			**34**

Source: S&S Planning and Design

Map 6.4: 100-Foot Erosion Risk Zone



LOSS ESTIMATES

Loss estimates for critical and public facilities located within the 100-foot erosion risk zone were calculated. These calculations were derived from Maryland Tax Assessment values.

Table 6.4: Critical Facilities Loss Estimate

Facility Type	Loss Estimates
County Owned	$ 761,500
Marina/Dock	$ 1,151,000
Medical	$ 305,100
Municipally Owned	$ 383,200
Utility	$ 12,483,200
Total	**$15,084,000**

Source: S&S Planning and Design

Loss estimates for all facilities, including critical facilities by land use were also calculated in the 100-foot erosion risk zone using Maryland Tax Assessment values.

Table 6.5: Loss Estimates for All Facilities by Land Use

Land Use	Loss Estimates
Agricultural	$ 31,854,620
Apartments	$ 9,468,800
Commercial	$ 21,774,600
Commercial Condominium	$ 516,200
Commercial Residential	$ 313,800
Country Club	$ 2,161,000
Exempt	$ 1,251,860
Exempt Commercial	$ 17,305,400
Industrial	$ 1,938,300
Residential	$ 158,218,170
Residential Condominium	$ $8,706,500

Source: S&S Planning and Design

CONCLUSION

Sea Level Rise-induced coastal flooding, storm surge, and elevated water levels are the primary concerns for developed areas. According to the Sea Level Rise Response Strategy for the State of Maryland, one can assume any development on close proximity to the water's edge, at a low lying elevation or within coastal flood boundaries, as well as urban and developed shorelines, will be susceptible to the impacts of sea level rise. In order to assess shoreline erosion and the effects of sea-level rise, an analysis was completed during the plan update process. Using a 100-ft risk zone, loss estimates for critical facilities were calculated and reported on Table 6.4 and facilities were listed on Table 6.3. There were six (6) marinas/docks, two (2) private medical buildings, seventeen (17) storage tanks, and four (4) utilities. The City of Salisbury's Waterwaste Treatment Plant, Southside Pumping Station, and the Salisbury Park Waterwaste Treatment Plant are all located within the 100-ft risk area. In addition, the Sharptown Sewer Plant is within the risk area. These facilities should be further assessed for vulnerability and resiliency.

CHAPTER 7 – SEVERE WEATHER

INTRODUCTION

Severe weather as described herein includes thunderstorms, tornados, lightning, hail, and wind. The effects of thunderstorms, tornados, hail, lightning, and wind may cause many types of hazards including power outages, communication failures, road closures, and loss of infrastructure. These hazards are random in nature and can occur Countywide due to the lack of predictable hazard zones.

THUNDERSTORM HAZARD CHARACTERIZATION

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 rises, cools and condenses. This condensation proceeds until most of the moisture in the air mass has been precipitated. 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.

THUNDERSTORM HAZARD RISK & HISTORY

The National Weather Service considers a thunder storm severe only if produces wind gusts of 58 mph or higher, large hail (3/4 in. diameter or larger), or tornados.

Between 1958 and 2015, the *National Weather Service*, *National Climatic Data Center* reported 96 thunderstorms that have occurred in Wicomico County. Thunderstorm events with reported property damage are shown in Table 7.1.

Table 7.1: Thunderstorm Events

Location	Date	Event Narrative	Property Damage
Salisbury	November 11, 1995	Numerous power lines down and poles snapped. Trees down, some caused damage to buildings.	$30,000
Powellville	November 11, 1995	Several power poles snapped off. Trees were downed. Roofs off two chicken houses in Parsonsburg; one chicken house destroyed and VFW damaged in Powellville.	$40,000
Wingate	January 19, 1996	High winds severely damaged an abandoned farm home.	$10,000
Salisbury	May 4, 1996	Several trees downed and roof blown off a chicken house.	$12,000
Countywide	June 26, 1997	Trees down throughout the county.	$3,000
Salisbury	July 16, 1997	Wind gust of 68 mph recorded at WBOC TV. Portions of a motel roof and industrial park roofs were blown off. Numerous trees and wires down.	$30,000
Salisbury	June 13, 1998	Wind gust of 66 knots (76 mph) was recorded at Salisbury Wicomico County Airport. Few trees and power lines down around the area.	$2,000
Salisbury	June 13, 1998	Thunderstorm winds caused construction wall to collapse at Giant food store.	$5,000
Hebron	June 26, 1998	Barn was destroyed and top of trees blown off.	$10,000
Salisbury	June 26, 1998	Several trees down and scattered power outages.	$3,000
Fruitland	May 22, 2001	Large trees down.	$2,000

Location	Date	Event Narrative	Property Damage
Pittsville	July 5, 2001	Trees down on road.	$2,000
Hebron	April 28, 2002	Several trees down.	$2,000
Salisbury	April 28, 2002	Trees down on two houses.	$5,000
Allen	May 13, 2002	Trees and power lines down.	$2,000
Fruitland	May 13, 2002	Trees and wires down.	$2,000
Salisbury	May13, 2002	Trees and power lines down.	$2,000
Willards	May 13, 2002	Trees down.	$2,000
Fruitland	August 2, 2002	Three trees down on roads.	$2,000
Salisbury	August 27, 2003	Trees and power lines down.	$2,000
Whitehaven	September 2, 2003	Several trees down. One tree down on house.	$3,000
Sharptown	June 17, 2004	Trees down.	$2,000
Willards	June 28, 2006	Trees blown down on Bethel Road.	$2,000
Salisbury	July 4, 2006	Power lines down.	$2,000
Allen	July 4, 2006	Trees down.	$2,000
Fruitland	July 4, 2006	Trees and power lines down.	$2,000
Parsonburg	July 28, 2006	Trees down and blocking Parsonsburg Road.	$2,000
Tyaskin	June 6, 2007	Approximately 15 trees were downed along Wetipquin Creek.	$5,000
Hebron	July 19, 2007	Numerous trees were downed in western part of county.	$2,000
Salisbury	March 5, 2008	Power lines were downed.	$1,000
Wicomico County Airport	March 5, 2008	Wind gust of 49 knots (56 mph) was measured at Salisbury.	$1,000
Hebron	March 8, 2008	Numerous trees were downed.	$2,000
Parsonburg	June 4, 2008	Estimated wind gust of 60 mph was reported in Parsonsburg.	$1,000
Delmar	June 16, 2008	Trees and siding from an apartment building were downed on the southside of Delmar.	$2,000
Hebron	July 4, 2008	Large tree and powerlines were downed across the road.	$1,000
Hebron	July 22, 2008	A couple of trees were downed.	$1,000
Salisbury	July 22, 2008	Several trees were downed.	$1,000
Parsonburg	July 22, 2008	Several trees were downed.	$1,000
Sunyar	April 26, 2009	Numerous trees were downed at Old Ocean City Road and Shamrock Road.	$2,000
Salisbury	May 9, 2009	Numerous trees were downed.	$2,000
Sunyar	May 9, 2009	Numerous trees were downed.	$2,000
Salisbury	May 29, 2009	Wind gust of 53 knots (61 mph) was measured at Salisbury.	$1,000
Salisbury	May 29, 2009	Five inch diameter tree limbs were downed.	$1,000
Salisbury	June 9, 2009	Power lines were downed in Salisbury.	$1,000
Hebron	July 29, 2009	Trees were downed at the intersection of Rockawalkin Road and Tourmaline Drive.	$2,000
Fruitland	July 29, 2009	Power lines were downed at Frederick Drive.	$1,000
Wicomico County Airport	July 29, 2009	Trees were downed at the intersection of Beaglin Park Drive and College Lane.	$2,000
Pittsville	July 29, 2009	Power lines were downed.	$1,000
Salisbury	July 31, 2009	Trees were downed across the road on Cannon Drive.	$2,000
Tyaskin	August 2, 2009	Numerous trees were downed and uprooted between Tyaskin and Nanticoke along State Highway 349.	$2,000
Allen	August 2, 2009	Multiply trees were broken off.	$1,000
2016 HMP Update			
Salisbury	June 22, 2010	Scattered severe thunderstorms associated with a frontal boundary produced damaging winds across portions of the Lower Maryland Eastern Shore. Tree was downed in Salisbury. Power lines were downed in Del Mar.	$2,000

Location	Date	Event Narrative	Property Damage
Salisbury	July 7, 2010	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Tree was downed onto a house and power line on Pacific Avenue.	$1,000
Allen	August 5, 2010	Scattered severe thunderstorms well in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Large tree was downed on a house.	$1,000
Salisbury	April 5, 2011	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Tree was downed at West Salisbury Parkway and Cypress Street.	$1,000
Salisbury	July 25, 2011	Isolated severe thunderstorm associated with a trough of low pressure produced damaging winds across portions of the Lower Maryland Eastern Shore. Trees were downed on Route 50.	$2,000
Delmar	August 19, 2011	Scattered severe thunderstorms in advance of a cold front produced damaging winds and large hail across portions of the Lower Maryland Eastern Shore. Numerous trees and a few power lines were downed.	$2,000
Delmar	June 25, 2012	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Numerous trees were downed in the Essex Ridge Subdivision.	$2,000
Salisbury	June 29, 2012	A derecho produced a widespread path of damaging winds across much of the Lower Maryland Eastern Shore. Numerous trees were downed in Salisbury.	$5,000
Sharptown	July 2, 2012	Isolated severe thunderstorm in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Trees were downed near Sharptown.	$2,000
Delmar	September 18, 2012	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Trees were downed with power outages along Route 13 near the Delaware State Line.	$2,000
Mardela Springs	June 13, 2013	A squall line produced widespread wind damage across much of the Maryland Eastern Shore. Wind gusts up to 70 mph (60 knots) produced widespread damage across the county. The most significant damage was near Mardela Springs where several trees were downed onto homes. A storage shed was also blown over. Significant damage was also observed around the Mardela Springs Middle and High Schools. Softball dugouts were destroyed, soccer goals were damaged, and bleachers were blown over. Several trees were sheared and some toppled around the schools. Additional trees were downed in Delmar and Salisbury.	$20,000
Fruitland	June 28, 2013	Scattered severe thunderstorms well in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Several trees were downed between Fruitland and Allen. One tree was downed on power lines.	$2,000
Salisbury	June 28, 2013	Scattered severe thunderstorms well in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Trees and power lines were downed.	$2,000
Countywide	January 11, 2014	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Long stretch of pool fence was blown over. Several large trees were also downed.	$5,000
Countywide	May 22, 2014	Scattered severe thunderstorms in advance of a cold front produced damaging winds across portions of the Lower Maryland Eastern Shore. Trees were downed.	$2,000

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of 66 thunderstorm events with reported property damage affecting Wicomico County from 1995-2015. Therefore, Wicomico County experiences 3.1 thunderstorm events with recorded property damage per year. The average amount of property damage per thunderstorm event in Wicomico County is $4,121.

THUNDERSTORM VULNERABILITY

Thunderstorms can cause damage to buildings, downed trees which can block roads, and power outages from downed poles and lines in the County. The events per year rate for this hazard are high when compared to other hazards; most events cause little or no damage to buildings such as critical and public facilities.

TORNADO HAZARD CHARACTERIZATION

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 tornados develop in warm, moist air in advance of strong eastward moving cold fronts in late winter and early spring. Tornados can also occur along a "dryline" which separates very warm, moist air to the east from hot, dry air to the west. Under the right temperature and moisture conditions, intense thunderstorms can produce tornados in areas of differential heating, which occurs on the Eastern Shore.

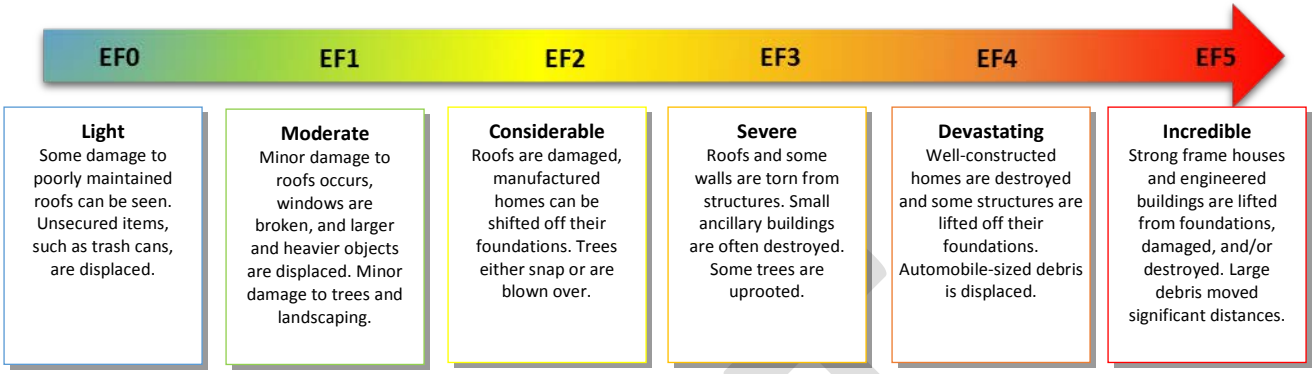
Tornados can be ranked by intensity using the Fujita Scale devised by Dr. Theodore Fajita at the University of Chicago in 1971. Since 2007, tornadoes are rated by the Nation Weather Service according to the Enhanced Fujita Scale (EF Scale). Ratings vary from EF0, for light damage, to EF5, for total destruction of a building. A tornado's rating is determined by a combination of wind speed (Table 7.2) and damage estimates to structures. Figure 7.1, below, provides basic FEMA definitions for each category.

Table 7.2: Enhanced Fujita Scale for Tornado Damage

Enhanced Fujita Wind Scale	
EF Number	**3 Second Gust (mph)***
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200
* The three-second gust is the highest sustained gust over a 3 second period having a 1 in 50 probability of being exceeded per year.	

Source: NOAA.gov

Figure 7.1 – Enhanced Fujita Wind Scale



Local National Weather Service (NWS) offices are responsible for issuing tornado warnings. Tornado warnings indicate that a tornado has been spotted or that Doppler radar detects a thunderstorm circulation capable of spawning a tornado. Nationally, tornado season is from March through August. According to the *2011 Maryland Hazard Mitigation Plan*, July is the peak month for tornado activity in Maryland.

TORNADO HAZARD RISK & HISTORY

Between 1962 and 2015, there have been a total of eight tornados reported in Wicomico County and one funnel cloud. Tables 7.3 and 7.4 provide additional information on theses events.

Table 7.3: Tornado Events

Location	Date	Event Narrative	Magnitude	Width	Property Damage	Injuries
Unknown	June 24, 1962	No Report	F0	17 Yards	$300	0
Unknown	October 8, 1965	No Report	F1	Not Available	$25,000	0
Unknown	August 4, 1975	No Report	F1	77 Yards	$25,000	0
Unknown	May 10, 1990	No Report	F1	23 Yards	$25,000	0
Unknown	May 10, 1990	No Report	F0	100 Yards	$25,000	0
Unknown	May 10, 1990	No Report	F1	23 Yards	$25,000	2
Salisbury	July 5, 2001	Several tree tops snapped or twisted.	F0	50 Yards	$3,000	0
Quantico	April 28, 2002	Tornado (F0) downed trees and sheared off numerous tree branches along 4 mile path that ended 2 miles southwest of Quantico.	F0	100 Yards	$5,000	0
2016 HMP Update						
No Tornado events were reported in the NCDC database since the 2011 HMP Planning Process.						

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of eight tornado events affecting Wicomico County from 1962-2015. Therefore, Wicomico County experiences 0.16 tornado events per year.

Table 7.4: Funnel Cloud Events

Location	Date	Event Narrative
Salisbury	August 2, 1994	U.S. Air pilot reported sighting a funnel cloud five miles north of Salisbury Airport. There was no damage reported or any indication that the funnel ever touched down.
2016 HMP Update		
No Funnel Cloud events were reported in the NCDC database since the 2011 HMP Planning Process.		

Source: NWS,NCDC(NOAA)

TORNADO VULNERABILITY

According to the information from the NWS, NCDC, there has been $133,300 in property damage due to tornado activity. Although no fatalities have been reported from tornados in Wicomico County, on May 10, 1990 an F1 tornado injured two people. The entire state of Maryland is subject to the possibility of strong tornados. Even though the possibility of such a tornado occurring in Wicomico County is low, it is a real danger and can occur at almost any time, anywhere in the County. However all new development within Wicomico County is required to withstand 100 mph wind speeds.

HAIL HAZARD CHARACTERIZATION

According to *NOAA*, hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they form into ice. Hail is only formed during a thunderstorm event. Property damage, specifically crop damage can be caused as a result of hail. Nationally hail causes approximately $1 billion in damage to property and crops each year. In fact, on April 10, 2001 hail caused $2 billion in damages to Kansas City. Due to the complexities and various factors involved in the formation of hail particle size and weight can vary tremendously. The typical size of hail is less than 2 inches in diameter; however, hail size may be up to seven inches in diameter as recorded in Nebraska.

HAIL HAZARD RISK & HISTORY

No property or crop damage was reported from hail events by the *National Weather Service, National Climatic Data Center* for Wicomico County. This could be because if any damage did occur it was not significant enough to be reported. As shown on in Table 7.5, the majority of hail events that have occurred in Wicomico County are before the peak of the growing season which reduces the chance of crop damage.

Table 7.5: Hail Events

Location	Date	Event Narrative	Magnitude
Wicomico	May 15, 1967	No Report	1.25 inches
Wicomico	July 1, 1979	No Report	1.75 inches
Wicomico	August 27, 1992	No Report	1 inch
Salisbury	July 3, 1996	No Report	1.75 inches
Fruitland	March 29, 1997	No Report	1 inch
Delmar	June 2, 1998	No Report	.75 inches

Location	Date	Event Narrative	Magnitude
Fruitland	June 2, 1998	No Report	.75 inches
Salisbury	June 16, 1998	No Report	.75 inches
Salisbury	April 9,1999	No Report	1 inch
Fruitland	July 24, 1999	No Report	1 inch
Mardela Springs	May 22, 2001	No Report	1.25 inches
Quantico	May 22, 2001	No Report	1.25 inches
Quantico	May 26, 2001	No Report	.75 inches
Delmar	July 5, 2001	No Report	.75 inches
Hebron	April 28, 2002	No Report	1.75 inches
Salisbury	August 2,2002	No Report	.75 inches
Salisbury	August 2, 2002	No Report	1 inch
Salisbury	July 4, 2006	No Report	.75 inches
Hebron	May 9, 2009	Quarter size hail was reported on Quantico Road.	1 inch
Salisbury	May 29, 2009	Half dollar size hail was reported.	1.25 inches
Parsonburg	May 29, 2009	Golf ball size hail was reported.	1.75 inches
Chesapeake Heights	May 29, 2009	Half dollar size hail was reported.	1.25 inches
Willards	May 29, 2009	Golf Ball size hail was reported.	1.75 inches
Mount Hermon	June 3, 2009	Penny size hail was reported in the vicinity of Snow Hill and Johnson Road.	.75 inches
Tyaskin	June 3, 2009	Nickel size hail was reported.	.88 inches
Melson	June 3, 2009	Nickel size hail was reported.	.88 inches
2016 HMP Update			
Salisbury	August 1, 2011	Scattered severe thunderstorms in advance of a weak cold front produced large hail across portions of the Lower Maryland Eastern Shore.	1.75 inches
Delmar	August 19, 2011	Scattered severe thunderstorms in advance of a cold front produced damaging winds and large hail across portions of the Lower Maryland Eastern Shore. Quarter size hail was reported.	1.00 inches

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of 28 hail events affecting Wicomico County from 1967-2015. Therefore, Wicomico County experiences 0.57 hail events per year. The frequency of hail events has increased during the last decade.

HAIL VULNERABILITY

Damage to crops is one of the most significant concerns during a hail event. Wicomico County has had the majority of its recorded hail events either before or at the beginning of the growing season. This reduces the amount of crop damage for the County. In addition to crop damage, property damage occurs during hail events. Auto dealerships are particularly vulnerable due to the large volume of product located outdoors. The scale of damage due to the number of cars on large open parking lots can oftentimes be significant, as it is accumulative impact.

LIGHTNING HAZARD CHARACTERIZATION

According to *NOAA*, lightning is created as a discharge of built up energy due to the separation of positive and negative charges which are generated inside the thunderstorm. Since 1959, an average of 72 people die each year nationally as a result of lightning strikes. In Maryland, there have been 12 lightning deaths according to the National Lightning Safety Institute. All lightning is dangerous and even the weakest thunderstorm produces lightning. People engaged in

swimming, golfing, or hiking are at the highest risk for lightning strike. Lightning strikes have resulted in over 15 thousand structural fires, and burn approximately 2 million acres of forest per year in the United States.

LIGHTNING HAZARD RISK & HISTORY

As indicated in Table 7.6 below, lightning strikes have caused five (5) structural fires and injured one person and killed another in Wicomico County within the fifteen years of reported data.

Table 7.6: Lightning Events

Location	Date	Event Narrative	Property Damage
Fruitland	June 15, 1998	Lightening strike caused a fire to a barn and also struck and killed a 20 year old man	$20,000
Salisbury	April 9, 2001	Lightening strike caused a fire to a chicken house	$10,000
Fruitland	July 1, 2009	One person was struck by lightning. The individual was released after receiving medical attention.	Not Available
2016 HMP UPDATE			
Salisbury	September 5, 2012	Lightning caused three house fires in a short period of time in the Salisbury city limits. Scattered thunderstorms in advance of a cold front produced lightning which caused several house fires across portions of the Lower Maryland Eastern Shore.	$75,000

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of four (4) lightning events affecting Wicomico County from 1998-2015. Therefore, Wicomico County experiences 0.22 lightning events per year.

LIGHTNING VULNERABILITY

As shown in the hazard risk and history for lightning, structural fires do occur in the County as a result of lightning strikes. Fortunately, the damage is usually minor. Critical and public facilities should be aware of the risks of such a hazard occurring, particularly power failure. Emergency back up generators should be installed at these facilities.

WIND EVENTS IN WICOMICO COUNTY

High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how winds can occur without the presence of thunderstorms, such as strong low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. Table 7.7 and 7.8 list high wind events chronologically in order to assess the history of high and strong wind events that have occurred in Wicomico County. High wind events as characterized by *NWS* are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.

Table 7.7: High Wind Events

Location	Date	Event Narrative	Magnitude (MPH)	Property Damage
Salisbury	September 22, 1994	Not Available.	Not Available	$5,000
Salisbury	November 2, 1999	Non-thunderstorm wind gust of 54 knots (62 mph) with trough passage in downtown Salisbury along Route 50.	62	Not Available
Countywide	September 1, 2006	The remnants of Ernesto along the Mid Atlantic coast combined with strong high pressure over New England produced very strong winds across the Lower Maryland Eastern Shore. Sustained winds in mph ranged from the lower 40s to near 50 with maximum gusts ranging from the mid 50s to as high as the mid 70s. Some higher sustained winds included 45 mph (39 knots) at Salisbury. The high winds caused numerous downed trees and power outages, along with significant structural damage.	45 – 66	5 Million
Not Available	May 11, 2008	Ocean City Coast Guard Station measured a wind gust of 63 mph. High winds from strong low pressure downed trees and powerlines, and caused some structural damage. There were widespread power outages.	63	$25,000
Salisbury	December 31, 2008	Wind gust of 54 knots (62 mph) was measured at Salisbury. Several trees were downed.	62	$2,000
2016 HMP UPDATE				
Countywide	February 25, 2011	Wind gust of 59 mph was measured by SBY.	59	$2,000
Countywide	October 29, 2012	The very strong winds caused by Tropical Cyclone Sandy downed trees, produced minor structural damage, and caused scattered power outages.	58	$10,000

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of seven (7) high wind events affecting Wicomico County from 1994-2015. Therefore, Wicomico County experiences 0.30 high wind events per year.

Table 7.8: Strong Wind Events

Location	Date	Event Narrative	Magnitude (MPH)	Property Damage
Salisbury	February 10, 2008	Wind gust of 48 mph was measured at Salisbury.	48	$1,000
Salisbury	March 8, 2008	Wind gust of 42 knots (48 mph) was measured at Salisbury.	48	$1,000
2016 HMP Update				
No Strong Wind events were reported in the NCDC database since the 2011 HMP Planning Process.				

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of two strong wind events affecting Wicomico County from 2008-2015. Therefore, Wicomico County experiences 0.25 strong wind events per year.

CHAPTER 8 – FLOODING PROFILE AND VULNERABILITY ASSESSMENT

INTRODUCTION

New Digital Flood Insurance Risk Maps (FIRM) developed for Wicomico County became effective in August 2015. The development of new digital FIRMs for every county in the State of Maryland is being conducted by the Federal Emergency Management Agency (FEMA). FIRMs are transiting from a paper product to various digital products. Through the utilization of Geographic Information System (GIS) data sets and digital topography, georeferenced HEC-RAS model for most of the riverine flood models were developed. The result of this model is an enhance riverine (non-tidal) mapping process that provides updated riverine floodplain models in both detailed Zone AE and approximate study Zone A areas. In addition to the updated riverine floodplains, FEMA is also conducting new coastal flood analysis for the Chesapeake Bay, its tidal tributaries and the Atlantic Coast and Coastal Bays. These results will be provided on the new DFIRMs.

HAZARD CHARACTERIZATION

The FEMA definition for flooding is "a general 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 thunderstorms, hurricanes, snow melt or some combination of the above events.

The State of Maryland is subject to three types of flooding:

- Nontidal – flooding from rivers and streams (riverine flooding).
- Tidal – flooding from tides and storm surges (discussed in Ch.4 – Coastal Storms).
- Coastal – tidal flooding combined with wave action (discussed in Ch.4 – Coastal Storms).

There are two different types of flooding that are associated with rivers and streams: flash flooding and riverine flooding. Flash flooding occurs from the combination of rainfall intensity and duration. Typically, the determining characteristics that can induce a flash flood include high rainfall intensity over a short time duration. Flash floods can be further influenced by local topography, the ground's capacity to hold water and soil moisture content. The sudden release of water can also cause flash floods, such as the breakup of an ice jam or dam. One of the deadliest flash floods in Maryland killed 14 people. The flood occurred in eastern Baltimore County when 11 inches of rain fell in a 10 hour time span on August 1-2, 1971.

Riverine flooding is caused by persistent moderate or heavy rain over one or more days. Remnants of hurricanes can also cause riverine flooding. Riverine flooding can be combined with snowmelt, causing a river to slowly rise and overflow its banks. This type of flooding can

take several days or even weeks to rise out over its banks, which typically provides adequate warning for people to move to higher ground.

Flooding is the most common, destructive, and deadliest natural disaster in the nation. Almost 90% of Presidential declarations involve flooding. Annual flood damage nationwide averages six billion dollars. In Maryland, flooding is a concern because it is a coastal state with over 12 percent of its surface area in floodplains and has approximately 8,000 miles of tidal shoreline.

Major drainage basins within the County provide drainage directly into the Chesapeake Bay. The eastern one-third of the County drains south toward the Pocomoke River and its tributaries. The central portion of the county is drained by the Wicomico River which flows in a southwesterly orientation. The portion of the County west of a line extending from the Delaware state line south through Hebron to Nanticoke is drained by the Nanticoke River.

The maximum elevation within the Nanticoke River watershed is approximately 40-feet above sea level. The highest elevation within the Wicomico River and Pocomoke River watersheds in the County are 60-feet and 85-feet, respectively. The highest elevation in Wicomico County, 85-feet, is near the Town of Parsonsburg (USGS).

The irregular shoreline is a result of drowned river valleys formed by the gradually sinking land mass. This has led to a change in the overall drainage patterns due to widening rivers and creeks. Extensive estuaries and tidal basins have resulted, producing a myriad of waterways.

HAZARD RISK & HISTORY

According to the FEMA *Flood Insurance Study*, Wicomico County has a low lying, relatively undisturbed topography, high seasonal water tables, poor drainage and high soil runoff characteristics. These factors combine to result in a high flooding potential. When heavy rainfall and elevated river discharges combine with storm tides, low lying areas adjacent to rivers and estuaries become inundated with saltwater. Major floods in the Wicomico County area have occurred in 1876, 1933, 1935, 1954, 1955, 1967, 1972, 1975, 1984, 1999, 2003, 2006, 2011, and 2012. Few detailed historical records of flood damage are available in terms of flooding associated with flash flooding. Wicomico County has been affected over recent years by heavy rains and flash flooding as shown in Tables 8.1 and 8.2.

Little is known of the 1876 flood, which is known locally as the Centennial Storm. Senator J.S. Shepard stated in 1933 that the Centennial Storm resulted in severe damage to the lower sections of Dorchester and Wicomico Counties where thousands of acres were ruined by saltwater flooding. Wicomico County experienced tides running five feet higher than the normal high tide which at that time was the highest ever experienced (The Cambridge Record).

On August 17, 1955, Hurricane Diane induced tides 1.5 to 2.5 feet above normal. The full force of the hurricane missed the Delmarva Peninsula and Wicomico County (The Banner). Hurricane Donna struck on September 16, 1960 causing minor wind and water damage (Star Democrat). No tidal information can be found for this storm. Tropical Storm Agnes brought winds up to 55 miles per hour during late June 1972 (The Banner). Some local flooding occurred but damage

was primarily restricted to crops. Heavy rains caused statewide flooding and intense costal erosion, especially along the lower Chesapeake Bay on March 28–29, 1984 (MDE). Hurricane Floyd caused widespread flooding on the northern portion of the Eastern Shores on September 16, 1999 (MDE). Remnants of Hurricane Isabel caused widespread tidal surge flooding on September 18-19, 2003 (MDE) causing the worst recorded flooding in the County's history. Isabel produced four to five foot storm surges on the Wicomico and Nanticoke Rivers and caused 15 deaths Statewide. A large storm event in June 2006 dropped 3 to 6 inches of rain in most of Wicomico County between June 22 and June 30, 2006 (NWS), which caused widespread flooding.

Since 2009, Wicomico County has not experienced major flash flood events. However, heavy rains produced by Hurricane Irene caused widespread low-land flooding for much of the County, which washed out or closed several roadways. Total rainfall recorded ranged between six (6) to ten (10) inches in the County. The Town of Pittsville reported 7.79 inches, while the City of Salisbury reported 7.75 inches. In 2012, Hurricane Sandy produced heavy rain causing numerous roads to close due to the flooding. This storm produced a total rainfall from five (5) to nine (9) inches across the County. The City of Salisbury report a total of 7.55 inches. In terms of heavy rain events associated with thunderstorms, Wicomico County experienced two (2) events; one in 2010 and another in 2014. Neither event caused significant flooding nor where road closures were reported.

Table 8.1: Flash Flood Events

Location	Date	Event Narrative	Property Damage
Salisbury	May 25, 1995	Up to 3 feet of water at some intersections in and east of downtown Salisbury leaving several vehicles trapped and occupants being rescued.	0
Salisbury	June 16, 1996	Two and half inches of rain in one hour produced flooding of several streets and intersections in the city of Salisbury. The flooding was exacerbated due to backing up of water drainage systems.	0
Delmar	September 2, 2000	Slow-moving thunderstorms dumped heavy rain over portions of the Eastern Shore causing flooding of the East Line Road near Route 13.	0
Wango	September 1, 2002	Portions of Ben Davis Road and Wango Road closed due to high water; bridge on Berar Swamp Road washed out.	0
Powellville	May 17, 2004	Purnell Crossing Road was washed out between Willards and Powellville.	0
Salisbury	June 23, 2006	Roads were flooded in downtown area of Salisbury.	0
Wicomico	July 29, 2007	Several roads were reported closed due to excessive rainfall, for example, Camden Avenue due to 1 foot of water covering the road.	0
Salisbury	August 2, 2009	Numerous roads were flooded throughout the city with a water depth of 2 feet	0
2016 HMP Update			
No Flash Flood events were reported in the NCDC database since the 2011 HMP Planning Process.			

Source: NWS, NCDC (NOAA)

Table 8.1 provides data from, The National Weather Service - National Climatic Data Center that listed a total of 8 flash flood events affecting Wicomico County from 1995-2009. According to the data, Wicomico County experiences approximately 0.53 flash flood events per year.

Table 8.2: Heavy Rain Events

Location	Date	Event Narrative	Property Damage
Salisbury	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
Salisbury	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
Wicomico	October 24 to October 27, 2007	Rainfall amounts averaged between 2 to 3 inches across the County.	Not Available
Parsonburg	December 10 to December 12, 2008	Rainfall amounts between 1 to 4 inches occurred across the County. 3.01 inches was measured at Parsonsburg.	Not Available
Wicomico County Airport	November 11 to November 13, 2009	Salisbury recorded 3.95 inches of rain. Two and a half miles west southwest of Salisbury recorded 3.72 inches of rain.	Not Available
2016 HMP Update			
Salisbury	March 29, 2010	Rainfall amounts of one to three inches occurred across the county. Salisbury reported 2.04 inches of rain. Showers and thunderstorms associated with low pressure and a cold front produced one to three inches of rain across portions of central and eastern Virginia from Sunday night, March 28th, into Monday evening March 29th.	0
Wicomico	May 16, 2014	Salisbury (SBY) reported 1.32 inches of rain. Heavy rain occurred along a frontal boundary across much of the Lower Maryland Eastern Shore. Rainfall amounts were mainly between one and two inches.	0

Source: NWS, NCDC (NOAA)

The National Weather Service, National Climatic Data Center listed a total of 7 heavy rainfall events affecting Wicomico County from 1998-2014; those events are provided on Table 8.2. According to the data, Wicomico County experiences approximately 0.44 heavy rainfall events per year.

VULNERABILITY

Flood zones are the geographic areas that FEMA has defined according to their varying levels of flood risk. The flood zones for Wicomico County are described in Table 8.3.

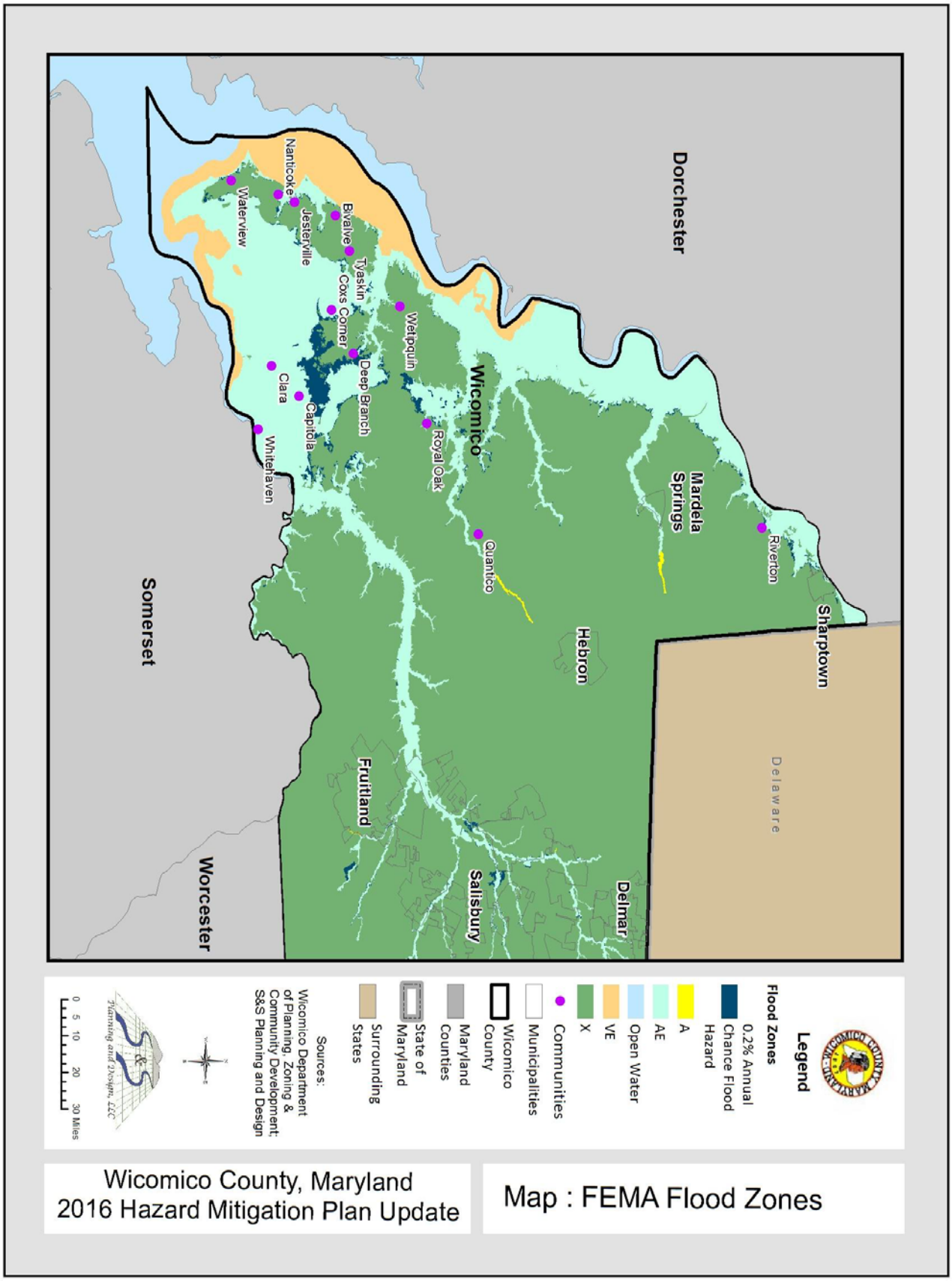
Table 8.3: Flood Zone Descriptions

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. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
High Risk – Coastal Areas	
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 to Low 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 protected by levee from 100-year flood.
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.

Source: FEMA

As depicted below on Map 8.1, the western and southern portions of Wicomico County are most vulnerable to flood risk. The western area is within Zones A, AE and VE. Several communities, such as Coxs Corner, Clara, Capitola and Whitehaven are located within the southern tip of the Wicomico County and are within Zone AE. While other numerous communities are located in close proximity to Zones A and AE. For example, Wetipquin, Deep Branch, Tyaskin, Nanticoke, Jesterville, Bivalve, Waterview and Riverton are on the fringe of Zone AE. These communities, specifically those located within Zone AE are prone to flooding during a 100 year flood event due to the Nanticoke River. Mitigation measures such as installing flood vents should be taken to minimize or avoid damage caused by flooding.

Map 8.1: FEMA 2015 Effective DFIRM Flood Zones



FACILITIES AT RISK

Critical facilities are facilities that are critical to the health and welfare of the population and are important to the type of hazard event such as shelters, police and fire stations, and hospitals. These facilities warrant special attention in preparing for a disaster and are of vital importance in maintaining the function of the community.

During the 2016 Plan Update, Wicomico County Flood Insurance Rate Maps (FIRM) became effective August 17, 2015. The new mapping was utilized to determine if critical and public facilities listed on Table 8.4 are located within each corresponding flood zone. Twenty-seven (27) critical and public facilities are located within Zone AE on the effective FIRM. There are no critical and public facilities located within Zone A or VE.

Table 8.4: Critical and Public Facilities- 2015 Effective DFIRM

Facility Type	Number of Facilities	Detail of Facility	Address of Facility	City
FLOOD ZONE AE				
County Owned	1	Parks and Recreation	2848 LEONARDS MILL POND DR	Salisbury
Emergency	1	City of Salisbury Fire Safety Station No. 16	325 CYPRESS ST	Salisbury
Marina/Dock	7	Salisbury Boat Marina	506 W MAIN ST	Salisbury
		Roads Division	23865 RIVER ST	Quantico
		Boat Marina	23851 RIVER ST	Quantico
		Boat Marina	3180 WINDROWS WAY	Eden
		Park and Recreation Dock	WETIPQUIN ROAD	Bivalve
		Nanticoke Harbor	20411 HARBOR ROAD	Nanticoke
		Cedar Hill Parkway	20945 HARBOR VIEW ROAD	Bivalve
Medical	1	Private Medical Building	312 W CARROLL ST	Salisbury
Museum	1	Whitehaven Schoolhouse	2740 CHURCH ST	Quantico
Storage Tanks	14	Underground storage tank	1535 NORTHWOOD DR	Salisbury
		Industry Tank Farm	317 LAKE ST	Salisbury
		Industry Tank Farm	FITZWATER ST	Salisbury
		Underground Storage Tank	710 FITZWATER ST	Salisbury
		Industry Tank Farm	FITZWATER ST	Salisbury
		Industry Tank Farm	418 MILL ST	Salisbury
		Industry Tank Farm	325 LAKE ST	Salisbury
		Underground Storage Tank	608 W MAIN ST	Salisbury
		Industry Tank Farm	LAKE ST	Salisbury
		Industry Tank Farm	313 LAKE ST	Salisbury
		Underground storage tank	521 MACK AVE	Salisbury
		Industry Tank Farm	333 LAKE ST	Salisbury
		Underground Storage Tank	223 LAKE ST	Salisbury
		2 underground storage tanks	241 CYPRESS ST	Salisbury
Utility	2	Salisbury Northside Pump Station	100 DELAWARE AVE	Salisbury
		Salisbury Park Water Treatment Plant	NORTH PARK DR	Salisbury
FLOOD ZONE 0.2% ANNUAL CHANCE FLOOD HAZARD				
County Owned	1	Housing Authority	615 JEFFERSON ST	Salisbury
Total Facilities			**28**	

Source: S&S Planning and Design

Table 8.5 consists of critical and public facilities that were identified as being located within Zones A and AE on the previous FIRM.

Table 8.5: Critical and Public Facilities- Previous DFIRM

Facility Type	Number of Facilities	Detail of Facility	Address of Facility
FLOOD ZONE A			
County Owned	1	Health Department	302 W CARROLL ST
Medical	3	Private Medical Building	533 RIVERSIDE DR
		Private Medical Building	545 RIVERSIDE DR
		Private Medical Building	205 S DIVISION ST
Municipally Owned	2	Salisbury Parking Garage	115 E MARKET ST
		Salisbury Public Works	400 W ISABELLA ST
Storage Tanks	2	Underground Storage Tank/ 7 Above Ground Storage Tanks	800 FITZWATER ST
		4 Above Ground Storage Tanks	337 LAKE ST
FLOOD ZONE AE			
County Owned	1	Housing Authority	615 JEFFERSON ST
Storage Tanks	1	Industry Tank Farm	1132 MARINE ROAD
Total Facilities		**10**	

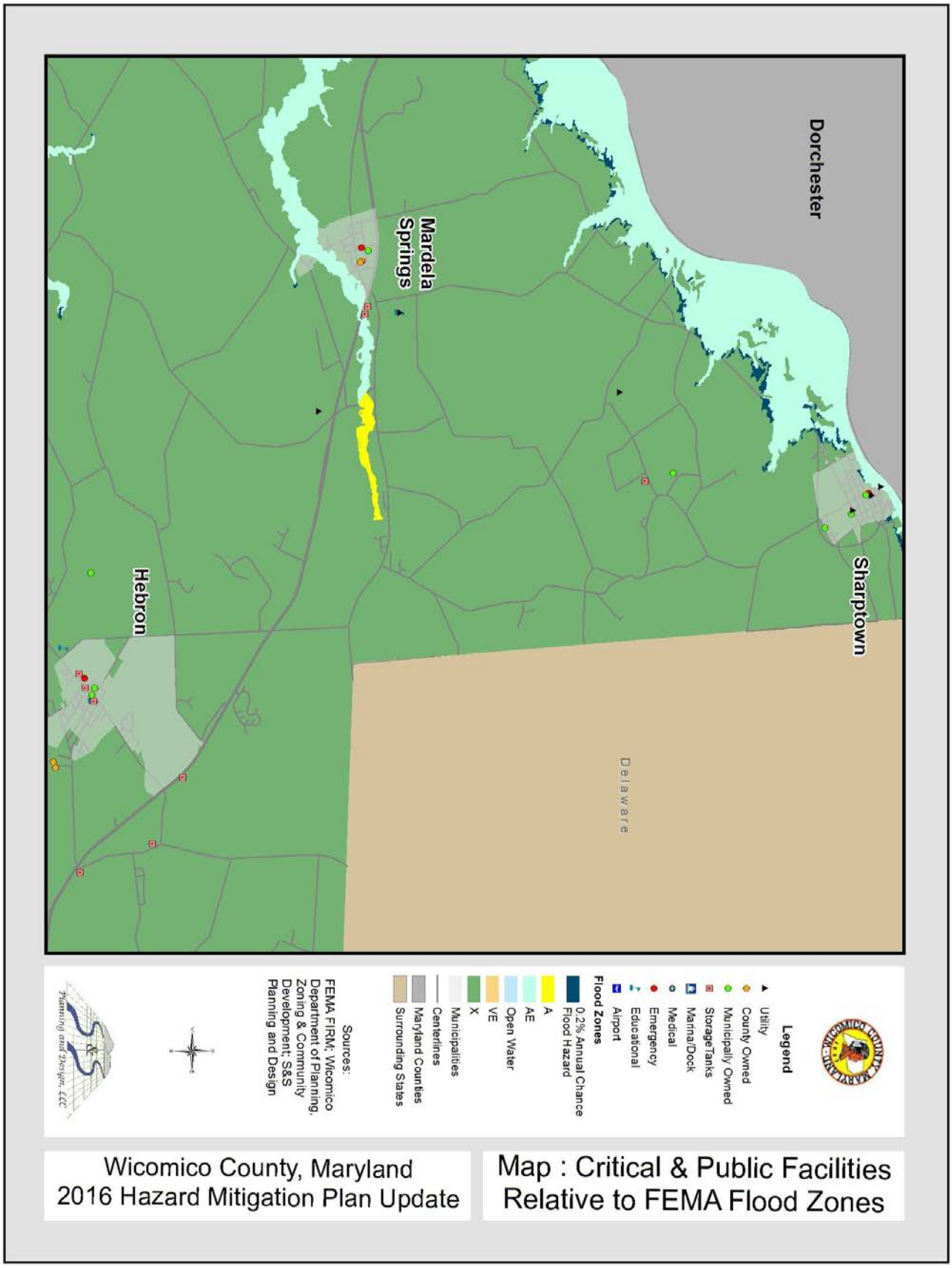
Source: S&S Planning and Design

Flood Zone X or areas of minimal flood hazard contains the remaining 395 critical and public facilities. Therefore, all facilities that are not listed in the above tables are in Flood Zone X and can be found in the Appendix section of the document. Note: All critical and public facilities are within one of the designated FEMA Flood Zones.

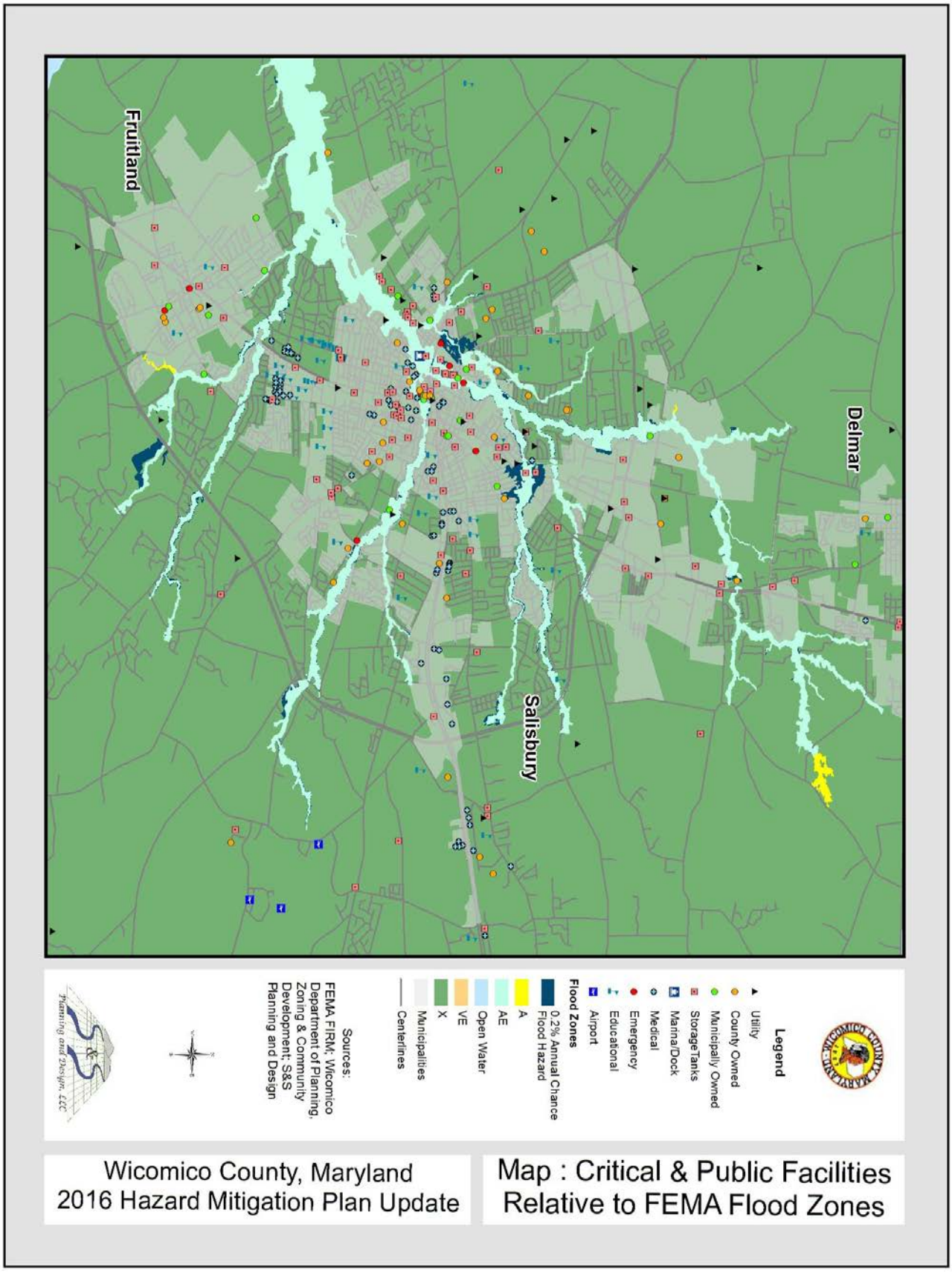
The followings maps, Map 8.2, 8.3 and 8.4, depict the location of critical and public facilities within the new effective DFIRM. As noted on the tables above, 10 critical and public facilities are no longer located within Flood Zones A or AE. The majority of critical and public facilities are located in and around Salisbury and the unincorporated areas of the County, which are intersected by the Wicomico River. As shown on Map 8.3, tributaries of the Wicomico River transect the City of Salisbury. Therefore facilities located in close proximity to the floodplain of the Wicomico River or its tributaries have a higher potential of flooding. As noted on Table 8.4, twenty (20) of the twenty-eight (28) critical and public facilities are located within the City of Salisbury and are located in Zone AE. Only one facility is located within Flood Zone 0.2% Annual Chance Flood Hazard. This zone is a minimal flood hazard and property owners are not required to obtain flood insurance.

Due to MDE and FEMA utilizing Geographic Information System (GIS) data sets and digital topography to develop georeferenced HEC-RAS models, an enhanced flood study could be produced, hence a more accurate floodplain. Map 8.5 illustrates where critical and public facilities are within relation to the previous DFIRM. As stated in Table 8.5, ten (10) critical and public facilities that were located within the floodplain on the previous DFIRM are no longer since the development of new effective DFIRM.

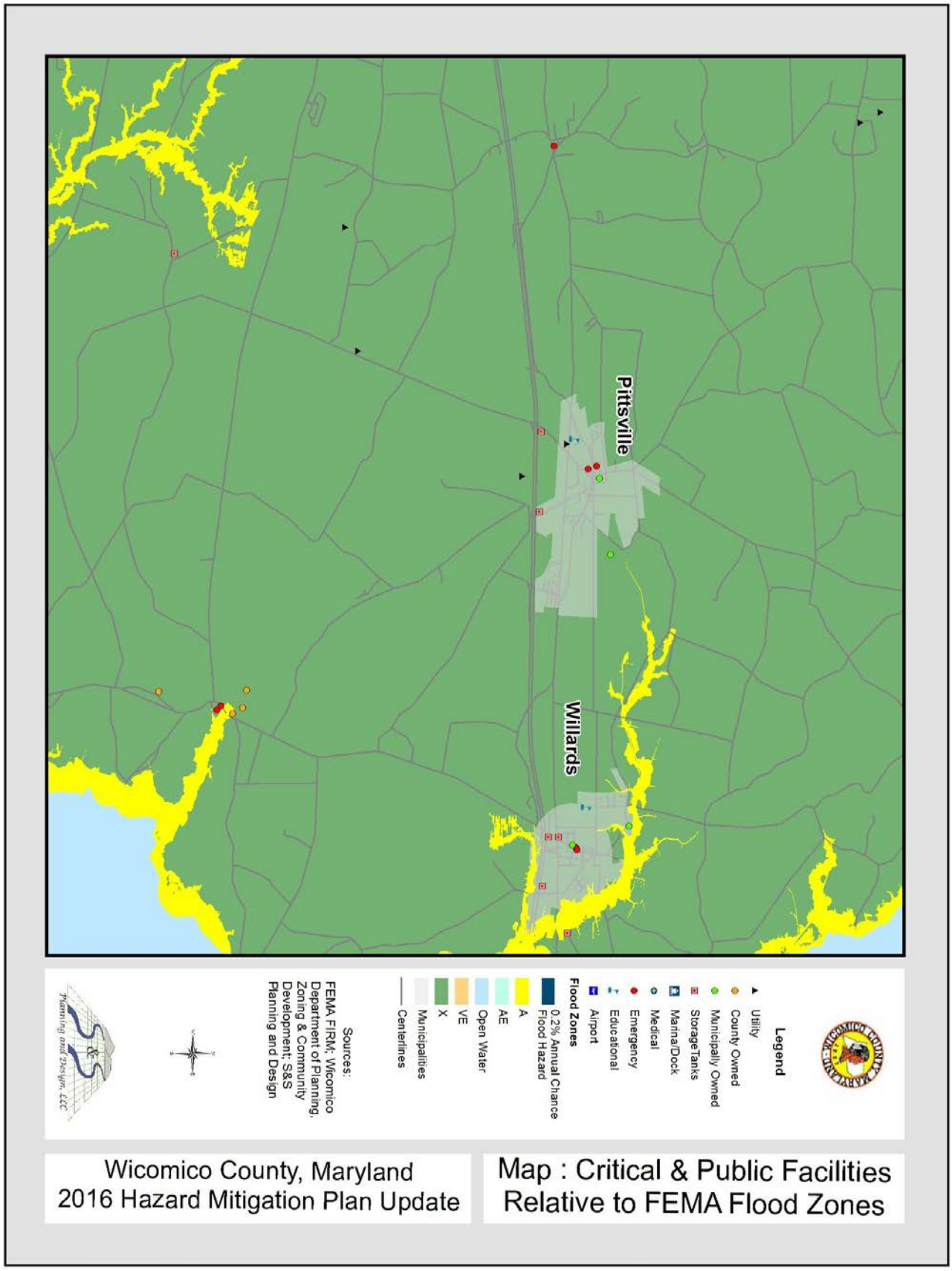
Map 8.2: Critical and Public Facilities– Sharptown, Mardela Springs, Hebron



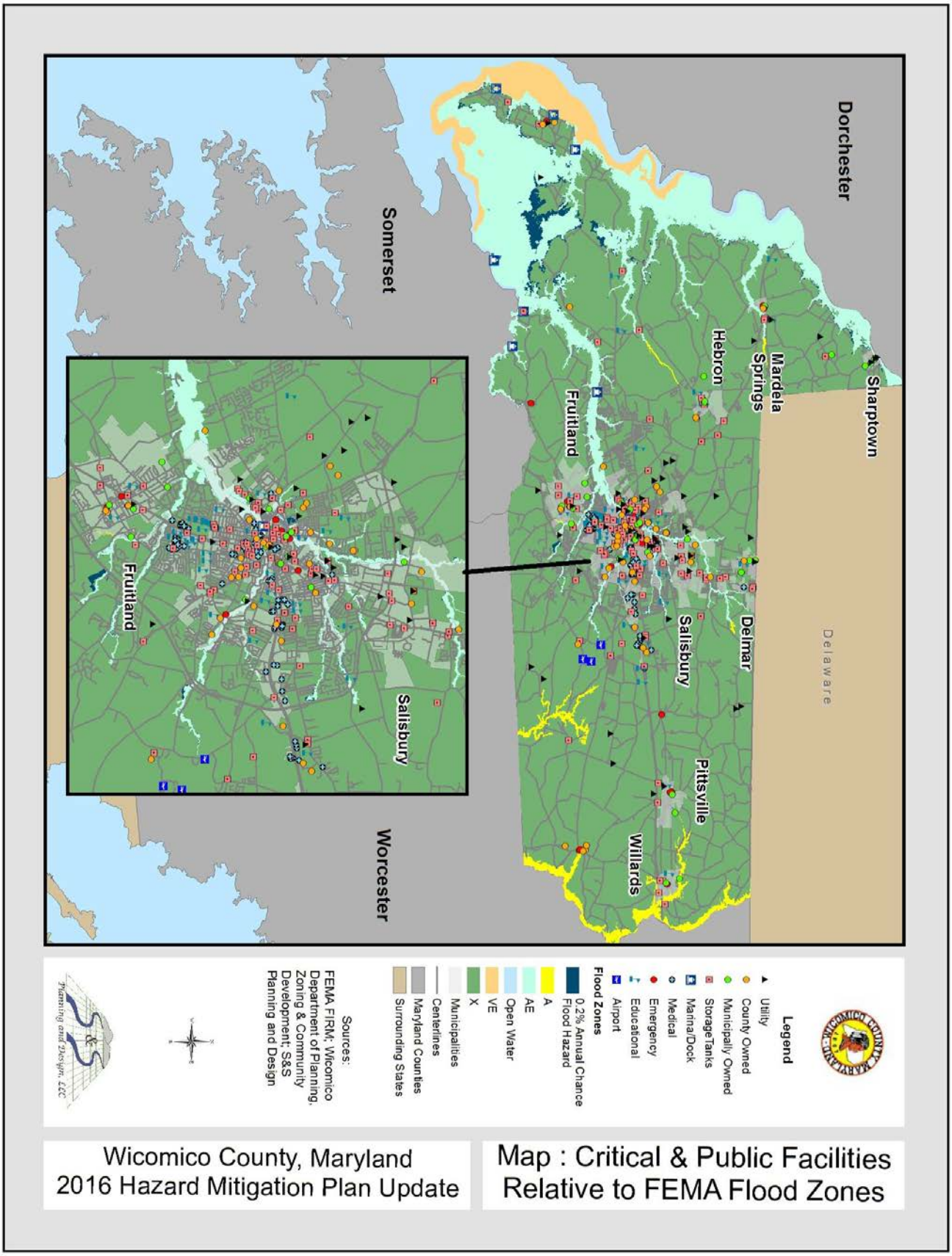
Map 8.3: Critical and Public Facilities– Delmar, Salisbury, Fruitland



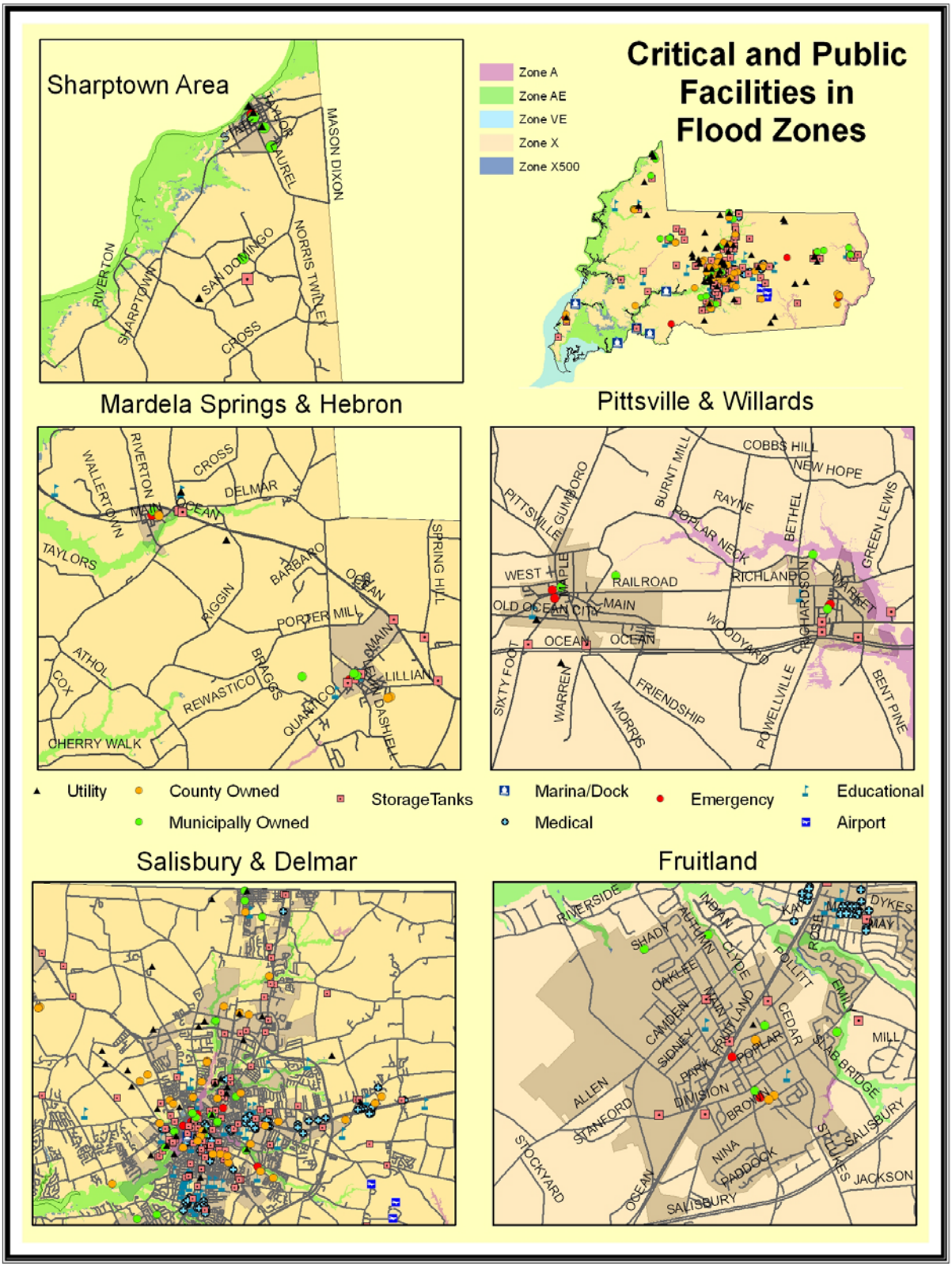
Map 8.4: Critical and Public Facilities– Pittsville, Willards



Map 8.5: Critical and Public Facilities– 2015 Effective DFIRM



Map 8.6: Critical and Public Facilities– Previous DFIRM



Source: S&S Planning and Design

LOSS ESTIMATES

Loss estimates for critical and public facilities located within all flood zones were calculated. These calculations were derived from Maryland Tax Assessment values. Total loss estimates for Flood Zones A, AE, VE and X totaled $1,020,923,850.

Table 8.6: Loss Estimates for Critical and Public Facilities

Facility Type	Loss Estimates				
Flood Zone	**A**	**AE**	**VE**	**X**	**0.2% Annual Chance Flood Hazard**
Airport	$0	$0	$0	$11,321,600	$0
County Owned	$0	$586,900	$0	$107,995,730	$80,440
Educational	$0	$17,100	$0	$300,815,300	$0
Emergency	$0	$6,425,200	$0	$11,543,100	$0
Marina/Dock	$0	$1,551,400	$0	$582,000	$0
Medical	$0	$524,800	$0	$225,177,490	$0
Municipally Owned	$0	$0	$0	$18,960,630	$0
Storage Tanks	$0	$1,699,900	$0	$264,886,260	$0
Utility	$0	$150,500	$0	$68,605,500	$0
Total	**$ 0**	**$10,955,800.00**	**$ 0**	**$1,009,887,610.00**	$80,440

Source: S&S Planning and Design

Loss estimates in dollars for all facilities, including critical facilities by land use were also calculated from Maryland Tax Assessment values. Land use category estimates were also separated out by Flood Zone.

Table 8.7: Loss Estimates for All Facilities by Land Use

Land Use	Loss Estimates			
Flood Zone	**A**	**AE**	**VE**	**X**
Agricultural	474,650	10,837,950	1,316,250	182,698,880
Apartments	1,207,000	142,000	0	94,704,900
Commercial	26,703,800	8,925,400	8,300	661,708,700
Commercial Condominium	997,400	263,400	0	4,622,600
Commercial Residential	198,800	0	0	2,860,400
Country Club	0	0	0	3,963,500
Exempt	0	219,440	0	20,640,850
Exempt Commercial	39,616,700	9,132,600	19,700	1,055,150,400
Industrial	3,047,300	3,471,900	12,500	104,707,200
Marsh Land	0	35,790	0	0
Residential	4,878,860	64,264,050	5,856,550	3,122,721,880
Residential Commercial	0	0	0	1,618,700
Residential Condominium	398,000	113,000	0	36,107,560
Town House	322,830	965,630	0	50,495,140

Source: S&S Planning and Design and Maryland Department of Planning

NATIONAL FLOOD INSURANCE PROGRAM

FEMA's National Flood Insurance Program (NFIP) Insurance Report of Maryland released on October 8, 2015 details various statistics pertaining to flood insurance in Wicomico County and its municipalities.

Table 8.8: NFIP Insurance Report

Location	Number of Policies		Total Coverage		Total Claims Since 1978		Total Paid Since 1978	
	2011 Plan	2016 Plan	2011 Plan	2016 Plan	2011 Plan	2016 Plan	2011 Plan	2016 Plan
City of Fruitland	9	10	$2,485,000	$ 3,360,000	1	2	$0	$3,516
City of Salisbury	224	222	$51,887,600	$ 57,305,300	37	67	$487,667	$ 1,587,438
City of Sharptown	7	6	$1,787,900	$ 1,465,300	3	4	$490,289	$ 490,289
Town of Willards	1	3	$350,000	$980,000	0	0	$0	$0
Remaining part of Wicomico County	419	456	$104,828,700	$ 120,315,900	51	106	$472,372	$ 1,278,148
County Total	660	697	$161,339,200	$183,426,500	92	179	$1,450,328	$3,359,391

Source: Federal Emergency Management Agency NFIP Insurance Report, Maryland, October 2015

As noted on Table 8.8, the overall number of policies for Wicomico County have increased by 37 since 2011. Total claims paid since 1978 increased substantially during this planning cycle. Specifically the City of Salisbury claims increased from $487,667 to $1,587,438 in 2015.

REPETITIVE LOSS PROPERTIES

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 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:

- Any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period. A repetitive loss property may or may not be currently insured by the NFIP.

FEMA defines a severe repetitive loss property as:

- 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.

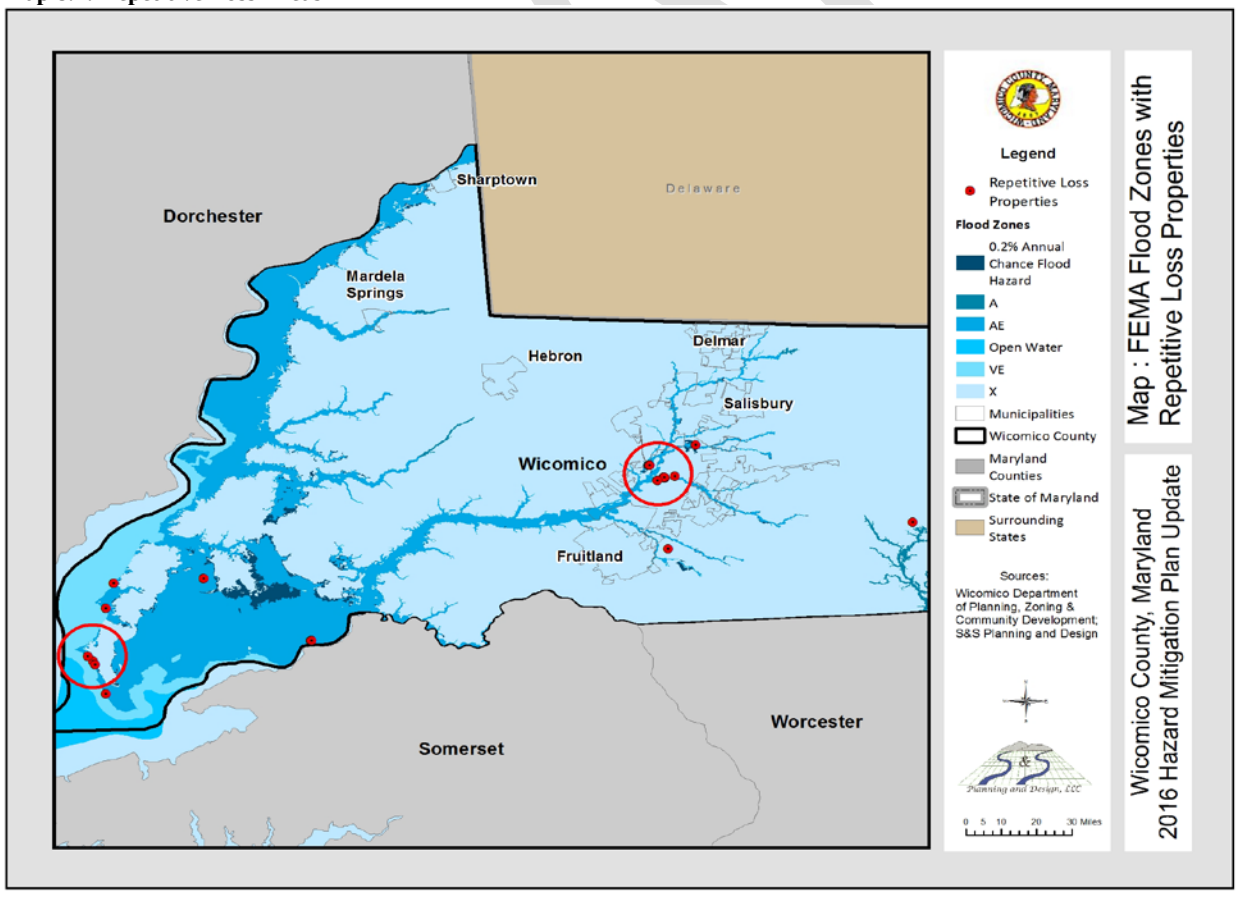
In May of 2010, there were only two repetitive loss properties that exist in Wicomico County. Both properties were residential, located in Salisbury, and were in Flood Zone A on Baptist Street and East Main Street, respectively.

As of September 2015, there are seventeen (17) repetitive loss properties that exist in the County. These include five (5) non-residential and twelve (12) residential properties with seven (7) being located in Salisbury, five (5) in Nanticoke, two (2) in Whitehaven, and one in each Tyaskin, Bivalve, and Parsonsburg. The structures located in Bivalve and Nanticoke are affected by the Nanticoke River, while structures in Whitehaven and Salisbury are affected by the Wicomico River. Tyaskin Creek is the source of flooding for the residential property in the Tyaskin community and the Waste Gate Creek affects the property in Parsonsburg.

Mitigation actions are currently under way for one of the properties located in Nanticoke. Mitigation activities to the structure include: elevating the existing home to comply with floodplain construction; removing the existing foundation and fill the basement to grade; and install flood vents per regulations.

In reviewing the list of repetitive loss properties, two areas have a high concentration of repetitive loss. One area is located in the City of Salisbury, while the other is located in Nanticoke. The area of concentration in Salisbury consists of commercial properties. Those in Nanticoke are residential.

Map 8.7: Repetitive Loss Areas



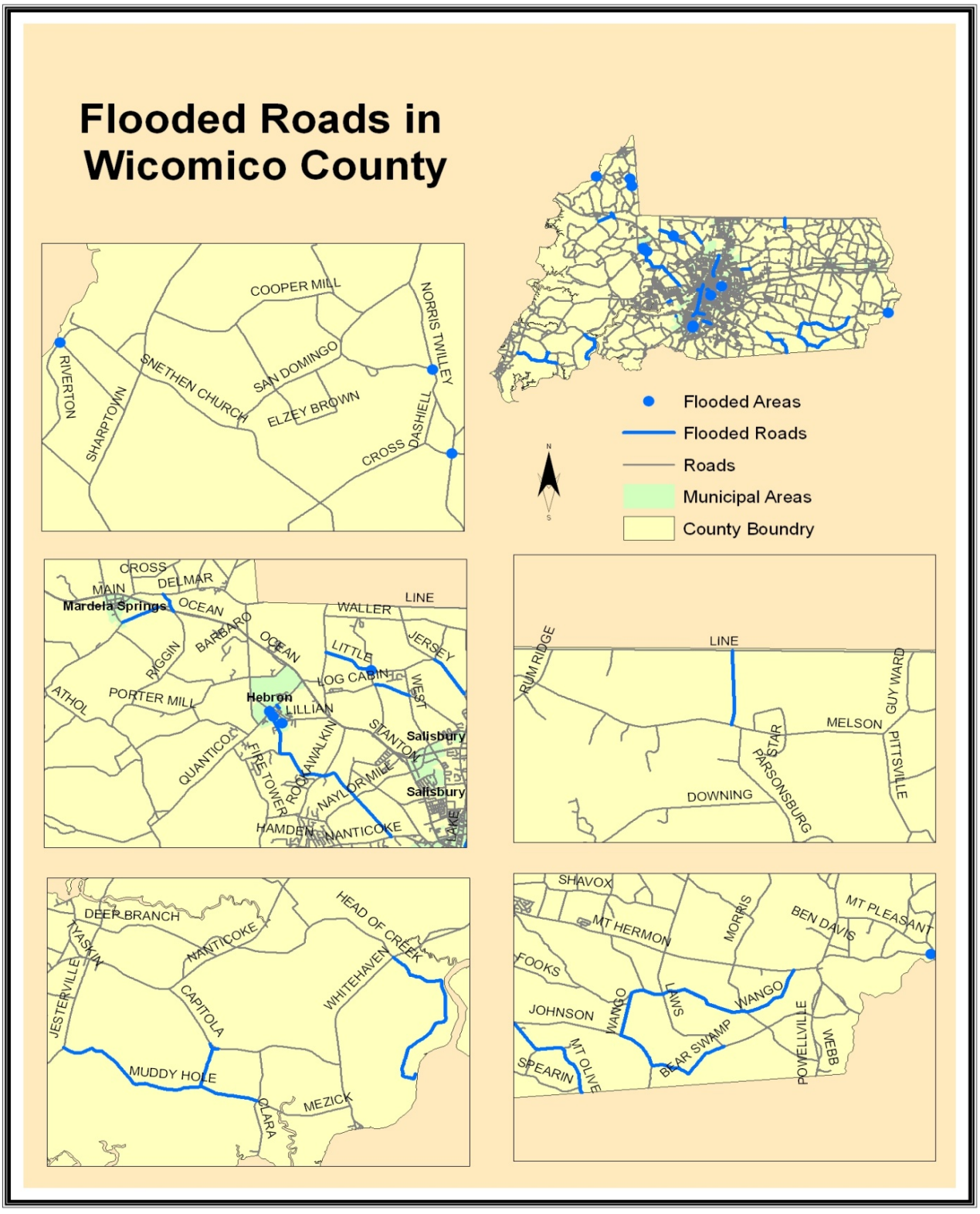
Repetitive loss properties are those properties that should be listed as a priority potential mitigation project as described in *Chapter 14 - Mitigation Strategies*.

FREQUENTLY FLOODED AREAS

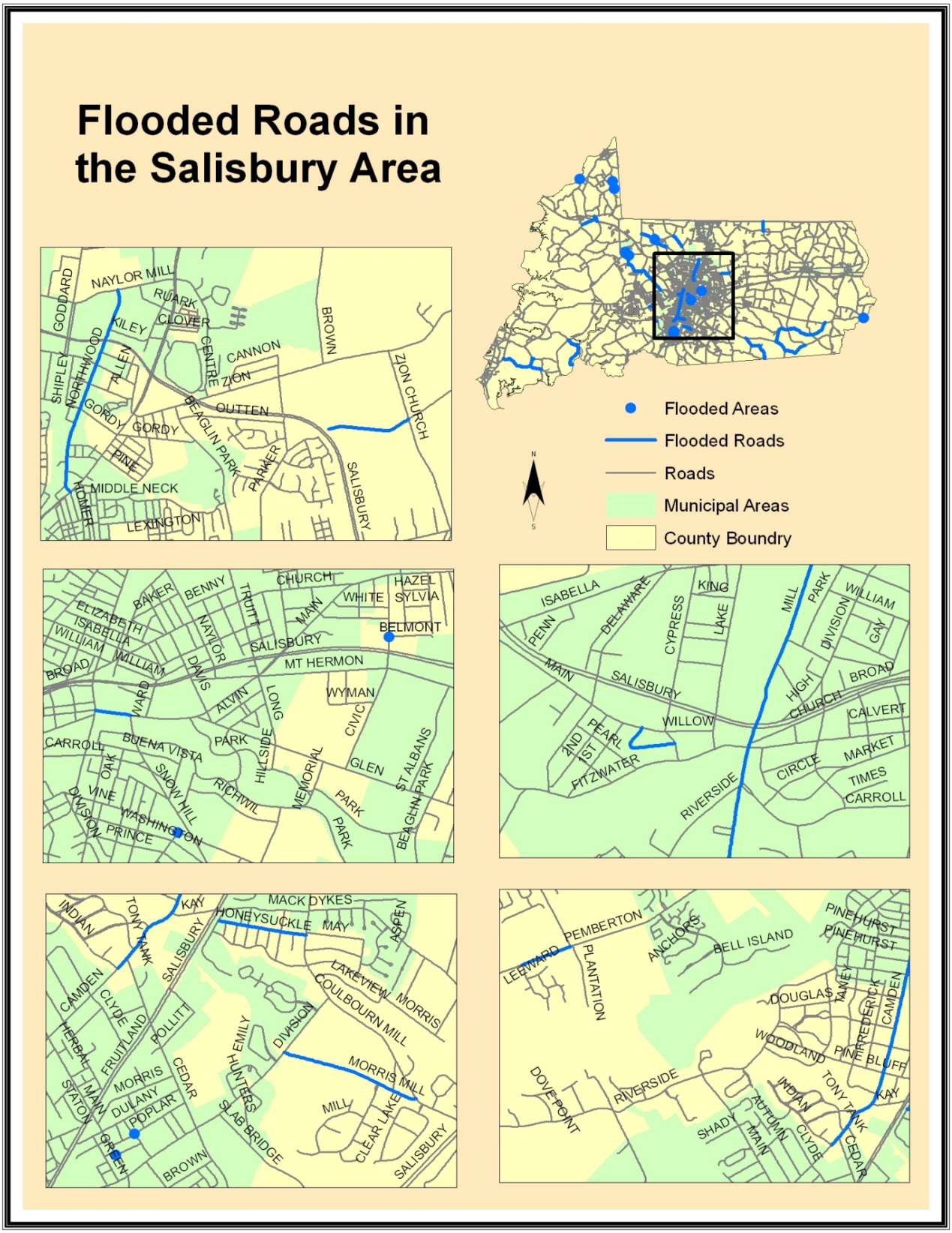
In 2010, the Hazard Mitigation Planning Committee (HMPC) identified various repetitive flooding locations within Wicomico County and its municipalities. During the 2016 Plan Update process, the 2015 HMPC reviewed the repetitive flood locations and provided modifications or additions where applicable. These repetitive flooding locations are problematic to the community at large due to the fact that road access is compromised. In addition, road closures impact evacuation routes and access to neighborhoods, critical and public facilities. These locations are depicted on the maps on the following pages and are discussed in more detail in the *Chapter 14 - Mitigation Strategies.*

Maps 8.8 and 8.9 illustrate the repetitive flood locations identified by the 2010 Hazard Mitigation Planning Committee, while Map 8.10 depicts the new locations identified by the 2015 HMPC. The City of Salisbury identified four (4) new flood related issues, the City of Fruitland provided there (3) new locations with flood related issues and the County identified three (3) new locations as well. The City of Salisbury also removed four (4) previously identified locations where the flood related issue was resolved.

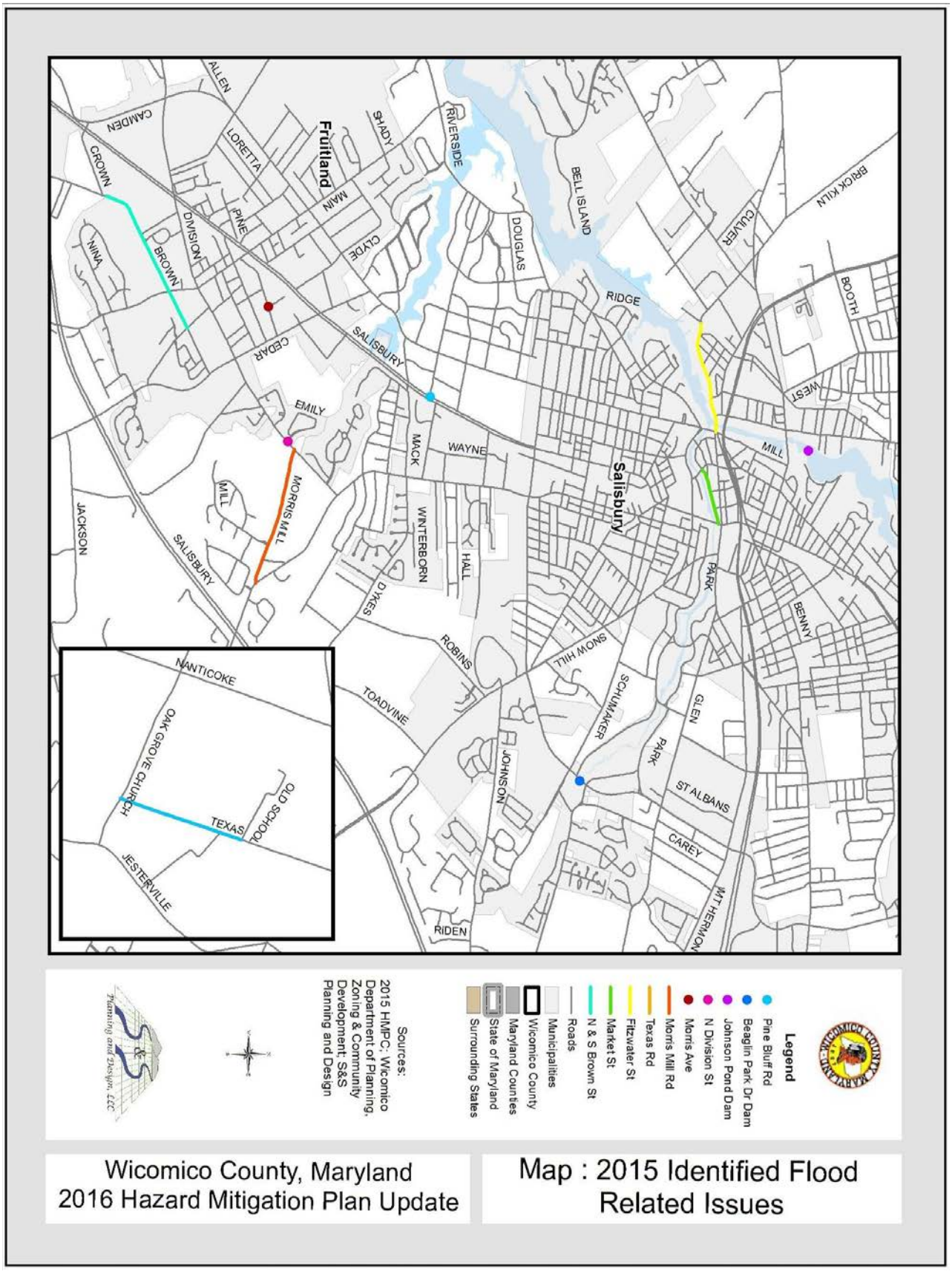
Map 8.8: Flooded Areas Identified in 2010



Map 8.9: Flooded Areas Identified in 2010 for the Salisbury Area



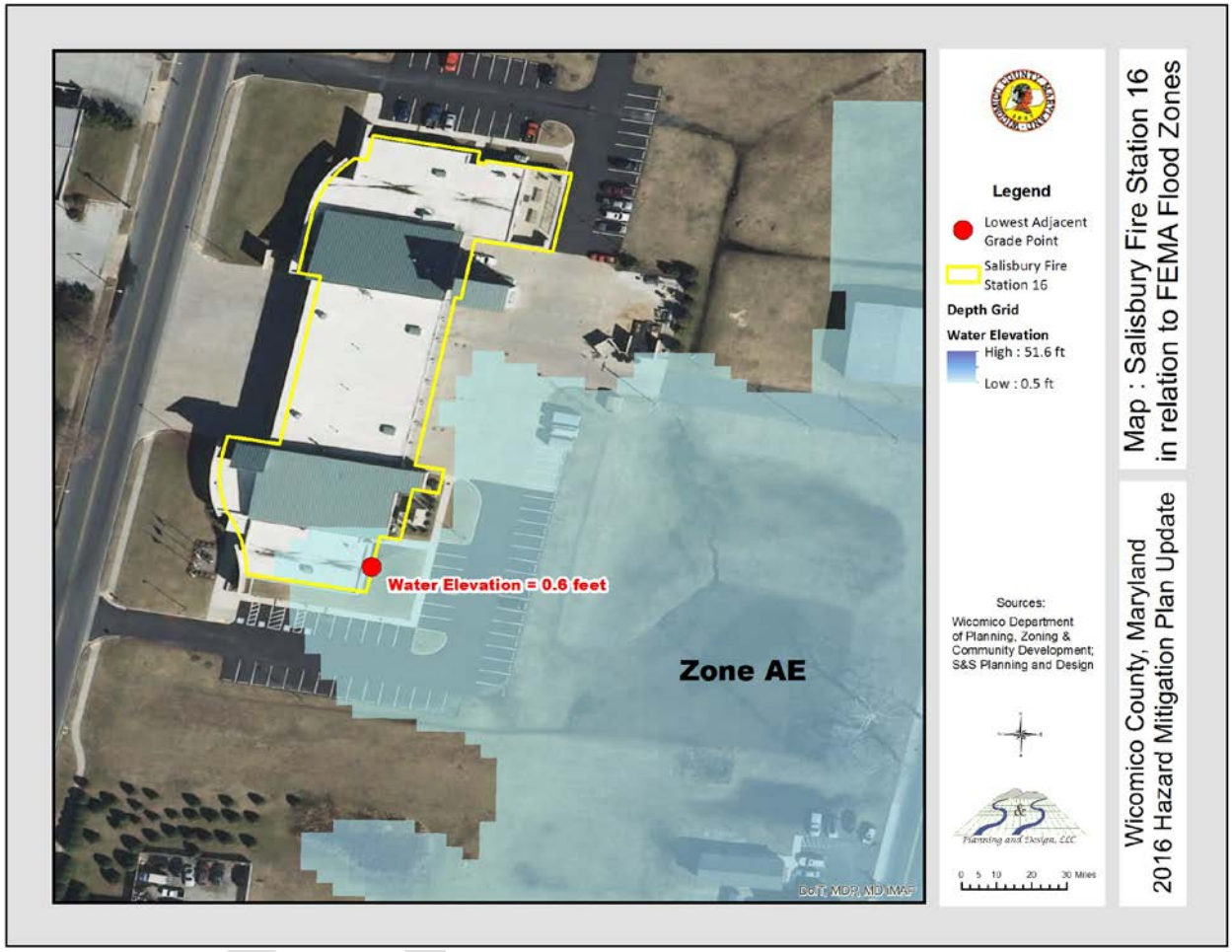
Map 8.10: New Flooded Areas Identified in 2015



CONCLUSION

Facilities at risk listed on Table 8.4 include the City of Salisbury Fire Station No. 16 and two (2) pump stations within Salisbury. These facilities are located within the Zone AE. The Salisbury Fire Station is considered an essential facility. Essential facilities are those facilities intended to provide services to the community in the event of a disaster.

Map 8.11: Salisbury Fire Station



Representatives from the Salisbury Fire Station indicated that there is no history of flooding at the facility. One past flood related issue was reported. This issue involved the stormwater management pond, which overflowed causing water to flow up to the parking lot, but did not overtop the parking lot.

Additionally, two (2) utilities within the City of Salisbury are located within the 100-year floodplain, Zone AE, and include: Salisbury Northside Pump Station on Delaware Avenue and the Salisbury Park Water Treatment Plant on North Park Drive.

The Station located on Delaware Avenue does not have any flooding issues considering the facility is located on elevated ground. However, the Fitzwater Pump Station located at 636 Fitzwater Street is impacted by flooding. The City of Salisbury is currently finalizing the reconstruction design for this site, which will include the elevation of all electrical components above the flood level.

According to the City of Salisbury, the Salisbury Park Water Treatment Plant located on North Park Drive does not have a history of flooding. As shown in the images below, the aerator building is on elevated ground and the pump building is on level ground. The storage building is below grade, however has not experienced flooding.

Photograph 2-3: Aerator Building Looking from the North

Photograph 2-1: Pump Building Looking from the East

Photograph 2-8: Below Grade Storage

Photo Source: City of Salisbury

CHAPTER 9 – WINTER STORMS

HAZARD CHARACTERIZATION

Winter storms can cause a wide variety of impacts including school, government and business closings, traffic accidents, power outages, loss of communication, and damage to buildings such as a roof collapsing due to the amount of snow pack. Sleet, freezing rain, snow, and extremely cold temperatures are all associated with winter storms. Flooding and flash flooding may also occur from warming temperatures that result in rapid snowmelt.

A winter storm warning is issued when snowfall is expected to accumulate more than four inches in 12 hours. The most significant snowstorms in Maryland history have had accumulations ranging from 12 to over 50 inches, and tend to occur in January or February.

HAZARD RISK & HISTORY

A historic record winter storm occurred in Wicomico County in February 2010 and the County received 20 inches of snow. The *National Weather Service, National Climatic Data Center* operating under *National Oceanic and Atmospheric Administration* reported one extreme cold event and 35 significant snow or ice events for the County; their descriptions are provided in Table 9.1 and 9.2, respectively.

Table 9.1: Extreme Cold Events

Date	Event Narrative
February 5 to February 7, 1996	An arctic air mass settled over the mid Atlantic states resulting in record breaking cold across the lower Maryland eastern shore. The temperature dropped to 1 below zero at the Salisbury airport on the morning of the 5th.
2016 HMP Update	
No Extreme Cold events were reported in the NCDC database since the 2011 HMP Planning Process.	

Source: NWS,NCDC(NOAA)

Table 9.2: Winter Storms - Significant Snow and Ice Events

Date	Event	Event Narrative
February 12, 1993	Winter Weather	A weak cold front moved east through the area and brought a mixture of winter weather to the region. Most places received rain, freezing rain, sleet, and snow. Numerous traffic accidents occurred across the state. Many school systems were closed or delayed Friday morning.
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 inches.
February 16, 1996	Winter Storm	A storm tracked northeast from western South Carolina Thursday night to off the north Carolina coast Friday morning, then moved north to off the Massachusetts coast by Friday night. It spread heavy snow across the lower Maryland eastern shore.
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	Salisbury and Fruitland in Wicomico County received 4 to 6 inches of snow.

Date	Event	Event Narrative
January 25, 2000	Winter Storm	Wicomico county including Salisbury received 6 to 9 inches, and Somerset county picked up 6 inches. Winds gusted over 30 mph, producing blowing and drifting snow during the late afternoon and evening hours.
February 22, 2001	Winter Storm	A winter storm produced 3 to 6 inches of snow across the Lower Maryland Eastern Shore. The specific snow total for Salisbury Airport in Wicomico county 5-6 inches. Schools were dismissed early and most were closed the following day due to slippery road conditions.
December 4, 2002	Winter Storm	A winter storm produced 2 to 5 inches of snow along with less than 1/4 inch of ice. 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 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 15, 2003	Winter Storm	6 inches fell in Delmar. Local law enforcement agencies reported numerous accidents. Schools were closed Monday, February 17th due to very slippery road conditions.
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 ice. The mixture of precipitation caused numerous power outages, and roadways were very slippery resulting in many accidents.
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.
December 18, 2009	Winter Storm	Snowfall amounts were generally between four and fourteen inches across the county.
January 30 to January 31, 2010	Winter Storm	Snowfall amounts were generally between six and thirteen inches across the county.
February 5 to February 6, 2010	Winter Storm	Snowfall amounts were generally between ten and twenty inches across the county.
2016 HMP Update		
January 30, 2010	Winter Storm	Snowfall amounts were generally between seven and eleven inches across the county. Salisbury reported 11.0 inches of snow. Parsonsburg reported 10.2 inches of snow. Sharptown reported 8.0 inches of snow. Low pressure moving off the coastal Carolinas produced between six and thirteen inches of snow across the Lower Maryland Eastern Shore from Saturday morning into Saturday night January 30th.
February 9-February 10, 2010	Blizzard	Snowfall amounts were generally between five and ten inches across the county. Sharptown reported 10.0 inches of snow. Salisbury reported 8.0 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.
February 5-February 6, 2010	Winter Storm	Snowfall amounts were generally between twelve and twenty inches across the county. Pittsville reported 20.0 inches of snow. Sharptown reported 19.0 inches of snow. Mardela Springs reported 18.0 inches of snow. Salisbury Airport reported 14.0 inches of snow. Fruitland reported 12.0 inches of snow. Low pressure moving off the coastal Carolinas produced between six and twenty inches of snow across the Lower Maryland Eastern Shore from Friday afternoon, February 5th, through Saturday afternoon February 6th.
December 16, 2010	Winter Weather	Snowfall amounts were generally between one inch and three inches across the county. Salisbury reported 2.0 inches of snow.
December 25-December 27, 2010	Winter Storm	Snowfall amounts were generally between eight and thirteen inches across the county. Pittsville reported 12.5 inches of snow. Fruitland reported 11.8 inches of snow. Low pressure moving north just off the Mid Atlantic Coast produced between four and fifteen inches of snow across the Lower Maryland Eastern Shore from Saturday evening, December 25th, into early Monday morning December 27th. Also, the storm produced near blizzard conditions over portions of the area.
January 26-January 27, 2011	Winter Weather	Snowfall amounts generally ranged between one half inch and two inches across the county. Salisbury reported 1.3 inches of snow.
February 11-February 12, 2012	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Salisbury reported 2.0 inches of snow.
February 19-February 20, 2012	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Salisbury reported 2.0 inches of snow.
January 17-January 18, 2013	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Salisbury reported 1.0 inch of snow.
January 24, 2013	Winter Weather	Snowfall amounts were generally between one and two inches across the county. Salisbury reported 2.0 inches of snow.

Date	Event	Event Narrative
January 25, 2013	Winter Weather	Snowfall amounts were generally between one half inch and two inches across the county. Fruitland reported 2.0 inches of snow. Pittsville reported 1.5 inches of snow.
December 8, 2013	Winter Weather	Freezing rain produced around 0.10 inch or less of ice accumulation. This resulted in some slick roadways.
January 2-January 3, 2014	Winter Storm	Snowfall amounts were generally between two inches and six and a half inches across the county. Salisbury reported 4.0 inches and 6.5 inches of snow. Parsonsburg reported 2.5 inches of snow. Mardela Springs reported 4.0 inches of snow. Delmar reported 5.0 inches of snow. Low pressure intensifying off the Mid Atlantic Coast produced between one inch and six inches of snow across the Maryland Eastern Shore.
January 21-January 22, 2014	Winter Weather	Snowfall amounts were generally between two inches and four inches across the county. Pittsville reported 5.0 inches of snowfall. Salisbury reported 3.1 inches of snowfall. Parsonsburg reported 1.8 inches of snowfall.
January 28-January 29, 2014	Winter Storm	Snowfall ranged from 4.5 inches to 5.5 inches across the county with snowfall reports of 5.5 inches in Pittsville and 5.0 inches in Salisbury. Coastal low pressure intensifying off the Mid Atlantic Coast produced snowfall ranging from four to five and a half inches of snowfall across the Maryland Eastern Shore.
March 3, 2014	Winter Weather	Snowfall amounts were generally between three inches and five inches across the county. Salisbury reported 4.8 inches of snowfall. Royal Oak reported 3.5 inches of snowfall.
March 16-March 17, 2014	Winter Storm	Snowfall amounts between 5.0 inches and 7.0 inches occurred across the county, with 7.0 inches of snowfall reported in Mardela Springs and 1 mile east of Salisbury. A complex area of low pressure developed along a stalled cold front across the Southeast United States with weak high pressure over New York, creating snow across the Lower Maryland Eastern Shore.
March 25, 2014	Winter Weather	Snowfall between 4.0 inches and 1.0 inches were reported across the county. Reported snowfall of 4.0 inches occurred 1 mile northwest of Northwood and 3.1 inches was occurred in Salisbury.

Source: NWS,NCDC(NOAA)

In terms of number of occurrences, the NWS, NCDC listed a total of 35 substantial winter storm events affecting Wicomico County from 1993-2015. Therefore, Wicomico County experiences 1.52 substantial winter storm events per year.

VULNERABILITY

The impacts associated with a winter storm are depicted in the hazard characterization of this chapter. The main impact that a winter storm will have on critical and public facilities is closure of operations and power outages. Generators are necessary for critical facilities to continue to operate during power outages. Facilities such as emergency management, police, fire, and EMS stations must be able to operate during winter storm power outages in order to provide their services to the public.

Winter weathers underlying hazards can significantly affect the environment and everyday lives for many individuals. The impacts include:

- **Roads** - Roadways are impacted by freezing rain, sleet, and black ice can dramatically worsen the driving hazard by creating dangerously slick, icy road conditions. The melting/refreezing process can occur for many days after a storm, and will only end once all moisture is melted and evaporated, and road are dry.

- **Ice Accrual** – Freezing rain accumulation on trees can cause large limbs or whole trees to snap and possibly fall on homes, cars, and powerlines. This can create a very dangerous environment outdoors and widespread power outages.

- **Visibility**- Heavy snow can create dangerous driving conditions commonly referred to as "white out" conditions. The lack of visibility combined with slick, snow covered roads greatly increase the probability of an accident.

- **Loss of Power (Heating Hazards)** – As a result of power outages during very cold conditions, residents may be forced to find alternative means to heat their homes. Carbon monoxide poisoning is a concern due to improperly ventilated heating sources from space or kerosene heaters, furnaces, water heaters, gas stoves, fireplaces, and blocked chimneys.

- **Dangerously Cold Temperatures** – When temperatures fall in the teens and single digits, it becomes more dangerous to be outside for prolonged periods. Some major threats include wind chill, frostbite, and hypothermia.

- **Aircraft Icing** – Icing poses a major threat to air travel, resulting in lengthy flight delays and cancellations.

CONCLUSION

Emergency generator back-up power at Wicomico County critical facilities listed within Appendix C was discussed during the HMPC Mitigation Strategies Meetings. Several facilities either lacked generators or generators currently on-site were under capacity to meet facility needs. These facilities include several potential shelters such as Salisbury Middle and Parkside High Schools. Shelter facilities that currently have generators, however, that are in need of an upgrade include James M. Bennett High School and Wicomico Youth and Civic Center. The Tri-County Council building which serves as a back-up facility for the court system currently does not have a generator. Finally, installation of landfill generators are needed at the Wicomico County Solid Waste Complex, as well as, two storage lift stations in the Town of Willards.

CHAPTER 10 – DROUGHT AND WILDFIRES

INTRODUCTION

The hazard risks from both drought and wildfire occur during the same months of the year, specifically from April to November. Wildfires and drought can cause both ecological and socioeconomic problems and have the potential to affect a large portion of the population.

DROUGHT HAZARD CHARACTERIZATION

The simplest definition of a drought is "an extended period of dry weather"; there are four different types of drought including:

- *Meteorological drought*: A measure of departure from normal precipitation. Due to climatic differences, what is considered a drought in one location may not be in another location.
- *Agricultural drought:* The amount of moisture in the soil no longer meets the needs of a particular crop.
- *Hydrological drought:* Surface and subsurface water supplies are below normal.
- *Socioeconomic drought:* The situation that occurs when physical water shortage begins to affect people.

Droughts may result in damage to crops, livestock and wildlife. During a prolonged drought, land values may decrease, and unemployment may increase. Negative economic impacts on water-dependent businesses may occur as well due to water restrictions implemented during a drought.

DROUGHT HAZARD RISK & HISTORY

As noted in *Chapter 3: Hazard Identification*, heat and drought are normally not a severe problem in Wicomico County. However, dry conditions do occur, impacting water service to County residents and businesses. The *National Weather Service, National Climatic Data Center* operating under *National Oceanic and Atmospheric Administration* reported the following events as extreme heat or drought for Wicomico County.

Table 10.1: Extreme Heat Events

Location	Date	Event Narrative	Property Damage
Unknown	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.	Not Available

Table 10.1: Extreme Heat Events – Cont'd

Location	Date	Event Narrative	Property Damage
2016 HMP Update			
Countywide	July 21, 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.	0
Countywide	July 5- July 8, 2012	High temperatures ranged from the mid 90s to lower 100s and low temperatures ranged from the mid 70s to lower 80s across the county from July 5th through July 8th. High Pressure centered just to the west of the Middle Atlantic Region produced hot and humid weather over the Lower Maryland Eastern Shore from July 5th through July 8th. High temperatures ranged from the mid 90s to lower 100s, and low temperatures ranged from the mid 70s to lower 80s across the area.	0

Source: NWS, NCDC (NOAA)

Table 10.2: Drought Events

Date	Event Narrative	Crop Damage
September 1, 1995 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
2016 HMP Update		
No Drought events were reported in the NCDC database since the 2011 HMP Planning Process.		

Source: NWS, NCDC (NOAA)

The worst drought in Maryland occurred from December 1929 to February 1931, with 1930 being the driest year since 1869 (*U.S. Weather Bureau 1930*). During the 15-month agricultural drought, rainfall was 21.5 inches below normal. Crop losses in 1930 dollars were estimated at $40 million.

Maryland generally experiences average to higher-than-average stream flow. However, it is normal for Maryland to experience drought cycles as well. In 2002, 72 average monthly low stream flow records were set across Maryland. In 2000, more wells broke monthly record lows than any other recorded period. In 1966, the worst year of the 1958-1971 droughts, 32 monthly low stream flow records were set. Between the years of 1951 -1999, stream flow into the Chesapeake Bay in 1999 had the fourth lowest annual flow. Lower flows were experienced only in 1963, 1965, and 1966.

DROUGHT VULNERABILITY

The *Water Resources Element* of the *2009 Wicomico County Comprehensive Plan* includes important data pertaining to the County water supply. For instance, there are no impoundments used for water supply in Wicomico County; residents rely exclusively on groundwater for water

supply. This can be problematic, as was the case from May 2007 to August 2007, when approximately 120 wells in Somerset and Wicomico Counties had to be replaced due to prolonged drought conditions that occurred in previous years.

WILDFIRE HAZARD CHARACTERIZATION

Wildfires are fueled by natural cover, including trees, brush, grasses, and crops. Available fuel, topography, and weather provide the conditions that encourage wildfires to spread. Wildfires pose serious threats to human safety and property in rural and suburban areas. They can destroy crops, timber resources, recreation areas, and habitat for wildlife. Wildfires are a growing problem in the wildland/urban interface of the eastern United States, including Maryland.

Climatic and meteorological conditions that influence wildfires include solar insulation, atmospheric humidity, and precipitation, all of which determine the moisture content of wood and leaf litter. Dry spells, heat, low humidity, and wind increase the susceptibility of vegetation to fire. Natural and human agents can be responsible for igniting wildfires. Natural agents include lightning, sparks generated by rocks rolling down a slope, friction produced by branches rubbing together in the wind, and spontaneous combustion. Most wildfires in Maryland are caused from humans, such as arson and accidents from equipment operations.

WILDFIRE HAZARD RISK & HISTORY

In Maryland, wildfires and brushfires have forced school closings, disrupted telephone services by burning fiber optic cables, damaged railroads, other infrastructure, and adversely affected tourism, outdoor recreation, and hunting. The peak months for wildfire activity in Maryland by rank order are April, March, and November (spring and fall). In the spring months, increasing daytime temperatures, low relative humidity, and wind combine to dry surface litter, which promotes the ignition and spread of wildfires. After forest canopies are established, the forest floors become shaded, moisture levels increase, and fire hazard decreases. In the fall typically there are depleted soil moisture conditions, low stream conditions, and increased insulation of the forest floor due to reduced leaf canopies

The Maryland Forest Service handles statistics on wildfires. Table 10.3 lists wildfires and the amount of acreage burned in Wicomico County from 1988 to 2015.

Table 10.3: Wildfire Events

Year	Number of Fires	Acres Burned
1988	125	1,461.5
1989	46	481.9
1990	41	609.8
1991	26	1,090.8
1992	28	199.9
1993	30	370.3
1994	35	33.7
1995	65	28.1
1996	22	29.3
1997	65	43.2
1998	70	89.8
1999	52	36.9

Year	Number of Fires	Acres Burned
2000	34	74.1
2001	57	39.0
2002	46	33.3
2003	17	6.4
2004	26	45.1
2005	32	31.9
2006	40	46.4
2007	29	121.7
2008	39	50.5
2009	14	3.1
2010	14	43.2
2011	13	19.2
2012	12	42.3
2013	9	4.1
2014	4	0.8
Average	**40**	**193.7**

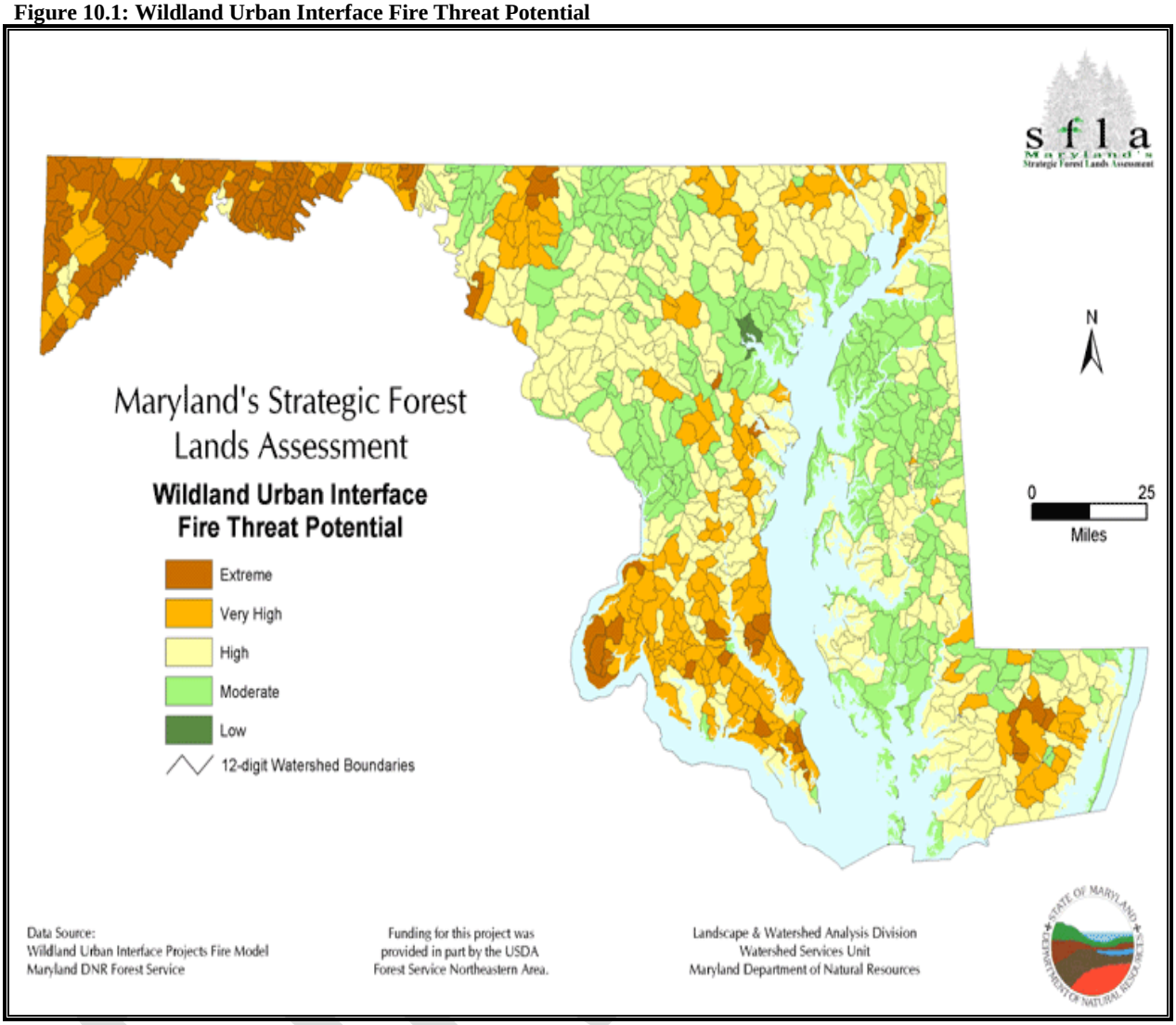
Source: Maryland DNR Forest Service
NOTE: Wildfire responses by the Maryland Forest Service do not represent all wildfire statistics in the County.

In terms of number of occurrences, the Maryland Forest Service listed a total of 1072 wildfire events affecting Wicomico County from 1988-2015. Therefore, Wicomico County experiences 40 wildfire events per year. As shown in Table 10.3, the number of fires and the acres burned per year has decreased over the years in Wicomico County. There are several explanations for the decrease in wildfires, including wildfire awareness in the County, loss of forestland due to urban sprawl, and increased response time by fire departments.

WILDFIRE VULNERABILITY

Maryland's Strategic Forest Lands Assessment is conducted by the Maryland Department of Natural Resources with financial assistance from the United States Department of Agriculture Forest Service and is composed of many types of vulnerability studies applying to the forests of Maryland. Figure 10.1 depicted below shows one of the studies conducted on wildland urban interface fire threat potential.

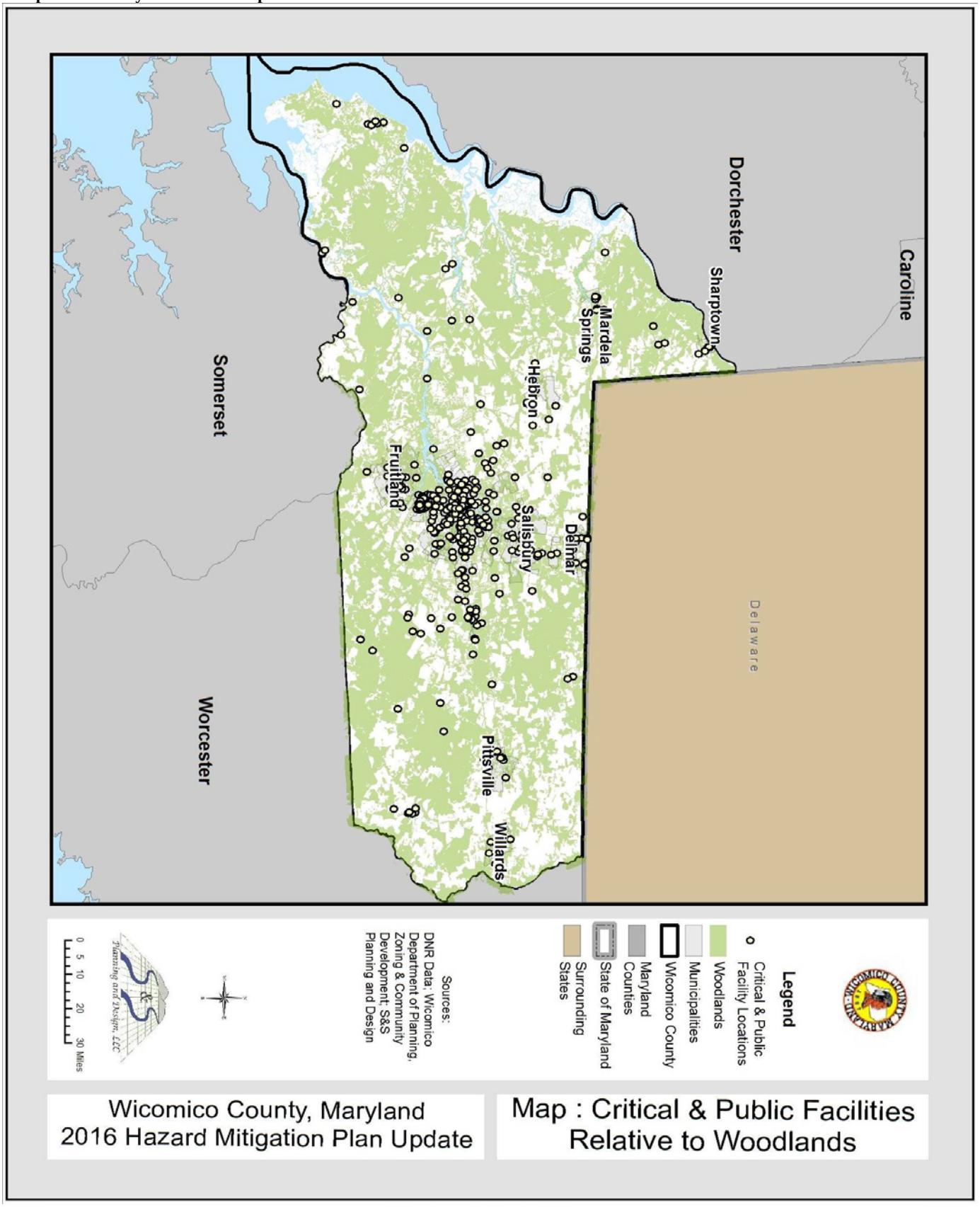
Figure 10.1: Wildland Urban Interface Fire Threat Potential



Source: Maryland DNR Forest Service

According to the figure, when compared to other counties in the state of Maryland, Wicomico County appears to have a moderate to high fire threat potential. In terms of forest cover, woodlands of Wicomico County along with the location of critical and public facilities within the County in order to determine their wildfire vulnerability.

Map 10.1: Facility Locations Compared to Woodlands



CONCLUSION

In reviewing Map 10.1: Facility Locations Compared to Woodlands, the potential Wildland-urban interface area(s) and concentrated areas of critical facilities in Wicomico County are moderate. Upon further analysis, critical and public facilities depicted in the Map 10.1, specifically when viewed up close, do not appear to be at significant risk to wildfire given the built-up environment within the county where the facilities are predominantly located.

CHAPTER 11 – HUMAN IMPACTED HAZARDS

INTRODUCTION

Human impacted hazards as described herein include dam failure, transportation and fixed-site hazardous materials events, airplane accidents, rail accidents, and epidemics. The effects of human impacted hazards include power outages, communication failures, road closures, loss of infrastructure, evacuation, and loss of life. The location of their occurrence and effects may be predicted to some degree by past incidents.

DAM CHARACTERIZATION

Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. Approximately one-third of all dam failures are caused by overtopping due to inadequate spillway capacity, one-third are caused by seepage through or under the structure, and the remainder from improper design or construction or because of earthquake or landslide events which trigger the dam failure. Dam failure examples in the United States include the Johnstown Flood in 1889 resulting in 2,209 deaths, the Saugus, California dam collapse in the Los Angeles Aqueduct system in 1928 resulting in 450 deaths, and the Teton Dam breach on the Snake River in Idaho during a flash flood in 1976 resulting in 11 deaths. During Hurricane Agnes in 1972, concern about the Conowingo Dam on the Susquehanna River led to the opening of all flood gates to release pressure when the water level was three feet higher than the dam's rated capacity.

DAM HAZARD RISK, HISTORY, & VULNERABILITY

According to the Wicomico Dam Conditions Information by MD Dam Safety compiled by Wicomico DPW and Emergency Services, Wicomico County has 18 dams. Three dams are rated as high hazard for the County: the Beaglin Park Dam, Coulbourn Mill (Fooks Pond) Dam, and the Morris Mill Pond. Johnson Lake Dam and Mitchell Pond #1 is currently rated as a significant hazard. Johnson Lake Dam may be upgraded to high hazard due to the population at risk. When looking at the combined risk for dam failure in the County, the probability of dam failure is low but the resulting impact is extremely high, may be, depending on location. According to the Maryland Dam Safety Division, the City of Salisbury is downstream of four dams that could pose a high or significant threat to the City in the event of a breach or failure. Emergency Action Plans (EAP) are maintained for the Beaglin Park Dr, Coulbourne Mill Dam, Johnson Lake Dam, Mitchell Pond #1, and Morris Mill Pond Dams in the County. The only other municipality downstream from a dam is Mardela Springs. Wicomico County dam inventory, conditions, and areas of impact are listed on Table 11.1. There are three dams rated as "High Hazards" and two rated as "Significant Hazards".

Table 11.1: Wicomico County Dam Condition Information

Wicomico County Dam Condition Information		
Dam Name	**Hazard/Condition**	**Areas of Impact**
Allen Town Dam	Low Hazard/Good Condition	Dam failure will not flood downstream structures but road on top would washout.
Anderson Pond Dam	Low Hazard/Poor Condition	If the dam fails, Pemberton Drive will be impassable and detours will have to be established. No downstream flood issues. Note: If Riawakin Pond upstream fails, it would overtop Pemberton Drive & possibly breach Andersn Pond. However, the increased flood depth with upstream pond failing is less than on foot (B. Harrington).
Barren Creek Pond Dam	Low Hazard/Poor Condition	There is a winch to raise the spillway gates on the North end of the dam. Without raising the gates, the dam and road would overtop and fail. This dam has a 20-square mile watershed and could overtop during a large storm event.
Beaglin Park Dr Dam	High Hazard/Good Condition	Downstream flooding during failure would involve several hundred business & residential buidlings, and many roads all the way to Riverside Drive.
Columbia Creek Dam	Low Hazard/Poor Condition	Located 1.4 miles upstream of Rewastico Pond.
Coulbourn Mill Dam (Fooks Pond)	High Hazard /Fairly Good Condition	Canal Woods and other nearby residential developments would flood if the dam fails.
Johnson Lake Dam	Significant Hazard/Fair Condition	There are several commercial buildings, residential structures, and roads in jeopardy of flooding. Flood increases with failure are less than 4 feet compared to non-failure conditions. Possible loss of life in the populated are downstream to Brew River Restaurant. Isabell Street would most likely fail, and Route 50 & Main Street would be overtopped by 5 feet or more. This will cause a definite traffic and possible public safety issue. May also take out US RT 50 and Main Street.
Leonard's Mill Pond Dam	Low Hazard/Fair Condition	Tourism Building may be effected.
Parker Pond Dam	Low Hazard/Good Condition	Roadway will not flood during a 100-yr storm.
Powellville Dam	Low Hazard/Good Condition	Large sheetpile spillway capable of passing 100-yr storm.
Rewastico Pond Dam	Low Hazard/Good Condition	It outfalls directly to tidal waters with no downstream structures. If dam overtops, could lose Athol Road on top of dam.
Riawakin Pond Dam	Low Hazard/Poor Condition	Access on MD Rte 349 would be lost if the dam is breached. A breach would also overtop Anderson Mill Pond downstream and possibly cause Pemberton Drive to washout.
Shad Point Bridge Dam	Low Hazard/Good Condition	If the dam fails and road fails, lake sediments would be carried into the Wicomico River but no downstream structures in harm's way.
Camden Avenue Dam	Low Hazard/Poor Condition	Failure of dam would washout Camden Avenue but no downstream structures should be impacted.
Mitchell Pond #1 Dam	Significant Hazard/Fair Condition	Failure of the dam would most likely fail Mitchell Pond 2 & 3 at Mitchell Road and Fitzwater Street. The flood wave would travel downstream to Fitzwater Street and cause some flooding to the Chesapeake Ship Buildings. Traffic would need to be detoured.
Mitchell Pond #2 Dam	Low Hazard/Fair Condition	If the dam fails, Mitchell Road would washout and result in some flooding of the Chesapeake Ship Buildings below Fitzwater Street building.
Mitchell Pond #3 Dam	Low Hazard/Fair Condition	Failure of the dam would washout Fitzwater Street and cause some flooding of the Chesapeake Ship Buildings downstream.
Morris Mill Pond Dam	High Hazard/Poor Condition	Canal Woods and other nearby residential developments would flood if the dam fails.

Source: Wicomico DPW & Emergency Services, 2013 & MD Dam Safety, 2015

TRANSPORTATION & FIXED– SITE HAZMAT CHARACTERIZATION

A hazardous material (HazMats) may be defined as a substance or material, which, because of 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.

According to the Maryland Hazard Analysis, the release of HazMats while in transit is of great concern to the U.S. 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 ships 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, the rail system and on shipping lanes in the Chesapeake Bay and its tributaries. Fixed-site use of HazMat is particularly evident in the Baltimore area near rail, truck, and shipping terminals.

According to the Delmarva Freight Plan, 2015, there are three main hazardous material concerns:

- **Site-Specific Hazardous Materials Issues**: Where freight activities involve hazardous materials, planning efforts should continue to monitor and enhance emergency response efforts.
- **Hazardous Materials Tracking**: A partnership with security authorities for tracking of hazardous materials needs to be established considering social and environmental exposure, natural and man-made disasters, anticipated disruptions of traffic and business, and related economic impacts.
- **Security Screening**: Exploration of public-private partnership opportunities may help to identify tradeoffs, cost benefits, or other interests relative to increasing route or mode options and security screening for the transportation of hazardous materials.

TRANSPORTATION & FIXED – SITE HAZMAT RISK, HISTORY & VULNERABILITY

Historically, most hazardous materials moving through Wicomico County have been on U.S. Routes 50 and 13, the Norfolk Southern rail line, and by barge on the Wicomico River. In recent years, there have been several fixed-site HazMat incidents, including an ammonia leak at a Perdue Chicken Processing Plant in September 2002, a hypoclorite spill at Filtronic Comtek in August 2004. More recently, a HazMat spill at Salisbury Bypass near Northbound exit of Snow Hill Road and Colbourn Mill Road near Nutters Cross Road, February 2015, and a HazMat recycled oil spill during pick-up at the City Yard, August 2015.

According to the most recent 2013 Toxics Release Inventory (TRI) factsheet available for Wicomico County, there are five TRI facilities located within the County. The TRI tracks the

management of certain toxic chemicals that may pose a threat to human health and the environment. Certain industrial facilities in the U.S. must report annually how much of each chemical is recycled, combusted for energy recovery, treated for destruction, and disposed of or otherwise released on-and off-site. This information is collectively referred to as production-related waste managed. In Table 11.2 listed below are quick facts for 2013.

Table 11.2: Quick Facts for 2013

Quick Facts for 2013		
	Wicomico County, MD	**United States**
Number of TRI Facilities	5	21,867
Total Production Related Waste Managed:	384.8 Thousand Lbs.	24.9 Billion Lbs.
Total On-site and Off-site Disposal or Other Releases:	278.1 Thousand Lbs.	4.1 Billion Lbs.
Total On-Site	278.0 Thousand Lbs.	3.7 Billion Lbs.
- Air	278.0 Thousand Lbs.	772.0 Million Lbs.
- Water	0 Lbs.	212.6 Million Lbs.
- Land	0 Lbs.	2.7 Billion Lbs.
Total Off-Site:	137 Lbs.	449.1 Million Lbs.

Source: 2013 Toxics Release Inventory for Wicomico County

These five fixed-site TRI facilities within the county should be given priority consideration by the Local Emergency Planning Committee (LEPC) due to the threat it poses to human health and the environment.

According to the *Wicomico County U.S. Route 13 Hazardous Materials Commodity Flow Study* completed in June 2006, hazardous materials were usually transported by tanker truck along U.S. Route 13. The top three hazardous materials transported during the sample period were gasoline, butane, and liquid CO2. Additionally, peak truck movement occurred between 6:00 AM and 2:00 PM. According to the Study, 43.4 trucks per hour, with 1.6 of those total trucks per hour carrying hazardous materials during the peak truck movement hours traveled along U.S. Route 13.

The *Wicomico County U.S. Route 13 Hazardous Materials Commodity Flow Study* contained vulnerability information pertaining to critical and public facilities. Tables 11.3 and 11.4 from the Study detail critical and public facilities within 1,000' of centerline along U.S. Route 13 and Business Route 13. These facilities may be at-risk depending upon the type and quantity of hazardous material spilled during a transportation accident.

Table 11.3: U.S. Route 13 Facilities at Risk

U.S. Route 13		
Facility Type	**Facility Name**	**Location**
Park	Leonards Mill Park	2848 Leonards Mill Pond Rd.
Dam	Leonards Mill Pond	2848 Leonard Mill Pond Rd.
Marina	Leonards Mill Pond Ramp	2848 Leonards Mill Pond rd.
Police	Maryland State Police	2765 N. Salisbury Blvd.
Shopping Center	The Centre at Salisbury	2300 N. Salisbury Blvd.
Shopping Center	Lowes Home Improvement	2606 N. Salisbury Blvd.
Shopping Center	Walmart Supercenter/North Pointe	2700-2750 N. Salisbury Blvd.
Shopping Center	The Commons (Best Buy, Home Depot)	105-115 E. North Pointe Dr.
Shopping Center	Promenade (Panera, Barnes & Noble)	2618 N. Salisbury Blvd.
Shopping Center	Gander Mountain	2410 N. Salisbury Blvd.
Shopping Center	Verizon Wireless	2720 N. Salisbury Blvd.
Shopping Center	Tractor Supply Company	112 E. North Pointe Dr.
Shopping Center	Lord Salisbury Center	2635-2659 N. Salisbury Blvd.
Shopping Center	Staples	2636 N. Salisbury Blvd.
Convenience Store/Gas	Tiger Mart/Exxon	2403 N. Salisbury Blvd.
Convenience Store/Gas	Wawa	2740 N. Salisbury Blvd.
County's Gov't	Board of Education	2424 Northgate Dr. Suite 100
Weigh Station	Maryland Weigh Station	N. Salisbury Blvd.

Source: Wicomico County U.S. Route 13 Hazardous Materials Commodity Flow Study

Table 11.4: U.S. Business Route 13 Facilities at Risk

U.S. Business Route 13		
Facility Type	**Facility Name**	**Location**
Park	River Walk Park	Riverwalk Ct.
Park	Fruitland Rec. Park	205 S. Brown St.
School	North Salisbury E.S.	1213 Emerson Ave.
College	Salisbury University	1101 Camden Avenue
College	Seagull Stadium Complex	Wayne Street
County Gov't.	Wicomico County Board of Education	Northgate Dr.
County Gov't.	State's Attorney Office	East Main Street
State Gov't.	MD District Court	201 Baptist St.
State Gov't.	MD General Services	201 Baptist St.
Fed. Gov't.	Social Security	2414 Northgate Drive
Fire/Rescue	Salisbury Co. #2	801 Brown St.
Fire/Rescue	Fruitland Co. #3	104 W. Main St.
Hospital	Peninsula Regional Medical Center	100 East Carroll St.
Nursing Home	Anchorage Nursing & Rehabilitation Center	105 Times Square
Communications Tower	WBOC	1729 N. Salisbury Blvd.
Communications Tower	AT&T	613 Calloway St.
Communications Tower	Spectra Site Comm. Inc.	110 Monroe St.
Communications Tower	State Highway Admin.	4085 Disharoon Rd.
Utility	Delmarva Power	2530 N. Salisbury Blvd.
Dam	Johnson Pond	Wicomico River
Dam	Tony Tank Pond	Tony Tank Creek
Post Office	Fruitland Post Office	201 E. Main St.
Post Office	Salisbury Main St. Post Office	129 E. Main St.
Industrial Park	Fruitland Bus. Park	IRL Lane
Shopping Center	Waverly Plaza	740 S. Salisbury Blvd.
Shopping Center	Giant Shopping Center	745 S. Salisbury Blvd.
Shopping Center	Clairmont Shopping Center	1014 S. Salisbury Blvd.
Shopping Center	Goliath Shopping Center	701 Roland St.
Shopping Center	Seagull Square Center	1306 S. Salisbury Blvd.

Facility Type	Facility Name	Location
Shopping Center	Court Plaza Center	1506 S. Salisbury Blvd.
Shopping Center	Walmart Super Center	409 N. Fruitland Blvd.
Shopping Center	Fruitland Center (Apple Drug, Big Lots)	404 N. Fruitland Blvd.
Shopping Center	Food Lion	206-208 S. Fruitland Blvd.
Sport Facility	Crown Sport Center	28410 Crown Rd.
Convenience Store/Gas	Wawa	668 S. Salisbury Blvd.
Convenience Store/Gas	Royal Farms	101 N. Salisbury Blvd.
Convenience Store/Gas	Express Mart/Oceanic	1312 N. Salisbury Blvd.
Convenience Store/Gas	Express Mart/Exxon	1053 S. Salisbury Blvd.
Convenience Store/Gas	Center City Tiger Mart	500 S. Salisbury Blvd.
Convenience Store/Gas	Wine Rack/Exxon	100 W. Cedar Lane

Source: Wicomico County U.S. Route 13 Hazardous Materials Commodity Flow Study

According to the *Wicomico County U.S. Route 50 Hazardous Materials Commodity Flow Study* completed in July 2006, hazardous materials were usually transported by tanker truck along U.S. Route 50. The top three hazardous materials transported during the sample period were gasoline, aviation fuel, and oxygen. Additionally, peak truck movement occurred between 6:00 AM and 2:00 PM. According to the Study, 41.9 trucks per hour, with 1.5 of those total trucks per hour carrying hazardous materials during the peak truck movement hours traveled along U.S. Route 50.

The *Wicomico County U.S. Route 50 Hazardous Materials Commodity Flow Study* contained vulnerability information pertaining to critical and public facilities. Tables 11.5 and 11.6 from the Study detail critical and public facilities within 1,000' of centerline along U.S. Route 50 and Business Route 50. These facilities may be at-risk depending upon the type and quantity of hazardous material spilled during a transportation accident.

Table 11.5: U.S. Business Route 50 Facilities at Risk

U.S. Business Route 50		
Facility Type	**Facility Name**	**Location**
Park	Emerson Holloway Park	Ocean Gateway
Park	River Walk Park	Carroll St.
Park	Nick Meyer Park	Fairfield Dr.
School	Wicomico Middle School	Salisbury Parkway
Library	Wicomico Co. Public Library - Salisbury Branch	East Market St.
County Gov't.	Wicomico Co. Courthouse	Division St.
County Gov't.	Wicomico Co. Office Bldg.	Division St.
County Gov't.	Health Dept. Hurdle Bldg.	East Main Street
County Gov't.	State's Attorney Office	East Main Street
Town Gov't.	Salisbury City Offices	North Division St.
Town Gov't.	Salisbury Public Works Water	East Main St.
State Gov't.	MD District Ct.	Baptist St.
State Gov't.	MD State Offices	Tri-County Way
State Gov't.	MD General Services	Baptist Street
State Gov't.	MD MVA	Merritt Mill Rd.
Post Office	Salisbury Post Office	Salisbury Parkway
Post Office	Salisbury Post Office (Downtown)	East Main Street
Fire/Rescue	Salisbury Co. #16	Cypress St.
Police	Salisbury Police	West Salisbury Parkway
Police	Salisbury Police Sub-station	Church St.
Military	National Guard Armory	Ocean Gateway
Hospital	Salisbury Med. Center	Salisbury Parkway East

Facility Type	Facility Name	Location
Nursing Home	Salisbury Nursing Home	200 Civic Avenue
Nursing Home	Parsons Nursing Home	300 Lemmon Hill Lane
Communication	Verizon	Church St.
Shopping Center	St. Paul Pemberton Plaza	Salisbury Parkway
Shopping Center	Twilley Centre Shop Center	Mt. Hermon Rd.
Shopping Center	Shoppes at Salisbury	Ocean Gateway
Shopping Center	Shopping World	Ocean Gateway
Shopping Center	Market Place East	Mt. Hermon Rd.

Source: Wicomico County U.S. Route 50 Hazardous Materials Commodity Flow Study

Table 11.6: U.S. Route 50 Facilities at Risk

U.S. Route 50		
Facility Type	**Facility Name**	**Location**
Park	Mardela Springs Park	Railroad Av.
Park	Arthur W. Perdue Stadium	Hobbs Rd.
Park	E. Wicomico LL Complex	Winterplace Pkwy.
Park	Wicomico Equestrian Ctr.	Blue Ribbon Rd.
Museum	Adkins Hist. Museum	Railroad Av.
School	Mardela Springs MS & HS	Delmar Rd.
School	Beaver Run ES	Old Ocean City Rd.
College	Wor-Wic Comm. College	Campus Drive
Town Gov't.	Mardela Springs Town Hall	Station St.
State Gov't.	MD Workshop for the Blind	Northwood Drive
State Gov't	State Highway Administration District #1	660 West Road
State Gov't	Maryland National Guard	28722 Ocean Gateway
Fire/Rescue	Mardela Sp. Co. #9	Station St.
Shopping Center	The Centre at Salisbury	Centre Drive
Industrial Park	Beaver Run Bus. Center	Beaver Run Rd.
Industrial Park	Northwood Ind. Park	Marvel Rd.
Industrial Park	Winterplace Business Park	Winter Place Parkway
Industrial Park	Westwood Commerce Park	Naylor Mill Road
Nursing Home	Wicomico Nursing Home	900 Booth Street

Source: Wicomico County U.S. Route 50 Hazardous Materials Commodity Flow Study

Hazardous material commodities shipped by rail through Wicomico County by the Norfolk Southern Corporation were also listed in the *Wicomico County U.S. Route 50 Hazardous Materials Commodity Flow Study.* These commodities included the following: petroleum gases, flammable liquids, ammonium nitrate, propanol and ethanol.

In terms of commodities that are transported along shipping lanes in Wicomico County, Tables 11.7 through 11.12 detail the flow of the Wicomico River, Nanticoke River, Pocomoke, Onancock, Cape Charles, and Tred Avon River Commodities.

Table 11.7: Wicomico River Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Petroleum	488,166		151	488,166	424,704
Grain	97,650		60	97,650	116,560
Aggregates	231,665		59	231,665	232,850
Ships	6,221	8,558	12	14,779	15,000
Totals	**823,702**	**8,558**	**282**	**832,260**	**789,114**

Source: Delmarva Water Transport Committee INC.

Table 11.8: Nanticoke River Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Grain	113,577	278,496	134	392,073	390,000
Liq Fert	-	-	-	-	-
Aggregates	118,942	80,725	55	199,667	225,463
Totals	**232,519**	**359,221**	**189**	**591,740**	**615,463**

Source: Delmarva Water Transport Committee INC

Table 11.9: Pocomoke River Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Aggregates	109,753	421,803	177	531,566	499,676
Totals	**109,753**	**421,803**	**177**	**531,556**	**499,676**

Source: Delmarva Water Transport Committee INC.

Table 11.10: Onancoke River Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Aggregates	**36,110**	**0**	**13**	**36,110**	**40,000**

Source: Delmarva Water Transport Committee INC.

Table 11.11: Cape Charles River Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Aggregates	**67,131**	**0**	**21**	**37,131**	**76,513**

Source: Delmarva Water Transport Committee INC.

Table 11.12: Tred Avon Commodities

Products Shipped	2014 Incoming (Tons)	2014 Outgoing (Tons)	2014 Total Barge Trips	2014 Total Tonnage	Tonnage Forecast (2015)
Aggregates	**74,180**	**0**	**33**	**74,180**	**93,295**

Source: Delmarva Water Transport Committee INC.

MAJOR TRANSPORTATION CHARACTERIZATION

In the context of this document, major transportation refers to modes of mass transportation including airplanes and railways. Major causes of airplane crashes are pilot error, mechanical failure and severe weather. The leading cause of rail accidents in Maryland is by far derailment, followed by rail-highway crossing incidents. Maryland has a relatively low rate of major accidents, with an average of 30 air accident/incidents per year as reported by the *National Transportation Safety Board*, and an average of 41 rail accidents per year, and 29 highway-rail incidents per year according to *Federal Railroad Administration Office of Safety Analysis*.

MAJOR TRANSPORTATION RISK, HISTORY & VULNERABILITY

According to Wicomico County Emergency Management, there have been numerous accidents over the past decade, but no transportation accidents would be considered major. However, accidents and incidents do occur due to the fact that the Salisbury Wicomico Airport and the Norfolk Southern Railroad are located in the County. Tables 11.13 and 11.14 feature major transportation accidents that have occurred in Wicomico County.

Table 11.13: Airplane Accidents/Incidents

Date	Make / Model	Event Severity
February 12, 1978	Grumman AA1-B	Nonfatal
March 31, 1978	Aero Comdr 500B	Fatal – 5
December 24, 1982	Grumman AA1-B	Fatal - 2
October 24, 1984	Piper PA-32R301	Fatal – 4
April 20, 1987	Piper PA-24-250	Fatal – 1
June 26, 1988	Boeing 737	Nonfatal
July 01, 1989	Bell 47J	Nonfatal
July 11, 1996	Piper PA-38-112	Nonfatal
October 30, 1997	Cessna 172M	Nonfatal
September 28, 1999	Cessna 310Q	Nonfatal
December 11, 1997	Piper PA-32-260	Fatal - 3
June 30, 2001	Chek Avid Mark IV	Nonfatal
August 20, 2008	Ferree Prostar B	Nonfatal
July 19, 2005	Ratliff Hummel Bird	Fatal - 1
June 25, 2010	Cessna 172S	Nonfatal
September 21, 2013	Lennox Kenneth J Zodiac 601HDS	Nonfatal
June 24, 2015	Diamond Aircraft IND INC DA 20 C1	Nonfatal

Source: National Transportation Safety Board

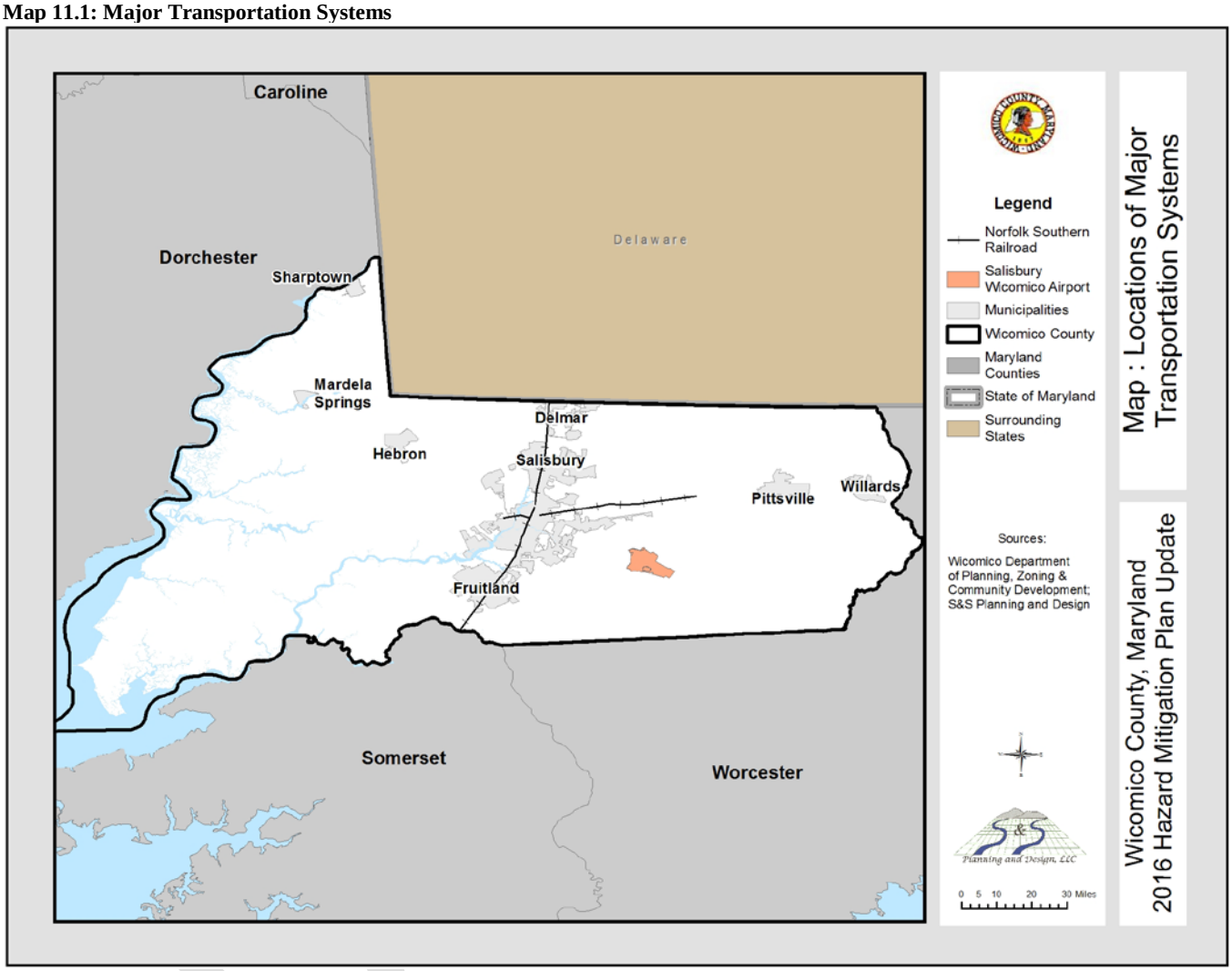
Table 11.14: Railroad Accidents/Incidents

Year(s)	Incidents at Public Crossings	Incident Injuries	Incident Fatalities
1975-1979	6	0	0
1980-1984	11	0	0
1985-1989	8	0	0
1990-1994	4	0	0
1995-1999	5	0	0
2000-2004	1	0	0
2005-2010	3	1	0
2011-2015	6	4	0
Total	**44**	**5**	**0**

Source: Federal Railroad Administration Office Safety Analysis

Both the Salisbury Wicomico Airport and the Norfolk Southern Railroad meet current safety standards set respectively by the FAA and the Railroad Safety Board. The map below depicts Wicomico County's major transportation systems.

Map 11.1: Major Transportation Systems



EPIDEMIC CHARACTERIZATION

According to the Maryland Hazard Analysis, 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 disasters such as flood, tornado, hurricane, or HazMat incident. 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 Maryland's Department of Health and Mental Hygiene (DHMH) regulations. Notable animal epidemics include rabies and avian influenza. There are no recorded human cases of rabies or avian influenza in Wicomico County.

EPIDEMIC RISK, HISTORY & VULNERABILITY

Pandemic influenza has been identified by the Wicomico County Health Department as the highest risk of potentially impacting the County. According to the Center for Disease Control (CDC), an influenza pandemic can occur when a non-human (novel) influenza virus gains the ability for efficient and sustained human-to-human transmission and then spreads globally. Influenza viruses that have the potential to cause a pandemic are referred to as 'influenza viruses with pandemic potential.'

It is difficult to predict when the next influenza pandemic will occur or how severe it will be. Wherever and whenever a pandemic starts, everyone around the world is at risk. Countries might, through measures such as border closures and travel restrictions, delay arrival of the virus, but cannot stop it.

During a pandemic, transmission can be anticipated in the workplace, not only from patient to workers in health care settings, but also among co-workers in general work settings. A pandemic could cause high levels of illness, death, social disruption, and economic loss. Everyday life would be disrupted because so many people in so many places become seriously ill at the same time. Impacts could range from school and business closings to the interruption of basic services such as public transportation and food delivery.

Planning documents utilized by the Wicomico County Health Department to mitigate or respond to any epidemics in the County include, but are not limited to:

- Pandemic Influenza Plan
- Medical Surge Plan
- Strategic National Stockpile Plan
- Risk Communication Plan
- Continuity of Operations Plan
- Emergency Response Plan includes both:
    - Anthrax Prophylaxis and Treatment Order
    - Smallpox Post Exposure Protocol

The Delmarva Avian Influenza Task Force Interim Guidance for Implementation of Centers for Disease Control and Prevention and Occupational Safety and Health Administration Avian Influenza Recommendations;

- Standing Order for Exposure to a Novel Strain of Influenza

HIGHLY PATHOGENIC AVIAN INFLUENZA RESPONSE

(Excerpt from the Maryland Department of Agriculture and the Maryland Emergency Management Agency Response Plan)

INTRODUCTION

Responding to a case of Highly Pathogenic Avian Influenza (HPAI) in Maryland will require activities from county, state , and federal agencies, as well as private agencies. While the planning and training process for HPAI is ongoing, this paper that all parties involved should understand presents background information

BACKGROUND

Avian influenza is a viral disease that can affect bird species throughout the world. The disease can vary from mild to severe, depending on the virus strain involved. The most severe strain is called highly pathogenic avian influenza (HPAI). HPAI is characterized by high, fast moving fatality rates (more than 75%) within infected flocks. This strain is spread by wild migratory birds but may also have other sources as well. Since December 2014, United States Department of Agriculture has confirmed many cases of HPAI in both commercial and backyard flocks. There are currently no known or reported cases of HPAI in Maryland. The Centers for Disease Control and Prevention has found that there is no indication that HPAI is becoming more transmissible to humans or from human to human. Therefore, the prevailing public health opinion is that the risk to people from these HPAI infections is low.

THREAT TO MARYLAND

Despite its small size, Maryland has a robust and economically vital avian agriculture sector. In 2013, the Maryland poultry industry was the state's largest animal and agriculture industry. The output from this industry is well over $1.7 billion in total sales and employs over 7000 individuals.

If the Maryland poultry industry is severely impacted by HPAI the total loss to Maryland's economy could be well over $3 billion. The vast majority of these avian agriculture farms exist in large industrial farming facilities in the counties of Washington, Frederick, Carroll, Cecil, Kent, Queen Anne's, Caroline, Talbot, Dorchester, Wicomico, Worcester, and Somerset. However, there are backyard flocks of small populations of birds in almost every county in Maryland. There is also the potential for wild birds to be affected. The Maryland Department of Agriculture has every reason to believe that HPAI will enter Maryland in the fall of 2015, and is making every effort to keep it out of commercial chicken houses and backyard flocks. Obviously the extent and duration of the impact on Maryland cannot be understood until the specifics of the incident are known; however, given the density of high-population chicken and turkey farms in some areas of the state, it is reasonable to expect the impacts to be quite severe.

RESPONSE

Unfortunately, it is far too difficult and expensive to treat or vaccinate against HPAI, therefore the most effective way to control the spread of the disease is to quickly depopulate all infected and exposed birds. Taking this step quickly ensures that other populations of birds will be spared. Whatever is determined by USDA and MDA officials as the safest, most effective and most humane method of depopulation will be carried out. Should a case of HPAI be confirmed in Maryland, the state works with USDA and other federal partners to execute a response plan. Existing USDA avian influenza response plans follow six basic steps:

- **Quarantine** – Restrict movement of poultry and poultry-moving equipment.
- **Eradicate** – Quickly and humanely euthanize the affected flocks.
- **Monitor** – Test wild and domestic birds in a broad area around the quarantine area.
- **Disinfect** – Clean and disinfect all areas where infected flocks have been.
- **Test** – Confirm that the poultry farm is AI virus-free.
- **Repopulate** – Monitor AI virus-free poultry on repopulated premise.

JURISDICTION ROLES

Should a case of HPAI occur in our jurisdiction, MDA will require numerous resources to safely and effectively respond to the crisis. Any local resources that are used in the response will remain under the command and control of the county, and local EM agencies are encouraged to work with MEMA and MDA to determine any issues, resources scarcities, and any questions. For the most part, funding for these resources with be reimbursable from the state or federal sources.

1. **EOC use –** MDA staff will need an office type setting not too far from the incident scene to communicate with MDA's operations center, develop logistics plans, and communicate with the local partners, the USDA and other agencies. Emergency Operation Centers would be an ideal setting, which would also ensure coordination between MDA and local EMs.

2. **Staging areas –** The large amount of equipment necessary for a response operation will require a staging area. Because the staging area should be close to the incident, it cannot be found until an incident is identified. To locate a good staging area quickly, MDA will require advice and support from local EMs to identify and set up a staging area.

3. **DeCon –** Local HazMat Teams will likely play a key role in advising and monitoring depopulation, cleaning and disinfection operations. Depending on the situation, this may be a direct role in operating equipment and lending equipment.

4. **Water –** Depopulation operations require water – lots of water. Local jurisdictions may be asked to provide logistics for up to 20,000 gallons of water per farm.

5. **Security –** In urban and suburban areas, and even in rural areas, state and local police may be asked to secure the site to prevent transmission of the disease as well as stopping any trespassers that might negatively affect operations. This security might need to be around the clock, depending on the situation.

6. **Generators –** In certain situations, depopulation operations may require generators and generator light units. While these resources can be available through EMAC and MEMAC, MDA may ask the counties for these resources first.

7. **Road Closure –** To prevent transmission or to facilitate the operations, it may be necessary to close local roads for a period of time. Should state roads require closing, MSP will be involved.

8. **Health and Safety -** Local and State Health Departments will be needed to attend to the health and safety needs of the emergency responders and people directly affected by the HPAI incident.

9. **Carbon Sources-** To facilitate cleanup and composting of expired chickens, carbon sources like sawdust, wood shavings, mulch, and shredded straw are used. MDA may seek to source these materials locally and get assistance in transporting these materials to infected premise. It has been estimated that 730 cubic feet of compost (30 tractor trailer loads) for a typical 50’ x 500’ chicken house may be needed.

CHAPTER 11 CONCLUSION

Reviewing the conditions of dams in Wicomico County detailed on Table 11.1 indicates there are six dams reported in poor conditions, five of which are low hazard categorized as low hazard dams, however, one is characterized as high hazard. Completing projects on dams in poor conditions will mitigate potential property loss and life safe issues.

Reference documents utilized with the chapter include the 2006 Hazard Materials Commodity Flow Studies for U.S Routes 13 and 50. These studies should be updated every five years as recommended by the U.S. Department of Transportation, which updates national studies on a five year cycle. In addition, hazardous materials transported by rail on the Norfolk Southern Line should be reviewed and discussed by the Local Emergency Planning Committee (LEPC).

Continued outreach and vaccination clinics to address the highest risk epidemic, pandemic influenza, should be prioritized by Wicomico County. Coordinated efforts that include Wor-Wic Community College, Salisbury University, University of Maryland Eastern Shore (UMES), and the highest concentration of commuters due to regional employment and medical facilities should be considered in all preparedness and prevention efforts.

CHAPTER 12 – PLAN INTEGRATION

INTRODUCTION

The goal of* 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 damaae.

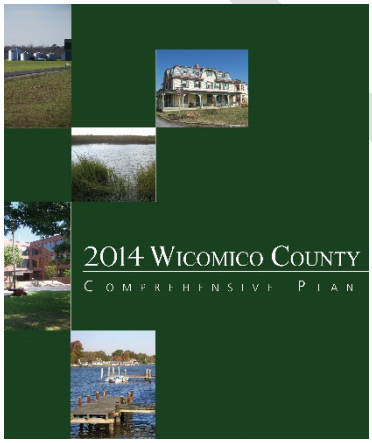
Generally described as the routine consideration and management of hazard risks in your community's existing planning framework – plan integration is the collection of plans, policies, codes, and programs that guide development in your community, how those are maintained and implemented, and the roles 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.

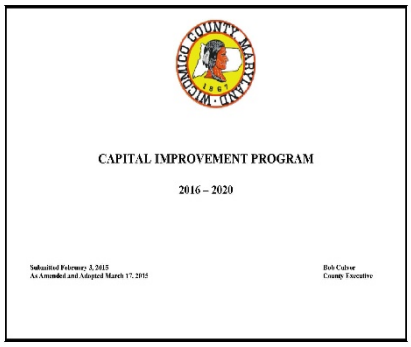
SAFE GROWTH AUDIT

During the preparation of the *2016 Wicomico County Hazard Mitigation Plan*, a 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.

Local documents reviewed during the Safe Growth Audit include:

- Draft Comprehensive Plan;
- Zoning Ordinance;
- Subdivision of Land;
- 2011 Hazard Mitigation Plan; and
- 2015-2019 Capital Improvement Plan.





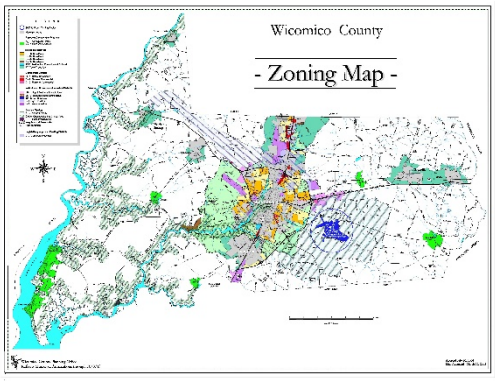


Table 12.1: Safe Growth Audit

Plan	***Location***
COMPREHENSIVE PLAN	
LAND USE	**CHAPTER 7: LAND USE PAGES 7-1 THRU 7-14**
Does the future land-use map clearly identify natural hazard areas?	Yes. Map 4-1: CRITICAL AREAS MAP 7.1 LAND USE MAP PLAN identifies "Critical Areas" Floodplains and Wetlands. "In addition to Tidal Wetlands illustrated on the Draft Land Use Plan, Maps 4.2 Floodplains and 4.3 Wetlands identify natural hazard areas."
Do the land-use policies discourage development or redevelopment within hazard areas?	The Land Use chapter of the Draft Plan includes the following objectives and implementation strategies relevant to the Hazard Mitigation Plan: "Focus continued economic development within County designated growth areas, Metro Core, and municipalities." See Pg. 7-2, Goals, 5th bullet; • "Preserve and enhance the sensitive areas and natural environment of the County." See Pg. 7-2, Goals, 8th bullet; • "Encourage development that creates and maintains a safe, healthy, and diverse residential community." See Pg. 7-11, Implementation Strategies, Residential, 7th bullet; • "Encourage revitalization and infill development in order neighborhoods within the County." See Pg. 7-11, Implementation Strategies, Residential, 9th bullet; • Overall, the County's Draft Land Use Plan is designed to achieve a pattern of orderly and controlled growth based on a myriad of considerations including infrastructure, educational facilities, environmental constraints, and the impact of climate change and sea-level rise. The densely developed areas will be located in areas with existing or planned services, and in close proximity to potential evacuation routes. CHAPTER 4: SENSITIVE AREAS Page 4-4 CHESAPEAKE BAY CRITRICAL AREAS –Wicomico County adopted a Critical Area Ordinance that provides special regulatory protection for the land and water resources located within the Chesapeake Bay Critical Area. There are 17,885 acres within the Resource Conservation Area and 3, 153 acres within the Limited Development Areas.
Does the Plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes. CHAPTER 1: INTRODUCTION PAGES 1-5. 2014 Draft DEVELOPMENT CAPACITY ANALYSIS: focus on infill/redevelopment, undeveloped, and underdeveloped. Note: revised DCA will be included in Final Plan prior to adoption. "The Draft Land Use Plan has delineated adequately sized designated growth areas to meet the demand of projected growth out until 2040."

Plan	***Location***
TRANSPORTATION	**CHAPTER 8: TRANSPORATION PAGES 8-1 thru 8-26**
Does the transportation plan limit access to hazard areas?	Yes, the road recommendations contained in the Draft Plan have taken environmental constraints and hazard mitigation concerns into consideration as part of the proposed delineation of new roadways. Chapter 4, Sensitive Areas, includes an objective to request assistance from appropriate State agencies to prepare a county-wide sea-level rise and climate change study. Upon completion, Wicomico County will have the necessary tools to evaluate flood zones and coordinate with appropriate federal, State, and local official to designate an evacuation routes map.
Is the transportation policy used to guide growth to safe locations?	Yes. CHAPTER 8: TRANSPORATION Page 8-23 Transportation infrastructure and land use guidelines create the framework within which communities grow and prosper while keeping the environmental impacts at a minimum. Page 8-10 Consolidated Transportation Program Page 8-11 Highway Needs Inventory
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	Snow emergency routes are designated in Snow Emergency Plan, not in the Comprehensive Plan. On Wicomico County website under GIS Department display an interactive Hurricane Evacuation Map "Shore Transit has a plan in place for continuation of operations under disaster and relief conditions."
ENVIRONMENTAL MANAGEMENT	
Are environmental systems that protect development from hazard identified and mapped?	Yes. CHAPTER 4: SENSITIVE AREAS PAGE 4-6 Discusses the benefits of stream buffer areas, system –wide riparian forest buffers, floodplains, and wetlands. Map 4-2 depicts major floodplains in the County.
Do environmental policies maintain and restore protective ecosystems?	Yes. CHAPTER 4: SENSITIVE AREAS
Do environmental policies provide incentives to development that is located outside of protective ecosystems?	CHAPTER 2: DEVELOPMENT GOALS AND OBJECTIVES Page 2-2 Plan Goal: *Preserve and protect environmentally sensitive and rural lands and resources from the impacts of development.* CHAPTER 7: LAND USE Page 7-7 thru 7-10 details Designated and Non-Designated Growth Areas.

Plan	***Location***
PUBLIC SAFETY	
Are the goals and policies of the comprehensive plan related to the FEMA Local Hazard Mitigation Plan?	Yes. CHAPTER 4: SENSITIVE AREAS PAGE 4-6 *"Flooding occurs periodically in Wicomico County. This can create public safety and health hazards, as well as, property loss. Most of the damage that is created due to flooding is associated with structures not built to current building specifications."* Wicomico County participates in National Flood Insurance Program (NFIP). "The Draft Comprehensive Plan includes legislative and policy considerations, both State and local, to decrease the impacts on the built-environment from sea-level rise and climate change." "Chapter 4 of the Draft Wicomico County Comprehensive Plan includes objectives designed to reduce the adverse effects of natural disasters by limiting and discouraging development in floodplains, steep slopes, and in other sensitive areas." See Pg. 4-2, 5th Objective. "Establish protective measures for sensitive areas including streams and stream buffers, 100-year floodplain, steep slopes adjacent to streams, vernal pools, dunes, and habitat of threatened and endangered species to reinforce regulatory protection." See Pg. 4-2, 5th Objective.
Is safety explicitly included in the plan's growth and development policies?	The overarching role of planning is predicted on the concept of protecting and promoting public health, safety, and general welfare. Therefore, the Draft Plan was developed in accordance with those principles that resonate throughout the various chapters of the Draft Plan. CHAPTER 4: SENSITIVE AREAS PAGES 4-6 Flooding-Public Safety Hazard CHAPTER 6: AGRICULTURE PAGE 6-11 Right to Farm Legislation-seeks to promote clear understanding between agricultural operations and non-agricultural neighbors –follow generally accepted agricultural practices and do not endanger public safety. CHAPTER 7: LAND USE PAGE 7-10 Airport Land Use area is designed to maintain and protect public safety. CHAPTER 9: COMMUNITY FACILITIES PAGE 9-3 Protect public safety through the proper design and operation of stormwater management facilities.

Plan	***Location***
Does the monitoring and implementation section of the plan cover safe growth objectives??	Yes. CHAPTER 14: PLAN IMPLEMENTATION PAGES 14-1 thru 14-14 Sensitive Areas Implementation Strategies 14-1 thru 14-2 including: • *Review Local Hazard Mitigation Plans, particularly the coastal hazard (e.g. erosion, flooding, and storm surge) element, to account for effects of sea -level rise.* • *Aligning growth strategies to reflect population growth and development patterns in areas vulnerable to sea-level rise.* • *Conduct sea-level rise study outlining inundation areas, protection guidelines, and evaluating existing evacuation policies and procedures.* • *Identify opportunities to restore important natural features, such as waterways, wetlands and forested riparian buffers.* "The Plan Implementation chapter reiterates strategies designed to achieve orderly growth and development, which are designed in a manner to reduce adverse environmental impacts and effects of climate change."
ZONING ORDINANCE	
Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	Yes. ZONING ORDINANCE PAGE 182 PART II ENVIRONMENTAL STADARDS FOR SENSITIVE AREAS
Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	Yes. Wicomico County does contain a Paleochannel Overlay District. This overlay zoning district is to reduce the potential of contamination of the water sources resulting from spills of hazardous materials or impacts from natural disasters on the built environment.
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density use?	ZONING ORDINANCE PAGES 19-20 Section 225-21. Conditional Zoning or Rezoning *May have the authority to impose additional restrictions, conditions or limitations as may be appropriate and shall have the authority to: Preserve, improve or protect the surrounding or adjacent lands or properties.*
Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?	No-Wetlands. ZONING ORDINANCE PAGE 183 Section 225-148. Non-tidal wetlands *A minimum twenty-five (25) foot setback from all non-tidal wetlands is encouraged for all development around the extent of the delineated non-tidal wetland except as permitted by the U.S. Army Corp. of Engineers and the Maryland Department of the Environment.* Development is restricted in wetlands, floodways, and floodplains in accordance with applicable State laws and sections of the County Charter. See Chapter 125 Critical Area Resource Protection, Chapter 126 Forest Conservation, Chapter 148 Flood Hazard Areas, Chapter 149 Floodplain Management, and Chapter 196 Stormwater Management.

Plan	***Location***
SUBDIVISION REGULATIONS	
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Restricted. SUBDIVISION OF LAND 148-2 Review of Subdivision Proposals. *Assure that:* *A. All such proposals are consistent with the need to minimize flood damage.* *B. All Public utilities and facilities, such as sewer, gas, electrical and water systems, are located, elevated and constructed to minimize or eliminate flood damage.* *C. Adequate drainage is provided so as to reduce exposure to flood hazards.*
Do the regulations provide for conservation subdivision or cluster subdivisions in order to conserve environmental resources?	Conservation or cluster subdivisions are a function of zoning, which Chapter 225 of the Wicomico County Code provides provisions for cluster subdivisions.
Do the regulations allow density transfer where hazard areas exist?	The Wicomico County Zoning Code permits transfer for development for both designated growth areas and rural areas.
CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES	
Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	The FY 2016-FY 2020 CIP for Wicomico County includes capital expenditures designed to improve the infrastructure of Wicomico County, including several bridge and dam replacements, storm drainage systems, and road resurfacing projects.
Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	CAPITAL IMPROVEMENT PROGRAM 2015-2019 PAGE 12 PUBLIC WORKS Chesapeake Bay Watershed Improvements Projects Morris Mill Dam Rehabilitation Johnson Road Enhancements-Eliminate Flooding Issues

Source: FEMA Integrating Hazard Mitigation Into Local Mitigation & Wicomico County Hazard Mitigation Planning Committee

CONCLUSION

Integrating hazard planning and resiliency 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, Wicomico 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 and build a resilient Wicomico 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 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, Wicomico County.

CHAPTER 13 – COMMUNITY CAPABILITY & RESILIENCE

COMMUNITY CAPABILITY GENERAL OVERVIEW

Wicomico County Emergency Services has access to a network of trained agency and volunteer personnel through the Maryland Emergency Management Assistance Compact, 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 Roads Department, Planning Office, General Services, Board of Education, the Community Action Agency and the Sherriff's Office.

In addition, the County has mutual aid agreements with surrounding counties and has also developed working relationships with the Salisbury Fire Department as well as the volunteer fire and rescue units throughout the County. The County also has mutual agreements with the American Red Cross and other groups that may be called upon under special circumstances, such as the National Guard. In addition, the County has agreements to coordinate mitigation activities with private utility companies, such as Delmarva Power and Verizon and with private transportation companies, such as Norfolk Southern, for rail transportation Hazmat events.

EMERGENCY SERVICES

Emergency Management Division

The division is responsible for updating and maintaining emergency plans to deal with mitigation, preparedness, response, and recovery for natural and man-made disasters along with administration of the county risk management program.

Members of the division participate with several community and area committees, and organizations on a regular basis to maintain working and cooperative partnerships in the furtherance of emergency preparedness. These committees and organizations include:

- Delmarva Emergency Task Force (DETF)
- Local Emergency Planning Committee (LEPC)
- Maryland Emergency Management Agency (MEMA)
- Maryland Emergency Management Association
- PRMC Disaster Committee
- Salisbury Mutual Assistance Group
- US Coast Guard Area Contingency Planning Committee

Communication Division

The Communications Division known as "Central" is manned 24/7. Central houses, maintains, and operates the Wicomico County Public Safety Answering Point, better known as 9-1-1. All incoming 911 calls from within Wicomico County are received at this center.

The center receives calls for service for six police agencies within the county, gathers information and transfers the call to the appropriate agency for action. Along with the six police agencies the center also receives and dispatches all fire and medical related calls for 14 fire companies and 14 ambulance companies.

Fire & Ambulance Companies:

- Salisbury Fire Department and E.M.S Station 16
- Salisbury Fire Department Station 1
- Salisbury Fire Department Station 2
- Fruitland Fire Department and E.M.S Station 3
- Delmar Fire Department and E.M.S Station 74
- Hebron Fire Department and E.M.S Station 5
- Parsonsburg Fire Department and E.M.S Station 6
- Pittsville Fire Department and E.M.S Station 7
- Willards Fire Department and E.M.S Station 8
- Mardela Springs Fire Department and E.M.S. Station 9
- Powellville Fire Department and E.M.S Station 11
- Westside Fire Department and E.M.S Station 12
- Sharptown Fire Department and E.M.S Station 14
- Allen Fire Department and E.M.S Station 15

Police Agencies:

- Delmar Police Department
- Fruitland Police Department
- Maryland State Police
- Salisbury Police Department
- Wicomico County Sheriff’s Department
- Salisbury University Police Department

Radio Division

The Radio Division maintains the seven channel 800 Mhz Trunking radio system in Wicomico County that supports fire, ems, and police agencies. This also includes other agencies not on the trunking system, but who share interoperability with County Public Safety agencies. There are approximately 1,800 portable and 625 mobile radios on the system. There are 14 fire and EMS departments and five police agencies on the system in the county.

As mentioned the system has interoperability with seven counties, the City of Salisbury and Ocean City Systems. Preventive maintenance is done in house on a 12 month schedule. A 60 ft. portable tower trailer for backup scenarios is also maintained by the division staff. The system provides on street coverage. BDAs, Bi-Directional Amplifiers, are used to inject signals in and out of a building to enhance in building coverage. BDAs are used on those building such as PRMC that because of the type of construction inhibit regular in building coverage provided by the current system.

The Maryland Eastern Shore Interoperability Network (MESIN) provides for interoperability capability between the counties on the Eastern Shore of Maryland. The division maintains the Wicomico County Emergency Mobile Command Unit for use by all emergency response agencies in the county.

CITIZEN WARNING/ALERT NOTIFICATION PLAN

Citizen Warning/Alert Notification Plan The objective of the notification plan is to provide timely information to both residents of and visitors to the county regarding impending or occurring extraordinary events that may impact the safety of individuals. The distribution of information through the components of the plan cited below will result in an informed public, which is a public armed to react in a safe and effective manner. The components implemented/utilized singularly or in combination will result in:

- Alerting citizens in geographically targeted area(s) of imminent threats/hazards to their safety.
- Providing alerts for life threatening/severe weather conditions to include National Weather Service forecasts, warnings, and watches.
- Notification of impending or occurring emergencies/hazardous conditions.
- Sharing emergency preparedness advisories dealing with current events.
- Access to emergency preparedness information dealing with both manmade and natural events adversely affecting the public.

Components include:

1) Citizen Warning/Alert Siren System. There are currently 13 outdoor sirens utilized by local fire departments throughout the County for alerting purposes and two (2) sirens maintained by the Department of Emergency Services for emergency purposes. These 15 sirens will make up the Citizen Warning/Alert Siren System. Sirens will be used to alert citizens of an imminent hazard and prompt them to seek shelter immediately and additional information on the threat (timing, location, and severity) from reliable sources such as those cited in items 2-5. Citizens should not call 9-1-1 to determine the hazard causing the activation.

2) NOAA Weather All-Hazards Radios (NWR). NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, seven days a week providing comprehensive weather and emergency information.

3) Emergency Alert System Messaging System (EAS). The National Weather Service (NWS) generates verbal and text messages dealing with weather warnings and watches that are broadcast by participating radio and television broadcasters, cable, satellite, and wireline providers.

4) Wireless Emergency Alerts (WEA). Allows customers who own certain wireless phone models and other enabled mobile devices to receive geographically-targeted alert text messages through cell towers in the area(s) of the emergency.

5) Local Television and Radio Media. A source of warning/emergency information reaching a large segment of the County's population. 2

6) "Communicator" System. A citizen notification method used to notify the Citizens of Wicomico County of important information in the event of an impending or occurring emergency via telephone communications. The system utilizes telephone company wireline phone listings and addresses to place calls to residences in specific areas or countywide. Note: Telephone companies do not maintain data bases for cellular phones that include address. Therefore, in order for a cellular customer to receive an informational call they must register their cell phone through a Self-Registration Portal accessed by visiting the County Department of Emergency Services website: www.wicomicocounty.org/es.

7) Press Releases. Distributed by the Department of Emergency Services. In addition, The County website enables members of the news media, as well as individuals, to obtain the latest press releases and media advisories. News on the site is updated daily.

8) County Department of Emergency Services (DES) Website. Contains information dealing with a variety of emergency preparedness topics and current advisories: www.wicomicocounty.org/es. The DES Facebook page is also a source for emergency preparedness information.

9) County Website Postings. Will provide emergency information during declared emergencies: http://www.wicomicocounty.org.

10) **Social Networking.** Facebook, Twitter, and YouTube are available on the county's website for up to date information on Youth & Civic Centers, Recreation & Parks, County Tourism, Emergency Services, and Early Childhood Council.

MITIGATION CAPABILITY ASSESSMENT

Through its Public Works Department, Wicomico County has developed a system to regulate land use in sensitive areas such as the Chesapeake Bay Critical Area, 100-yr floodplains, high risk coastal areas (VE Zone), stream buffer areas, wetlands, and other designated Critical Areas. The County also has subdivision regulations for the creation of new lots and zoning ordinances. Each municipality has similar regulations that are administered locally. Municipalities were asked to review a mitigation capability assessment matrix and the results are shown on Table 13.1.

Table 13.1: Mitigation Capability Assessment Matrix

	Wicomico County	Willards	Salisbury	Sharptown	Fruitland	Hebron	Delmar	Pittsville	Mardela Springs
Comprehensive Plan with Hazard Mitigation	Yes – Comprehensive Development Plan Draft 2014	No	Yes – Comprehensive Plan 2010	Yes – Comprehensive Plan 2008	Yes	Yes	Yes – September 28, 2009	No	Yes
Land Use Plan	Yes	Yes – Comprehensive Plan 2009	Yes – Comprehensive Plan 2010	Yes	Yes	Yes	Yes – September 28, 2009	Yes	Yes
Subdivision Ordinance	Yes – Subdivision Regulations 1994	Yes – 2009 Amended Sub-division Regs	Yes – Subdivision Code (Ch. 16)	Yes – Town	Yes – Ordinance # 76	Yes	Yes – February 24, 2010	Yes	No
Zoning Ordinance	Yes – Wicomico County Zoning Regulations	Yes – 2009 Zoning Code	Yes – Zoning Code (Ch. 17)	Yes – Town	Yes – Ordinance # 67	Yes	Yes – February 24, 2010	Yes	Yes
Flood Mitigation Assistance Plan (FMA)	No	No	Yes – City of Salisbury Flood Mitigation Plan 2008	No	No	No	No	No	No
Floodplain Management Ordinance	Yes – 2015 Floodplain Ordinance Ch. 149	Yes	Yes – Floodplain Management (Ch. 15, 16)	Yes - Town	Yes – Ordinance # 146	Yes – Wicomico County	No	No	Yes
- # of Flood Insurance Policies	697 Total County – NFIP Report	3 – NFIP Report	222– NFIP Report	6 – NFIP Report	10 – NFIP Report	N/A	N/A	N/A	N/A
Stormwater Program	Yes – Stormwater Management Act 2007	Yes – Wiomico County	Yes – Maryland Stormwater Design Manual (Latest Edition)	Yes – Wicomico County	Yes – Wicomico County	Yes – Wicomico County	No	Yes	Yes
Building Code	Yes – International Building Code	Yes – International Building Codes 2015	Yes – International Building Code 2006	Yes – Town/International Building Code	Yes - International Building Code 2006	Yes – Wicomico County	Yes – International Building Code	Yes	Yes
Building Official	Yes	Yes	Yes	Yes	Yes	Yes – Wicomico County	Yes – Code Enforcement Officer	Yes	Yes
Inspections?	Yes	Yes	Yes	Yes	Yes	Yes – Wicomico County	Yes	Yes	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Rating	Yes	No	Yes - 4	No	Yes	Yes – Wicomico County	No	No	Yes
Warning-sirens?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
NOAA Weather Radio?	Yes	Yes	Yes	No	Yes	Yes – Wicomico County	No	Yes	Yes

	Wicomico County	Willards	Salisbury	Sharptown	Fruitland	Hebron	Delmar	Pittsville	Mardela Springs
Reverse 911/ Communicator System?	Yes	Yes	Yes	Yes – Wicomico County EOC	Yes	Yes – Wicomico County	Yes	Yes	Yes
Critical Facility Protection	Yes	Yes - Insurance	Yes	Yes	Yes	Yes	Yes	Yes	No
Natural / Cultural Resources Inventory	Yes	No	Yes – Comprehensive Plan 2010	No	Yes	Yes – Wicomico County	No	No	No
Erosion Control	Yes – Sediment/Erosion Control Plan Wicomico County	Yes – Wicomico County	Yes	Yes – Wicomico County	Yes – Wicomico County	Yes – Wicomico County	No	No	No
Sediment Control	Yes – Sediment/Erosion Control Plan Wicomico County	Yes – Wicomico County	Yes	Yes – Wicomico County	Yes – Wicomico County	Yes – Wicomico County	No	Yes	No
Public Information Program	Yes – Public Information Officer	No	Yes	Yes – Town Fire Dept/County	Yes – PAC 14	Yes – Wicomico County	Yes	No	Yes

Source: Wicomico County Planning, Zoning, and Community Development & Wicomico County Municipalities

WEATHER RELATED EVENTS

WINTER STORM CAPABILITY

The County Roads Department, the Board of Education and local municipalities, along with the State Highway District Office are equipped to deal with significant snow storms. As mentioned in the hazard profile, the County also has to deal with occasional ice storms during the winter months.

In addition to the County Roads Department and State Highway Administration, the Emergency Services Office has close ties with utility companies that provide electrical and telephone service to the citizens of the County. These utility companies clear dead, overhanging, and downed trees from utility rights-of-way during summer months to mitigate ice and wind damage during winter storms. With respect to new construction, the County's Building Code has both snow loading and wind loading requirements.

Generators at critical facilities were discussed by the 2016 HMPC during the mitigation strategies meeting. With the exception of two facilities, all other facilities were found to have emergency back-up power. The two facilities lacking were included in the 2016 Mitigation Action Items, Table 14.2, Chapter 14.

COASTAL AND RIVERINE FLOODING –HURRICANE AND TORNADO CAPABILITY

During major weather events, including thunderstorms, tornados and the passage of hurricanes, most of the agency and volunteer groups mentioned in their corresponding hazard profiles are called upon for assistance by the Emergency Services Office. Wicomico County's capabilities are similar to other coastal counties that must deal with hurricanes and storm surge flooding. Usually local roads are blocked as shown in *Chapter 8: Flooding Profile and Vulnerability Assessment* and described in *Chapter 14: Mitigation Strategies* and when warranted, residents are asked to evacuate from the flooded area.

Emergency Services has a plan which coordinates evacuation activities with the Roads Department, State Highway Administration, local police, fire and rescue units, the Health Department, Department of Social Services, Humane Society, and the Red Cross. While Wicomico County makes a vast effort to mitigate flood events, the character of the natural environment, along with large 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, Floodplain Management Ordinance and Building Code. The new Floodplain Ordinance adopted in 2015, requires that the first floor of new structures be two feet above base flood level elevation in the floodplain area. The Building Code has 100 mph wind loading requirements for new structures and tie-down requirements for mobile homes. Finally, the County participates in the National Flood Insurance Program (NFIP) to allow property owners to purchase insurance through this federally sponsored program.

As a result of the effective Digital Flood Insurance Rate Map (DFIRM), as of August 17, 2015, changes to flood risk may have changed. A low risk area may have changed to a high-risk area, or vice versa. To assist citizens in determining flood risk, MDE created the DFIRM Outreach Website @ www.mdfloodmaps.com, Flood Risk Application. The Flood Risk Application is a step-by-step interactive tool designed to help citizen understand their flood risk and what their next steps should be based on their personalized results.

CLIMATE CHANGE

Maryland's *Climate Action Plan* includes two climate change adaptation strategies that are currently being used to guide state-level adaptation planning efforts. The first strategy (Phase 1) addresses the impacts associated with sea level rise and coastal storms. The second strategy (Phase II), released as a complement to the Climate Action Plan, addresses changes in precipitation patterns and increased temperature, and the likely impacts to human health, agriculture, forest and terrestrial ecosystems, bay and aquatic environments, water resources, and population growth and infrastructure. Together, more than 100 experts from the governmental, nonprofit, and private sectors participated in a series of meetings from the purpose of interpreting the most recent climate change literature, evaluating adaptation options, and recommending strategies to reduce Maryland's overall climate change vulnerability.

The strategies provide the basis for guiding and prioritizing State-level activities with respect to both climate science and adaptation policy over the near and longer terms. A variety of projects designed to implement components of the strategies is well underway and additional efforts have been identified as high-priorities for early action.

HEAT AND DROUGHT CAPABILITY

As noted in the hazard profile, heat and drought are normally not a severe problem in Wicomico County. However when dry conditions do occur, they can disrupt water service in an area of the County, the Emergency Services may request the Maryland Emergency Management Agency to activate the Maryland National Guard to provide temporary water storage tanks. 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.

TECHNOLOGICAL OR OTHER EVENTS

EPIDEMIC CAPABILITY

As noted in the epidemic hazard profile, the Maryland Department of Health and Mental Hygiene administer 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 Wicomico County. Planning documents developed to mitigate and respond to epidemics include: Pandemic Flu, Medical Surge, Strategic National Stockpile, Risk Communications, Continuity of Operations, Emergency Response Plan for both Anthrax Prophylaxis and Treatment Order and Smallpox Post Exposure Protocol.

FIRE OR EXPLOSION

Wicomico County developed its fire and rescue capability response to fire hazard early in the 20th Century. More recently, fire prevention measures such as regulatory requirements mandated through the County's Building Code and the dissemination of public information through the State Fire Marshal's Office and all Wicomico County Volunteer Fire Departments have become the norm. Safety requirements for explosive materials in containers being shipped by rail or truck are enforced by the Department of Transportation.

WILDFIRE

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

DAM FAILURE CAPABILITY

All dams in the County are subject to inspections by the State's Dam Safety Division and the Army Corps of Engineers. A potential failure at any of the dams in the County would be called in to the Emergency Management Office and relayed to citizens via local radio outlets. As shown in the mitigation projects in *Chapter 11: Human Impacted Hazards* the County is

continually taking measures to ensure the structural integrity by proposing to reconstruct failing dams. Table 11.1 Dam Condition Information, details the hazard rating and dam condition for each dam within Wicomico County.

TRANSPORTATION/HAZMAT CAPABILITY

The Salisbury Fire Department has a HazMat Team that can be called upon in the event of a HazMat incident within the County. The Maryland Department of the Environment is also on call to assist in the cleanup of hazardous materials. The Maryland Department of Transportation would be called upon to assist with a major transportation accident or transportation HazMat incident. In addition, the Coast Guard is available to assist with any water borne transportation accident or HazMat event.

COMMUNITY RESILIENCE

> The National Preparedness Goal, developed by the Federal Emergency Management Agency (FEMA) in response to a Presidential Policy Directive, envisions ―a secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk‖ [FEMA 2015a].

Presidential Policy Directive (PPD)-8 [2011] defines resilience as "the ability to adapt to changing conditions and conditions and to withstand and rapidly recover from disruptions due to emergencies." PPD-21 [2013] expanded the definition to ―the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents. Disaster refers to ―a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses, which exceed the ability of the affected community or society to cope using its own resources‖ [National Science and Technology Council 2005]. Under these definitions, resilience includes activities already conducted by some communities as a part of disaster preparedness.

The general definition of the word resilience refers to the ability to recover quickly from a disaster event. Through continued hazard mitigation initiatives and projects Wicomico County builds upon their overarching goal of becoming a more disaster-resistant community. Coupling this idea with the continual effort to improve and expand community capabilities to prevent, mitigate, respond and recover from a disaster event, Wicomico County evolves into a more resilient community. Improving the ability to maintain and restore vital services in a more timely and efficient manner has been added as "Goal 9" in Chapter 14- Mitigation Strategies. Additionally, many of the goals and associated mitigation action items and projects are proactive and continuous. Furthermore, the Safe Growth Audit within Chapter 12-Plan Integration has been added during the update process to ensure that mitigation and community resilience are included within all County-planning documents. As part of the shared community vision of resiliency, a safe, sustainable, economically vibrant, and healthy environment emerges.

CHAPTER 14 – MITIGATION STRATEGIES

MITIGATION ACTION STATUS REPORT

There were thirty-four (34) mitigation action items identified in the *2011 Wicomico County Hazard Mitigation Plan Update*. The Local Emergency Planning Council (LEPC) reviewed the 2011 mitigation action items annually (2012, 2013, 2014, and 2015). Emergency Services staff provided updated information for inclusion in the 2016 Plan.

Members of the Wicomico County Local Emergency Planning Committee include:

- American Red Cross
- Citizen groups
- County extension
- Emergency management
- Fire departments
- Law enforcement
- Local governments
- Local hospitals
- Local media
- Planning and zoning
- Private / Commercial sector
- Schools
- State officials

During the 2016 Plan Update process, members of the Hazard Mitigation Planning Committee (HMPC) were provided with the annual updates from the LEPC and were given an opportunity to provide additional updated information. Status updates were compiled and added to the 2011 Mitigation Actions, Rating and 2016 Status Table, located in Appendix H.

Results indicate that thirty (30) of thirty-four (34) or eighty-eight percent (88%) of the 2011 mitigation action items were completed and/or are ongoing. One (1) of the four (4) remaining items is underway, while three (3) action items remain incomplete or no longer relevant.

In addition to Mitigation Action Items, the 2011 HMPC identified areas throughout the County that experience repetitive flooding due to heavy rain or severe storm events. Twenty-two flood issues were identified within the unincorporated areas of the County. Upon review by the 2016 HMPC, two (2) issues were mitigated and shown as complete on Table 14.3. While two (2) other issues are within the Capital Improvement Plan and/or are underway.

Seven (7) flood related issues were identified within the City of Salisbury. Upon review of these issues by the 2016 HMPC, four (4) issues were removed, one (1) was reported as complete, and two (2) are underway.

Two (2) issues were identified by City of Fruitland and remain incomplete. Both the Town of Hebron and Mardela Springs had five (5) identified issues, which remain incomplete. Finally, Town of Willards identified (1) flood-related issue, which also remains in need of mitigation.

There were thirteen (13) mitigation projects identified in the *2011 Wicomico County Hazard Mitigation Plan Update* and found in Appendix H. These projects were developed from the mitigation action items that were identified as a high priority by the 2011 HMPC. The table below lists the thirteen (13) 2011 projects and the associated 2016 status.

Table 14.1: 2011 Mitigation Project Status

2011 MITIGATION PROJECT	2016 STATUS
Barren Creek Dam Mitigation	Incomplete
Leonard Mill Pond Dam	Incomplete
100-Year Floodplain Analysis	In Progress
Hazard Areas and Future Land Use	In Progress
Hazard Mitigation in Comprehensive Plan	In Progress
Peninsula Regional Medical Center Mitigation	Incomplete
City of Salisbury Flood Issue Upgrades	In Progress
City of Fruitland Flood Issue Upgrades	Incomplete
Wicomico County Flood Issue Upgrades	Complete
State of Maryland Flood Issue Upgrades	In Progress
Multi-Level Structures Wind Loads	Incomplete
Mitigating Shelters	Incomplete
Facilities and Generators	Complete

Note: *Several projects that have been completed have multiple components, many of which are still in progress.*

Two (2) projects were completed, while five (5) projects remain in progress. There are six (6) projects that have not been completed during the 2011-2015 planning cycle.

GOALS, OBJECTIVES AND MITIGATION ACTIONS

Upon completion of the 2016 Hazard Identification Risk Assessment and Vulnerability Analysis, the Hazard Mitigation Planning Committee (HMPC) was able to develop new objectives as part of the mitigation strategies. The goals and objectives serve as the basis for implementing mitigation action items which aid in mitigating the hazards described in *Chapters 4-11* of the Plan.

Following the review of goals and objectives, the HMPC determined which of the six broad categories the new mitigation action items would be grouped under. These categories include Prevention, Property Protection, Public Education and Awareness, Natural Resources Protection, Emergency Services, and Structural Protection. The HMPC has identified and prioritized thirty-nine (39) 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.

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

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

Objectives

- Institutionalize hazard mitigation.
- Improve organizational efficiency.
- Maximize utilization of best technology.
- Maximize utilization of GIS software.

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

Objectives

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

Goal 3 Improve coordination and communication with other relevant organizations.

Objectives

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

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

Objectives

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

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

Objectives

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

- 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.
- Reduce the number of houses in the floodplain that are subject to flooding.
- Increase the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 100 year flood event.

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

Objectives

- Prioritize new mitigation projects, starting with sites facing the greatest threat to life, health, and property.
- Use public funding to protect public services, and critical and public facilities.
- Use public funding on private property where benefits exceed costs.
- Maximize the use of outside funding sources.
- Encourage property-owner self-protection measures.

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

Objectives

- Establish open space parks and recreational areas in flood hazard areas.
- Provide for the conservation and preservation of natural resources.
- 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.

Objectives

- Improve communications capability between municipal and County emergency management and law enforcement personnel.
- Identify specific high hazard areas in the Urban Wildland Interface and notify residents of means to protect their property from wildfire damage.
- Develop evacuation procedures to enable residents near forested areas to evacuate safely.

Goal 9 Protect public infrastructure, especially evacuation routes.

Objectives

- Upgrade or replace public roads and storm water management features to include mitigation into the project design and construction.
- Improve evacuation routes utilized in flood hazard events to mitigate life-threatening road conditions and road closures.
- Mitigate problem road sections within the County and municipalities.

Goal 9 Improve the ability to maintain and restore vital services following a disaster event in a more timely and efficient manner.

Objectives

- Ensure emergency back-up power is available at all critical facilities.
- Evaluate and improve the resiliency of infrastructure lifelines.
- Design new systems or upgrade existing systems to withstand evolving and future hazards.

MITIGATION ACTIONS

Mitigation actions address the goals and objectives developed by the Hazard Mitigation Planning Committee. These actions form the core of the Wicomico 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.

2016 MITIGATION ACTION ITEMS AND RATINGS

The following table lists the mitigation action items that were developed by the 2016 HMPC. A fillable Adobe PDF containing mitigation actions and associated information was provided to all HMPC members for ranking purposes. The table listed location/responsible entity, goals for each action item, provides the time frame for completion, associate hazard. All HMPC ranking forms were collected and a composite ranking was added to the 2016 Mitigation Action Items table. Committee members rated each action item as low, medium or high priority. The mitigation table below shows the composite of the committee's rankings.

Overall there are twelve (12) action items rated as high and are shown in bold type on the 2016 Mitigation Action Items. An additional twenty-four (24) action items were rated medium and five (5) action items were rated as low. Of high rated actions, two (2) is prevention related, six (6) are property protection related, one (1) public education and awareness and three (3) are related to structural projects. These actions were ranked by the HMPC by their importance, (high, medium, low) which focused heavily on what mitigation projects were the most beneficial.

2016 MITIGATION ACTIONS ITEMS & RATINGS

During the 2016 Plan Update, the following mitigation actions were developed. Action item were ranked "High", "Medium" or "Low". *Note - Timeframe Definitions: Short-term is less than 0-2 years and long-term is 2-5 years.*

Table 14.2: 2016 Mitigation Action Items & Ratings

ACTION	LOCATION/ RESPONSIBLE ENTITY	GOALS	TIMEFRAME	HAZARD	RATING
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.					
Apply for a Coast Smart grant to conduct a Plan Integration study that incorporates hazard mitigation strategies into Comprehensive Plan and/or Critical Areas Plan.	Planning and Zoning	1 2 3	Long-term	All Hazards	**High**
Update GIS Program to include floodplain structure information including elevation certificate database.	Planning and Zoning	1 2 3	Short-term	Flood	Medium
Designate Whitehaven within the Comprehensive Plan update as a vulnerable area.	Planning and Zoning	1 2 3	Short-term	Flood	**High**
Update 2006 Hazardous Materials Commodity Flow Studies for both US Route 13 and 50.	Emergency Services	1 2 3	Short-term	Human Impacted	Medium
PROPERTY PROTECTION - Actions that involve the modification of existing critical and public facilities, buildings, structures, and public infrastructure to protect them from hazards.					
Install impact glass, hurricane shutters and retrofit roofs as needed at critical facilities to ensure protection from severe weather, such as hurricanes.	Peninsula Regional Medical Center	3 5	Long-term	High Wind Hurricane	**High**
Take measures to prevent flooding of the Peninsula Regional Medical Center by installing a levee, back flow prevention valves, and stormwater pumping stations.	Peninsula Regional Medical Center	3 5 6	Long-term	Flood	Medium
Install generators at designated shelter facilities that currently lack a back-up emergency power source.	Salisbury Middle and Parkside High School	5 6 9	Short-term	All Hazards	**High**

ACTION	LOCATION/ RESPONSIBLE ENTITY	GOALS	TIMEFRAME	HAZARD	RATING
Upgrade or install additional generators at shelter facilities that currently have undersized generators.	James M. Bennett High School & Wicomico Youth Civil Center	5 6 9	Short-term	All Hazards	**High**
Install landfill generators – Wicomico County Solid Waste Complex.	Public Works Emergency Services	5 6 9	Short-term	All Hazards	Medium
Install a generator at the Tri-County Council Building, which serves as a back-up facility the court system as designated in County Continuity of Operation Plan. An agreement is in place to provide space at the facility to both FEMA, MEMA and the Department of Agriculture during incident response/recovery.	Public Works Emergency Services	1 5 6 9	Short-term	All Hazards	**High**
Install stationary generators at the following high priority pumping station locations in Salisbury: Wavely Drive, College Avenue, and Cherokee Lanes.	Salisbury Public Works Dept.	5 6 9	Short-term	All Hazards	Medium
Complete flood mitigation study in the Pine Bluff (Camden/RT 12) area.	Public Works Emergency Services	5 6	Long-term	Flood	Medium
Install generators for two storage lift stations. Currently each lift station can hold 1-1 ½ days storage capacity before overflow occurs.	Willards	2 5 6 9	Short-term	All Hazards	**High**
Encourage back flow prevention on municipal water service to homes.	Willards	2 5 6 9	Short-term	Flood	Medium
Assess and mitigate flood risks to the seven (7) repetitive loss properties located within the City of Salisbury specifically, Baptist Street, West Market Street, Delaware Avenue, Greentree Drive, Middle Neck Lane, and (2) properties on East Main Street.	Salisbury	2 5 6 9	Long-term	Flood	**High**
*Mitigate and upgrade flooded roads when funding is available, specifically evacuation routes, based on areas that the HMPC identified as “high” in the following table.	Countywide	9	Long-term	Flood	Medium

ACTION	LOCATION/ RESPONSIBLE ENTITY	GOALS	TIMEFRAME	HAZARD	RATING
Mitigate flooding at the Salisbury Fire Station 16 located in the 100-year floodplain – Zone AE.	Public Works Emergency Services	5 6	Long-term	Flood	Medium
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.					
Develop and disseminate public information materials encouraging flood mitigation and prevention. Specifically, the use of sandbags and hydrosacks.	Salisbury	1 2 4 5	Short-term	Flood	**High**
Target residents for public outreach campaign preparedness in high hazard areas such as the 100 year floodplain.	Countywide	4 6	Long-term	Flood	Medium
*Complete CRS Activity 332.b Flood Response Preparations (FRP). Develop a pre-flood plan for public information projects. Materials may include templates of handouts, mailers, press releases, webpage and social media that cover key messages to be disseminated before, during and after flood. Include materials and the procedures for how FRP will be used.	Planning and Zoning Emergency Services	4 5 6	Short-term	Flood	Medium
*Provide brochure on flood insurance produced by FEMA at various public places. Include locations such as insurance and real estate agencies.	Planning and Zoning Emergency Services	4 5 6	Short-term	Flood	Medium
Conduct repetitive flood loss outreach project such as annual mailings or neighborhood meetings.	Planning and Zoning Emergency Services	4 5 6	Short-term	Flood	Medium
NATURAL RESOURCE PROTECTION - Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural protection systems.					
Build coastal resiliency through living shoreline implementation, invasive species management, or vegetation selection for future climate conditions.	Planning and Zoning	3 7	Long-term	Shoreline Erosion Climate Change	Medium

ACTION	LOCATION/ RESPONSIBLE ENTITY	GOALS	TIMEFRAME	HAZARD	RATING
Maintain green corridors, protect against fragmentation, and facilitate habitat migration.	Planning and Zoning	3 7	Long-term	Shoreline Erosion Climate Change	Low
Maintain, identify, and protect new marsh migration corridors.	Planning and Zoning	3 7	Long-term	Shoreline Erosion Climate Change	Low
Create habitat mosaics that may be more resilient to climate change impacts, such as sea level rise.	Planning and Zoning	3 7	Long-term	Sea Level Rise Climate Change	Low
Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers.	Planning and Zoning	3 7	Long-term	Drought Sea Level Rise Flood	Medium
Create an “ideal” living shoreline by installing: riparian buffers about the tide line using native trees and shrubs; tidal wetlands using grasses, rushes, and sedges at mid-tide elevation and marsh grasses and common three-square at low tide; and underwater grasses in shallow water.	Planning and Zoning	3 7	Long-term	Drought Sea Level Rise Flood Climate Change	Medium
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.					
Conduct county wide dry hydrant assessment to ascertain the need for additional dry hydrants.	Public Works Emergency Services	1 4 8 9	Long-term	Fire	Medium
Improve emergency notification and evacuation information by using technology, such as a smartphone App.	Public Works Emergency Services	1 4 9	Short-term	All Hazards	Medium

ACTION	LOCATION/ RESPONSIBLE ENTITY	GOALS	TIMEFRAME	HAZARD	RATING
Install dry storage building (salt) to mitigate problems related to winter storms.	Public Works Emergency Services	4 9	Long-term	Winter Storm	Medium
Obtain and strategically place mobile sign boards at fire and law enforcement locations.	Public Works Emergency Services	3 4 6	Short-term	All Hazards	Medium
Procure chippers needed for tree removal from storms.	Fruitland	1 2	Short-term	High Wind Hurricane	Low
Procure snow removal equipment (currently using contractors - Snow evacuation route goes thru center of town).	Delmar	4 9	Long-term	Winter Storm	Medium
Procure storm damage removal equipment	Delmar	1 2	Long-term	All Hazards	Low
Establish a debris storage area at city yard for use during clean up after flooding events and weather emergencies.	Salisbury	1 4	Short-term	All Hazards	Medium
STRUCTURAL PROJECTS - Actions that involve the construction of structures to reduce the impact of a hazard event.					
Replace Barren Creek Dam to prevent road wash-outs and to reduce the economic impact of the failure of this dam.	Public Works	5 6 9	Long-term	Flood/ Dam Failure	**High**
Mitigate flooding at county Sheriff's Office (Naylor Mill) through acquisition/relocation.	Public Works Emergency Services	5 6	Long-term	Flood	Medium
Mitigate flooding issues at the Health Department basement – used as Emergency Operations Center (EOC).	Public Works Emergency Services	5 6	Long-term	Flood	**High**
Install and improve drainage/stormwater mitigation on South Brown Street.	Fruitland	2 5 6 9	Long-term	Flood	Medium
Install backflow prevention/tide gates along Market Street and Fitzwater Street/West Main Street.	Salisbury	2 5 6	Long-term	Flood	Medium
Repair/rebuild the Morris Mill Dam to prevent flooding in the Canal Woods subdivision.	Public Works	5 6 9	Long-term	Flood/ Dam Failure	**High**

The 2010 HMPC identified areas throughout the County that experience repetitive flooding due to heavy rain and severe storm events. During the Plan Update process, the listing was reviewed by the Wicomico County Roads Superintendent and the by 2016 HMPC during the September 29, 2015 meeting. Several new flood related issues were identified and added to the listing as denoted by **"NEW".** These flood related issues were analyzed and ranked by priority as shown.

Table 14.3: 2016 Flood Related Issues

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	State, County, or Municipal	Ranking (High, Medium, Low)
City of Salisbury Coty Cox Flood Relief; currently a proposed project in the Capital Improvement Plan.	Yes	SWM	Municipal	**High**
Status Update: City of Salisbury Coty Cox emergency repairs (August 2013) have alleviated recent problems associated with Culvert blockage. Stormwater Improvement design is 95% complete with construction anticipated for 2016.				
City of Salisbury Honeysuckle Drive Regional Storm Drain & Canal Woods	N/A	SWM	Municipal	Medium
Status Update: Removed.				
City of Salisbury East Main Street Storm Drain	No	SWM	Municipal	Medium
Status Update: In design as part of "Main Street Master Plan". Construction dependent on funding; pending for 2016.				
City of Salisbury Vine Street Flood Relief	N/A	SWM	Municipal	Medium
Status Update: Removed.				
City of Salisbury Germania Circle Regional Stormwater System and Property Acquisition	Yes	Elevation	Municipal	**High**
Status Update: City has obtained property appraisals. Acquisition dependent on grant funding and property owner involvement.				
City of **Salisbury** Northwood Drive Storm Drain	N/A	SWM	Municipal	Medium
Status Update: Removed.				
City of Salisbury 911 Camden Ave Regional Storm Drain	N/A	SWM	Municipal	Medium
Status Update: Removed.				
NEW City of Salisbury Market Street and Baptist Street	No	Storm Drains & Flood Mitigation	Municipal	**High**
NEW City of Salisbury Fitzwater Street and Lake Street	Yes	Storm Drains & Flood Mitigation	Municipal	**High**
NEW City of Salisbury Johnson Pond Dam	No	Sluice Gates & Access	Municipal	Medium
NEW City of Salisbury Beaglin Park Dr. Dam	No	Sluice Gates & Access	Municipal	Low

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	State, County, or Municipal	Ranking (High, Medium, Low)
City of Fruitland Intersection of Poplar and Anderson St.	No	SWM	Municipal	Medium
NEW **City of Fruitland** Morris Ave. at Moore Ave.	Yes	SWM	Municipal	**High**
NEW **City of Fruitland** North Division at Morris Mill Dam	Yes	SWM	Municipal	**High**
NEW **City of Fruitland** North and South Brown St. from St. Lukes to Crown Rd.	Yes	SWM & Elevation	Municipal	**High**
Town of Hebron Culver St.	No	Elevation – Low Spot	Municipal	Medium
Town of Hebron Downing St.	No	Elevation – Low Spot/Drainage	Municipal	Low
Town of Hebron Corner of Howard St. and East Walnut St.	No	Elevation – Low Spot	Municipal	Low
Town of Hebron Corner of Chestnut Tree Rd. and East Walnut St.	No	Elevation – Low Spot/Drainage	Municipal	Medium
Town of Hebron Corner of Northeast Railroad Ave and North Main St.	No	Elevation – Low Spot	Municipal	Medium
Town of Willards recently upgraded WWTP continue to experience problems due to proximity to Pocomoke River. **Statue Update: Holding tanks are WWTP flood during severe rain events; 8-10 inch events.**	N/A	Elevation	Municipal	Low
Town of Mardela Springs of Main St. and Main St. Extended to Route 50.	Yes	SWM	Municipal	Low
Town of Mardela Springs of Bridge St. to Main St. and Athon Rd.	Yes	SWM	Municipal	Low
Town of Mardela Springs of Station St. to Route 50	Yes	SWM	Municipal	Low
Town of Mardela Springs of Spring Grove Rd. to Route 50	Yes	SWM	Municipal	Low
Town of Mardela Springs of Bratton St. to Route 50	Yes	SWM	Municipal	Low
Wicomico County Roads				
NEW Pine Bluff Rd @ Route 13	No	Elevation: Low Spot/Drainage	County	Low

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	State, County, or Municipal	Ranking (High, Medium, Low)
NEW Morris Mill Dr	No	Elevation: Low Spot/Drainage	County	Low
NEW Texas Road; segment between Old School St and Oak Grove Church Rd	Yes	Private Ditches	County	Low
Civic Avenue at Nursing Home SHA issue on County Road	Yes	Elevation – Low Spot/Drainage	County	**High**
Morris Leonard Rd. east of Zion Church Rd.	No	Elevation – Low Spot	County	Low
Barren Creek Rd. (Dam requires constant monitoring) **Status Update: Project is currently within the County CIP**	No	SWM/Elevation	County	**High**
Jersey Rd. between Connelly Mill & Adkins Rd. **Status Update: Road has been raised.**	No	Elevation	County	Low
Log Cabin Rd. between Naylor Mill and West Rd.	No	Elevation – Low Spot/Drainage	County	Medium
Little Lane at S turns	No	Elevation – Low Spot/Drainage	County	Low
Hickory Mill Rd. at Little Lane intersection **Status Update: The project is surveyed, designed and property acquisition is underway**.	No	Elevation – Low Spot	County	Low
Norris Twilley Rd. at Cross Rd.	No	Elevation – Low Spot/Drainage	County	Low
Purnell Crossing Rd. at bridge and Mt. Pleasant intersection	No	Elevation – River Flooding	County	Medium
Riverton Rd. near Old School Rd.	No	Elevation – River Flooding	County	Low
Muddy Hole Rd.	No	Elevation – Low Spot/Drainage	County	Low
Trinity Church Rd. and Trinity Church Loop	No	Elevation – Low Spot/Drainage	County	Low

Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	State, County, or Municipal	Ranking (High, Medium, Low)
Quinton Rd. at Norris Twilley Rd.	No	Elevation – Low Spot/Drainage	County	Low
Green Hill Church Rd. (3 areas) **Status Update: Projected was completed during the 2011-2015 planning cycle.**	Yes	Elevation – River Flooding	County	**High** – Residents may not be able to get out
Bear Swamp Rd.	No	Elevation – Low Spot	County	Low
Mt. Olive Rd.	No	Elevation – Low Spot	County	Low
Wango Rd.	No	Elevation – Low Spot/Drainage	County	Low
Melson Church Rd. at Rt. 54	No	Elevation – Low Spot/Drainage	County	Low
Athol Rd. off Rt. 50	No	Elevation – Low Spot	County	Low
Sharps Point Road at Fruitland line	No	Elevation – Low Spot	County	Low
Levin Dashiell Rd.	No	Elevation – Low Spot	County	Low
Pemberton Dr. past Crooked Oak Rd.	No	Elevation – Low Spot	County	Low
State Routes				
US Business Route 13 floods during heavy rain events and the right lane becomes impassable. **Status Update: Improvements are being completed in phases by SHA.**	Yes	SWM	State	**High**
US 50 at US Route 13 Business Route	Yes	SWM	State	**High**

2016 MITIGATION PROJECTS

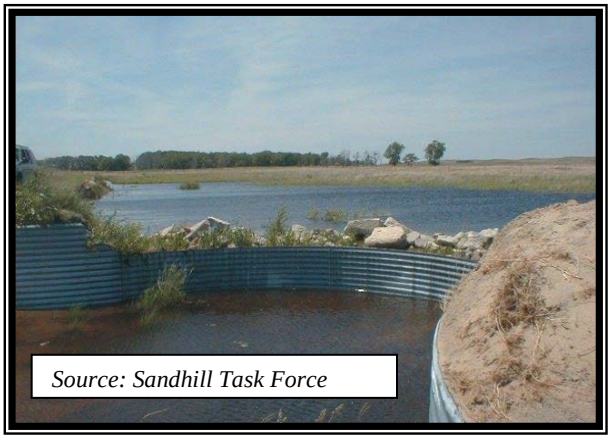
During the third meeting of the Hazard Mitigation Planning Committee held on September 29, 2016, mitigations actions were developed during the project work session portion of the meeting. A fillable PDF mitigation action items ranking form was distributed to all HMPC members following the meeting. Results of the action item ranking process yielded eleven actions rated as "High" by the HMPC. In addition, repetitive flood related issues on roadways were ranked, as well. Those issues ranked as "High" were included as 2016 Mitigation Projects.

PROJECT NAME: BARREN CREEK DAM MITIGATION

Description: The Barren Creek Dam Mitigation Project was previously identified in the *2011 Wicomico County Hazard Mitigation Plan* as a "High" priority project. This project was not completed during the previous planning cycle (2011-2015) and has been ranked, yet again, as a "High" priority in the Plan Update by the 2016 Plan Update.

Barren Creek Dam	
Responsible Organizations	Wicomico County Roads Department Wicomico County Public Works Contracted Engineer Company Contracted Construction Company
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Watershed Protection and Flood Prevention Program Small Flood Control Projects
Approximate Timeline:	2 – 3 years

This dam originated as an old mill race structure with gates and is located under Barren Creek Road. This dam has breached, resulting in Barren Creek Road being washed out multiple times. The existing flood gates used for flood control require a come-along or equipment to open and therefore, must be continuously monitored during a significant storm event. The capacity of the pond is insufficient for its 19 square mile watershed. A steel weir would be used to replace the existing dam. Because of the location of the dam being underneath Barren Creek Road, this road would also have to be modified and would play a major part in the replacement of the new dam.



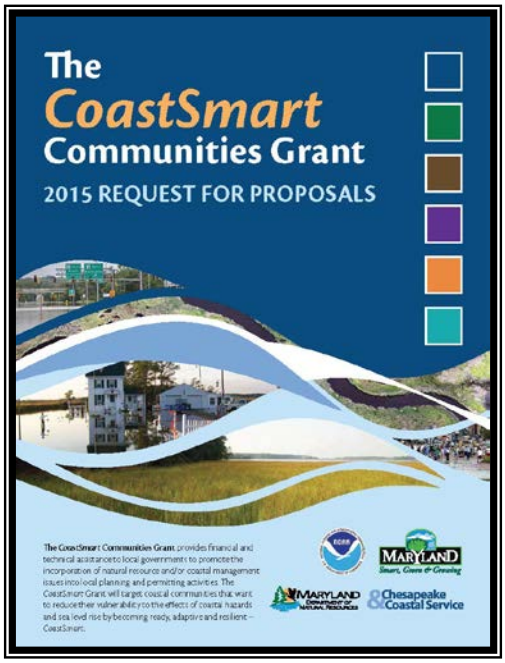
Source: Sandhill Task Force

PROJECT NAME: *COASTSMART* GRANT FOR PLAN INTEGRATION STUDY

Description: Expand on the Safe Growth Audit information presented in Chapter 12-Plan Integration, and conduct a Plan Integration Study. The depth of the review conducted as part of the Study will enable the County to identify and complete plan integration measures resulting in effective ways to reduce hazard vulnerability and build a resilient Wicomico County.

***CoastSmart* Grant for Plan Integration Study**	
Responsible Organizations	Wicomico County Planning, Zoning and Community Development Wicomico County Emergency Services
Estimated Costs	$50,000
Possible Funding Sources	*CoastSmart* Communities Grant (CCG)
Approximate Timeline:	2 years

The Study review process will identify plans, policies, regulations and programs that already exist addressing coastal hazards and resiliency. An inventory will be developed, which will enable the county and the planning committee to identify gaps and overlaps between the current hazard mitigation plan and the larger planning framework. 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, Wicomico County.



The formation and continued engagement of a stakeholder planning committee throughout the planning process is an integral component. The various planning documents, policies, codes, and programs that guide development in Wicomico County and it's municipalities involve a diverse group of stakeholders, and as such, representatives from agencies, departments, citizen organizations, as well as, public officials, must be involved in the process.

To guide and aid county staff in accomplishing this planning initiative, the county will hire a contractor with both land use and emergency management planning experience. Upon completion of this planning process, the following deliverables will be produced and disseminated:

Project Deliverable(s):

- Development of coastal hazard planning element and/or additional language for inclusion in existing Comprehensive Plan chapter(s) with recommendations to reduce coastal hazards through planning, including potential long-term hazards such as: sea-level rise, coastal erosion, and increased storm activity and severity;

- Development of checklist or matrix for inclusion in the appendix section of the County Comprehensive Plan. This product will track where and how coastal hazards are currently integrated into the plan and suggested text and areas of the Plan for integration;
- Evaluation of county's ability to apply, achieve credits, and maintain FEMA Community Rating System;
- Evaluation of evacuation routes, shelters, and critical facilities in relation to vulnerability to coastal storms, sea-level rise and associated flooding, including an analysis of the effects of future land use and development rates on evacuation and shelter capacity. This information will be used to inform the comprehensive plan, emergency operations plan, and the hazard mitigation plan for integration purposes; and
- Evaluation of current transportation networks for vulnerability to coastal hazards with recommendation for hazard mitigation, maintenance, and future infrastructure development.

PROJECT NAME: HAZARD MITIGATION IN COMPREHENSIVE PLAN-WHITEHAVEN COMMUNITY

Hazard Mitigation in Comprehensive Plan	
Responsible Organizations	Wicomico County Planning Zoning, and Community Development Wicomico County Emergency Services Maryland Historic Trust
Estimated Costs	Staff Time
Possible Funding Sources	Wicomico County Maryland Historic Trust
Approximate Timeline:	1 year

Description: The Wicomico County Comprehensive Plan is in the process of being updated. The American Planning Association, Federal Emergency Management Agency, and Maryland Department of Planning encourage jurisdictions to incorporate hazard mitigation in their comprehensive plans. This could be accomplished by Wicomico County Planning and Zoning with the help of the County's Emergency Services. During the 2016 Plan Update, the Hazard Mitigation Committee ranked the designation of Whitehaven as a vulnerable area within the County Comprehensive Plan as "High" priority.

In *Chapter 8: Flooding Profile and Vulnerability Assessment*, Whitehaven was shown to be within Zone AE on the effective FEMA Digital Flood Insurance Risk Map (DFIRM), published August 2015. The community Whitehaven is located in the southern portion of Wicomico County and is centered around fishing and the waterfront. The Town is situation on a tidal river with a deep channel, the Wicomico River. There two (2) FEMA designated repetitive loss properties (a property which has at least two (2) separate claims payments) in Whitehaven.

Whitehaven is significant to the history of the Eastern Shore. Maryland's National Register Properties designates the Whitehaven Historic District and period/date of construction as 19th Century. The Whitehaven ferry has been in continuous operation since 1688 or earlier. The village consists of a hotel, church, school, marina, railway and 24 houses dating from the 19th Century. There are also two (2) 18th Century and one (1) 20th Century dwellings. Whitehaven is unique in Wicomico County and on the lower Shore as a whole.

Planning for this historically significant and hazard vulnerable area encompasses many factors and considerations. Hazard mitigation and planning will need to be consistent with the retention of the historical character of Whitehaven. The Maryland Historic Trust has a program, Cultural Resources Hazard Mitigation Program, which aims at protecting historic places, archaeological sites, and cultural landscapes from the effects of sea level rise and coastal storms. Technical assistance is available through the Maryland Historic Trust.

Source: www.tripadvisor.com

PROJECT NAME: PENINSULA REGIONAL MEDICAL CENTER MITIGATION

Peninsula Regional Medical Center Mitigation	
Responsible Organizations	Wicomico County Public Works Wicomico County Emergency Services Wicomico Planning, Zoning and Community Development Contracted Construction Company
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Watershed Protection and Flood Prevention Program Small Flood Control Projects
Approximate Timeline:	3 - 5 years

Description: Peninsula Regional Medical Center (PRMC) is located in Salisbury, Maryland and is the regional healthcare facility serving Wicomico, Worcester, Somerset, and Dorchester Counties. It is situated less than 300' from the Wicomico River. PRMC is at risk of catastrophic systems failures in the event of a category three or higher storm surge. The elevation of the lower levels of the hospital where all of the buildings critical electrical and mechanical systems are located is susceptible to rising flood waters. The main service court where medical oxygen tanks, generators, electrical substations, heating, ventilation, and air conditioning equipment are located will be under several feet of water in a category four storm surge. This elevation was based on surveys by Becker Morgan Group, Inc. of Salisbury, MD. A hurricane model for Wicomico County was prepared by the Army Corps of Engineers. Compounding the problem, is an active storm drain line that passes under the building which has historically backed up runoff water into the service court of the medical center and threatened the operations of the facility. Becker Morgan proposes that a levee be constructed to prevent rising waters on the Wicomico River from flooding the PRMC. In conjunction with the levee, back flow prevention valves on the storm drain system and storm water pumping stations should be installed at the facility. Taking these measures will ensure that the hospital can remain operational during a crisis or hazard when its services are most important to the community.

Source: Peninsula Regional Medical Center Website

During the 2016 Plan Update process, an additional project was identified for the PRMC. The Hurricane Wind- Enhanced HAZUS Analysis, *Chapter 4-Coastal Storm Profile and Vulnerability Assessment* results indicated one essential facility that the PRMC facility would be

impacted by the probabilistic hurricane event modeled within the assessment, pages 4-12 through 4-13. This five (5) level structure was constructed prior to 1980. The installation of impact resistant glass, hurricane shutters and roof retrofit are necessary to ensure the protection of the facility during severe weather events, such as a hurricane.

PROJECT NAME: CITY OF SALISBURY FLOOD ISSUE UPGRADES

City of Salisbury Flood Issue Upgrades	
Responsible Organizations	Salisbury Public Works Department Wicomico County Emergency Services City of Salisbury
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Emergency Advance Measures for Flood Prevention U.S. Economic Development Administration, Public Works and Development Facilities NRCS-Watershed Protection and Flood Prevention Program
Approximate Timeline:	2 - 5 years

Description: Out of the six (6) flood related issues identified for Salisbury, three (3) were ranked as "High". These flood issues include the Germania Circle Regional Storm Drain, the Market Street and Baptist Street area, and the Fitzwater Street and Lake Street area. All issues are stormwater management related and should be considered for flood mitigation by the City of Salisbury as a high priority.

PROJECT NAME: CITY OF FRUITLAND FLOOD ISSUE UPGRADES

Description: Out of the four (4) flood related issues for Fruitland, three (3) were ranked as "High". These flood issue consist of: the intersection of Morris Avenue at Moore Avenue, North Division at Morris Mill Dam, and North and South Street from St. Luke's to Crown Road. These issues are stormwater management related and the identified roads are evacuation routes. As such, flood related issues should be considered for flood mitigation by the City of Fruitland as a high priority.

City of Fruitland Flood Issue Upgrades	
Responsible Organizations	Fruitland Roads Department Wicomico County Emergency Services City of Fruitland
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Emergency Advance Measures for Flood Prevention U.S. Economic Development Administration, Public Works and Development Facilities NRCS-Watershed Protection and Flood Prevention Program
Approximate Timeline:	2-5 years

PROJECT NAME: WICOMICO COUNTY FLOOD ISSUE UPGRADES

Description: Out of the twenty-five (25) flood-related issues identified for Wicomico County, two (2) projects were completed during the previous planning cycle and two (2) issues were ranked as "High" during the 2016 Plan Update. These flood issues include Barren Creek Road, which is in constant need of monitoring due to the Barren Creek Dam. The flood issues in this area are attributed to storm water drainage and low elevation. The project is currently in the *Wicomico County Capital Improvement Plan*, however grant funding should be sought to ensure that the project includes flood mitigation necessary to address the issue to the fullest extent. The second flood issue identified by the Hazard Mitigation Planning Committee during the 2016 Plan Update includes the Civic Avenue area at the Salisbury Rehabilitation and Nursing Home. Civic Avenue and US Route 50-Ocean Gateway intersect in this area. This is an area of low elevation and storm-water drainage is a repetitive issue. Finally, this route is designated as an evacuation route and should be mitigated.

Wicomico County Flood Issue Upgrades	
Responsible Organizations	Wicomico County Roads Department Wicomico County Emergency Services
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Emergency Advance Measures for Flood Prevention U.S. Economic Development Administration, Public Works and Development Facilities NRCS-Watershed Protection and Flood Prevention Program
Approximate Timeline:	2 – 5 years

PROJECT NAME: STATE OF MARYLAND FLOOD ISSUE UPGRADES

Description: Both flood related issues identified for State owned roads were ranked as "High." These roads are US Business Route 13 and US Route 50 at US Business Route 13. US Business Route 13 floods during heavy rain events and the right lane becomes impassable. Both roads are major evacuation routes and are stormwater management problems. The State Highway Administration has completed phases of the project during the previous planning cycle (2011-2015), however additional improvements are needed. Although these roads are not the responsibility of the County, it is recommended that these projects be added to the State Mitigation Plan.

State of Maryland Flood Issue Upgrades	
Responsible Organizations	State of Maryland State Highway Administration
Estimated Costs	To be determined during the conceptual design phase process.
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program Emergency Advance Measures for Flood Prevention U.S. Economic Development Administration, Public Works and Development Facilities NRCS-Watershed Protection and Flood Prevention Program
Approximate Timeline:	To be determined.

PROJECT NAME: SHELTER FACILITIES AND GENERATORS

Facilities and Generators	
Responsible Organizations	Wicomico County Emergency Services Wicomico County Department of Social Services Wicomico County Board of Education Wicomico Youth & Civic Center
Estimated Costs	TBD-Per Site Estimate Needed for Grant Applications
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program
Approximate Timeline:	Ongoing

Description: During the 2011-2015 planning cycle an examination of each shelter facility was conducted to determine if proper generators were present. Facilities designated as shelters have been determined to be of high importance and must be kept operational under a disaster or power outage. Shelter facilities that lack generators or that have undersized generators or generators in need of an upgrade have been identified in the *Wicomico County Shelter Resource Plan* and include: Salisbury Middle School, Parkside High School, James M. Bennett High School, and the Wicomico Youth & Civic Center.

PROJECT NAME: TRI-COUNTY COUNCIL BUILDING GENERATOR

Facilities and Generators	
Responsible Organizations	Tri-County Council
Estimated Costs	TBD- Site Estimate Needed for Grant Applications
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program
Approximate Timeline:	1-2 Years

Description: The Tri-County Council Building serves as a back-up facility for the Court System within the *Wicomico County Continuity of Operations Plan*. In addition, an agreement with FEMA, MEMA, and the Department of Agriculture has been signed stating that the facility will be used during a hazard incident for response and recovery efforts. The facility's lack of a generator hinders the ability of the facility to function without interruption. As such, this facility has been identified as a critical facility by Wicomico County and is in need of a generator.

PROJECT NAME: TOWN OF WILLARDS-STORAGE LIFT STATIONS (2) GENERATOR

Facilities and Generators	
Responsible Organizations	Town of Willards
Estimated Costs	TBD- Site Estimate Needed for Grant Applications
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program
Approximate Timeline:	1-2 Years

Description: Facilities designated as critical facilities have been determined to be of high importance and must be kept operational during a hazard incident/power outage. The Town of Willards operates two (2) storage lift stations. These stations can hold 1-1 ½ days of storage capacity until they overflow occurs.

PROJECT NAME: NFIP & CRS: FLOOD MITIGATION-REPETITIVE LOSS PROPERTIES AND REPETITIVE LOSS AREAS PROJECT

Repetitive Loss Projects	
Responsible Organizations	Wicomico County City of Salisbury
Estimated Costs	Staff Time TBD
Possible Funding Sources	FEMA Hazard Mitigation Assistance (HMA) Program Community Development Block Grant
Approximate Timeline:	Ongoing

Description: According to the *2013 CRS Coordinator's Manual 501.a*, repetitive loss properties are those properties for which two or more claims of more than $1,000 have been paid by the NFIP within a ten-year period since 1978. There are seventeen (17) properties listed in Appendix G-NFIP & CRS on Table 3, however several of the properties contain multiple units. Following review of Repetitive Loss Properties (RLP) displayed within *Chapter 8-Flooding Profile and Vulnerability Assessment*, Map 8.7 and Appendix G, two (2) repetitive loss areas have been identified within Wicomico County. These areas had the highest concentration of RLP's and include residential properties in Nanticoke Drive area and commercial properties within Salisbury listed in Appendix G, Table 4 and depicted on pages G-8 through G-10. As noted within text boxes on maps, pages G-9 and G-10, flood depths for both repetitive loss properties and adjacent properties indicate that 0.8' to 3.7' of water is present during coastal flooding. 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.

Seventeen (17) properties are located within the Salisbury repetitive loss area. These properties include both repetitive loss properties and adjacent properties that may potentially be impacted by flooding as illustrated page G-9 of Appendix G. Eighteen (18) properties are located within the Nanticoke Drive repetitive loss area. These properties include both repetitive loss properties and adjacent properties that may potentially be impacted by flooding as illustrated on page G-10 of Appendix G.

Repetitive loss properties and properties identified within the Repetitive Loss Areas should be targeted and prioritized for flood mitigation projects.

As a Category C community, (refer to Appendix G), Wicomico County must implement an annual outreach project to the properties in the mapped repetitive loss areas that have insurable buildings in order to qualify for CRS points. A sample public outreach letter is available in the *2013 CRS Coordinator's Manual.*

Additional mitigation activities include:

- Incorporating the procedures for tracking high water marks following a flood into emergency plans;
- Conducting a verification study of FEMA's repetitive loss inventory and developing an associated tracking database;
- Developing and maintaining a database to track community exposure to risk;

- Conducting NFIP community workshops to provide information and incentives for property owners to acquire flood insurance;
- Completing and maintaining FEMA elevation certificates for pre-FIRM and/or post-FIRM buildings within flood risk areas;
- Developing an educational flyer targeting NFIP policyholders on increased cost of compliance during post-flood damage assessments;
- Annually notifying the owners of repetitive loss properties of Flood Mitigation Assistance funding; and
- Advising the public about the local flood hazard, flood insurance, and flood protection measures.

PROJECT NAME: FLOOD MITIGATION AND PREVENTION PUBLIC INFORMATION CAMPAIGN

Public Outreach	
Responsible Organizations	Wicomico County Emergency Services City of Salisbury
Estimated Costs	Staff Time TBD
Approximate Timeline:	Ongoing

Description: Develop and disseminate public information materials encouraging flood mitigation and prevention. Specifically, the use of sandbags and hydrosacks to prevent flood waters entering through doorways and low windows and other openings resulting in first floor flooding. As an alternative to sandbags, hydrosacks are now used for flood protection. While hydrosacks are more expensive than sandbags, they are easier to handle, especially when wet. Hydrosacks are placed in the front of the property. Water is absorbed and then crystallizes, so it will not come out again. Even if the Hydrosack is pierced, the sac will not let the water out.

Source: www.twistfix.co.uk

PROJECT NAME: WICOMICO COUNTY HEALTH DEPARTMENT BACK-UP EOC FLOOD MITIGATION

Description: The Wicomico County Health Department facility has been designated as a back-up Emergency Operations Center (EOC) for Wicomico County. The back-up EOC is located in the basement of the Health Department facility. The basement is prone to flooding and is need of mitigation at this time. The facility is located at 108 E. Main Street in Salisbury.

Wicomico County Health Department Back-up EOC	
Responsible Organizations	Wicomico County Health Department Wicomico County Emergency Services
Estimated Costs	TBD
Possible Funding Sources	FEMA Hazard Mitigation Grant Program FEMA Pre Disaster Mitigation Grant Program
Approximate Timeline:	1-2 years

Source: www. http://ja.cuyahogacounty.us/

CHAPTER 15 – PLAN MAINTENANCE AND IMPLEMENTATION

PLAN ADOPTION

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

MITIGATION IMPLEMENTATION PROGRESS REPORT

The *2016 Wicomico County Hazard Mitigation Plan* includes a Mitigation Implementation Progress Report. This report provides an overview of mitigation actions and projects that have been undertaken to minimize impacts from hazards and continue to improve community resiliency. During the next planning cycle, the Mitigation Implementation Progress Report will be evaluated and updated on an annual basis. This report will be distributed to various agencies, organizations, and departments.

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 Local Emergency Planning Committee (LEPC), which was instrumental in developing this Hazard Mitigation Plan, will continue to meet at recurring fixed times during the five-year cycle to monitor and evaluate mitigation projects and to keep the Plan current. Annual status reports will be completed on the progress of various mitigation activities. Copies of these status reports will be made available to the general public.

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 as 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 report will be made available to 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 required. The LEPC and the Department of Emergency Services 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 Hazard Mitigation Planning Committee and would also include municipal and citizen involvement.

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.

RESOLUTION NO. _____

A RESOLUTION OF THE CITY OF SALISBURY, MARYLAND ADOPTING THE WICOMICO COUNTY MULTI-HAZARD MITIGATION PLAN.

WHEREAS, the City of Salisbury, a municipality in Wicomico County, Maryland, recognizes the threat that natural and technological hazards pose to its citizens and their property: and

WHEREAS, the 2016 Wicomico County Hazard Mitigation Plan has been prepared in accordance with the Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. 201.6; and

WHEREAS, an adopted multi-hazard mitigation plan is required by the federal government as a condition of future funding for hazard mitigation projects; and

WHEREAS, the City of Salisbury has jointly participated in the planning process with other local units of government and agencies within the County to prepare a multi-hazard mitigation plan;

NOW, THEREFORE, BE IT RESOLVED THAT, the Council of the City of Salisbury, Maryland officially adopts the Wicomico County Multi-Hazard Mitigation Plan as an official plan, and, that the Wicomico County Emergency Management Agency is authorized to submit, on behalf of the City, the adopted Multi-Hazard Mitigation Plan to the Federal Emergency Management Agency for final review and approval.

THIS RESOLUTION was duly passed at a meeting of the Council of the City of Salisbury, Maryland held on _____, 2016, and is to become effective immediately upon adoption.

ATTEST:

_____ _____

Kimberly R. Nichols, City Clerk John R. Heath, President
Salisbury City Council

APPROVED BY ME THIS:_____ Day of _____, 2016.

_____

Jacob R. Day, Mayor