Charlestown Watershed Master Plan

Community Meeting #1

November 16, 2022

Charlestown Fire Hall

Meeting Agenda

- 6:00-6:05: Arrival
- 6:05-6:30: Project Presentation
- 6:30-7:00: Breakout Discussion
- 7:00-7:20: Report out of Breakout Discussions
- 7:20-7:30: Closing Thoughts/Discussion/Next Steps
- 7:30: Adjourn

Project Team

Bryan Lightner
Town Administrator
Town of Charlestown

Jessica Seipp
Project Manager
Dewberry

Dano Wilusz
Project Engineer
Dewberry

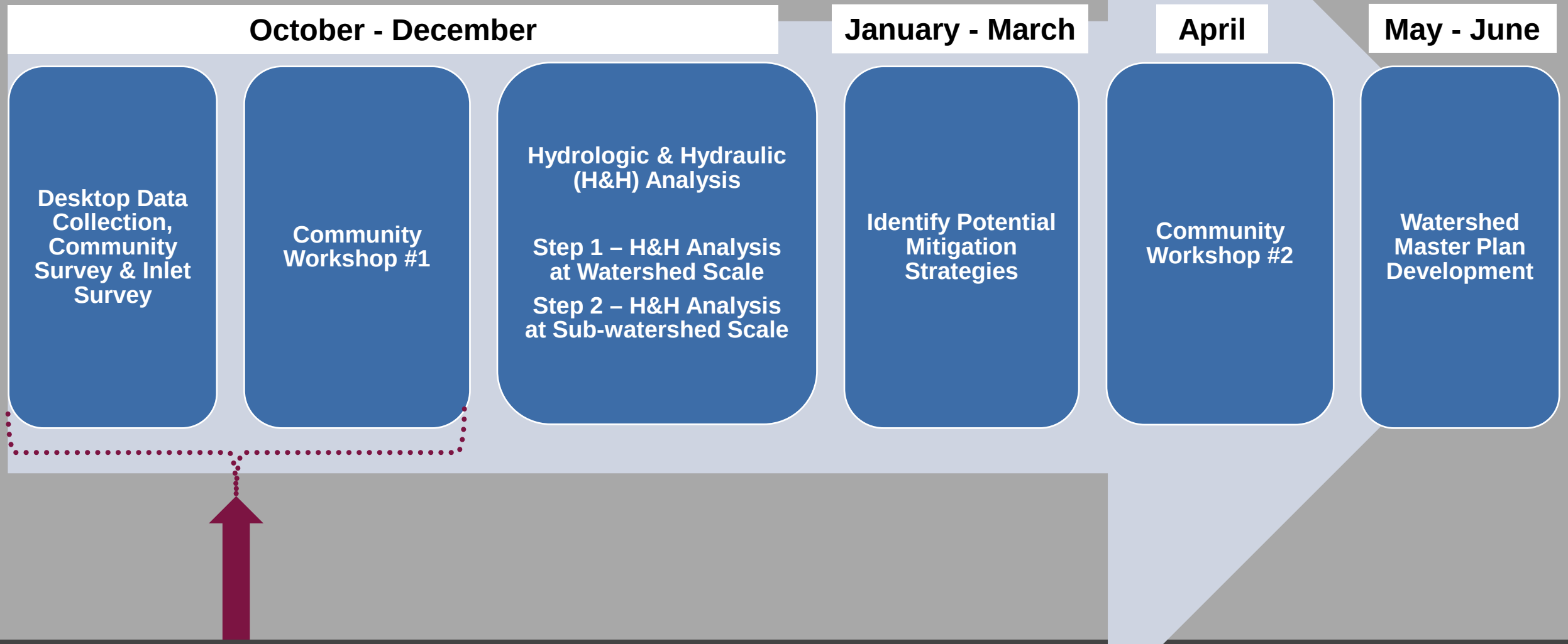
Presentation Overview

- Project Introduction
- Project Overview
- What We Currently Know
  - Stormwater Assets
  - Flooding History
  - Community Survey Results
- Future Projections
- Modeling Approach
- Potential Mitigation Strategies
- Discussion

Project Introduction

- Develop a plan which identifies and prioritizes flood mitigation strategies
- Learn from community about existing issues
- Model existing, proposed, and future conditions
- Develop concept plans for 3 priority projects

Project Overview



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Stormwater Asset Inventory (Town)

- Stormwater point features
  - Inlets
  - Manholes
  - Junction boxes
  - Outfalls
- Conveyances
  - Pipes
  - Culverts
  - Swales
- Best Management Practices (BMPs)
  - Wet ponds
  - Infiltration practices

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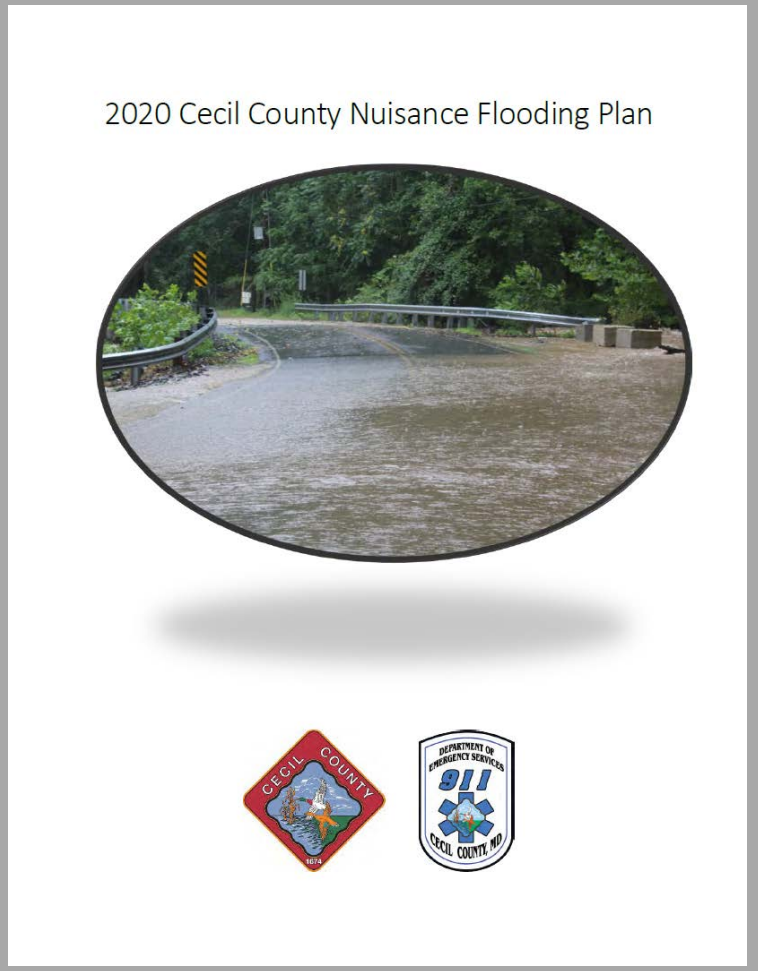
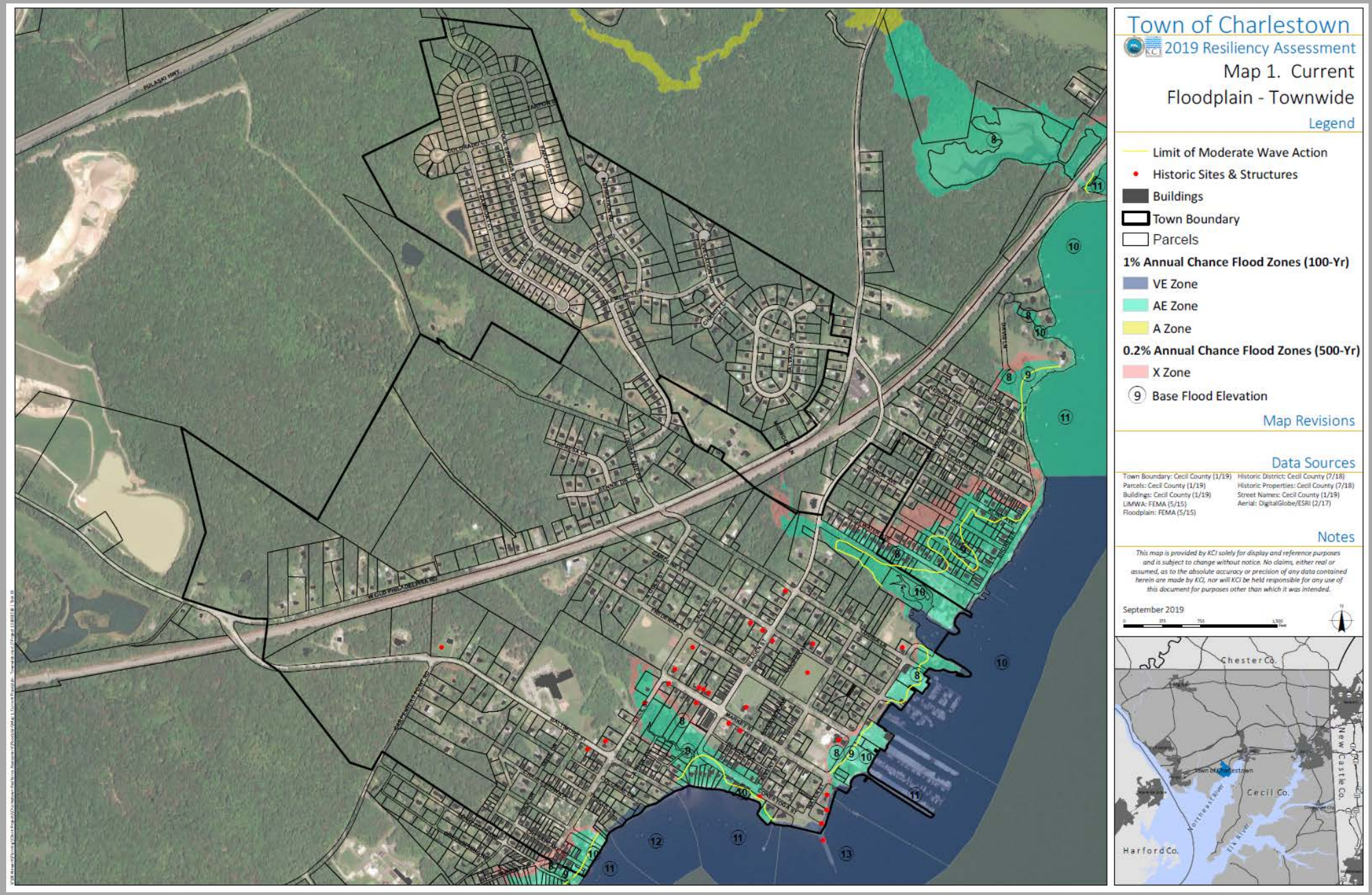
Recent Studies




Town of Charlestown
2019 Resiliency Assessment
Map 1. Current Floodplain - Townwide
Legend
Limit of Moderate Wave Action
Historic Sites & Structures
Buildings
Town Boundary
Parcels
1% Annual Chance Flood Zones (100-Yr)
VE Zone
AE Zone
A Zone
0.2% Annual Chance Flood Zones (500-Yr)
X Zone
9 Base Flood Elevation
Map Revisions
Data Sources
Town Boundary: Cecil County (1/19)
Parcels: Cecil County (1/19)
Buildings: Cecil County (1/19)
LiMWA: FEMA (5/15)
Floodplain: FEMA (5/15)
Historic District: Cecil County (7/18)
Historic Properties: Cecil County (7/18)
Street Names: Cecil County (1/19)
Aerial: DigitalGlobe/ESRI (2/17)
Notes
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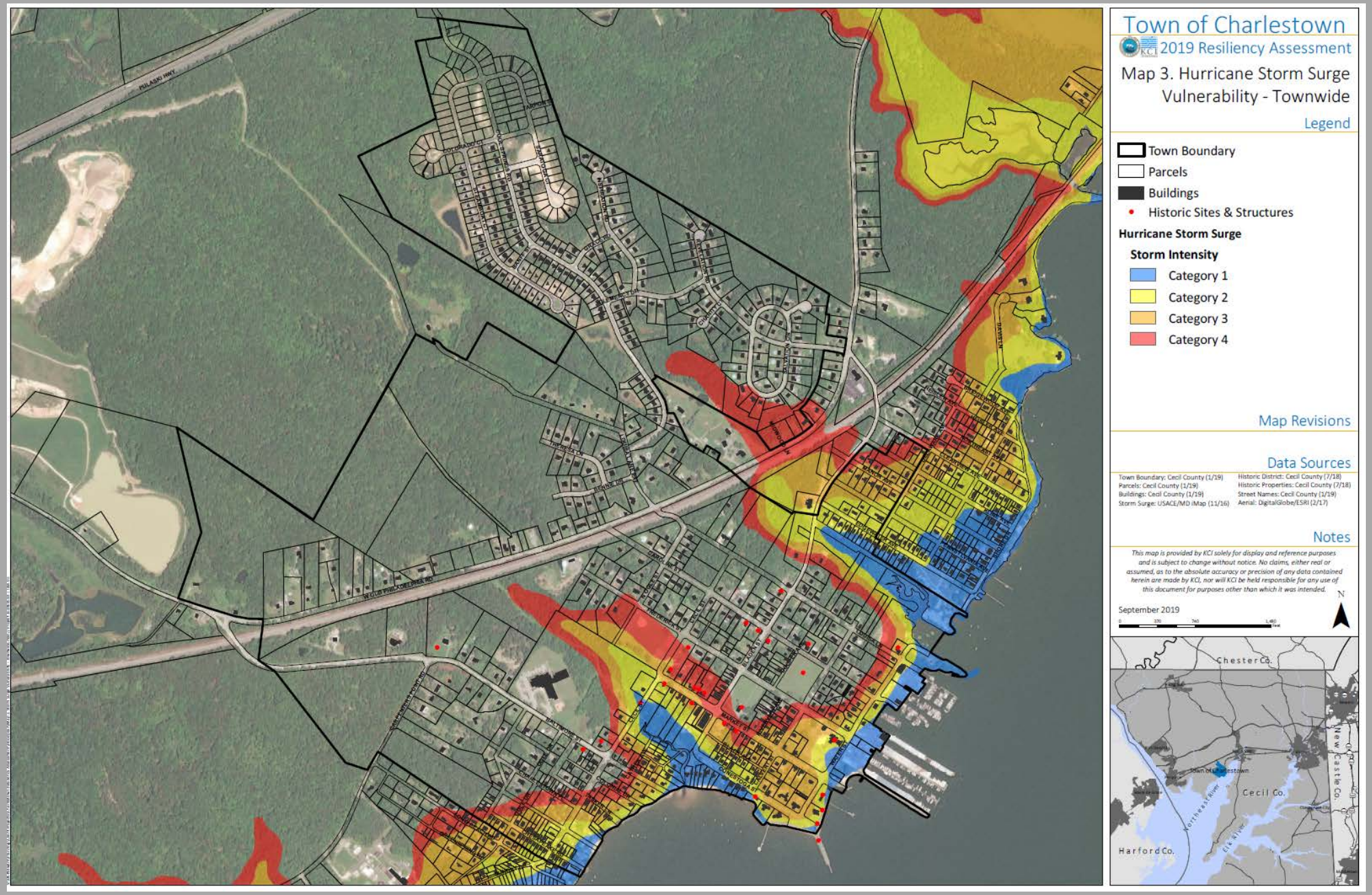
September 2019
Chester Co.
Cecil Co.
Harford Co.
New Castle Co.
Northeast River
Elk River


Town of Charlestown
2019 Resiliency Assessment
Map 3. Hurricane Storm Surge Vulnerability - Townwide
Legend
Town Boundary
Parcels
Buildings
Historic Sites & Structures
Hurricane Storm Surge
Storm Intensity
Category 1
Category 2
Category 3
Category 4
Map Revisions
Data Sources
Town Boundary: Cecil County (1/19)
Parcels: Cecil County (1/19)
Buildings: Cecil County (1/19)
Storm Surge: USACE/MD iMap (11/16)
Historic District: Cecil County (7/18)
Historic Properties: Cecil County (7/18)
Street Names: Cecil County (1/19)
Aerial: DigitalGlobe/ESRI (2/17)
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September 2019
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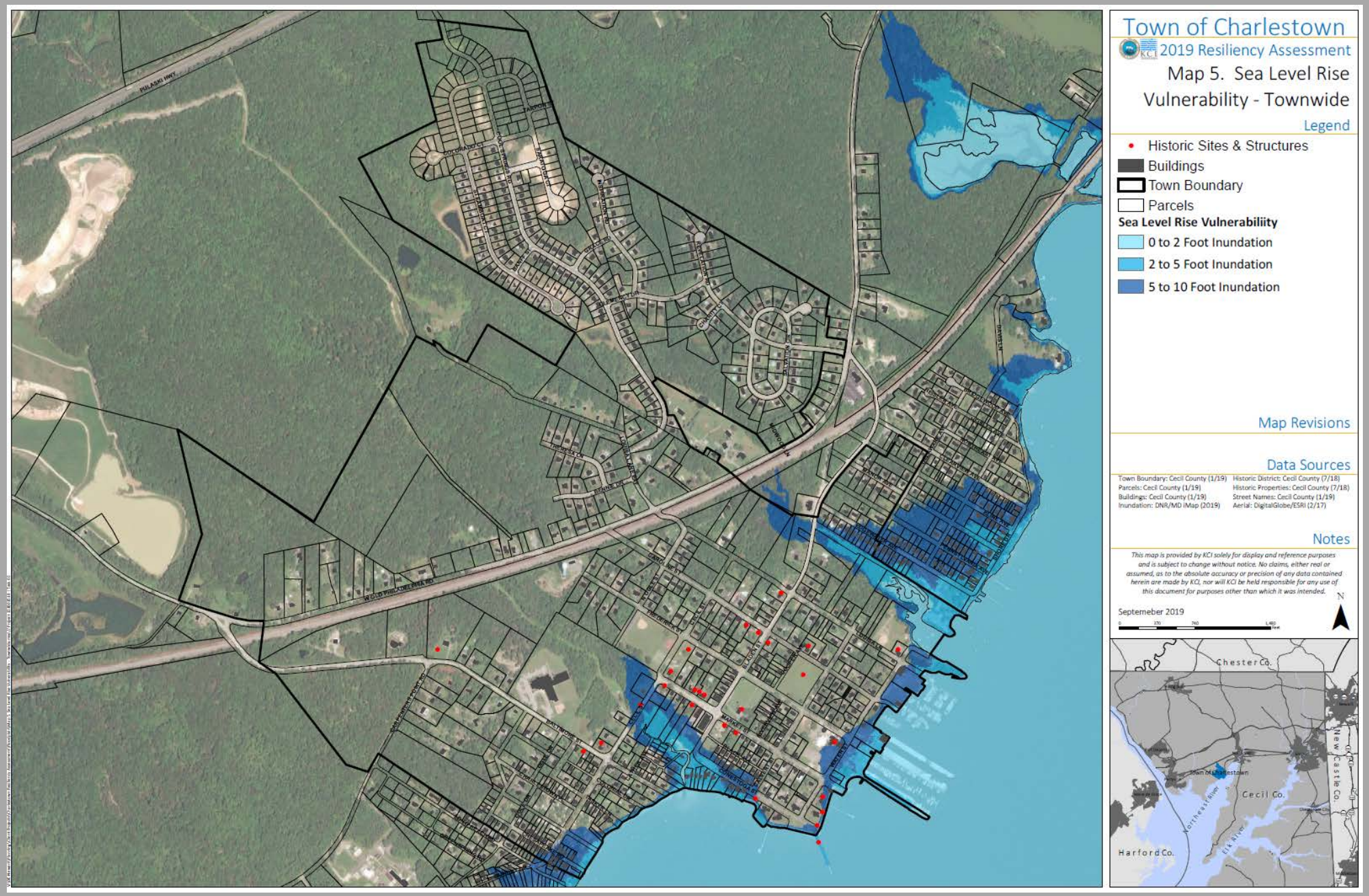
Cecil Co.
Harford Co.
New Castle Co.
Town of Charlestown


Town of Charlestown
2019 Resiliency Assessment
Map 5. Sea Level Rise Vulnerability - Townwide
Legend
Historic Sites & Structures
Buildings
Town Boundary
Parcels
Sea Level Rise Vulnerabiliity
0 to 2 Foot Inundation
2 to 5 Foot Inundation
5 to 10 Foot Inundation
Map Revisions
Data Sources
Town Boundary: Cecil County (1/19)
Parcels: Cecil County (1/19)
Buildings: Cecil County (1/19)
Inundation: DNR/MD iMap (2019)
Historic District: Cecil County (7/18)
Historic Properties: Cecil County (7/18)
Street Names: Cecil County (1/19)
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N
Septemeber 2019
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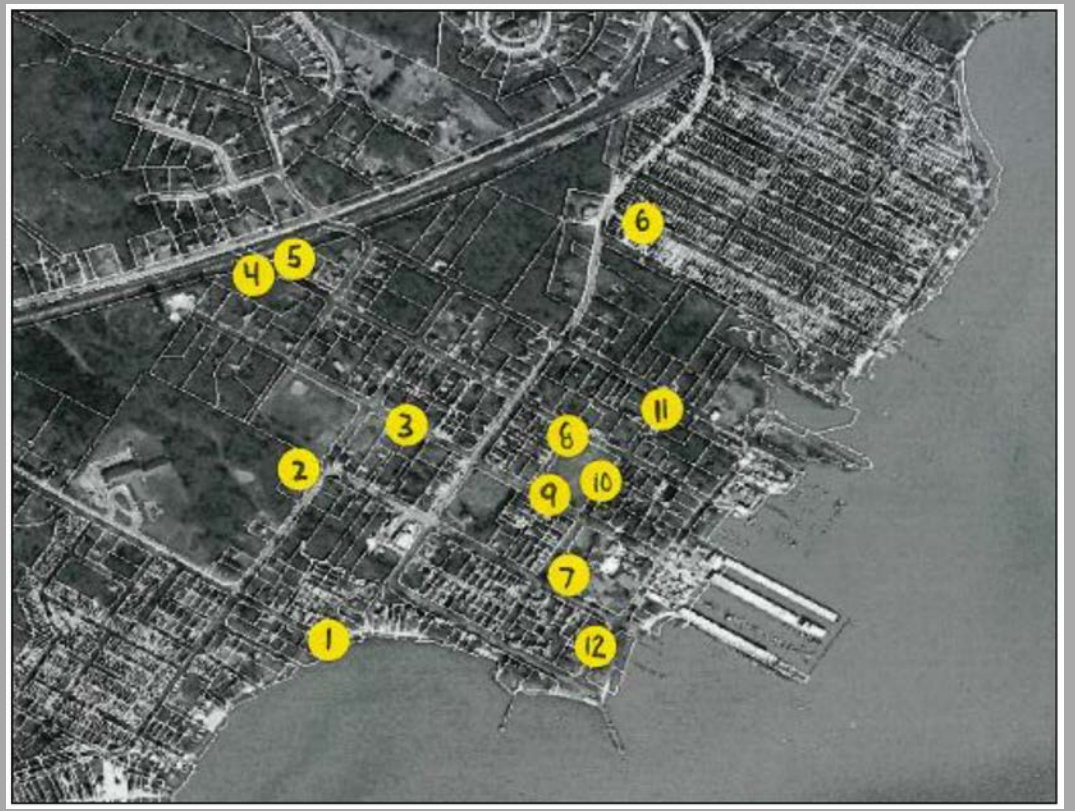
Community Surveys - 2019

1. Baltimore Street right-of-way, from 308 Baltimore Street to the North East River.
2. 493 Cecil Street, northwest of Structure 200 & Conveyance 202.
3. 333 Frederick Street to 340 Market Street, ending just north east of Conveyance 128.
4. 707 Caroline Street to 466 Frederick Street, starting around Structure 943 & ending northwest of Conveyance 1030.
5. 701 N Ogle Street, along Caroline Street, from railroad right-of-way & Structure 943, south east towards N Ogle Street.
6. 108 Edgewater Avenue.
7. 132 Market Street to Water Street, from Structure 160 to Structure 27 & Conveyance 37.
8. Caroline St & Cooper Ave intersection to Frederick St & Riverview Ave intersection, starting just north of Structure 875 & Conveyance 876.
9. Frederick St & Riverview Ave intersection to Water Street, to Conveyance 19.
10. Calvert St, half way between Caroline & Frederick Streets, to 520 Calvert Street, and then south to Water Street, ending at Structure 27 & Conveyance 37.
11. 726 Calvert St, from Calvert St to Water Street.
12. Water Street, from 429 Water St, to 407 Water St.

Source: Stormwater Vulnerability & Floodplain Management Assessment, KCI 2019



Identified Areas of Improvement

Date	Structure/ Conveyance ID No.	Address	Priority	Pipe Properties	Defect Description
01-08-19	Structure 00075	205 Conestoga Street	High	N/A	Bottom of pipe is missing; tire filled with concrete was placed on end of outfall blocking water from leaving system.
01-09-19	Structure 00103	424 Calvert Street	High	N/A	Cast iron grate placed on inlet does not support weight; no frame.
01-09-19	Structure 00160	132 Market Street	High	N/A	Grate bent in; side of grate broken off; no frame.
01-09-19	Structure 00166	Beach Road	High	N/A	Filled with leaves and water; no grate or frame (just sheet metal).
01-25-19	Structure 00184	333 Frederick Street	High	N/A	Backyard swale is flooded; outfall is submerged; sinkhole created around outfall and fencing is placed over top.
01-25-19	Structure 00336	Frederick Street (side of 601 N Ogle Street)	High	N/A	Grate does not sit properly in frame.
01-25-19	Structure 00338	708 North Ogle Street	High	N/A	Filled 90% with debris.

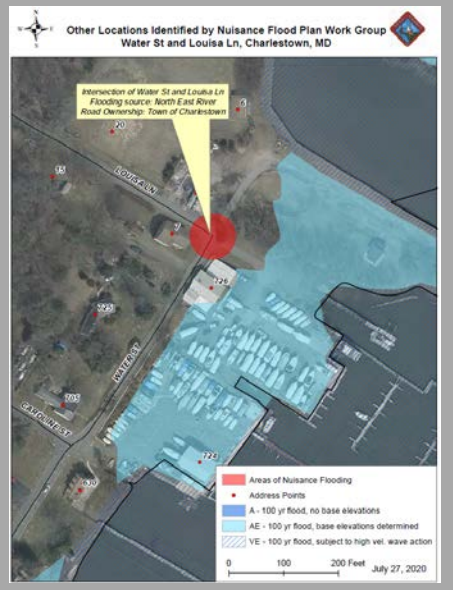
Source: Stormwater Vulnerability & Floodplain Management Assessment, KCI 2019

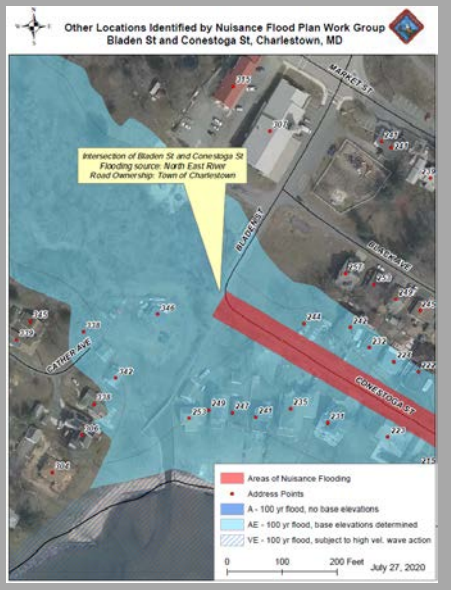
Town of Charlestown Identified Areas of Improvement

2020 Cecil County Nuisance Flooding Plan

Location Identified by NFP Workgroup	Notes
Conestoga Street, from Bladen to Water Streets	
Water Street, from Conestoga to Frederick Streets	
Intersection of Water and Conestoga Streets	Long Point Park
Intersection of Water & Louisa Streets	Avalon Park
Intersection of Bladen and Conestoga Streets	Foot Log Park
Baltimore Street Charlestown	Foot Log Beach
Colonial Drive Charlestown	Sewer manhole on beach
Holloway Beach	Identified problem with septic along Long Beach Road

2020 Cecil County Nuisance Flooding Plan Maps





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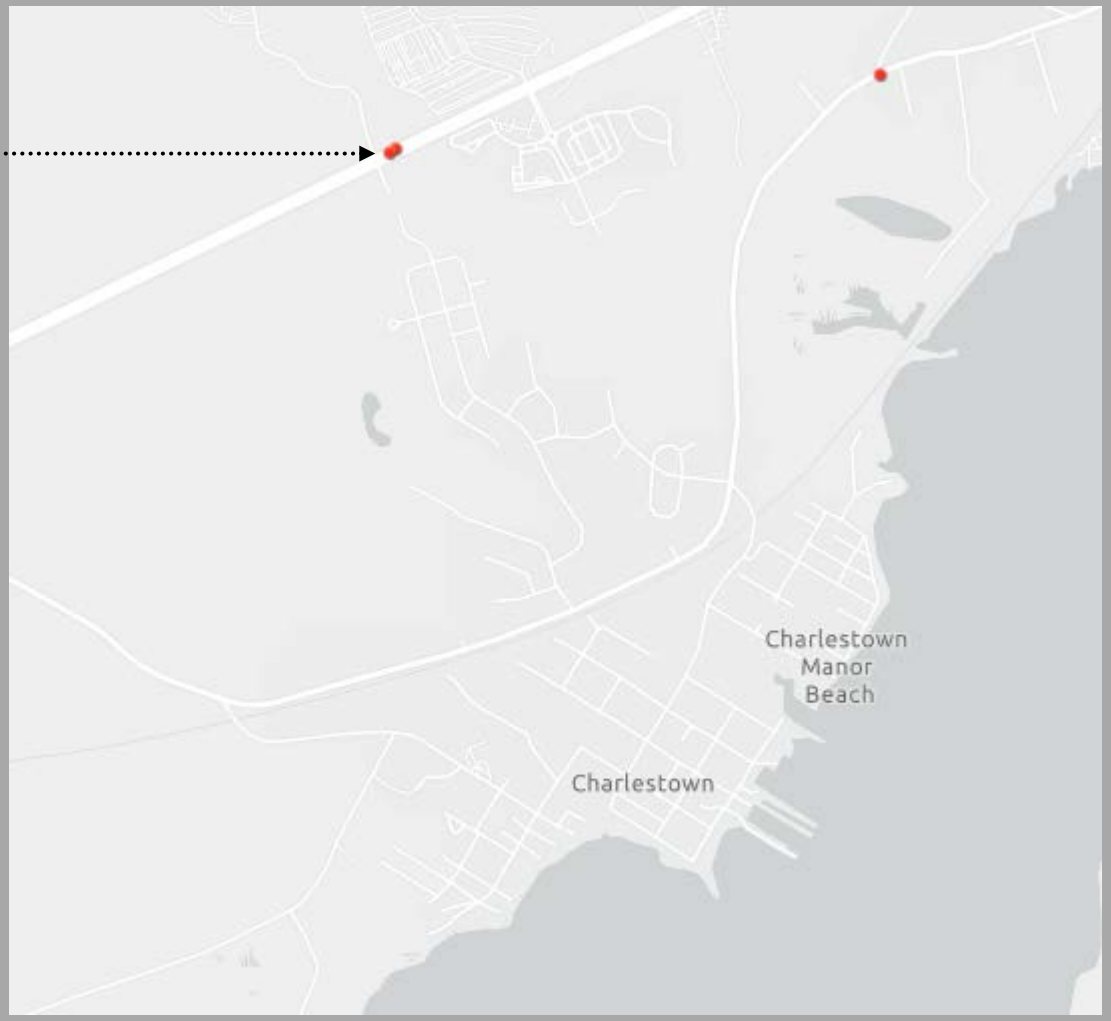
2020 Cecil County Nuisance Flooding – Critical Facilities

Charlestown Manor Pump Station is critical facility vulnerable to nuisance flooding

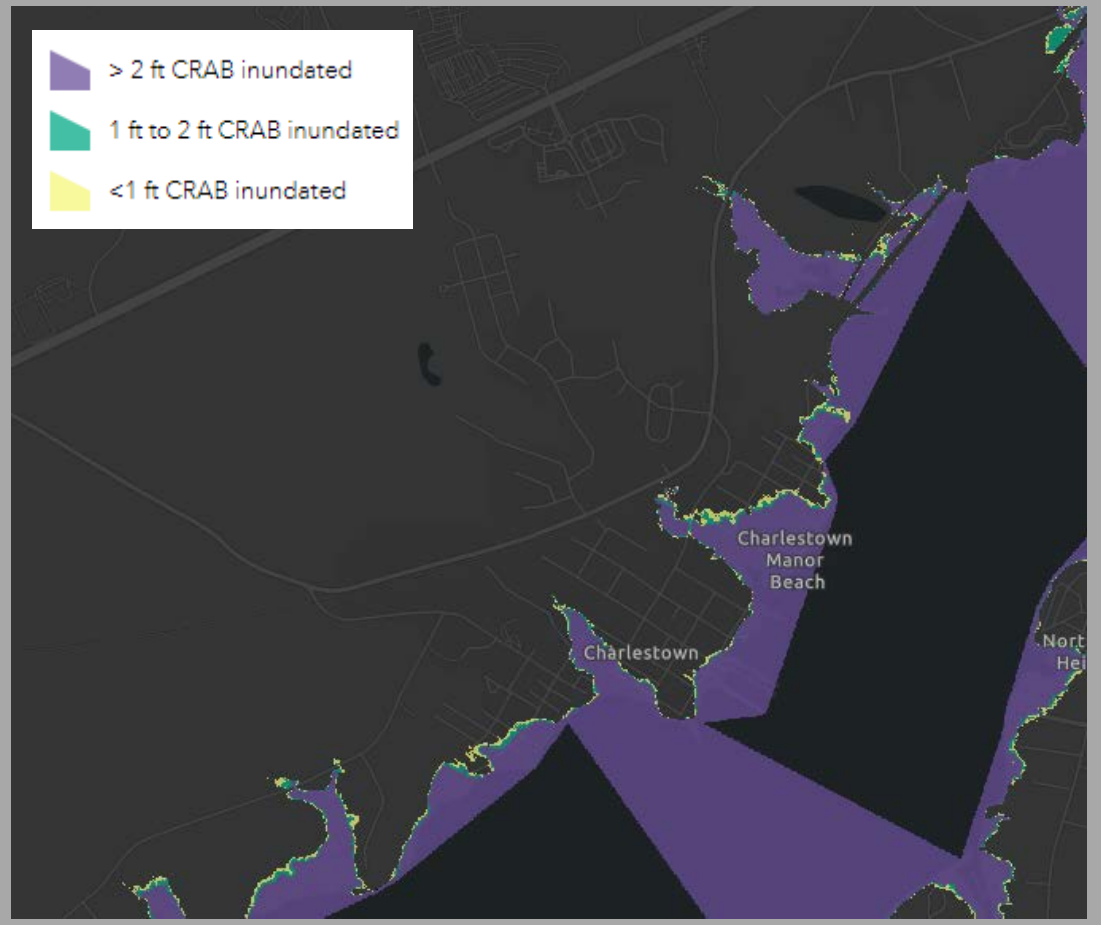
Stormwater Flooding Reports

- August 31, 2021
- US 40/Pulaski Highway closed due to flooding between Principio Parkway East and Charlestown Crossing Boulevard.
- The remnants of Ida produced widespread flooding along with instances of flash flooding across the area. Tropical moisture infiltrated the area and there were moderate amounts of instability as well. This combined with the lift provided from the remnants
- Source: https://sb-227-maryland.hub.arcgis.com/pages/mapping-watershed-assessment



Climate Ready Action Boundary

- https://mdfloodmaps.net/CRAB/
- Created by MDE
- “Maryland Coast Smart regulations that went into effect on September 1st, 2020 - now require State projects over $ 500,000 for construction or State funding to apply the corresponding horizontal limits of the higher 100-year + 3 feet inundation as indicated by the Coast Smart - Climate Ready Action Boundary (CS-CRAB).” (source)



Potential Mitigation Concepts

- Gray (concrete) infrastructure
- Green infrastructure

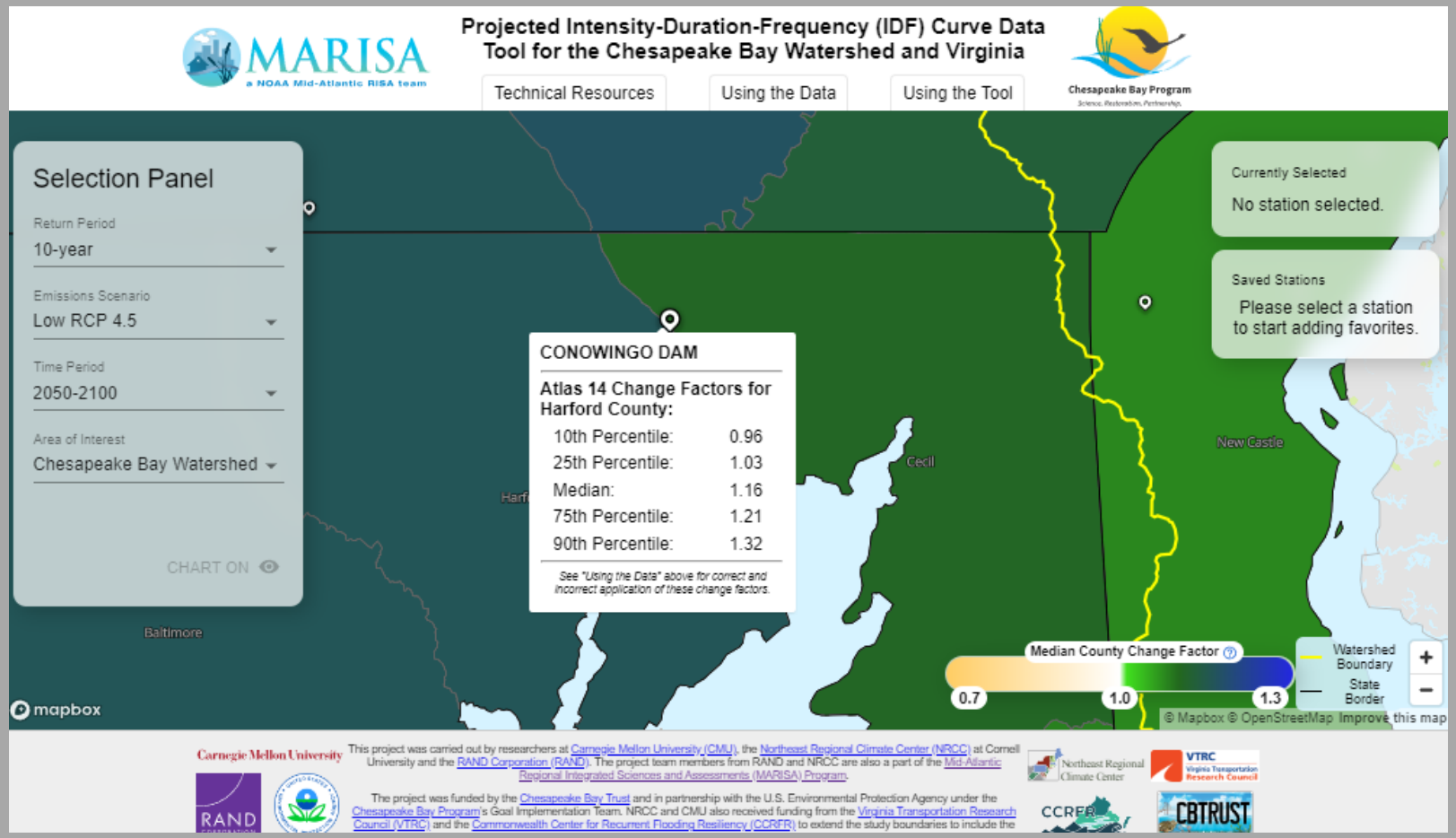
BMP	Site Suitability Criteria							
	Drainage Area (acre)	Slope (%)	Hydrological Soil Group	Water Table Depth (cm)	Road Buffer (ft)	Stream Buffer (ft)	Wetland Buffer (ft)	Land cover
Bioretention	< 2	< 5	A–D	> 61	< 100	> 100	> 100	Grass, bare earth, parking lots
Constructed Wetland	> 25	< 15	A–D	> 122	--	> 100	> 100	Grass, bare earth
Dry Pond	> 10	< 15	A–D	> 122	--	> 100	> 100	Grass, bare earth
Grassed Swale	< 5	< 4	A–D	> 61	< 100	--	--	Grass, bare earth, parking lots
Infiltration Basin	< 10	< 15	A–B	> 122	--	> 100	> 100	Grass, bare earth
Infiltration Trench	< 5	< 15	A–B	> 122	--	> 100	> 100	Grass, bare earth, parking lots
Porous Pavement	< 3	< 1	A–B	> 61	--	--	--	Parking lots
Sand Filter (non-surface)	< 2	< 10	A–D	> 61	--	> 100	> 100	Grass, bare earth, parking lots
Sand Filter (surface)	< 10	< 10	A–D	> 61	--	> 100	> 100	Grass, bare earth, parking lots
Vegetated Filterstrip	--	< 10	A–D	> 61	< 100	--	--	Grass, bare earth, parking lots
Wet Pond	> 25	< 15	A–D	> 122	--	> 100	> 100	Grass, bare earth

Source: 2019 Cecil County Green Infrastructure Plan

Community Survey Results

- Currently being analyzed
- Received 55 responses
- Continuing to receive submission
- 19 of 55 experience no flooding (35%)
- 26 of 55 experience some level of flooding (47%)
- Sources of flooding:
  - Runoff, heavy rain, location within the landscape (e.g. bottom of hill), creek/stream flooding, inadequate stormwater conveyance

Future Rainfall Projections



Source: https://midatlantic-idf.rcc-acis.org/

Sea-level Rise

Table 2. Projected sea-level rise estimates above 2000 levels for Maryland based on the Baltimore tide-gauge station. Columns correspond to different projection probabilities and rows represent to time horizons and emissions pathways. See caveat in the text concerning potentially greater sea-level rise late this century under higher emissions pathways.

Year	Emissions Pathway	Central Estimate 50% probability SLR meets or exceeds:	Likely Range 67% probability SLR is between:	1 in 20 Chance 5% probability SLR meets or exceeds:	1 in 100 Chance 1% probability SLR meets or exceeds:
2030		0.6 ft	0.4 – 0.9 ft	1.1 ft	1.3 ft
2050		1.2 ft	0.8 – 1.6 ft	2.0 ft	2.3 ft
2080	Growing	2.3 ft	1.6 – 3.1 ft	3.7 ft	4.7 ft
	Stabilized	1.9 ft	1.3 – 2.6 ft	3.2 ft	4.1 ft
	Paris Agreement	1.7 ft	1.1 – 2.4 ft	3.0 ft	3.2 ft
2100	Growing	3.0 ft	2.0 – 4.2 ft	5.2 ft	6.9 ft
	Stabilized	2.4 ft	1.6 – 3.4 ft	4.2 ft	5.6 ft
	Paris Agreement	2.0 ft	1.2 – 3.0 ft	3.7 ft	5.4 ft
2150	Growing	4.8 ft	3.4 – 6.6 ft	8.5 ft	12.4 ft
	Stabilized	3.5 ft	2.1 – 5.3 ft	7.1 ft	10.6 ft
	Paris Agreement	2.9 ft	1.8 – 4.2 ft	5.9 ft	9.4 ft

Source: https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/Sea-LevelRiseProjectionsMaryland2018.pdf

Future Land Use - Example

EPA ICLUS Land Use	% Study Area Year 2010 (A)	% Study Area Year 2100 (B)	Percent Point Change
Suburban	5.5%	23.8%	18.4
Exurban, high density	18.6%	28.2%	9.5
Urban, low density	2.9%	5.6%	2.8
Wetlands	3.3%	3.2%	-0.1
Pasture	0.3%	0.0%	-0.3
Grazing	0.9%	0.0%	-0.9
Timber	5.6%	2.9%	-2.7
Cropland	12.9%	1.3%	-11.6
Exurban, low density	30.3%	15.1%	-15.2

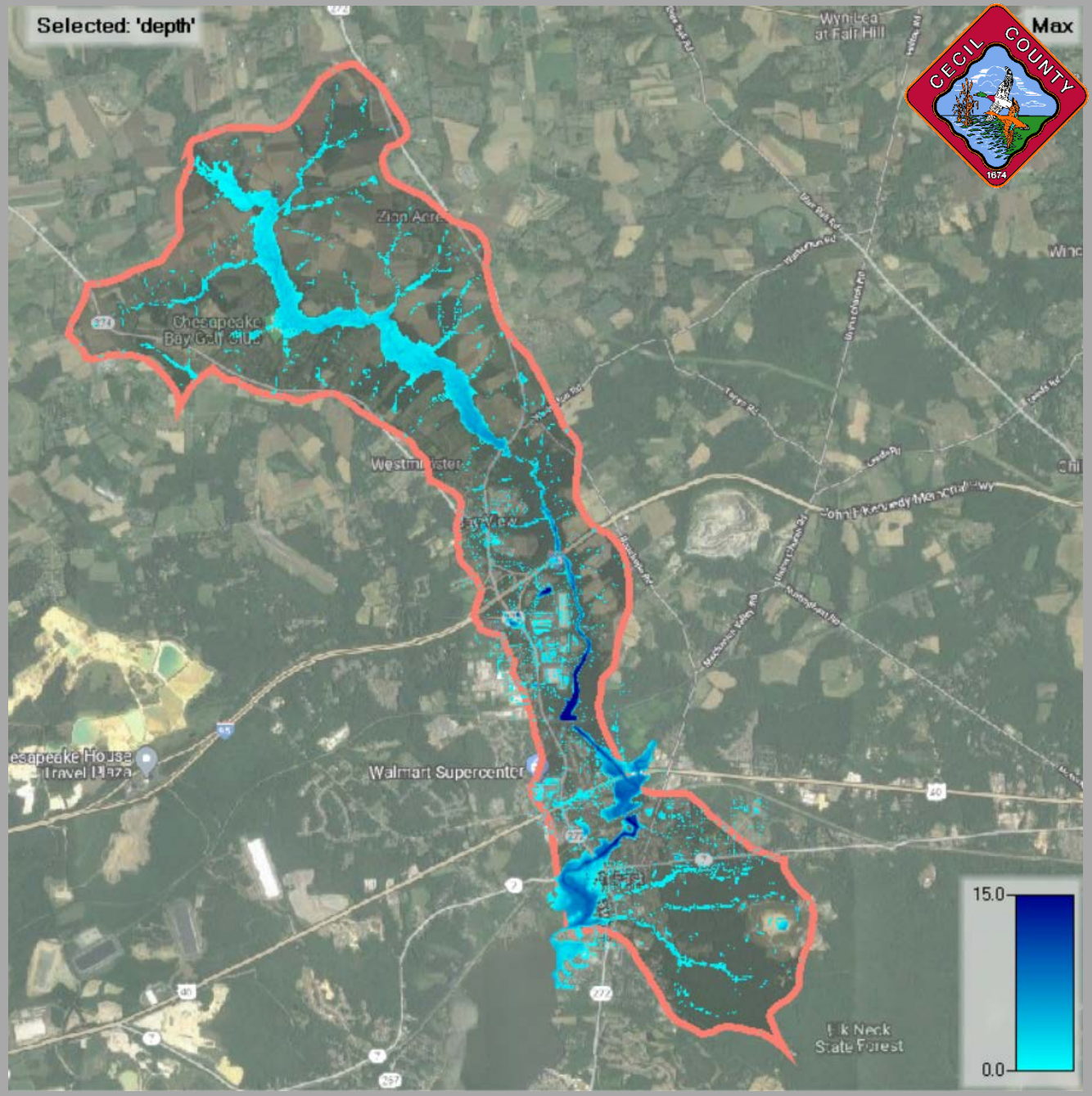
Source: EPA ICLUS dataset, analyzed for the Town of North East region

Stormwater Guidelines – Potential Changes

- Increase requirement for green infrastructure treatment from 2.7” rainfall to 3” rainfall
- Require peak flow management for the 25-year storm and/or 100-year storm where flooding has occurred

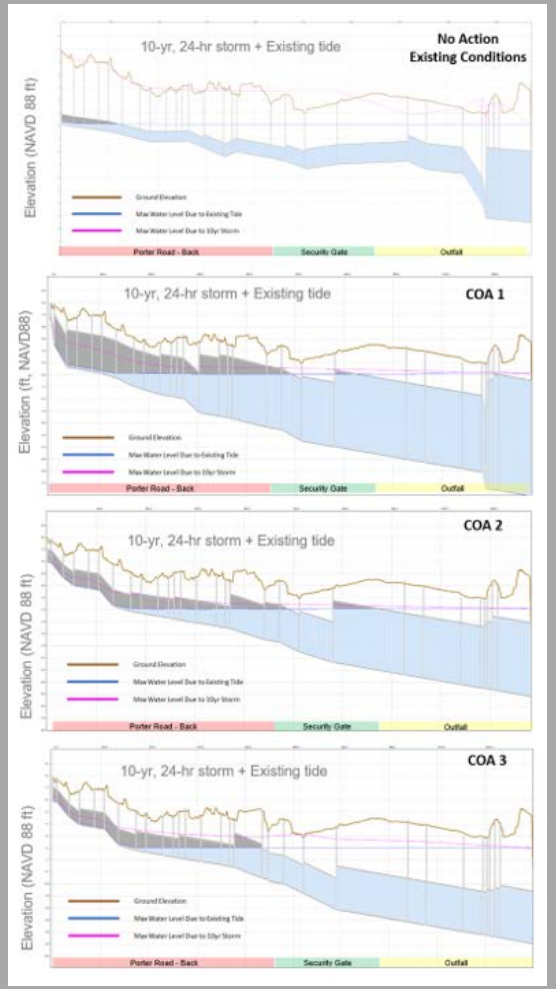
Planned Approach

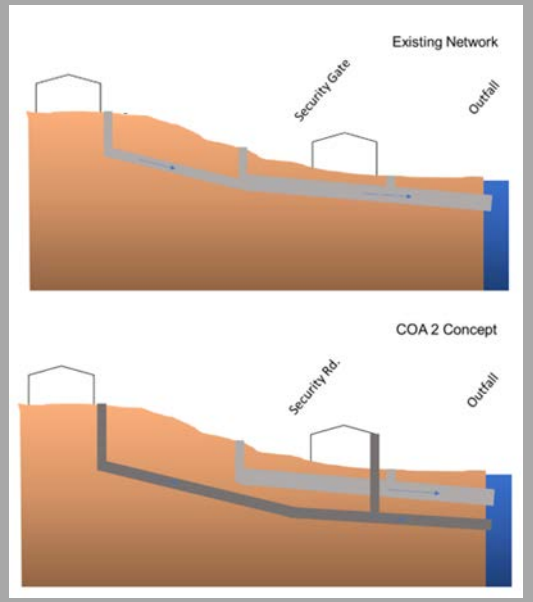
- USACE HEC RAS-2D
- Incorporates elevation, land use, waterways, precipitation
- Analysis of combined impacts of riverine, rainfall & coastal
- Model range of scenarios (intensity & duration)
- Evaluation of existing & future conditions

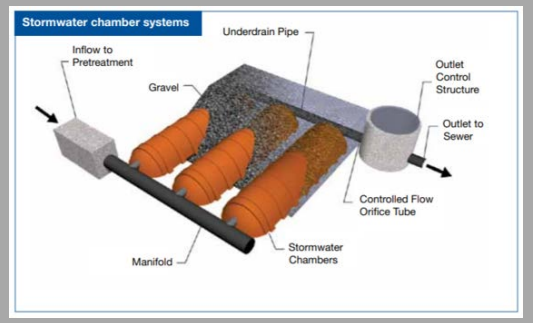


Potential Mitigation Strategies

- Stormwater Infrastructure Improvements
- Changes to Regulations
- Stormwater Best Management Practices (BMPs)/Green Infrastructure (GI)



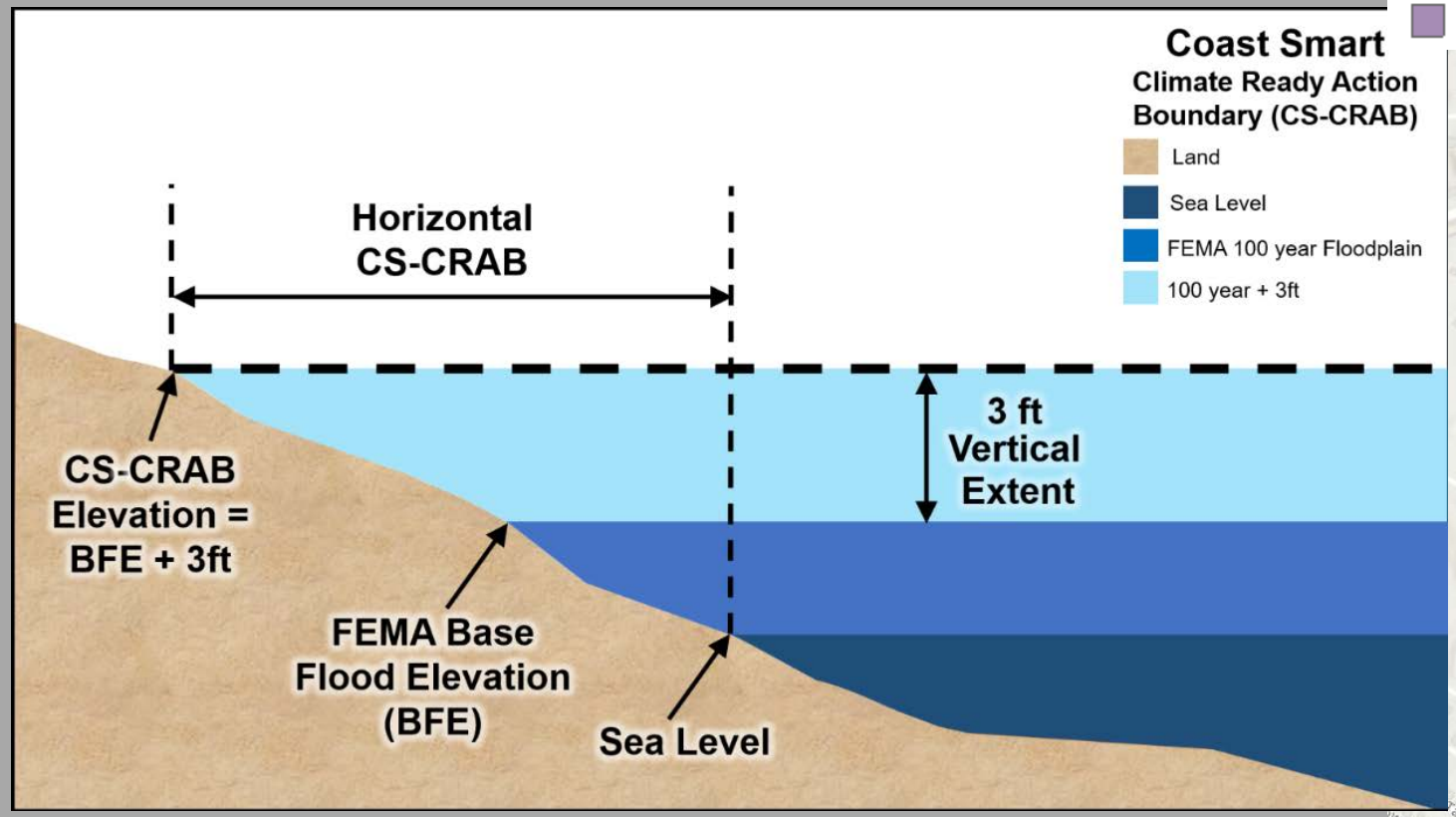


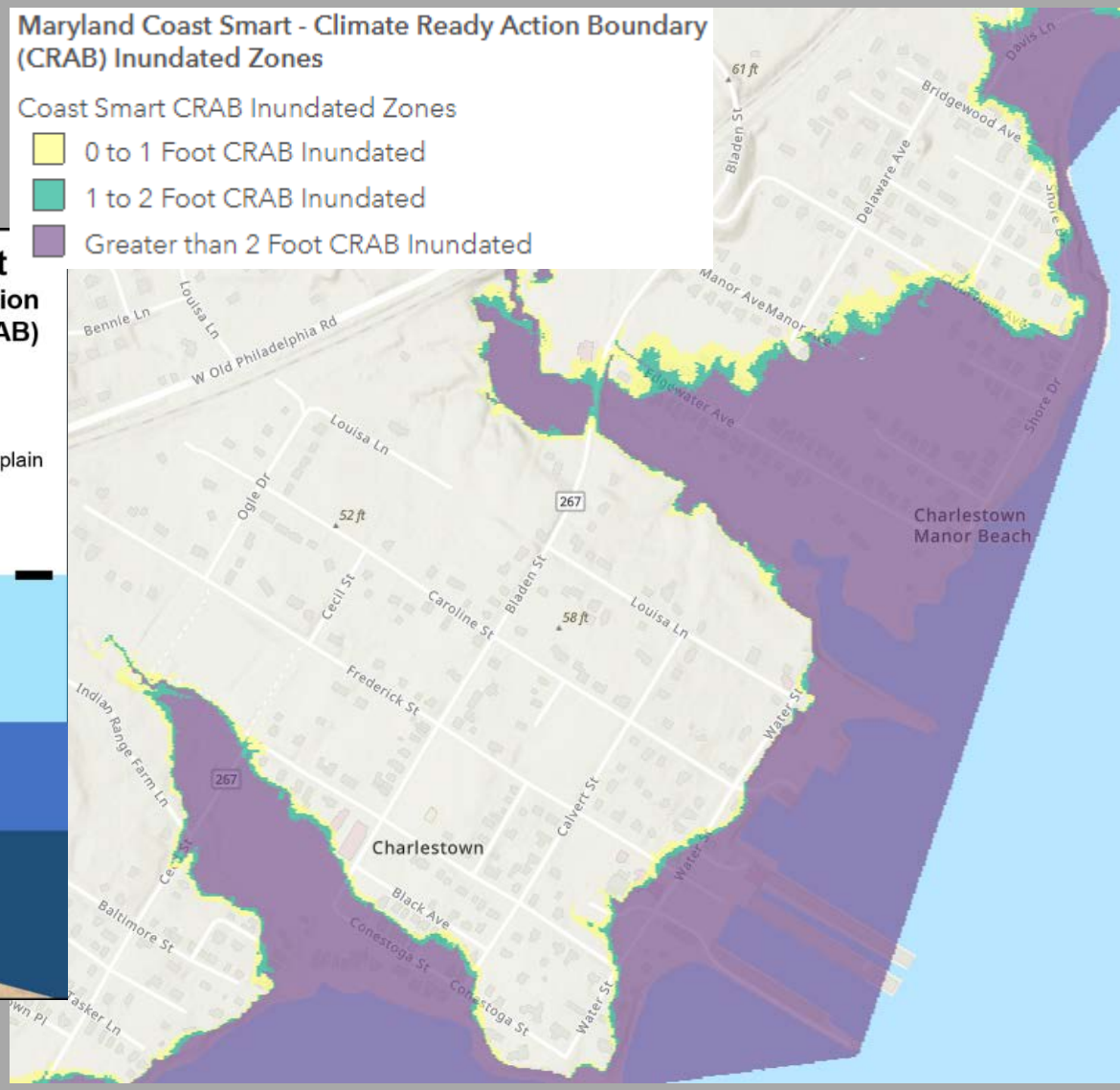


Source: Guidelines for the Design and Construction of Stormwater Management System, New York City Department of Environmental Protection, July 2012

Potential Mitigation Strategies – Stormwater Infrastructure Improvements

Potential Mitigation Strategies – Changes to Regulations





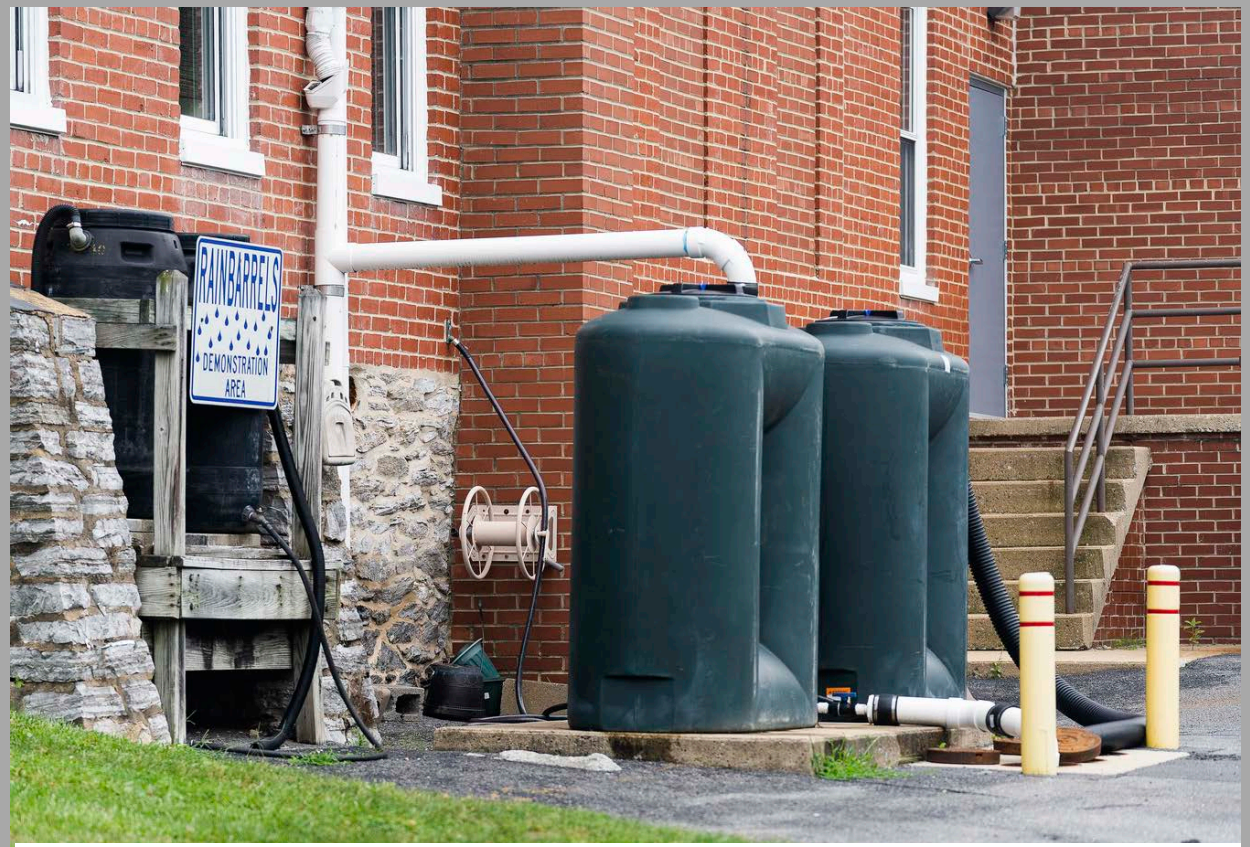
Source: Coast Smart Climate Ready Action Boundary (CRAB)

Potential Mitigation Strategies – Stormwater BMPs/GI Practices

Filterra Planter Box

Microbioretention

Potential Mitigation Strategies – Stormwater BMPs/GI Practices



Rain Barrels/Cisterns

Grass Swale

Potential Mitigation Strategies – Stormwater BMPs/GI Practices

Rain Garden

Wet Pond

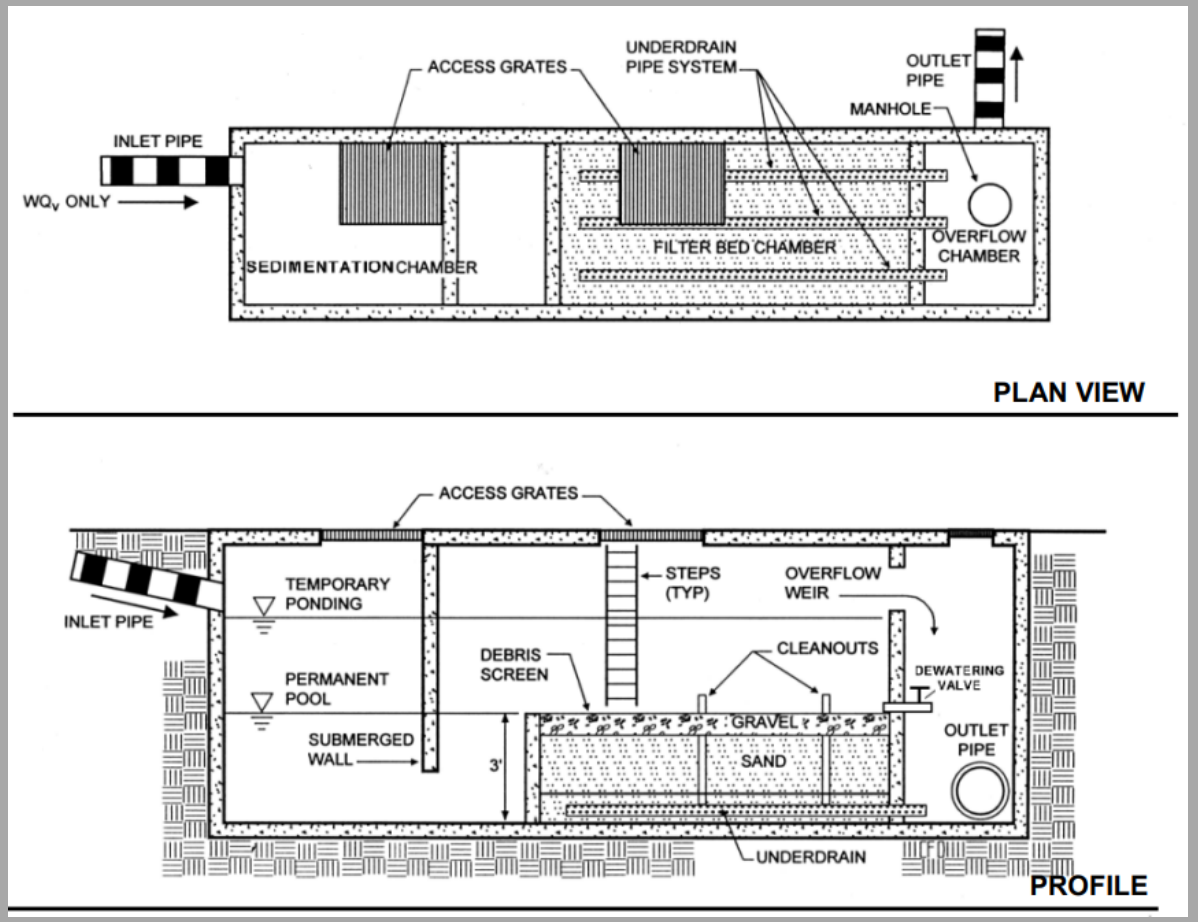
Potential Mitigation Strategies – Stormwater BMPs/GI Practices

Filtering Device

Submerged Gravel Wetland

Potential Mitigation Strategies – Stormwater BMPs/GI Practices

Underground Storage



Breakout Discussion

- Provide specific input about flooding issues and locations
- What are the benefits of watershed planning? [Pick top 3]
- What are challenges to fixing flooding/watershed issues? [Pick top 3]
- What are your preferred mitigation strategies? [Pick top 3]

Next Steps

H&H Analysis	December/January
Identify potential mitigation strategies	February/March
Community Workshop # 2	April
Finalize Plan	May/June

Any Questions?

Bryan Lightner

Town Administrator

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