



Flood Remediation Project Oxford, Maryland

Outline



Natural topography

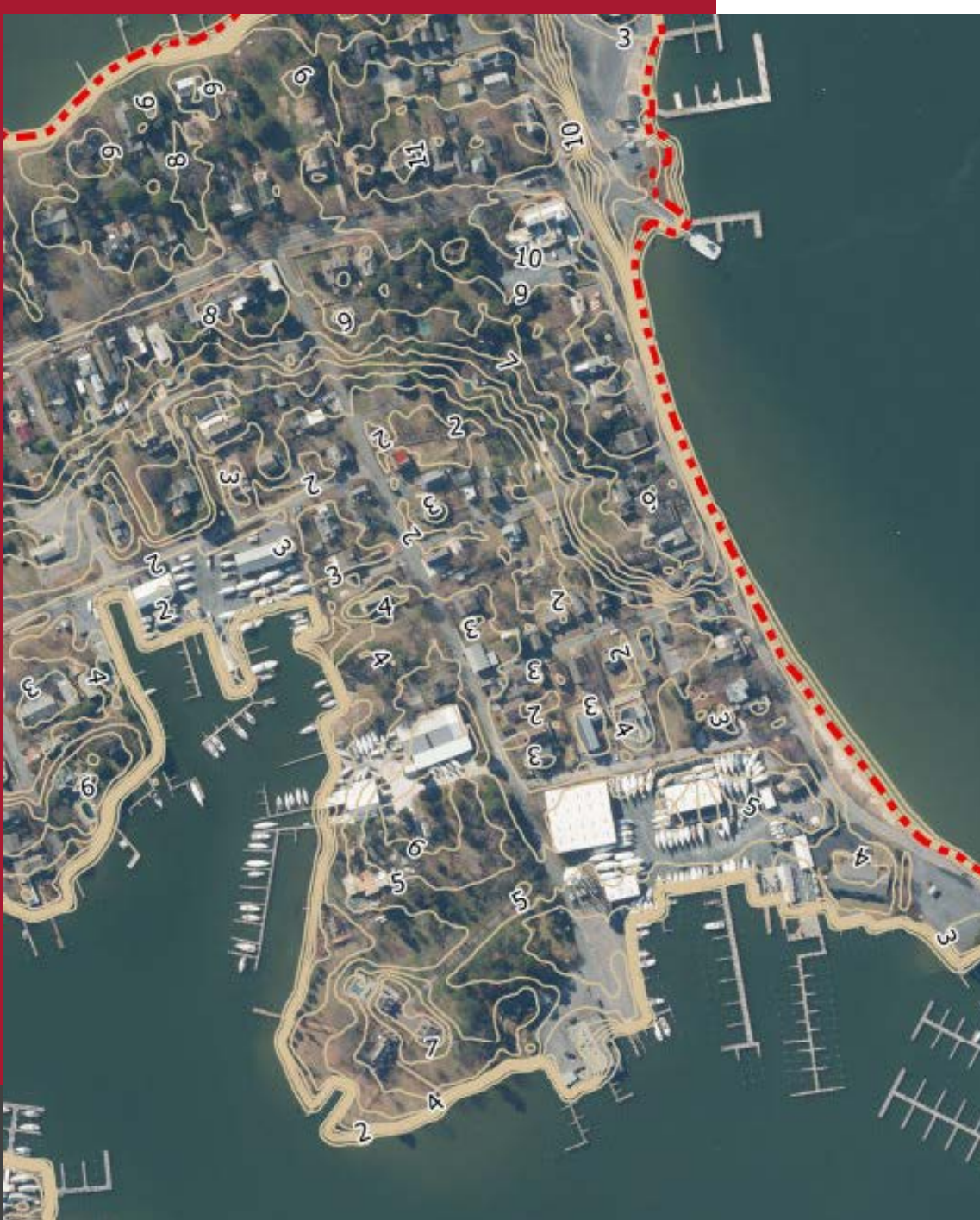
Climate change

Flooding

Functioning Infrastructure

Stresses on the network

Solutions



Topography

- Low Elevations (below higher tides)
- Antiquated infrastructure
- Water/Land interface
- Runoff drains to the low spot

Climate Change

- Sea Level Rise
- More intense rainfalls
- Drainage pressure from higher water levels
- Subsidence

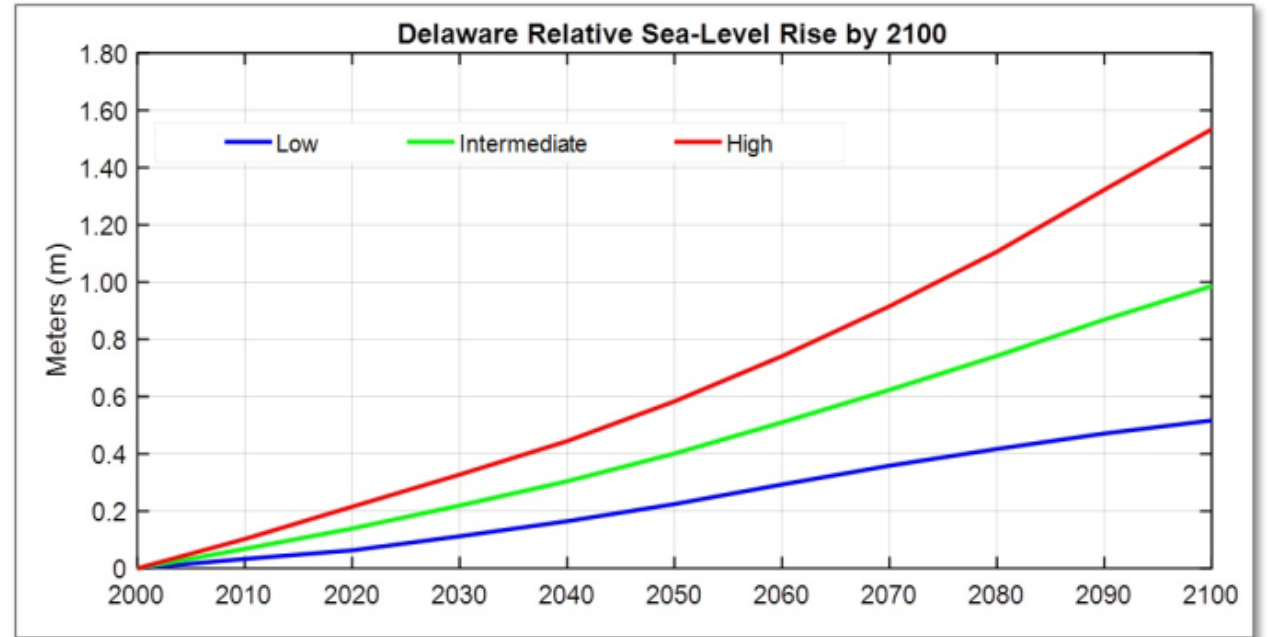
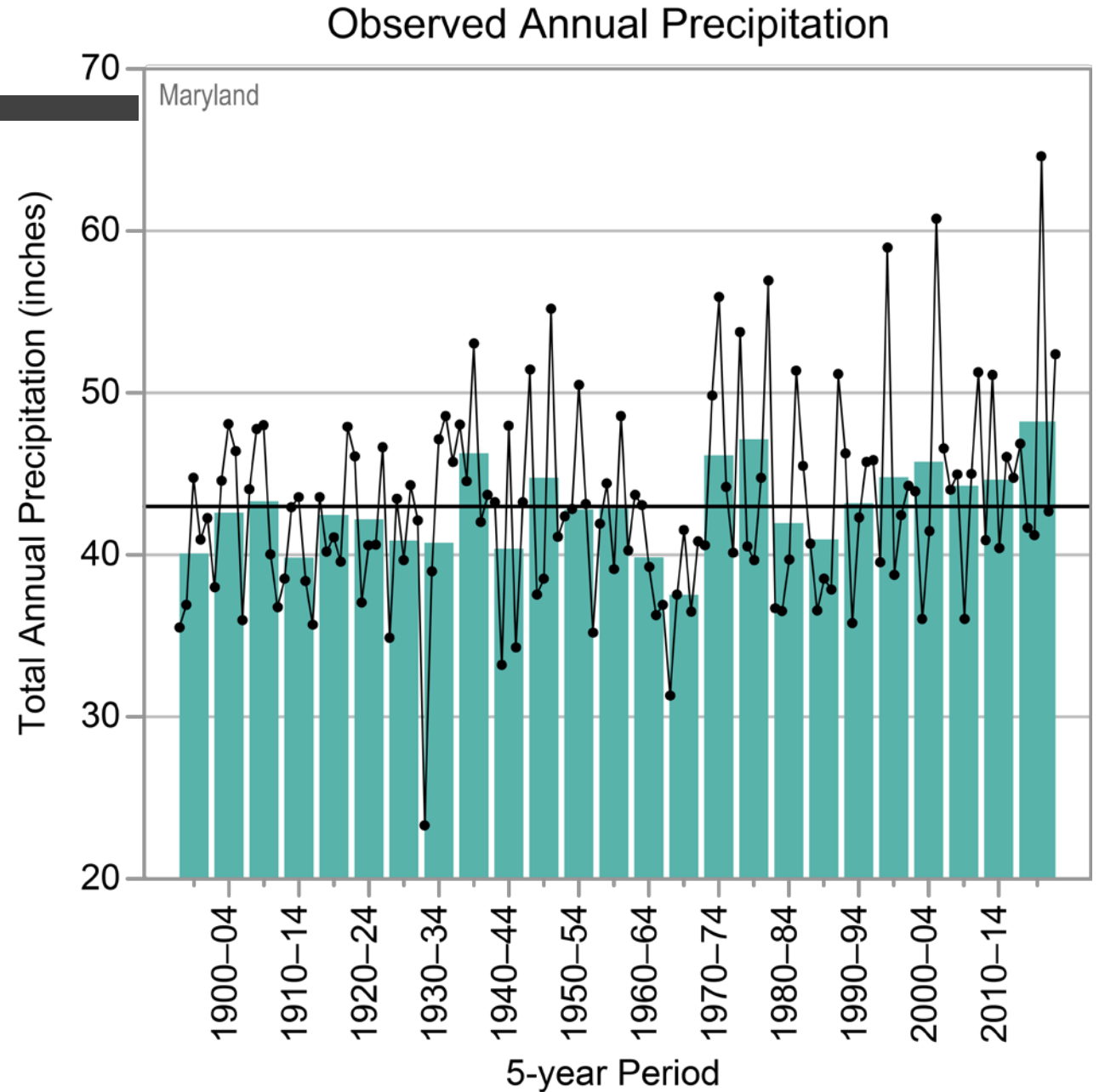


Figure ES-7. The 2017 Delaware SLR planning scenario curves to the year 2100. The Low, Intermediate and High planning scenarios correspond with the 5%, 50%, and 95% probability levels.

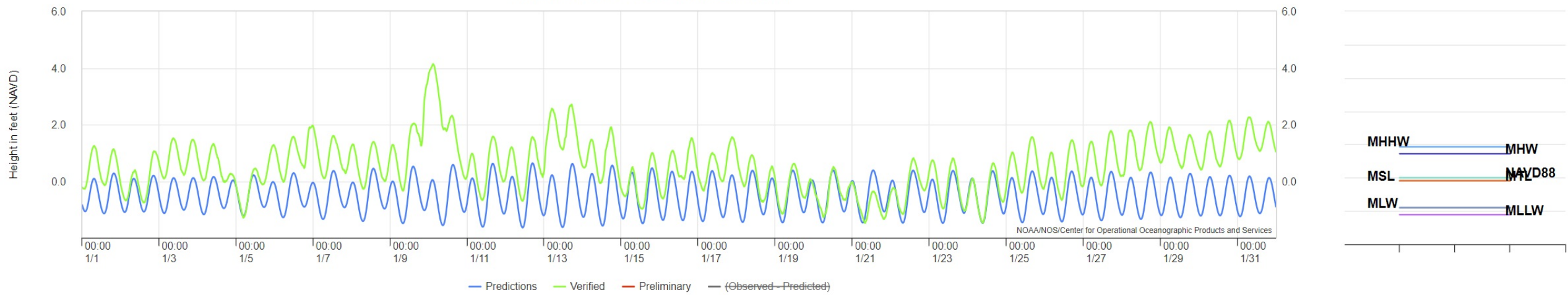
Climate Change

- Sea Level Rise
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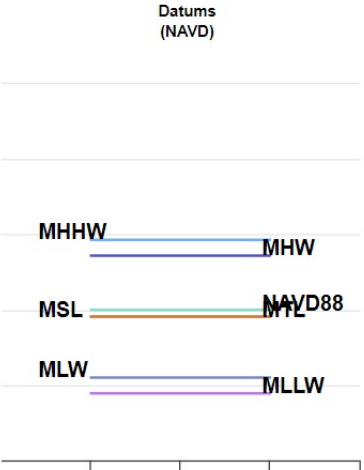
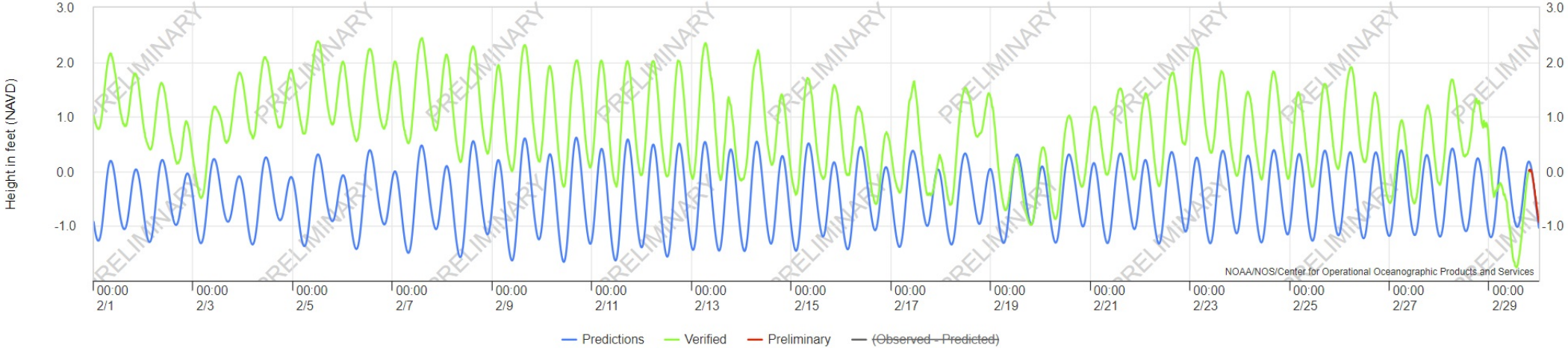
Jan 2024 Tides

NOAA/NOS/CO-OPS
Observed Water Levels at 8571892, Cambridge MD
From 2024/01/01 00:00 LST/LDT to 2024/01/31 23:59 LST/LDT

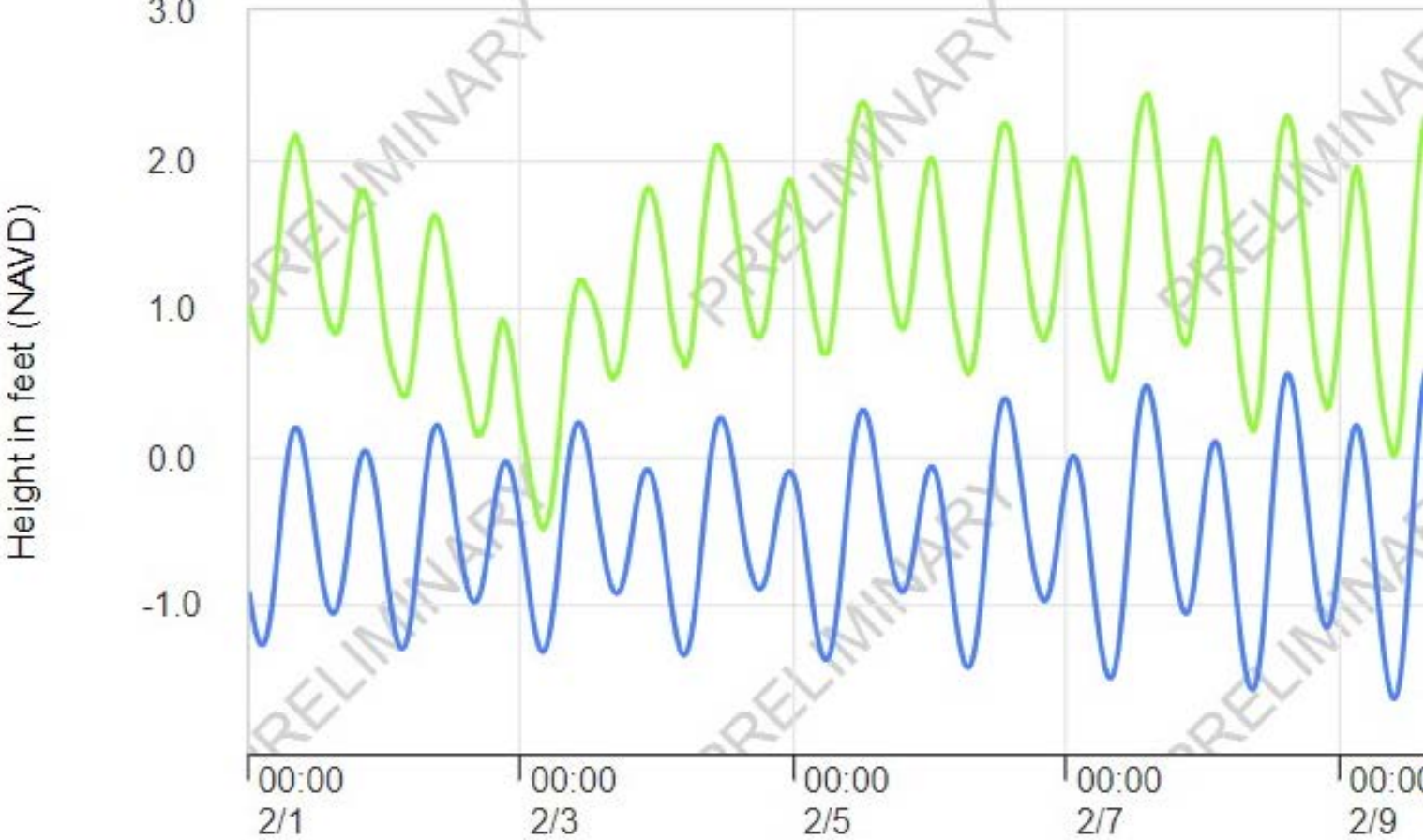


Feb 2024 Tides

NOAA/NOS/CO-OPS
Observed Water Levels at 8571892, Cambridge MD
From 2024/02/01 00:00 LST/LDT to 2024/02/29 23:59 LST/LDT



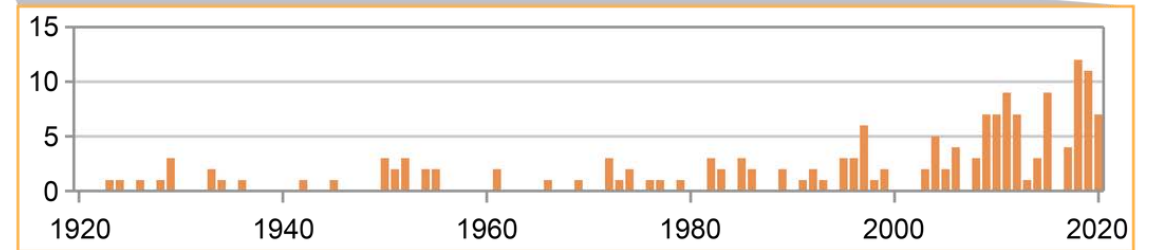
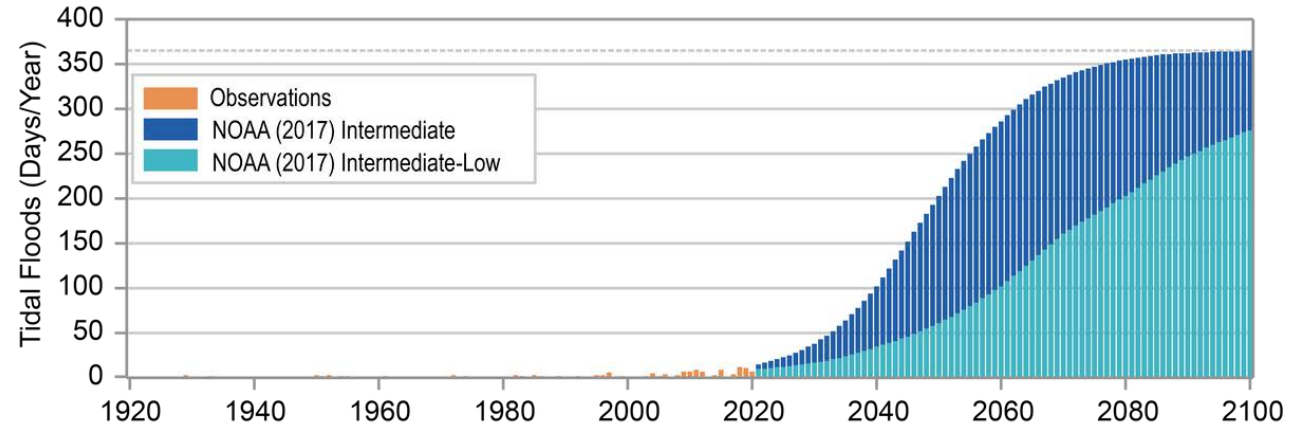
Feb 2024 Tides



Flooding

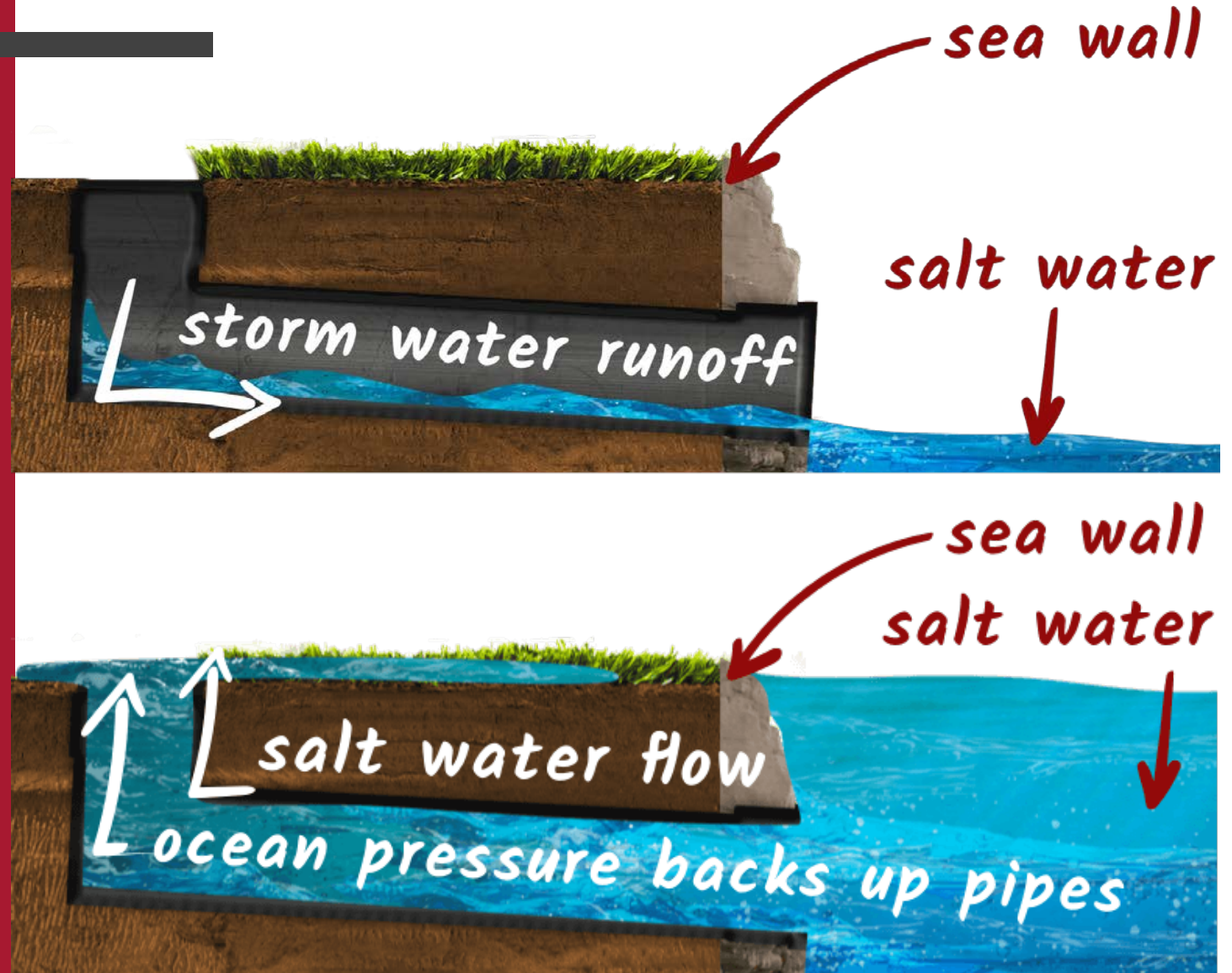
- Increased frequency from SLR
- Increased depth with surges
- Localized from intense rainfalls
- Combination of these

Observed and Projected Annual Number of Tidal Floods for Baltimore, MD



Hydrology

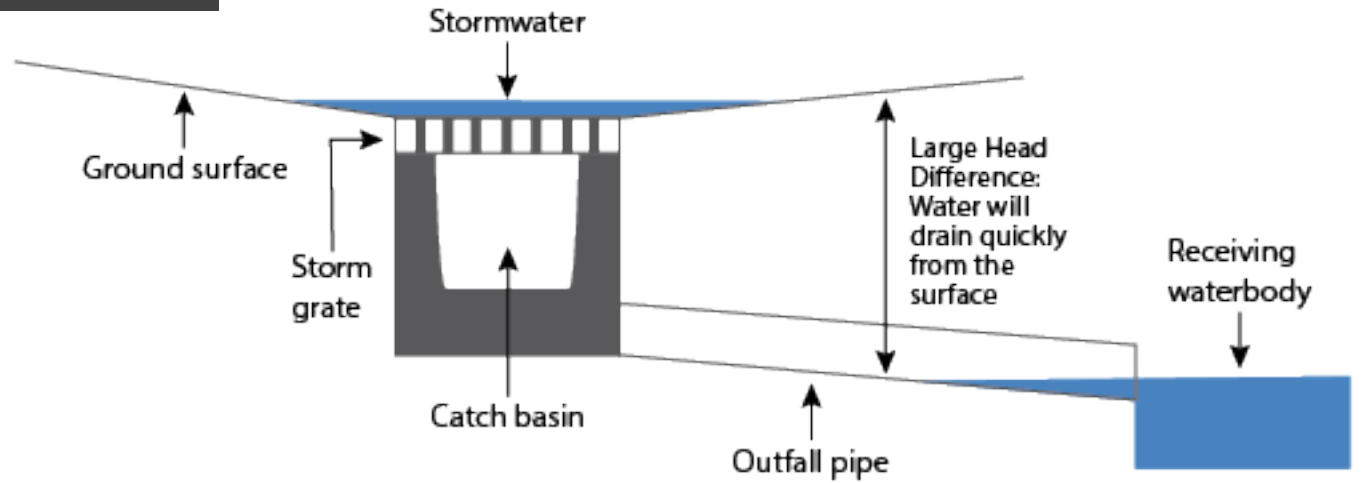
- Low elevations
- Higher sea levels
- More intense Rainfalls
 - Inundation of infrastructure
 - Localized “flooding”
 - Slower drainage



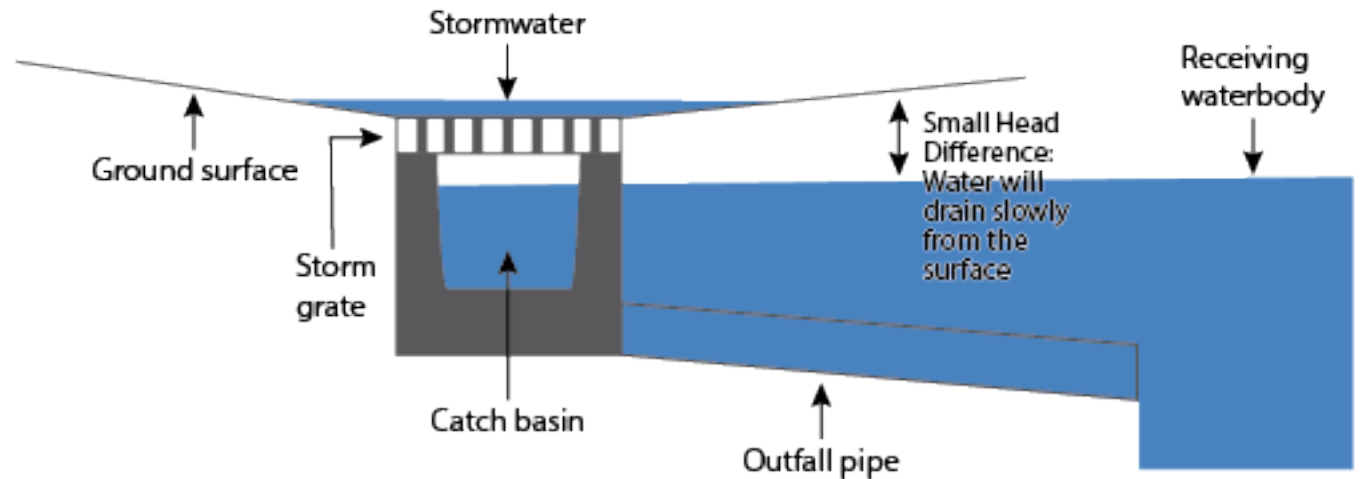
Hydrology

- Lowered head pressure to push runoff overboard against higher tide elevations

LOW TIDE SCENARIO



HIGH TIDE SCENARIO





HOLDING BACK THE FLOOD

wapro.com



Infrastructure

- Aging towns have aging infrastructure
- Sized for older standards - antiquated
- Normal wear and tear
- Costly and disruptive to redo/modernize

Similar Projects



South Bethany Resiliency and Flooding Study

Oxford 2100 Visioning Resiliency Plan

Cambridge Make Cambridge Resilient Choptank Waterfront Design

UMES Hazard Mitigation Plan

Seaford Flood Study

Salisbury Resilience Study

Similar Partners

The City of Lewes



Lewes Beachside Flood Study & West Cedar St Flood Study

Resulted in successful HMGP grant for berm along Cedar St to mitigate flooding up to elevation 5.0

Various Oxford Flood Studies, Visioning Projects, SWM Studies

St. Michaels Harbor and Stormwater Infrastructure Flood Study

West Harbor Road/East Chew Avenue Flood Mitigation Feasibility Assessment and Conceptual Design

Make Cambridge Resilient Flood Mitigation Project

Similar Process: Flood Study and Stormwater Infrastructure Flood Study

St. Michaels

- Analyze SLR impacts thru 2050
- Understand swm infrastructure
- Identify priority areas and techniques for improvements
- Keep the historic nature of St. Michaels
- Call out funding options
- 8 areas of interest called out



Similar Process: St. Michaels Success

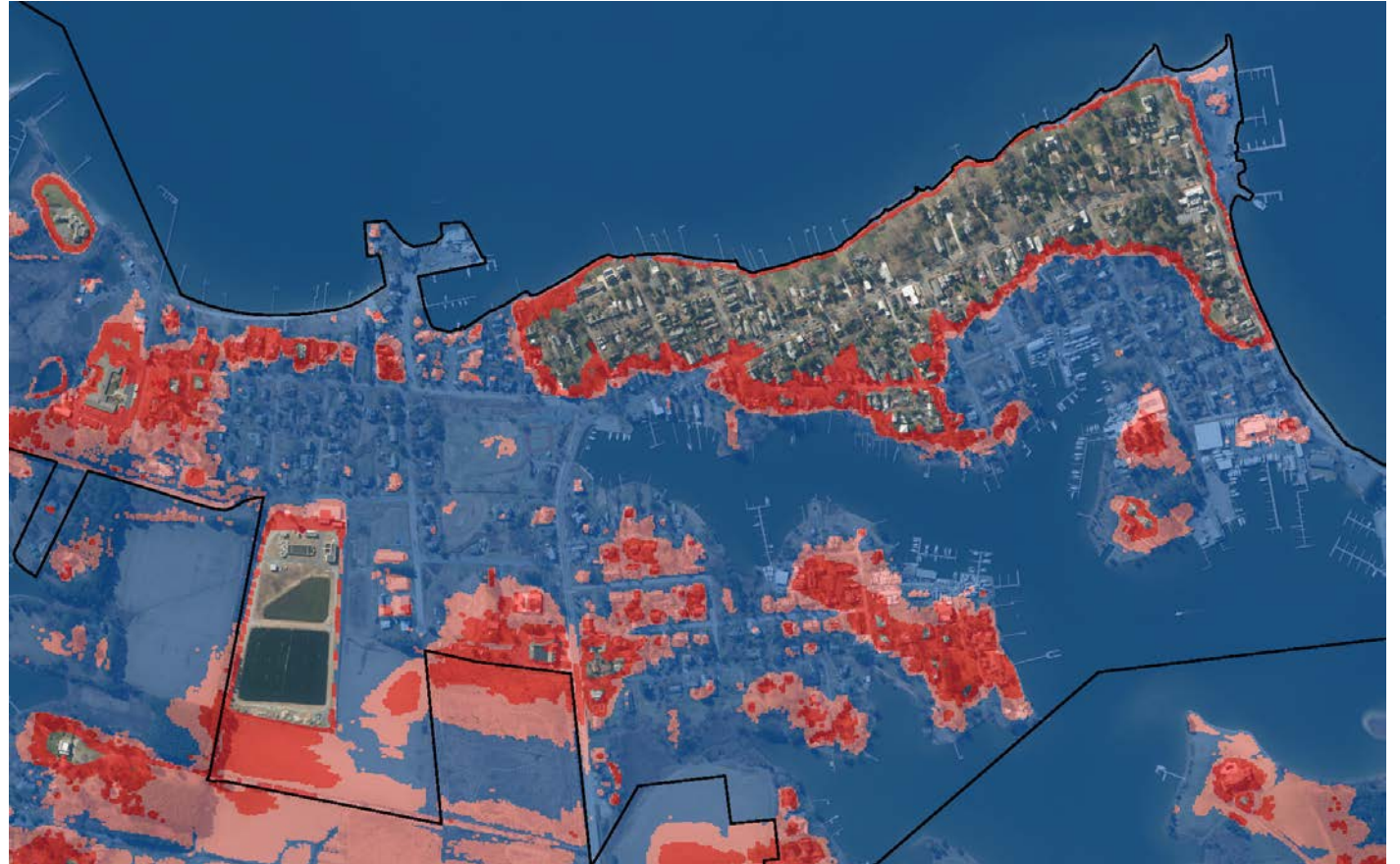
St. Michaels

- Assisted with grant application for funding
- Original report submitted as background and need
- Reduced impervious by 32%
- Only lost 4 parking spaces
- New pedestrian boardwalk
- New park area
- New kayak launch
- Bioretention for SWM
- Unanimous support

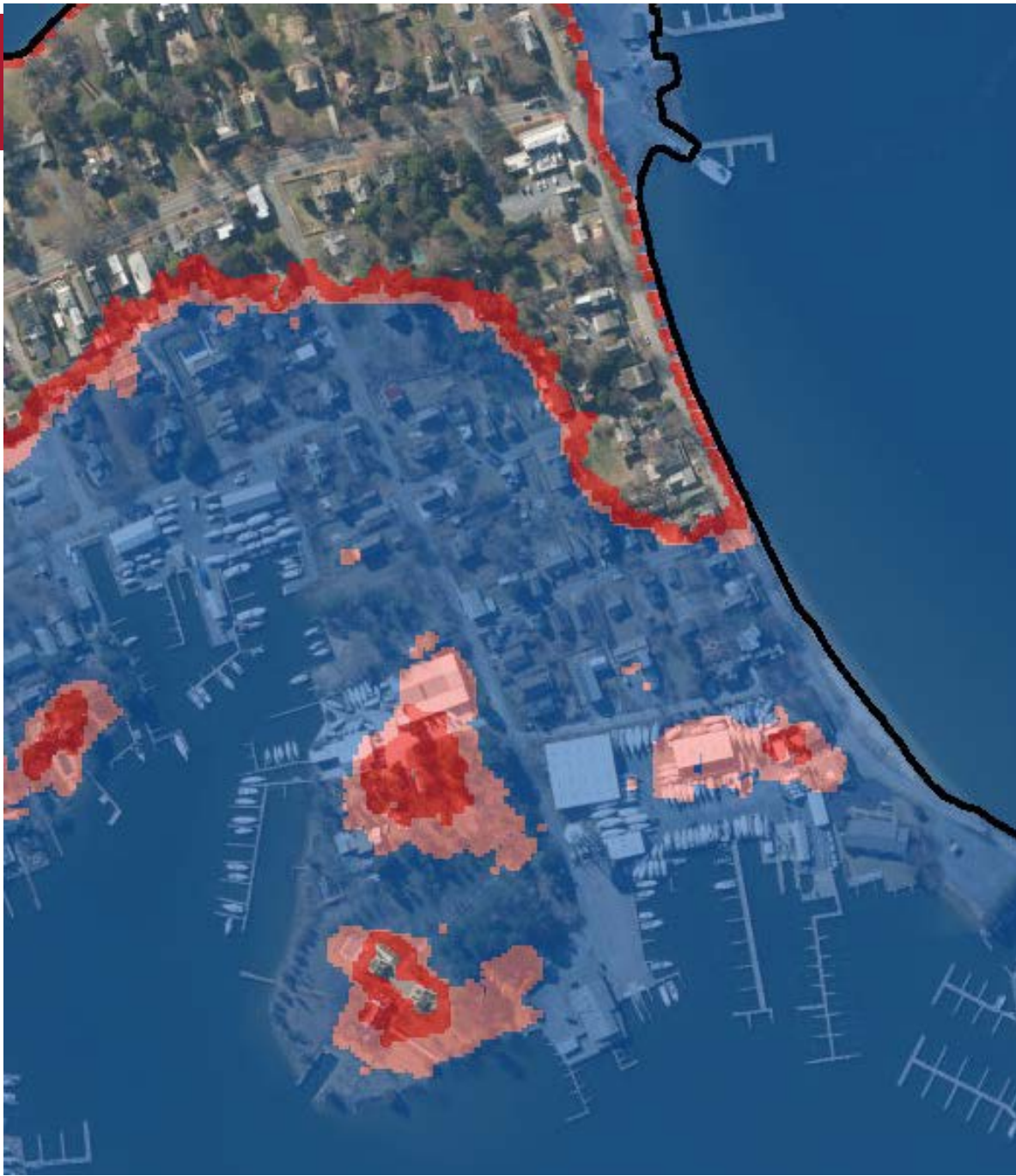


Low Lying Elevations

- Various Techniques discussed:
 - New and improved SWM infrastructure
 - Too low
 - Lock system at inlet
 - Boating traffic & permitting
 - Flood walls
 - Visual disruption
 - Earthen berm w tide gates

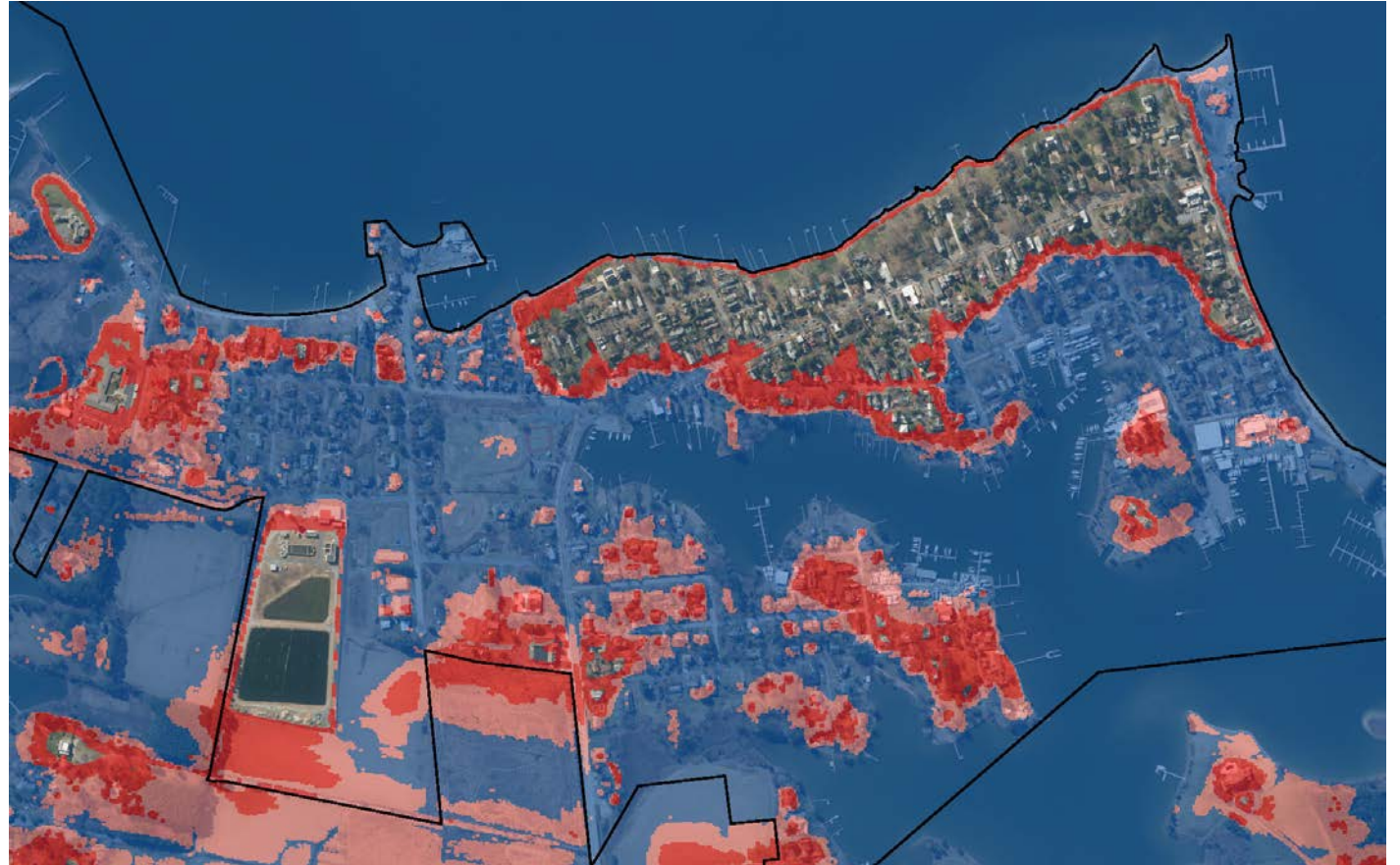






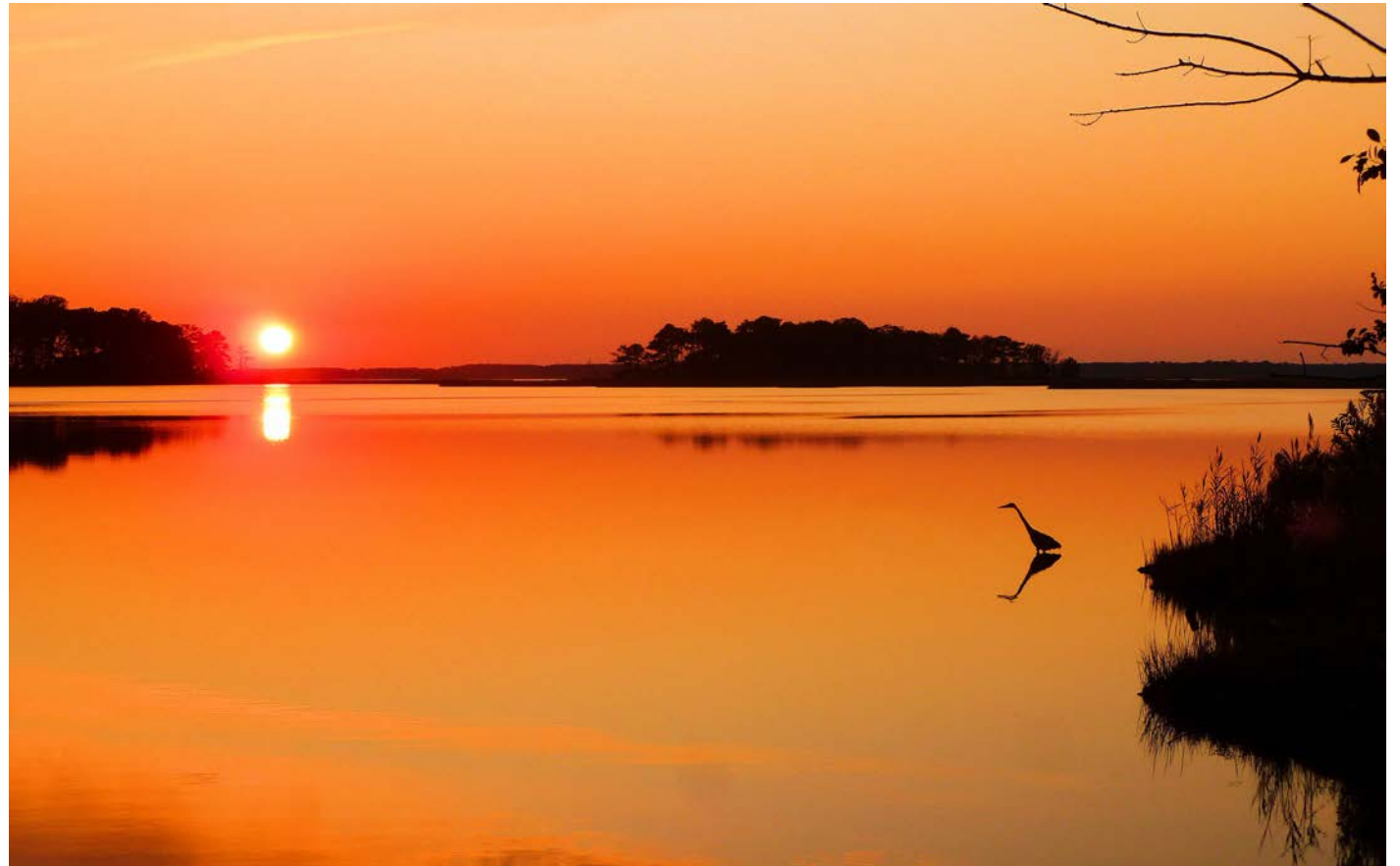
Challenges

- Low Elevations
- Antiquated Infrastructure
- Equalization of tide and standing water
- Sea Level Rise
- Increase tidal surges
- Increases in rainfall intensities
- Wetter seasons/drier seasons
- Limited applications in Chesapeake region



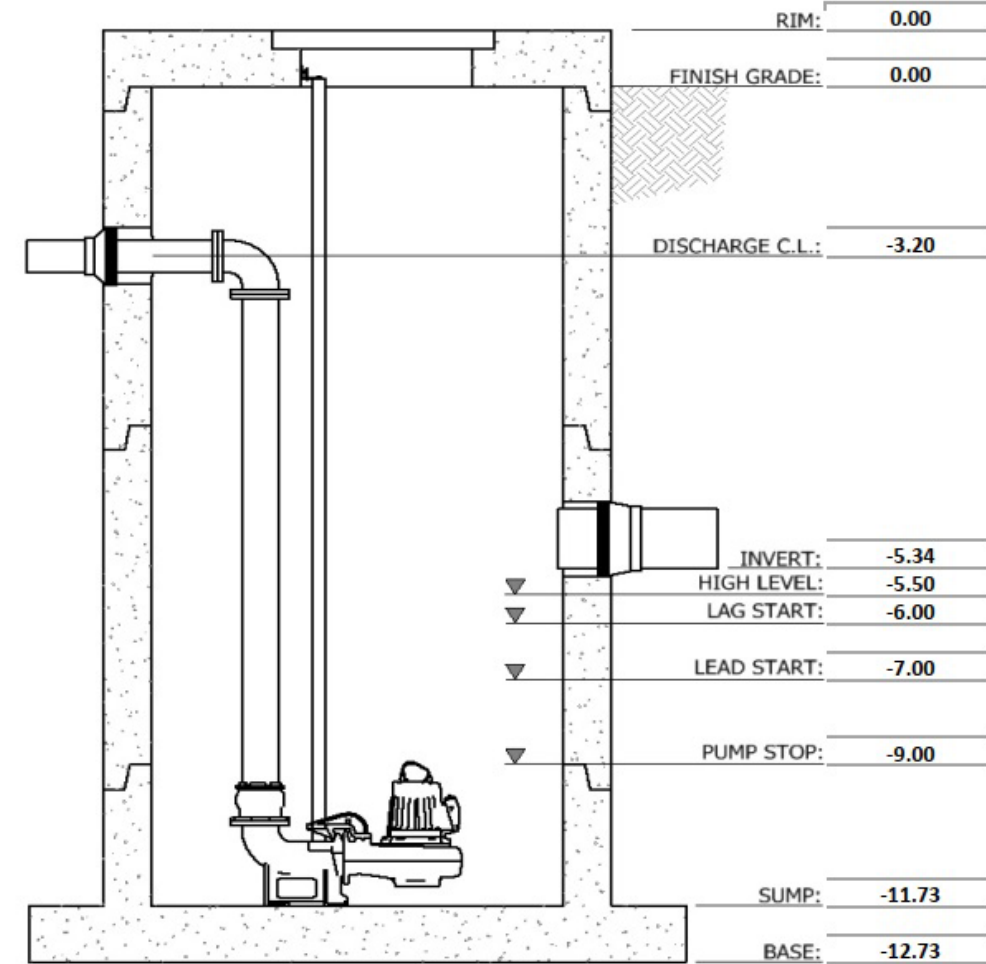
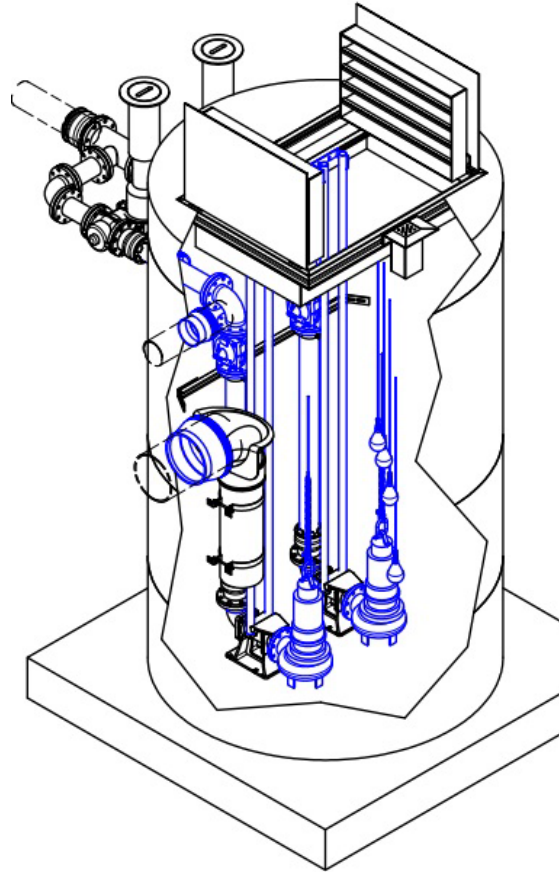
Options

- Do nothing?
- Wait for dissipation?
- Replace/line all stormdrains?
- Manipulate the standing water!
- Move runoff as quickly as possible
 - Lessen the impacts;
address nuisance flooding



Pump Stations

- Mechanical improvement to the head differential when gravity won't push runoff overboard and the tide is up blocking drainage:
 - Low head pump system
 - Can discharge same location as ex culvert
 - Improvement to current situation
 - Located in Town R.O.W.



Note: Image is a preliminary representation of the pumping system. Elevations shown are the primary factors used for sizing the wet well. Backup levels not shown. Additional (or fewer) level settings may be required.

Pump Stations



Pump Station – Mill St

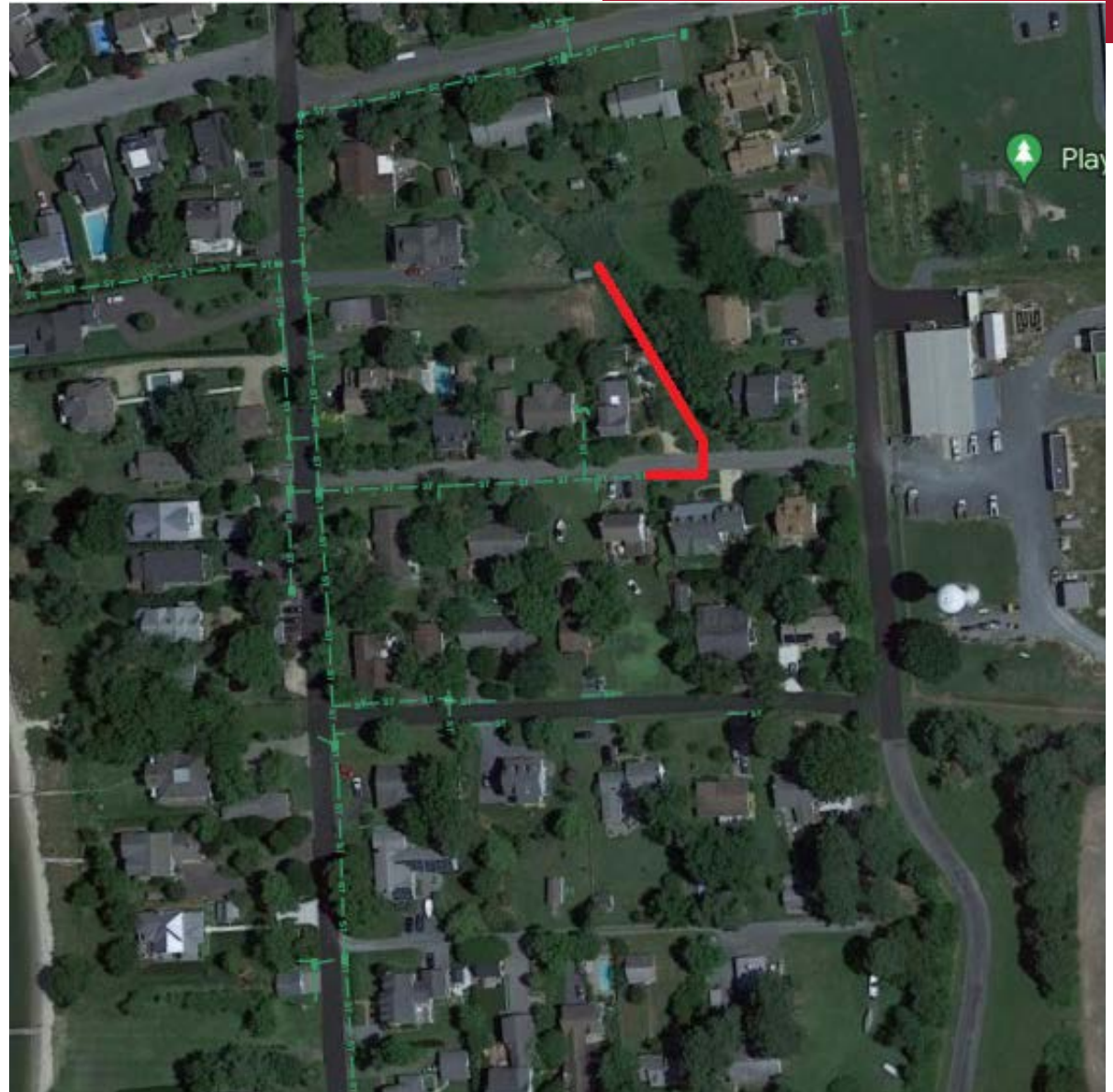


Pump Station – W Pier St



Pump Station – E Pier St/Willows

- Install smaller sump to drain wet area down during higher tides, utilizing Town easement
- Fill the area per new SCOTUS ruling





Questions

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