

WORKSHOP ON CANAL DRIVE, FLORIDA AVENUE AND NORTH END FLOODING AND POSSIBLE SOLUTIONS

A PRESENTATION OF THE CAROLINA BEACH CANAL DRIVE FLOODING
ADVISORY COMMITTEE

TUESDAY, DECEMBER 3RD 2019 - 6:00 – 7:30 P.M.



OUTLINE FOR TONIGHT'S PRESENTATION

- I. INTRODUCTION
- II. BACKGROUND, FORMATION AND OBJECTIVES OF THE COMMITTEE
- III. INTRODUCTION TO THE PROBLEM
 - a. FORMATION OF THE COMMITTEE
 - b. SUMMARY OF SOLUTIONS FROM THE COMMITTEE
- IV. CURRENT MAINTENANCE & OPERATIONS
- V. TRAFFIC ORDINANCE
- VI. POSSIBLE SOLUTIONS FROM THE COMMITTEE
 - a. NO ACTION SCENARIO
 - b. DESCRIPTION OF PROPOSED SOLUTION
 - c. CHALLENGES & LEGALITY
- VII. LEGISLATIVE INITIATIVE (DALE)
- VIII. CLOSING – PUBLIC INPUT



II. BACKGROUND: INTRODUCTION TO THE PROBLEM

- The Town of Carolina Beach has experienced increased flooding of the public and private infrastructure located along Canal Drive and Florida Avenue that borders the Carolina Beach Yacht Basin.



II. BACKGROUND: INTRODUCTION TO THE PROBLEM

The perpetual flooding on Canal Drive presents a continued threat to

- Access to the North End for the Town's first responders
- Critical infrastructure
- Public health.
- Water Quality



II. BACKGROUND: INTRODUCTION TO THE PROBLEM

- Flooding is primarily due to seasonal high tide events (commonly referred to as King Tides), storm related high tides and rainfall events.
- This has been a problem for decades, but is getting worse due to increased development and gradual sea level rise.



II. BACKGROUND: FORMATION OF COMMITTEE

- The Town commissioned/established the Carolina Beach Canal Drive Flooding Advisory Committee on February 13, 2018.



II. BACKGROUND: FORMATION OF COMMITTEE

Chairman: Dale Walters

Vice Chairman: Stephen Taylor

Secretary: Rob Gordon

Town Liason: Mayor Joe Benson

Original Members: Jerry Hall, Bill Skinner, Gregory Higgins, Kevin Dovel, David Riehm, James Sanderford

Staff Support: Brian Stanberry, Jeremy Hardison

- Volunteer committee made up of nine residents of Carolina Beach
- We meet the 2nd Thursday of each month
- All meetings are open to the public



**CANAL DRIVE FLOOD COMMITTEE MEETING
THURSDAY, OCTOBER 10TH, 6:00PM
TOWN HALL CONFERENCE ROOM**

II. BACKGROUND: FORMATION OF COMMITTEE

CAROLINA BEACH CANAL DRIVE FLOODING ADVISORY COMMITTEE OBJECTIVES

- To advocate for programs that promote awareness of and solve issues related to tidal and stormwater flooding
- To form a visible, vocal and effective coalition of residents, engineers, roadway and stormwater experts to be advocates for improving systems to limit the negative impacts of tidal and stormwater flooding
- To support and recommend town ordinances that improve the communities ability to deal with potential sea level rise
- To develop and implement education program for citizens, visitors and drivers of motor vehicles about the hazards of traveling through flood waters



II. BACKGROUND: SUMMARY OF SOLUTIONS

TIDAL CONTAINMENT!!

****The single most important element in the solution to flooding along Canal Drive****

- Experts were requested to brief the committee and a number of possible approaches were considered.
- Very early on it became clear, because the problem was tidal, only a system of barriers preventing tidal encroachment on private residences and public infrastructure would provide significant relief.
- Tidal containment structures must meet standards – be of sufficient height and competent engineering to protect residents from the effects of tidal flooding.



II. BACKGROUND: SUMMARY OF SOLUTIONS

BULKHEAD/TIDAL CONTAINMENT ORDINANCE

- An ordinance was necessary to develop and enforce specifications for the building, upgrade and maintenance of tidal barriers.
- Enabling legislation would be required to enact the ordinance
- Identify public and private sources of funding and financing required to make bulkhead improvements



III. CURRENT MAINTENANCE & OPERATIONS

CANAL DRIVE STORMWATER CHECK VALVES

- Check valves prevent the flow high tidal water back through the stormwater system and onto the roadway.
- The existing duckbill backflow prevention devices were observed to be encrusted with oysters and barnacles that inhibit proper sealing of the valves.
- Over a period of 2 years, the town has replaced the majority of all affected back flow valves at the Canal Drive outfall pipes.
- New valves operate more efficiently and with less maintenance than older systems.
- New check valves were installed this year at Dolphin, 403 Canal, Scallop, Anchor Bay, Sea Gull, Oyster Shell, Starfish, 1213 Canal, Clam Shell (resizing in progress).
- The costs of these improved valves has a total cost of approximately \$80,000.



III. CURRENT MAINTENANCE & OPERATIONS



III. CURRENT MAINTENANCE & OPERATIONS

APTIM STUDY

This Canal Drive Flooding Assessment provided the following:

1. Bulkhead Elevation Survey
2. Coordination & Support for Water Level/Rain Gauge Monitoring Station (at the end of Sandpiper).
3. Bulkhead Vulnerability Study
4. GIS Support to Integrate LiDAR Data and Applications into Local GIS Framework



III. CURRENT MAINTENANCE & OPERATIONS

STREET SWEEPING

- The street sweeper is one of the Town's most important stormwater best management practices, as it keeps the sand and debris from entering and blocking stormwater pipes.



III. CURRENT MAINTENANCE & OPERATIONS

STORMWATER VAC TRUCK

- The Town has approved in the 2019/2020 annual stormwater budget a new vac truck.
- This piece of equipment will be dedicated to stormwater functions and will allow for thorough, methodical cleaning of all stormwater pipes throughout the Town.
- The truck is scheduled to arrive within several weeks.



TRAFFIC CONTROL DURING TIDAL FLOODING

- TRAFFIC ORDINANCE- To address the damage caused by traffic speeding through floodwaters, an enforceable ordinance to penalize speeding was adopted by the Town
- New traffic patterns as well as accompanying barriers and signage were developed and implemented.
- This ordinance is enforced by local law enforcement



ROADS SERVE MULTIPLE PURPOSES

- Roadways, water, sewer and other infrastructure are all impacted by tidal flooding
- Drainage infrastructure is impacted most, including water quality



CONDITIONS ON FLORIDA AVE IN 2012



CONDITIONS ON FLORIDA AVE TODAY - 2019



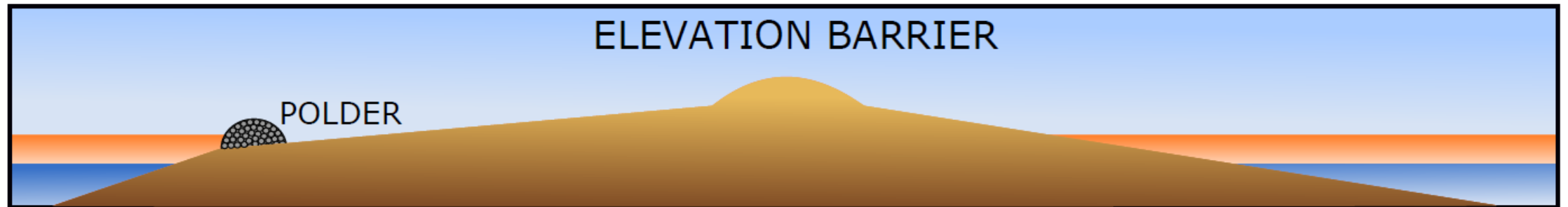
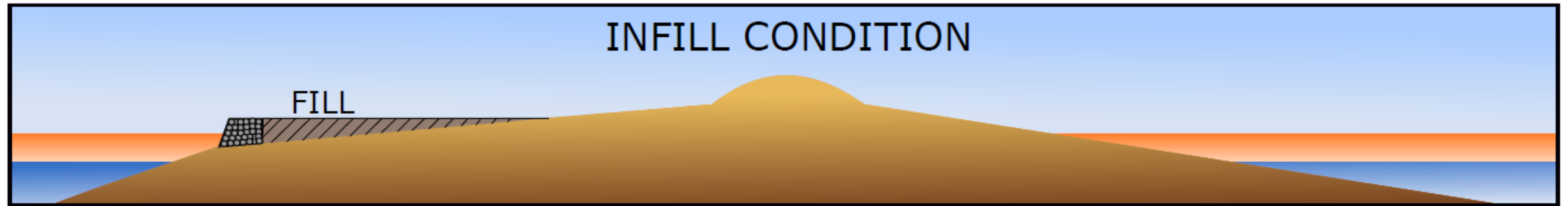
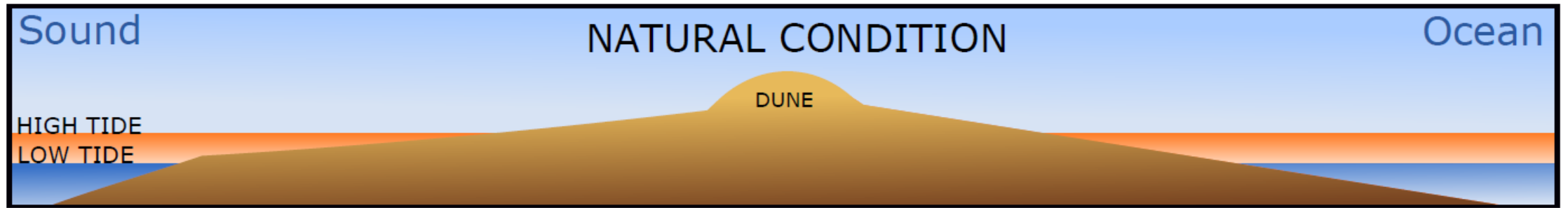
DETOUR SIGNAGE



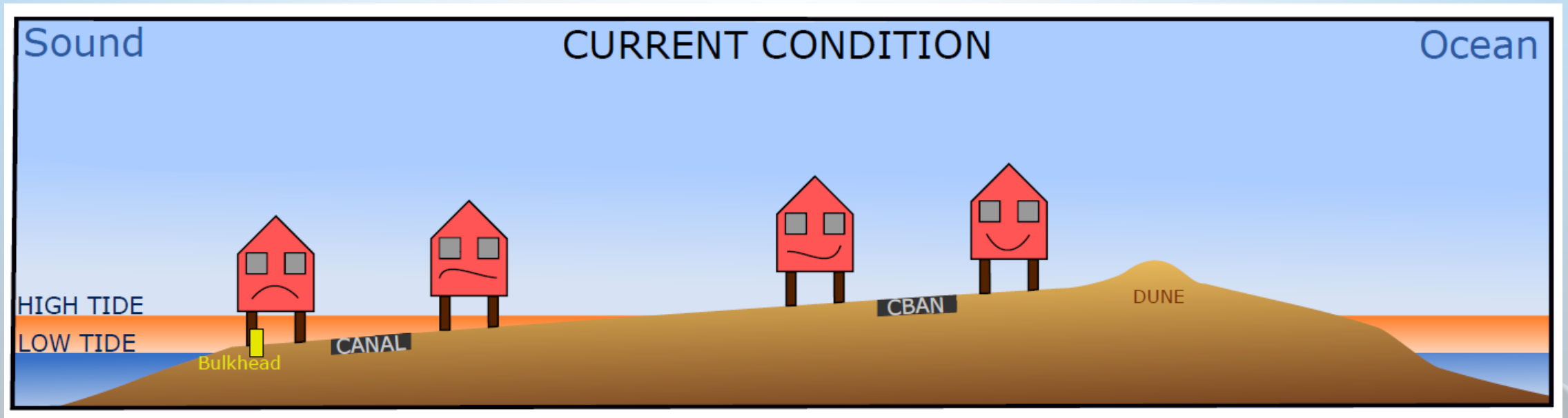
- New warning signs
- Improved operations for street closure due to tidal flooding
- Reduce damage to private property and impacts to public infrastructure



TRIED AND TRUE SOLUTIONS



AARRGH!



THE ELEVATION BASED SCENARIO

Sound

Ocean

Three Men in a Tub!!

HIGH TIDE

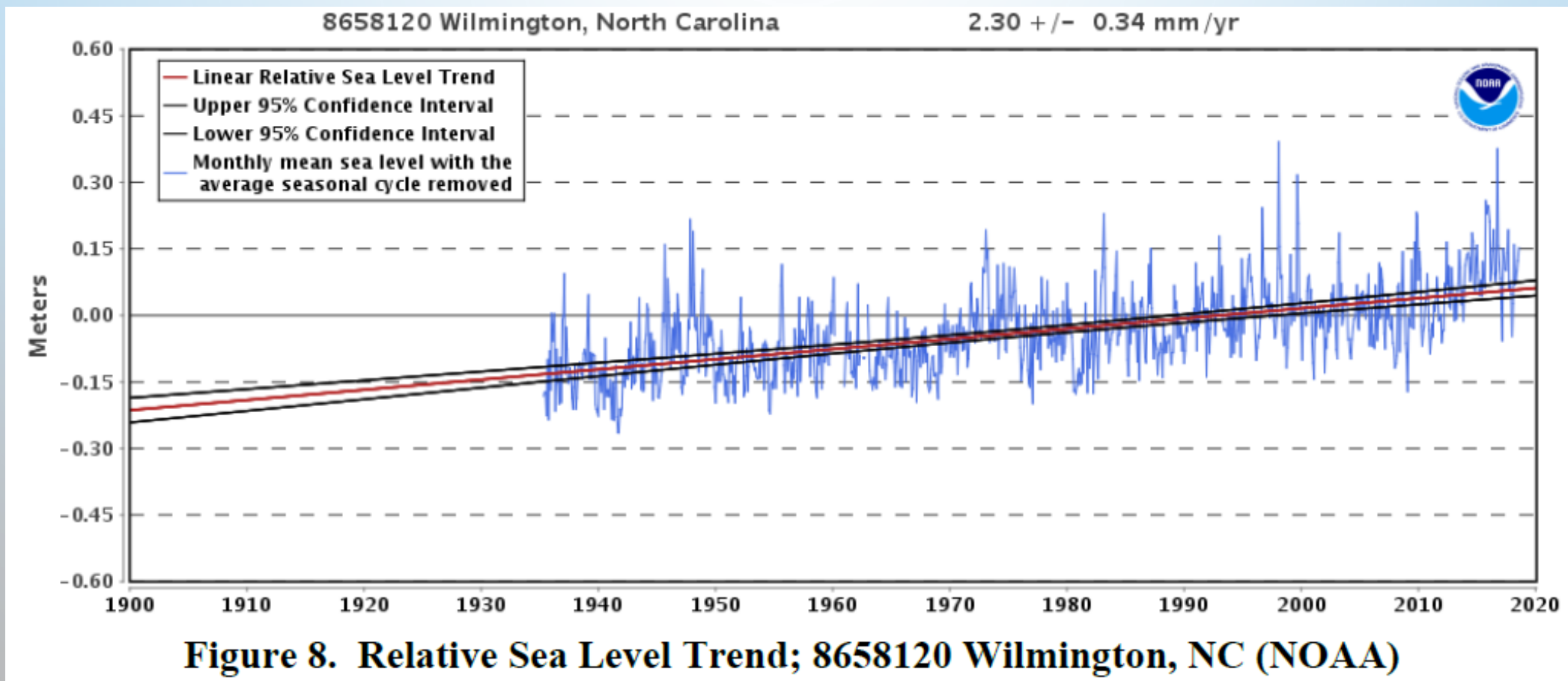
LOW TIDE



THE DO-NOTHING SCENARIO



HISTORICAL TIDAL MEASUREMENTS AND PROJECTIONS



THE GOOD NEWS!

- ✓ THIS IS A SOLVABLE PROBLEM
- ✓ THIS IS SOLVABLE WITHIN NORMAL FINANCIAL RESPONSIBILITY
- ✓ THIS IS SOLVABLE WITHIN A NORMAL MAINTENANCE TIMEFRAME
- ✓ THIS IS NOT A CATASTROPHIC PROBLEM
- ✓ THIS DOES NOT REQUIRE AN EXOTIC SOLUTION



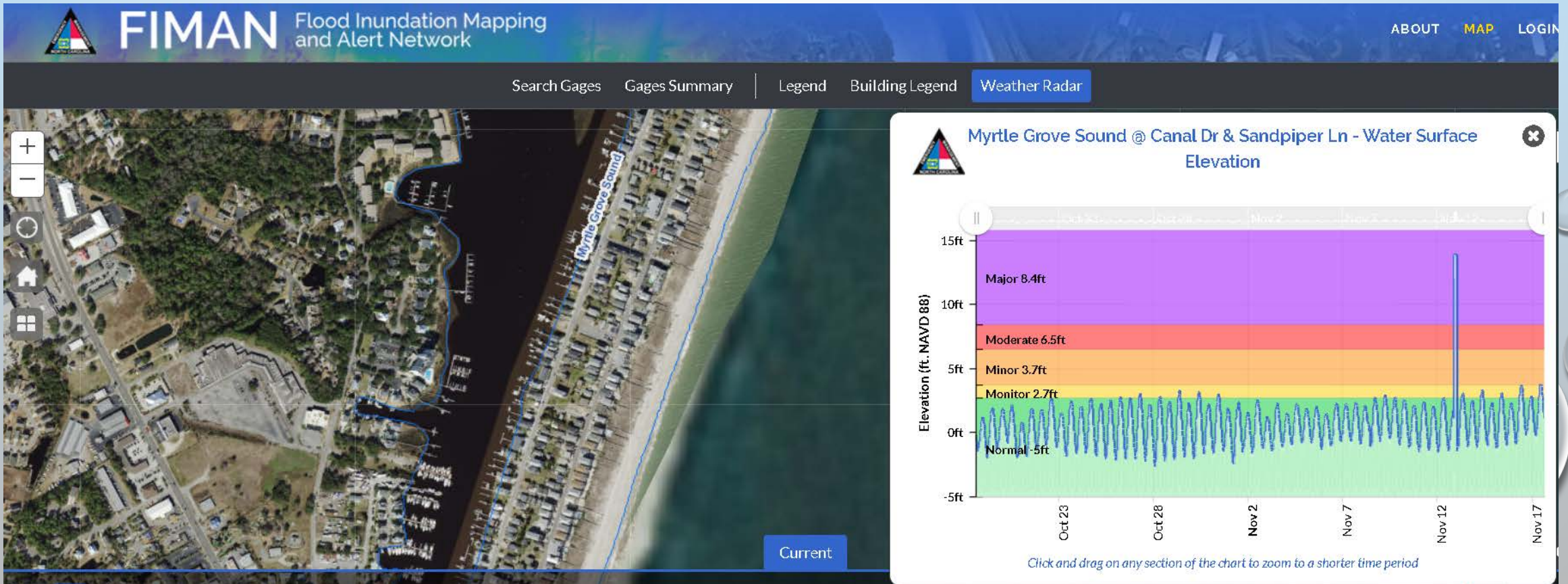
● **BUILDING A GOOD FIT FOR CAROLINA BEACH**

- ✓ RATIONAL BASIS FOR THE PLAN
- ✓ ENVIRONMENTAL RESPONSIBILITY
 - ✓ LAND USE COMPLIANCE
- ✓ REALISTIC IMPLEMENTATION
- ✓ FINANCIAL RESPONSIBILITY

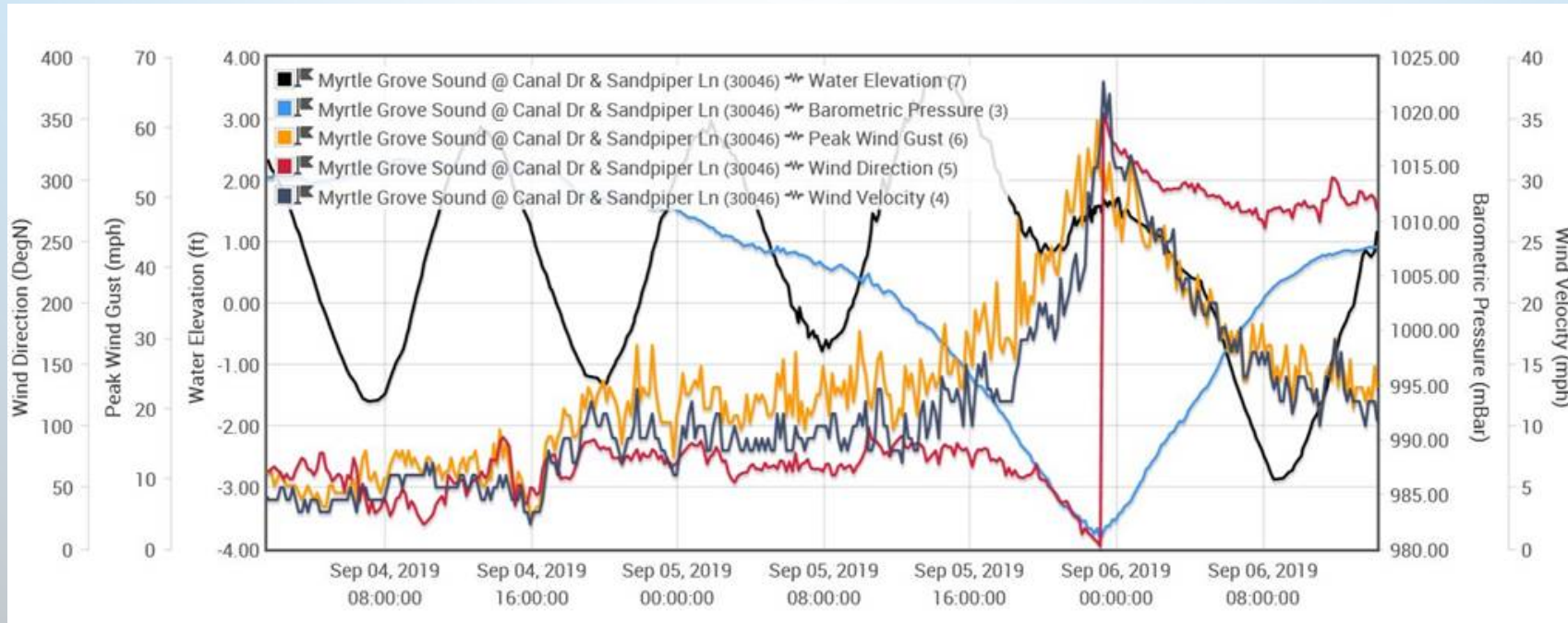


REAL TIME WATER SURFACE ELEVATION AND WEATHER MONITORING

<https://fiman.nc.gov/>



HURRICANE DORIAN SNAPSHOT



● **BUILDING A GOOD FIT FOR CAROLINA BEACH**

✓ RATIONAL BASIS FOR THE PLAN

✓ **ENVIRONMENTAL RESPONSIBILITY**

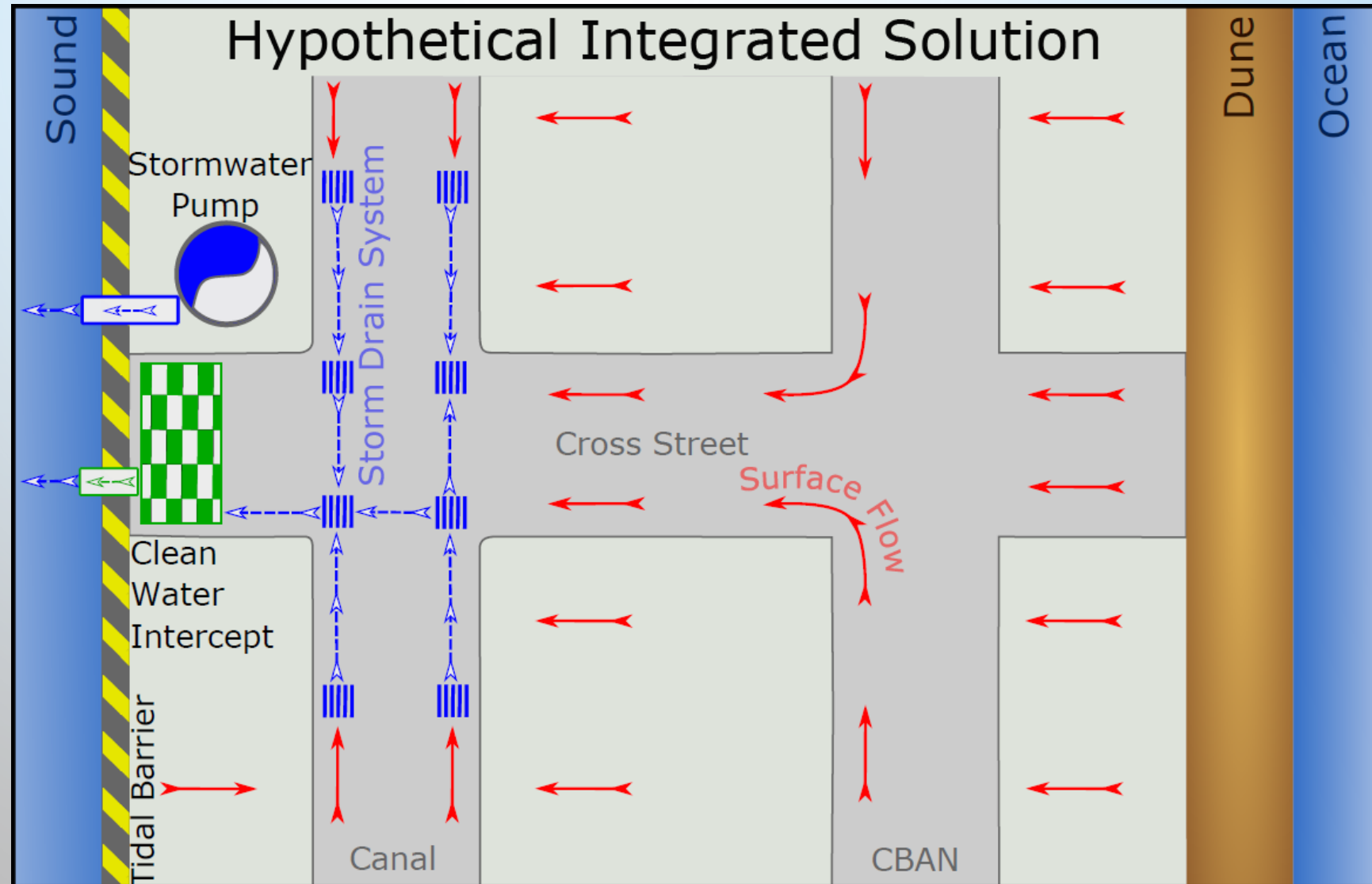
✓ LAND USE COMPLIANCE

✓ REALISTIC IMPLEMENTATION

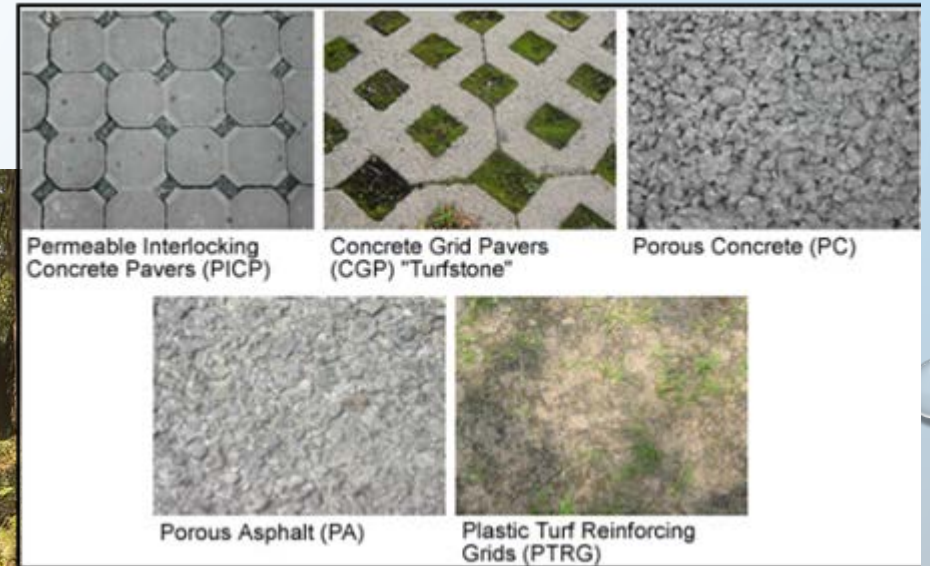
✓ FINANCIAL RESPONSIBILITY



COMBINED STREET GRADE, STORM DRAIN, PUMP AND TIDAL BARRIER



FUTURE CLEAN WATER MANAGEMENT TOOLS



● **BUILDING A GOOD FIT FOR CAROLINA BEACH**

- ✓ RATIONAL BASIS FOR THE PLAN
- ✓ ENVIRONMENTAL RESPONSIBILITY
- ✓ **LAND USE COMPLIANCE**
- ✓ REALISTIC IMPLEMENTATION
- ✓ FINANCIAL RESPONSIBILITY



THE TOWN IS ASKING FOR 3 POLICY DELEGATIONS

1. The capacity to direct the physical elevation of containment structures
2. Time certain completion of related infrastructure
3. A workable financial platform allowing for completion of the needed infrastructure



LEGISLATIVE INITIATIVE – TIDAL CONTAINMENT CHALLENGES

•**Legal and Administrative Structure:**

- Within current Subdivision Regulation delegation capacity to local governments.
- Full environmental reviews through the General Plan Amendment process.
- Delegates and combines a multiple, cross-agency approval process to local elected board for approval and permitting.

•**Enabling Legislation Needed to Make it Happen:**

- Local Design control for construction parameters; height, alignment and construction standards.
- Time Certain Completion
- Enforceability

•**Financial Platform for Implementation:**

- Private/public participation

•**Consequences of Inaction:**

- De facto condemnation of developed waterfront properties.

QUESTIONS AND COMMENTS

QUESTIONS AND COMMENTS DIRECTED TO:

CANALDRIVEFLOODINGCOMMITTEE@CAROLINABEACH.ORG

