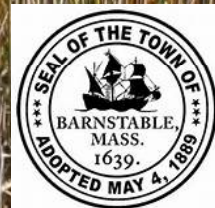
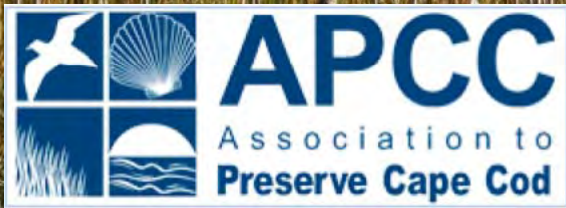


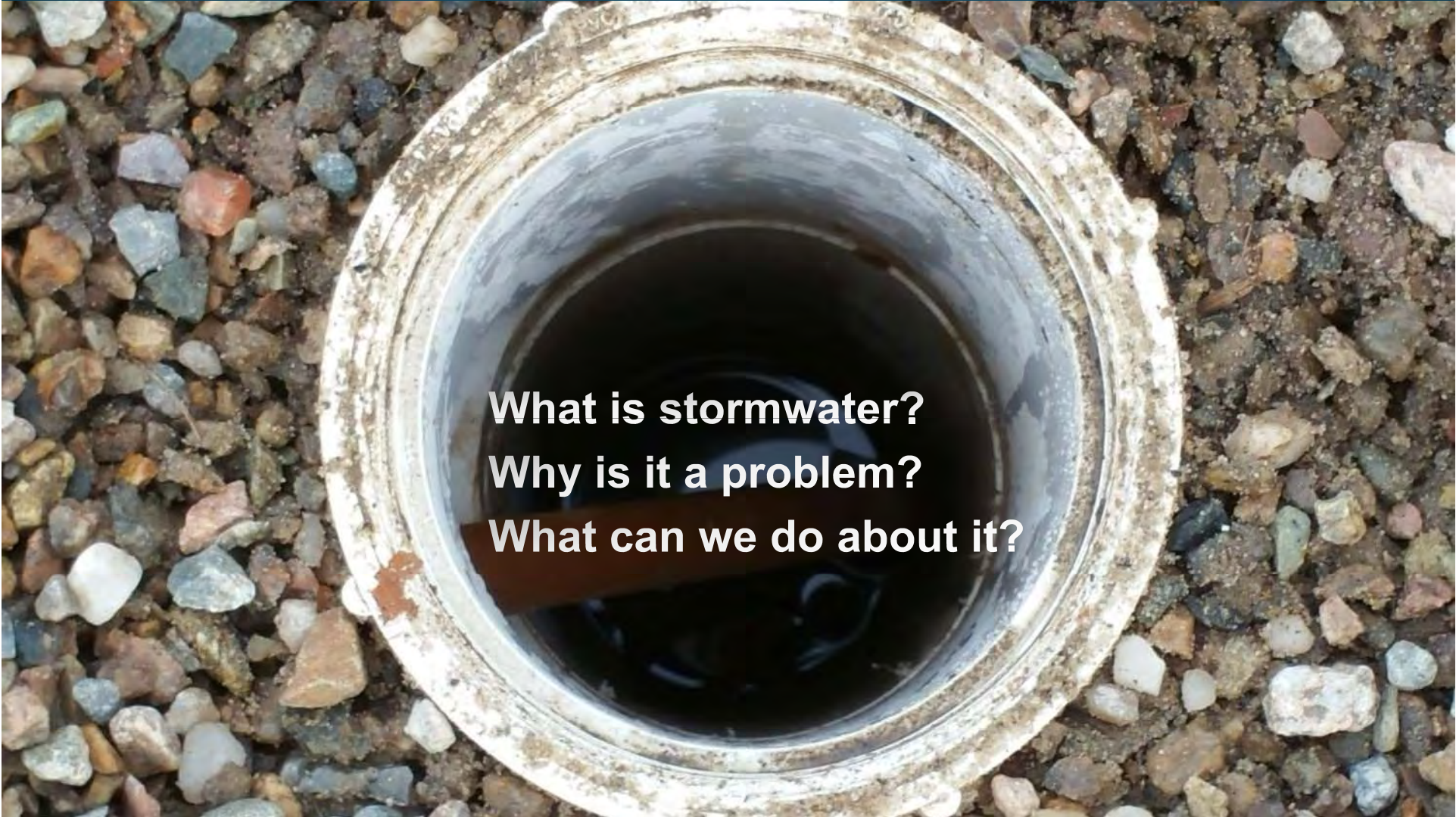
# Cleaning Up The Bays

## Managing Stormwater in the Three Bays





# Stormwater 101



**What is stormwater?  
Why is it a problem?  
What can we do about it?**

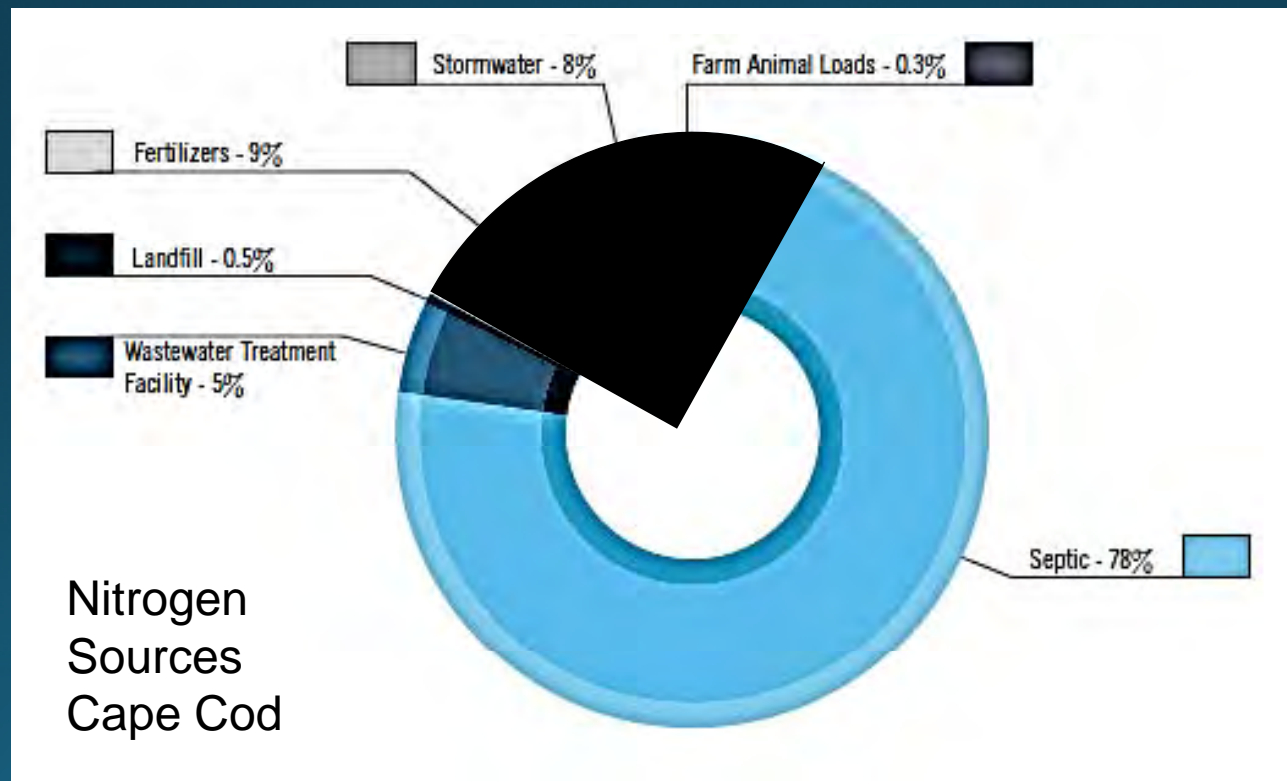


# Three Bays Impaired by Excess Nitrogen and Bacteria



# Nitrogen and Stormwater

- On average 8% of nitrogen in estuaries across the Cape is from stormwater runoff, and 9% from fertilizer use.
- In the Three Bays: **more than 23% of nitrogen** comes from these two sources.





# Negative Effects on the Environment and Community





# Project Overview

A photograph of a sunset over a body of water. The sun is low on the horizon, creating a bright, golden glow that reflects on the water's surface. The sky is filled with dark, dramatic clouds. In the foreground, the dark, silhouetted bow of a boat is visible, with a rope coiled on it. The overall mood is serene and contemplative.

3 Year Project

Total Cost: \$613,326

\$472,574 from U.S. EPA Southeast  
New England Program





# Benefits

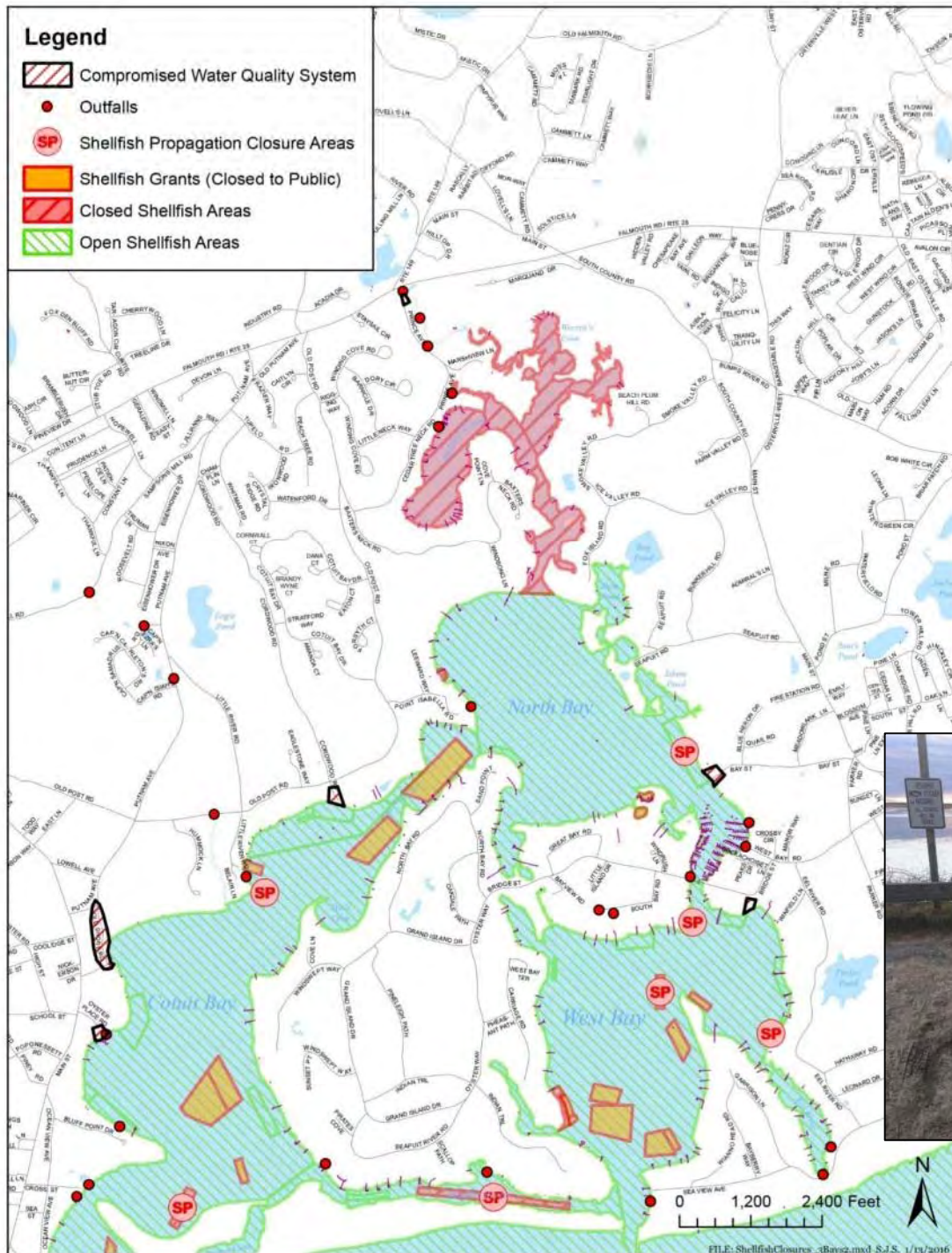
- Improved habitat for shellfish, fish and wildlife
- Restoration of water quality for shellfishing, fishing, boating and swimming

06/22/2016

Credit: Barnstable Clean Water Coalition

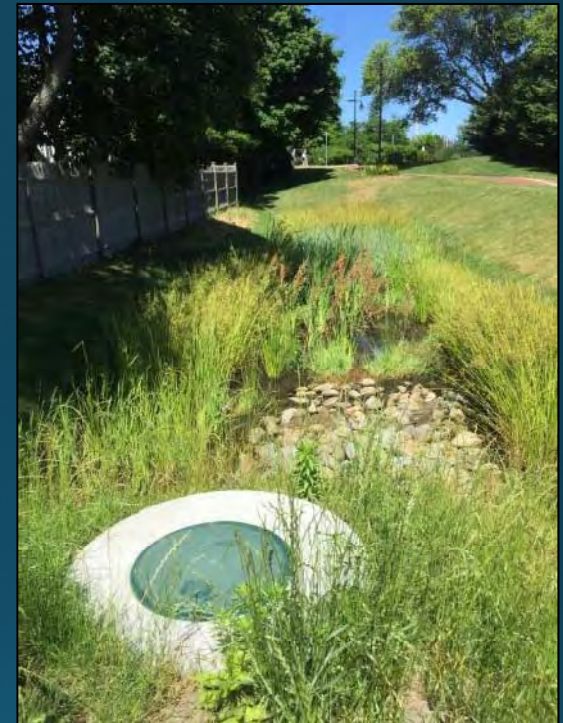
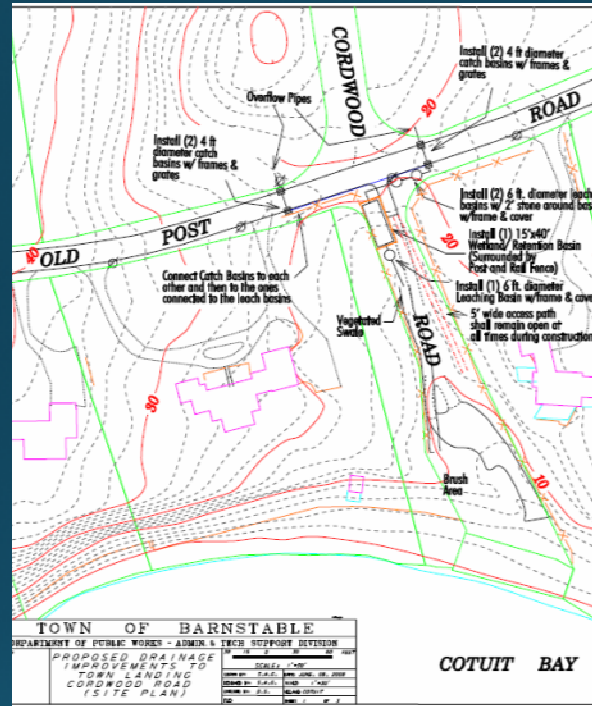
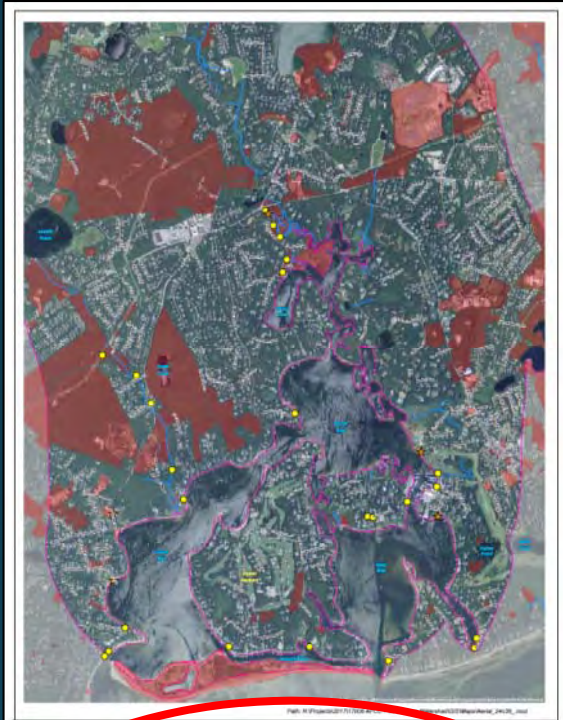


# Project Area





# Approach



## Assessment and Prioritization

March – August  
2017

## Design and Permitting

2017 – 2018

## Installation

September -  
December 2018



# Field Assessment - Methods

- Collect data on iPads loaded with existing info
- Visit pre-identified areas
- Talk to the experts/locals







# Osterville Library Rain Garden

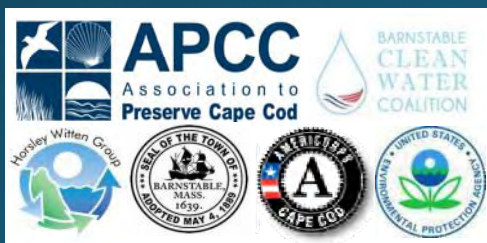


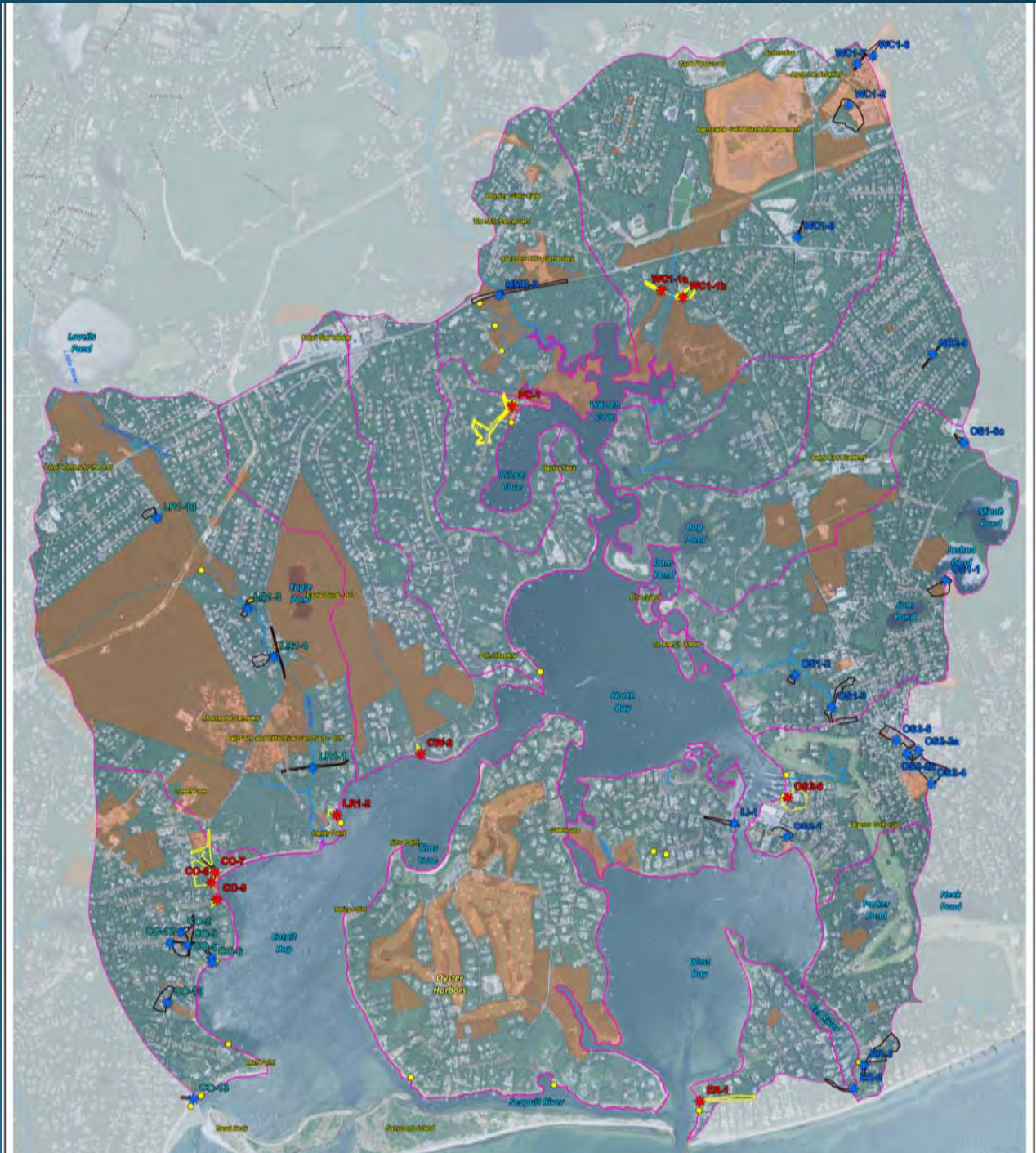
Photo Credits: APCC, Tara Racine and Horsley Witten Group



# After the Fieldwork...

- Collect additional information
- Perform sizing calculations
- Develop concept designs
- Calculate pollutant removal
- Estimate costs

42 Ranked Sites  
and many more  
unranked project  
suggestions!







Credit: Three Bays Preservation, Inc.

# Prioritization of Sites

- **Pollution Removals**
- **Cost**
- **Ease of Implementation**
- **Additional Benefits:**
  - Public Education
  - Direct benefits to the key resources? (shellfish beds, beaches, fish, etc.)



# Priority Sites

## Cotuit:

- Cotuit Center: Ropes Beach (CO 7/8/9)
- Little River: LR1-2
- Cordwood Landing: CW-2

## Marstons Mills:

- Prince Cove: PC-1
- Warren's Cove: WC1-1a/b

## Osterville:

- Osterville Center: OS2-6
- Eel River: ER-1



# Cotuit Sites:





# CO-7B: Ropes Beach





## Concept:

- Pavement Reduction
- Gravel Wetland
- Keep Parking but Move Back
- Public Education: Incorporate Site into Cotuit Stormwater Walking Tour





# Parking Lot Swale





# CO-8: Ropes Beach





## Concept:

- Wet Swale
- Salt Marsh Restoration
- Public Education:  
Incorporate Site into Cotuit Stormwater Walking Tour





# Wet Swale





# CO-9: Town Landing on Old Shore





## Concept:

- Wet Swale
- Public Education  
Cotuit  
Stormwater  
Walking Tour
- Potential for  
capturing more  
runoff/expanding  
stormwater  
treatment
- Pavement  
reduction or  
alternative  
surfaces?









# LR1-2: Little River Landing







Remove Old  
Pavement and  
Restore Marsh

Stormwater  
Treatment



## Concept:

- Pavement Reduction
- Salt Marsh Restoration
- Wet Swales
- Stabilized/Improved Water Access
- Public Education





# CW-2: Cordwood Landing









## Concept:

- Invasive Species Removal/  
Buffer Restoration
- Bioretention
- Stabilized/  
Improved  
Water Access
- Improve  
Parking Lot
- Public  
Education





# Bioretention Area





# Marstons Mills:





# PC-1: Prince Cove Marina





## Concept:

- Pavement Reduction
- Bioretention
- Coordination with Barnstable Land Trust
- Buffer Restoration
- Public Education





# WC1-1A/B: County Road





## Concept:

- Dry Swales
- Example of how to manage runoff from similar roads throughout Town





# Dry Swale





# Osterville:





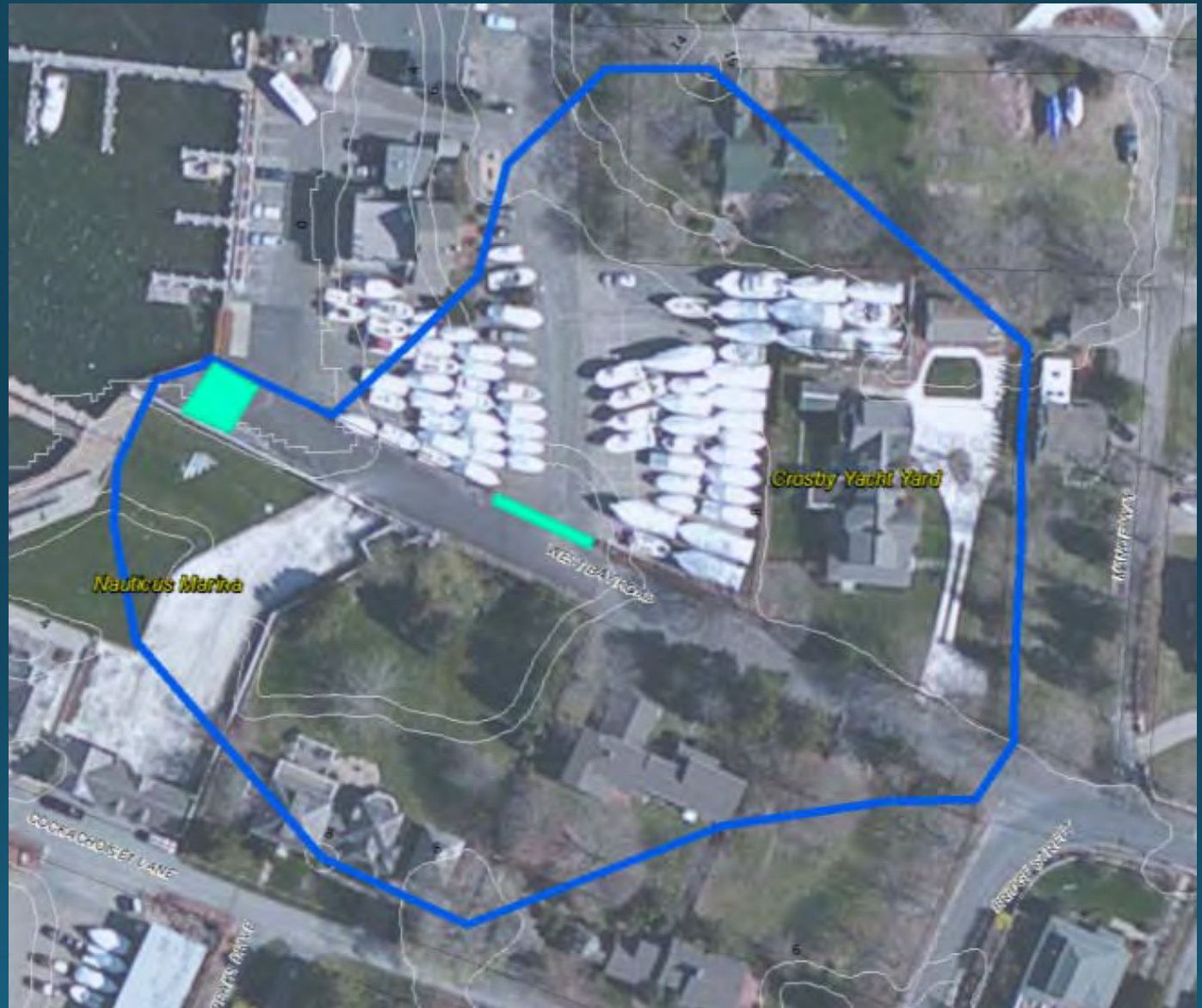
# OS2-6: End of W. Bay Rd





## Concept:

- Pavement Reduction
- Underground Sand Filters
- Public Education
- Public/Private Partnership Opportunity





# Sand Filter





# ER-1: End of Seaview Ave





## Concept:

- Pavement Reduction
- Bioretention
- Stabilized/Improved Access
- Public Education

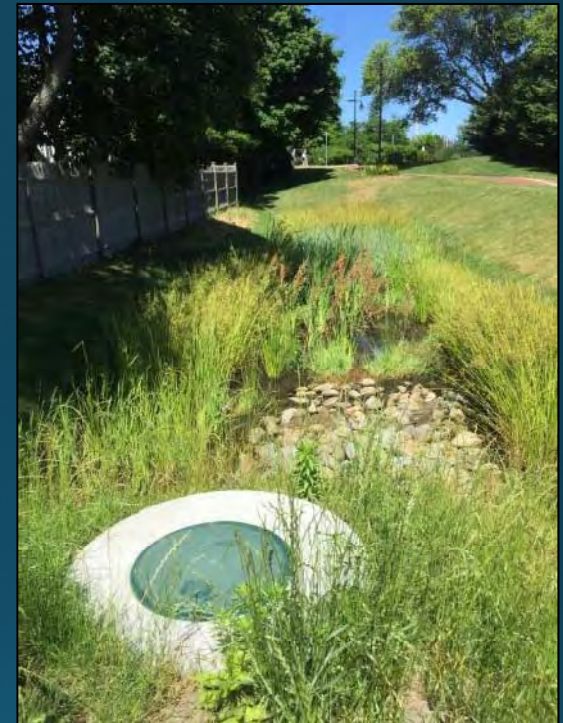
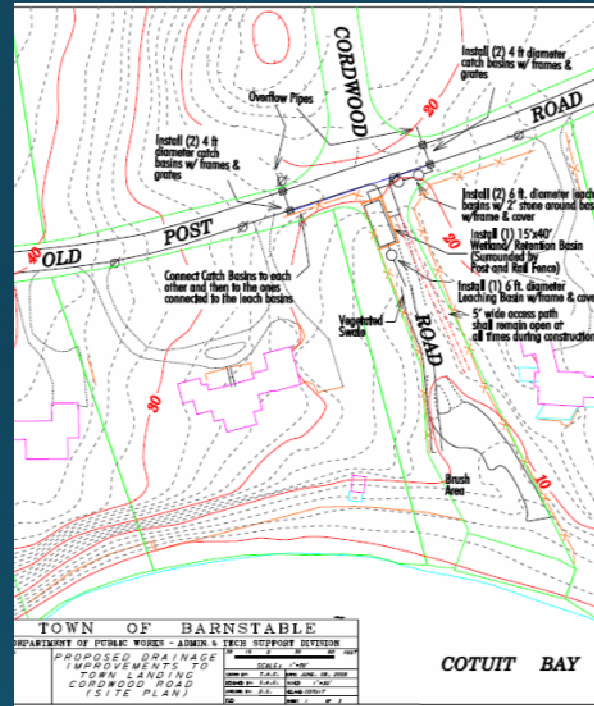
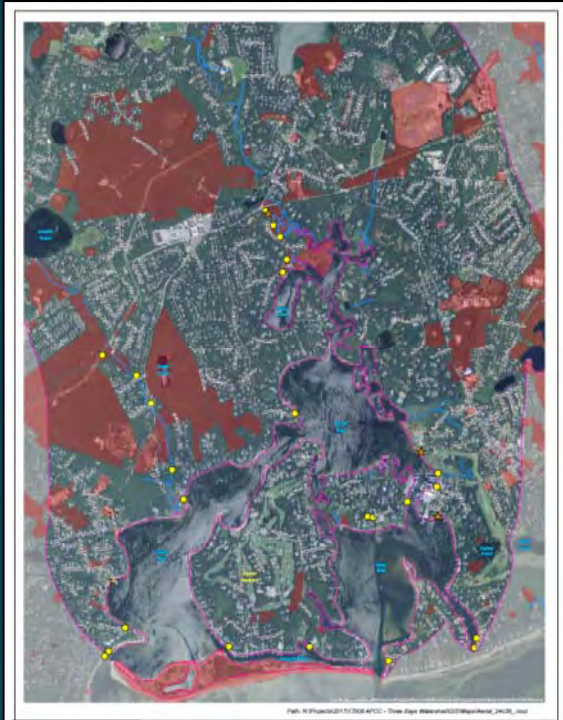




# *Breakout Groups*



# Next Steps and Timeline



## Assessment and Prioritization

March – August  
2017

## Design and Permitting

Fall 2017 – Spring  
2018

## Installation

September -  
December 2018



# Upcoming Events

Go to [www.apcc.org](http://www.apcc.org) for more info and to register

## Guided Walking Tour

Cotuit Village Stormwater

Date/Time TBD



## Maintenance Workshop

Early November

- Types of Stormwater Treatment Practices
- Basic maintenance
  - Above ground clean out
  - Planting
  - Care of Plants
  - Reporting to town on issues or concerns





# What You Can Do

1. Reduce use of fertilizers and pesticides
2. Reduce area of lawn
3. Install native plants
4. Mulch leaves and grass clippings
5. Pick up pet waste
6. Only rain down the drain
7. Rain barrels or gardens
8. Septic maintenance





# Questions?

## Contact

Project: April Wobst, [awobst@apcc.org](mailto:awobst@apcc.org)

Upcoming Events: Kristin Andres, [kandres@apcc.org](mailto:kandres@apcc.org)

