Yarmouth Stormwater Project Improving Water Quality

Public Meeting

June 12, 2024

***Funding for this work has been provided by Massachusetts Office of Coastal Zone Management Coastal Habitat and Water Quality Grants. Future funding will also be provided by USDA Natural Resources Conservation Service in coordination with the Cape Cod Conservation District.**

agenda

1. Project Overview
2. Green Stormwater Infrastructure
3. 25% Concept Designs (6 sites)
4. Q/A

1. Goal of Project

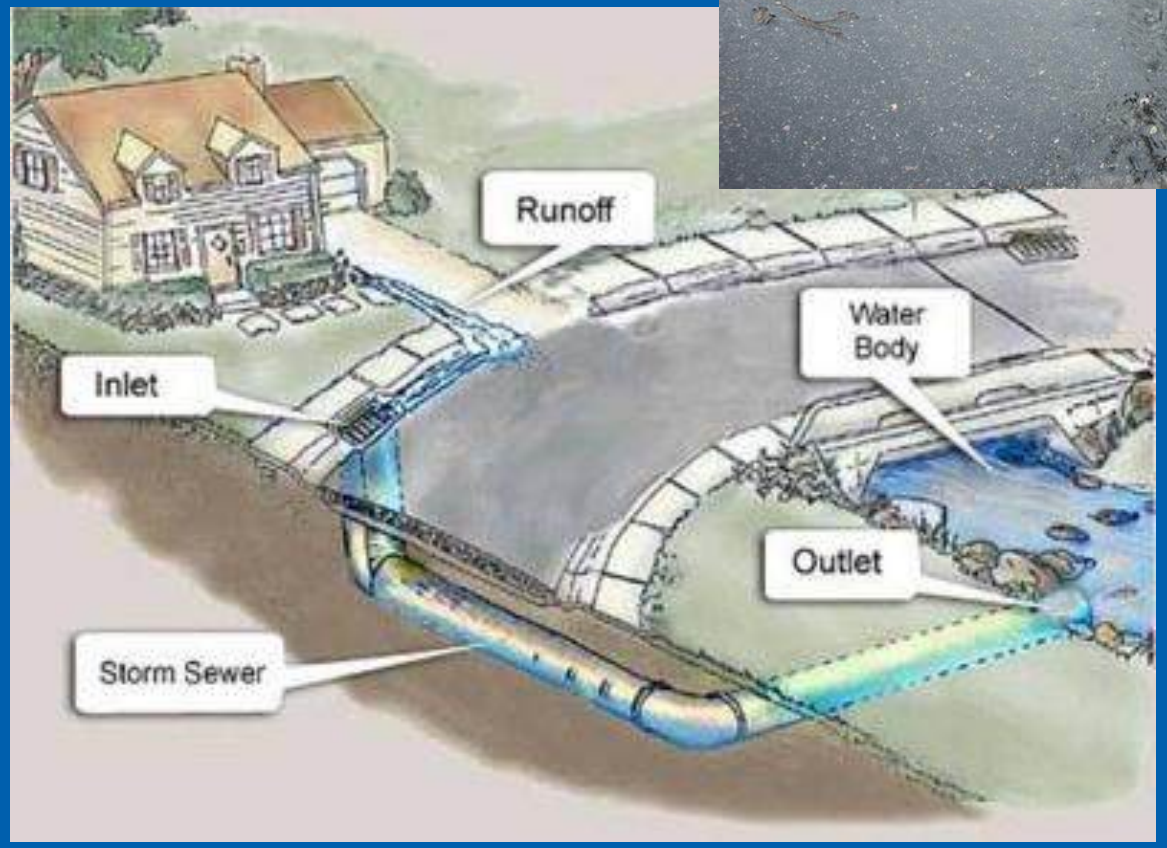
To improve coastal water quality by reducing or eliminating pollution (bacteria and nitrogen in particular) from stormwater runoff

What is stormwater?

rain

impervious

runoff



Why is stormwater a problem?

nutrients

bacteria & pathogens

metals

trash

pesticides

thermal stress

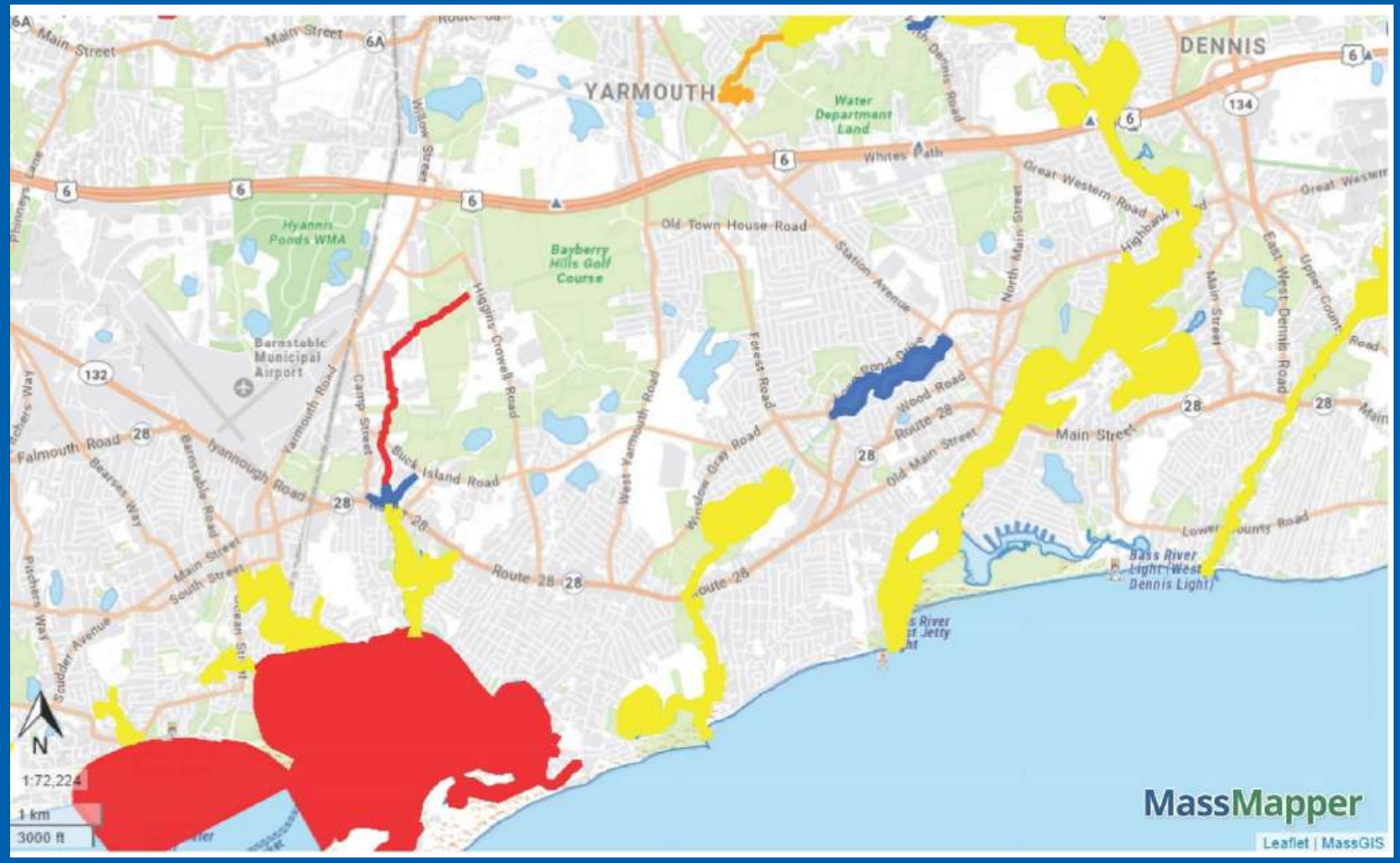
oil

emerging contaminants

sediment

salts

The Water Quality Problem - Yarmouth



2018 Integrated List of Impaired Waterbodies

Negative Effects on the Environment

- Excessive algal growth
- Habitat degradation
- Harm to wildlife

Negative Effects on the Community

- Health hazards
- Beach closures
- Shellfishing closures
- Algal nuisance
- Aesthetics and odor
- Lower property values

What can we do about it?

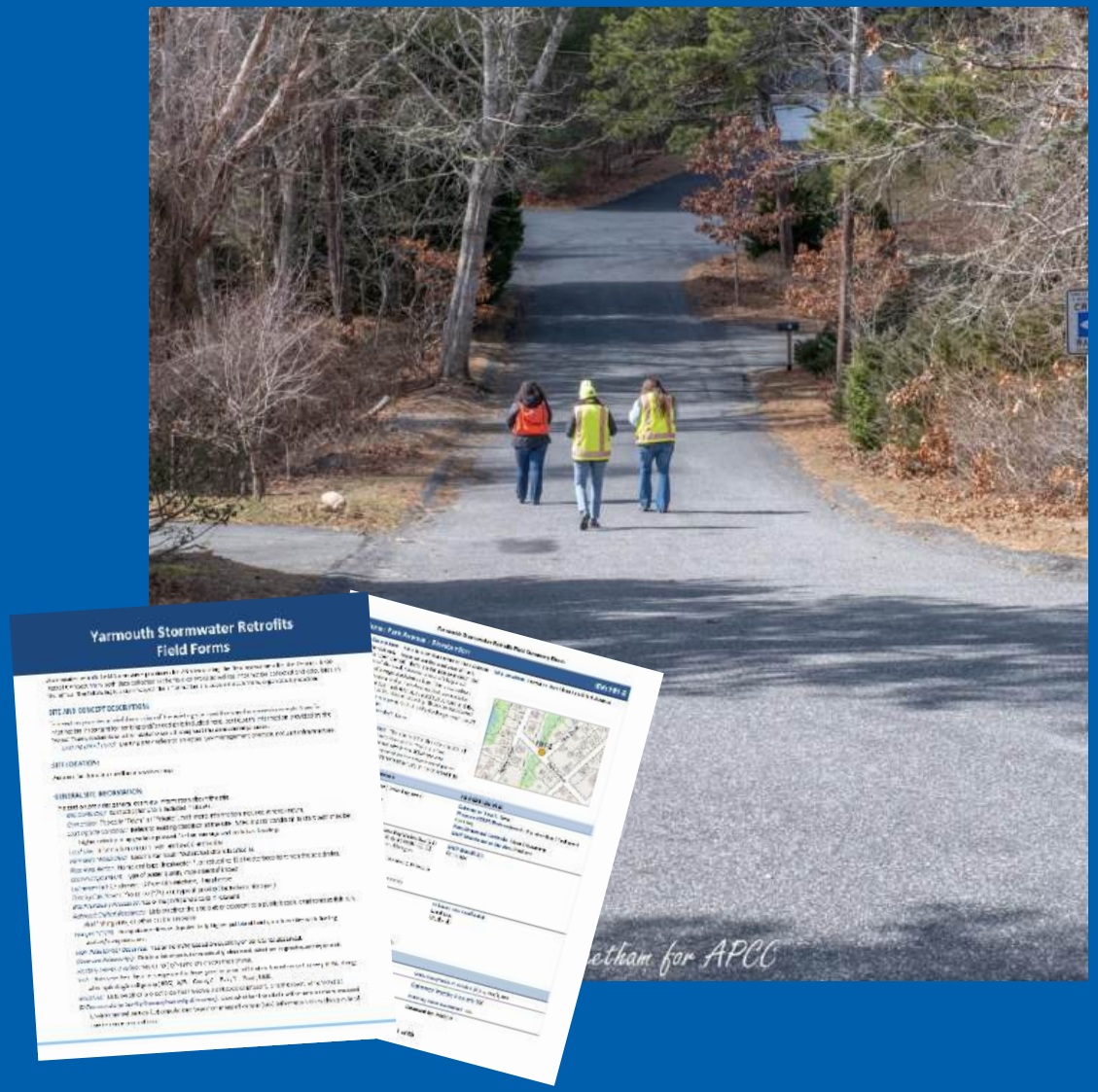
1. Reduce stormwater volume
2. Reduce pollutants at the source
3. **Install green infrastructure stormwater systems**

Photo Credit: Gerald Beetham

Project Overview

- Building on Ongoing Work by the Town to Support Plans for Multi-Year Project
- $82K FY23 CZM grant
- $795K FY24 CZM grant
- $180K NRCS
- Town Matching Funds
- Project: 2022-2025
- Complete Assessment, Prioritization, Design and Installation of Green Infrastructure at Top Priority Sites

Project Timeline to Date

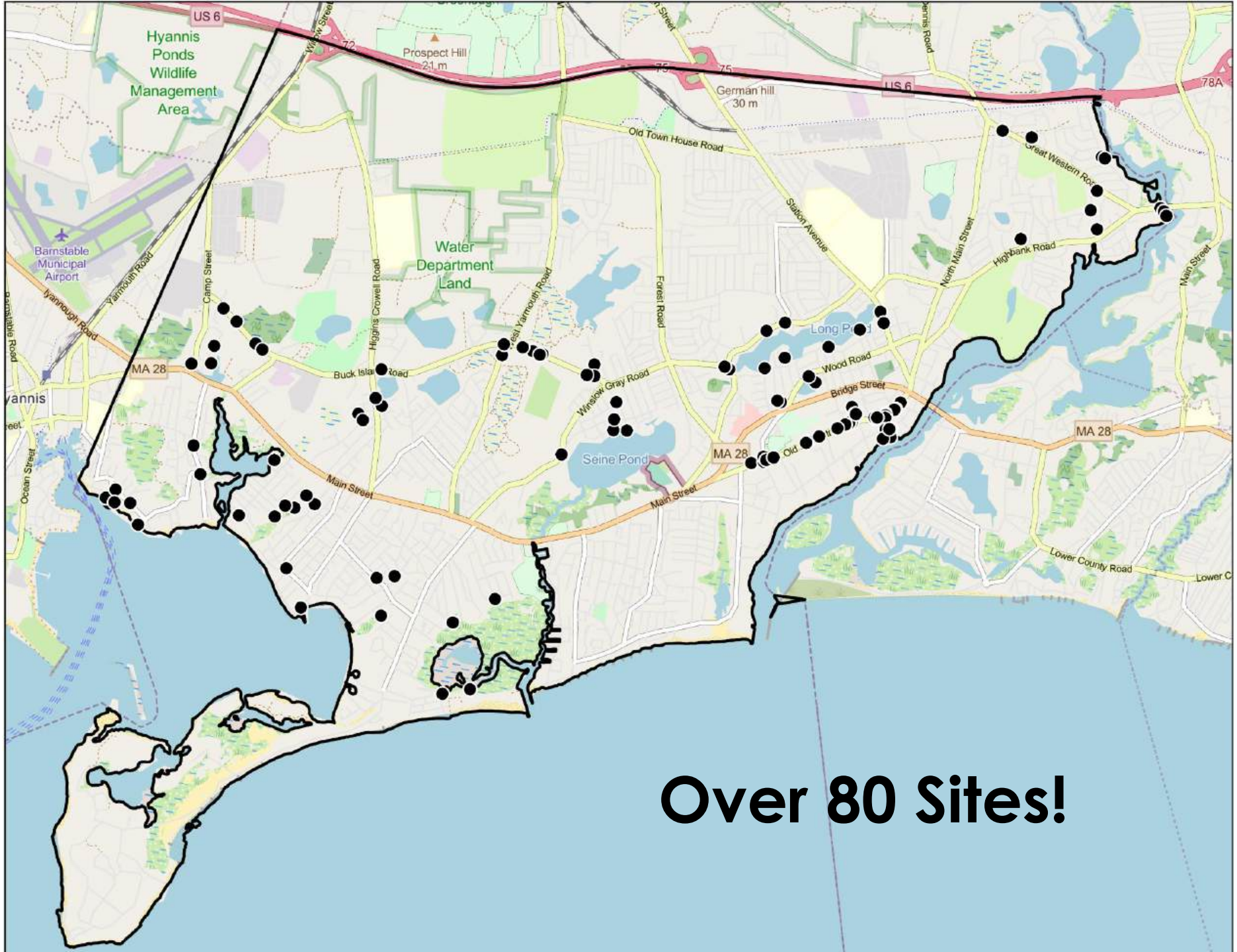


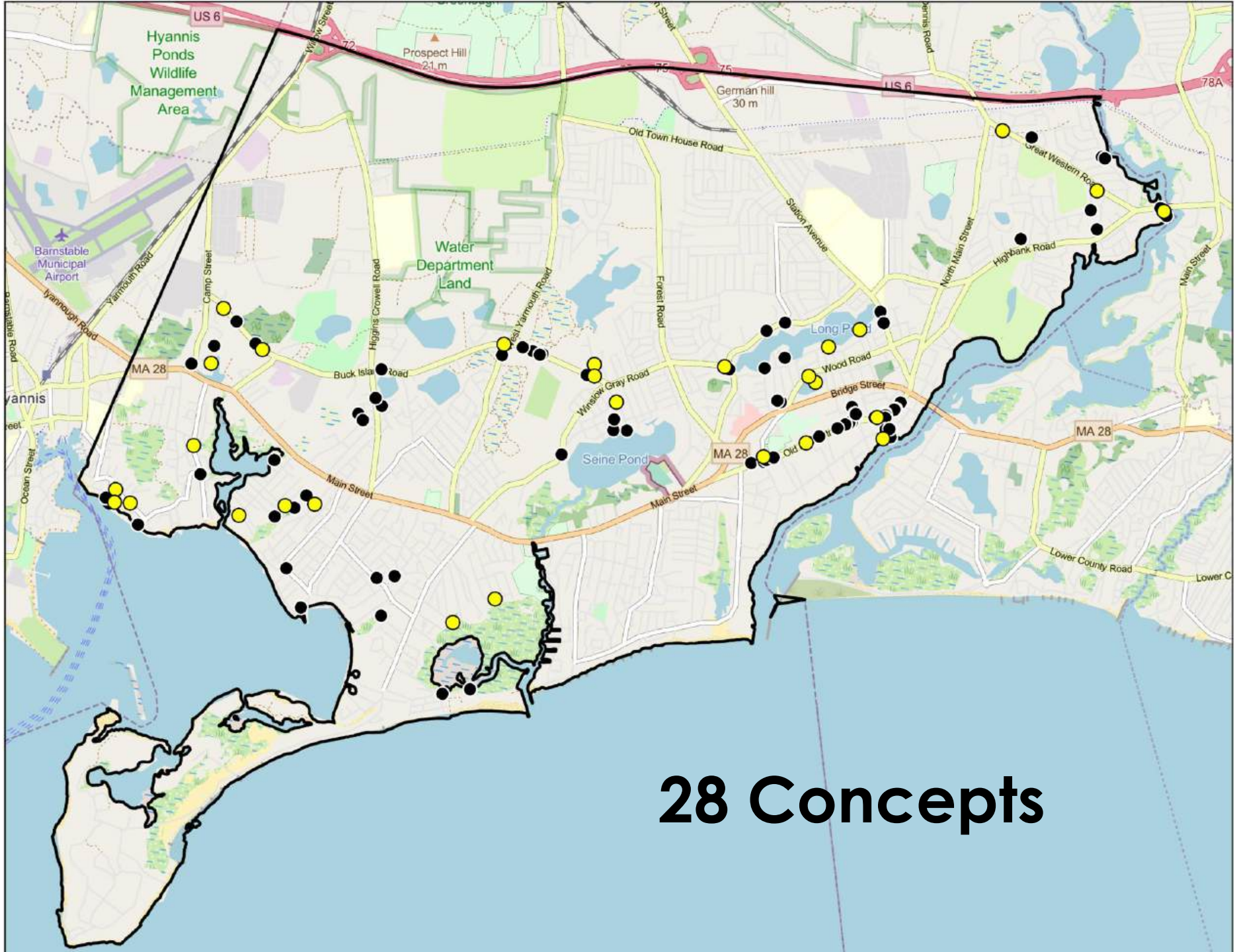
Year 1

- Oct 2022–June 2023: Planning, Prioritization and Conceptual Designs for 28 of 80 Sites Identified
- June 2023: Public Meeting to review top 10 sites

Year 2

- Fall 2023: Selected Top 5
- Winter 2023: Completed Site Survey and Assessment
- Spring 2023: Developed 25% Concept Designs
- June 2024: Public Meeting to Review


US 6
Hyannis Ponds Wildlife Management Area
Prospect Hill 21 m
German hill 30 m
US 6
78A
Old Town House Road
Great Western Rd
Barnstable Municipal Airport
Water Department Land
Yarmouth Road
Camp Street
Higgins Crowell Road
West Yarmouth Road
Forest Road
Station Avenue
North Main Street
Highbank Road
Main Street
Iyannough Road
MA 28
Buck Island Road
Winslow Gray Road
Long Pond
Wood Road
Bridge Street
MA 28
Seine Pond
Main Street
Main Street
Ocean Street
Lower County Road
Over 80 Sites!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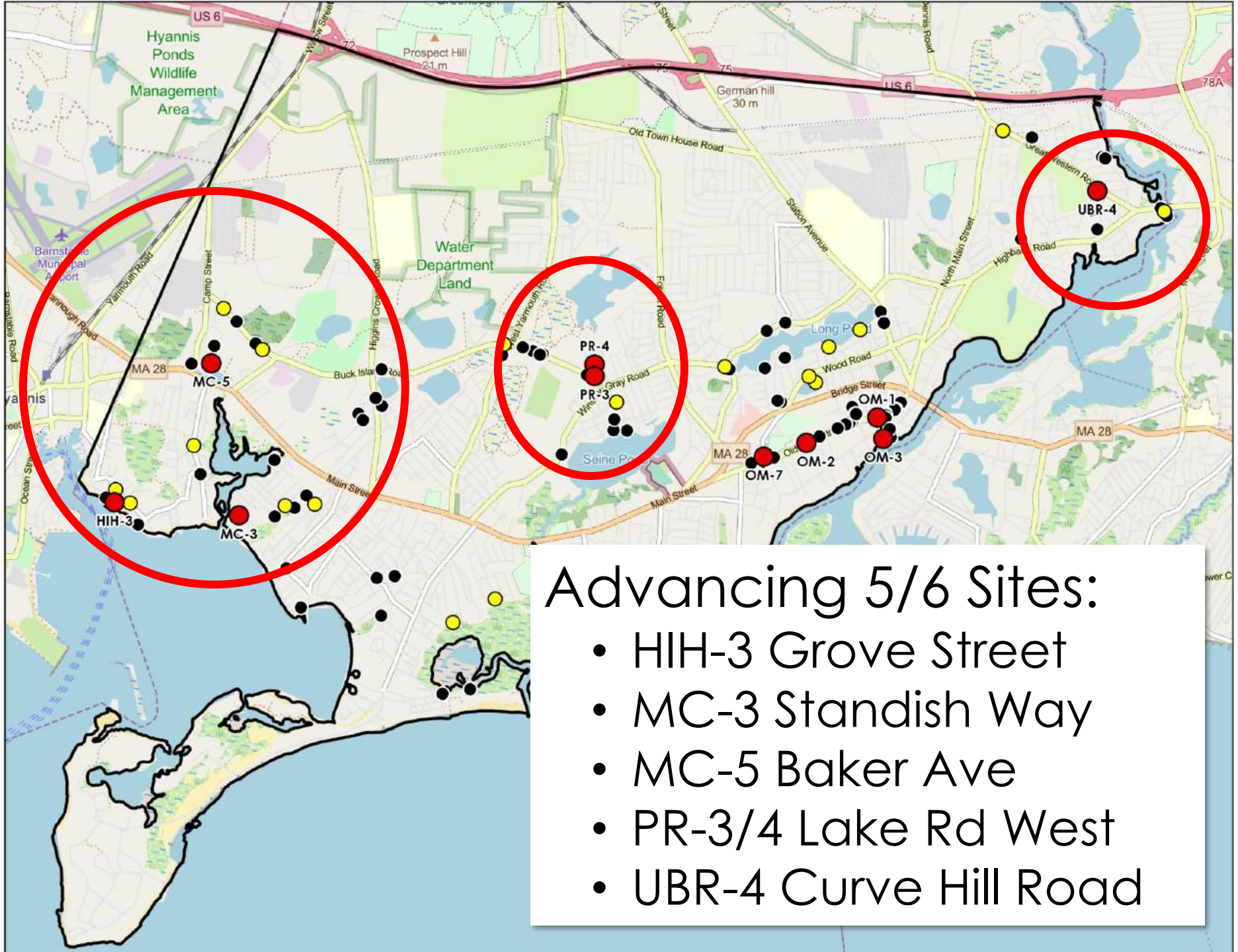
28 Concepts



Advancing 5/6 Sites:

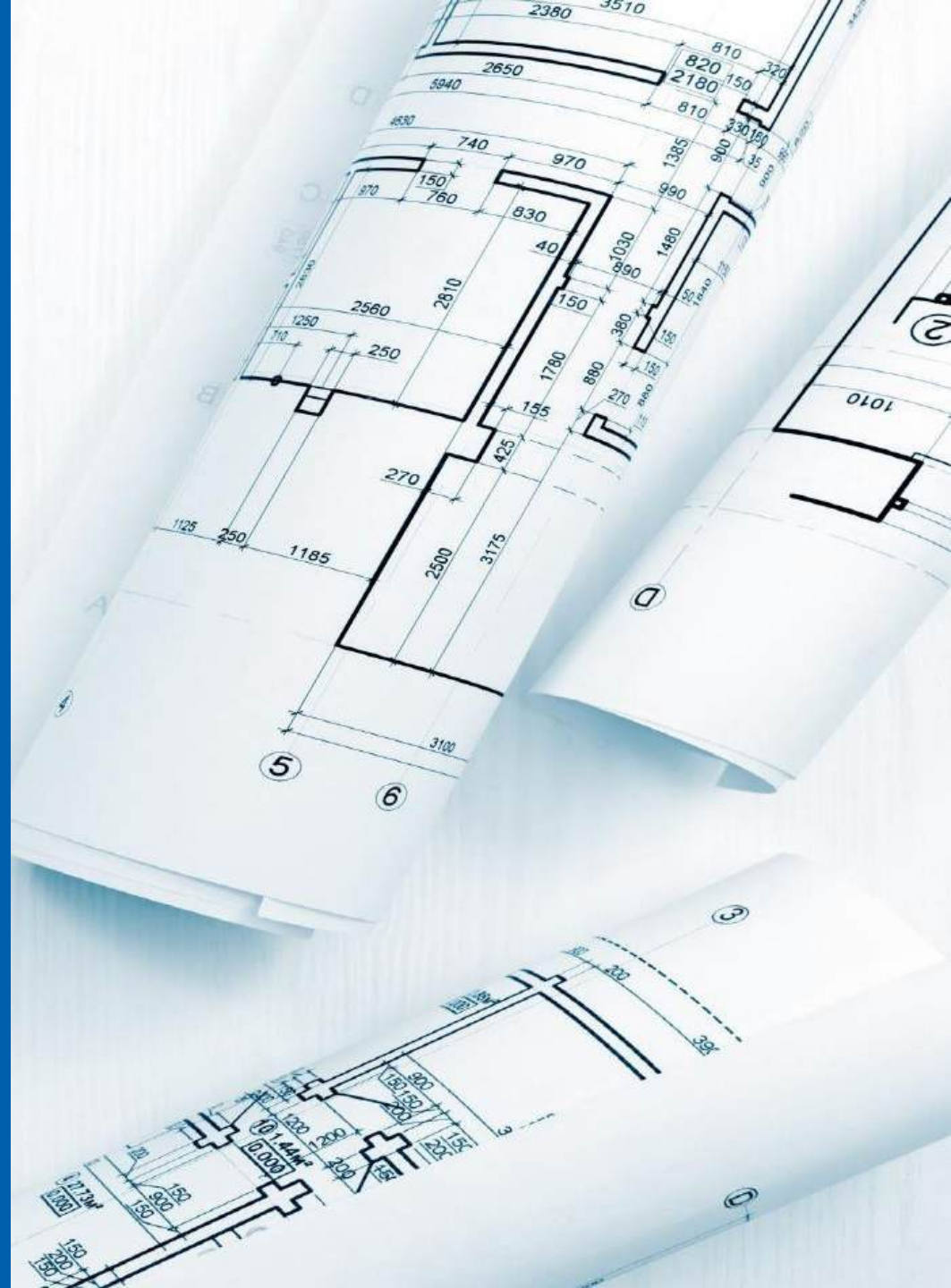
- HIH-3 Grove Street
- MC-3 Standish Way
- MC-5 Baker Ave
- PR-3/4 Lake Rd West
- UBR-4 Curve Hill Road

Horsley Witten Group

Next Steps – Planning to Implementation

Year 3

- Summer/Fall 2024 Complete Design and Permitting for 2 Sites
  - Standish Way ($212K NRCS and Town)
  - Second Site (up to $550K CZM Funding)
  - Total: $762K Construction Budget
- Winter 2024 – Spring 2025: Construction
- Completion of Current Scope: June 2025



Anticipated Outcomes

- Reduction in bacteria and nitrogen entering coastal embayments
- Reduce beach and shellfish closures
- Improved habitat for shellfish, fish and wildlife
- Restoration of water quality for shellfishing, fishing, boating and swimming

2. Green Stormwater Infrastructure (GSI) Mimic Nature

Structural Practices

- Infiltration
- Filters
- Wet Practices
- Rainwater Harvesting

Non-structural Practices

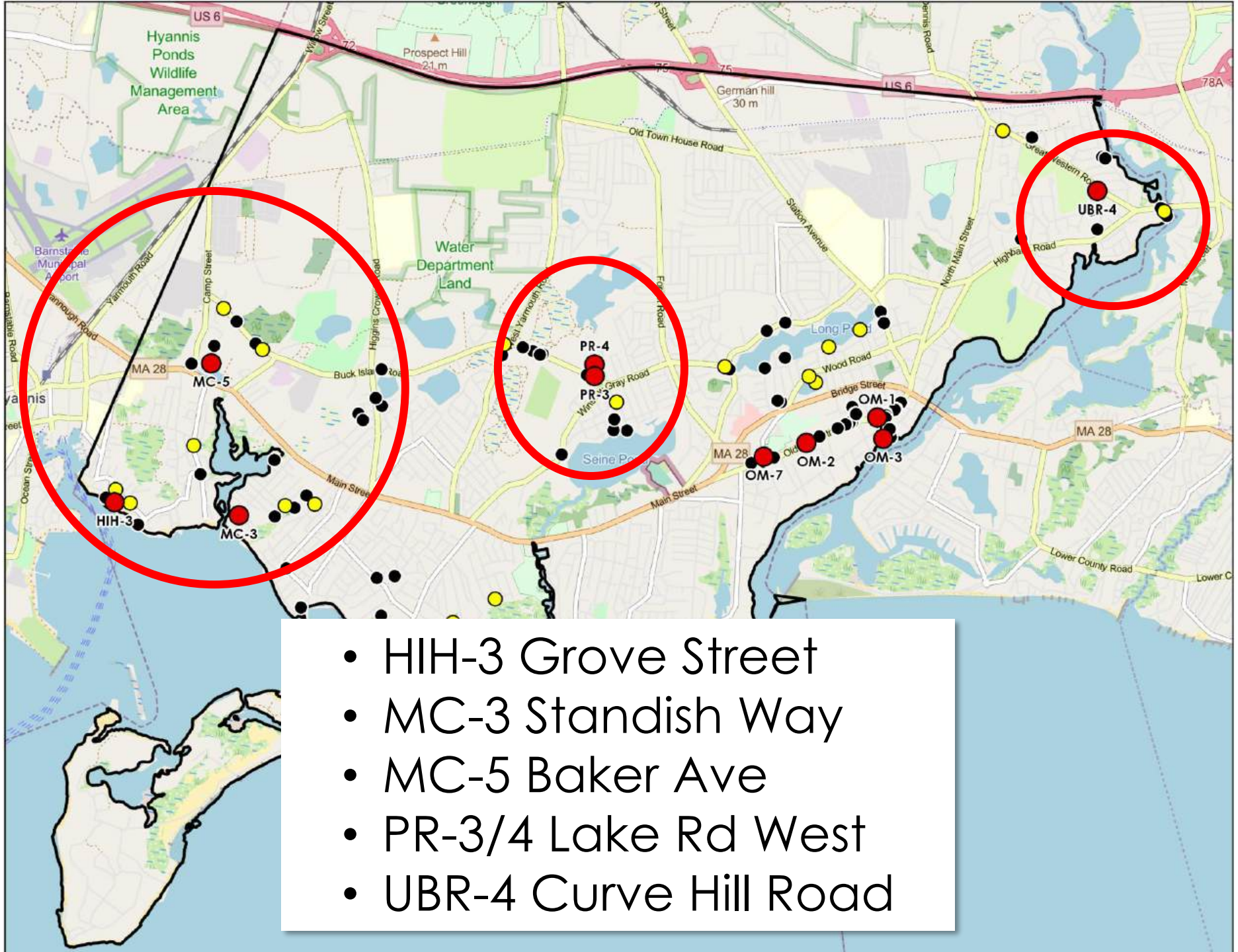
- Pavement Removal
- Revegetation
- Source Control
- Public Education

Green Stormwater Infrastructure (GSI) Mimics Nature

3. 25% Design Concepts

Top Sites:

- HIH-3 Grove Street
- MC-3 Standish Way
- MC-5 Baker Ave
- PR-3/4 Lake Rd West
- UBR-4 Curve Hill Road

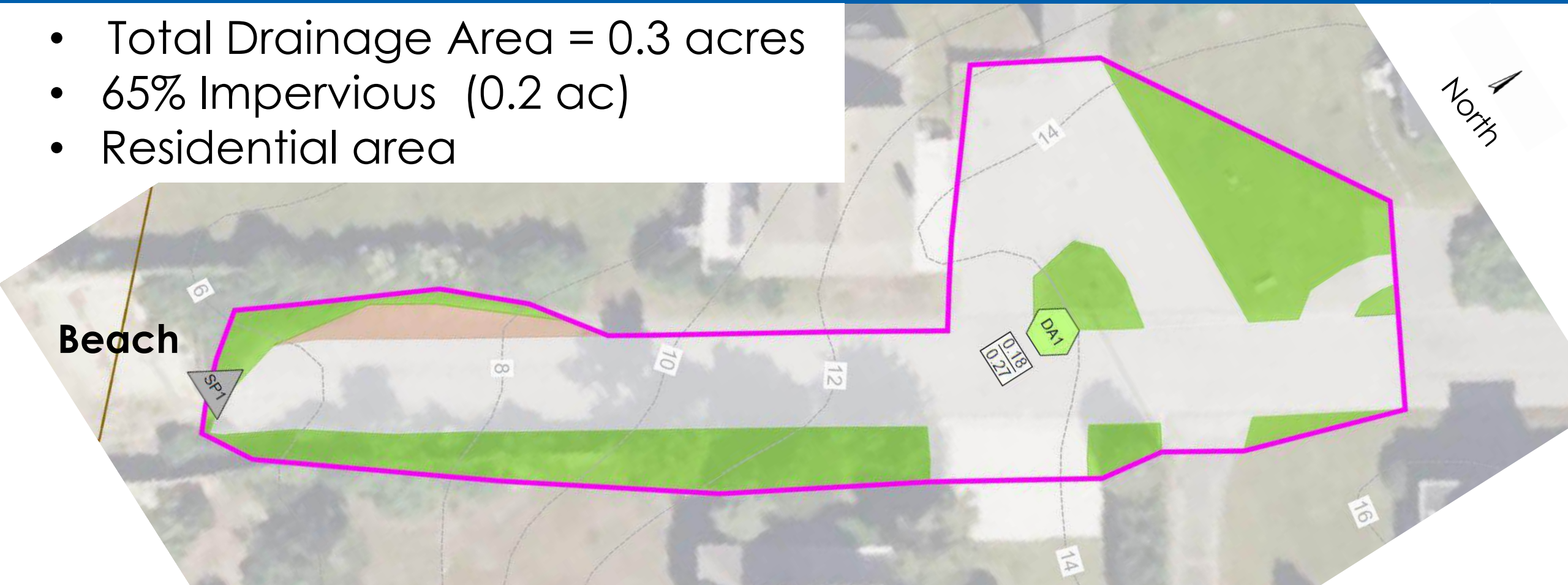


- HIH-3 Grove Street
- MC-3 Standish Way
- MC-5 Baker Ave
- PR-3/4 Lake Rd West
- UBR-4 Curve Hill Road

Horsley Witten Group

HIH-3 Grove Street Existing Conditions

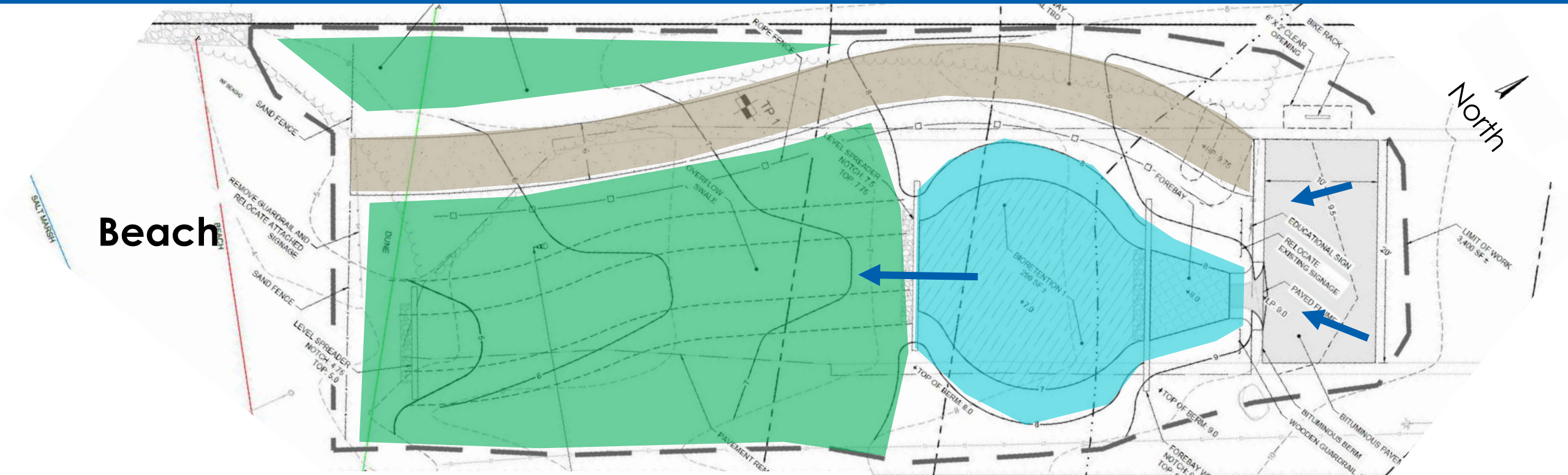
- Total Drainage Area = 0.3 acres
- 65% Impervious (0.2 ac)
- Residential area



Existing Conditions

- Town Way to Water
- Existing Stormwater Infrastructure
  - Clogged Leaching Basin
- Steep site with invasive species
- Pavement impacting dune
- Discharges into Hyannis Inner Harbor/Lewis Bay
- Adjacent to tidal stream

Grove St - Design Components



- Pavement net reduction (1,450 sf)
- Bioretention for Treatment
- Revegetate Buffer/Dune
- Fencing, bike rack, pedestrian path

Bioretention

- Sediment forebay for pretreatment
- Infiltrating bioretention with plants
- 90% TSS, 98% TP, 100% TN and Bacteria Removals

Proposed Conditions - benefits

- Water quality improvements
- Infrastructure retreat – coastal resiliency
- Resource protection/stabilization
- Improved access
- Educational outreach

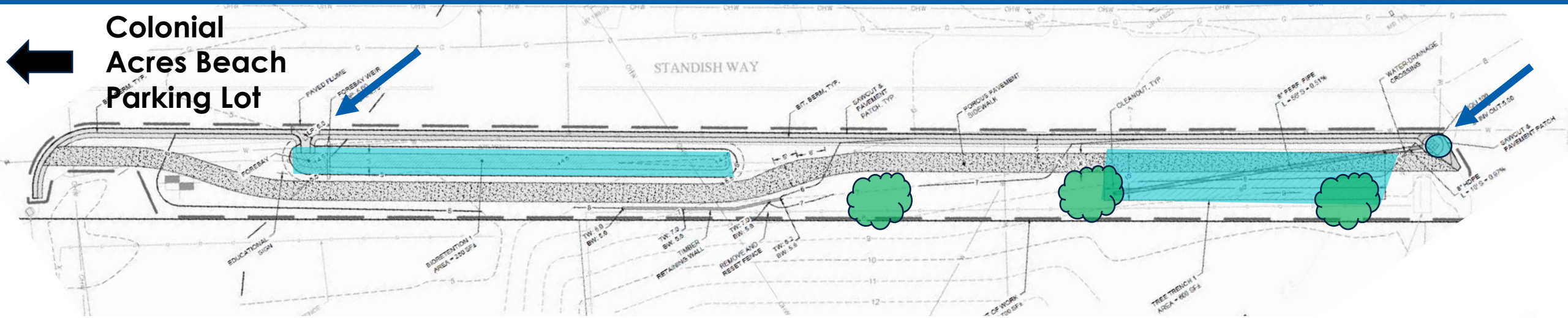
MC-3 Standish Way Existing Conditions

- Total Drainage Area = 1.5 acres
- 40% Impervious (0.65 ac)
- Residential and Commercial Land Use

Existing Conditions

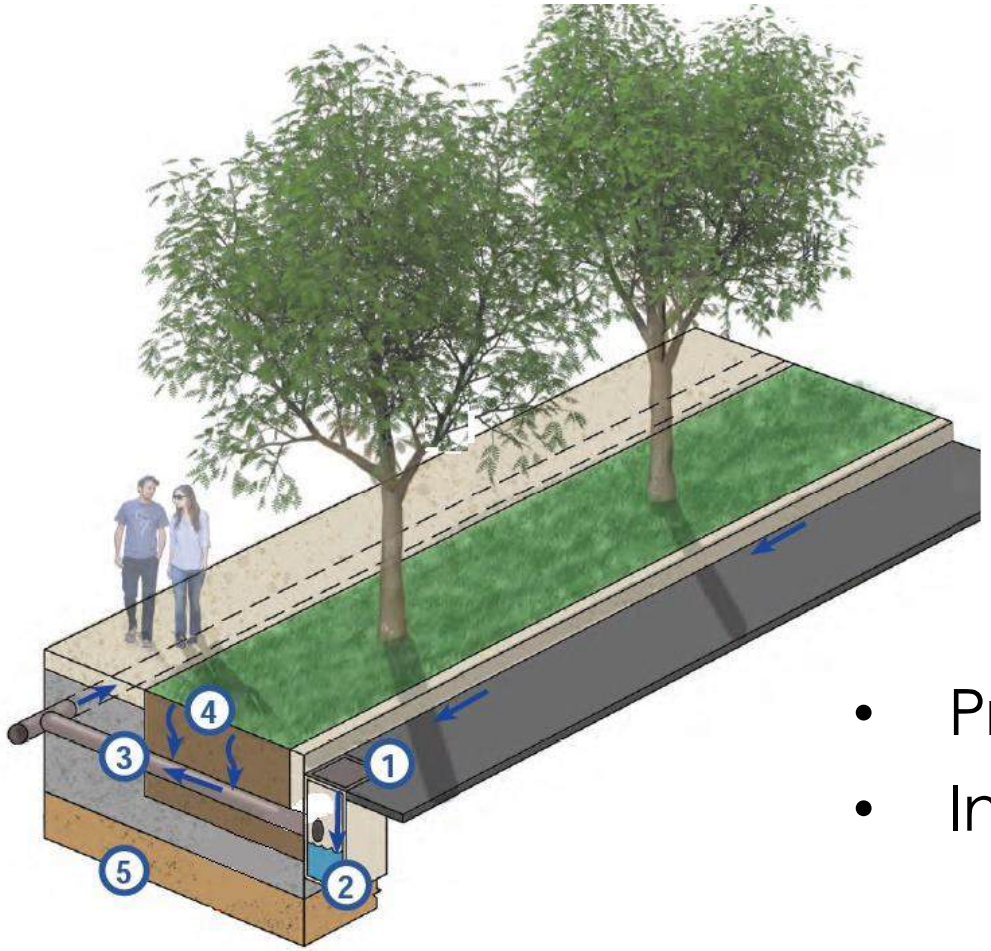
- Town Road and Parking Lot (Colonial Acres Beach)
- Existing Stormwater Infrastructure
  - Porous Asphalt
  - Infiltration Structures
  - Constructed Wetland
- Shallow depth to groundwater
- Salt Marsh/Tidal River along Mill Creek/Lewis Bay

Standish Way - Design Components



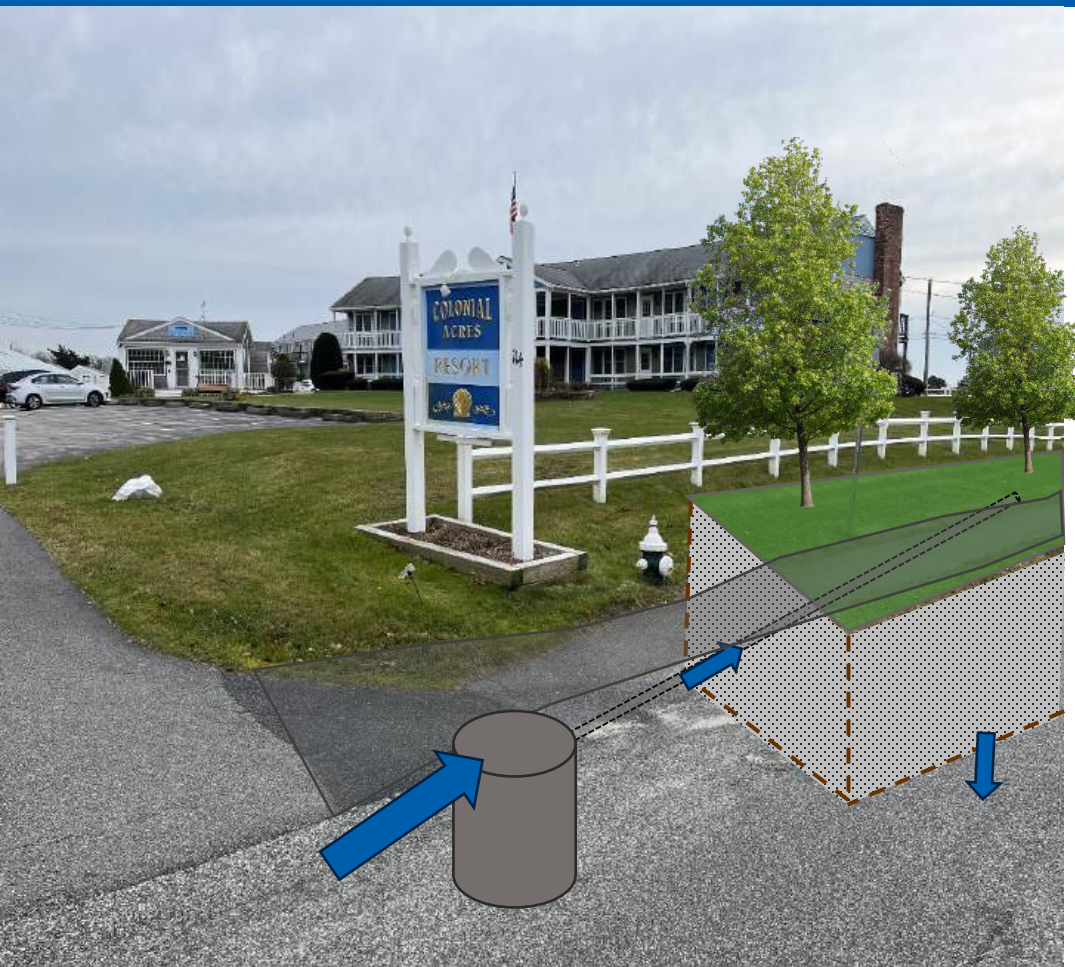
- Tree Trench and Bioretention for Treatment
- Overflows continue down road
- Porous asphalt sidewalk

Tree Trench



- Proprietary pretreatment unit
- Infiltration trench with tree for nutrient uptake

Tree Trench



MC-5 Baker Ave Existing Conditions

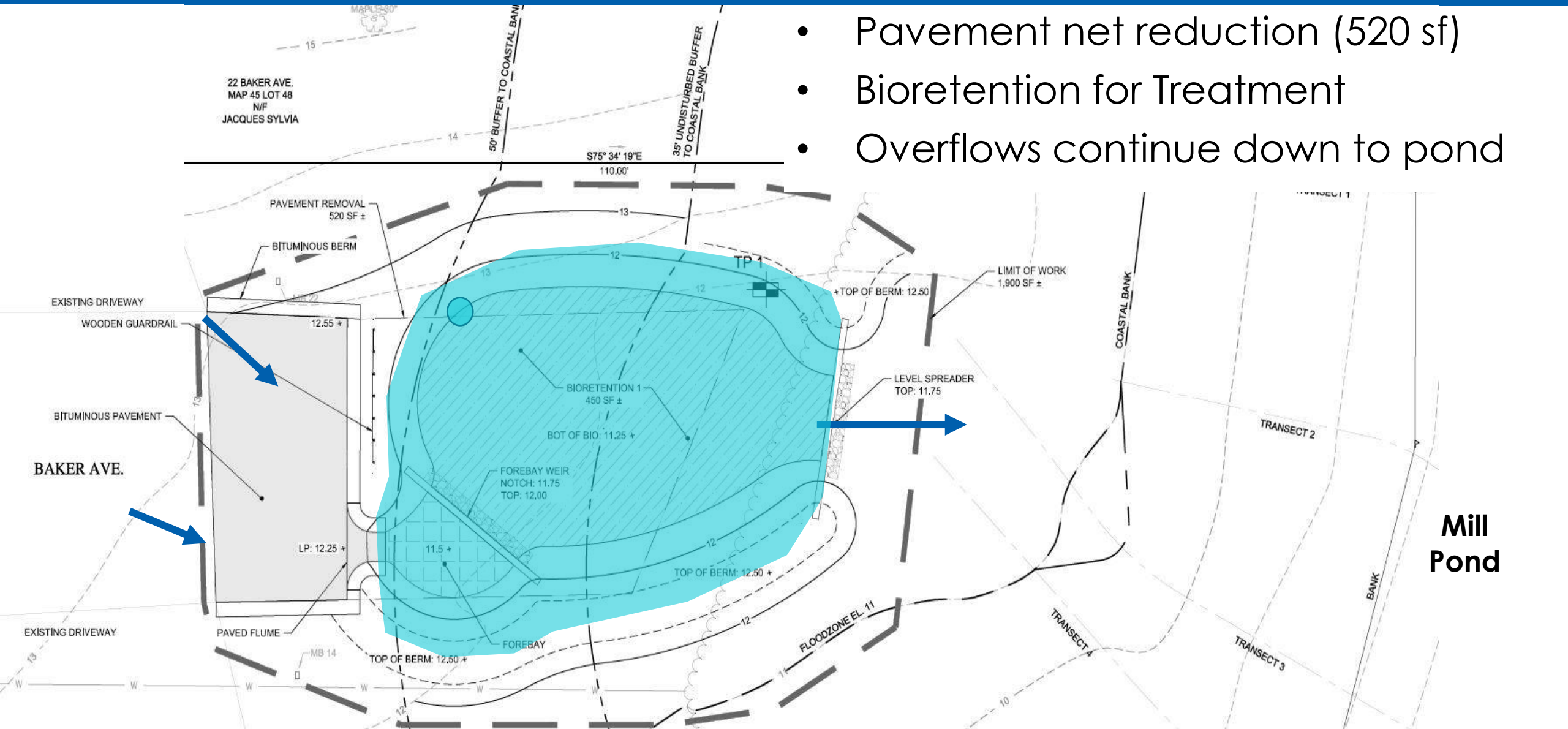
- Total Drainage Area = 0.6 acres
- 30% Impervious (0.2 ac)
- Residential

Existing Conditions

- Town Road
- No Existing Stormwater Infrastructure
  - Evidence of ponding along edge
- Discharges over Coastal Bank into Mill Pond
- Vegetated buffer has many invasive species

Baker Ave - Design Components

- Pavement net reduction (520 sf)
- Bioretention for Treatment
- Overflows continue down to pond



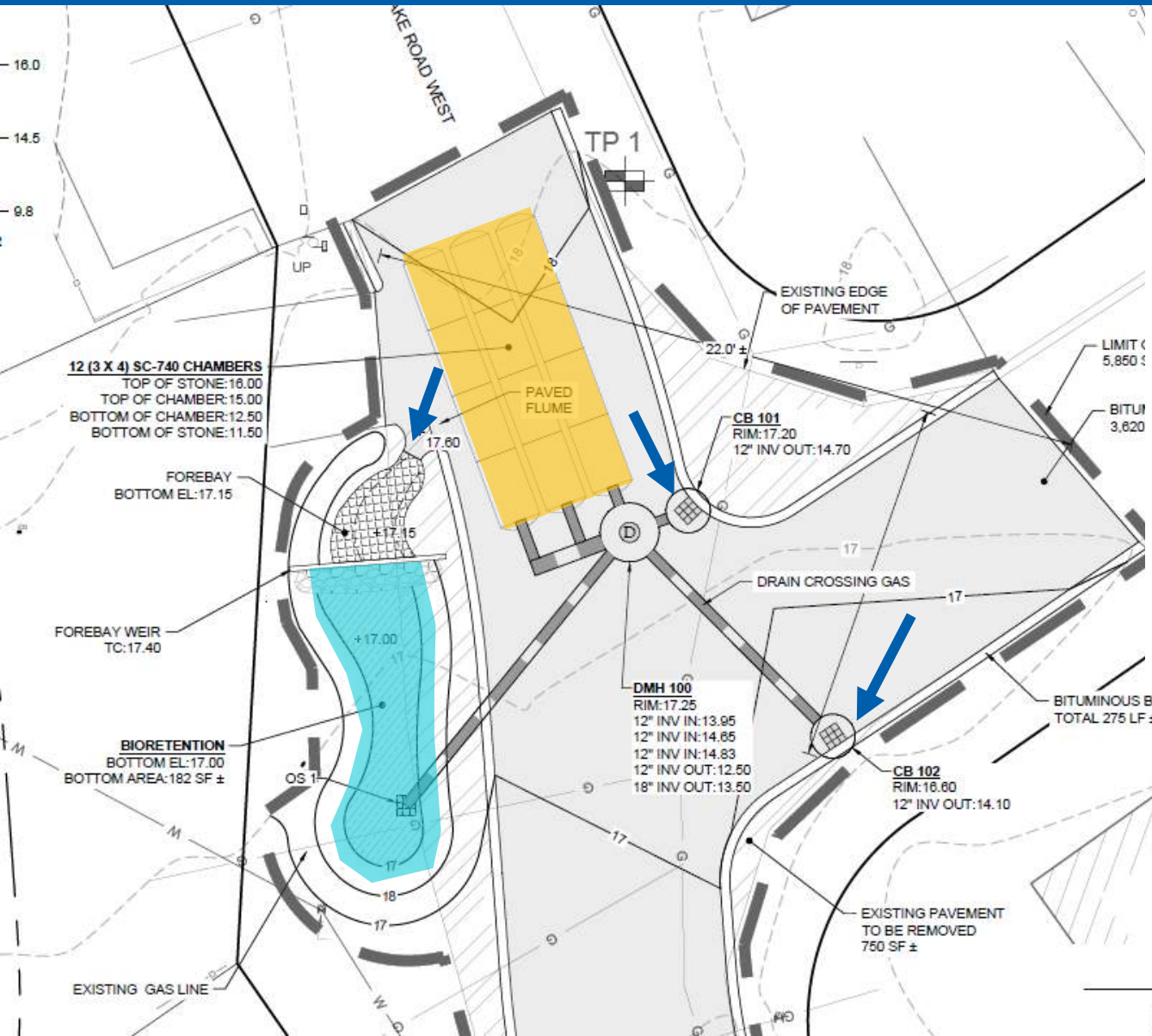
PR-3 & 4 Lake Rd West Existing Conditions

- Total Drainage Area = 9.84 acres
- 29% Impervious (2.81 ac)

PR-3 and 4 Existing Conditions

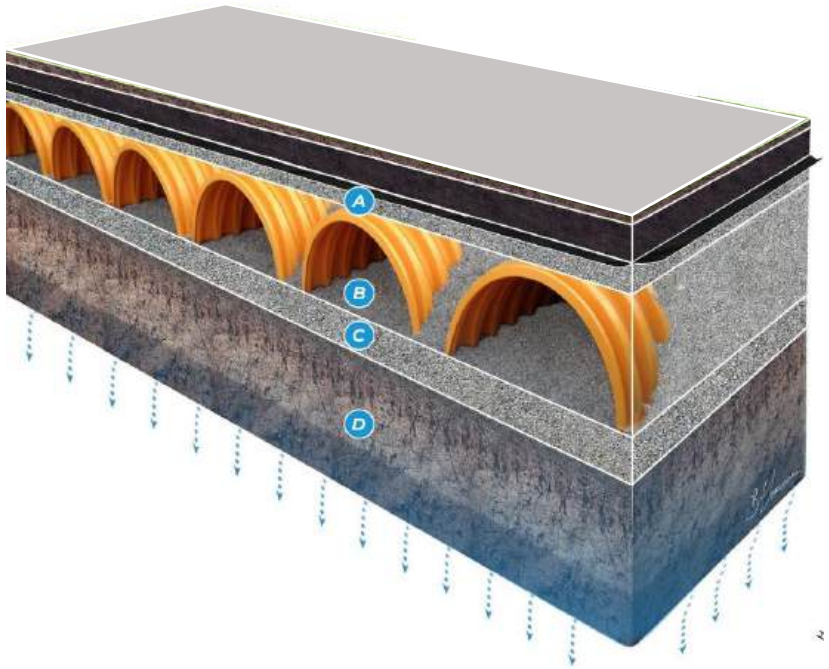
- Neighborhood area
- Large undeveloped Town property at corner of Lake Road and Buck Island Road
- Existing Stormwater Infrastructure
  - Along Buck Island Road and parts of Lake Road E and W
- Visible areas of ponding

PR-4- Design Components



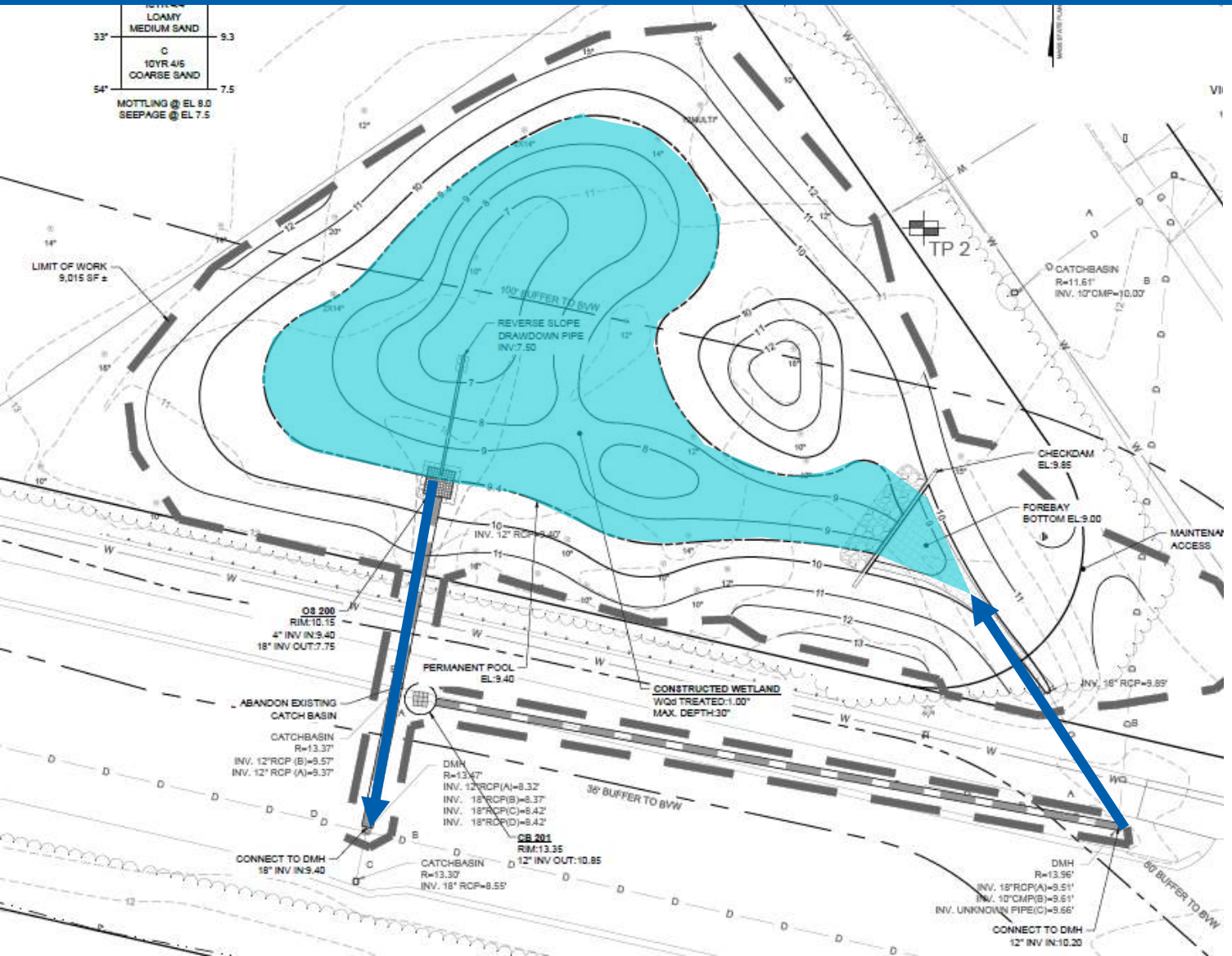
- Bioretention for treatment
- Underground infiltration chambers for storage and infiltration
- Reduces the stormwater load to downgradient infrastructure (reduces downstream flooding)
- Overflows continue down road to Buck Island Road infrastructure

Underground Infiltration Chambers



- Temporarily store runoff underground and gradually infiltrate it
- Isolator row for pretreatment

PR-3- Design Components



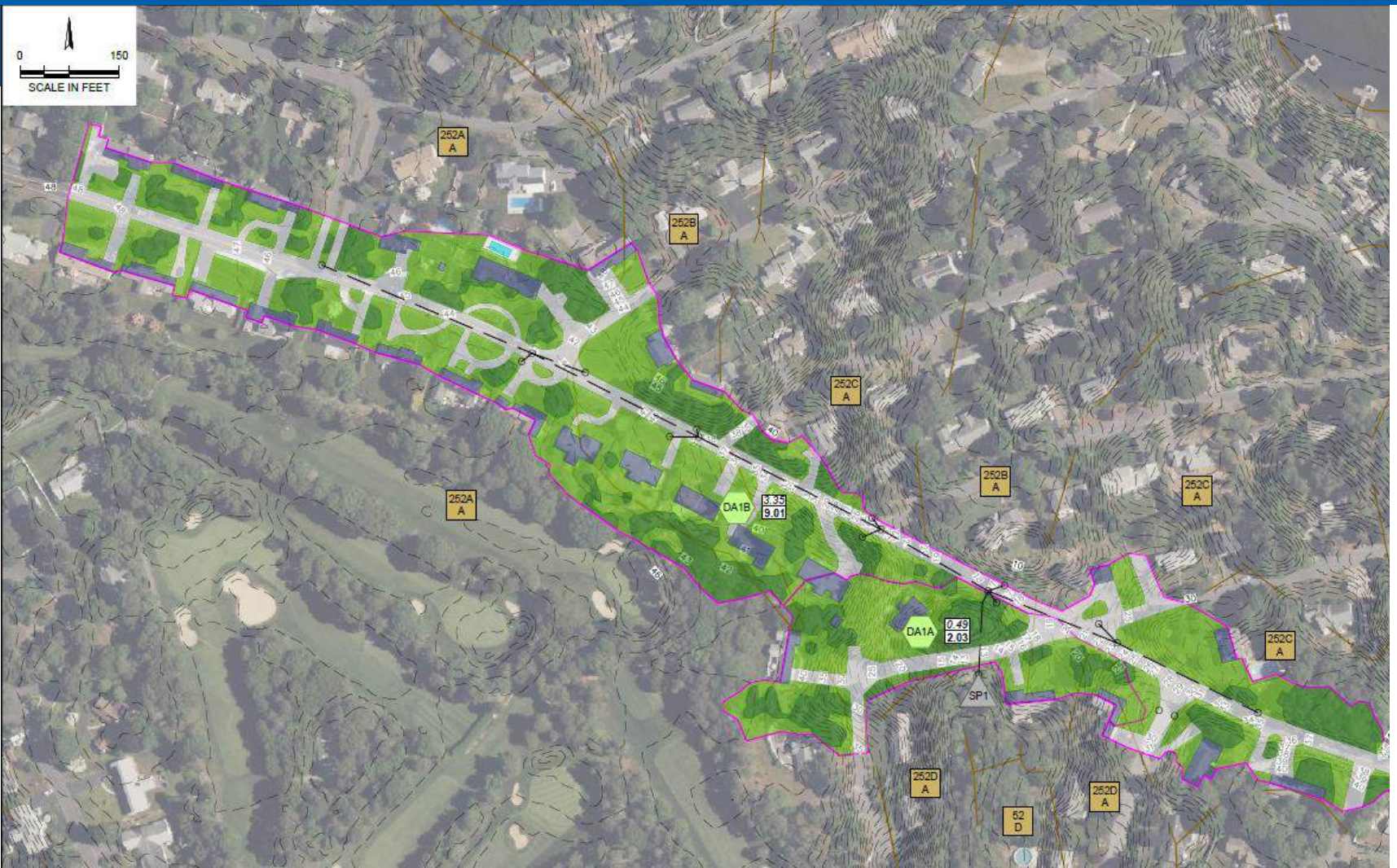
- Constructed wetland
- Sediment forebay for pretreatment
- Modifications to existing drainage infrastructure along Buck Island Road

Constructed Wetlands

A Permanent Pool
B Micropool
C Native Hydric Subsoils
D Outlet Structure

- Create different wetland zones (shallow and deep) to store runoff
- Mimics natural wetlands to treat pollutants through vegetation uptake, retention, and settling
- Provides habitat and can improve aesthetics of a site
- Provides flood storage opportunities

UBR-4 Curve Hill Existing Conditions

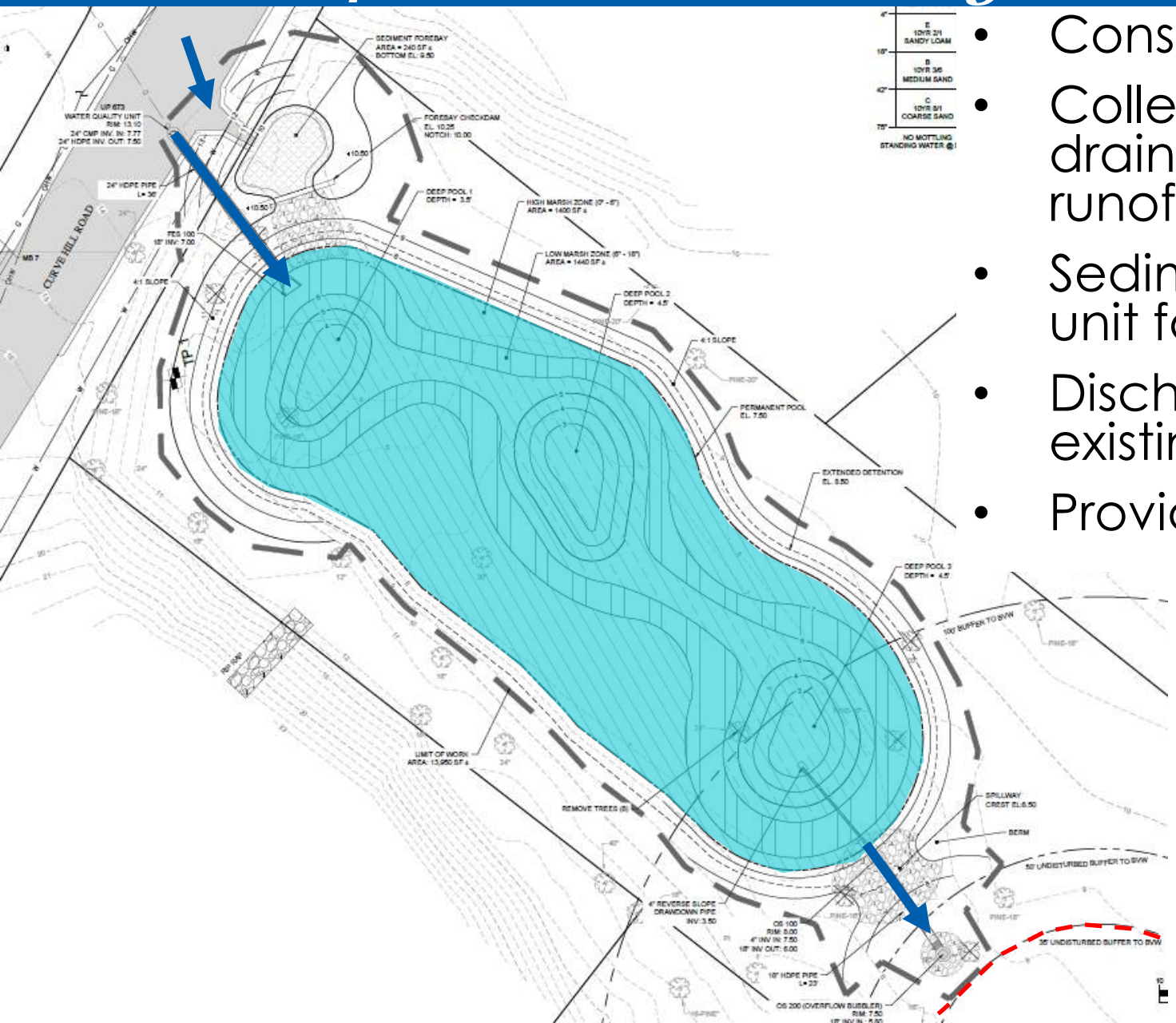


- Total Drainage Area = 11.0 acres
- 35% Impervious (3.84 ac)
- Great Western Road drainage infrastructure
- Surface runoff from Curve Hill Road

UBR-4 Existing Conditions

- Large undeveloped Town parcel
- Receives surface and piped flow
- Evidence of accumulated sediment
- Existing Stormwater Infrastructure
  - Large drainage area with no treatment
- Wetland further downgradient

UBR-4 Curve Hill Design Components



- Constructed Wetland for Treatment
- Collects runoff from both existing drainage infrastructure and surface runoff from road
- Sediment forebay and water quality unit for pretreatment
- Discharges treated stormwater to the existing wetland
- Provides flood storage

4. Questions?

Email awobst@apcc.org or alima@yarmouth.ma.us with questions, comments or to sign up for future emails

Go to www.apcc.org/stormwater for more information on stormwater, rain gardens, and what you can do to help

Thank You!

APCC Association to Preserve Cape Cod

Cape Cod Conservation District

USDA United States Department of Agriculture Natural Resources Conservation Service

Town of Yarmouth Incorporated 1639

Massachusetts Office of Coastal Zone Management

Horsley Witten Group