Anchorage Canal Pollution Clean Up Public Meeting

May 20, 2010

DELAWARE

Limulus polyphemus

CENTER FOR THE INLAND BAYS

Rehoboth Indian River Little Assawoman

CENTER FOR WATERSHED PROTECTION

JMT

Engineering A Brighter Future

Stormwater Retrofit Plan for the Anchorage Canal Drainage Area

Retrofit Reconnaissance Inventory and Neighborhood Source Assessment

Field Assessments Conducted
August 19, 2009

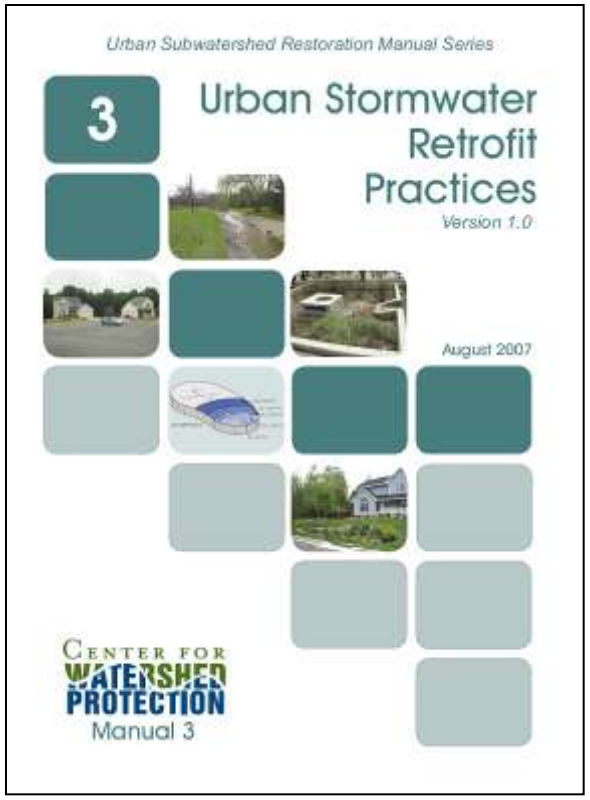
What Are Stormwater Retrofits?

Rolling Stone Retrofit Montgomery Co., MD

Stormwater retrofits are stormwater management practices in locations where stormwater controls did not previously exist or were ineffective

What are Stormwater Retrofits?

- **Stormwater retrofits** are just one type of urban watershed restoration practice.
- Others include:
  - Stream Repair
  - Riparian Management
  - Illicit Discharge Prevention
  - Watershed Forestry
  - Pollution Prevention
  - Municipal Good Housekeeping



www.cwp.org

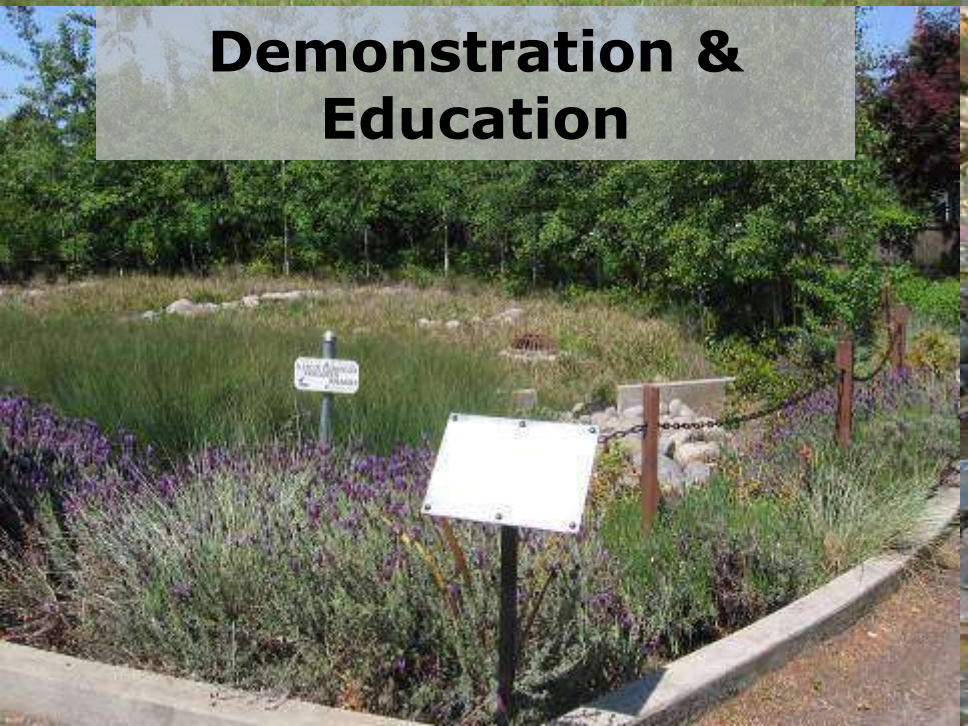
Why Retrofit?

- Many of our subwatersheds were developed without effective stormwater management practices
- This has caused a number of negative impacts on our receiving waters
- Stormwater retrofitting can be used to address these situations and help meet a wide range of subwatershed restoration objectives…

Fix Past Mistakes & Maintenance Problems

Solve Chronic Flooding Problems

Demonstration & Education



Reduce Pollutants of Concern

Retrofitting is Different

- Retrofitting is different than new stormwater design
- Retrofitting requires:
  - Sleuthing skills to determine what can work at highly constrained sites
  - Simultaneously envisioning restoration possibilities and anticipating potential problems
- Design, permitting and construction of stormwater retrofit practices is almost always more complex than new stormwater management practices

Retrofitting is Challenging

It can be difficult to find enough retrofit locations to meet restoration objectives

- Required storage volumes can get prohibitively large, particularly when channel protection and flood control are restoration objectives
- Depending on watershed condition and restoration objectives, many retrofit sites may be needed
- The more impervious a watershed becomes, the more storage is required and the more difficult it becomes to find retrofit sites

Step 1: Retrofit Scoping

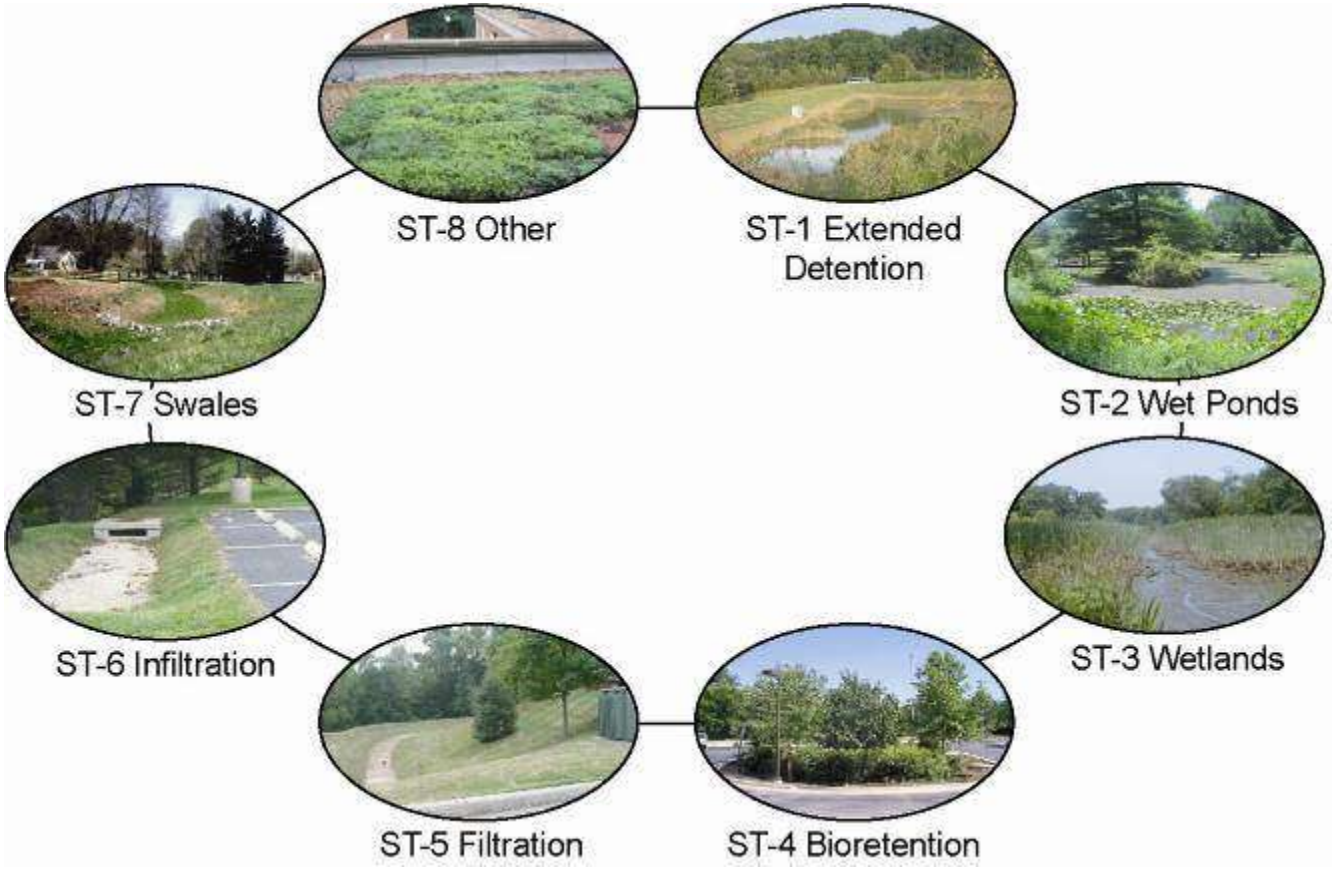
- Purpose
  - Define a retrofit strategy to meet local restoration objectives
- Key tasks
  - Define restoration objectives
  - Define preferred retrofit practices

Table 2. Retrofit Objectives

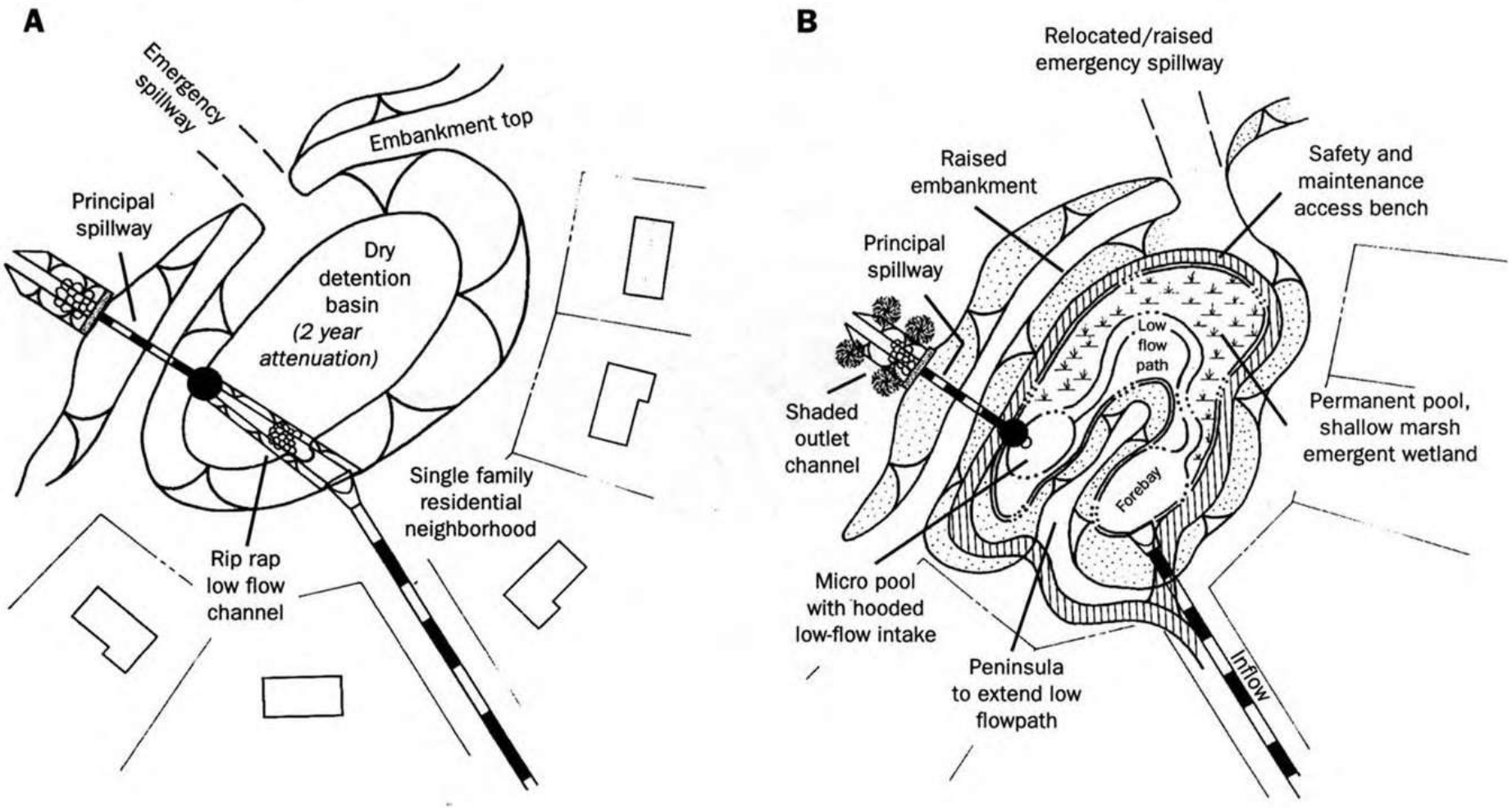
Description	Primary Objectives
Target Pollutant Removal Volume	1. Retrofits shall reduce pollutants of concern from the sites they capture. The goal is a 40% reduction in N and P, and a 40% reduction in bacteria.
Description	**Secondary (Community Benefits) Objectives**
Coastal Concerns	2. Retrofits shall account for the potential effects of future sea level rise and storm impacts.
Aesthetics, Safety, Nuisance Concerns	3. Retrofits shall be well-integrated into the native coastal vegetation landscape and not cause any risk to public safety or nuisance issues.
Education and Outreach	4. Provide outdoor learning and community outreach opportunities on public and private lands.
Maintenance	5. Retrofits shall require the minimum amount of maintenance possible.
Drainage Problems	6. Retrofit designs shall work towards alleviating existing drainage problems when feasible.
Habitat	7. Create desirable wildlife habitat areas.
Naturalization and Recreation	8. Support existing greenway, trail, and stream corridor naturalization efforts, while not interfering with existing active recreational uses.
Land Acquisition	9. Identify potential land acquisition opportunities that would enable the construction of retrofits or of new stormwater BMPs.

Defining Preferred Retrofit Practices

Different types of stormwater management practices used in retrofitting

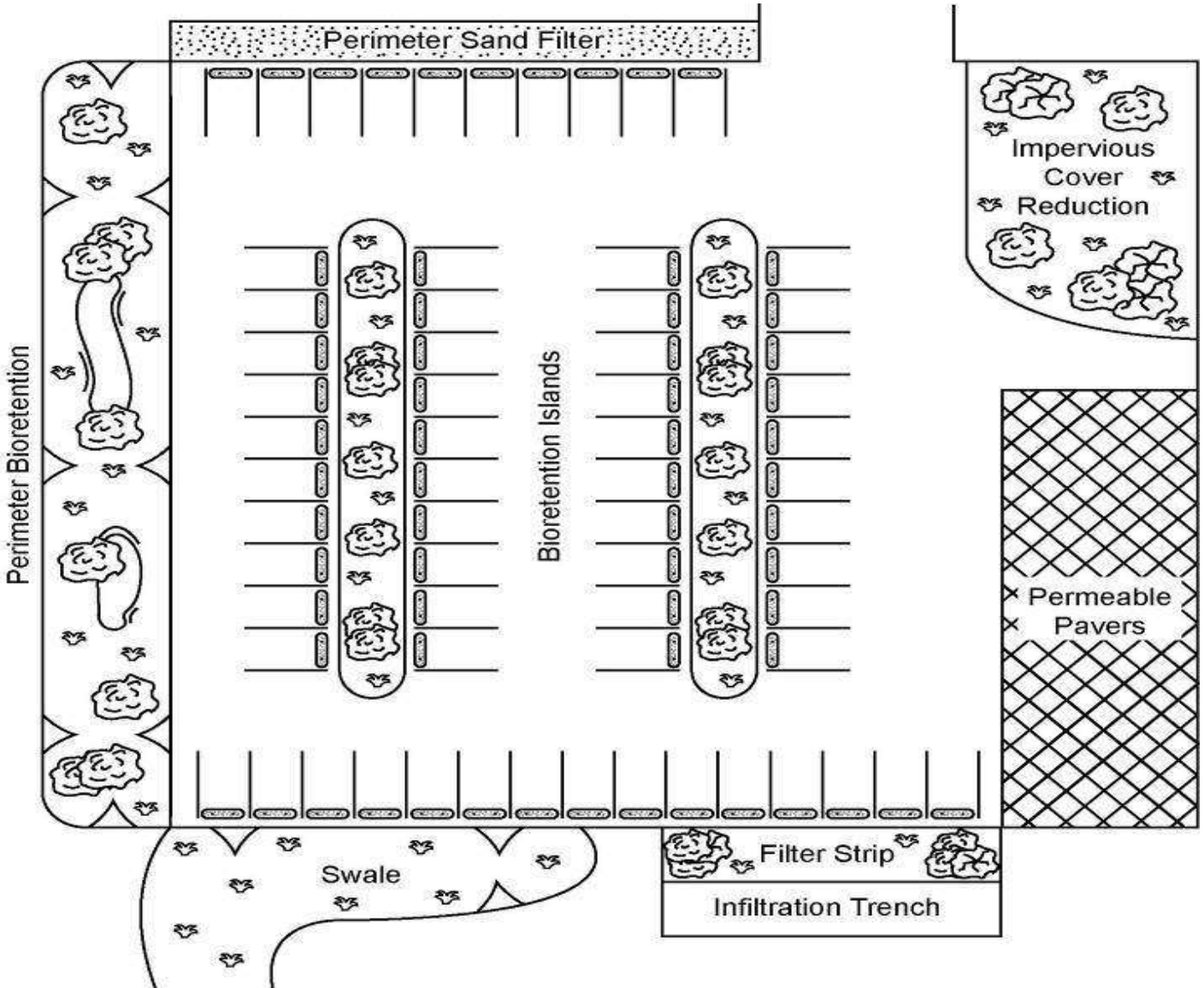


Extended Detention, Wet Ponds, and Wetlands




POLICE
POLICE

Bioretention, Filtration, Infiltration, & Swales



Step 2: Desktop Analysis

Purpose

- Rapidly search for and identify potential retrofit sites across the subwatershed
- Save time in the field

Step 3: Retrofit Reconnaissance Inventory (RRI)

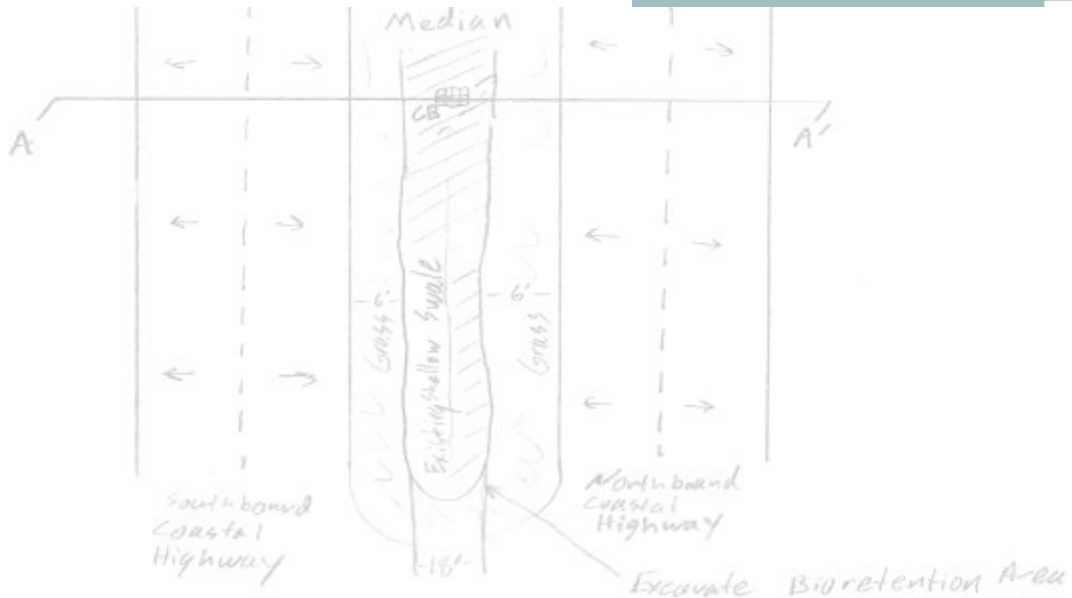
- Purpose
  - Verify feasibility of candidate retrofit sites
  - Collect information
- Key tasks
  - Evaluate potential retrofit sites, collect pertinent site information, and produce a basic concept design sketch

Stormwater Retrofitting

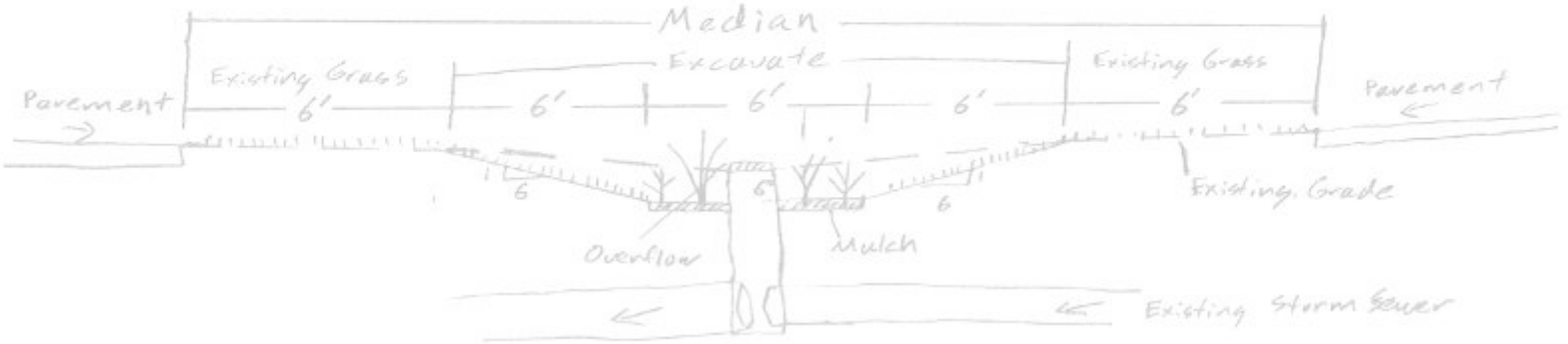

GENERAL


RENT

Anchorage Canal - Drainage Area for R4

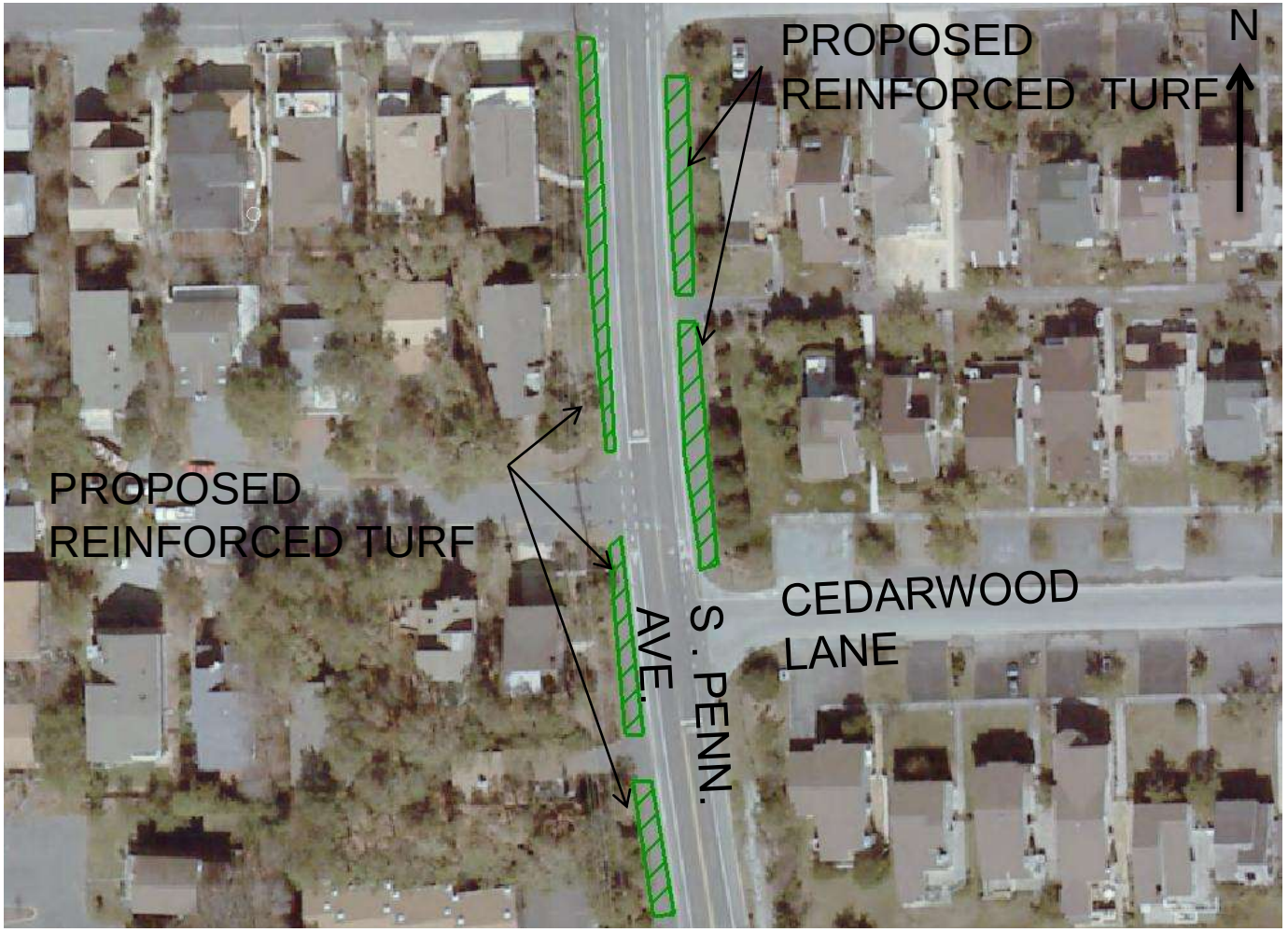


Plan View



Cross Section A-A'

RETROFIT SITE – R1A



RETROFIT SITE – R1A

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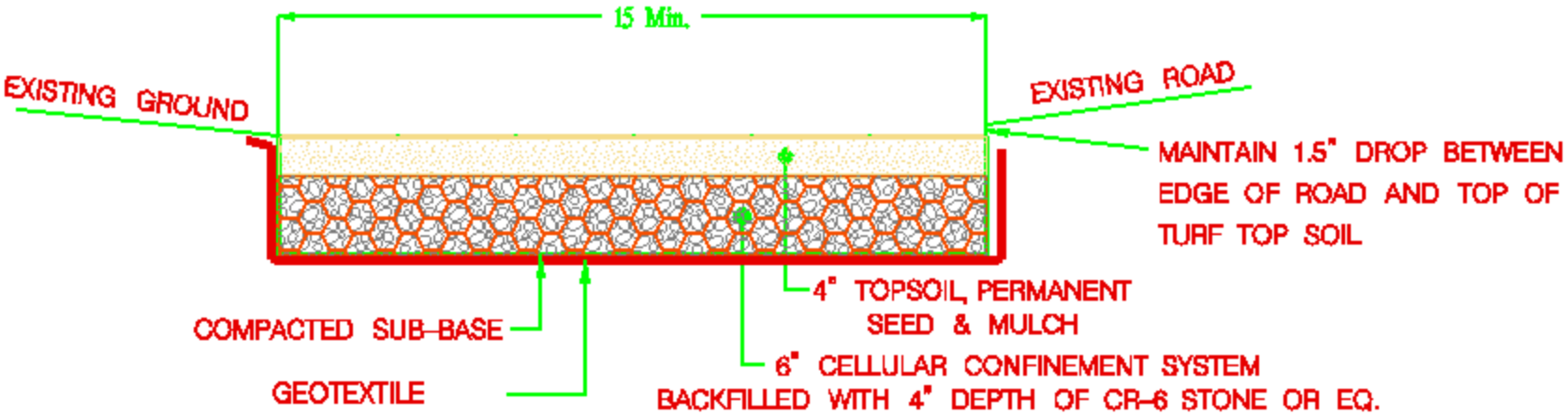
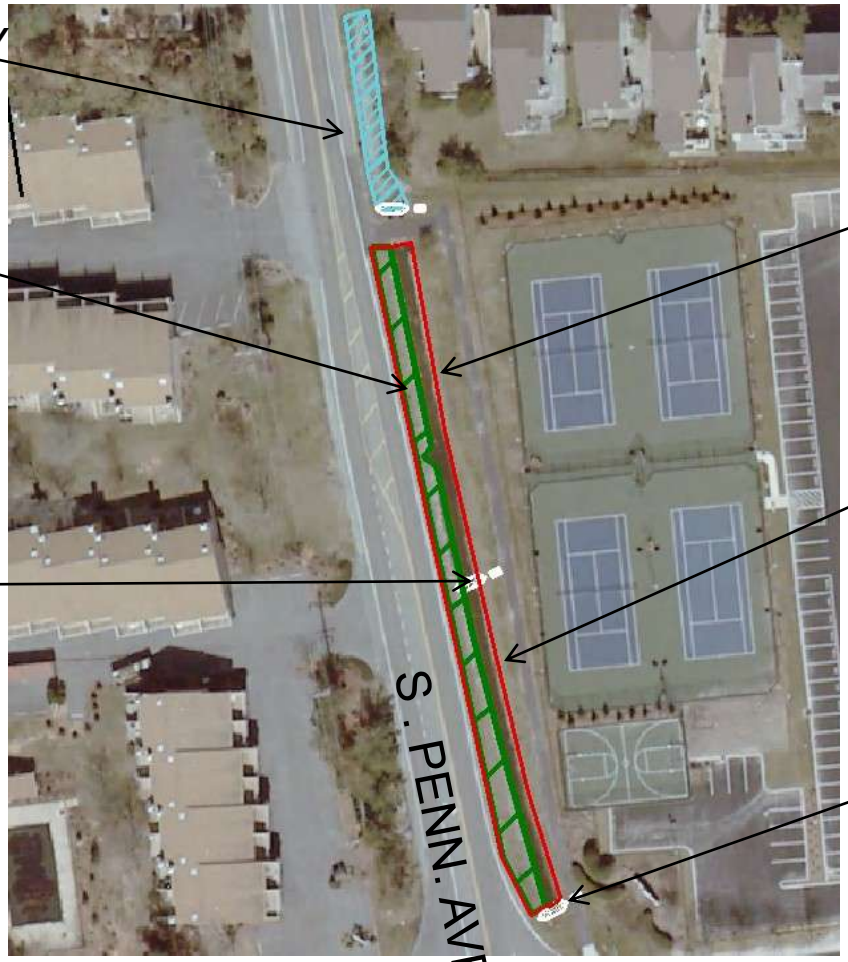


RETROFIT SITE – R1B



RETROFIT SITE – R1B

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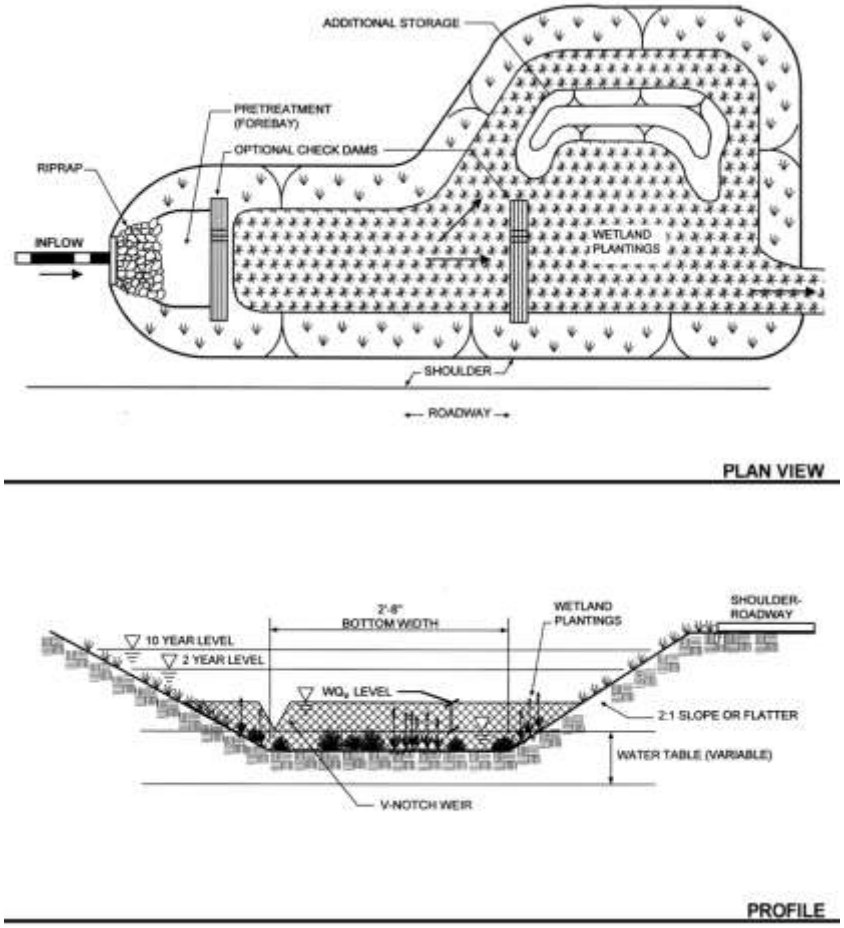

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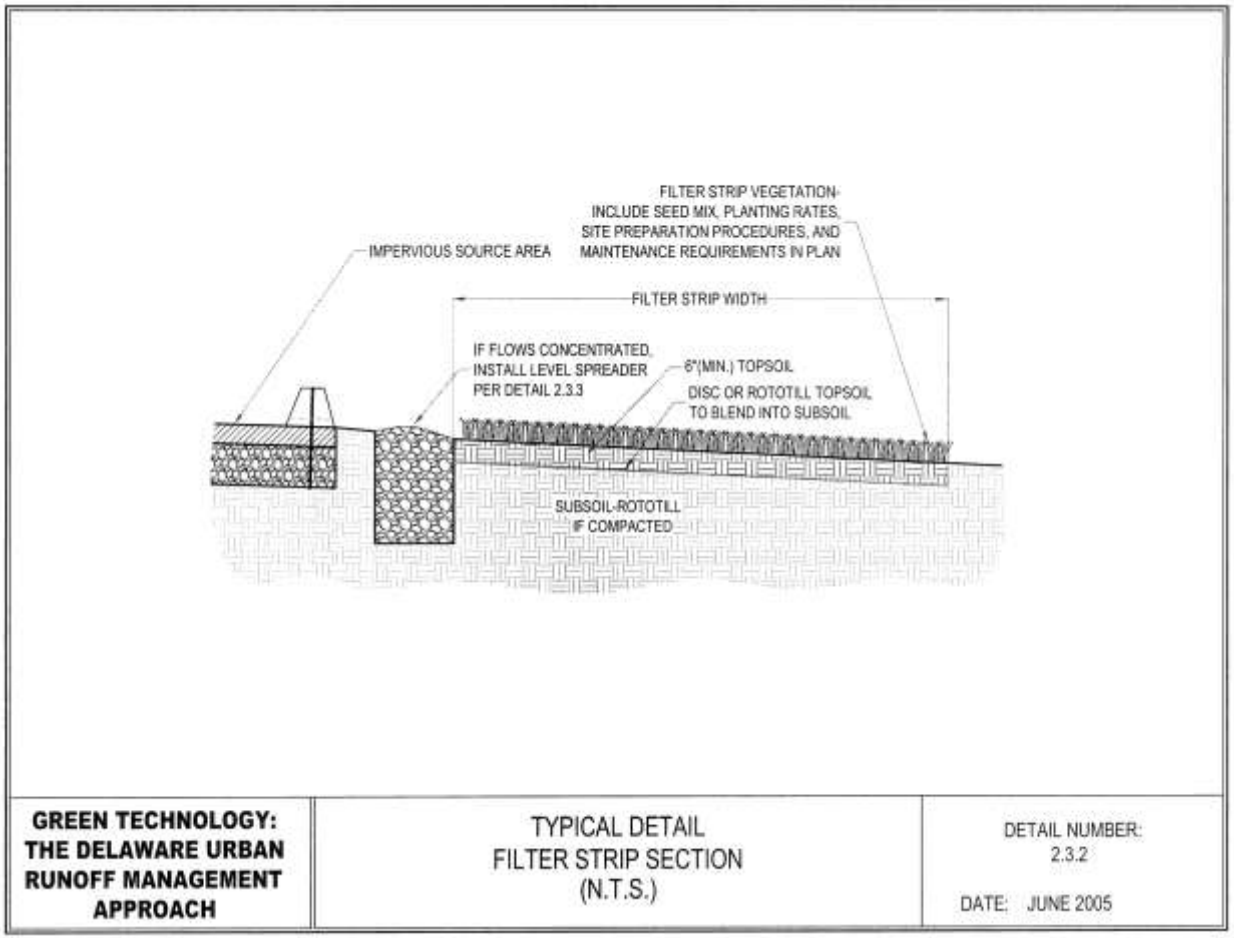
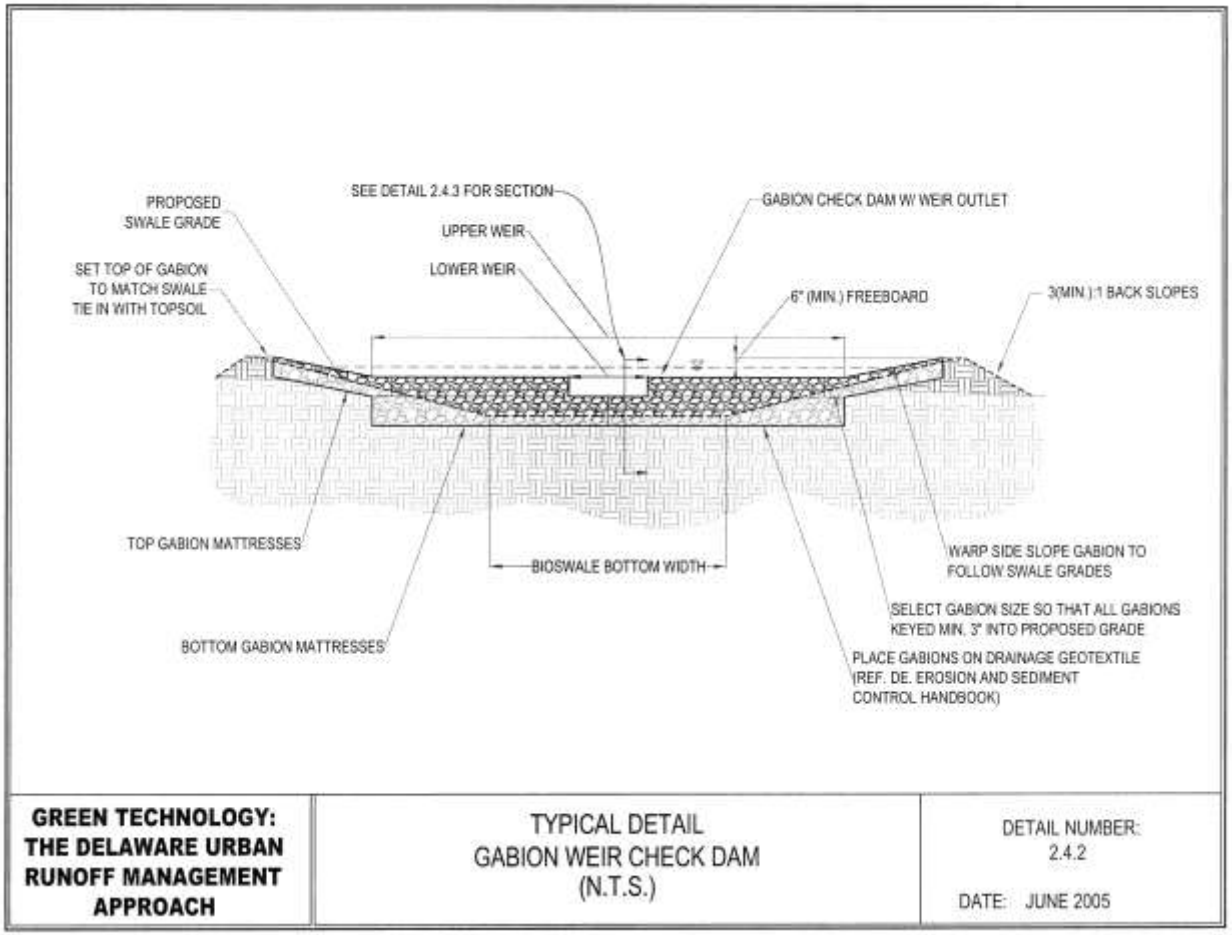
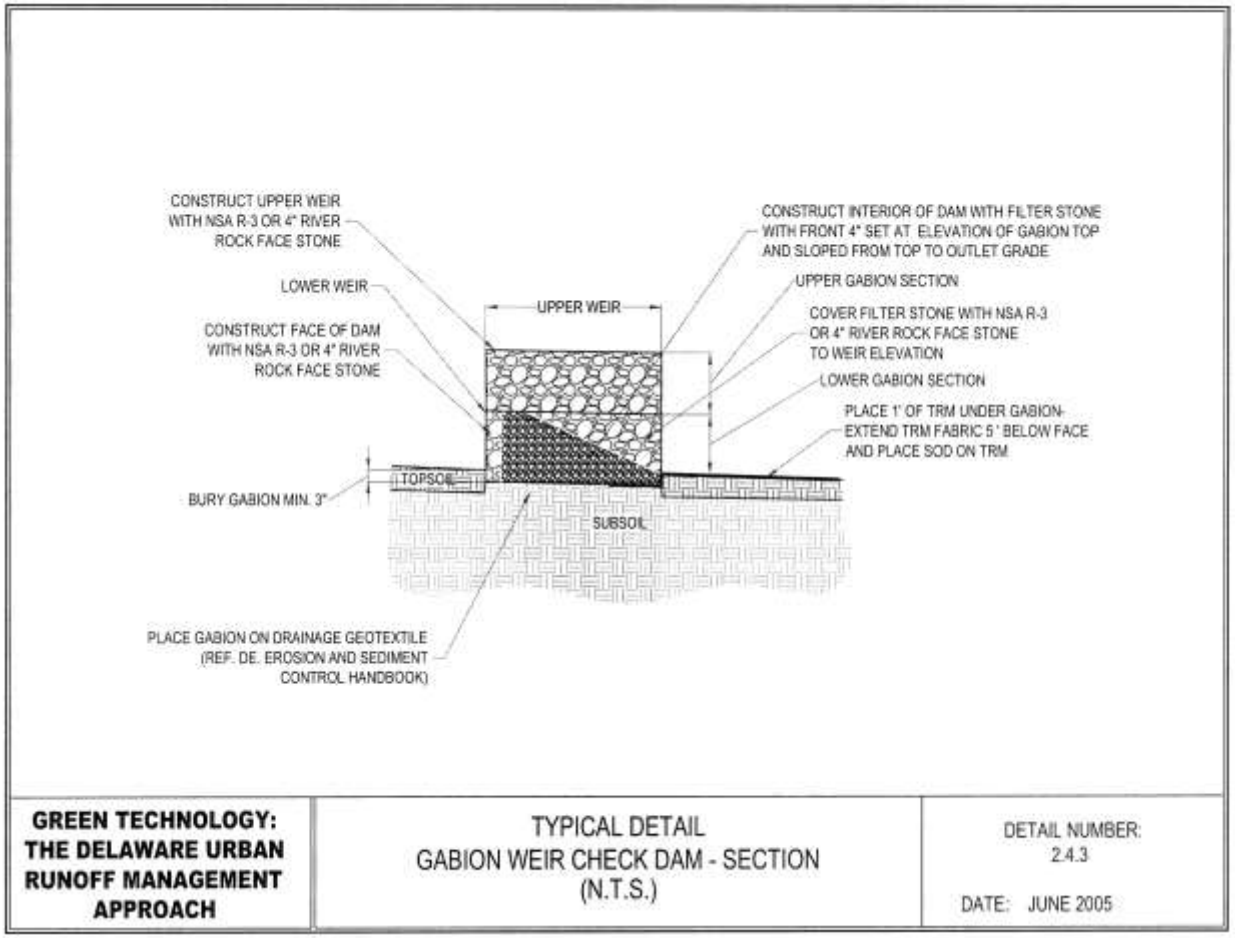


RETROFIT SITE – R1B



RETROFIT SITE – R1B



MD 2 Wet Swale

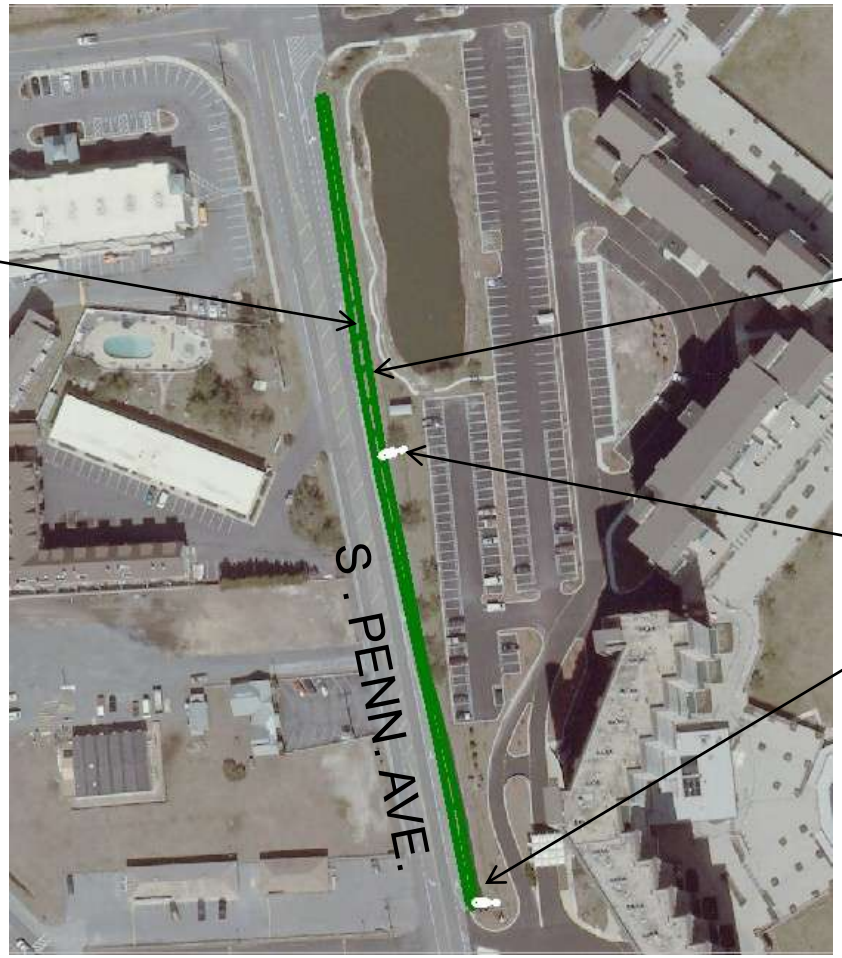
Green Gabion

Washed Gravel

Cardinal Flower

Duck Potato

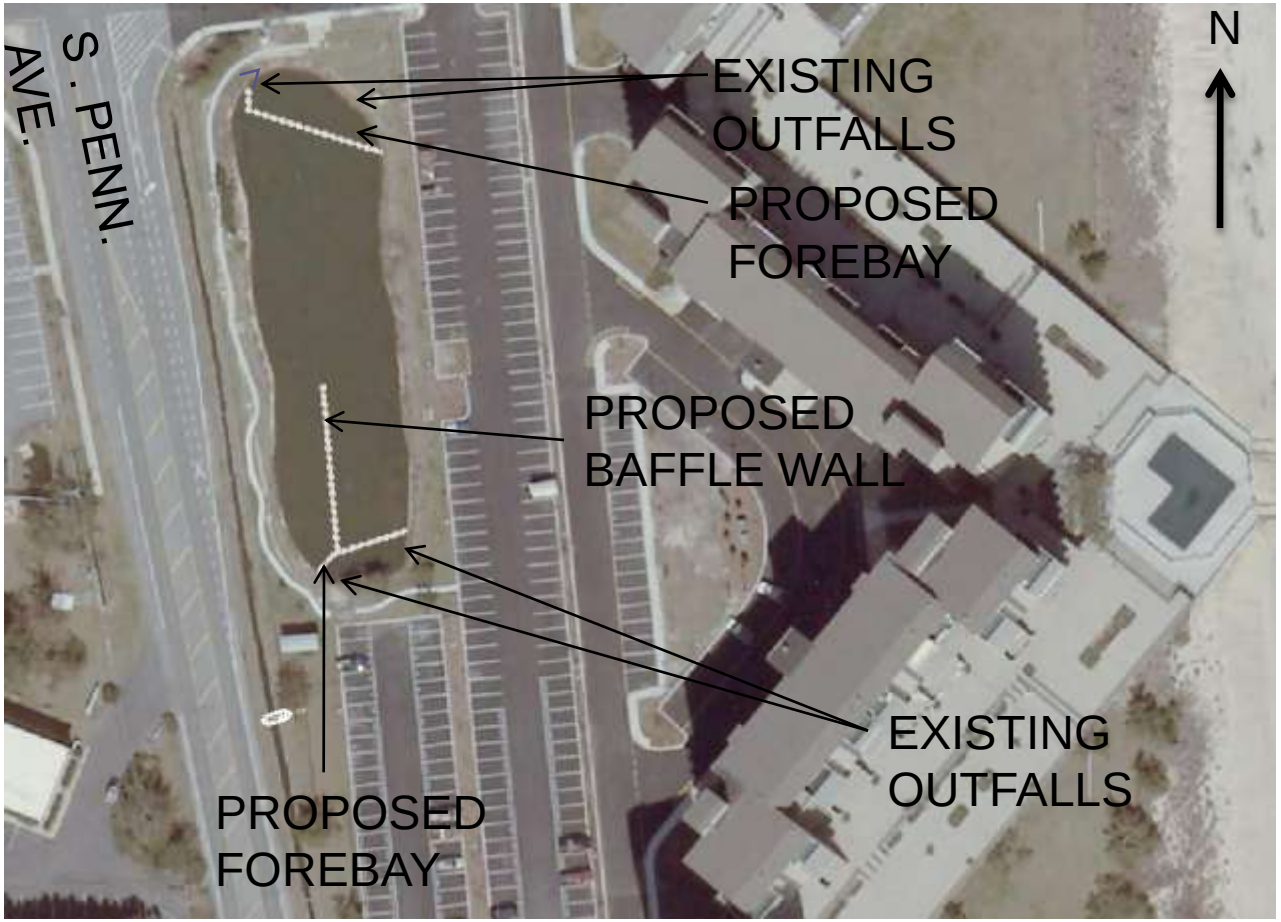
RETROFIT SITE – R2A



RETROFIT SITE – R2A

RETROFIT SITE – R2A

RETROFIT SITE – R2B

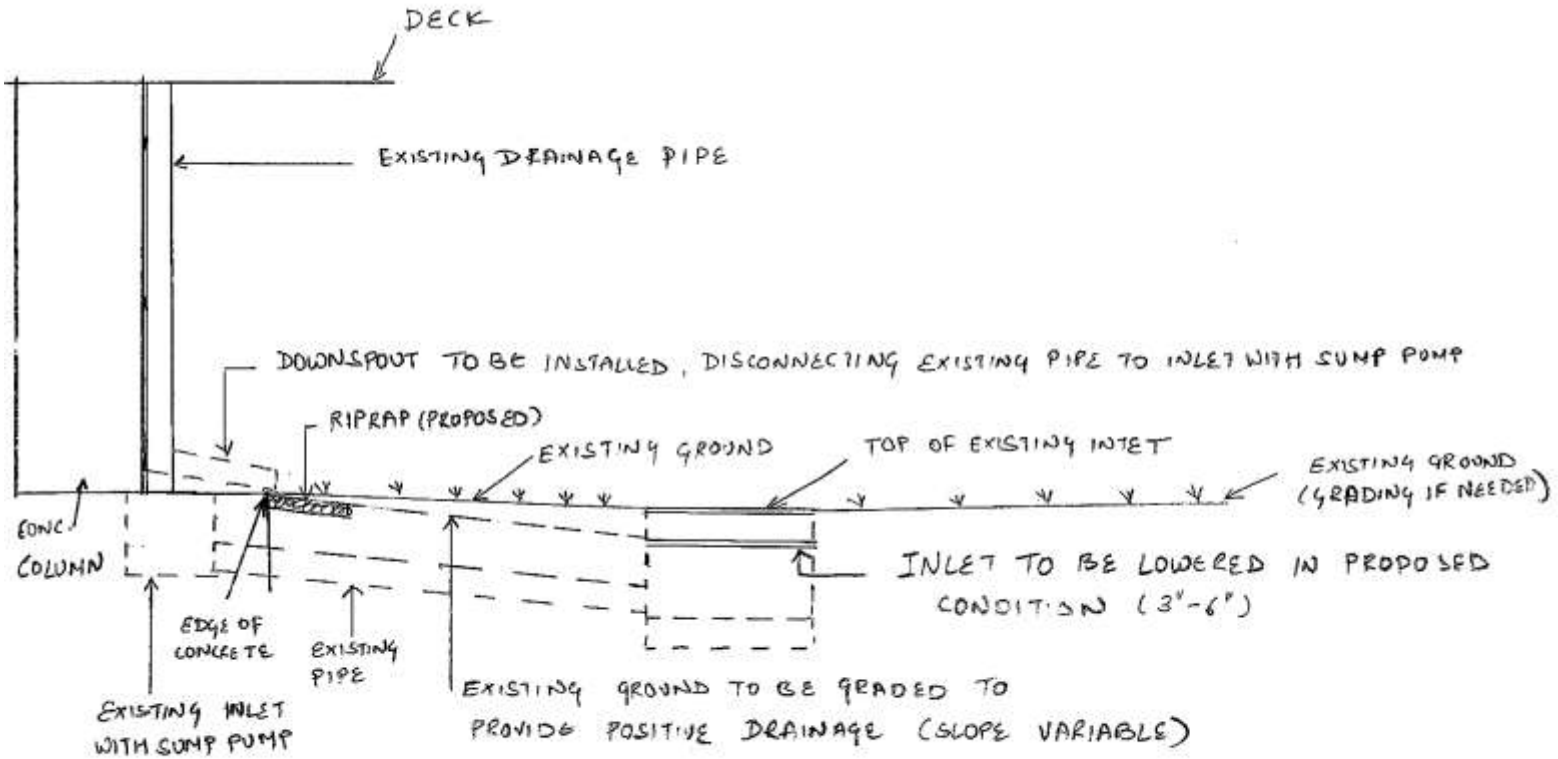


RETROFIT SITE – R2B

RETROFIT SITE – R2C

RETROFIT SITE – R2C

RETROFIT SITE – R2C

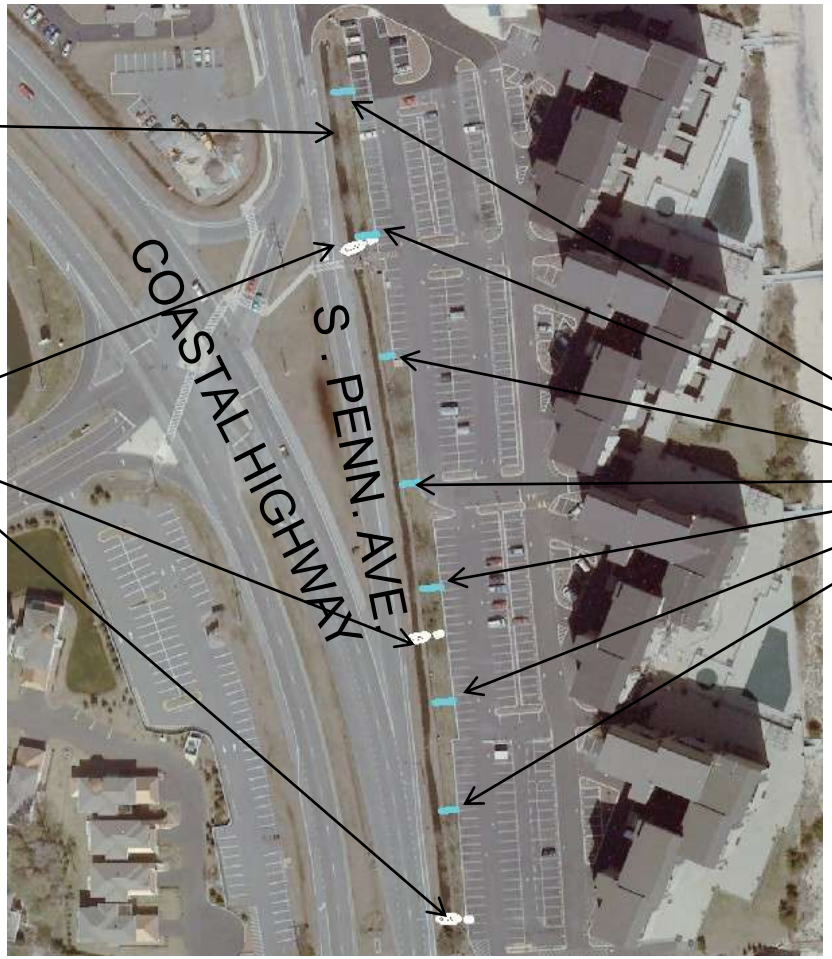


RETROFIT SITE – R2E

DITCH – 3 WET (EXISTING DITCH GEOMETRY

UNCHANGED)

PROPOSED CHECK DAM



N

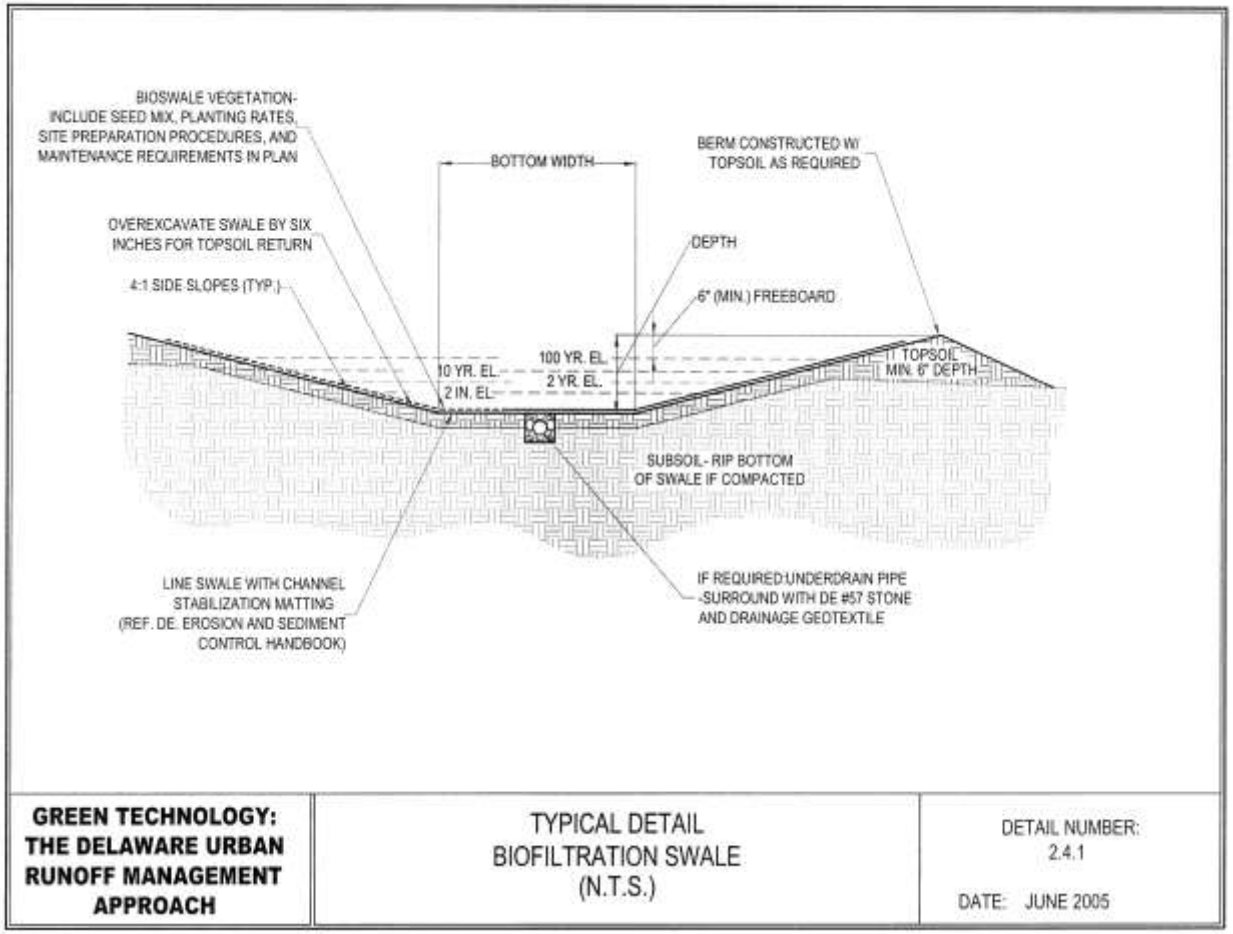
PROPOSED CURB OPENINGS & BIOSWALES

RETROFIT SITE – R2E

RETROFIT SITE – R2E

RETROFIT SITE – R2E

RETROFIT SITE – R2E



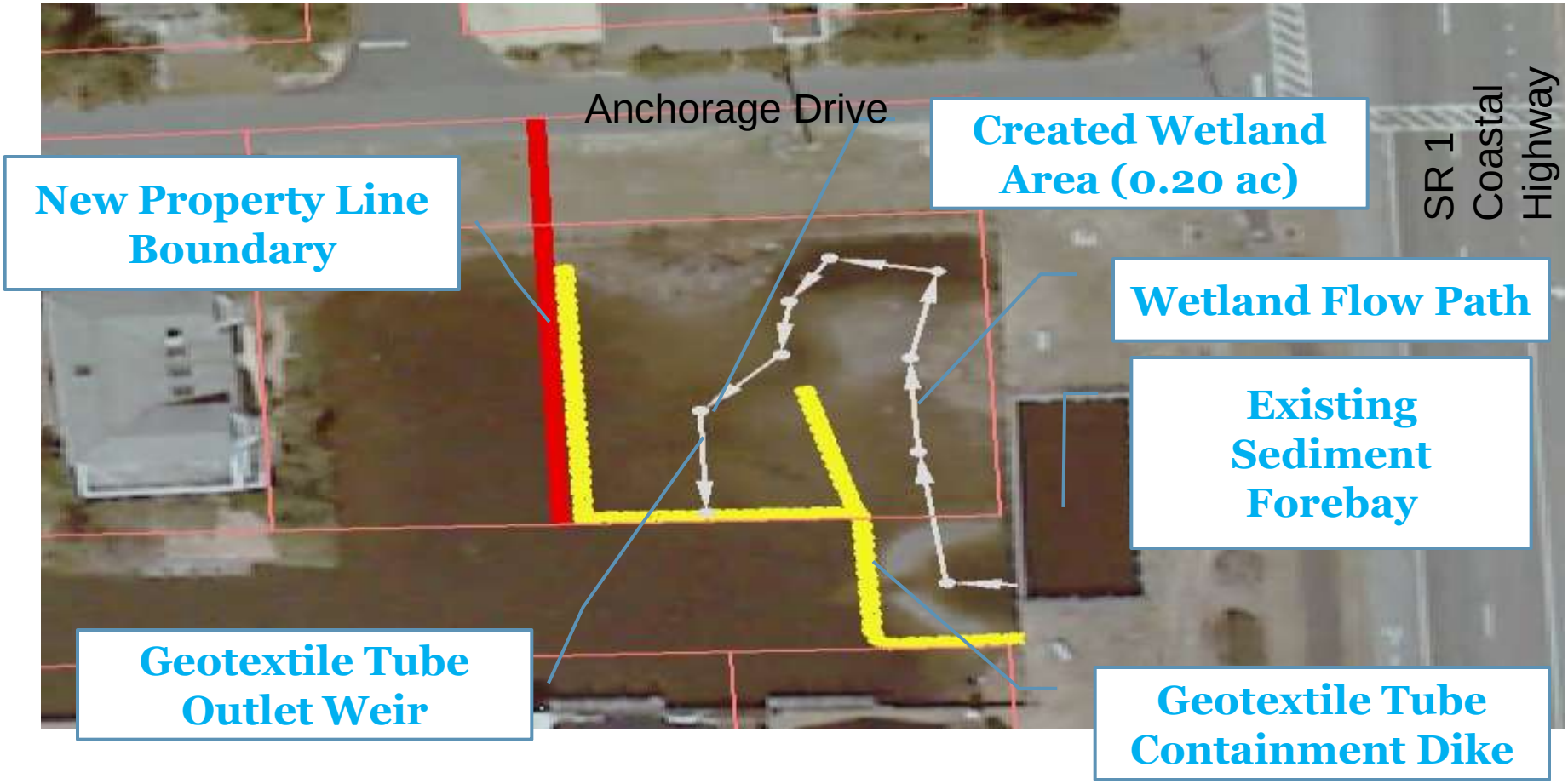
RETROFIT SITE – R2H

RETROFIT SITE – R2H

RETROFIT SITE – R2H

RETROFIT SITE – R2H

RETROFIT SITE – R9



RETROFIT SITE – R9

Next Steps

- Discuss the project proposal with appropriate community, county, and state staff.
- Collect additional information needed to further develop the bioretention design, including utility verification and a survey of key elevations (road elevation, drop inlet grate elevation, etc.).
- Hold a pre-application meeting with permitting representatives from community, county, and state staff to discuss the proposed retrofit and the project review and approval process.
- Use information gathered from the pre-application meeting and additional information about site characteristics and constraints to perform final design of the bioretention area.
- Submit final design to appropriate agencies for review and approval.

Upland Assessments – Envisioning Restoration

1. Evaluate restoration potential

- Unified Subwatershed and Site Reconnaissance (USSR)

2. Identify restoration opportunities

- On-site stormwater retrofits
- Source controls
- Illicit discharges
- Municipal practices

1. Envisioning Restoration

NSA Field Form

Evidence of lawn treatment

Mammoth cul-de-sacs

Illicit connections to storm drains

HSI Field Form


Bethany Beach
Middlesex Beach
South Bethany
Legend
Anchorage Canal Drainage Area
Field Sites
Municipalities
Communities
Streams and Water Bodies
0
500
1,000
Feet
N
Bethany Beach
N1
R1
R2
R3
R4
R5
R6
R7
R8
R9
N2
N3
N4
Anchorage Canal
Sediment Forebay

Neighborhood Source Assessment

Neighborhood Recommendations				
Recommendation	**N1 Bethany Beach Area: 17.3 ac # Lots: 89**	**N2 Middlesex Beach Area: 18.3 ac # Lots: 79**	**N3 South Bethany Area: 5.2 ac # Lots: 27**	**N4 South Bethany Area: 23.4 ac # Lots: 153**
Lawn care Education	X	X	X	X
Downspout and Outdoor Shower Disconnection				X
Storm Drain Stenciling/Marking			X	X
Impervious Cover Reduction	X	X	X	X
Inlet Retrofits				X

Lawncare Education

Middlesex Beach

South Bethany

Bethany Beach

Lawncare Education

- Master gardener program
- Direct homeowner assistance and training
- Exhibits and demonstration at point-of-sale retail outlets
- Free or reduced cost for soil testing
- Local restriction on phosphorus content in fertilizer
- Training and/or certification of lawn care professionals
- Media awareness campaigns
- Distribution of lawn care outreach materials

Lawncare Education

What is currently being done:

•Delaware Nutrient Management Commission distributes brochures on proper lawn maintenance through retail outlets in the Inland Bays Watershed.

•Inland Bays Tributary Action Team advertises proper lawn care on a local television station.

•Master Gardener Program

Additional Suggestions:

•CIB educators work more closely with homeowner associations

•Create a demonstration yard that includes xeriscaping/rain gardens

Downspout and Outdoor Shower Disconnection

South Bethany Homes along Anchorage Canal

Downspout and Outdoor Shower Disconnection

Suggestions:

- Provide technical and financial assistance to homeowners.
- Promote rain barrels and stormwater planters.

Cost:

- Simple Disconnection = Approximately $25
- Rain Barrels = $50-$300
- French Drains = $15-$17 per linear foot

Stormdrain Stenciling/Marking

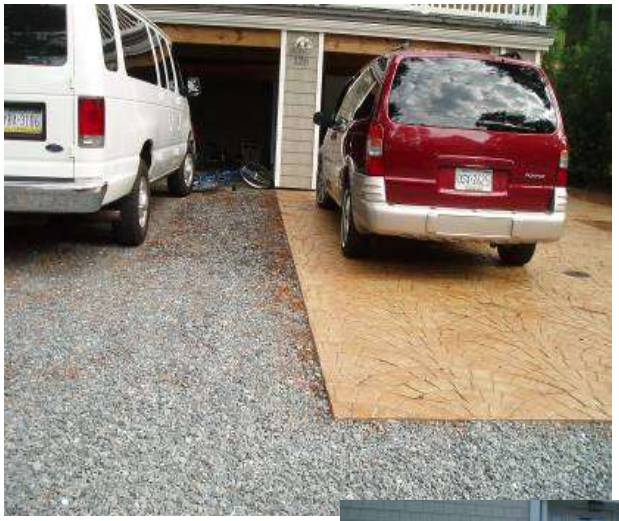
South Bethany

Stormdrain Stenciling/Marking

Cost ranges from $300-$400 per neighborhood, but would be lower in the South Bethany neighborhoods due to the limited number of inlets.

DNREC Division of Soil and Water Conservation

Impervious Cover Reduction



South Bethany

Middlesex Beach

Bethany Beach

Impervious Cover Reduction

South Bethany Impervious Cover Ordinance

- Require that 55% of any required setback area be covered with pervious materials
- Require that only pervious material is permitted within 5 feet of the property boundary
- Require advance approval to install ground covering on building lots

Impervious Cover Reduction

Permeable Pavers Education Program

- Guide homeowners through the process of installation, choosing the right materials and design, and identifying a certified contractor.
- Permeable pavers to help address seasonal parking and reduce impervious cover.

Pavement that looks permeable in South Bethany

Seasonal parking at Middlesex Beach

Inlet Retrofits

South Bethany

Inlet Retrofits

Suggestions:

•Remove pavement and rip-rap surrounding the inlet and plant grass and native vegetation. Approximate cost per inlet is $1,800 (will be cheaper for inlets surrounded by rip-rap.

•Catch basin inserts range from $100-$1,500. They are used to remove sediment, oil, and grease from stormwater runoff. However, must be frequently cleaned and maintained.

•Filter socks are most frequently used during construction. They may be used post-construction, but may have limitations in terms of durability and frequency of sediment clean-up.