Straughan Environmental

- Woman owned company of scientists, engineers, and planners aligned to support projects that improve the human and natural environments; it has 100 employees.
- Provides custom environmental solutions for resiliency concerns associated with sea level rise and climate change
- Over 100 environmental and climate change projects in the Mid-Atlantic region
- Relationships with UD / Sea Grant /Inland Bays/DNREC/DelDOT

STRAUGHAN ENVIRONMENTAL

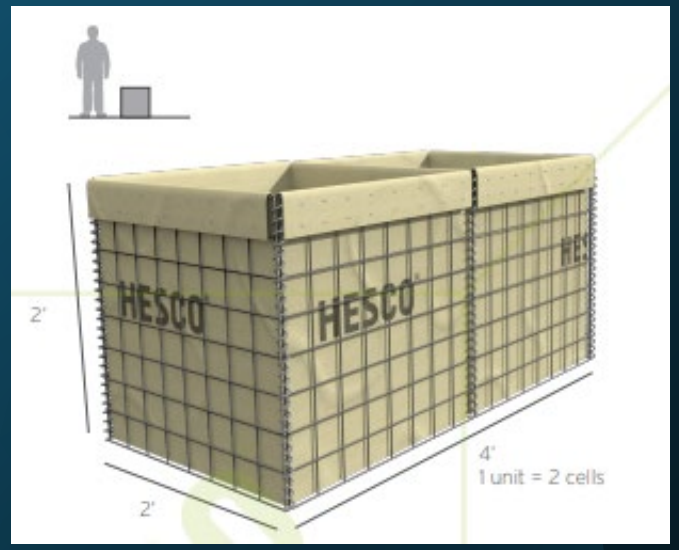
Flood and Stormwater Resiliency Projects Engineering Support

- Task 1 - Define a Comprehensive Engineering Master Plan for the Town
  - Develop list and description of subprojects (eight (8) street ends)
  - Define forecast scenarios plan will consider
  - Document assumptions about actions taken by private property owners
- Task 2 - Define Methods to be Used in Mitigation
  - Define flood protection toolkit for use on public and private property
  - Assess road heights and possible lot elevations
  - Analyze stormwater management (SWM) alternatives
- Task 3 - Define Demonstration Projects
  - Develop multi-criteria decision analysis (MCDA) matrix for town owned streets and recommend four (4) specific streets
  - Perform topographic survey
  - Conduct field work at demonstration sites to acquire additional data
  - Continue property owner engagement, field assessments and development of homeowner packages
- Task 4 - Develop Concept Designs for Demonstration Projects
  - Concept design for town owned sites using potential mitigation methods
  - Analyze, compare and contrast feasibility and comparative effectiveness of mitigation
  - Define site specific flood mitigation and SWM designs
  - Perform design analysis
- Task 5 - Prepare Pre-Final Design (60% Completion Level)
  - Prepare pre-final design level plans for two (2) street ends and/or marsh ends
  - Prepare design report
  - Prepare hydrologic/hydraulic analysis
  - Prepare permitting applications
- Task 6 - Prepare Bid Documents (100% Completion Level)
- Task 7 - Develop Storymap and 3D Renderings

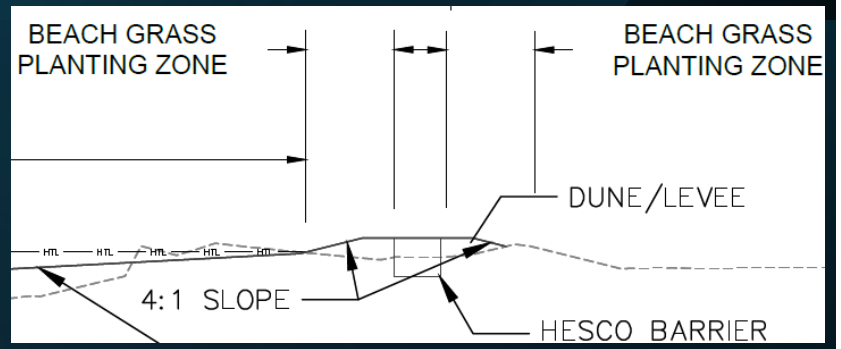
STRAUGHAN ENVIRONMENTAL

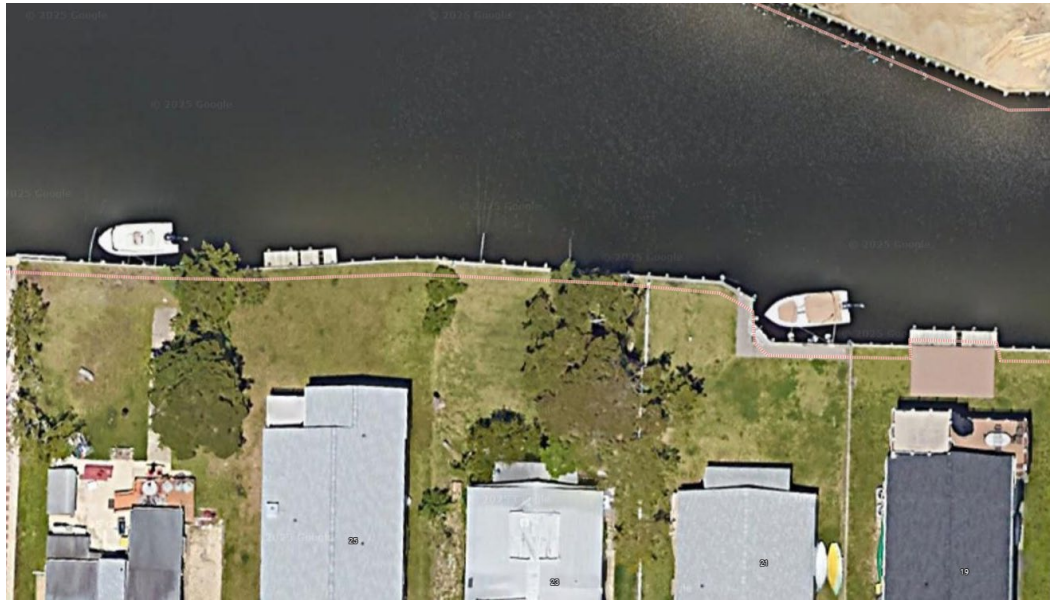
Potential Flood Protection Toolkit on Public and Private Property

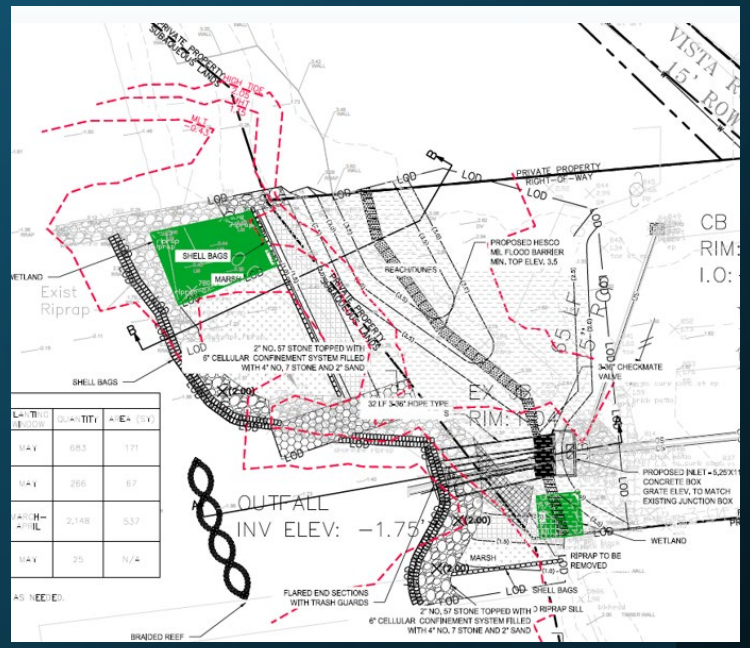
- Flood Protection
  - Raised Bulkheads and/or Levees (Dunes)
  - Living Shorelines (marsh restoration)
  - Raised Lots/Roads
- Management of Rainwater
  - New/Extended Drainage Systems
  - Green Infrastructure (nature-based solutions)
    - Rooftop disconnection
    - Native Landscaping
    - Rain Gardens
    - Soil Amendments
  - Permeable surfaces
  - Infiltration and Storage practices


HESCO
HESCO
2'
4'
1 unit = 2 cells
2'

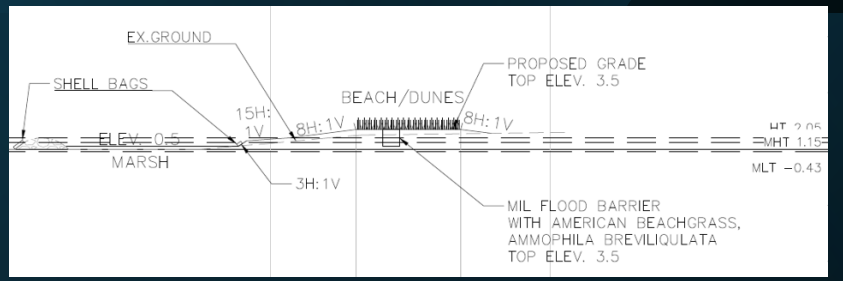
Levee/Dune

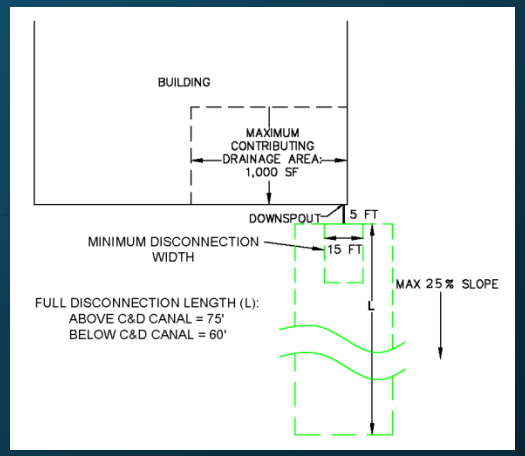

BEACH GRASS
PLANTING ZONE
BEACH GRASS
PLANTING ZONE
DUNE/LEVEE
4:1 SLOPE
HESCO BARRIER





Living Shoreline

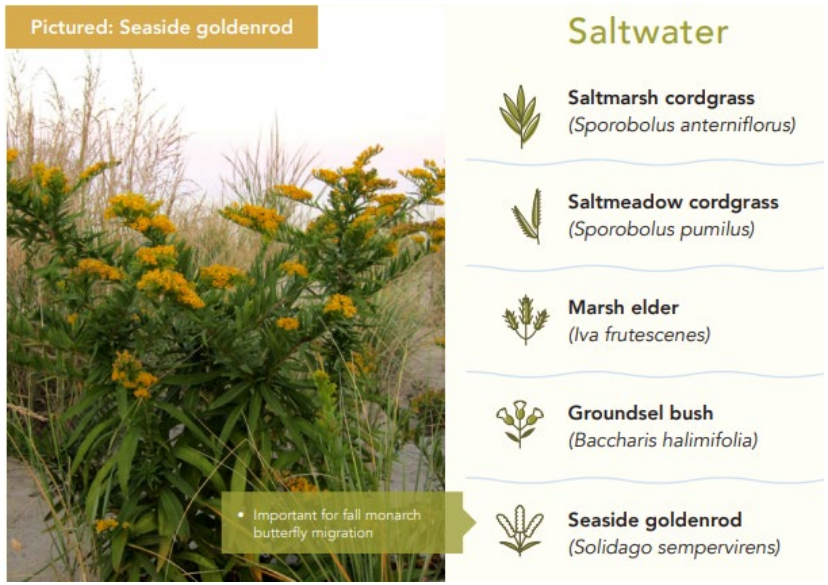




Rooftop Disconnection/Native Landscaping

Plants for a Livable Delaware

Livable Plants for the Home Landscape



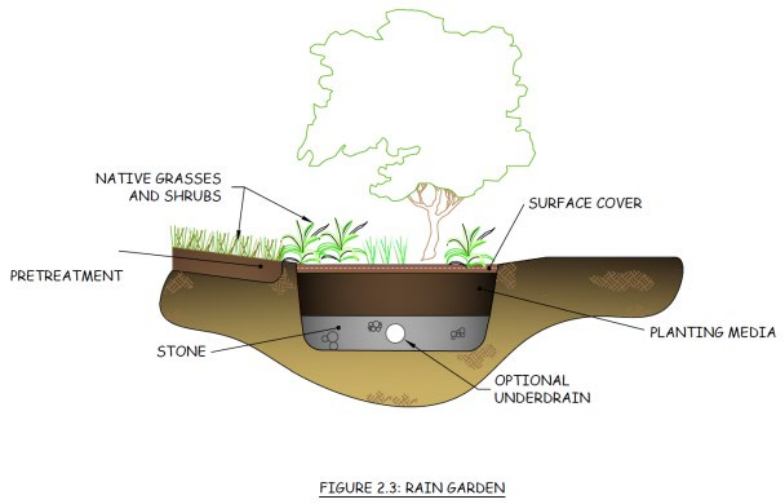
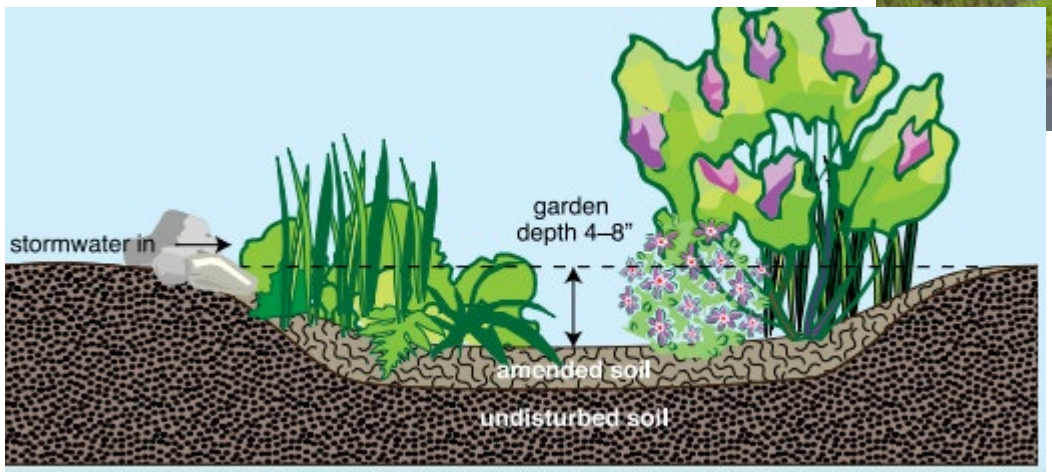


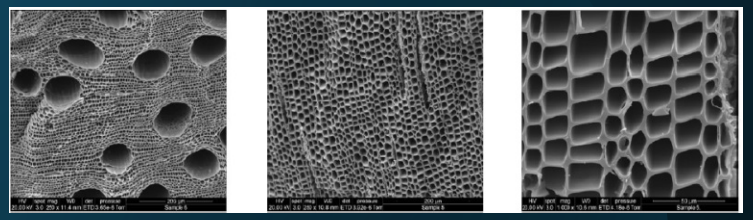
FIGURE 2.3: RAIN GARDEN

Rain Gardens

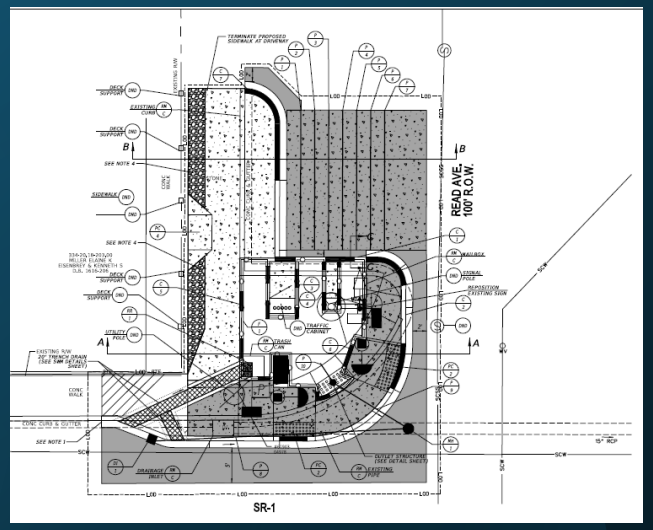
RAINGARDENS
for the Inland Bays

A Local Solution to Stormwater Pollution

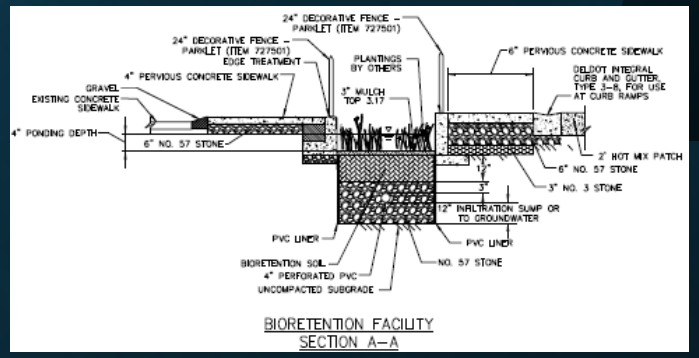




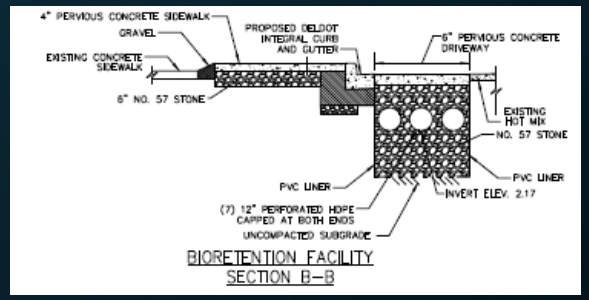
Biochar Soil Amendment



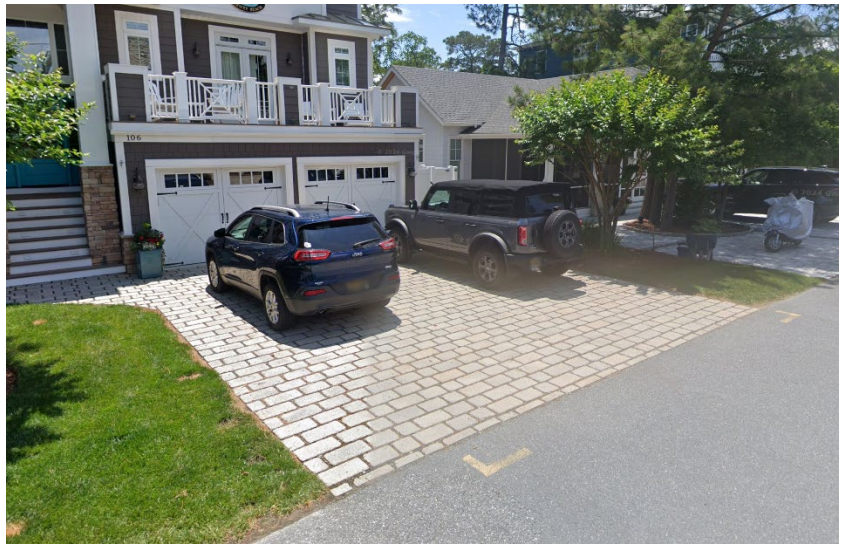
Permeable Surfaces/Infiltration



BIORETENTION FACILITY
SECTION A–A



BIORETENTION FACILITY
SECTION B–B



For more information:
Green Infrastructure Primer
www.de.gov/greeninfrastructure

Delaware Division of ENERGY & CLIMATE

Green Infrastructure Fact Sheet

Rain Barrels, Cisterns, and Downspout Disconnections

Rainwater Harvesting

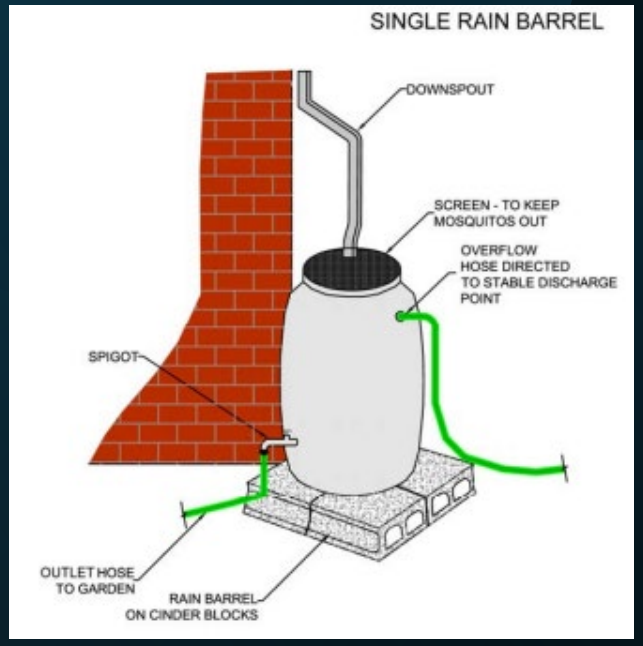


ILLUSTRATION: Jeffery Mathison