

Multi-Functional Design Concepts for Coastal Stormwater Management

The Place: Marine Avenue, Newport RI

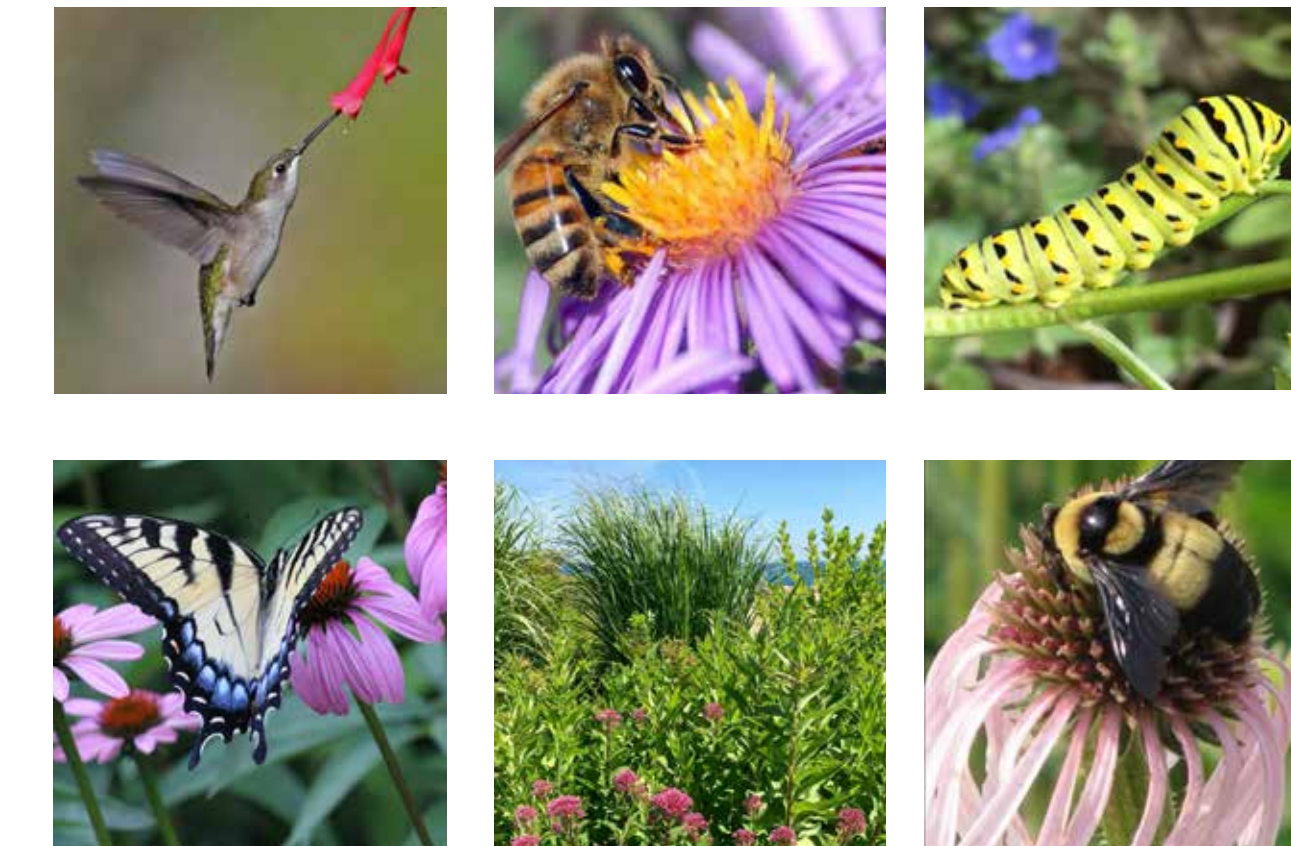
This area off of Marine Avenue in Newport is a popular public access route to the historical Cliff Walk and Belmont Beach, which offers an important link between public and private properties.



The stormwater runoff from the watershed (275,000 sqft, 6.3 acres) is captured in the proposed bioretention basin, see Appendix X for sizing information

Nature is at work here!
We're creating a healthy community! This site uses nature to clean dirty stormwater and reduce flooding.

- Clean**: Uses plants and soils to filter out pollution.
- Cool**: Replaces hard surfaces that hold heat.
- Protect**: Absorbs rain and reduces flooding.
- Wellness**: Cleans our air and creates welcoming spaces.
- Economy**: Reduces utility bills and creates local jobs.
- Habitat**: Attracts animals like butterflies, turtles and frogs.



The recommended seed mixes were selected for the co-benefits associated with low maintenance requirements and the potential to provide important habitat for pollinators, providing food, shelter, and connections to other patches of habitat; as well as beauty for public/private visitors.



A low maintenance design like this requires mowing once a year at the appropriate time in the spring. This provides protective habitat for native insects and food for native wildlife through the winter. See maintenance information in Appendix X.

The Problem: Water Quality and Erosion

During rain storms, runoff from the land and impervious surfaces carries nutrients, bacteria, and sediment down Wetmore and Marine Avenue, causing erosion of the path to the Cliff Walk and sending harmful pollutants into the cove. The untreated stormwater impacts safe public access to the Cliff Walk, and the area's many recreational uses including walking, swimming, surfing, and fishing.



Looking east toward the Cliff Walk, Belmont Beach and the Atlantic Ocean

Looking west toward Marine Avenue

The Solution: Green Infrastructure/Multi-functional Stormwater Management

- Green Infrastructure is a nature-based adaptation tool for:
 - Stormwater filtration and infiltration
 - Restoration and enhancement of habitats
- Uses designed or engineered systems that allow soil and vegetation to capture water where it falls
- Aims to preserve natural hydrology of watershed
- Reduces stress on and need for traditional "grey" or "hard" design solutions
- Is applied and adaptable at different scales

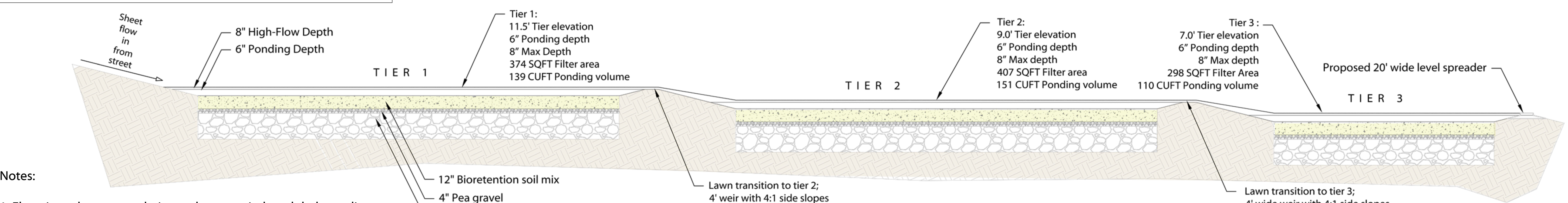
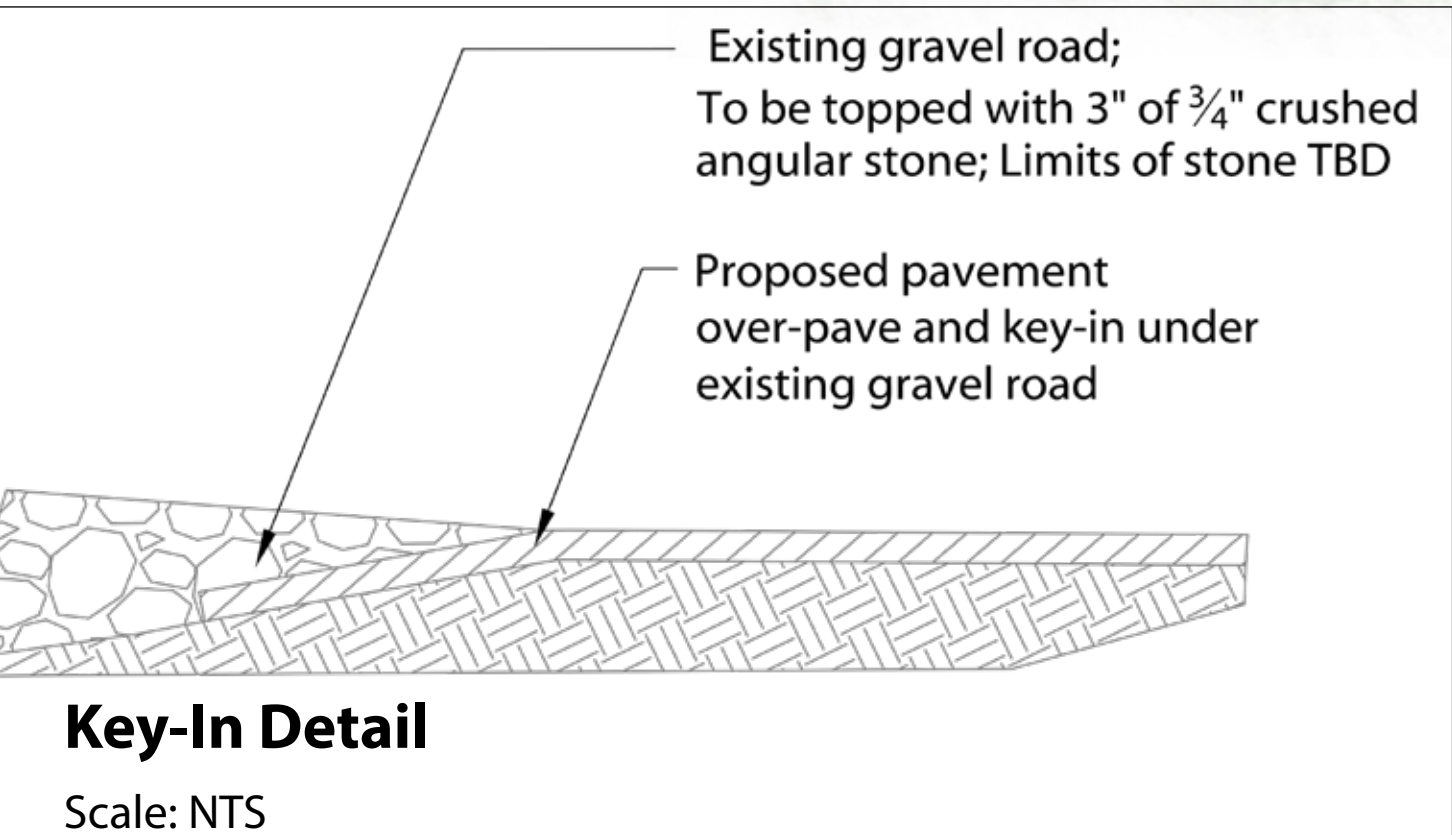
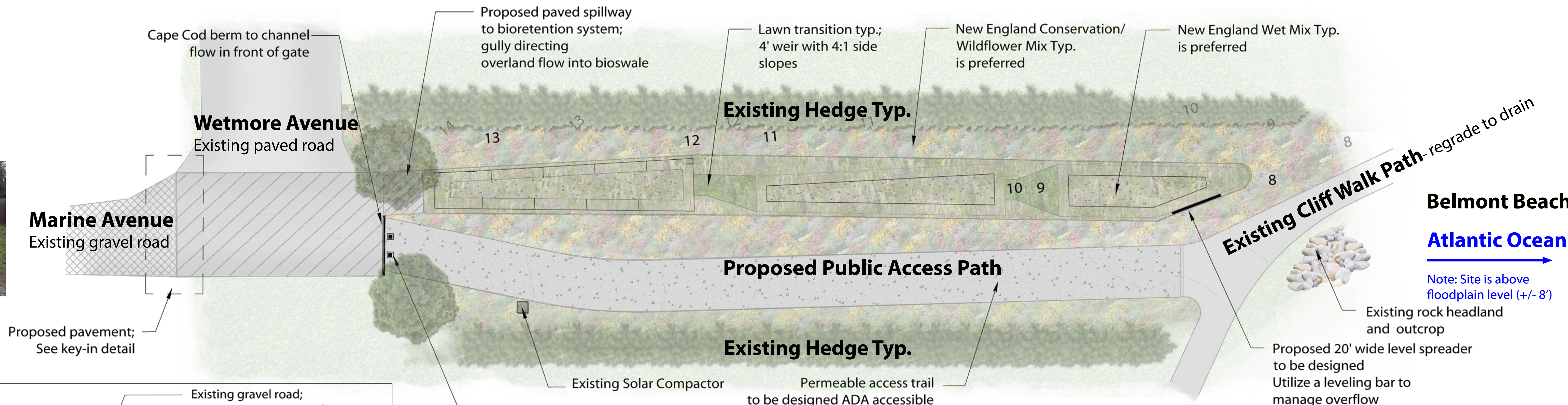
Opportunities and Benefits: Community

Implementing green infrastructure on Marine Avenue will:

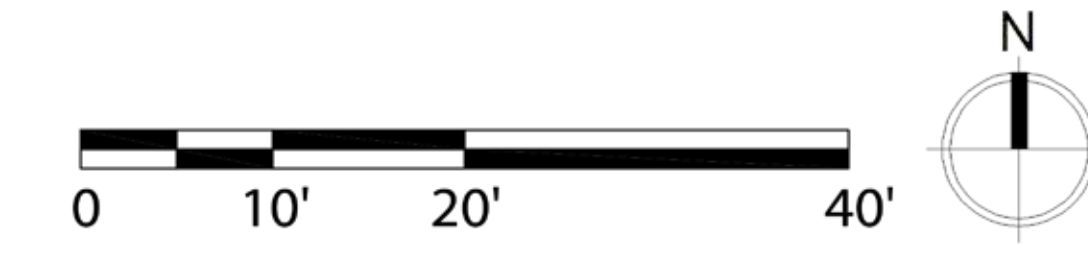
- Slow and treat storm water to reduce erosion along the Cliff Walk
- Reduce polluted runoff flowing to Belmont Beach
- Improve public access
- Increase public health and safety
- Create opportunities for public education and awareness
- Enhance aesthetics of the area
- Recognize, support, and enhance historic uses
- Provide habitat for native plants and pollinators

Opportunities and Benefits: Municipal

- Cost effective and practical solutions to stormwater problems
- Fewer contaminants into coastal waters
- Reduce pressure on existing infrastructure
- Create health and social benefits
- Support for jobs, local business hubs, and economic vitality
- Easy and inexpensive to maintain with routine mowing



- Notes:
- Elevations shown are relative and are not tied to global coordinates
 - All basin side slopes are to be graded at 4:1
 - Conceptual design plan; boundary survey for R.O.W. including existing easements to be confirmed by City of Newport prior to construction
 - Site is above floodplain level
 - Bioretention filter media consists of 60% sand, 20% loam, 15-20% wood chips, 5% water treatment residuals for Phosphorus removal. Measured by volume and uniformly mixed.
 - Design Consideration: Plan for potential flooding from runoff, with a design life of 20 years



Green and Resilient Infrastructure Planning (GRIP): Get a GRIP on RI's Coastline

Funding for this project is provided by the Department of the Interior through a grant from the National Fish and Wildlife Foundation's Hurricane Sandy Coastal Resiliency Competitive Grant Program

