

Green Infrastructure

for New Hampshire Coastal Watershed Communities

what is Green Infrastructure

Green Infrastructure is a programmatic use of Low Impact Development (LID) and other management measures to control drainage and pollution in a watershed or municipal setting. LID techniques mimic natural processes to capture and treat stormwater close to its source and enhance overall environmental quality. As a general principal, green infrastructure engineered systems use soils and vegetation to infiltrate and/or treat runoff. Structural examples include bioretention systems and rain gardens; permeable pavements; tree filters and stormwater planters; and vegetated roofs. Non-structural elements may include incorporating best practices into site design; regulations requiring better infrastructure performance; and incentives or education to encourage property owners to protect water quality.

THE VALUE OF GREEN INFRASTRUCTURE

INVESTING IN GREEN INFRASTRUCTURE CAN PROVIDE MUNICIPALITIES WITH A RANGE OF LONG-TERM ECONOMIC, ENVIRONMENTAL, AND SOCIAL BENEFITS INCLUDING:

The potential to reduce municipal costs for stormwater management by decreasing a reliance on costly grey infrastructure

Reducing stress to aging municipal grey infrastructure and minimizing the need for capacity increases (i.e., gutters, storm sewers)

Improving water quality in our streams, rivers, ponds, and estuaries

Increasing groundwater aquifer recharge to support drinking water and stream baseflow

Minimizing flooding and building resiliency to extreme storm events

Increasing the usage of green spaces for water management and improving community aesthetics

Cultivating public education opportunities by connecting people more directly with natural resources

the Green Infrastructure PROJECT

Researchers from the University of New Hampshire, and Geosyntec, as well as staff from the Southeast Watershed Alliance, Strafford Regional Planning Commission, Rockingham Planning Commission, Antioch University, and the Great Bay National Estuarine Research Reserve partnered to deliver customized technical assistance and educational resources focused on stormwater management in the coastal watershed. One of the primary goals of this project was to communicate with municipalities on the values of green infrastructure in order to assist them in deciding where, when, and to what extent green infrastructure practices should become part of future planning, development, and redevelopment efforts.

Rain Garden, Public Library, Durham, NH



Bioretention Retrofit, UNH Campus, Durham, NH



BECOMING AN IMPLEMENTATION COMMUNITY

The Green Infrastructure project advocates that municipalities take a Complete Community Approach to mitigate the negative effects associated with increasing impervious cover and stormwater runoff, thus minimizing impacts to water quality and protecting ecosystems and water resources.

A Complete Community Approach uses green infrastructure throughout all aspects of community planning. This approach includes: ordinances and regulations; stormwater controls; conservation strategies; reduced impervious cover; long-term commitments to fund and maintain stormwater controls; opportunities for outreach.



GOAL

THE GOAL OF THIS PUBLIC INFRASTRUCTURE REPAIR AND IMPROVEMENT PROJECT WAS TO DISCONNECT THE STORMWATER RUNOFF GENERATED FROM THE NEIGHBORHOOD AND REDUCE NON-POINT SOURCE POLLUTION ON THE OYSTER RIVER. THE UNH STORMWATER CENTER ASSISTED BY DEVELOPING DESIGN PLANS AND PROVIDED BUILDING OVERSIGHT FOR THE PROJECT. THE TOWN OF DURHAM AND THEIR SELECTED CONTRACTORS FINALIZED THE CONSTRUCTION IN THE SPRING OF 2015.

“A WIN-WIN-WIN”

This subsurface gravel wetland installation created an eventual win-win-win, where we reduced dissolved nutrient contributions from yard waste, prevented localized soil erosion, and improved water quality control of a 10-acre residential area discharging directly to the Oyster River.

JAMIE HOULE,
PROGRAM MANAGER, UNH STORMWATER CENTER



DURHAM'S COMMITMENT TO GREEN INFRASTRUCTURE

2010 INCORPORATED STORMWATER REGULATIONS WITH LOW IMPACT DEVELOPMENT INCENTIVES IN SITE PLAN REVIEW AND SUBDIVISION REGULATIONS

2011 PARTNERED WITH THE UNH STORMWATER CENTER TO RETROFIT A CUSTOM DESIGNED STATE OF THE ART NITROGEN TREATMENT BIORETENTION STRUCTURE IN A BUSY DOWNTOWN PARKING LOT

2012 TOWN PARTNERED WITH THE OYSTER RIVER HIGH SCHOOL TO DESIGN AND CONSTRUCT A 1,000 SQUARE-FOOT RAIN GARDEN TO DISCONNECT AND TREAT STORMWATER RUNOFF FROM 10,000 SQUARE FEET OF THE HIGH SCHOOL MAIN PARKING LOT

2013 ADOPTED A NEW WATER ORDINANCE, WHICH INCLUDES PROTECTION OF ALL THE TOWN'S WATER RESOURCES FROM DISCHARGES OF POLLUTED STORMWATER RUNOFF AND ILLICIT DISCHARGES

LOCAL PLANNING: TOWN OF DURHAM

DESIGN AND CONSTRUCTION OF A STORMWATER RETROFIT AT THE INTERSECTION OF OYSTER RIVER ROAD AND GARDEN LANE

IDENTIFIED NEED

The Town of Durham's Department of Public Works recognized that a stormwater outfall in a residential neighborhood had fallen into serious disrepair and was discharging directly into the Oyster River. The existing drainage structure and outlet pipe were under capacity and severely degraded. The site contained a highly eroded trench that had undermined a 20' section of corrugated metal pipe (see picture, middle left), which according to the UNH Stormwater Center, was responsible for releasing approximately 30 dump truck loads of fine sediment per year into the river. The undercutting from the existing pipe resulted in massive erosion, slope instability, and water quality issues. Due to these factors, staff from the Durham Public Works Department submitted a grant application to evaluate the contributing drainage area and existing stormwater management infrastructure, design an engineered green solution, and install a control measure.

SPECIFIC RESULTS OF THIS PROJECT



- Stabilization of 50 feet of heavily eroded and entrenched gully discharging directly to the Oyster River
- Installation of a subsurface gravel wetland system at the outfall to slow flow and provide water quality treatment from 6 acres of untreated residential land uses
- Employ a regenerative stormwater conveyance approach that will use the existing eroded gully as the excavation for the treatment area and will result in less than 750 square feet of temporary disturbance associated with an access for construction; no additional impervious area is proposed
- Overall improvement to the aesthetics of the site, which in its former condition had become a dumping ground for nutrient laden lawn and leaf debris from local yards