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:**
- bioretention systems and rain gardens,
- permeable pavements,
- tree filters and stormwater planters, and
- vegetated roofs.

**NON-STRUCTURAL ELEMENTS:**
- incorporating best practices into site design,
- regulations requiring better infrastructure performance, and
- incentives or education that encourages property owners to protect water quality.

Rochester, New Hampshire

**THE GREEN INFRASTRUCTURE PROJECT**

Researchers from the University of New Hampshire, Geosyntec, and VHB, 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.

**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, and opportunities for outreach.

**ROCHESTER’S COMMITMENT TO GREEN INFRASTRUCTURE**

The goal of this project was to improve the quality of life of Rochester’s citizens and visitors, protect natural resources and reduce municipal costs by:

- Updating the stormwater regulations so the City can consistently require the implementation of the current best management practices using low impact development and green infrastructure
- Establishing recommendations for developing a database to track and account for best management practices, maintenance, impervious cover, and other elements of future permit reporting requirements.
LOCAL PLANNING: CITY OF ROCHESTER

Incorporating Updates to Stormwater Management in the City Ordinance and Land use Regulations

IDENTIFIED NEED

The City of Rochester’s Planning and Community Development Department recognized that their current approach to stormwater management needed major revisions and updating. Many of the best management practices referenced in documents including Site Plan regulations, Subdivision Regulations, and Chapter 50 of the City Ordinance were outdated and no longer the best options for management of stormwater runoff.

The City’s stormwater regulations were created at different times and have many inconsistencies and outdated references. Conventional stormwater management had resulted in many of the problems the City has experienced, which include: flooding, stressing the existing public drainage systems, and degrading wetlands, rivers, and aquifers. All of the impacts represent economic and health cost to the City’s population.

As one of the fastest developing communities in the NH Seacoast, it is important that the documents be revised so that the City can take advantage of low impact development and Green Infrastructure stormwater best management practices moving forward.

GREEN INFRASTRUCTURE FOR SUSTAINABLE COASTAL COMMUNITIES

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

REGULATION UPDATE PROCESS

The city staff, their technical consultant, and a subcommittee of the city’s planning board review used the following process:

- Review of stormwater components of the existing city documents including the Site Plan Regulations, Subdivision Regulations, Public Works Design Standards, and Chapter 50 of the City Ordinance
- Collection and review of other available information including the 2012 Southeast Watershed Alliance Stormwater Standards
- Provide recommendations for regulation updates to improve consistency, clarify the review process, and include revisions to best management practices requiring the usage of low impact development and Green Infrastructure for stormwater management
- Facilitate public outreach efforts

SPECIFIC OUTCOMES PROPOSED IN THE REVISED STORMWATER ORDINANCE

- Low Impact Development (LID) site planning and design strategies will be required to the maximum extent practicable
- Unique regulatory standards will be created for projects that meet the definition of “redevelopment project” thus fostering responsible redevelopment while reducing regulatory burden
- Offsite mitigation will now be permissible when onsite mitigation is impractical
- The 50-year, 24-hour storm event will be required to be modeled, in addition to the 2-year, 10-year, and 25-year events, 24 hour events.
- Specific water quality standards will become part of the minimum design standards
- Stormwater systems will not be allowed in sensitive areas
- Stormwater standards will now be in a single regulatory location (Chapter 50 of the General Ordinance)

Green Infrastructure design is good design.

“Thanks to Green Infrastructure stormwater standards, Rochester will begin to see developments creating gardens, shallow ponds that drain quickly, and other vegetated areas instead of ponds and pipes. This will really be a win-win for all parties: The City will have cleaner and less stormwater to pay for and treat; developers will reap economic benefits in the means of less maintenance and greater flexibility to retrofit a built site, and residents/visitors will enjoy more attractive and welcoming developments. Green Infrastructure design should simply be called good design.”

—Seth Creighton, Staff Planner, City of Rochester

GREAT BAY NATIONAL ESTUARINE RESEARCH RESERVE

This project is funded by the NERRs Science Collaborative to a project team led by the UNH Stormwater Center and the Great Bay National Estuarine Research Reserve. It supports Green Infrastructure implementation with local municipal, non-profit and private sector partners. For more information, visit southeastwatershedalliance.org/green-infrastructure.