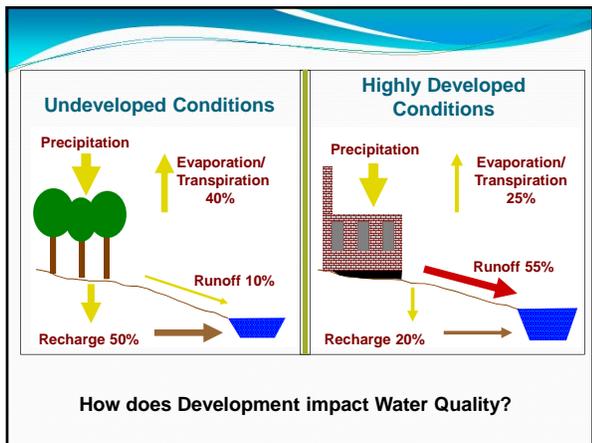
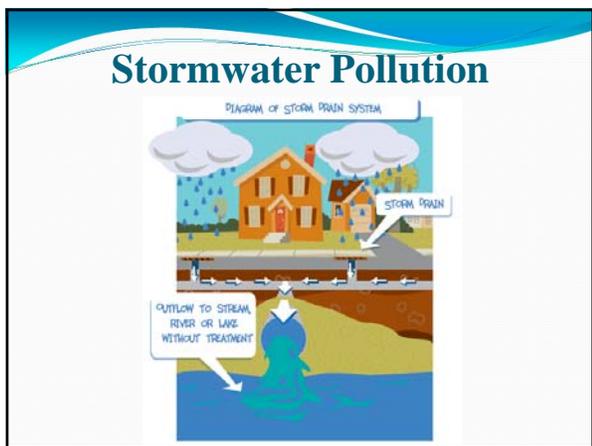


Implementation of Green Infrastructure: What Every Municipality Should Know

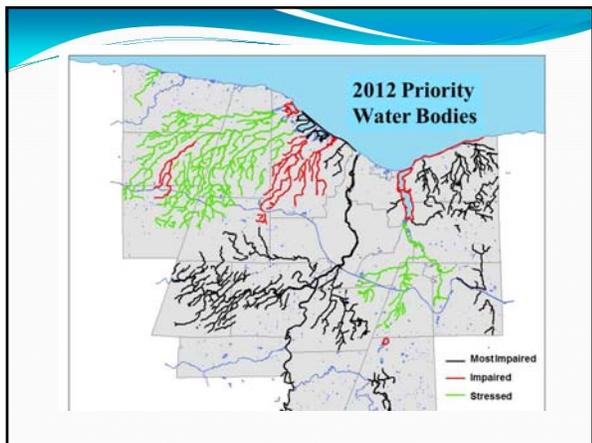


Caroline Myers Kilmer
Stormwater Coalition of Monroe County









What is the Solution?

- **Green Infrastructure (GI)** – Practices that use natural processes such as infiltration (soaking water into the ground) to reduce stormwater runoff, protect water quality, & minimize flooding.

Why Do We Need Green Infrastructure Practices?



Northrup Creek

Basic concept: We no longer want to pave over as much as possible and send water down the pipe as fast as we can



Examples of Green Infrastructure

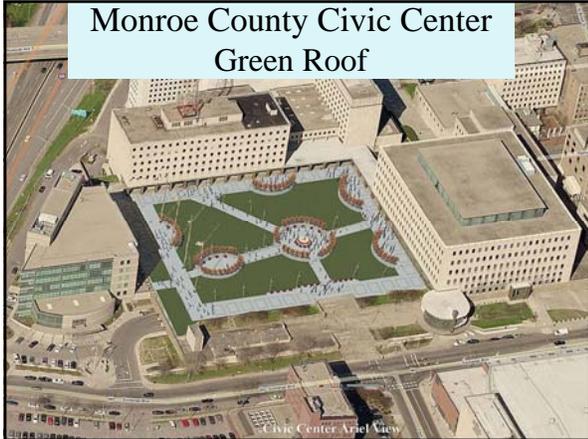
- Porous pavement
- Green roofs
- Swales & filters
- Downspout disconnection
- Rain barrels
- Rain gardens

Porous Pavement



Irondequoit Secret Cove Park

Monroe County Civic Center Green Roof



Swales & Filters



RIT - Perkins Green















What is a Rain Garden?

- A **Rain Garden** is a landscaped depression designed to soak up rain water from a roof, driveway, or other hard surface. The rain garden fills with a few inches of water after a storm and the water slowly filters into the ground rather than running off to a storm drain.
- A **Rain Garden** is not a pond or wetland.

Rain Garden Myths

- **Standing water**
- **Mosquitoes**
- **Maintenance**
- **Cost**

Rain Garden Considerations

- Soils: Rapidly infiltrating soils are ideal
- Avoid areas known to have standing water issues.
- Distance from building – 10’ minimum to protect the foundation.
- Adjacent Properties.



Plant Choices
Choose native plants based on need for light, moisture and soil. Vary plant structure, height, and flower color for seasonal appeal and butterfly habitat.

Depth
A typical rain garden is between four and eight inches deep. This depth, proportionate to surface area, helps ensure water will infiltrate quickly and not pond.

Site
A rain garden is typically 3 to 10 percent the size of the impervious surface that generates runoff.

Soil Amendments
A good soil mix for rain gardens is 65 percent sand, 15 percent topsoil, and 20 percent compost.

Location
Rain gardens are often located at the end of a roof gutter or down-slope, or in a buffer between the lawn and the street.

Rain Gardens



City of Rochester Turning Point Park



- GI techniques also include...**
- Preservation of undisturbed areas, buffers along streams, rivers and shorelines.
 - Reduction of clearing and grading.
 - Cluster developments.
 - Soil restoration.
 - Stream daylighting.
 - Tree planting/tree pits.
 - Stormwater planters.

- Community Benefits of GI**
- Reduces flooding.
 - Improved local water quality.
 - Groundwater recharge.
 - Rain water harvesting.
 - Reduces costs of stormwater facilities i.e. ponds.
 - Lower costs for site grading, paving, and landscaping.

NY State Pollutant Discharge Elimination System (SPDES) General Stormwater Permits

GP-0-15-002
SPDES General Permit for Stormwater Discharges from Construction Activity
Regulates Construction Activities that disturb 1 acre or more of land

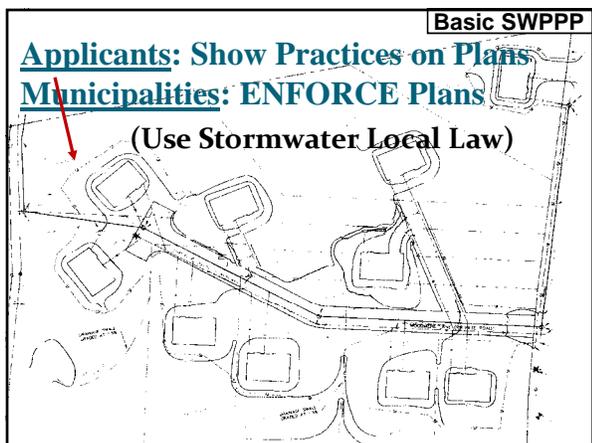
GP-0-15-003
SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s)
Regulates MS4s located in "urbanized areas"

NYS Stormwater Design Manual
Green Infrastructure Practices:
New Requirements for construction projects:

1. **Planning Practices for Runoff Reduction**
2. **Treatment Practices for Runoff Reduction**

Basic SWPPP

Applicants: Show Practices on Plans
Municipalities: ENFORCE Plans
(Use Stormwater Local Law)



Adopting GI can help MS4s meet Stormwater General Permit Requirements:

- Public education & participation through workshops.
- Education to contractors through construction permit process.
- Municipal boards.



GI Municipal Maintenance ...

- Rain gardens, vegetated swales.
- Porous pavement.
- Simple planting plans.
- Establish maintenance plans
- Maintenance agreements.

Challenges to GI Implementation:

- Limited understanding among construction industry, some municipalities, and the general public.
- Drainage, maintenance and cold climate concerns.
- Increased initial costs of some GI practices over traditional.

How do Municipal Codes affect ability to implement GI?

GI Goal: Reduce Impervious Area and Infiltrate Runoff

Barriers to GI Implementation:

- Municipal Codes either don't allow GI or are silent.
i.e. Downspout disconnection.
- Code/Specs. were silent on many new G.I. practices.

Downspout Disconnection: potential for significant runoff reduction at reduced cost



Municipal Codes/Specs. Can Dictate:

- Road widths and lengths, cul-de-sacs, use of bioretention in parking lots.
- Use of curbs and gutters, minimum parking requirements.
- Shared parking, parking space size, and use of pervious materials for parking.

**Municipal Code on Cluster Developments
(Ch. 278 NYS Town Law).**

- Allow cluster developments in all residential districts not just designated ones. i.e. Wappinger and Clinton, NY.
- Eliminating additional approval procedures for cluster developments i.e. Brighton, Greece, Mendon, Perinton and Pittsford.
- Level the playing field.

Reduction in imperviousness of subdivisions and lots:

- Reduction in front setback reduces length of the driveway, and reduction in side setback brings homes closer together thus reducing street length.
- Reduce front setback to 20' or less, rear setback to 25' or less, and side setback to 8' or less.

i.e. Village of Pittsford setbacks: Front-15', Side-5', Rear-20'

Sidewalks:

- Allow sidewalks on only one side of the street, rather than both. (Most munis. subject to PB approval).
- Require/consider sidewalks to be constructed of porous pavement (when feasible) and add a design spec. on pervious sidewalks. i.e. Turning Point Park and RIT.
- Allow/encourage the use of alternate pedestrian networks such as pervious trails (rather than sidewalks) that link pedestrian areas, open spaces, and recreational areas. i.e. Town of Pittsford.
- Slope sidewalks (1:48 cross-slope-ADA standard)so they drain to the front yard as opposed to the street. i.e. Lancaster County, PA, San Antonio, TX and Seattle, WA.

Open Space Management



Open Space Management

- Establishing requirements that allow open space to be managed by a third party using a land trust or conservation easement i.e. Greece, Mendon and Wappinger, NY.
 - Require a min. % of open space to remain natural
 - Define allowable uses for open space.

Conservation of Natural Areas

- Stream buffers ordinance, clearing and grading requirements, tree conservation, land conservation, stormwater management, and floodplain management.
- Preserve natural areas for stormwater benefits.

Stream Buffers

Photo taken from U.S. Forest Service



Adoption of “Watercourse Protection” EPOD:

- Protects 75’ or more, including wetlands, steep slopes and floodplains.
- Requires that part of stream buffer be maintained with native vegetation.
- Defines allowable uses, and has enforcement and education mechanisms.
 - Local examples of Watercourse Protection EPODS: Mendon, Brighton, Parma and Wappinger, NY.

Land Conservation...

- Adopt a Incentive Zoning Ordinance that offers flexibility with zoning requirements to conserve non-regulated land i.e. Town of Ogden, NY.
- Offer design flexibility to meet regulatory or conservation restrictions i.e. Greece, Pittsford (T), Henrietta, Perinton, Wappinger and Clinton NY.

Tree Conservation...

- Adopt a "Woodlot Protection District" EPOD.
- Local examples of Woodlot EPODs are Brighton, Parma, Irondequoit, and Mendon NY.
- Add a design spec. for proper tree protection and placement of fencing during construction at a site.

Municipal Code/Specs. are silent on many green infrastructure practices:

Examples:

- Bioretention in center of cul-de-sacs and Code language for maintenance of landscaped cul-de-sacs.
- Vegetated swales and curb-cut designs for stormwater treatment.
- Pervious/permeable paving materials (asphalt, concrete and permeable paver) for spillover parking areas.
- Sand filters, filter strips and bioretention for parking lots.

A Municipality Can Encourage GI By...

- Review existing Municipal Codes to identify barriers to GI.
- Add Specs./Code language on G.I. practices will let design engineers know that the municipality supports these practices and would like to see them used.
- Add Code language to encourage a practice where currently left up to the PB discretion is important due to turnover of Board members and to help encourage use of practice.
- Provided new design/construction specifications for green infrastructure practices i.e. bioretention practices, pervious pavement, and downspout disconnection.



Lake Ontario needs heroes.

Find out more at
H2OHero.org

Thank you!

Any Questions???

 Water Education Collaborative
