

2014 Southeast New York Stormwater Conference

Stormwater Management in a Changing Climate

October 15, 2014

Agenda

8:00-8:30	Sign in and breakfast	
8:30-8:45	Welcome and LHCCD Update	
8:45-9:45	1. Climate Change and Resilient Site Planning - <i>Russell Urban-Mead & Kelsey Carr</i>	
9:45-10:00	Break	
10:00-11:00	2. Diving Deeper into Green Infrastructure: Design Opportunities, Avoiding Pitfalls - <i>John Dunkle</i>	3. Removing Barriers to GI in Municipal Codes - <i>Nadine Medina & Marcy Denker</i>
11:00-11:15	Break	
11:15-12:15	4. Maximizing Phosphorus Load Reduction - <i>Derek Berg</i>	5. Culvert Sizing for Flood Resilience and Wildlife Passage - <i>Andrew Meyer & Brian Scoralick</i>
12:15-1:15	Lunch	
1:15-2:15	6. Modern Erosion Control Techniques and Materials - <i>Doug McCluskey & Randy Thompson</i>	7. Effective Green Infrastructure Retrofits - <i>Tana Bigelow</i>
2:15-2:30	Break	
2:30-3:30	8. Practical Long-Term Green Infrastructure Design - <i>Josh Kogan</i>	9. Multiple Benefits of Green Infrastructure Practices - <i>Libby Murphy & Simon Gruber</i>

1. Climate Change and Resilient Site Planning

Presenters:

Russell Urban-Mead, PG, CPG, LEED AP – Vice President Environmental Services

Kelsey Carr, LEED AP BD+C – Project Engineer

The Chazen Companies

Overview:

According to recent IPCC reports, temperatures across New York State are expected to rise, average annual precipitation is expected to increase, sea levels are expected to rise, and flora and fauna composition is expected to change. Each of these considerations will alter the way we approach site design, with greater emphasis on asset protection, emergency response, stormwater management, heat island effect, material selection, and landscaping.

This session will outline the design components being used or contemplated to make sites function effectively in a changing climate. Project-specific case studies will be used to emphasize various climate considerations and the design approaches being implemented to alleviate the impacts.

Learning objectives:

- Identify four anticipated changes to climate in NYS:
 - 1) Increasing Temperatures
 - 2) More & Extreme Precipitation
 - 3) Rising Sea Levels
 - 4) Altered Ecology
- Recognize the negative impacts of climate change and why these changes must be considered as part of site design going forward, as well as site redevelopment.
- Outline the design components being used or contemplated to make sites function effectively in a changing climate.
- Understand holistic site approaches that have been implemented at specific project case studies to promote climate resilience.

2. Diving Deeper into Green Infrastructure: Design Opportunities, Avoiding Pitfalls

Presenter:

John Dunkle, PE, CPESC, CMS4S

Overview:

Most of us are now familiar with the concepts of Green infrastructure, but we may not know some of the intimate details that affect the design, use, and care of GI practices. This presentation will examine some of the specifics and nuances of the various GI practices, and provide numerous examples of their proper and improper applications.

We will answer such questions as:

- Are all GI practices green?
- How important is permeability for GI practices?
- Where does porous pavement really work best?
- What plants and soil are best for bio-retention?
- How much does it cost to take care of GI practices, and who should do it?
- What is the difference between a rain garden and a bio-retention area?
- What is the best pre-treatment for an infiltration trench?
- Do green roofs really provide 100% runoff reduction?
- What makes a good street tree?

Learning objectives:

- Explore the details that maximize the effectiveness of various green infrastructure practices
- Understand how to select the best practices for various sites and situations
- Examine case studies of green infrastructure projects including porous pavement, rain gardens, green roofs and street trees

3. Removing Barriers to GI in Municipal Codes

Presenters:

Nadine Medina, PE, CPESC, LEED AP
Project Engineer at Barton & Loguidice, DPC

Marcy Denker, MLA
Landscape Designer and Green Infrastructure Consultant

Overview:

Nadine Medina will discuss her work with the Stormwater Coalition of Albany County managing their Green Infrastructure Local Law Project. The Coalition, a collaborative group of 12 unique MS4 communities, received a 2010 NYSDEC Water Quality Improvement Project Grant to assist it with a collaboration that would study and address green infrastructure local laws with the goal of encouraging green infrastructure practices. The coalition consists of Towns, Cities, Villages, Albany County, and University at Albany SUNY, making this project a local case study applicable to many of the MS4s to which the NYSDEC MS4 permit applies. The presentation will discuss the need, how the need was fulfilled, how the project progressed (in-depth discussion of scorecard process, gap analysis, “gap” identification and selection, “gap” research, and drafting of local laws) and, if time permits, how the deliverable is intended to be used. Additional project information can be found here:

<http://www.stormwateralbanycounty.org/green-infrastructure/>

Marcy Denker will describe two Green Infrastructure Code Reviews that she has worked on in Rockland County, in the Village of Nyack and the Town of Orangetown, with support from the Hudson River Watershed Alliance (HRWA). Her presentation will illustrate how the approaches and resources developed in other communities were adapted and discuss new guidance being developed to help communities carry out the code review process with limited resources. Nyack’s successful process, completed in 2013, utilized the Code and Ordinance Worksheet for Development Rules in New York State and based its roundtable process on similar work the Towns of Wappingers and Clinton Corners in Dutchess County completed in 2006. The final report departed from these models in ways that reflected Nyack’s small urbanized setting, and the process in Nyack was also significantly simpler and shorter than in the two Dutchess County towns. In Orangetown, a revised version of the Code and Ordinance worksheet is the basis of a project that is currently underway.

Learning objectives:

- Opportunities for municipal codes to support and promote the use of green infrastructure
- Available tools and resources for green infrastructure code reviews
- Code review experiences of multiple municipalities in urban, suburban and rural settings, approached as individual municipalities and collectively

4. Maximizing Phosphorus Load Reduction

Presenter:

Derek M. Berg, CPSWQ
Regional Regulatory Manager- Stormwater
CONTECH Engineered Solutions LLC

Overview:

As we continue working to restore our watersheds that do not meet their designated uses because of impairments, as well as preserve those watersheds not yet considered impaired, the need for advanced stormwater treatment solutions has become apparent. One pollutant that has been getting an increasing amount of regulatory attention in recent years is phosphorus. Numerous watersheds are impaired as a result of excess phosphorus loads being delivered in both agricultural and urban runoff. In the case of urban runoff, we have a number of established best management practices (BMPs) that typically achieve moderate levels of phosphorus load reduction. However, the implementation of TMDLs and other load based phosphorus reduction criteria are yielding phosphorus reduction targets not readily achieved by many common stormwater BMPs.

Advancements have been made in developing innovative solutions to maximize phosphorus load reduction, but as most stormwater practitioners know, bringing something new to the table in the field of stormwater management is easier said than done. This presentation will discuss challenges in achieving high levels of phosphorus load reduction from urban runoff, recent research and performance testing on several new solutions for enhanced phosphorus removal as well as the regulatory hurdles that often hinder acceptance and implementation of innovative BMPs. Special focus will be given to practices accepted in New York State.

Learning objectives:

- Sources of phosphorus pollution and need for reducing phosphorus loading.
- Challenges in achieving high levels of phosphorus reduction from urban runoff.
- Performance of new phosphorus removal techniques.

5: Culvert Sizing for Flood Resilience and Wildlife Passage

Presenters:

Andrew Meyer, Hudson River Estuary Program
Brian Scoralick, Dutchess County SWCD

Overview:

The purpose of this presentation is to share the findings of an ongoing project exploring better culvert management on a watershed scale through modeling of stream flows.

As rainfall increases and land use patterns change, culverts may not be large enough to pass stream flows. When water backs up, it can cause flooding and erosion damage to public infrastructure and private property. Constriction at culverts can also cause damage within the stream, when rushing water erodes the channel downstream of the culvert. Having better information on the future sizing needs of culverts enables highway managers to prioritize their infrastructure needs in the coming years, making good decisions about pipe replacement and upgrade. Sizing and positioning culverts to allow fish passage also benefits the health of streams and the recreational value of a community's waterways, and promoting fish passage can usually be accomplished at the same time as right-sizing a culvert.

Over the past two years, a Culvert Sizing Study has been conducted in targeted watersheds in the Lower Hudson region by a team comprised of Cornell University, the Hudson River Estuary Program, and the Lower Hudson Coalition of Conservation Districts. The communities in the selected watersheds had faced infrastructure damage as a result of storm events and were interested in upgrading culverts proactively to reduce flood risk and emergency repairs. The results of this study will be discussed, as well as the development of an online tool to allow other municipalities to conduct culvert size assessments.

Learning objectives:

- Problems of undersized culverts and effects of predicted climate change
- Principles of properly sizing culverts for both flood resilience and wildlife habitat
- Techniques for assessing culvert infrastructure

6. Modern Erosion Control Techniques and Materials

Part 1: Erosion and Sediment Control on Construction Sites

Presenter:

Doug McCluskey, Assistant Erosion Control & Geoproduct Manager
EJ Prescott

Overview:

This presentation will educate participants on the basics of erosion and sediment control. New techniques and modern material options will be presented. The presenter will use examples to demonstrate the use of sustainable erosion and sediment control technologies on construction sites.

Part 2: Elevating the Quality of Turf Reinforcement Mat Design

Presenter:

Randy Thompson, P.E.
Propex Inc.

Overview:

Turf Reinforcement Mats (TRMs) are a product sometimes used for long-term erosion control on slopes and vegetated channels. For years, engineers have been designing with TRMs based on water velocity and shear stress values determined in a laboratory. While this is important to consider, sole reliance on these hydraulic values in selecting an appropriate TRM can result in disappointing field performance. A more in depth design will also consider material index properties link to long-term performance. This presentation seeks to elevate the quality of TRM designs by discussing recently published data from Colorado State University confirming the construction of the material matrix may be more critical to field performance than the reported hydraulic lab values used currently for selection. Moving the engineer's emphasis to several design variables for selecting TRMs and relating these to different field applications will lead to more predictable long-term performance.

Learning Objectives:

- Understand the principles of erosion and sediment control
- View modern, sustainable techniques for construction site erosion control
- Define the different generations of turf reinforcement mats and their proper applications
- Establish turf reinforcement mat selection criteria for more predictable long term performance
- Understand the information provided by ASTM Test methods for turf reinforcement mats

7. Effective Green Infrastructure Retrofits

Presenter:

Tana Bigelow, Green Infrastructure Coordinator
Environmental Facilities Corporation

Overview:

This presentation will focus on green infrastructure retrofit techniques for improving stormwater management in urban, suburban and rural settings. Using real-life examples of projects constructed by the Environmental Facilities Corporation's Green Innovation Grant Program, slides will help illustrate techniques for integrating green infrastructure into a variety of contexts. Projects shown will be at a range of scales, from municipal parking lot retrofits using bioretention and porous pavements, to successful "green streets" programs, regional wetland creation, and city-wide urban tree canopy restoration projects.

Learning objectives:

- Defining green infrastructure stormwater retrofits (e.g., recommended practices, applications, context);
- Identifying appropriate opportunities for green infrastructure stormwater retrofit projects ("real world" case studies and lessons learned from constructed GIGP projects);
- Tools for planning and implementing green stormwater retrofits (approaches, organizations, resources).

8. Practical Long-Term Green Infrastructure Design

Presenter:

Josh Kogan, Engineered Products Manager
Advanced Drainage Systems

Overview:

Precipitation data now show that we're experiencing higher-intensity storms with increased frequency than realized historically. At the same time, our current stormwater infrastructure is both undersized and degrading, with an over-arching reaction to remedy with green infrastructure.

This seminar will present real-world non-proprietary design methodologies that emphasize:

- context (rural, suburban, urban) and appropriate green infrastructure selection
- design aesthetic and community expectations
- design enhancements yielding increased volume capacity and infiltration footprints
- maintenance-performance correlation
- planning for maintenance needs in site planning and practice selection

The presenter's work with both the City of Philadelphia and NYC, along with smaller single-site projects throughout the Hudson Valley will be used as examples.

Learning objectives:

- Considering context (rural, suburban, urban) in green infrastructure practice selection
- Techniques for enhancing practices to increase volume capacity and infiltration footprints
- Planning for maintenance needs in site planning and stormwater practice selection

9. Multiple Benefits of Green Infrastructure Practices

Part 1: Cost-Benefit Analysis of Permeable Pavement in the Hudson Valley

Presenter:

Libby Murphy, Hudson River Estuary Program, NYS DEC

Overview:

Stormwater management is a priority in New York State that is gaining attention due to increased intense precipitation from climate change and increased urban development. The state has adopted stricter regulations that are driving the adoption of green infrastructure. Municipalities, schools, and private firms are already installing permeable pavement in the Hudson Valley, but there is a lack of robust, unbiased economic analyses of the technology found in the peer-reviewed literature. We have created a cost-benefit analysis model for permeable pavement in the Hudson Valley using existing models and empirical studies. The model estimates the five primary costs and benefits of permeable pavement as outlined in the literature: installation cost, operating and maintenance cost, runoff reduction benefit, pollutant removal benefit, and deicing reduction benefit. The initial analysis yielded a significant positive net present value of over \$175,000 for each acre of new development permeable pavement. Despite various weaknesses, this model is a significant improvement on previous models in a new amalgam of more singular and unbiased studies of permeable pavement. We are currently working to validate the model on real-life regional projects and potential transform it into user-friendly online tool for prospective adopters to better understand the balance of costs and benefits of permeable pavement in the Hudson Valley and beyond.

Part 2: Green Infrastructure's Co-Benefits and their Relevance for Community Support for Stormwater and MS4 Programs

Presenter:

Simon Gruber, Green Infrastructure consultant, Hudson Valley Regional Council, and Fellow, CUNY Institute for Sustainable Cities

Overview:

Green infrastructure (GI) for stormwater management has gained widespread attention in recent years and there are significant resources being allocated to training, education, demonstration projects, and related work to implement these concepts and practices. Most of this attention, and the awareness about GI's benefits, however, is limited to professionals and other decision-makers who are directly involved in stormwater management and water quality issues in a significant way. Policy, funding, training and education initiatives for GI often reference one key tenet as a major advantage of GI over conventional stormwater practices – the multiple benefits it provides, compared to the single-purpose functions and benefits offered by conventional stormwater and drainage practices. These co-benefits include energy efficiency, air quality, beautification, wildlife habitat, and a variety of links to health and wellness. These other benefits of GI offer an opportunity to broaden and expand the conversation about how to maximize the use of GI at the community level, by raising awareness about the co-benefits and reaching decision-makers in new sectors who have generally not been involved in decisions about stormwater management per se. This presentation will provide an overview of the range of GI's co-benefits documented in the literature, focusing on trees in particular while including material relevant to

other GI practices as well, and discuss how these benefits relate to specific sectors in municipal, institutional and organizational contexts. It will also touch on significant policy priorities at the regional and state level for which GI's co-benefits are particularly relevant, including climate resilience, managing the region's energy infrastructure, and health and wellness initiatives.

Learning Objectives:

- Primary costs, benefits, and lifetime value of permeable pavement in the Hudson Valley
- How stormwater regulations in NYS apply to permeable pavement
- Barriers for adoption and policy recommendations for permeable pavement
- Co-benefits of green infrastructure practices, including energy efficiency, air quality, beautification, wildlife habitat, and a variety of links to health and wellness
- Using the co-benefits of green infrastructure to garner support from decision-makers in different sectors