



U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

James L. Oberstar
Chairman

John L. Mica
Ranking Republican Member

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David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

James W. Coon II, Republican Chief of Staff

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on “Impact of Green Infrastructure and Low Impact Development on the Nation’s Water Quality, Economy and Communities”

PURPOSE OF HEARING

The Subcommittee on Water Resources and Environment will meet on Thursday, September 30, 2010, at 10:00 a.m., in room 2167 of the Rayburn House Office Building to receive testimony from Representative Allyson Y. Schwartz; representatives from the business community; the City of Philadelphia, Pennsylvania; the Town of Edmonston, Maryland; the National Association of Flood and Stormwater Management Agencies; and the National Association of Home Builders on the use of green infrastructure and low impact development and its impact on water quality, the economy, and communities across the country.

BACKGROUND

This memorandum summarizes the impact of green infrastructure and low impact development on water quality, the economy, and communities. It also introduces green infrastructure and low impact development approaches and technologies.

I. Green Infrastructure and Low Impact Development

In general, “green infrastructure” or low impact development describes an array of technologies, approaches, and practices that use existing natural systems, or systems engineered to mimic natural processes, to enhance environmental quality and provide services, such as decreasing stormwater flows to alleviate overwhelming sewage systems.

Green infrastructure can take a variety of forms. Central to all technologies and approaches is the use of the natural environment to reduce the need for hard or traditional infrastructure to address pollution problems. Examples of green infrastructure include:

- Green roofs: Outfitting buildings with soil and vegetation on the roof can nullify the impervious nature of most roofs. Instead of immediately washing off a building's roof and into the stormwater system, precipitation is absorbed into the soil where it is absorbed by the vegetation or released slowly into the stormwater system. Precipitation is also evapotranspired from the vegetation back into the atmosphere. Green roofs can help buildings stay cooler in the summer and warmer in the winter;
- Permeable Pavement: Roads or alleys can be designed and constructed with materials that allow for increased infiltration of water into the ground;
- Curb Cut-outs: Curb cut-outs are constructed gaps in street curbs that allow for some of the stormwater making its way along street gutters to enter into median strips where it can infiltrate into the ground;
- Rain Swales and Gardens: Rain swales and rain gardens are designed ditches or depressions that contain stormwater during wet weather events. These can hold larger volumes of stormwater than traditional street gutters, slow down the flow of stormwater, and promote infiltration;
- Increased Tree Cover: Planting street trees can reduce stormwater runoff because urban tree canopies intercept rainfall before it hits an impervious surface below (a sidewalk or road). This lessens the volume and rate of flow of stormwater entering the stormwater conveyance system. Trees with mature canopies can absorb the first half-inch of rainfall. Increased tree cover can help sequester carbon and can mitigate the urban heat island effect by cooling urban areas; and
- Green Space and Buffer Zones: Urban parks and the expansion of green space provide additional opportunities for infiltration to occur. This reduces the volume and flow of stormwater entering into the sewer system. Planting vegetation by urban and suburban water bodies can also help to slow stormwater runoff, and capture constituent pollutants contained within the stormwater.

II. Implications of Green Infrastructure and Low Impact Development

Green infrastructure or low impact development approaches can offer a number of benefits, including mitigation of urban heat island effects, reduction of energy demands, reduction of stormwater flows, protection from flooding, sequestration of carbon, and filtration of air and water pollutants. Green infrastructure can yield aesthetic improvements and other community, economic, and environmental benefits.

The cost-effectiveness and technical feasibility of incorporating these green infrastructure, or low impact development, approaches can vary. However, in particular circumstances, the incorporation of green infrastructure technologies may offer advantages to municipalities.

Decentralized mitigation options, like green infrastructure, can also provide city planners with options that may work in constrained urban spaces.

A. Water Quality

There has been an increased interest in green infrastructure and low impact development approaches recently. This has been driven by a number of perspectives, including: its applicability in ensuring the availability of water sources to meet future water supply needs; the expense of traditional water infrastructure; and the recognition of stormwater impacts on water quality. Growth in population and increasing environmental awareness are causing many communities to explore alternative water supplies through reclamation, reuse, and conservation.

An example of cost savings from the use of green infrastructure are the steps that New York City took to find an alternative to building an estimated \$6 to \$8 billion filtration plant. Faced with an order from the U.S. Environmental Protection Agency (EPA) to build a drinking water filtration plant, New York City identified a less expensive option: protecting the 2,000-square-mile Catskill/Delaware Watershed in upstate New York, the source of New York City's water. New York City spent \$1.5 billion on land acquisition, the construction of new storm sewers and septic systems, and programs to help farmers limit their pollution in the Watershed. New York City purchased property around the reservoirs, which created buffers to let nature do its water-filtration work. New York City saved billions in construction costs for the new plant and is estimated to have saved many billions more in maintenance and repair costs.¹

While the initial Clean Water Act construction grants program and the Clean Water State Revolving Funds (CWSRF) have been available for innovative activities, most expenditures to date have been for more traditional wastewater projects, and not for enhancing water supplies through wastewater reuse and water recycling.

To provide Federal assistance, in 2000, Congress amended the Clean Water Act to add section 220 (Title VI of P.L. 106-457). Section 220 authorized appropriations of \$75 million for fiscal years 2002 through 2004 for EPA to make grants for alternative water source projects to entities with authority under State law to develop or provide water for municipal and industrial or agricultural uses in areas that are experiencing critical water supply needs, with a non-Federal cost share of 50 percent. This authorization has expired. If section 220 of the Clean Water Act was reauthorized, it would provide an authority to help meet some critical water supply needs around the nation.

The American Reinvestment and Recovery Act (Recovery Act)(P.L. 111-5) required that States spend 20 percent of the CWSRF and Drinking Water State Revolving Fund (DWSRF) funding received under Recovery Act on "green infrastructure, water and energy efficiency improvements or other environmentally innovative activities." Communities across the country have been able to work on innovative projects to reduce flows entering their wastewater treatment systems, thus improving the ability of systems to deal with surges of wastewater and stormwater during storm events. This could result in wastewater and stormwater being treated more effectively during storm events.

¹ Mark A. Benedict and Edward T. McMahon, "Green Infrastructure: Linking Landscapes and Communities," *The Conservation Fund* (2006).

Although the Recovery Act required States to spend 20 percent of Recovery Act funds for green projects, nationally, 30 percent of clean water and 29 percent of drinking water funds were used for the Green Project Reserve.² Overall, six States used approximately half of their clean water infrastructure money on green projects.³ These numbers indicate that there is a growing demand for programmatic and financial support for green infrastructure projects, especially related to clean water and drinking water infrastructure.

The EPA notes that it is generally less expensive to keep water clean than it is to clean it up.⁴ By way of example, one study shows that tree cover in Atlanta has saved more than \$883 million by preventing the need for stormwater retention facilities.⁵ A study conducted by the American Water Works Association and Trust for Public Land found a correlation between water supply treatment costs and the amount of forest cover in a watershed.⁶ In short, greater forest cover led to lower treatment costs for communities.

B. Cooling Effects and Air Pollution Abatement

Tree cover is essential to keeping cities cool and to help mitigate the urban heat island effect. Major shade trees have been shown to cool surface temperatures between nine and 13 degrees.⁷ Lower temperatures are important for helping to ameliorate the production of hazardous air pollutants like ozone, which is harmful to those with asthma and other respiratory issues.

Tree cover can also help to abate the pollution that contributes to climate change. For example, according to the U.S. Forest Service, each year, Chicago's urban tree canopy is able to remove 15 metric tons of carbon monoxide, 84 metric tons of sulfide dioxide, 89 metric tons of nitrogen dioxide, 191 metric tons of ozone and 212 metric tons of particulates.⁸ Further, according to David Nowak with the U.S. Forest Service, New York City's tree cover helps remove enough airborne pollution to save taxpayers up to \$10 million each year in pollution mitigation costs.⁹

C. Impacts on Real Estate Values

Additional green space created by the implementation of green infrastructure approaches can increase real estate values. In a poll conducted by the National Association of Realtors, 57 percent of those surveyed said they would be more likely to purchase a home near green space, and 50 percent said they would be willing to pay 10 percent more for a home located near green space or protected areas.¹⁰

² EPA, *Clean Water State Revolving Fund. Green Project Reserve Funding Status* (March 17, 2010). EPA, *Drinking Water State Revolving Fund, Green Project Reserve Funding Status* (March 26, 2010).

³ *Id.*

⁴ U.S. EPA, *Reducing Stormwater Costs Through Low Impact Development (LID) Strategies and Practices*, EPA 841-F-07-006, (December 2007).

⁵ Trust for Public Land, *The Economic Benefits of Open Space*, Trust for Public Land (1999).

⁶ Trust for Public Land and American Water Works Association, *Protecting the Source*, San Francisco, CA: Trust for Public Land (2004).

⁷ Casey Trees News (June 2004).

⁸ John Alderman, *Earhtalk: Do Urban trees really help reduce pollution and clean the air?* (August 31, 2004).

⁹ *Id.*

¹⁰ *Id.*

D. Flood Protection Benefits

Using green infrastructure and natural features in development may be beneficial in reducing flooding and saving resources for other projects, as opposed to stormwater retention. The conservation organization, American Forests, estimates that trees in our metropolitan areas may be worth \$400 billion in stormwater retention alone, because they help reduce and eliminate the need for the stormwater retention facilities to be built.¹¹ Further, national studies indicate an eight to one dollar savings ratio when lands are preserved and used for flood storage versus man-made structures.¹² Additionally, the less flooding communities experience, the less they will have to spend in costs associated with damage to property and infrastructure.

E. Quality of Life and Health Impacts

There may be additional benefits to the presence of urban tree canopy and green space in general. A study by the University of Illinois at Urbana-Champaign looked at crime rates in inner cities and crime rates were lower in areas with greener surroundings than those with less green space and tree cover.¹³

In terms of health benefits, green spaces that result from preservation or the implementation of green infrastructure can have a positive impact. One study indicates that people living near parks and other types of green spaces live healthier lives with fewer hospital visits.¹⁴

Pending Green Infrastructure Legislation

A. H.R. 4202, the “Green Infrastructure for Clean Water Act of 2009”

On December 3, 2009, Representative Donna F. Edwards introduced H.R. 4202, the “Green Infrastructure for Clean Water Act of 2009”. H.R. 4202 establishes a grant process through the EPA to establish and maintain between three and five centers of excellence for green infrastructure. One of these centers would be designated the national electronic clearinghouse center. Under H.R. 4202, the duties of each center include: researching green infrastructure; developing manuals and setting industry standards for low impact development and green infrastructure; providing information to the national electronic clearinghouse center; providing technical assistance and training; and evaluating regulatory and policy issues regarding green infrastructure. H.R. 4202 sets up a competitive grants program for eligible entities that manage stormwater, water resources, or waste water resources to implement green infrastructure projects. H.R. 4202 establishes a green infrastructure program within EPA’s Office of Water to focus on green infrastructure and integrate it into EPA’s other programs.

¹¹ Steve Lerner and William Poole, *The Economic Benefits of Parks and Open Space: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line*, San Francisco: Trust for Public Land (1999).

¹² Community Open Space Partnership, *Paint the Town Green: Green Infrastructure for Tomorrow*, Madison, WI: Community Open Space Partnership (2003).

¹³ “Green Streets, Not Mean Streets: Vegetation May Cut Crime in the Inner City,” Vol. 1 No. 2, University of Illinois at Urbana-Champaign Human-Environment Research Laboratory.

¹⁴ Mark A. Benedict and Edward T. McMahon, “Green Infrastructure: Linking Landscapes and Communities,” *The Conservation Fund* (2006).

B. H.R. 2222, the “Green Communities Act”

On April 30, 2009, Representative Allyson Y. Schwartz introduced H.R. 2222, the “Green Communities Act”. H.R. 2222 establishes a grant program for 80 municipalities to promote community greening initiatives. H.R. 2222 includes requirements for an eligible program partner to develop and plan such initiatives, including revitalizing public parks and spaces, tree plantings, and green roofs. H.R. 2222 establishes a grant program for five nonprofit organizations to provide technical assistance and training to eligible program partners in developing, planning, implementing and assessing initiatives.

WITNESSES

PANEL I

The Honorable Allyson Y. Schwartz
Member of Congress
Thirteenth District, Pennsylvania

PANEL II

The Honorable Adam Ortiz
Mayor of Edmonston, Maryland

Mr. David Yocca
Principal Landscape Architect/Planner
Conservation Design Forum
Elmhurst, Illinois

Mr. Timothy Richards, P.E.
NAFSMA Director and Stormwater Committee Chair
Deputy City Engineer
City of Charlotte, North Carolina

Testifying on behalf of the National Association for Flood and Stormwater Management Agencies

Mr. Bruce Boncke
BME Associates
Fairport, New York
Testifying on behalf of the National Association of Home Builders

Mr. Drew Becher
Executive Director
The Pennsylvania Horticultural Society
Philadelphia, Pennsylvania

Mr. Howard Neukrug, P.E.
Deputy Commissioner
Philadelphia Water Department

Philadelphia, Pennsylvania