

A relatively inexpensive method to maximize green infrastructure systems performance

Transforming Our Cities: High-Performance Green Infrastructure (INFR1R11)

The Central Issue

Managing urban stormwater to eliminate combined sewer overflows (CSOs) is a priority for many U.S. cities and numerous jurisdictions use gray infrastructure to manage their stormwater rather than green infrastructure. Gray infrastructure is often selected because green infrastructure is perceived to be less cost effective.

Context and Background

This research evaluated the most recent advances in computer hardware and software that maximize the performance of several green infrastructure assets. Pilot tests conducted at multiple locations showed that the technologies used were robust, low cost, and flexible. The research was conducted remotely on internet connected devices in real time, which was a dramatic step forward in monitoring stormwater flows.

Findings and Conclusions

This research supports the hypothesis that controlled, highly distributed green infrastructure may be a cost-effective approach to urban stormwater management. The research demonstrated that environmental real-time monitoring and control can be managed with field hardware and software for stormwater control assets. Guidance and case study examples in the report discuss installing real time controls for various stormwater and green infrastructure assets. Specifically, the research demonstrated that through both targeted field pilots and planning level analysis, the integration of these innovative systems provides a new suite of tools that utility operators can use to optimize investments in green infrastructure. Case studies include:

- Advanced Rainwater Harvesting Pilot Site – New Bern, North Carolina.
- Actively Controlled Green Roof Retrofit – SAP America Headquarters, Newtown Square, Pennsylvania.



Dashboard for system at New Bern incorporates live and continuous data streams from onsite sensors and NOAA forecasts.

- Advanced Rainwater Harvesting Systems – Department of the Environment, Washington, D.C.
- Advanced Rainwater Harvesting Systems – McCormack Baron Salazar, St. Louis, Missouri.

Management and Policy Implications

This research describes a relatively inexpensive method that can be widely adapted to various types of stormwater retention technologies. The application of real-time controls to green stormwater infrastructure is attractive because it combines the known benefits of green infrastructure (such as rainwater reuse, increased infiltration, dampening of peak flows) with the benefits of advanced decision making, automated controls, and real-time monitoring. Thus, utilities can impact stormwater capacity by controlling rates at which water enters their systems. Most importantly, cities facing the high cost of expanding stormwater infrastructure can achieve the same benefits with a much lower cost by retrofitting existing systems with real-time monitoring and controls.



Site photo of New Bern, NC with system control box.

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Related WERF Research	
Project Title	Research Focus
Tools for Evaluating the Benefits of Green Infrastructure for Urban Water Management: Informational Brief (INFR5SG09b)	Reviews the criteria, metrics, and protocols used to integrated water systems and provides overviews for two analysis methods – life cycle cost analysis and triple bottom line – as they apply to stormwater and urban water management.
Twenty First Century Water Asset Accounting – Case Studies and Implications Reports (INFR6R12a and b)	Suggests accounting frameworks for adding the cost savings provided by green infrastructure and watershed protection to the balance sheet in a format that parallels current accounting principles. Reports describe utility experiences and implications for widespread implementation of the frameworks.
LIFT Green Infrastructure Focus Area (werf.org/lift/)	LIFT’s Green Infrastructure Focus Area helps identify facilities and communities that are interested in working together to examine ideas, practices, and programs that will enhance their green infrastructure initiatives. Additionally, it provides data sharing opportunities focusing on design, cost, performance, maintenance, and communications aspects of green infrastructure programs and practices.

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