



GREEN STREET ELEMENTS



**CANOPY TREES**



**GREEN ALLEYS**

**CENTRAL LOUISVILLE GREEN INFRASTRUCTURE PARTNERSHIP**

*LOUISVILLE, KENTUCKY*

*The Partnership is an innovative approach to addressing stormwater and regulatory compliance while enhancing the life of its urban residents*

**PROJECT DESCRIPTION**

Pursuant to the federal consent decree issued in 2005, Louisville and Jefferson County MSD developed an Integrated Overflow Abatement Plan (IOAP) to correct violations of the Clean Water Act (CWA). The IOAP proposed a suite of projects, the majority of which were gray infrastructure such as storage basins, to provide additional system capacity to reduce combined sewer overflows (CSOs). MSD, with the assistance of Heritage Engineering, modeled sewersheds using the InfoWorks Collection Systems platform.

This 1,400-acre urban watershed—located in central Louisville—includes the University of Louisville Belknap Campus; residential, commercial and industrial land uses; and major rail and highway transportation corridors. Historically, the area drained to a tributary/slough of Mill Creek, before area surface streams were piped to carry combined stormwater and wastewater. In the early to mid-1800s, nearly 26 miles of streams were piped, and 560 miles of combined sewer system were installed. This area now drains to the combined sewer system, which discharges to the Ohio River.

In some basins, model results supported strategic placement of green infrastructure practices to replace proposed gray infrastructure storage basins and reduce CSOs to the regulated level of control. MSD developed a green infrastructure financial incentive program based on model results from the targeted sewersheds to encourage the use of green infrastructure and thereby improve water quality and reduce the frequency and volume of combined sewer overflows.

Since the piping removed surface streams from sight, over time, developments were built in flood-prone areas. This includes sections of the University of Louisville Campus and the Park Hill neighborhood, which experienced severe flooding in 1997, 2006, 2009 and 2011. Floodwaters caused more than \$25 million in damages at the University alone during the August 4, 2009 event (7.5 inches in less than 1 hour).

Louisville Metropolitan Sewer District (MSD) installed multiple green infrastructure projects in the watershed, including:

- Planting more than 115 canopy trees,
- Installing green alleys with infiltration trenches and permeable pavers at Magnolia Alley and Ormsby Alley, respectively.

These installations include nearly \$788,000 for a green roof and infiltration practices at the Business School; the Grawemeyer Oval; Speed Museum; and, the Ekstrom Library. Favorable sandy soils in the area contributed to the application of infiltration practices and maximized the volume of stormwater removed from the combined sewer system.

LEARN MORE

[http://www.msdlouky.org/aboutmsd/streamline/2015/StreamLine\\_08-2015.pdf](http://www.msdlouky.org/aboutmsd/streamline/2015/StreamLine_08-2015.pdf)

PROJECT PARTNERS

MSD has met extensively with the Old Louisville Neighborhood Association and Park Hill neighborhood residents as well as University stakeholders to discuss green infrastructure and flood mitigation opportunities. After the 2009 flood event, the University of Louisville included green infrastructure as part of its master plan, which spurred the density of green infrastructure on its campus.

## PURPOSE/OBJECTIVE

The Central Louisville Green Infrastructure Partnership is the result of MSD's forward thinking desire to simultaneously achieve regulatory compliance while reducing flooding and enhancing the quality of life for Louisville's urban residents. The goals of the Central Louisville Green Infrastructure Partnership include reducing the number and volume of CSOs; reducing flooding around the University of Louisville campus; reducing cost of CSO controls to ratepayers; and, increasing project benefits to the community.

## APPROACH

In light of repeated flooding—and the availability of MSD's green infrastructure financial incentives program—the University of Louisville and other area property owners partnered with MSD to install green infrastructure.

## LESSONS LEARNED

The project has demonstrated a significant positive impact on the environment and community. With no surface streams in the area, green infrastructure is used to reduce impervious area, increase tree canopy, provide open space, and capture and infiltrate stormwater that would otherwise travel through gray infrastructure and treatment plant effluent to the Ohio River, or overflow through combined sewer overflows. The green infrastructure projects treat the first flush of stormwater and reduce the volume and frequency of these combined sewer overflows, thereby lowering levels of bacteria that pollute the Ohio River.

Project information transfer within the clean water industry has included both local partners and national researchers. Leveraging partnerships with the University of Louisville and EPA Office of Research and Development (ORD), the project research, including planning, SUSTAIN water quality modeling, design, construction and post-construction monitoring have been documented and disseminated to national peers. Project impacts have been supported by the EPA, who provided peer review and also recognized Louisville's work with green infrastructure in a memo titled "Protecting Water Quality with Green Infrastructure in EPA Water Permitting and Enforcement Programs" as a benchmark example of meeting regulatory requirements with the use of green infrastructure. The green infrastructure knowledge gained from this project is now a key component of a new graduate-level class, as well as a capstone design class that MSD staff teaches at the University of Louisville, focusing on effective design and implementation of green infrastructure.

## POINT OF CONTACT

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This project enabled successful implementation of key portions of the Phase I stormwater quality MS4 permit program including requiring green infrastructure on new development, demonstrating viability of green infrastructure, outreach and education. The project is a successful component of MSD's implementation of a consent decree for combined sewer overflows.

These projects have combined to remove more than 123,000,000 gallons of stormwater, and nearly 300,000 gallons of Combined Sewer Overflow in a typical year. In addition to infiltrating stormwater, reducing flooding and combined sewer overflows, the project also provided ancillary aesthetic benefits to the project area cityscape— including open space, tree cover and paver blocks to revitalize and support underserved communities in this area. Per U.S. Census data estimates for 2013, the area's median household income (zip code 40208) was \$25,760. The data also revealed income for nearly 29 percent of households below \$15,000 annually. The green infrastructure projects reduce the magnitude and frequency of combined sewer overflows. Offloading the system mitigates flooding and combined sewer overflows and basement backups, thereby improving the quality of life for area residents.