CASE STUDY | Taking Steps to Protect Our Communities

FROM PARKING LOT TO BLOCK PARTY: D.C.'S CANAL PARK CAPTURES STORMWATER REUSE BENEFITS

In Washington, D.C., a former bus parking lot has been transformed into a community park and a model beneficial stormwater capture and use project that is also helping to reduce pollution in the Anacostia River. Stormwater that lands onsite and on neighboring streets is captured and managed with bioretention, tree planters, and cisterns, then reused to meet most of the park's water supply needs for landscape irrigation, fountains, and an outdoor ice rink. Canal Park's green spaces have provided the community with social, economic, and environmental benefits while reducing pollution in the Anacostia River.

BACKGROUND

Running through Washington, D.C.'s Southeast neighborhoods, the Anacostia River has been polluted, in part, by stormwater that has washed pollutants off pavement and into the river during rain and snowstorms. In 2000, 19 federal and District of Columbia agencies formed the Anacostia Waterfront Initiative (AWI) to improve the health of the Anacostia River and revive its waterfronts, adjoining communities, and parks. AWI's Anacostia Waterfront Framework Plan identified five themes for the Anacostia River effort: rejuvenating a clean and healthy river, eliminating barriers to access by the community, creating a system of waterfront parks, protecting the distinct character of the waterfront, and building strong, sustainable waterfront neighborhoods.

One of AWI's first proposals was to redevelop Canal Park, a three-acre, multi-block urban site formerly used as a school bus parking lot. The Canal Park project was designed as a demonstration project for D.C.'s Department of Energy & Environment

AT-A-GLANCE

PROJECT NAME:
Canal Park

COMPLETED:
2012

LOCATION:
Washington, D.C.

PROJECT FOOTPRINT:
3 acres

GREEN INFRASTRUCTURE:
Cisterns, tree planters, and bioretention

RESULTS:
The stormwater capture and reuse system collects an estimated three million gallons of water per year.

BENEFITS:
An estimated one million gallons per year of captured stormwater is treated and reused within the park to meet demand for irrigation, an ice rink, and two interactive water features.

November 2024

FORMER WASHINGTON, D.C., MAYOR ADRIAN M. FENTY (2010)

"Washington Canal Park will serve as a functional and fun space for the Ward 6 community. I am delighted that neighborhood residents will have an innovative and beautiful gathering place that can be enjoyed in any season."

(DOEE), meant to revitalize the waterfront neighborhood and improve water quality within the river. The potential for the site to become a community and social hub grew as more significant development projects arose in the area, including the Washington Nationals baseball stadium, the U.S. Department of Transportation headquarters, and the redevelopment of a public housing site nearby.

The Canal Park project was proposed as a national model for sustainability, incorporating a stormwater capture and reuse system, geothermal heating and cooling, electric vehicle charging stations, and the use of emissions-free maintenance equipment. Furthermore, the park project was chosen as a pilot for the national Sustainable Sites Initiative (SITES™), a rating system that certifies a project's sustainability in the planning, design, construction, and management of landscapes and other outdoor spaces.

PLANNING AND FUNDING

Funding for the project came from both public and private sources: Out of a total cost of $27.8 million, the D.C. City Council budgeted $13.5 million through tax credits for initial project development. The Canal Park Development Association was formed to secure the site and oversee development.

The Canal Park design incorporated bioretention, tree planters and three pavilions, which were a nod to floating barges once used on the nearby canal. The design also emphasized sustainability, which included water conservation and renewable energy. Because the area had experienced water pollution from combined sewer overflows, capturing stormwater before it enters the sewer system was a top design priority. Today, the innovative stormwater management system captures and treats stormwater from both the park and pavement from nearby sites; the treated stormwater irrigates landscaping, powers

Before and after image of Canal Park. The 3-acre site formerly used as a school bus parking lot was transformed into a multi-use waterfront park. Photo credit: SITES™.

RECOGNITION FOR SUSTAINABILITY

Canal Park achieved a Three-Star Certification in the SITES™ Pilot Program and Gold Certification in the U.S. Green Building Council's LEED® rating system for Building Design and Construction. These certifications symbolize the park's leadership in sustainable planning and design to address environmental challenges faced by the community, including climate change, ecosystem protection, and resource conservation. Community benefits recognized by the SITES™ and LEED rating systems include increased value; waste reduction; energy and water conservation; community health; reductions in greenhouse gas emissions; and tax rebates and other financial incentives.

sidewalk jets that children use to cool off during Washington D.C.'s hot summers, and is used for an ice rink in the winter. Additional captured stormwater is infiltrated or slowly returned to the existing drainage system.

PROJECT DETAILS

In addition to demonstrating good stormwater management, Canal Park is a multi-functional space with an ice rink and pavilions with amenities. The main pavilion contains a restaurant and utilities supporting the park and ice rink. Sustainable design elements include an accessible, vegetated green roof; geothermal wells that provide a renewable energy supply for the utilities; dark-sky lighting elements that reduce light pollution by directing light to the ground, rather than into the sky; high albedo paving that absorbs less heat; and electric car charging stations, bicycle racks, and recycling bins.

In addition to cisterns, tree planters, and bioretention installations, the park includes two interactive water features for an array of 42 programmable water jets and a shallow pool. Captured and treated stormwater is also reused for an ice-skating rink during the winter months. More than 150 trees and hundreds of shrubs and flowers are found within the park, and bioretention

6,000 square feet of linear rain gardens capture stormwater that falls within the Canal Park site for reuse. Photo credit: Washington D.C. Department of Energy and Environment.

5,650
square feet of bioretention

46
curb-edged tree planters

76,075
gallons of storage within two underground cisterns

STORMWATER MANAGEMENT AND GREEN INFRASTRUCTURE TERMS DEFINED

Combined Sewer System: A sewer system that collects both wastewater and stormwater that flows in the same underground pipes.

Combined Sewer Overflows (CSOs): Occur when heavy precipitation overflows a combined sewer system, causing diluted sewage to be released into local waterways. CSO events can dump nutrient pollution, high levels of pathogens, and chemicals such as pesticides into public water bodies.

Bioretention: A green infrastructure practice that treats and filters stormwater through layers of soil, sand, gravel, and other substances. It is landscaped with native plants appropriate for the region.

Tree Planter: A bioretention feature comprised of a tree planted within a curb-edged, which can include an underground pit containing a combination of media layers that allow stormwater to infiltrate to the subsurface.

Cistern: A large storage vessel that captures and stores stormwater, allowing it to be used for other beneficial purposes.

installations are planted with a range of native plant species.

Because the project design for stormwater capture and reuse was new to DOEE, existing regulations or guidance did not provide water quality standards for these types of non-potable applications. To address this challenge, the design team performed a risk assessment of the site and collaborated with DOEE to develop water quality benchmarks specific to the proposed stormwater management system. The collaboration led DOEE to add an appendix to their *Stormwater Management Guidebook* to provide a process for evaluating human health risks based on a system's collection area and possible exposure.

Recycled stormwater accounts for all of the water supply needs for the fountains located in Canal Park. Photo credit: U.S. Green Building Council.

The treatment system for the captured stormwater employs a combination of sediment removal, filtration, and ultraviolet disinfection to reduce concentrations of potential contaminants and treat 100 percent of biological pollutants.

RESULTS

The stormwater capture and reuse system at Canal Park captures and treats 95 percent of the average annual runoff from the site footprint and neighboring streets, or approximately three million gallons of water per year. Of this amount, an estimated one million gallons per year is directly used onsite, resulting in

In addition to housing a full-service restaurant, a skate rental booth, and utilities supporting the park, the main pavilion contains an accessible vegetated green roof and light cube that can project images, light shows, or videos. Graphic credit: STUDIOS Architecture.

significant environmental and societal benefits to the community:

WATER CONSERVATION: The captured stormwater satisfies almost all of the park's non-potable water supply needs for irrigation, an ice rink, and two interactive water features, saving approximately one million gallons of potable water per year.

IMPROVED WATER QUALITY: The stormwater capture and reuse system helps prevent combined sewer overflows by managing the stormwater onsite during wet weather.

COMMUNITY REVIVAL: Canal Park has helped renew the Anacostia Riverfront neighborhood and improve the community significantly by providing an inviting, interactive recreation area for both children and adults. The addition of native plants and attractive landscaping helps to enhance the appearance of the site, making it a welcoming place to visit and demonstrating investment in the community.

IMPROVED SAFETY: The increased pedestrian traffic to Canal Park has encouraged community gathering in the area. A 2015 survey of nearby residents by the local business improvement district found that 90 percent considered the area "clean and safe," compared to 30 percent in 2009.

LESSONS LEARNED

Collaboration between public and private organizations was critical in getting the project funded and addressing challenges associated with innovative design elements. Following are some lessons learned through the Canal Park project's development:

- **Partnerships promote improvements and innovative financing:** Partnerships between public and private entities were instrumental in raising money for the construction of the park and fostering relationships that resulted in an innovative stormwater management system design and long-term maintenance plan. The public/private partnerships had a positive

Recycled stormwater is used to create a seasonal ice rink within Canal Park, which serves as a social gathering area during the winter months. Graphic credit: OLIN.

impact on the neighborhood, including environmental and social benefits.

- **Authentic community engagement can inspire innovative water management:** The owners of the site conducted extensive community engagement prior to selecting a design to ensure the park included innovative elements that the neighboring community desired. The design team also worked with the local business improvement district to educate the public by conducting tours and creating educational signage throughout the park on how the stormwater management system functions to protect the surrounding environment and benefit the public.
- **Designs should consider long-term benefits and future development:** Canal Park's stormwater system was designed to scale-up over time. When other nearby lots are redeveloped, the stormwater system can connect to them and collect additional stormwater. This innovative thinking makes more water available for capture and use in the park, while providing economic benefits to those developing nearby areas.
- **Be responsive to public perception for successful water reuse:** Park managers were open to listening and adapting to community needs, which led to refinement of certain design elements. For example, when first opened, the park used reclaimed water for toilet flushing; however, park managers eventually received complaints from the public regarding the "dirty" appearance of the water in the toilets. Ultimately, park managers decided to alter the color of the water in the toilets and use city water in most of the toilets. Additionally, park managers noticed that pets were degrading substantial areas of green space and vegetation within the park shortly after the park opened. Later, a neighboring dog park was built to accommodate residents and their pets.

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