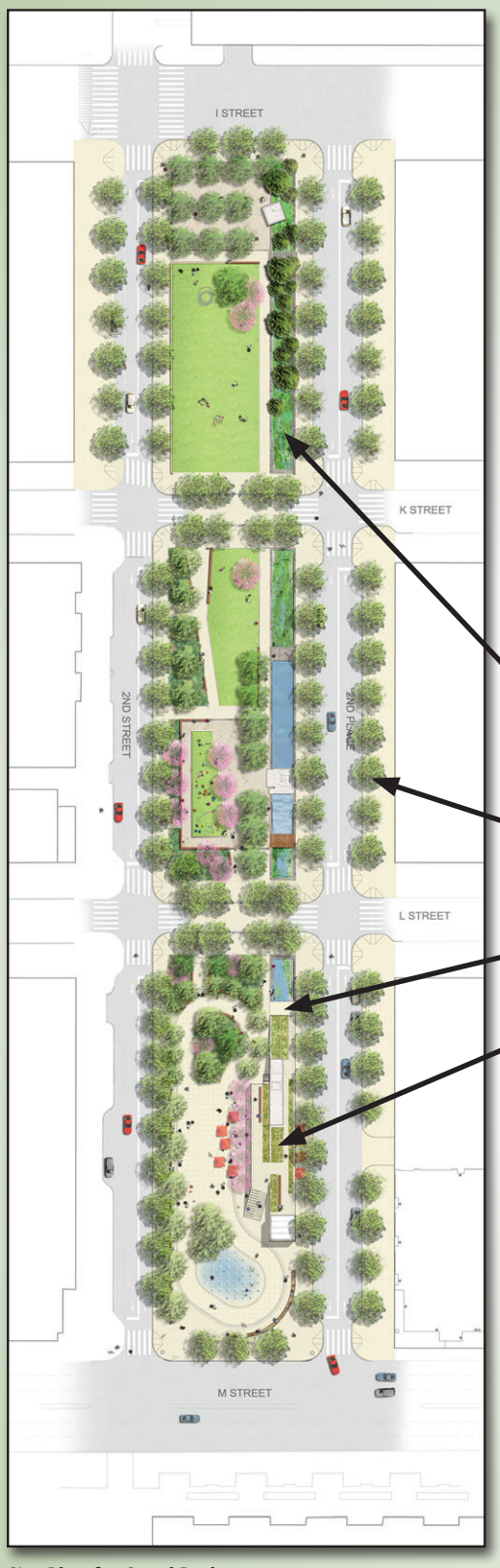
Case Study – The Use of Green Infrastructure in Parks

Canal Park, Washington DC



Site Plan for Canal Park
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Key Themes

- ✓ Brownfield Redevelopment
- ✓ Public-Private Partnership
- ✓ Neighborhood Stormwater Management

Canal Park serves as both an urban park and neighborhood stormwater management area to capture, infiltrate, treat, and use runoff collected from a 4.08 drainage area including both onsite and adjacent residential and commercial properties. The three-acre park provides open space and amenities including a café with outdoor seating, an interactive fountain, an ice skating path, and play and performance areas.

Green Infrastructure Design Elements/BMPs

7,500 square feet of **rain gardens** distributed around the edges of the site

41 **tree planters** located along the park perimeter collect street runoff through curb cuts

Two 40,000 gallon **cisterns** to store pre-treated runoff and filtered stormwater

a **green roof** located on top of the café and accessible by visitors

Annual Benefits

- ➥ **Meet 66% of the park's non-potable water demand using captured runoff** for irrigation, bathroom facilities, and outdoor amenities such as the ice skating rink and fountains. (estimated to be 99% when adjacent parcels are developed to provide another source of stormwater)
- ➥ **Avoid the cost** of treating and delivering 1.5 MG of potable water.
- ➥ **Reduce the amount of stormwater** by up to 2.35 MG annually from entering the combined sewer (which also receives sanitary waste) resulting in a decrease in the discharge of untreated wastewater.

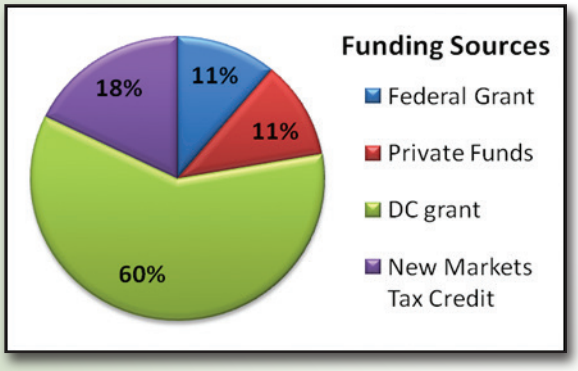
Brownfield Redevelopment

The Anacostia riverfront area in which Canal Park is located has undergone significant redevelopment. The park location had been a canal in the 19th century, an open storm sewer in the late 1800's, and paved over in the early 20th century. The District of Columbia acquired the site in the 1940s and most recently used it as a parking lot for school buses. The site was a designated brownfield prior to the development of Canal Park. The costs of remediating the contaminated soils was paid for by the project.

Canal Park is intended to be a model of urban sustainable design in terms of both the built and landscaped environment. The project has attained a U.S. Green Building Council LEED® Gold Rating and Sustainable Sites Initiative (SITES™) Three-star certification.

Public-Private Partnership

The planning, design, and fundraising for the park was spearheaded by a non-profit entity, the Canal Park Development Association (CPDA), which includes real estate developers, D.C. municipal officials, and local stakeholders. OLIN, a landscape architecture, urban design and planning firm led the design team. In total, $22.5 million of revenue was raised for capital expenditures from private donations and grants according to the breakdown provided in the figure below.

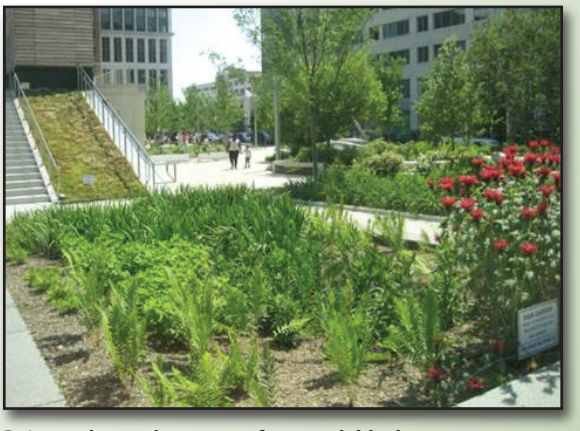


Critical to the project development was a license agreement between the CPDA and the D.C. city government. CDPA has a 40-year lease and is responsible for maintenance and operations, as well as compliance with stormwater requirements.

Funding for maintenance of the facilities is generated from the pavilion lease income and operations of the ice rink. The Capitol Riverfront Business Improvement District (BID) manages basic maintenance such as mowing, trash removal, and security, and also programs events in the park (e.g., movies, concerts, and holiday festivals).

Site in its former incarnation as a bus depot parking lot

View of Canal Park looking northward seven months after construction completed



Rain garden and green roof on south block

Tree planters, gardens, and benches located in the center block
© 2013 Alisha Goldstein

Ice skating rink, fountains, and café on south block
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Stormwater Management

The stormwater collection, treatment and use system is one of the showcase elements of the park design. Canal Park captures 2.84 million gallons (MG) of stormwater runoff annually through the rain garden/rainwater harvesting system and reuses 1.5 MG annually. Additionally, an estimated 0.85 MG of stormwater infiltrates directly into the ground through tree pits and permeable pavement. The stormwater management process includes the following components which are also visually shown in the schematic on the following page.

- Runoff from buildings and hardscapes is collected through entryway points into an underground pipe network
- Runoff flows through a hydrodynamic separator to remove coarse sediments
- Strained runoff is stored in a 40,000 gallon "pre-treatment" cistern before being routed through surface rain gardens
- Soil-filtered rain garden runoff is collected in a 40,000 gallon "clean water" cistern
- The "clean water" from the cistern is further purified by a micro-filtration and ultra violet (UV) irradiation treatment system
- Purified water is pumped to the bathrooms, fountains, and landscape for use.

The LID features in the park are sized to retain at least 1.2 inches of rainfall from a 24-hour storm on-site, exceeding the D.C. stormwater regulations at the time of construction (which required the capture and treatment of at least 0.5 inches of stormwater).

References

Integrating Stormwater Management and Public Amenities through a Public-Private Partnership, Canal Park – Washington, D.C., EPA 841-F-14-002, April 2014, U.S. EPA Office of Wetlands, Oceans, and Watersheds.

http://www.canalparkdc.org/

http://archrecord.construction.com/projects/portfolio/2013/08/1308-canal-park-olin.asp

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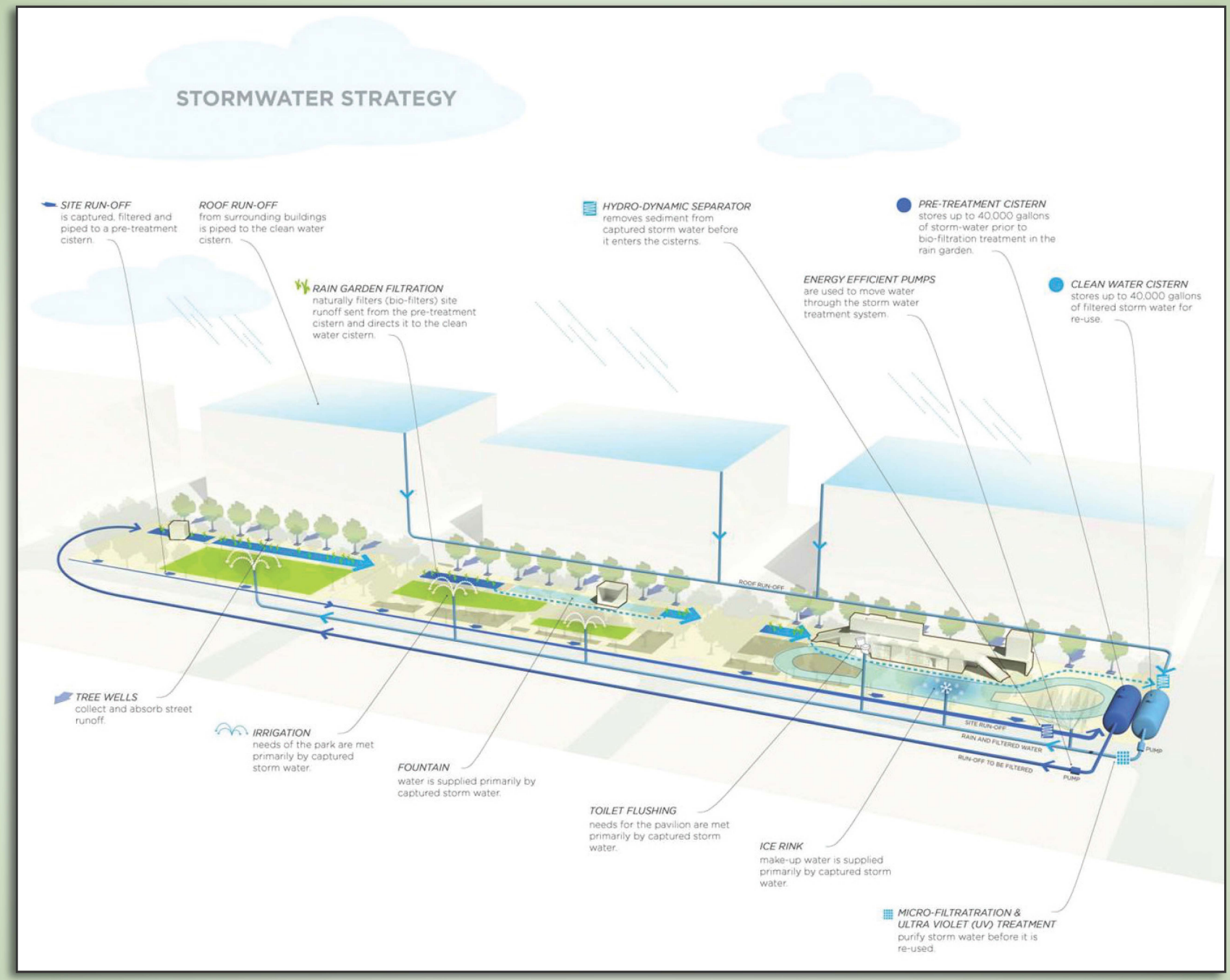

Schematic of the various stormwater features (i.e. rain gardens, cisterns, and water features) in Canal Park