



# Green Infrastructure & Stormwater Management CASE STUDY

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## Green Innovation Grant Program - Stormwater Tree Pits and Rain Barrels

**Location:** Utica, NY

**Client:** City of Utica

**Design Firm(s):** Shumaker Engineering and Land Surveying, P.C.

**Landscape architect/Project contact:** Shumaker Engineering

**Email:** [cszymanski@shumakerengineering.com](mailto:cszymanski@shumakerengineering.com)

**ASLA Chapter:** None

### Project Specifications

**Project Description:** This Green Innovation Grant Project resulted in the installation of stormwater tree pits, tree plantings, and rain barrels throughout the City of Utica that serve to reduce the volume of water entering into the City's combined sewer system, reducing peak flows, and providing additional filtering and treatment to stormwater that ultimately reaches the Mohawk River.

**Project Type:**

A retrofit of an existing property

**Design features:** Rain barrels, downspout removal, porous pavers, and curb cuts.

**This project was designed to meet the following specific requirements or mandates:**

State statute, local ordinance, to meet funding criteria, implementation of this project is part of the City's NYSDEC SPDES Permit to implement Best Management Practices per their Long-Term CSO Management Plan

**Impervious area managed:** greater than 5 acres

**Amount of existing green space/open space conserved or preserved for managing stormwater on site:** 5,000 sq/ft to 1 acre

**The regulatory environment and regulator was** supportive of the project.

**Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements?** The project followed Green Innovation Grant Program requirements.

### Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$1,000,000-\$5,000,000 (Public funding: State, local, NYS Green Innovation Grant Program w/ 10% local match)

#### Related Information:

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
Rain Barrels	EA	400	\$ 100	\$ 40,000
Street trees with curb alteration	EA	300	\$ 1,600	\$480,000
Tree pits	EA	25	\$14,000	\$350,000
<b>Total Estimated Construction Cost</b>				\$870,000
<b>Engineering (10%)</b>				\$ 97,000
<b>TOTAL</b>				\$967,000

**Was a green vs. grey cost analysis performed?** No, since the purpose of this project was to incorporate and implement green technology, grey costs were not considered.

**Cost impact of conserving green/open space to the overall costs of the site design/development project:** Since the purpose of this project was to incorporate and implement green technology, grey costs were not considered.

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** Slightly increased. Specialty tree pit structures suited for root growth and stormwater treatment in urban areas added costs over simple tree planting techniques.

**Number of jobs created:** Not available

#### Job hours devoted to project:

Planning and Design: 498

Construction: 844

Annual Maintenance: 2,040

## Performance Measures

**Community & economic benefits that have resulted from the project:** The installation of these proposed measures will lead to the enhancement of water quality within the receiving water bodies, and an enhancement of the quality of life in the City, ultimately leading to an increase in the overall economic vitality of the area through an increase in recreation opportunities, enhancement of local tourism promotion efforts, and the recognition by the business community that the region is committed to the improvement and conservation of natural resources.

## Additional Information

The City of Utica owns and operates a combined sewer system that collects both sanitary and storm flows and discharges to the Oneida County Water Pollution Control Plant. Relief points, or combined sewer overflows, exist throughout the sewer system to divert portions of the flow to adjacent storm sewers or directly to local creeks or the Mohawk River when the system is at or near capacity during certain rain events. Due to these combined sewer overflow (CSO) locations, the City holds a CSO SPDES permit with the New York State Department of Environmental Conservation (NYSDEC).

Among the requirements identified in the Permit, the City is required to implement a Best Management Practices program and a CSO Long-Term Control Plan in accordance with elements of the Guidance for Long-Term Control Plan published by the U. S. Environmental Protection Agency (USEPA) in September 1995. The goal of these programs is to reduce the frequency of CSO discharges and improve water quality. In addition to holding a SPDES permit for combined sewer overflows, the City is also an MS4 community, and thus holds a permit for stormwater discharges. Essentially, the goals of both permits are the same: to protect and improve the quality of the waters surrounding our community.

The 2010 City of Utica Green Infrastructure Program utilizes the absorbing and filtering abilities of plants, trees, and soil to protect water quality, reduce runoff volumes, and recharge groundwater supplies. The installation of stormwater tree pits, residential rain barrel systems, and simple tree plantings is an easy and economical, yet useful, tool in both filtering and controlling stormwater runoff. In addition to cleaner water, this approach will also produce cleaner air, enhanced water supplies, and reduced urban temperatures.

### *Tree Pits*

Tree pits, either concrete vaults or Silva Cell Systems (Deep Root Partners, L.P., San Francisco, CA), were installed throughout the City. Preference was given to the use of the Silva Cell

Systems, since their design would not restrict root growth as a concrete vault would. The plastic cell-type systems also allow for more stormwater storage and treatment than a concrete vault system since the cellular arrangement provides the structural support for concrete walks while providing protection to loose, granular soils surrounding the rootball. The tree pits are designed to act as retention devices to retain and filter stormwater, prior to discharge to the storm sewer system or conveying the filtered runoff directly to groundwater. The pre-cast concrete tree pits were only used in areas where adjacent utilities or poor soil conditions preclude the use of the plastic cell-type systems.

*Rain Barrels* A typical rain barrel system may save the use of up to 1,300 gallons of potable water for a residence over a 1-year period as lawn and garden watering can sometimes comprise up to 40 percent of a homeowners water usage. Rain barrels were installed as part of this program for intercepting rain water from roof downspouts and divert flow for use in watering lawns and gardens in an effort to reduce the amount of combined sewage reaching the Mohawk River during wet weather by removing flow from the storm system. This will serve to not only minimally reduce the peak flow which overflows to the Mohawk, but also to reduce potable water consumption within the City.

*Tree Plantings* Simple tree plantings were also installed as part of the Green Infrastructure Grant Program as an extension of the current City tree planting program. These tree plantings will be designed to intercept stormwater runoff from streets via curb cuts as their water source, thereby reducing runoff by capturing water which would normally be conveyed into storm sewers.

*Summary* The installation of these proposed measures will lead to the enhancement of water quality within the receiving water bodies, and an enhancement of the quality of life in the City, ultimately leading to an increase in the overall economic vitality of the area through an increase in recreation opportunities, enhancement of local tourism promotion efforts, and the recognition by the business community that the region is committed to the improvement and conservation of natural resources.

Under the 2010 program, the City installed a total of 20 Silva Cell System tree pits, 7 concrete tree vaults, 300 tree plantings, and 400 rain barrel systems.