



Green Infrastructure & Stormwater Management CASE STUDY

Wyoming High School Rain Garden

Location: Wyoming, OH

Client: Wyoming Rain Garden Committee / Metropolitan Sewer District of Greater Cincinnati

Design Firm(s): Vivian Llambi & Associates, Inc.

Landscape architect/Project contact: Todd Wales

Email: Todd.Wales@vla.net

ASLA Chapter: Ohio

Project Specifications

Project Description: Stormwater runoff from the high school roof, entry drive and parking lot were directed to an existing grass detention basin. The detention basin previously contained concrete swales that led to an outflow structure that was tied to the combined sanitary/storm sewer system. The concrete swales were eliminated, and the elevation of the outfall structure was raised to allow on-site infiltration. The 1,000 cubic foot detention basin was then planted with perennials, shrubs and ornamental grasses to create the rain garden. In addition to reducing stormwater runoff from the combined sewer system, the installation serves as an educational, green demonstration project.

Project Type:

Institutional/Education

Part of a new development

Design features: Rain garden

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

Metropolitan Sewer District of Greater Cincinnati (MSDGC), Global Consent Decree

Impervious area managed: 1 acre to 5 acres



Amount of existing green space/open space conserved or preserved for managing stormwater on site: Less than 5,000 sq/ft

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 educational component was important in the design. An educational sign was included and the school intends to use the rain garden as part of their Environmental Education Program.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: \$10,000-\$50,000 (Public funding: Regional, funded by MSDGC's Green Demonstration Projects Program)

Related Information: Project budget for design: \$2,000 Project budget for installation: \$30,000 (includes labor, materials, and equipment)

Was a green vs. grey cost analysis performed? No

Cost impact of conserving green/open space to the overall costs of the site

design/development project: All of the costs were associated with converting an existing detention basin with concrete swales into a

rain garden that captures and slowly releases stormwater runoff through on-site percolation or a slow release overflow structure.



Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Slightly reduced costs (1-9% savings). The rain garden reduces the amount of stormwater reaching the combined sewer system, and lessens the burden on the municipality for maintenance and repair.

Number of jobs created: Actual numbers not available. Temporary job for the design firm and the contractor.

Job hours devoted to project:

Planning and Design: Approximately 100

Construction: 200-300

Annual Maintenance: New installation. Maintenance hours not available.

Performance Measures

Stormwater reduction performance analysis:

Stormwater Analysis: Since the rain garden is proposed to be built in an existing lawn detention basin, the review has been limited to the 2-year storm. The addition of the rain garden adds approximately 1,000 cubic feet of storage capacity to the existing basin, all of which is available for any rain event.

Basic Assumptions: Watershed Area, $A = 190,540$ sq/ft (4.37 acres) Weighted C $42,420$ sq/ft roof 0.97 ac $\times 0.9 = 0.873$ $80,570$ sq/ft paving 1.85 ac $\times 0.9 = 1.665$ $67,550$ sq/ft lawn. 1.55 ac $\times 0.3 = 0.465$ $3.003/4.37 = 0.69$ Time of Concentration = 10 minutes

The existing condition and condition with the rain garden added were modeled using Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010. The software generates IDF curves from data taking from MSD Technical Reference Manual, Exhibit V-2. The hydrographs show that for the 2-year storm the rain garden reduced the peak discharge from 2.607 cfs to 1.825 cfs.

Community & economic benefits that have resulted from the project: Beautification, educational opportunities, increase of wildlife habitat and general biodiversity, reduced lawn maintenance, stormwater runoff improvements, stormwater quality improvements from on-site infiltration, increase aquifer recharge.

Additional Information

Links to images: (Please contact **Todd Wales** for project images)

<http://cincinnati.com/blogs/tricountytips/2011/04/13/wyoming-rain-garden-blooms/>

Through the funding of the Metropolitan Sewer District of Greater Cincinnati (MSDGC) grant, Vivian Llambi & Associates, Inc., was hired to assist the City of Wyoming in the development of a rain garden. A committee of community volunteers representing the Environmental Stewardship, Beautify Wyoming, and the Urban Forestry Board led the effort to install a rain garden as a demonstration project through a MSDGC grant program. The committee selected a site at the Wyoming High School due to its visibility within the community and the educational opportunity associated with the school. The Wyoming School Board embraced the project and has been an active partner in making it become a reality. Vivian Llambi & Associates' role included the rain garden design and the engineering calculations required to meet MSDGC's grant. The effort included determining the quantity of rainwater runoff that would be held on site in an effort to reduce the amount of stormwater entering the combined sanitary/storm sewers. It also included developing signage that would aid and promote the educational aspects of a rain garden. The design reflects the principles published in "Sustainable Landscape Systems for

Managing Storm Water, 2nd Edition” by MSDGC and The Ohio State University Extension. The rain garden will be used by the Wyoming High School Science department in association with the Environmental Education program. The project met all the requirements of the grant and was funded by MSDGC.

