Green Infrastructure & Stormwater Management CASE STUDY

Mount Pleasant Stormwater Retrofit Project Phase 1 - Parking Lot Rain Gardens

Location: Mount Pleasant Borough, Westmoreland County, PA
Client: Mount Pleasant Borough
Design Firm(s): Westmoreland Conservation District
Landscape architect/Project contact: Kathryn Hamilton, ASLA, RLA
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ASLA Chapter: Pennsylvania/Delaware

Project Specifications

Project Description: Mount Pleasant Borough retrofitted municipal parking lots with five rain gardens utilizing curb cuts, native plant landscaping, and a permeable concrete island with street trees to provide sustainable stormwater management where none had existed.

Project Type:
Commercial
A retrofit of an existing property

Design features: Bioretention facility, rain garden, porous pavers, and curb cuts.

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

Impervious area managed: 5,000 sq/ft to 1 acre

Amount of existing green space/open space conserved or preserved for managing stormwater on site: Not applicable

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 Mount Pleasant Parking Authority was willing to give up four parking spaces in metered lots to manage stormwater. This project reduces the volume of runoff and improves water quality within the Jacobs Creek Watershed.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: $50,000-$100,000 (Public funding: Federal - EPA 319 Grant thru PA DEP Growing Greener)

Related Information: $75,000 project cost included $8,400 for installing 1,300 sq/ft of permeable concrete (including stone subgrade); $10,900 for five rain gardens including excavation, underdrain, soil mix, and plant materials.

Was a green vs. grey cost analysis performed? Not applicable

Cost impact of conserving green/open space to the overall costs of the site design/development project: Not applicable

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Did not influence costs. Project is a stormwater management retrofit on an existing parking lot.

Number of jobs created: 1 foreman, 4 laborers for 3 weeks

Job hours devoted to project:

Planning and Design: 120 hours project coordination and design
Construction: 48 hours construction oversight
Annual Maintenance: Not available

Performance Measures

Stormwater reduction performance analysis:

1. Using the PA DEP SWM Manual of 2006, worksheet 13 and other Manual data, calculations were made for the removal of TSS, TP, and NO3 for the five rain gardens and the permeable concrete sidewalk included in this project. These project BMP's remove 12.7 lbs of TSS, 0.04 lbs of TP, and 0.02 lbs of NO3 from runoff for a typical one-inch rainfall event. In the Pittsburgh area, 81.1% of precipitation volume comes from rainfall events of one inch or less. Of our 45-inches per year, therefore, 36.5 inches falls in these one-inch or less events. The totals of pollutants removed from runoff in one year are: 463.5 lbs TSS; 1.46 lbs TP; 0.73 lbs NO3.

2. The rain gardens will also remove a total of 1,960 cubic feet of runoff from the typical one-inch rainfall event. In the Pittsburgh area, 81.1% of precipitation volume comes from rainfall events of one inch or less. Of our 45-inches per year, therefore, 36.5 inches falls in these events. These BMP's control runoff from 0.54 acres and will remove a total of 71,500 cubic feet of water or 536,000 gallons of water from the site runoff over the course of a year.

Community & economic benefits that have resulted from the project: The Mt. Pleasant Stormwater Retrofit Project Phase I is effectively capturing, treating, and reducing stormwater runoff in the Jacobs Creek watershed through the implementation of innovative stormwater BMP rain gardens and porous paving and is serving as an example of affordable and sustainable stormwater management within Mt. Pleasant Borough, Westmoreland County, and throughout southwestern Pennsylvania.

Additional Information

Links to images: Attached separately