



# Green Infrastructure & Stormwater Management CASE STUDY

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## GreenForge - Stormwater Management Retrofit

**Location:** Greensburg,  
Westmoreland County, PA  
**Client:** GreenForge Inc  
**Design Firm(s):** Westmoreland  
Conservation District  
**Landscape architect/Project  
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RLA  
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**ASLA Chapter:**  
Pennsylvania/Delaware



### Project Specifications

**Project Description:** The GreenForge project is an adaptive re-use of an industrial building for commercial use. Renovations included sustainable stormwater retrofit demonstrations across the site. Built in the 1980s, the 16,400 sq/ft structure had no stormwater management and contributed to erosion, flooding events and stream degradation in the Sewickley Creek Watershed. Innovative stormwater management technologies retrofitted onto the site include a 1,600 sq/ft vegetated wall to minimize the footprint of site disturbance, 9,000 sq/ft of green roof, 5,400 sq/ft of permeable pavements for parking and walkways, 700 sq/ft of bio-infiltration rain garden and native landscaping across the site.

### Project Type:

Commercial  
A retrofit of an existing property

**Design features:** Bioretention facility, rain garden, green roof, and porous pavers.

**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:** 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

green roof was a consideration for building heating and cooling, and the permeable pavements, vegetated wall, rain garden and, native landscaping all contribute to reducing the 'heat island effect'.

## Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$100,000 - \$500,000 (Public funding: State, regional - PA DEP Growing Greener II grant, PA DEP Energy Harvest grant, Southwestern Pennsylvania Watershed Protection Program grant)

**Related Information:** The project costs were over \$250,000 including \$18,500 for 3,900 sq/ft of porous paving using concrete unit pavers; \$13,100 for 1,500 sq/ft permeable concrete; \$139,100 for 9,000 sq/ft of new roofing membrane and green roof; \$3,900 for 700 sq/ft of rain garden; \$56,400 for 1,600 sq/ft of face for vegetated retaining wall system for low-impact development; and \$22,800 for native landscaping across the 2.6-acre site.

**Was a green vs. grey cost analysis performed?** No. This project was a stormwater management retrofit on an existing site where none existed.

**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)?** Not applicable

**Number of jobs created:** Not available

**Job hours devoted to project:**

Planning and Design: 510 for project coordination and design

Construction: 240 hours for construction oversight

Annual Maintenance: 30 total for all management practices

**Performance Measures****Stormwater reduction performance analysis:**

This project manages 50% to 100% of the 2-year storm event. The green roof will manage at least 50%, the permeable pavements will manage 100%.

**Community & economic benefits that have resulted from the project:** The GreenForge stormwater management retrofit is an educational showcase which includes a walkable stormwater trail. Visitors to the site can follow descriptive signposts explaining all the stormwater management retrofits and their benefits used on the project.

**Project Recognition**

PA/DE ASLA 2008 Special Recognition Award for Sustainability; National Concrete Masonry Association (NCMA) 2007 Design Award of Excellence; Smart Growth Growth Partnership of Westmoreland County Award 2008

**Additional Information**

**Links to images:** See attached

