



# Green Infrastructure & Stormwater Management CASE STUDY

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## Lawrence Technological University - Quadrangle Open Space and Campus Stormwater Master Plan

**Location:** Southfield, MI

**Client:** Lawrence Technological University

**Design Firm(s):** Harley Ellis Devereaux

**Landscape architect/Project contact:** Mark Hieber, ASLA

**Email:** [mehieber@hede.com](mailto:mehieber@hede.com) **ASLA Chapter:** Michigan



*Figure 1- Quadrangle features a perimeter bioswale, geothermal field of 100+ wells beneath it, adjacent green roof with gray water cistern below grade for toilet flushing*

## Project Specifications

**Project Description:** A campus stormwater master plan developed to describe how to create infiltration-based approaches to campus runoff. First project implemented from the Stormwater Master Plan was the Quadrangle Open Space that features an extensive bioswale with stone sub-trench to foster infiltration, decompacted subsoils following construction activities, rainwater cistern to collect roof water of adjacent Student Services Building for gray water toilet flushing and educational signing to help students understand the processes at play.

**Project Type:**

Institutional/education

A retrofit of an existing property

**Design features:** Bioretention facility, bioswale, green roof, cistern, and education.

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

Local ordinance, developer/client preference

**Impervious area managed:** 1 acre to 5 acres

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

**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?** We demonstrated that these valued aspects would be the outfall of an infiltration-based approach to stormwater management. Then the client wanted them considered.

## Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$100,000-\$500,000 (Public funding: None )

**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:** Allowed green elements to take the place of hidden pipes for stormwater conveyance. Site soils included free draining soil compositions which were more expensive than typical soils. Decompacting the site was not seen as a typical expense and was therefore considered an added cost (although it is really a protection of the investment in trees, plants and stormwater runoff reduction).

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** Slightly increased. Most likely due to contractor unfamiliarity with infiltration-based approach to stormwater management.

**Number of jobs created:** Not available.

**Job hours devoted to project:**

Planning and Design: several hundred hours

Construction: 100 hours

Annual Maintenance: Not available

## Performance Measures

**Stormwater reduction performance analysis:**

Info can be provided if needed.

**Community & economic benefits that have resulted from the project:** The Quadrangle Open Space is the central area of campus life and is used extensively for prospective student recruitment, as a student activities space, and as a mediating element for the various buildings that orient toward this open space.

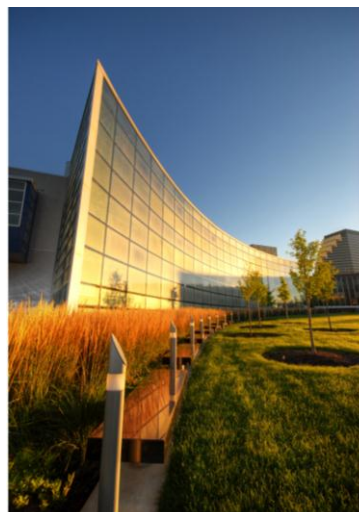
## Project Recognition

2010- Green Leader Award- Detroit Free Press

2011- Design Merit Award- ASLA, Michigan Chapter

## Additional Information

**Links to images:** <http://www.ltu.edu/map/> select #11 on map for photo



*Figures 2 & 3- Cross section of bioswale and as installed.*