



Green Infrastructure & Stormwater Management CASE STUDY

Parkway Central High School New Science Addition

Location: Chesterfield, MO

Client: Parkway School District

Design Firm(s): Parsons Brinckerhoff and Genesis Engineering

Landscape Architect/Project Contact: H. Lenn Miller, RLA, ASLA, LEED AP BD+C

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ASLA Chapter: Missouri

Project Specifications

Project Description: In 2008, the residents of Parkway School District passed a bond referendum that included appropriations for a major renovation and addition at the Central High School campus. The majority of the \$7.6 million apportioned for the project went towards the construction of a new 24,000 SF science wing located adjacent to the existing science building.

The building and exterior spaces are integrated into an existing hillside and incorporate sustainable planning techniques that meet the design criteria for LEED certification. Additionally, the site design leverages many opportunities for science educators to demonstrate the hydrologic cycle, wetland and prairie ecosystems and insect / animal habitats.

Project Type:

Institutional/education

A retrofit of an existing property



Design Features: The design includes a variety of stormwater infiltration facilities including three rain gardens, structured stormwater planters and a bio-swale. Roof downspouts were taken off-line and redirected through the infiltration facilities and a rainwater storage cistern. The design also includes an outdoor classroom and plaza spaces for student / teacher gatherings, 100% native plantings (including wetland and prairie species), porous pavers, a simulated fresh water spring and a science story wall.



A permanently wet aquatic pool serves as the central focus of the outdoor classroom. Rain water is channeled through the aquatic pool and stormwater planters, from roof drains and the surrounding site, through a series of cascading rills above the pool. In this regard, the dynamics of rain events become a showcase that students may observe from the relative comfort of a glass enclosed staircase in the addition.

This project was designed to meet the following specific requirements or mandates: The project was designed to meet the Metropolitan St. Louis Sewer District guidelines of removing 80% of the Total Suspended Solids (TSS) from 90% of the stormwater events. Additionally, LEED Sustainable Sites credits for Stormwater Design, Quantity and Quality Control was documented.

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? Yes, the exterior and interior of the new science wing are designed to meet Leadership in Energy and Environmental Design (LEED) standards to achieve a “Certified” status. 50% of the site was restored with native plantings. These were installed within infiltration basins and around pedestrian spaces (including an outdoor classroom) for the creation of usable green space. Additionally, energy savings will be realized by:

- optimizing building mechanical systems
- reducing urban heat island effect on roof and pavement surfaces
- passive solar and natural ventilation techniques.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: \$100,000-\$500,000 (Public funding: Local - school district funds)

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: It increased the cost, because the preserved open space on the site was completely renovated and replanted.

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? It increased the cost, because the preserved open space on the site was completely renovated and replanted. Additionally, structured bioretention planters were designed that provided a formal plaza / outdoor classroom setting.

Number of jobs created: Not available

Job hours devoted to project:

Planning and Design: 596 hours

Construction: unknown - approximate 6 month installation

Annual Maintenance: unknown - recently constructed (40 hrs./yr. anticipated)

Performance Measures

Stormwater reduction performance analysis: This project is part of a larger campus stormwater management plan that includes the use of detention basins to prevent contributing to excessive stream velocities of site. The implementation of infiltration basins and bio-swales, upstream of detention basins, reduces the rate of stormwater runoff generated by the project.

Community & economic benefits that have resulted from the project: Given that the project provides more instructional space, the value to the community and property values is greatly increased. The project also has great educational value, providing opportunities for science teachers to demonstrate visual examples of the hydrologic cycle and the importance of water quality on site in an instructional environment.

