



Green Infrastructure & Stormwater Management CASE STUDY

SOS Stormwater Management and Permaculture Food Forest

Location: Beacon Light Seventh Day Adventist Church 4841 Paseo Blvd, Kansas City, MO

Client: Keep Kansas City Beautiful and Beacon Light Seventh Day Adventist Church

Design Firm(s): Syntax Land Design

Landscape architect/Project contact: Hilary Noonan, Associate ASLA

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ASLA Chapter: Prairie Gateway

Project Specifications

Project Description: Stormwater management had not been addressed when an addition was added to the church. Last spring the church had 6" of stormwater in the sanctuary after a standard Midwestern thunderstorm. After looking at the situation I suggested a way to mitigate the effects of the stormwater and turn the problem into a large vegetable, fruit and nut garden for both the church and other members of the community. The church is located in an area where residents have limited access to fresh produce. In addition, the congregation is vegetarian. The church also houses and runs a daycare center. In addition a raingarden provides a restful place for reflection outside the front doors.

It is important to note that stormwater is not taken from the street and therefore does not need to be treated before it is available to the garden plants.

Project Type:

Urban agriculture

A retrofit of an existing property

Design features: Rain garden, bioswale, and curb cuts. Berms and swales were used down the hillside to direct and slow water. Pipe from the retaining walls brings water from behind the walls to the swales. Two shallow basins can hold water short term that can be piped back up the hillside to irrigate. Soil is being enriched with organic matter and planted with deep root plants, nitrogen fixers and dynamic accumulators to improve soil structure and ability to hold water.

This project was designed to meet the following specific requirements or mandates: To meet funding criteria, developer/client preference

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. Area around building was in big trouble. The soil is clay silt on top of limestone and shale. A little lawn grass had been spread about after grading had denuded the area. Excess soil had been placed on top of hills to the north and east making the problem worse and killing trees. No soil borings had been taken before building and no piers are under the church, just standard footings. I had to make sure water would not be directed under the church that could destabilize the foundation.

The regulatory environment and regulator was indifferent to the project.

Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements? We were concerned with making the project neat in appearance so members of the congregation would be comfortable with the transition. This is a new concept for most of the congregation to grow food instead of lawn. KKCB wants to use the finished gardens as an example of what can be done with green infrastructure. So showing a number of ways of handling the water was important to them.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: \$100,000-\$500,000 (Public funding: No public dollars were used)

Related Information: Net cost after in-kind contributions and volunteer labor will be about \$80,000.

Was a green vs. grey cost analysis performed? No They were living the grey cost!

Cost impact of conserving green/open space to the overall costs of the site design/development project: If we had simply put drains into existing city stormwater infrastructure we would have had to upsize pipes and would have destabilized another section of the hillside from construction damage. The cost would have soared. Not a possibility for the church.

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Significantly reduced costs (10% or greater savings). The retaining walls we built were less expensive than the first suggestion made by the team before I joined. The first suggestion was a standard (grey) management solution which would have built one massive wall 10' out from the church and sloped toward the street on the east. Further drains around the church would have gone to a catch basin in the city stormwater system. The catch basin would have been enlarged and the pipe to the next catch basin would have been upsized as well. Nothing would have been

done to stabilize and hold soil beyond the wall area north of the church, which would have continued as a problem.

Number of jobs created: 20 construction

Job hours devoted to project:

Planning and Design: 150 (volunteer)

Construction: 400

Annual Maintenance: 1,000 (volunteer)

Performance Measures

Stormwater reduction performance analysis:

Estimated figures are being recalculated to reflect as built conditions.

Community & economic benefits that have resulted from the project: The church community can provide food for themselves and they wish to make plots available to neighborhood residents to grow food. The church wishes to show leadership within the "green zone" of the city. The church wishes to encourage healthy lifestyles by providing a place for neighborhood residents to grow fresh food. The church wishes to encourage leadership in the congregation and the neighborhood by providing opportunities for participants to gain expertise as urban agriculturalists and good stewards of the environment.

Additional Information

Links to images: None available. We're doing this on a shoestring.

This project is under construction now. The project started in June 2010 and the first of the gardens will be planted this spring. Volunteer participation has been well attended. Additional volunteer dates have been advertised and well subscribed. Future plans will enlarge the garden and may include high tunnels to extend the season.