



Green Infrastructure & Stormwater Management CASE STUDY

Silver Creek Flood Reducation Study

Location: Toledo, OH

Client: City of Toledo

Design Firm(s): URS Corporation, Cleveland

Landscape architect/Project contact: Thomas Evans, ASLA

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ASLA Chapter: Ohio

Project Specifications

Project Description: The Silver Creek Flood Reduction Study identified measures to reduce chronic flooding in a 6,000-acre urban watershed in a mature, built out, urban watershed in northwest Toledo. The study compared traditional grey solutions to green solutions. Over 25 green infrastructure watershed restoration opportunity sites were identified which could provide up to 125 acre-feet of flood storage capacity and if fully implemented, remove more than 200 structures from the 100-year floodplain. The preferred green scheme offered cost savings of about 20% or about \$10M versus the grey scheme.

Project Type:

Other (please specify)

A retrofit of an existing property

Design features: Bioswale, green roof, porous pavers, stream restoration, floodplain restoration, and bioretention.

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

Project was designed to maximize the removal of more than 400 structures located in the 100-year floodplain.

Impervious area managed: greater than 5 acres

Amount of existing green space/open space conserved or preserved for managing stormwater on site: greater than 5 acres. The green scheme identified 25 opportunity sites within the 6,000-acre watershed totaling about 75 acres in proposed preservation areas.

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 city was also interested in improving water quality in the watershed.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: >\$5,000,000 (Public funding: Local)

Was a green vs. grey cost analysis performed? Yes - The Silver Creek Flood Reduction Study identified measures to reduce chronic flooding in a 6,000 acre urban watershed in a mature, built out, urban watershed in northwest Toledo. The study compared traditional grey solutions to green solutions. Over 25 green infrastructure watershed restoration opportunity sites were identified which could provide up to 125 acre-feet of flood storage capacity and if fully implemented, remove more than 200 structures from the 100-year floodplain. The preferred green scheme offered cost savings of about 20% or about \$10M versus the grey scheme.

The grey scheme was defined as enlarging numerous culverts and bridges to provide greater conveyance capacity. The green scheme was defined as excavating floodplain areas in opportunity locations adjacent to the highly channelized 8-mile stream corridor.

Cost impact of conserving green/open space to the overall costs of the site design/development project: Both grey and green schemes required land acquisition. Total costs of the green scheme were found to be \$10 M less than the grey scheme.

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 grey scheme, identified as culvert, bridge, and channel enlargement was significantly more costly than the green scheme, and probably would have difficult or impossible to obtain permits for.

Number of jobs created: Not available

Job hours devoted to project:

Planning and Design: 2,000

Construction: Not available

Annual Maintenance: Not available

Performance Measures

Stormwater reduction performance analysis:

HEC RAS modeling of the watershed revealed that the green scheme relieved flooding in most

of the stream tributaries and significantly reduced flooding in the main stem of Silver Creek. Some grey scheme culvert enlargements are required, due to a lack of opportunity sites in the urbanized watershed.

Community & economic benefits that have resulted from the project: Flood relief will improve quality of life and the desirability of the Silver Creek watershed. Restoring of riparian vegetation to channelized streams will beautify the neighborhood. Several opportunity sites were on school property, presenting educational land lab opportunities.

Additional Information

Links to images: A full project profile with images is readily available from the landscape architect.