Title: Urban Rain Gardens Improve Storm Water Retention in Lansing

Waterbody Improved: Upper Grand River, Ingham County, Michigan (AUID number 040500040704-03).

GRTS Numbers: This project does not have a GRTS number; it was funded by a Clean Michigan Initiative-Nonpoint Source grant

Problem: Urban storm water runoff from the Lansing metropolitan area is a source of nutrients and sediments to the Grand River, as well as a contributor to hydraulic alteration in the watershed.

Project Highlights: This project funded design, construction and monitoring of 30 street-side rain gardens (Figure 1) along four blocks of Michigan Avenue, a major thoroughfare lined with stores, restaurants and other businesses in downtown Lansing. The rain gardens were designed to treat street and sidewalk runoff from a 4.1 acre drainage area for at least a 1 inch rain event throughout the project area and up to a 4 inch event in certain areas.

This project was one of the first green infrastructure projects in Lansing and was a template for the installation of similar projects elsewhere in the city, including:

- Boulevard bioswales on Linden Grove Avenue
- Boulevard infiltration on Barnes Avenue
- Bioretention curb extensions on Washington Square
- Permeable pavement parking lane on Barnes Avenue

Tours of this project have been conducted for groups from Toledo, Ohio, Fort Wayne, Indiana, the Michigan Water Environment Association, and the national nonprofit group American Rivers.

Results:

Field measurements and SWMM modeling showed that the gardens decreased the runoff volume leaving the project site, decreased the peak discharge rate, and increased the time-of-concentration (Figures 2 and 3). Additional modeling predicted annual load reductions of 1,800 pounds of sediment, 9 pounds of phosphorus, and 41 pounds of nitrogen.

A year and a half after construction, inspection of the gardens found that 90 percent had good overall plant health and 10 percent had fair plant health; only 17 percent of the gardens contained excessive weed species; 80 percent of the gardens had good soil conditions, with poor drainage being the most common problem; and 17 percent of the gardens contained excessive amounts of trash.

Partners, Funding, and Congressional District: Design and construction was funded by a Clean Michigan Initiative Nonpoint Source grant to the City of Lansing. The grant amount was $595,200 and the match was $199,000, for a total of $794,200. Partners in the project were the Tetra Tech, Inc., C2AE, Aggregate Industries, Wildtype Design, Downtown Lansing, Inc., and the Michigan Department of Transportation. This project is located in Michigan's 8th Congressional District.

Photographs:

Figure 1. Photographs of the rain gardens.

Data table/graph/chart:

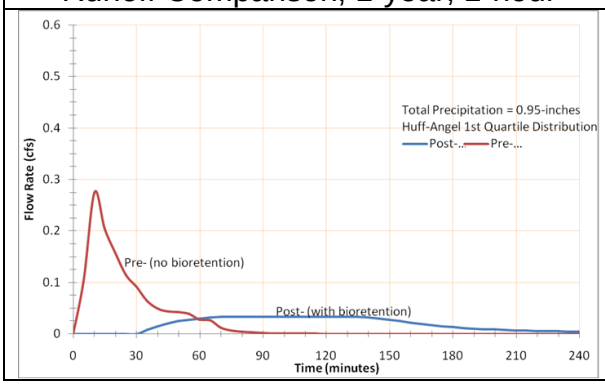
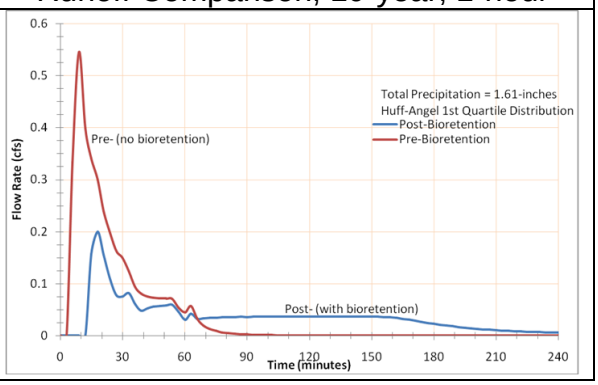
Runoff Comparison; 1-year, 1-hour	Runoff Comparison; 10-year, 1-hour
	

Figure 2. Model hydrographs for the 1-hour duration, 1-year and 10-year return interval rain events.

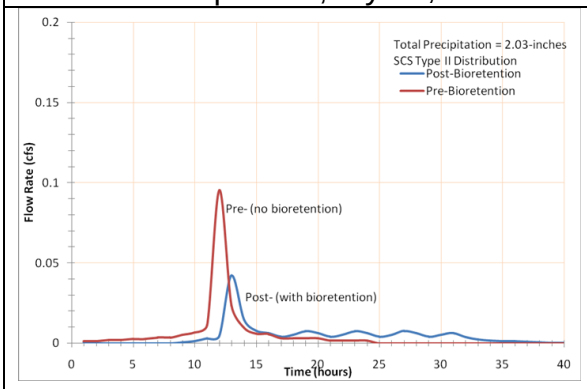
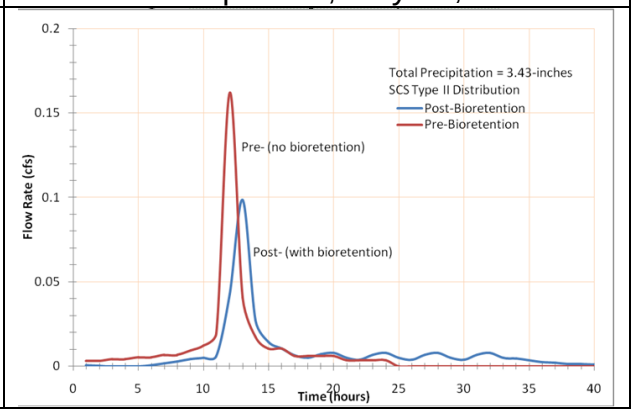
Runoff Comparison; 1-year, 24-hour	Runoff Comparison; 10-year, 24-hour
	

Figure 2. Model hydrographs for the 24-hour duration, 1-year and 10-year return interval rain events.

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