

Urban Stream MANAGEMENT

Variety of stabilization practices save an eroding Illinois tributary

By Jonathan Koepke, CPESC, LEED AP

Urbanization and land development in the 1930s to 1960s in the near western suburbs of the Chicago region has significantly impacted the ecology and hydrology of the Des Plaines River watershed. A tributary to the Des Plaines River, Silver Creek runs in back of and between industrial parks, shopping malls, roadways and residences as it makes its way to the Des Plaines River. Over the course of the past 30 to 40 years, the downstream sections of Silver Creek have experienced significant erosion, including channel scour and streambank loss. Because much of this section of the creek runs behind and adjacent to homes, streambank erosion

was of serious concern to residents and the village of Melrose Park, Ill.

Stabilization Story

The village of Melrose Park chose to resolve the ongoing streambank erosion problems, turning to Ted Gray, stream engineer and fluvial geomorphologist with Living Waters Consultants Inc., Oakbrook Terrace, Ill. Gray has many years of design, consultation and construction supervision experience in working with streams in northeast Illinois, particularly streams in urbanized settings.

The Silver Creek Phase III project was designed to provide long-term, environmentally sound solutions for stream management in an urban

setting. For that, a diverse series of stream stabilization practices was included in the design and installation, including rock toe, bank slope shaping, vegetated geogrid, fiber roll terraces, rock points, rock riffles, erosion control blanketing and native plantings. The design preparation included working with significant challenges.

“One design challenge for stabilization included that the Des Plaines River is located just 2,500 ft downstream of the project site,” Gray said. “During spring, this area floods several feet in depth over several continuous weeks. The height of the flooding extends to at least the middle of the bank. These unusual conditions make the banks susceptible to mass sliding and slumping due to the weight of the saturated soils and the loss of soil cohesion. In addition, this condition puts a high amount of stress on the native vegetation that is intended to stabilize the banks. As a result, the types of native plants that can tolerate these conditions are limited.”

The variety of practices implemented on this project was necessary to ensure that the challenging conditions imposed by the stream dynamics and watershed were addressed in a cost-effective way. One existing challenge that had to be addressed was the very limited access to the work area due to encroachment of homes, loss of bank soils and a high density of trees and woody debris along the creek corridor. The majority of the work area was



The Silver Creek Phase III project comprised many streambank stabilization solutions, including soil lifts.

densely wooded with large-diameter cottonwood, willow, elm and maple species. These undesirable species had contributed to the stream erosion by shading out native vegetation along the banks and creating debris jams. Cutting and removal of nearly all of the woody species and removing the existing fallen trees and debris was a necessary first step in constructing the project.

The steep slopes along the creek corridor and heavily eroded banks made traversing the work area difficult by foot and nearly impossible by machine. Additionally, permit restrictions on construction activity required that no equipment could operate in flowing water. The contractor on the project, Encap Inc., Sycamore, Ill., used a variety of innovative techniques to construct the project. Through the use of temporary piped stream crossings, benched access routes and heavy-duty timber mats to keep equipment out of the flowing water while constructing the project, workers were able to complete the work efficiently while still

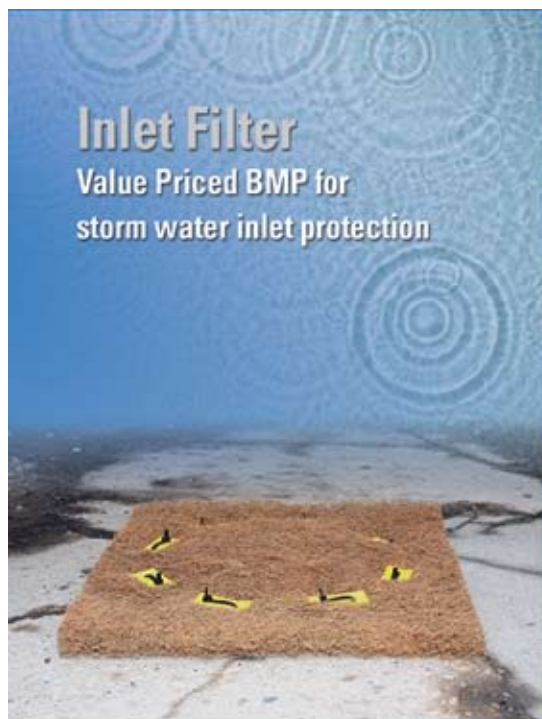


Workers installed geogrids on select stretches of Silver Creek.

maintaining permit compliance.

The most critical portion of the project was just downstream of a major bridge crossing on an outside meander of the creek. A nearly vertical eroded bank had been created about 6 ft in height. In order to restore this portion of creek bank, a series of soil lifts was reconstructed in this 200-ft section of bank utilizing uniaxial geogrid reinforcement of the backfill material used to reconstruct

the slope. In addition, a geogrid soil lift was constructed just above the rock toe stabilization utilizing a 3-D combination of erosion control and turf reinforcement matting. The face of the soil lift and the remaining slope were seeded with a specialized native seed mixture specific to this project. The upper portions of the slope and the regarded slopes were then seeded and stabilized using a bionet straw coconut erosion blanket.



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Put to the Test

Within 24 hours of construction of this critical section of the project area, a severe thunderstorm dropped nearly 6 in. of rain on it within a few hours. The result caused flood depths of nearly 8 ft above base flow, with massive flooding of the work area. To the satisfaction of the contractor, engineer and village, the project withstood the flooding with no damage, at a time when it was at its weakest. This was truly a testament to the power of design and proper construction.

This project, as with all successful projects, involved proper and thorough planning and design, collaboration between stakeholders and the coordination of regulatory agencies, the designer, residents, municipal officials and the contractor. Ultimately, the result is reduction of nonpoint source pollution, improved water quality in the stream reach and downstream watershed, improved habitat and stream structure and an improved aesthetics along the stream corridor.

This Silver Creek Phase III project was constructed with matching funds through the Illinois Environmental Protection Agency—from Section 319 of the Federal Clean Water Act—and the village of Melrose Park covered the remaining balance. **[SWS]**

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