



CASE STUDY

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Stabilizing Riverbanks with P550® and Native Vegetation

P550 Protects the White River in Indianapolis, Indiana from Sediment and Landfill Pollution

Background

For Indianapolis, Indiana residents, the White River offers many opportunities for outdoor recreation. The White River State Park, the Indianapolis Zoo, and the White River Botanical Gardens are just a few of the many points of interest nestled along the White River's shore. While the river is home to many recreational sites, by dissecting the booming state capitol with its continual industrialization, the river limits the available space for locating large municipal facilities. Due to the restricted building space within the city limits, the Tibbs/Banta landfill was forced to position itself in near proximity to the White River. This old landfill, along with a Teppco petroleum pipeline positioned just off the banks of the White River, posed a possible environmental threat to both the aquatic wildlife and the quality of the water so often used for recreational purposes.

Problem

Waves generated by wind and water traffic, as well as natural fluctuations in the river level due to storms and flooding events had caused the banks of the White River to erode. As riverbank erosion progressed, large amounts of soil were stripped from the shorelines exposing landfill waste. The deposition of sediment as well as landfill waste into the river threatened the water quality. Not only was the water quality an issue for the White River, but due to the placement of the petroleum pipeline and the potential for damage to the conveyance lines, the United States Army Corp of Engineers (USACE) restricted anchoring and dredging activities in that portion of the river. This restriction limited the available options for restoring the river and securing the banks from additional erosion.

Solution

The City of Indianapolis needed a solution that would provide both immediate and long term protection. With Environmental Protection Agency (EPA) funding only available for a short time,



High water flows and multiple flooding events each year leave the banks of the White River exposed, polluting the water with sediment and landfill waste.



P550 TRM protects landfill shore line through winter until vegetation establishes (top). Coneflowers and butterfly weed are two of the many wildflower species planted on the site (bottom).

the Erosion Solutions Specialists at D2 Land and Water Resource found a solution in North American Green's P550 permanent Composite-Turf Reinforcement Mat (C-TRM). The outstanding mulching characteristics of the P550 polypropylene fiber matrix provided the immediate erosion protection needed on the riverbank, by shielding both the seed and soil bed from erosive forces. The surface application of the TRM, as compared to a soil infilled installation, facilitated better root and shoot entanglement with the vegetation, offering the highest degree of reinforcement possible. The three-dimensional ultra-high strength netting structure of North American Green's P550 provided permanent root and stem reinforcement needed to sustain the river's high shear stress force and wave action that occurs during storm and flood events.

The shoreline stabilization project was started in April 2003 and continued through October 2003. The P550 turf reinforcement mats were installed on the 3:1 gradient slope on top of the prepared seed bed and stapled into place. Rock riprap was placed along the shoreline edge. The rock was used to anchor the bottom edge of the TRM and to help dissipate wave action along the shoreline. With easy installation requiring no heavy equipment, the P550 was the only solution that met both the EPA budget, and the USACE permitting restrictions. North American Green's P550 saved the city over \$800,000 compared to the cost of 30" rock rip rap.



Vegetation is nearly fully established on the river banks in only three months (top), and a mature vegetation stand (bottom) offers a diverse array of native species for wildlife habitats. The soft armored P550 C-TRM saved the city \$800,000 compared to 30" rock rip rap.

The vegetation selected for the White River shoreline included Graminoids (sedges, bottlebrush grass, wild ryes, and switchgrass, etc) and wildflowers (columbine, butterfly weed, asters, coreopsis, coneflowers, and goldenrod, etc). Initially there was some concern from the project developers that the selected native broadleaf plants would not be able to grow up through the turf reinforcement mat. These concerns were quickly relieved after high germination rates and quick vegetation establishment along the shoreline occurred within three months of installation, proving that the mulching characteristics of the P550 actually increased biomass establishment rates by 354% compared to bare soil.

Results

The performance of the P550 was put to the test immediately after installation. During the course of this 7 month project, the area was subjected to six high flow events, the first in April and the last a nine inch rainfall on Labor Day. After many of the storm events, the complete inundation of the river's shoreline lasted 15 days or more causing the river level to crest at 12 feet above average river level. Even with stream flow rates of 30,000 cubic feet per second (cfs) compared to average flow rates of 850 cfs, North American Green's P550 successfully stabilized the shoreline and protected the native vegetation during early establishment. Now, three years after the project was completed, the riverbank has been permanently restored, and the landfill contents are safely secured from exposure into the river. The fully established native vegetation harbors a multitude of wildlife, restoring the natural balance along the White River shore.