

ERTEC Environmental Systems

Protecting the Integrity of Global Lands and Waterways™

Case Study



Application: Stabilize Bank of Permanent Roadside Water Treatment Basin
Product: Bank Stabilization System™ **Date:** Summer 2006
Location: Lake Tahoe—Douglas County, Nevada
Customer: Logan Creek Estates General Improvement District
Engineer: JWA Consulting Engineers, Inc.
Contractor: V&C Construction, Inc.
Funded by: Tahoe Bond Act, Nevada Division of State Lands, U.S. Forest Service, Nevada Division of Environmental Protection

Project description and background

Logan Creek Erosion Control Project was a water quality improvement project. The site is located in the Logan Creek Estates residential subdivision along Highway 50. The broad project goal was to reduce the sources of sediment within the project area, then collect and convey storm water to designated treatment basins throughout the subdivision. In addition to the ERTEC Bank Stabilization System, the project included other erosion control measures such as retaining walls, rock-lined and asphalt concrete swales, concrete curb and gutter, drop inlets, sediment traps, treatment basins and re-vegetation to decrease runoff and sediment introduction into Logan Creek which flows into Lake Tahoe. The problems in the area are mostly due to steep cut slopes from the construction of the subdivision roadways, and included a lack of proper drainage adjacent to paved roadways, the sloughing of steep slopes, and unpaved roads. ERTEC's Bank Stabilization System was installed to protect the slope of a Sediment Basin.

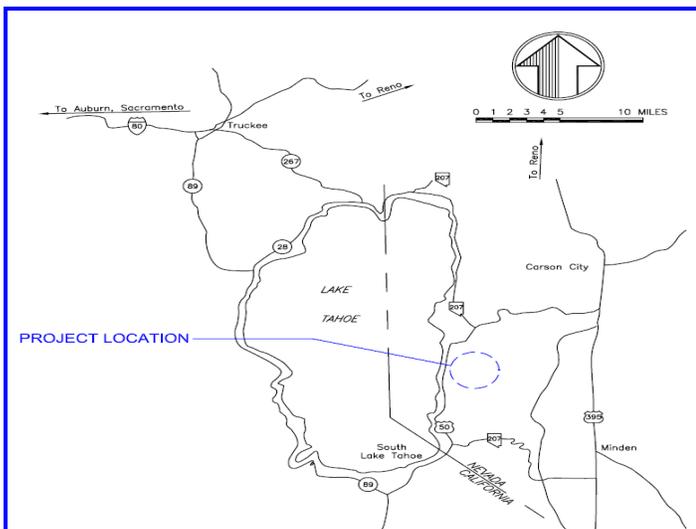


Fig 1: Location of ERTEC project at Logan Creek



Fig 2: Pre-conditions. Location of proposed basins

The problem to be solved

In one section of the project, in order to improve drainage adjacent to the road, two small water quality treatment basins were proposed within the right-of-way. With limited room for proper basin sizing, it was necessary to create steep slopes (1:1) to attain the required basin depth and volume. The steep slopes would potentially leave the adjacent road vulnerable to erosion mechanisms such as scour, sloughing and undermining. To protect the road, ERTEC's Bank Stabilization Modules were imbedded into the slopes, completely covered and vegetated. Additionally, to enhance drainage from the water treatment basins, permeable berms were created at the downstream ends of each of the basin, by installing the BSS system and filling with drain rock.

Additionally, given the project location is in a highly visible location it was desirable to achieve a functioning system that could blend-in with the natural surroundings with minimal or no exposed structures.

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Figure 3: Section assembly



Figure 4: Section placement—post trenching—bank protection



Figure 4: Filling of inter-basin berm trenching

Possible Consequences

A breach in the Water Treatment Basin Perimeter could have undermined the only access road to this residential development, and provided a steady source of sediment downstream into Lake Tahoe.

Alternatives

Rip-Rap. Eliminated due to limited space and high cost to install boulders. With limited space, rocks and boulders would reduce the volume available for water retention. There were also concerns about Rip-Rap’s negative visual impact.

Solution

The erosion-control structures selected for the project were one-foot diameter multi-cylinder modules (ERTEC Environmental Systems) of high-density polyethylene (HDPE). For Bank Protection—each set consisted of one 1’, one 2’, and one 3’ length cylinders fastened into a staircase buttress design. Two sets were fastened to each other to increase structural integrity, forming a module two feet wide. To increase soil retention, a 200-micron AOS filter fabric was layered within the cylinder walls. Initial soil excavation provided a level footing to set the modules. The perimeter surfaces and bottom of the modules were wrapped with a non-woven filter fabric to provide additional soil retention. The Berm system structure was similar but contained an additional 4’ cylinder. The Bank system was filled with sand slurry pumped in with a concrete pump. The two Berm systems were filled with drain rock. As installation was completed, crews back-filled the modules and voids with loose soil and compacted it. As a last step, crews shaped the two water treatment basins, installed re-vegetation and erosion control blankets throughout the basins.

Results

The installation will be monitored through coming storm seasons to assure that it has achieved its intended results. Updates will be recorded here.

Summary

This was a successful program for the following reasons: low cost, simple, and robust with Immediate protection of existing resources.



Figure 5: During backfill and basin forming



Figure 6: 2 months after installation