

ERTEC Environmental Systems

Protecting Global Lands and Waterways™

Case Study ProWattle™ Slope Stabilization



- > Lower Project Costs
- > Better Performance
- > R R R™

- ✓ Recycled
- ✓ Reusable
- ✓ Recyclable



Stakes on downstream side



Side view: staked, not yet backfilled

Application: Road Construction - Slope Stabilization
Product: ERTEC ProWattle™
Project: Caltrans HWY 70 widening
Gen'l Contractor: DeSilva Gates Construction
Subcontractor: ProTech General Contracting Services, Inc.
Project Date: August 2008—January 2010 & ongoing

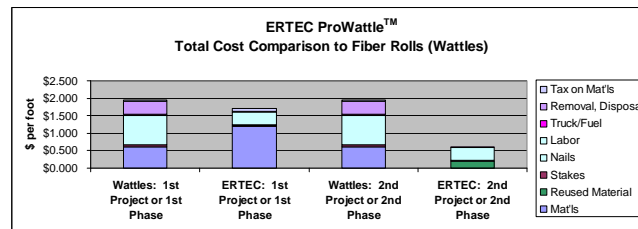
ERTEC ProWattle™ is a patented, **high performing, low cost, and high environmentally sustainable** system designed to protect slopes from erosion during construction. ProWattle™ dramatically reduces logistics, installation and maintenance costs. ProWattle™ is fast to install and unlike fiber rolls (wattles), it spreads rather than concentrates flow.

ProWattle™:

- Is part of a BMP system to protect slopes
- Designed to spread flow and eliminate undercutting
- Is made from post consumer recycled HDPE
- Easy to reuse (and recycle at the end of life)

The Method: The traditional practice in the Western U.S. is to use fiber rolls placed as water velocity checks along freshly graded slope contours evenly spaced and parallel prior to hydraulically applying a soil stabilizer. The intent is to minimize down-slope velocity so rilling and erosion can be controlled. Soil stabilizer, seed or straw is also applied to keep soil particles in place. Because they are cumbersome, fiber rolls can be logistics intensive and laborious to install. They also may become ineffective due to damming which often causes undercutting which in turn concentrates flows. ProWattle™ is an alternative to fiber rolls. ProWattle™ is reusable and can be redeployed when vegetation coverage is greater than 70%.

Initial Installation: ProWattle™ was installed in October 2008 along with soil stabilizer, seed and straw (approximately 30,000 feet). The total cost to install was half to three-fourths the cost of fiber roll deployment.

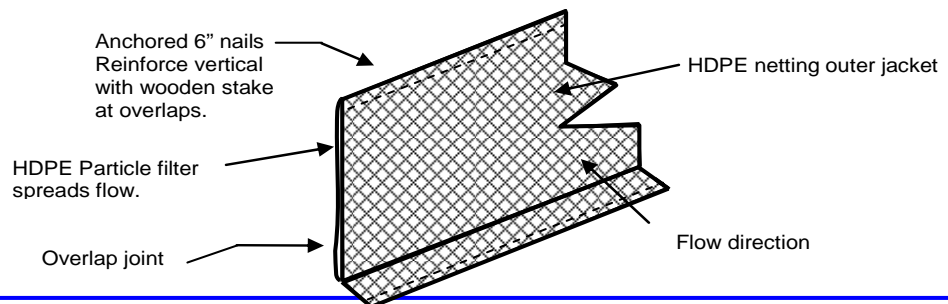


1st Install October 2008



February 2, 2009

During heavy storms in late January and February (30 inches during February), the system performed very well. The slopes remained stable with very little soil movement. By March, vegetation returned and by April 2009 the slope achieved greater than 70% coverage. It was now acceptable to remove and redeploy ProWattle™. (over)



Removal

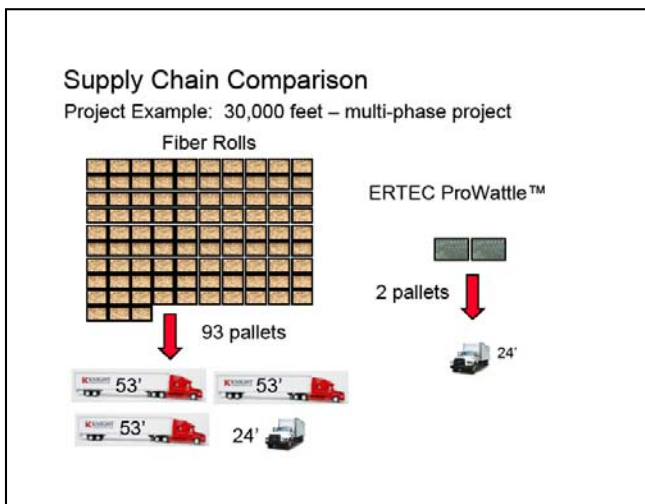
DeSilva Gates performed the initial removal operation in July 2009. Each abutment slope had about 3,500 feet of ProWattle™. A 3-man crew removed about 3,500 feet per hour. The soil was dry and hard, vegetation was thick and high and sediment had built up many areas against the product. ProWattle™ pulled up more easily than anticipated. The crews were able to remove the product by grabbing one end of the segment and pulling. The pins came up with it. ProWattle™ material strength was evident when the crews occasionally had to pull hard when a pin stuck. On a couple occasions it was necessary for the crew to use a tool to lift one end of a segment. All of the removed segments were intact and in excellent condition. There were no tears and no sign of ultraviolet light degradation after a 9 month installation. In most cases the nails or pins used to anchor ProWattle™ came up and were still lodged in the flaps (pins and nails can be reused). The filter fabric was also in excellent condition. It appeared that the wooden stakes could also be reused. Unlike fiber rolls, it was not necessary to dispose to landfill.

Transportation

Up to 2,500 feet was loaded into standard pick up trucks for quick transportation to the next phase of the project.

Reinstallation

Prior to ProWattle™ reinstallation, the installer must perform the 2-step quality check recommended by ERTEC (see installation guidelines at www.ertecsystems.com). A ProTech GCS crew reinstalled the recovered ProWattle™ segments on new abutments. The installing crew felt that additional stakes (4 feet centers versus 5 feet centers) were required on the 2nd installation because the material seemed less rigid. After analysis it was found that when pieces were restored to their "L" shape (by folding and walking back and forth along the crease) the rigidity increased. It was determined that 5 foot centers is acceptable on redeployed pieces. In early 2010, some of the material was removed and reinstalled the third time.



Summary

This was the first removal and redeployment after a major roadside slope stabilization.

"We are very happy about the cost and performance benefits of ProWattle™. Total cost is half that of wattles and drops with our subsequent redeployments. Performance is better. We saw excellent performance during the heavy storms of February 2009. We are continuing to redeploy the same material on new projects"
- John Coon—ProTech GCS

Environmental sustainability – for the first time a temporary slope stabilization project was completed with no material sent to landfill.

See video: http://www.youtube.com/watch?v=HuVzxoyR1_Q

A new way of doing things

Time and time again, ERTEC has delivered the following benefits to builders:

- Lower Total Cost
- Significantly Better Sediment Control
- High Environmental Sustainability

Job Notes

HWY 70 is a multi-phase, multi-year project:

- Original footage installed: 30,000 feet
- Amount redeployed to subsequent phases or projects: 30,000
- Average slope angle: 1.4:1

