

# *Use of HydraCX<sup>2</sup> Extreme Slope Matrix on DOT Slope Application*

**An erosion control project with the North Carolina Department of Transportation**

## **Background**

Roadside highway construction can have a huge effect on the environment if the proper measures are not followed. The fear of a harmful environmental impact became a realization when the North Carolina Department of Transportation introduced a large highway construction project near Murphy, North Carolina, which consisted of relocating 4.9 miles of US Highway 64. The large \$50 million dollar project in Cherokee County consisted of rerouting 4 traffic lanes and building two additional lanes. The highway relocation also consisted of paving the way through eight jurisdictional wetlands, along with building two bridges over the Hiwassee River. The Tennessee Valley Authority (TVA) was adamant that strict erosion and sediment control procedures were to be followed, all in an attempt to reduce the long-term and permanent effects that the construction project would have on the river and wetland water quality as well as the established wildlife habitats.

## **Problem**

With such a large construction site, many areas required slopes to be cut and filled. This process often results in steep slopes with loose soil beds with increased erosion potential. Early soil testing on the area concluded that the site had a high percentage of acid rock. This highly acidic soil type would require a heavy application of lime to make the site suitable for establishing vegetation. In general, the main erosion issues on the site were steep 1.5:1 (H:V) slopes ranging in length up to 120 ft, and poor soils. To protect the site from erosion, the North Carolina DOT would need to install a high-performance erosion control product that would result in good vegetation but that also would be appropriate for use in an environmentally sensitive area.

## **Solution**

While in the past the North Carolina Department of Transportation was accustomed to using temporary erosion control blankets for highway erosion control, they decided to assess an hydraulic mulch product on slopes after seeing an increase in such products on the market. The main reason for the assessment was initially cost driven, but the curiosity of the time savings with the use of a hydraulically-applied product was also a consideration. The North Carolina DOT selected HydraCX<sup>2</sup>, a mulch made with a proprietary blend of straw, reclaimed cotton plant material, tackifiers and polymers, from many other hydraulically applied products currently on the market. This high-performing matrix requires only 100 gallons of water to a 50 pound bag during agitation as well as other established performance capabilities. In addition, the HydraCX<sup>2</sup> mulch consists of all-natural fibers and contains no synthetic components; therefore making it



**All the slopes were track walked prior to application of HydraCX<sup>2</sup> Extreme Slope Matrix (top), while the mulch was applied to the steep 1.5:1 slopes from two directions (bottom).**



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safe for use near waterways and in wildlife habitats. Portions of the site were installed with the standard straw matting, while other sections were sprayed with hydraulic mulches.

### Installation

After road work completion, final grade was set at 1.5H:1V, and track walked up and down the slopes. Track walking slopes with a bulldozer can aid in reducing soil erosion by creating small cleat indentations where seed and water can collect. As the water collects, the erosive power of the rainfall is reduced.

Next, approximately two tons of agricultural lime was applied to the prepared soil bed to help mitigate the effects of the acidic soil. Then HydraCX<sup>2</sup> was applied to the slope surfaces at an application rate of 3000 lbs/acre. It was later realized that they had applied the matrix at a reduced application rate compared to the manufacturer's recommendation of 4000 lbs/acre. The matrix was mixed at a rate of 100 gallons of water per 50 lb bag of mulch, a reduced rate compared to other hydromulches which can require up to 150 gallons of water per 50 lb bag. In addition to the mulch and water, a seed mix of hardy fescue, bluegrass, Kentucky 31 fescue, and sercia lespedeza was also added to the slurry.



Carolina Construction was awarded the contract by the North Carolina DOT to apply the erosion control products on the Murphy project site. With many years of hydroseeding experience, Chip Staton, Supervisor and lead hydroseeder, was excited to test a new product for the NC DOT. According to Chip, “HydraCX<sup>2</sup> was one of the easiest hydromulches to handle. The mulch fell right out of the bag, and I experienced no clogs during the mixing and application process. It was a difficult site, and HydraCX<sup>2</sup> had excellent coverage and the labor savings were notable.”

Since the seed can be mixed directly with the mulch in the machine, and the water to mulch ratio is less than many other hydraulic mulches, the amount of time to mix and apply the mulch can be reduced. The NCDOT installation time was reduced by about 20% according to Chip Staton. Additionally, the number of crew members on site could also be reduced.

### Results

The first of the hydromulch was applied in July of 2007, with additional phased applications occurring in both August and September. While the weather during the summer proved to be drier than normal, the vegetation started germinating within a week of application. This quick germination was due partly to the nutrient rich HydraCX<sup>2</sup> mulch as well as the water holding ability of the fibers. Ed Ingle, Roadside Environmental Field Operations Engineer with the NC DOT, stated that he was “impressed with the germination and establishment rate of the HydraCX<sup>2</sup>” and “compared to other products, the vegetation germination was increased by 25-30%.” Chip with Carolina Construction also noted that he was pleasantly surprised with the quick germination. “I was astounded to see grass already present and visible one week after application, and the even distribution of seed was impressive.”

For the most part the summer was dry, but heavy rains occurred in August and September producing 4-5 inches of rain with at least one washing storm producing 2-3 inches of rain in a short time frame of about 30 minutes. This storm event was erosive enough to produce extensive erosion on areas not yet protected. The hydromulched slopes that had already vegetated did not experience any noticeable erosion, even though they had been sprayed at the incorrect application rate.

North Carolina Department of Transportation concluded that HydraCX<sup>2</sup> exceeded all expectations in performance and application. In addition the contractor was pleased with the ease of use and the time and labor savings incurred from this hydromulch. Since this demonstration, the North Carolina Department of Transportation has added a new high-performance matrix product category to its state specifications, opening up a new realm of products for use along the roadsides of North Carolina.