



Case Study

application	Reinforced Soil Slope
location	US Route 201, Moscow, ME
product	Mirafi® HS400

job owner	Maine DOT
engineer	Maine DOT
contractor	Bridge Corp., Augusta, ME

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

The challenge of this project was to realign a section of US Route 201 including the replacement of the Carney Brook Bridge at the outlet of Wyman Lake, located in Moscow, Maine. Prior to construction, the bridge was located on a horizontal S-curve and was the site of numerous accidents. Because Wyman Lake is classified as pristine water by the Maine Department

of Environmental Protection, and the outlet of Carney Brook to the lake is determined to be a fish spawning substrate by the Maine Department of Inland Fisheries and Wildlife. Further, this portion of Route 201 is classified as a National Scenic Byway.

The design and construction of this project needed to limit wetland impacts, with zero impact to the fish spawning substrate, while maintaining the esthetic requirements of the National Scenic Byway.

THE DESIGN

To reduce the severity of the S-curve, the new alignment was located downstream. Due to the high cost of a long span bridge, an alternate method of a shorter bridge with approach embankments touching-down in the lake could be constructed. The design included a 1:1 Geotextile Reinforced Slope, utilizing Mirafi® HS400. The south approach embankment is 295 ft. long, ranging in height from 9.8 ft. to 27.9 ft. The North approach embankment is 130 ft in length and ranging in height from 25.6 to 29.5 ft. To meet the National Scenic Byway requirements the slopes were vegetated using a TRM (Turf Reinforcement Mat).



Moscow, Maine.

THE CONSTRUCTION

The contractor built temporary forms to aid in the construction of the 1:1 slope. Up to 25 layers of Mirafi® HS400 with embedment lengths of up to 25 ft were used with select backfill. The reinforced backfill had to meet both MEDOT Type E specifications and the following requirements: 0 to 10% passing the #200 sieve with maximum aggregate size no larger than 1", plasticity index < 6, internal friction angle > 34 degrees, free of angular material and within a pH range of 3 and 9. No shale or soft, poor-durability particles were used.

The contractor was able to spread the reinforced soil and compact to 95% of standard Proctor effort. The lower zone reinforcing fabric was spaced at 1 ft and the 2nd and 3rd zone at 2 ft. On the 2nd and 3rd zones a secondary/.compaction aid geotextile was used. Each lift was stepped back approx 1'. Each step was then filled with a specific soil mix designed by MEDOT, seeded and then covered with a Turf Reinforcement Mat.

THE PERFORMANCE

By using Mirafi® HS400 for the Reinforced Soil Slopes, the wetland impacts to Wyman Lake were reduced by 50% over other construction methods. This option resulted in a cost savings of approximately \$700,000. The completed project met the National Scenic Byway requirements, while also resulting in a safer alignment than previously configured.



Moscow, Maine before construction.



Moscow, Maine during construction.

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