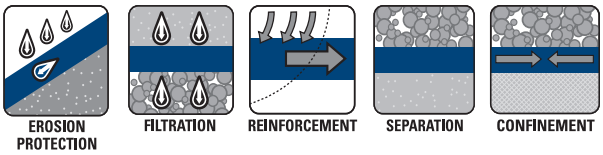
TENCATE Mirafi®



Case Study

application	Embankment/Sludge Lagoon	job owner	City of Columbus/ Ohio DOT
location	Columbus, OH- Highway I-670	engineer	Clyde E. Williams & Associates
product	FW402 & HP1500	contractor	Site Suppply, Inc.

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 extension of I-670 into downtown Columbus, Ohio had been on the drawing boards since the mid-1980s. The only alignment available was across a one-half mile stretch of gravel pits that had been filled with lime sludge from an adjacent water treatment plant. A 40 foot high embankment was required over the sludge lagoon. The sludge had a pH of 10 and was so soft that one could not even walk on it. Because of environmental consequenses, it could not be removed from the site. The choices were a bridge or a geosynthetic reinforced embankment. The embankment design would save $10 million.

THE DESIGN

A fully instrumented test fill was constructed and monitered for two years. The test fill was reinforced with a high-strength Mirafi® HP1500. Data was collected using strain gages, extensometers, pneumatic pressure cells, inclinometers, piezometers and settlement gages. After analyzing the test data, a final design was acheived. The design required geosynthetic reinforcement of 2400 lbs/in at 5% strain to maintain an acceptable factor of safety.

THE CONSTRUCTION

A monofilament woven geotextile,Mirafi® FW402, was deployed over the sludge lagoon(Figures 1 and 2). All seams were field sewn using a hand-held Union Special 2200B sewing machine. A prayer seam developed a grab tensile strength of 216 pounds, plenty for the design. Next, a layer of sand, three feet in thickness, was placed. Wick drains were installed on a 6' by 6' grid to dry the sludge. The design called for a composite strength of 2400 lbs/in at 5% strain. To accomplish this design, three layers of high modulus, polypropylene, multifilament, woven geotextile, Mirafi® HP1500, were installed 1 foot apart for reinforcement as the embankment was being built(Figure 3).

The final embankment was 40 feet above the level of the sludge with 2H:1V side slopes(Figure 4)

Figure 1

Figure 2

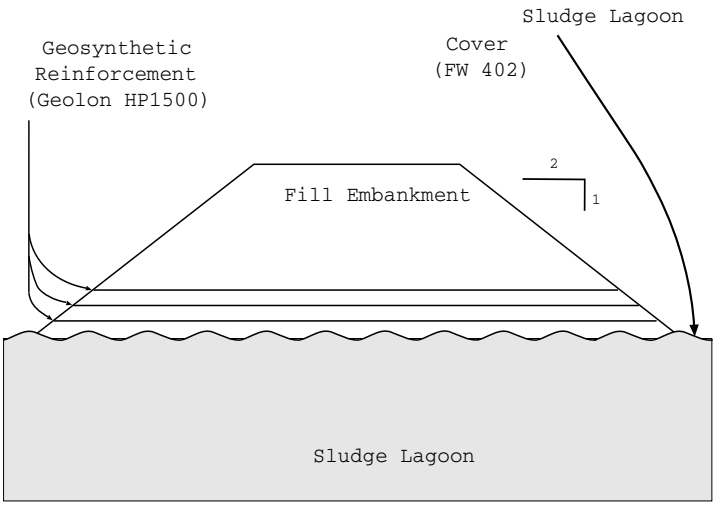
THE PERFORMANCE

Nearly $1 million of geosynthetics were used. Embankment continuity was maintained during construction as the structure settled approximately 10 ft. The embankment was constructed in 1997/1998. Final pavement will be placed after the surcharge is removed.

Figure 3

Figure 4

Cross-Section of I-670 Project Embankment



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