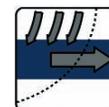




Drainage



Separation



Soil Reinforcement

Case Study

application | **Surficial Slope Reinforcement and Drainage**

location | **Livermore, CA**

product | **Mirafi® 2XT, 140N, G200N**

job owner | **Hanson Aggregates**

contractor | **Maggiore and Ghilotti,
San Rafael, CA**

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 Hanson Aggregates Quarry in Livermore, California, had been in existence for over 20 years as a local source for rock and gravel. As part of a future wetlands and ground water recharging area, the owner was required to restore the vast acreage of the site to its pre-quarry state. Placement of thousands of cubic yards of soil fill in the voids created by the many years of rock excavation was required for this restoration process. Also included in the project site was a 40' high slope and sedimentation pond. The massive slope structure needed surficial reinforcement to prevent sloughing of fill at the slope face into the sedimentation pond and a proper drainage system in order to insure overall global stability.

THE DESIGN

The design of the slope required that compacted engineered fill be properly drained to prevent failure and surficially reinforced in order to prevent the loss of soil from the face of the slope. The drainage of the slope was accomplished through the use of Mirafi G200N and Mirafi 140N. The engineer specified the Mirafi G200N geocomposite drain that was used to intercept groundwater and prevent saturation within the engineered fill. The G200N can be installed in one continuous piece from the top of the slope back cut to the bottom to form a chimney drain (G200N can be installed all at once or unrolled upward as the fill placement rises. Using the G200N removed the worries and construction nightmares associated with a typical rock chimney drain that must be placed one lift at a time (without any soil intrusion).



Mirafi® G200N, used as chimney drain, ties into Mirafi® 140NC wrapped subdrain system.

The engineer used Mirafi140N as a permeable separator geotextile that was wrapped around drain rock like a "burrito" at the foot of the slope. The Mirafi 140N allows water to freely pass through, while keeping the fine grained soils out of the drain rock. The Mirafi G200N was then tied into the Mirafi 140N burrito at the foot of the slope. Mirafi Miragrid 2XT geogrid was specified for use in the outer four feet of the slope face to maintain surficial stability of the slope face. The Mirafi Miragrid 2XT was designed to be placed every two vertical feet for the entire height of the slope. The slope was specified with a temporary erosion blanket to give temporary erosion protection for the hydro seeded slope.



Above: Drain rock being dumped on pipe and Mirafi® 140NC.

Below: Mirafi® G200N terminating at subdrain system.

THE CONSTRUCTION

The contractor on the project had no problems with the geosynthetic placement and the project came in on time. The flexibility and easy handling of the Miragrid 2XT made the installation of the surficial reinforcement simple and problem free. The Mirafi G200N unrolled easily upslope in one continuous piece and removed the tedious chore of placing rock every lift to form a rock chimney drain. The Mirafi 140N



filter fabric easily rolled out and held up well to the placement of the 3/4 minus drain rock. The owner and contractor were pleased with the outcome of the project.

THE PERFORMANCE

The use of the Mirafi G200N, 140N, and 2XT allowed the eroding slope to be transformed from an eyesore that was silting up the pond, to an aesthetically pleasing vegetated slope. The use of the correct drainage products and surficial reinforcement material provided by TenCate Mirafi created a slope that will remain stable for the foreseeable future.



Above: Backfilling of subdrain system.

Below: Covering of subdrain system complete.



Today, a fully vegetated competent slope.

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