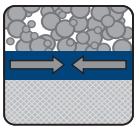
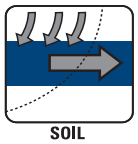
TENCATE Mirafi®


CONFINEMENT


SOIL REINFORCEMENT

Case Study

application	Tonaquint Drive, Roadway Construction
location	St. George, Utah
product	Mirafi® BXG12
job owner	City of St. George
engineer	Alpha Engineers
contractor	Sunroc Construction

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. TenCate™ Geosynthetics is charting a new course in roadway construction with the use of Mirafi® HP-Series High Performance, geotextiles and Mirafi® BXG biaxial polyester geogrids.

THE CHALLENGE

In St. George, Utah, 55,000 SY of Mirafi® BXG12 geogrid was used to provide stability in the reconstruction of Tonaquint Drive. Notable to this project was the use of a reduced subase thickness placed over the Mirafi® BXG12 geogrid and the ease of installation using the Mirafi® BXG12 geogrid for Sunroc Construction. Tonaquint Drive is now open for public use with an extended life to satisfy the growing traffic needs of St George.

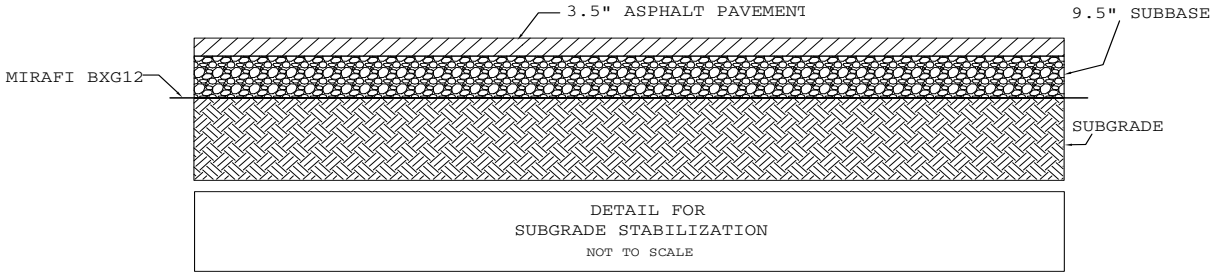
THE DESIGN

The pavement section design is a 3.5 inch thick asphalt pavement surface over a 9.5 inch subase on the geogrid. The subase consists of one inch maximum graded rock. The Mirafi® BXG12 geogrid is located below the composite pavement section along the entire road length. Prior to the reconstruction project, Tonaquint Drive was in "bad shape." The road consisted of failed pavement sections and severe cracking. The design to widen the road included complete removal and reconstruction. The roadway is a 4 lane major thourghfare moving traffic from housing subdivisions to retail centers and freeway access. Although city expansion occurs, high rock bands of lava cliffs restrict development of new roadways. Expansion of existing roads is critical to city development. This scenario lead to the use of a biaxial geogrid below the pavement section to ensure longer design life for the pavement. The Mirafi® BXG12 biaxial polyester geogrid provides high strength at low strain to support the repeated short term traffic loads.

THE CONSTRUCTION

The existing asphalt pavement and subase was removed and recycled. The subgrade foundation was prepared and inspected for suitability prior to new construction. The Mirafi® BXG12 geogrid was placed on the existing subgrade. Each roll of Mirafi® BXG12 is marked in white paint every few feet along the roll edge for inspection purpose. The 13.1 ft wide rolls were attached to a front end loader and the geogrid was unrolled by slowly backing up the loader in the roadway direction. A crew size of 2 laborers was used to adjust the 164 ft long rolls in place and achieve the proper 18 inch overlap. The Mirafi® BXG12 geogrid laid flat on the subgrade and remained in place during construction without the need for pins or weights.

Tonaquint Drive completed pavement surface



Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites
Geosynthetics
Industrial Fabrics
Synthetic Grass

TENCATE™
materials that make a difference

Rubber tired equipment including semi-tractor trailer bottom dump trucks and tractor blades (see photos) were driven directly on the Mirafi® BXG12 geogrid. Extensive installation damage testing has been conducted by independent laboratories to confirm the stability of Mirafi® BXG12 geogrid in construction. The subase was dropped directly on the geogrid and spread in 2 compacted 4.75 inch thick lifts. Compaction was achieved with a smooth drum vibratory roller operating on the one inch minus gravel subase. No construction damage occurred to the Mirafi® BXG12 geogrid and the geogrid remained intact without any deformation of the grid structure.

A 500 ft long section of poor unstable soft subgrade was encountered during roadway construction. The wet unsuitable soil was removed down a few feet to stiff clay. A layer of Mirafi® BXG12 geogrid was installed on the clay subgrade. In this section the recycled asphalt pavement was used as structural backfill. An attempt was made by the contractor to grind the asphalt millings to within the one inch maximum size subase gradation. However, the millings were filled with 4 inch size asphalt chunks. Although this is not a typical gradation size for biaxial geogrid, the Mirafi® BXG12 geogrid performed well as reinforcement layers in this structural backfill section.

THE PERFORMANCE

The use of Mirafi® BXG12 geogrid provides reinforcement stability to the Tonaquint Drive pavement roadway section. The traditional subase layer thickness may be reduced up to 20 percent with the additional reinforcement support provided by the geogrid. The Mirafi® BXG12 geogrid met the demand for long term pavement life under increased traffic volumes in St George while also providing a cost effective solution and a simple installation method.

Construction vehicles operating directly on Mirafi® BXG12

One inch minus gravel subase spread on Mirafi® BXG12

Mirafi® BXG12 placed over subgrade

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