



Case Study

application	Subgrade Stabilization & Reinforcement
location	Springdale, AR
product	Mirafi® RS580i

job owner
engineer
contractor

City of Springdale, AR
Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers
Boulder 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.

THE CHALLENGE

The City of Springdale, AR is constructing several miles of hiking and biking trails throughout the city. These trails link with other trails from adjacent cities. The State of Arkansas appropriated funds for these trail projects with an overall goal to create an extensive trail system throughout Northwest Arkansas. Part of the project included the construction of trail head parking facilities at different intersections of the trails. This project includes constructing a parking lot, restrooms, and a section of trail connecting portions of the trail already in place. The goal of the project was to have construction completed by the end of Spring 2015, in time for the busy trail use season.

The location of the project is on the north side of the Spring Creek at the southeast intersection of Silent Grove Road and West Pump Station Road. The project area is located in the flood plain of Spring Creek, and as a result the project site is often saturated by rain water runoff. The soils in the immediate project area are extremely moisture sensitive and saturated. The project site is also located in an archeological sensitive area. The design engineers for the project initially recommended a deep undercut of the existing soils to provide a stable platform for construction, but an alternative solution was needed due to archeological concerns associated with disturbing the soils in the area.

THE DESIGN

The design engineers for the project initially recommended 4 feet of undercut and replacement of the existing subgrade soil with a less moisture sensitive compacted aggregate to provide a stable platform for construction. The City of Springdale challenged the engineers to provide an alternative to the deep undercut due to the high cost and to the archeological sensitive nature of the site. Several alternatives were discussed, but ultimately the use of a shallow excavation utilizing TenCate Mirafi RS580i high strength geosynthetic was chosen due to the proven effectiveness of this roadway reinforcement geosynthetic.

The City of Springdale contacted TenCate Geosynthetics for assistance in providing a value engineering alternative for the project. Mirafi® RS580i was chosen due to its effectiveness in providing separation of the moisture sensitive soils from the planned base course backfill, as well as its stabilization and reinforcement performance properties, all of which allowed for a much shallower undercut of the existing subgrade soils.

The final design of the stabilization method consisted of placing Mirafi® RS580i on the existing subgrade and compacting 16 inches of Arkansas DOT Class 7 base course stone. The flexible pavement surface section consisted of 2 inches of hot mix asphalt was constructed on top of the compacted gravel layer constructed over the stabilized / reinforced subgrade soils.

THE CONSTRUCTION

Boulder Construction started construction in March 2015. Initially, the surface soils were excavated to the planned subgrade elevations, which varied across the site due to the location specific grades. The exposed subgrade was level, but not entirely smooth due to the presence of soft soils and the rutting that occurred with heavy construction equipment. Mirafi® RS580i was placed directly on the surface of undercut subgrade soils and overlapped a minimum of two feet (2 ft) at the roll edges.



Installation of Mirafi® RS580i.

Mirafi® RS580i was also extended vertically up the excavation face about one foot (1 ft) to provide additional lateral restraint for the gravel layer and to help maintain one hundred percent (100%) coverage of the reinforcement layer during construction. The aggregate was backfilled on the edge of the excavation and a heavy CAT bulldozer spread the aggregate out over the surface of Mirafi® RS580i. An initial eight inch (8 in) lift of gravel was compacted to ninety five percent (95%) maximum density utilizing smooth drum compaction equipment. The remaining eight inch (8 in) thickness of aggregate was then placed and compacted for a total of sixteen inches (16 in) of compacted aggregate on top of the layer of Mirafi® RS580i. A proofroll was performed the following day and no deflection of the compacted aggregate was observed. The entire parking lot area was left exposed for a couple of more months prior to the placement of 2 inches of asphalt and no rutting occurred in the gravel surface despite many rain delays and minor flooding.

THE PERFORMANCE

The City of Springdale had very limited options for economically designing and constructing the pavement for their trail head parking lot. Ultimately, utilizing Mirafi® RS580i in construction of the project allowed for a significant reduction in the amount of over-excavation that would have been required, and resulted in approximately \$100,000 in cost savings for the City of Springdale. Eliminating the deep excavation also eliminated the disturbance to an archeologically sensitive area that would have added unwanted delays to the project timeline. Although the contractor had used geosynthetics in construction of previous projects, they had never used a roadway reinforcement geosynthetic like Mirafi® RS580i. Even though the contractor was a little skeptical that any type of geosynthetic would be able to stabilize the soils present on this site, the performance of Mirafi® RS580i was a huge success, and everyone involved was very satisfied with its ease of installation and its excellent performance.



Mirafi® RS580i prior to the aggregate placement.



Spreading and compacting the aggregate on top of Mirafi® RS580i.

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365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400
Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com



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