

## Case Study

application  
location  
product

Subgrade Stabilization  
Highway 48, Stouffville, ON  
Mirafi® RS580i

job owner  
engineer  
contractor  
date of installation

Town of Whitchurch Stouffville  
Soil Engineers  
Coco Paving  
July 2015

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

Highway 48 is one of the main transportation arteries in the Town of Whitchurch Stouffville, part of the Regional Municipality of York, located 50km north of downtown Toronto, ON. To allow for increasing traffic demands, the road was to be widened by 5m in the northbound and southbound lanes over a 1km stretch to accommodate a second lane of traffic in both directions.

Since this was a lane widening project, the newly constructed cross-section had to remain similar to the existing roadway. This cross section consists of: 60mm surface asphalt, 100mm base asphalt, 150mm granular base & 600mm granular sub-base. Due to the volume of traffic expected, the design life for this road was 15,000,000 ESALs.

Upon excavating the existing shoulder, topsoil was found to be present in the sub-grade. The thickness of this topsoil was variable, exceeding 1m in some areas. When faced with the client's refusal to approve the removal of this topsoil due to the high excavation costs, the Soil Engineers design engineer contacted the local TenCate representative to discuss the situation. The TenCate representative conducted on-site Dynamic Cone Penetrometer (DCP) analyses to determine the California Bearing Ratio (CBR) of the topsoil. In-field measurements indicated dynamic CBR values as low as 2.3%. Soil Engineers decided to apply a safety factor of approximately 1.25 and lower this value to 1.7% for design purposes.

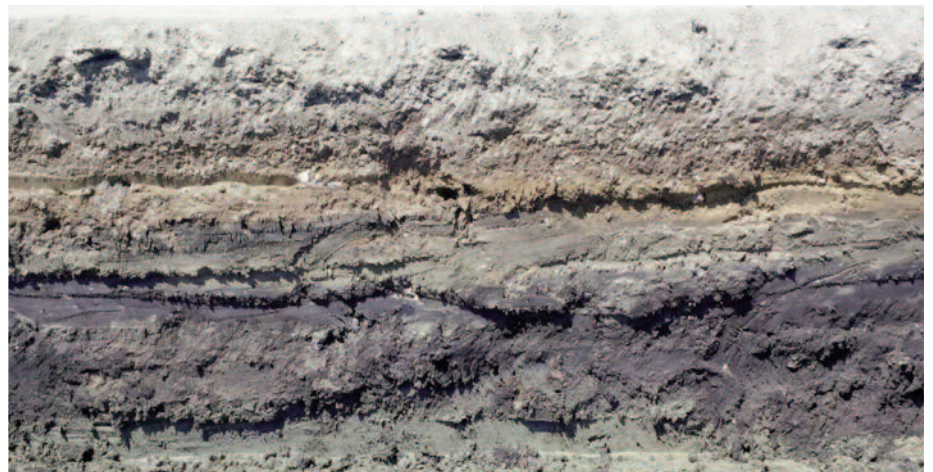
### THE DESIGN

Applying a dynamic CBR of 1.7% (equating to a Resilient Modulus of ~ 18 MPa) with the previously mentioned road cross-section, it was determined that the life expectancy of this section would be less than 4,500,000 ESALs, far short of the required 15,000,000 ESALs.

To attain this level of performance, an additional placement of 575mm of granular sub-base would have been required.



Excavation of the southbound lane of Highway 48.



Topsoil layer at bottom of excavated area.

Protective & Outdoor Fabrics

Geosynthetics

Aerospace Composites

Industrial Fabrics

Armour Composites

Synthetic Grass



TenCate proposed the use of Mirafi® RS580i, an engineered high-modulus reinforcement geosynthetic with unique separation and filtration capabilities which has been calibrated, by full-scale testing, to AASHTO 93 to provide quantifiable base reinforcement in flexible pavement designs and applications.

By incorporating the benefit of Mirafi® RS580i within TenCate's Miraspec design software, the revised # of ESALs dramatically increased to over 15,000,000. The design engineer submitted this design, accompanied by supporting documentation substantiating the approach incorporated into the Miraspec software, to the owner for approval and the decision was made to proceed with this approach.

### THE CONSTRUCTION

Following excavation to the proper depth, the contractor rolled out Mirafi® RS580i on top of the subgrade, and then completed the construction of the roadway as per design. Compaction of the granular material resulted in a very stable working platform allowing for the construction equipment to travel on the surface without undue rutting. The construction of the 5-metre lane expansion was completed and re-opened to local traffic on schedule.

### THE PERFORMANCE

The use of Mirafi® RS580i allowed the contractor and the owner to greatly reduce the amount of granular subbase that would otherwise have been required to widen the roadway lanes on this busy stretch of road.

#### Mirafi® RS580i provided:

- Superior tensile strength at low strains for subgrade support.
- Lateral confinement of the granular subbase.
- Substantial reduction of the granular subbase section.



Placement of Mirafi® RS580i.



Placement of Mirafi® RS580i.

TenCate Geosynthetics Americas assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate Geosynthetics Americas disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

Mirafi® is a registered trademark of Nicolon Corporation..

© 2017 TenCate Geosynthetics Americas

0217

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



ISO 9001 FM 61026

**TENCATE**  
materials that make a difference