



Case Study

application Crane Pad Reinforcement
location Toronto, ON
product Mirafi® HP770PET

job owner
contractor
date of installation

Hines
Geo-Foundations Contractors, Inc.
September 2013

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 United States development giant Hines, in partnership with Canada's biggest condo developer Tridel, are building the Bayside Development project in Toronto. This \$1.1 billion community will be located on Toronto's easterly waterfront of Lake Ontario. The development, expected to take at least a decade to complete, is being touted as the largest private-sector development in Waterfront Toronto's efforts to revitalize the city's lakefront.

The East Bayside portion of the project will be built on up to 30 feet of very weak fills that have SPT counts under 5. The existing fill varied widely from loose wet silty sand, to partially decomposed organic matter, to the occasional brick fragment. As it was economically not feasible to remove all this fill, Geo-Foundations Contractors Inc. was tasked to drive a series of deep piles for the foundations of the future condominium construction.

In order to drive their piles, Geo-Foundations required a working platform on which to operate a 125-ton drill rig that would be tasked with driving the piles. Additionally, the contractor would only be able to remove a maximum of 5' of fill to construct the working platform, owing to the existing high water table.

THE DESIGN

In order to drive their piles, Geo-Foundations required a working platform on which to operate the Delmag RH 28 drill rig. This 120 ton rig needed a substantial working platform in order to operate on the low bearing capacity fill located by Lake Ontario.

The Geo-Foundations Senior Project Manager had previous experience in using geosynthetic reinforcement for building such working platforms. This experience, however, was with subgrades that had higher bearing capacities and less variability than what was present on the Bayside Development Project. He contacted a TenCate Geosynthetics representative and requested assistance in the design of a reinforced working platform for the project. The TenCate engineering department correlated information from a series of borehole logs into a reinforced slope stability analysis using Mirafi® HP770PET as the reinforcement geosynthetic. This geotextile is composed of high tenacity polypropylene yarns in the machine direction and high tenacity polyester multifilament yarns in the cross-machine direction. It was chosen for its high tensile strengths, especially in the cross-machine direction.

The original slope stability analysis took into account a thin, stiffer crust of previously compacted fill (angle of friction of 8°, cohesion of 7 psi) overlying a very soft subsoil (friction angle 4°, cohesion of 1.5 psi). The reinforced design was determined to be 4' of granular material on top of the reinforcement. This was just within the 5' depth limit set by the water table governed by adjacent Lake Ontario.

THE CONSTRUCTION

Through some initial trial and error, it was determined that the Mirafi® HP770PET performed even better than originally anticipated. The final construction sequence consisted of laying the fabric outside the construction area and dragging it into place by hand. The reason for this is that the earth moving equipment was simply too heavy for the unreinforced soft fill and the contractor feared that it would embed itself into the fill.



Blading out the aggregate on top of Mirafi® HP770PET.

Afterwards, between 24 and 28 inches of recycled concrete was placed on the fabric in two lifts. This recycled concrete was graded like a local subbase material, however it was half the cost as the materials were locally present.

After the piles were driven, the Mirafi® HP770PET was removed to allow the contractor to pour their foundations.

THE PERFORMANCE

Geo-Foundations Contractors Inc. did not have the in-house expertise to design the necessary reinforced working platform. TenCate was able to demonstrate to the contractor and the owner that including Mirafi® HP770PET would make the working platform a technical reality. A TenCate representative was on site at the beginning of the installation of the geotextile to ensure that proper installation procedures were followed while providing the owner with reassurance that TenCate stood by its product and recommendations.



Two feet of overlap was needed when placing the Mirafi® HP770PET.



Driving piles on the reinforced platform.



Bridging soft soils and building the platform.

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

0317

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

