

Mirafi[®] PET Reinforcement Bridging Soft Coal Fines, Tailings Storage Closure, Australia



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TenCate Mirafi® PET reinforcement geotextiles are widely used worldwide in civil ground improvement works and the closures of tailings storage facilities (TSF) that need to be capped prior to cover material being placed.

A typical example of this is the use of Mirafi® PET reinforcement in capping of sections of soft coal tailings in a TSF impoundment in the Hunter Valley coal mining region of New South Wales, Australia. The areas to be capped comprised three sections with differing coal tailings strength conditions.

Tailing dams are used to store saturated mining by-products which makes for a very soft subgrade. This makes it challenging for construction machinery or people to traverse the site. Figure 1 shows the overall site and soft zones to be capped with the geotextile reinforcement. Each of the three zones required geotextiles meeting specific long term design strengths (LTDS) whilst the plan area of each section required materials be supplied in customized lengths to bridge across the entire area to be capped.

The tailings surface comprised a crust 300 mm – 500 mm thick. The tailings below the crust towards the centre areas of each zone comprised soft tailings with undrained shear strengths of <10 kPa. This required the geotextile reinforcement to be deployed along with the use of only light tracked equipment.

For Zone 1, geotextile reinforcement with a long term design strength (LTDS) of 145 kN/m was specified. Zone 2, which had a stiffer subgrade, required the geotextile reinforcement to have a LTDS of 70 kN/m, while Zone 3, the stiffest of all three locations, required the geotextile reinforcement to have a LTDS of 50 kN/m.

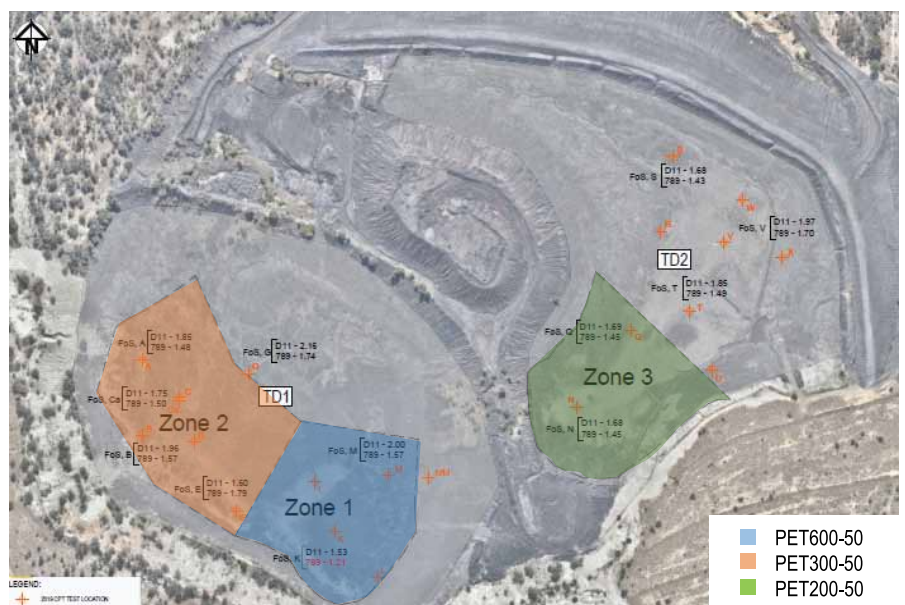
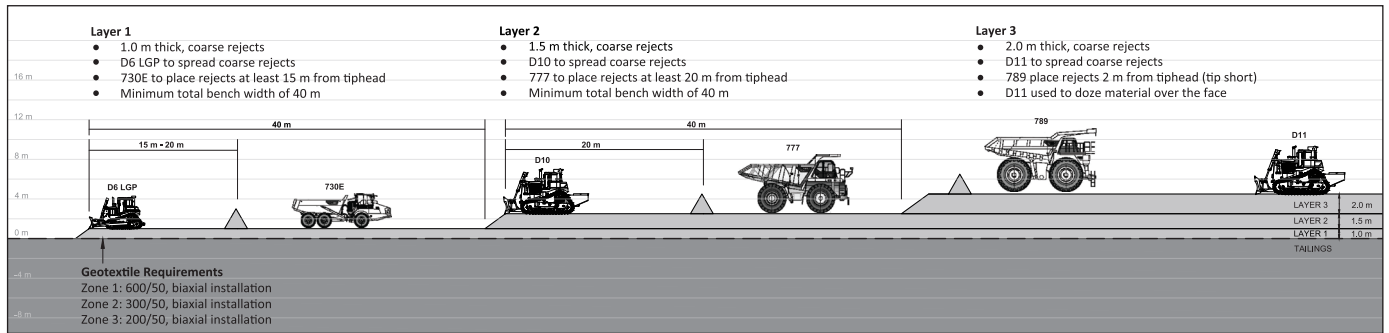


Figure 1: Plan view of the site illustrating reinforced work zones



After the laying of Mirafi® PET, mixed soil and site dump rocks are built up in layers to the final level

Three different grades of Mirafi® PET - 200kN/m, 300kN/m and 600kN/m were approved for use. The geotextile reinforcement was to be laid in two layers perpendicular to each other and be securely anchored around the edges. The rolls were supplied in varying lengths according to the detailed layout plan developed by the contractor.

Zone 2, the largest of the three zones, was the first to be capped, with Mirafi® PET300 supplied in lengths ranging from 130 m - 200 m. This was followed by the installation of Mirafi® PET 600 over Zone 1, the softest zone. Finally, Mirafi® PET 200 was installed over Zone 3, the firmer of the three zones.

All materials manufactured and supplied to the project were tested and certified in accordance with the design requirements. Each roll was also individually marked to indicate the zone and layout section it was required to be laid to facilitate correct placement on site. Deployment over the soft tailings was undertaken using a light tracked Bobcat with a laydown dispenser to facilitate easy unrolling.

Following installation, the Mirafi® PET reinforcement was covered by an initial 400 mm layer of mixed spoil laid as finger berms progressively penetrating out towards the centre of each Zone and then being infilled (Figure 2). This method of filling tensions the geotextile and enables faster closure of the unfilled areas between the finger berms. Once capped, these layers of mixed spoil will be covered with layers of site dumped rock to a final level designed to facilitate natural vegetation growth.

Every soft site closure brings with it a series of unique challenges and this project is a case in point with three different locations requiring specific solutions. Invariably, in projects such as these, the areas to be covered are large and subgrades are often soft and unstable, or even under water.

TenCate can supply specification compliant, custom lengths, designed to bridge the entire area without seaming. Also, specially fabricated fabric panels can be deployed across large areas in a single pull.



Reinforcement geotextiles delivered in custom roll lengths and installed using light Bobcat equipment. Each roll is individually marked to assist laydown works

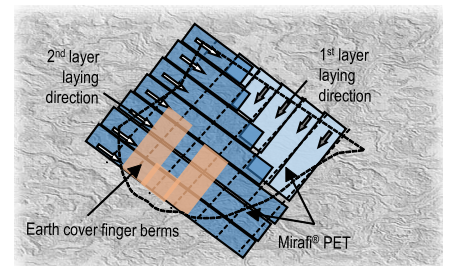


Figure 2: Multiple layers of Mirafi® PET laid perpendicular to each other to cover the full designed area



An aerial view of the tailings storage closure

Geosynthetics Solutions for Engineering Structures

Malaysia

TenCate Geosynthetics Asia Sdn Bhd
Registration No. 199301009495 (264232-U)
14, Jalan Sementa 27/91
Seksyen 27, 40400 Shah Alam,
Selangor, Malaysia
Tel : +60 3 5192 8568
Fax : +60 3 5192 8573

Philippines

TenCate Geosynthetics Asia Sdn Bhd
Philippines Representative Office
Unit 1803 West Avenue Suites
124 West Avenue Barangay Philam
Quezon City, Philippines 1104
Tel : +63 426 8834 / 426 8835
Fax : +63 518 9028

India

Tencate Geosynthetics India Pvt Ltd
Vishwasri GL, Plot No 5, IInd floor,
Vijay Nagar Colony,
Behind Secunderabad Club, Picket,
Secunderabad – 500003 Telangana,
India
Tel : +91 40 2770 1271 / 1273
Fax : +91 40 2770 1276

info.asia@tencategeo.com

www.tencategeo.asia

Thailand

TenCate Geosynthetics (Thailand) Ltd
169/98 Serm Srapi Bldg, 3rd Floor,
Ratchadapisek Road Dindaeng,
Bangkok 10400, Thailand
Tel : +662 692 6680
Fax : +662 692 6679

Indonesia

TenCate Geosynthetics Asia Sdn Bhd
Indonesia Trade Representative Office
Graha Simatupang Tower ID 4th Floor,
JI Letjen TB Simatupang Kav 38
Jakarta 12540, Indonesia
Tel : +62 21782 8963
Fax : +62 21782 8664

Australia

TenCate Geosynthetics Asia Sdn Bhd
Australia and New Zealand Representative Office
8 Eric Court,
A 4163 Cleveland, Queensland,
Australia
Tel : +61 420 600 937

Singapore

TenCate Geosynthetics Singapore Pte Ltd
67B, Tuas South Ave 1,
Singapore 637581
Tel : +65 6266 0188
Fax : +65 6266 0182

Myanmar

TenCate Geosynthetics Asia Sdn Bhd
Myanmar Representative Office
No. L-108 Ground Floor,
Manaw Hari Avenue Baho Road,
Ahlone Township, Yangon, Myanmar.
Tel : +951 1122 4551

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