

Project: Mackays to Peka Peka Expressway
Date: December 2015
Client: NZTA
Location: Kapiti Coast North Island



bidim[®] Geotextile

The Mackays to Peka Peka Expressway is a \$630m NZ Transport Agency project to build 18km of four-lane expressway along the Kāpiti Coast, including 18 bridges. This is one of seven projects that make up the Wellington Northern Corridor, a four lane expressway stretching from Wellington Airport to just north of Levin.

The Wellington Northern Corridor is one of the New Zealand government's Roads of National Significance (RoNS) and provides a long needed upgrade of State Highway 1 north of Wellington. This highway is a critical link to the lower North Island and key regional destinations because the existing highway does not serve its users well. It has a poor safety record, is vulnerable to closures by storms and crashes, and drivers are often caught up in nose-to-tail traffic. The upgrade is required to provide safe, efficient and reliable access to and from New Zealand's capital and third-largest city. It's also needed to support expected residential and business growth throughout the Wellington region.

The contract was awarded to the Mackays to Peka Peka (M2PP) Alliance made up of the NZ Transport Agency, Beca Planning and Infrastructure, Fletcher Construction and Higgins Group supported by Goodmans Contractors, Incite and Boffa Miskell. Construction began in November 2013 after obtaining the necessary consent approvals from the Kapiti Coast District Council and Greater Wellington Regional Council for the works.

Construction for the project is in its third year (with completion planned for mid-2017) and the works are carried out within three geographical zones (northern, central and southern). The southern zone involves large amounts of peat that can either be removed or have high strength woven geotextile placed over the top and then preloaded for up to two years. The southern zone will eventually connect through to the Transmission Gully Highway once it's completed in 2020. In addition to the large amounts of peat the designers, Beca working out of the main site office in Paraparaumu, have also had to take into consideration areas that are prone to liquefaction during a major earthquake.



Northern Zone Deployment of Mirafi PET



Installation of Mirafi PET



Use of bidim[®] for drains and sediment ponds

Mirafi® PET high strength woven geotextiles (for the road and bridge embankment construction) and over soft ground and areas of peat, as well as **bidim®** nonwoven geotextiles as a separation layer in the MSE bridge abutment construction, sediment ponds and drainage systems.

Mirafi® PET high strength woven geotextiles are used in basal reinforcement and for this project in particular for use in areas with a high water table and with very deep peat soils. In addition, areas of the Kapiti Coast including areas along the new road embankment construction are prone to liquefaction during an earthquake and as a result **Mirafi® PET 1000kN** was selected to meet the strain limited seismic strength for the design acceleration of 0.56g. **Mirafi® PET 1000** and **Mirafi® PET 600** were also used under the embankments of the MSE bridge abutments. There will also be an end-to-end shared pathway for pedestrians, horses, and cyclists that's being built requiring the use of **Mirafi® PET 300** woven geotextile.

Mirafi® PET high strength woven geotextiles provided a separation function and additional strength for preloading and minimising differential settlement during the construction programme. They are not easily joined, so product was specifically manufactured to lengths required for the abutment approaches resulting in minimal waste of a high value product. The correct placement and alignment of the product was achieved with the use of engineer certified dispensing bars supplied by Geofabrics New Zealand Ltd and the use of an excavator. Product lead times were reasonably short (4-6 weeks) so that programme disruptions were kept to a minimum.

Besides technical support, quality assurance and certification, local storage and just in time deliveries of product on site were beneficial in keeping stock on site to a minimum. Monthly meetings also ensured stock lead times were met and any issues addressed, minimising any disruptions to the construction programme.

Mackays to Peka Peka project involves a lot of new innovative thinking and techniques especially when considering the issues around liquefaction following on from experiences during the Christchurch Earthquake in particular.

Mirafi® PET Woven Geotextile

Mirafi® PET-Series woven high-strength polyester geotextiles are used to provide stability and limit differential settlement when constructing embankments over soft soils, piled foundations and over voids. Applications include supporting reinforced soil structures, road and rail embankments, bridge foundations and landfills.

Mirafi® PET high-strength woven polyester geotextiles provide the highest tensile and long term design strength (LTDS) available in any geosynthetic. **Mirafi® PET-Series** are comprised of high tenacity and high molecular weight polyester yarns which provide excellent creep resistance, strength, and soil interaction.

bidim® Non-Woven Geotextile

bidim® geotextiles are supplied fully wrapped in rolls up to 6m in width to minimise wastage and laps. They can be used to rapidly and economically construct roads and embankments over soft soils. The hydraulic properties of **bidim®** geotextiles make them ideal for use for drainage and filtration applications and they are also used in erosion control structures such as behind gabions, under rock armour and as temporary erosion control.



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