# CASE STUDY

Cellular Confinement

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| Project: | Beaumount Bridge Upgrade |
| Date: | February - June 2009 |
| Client: | Manukau City Council |
| Location: | Manukau City |

GEOFABRICS®

## Geoweb® Cellular Confinement

The old Beaumont's Bridge in Manurewa has long been an accident black spot and had reached the end of its serviceable life. Manukau City Council commissioned Opus International Consultants to design a realignment which had to accommodate extra clearances for future rail upgrades and electrification. The new bridge and realignment of Great South Road is an example of excellent design, construction and collective proactive team input, with an innovative methodology and design.

The construction of the site was environmentally sensitive due to the presence of contaminated material and the proximity of open surface water channels discharging into the adjacent waterways. The contractor's proposed construction methodology for constructing the road approaches considered the use 'rotten rock' fill over the clay liner required to contain contaminants as well as reducing pile lengths in response to geotechnical conditions. Both methods delivered savings in excess of 10 percent.

The steep bank on the western side of the bridge also required landscaping to complete the project. Due to a lack of any existing soil on the slope, **Geoweb** was employed to contain the new soil/mulch mix used as a growth medium for the proposed vegetation.

Soil fill up to 1.6m deep covering an area of 1400m² on the west side was found to be contaminated with low levels of polycyclic aromatic (PAH) hydrocarbon compounds. It was originally intended that all of the contaminated soil fill would be excavated, stockpiled on site, compacted to an engineering fill standard and then encapsulated beneath the southern approach to the new bridge.

The use of **ELCOSEAL X1000**, geosynthetic clay liner, was an innovative response to this conventional approach of contamination remediation using clay fill. The solution offers an improved and more reliable seal to eliminate the potential of leaching. The advantage of **ELCOSEAL X1000** lies chiefly in its practicality and ease of use requiring a modest level of supervision and reduced volume of earthworks.ew

Geoweb laid on the slope

Area planted

Vegetation growth on slope after 6mths

After the initial stripping of the contaminated fill, a decision was made for the majority of the fill to remain in place and be covered with **ELCOSEAL X1000**. This approach offered a lower level of risk especially when considering the use of **ELCOSEAL X1000** over the conventional clay liner.

**Geoweb** proved to be a cost effective solution to retain soil and mulch mix on the steep western embankment to aid plant establishment. Utilising the cellular confinement properties of the **Geoweb** system, soil erosion prior to establishment of vegetation was eliminated.

Installation of these products proved to be very efficient with the installation of **ELCOSEAL X1000** carried out by team of up to 5 men who were able to lay 250m2 per day utilising the Geofabrics supplied **ELCOSEAL X1000** spreader bar assembly lifting and deployment beam. A 2 man team installed the **Geoweb** and soil infill over a 2 day period. This was followed by the planting of selected plant species for the site.

ELCOSEAL installation

Aerial view of project

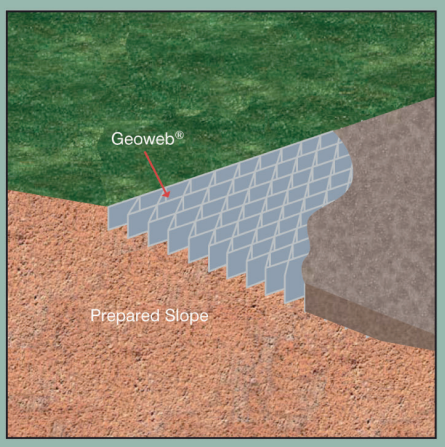
The **Geoweb**® system is the most advanced soil stabilisation technology available on the market today. Initially developed by the US army to allow trafficking of heavy vehicles over very soft ground.

The **Geoweb**® system consists of a flexible, high-strength network of interconnected cells that confine and stabilise soil. **Geoweb**® is widely used around Australia as a support platform in unsealed roads, on slopes and in low velocity channels.

A variety of infill materials can be used depending on the problem, including topsoil with selected vegetation, sand and gravel, larger rock and stone and concrete.

The system is made from high-quality polyethylene in collapsed, lightweight panels that are easily and safely handled onsite. **Geoweb**® has a solid reputation for quality and innovation and is manufactured to the highest international standard with ISO9001:2008 accreditation.

Geofabrics supports the **Geoweb**® system with design support and installation tools.




**Geoweb® Installation**