

MACKAYS CROSSING FLYOVER PROJECT-GEOTECHNICAL INSTRUMENTATION  
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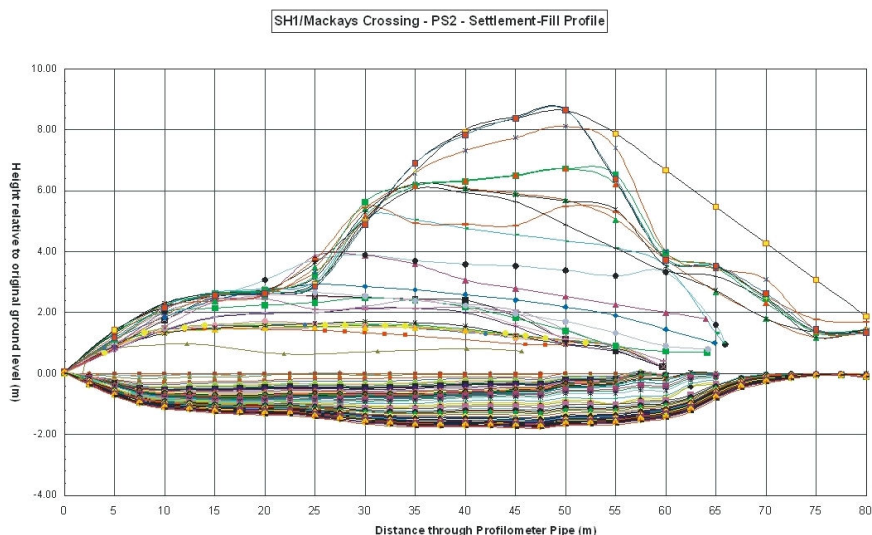


**Above: The newly opened Mackays Crossing Flyover -a four lane rail over-bridge, separated interchange and underpass.**

Initially Geotechnics Ltd opened up a branch in Wellington in November 2004 to provide Geotechnical services for the Mackays Crossing Over-bridge Project. Mackays crossing is located approximately 3 kilometres north of Paekakariki or a 35 minute drive north of Wellington City.

The site straddles a very contrasting geological setting, varying from generally colluvial substrate along the eastern margin, to wetland-mainly consisting of very soft peat to the west. Here in lies the challenge for the engineers, building a large embankment on materials with such different physical properties and the potential for highly contrasting rates of settlement across the site.

Following initial design, it was decided that a series of Hydrostatic Profilometers would span the site under both the Northern embankment (pictured above) and the much smaller 'Sang Su' Corner embankment to the south. In conjunction with the settlement information obtained from the profilometers, a number of piezometers were installed within the peat layer along the western margin of the project to also monitor groundwater pressures.



**Above: An example profilometer cross section from the Northern embankment showing fill amounts against profilometer settlements below original ground level.**

The engineers at Tonkin & Taylor expected settlements of as much as two metres in the thickest section of the peat. It was very important to monitor the increasing settlement and ground water pressures throughout the fill placement periods to ensure safe, accurate construction and to provide scheduling information.

Throughout construction settlements and groundwater pressures proved very responsive to fill placement above the peat sections throughout the duration of the project, sometimes within hours. This emphasized the benefit of using geotechnical instrumentation in these kinds of highly variable geological settings to provide 'real time' geotechnical assessments during construction.

Following completion of the project, the Minister of Transport Hon Annette King cut the ribbon to declare the overbridge open on Saturday 24 March 2007, with an official opening ceremony at the near by Queen Elizabeth Park. The newly constructed over bridge now takes traffic up and over the main railway line, alleviating the traffic congestion which used to occur previously due to the old level crossing.



**Above: The old level crossing (left) and the new over-bridge embankment (right) allowing free flowing traffic on S.H.1.**

In addition to providing services to the large projects, the Geotechnics office in Wellington has also been kept very busy carrying out numerous site investigations for various consultants in the Lower North Island and South Island. This work has involved extensive geotechnical site investigations of landslides, old retaining walls and other such landforms and structures. This work has included the use of a Window sampler (for more detailed info <http://www.geotechnics.co.nz/news.html>) which has proven particularly useful, as it provides core samples from locations with difficult access, as is often encountered in Wellington. Depths achieved by the sampler in the Wellington Region have been up to 5-6m in disturbed ground and up to ~3-4m depth in natural ground and generally meeting refusal against less weathered basement Greywacke rock.

Geotechnics Wellington can provide a wide range of Geotechnical testing, site investigation and instrumentation services to the lower North Island and the South Island. The full variety of services can be viewed at [www.geotechnics.co.nz](http://www.geotechnics.co.nz).

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