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ON GROUND IMPROVEMENT

Clients benefit from our in-house geotechnical engineers and construction consultants who work together to provide solutions that save both time and money.

Our access to the latest technology and industry smarts means we can ditch conservative methods where appropriate, and explore new and innovative ways of improving the ground to suit our clients’ needs.

PROJECT PROFILE: HOSPITAL & AGED CARE FACILITY

Location: Christchurch, New Zealand

Capacity: Innovative design and new construction technology to provide cost effective solutions

The 2010-2011 Canterbury Earthquakes rendered an iconic hospital inoperable, and required evacuation of the aged residents to other care facilities situated several hundred kilometres outside of Christchurch.

When the dust settled, work on a new hospital and aged care facility began in a location with both soft and compressible soils as well as potentially liquefiable ground. Our consultants saw the challenging conditions as an opportunity designed specifically to take advantage of the Geopier Rammed Aggregate Pier® System (RAP), which was new to New Zealand at the time.

The original foundation design comprised 27 m deep steel piles to support the one and two storey development. Our team identified that the foundation system was impractical for the size of structure, and proposed an alternate design comprising 5 m - 8 m deep RAP elements to provide a non-liquefiable crust to limit liquefaction-induced settlements and reduce settlement of the soft and compressible soils.

RAPs were selected over the originally proposed deep driven pile foundation as a cost effective alternative taking into account benefits to construction program and reduced need for heavy ground beams.

We were also able to offer the client cost savings using the PSHA (Probabilistic Seismic Hazard Analyses) and seismic site response analyses, which allowed the design to be optimised to use lower cost shallow foundations.

The project benefitted from an innovative design approach that integrated PSHA and seismic ground response analyses directly and seamlessly into the design of ground improvement. This was the first project of its kind in New Zealand.
Specialist expertise and excellence in geotechnical and natural hazard engineering

Tonkin + Taylor is an employee-owned environmental and engineering consultancy with a solid reputation for providing innovative, cost effective and sustainable solutions. Our team culture and unique ability to successfully collaborate really sets us apart and ultimately delivers outstanding results.

About us
We shape the interface between people and the environment - earth, water and air - using science and engineering. Our team of engineers, scientists, planners and project managers, together with our track record in natural hazard work (earthquakes, flooding, landslides, tsunami, coastal and climate change) and other major projects across the built and natural environment, means we can respond effectively to clients' needs and add value.

T+T has offices located throughout New Zealand, Australia and the wider Asia Pacific region. Our 500 plus strong team have developed strong partnering relationships with our clients along with a number of other leading agencies around New Zealand and the world. Every day we deliver outstanding results for our clients with our collaboration and commitment.

Our work in Canterbury
T+T has been integral to the Canterbury Earthquake recovery, working with government, private insurers, international researchers and disaster risk resilience agencies. Our world-class expertise in geotechnical engineering and liquefaction has been recognised and sought after both in New Zealand and by leading international institutions.

T+T’s extensive Canterbury work programme provides an extraordinary database of high-quality technical information to aid the understanding of liquefaction consequences in Canterbury, New Zealand and beyond. These events provide valuable lessons about post-disaster recovery and highlight the importance of disaster risk reduction strategies and building community resilience.

We are recognised throughout New Zealand and internationally for our work in geotechnical engineering, engineering geology and natural hazard engineering.

Geotechnical excellence
Our internationally experienced team is widely regarded as a leader in the industry. The geotechnical services we provide are diverse, and our engineers and geologists are supported by a suite of advanced design software and the latest field testing equipment.

Capabilities include:
• Engineering geological modelling
• Earthquake engineering and seismic hazard evaluation
• Earthworks design and specifications
• Foundation and pile design
• Geotechnical modelling
• Investigations and geological mapping
• Instrumentation and monitoring
• Liquefaction assessment and design solutions
• Mining and quarry development
• Slope stability assessment, stabilisation and slope retention
• Tunnelling.

Natural hazard specialists
Natural hazards such as earthquakes, volcanic eruptions, landslides, coastal erosion, floods, droughts and tsunami can impact communities. T+T delivers solutions to build more resilient communities.

Preparedness, protection, emergency response and recovery are the four pillars of our disaster resilience response services. With more than 40 years’ experience in natural hazards and risk management, T+T has proven leadership and capability at supporting clients through all stages of disaster resilience.

Capabilities include:
• Preparedness and protection
• Emergency response support
• Strategic recovery advice
• Risk and opportunity development
• Adaptation and mitigation options
• Climate change and resilience
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Our multi-disciplinary team focused on resilience has a diverse range of expertise which include engineering geologists, hydrogeologists, planners, geotechnical, coastal, earthquake, civil and structural engineers. The team has the skills and expertise to identify and evaluate risk from a diverse range of natural hazards, including earthquake and fault activity, slope movement, cyclone, flood, tsunami and volcanic eruption. We provide advice and engineering solutions across a wide spectrum of organisations including government, commercial, industrial and infrastructure clients worldwide.
We work alongside the NZ Geotechnical Society and other professional bodies to develop national geotechnical guidance and to improve the geotechnical design practice in New Zealand.

Following the Canterbury earthquake sequence, MBIE identified New Zealand’s geotechnical engineering experts and worked with them and international experts to develop technical guidance to repair and rebuild homes and buildings on land vulnerable to liquefaction.

MBIE are currently exploring the development of a New Zealand Geotechnical Database (NZGD) building on the success of the Canterbury Geotechnical Database. The NZGD will be an invaluable resource for geotechnical engineers and will facilitate research on geotechnical design and hazard issues.

Visit our website to find out more: www.building.govt.nz
MWH is a leading provider of geotechnical investigations and earthquake engineering services in New Zealand and globally. Our team of local specialists working across 15 New Zealand offices, and global experts in 35 countries, deliver seismic analysis, risk assessment and design services on dams and hydropower, mining, transport and wet infrastructure projects.

Talk to an MWH earthquake expert at Stand No. 42.

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