

Geotechnical

Australia's need for resilient infrastructure is intensifying. However, it's clear the ground beneath us is not always as rock solid as we'd like to think.

Tonkin + Taylor's Geotechnical team combines leading expertise in field testing and advanced calculations with the latest technology to provide customised design solutions that enable safe and effective construction.

A background illustration featuring a green dragon with a yellow sun and a yellow arrow. The dragon is depicted in a stylized, traditional manner, with its body curving across the frame. The sun is a yellow circle with radiating lines, and the arrow is a yellow shaft with a fletched tail. The entire scene is set against a solid blue background.

Tonkin + Taylor acknowledges the First Nations peoples of Australia as Traditional Custodians of the land and waterways on which we work and live, and recognise their continuing connection to land, water, and culture.

We pay our respects to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

About us

Tonkin + Taylor is a leading employee-owned environmental and engineering consultancy. With offices across Australia and New Zealand, we service these areas, the Pacific and SE Asia.

In Australia, our diverse team provide specialist services across a range of practice areas, including Coasts + Water, Geotechnical, Geosciences, Pavements and Waste. We are renowned among our diverse range of clients for delivering innovative, sustainable and resilient solutions.

Our reputation for professional excellence, strong collaboration and trusted partnerships is one we continue to be very proud of as we work with our clients and communities to embrace the challenges and opportunities around us as we strive to meet our purpose:

Together, we create and sustain a better world.

Our team are experienced, knowledgeable, and passionate about what they do. We look forward to being your partner of choice in finding sustainable solutions.



Our services

Our expert geotechnical consultants provide highly specialised advice to clients from our offices in Victoria, New South Wales and Queensland. Our partner company, Chadwick Geotechnics, is a leading supplier of field engineering, drilling, instrumentation and laboratory services.

We have significant experience advising on ambitious and complex projects within land and buildings development, transport, renewable energy, industry and mining.

In collaboration with our industry partners, we provide expert staff, specialist teams and project leadership to a highly varied client base, including national and multinational private sector companies, local, regional, state and national government agencies, developers, contractors, and regional development agencies.

Comprehensive offering

- Foundation design
- Pavement design
- Geotechnics
- Geology
- Feasibility studies + reports
- Site investigations, including specialist laboratory, field testing + instrumentation
- Investigative drilling
- Laboratory testing
- Slope stability + landslide risk management
- Settlement assessments
- Soft soil expertise
- Ground improvement
- Wind farm footing, pavements + hardstands
- Heavy-Duty pavements
- Pavement rehabilitation design
- Prospect identification + evaluation
- Assessment of alternative driven or bored pile foundation options
- Detailed analysis of piles for bearing capacity, lateral capacity + load-displacement analysis, uplift capacity + negative friction
- Preparation of tailored specifications
- Experienced construction supervision
- Soil interaction analysis
- Earthworks
- Earthworks specifications
- Seismic hazard evaluations
- Drilling + installation of systems
- Tunnelling
- Retaining structures
- Landscape structures
- Challenging site re-purposing
- Marine structures
- Commercial + industrial structures
- Tailings dams
- Rail infrastructure
- Tender design
- Utility impact assessments
- Settlement monitoring + back analysis
- Pile capacity back analysis
- ANCOLD
- Sodic soils
- Dams
- Retarding Basins
- On site soil capacity verification
- Residential development.
- Numerical modelling
- Desk studies + preliminary assessment of piling options

Track record

New Bridgewater Bridge, TAS

The largest transportation infrastructure project in Tasmania's history involves a proposed new 1.23km long bridge over the River Derwent, new road interchanges, an underpass, a new single span overpass, and associated road infrastructure.

Technical Response

- Site investigations
- Foundation design for the main bridge
- Seismic + liquefaction assessment
- Retaining walls design
- Earthwork cut + fill design
- Scour assessment
- Foundation design for underpass/overpass
- Reinforced soil structure wall design
- Land reclamation design
- Construction support

Western Roads Upgrade, VIC

A \$1.8 billion investment to improve roads in Melbourne's western suburbs, including a 20-year maintenance contract. Project is being delivered through a Public Private Partnership (PPP). Key (re)developments include: lane duplication and widening, intersection upgrade and resurfacing, bridge and culvert strengthening and widening, new and rehabilitation pavement design.

Technical Response

- Construction supervision + Quality Assurance
- RFI support for pavement engineering
- Pavement rehabilitation design
- Retaining wall assessment
- Geotechnical hazard assessment

Mordialloc Freeway, VIC

The Mordialloc Freeway project is a 9km freeway link between Dingley Bypass and the Thames Promenade, including several grade-separated interchanges, bridges over wetlands and Mordialloc Creek, and a parallel cycling/walking path along its length. The route crosses over extensive areas of soft ground, as well as historical landfill areas.

Technical Response

- Ground improvement solutions
- Foundation solutions
- Detailed environmental investigations
- Minimise impacts of landfill gas migration
- Environmental monitoring + reporting

Melbourne Metro, VIC

Comprises a new underground rail route with five new underground stations. The new route will be integrated with the existing rail networks by tunnel decline structures at both ends of the Metro tunnel. Also includes upgrades to overhead electrification, ancillary structures, new road and rail bridges, and modification to existing bridges.

Technical Response

- Design calculations, numerical modelling + drawings:
 - Cut + cover decline
 - Overhead Line Equipment (OHLE) foundation
 - Road and rail bridges, various structures + buildings
 - Post + panel retaining wall
- Design compliance
- Risk mitigation



Port of Brisbane Peer Review, VIC

Conducted a review of the proposed pavement designs for heavy duty pavements at multiple berthing sites, including rigid and flexible pavement options. Pavements were subject to varying and repetitive loadings, such as highway and long-haul vehicles, heavy forklifts, and straddle carriers used to transport a mix of 20-foot and 40-foot containers.

Technical Response

- Detailed peer review of designs
- Provided design solutions
- Identified deficiencies in the calculated traffic loadings + proposed pavements

Webb Dock Upgrade, Port of Melbourne, VIC

Upgrade of Australia's busiest roll-on/roll-off terminal. Rehabilitation works and construction of new pavement areas. The technical challenges were extensive; including a variety of subgrade conditions and pavement types.

Technical response

- Geotechnical investigations
- Data analysis
- Detailed pavement design
- Value engineering
- Environmental engineering
- Peer review of pavement works
- Optimisation of proposed pavement design(s)

Stockyard Hill Wind Farm, VIC

The Stockyard Hill project involved the construction of 149 turbines within four different geological conditions. The footing designs included three different types to suit varying ground conditions – full gravity, anchored, and composite footings. The pavement construction included over 110km of internal roading network with silt and clay subgrades.

Technical response

- Geotechnical + hydrogeological investigations
- Drilling + test pitting
- Design of footings
- Construction support
- 3D modelling of foundations
- Pavement designs
- Subgrade improvements
- Earthworks specifications + technical advice
- Laboratory services
- Crane lift studies

Ryan Corner Wind Farm / Decmil Pty Ltd, VIC

Construction of 52 new wind turbine generators (WTG), underground cables linking all WTG locations, 38.2 lineal km of associated access roads and upgrading surrounding public roads. A large portion of the site is covered by the geological unit of Quaternary age newer volcanic basalt with Bridgewater Formation consisting of limestone and Quaternary age swamp and lake deposits.

Technical response

- Geotechnical + hydrogeological assessments
- Geotechnical laboratory services
- External pavements
- Geophysical survey
- Pavement design for roads + hardstands
- Advice on subgrade preparation + treatment

Hawkesdale Wind Farm, VIC

Construction of 23 new wind turbine generators (WTG), underground cables linking all WTG locations, 22 lineal km of internal access roads.

Technical response

- Site investigation
- Geotechnical assessments
- Geotechnical laboratory services
- Geophysical survey
- Pavement design for roads + hardstands
- Advice on subgrade preparation + treatment

Kinley Estate, Lilydale Quarry Backfill, VIC

Provided ongoing geotechnical services for the redevelopment of the closed former Sibelco limestone quarry and processing facility. As part of the redevelopment, the quarry is being backfilled with approximately 9 million m³ of fill from an RL of 10m to an RL of 130m.

Technical response

- Settlement assessments
- Earthworks specifications
- Site investigation, including 50 boreholes
- Dewatering sump design
- Bridge foundations + soil-supporting structures advice
- Groundwater dewatering monitoring + recovery modelling
- Pavement, sewer, retarding basin advice + design
- On-site supervision
- Plate load test + interpretation.
- Services in accordance with AS 3798-2007

Contact us



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