

Dam Engineering

From generating and storing renewable energy, to providing fresh drinking water, irrigation water, and managing flood hazards, dams are critical assets for Australia's future water and energy security.

Tonkin + Taylor brings comprehensive expertise in dam engineering, from feasibility through to design, construction monitoring, dam safety reviews and monitoring.

A background illustration on a teal gradient. It features a green dragon with a yellow sun on its back and a yellow arrow pointing upwards. The dragon is coiled around the text. The sun has a yellow center with concentric circles and yellow rays. The arrow is yellow with a black outline.

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

We have been assessing, designing and monitoring dams for over 60 years, throughout Australia, New Zealand, and internationally.

We have extensive experience on both large and small dams across a range of end uses including hydropower, flood detention, water supply, and energy storage. Our experience further covers appurtenant and ancillary infrastructure, including power stations, spillways, penstocks, bridges, inlet structures, tunnels and roads.

Our capabilities include investigation (often in remote and challenging terrains), assessment, design, consenting, construction supervision, and commissioning of new dams and upgrade works. We also offer expertise in ongoing safety management, safety reviews, surveillance, regulatory compliance, and deficiency management of existing dams during operation, as well as expertise in decommissioning at the end of a dam's service life.

Complementary services are provided by our sister company, Chadwick Geotechnics, a leading supplier of field engineering, site investigation, instrumentation and laboratory services, including on-site laboratories that provide fast turn-around results from in-situ testing.

Tonkin + Taylor is a corporate member of ANCOLD.

Investigation and feasibility studies

- Project definition and value engineering
- Geotechnical investigations and assessments
- Hydrogeological assessments and modelling
- Hydrological and flood hazard studies
- Dam break hazard assessments, including complex 2D flood modelling
- ANCOLD consequence category assessments
- Environmental assessments including compliance, water and soil science, contaminated land, and impact assessments
- Expert witness services

Geology and geotechnical engineering

- Site geology and geomorphological mapping
- Structural geological mapping
- Geological hazard identification and risk assessment
- Geological risk mitigation and management
- Groundwater and hydrogeological evaluation
- Site investigations in challenging locations such as on steep slopes
- Risk assessment and management for intrusive investigations close to existing structures
- Slope stability assessment
- Liquefaction and seismic hazard assessment
- Soil and rock slope design
- Internal erosion analysis and filter design
- Rock and soils materials assessment
- Tunnelling investigation and design
- Dam foundation investigation and design
- Slope and groundwater instrumentation and monitoring

Dam design, construction support and documentation

- Failure Mode and Effects Analysis (FMEA)
- Detailed design and documentation
- Design review during construction
- Construction supervision and testing
- Commissioning
- Development of Dam Safety Management Systems, including:
 - Operation, maintenance and surveillance manuals
 - Emergency action plans
- Peer review

Dam safety management

- Surveillance, monitoring, and evaluations
- Instrumentation and calibration
- Dam safety reviews
- Deficiency management
- Risk-based frameworks and tools
- Asset valuation
- Training
- Regulatory compliance

Track record

Wivenhoe Dam spillway power station, QLD

Engaged as the civil engineering and dam safety specialists to investigate minor water ingress into the power station control room. Conducted a site inspection followed by a high-level assessment of remedial options. Our recommendations balanced constructability, durability, and performance risks, supported by AACE Class 4 cost estimates to guide informed decision-making.

Dam engineering input into wetlands/Retarding basins, VIC

Regularly engaged by residential and industrial developers throughout Melbourne to provide dam engineering review services of retarding basin and wetland designs. Includes carrying out ANCOLD consequence assessments, reviewing embankment design, compliance with Melbourne Water and ANCOLD requirements, providing geotechnical advice and construction supervision. We work closely with our sister company, Chadwick Geotechnics, who provide Level 1 Geotechnical Investigation and Testing Authority (GITA) services.

Snowy Hydro, NSW

Surveillance reviews for the Tumut Pond (concrete arch), Tumut 2 (concrete gravity), Khancoban (earthfill), Murray 2 (concrete arch) and Jindabyne (rockfill) Dams in NSW.

Mornington Peninsula Dam Safety Reviews, VIC

Dam safety reviews of the Briars Camp, Mt Martha Golf Course, Unthanks Reserve and Bilgola Court Dams in Mornington Peninsula. This review included development of 2D dam break flood hazard models and carrying out consequence category assessments.

Whau Valley Dam, NZ

Completed Investigation and design for Whau Valley Dam, a 25m high embankment dam founded on soft foundations soils, with bellmouth spillway(s), a diversion tunnel, and a grass lined auxiliary spillway. T+T has provided ongoing dam safety and multi-disciplinary engineering services since commissioning of the dam, with various maintenance works and improvements undertaken to maintain compliance with dam safety regulations. T+T also provided hydraulic and hydrological modelling to inform dam break assessments, detailed geotechnical site investigations and monitoring for landslide activation in surrounding terrain following Cyclone Gabrielle.

Opuha Dam, NZ

All civil, water resources, and geotechnical work, including scoping and feasibility, evidence for resource consent hearings, detailed design, construction observation, remedial works, and ongoing surveillance for a 50 m high earth and rockfill dam on Opuha River that stores 95 million m³ of water for hydroelectric power generation.

Auckland Council Dam Safety Management, NZ

T+T provides technical dam safety advice to support development and implementation of a Dam Safety Management System for the Council's portfolio of stormwater dams, comprising 600 mixed-use ponds and retarding basins. T+T assisted in identifying, classifying, and prioritising existing dams and risk mitigation measures, as well as establishing systems for new dams that continue to be developed and vested.

Aniwhenua Hydropower Scheme Headpond Remediation, NZ

Forensic investigations, consents, and rehabilitation design to keep the headpond of the 18.5m high sloping earth core rockfill dam operational; construction monitoring to ensure the complex and challenging project was completed on time and to budget. Included removal of rip rap on headpond embankment face and base, construction of temporary EPDM lined coffer dams, temporary stream diversion to enable repair works, and construction of liner underdrain system and collector pipe.

Huoi Quang Hydropower, Vietnam

T+T provided technical review of the hydropower, engineering geology, hydrology, hydraulics, structural and civil aspects of the headworks through design and construction for the 520 MW, 104 m high concrete gravity dam and 4.6 km headrace tunnel.

Catuiran Hydropower Scheme, Philippines

Design support and technical review of 8 MW run of river hydropower scheme from concept to construction. Design inputs into 28 m high concrete gravity ogee weir with flip bucket on rock, sluiceway, gated side intake structure with twin bay desander (underground), 3 km long low pressure tunnel in schist rock, surge shaft, above ground steel penstocks, surface powerstation with two units, and tailrace channel.

Contact us



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