Australasian Groundwater & Environmental Consultants

Infrastructure

Tunnels, Roads, Rail, Buildings and Water/Waste Storage Structures

Advancing projects in an ever-changing world

Groundwater presents one of the biggest challenges in any construction project that interacts with the water table or requires a reliable water source. Often overlooked on a project until it becomes an issue, groundwater can significantly impact your project's design, timelines, budget, stakeholder management and regulatory requirements.

Obtaining a clear, informed view of your groundwater environment and its potential influence on your project is crucial to help you manage unstable excavation and water seepage, construction delays, increasing costs and legislation headaches. Understanding future groundwater levels is also critical for designing infrastructure.

With the uncertainty of ground conditions in the built environment and increasing environmental regulation and public scrutiny, the success of your infrastructure project depends upon a comprehensive hydrogeological assessment and reliable advice that consistently stands up to scrutiny.

About us

We're Australia's groundwater specialists, providing groundwater and environmental advisory for more than 25 years. We have a depth of experience and technical excellence borne out of more than 2,500 projects across major industries, agriculture, government and communities in Australasia and beyond.

We specialise in end-to-end groundwater services, from field work and modelling, to analysis and reports, to expert advisory and peer review. That means we understand the commercial, environmental, government and community challenges you face in your infrastructure projects.

Through our high-quality outputs and advice, we support your teams, progress your projects and achieve your goals.

Our expertise

Our team delivers detailed hydrogeological investigations and impact assessments to help you understand the complexities of your underground environment.

Large construction projects can present a range of technical, safety and environmental risks. Construction of infrastructure such as tunnels, road and rail cuttings, pits and building basements may be impacted by groundwater inflow and wall instability associated with elevated pore pressure from saturated wall rock conditions. Storage facilities may experience seepage of contaminants into groundwater systems. This can compromise structural integrity and lead to mounding in groundwater systems and deterioration of groundwater quality. Through our depth of understanding of groundwater systems and the issues that can arise, we proactively assist in identifying risks and support you through mitigation. We help refine your design specifications and plan, and ensure a smooth compliance process.

We're early adopters of cutting-edge thinking and modelling techniques, with the largest consulting groundwater modelling team in Australia. Our conceptual and numerical modelling experience flexes to your needs, whether you require a simple model or a detailed, complex model to represent your groundwater systems. We regularly develop simple models for assessment of basement inflows through to complex 3D representation of rail tunnels spanning complex geologies to determine impacts and dewatering requirements.

We know how important it is to work harmoniously with other specialists on your team. We work closely with your team of engineers, scientists, and planners and engage with regulators to help you achieve your project goals. From applying the latest industry techniques to navigating government legislation: our priority is delivering high-quality, comprehensive advice that deciphers the science and tells a clear and compelling story to your diverse stakeholders.

Our services

Dewatering and seepage assessments Tunnels, road, rail cuttings, basements, drainage diversions, sheet piling and impoundment structures

- Site investigations to characterise hydrogeology.
- Modelling of inflows and drawdown for different design options.
- Sizing/planning of dewatering infrastructure.
- Informing subsidence risk assessments.
- Assessment of groundwater chemistry to inform disposal options.
- Developing dewatering management plans.
- Quantifying seepage, impact on water quality and sensitive receptors, solute transport modelling.

Drainage assessment for tunnels and road and rail cuttings

- Modelling of drainage scenarios to assess flow rate, drawdown and water quality.

Environmental impact assessment

- Baseline groundwater investigations and water levels and quality assessment.
- Hydrogeology conceptualisation.
- Legislation and policy advice.
- Qualitative or quantitative (modelling) assessment of infrastructure impacts on groundwater regime, sensitive receptors (bores and groundwater dependent ecosystems).
- Discharge compliance on groundwater systems.
- Changes in groundwater levels and quality from modification of landscape and groundwater recharge processes due to earthworks (embankments) and compaction.
- Landholder bore assessments.

Borefields and construction water supply

- Site investigations.
- Analytical and numerical modelling to optimise boreconfiguration and yields.
- Design of infrastructure and testing.
- Developing specifications and supervising specialist sub-contractors.
- Geophysical surveying support with interpretation and identification of optimal sites.
- Compliance, permits and licences.
- Advice on rehabilitation.
- Comparative analysis for different water supply options.

Hydrogeology component for geotechnical interpretative reviews

- Linear projects.
- Integrate hydrogeology components with geotechnical and surface water investigations.
- Develop water quality and level triggers from data assessment.
- Assist with obtaining construction and operation approval and permits for groundwater interference activities.
- Terms of Reference (TER) groundwater assessment.

Monitoring and risk management

- Ongoing site support for monitoring.
- Monitoring and management plans.
- Data review.
- Risk assessment and audits.

Technical peer review

- Design and impact assessment documentation.
- Expert witness.

Our experience

Our highly technical advisory team has in-depth knowledge and experience of groundwater impact assessments, technical design investigations and monitoring networks for a range of government and commercial infrastructure projects. We've helped clients progress construction projects in both metropolitan and regional areas, from cross-city tunnels and property developments to landfills, feedlots and factories.



We've supported clients end-to-end on their infrastructure projects, from concepts through to detailed design, construction, operations, closure and rehabilitation. Our experience in groundwater investigations across a wide range of infrastructure projects includes:

- tunnels;
- road and rail cuttings;
- vertical infrastructure;
- basement excavation and design;
- drainage diversions;
- process water, brine and tailings impoundment structures;
- bridge abutments and excavation piling;
- groundwater supply;
- landfill; and
- quarry approvals.

Our projects

Tunnels and roads

Our track record includes impact assessment and design inputs to a wide range of tunnelling projects, including:

- Airport Link Tunnel - Brisbane.
- Cross River Rail Tunnel - Brisbane.
- Toowoomba Bypass Tunnel.
- NS Bypass Tunnel - Brisbane.
- S1 Sewer Tunnel - Brisbane.
- M4 East Tunnel - Sydney.
- Sydney Cross City Road Tunnel.
- Chatswood-Parramatta Rail Link.
- Eastlink Tunnel - Melbourne.
- Eastern Freeway - Melbourne.

Land and industrial development

Land development filling project

Cudgen, Tweed Region, New South Wales

We undertook a groundwater assessment for approvals of a sand extraction dredging operation and assisted with design of a groundwater extraction system to supply water to a dredge pond. The project included installing spear points, trial pumping and numerical modelling to determine water supply available, as well as annual groundwater compliance reporting.

Toondah Harbour

Cleveland, Brisbane, Queensland

We conducted a groundwater impact assessment for a proposed marina-residential development including site investigations, development of a hydrogeological model and identification of environmental risks from the development.

Landfill cell underdrainage design

Noosaville, Sunshine Coast, Queensland

We undertook a hydrogeological assessment to provide data for construction of a new landfill cell at the site. The project included installation of monitoring bores, hydraulic testing, water quality assessment and formulation of a conceptual groundwater model. Recommendations for design of an underdrainage system were also provided.

Yarooma Beach development

Coolum, Sunshine Coast, Queensland

The project developers commissioned us to assess the existing groundwater regime and impact of developing the Yarooma Beach Ecotourism project. The project included assessment of the aquifer regime which was supported by groundwater numerical modelling.

We have a significant track record and reputation with regulators across the country over more than two decades. Our strong team of modellers and supporting staff are very familiar with the challenges in green tape and regulatory requirements.

New Chum landfill

Ipswich, Queensland

We were engaged to provide expert witness services as part of a court appeal for a proposed resource recovery facility. The project included review of hydrogeological datasets and preparation of a conceptual model of the groundwater regime at the proposed landfill site. The conceptual model was used to assess potential for interaction with the water table and environmental impacts. We provided expert witness services that included preparing joint expert reports and giving oral evidence in the Planning and Environment Court.

Lansdown eco-industrial precinct

Townsville, Queensland

We undertook a hydrogeological assessment and field action campaign at the site of the proposed eco-industrial precinct. Local stakeholders had long-standing and vocal concerns about the impacts of this usage on groundwater. The project included a review of existing knowledge and the design and installation of monitoring bores to determine baseline water quality. Research and ongoing monitoring has ensured decisions are informed by robust scientific evidence.

Buildings

Souls residential tower development

Surfers Paradise, Queensland

We assessed for potential groundwater inflows through the base of the excavation for various depths of the diaphragm wall, as well as for potential hydrostatic pressures beneath the floor of the excavation. This included field investigations and two dimensional numerical modelling.

Proposed residential development

The Entrance, New South Wales

We developed a numerical model of the hydrogeological regime of the site and surrounding area. Modelling was undertaken to simulate and assess the rate of groundwater inflow to a basement carpark constructed in sand 6m to below the water table and the local impact of dewatering, and to design a permanent under slab drainage system to permanently maintain the water level beneath the base of the slab.

Palazzo Versace basement dewatering/re-injection design

Gold Coast, Queensland

We developed a numerical model for the design of a dewatering / re-injection system which would enable excavation to 3m below the water table in a sand aquifer. The site adjoins the Broadwater, Marina Mirage and Marina Sheraton developments. Prevention of settlement beneath these structures was a pre-requisite. We provided ongoing advice during construction and installation of a permanent dewatering bore beneath the carpark.

Our team

Andrew Durick

Director | Senior Principal Groundwater Modelling

Andrew has over 25 years' experience in groundwater modelling with intimate working knowledge of MODFLOW (industry standard modelling code) and significant experience in both the public and private sectors. He specialises in conceptualisation and modelling of complex groundwater systems, implementation of complex mine plans and third party review of models.

Keith Phillipson

Senior Principal Hydrogeologist

Keith specialises in the use of groundwater models to assess and manage the impacts of a broad range of developments on groundwater and surface water resources, with more than 25 years' experience working in jurisdictions including Queensland, New South Wales, Victoria and Europe. In particular, Keith has undertaken, overseen and peer reviewed a wide variety of modelling studies focused on assessing the cumulative impacts of large-scale water supply, coal mining and coal seam gas developments.

Pieter Labuschagne

Central South QLD Region Manager | Principal Hydrogeologist

Pieter has 20 years of experience in Southern Africa, Africa and South America, including more than 15 years in a South African based consultancy as director and principal scientist. Having started his career in the development of groundwater monitoring systems for coal fired power stations, Pieter's expertise includes project management and delivery of hydrogeological conceptual models, groundwater impact and liability assessments, development of groundwater management plans, consultant reviews and numerical applications.

We empower informed water decisions that help our clients, communities and environment thrive.

IIf you're looking for an expert groundwater partner to advance your infrastructure project, get in touch with us.

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