Douglas PARTNERS

GROUNDED EXPERTISE

Groundwater

“Without exception Douglas Partners has been able to add value to the project work we have been jointly involved in. We have found their staff to be knowledgeable, experienced, flexible, and a pleasure to work with.”

John Eggleston
Senior Project Manager Robert Luxmoore Pty Ltd

Grounded Expertise

We are down-to-earth, practical ground experts who have been getting the job done with integrity since 1963. Our specialist disciplines encompass geotechnical engineering, rock mechanics, contaminated land, groundwater, geophysics, and materials testing.

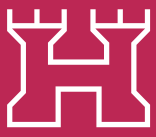
With over 60 years of experience, using local knowledge to collect high-quality ground data, Douglas Partners are uniquely positioned to deliver practical solutions for projects where the built environment interacts with the ground.

Quality is central to our operations. Our ISO9001 accredited Quality Assurance system underscores our commitment to excellence. Our culture embodies our guiding mantra: “Keep it Simple, Get it Right, Do it Well.”

With 600+ dedicated professionals across 20 branches in Australia, including 14 NATA registered laboratories, our expert advice helps manage and mitigate risk and our solutions are tailored to enhance outcomes for our clients, community and environment.

Services Across Sectors

Douglas Partners consulting services provide our clients with a range of integrated and specialist skills with the aim of delivering practical solutions across a large number of business sectors including:



DEFENCE

WATER

TRANSPORT

RESOURCES

ENERGY

HEALTHCARE

PROPERTY & BUILDINGS

MARINE

LAND DEVELOPMENT

SPORT & RECREATION

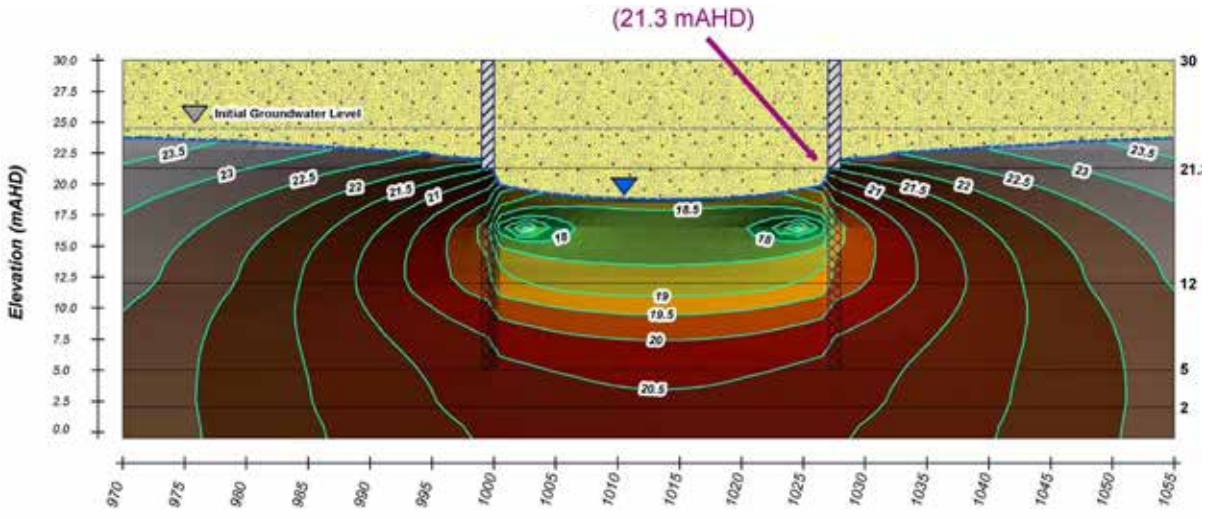
WASTE MANAGEMENT

TELE-COMMMUNICATIONS

Groundwater Investigations

A thorough understanding of regional or local groundwater systems is imperative for nearly every development. The motivations behind groundwater investigations are diverse, encompassing a wide range of factors, as are the methodologies and techniques applied in each investigation. Drawing upon our extensive expertise, Douglas Partners brings a wealth of experience to groundwater investigations - ensuring thorough and tailored solutions for every unique scenario.

- Review of relevant information including: geological mapping, hydrogeological data from Government databases and review of previous investigations;
- Geophysical surveying;
- Exploration drilling and borehole logging;
- Construction of monitoring bores and production bores;
- Aquifer and well hydraulic testing (test pumping of water bores), and permeability estimation (slug tests);
- Conceptual, analytical and numerical modelling;
- Groundwater quality assessment; and
- Liaison with Regulatory Authorities.



Groundwater Monitoring

In-depth knowledge of groundwater quality, as well as the levels and direction of groundwater flow, constitutes vital components of many groundwater assessments. Constructing monitoring bores or piezometers is instrumental in gathering essential data on groundwater levels and quality.

These networks of groundwater monitoring locations are meticulously designed not only to establish baseline (pre-development) conditions before development but also to record any changes that may occur over time. Douglas Partners can provide critical insights into these intricate aspects, ensuring a thorough understanding of groundwater dynamics for informed decision-making.

Douglas Partners' expertise in groundwater monitoring includes:

- The design and installation of groundwater monitoring networks comprising monitoring bores and / or piezometers;
- The installation of Vibrating Wire Piezometers (VWPs), downloading and processing of VWP data;
- Installation of dataloggers, and the downloading, correction and analysis of pressure transducer data;
- Installation of dataloggers in remote areas and downloading via telemetry (i.e. mobile phone networks);
- Field recording of water quality parameters;
- Sampling of groundwater for detailed analysis of chemical parameters at a NATA accredited laboratory;
- Design and undertaking of groundwater monitoring programs; and
- Analysis and reporting of monitoring data for submission to Regulatory Authorities.

> "I have always found Douglas Partners to be competitive, honest, approachable, proactive, cooperative, an important member of the consulting team, and who demonstrate a commitment to delivering quality technical advice to clients."
>
> **Gil Alexander, Managing Director Serling Consulting (Australia) P/L**

Conceptual, Analytical & Numerical Modelling

Our hydrogeologists recognise that diverse groundwater problems require varied approaches. With our wealth of experience, our team adeptly applies a range of methods to assist clients in comprehending the extent of their groundwater challenges and the inherent risks linked to uncertainties. Through our nuanced understanding and adaptable methodologies, we offer personalised solutions, addressing complex groundwater issues with precision and expertise.

Our capabilities include:

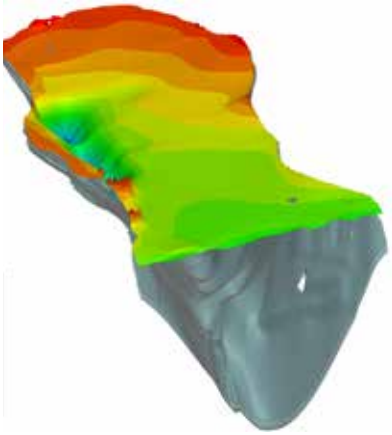
- Development of sound conceptual hydrogeological models;
- Application of proven analytical techniques to estimate specific components of the water budget (e.g. recharge analysis);
- Estimation of aquifer (and well) parameters from the analysis of test pumping data;
- Construction, calibration, sensitivity testing, verification and uncertainty analysis for either regional or site based numerical models;
- Steady state or transient modelling with all industry standard codes including USGS MODFLOW variants and MODFLOW SURFACT, FEFLOW, and SEEP/W;
- Contaminant fate and transport modelling;
- Water quality and hydrochemical modelling;
- Statistical modelling of hydrological data;
- Design and assessment of dewatering systems;
- Assessment of inflows to mines, tunnels and basement excavations; and
- Groundwater impact assessment of mines and civil infrastructure projects.

Impact Assessment & Approvals

Safeguarding groundwater resources demands a thorough evaluation of the potential impact of proposed developments on the groundwater system.

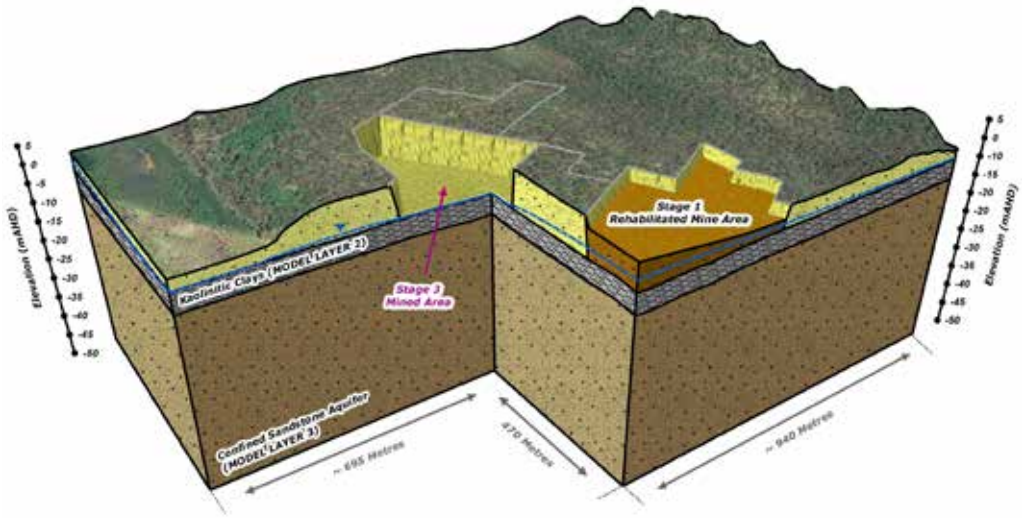
Additionally, the sustainable utilisation of these resources requires meticulous management to prevent degradation. For most developments or groundwater utilisation projects, an Assessment of Impact is required to secure necessary approvals.

At Douglas Partners, we recognise the critical importance of these assessments. Our dedicated experts conduct comprehensive evaluations to ensure the protection and sustainable management of groundwater resources, aligning with our commitment to responsible development practices.



Our expertise in undertaking Impact Assessments includes:

- Collection of baseline data;
- Development of Conceptual Hydrogeological Models;
- Assessing impact using analytical or numerical modelling;
- Evaluating management strategies;
- Groundwater monitoring programs; and
- Undertaking compliance reporting.



Dewatering & Groundwater Control

Douglas Partners utilises advanced computer modeling software and state-of-the-art technology, enhancing our capabilities in groundwater assessments and engineering solutions.

This includes:

- Aquifer simulation for steady state or transient problems for water supply and dewatering;
- Contaminant migration modelling;
- Processing of pumping test data from data loggers;
- Water quality and hydrochemical modelling;
- Fate and Transport modelling;
- Statistical modelling of hydrological data;
- Development of conceptual hydrogeological models;
- Design and assessment of dewatering systems;
- Preparation of dewatering management plans.

Groundwater Contamination

Potential sources of groundwater contamination include landfill sites (sanitary and hazardous wastes), leaks and spills from petroleum, septic and chemical storage tanks, tailings dams, radioactive waste and the use of herbicides, pesticides and fertilisers for agricultural purposes. Prevention detection and control requires effective containment and management techniques.

Douglas Partners provides expertise in:

- Site contamination assessment;
- Underground storage tank evaluation;
- Installation of monitoring wells and groundwater monitoring;
- Assessment of contaminant levels;
- Design of landfills and tailings dams;
- Contaminant fate and transport modelling; and
- Containment and clean-up strategies.

Consistently delivering High Quality with Integrity

At Douglas Partners, our purpose it is to provide our clients with **“Grounded Solutions for the built environment”.**

We hire, acknowledge and incentivize our employees based on their application of our values to steer their choices and behaviours.

Our Values:

- People

Safety comes first in all we do.

We foster an inclusive and collaborative culture, enabling all to thrive.

We build trusted relationships and are defined by how well we take care of them.

We strengthen connections and make a positive difference where we work and live.

- Integrity

We do what’s right for the environment, client and community.

Customers choose us because they trust our name, and people. We earn that trust by always acting honestly and with the highest level of integrity.

- Improvement

We’re proud of our industry-leading processes and are always looking for ways to improve.

We make improvement a daily habit as continuous improvements lead to sustainable innovation.

- Excellence

We pride ourselves on our high level of technical expertise.

We recognise quality is important in every step of the process.

We work collaboratively, combining our collective knowledge and experience to provide grounded solutions.

"We believe that the hallmark of a good consultant is being a trusted business partner in whom clients have confidence."

Will Wright, Managing Director
Douglas Partners Pty Ltd

Groundwater Specialists

Our success is due to the expertise, skills and knowledge of our staff, many of whom have postgraduate qualifications and international experience. With over 600 highly skilled team members, clients gain access to top engineering talent. Our track record includes winning the Client Choice Awards 20 times a testament to our unwavering commitment to Excellence.

Douglas Partners' offices have a number of key personnel who have expert hydrology skills and experience, enabling projects to be undertaken effectively and at minimal cost to the client.

Directors and Principals actively participate in projects, ensuring clients access the highest level of expertise and experience within the Company.

WILL WRIGHT

Principal / Geotechnical & Groundwater Engineer

Will graduated from a Master of Engineering Science, majoring in Groundwater Studies in 1997. Will has significant experience in geotechnical and hydrogeological investigations in Australia and overseas, and his fields of expertise include groundwater assessment for coastal development, mining, landfills and dewatering assessments. Will is a specialist in groundwater flow and transport modelling and seepage analysis through dam walls.

CHRIS KLINE

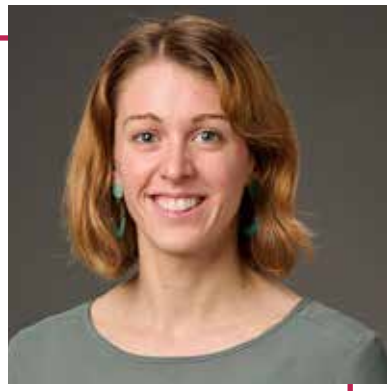
Principal / Geo-Environmental Engineer

Chris is a Chartered Professional Engineer (Civil, Environmental and completed a Master of Engineering Science, majoring in Hydrogeology in 2001. Chris has managed a broad range of projects throughout New South Wales, and has significant hydrogeological experience with construction dewatering assessments, dryland salinity and land management, aquifer testing, hydrogeological mapping, groundwater modelling, and groundwater contaminant monitoring and assessment.

CHRIS CROWE

Principal / Geotechnical Engineer

Chris is a Chartered Professional Engineer graduating with a BEng (Civil) from the University of Aston in 1993 and has a Master of Science (Engineering Geology). Chris has experience in construction dewatering and has been involved in the investigation, design and construction of many of Victoria's major infrastructure projects, including EastLink, West Gate Freeway Upgrade, Victorian Desalination Plant, Regional Rail Line and Level Crossing Removal Projects.



CLAIRE CORTHIER

Hydrogeologist

Claire has a double Masters degree in Hydrogeology and Civil Engineering (geo-engineering), graduating in 2016. Claire's experience includes water impact assessments for EIS, groundwater investigation supervision, and significant experience in analytical and numerical modelling.

DANA WILSON

Senior Associate / Environmental Engineer

Dana is an environmental engineer and completed a Master of Engineering Science in 2016.
Dana specialises in groundwater investigation for contaminated lands as well as baseline water quality and groundwater management/ monitoring programmes. Dana has considerable experience the project management of a number long-term groundwater monitoring projects involving regulatory department review and audits.

JOEL HUANG

Senior Associate / Geotechnical Engineer

Joel is a Chartered Professional Engineer with a Master of Engineering (Civil) completed in 2012. Joel has experience in geotechnical and hydrogeotechical engineering in commercial and residential development, roads and railways and land development. Joel specialises in 2D and 3D numerical modelling, particularly in shoring excavations, tunnelling, underground pipelines, groundwater modelling and dewatering impact assessment.

"This team is efficient and service orientated and the level of mutual trust between our organisations ensures that Douglas Partners are our first choice consultant."

David Bobyreff, Director,
Minotaur Project Management

Local capability, world-class talent

For information on how Douglas Partners can assist on your project, please contact one of our branches below or email info@douglaspartners.com.au.

BRISBANE	(07) 3237 8900	**MELBOURNE**	(03) 9673 3500
CAIRNS	(07) 4055 1550	**NEWCASTLE**	(02) 4960 9600
CANBERRA	(02) 6260 2788	**NTH WEST SYDNEY**	(02) 4666 0450
CENTRAL COAST	(02) 4351 1422	**PERTH**	(08) 9204 3511
COFFS HARBOUR	(02) 6650 3200	**PORT MACQUARIE**	(02) 6581 5992
DARWIN	(08) 8948 6800	**SUNSHINE COAST**	(07) 5351 0400
GEELONG	(03) 5221 0711	**SYDNEY**	(02) 9809 0666
GOULBURN	(02) 4822 8395	**TOWNSVILLE**	(07) 4779 9866
GOLD COAST	(07) 5568 8900	**WOLLONGONG**	(02) 4271 1836
MACARTHUR	(02) 4647 0075		