EXCELLENCE IN WATER ENGINEERING FOR THE NORTHERN TERRITORY
WRM UNDERSTANDS WATER IN THE TERRITORY

WRM Water & Environment has a wealth of experience in advising government and private sector clients in the Northern Territory. WRM’s Senior Principals completed a comprehensive flood study of the Katherine River in the late 1990s and have had ongoing involvement in NT ever since. We have advised miners, developers and government agencies on how to best manage water in the wide range of climatic conditions that occur across the top end.

Establishing our Darwin office in 2018 has provided us with a local presence to better service our existing and new clients.

The WRM NT office manager is long-time Territorian Phill Piper. He has over 40 years’ experience working as a professional engineer both within the NT Public Service and as a freelance consultant dealing with complex engineering design, construction and environmental issues.

Phill has worked in the areas of water supply, sewerage, airports, bridges, roads and drainage, with his main expertise being in subdivisional design, environmental assessment and drainage including water sensitive urban design. His experience includes many major projects such as the development of the City of Palmerston, the proposed new city of Weddell and a range of other infrastructure projects.

Based on his extensive knowledge and experience, Phill is well regarded by the public and private sector as a civil engineer and project manager with a pragmatic approach.
Our specialist team has resolved water management issues for the private sector and all levels of government throughout Australia. We deal with water at all scales, from a single allotment to an entire river basin.

We have developed planning and policy tools, designed water management infrastructure and provided detailed advice to help our clients achieve their goals. Our plain-language reports are technically sound and comprehensive.

We help our clients manage risk and give them a well-researched, logical basis to deal with competing interests for water resources.

We have demonstrated high-level expertise in:

- flood hydrology
- regional water strategy and policy development
- mine water management
- erosion and sediment control
- water quality monitoring and management
- floodplain management
- flood damage assessment
- flood mitigation options assessment
- stormwater drainage and management
- natural channel design
- flood risk assessment and minimisation
- water sensitive urban design
- stormwater harvesting
- accurate hydrological and hydraulic modelling
- design and planning evaluation
- peer review
- acting as expert witnesses
- water balance and contaminant transport modelling
- water supply planning and security assessment.
McARTHUR RIVER WET SEASON FLOWS
AT THE NATIONAL HIGHWAY CROSSING AT BORROLOOLA
Our knowledge isn’t limited to water engineering. By bringing an understanding of policy development, government procedures and legislative requirements to our work, we are able to give advice and prepare reports which minimise risk and are ready to implement.

We’ve helped federal, state and local governments to have confidence in their planning and decision making. This has included managing catchments and river systems, reviewing development proposals, preparing for future flood events and ensuring that water quality is managed effectively throughout a region.

Our NT experience includes:
- McArthur River Mine
- Katherine Flood Study
- Adelaide River Flood Study
- Jervois Base Metals Project
- Kilgariff development
- Mt Johns development
- Mt Johns Flood Immunity Project
- Alice Springs Flood Study
- Tennant Creek Stormwater Investigation
- Darwin CBD Stormwater Investigation.

EXAMPLES OF OUR SKILLS AND EXPERIENCE INCLUDE:

**Developing water management strategies in a challenging environment**

As we did for McArthur River Mine. The water management strategy identified the required infrastructure and management approaches to deal with the complex interactions of flooding, groundwater and mine process water across the site. Our work included additional drainage and flood studies, designing new water management infrastructure, preparing annual water balances and providing advice on regulatory matters.

**Identifying and managing major river floods**

We completed a comprehensive set of flood depth and hazard maps for events up to the Probable Maximum Flood across the Adelaide River floodplain. The flood model results were used to identify the existing flood risk and flood hazards throughout the Adelaide River town area including the Stuart Highway and to determine the potential for development in the town area. In addition, flood emergency response classifications and potential flood evacuation routes were determined for the Adelaide River Town for different magnitudes of flooding.
Assessing water use and impacts for new mining development

WRM advised on water impacts for the Jervois Base Metal Project, a proposed copper, lead and zinc mine located about 270 km northeast of Alice Springs. Surface water management at the project needs to ensure adequate water supply for operations while managing runoff during the wet months, and is complicated by legacy infrastructure on the site. A comprehensive surface water management system was developed for the project which will ensure water supply, minimise import water and protect downstream ecosystems.

Managing flooding and stormwater in the urban environment

We developed a flood and stormwater management plan for the Kilgariff estate, about 9 km south of Alice Springs. A key challenge was to define a drainage strategy that was sympathetic to the local environment but maximised the developable areas with sufficient immunity from flooding from the Todd River and St Marys Creek. Stormwater management was problematic, given the very low relief and ill-defined drainage lines. The study delivered a provisional development layout for future demand, as well as flood mitigation measures.
KNOWLEDGE

We understand policy development as well as water

Faced with many complex inputs and vast areas, it’s vital that engineers understand the specific requirements of government. Our experience working with all levels of government across Australia and internationally means that our work is always relevant to a policy framework.

That experience also extends to working across diverse climates and geologies.

SPECIALISATION

Skills to handle the most complex of problems

We’ve spent many years studying and working in all aspects of water engineering, and have developed a set of skills and experience which set us apart from other engineering firms. In fact, we’re often hired by other consulting companies to peer review their work.

We are able to overcome complex and rare problems with competing priorities, that are simply beyond the scope of more generalist companies.
INNOVATION

Clever thinking, underpinned by thorough research

We know when – and how – to modify existing methods and designs to come up with original ways to meet each project’s unique challenges.

We do thorough research and take nothing for granted, resulting in tailor-made solutions that stand the test of time.

RELIABILITY

Robust, impartial advice that stands up to scrutiny

We’re proud of our reputation for thorough preparation and review of our technically robust reports, advice and recommendations.

To our clients, it adds up to confidence. We provide solutions that don’t have to be revisited, with all the delays that entails, and which stand up to public scrutiny and in court. We also have extensive experience as expert witnesses to back up our work.
FLOOD MAPS IDENTIFY THE EXTENT AND DEPTH OF FLOODING FOR DIFFERENT Sized FLOODS

THE 1998 KATHERINE RIVER FLOOD INUNDATED MOST OF KATHERINE
THE CHALLENGE

Katherine has experienced significant flooding in the past, including in 1931, 1940, 1957, 1998 and 2006. The 1998 flood event, which is the largest on record with an annual exceedance probability of less than 0.5%, inundated almost the entire town and caused extensive damage.

The key challenge for this project was to identify cost-effective flood risk management measures to reduce the risk of damage, disruption and costs associated with major flooding in Katherine.

Detailed calibrated flood models were used to identify flood affected properties, potential structural flood mitigation measures for Katherine and any culturally sensitive sites or areas potentially affected by such measures.

THE RESULT

The flood modelling results were also used to identify the existing flood risk and flood hazards throughout the Katherine town and to determine potential flood mitigation measures.

The flood modelling showed that it is possible to significantly reduce flooding of properties in Katherine during smaller more frequent floods, such as a 5% AEP flood event. However, structural mitigation options would not work for larger floods such as the 1% AEP or rarer flood events. The study identified potential mitigation measures which included a combination of structural measures such as levees and drainage works, and non-structural measures such as land use and planning controls.
DIRECTORS

WRM’s team of 20 engineers and support staff are led by our four directors. Our directors are involved in every project that WRM takes on, ensuring that our clients can rely on high levels of expertise and effective decision-making.

Dr Sharmil Markar

BSc(Eng) (Hons) PhD FIEAust CPEng RPEQ IPE(Aus) APEC Engineer
DIRECTOR / SENIOR PRINCIPAL ENGINEER

With over 35 years in water resource management, Sharmil has worked on projects across all market sectors in all Australian states and territories, as well as several countries overseas. This includes a number of years in China undertaking major flood management, flood forecasting and water resource allocation and management projects.

He has been commissioned to peer review hydrologic and hydraulic modelling of several major water infrastructure projects in Queensland.

KEY AREAS OF EXPERTISE:
- numerical modelling of hydrologic and hydraulic processes
- water resource management and planning
- flood and floodplain management
- flood forecasting
- flood damage assessment
- mine site water management.

Greg Roads

BE(Civil)(Hons) MIEAust RPEQ
DIRECTOR / SENIOR PRINCIPAL ENGINEER

Greg’s extensive knowledge of two-dimensional hydraulic modelling and extreme flood hydrology, together with his background in hydraulics and fluvial geomorphology, give him enormous expertise in floodplain management, designing stream diversions and riverine erosion control techniques.

Greg has played an important role in the flood and environmental flow impact assessment of many of Queensland’s major water infrastructure projects.

He also has vast experience helping local communities to develop flood management strategies.

KEY AREAS OF EXPERTISE:
- two-dimensional hydraulic modelling
- extreme flood hydrology
- river engineering
- water resource planning
- large and small stream diversions
- riverine erosion control techniques.
Dr David Newton
BE(Hons) MEngSt PhD MIEAust CPEng RPEQ
DIRECTOR / SENIOR PRINCIPAL ENGINEER

David is a highly experienced numerical modeller with specialist expertise in flooding and drainage, stormwater management and water sensitive urban design. He has more than 25 years’ experience of providing specialist advice on water quality and quantity management and infrastructure design.

He is skilled in finding collaborative, strategic solutions to complex water and environmental problems.

KEY AREAS OF EXPERTISE:
• urban hydrology
• hydraulic design
• synthesis and presentation of complex systems and water-related data sets
• flood hydrology
• water sensitive urban design
• high-quality technical writing
• corporate water management strategies.

Michael Batchelor
BE (Hons) MEngSt MIEAust RPEQ
DIRECTOR / SENIOR PRINCIPAL ENGINEER

Michael’s primary areas of practice include flood protection, stormwater management, mine site water management and water supply planning. His experience in water resources management and environmental impact assessment for major infrastructure projects spans more than 25 years.

He has worked with clients across a diverse range of industries and hydrological conditions to deliver efficient project solutions which fulfil environmental protection requirements.

KEY AREAS OF EXPERTISE:
• hydrologic modelling for yield analysis and environmental flow impact assessment
• hydrologic and hydraulic modelling for flood assessment and mitigation
• hydraulic design (water distribution systems, stormwater management infrastructure)
• mine site water management
• industrial water supply planning.
TRUSTED ADVICE FOR THE NORTHERN TERRITORY

We have worked on projects in every state and territory of Australia, along with various international sites including in China, Thailand and New Caledonia.

We are registered with the NT ICN as a local business. Clients we have advised on water issues in the Northern Territory include:

- Aurecon
- Bowden McCormack Lawyers & Advisors
- Bureau of Meteorology
- CGU Insurance
- Department of Environment and Natural Resources
- Department of Infrastructure, Planning and Logistics
- Department of Health
- Gilchrist Connell Lawyers
- Glencore
- Insurance Australia Group
- Integra Technical Services (Australia) Pty Ltd
- KGL Resources.

A COLLABORATIVE APPROACH

COMMUNICATION

Direct, hands-on involvement of our principals

Our directors are all highly experienced engineers who take direct responsibility for each project, meaning clients have direct access to someone capable of making quick and informed decisions.

We’re flexible and can deal with rapidly changing circumstances and quick turnaround times. We listen.

INTEGRITY

Professional integrity is a core value

Our advice is always provided in the best interests of our client, the community and the environment. We’re honest and trustworthy in all we do.

We present all of the relevant facts so that our clients, regulators and the community understand the project risks.

We succeed when our clients succeed.