



DISCIPLINE BROCHURE

Flooding & Hydrology

OPPORTUNITIES
THROUGH
EXCELLENCE

bgeeng.com

BG
&E

Building Our Flood Resilient Future

At BG&E, we specialise in comprehensive flood risk management solutions designed to protect communities and infrastructure.



Avon River Flood Mapping - Avon, VIC, Australia.

At BG&E, we specialise in comprehensive flood risk management solutions designed to protect communities and infrastructure. Understanding catchment flood behaviour and flood risk is essential to reducing the social, environmental, and economic impacts of flooding. Our passion is evident through the delivery of smart and considered solutions that manage flood risk, strengthen climate resilience, and minimise the need for reactive disaster recovery efforts.

ADAPTING TO A CHANGING CLIMATE

As our climate changes and populations grow, effective flood risk management becomes increasingly crucial. Recent flood events in Australia have been the most expensive in history, highlighting the need for resilient design to protect communities and reduce costs associated with adverse weather.

COMPREHENSIVE FLOOD RISK MANAGEMENT

We begin with a thorough risk assessment and mapping process, conducting detailed flood studies, flood behaviour and hazard mapping, as well as flood frequency and event-based analysis. This can include reviewing the flooding history at the site and incorporating community experiences. Combining these insights with advanced flood modelling allows us to effectively identify and map the risks to communities and infrastructure.

Our collaborative design solutions involve working closely with multi-disciplinary teams to enhance the flood immunity and resilience of assets and infrastructure while ensuring that new developments and infrastructure do not increase flood risk to others.

Our approach to flood risk management is holistic, integrating land use planning, community awareness, and flood emergency response into our designs where needed. All aspects of risk management are considered, providing a comprehensive solution to flood risk.

OUR COMMITMENT TO FLOOD RESILIENCE

At BG&E, we believe in designing for resilience. While we can't stop the rain, we can significantly reduce the losses caused by flooding. Our Flooding and Hydrology Team, consisting of skilled engineers, modellers, and hydrologists, is dedicated to understanding and managing flood risk from start to finish.

SUPPORTING INFORMED DECISIONS

Our collaborative approach ensures that clients are well-informed about risks, enabling them to make risk-based decisions confidently. At BG&E, we take pride in our ability to manage flood risk effectively, adding value to projects through cost-effective designs and safeguarding communities and infrastructure for a resilient future.

Fitzroy Crossing – Kimberley, WA, Australia.





Avon River Bridge Project, VIC

CLIENT TESTIMONIAL

Thanks to the BG&E Team for the thoroughness that they have demonstrated in assessing the flood criteria, and how impressed the Catchment Management Authority were with the report and project outcomes. The quality of BG&E's work meant a very smooth approval process for the project.

Graham Hawthorne
Engineering Manager, CPB Contractors



Our Capabilities



FLOOD RISK ASSESSMENT

- Hydrologic and 1D and 2D hydraulic flood modelling
- Flood frequency analysis
- Catchment-wide flood studies and mapping
- Site-specific flood risk assessment
- Flood damage assessment



FLOOD IMPACT & MITIGATION

- Flood impact assessment
- Concept and detailed design for flood mitigation
- Flood impact mitigation for infrastructure and development



DESIGNING FOR RESILIENCE

- Flood immunity analysis and design
- Infrastructure resilience assessment
- Scour and erosion management
- Waterway and hydraulic structure design



FLOOD HAZARD & RESPONSE MANAGEMENT

- Catchment wide floodplain risk management studies and plans
- Flood planning guidance
- Community consultation and awareness
- Flood emergency response management



CLIMATE CHANGE

- Climate change assessment for flood risk
- Flood planning for future climates
- Asset vulnerability and resilience

“

Country Rail Network Washaway Assessments, NSW

CLIENT TESTIMONIAL

I've had the pleasure of working with BG&E on a number of interesting projects in areas related to flood investigations and hydrology assessments - including in response to washaway incidents at several locations across the rail network. Above all, I was impressed with the BG&E Team's ability to provide innovative solutions and drive away from conservative assumptions.

Moatasem Fayyadh

Lead - Civil & Structures, John Holland & Country Rail Network

Our Clients

INFRASTRUCTURE

From preliminary to detailed designs and construction staging, BG&E's experienced flooding and hydrology team works directly with contractors and transport authorities to deliver major road, rail and metro infrastructure projects.

While considering flood risk to the asset and surrounding area, our team seek value engineering options.

We have achieved significant reductions in construction costs by optimising bridge spans across major waterways, balancing cut and fill operations, and minimising cross drainage requirements, all while prioritising flood immunity and resilience in our designs.

INFRASTRUCTURE PROJECTS

- **M1 to Raymond Terrace Motorway (NSW)**
- **Sydney Metro City & Southwest (NSW)**
- **Fitzroy River Bridge (WA)**
- **Inland Rail - Albury to Parkes & Illabo to Stockinbingal (NSW)**
- **Narre Warren North Road Upgrade (VIC)**
- **Avon River Rail Bridge (VIC)**
- **Ipswich Motorway - Rocklea to Darra (QLD)**
- **Tonkin Highway Extension (WA)**
- **Mandurah Estuary Bridge Duplication (WA)**
- **Barwon Heads Road Upgrade (VIC)**
- **Coomera Connector South (QLD)**

*Ipswich Motorway—Stage 1 Upgrade: Rocklea to Darra -
Brisbane, QLD, Australia.*



DEVELOPERS

Navigating flood risk requirements for development applications and planning proposals can be complex. BG&E's team has provided expert advice and documentation for hundreds of such applications.

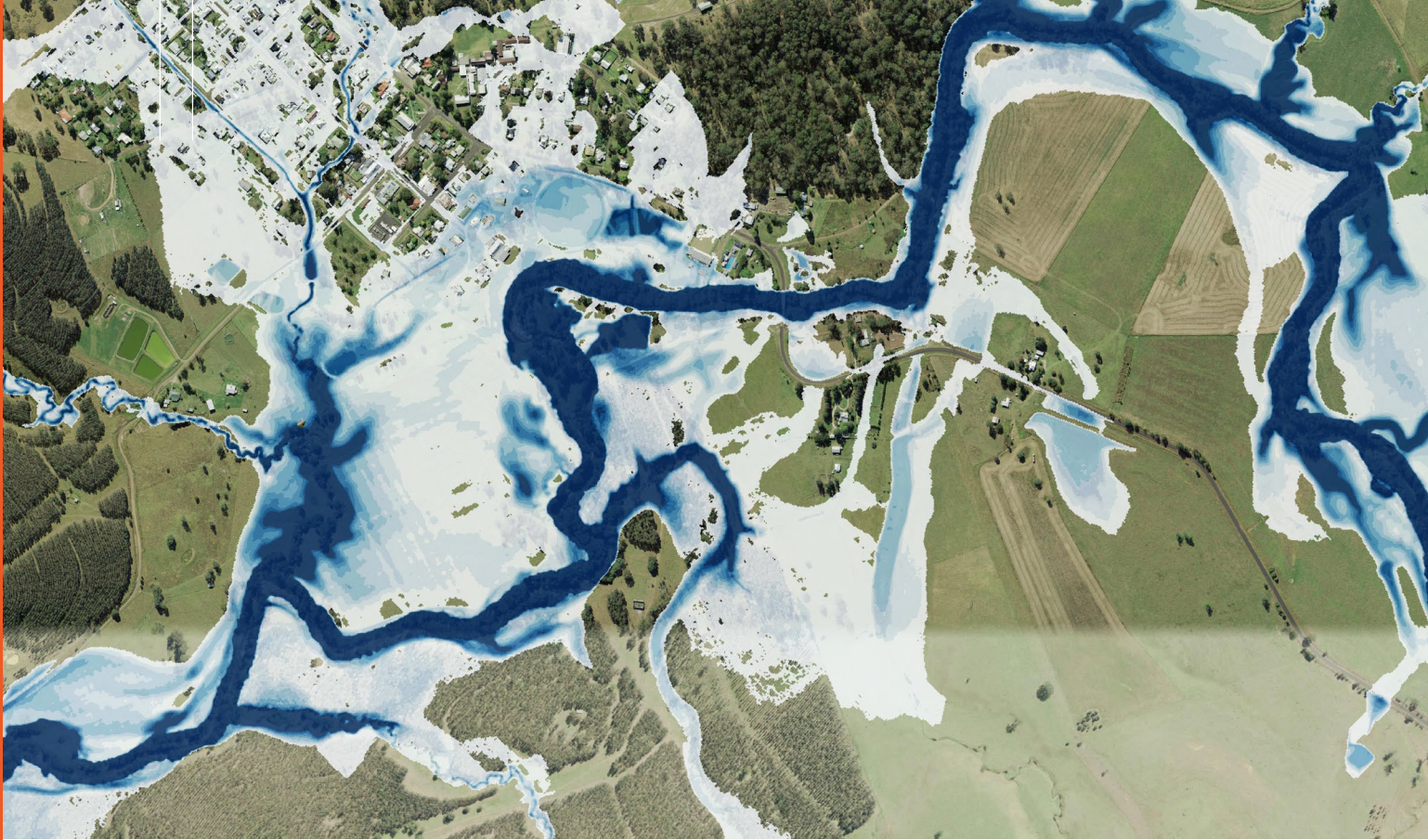
Our approach focuses on seeking solutions that simultaneously meet the developer's needs while satisfying the intent of flood planning requirements and suitably addressing risk to future occupants.

DEVELOPER PROJECTS

- **Parramatta Square (NSW)**
- **Fortitude Valley State Secondary College (QLD)**
- **St Basil's Aged Care Annandale (NSW)**
- **Parker Street Residential Flood Emergency Response Plan (NSW)**
- **Tom Price Hospital Redevelopment (WA)**
- **Paraburdoo Hospital Redevelopment (WA)**



*Parramatta Square -
Parramatta, NSW, Australia.*



*Bonalbo Flood Study & Floodplain Risk Management Plan –
Bonalbo, NSW, Australia.*

CATCHMENT MANAGERS

Understanding catchment flood behaviour and flood risk is essential to reducing the social, environmental and economic impacts of flooding and for planning to minimise future flood impacts.

At BG&E, we work with local authorities, catchment management authorities and other catchment managers to help them understand their flood risk through catchment flood studies, flood mapping and the provision of clear and concise data. Our insights help inform planning and emergency response decisions.

Floodplain risk management must be considerate of the impacts of flooding and flood mitigation strategies on the community, flood risk managers, emergency response services and other stakeholders. We adopt a collaborative approach to risk management - considering emergency response in integration with physical flood mitigation measures.

BG&E has developed flood management and mitigation measures from concept through to detailed design and construction.

CATCHMENT MANAGER PROJECTS

- **Bonalbo Flood Study & Management Plan (NSW)**
- **Gerringong & Jamberoo Flood Mitigation Design (NSW)**
- **Orange Ultimate Flood Modification Scheme (NSW)**
- **Tenterfield & Woodenbong Flood Studies (NSW)**

ASSET MANAGERS

Downtime caused by flooding can cause considerable cost implications impacting both asset managers and communities. Fast recovery to full operation is essential for reducing the impacts of flooding.

BG&E partners with asset managers across the infrastructure, road, rail and mining sectors to identify the flood risks to their assets and networks and to improve flood resilience. Through smart design and 'build back better' principles, we develop measures for recovery solutions to minimise future risks.

We also perform event-based analyses following rainfall and flood events to identify the causes of asset or network failure. These insights help shape practical recovery measures and future risk-reduction strategies.

ASSET MANAGER PROJECTS

- **Parkes Surface Water Assessment & Flood Mitigation (NSW)**
- **Country Rail Network Washout Analysis & Mitigation Design (NSW)**
- **Southern QLD Flood Reconstruction Works (QLD)**
- **Nyidinghu Rail Waterways (WA)**
- **Dampier Salt Surface Water Management (WA)**

*Country Rail Network Washaway Assessment -
NSW, Australia.*





Parkes Surface Water Assessments & Flood Mitigation, NSW

CLIENT TESTIMONIAL

BG&E's technical expertise and commitment to delivering high-quality flood risk management solutions on various projects have been invaluable to Parkes Shire Council.

David Pearce

Project Manager, Parkes Shire Council

At BG&E, we are united by a common purpose – we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments. Our team of more than 700 highly skilled people, in 15 offices across Australia, New Zealand, South East Asia, the United Kingdom and Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Energy and Resources sectors.

OPPORTUNITIES
THROUGH
EXCELLENCE

bgeeng.com

BG
&E

FH_DIS_BR_R1_P0525