

# Process Engineering

Capability Statement



  
COMPETENCY  
CAPACITY  
COMMITMENT

**BG  
&E**  
RESOURCES

# Acknowledgement of Country

**BG&E Resources acknowledges Aboriginal and Torres Strait Islander peoples as the first peoples of Australia and the Traditional Owners and Custodians of lands and waterways on which we work and live.**

**Our operations are conducted on the traditional lands of the Whadjuk people of the Noongar nation in Perth, the Bindjareb people in Mandurah, the Larrakia people in Darwin, the Kurna people in Adelaide, the Gurambilburra Wulgurukaba, Bindal, Nywaigi, and Gugu Badhun peoples in Townsville, the Turrbul and Jagera peoples in Brisbane, the Awabakal people in Newcastle, the Gadigal people of the Eora nation in Sydney, and the Wurundjeri and Boon Wurrung peoples of the Kulin nation in Melbourne.**

**We honour the wisdom of, and pay respect to, Elders past and present, and we acknowledge the cultural authority of all Aboriginal and Torres Strait Islander peoples across Australia.**

**We also acknowledge the vital contribution made by our Aboriginal and Torres Strait Islander employees and we thank those who have guided our approach and generously shared their insights.**

Image: Aboriginal artwork created by Jayda Sebire (Indigenous Artist and former BG&E Resources People and Culture Assistant).  
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# Process Engineering and Design for Asset Optimisation

BG&E Resources (BGER) is a multidisciplinary engineering, EPCM and ESG consultancy, delivering technical solutions for clients in the Resources, Energy and Industrial sectors.

With offices on the East and West coasts of Australia, we are majority owned by our employees and committed to helping clients decarbonise in a net zero economy.

Our fit-for-purpose engineering solutions enable mining and raw material proponents, energy and water utilities, and port authorities to optimise the performance of their assets, minimise operational disruption, improve safety and mitigate risks.

BGER's proven approach to deliver schedule and cost benefits through clever engineering and true collaboration is what sets us apart.

Our people pride themselves on providing smart and sustainable solutions to complex engineering problems; and importantly, on being great people to work with.





# Technical Excellence

## Our people are passionate about leveraging their technical ingenuity to solve complex problems.

Technical excellence is the bedrock of our business. It drives our people and propels the outcomes that we provide for clients, communities, asset owners and operators, and financiers.

Our dedicated professionals and subject matter experts focus on understanding our clients' business objectives, their desired project outcomes, as well as the latest industry research for the sectors in which we operate.

### A Premium Client Experience

The success of our project work depends on leveraging the best expertise of our people. That's why we allocate the most qualified professionals to help realise our clients' development vision and bring their projects to life.

Our work is underpinned by strong engineering design principles, industry-leading technology and pragmatic advice to deliver exceptional outcomes, every time.

This approach provides the following benefits:

- Ease of understanding of regulatory frameworks
- Efficient navigation through the development approvals process
- Protection and preservation of our cultural heritage, the environment and waterways
- Healthy, transparent and trusted relationships are established with stakeholder groups
- Respectful liaison with Traditional Owners is undertaken
- Fair and equitable outcomes are achieved for First Nations' communities
- Project knowledge is retained, including lessons learned
- Innovation is embraced and deployed.

### Technical Leadership Team

The quality and excellence of our world and ability to deliver the best technical and cost-effective solutions for our clients is guided by our Technical Leadership Team.

Led by the most senior members of our business, this team facilitates learning and knowledge transfer, professional collaboration and mentorship to drive continuous excellence in our technical capabilities. It also encourages our people to perform to high technical standards and rewards staff for incorporating innovation into projects.

Image: Steve Ash and Kanishka Pathirana at Paraburdoo Train Load Out Facility, Pilbara WA.



# Safety is at the Heart of our Business

**Our diverse and culturally aware teams embrace safe work practices that are environmentally sound.**

Safety is integral to everything we do at BG&E Resources. We care about our people, clients, and the communities in which we operate, and strive for zero harm in everything we do.

Health, safety and quality are embedded in our work practices, while heritage and sustainability are considered throughout the entire project life cycle.

We recognise the importance of continuously reviewing safety in design issues at all stages of a project, from investigation, design, construction, operation (including maintenance), closure and rehabilitation.

Exceeding regulatory obligations, we leverage a formalised Health, Safety, Environment and Quality Management framework that allows us to analyse and implement practical measures to mitigate risks.



## Leadership

- Understanding of client needs
- Technical Leadership Team governance
- Strong Chartered presence
- Adherence to Technical Standards & Regulatory Instruments
- Committed to Technical Excellence
- Striving for low-carbon impacts



## Systems

- ISO Accredited Quality Management System (QMS)
- Design Assurance
- Engineering Verification Procedures
- Safety in Design
- Net Zero in Design
- Risk Mitigation & Management
- Project Governance (Action Tracking, Monitoring, Performance & Auditing)
- Continuous Improvement (Lessons Learnt)



## Characteristics

- Client Centric
- Risk Adverse
- Reliable
- Accountable
- Innovative
- Simplification
- Community & Culture



Image: Lucy Nguyen at Cape Lambert Port Facility, Karratha WA.





Image: Indigenous peoples' hands. Copyright approved via Shutterstock.

# Respecting, Protecting and Preserving our Cultural Heritage

## Diversity across our workforce and our supply chain is vital.

Our clients trust in our ability to enhance their social license to operate, including through the provision of mutually rewarding cultural heritage consultation and management, healthy Indigenous partnerships, and ethical procurement from Aboriginal-owned and operated businesses.

Working with Traditional Owners, First Nations peoples, Indigenous Prescribed Body Corporates and Aboriginal Corporations, is seeded in early engagement as it enables our team to deliver benefits for today (across the life cycle of proponents' projects) and for future generations.

Early engagement underpins our approach to cultural heritage management as it enables us to understand the needs and desires of all stakeholder groups, as well as any existing Indigenous Land Use Agreements (ILUAs) which have been registered with the National Native Title Tribunal (NNTT).

We partner with highly experienced local archaeologists and ethnographic specialists to provide clients with access to an abundance of heritage site data, and to collectively undertake walk-throughs of proposed project sites.

From the Kimberley in the North to Esperance in the South of WA, across central Australia and along the Eastern seaboard – we engage with Traditional Owners and Custodians, Prescribed Body Corporates (PBCs), Aboriginal development corporations and First Nations communities to preserve their cultural heritage and when helping proponents and/or government agencies to deliver projects.

### Cultural Heritage Management Capabilities

- Stakeholder consultation and engagement to help Traditional Custodians of the land and Native Title Claimants to establish IULAs, registration to the NNTT and compensation frameworks (among others).
- Advice for proponents regarding the application of legislation including the Native Title Act 1993, Heritage Act 1972 (Aboriginal Cultural Heritage Bill 2021) and Repeal Bill 2023.
- Developing scopes for archaeological and ethnographic surveys.
- Indigenous business contracting (including teaming with Aboriginal-owned and Supply Nation-certified businesses to develop First Nations regional workforces).
- Capacity building (including coaching, mentoring and career pathway development, etc. for First Nations peoples).
- Reconciliation Action Plans.

### First Nations' Partnerships

We have a range of actions in place to increase Aboriginal and Torres Strait Islander employment and engagement in our business, to help First Nations communities become self-sustaining (current participation is approximately 1.5 per cent of our workforce and we are striving to increase that to three per cent by December 2025).

We proudly support Aboriginal and Torres Strait Islander owned businesses and have established a majority-owned Aboriginal company, TICS (WA) Pty Ltd (TICS). TICS is a NATA-accredited laboratory to ISO 17025, providing non-destructive testing (NDT) services.

Similarly, we have strategic partnering arrangements with several Aboriginal-owned businesses, including Karlayura Contracting, which provides design and construction support for clients.

We have also established a similar partnering agreement with i24s, an Aboriginal-owned and operated workforce company, providing security, civil works and commercial cleaning services for mine sites in remote locations across Australia, as well as for commercial premises in capital cities (their clients include BHP, Horizon Power and Cundaline Resources, among others).

Most recently, we also established a partnership with Pirrpala, a 100 per cent Aboriginal-owned and operated small scale project delivery provider.

Our partnerships also span the globe, specifically in China, for the procurement of equipment and professional services, including on Country inspections of fabrication, testing, compliance and design reviews.

### Reconciliation

Review our [Innovate Reconciliation Action Plan](#), [Aboriginal and Torres Strait Islander Engagement Strategy](#), [Human Rights Statement](#) and [Anti-Discrimination Policy](#).



# Process Engineering

**Delivering bespoke design for projects with a focus on optimising costs and increasing circuit efficiencies.**

BGER's process engineers have amassed considerable experience in mining, mineral processing, hydro and pyro-metallurgy, with specialist expertise in areas such as metallurgical test work management, process modelling, flowsheet development, commissioning, operations and maintenance.

Our team is also committed to delivering renewables-based hydrogen and ammonia projects. We bring relevant experience in H<sub>2</sub> and NH<sub>3</sub> production. This includes process design and novel technology development for H<sub>2</sub>, process safety, hazardous area classification as well as operations and management support for large scale air separation unit.

From concept/trade-off studies to detailed engineering and commissioning support, our specialised team offers full engineering and design services, procurement management and construction management services.

Collaborating with our clients, we tailor our approach to meet project requirement and provide support in process activities, such as process design, mass and energy balances, process optimisation, and concept studies, whilst maximising the use of recycles and renewable resources.

## Capabilities

- Alumina (Bayer Process) and High Purity Alumina (HPA)
- Lithium plants (Hard Rock and Brine)
- Rare Earths
- Nickel
- Vanadium
- Phosphate
- Gold
- Iron Ore
- Copper
- Petrochemicals & Chemicals







## Project Phases

**Our Process team offers services throughout the project life cycle covering concept, PFS, FS, Detailed Design through to construction and commission support.**

### Capabilities

- Concept Studies
- Pre-Feasibility Studies
- Bankable Feasibility Studies
- Front End Engineering Design
- Detailed Design
- Independent Review
- Construction Support
- 2D & 3D Design



# Projects







# Gold Mine Operation

Client: Undisclosed

**An Australia gold producer engaged us to conduct a Safety Study and Process Engineering Review of an existing elution circuit at its mining operation.**

The extensive study included the delivery of a HAZOP workshop to address engineering improvements, resulting from the site's recent production upgrade.

BG&E Resources' (BGER) works package included reviewing and updating the Process and Instrument Diagrams as well as the operational documents.

Our team assessed the elution columns, acid wash columns, and other ancillary equipment in the gold recovery area. Detailed design for few major upgrades have also been completed.

After the update of the elution circuit, we reviewed hazards and risks associated with acid wash and elution columns which included:

- Assisting with action plan post regulatory inspections from Western Australia Department of Mines, Industry Regulation and Safety (DMIRS)
- Designing the valves that enable dam operations to isolate Elution columns
- Identifying hazards and operability issues based on the design post upgrade
- Conducting a HAZOP workshop
- Improving the procedures and permits for safe operation and maintenance of Elution Circuit.

# Ore Sorter Plant - PFS & DFS

Client: Undisclosed

**Our work has shaped the plans for a world-leading minerals producer to meet increasing demand for lithium driven by the global energy transition.**

BG&E Resources (BGER) conducted the Pre-Feasibility Study (PFS) and the Detailed Feasibility Study (DFS) for our client's proposed two-stage crushing, screening, and Ore Sorting Plant (OSP).

Our client had marginal stockpiles with high levels of iron contamination that could not be processed through the existing Chemical Grade Plant (CGP). After extensive testing, it was concluded that an OSP would be required for the pre-processing of marginal stockpiles. By pre-processing these marginal stockpiles through sorting the product can be blended through the crushing circuit into the CGPs.

This expansion would enable our client to meet the increasing demand for lithium driven by the global energy transition such as electric vehicles and energy storage.

BGER assembled a multidisciplinary team of professionals from our Project Delivery, Civil/Structural, Process, Mechanical, Piping, Electrical and Energy practices to complete the concept design and detailed design.

The PFS explored the options for designing the Ore Sorting Plant, which was designed to guarantee performance between 1 and 2 Mtpa. During the study, the plant transitioned from a semi-mobile to a fixed plant.

Our team modelled the crushing sizes based on the proposed optical sorters' throughput and size capabilities. External factors such as the mobility of the plant, and environmental constraints such as noise and dust were all considered due to site's location.





# Our Process Engineering Team



## **Joe Allen** **Director of Operations**

15 years of experience in design, construction and operation of process plants with diverse experience across mining, power generation and infrastructure projects. Joe has proven experience in leading teams through all scales and phases, having overseen projects across Lithium, Power Generation and Water. His skills include concept studies and layout development, and capital cost estimates for complete project lifecycle.

## **Erin Ireland** **Principal Process Engineer**

13 years of experience as a highly technical manager including senior management, production, project management, technical development, feasibility studies, plant design and engineering. Erin's project experience ranges from being involved in the battery supply chain from spodumene and brine processing, to lithium hydroxide carbonate production, precursor and gold projects.

## **Michael Manichia** **Lead Process Engineer**

12 years of experience in implementing mineral processing technologies while balancing environmental sustainability, and statutory compliance. He has experience in production management, test work management, feasibility studies, FEED, and plant commissioning. Michael has worked across the project life cycle specific to gold and silver in greenfield and brownfield projects. His expertise includes copper-gold, magnetite, and tailings processing, process modelling and conceptual/scoping studies during project development in the resource sector.

## **Jamie Tee** **Senior Process Engineer**

5 years of experience in engineering design, project development, construction, commissioning, operations and maintenance in the chemical and resources sectors. Jamies project experience includes scale-up and commercialisation of new process technology, process plant & facility design, renewables & power generation, brownfield construction, plant upgrade and modification, reliability improvement and industrial IoT.

## **Matheus Pimentel** **Process Engineer**

6 years of experience with mineral characterization, ore processing and design of pre-feasibility, feasibility, and executive projects for mining enterprises. He has Process Engineering experience working with both consultants and sellers. Matheus' project experience includes crushing plants, dewatering plants, copper flotation circuits and slurry pipelines to name a few while his operational experience includes both pilot plant test work and full scale commissioning and troubleshooting for Flotation circuits in the copper industry.

## **Chris Larder** **Principal Project Engineer**

30 years of experience in project and study management for mineral processing plants spanning across the fields of base metals, gold, iron ore (magnetite and hematite) and battery metals metallurgy. He is experienced in general and plant management to general manager/senior site executive level. He has delivered cost effective process development, major testwork program development, management and reporting, design and operation of pilot plants, as well as budget preparation and cost management.



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BG&E Resources is a multidisciplinary engineering, design, project delivery and advisory consultancy, providing technical solutions for clients in the Resources, Energy and Industrial sectors. We are majority owned by our employees, who are united by our purpose – together, we embrace innovation to solve complex problems, for today and future generations.

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