



# SHORE POWER

At the helm of a greener future



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# Who we are

AtkinsRéalis connect people, data and technology to transform the world's infrastructure and energy systems. Collaboratively with industry partners and clients, and our global team of over 36,000 consultants, designers, engineers and project managers, we are ready to change the world.

Our commitment to a whole-life view of major development programmes enables us to lead projects at every stage and deliver innovative solutions that will last.

In a society which is changing at a rapid pace, AtkinsRéalis recognise how we are not alone in fundamentally transforming the way teams operate to respond to climate change, population growth and other major societal risks and opportunities. Our highly skilled team of consultants and engineers deliver holistic sustainability and energy efficiency services that are client-centric and collaborative by nature.





## The path to Net Zero

As the UK charts its ambitious path to net-zero carbon emissions by 2050, the ports and shipping industry plays a vital role. The sector, long a backbone of global trade and economic growth, must now innovate and adapt to align with these climate targets.

Introducing shore power technology and reducing in-port carbon emissions are critical steps in this transition. As an experienced and trusted design, engineering and project management company, with experience in designing and delivering the UK's largest shore power project to date, we offer expertise that can guide port operators through the complexities of implementing these transformative projects.



# Why shore power, and why now?

**If we can run a car or a lorry from electrical power, why not a ship? That's where shore power comes in.**

More than 100,000 vessels dock at 4,500 ports worldwide, annually emitting over 900 million metric tons of CO<sub>2</sub>, nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>) and particulate matter combined – equal to 220 coal-fired power plants.

Government legislation on air quality (such as the UK Clean Air Strategy) and increasing pressure from vessel operators demanding more sustainable practices from ports is driving the need for a sustainable solution that can be delivered quickly, to help ports meet their own Net Zero targets – some coming as early as 2030.

And while the transition to shore power and green energy is crucial for reducing emissions in the maritime sector, it also presents substantial challenges related to national infrastructure capacity and the need for integrated systems thinking. Addressing these challenges requires coordinated efforts, substantial investments, and a commitment to sustainable development from all stakeholders involved. By navigating these complexities effectively, ports can play a pivotal role in achieving broader climate goals and driving the global shift towards sustainability.

**The benefits of shore power are clear to see**





# The benefits of shore power

As well as reducing shipping emissions and improving air quality, there are other benefits ports can reap with the implementation of shore power.

**Net Zero:** As other alternative fuels are still being developed, ports don't need to wait. With over 50 ports already using shore power in Europe alone, it's a proven way to meet your Net Zero targets and is available right now.

**Getting ahead:** The transition to shore power can attract environmentally conscious shipping operators looking to minimise their carbon footprint, leading to increased traffic and revenues.

**Regulation & compliance:** By investing in shore power infrastructure, ports can future-proof their operations against tightening environmental regulations and potential carbon pricing mechanisms.

**Energy systems:** The infrastructure required for shore power can be easily coupled with the installation of renewable energy systems and storage – such as wind and solar – for 100% sustainable shore power, and can also help prepare your port for other future site developments.

**Operations & maintenance:** Shore power can improve the efficiency and reliability of port operations. When ships connect to shore power and shut off their engines, they can undergo crucial maintenance without needing to dock in maintenance bays. This means that while essential work is being done, all on-board systems can stay active and normal operations can continue.





# Challenges

The transition from fossil-fuelled operations to sustainable energy sources like shore power can present significant challenges for ports.

## **Grid capacity and stability:**

Shore power needs a reliable and sufficient supply of energy. The electrical grid must be capable of handling the substantial and variable loads that shore power demands. This can require significant upgrades to transmission and distribution lines, substations, and other components to ensure they can accommodate the power needs of ports without causing disruptions or instabilities in the broader electrical network.

## **Investment and funding:**

Upgrading national infrastructure and increasing renewable energy capacity require substantial investment. Securing and maximising the necessary funding can be challenging, particularly in a landscape where government budgets are already stretched. Ports must balance the immediate costs and operational disruptions associated with transitioning to shore power against the long-term environmental and economic benefits.

## **Port infrastructure & operations:**

When choosing shore power, ports require the delivery phase to have minimal impact on their operations and to have careful consideration for existing infrastructure.

## **Technological integration:**

The technology required for shore power involves not only electrical infrastructure but also advancements in ship design and retrofitting existing vessels. Coordinating these technological requirements and ensuring compatibility between shore-side and ship-side systems is a significant challenge. Ports need to work closely with shipping companies and equipment manufacturers to develop and implement compatible technologies.

## **Cross-sector collaboration:**

Implementing shore power requires collaboration between various sectors, including energy providers, port authorities, shipping companies, and government bodies. Each stakeholder has different priorities and constraints, making coordination complex. AtkinsRéalis can support you with effective, integrated planning to align these disparate interests towards common goals.

## **Regulatory and Policy alignment:**

Policies and regulations at local and national levels must support the transition to green energy. Ports need coherent policies that promote green energy adoption, provide incentives for investment, and set clear standards for emissions reductions. At AtkinsRéalis, we bring together a wealth of knowledge and experience in energy masterplanning working with service providers, regulatory bodies and policy makers. We utilise digital engineering techniques to identify effective solutions tailored to individual port's needs; in the most cost effective, resilient and low carbon manner.





# Our approach

The complexity of transitioning to shore power requires integrated thinking. At AtkinsRéalis, we partner with our clients and the supply chain, embedding an open culture of challenge within the infrastructure value chain to nurture innovation.

Our ability to carry out complex projects with proactive support from our industry-leading experts, helps move issues forward. We help resolve the unexpected twists and turns that come with developing and operating the world's leading ports.

Our expertise encompasses a wide range of services that can support the implementation of shore power and other green technologies on your path to Net Zero:

## **Strategic planning and feasibility studies:**

By providing a clear roadmap, AtkinsRéalis help port operators make informed decisions and develop strategic plans that align with their long-term sustainability goals. We also provide support with funding proposals and applications from the very early stages and can conduct comprehensive feasibility studies to assess the technical, economic, and environmental viability of shore power installations.

## **Innovative engineering solutions:**

We bring a wealth of lived experience in designing and integrating complex systems and can work with you to develop customised shore power solutions that optimise energy efficiency, minimise costs and operational disruption, and ensure compatibility with existing infrastructure.

## **Project management and execution:**

We offer robust project management services that oversee every stage of the project lifecycle, from initial planning and design to construction and commissioning. Our expertise ensures that projects are delivered on time, within budget, and to the highest quality standards. This includes coordinating with multiple stakeholders, managing risks, and ensuring seamless integration with port operations.

## **Regulatory compliance and sustainability reporting:**

AtkinsRéalis can help ease the burden on port operators when it comes to understanding and complying with relevant regulations, standards, and guidelines. As well as monitoring and taking steps to improve air quality, we can support you in obtaining the necessary permits, conduct environmental impact assessments, ensuring adherence to safety protocols, and facilitating sustainability reporting to help you accurately demonstrate your environmental performance.





## Our value

In their journeys to Net Zero, ports will develop and deliver their business plans, enhancing the sustainability and efficiency of their operations by utilising shore power. By embracing shore power and reducing in-port carbon emissions, you can significantly contribute to a sustainable future. AtkinsRéalis are critical enablers in this transition, offering the expertise, innovation, and strategic guidance needed to deliver successful projects.

**AtkinsRéalis combine the breadth and reach of a major, full-service consultancy with specialist power capability and lived experience in port development and operations to enable your port to deliver cost effective and timely shore power that will maintain competitive advantage.**

We are uniquely placed to support across the whole project lifecycle through our end-to-end expertise and ongoing relationships and involvement with government (nationally, regionally and locally), national infrastructure providers, port operators, supply chain partners and end users.

### **Commercial support:**

AtkinsRéalis can help your port identify routes to market to achieve your project timescales, including procurement and commercial advice on supplier selection and specialist equipment.

### **Energy experts:**

We provide expertise in power transmission and energy storage to enable ports to receive and connect the required energy from the UK national grid and implement sustainable energy solutions.

### **Digital first:**

Our 3D visualisation modelling capability simulates the operations at berths with different vessel types, cable management systems and port logistics equipment such as passenger boarding structures and cargo handling vehicles. Ports can easily visualise shore power solutions and engage with a variety of stakeholders using our cutting-edge modelling techniques.

### **Collaborative at the core:**

We work closely with all stakeholders to identify operational constraints and opportunities swiftly and support you to make informed decisions to de-risk your project.



# Services

We offer end-to-end services that cover the whole project lifecycle:

- Regulation & consenting
- Business planning & port masterplanning
- Power transmission and energy master planning & modelling
- Emissions management
- Carbon net zero & sustainability
- Ecological & environmental services
- Engineering design & integration – concept, outline and detailed
- Electrical engineering, balance of plant (substations, switchgear, SCADA, etc.)
- Civil engineering (accesses, platforms, foundations, cable duct networks, etc.)
- Programme & project management
- Contract & commercial management
- Supplier specification & procurement
- Construction management & supervision
- Digital Twin, 3D modelling and visualisations.





# Case studies



Portsmouth International Port  
Shore Power



Long Beach Cruise  
Terminal Improvements



Port of Tilbury Air  
Quality Monitoring



Carbon  
Critical Knowledgebase



# Portsmouth International Port Shore Power

AtkinsRéalis was commissioned by Portsmouth International Port (PIP) to assist in designing and delivering a shore power solution on 3 of its busiest berths.

## CLIENT CHALLENGE

PIP is ambitiously targeting to be Net Zero by 2030 and the UK's first zero emission port by 2050. As such, they needed to implement a solution to drastically reduce their port emissions and improve air quality.

The busy municipal port serves cross channel ferries, cruise and freight ships across its 5 berths – with over 1.6 million passengers passing through the port in 2023 – so PIP required a solution that would not affect its operational activities. This included an electrical design that could accommodate various vessel types, whilst keeping the berths free from equipment clutter.

The port also has challenging timescales. The Zero Emission Vessels and Infrastructure (ZEVI) funding received by PIP requires the port to implement shore power and start collecting data by April 2025, and there are challenging lead times for the delivery of the specialist electrical equipment.

## OUR APPROACH

AtkinsRéalis have been a key partner throughout almost every stage of the project:

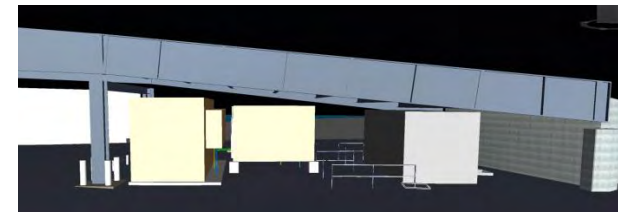
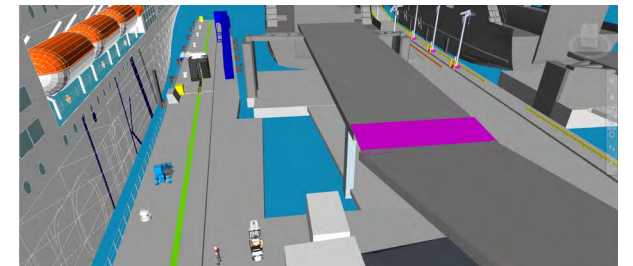
- Defined project scope
- Guided the client through potential delivery models
- Provided procurement support and optioneering for specialist equipment and suppliers
- Provided commercial contract and tender management
- Led on civil and structural design and design coordination
- Managed collaboration between the port, construction contractor and supply chain
- Facilitated a coordinated construction programme through phased release of design information
- Advised on planning permissions, environmental assessments, and marine and harbour orders
- Provided electrical engineering oversight for technical reviews
- Mapped buried services and quay walls

We also produced detailed 3D models early in the design process to include multiple suppliers' products, which helped the

port to visualise the scheme and how new equipment would interact with existing fixtures and vehicles on the berths to minimise operational impact. The 3D models also enabled better engagement with key stakeholders from across the project and the same models can be used to aid future operational and maintenance phases.

## OUTCOMES DELIVERED

- Integrated programme being delivered on time, to budget and with minimal disruption to PIP and its operations
- Minimising risk for the client
- Reduced procurement timescales and costs for specialist equipment
- Built strong relationships with suppliers
- 3D models have informed commercial decisions and identified and resolved issues early, with fewer cost impacts
- No planned services have been cancelled or delayed as a result of survey and construction works at the port



"Through the use of precise and complex digital tools, AtkinsRéalis are supporting Portsmouth International Port to design and develop a compelling carbon neutral Shore Power solution which will seamlessly serve the needs of the UK's busiest municipal port. In working with AtkinsRéalis we are a step closer to our ambition of net zero by 2030."

**Steve Watkyns** Technical Director, Portsmouth International Port



# Long Beach Cruise Terminal Improvement

## CLIENT CHALLENGE

Situated 25 miles from Los Angeles and covering 13,000 hectares, Port of Long Beach hosts more than 300 cruises a year.

The Pier H design needed to cater for the range of vessels and the growing number of cruise ship calls, together with an increase in road traffic movements from increased passenger, employee and service vehicles.

Environmental risk to air quality for the surrounding area was posed by emissions resulting from increased traffic. Petrol and diesel engines emit a variety of pollutants, which have increasing impacts on urban air quality, not only in the immediate vicinity but impacting the city of Los Angeles.

## OUR APPROACH

We worked collaboratively with the client and project team to obtain information from local staff with long careers working in the port who provided significant benefits in helping fill in data gaps along with an archive search of technical data.

The required Air Quality and Greenhouse Gas assessment used CalEEMod and the Port of Long Beach Air Emissions Inventory, pursuant to California Environmental Quality Act Guidelines.

This identified potential impacts on air pollutants and greenhouse gas emissions and were compared to Localised Significance Thresholds. Where project specific information was unavailable, appropriate substitute data was used from existing published data.

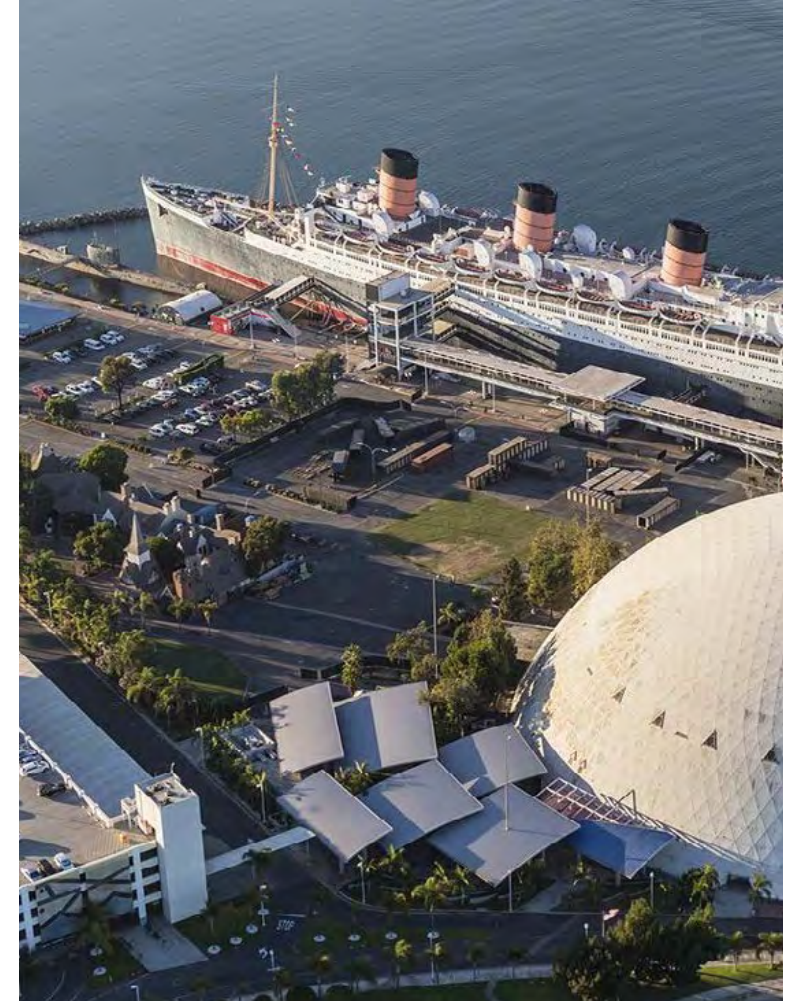
We designed, secured permits and provided construction oversight for improvements to Pier H. Part of this involved writing the project description for CEQA Initial Study/Mitigated Negative Declaration. The lessons learned from other sectors and across a range of client organisations enabled us to share best practice and introduce innovation in a systematic way.

## OUTCOMES DELIVERED

Our expertise helped further Port of Long Beach's transformational goals of a cleaner port, soil and skies while still fostering economic activity during a time of unprecedented change and expansion of the ports industry. Our assessment enabled the client to optimise the way it operates and maintains the cruise terminal across the whole of the asset lifecycle by:

- Faster, better quality assessment
- More accurate capture of data and data analysis to guide decision-making
- Aggregating and analysing data in the future to improve predictions and planning; and
- Rigorous data validation

Development included expansion of the shore power capacity to accommodate larger vessels. Shore power allows berthed cruise ships to shut down their main diesel engines and plug into the city's electrical grid, using hydroelectricity for their onboard services using, in this situation, hydroelectricity.





# Port of Tilbury Air Quality Monitoring

## CLIENT CHALLENGE

Port of Tilbury purchased 152 acres of land, including a deep-water jetty, close to the east of the Port, on brownfield land which was part of the former Tilbury Power Station being decommissioned at the time of purchase.

The client required the full range of assessments necessary to support the Development Consent Order (DCO) submission, from scoping through to examination, and drafting Statements of Common Ground with stakeholders, accounting for:

- Scheme classified as Nationally Significant Infrastructure Project
- New surface access links required as well as the development itself
- Site constrained by residential, ecological and heritage receptors
- Environmental Impact Assessment required to support application for development consent
- Discharge of planning requirements

## OUR APPROACH

In collaboration with the client, we consulted on technical and operational aspects and pricing to offer relevant, resilient advice with tangible, deliverable outcomes. We informed commercial discussions delivering change for growth.

We brought together our industry-leading air quality to provide the client with the full range of assessments necessary to support the application, from scoping through to examination and drafting Statements of Common Ground with stakeholders.

We provide:

- Stakeholder consultation
- Air and noise modelling for road, rail, shipping and on site plant
- Impact assessments for construction and operational phases
- Ecological impact assessment to support HRA for European sites
- Input to Human Health and Cultural Heritage assessments
- Qualitative assessment of odour impacts
- Construction and operational dust and noise monitoring plans
- Expert witness and oral evidence at examination

## OUTCOMES DELIVERED

Close stakeholder engagement during the planning phase enabled AtkinsRéalis to accommodate the client's aspirations in a clear terminal layout that maximised operational footprint. This was successfully developed into the design blending economic, engineering, regulatory, environmental and safety requirements for the UK's newest freight port and associated road and rail links:

- DCO application granted by Secretary of State for Transport
- Environmental Impact Assessment
- Flood Risk Assessment
- Collaborative approach with other consultants employed by client and 3rd party reviewers
- Working with consultees to achieve statements of common ground
- Problem solving approach to cumulative impact assessments from emerging schemes
- Follow up support on dust and noise monitoring
- for operational site to meet DCO conditions
- WINNER of the National Infrastructure Planning Association Award for "Best Project" in 2019



"We received our DCO this week and, having now had a chance to reflect on both the process and the outcome, I have to say it has been a tremendous achievement... without doubt the greatest project I have ever worked on."

**Peter Ward** Commercial Director, Port of Tilbury



# Carbon critical knowledgebase

## Helping Heathrow to deliver their low-carbon ambitions.

### CLIENT CHALLENGE

Heathrow has long been at the frontline of Britain's climate change debate. But since the UK committed to Net Zero emissions by 2050, the issue has become much more urgent.

The airport's third runway was found to be in breach of the climate regulations ushered in by the Paris Accord. Competing airports like Birmingham have pledged to reach net zero carbon by 2033. And other modes of transport, such as rail, have made progress on going greener, with HS2 committing to a 50% reduction in carbon across all projects.

That's why the blueprint for Heathrow 2.0 includes a commitment to 'operate zero carbon infrastructure by 2050'. So Heathrow challenged us to develop whole lifecycle embodied carbon assessments across 7 projects in their £1.3bn asset management programme, ranging from renewing the Alpha South Taxiway to transforming their waste water pipework infrastructure and repairing the concrete in their multi-storey car park and service subways.

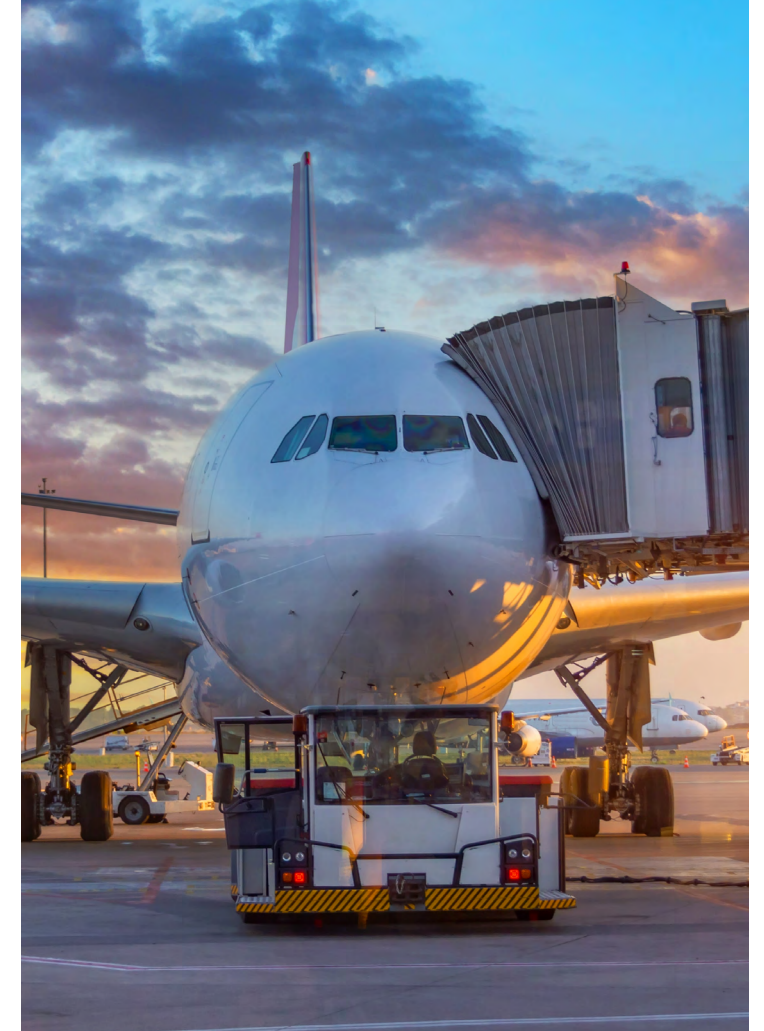
### OUR APPROACH

To achieve this, we sought to determine the baseline for embodied carbon (BAU). We began with a carbon reduction workshop to give us a deeper understanding of where the biggest gains were to be had.

These insights allowed us to focus on the high-impact materials and processes, enabling us to make the biggest carbon reductions in the most cost-effective way possible. We aligned our process with the 'Gold Standards' of carbon quantification, including PAS 2080 (Carbon Management in Infrastructure), BS 15978:2011 ('Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method') and BS EN 15804:2012 ('Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products'). We also aligned with the RICS Professional Statement for Whole Life Carbon Assessment for the Built Environment, ensuring that our carbon reduction methodologies were properly reflective of industry best practice and delivering results for Heathrow.

### OUTCOMES DELIVERED

- So far, we've delivered a combined carbon saving across the programme of 16,080 tonnes CO<sub>2</sub>e (roughly equivalent to annual emissions from 2,000 average UK homes). It represents an average of 38% carbon reduction across the four projects mature enough for reductions to be calculated.
- These reductions have been achieved through the implementation of the low-carbon design process and resulting carbon reduction measures identified in carbon workshops, ensuring that the gains are properly embedded for the long term improvement of Heathrow's carbon footprint.
- Alpha South Taxiway – approx. 25% reduction in embodied carbon through carbon-integrated design process and carbon conscious decision making.
- Terminals 2&3 Waste Water Infrastructure Renewals – by renewing the pipework with stainless steel, we managed to keep emissions down to 1.2 kg CO<sub>2</sub>e per m – as opposed to 1.8 kg CO<sub>2</sub>e per m with lightweight cast iron and 5.3 kg CO<sub>2</sub>e per m with HDPE.





# Differentiators bringing value to our clients

## Fully Integrated Service Offering

As a global business, we leverage our capabilities and expertise across regions to deliver the best value for our clients. Our teams of experts collaborate and share international best practice to apply our global service offering to local projects – seamlessly.

## Local Communities And Sustainable Development

We are committed to leaving behind a positive and sustainable legacy for the communities in which we work. We have a demonstrated track record of our commitment to community engagement, particularly in industrial work locations, delivering:

- Skills training and mentoring programs
- Involvement in our local community's organisations
- Traditional knowledge and community studies
- Assistance in education and health services
- Permitting and approvals





# GET IN TOUCH

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