



ENGINEERS  
AUSTRALIA



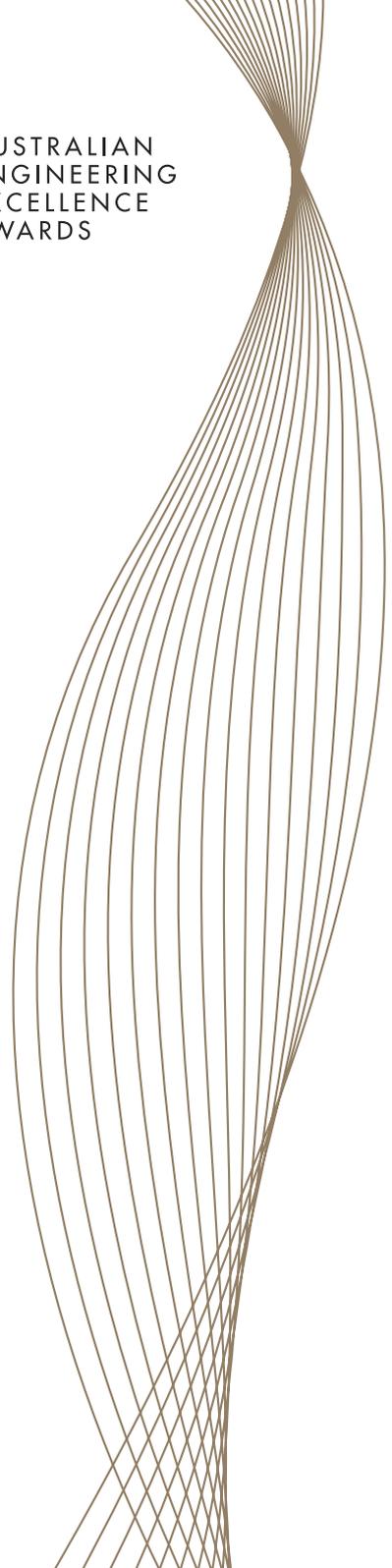
AUSTRALIAN  
ENGINEERING  
EXCELLENCE  
AWARDS

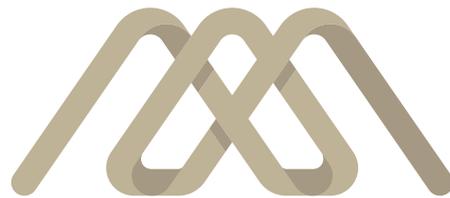
# ICONIC INNOVATION

Celebrating Extraordinary Engineering

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AUSTRALIAN  
ENGINEERING  
EXCELLENCE AWARDS  
**QUEENSLAND**





AUSTRALIAN  
ENGINEERING  
EXCELLENCE  
AWARDS

These awards recognise and promote new and innovative ideas that are brought to life in ways that bring fundamental change to our society.

## OVERVIEW

Engineers Australia recognises outstanding achievement in engineering and the invaluable contribution engineering makes to the economy, community and the environment.

The Australian Engineering Excellence Awards (AEEA) inspire and encourage engineering distinction through teamwork, innovation, and technical excellence.

The AEEA is an integrated program resulting in awards at National level once local finalists are determined. To enter the AEEA, entrants are required to submit project nominations at the relevant local level, depending on the project's location.

Excellence, distinction, merit, perfection and quality are the characteristics that winning entries exhibit. View the 2018 entrants.



ENGINEERS  
AUSTRALIA

### Queensland

Engineering House  
447 Upper Edward Street  
Brisbane QLD 4000



## QUEENSLAND PRESIDENT'S MESSAGE



The Engineering Excellence Awards are a time to showcase some of the special things that engineers have achieved during the year. A recognition of the contribution that engineers provide to society to advance our environment.

Innovation has always been at the forefront for the development and provision of engineering outcomes and no

less in today's world where ideas and science must be optimized and delivered by engineers in advancing our energy production, batteries for energy storage, provision of water security, infrastructure and other areas to make a better world in which we live.

The recipients of these awards are acknowledged for their contribution and the profession has many others who strive to achieve the excellence shown here.

I, on behalf of Engineers Australia, Queensland Division, congratulate all entrants on their achievements and especially the winners in their categories.

**Ken Gillard** FIEAust CPEng NER  
APEC Engineer IntPE(Aus)  
Queensland President

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## CHIEF JUDGE'S MESSAGE



Our Queensland EA Division's Judges were very pleased, indeed, with the number of entries for our Division in the AEEA 2018 (totalling 38 submissions – the largest of any EA Division), as well as, the high quality and engineering diversity of our entries (in all seven (7) Categories).

This year's entries compare favourably with our AEEA

2016 submissions which totalled 48 (with four (4) as dual Category entries), across all the 11 Categories (for 2016). Very proudly one of our Division's Finalists "Brisbane's Flood Recovery Ferry Terminals" submitted by Aurecon / Cox Rayner / BCC went on to win the overall Australia-wide AEEA Award.

Our judging team sincerely wishes to thank all our Entrants for excellently documenting and their submission of these high calibre / wide ranging Projects – to clearly demonstrate the high standard of Engineering undertaken in our Division over the last two (2) years.



**Cliff Button** FIEAust CPEng(Ret)  
Chief Judge



## JUDGING CRITERIA

### **Actual or potential contribution of the work to the economy**

Contributes to the local, regional or national economy by reducing whole of life costs or adding to the efficient use of existing engineering construction, manufacture, maintenance or application.

### **Impact of the work on the quality of life of the relevant communities**

Contributes positively to the communities using it in respect of cost, time, environment or general amenity of the community.

### **Significance of work as a benchmark of Australian Engineering**

Sets new benchmarks or continues current high standards thereby raising the standard and standing of Australian Engineering.

### **Extent to which the work represents world best practice**

Can be matched against similar engineering achievements to represent world best practice.

### **Other considerations**

The environmental impact of the work, the sustainability of the project and the work health and safety consideration. These must outline the effect on those directly or indirectly involved and members of the community in general.

## JUDGES 2018

### **Joe Abercrombie**

HonFIEAust

Retired

### **Alan Ainsworth**

BE CPEng FIEAust RPEQ GAICD

EngExec

Engineering Systems and  
Delivery Lead

Laing O'Rourke Australia

### **Brian Becconsall**

FIEAust CPEng(Ret)

Principal Engineer

Coordination

Retired

### **Jane Copperthwaite**

B.Eng (Hons) CPEng FIEAust IntPE

(APEC) RPEQ

Systems Engineering

Manager

SYSTRA Scott Lister

### **Dr Peter Ho AM**

BSc PhD CPEng FIEAust FStructE

MICE MHKIE RPEQ

Director

Dragon Engineers Pty Ltd

### **Mark Lendich**

FIEAust CPEng NER APEC Engineer

IntPE(Aus) FIML GAICD

Deputy President

Engineers Australia

Queensland

### **Dr David Royston**

BSc (Hons) (Dunelm) PhD (UNSW)

FIEAust

Director

Royston Process Technology

### **Dr David Thorpe**

PhD FIEAust CPEng EngExec NER

RPEQ JP(Qual)

Associate Professor

School of Civil Engineering  
and Surveying, University of  
Southern Queensland

### **Frank Vromans**

BEng(civil) FIEAust RPEQ

Senior Consultant

Arup Pty Ltd

### **Michael Waldby**

FIEAust CPEng NER APEC Engineer

IntPE(Aus)

### **Dick Wharton**

BE (Civil) Hon FIEAust

Retired

### **Dennis Wogan** FIEAust

CPEng (Ret.)

Retired

## PROJECT ENTRIES

### AMRUN PROJECT CHITH EXPORT FACILITY

Rio Tinto

Bechtel

Jacobs

McConnell Dowell



Rio Tinto's Amrun Project located south of the Embley River, between Weipa and Aurukun in Far North Queensland, has revolutionised the design, fabrication and construction of wharf infrastructure through a collaborative approach between Rio Tinto, its EPCM Bechtel, Jacobs,

and McConnell Dowell Constructors. Designed by Jacobs, and constructed in 12 months by McConnell Dowell with constructability input and construction oversight by Bechtel, Rio Tinto have a state-of-the-art facility that has been delivered safely, efficiently, and with minimal environmental impact.

### ASTA PROJECT

Norwood Technologies Pty Ltd  
trading as The Project Office

Enesys



The Project Office, a long established Australian engineering design and construction organisation, completed an innovative aquaculture process plant in Qld involving growing and processing a fragile but valuable astaxanthin rich algae. Against all technical and financial odds, TPO reduced the

original design and construction estimate by 70% while increasing process redundancy and automation.

The organisation's automated design and procurement systems were fully utilised on the Asta Project which significantly cut engineering and project management time and costs, but more importantly, the organisation's smart modeling systems were able to extensively rework the process hydrology to cut 90% of the pumping costs from the project. A commercial scale trial of a new distributed process control system CubeLink, and the IoT capable supervisory control system CubeHMI was also installed which cut process control equipment costs by 85%. CubeLink and CubeHMI have been newly developed by TPO's sister R&D organisation Enesys.



## BRISBANE AIRPORT RUNWAY 01/19 STAGE 2 OVERLAY

GHD Pty Ltd



How do you resurface 3.5 kilometres of one of the world's busiest single runways without shutting down the entire airport?

Catering for up to 650 aircraft movements a day and operating twenty-four hours a day, seven days a week, Brisbane Airport is home to one of the world's busiest single

runways. As with all runways that handle passenger jet traffic, Brisbane Airport's runway requires resurfacing every 10 to 15 years.

Following a feasibility study by GHD to evaluate how such a complex undertaking might be achieved, functional design parameters were defined that would make such an undertaking possible. Despite a highly compressed timeframe for delivery of design and construction, GHD developed a design that was successfully implemented and constructed with minimal disruption to Brisbane Airport's regular operations.

## BRISBANE CITYWIDE CREEK AND OVERLAND FLOW PATH MODELLING AND FLOOD RISK MAPPING STUDY

GHD Pty Ltd

Brisbane City Council



Brisbane's subtropical climate is, in the warmer months, characterised by sudden and extremely heavy downpours. Under conditions of heavy rainfall, large parts of the city are at risk of flooding from the high volumes of stormwater runoff that form overland flow paths. The flow depth

and velocity associated with these flow paths can have significant impacts on people, property and infrastructure.

In response to a market request for innovative proposals, Council engaged GHD to develop a high-resolution, calibrated 3D computer model of the entire Brisbane city area (1,200 km<sup>2</sup>) that could simulate the dynamic propagation of rainfall runoff for a range of historical and design storm events. Furthermore, GHD prepared a detailed flood level, depth, velocity and hazard map for the Council's entire local government area.

## BRISBANE RIVER CATCHMENT FLOOD STUDY

**BMT**

**Aurecon**



BMT and Aurecon undertook the Brisbane River Catchment Flood Study (BRCFS), which extended best-practice and developed new techniques to understand and represent flood behaviour in the Brisbane River catchment. The catchment is unique in Australia for the

complexity of hydraulic behaviour (including dams, multiple tributaries and tidal influence), and for the high flood risk to multiple major urban centres. Methodologies developed and applied in the study were highly innovative and more complex than current standard practice, including use of a Monte Carlo approach to design flood selection.

The study was independently assessed as “the most comprehensive flood study undertaken in Australia”. The BRCFS is supporting communities to live and work safely in the floodplain, now and into the future. The work of BMT and Aurecon has positive impacts beyond the Brisbane River floodplain, with their world-class methodologies able to be applied in other regions of Australia, and throughout the world.

## BRUCE HIGHWAY – BOUNDARY ROAD INTERCHANGE UPGRADE

**BMD Constructions**

**Department of Transport and Main Roads**



BMD Constructions delivered the construction of the \$100.4 million Boundary Road Interchange Upgrade over the Bruce Highway at Narangba for client, Department of Transport and Main Roads in collaboration with designer WSP, and client’s representative GHD.

BMD Constructions replaced the existing ageing and over-capacity two-lane overpass with a new six-lane bridge with improved bridge clearance, plus road upgrade and realignment, dedicated pedestrian and cyclist pathways, additional street lighting and longer on and off-ramps to improve safety and address congestion issues at the intersection. The project was delivered six months ahead of schedule as a result of an expedited program and optimised earthworks staging.



## CAPRICORN COPPER REFURBISHMENT & RESTART PROJECT – INNOVATIVE REPURPOSING OF OBSOLETE INFRASTRUCTURE

**Ausenco**



The refurbishment and restart of the Capricorn Copper Mine in Mt Isa was an ambitious project with an aggressive budget and schedule. To deliver this, Ausenco and Capricorn Copper developed an innovative approach that included repurposing disused minerals processing

infrastructure (converting a heap leach facility into a water treatment plant), refurbishment of the process plant and an inventive way to co-locate water supplies and mining waste product. The outcome of this has been to reduce the site dependency on external water sources, and to restart the mine in a capital effective manner that improves the NPV of the mine.

## CHARTERS TOWERS TENNIS COURTS UPGRADE

**Langtree Consulting**

**Charters Towers Regional Council**

**Charters Towers Tennis Club**



The purpose of this project was to upgrade the existing deteriorated courts that had reached end of life and were no longer fit for use. The project included the construction of eight International Tennis Federation competition standard tennis courts (including junior

courts) with state of the art LED lighting and associated infrastructure. The management of this project was the main reason that contributed to the fact that we were able to successfully deliver “state of the art” tennis courts with the blessing of all parties involved, within the original project time frames and the budget generated for this project. These courts have breathed new life into the Charters Towers Community and secured the long term future of the Charters Towers Tennis Club. This project has also contributed positively towards the local community whilst also allowing the club to secure a number of regional tennis tournaments, boosting the local economy.

## CONERGY'S LAKELAND SOLAR & STORAGE PROJECT

### Conergy Australia



Located off the Mulligan Highway at Lakeland in Far North Queensland (FNQ), the 20-hectare Lakeland Solar & Storage Project was developed, engineered and constructed by project owner Conergy. The world-class project marks the first and largest grid-connected

utility-scale solar-plus-storage project demonstrating grid-to-islanding functionality in Asia Pacific, positioning Queensland, and indeed Australia, as a leader within the global renewable energy arena. The improvements in reliable power quality for the Cook Shire region in conjunction with auxiliary benefits to fringe-of-grid network supply is an advancement for power distribution in remote communities. The successful commissioning and connection to the grid, operation and ongoing ancillary services testing of this facility demonstrates engineering excellence in practice. Conergy has successfully developed, designed, financed, engineered, procured, commissioned, operated and maintained over 2GW of solar plants worldwide. The company has subsidiaries in Australia, Singapore, Japan, Thailand, the Philippines, Myanmar and Germany.

## COOMERA TO HELENSVALE RAIL DUPLICATION

### GHD Pty Ltd

### Golding Contractors



The Coomera to Helensvale portion of train line is a relatively long section of single track. At approximately 8.2 km in length, it comprises eight bridges totalling some 1.4 km of structure. The largest of these bridges was the 860 m bridge spanning the Coomera River, Hope Island Road

and Salt Water Creek. This bridge is elevated some 10m above the waterway surface level with marine pier footings founding in ground material that is subject to design scour depths up to 7 m deep.

The bridge was detailed with continuously welded rails (CWR) and a ballasted track, which represents typical detailing for QR. The magnitude of the bridge length and height was unique in Australian railway bridge design. GHD's design team overcame this major technical challenge with engineering excellence in order to produce a safe, sustainable and economical design solution.



## DBCT REMEDIALS PROJECT

John Holland Pty Ltd



Wrapping piles on a 4.2 km-long Jetty in a tidal zone is all about access and safety. One needs to be able to move up and down the piles in a matter of minutes with the daily tide and to relocate quickly along the Jetty. Traditionally, this work used drop/suspended scaffold and blast and

paint that took up to two weeks in a high-risk environment to essentially provide access for wrapping works that take one day to complete. To overcome these constraints, we developed a bespoke design that provided significant safety, time and cost benefits, and implemented the use of HDPE wrapping. We developed an innovative solution called a Mobile Swing-stage Gantry, and eliminated the blast and paint. Whilst a small project, it has punched well above its weight in what it delivers:

- Significant safety and productivity improvements
- Significant reduction in costs and downtime.

## GATEWAY UPGRADE NORTH PROJECT

The Department of Transport and Main Roads

Lendlease

Transurban Queensland



The \$1.143 billion Gateway Upgrade North project is jointly funded by the Australian Government (\$914.18 million) and Queensland Government (\$228.54 million) on an 80:20 split. The project involves widening the Gateway Motorway to six lanes between Nudgee and

Deagon, as well as undertaking safety works through to Bracken Ridge. Key works include reconfiguring the Nudgee Road and Bicentennial Road interchanges, constructing new dedicated northbound access to Redcliffe via the Deagon Deviation, and constructing 15 kilometres of new off-road pedestrian/cyclist pathway.

The Gateway Upgrade North is being delivered by the Department of Transport and Main Roads. Transurban Queensland has been engaged to assist in managing the project's delivery. Lendlease has been contracted to design and construct the project. Major work began in early 2016, with the project due for completion by late 2018. Once complete, the project will reduce congestion, improve motorists' safety and travel time reliability, and accommodate future growth.

## HOTA OUTDOOR STAGE

**Arup Pty Ltd**

**City of Gold Coast**

**ARM Architecture**

**ADCO Constructions**



In 2013, the City of Gold Coast launched an international design competition to masterplan a new cultural precinct at Evandale, Gold Coast. The successful masterplan proposed by ARM Architecture, landscape architect TOPTEK1 and multi-disciplinary engineers

Arup, transforms the site from a governmental precinct with ageing infrastructure into a thriving community hub. The Outdoor Stage is the first project to be delivered from the masterplan and welcomes people 24/7.

The highly versatile venue comprises a black-box theatre with a back wall that folds away completely, opening the box out onto an amphitheatre with seating and lawn space for 5,000. In amphitheatre mode, the Outdoor Stage has the technical infrastructure and event overlays to host major public events from rock concerts to orchestral performances. There are no gates, and the landscape is fully accessible for people of all mobilities. It is durable, flexible and bespoke—tailored to its place and inviting maximum activity.

## ILUKA REDEVELOPMENT FOUNDATIONS - STAGE 2

**Keller Pty Ltd**



When finished, the Gold Coast's Iluka re-development will be the tallest residential tower in the southern hemisphere.

The 88-storey mixed-use residential building will include 693 luxury apartments and three levels of recreation decks for residents, as well as premium shopping, restaurants and commercial spaces.



## INNOVATIVE USE OF FLOATING WETLANDS TO TREAT STORMWATER RUNOFF IN A GREENFIELD DEVELOPMENT

**Covey Associates Pty Ltd**

**The Stormwater Research Group  
at the University of the Sunshine Coast**



Covey Associates, one of Australia's leading engineering firms, is nominated for its innovative, world-first use of floating wetlands to treat stormwater runoff in an urban greenfield development.

The novel use of a floating wetlands system and its research in partnership

with University of the Sunshine Coast has become a model for other such projects throughout the world.

The development of Parklakes 2 at Bli Bli in Queensland was initially going to be treated by a large constructed wetland; but the implementation of the floating wetlands has ultimately required a smaller treatment footprint, reduced drainage infrastructure and capital costs, increased the lake area and vastly reduced maintenance requirements.

The company has presented the floating wetlands research and outcomes at conferences and to governments throughout the world to enable other countries to utilise the findings for new projects, including within Australia, France, Prague and Hong Kong.

## LEICA GS18 T - WORLD'S FASTEST GNSS RTK ROVER

**Leica Geosystems**



The heart of the Leica GS18 T innovation, the world's fastest GNSS RTK Rover borrows a key idea from the aerospace industry to integrate a sensor fusion of GNSS and IMU sensors to deliver the fastest and easiest to use GNSS smart antenna to surveying and construction professionals.

Developed by the Australian R&D Leica Geosystems team, the GS18 T innovation is the first true tilt compensation solution that is immune to magnetic disturbances and calibration free, allowing surveyors to save up to 1 hour of every working day and 20 per cent over conventional surveying practices to dramatically improve safety, productivity and accuracy of GNSS-based surveying operations.

## LOGAN ENHANCEMENT PROJECT

Transurban Queensland

CPB Contractors



Transurban Queensland's \$512 million Logan Enhancement Project includes widening sections of the Logan and Gateway motorways, improving key congestion hot spots (Logan Motorway/ Mt Lindesay Highway/ Beaudesert Road interchange and the Wembley Road/Logan

Motorway interchange) and constructing new south-facing ramps on the Gateway Motorway at Compton Road.

The project will improve safety and reliability, reduce travel times, enhance connectivity to key residential and business areas, and future proof the network.

CPB Contractors, a member of the CIMIC Group, is undertaking detailed design and construction of the project. The project will support 1300 direct jobs during construction and generate around approximately \$1.2 billion in economic benefits for Queenslanders over 30 years.

The development/detailed design phases of the project were undertaken between 2015-2017. Major construction is now underway and is scheduled to be completed in mid-2019.

## METROPOLITAN COAL MINE WASTE BACKFILL – ENVIRONMENTALLY SOUND STORAGE AND REDUCTION OF WASTE CARTAGE THROUGH COMMUNITY

Ausenco



Ausenco was approached by the Metropolitan coal mine to develop options for the disposal of coal rejects that would meet specific project site, environmental, community and project efficiency needs. The solution was a world first method of injecting waste material underground, reducing

the amount of material transported to the surface, with the potential to ultimately remove the need to store waste material in tailings dams or offsite. This outcome was both cost effective and environmentally friendly.



## NCOS ONLINE – WORLD'S MOST ACCURATE PHYSICS-BASED PORT TRAFFIC MANAGEMENT SYSTEM

Port of Brisbane Pty Ltd

DHI Water and Environment Pty Ltd



NCOS ONLINE developed by Port of Brisbane, DHI Water & Environment and FORCE TECHNOLOGY, is a world-first software solution that allows Port of Brisbane to safely accommodate larger and deeper drafted cargo ships and avoid potentially environmentally-sensitive dredging programs.

Other ports use outdated, static systems to allocate sailing windows, without maximising the capacity of its existing shipping channel. This results in regular large-scale dredging programs. NCOS ONLINE uses big data to make millions of calculations a second based on channel depth, weather conditions and vessel configurations to accurately produce optimal sailing windows for larger ships. This dramatically increases operational flexibility and safety for shipping customers, and reduces dredging requirements. Since the introduction of NCOS ONLINE on 1 August 2017, the percentage of deep drafted bulk carriers above 14.0 m draft has increased by 300%, while deep drafted containers above 13.0 m has increased by 233%.

## ORIGINAL GATEWAY BRIDGE BEARING REPLACEMENT PROJECT

Transurban Queensland

AECOM Australia

Freyssinet Australia

Heywood Engineering Solutions



The northbound Sir Leo Hielscher Bridge was completed in 1986 and is a major prestressed concrete box girder bridge across the Brisbane River. Road closures around the bridges have significant impact on the community and cause major disruptions Brisbane's road and trade network.

The project required replacement of four intra-span bearings at two major movement joints under live traffic and at 40 metres above the ground/river.

Difficult access to the four bearings and the need to minimise traffic disruption required an innovative bearing design, temporary works, bearing in-service performance monitoring and a collaborative approach between client, designer and contractor.

This project challenged a number of current standards and practices for bearing rehabilitation and repairs, and sets a new benchmark for proactive asset management for hidden bridge component defects. The project also applied a condition and in-service performance-based approach to bridge bearing replacement rather than relying on nominal design life.

## PETRIE WATER SUPPLY UPGRADE

Unitywater  
Seqwater



The Petrie Water Supply Zone Upgrade connected 100,000 people to a new, more secure source of water, avoiding an expensive upgrade of an ageing treatment plant. The \$16.5 million project comprised three major construction projects that were seamlessly integrated, connecting the

scheme to the SEQ Water Grid while avoiding potentially major disruptions to the water supply. Unitywater and Seqwater worked together to deliver this complex project which reversed the direction of flow in the scheme's network hydraulics and changed the disinfection regime. The project was commissioned without disruption to customers and the old treatment plant turned off.

## PHU KHAM PROCESS IMPROVEMENTS – BENCHMARK MODEL AND PLANT OPTIMISATION

Ausenco



The Phu Kham Copper-Gold Operation is located in northern Laos. The Operation is a producing asset for Australian-based copper and gold producer, PanAust Limited (PanAust) and is operated by Lao-registered company, Phu Bia Mining Limited (Phu Bia Mining).

The Phu Kham Operation has recently undergone a series of process improvements to treat the anticipated competent ores scheduled for 2017 and 2018.

Ausenco Services Pty Ltd (Ausenco), was engaged to help optimise and enhance the productivity of the Phu Kham comminution circuit over an eight-month period. The work involved participating in and overseeing the redesign of the SAG mill liner systems and developing operational strategies for maximising throughput through to the end of mine life.

In combination with the redesigned liner system, optimised process controls for varying ore competencies, and improved operational practices and troubleshooting strategies, increased Phu Kham overall production, exceeding the milling capacity when treating competent ores.



## PROJECT CURRAWONG

### Boeing Defence Australia (BDA)

#### Defence Capability Acquisition and Sustainment Group (CASG)



The Currawong project is delivering a next generation deployed integrated battlespace communications network solution to the Australian Defence Force (ADF). Currawong enables secure wideband voice, data and video services over wireless and wired infrastructure between

deployed forces and headquarters around the globe. Boeing Defence Australia (BDA) was awarded the prime contract in September 2015. Since then, the BDA team, together with its ADF partners has developed and delivered the mission and support system products in 27 months, ahead of schedule and budget.

## PROJECT NULLARBOR

### Boeing Defence Australia



Boeing Defence Australia supports some of the largest and most complex programs for the Commonwealth of Australia (CoA). Under Project Nullarbor, Boeing provided the CoA with a High Frequency (HF) Direction Finding and Signal Improvement capability to bolster

the Defence High Frequency Communications System (DHFCS). The system is a sophisticated joint service multi-site centrally-managed HF radio system which enables Defence to use a single system to pass voice and data traffic to mobile users within Australia and overseas.

As part of Project Nullarbor, Boeing expanded the reach of the system across CoA agencies, reducing duplication and expense for taxpayers. As well as upgrading DHFCS for Defence, Boeing expanded the service and new capabilities to the Australian Communications and Media Authority to replace their aging DF systems. Boeing worked closely with Defence to provide appropriate software and network controls to deliver a system capable of simultaneously serving civil and military users.

## SUN AND SALT: LOGAN'S WATER QUALITY SOLUTION

### Logan Water Infrastructure Alliance

- Logan City Council
- Downer
- Cardno
- WSP



Logan Water Infrastructure Alliance has harnessed the power of sun and salt in an Australian first solution for managing drinking water quality in a remote location. The \$3 million project at Round Mountain Reservoir in the City of Logan's south west combines solar power, commercial battery

storage and electro-chlorination technologies to maintain water quality for residents, 24 hours a day. This innovation achieved a \$1.9 million capital cost saving and almost \$50,000 in annual operational cost savings for Logan City Council. The solution is safe, reliable and sustainable, and easily transferrable to other Councils and utilities operating in remote locations.

## SUNSHINE BEACH EARTH RETENTION AND PILING

### Piling & Civil Australia



The project involved the design & construction of high & low pressure grouted micropile earth retention & foundation systems supporting a residential project at Sunshine Beach, Queensland. Limited access restricted traditional piling & construction equipment

requiring several new & innovative solutions. A custom designed 4m high grout column wet wall using high pressure grouting divides the property into two levels while grout injected micropiles support the building & provide deep slip support for surrounding structures. Construction techniques utilising specially-designed equipment were required to install the various ground engineering solutions enabling the project to be delivered safely & within program requirements with minimal impact on the surrounding community.



## SUNSHINE COAST UNIVERSITY HOSPITAL

### Aurecon



Sunshine Coast University Hospital (SCUH) is a \$1.8b hospital project delivered by the Queensland Government as part of a Public Private Partnership contract with Exemplar Health, a consortium comprising of Lendlease, Siemens and Capella Capital, with partners Spotless Facilities Services

and Aurecon. Completed in November 2016 and opened to the public in April 2017, the SCUH complex features a state-of-the-art health facility and teaching hospital comprised of 450 beds, growing to a 738-bed facility in 2021, with a design built for expansion beyond that capacity.

The 164,000m<sup>2</sup> main hospital building forms the centre of the new hospital, and is split over six functional levels, plus roof top plant rooms and helipad. Aurecon was engaged to provide civil, structural and mechanical/electrical/plumbing engineering, security, telecommunications and environmentally sustainable design services. Aurecon has been involved from early master planning through to detail design and documentation, and a fulltime site based role during construction.

## SUPER I GIRDER

### Arup Pty Limited

### Seymour Whyte Constructions

### Port of Brisbane Pty Limited



For the first time in approximately 25 years there is a new precast concrete girder available for industry use that is challenging preconceptions on acceptable maximum length of spans. The Super I Girder is Australia's longest pre-cast pre-stressed simply

supported single-length concrete bridge girder and it has the potential to transform the bridge girder market. This Australian-first initiative was conceived by Quickcell Technology Products Pty Ltd and made possible in practice by the structural engineering excellence of Arup Pty Limited (the designer), the construction prowess of Seymour Whyte Constructions (the principal contractor) and the support and backing of the owner and client Port of Brisbane Pty Ltd (PBPL) on the Port Drive Upgrade project. With spans of up to 46m, this bridge girder contests the accepted industry standard of 35m, the maximum length achieved by the 1,800mm Super T-girder, the traditional Pre-Stressed Concrete (PSC) girder used throughout Australia.

## TRANSMISSION TOWER FOUNDATION REPLACEMENT FOR LINES BS1219 AND BS1223 TOWNSVILLE

### Piling & Civil Australia



The project involved the replacement of foundations supporting 26 lattice 132kV transmission towers deemed critical due to their locations adjacent to housing & critical infrastructure, including installation of grout injected micropiles through the existing grillage foundations.

Connection to the towers involved a bespoke steel bracket. Foundations were installed under live conditions with specialist equipment & procedures removing costly network shut-downs. Modern finite element design procedures were required to ensure the components met the required load & deflection requirements. The foundations will extend the life of the transmission tower by 50 years, providing a future cost-saving solution for the wider network of transmission infrastructure.

## WAGNERS CEMENT WHARF PROJECT

### Wagners New Generation Building Materials

### Wagners CFT



The design and construction of a new wharf at Wagners' cement business features a new and innovative approach to building materials that: - significantly reduce greenhouse gas emission, - produce a structurally superior outcome, and - result in a lower maintenance structure

that is more durable than a conventional wharf structure. The wharf deck structure consists of 191 no. prefabricated units made from Wagners CFT U-girders, Wagners EFC geopolymer concrete and Wagners GFRP reinforcing bar. The hybrid deck superstructure constructed from high technology building materials will be a demonstration case for long life, low maintenance and extremely low CO2 emission engineering structures.



## WHITTY BUILDING REDEVELOPMENT PROJECT

**Aurecon Australasia Pty Ltd**



Originally opened in 1911, the Whitty Building boasts significant history, morphing from its primary function as a public hospital at Mater South Brisbane to an educational facility focusing on medical, nursing, midwifery and allied health services training. In a bid to refurbish

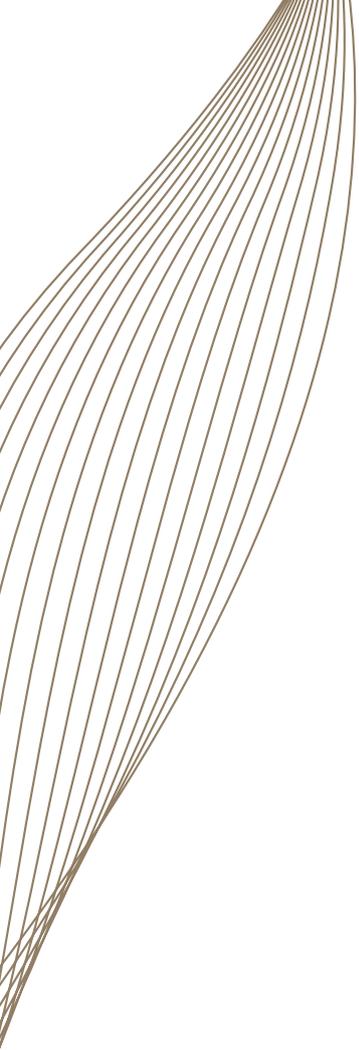
the building and create a world-class education facility, Aurecon was appointed as Project Manager and given the special opportunity, together with Conrad Gargett as Principal Consultant and Architect, and Turner & Townsend as Quantity Surveyor, to become part of Mater's unique story. While respecting and maintaining the building's historic architectural features, including pressed metal ceilings and stained-glass windows, Aurecon successfully delivered on Mater's shared vision, with The University of Queensland, of converting the heritage-listed building into a leading, modern learning space.



ENGINEERS  
AUSTRALIA



WE ARE THE GLOBAL HOME FOR  
ENGINEERING PROFESSIONALS  
RENOWNED AS LEADERS IN  
SHAPING A SUSTAINABLE WORLD.



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