



# HINZE DAM

HINZE DAM ALLIANCE  
NERANG RIVER QLD



## ALLIES MEETING TOMORROW'S NEEDS

**W**ater is one of the critical natural resource issues of our times. Over the past decade, South East Queensland has experienced record drought conditions, one of the ways to address this issue and to ensure a future water supply to the region was to raise the Hinze Dam wall was made. Along with increasing the water supply, the issue of better flood mitigation for the Lower Nerang catchment also influenced this decision.

The Gold Coast City Council, the then owners of the project, Thiess, Sinclair Knight Mertz (SKM) and URS formed the Hinze Dam Alliance in 2007. The Alliance has been appointed to undertake the planning, approval, design and construct task of raising the wall of Hinze Dam - the source of the Gold Coast's primary water supply, by 15 metres.

They have constructed the deepest continuous cut off wall addition to an Australian water reservoir to date as part of the \$395 million project.

Other elements to the task include extending the existing main embankment and saddle dam up to the new wall height of 108.5 metres, raising the spillway, raising the intake towers and re-establishing recreational areas and road infrastructure at Hinze Dam.

The four partners in the Alliance have between them 150 years experience on dam building projects, and have collectively designed more than 400 dams worldwide and constructed 75 dams in Australia.

Thiess was established in Queensland in 1934, and took a pioneering role in the Snowy Mountains Hydro-electric Scheme in the 1950s. They are at the forefront of civil engineering, and can lay claim to building Australia's highest dam (Dartmouth, at 180m) and Australia's largest volume dam (Talbingo, with an embankment volume of 14.5 million cubic metres of fill), in addition to substantial overseas work. This is their 80th dam project.

SKM has 40 years experience as a global project delivery organisation, and have expertise in community consultation, scientific studies, planning, economics, logistics, communication, geotechnical engineering, environmental management and spatial information. Their work on the community consultation for this project won an IPA award in 2008.

URS are one of the world's largest engineering design firms, working across industries and sectors in over 20 countries with a staff that includes scientists, engineers, economists, planners, project managers and risk management specialists.

In 2008, Seqwater replaced Gold Coast City Council as the asset owner of Hinze Dam, and became the fourth member of The Hinze Dam Alliance.

"There are many different delivery mechanisms for a major project like this," said Hinze Dam Alliance spokesperson Peter Kinsella.

"The Alliance is an extension of design and construct, where the client is working as part of the team to ensure they get what they want.

"One of the major challenges with the project is the Gold Coast does not have another water supply, so we are very aware of water quality issues from sedimentation. We are making sure we minimise exposure of the water to hydrocarbons, such as machinery oil and diesel spills.

"At the peak of construction we had about 300 workers on site. The project is scheduled to be complete by the end of 2010. We have had a preference for employing locals where possible."

The EIS for the project was handled by SKM, and included special attention to threatened and endangered flora. The project has a full time environmental team who undertake protective tasks, including a trap and transfer facility for migrating fish as part of the final design.

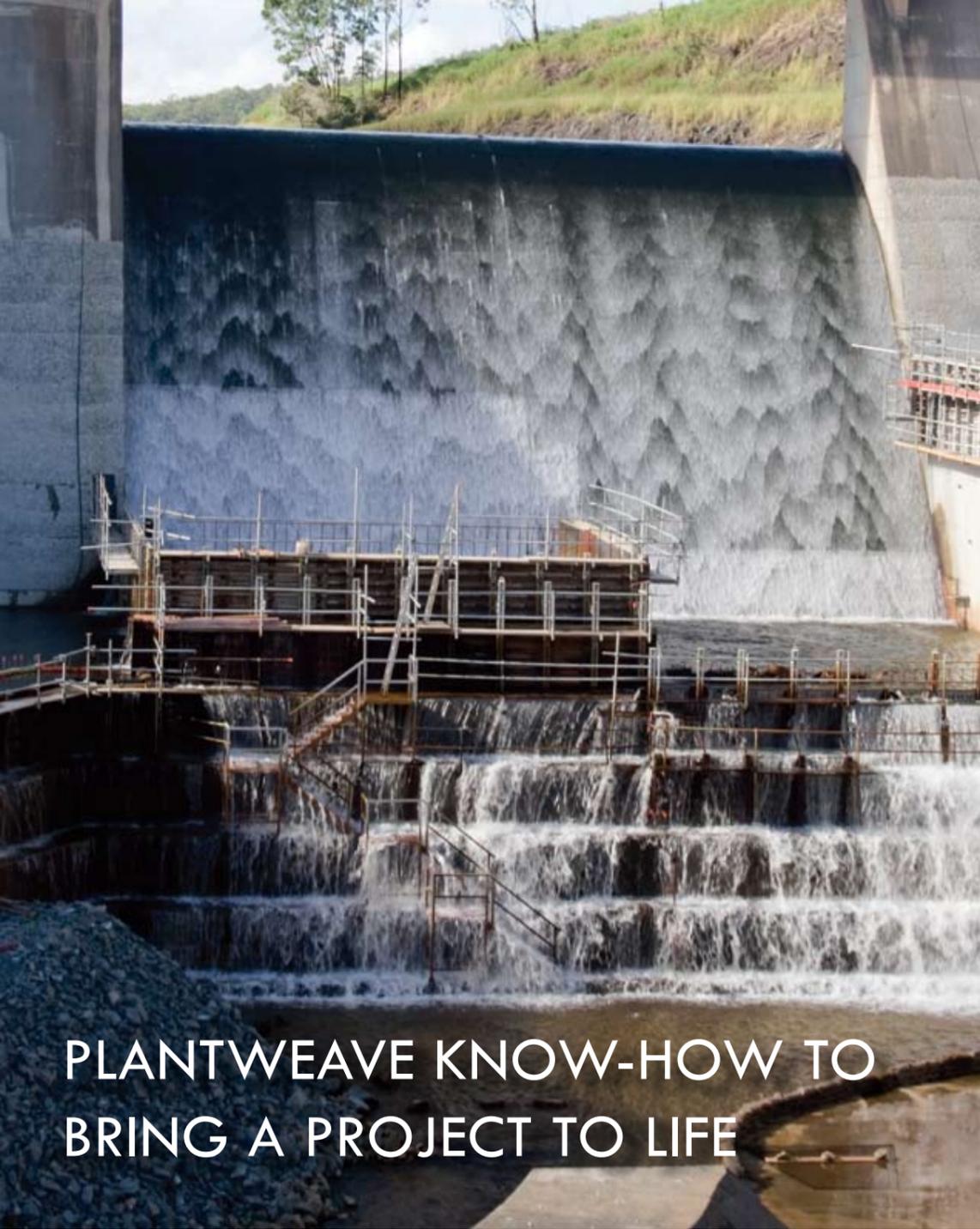
There is a strict OH&S policy and a fulltime team of six staff dedicated to safety as the full gamut of risks exists on site – working at heights, working on and over water, blasting, crushing, and working with machinery including 85 tonne, 50 tonne and 40 tonne dump trucks.

"Another challenge from a project point of view was just after we moved to the site, the dam filled and has overtopped eight times in the past 18 months. This doesn't affect the placement of rock, but it affects concrete working, and we had to take people out of the spillway," said Peter Kinsella.

"We've had two years on site of above average rainfall. Most of the impacted work is not on the critical path, but it does slow down concreting on the spillway. Dam builders are the only people who welcome a short drought."



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## PLANTWEAVE KNOW-HOW TO BRING A PROJECT TO LIFE



Filtration Plant, one of the largest Water Treatment Plants in the Southern Hemisphere, supplying 85 percent of Sydney's water. Their systems manage and monitor all the critical processes for this vital civil infrastructure.

Many industrial and commercial facilities around Australia have also engaged them for a diverse range of energy management projects. The systems PlantWeave Technologies design and provide, contribute to these companies saving on both carbon emissions through reduced energy use and ongoing costs.

"By identifying and defining process improvement initiatives within the business that reduce consumption of water, air, gas, electricity, steam and air, there are real savings. These businesses then also are in a better position to comply with the ever-evolving legislative requirements from government," said Robert.

"PlantWeave Technologies can audit the systems of dams, desalination plants, factories and buildings, accurately measure consumptions and deliver solutions in line with improvement initiatives for genuine business returns. We are not just talking token "green" ideas because environment is foremost (rightly) in everybody's minds. We are looking to lead, deliver real business benefits in addition to an entity's corporate responsibility or compliance with any government legislation, and engineer real world solutions.

"All projects and all market verticals such as utilities, infrastructure, manufacturing sectors, mining, transport and commercial developments need this level of engineering systems expertise. One of our key business objectives is to be the premier engineering solution provider in Australia and also gain recognition abroad. Our industrial strength and experience is currently being applied across many sectors."

A game plan which requires an all encompassing needs a hi-tech tool kit. PlantWeave Technologies' own infrastructure includes systems and procedures that are currently being audited for ISO9001 and GAMP certifications. This is complemented by powerful engineering methodologies derived from many industrial applications and project experience, which can be applied to any client requirements. Typical process systems and control platforms include leading-edge suppliers such as Siemens, Rockwell, Yokagawa, Schneider Electric, Emerson, Invensys and ABB. They have over 20 staff, six of whom worked on the Hinze Dam Alliance systems.

"We will be one of the last contracted companies at the Dam. Our onsite role includes computer and software installations for commissioning, which has been fully tested beforehand in our lab because if it doesn't work, neither will the dam," said Robert.

"We model and run all the dam systems before we get there, including thorough simulation of disaster recovery scenarios. Our systems bring together all operational information, all critical measurements and reports that are essential to the dam's ongoing operation. The system intelligence is such that it will automatically alert to any critical event."

PlantWeave Technologies design, program and install the "brains" for major projects. Their field of engineering expertise also includes high-level electrical and industrial process control systems, purpose-built software and digital technology, the sort needed to manage and deliver on major installations like the Hinze Dam.

With their control system software and control of remote telemetry systems installed at the Dam, it is possible to model and manage every possible scenario that might occur, as well as closely monitor aspects such as water volumes, turbidity, water quality and pressures.

"With PlantWeave Technologies' engineering systems, total simulation, monitoring, control, visibility, alerts and intelligence is available and configurable via the click of a computer mouse. These systems are also designed to be secure and robust, so they can only be used by authorised personnel," said PlantWeave Technologies Director, Robert Harvey. "The entire infrastructure of something like Hinze Dam is run from a

'mission control room'. PlantWeave Technologies were the key partner in engineering this system, and almost entirely from our state of the art office. We can provide the whole engineering solution and technical support thereafter. There is 24/7 site support options, secure VPN remote network access and also telephone assistance. And if a client wishes to look after the deliverables themselves, we train them.

"How the solution is delivered to the client starts with us consulting closely with them to properly define the scope of work which includes detailed documentation and technical specifications prior to commencement. Total life cycle cost of a project is critical and many projects fail due to lack of upfront engineering. What we don't do at the beginning of the project will bite at the back end and overall project cost blow outs can be crippling.

"We then design the system, process or machine with high-level software tools and powerful simulation techniques, and then test the solutions under laboratory conditions in our office with the client. We manufacture

any discrete mechanical components, electrical panels or other hardware needed, and then project manage the site installation, commissioning and handover. "Our engineering methodology in conjunction with our Quality Assurance systems and a commitment to exceed client expectations guarantees an overall superior engineered solution and ensures lower risk delivery."

PlantWeave Technologies was founded in 2004 as a team of mechanical, electrical, mechatronic, software and systems engineers who saw a need for a firm which could deliver the entire package, not only designing but simulating, testing, building, installing and commissioning complete end to end system solutions for industrial and commercial applications. The team combines professionalism, credibility, dynamism, creativity, expertise and ingenuity with a solid CV of achievements.

For example, PlantWeave Technologies are currently delivering major process control system and network upgrades for Sydney's Prospect Water

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## CUT-OFF WALL IN HARD ROCK FORMATION

**B**AUER Foundations Australia Pty Ltd recently completed the foundation works on the Hinze Dam stage 3 upgrade located in the Gold Coast Hinterland. As part of the upgrade a cut-off wall was constructed in the right abutment to prevent seepage / piping through the insitu rock formations. The cut-off wall commences at the existing dam wall and achieves the length of 227 meters with a thickness of 0.80 meters and a depth of up to 54 meters.

To create the space for the cut-off wall the trench was excavated into the ground that was classified as extremely weathered to very high strength rock with up to 200MPa. Because of the inhomogeneous ground conditions an assortment of specialist equipment was used for the excavation. A grab unit with a K810 grab mounted on a HS883 base carrier was used for soft and low strength formations and a 200 ton BAUER BC40 trench cutter with an HS885 base machine for cutting hard and very hard rock.

The cut off wall was completed and delivered to the client several weeks prior to the contract completion date. The result is the deepest, continuous cut-off wall to an existing storage reservoir in Australia to date.

BAUER has operated in Australia since 1989 to meet growing demand for skilled expertise in specialist foundation engineering. BAUER Foundations Australia has grown rapidly and today employs a highly skilled workforce completing contracts Australia wide.

BAUER Foundations Australia has recently been involved in the following projects:

- Perth - New Metro Rail / Leighton Kumagai JV
- Tugun - Bypass Motorway / Pacific Link Alliance

- Gold Coast - Desalination Plant / GCD Alliance
- Brisbane - Vision Highrise / Grocon
- Adelaide - University 'New Engineering' / Hindmarsh
- Gold Coast - Hinze Dam / Thiess
- Brisbane - Airport Link / Thiess John Holland JV

BAUER Foundations Australia is part of the BAUER Group which operates a network of branches on all of the world's continents through more than 50 subsidiaries and branch offices.

Founded 200 years ago, the BAUER group today employs some 8,600 people, the Group's total revenues in 2008 were AUD ~2.82 billion (EUR 1.53 billion). BAUER Aktiengesellschaft has been listed on the official market of the Frankfurt Stock Exchange since July 4, 2006.

As a key player in the development of specialist foundation engineering BAUER provides design and construct services for:

- Bored Pile Foundation and CFA Piles
- Retaining Structures (secant pile-, contiguous pile- and diaphragm walls)
- Soil Improvement (stone- and cement columns)
- Cut Off Walls

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## DIAMOND-TIPPED DUST-FREE DEMOLITION

**M**ajor construction often involves substantial deconstruction - that's DecoTEC's business. Modifying Hinze Dam required the removal of 2000 m<sup>3</sup> of concrete. Diamond wire saws were used with some cuts exceeding 50m<sup>2</sup> the largest ever done in Australia. "With concrete cutting, one of the biggest challenges is the slurry produced," said the company's Technical Director Ross Cole.

Hinze Dam delivers the Gold Coast's drinking water, this meant scrupulous containment of slurry, with all fines being removed and the water's pH balance restored. DecoTEC have strict safety & environmental protocols to manage their work.

Another aspect of the project scope was to reduce hydrostatic uplift pressures. This entailed drilling 25, 75mm & 160mm holes up to 25m deep from within the gallery.

Ensuring a good bond between the existing concrete and new concrete required 6500m<sup>2</sup> of hydro-demolition surface preparation.

DecoTEC are in demand worldwide and recent achievements include developing a system to drill 96,000 50mm holes to 1mm tolerances in 100 days for Chatswood-Epping Rail, removing 73Tonne of concrete for the Cross City Tunnel, and removing 700Tonne of concrete at BHP's Port Hedland facility. They also work internationally with planning well underway for another dam project, this time in South America. They have five engineers, and offer a comprehensive suite of structural modification services.

"DecoTEC specialise in technically challenging projects where their experience and focus on innovation enable them to deliver superior results. With offices in Sydney, Brisbane and Auckland DecoTEC is well placed to meet the growing international trend towards modification of existing infrastructure," said Ross Cole.

"With Hinze Dam the issue was increasing storage capacity by modifying the structure to withstand increased loads. The complex nature of the work requires a high degree of cooperation between the various stakeholders and communication with the Hinze Dam Alliance has been excellent."

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## BRINGING INDUSTRIAL DEVELOPMENTS TO LIFE

## MORE DAM ANCHORS!

Operation and management of our water resources has become a greater challenge in recent years due to heritage, environmental, community, security and climate change issues. The management of water storage and facilities by industry professionals has and will need to change as an outcome of these external impacts.

The Hinze Dam Alliance identified Geovert's capabilities in difficult access drilling, and awarded the contract for drilling and installing anchors in the existing live spillway. As part of raising the existing dam, Geovert worked to heights of approximately 30m above the base of the spillway to install anchors for the new lining and spillway walls using a remote controlled drilling unit, which was specifically procured to meet the requirements at Hinze Dam. The Geotechnical Construction specialists were also commissioned to install post-tensioned anchors through the existing dam structure to tie the newly raised spillway into the rock foundations.

Geovert is a specialised Construction Company that has developed a reputation for providing innovative construction solutions in the field of Ground Engineering, Slope Stabilisation and Rockfall Protection. They're able to provide clients' value engineering on projects at an early stage in their design process by using innovative construction techniques and turn key solutions. The technical team draw on their vast amounts of experience working on foundation engineering projects locally and

internationally, managing the design and construction of geotechnical works on civil, mining and infrastructure projects.

Geovert is an Australian owned business that has been operating for 10 years with offices in Sydney, Brisbane and New Zealand and has worked on projects through-out Asia and the Pacific. The company has continually developed innovative construction and access techniques, along with detailed project analysis systems, to eliminate associated environmental and safety risks associated with this type of work.

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PT Automation Solutions (PTAS) are a fast paced, vibrant company with substantial experience in the industrial electrical sector. Their team have the ability to take an idea from concept to commissioning, providing fast-tracked turnkey industrial electrical solutions.

Over the years they have worked with many major clients in Australia and overseas too, including Xstrata Mines, BHP Billiton, Thiess, Australian Federal Government, Hatch, Sedgman, Hirsch GMBH, Sydney Water, Comalco, Smorgans, Sara-Lee, Frito-Lay, Smiths, ACI Plastics and Callide Power Station. Their global presence has extended as far a field as the UK, Austria, China and Kazakhstan.

They supplied PLC Panels, Motor Control Centres, Distribution Boards, and Local Control Stations for the Hinze Dam. As with all PTAS boards, these are certified to International Quality Standard ISO 9001.

"We are setting the standard on quality, we get a lot of glowing feedback from clients," said Managing Director Peter Taylor. "We design if required, build, test, install, program and commission everything ourselves. What sets us apart from many industrial electrical firms is we have on staff a depth of engineering and application knowledge to assist our clients through their projects and most importantly support them after."

"Our engineers can go to any type of industrial application with a mechanical component and put together a complete turnkey electrical solution."

The business launched in 2000, and is owned and managed by Peter Taylor, who has extensive experience in the automation industry covering

areas including mining, materials handling, conveying systems, food and beverage, water, machine building, refrigeration and the steel industry.

PTAS were awarded the Gold Coast City Council Mayors Innovation Award in 2008 for their work in Austria on a world-first dual sided EPS pallet manufacturing facility that produces completed pallets in less than 90 seconds. This technology will be established world-wide soon.

Products and services available from PTAS range from Modular Custom Type Tested Motor Control Centres and Main Switchboards, Control Panels, DCS and PLC panels, JB's and LCU's. Design, industrial electrical installations, PLC and SCADA software development and commissioning for RSLogix 500, 5000, Siemens S7, Modicon, RS View, Win CC, Citec, IFix, Mitsubishi and Wonderware. They also specialise in Industrial networks, CAD and Safety integration.

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## EXPERT FELLERS

Advance Tree Lopping are skilled fellers, whether they are pulling storm blown trees out of houses or doing the inundation clearing for the raising of the Hinze Dam Wall.

Company founder Wayne Seaward began the business doing domestic lopping, tree removal, stump grinding and land clearing in 1992, and moved into commercial and insurance work due to the high demand for their services.

In the last year his three crews have worked from Cairns to Melbourne. For the Hinze Dam project, Advance Tree Lopping spent a year clearing for the haul roads, clay borrow pits and quarry. Then they won the contract for another year's work performing the inundation clearing of 270 hectares on the flanks on the Numinbah Valley.

Most has been done mechanically with the company's Fellabuncher (mechanical harvesting equipment). They also have on site their own skidders, chippers and trucks for carting the mulch to Rocky Point Sugar Mill, where it generates power fed into the main electrical grid. They also always work with their own water truck and fire fighting gear.

Not that fire has been a major worry at the Hinze Dam site, instead wet weather caused almost three months working time lost to saturation. "We are clearing to 15 metres above the full supply line," explained Wayne. "There have been a lot of environmental issues, with a lot of protected trees that we have had to leave and work around and we have communicated very closely with the environmental team at the Hinze Dam to make sure there is as little disruption to the surrounding flora

and fauna as possible. This is very important to everyone. "Another part of our job is we do silt control. We've built a lot of earth bunds, which diverts run off into sugar cane mulch bales. We've also used temporary silt fencing, which we have to later remove. "All our workers have forestry felling tickets and are very skilled in their line of work. "We are fully insured and covered by WorkCover Qld. Before any job is attempted, we do a risk assessment, including assessing - where cars are parked, trouble spots and where phone and power lines are located. And we don't touch a tree without permission from council." Their equipment includes two cherry pickers, skidders, five chippers, seven trucks, stump grinders and bobcats.

Another major project currently on the go is the clearing for the Thiess John Holland inner city airport and tunnel project, and the Northern Busway.

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## SUSSING OUT THE SOIL

When South Qld Soils take on a project, they are there for the long haul! Raising the Hinze dam is one such project. With their expertise being assessing and testing soils, aggregates and concrete for major construction projects, they arrived on site in January 2008 operating from an on-site lab with NATA accreditation. They have since been contracted to continue their services until December 2010.

"We were one of the early birds on this job – preliminary testing of the materials required us to be on site basically from kick off. Our main involvement is in compaction testing, grading of the construction aggregates used in the manufacture and supply of concrete for the project and compression testing of such concrete, with results being logged and test reports made available to contract supervisors," said South Qld Soils Managing Director John McQuaid.

"Our work ensures that there is compliance with project specifications. Materials must meet certain criteria for incorporation into the works and be tested to the relevant Australian Standards. To raise a dam wall by 15 metres by way of an earth core fill is a massive expansion. It is crucial that soil compaction and concrete strengths meet the specified standards. The Contractor depends on our proficiency for progression of the works."

Their affiliated company Brandon and Associates (Consulting Engineers), began providing soil testing services in 1984 with the soil testing arm eventually forming its own company in 1994 under the name South Qld Soils. The company also boasts office-based NATA accredited laboratories in Brisbane, Toowoomba, Roma, Chinchilla and Narrabri.

This ever-expanding company has a staff complement of over 30 qualified technicians and in addition they encourage trainees into their ranks to ensure levels of experienced personnel are such that they are available to service the increasing demand for testing services both in the private and public sectors.

Recent testing projects undertaken by South Qld Soils include upgrading of Beerwah railway Crossing for Trackstar (Theiss Alliance), upgrading and duplication of Caloundra Road (Contractor Fulton Hogan), Boggo Road Busway for Theiss P/L, Gatton Correctional Precinct Development by Alexanderson Earthmover and various projects for Queensland Gas and Origin Energy in particular the construction of vast evaporation ponds.

"The confidence shown in engaging South Qld Soils for major projects by these and other well respected contractors is truly valued by management and in turn we believe well rewarded by the competence and skills we demonstrate in the geotechnical field" said John McQuaid.

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The aerial view of The Hinze Dam



# KNOW-HOW WITH HEAVY PLANT



The Jonker Group is one of Queensland's fastest growing privately owned companies, specializing in heavy earthmoving and civil construction equipment. They provide machinery to customers on a wet or dry hire basis catering for the civil construction, mining and quarrying sectors. Complimenting the hire side is equipment sales, with the Jonker Group offering the flexibility of machinery procurement.

When a machine has a mechanical glitch, it can stop a project in its tracks. That's why Jonker Plant Hire have varied list of tradesmen on staff to instantly respond and rectify the problem.

Being the preferred suppliers for a three year contract to Thiess at the Hinze Dam Expansion Project, Jonker Plant Hire is required to supply a fulltime on site fitter and 15 pieces of plant. This list includes five 50t dump trucks, a 30,000L water truck, two Hino 13,000L water trucks, a 30T excavator with GPS, a 20T excavator, a 45T excavator, a 120T excavator, two 18t smooth drum rollers and an 815 compactor.

"Keeping it all going is the big challenge," said Company Representative John Mathers. "It is a very abrasive job, there's a lot of granite, which wears everything extremely quickly. We have to respond to problems immediately, which is one of our strengths."

Major projects the Jonker Group has been involved in include – construction of the TPI Rail project in WA (Port Hedland), Hail Creek infrastructure construction and Overburden Removal near Mackay, Construction of the new Clermont Coal Mine and Kestrel Coal Mine Extension near Emerald, Osborne Mine Tailings Dam lift at Mount Isa, pre-strip mining contract at Foxleigh Mine, construction of Lake Lindsay Coal Mine in Middle Mount, levy bank construction at Ensham Coal Mine at Emerald, BMA Peak Downs mining and civil earth works,

and construction of heavy haul roads and conveyor belt footings for Thiess at Currugh Coal Mine.

As with any successful company, Jonker Group is always on the prowl for business opportunities and as such, recently expanded its operations into the steel engineering industry with the establishment of Jonker Engineering. Not only does it complement the earthmoving side of the company but it also caters for all minor and major engineering requirements, having the key asset of highly skilled experienced staff and a number of specialized machinery.

Jonker Group is a family owned and operated company which started in Ipswich in 1975. Their fleet consists of, but is not limited to: Caterpillar, Komatsu and Hitachi - Dozers, Excavators, Off Highway Trucks, Compactors, Graders, Wheel Loaders, Articulated dump trucks, Smooth Drum and Padfoot Rollers, Mobile Lighting Towers, Off Hi-way Water Trucks ranging from 18,000L to 50,000L and Road Reg Water Trucks from 8,000L to 14,000L.

If you are chasing the best service in the industry by a company that has everything you need, contact Jonker Plant Hire

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