

# TIGER BRENNAN DRIVE

**MAIN CONSTRUCTION COMPANY : MACMAHON**  
**COMPLETION : December 2010**  
**PROJECT END VALUE : \$95 Million**

**MACMAHON CONTRACTORS PTY LTD**  
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Macmahon Contractors have again shown that experience coupled with an innovative approach to problem solving can achieve excellent outcomes. The company have just completed the Stage Two of one of the Northern Territory's most significant public infrastructure projects, the \$95 million Tiger Brennan Drive Extension (TBDE) project, which is the largest and most significant section of the \$110 million East Arm Port Access Route (EAPAR).

Funded by both the Federal and Northern Territory Governments, and managed by the Department of Construction and Infrastructure (DCI), the TBDE will improve road safety, reduce travelling time and ease traffic congestion for the 34,000 vehicles travelling between the rural area, Palmerston and Darwin each day, and improve access to East Arm Port. Macmahon engaged in an Early Contractor Involvement (ECI) Contract with the DCI to design and construct the Tiger Brennan Drive Extension having already constructed Stage One of the EAPAR, the \$6.5 million Berrimah Road Duplication, completed in 2009.

Macmahon's key partners for the TBDE Stage Two were Sinclair Knight Merz, engaged as lead design consultants, and the Larrakia Development Corporation. The unique combination of civil construction know how, engineering excellence and Indigenous involvement has delivered a project with broad community support, a spotless safety record and multifaceted benefits for the Northern Territory community.

The TBDE includes a 7.5 kilometre four-lane highway between Berrimah Road and the Stuart Highway and free flow, grade separated interchange at the intersection with the Stuart Highway and Roystonea Avenue that includes two road bridges and a dedicated pedestrian/cycle bridge. The scope of the project has also increased to include the upgrade of the former "Blackspot" intersection at Tivendale & Wishart Rds including road realignment and the construction of a new rail level crossing to replace two existing level crossings.

The ECI model has enabled Macmahon, as the Contractor, to meet stakeholder needs to deliver the project within the earliest time frame. The collaborative format allowed the client to utilise the contractor's design and construction expertise to develop the original Client concept plan to a detailed 'constructible' design with an accurate cost estimate which allowed for the best utilisation of funds. Techniques used were a two stage 'Value

Management' process for the selection of the preferred interchange layout, value engineering sessions to drive "Value for Money" and define the agreed scope and Risk/Opportunity sessions.

During the first phase of the project which included the preliminary design development, construction planning and cost estimate and coincided with the 2008/09 Wet season, the Client insisted that elements of the project be identified for Early Works packages to allow construction activities to commence as soon as the Wet had abated and site conditions were suitably dry to start works. In line with this request Macmahon identified several Early Works packages and with the Client's approval Macmahon placed orders for the relocation of existing services including water, communications and high voltage power and for materials with long lead times such as precast drainage culverts.

Macmahon in collaboration with the Client fast tracked the development and approval of the required Contract Management Plans, including Safety, Environmental, Stakeholder, Quality and Traffic Management. This enabled the project to start with a cracking pace as site clearing works were able to start with the early onset of the 2009 Dry season as the Environmental Management Plan was approved.

Macmahon's experience gained in over 40 years constructing vital projects in the Territory allowed them to solve some varied challenges, including those created by the location and site materials. "We were working with very low strength fill materials, trialling blended mixes of site won material

to achieve the required CBR (California Bearing Ratio) for subgrade. Our management of on-site materials included blending the limited good quality gravel material with lower bulk excavated material to provide required subgrade CBR rather than stabilising the lower quality material with lime or cement providing significant cost savings," said Macmahon NT Construction Manager, Chris Pick.

"Another practical application was the use of surcharge loading with CBR testing to reflect true CBR's of the in-situ materials in a confined environment. This method is not commonly used in the Northern Territory."

The final layout of the interchange allowed all three bridges to be constructed "off line" away from traffic on the existing Stuart Hwy which allowed for efficiency in the construction of bridge structures and roadworks approaches. Maintaining the strict programme for the bridge works was essential to ensure traffic could be diverted off the existing Stuart Hwy and over the new bridges to allow Macmahon sufficient time to complete the final major cutting for the new Tiger Brennan Drive through the existing highway and achieve our completion date.

Part of the brief for the design of the interchange was to make it a "Gateway into Darwin". Consequently, much thought and consideration went into selecting the theme for the interchange artwork, resulting in a carefully chosen colour scheme and design to reflect aspects of the landscape and culture of the Larrakia "Saltwater" people. The design

## MACMAHON GETS THE TOP END MOVING

is based around 'Dalirgang' meaning 'The pre-monsoon season of hot weather, increasing humidity and building afternoon thunderstorms with rain that returns a green tinge to the dry land'.

Artistic elements were incorporated into the bridge structures through different mediums including precasting designs into the concrete bridge barriers, painting of designs onto the bridge abutment walls, fabricating a balustrade on the cycle bridge to reflect the random shapes of spear grass shoots and the installation of statues. All of these artwork elements are complemented by the landscaping chosen for the interchange.

In addition to contributing to the artwork theme and design, Larrakia Development Corporation carried out planting of 700 cycads removed from the site prior to construction activities and transplanting them as part of the interchange landscape works. The LDC also contributed to procurement of project materials including light pole rag bolt assemblies through their own fabrication operation.

Peak workforce including subcontractors was 143 persons in the month of November 2009, and on average the project maintained a total workforce of 110 persons per month, with an LTI free safety record showing excellent management of high risk activities including working at heights, drill & blast, use of heavy haulage plant (785 dump trucks) and working adjacent to traffic.

Macmahon also set a target of 25,000 hours for Indigenous labour, and exceeded it by 20%, employing on average 10 Indigenous persons at any one time.

All subcontractors and suppliers had to be National Code of Practice for the Construction Industry compliant, and information sessions were held to give potential suppliers and subcontractors an understanding of the Code and what processes to take to become Code compliant. Over 240 suppliers and subcontractors have been used on the project with 98% of them NT based.

The TBDE now joins the list of major contributions Macmahon has made to the essential civil infrastructure of the Territory, including the Alice Springs to Darwin Railway, Bradshaw Station and the Darwin Waterfront Redevelopment.



# HOME FROM HOME WHEREVER YOU MAY BE

**N**T Link is a privately owned company based in the Northern Territory and has been involved in the transportable building industry since 1983 and maintain construction and distribution centre's in Darwin and Alice Springs.

NT Link specialize in the design, construction and installation of camps catering for up to 1000 people, complete with all amenities and infrastructure designed to fully support the intended use.

NT Links methodology entails working with the client on the initial concept and scope of the project to produce working drawings and camp layout designs. Buildings to suit these parameters may be sourced from their extensive hire fleet of over 1000 buildings or constructed as needed at their yards in Darwin or Alice Springs.

Once building procurement is finalized the task of transportation and installation begins. Initial site preparation is carried out prior to delivery by NT Links experienced staff and the buildings and associated infrastructure are loaded and delivered to site utilizing their fleet of Prime movers, trailers, for installation onto engineered

footings. Associated works such as service connections, fencing, shade structures, walkways, and civil works are all performed by NT Links staff and long term associated sub contractors.

At the completion of the hire period NT Link will return to demobilize the camp and return the site to its original condition.

Rather unusually, they will also collaborate with their competitors throughout Australia to ensure that even the very tightest of timeframes will always be met.

For the Tiger Brennan Drive Project, NT Link provided their full range of services in supplying a wide variety of rental buildings to meet the needs of this large and dynamic project.

Offices were supplied for Macmahon staff to cater for the differing requirements of their project managers, civil engineers, administration staff and safety officers. Crib and lunch rooms, training rooms and ablution areas were of course necessary additional facilities.

They also supplied a multi-roomed office complex for the government officials who were working with Macmahon on the construction site.

Starting in September 2009, six NT Link staff worked over a period of two weeks on the installation and the structures will be in use for at least 18 months.

Setting up temporary accommodation and camp facilities demands a variety of skill sets and trades. NT Link employs experienced personnel to deal with all administration, design, drafting, construction, and installation phases. They have their own carpenters, plumbers, electricians, drivers and mechanics; all of whom have spent many years in the specialized field of transportable camp installation.

NT Link monitors all aspects of each project on a daily basis through onsite reporting and report sheets. This information is fed back to the head office in Alice Springs to update timelines and transport and delivery scheduling.

This company works hard on ensuring that their structures are strong, durable and meet all health & safety standards and statutory

requirements, demanding the highest standard of workmanship and with a strong commitment to continually improve ways to transport and install their buildings.

An outstanding example of this is shown in the fact that they have designed and engineered cyclonic log footings, which are now an essential element of any work undertaken in cyclone prone regions.

Additionally, NT Link ensures that all personnel are given appropriate training in all matters concerning safety, health and environmental issues on top of a detailed induction program for all new employees.

NT Link specializes in the installation of mining camps in remote locations and have installed camps into all areas of the Northern Territory, Western Australia and South Australia.

In over 24 years of operation, they have been able to meet the differing needs of extremely varied clients such as station owners, individuals, government agencies, the Defence Force and mining companies, offering both custom purchase and hire arrangements.

Specialising in remote area transportation and installation of buildings and associated works, frequently in harsh and difficult conditions, NT Link takes great pride in their workmanship and efficient project management and their vast experience means they are confident in taking on any challenge!



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**T**utt Bryant Crane Hire conducts operations from Darwin, Brisbane, Perth, Melbourne, Karratha and NSW, with Muswellbrook Crane Services, making them one of Australia's largest crawler crane hire operators.

The Darwin office were particularly pleased to have been involved on this large infrastructure project for The Territory and enjoyed playing an important part in a development directly benefiting the local community.

Assisting in Stage 2 of the Tiger Brennan Drive extension, Tutt Bryant Crane Hire Northern Territory were part of the team working on the construction phase of the north and south-bound bridges.

Cranes ranging from 200 tonne to 2.9 tonne were utilised with the larger cranes used to manoeuvre a variety of beams for the walkways, bridges and cycle paths. To get an idea of the scale of the operation, 120 beams weighing 20 tonnes each were put in place, just for the bridges alone.

A range of 50 tonne capacity cranes were used for erecting and dismantling the enormous formwork shutters and steel fixings required for such a large project as this. Below ground, they also facilitated the insertion of concrete culverts.

The smaller 2.9 tonne cranes came into play for putting the concrete pre-cast panels accurately in place, which formed the basis of the attractive design work for the bridges.

Although Tutt Bryant Crane Hire offers both wet and dry hire, as wet hire was required for this job, they provided their own experienced operators and riggers.

Security and safe handling is paramount with this scale of operation. Tutt Bryant are extremely proud of their very strong safety and serviceability record resulting in them being recognised as one of the leaders in the industry.

Tutt Bryant naturally works within their host company's safety scheme, but they also provide a full Job Safety Analysis and prepare detailed computerised lift plans for projects.

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7 DAYS A WEEK  
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**CRANE HIRE - TRANSPORT & LOGISTICS - PROJECT SERVICES - HEAVY  
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Furthermore, Tutt Bryant offers a full assessment of any job, offering recommendations for the equipment and personnel required. This in-depth knowledge is especially important to have on hand particularly for larger projects.

Cranes and personnel can be hired by the hour or on a long term basis, and staff are available 24 hours a day, 7 days a week to answer your queries.

Moreover, with equipment strategically placed at a number of offices across the country ready for quick and easy mobilisation, you can have your project up and running in no time.

However, that's not the limit of what the Tutt Bryant portfolio of companies can do.

The Northern Territory arm of this national company is the first port of call for the provision of logistics, heavy haulage, lifting, labour and specialised services for the construction, mining, oil and gas industries, both on and off-shore.

Tutt Bryant Project Services provides the additional equipment and services needed for large-scale transport equipment from highway-type trailers to computerised self-propelled transporters and other ancillary machinery.

Kingston Heavy Haulage specialises in large and unusual consignments to anywhere in Australia.

Major projects such as The Narrows Bridge, Perth; the Queensland State Government grid expansion and desalination projects; The Pacific Highway and Bell Bay Power Station, Tasmania shows the wide geographical and logistical range of their work.

Specialists in the oil and gas industry, they have also considerable expertise in many other areas and are confident in being willing and able to deliver their services anywhere in Australia, having the equipment and staff to cover all jobs.

"We love a challenge!" enthuses Craig Murray, Crane Supervisor at Tutt Bryant: epitomising the company's 'can do' attitude where no lift is too big or too awkward.







## EVERYONE WINS WITH WORKPAC

we are involved in, know what is required from both the employer and employee perspective and have an extensive network of contacts across Australia to assist our clients to find the perfect match.

We additionally are proud of the strong occupational health & safety focus to all our work. Our qualified Business Development Managers are available to our clients for advice and support, ranging from risk assessment of proposed work sites, providing safety conscious candidates, to incident investigations and management (including workers compensation claims management and rehabilitation).

WorkPac staff are on call 24 hours a day to support our clients, and our online system, iWorkSmart, enables employers to place an order for staff, read resumes, view and accept candidates and manage temporary workers. Employees, using the same system, can easily search and apply for jobs online, update resume details, submit timesheets and view payslips.

To find the right people or job, whenever and wherever you need, WorkPac makes the process an easy win-win solution.

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A leading specialist recruiter since 1997, WorkPac are well-established in the mining, construction, engineering, manufacturing, industrial, and healthcare sectors, with over 42 offices located across Australia.

100% Australian owned, the company has achieved rapid expansion through its own successful operation (no mergers or acquisitions).

2010 has seen nationwide recognition of the company's top class ranking: winning two Australian Business Awards for Enterprise and Recommended Employer, winning the Recruitment Excellence Awards for Best National Agency and achieving a finalist place in the Deloitte Recruitment Excellence Award.

In more good news, WorkPac has won a five year contract to service BHP Billiton's Olympic Dam mining operation. WorkPac will provide professional and industrial employees – a similar role to that played on the Tiger Brennan Drive Project.

All our recruiters are experienced industry professionals with many years knowledge of the recruitment business. We understand the industries

## STRATEGY, KNOW-HOW AND MOBILITY – THAT'S SKM!

Leading engineering consultancy firm Sinclair Knight Merz (SKM) has continued its contribution to Australia's transport infrastructure, playing a crucial role in Darwin's Tiger Brennan Drive extension.

The 6,500 person strong SKM is a long established and independent professional consultancy operating in the engineering, sciences and project delivery fields. It was established in Sydney in 1964 and formalised its Northern Territory presence in 1996 following the successful merger with the local company, Sleeman Dunkley Treacy (SDT) Pty Ltd.

The firm is a leading provider of infrastructure design in Australia and one of the most experienced road and bridge designers in the Northern Territory. SKM's Darwin based team was delighted to be involved as a key design consultant partner in the professional team of Macmahon and the Department of Construction and Infrastructure on the strategic Tiger Brennan Drive project.

SKM provided the preliminary and detailed design for the 7.5 km of divided four-lane carriageway and grade separated interchange. The project's design team is predominantly Darwin based, and leveraged input from SKM's resources in Sydney, Perth, Kuala Lumpur and Melbourne where required.

SKM's successful approach for Tiger Brennan Drive combines critical local knowledge while harnessing the experience and specialist capability from the firm's operations that supports clients across Australia, New Zealand, Asia, Middle East, United Kingdom and South America.

Overall SKM operates across four market areas, Buildings and Infrastructure, Mining and Metals, Power and Energy and Water and Environment, providing the full range of engineering and environmental consultancy services including project management, planning and consultation. In transport infrastructure, SKM has extensive experience in the planning, engineering design, construction and management of roads, rail and maritime infrastructure. They form a strong combination of civil and structural engineers, along with transport planners, transport design engineers, environmental scientists, urban planners and economists. They also provide essential infrastructure for the mining, power and energy sectors.

Tiger Brennan Drive represents one of many significant infrastructure links successfully engineered by SKM. The firm's portfolio includes numerous sections of duplicated motorway for the Hume Highway and urban infrastructure upgrades such as Melbourne's Monash Freeway. It is currently delivering the extensive, Peninsula Link south of Melbourne and most recently has been appointed to the design team for the Hunter Expressway north of Newcastle.



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While the Territory is not quite a concrete jungle – finding a good concreter or supplier can be like wading through a jungle to find a gem.

Reputable mining and construction companies don't muck around, they use tried and trusted suppliers to get a quality job done. That's why Associated Masonry Supplies boasts an excellent relationship with its clients.

The trader's customer base includes major construction companies, general builders, concreters, concrete precasters, mining companies and civil engineering companies. The company has supplied products for major projects such as LNG Gas Plant, the Alcan G3 expansion, the Alice Springs to Darwin Railway, East Arm Port Facility, Evolution on Gardiner and Mantra Pandanas in Darwin.

Associated Masonry Supplies recently expanded to double its warehouse and showroom capacity. The Winnellie-based business stocks water-stops, concrete repair products, waterproofing membranes, concreter's tools and machinery, concrete jointing, joint sealers, epoxies, non-shrink grouts and diamond blades. All products are high-quality brands such as BASF, Parchem, Epirez, Sika, Gripset, Flextool, Danley, Megapoxy, Actech and Concrete Colour Systems.

A large range of decorative concrete products are also in stock including stencils, colour oxides, resurfacing and acrylic concrete sealers. Construction equipment lines are extensive and include trowel machines, drive units, compactors, vibrators, trash pumps, brick/block saws and ventilation fans.

Associated Masonry Supplies specialises in the supply of concrete construction products and, as a result of the expansion, it's stocking items such as bar chairs, bar guards, keyjoint (pvc and metal), dowel bars and sleeves and crack-a-joint. Owner Derek Dearman said his company's success was not due to his products alone.

"Customer service is also a big part of the way we do business," he said.

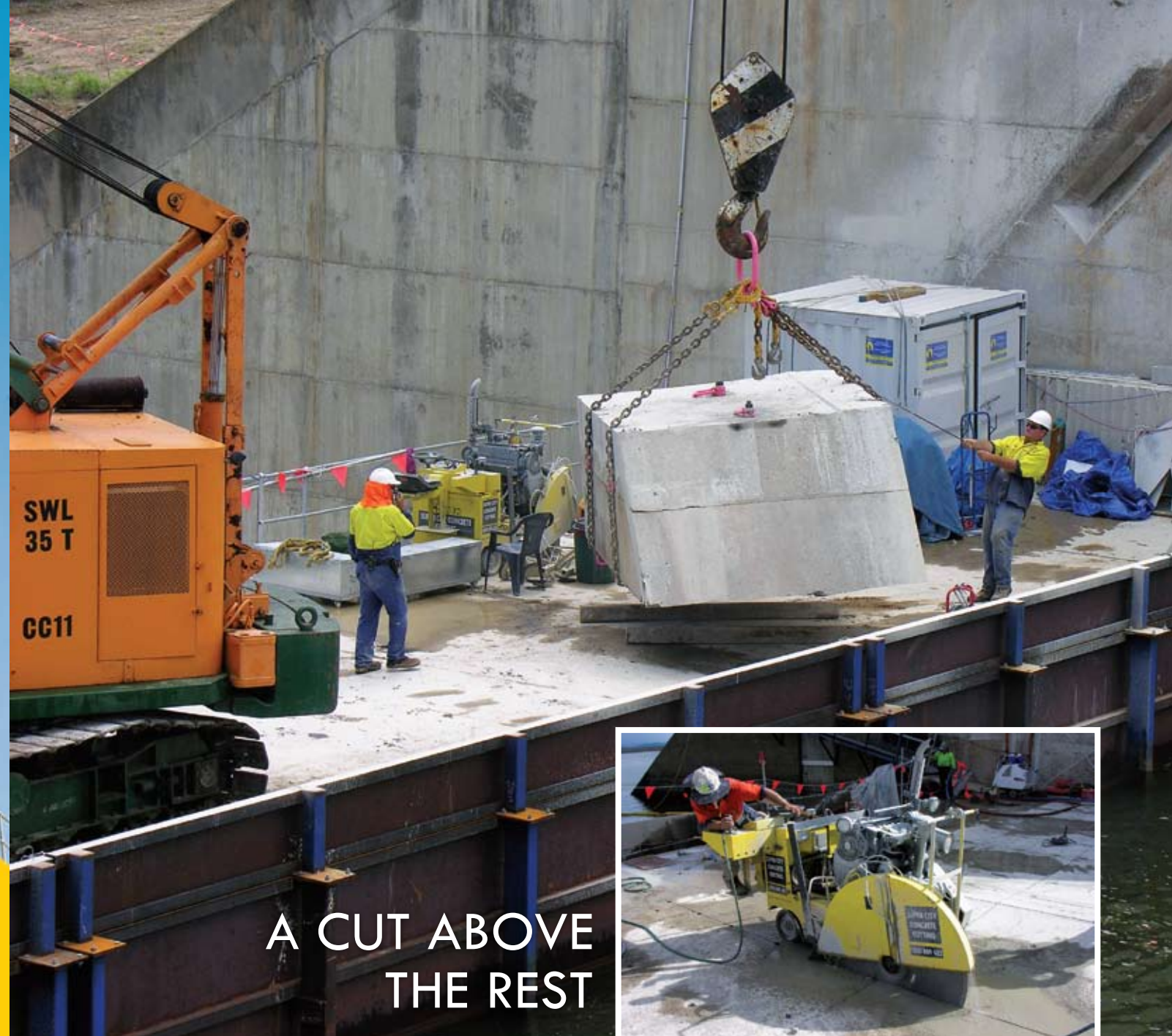
The Associated Masonry Supplies team includes Tim O'Connor (sales), Paul Tschuma (sales), Alison Clarke (accounts) and Adam Harvey (storeman and deliveries). Derek said together, the team excelled.

"Our friendly staff are always willing to help," he said. "They go above and beyond the call of duty to fulfil our clients' requirements."

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## A GEM IN THE OUTBACK



## A CUT ABOVE THE REST



Established in 1993, Super City Concrete Cutting is a national company with an operating base in Darwin. They were delighted to be chosen to supply their services on this major road and bridge project.

Mr Alan Torrance, the Darwin manager commented, "We specialise in all aspects of concrete sawing, drilling, breaking, and controlled demolition. Our systems of work are complemented by the very best equipment and technology currently available in the market. I was very pleased with our contribution to the project as we were able to provide site-specific solutions on several challenging work requests. Our operators performed a number of sawing and drilling activities on bridge abutments and roadways that enabled the project to progress at a rapid rate."

Part of the installation and connection process of bridge decks and beams required diamond core drilling for anchor bar installation. The diameter and depth of hole required was not a standard measurement and Super City was able to supply the necessary specification on very short notice.

This customised aspect of their service plays a fundamental part in maintaining strong customer relationships, and has resulted in their continued growth in a very demanding market.

Their success in a number of commercial projects such as those underway in the Darwin CBD, Queensland, New South Wales and Victoria is also due to their alternative approach to demolition methods through specialised sawing and drilling systems. Super City provides 'controlled demolition', an alternative to percussion, vibration, and noise generating techniques that can sometimes have an adverse effect on client/builder relationships. Their technique uses electric-hydraulic bursting and crushing machines that produce no vibration or noise.

Clients can also be assured that their asset will not be compromised or damaged during upgrade works - delivering peace of mind as well as peaceful environments!

#### SUPER CITY CONCRETE CUTTING PTY LTD

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# ALL UNDER CONTROL



Tiger Brennan Drive Extension, NT

**A**ce Traffic Control established itself in 2000 as the first traffic control company in the Northern Territory.

They offer a complete range of services from the design, planning and implementation of work zone traffic management, to the lease of traffic control devices, which all meet the requirements of the Australian Standard 1742.3 – 2009 and the Department of Construction & Infrastructure's Provision for Traffic.

Traffic Management Plans are compiled using traffic control planning software to devise a work zone management strategy, optimising effective, safe traffic flow as well as ensuring the health and wellbeing of your workforce.

For the Tiger Brennan Drive development, Ace Traffic Control worked on both Phase 1 and 2 projects, providing services directly to Macmahon. They provided fully qualified traffic controllers and all traffic control devices required. They worked closely with Macmahons to ensure professional traffic management was implemented.

Ace Traffic Control is equally qualified to deliver on both large scale works such as the Tiger Brennan Drive as well as smaller works. They hold the contract with Department of Construction and Infrastructure to attend emergency works and the contract

with Power & Water for works requiring traffic management. Smaller works involve providing traffic management for crane lifts and concrete pours.

Their broad range of customers demonstrates this capability, covering the corporate, private and government sectors. Current contracts include providing traffic management to Visionstream who are conducting the installation of fibre optic cable for the National Broadband Network and for Barton Housemovers who are relocating 50 houses from Larrakeyah Barracks.

As the largest traffic management company in Darwin, Ace Traffic Control is committed to providing a safe and effective environment for their clients as well as minimising the impact of works on the local population. They liaise regularly with clients to ensure and maintain the highest quality of service.

#### ACE TRAFFIC CONTROL

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## DRIVING THE GREEN SIDE

Established for over 20 years, Top End Seeds is a Darwin based business focusing on the rehabilitation and revegetation of land. Using native species, their aim is to integrate man-made activity such as roadworks, mining sites and commercial developments into their local surroundings.

In this instance, they supplied a mix of tree and shrub seed for use in direct broadcasting on prepared surfaces, such as along the sides of the 7.5 km Drive, in the median strip and in surrounding areas.

Their high quality seeds have also been delivered to local nurseries who are raising the plants for landscaping other designated areas, such as roundabouts and overpasses where a more controlled planting mix is required.

Top End Seeds provided local knowledge on suitable varieties, volume calculations, best practice information on preparing the area, meeting legislative requirements, optimum times for sowing as well as subsequent growing and nurturing techniques: the total environmental package.

### TOP END SEEDS

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## CAPTURING THE ESSENCE

DigiFilm Australia's position as a leader in the corporate imaging field is reflected in its involvement in the delivery of photographic services for Macmahon and the Tiger Brennan Drive Extension.

They are providing a life-of-project service, from assistance with the concept to final production, including secure file storage and conversion of files for repurposing images.

Managing Director Chris Knight explains, "Our clients rely on us to help communicate their expertise to their clients. We focus on the main purpose intended for the images and provide a customised service. We pride ourselves on our personal touch, which always makes for optimum results and easy project management."

"Our business recorded the original Tiger Brennan Drive construction in the '80s, so we are delighted to be involved again."

Other photographic projects range from airfield construction and mines to undersea pipelines, aerial portraits of offshore oilrigs, and port work including the Darwin Waterfront Development.

### DIGIFILM AUSTRALIA PTY LTD

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## WASTE NOT, WANT NOT

Litchfield Green Waste Recyclers are a well-established Darwin based company specialising in land clearing and mulching, safe removal of trees, power line clearance and all things related.

With a range of plant and other machinery, they are able to cater to small businesses up to the largest of corporate clients.

This flexibility was ably demonstrated with their involvement in the Tiger Brennan Drive extension. A considerable amount of land has been cleared for this project and Litchfield Green Waste Recyclers were on hand to mulch the trees and brush creating extremely valuable organic matter, which was immediately repurposed on site.

The team of dedicated and experienced professionals provide advice and recommendations to ensure the job is done efficiently and neatly by matching the right equipment for the right task. Safety is a major component in this advisory process so a full risk analysis on people, neighbouring habitat and habitation is always carried out.

### LITCHFIELD GREEN WASTE RECYCLERS

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### Tiger Brennan Drive Extension, NT

