BALLINA BYPASS

MAIN CONSTRUCTION COMPANY : Ballina Bypass Alliance
CLIENT : Roads & Traffic Authority
COMPLETION : Mid 2012
LENGTH : 12 Kilometres
PROJECT END VALUE : $640 Million

BRILLIANT IDEAS DELIVER EXCELLENT RESULTS ON THE BALLINA BYPASS

Every civil project requires ingenuity, the Ballina bypass however involved a level of innovation which cut just under a decade from the project time. The region around Ballina has some of the best arable land in the state, these soft soils however, are no good at all for bridge approaches or stable road base.

The NSW Minister for Planning approved the Ballina bypass project on 22 May 2003. The RTA formed an alliance with Leighton Contractors, AECOM, SMEC and Coffey Geotechnics for the design, engineering and construction of the project. The scope of works included 12 kilometres of new four lane divided carriageway, diverting traffic from the former Pacific Highway route which passed through the Ballina township and CBD area. The Bruxner Highway and Pacific Highway will be fully separated between the existing intersection of the highways, just south of Ballina, and the Teven Road Interchange.

New interchanges have been built at Teven Road, Cumbalum and Ross Lane, a climbing lane constructed up to Ross Lane, and new bridges over Emigrant and Sandy Flat creeks. The project has been designed for flood immunity of 1 in 20 years. The weather throughout the construction period not only slowed works down at times, the heavy inundation and occasional flash flood thoroughly tested out the design and the soundness of earthworks for soil erosion prevention and storm water management.

The Ballina region is characterised by complex geotechnical conditions, including deep soft soils in the flood plain areas. A combination of treatments was used to address the soft soil issues, including lightweight fill, deep soil mixing, wick drains, stone columns, surcharging, and the first Australian use of vaccum consolidation.

Wick drains remove water content from soft soils so settlement time of the existing soil is reduced from years to months. They were installed in a grid pattern across the treatment area, and then fill materials placed on top. The pressure created by the weight of the fill squeezes the water from the ground, pushing it up the wick drains to escape at ground level. The water filters through a porous material (normally a layer of rock and sand) between layers of geotextile fabric and flows into drains on either side. Wick drains are being used at various high embankment locations on the Ballina bypass to accelerate settlement and avoid the need to constantly top up bridge approaches.

Vacuum Consolidation is suitable for very deep soft soils. Drains are driven vertically into the soil in a similar way to wick drains. Large pumps are connected to the drains which remove the water and air trapped in the soft soils. This accelerates the settlement of the soft soils. This method of soft soil treatment was used at the southern embankment of the Emigrant creek bridge. The embankment at this location has settled over 6m.

The project team's innovative approach to the treatment of soft soils had a significant impact on the duration of the project, reducing it from a projected 13 years to just four years.

Construction commenced in June 2008, and at the peak of works, there were over 300 workers on site and over 100 pieces of large plant. In 2010 Approval was obtained for the project's scope of works to be extended by 500m to the north of the project, to facilitate a safer connection with the approved Tintenbar to Ewingsdale upgrade in the future.

The first stage from Cumbalum to Ross Lane was opened on 1 March 2011. In May 2011, the Gateway Roundabout at the Teven Road Interchange was officially opened, this roundabout features artwork and landscaping designed by Indigenous custodians of the area. The second stage of the Ballina Bypass, the section from the Teven Road to Cumbalum interchange will be open by the end of 2011. The remainder of works will be completed in early 2012.

The project focus has not only been on removing Pacific Highway traffic from within Ballina, but on improving the safety of the entire route between Tintenbar and the Bruxner Highway entrance. In the past, southbound traffic entering the Pacific Highway from the Bruxner Highway was required to turn across the single northbound lane of the Pacific Highway. The at-grade right hand turn movement has now been removed, and traffic will enter the southbound Pacific Highway lanes via the Teven Road interchange.

At the interchange, a longer bridge over the interchange was designed to reduce the height of the embankment in an area of deep soft soils, allowing faster construction.

The alliance refined the concept design to further improve safety and constructability. The Bruxner Highway and Pacific Highway traffic between the Bruxner Highway and Teven Road was separated to improve traffic safety and flow, with additional property acquired.

The Ballina Bypass Alliance won the 'Best workplace health and safety management system - Private sector' award at the 6th annual Safe Work Australia Award. This represents a great achievement for the project, and is a tribute to the dedication to safe work practices of everyone working on the site.

An independent environmental management representative was appointed to the project, to monitor construction works and check for compliance with the conditions set by the Minister for Planning. The project team also includes numerous experienced and dedicated environmental professionals who developed and implement the project's environmental management plans.

All construction activities on the site are subject to audit and inspection by the Department of Planning (DoP), the Department of Environment, Climate Change and Water (DECCW) and Department of Industry and Investment.

At the end of the project, the section of the road over the floodplain has been designed to settle in a controlled manner over an extended period of time during its operation. During the first 12 months, various pavement interventions are planned to ensure the pavement remains smooth and above the design flood level. The final surface layer of asphalt will then be laid at a thickness of 50 to 100 mm. The road will continue to settle at a reduced rate with further interventions required at about 5 to 10 year intervals.

Extensive community consultation was carried out before and during the project. This included regular public information sessions, updates on progress through local media and the RTA website, and tours of newly completed sections of the bypass.

As a team, the RTA and its alliance partners have demonstrated best practice on every front, and are delivering a result which will make a massive difference to both residents of and travellers through Ballina and the surrounding area.

BALLINA BYPASS ALLIANCE
PO Box 303 Ballina NSW 2478
f. 02 8339 9348
e. community.enquiries@ballina.incite.com.au

EXCELLENT EYES FOR CRITICAL DATA

Prosurv were one of the first sub contractors on site at the Ballina Bypass project, contributing their expertise to the detail survey of the project so that detailed design could progress, and collaborating on the extensive geotechnical investigations. Their data was crucial for this project, as the site soil conditions made it one of the most challenging highway upgrades undertaken to date.

Using the latest GPS survey equipment, Prosurv applied their high standards of performance and teamwork to the task, efficiently delivering accurate data to the project team. During the three years of construction, Prosurv provided surveying assistance for structure setout, earthworks, settlement monitoring, drainage, services and dynamic replacement technology.

"Prosurv has enjoyed working with RTA and Leighton Contractors on the Ballina Bypass Alliance immensely. During our involvement we have maintained a high standard of business relationships which can only create opportunities for the future," said Prosurv Founder and Director, John Modystach.

"The alliance themselves deserve a big congratulations for creating an environment and culture which allowed contractors such as ourselves to be included in a lot of training and functions that we would not usually be involved with."

Using the latest software and survey equipment including Global Positioning Systems (GPS), total station and machine control survey technology, Prosurv offers complete Land and Engineering surveying solutions for civil projects. Other recent successes include Gateway Upgrade, Gatton Correctional Precinct, Logan Motorway Alliance, M2 Upgrade, Oxley Highway Upgrade, Tully Alliance and Alstonville Bypass.

Their capabilities include digital terrain modelling; survey management; survey control and support; Detail surveys; and As built surveys for projects across New South Wales and Queensland. The company is also a one stop GPS machine control provider for Machine guidance design files; GPS Site setup and support; Hire of equipment; and data services for all types of GPS machine guidance systems including Topcon, Trimble, APS, Georog and Leica.

PROSURV Pty Ltd
t. 1300 596 100
f. 1300 378 880
e. john.m@prosurv.com.au
www.prosurv.com.au

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GO ANYWHERE EXCAVATION EXPERTISE

Having excavators which can handle any terrain has proved an advantage both for Ken Wright Excavations and for their clients. For Leighton Contractors, having two of Ken Wright's rubber tired excavators working on the Ballina Bypass project enabled them to more effectively complete work in certain areas.

"The rubber tyres have an advantage on road projects for areas where they can't run tracked machines, such as concrete areas. The rubber tired machines are cleaner, they don't make a mess, they are also more mobile and don't need a float to move from one end of the project to the other," said Company Director, Ken Wright.

"The mobility of the machine lets the operator go anywhere – in six months one of our operators did a total of 1,000kms up and down the site on the Ballina project."

All of Ken Wrights' operators have a minimum of ten years experience in earthworks, and have worked across major projects for contractors including Abigroup, Leighton, Thiess and TrackStar.

For Thiess, Ken Wright Excavations provided men and machines for the 12km of new road to the new mine site at Dysart; they have worked for Abigroup at Banora Point; for seven months and at Beerwah for the Thiess/QR Alliance.

KEN WRIGHT EXCAVATIONS
Director: Ken Wright
t. 07 5597 0339
m. 0402 141 008
e. kaoruwright@optusnet.com.au

Ken Wright Excavations has three machines, ranging from 14T to 20T, with adjustable booms to allow the company to undertake both bulk and detailed excavation work. All the rubber tyre excavators are fitted with tilt hitches, so every bit of equipment can access tight, challenging areas for finishing works. Ken Wright has many decades of experience in the earthmoving business, and is a qualified diesel fitter and mechanic, which ensures impeccable equipment maintenance.

"All of our equipment is new. Our 20T and 17T are not quite a year old, and the 14T purchased in 2008 has been built specifically to mine specifications, and has safety equipment which meets coal mine specifications," said Ken.

Ken Wrights' equipment is also available to projects on a dry hire basis, offering major projects in both Queensland and New South Wales a reliable, adaptable option for time-critical earthworks, no matter how muddy, dusty, sensitive or isolated the terrain.

Ballina Bypass, NSW

ANOTHER CIVIL JOB WELL DONE

Hungry's Tipper takes a straight forward approach to getting work done safely and reliably – communication is the keyword. One of Hungry's three trucks and an operator was working on the Ballina Bypass project for eight months, carting dirt and soil and placing the concrete for paving works.

"Weather was the major challenge, and with the batch plant for the concrete located at Alstonville, and carting loads up to Teven, we were working the length of the project," said Hungry's Owner and Operator, Chris Carter.

"You've got to know what you are about. Our approach is to get in and do the job to the best of our ability. I ask a lot of questions at the outset so I have a complete picture of the project requirements. Because I do the maintenance myself, there were no breakdowns, and when someone wanted a truck, it was there. Safety is also a real focus for me, being clear about what can or can't be done safely."

All of Hungry's trucks are Kenworth L700s, 8-wheelers with share axles and 27.5 tonne rating. Having finished the bulk of works on Ballina, two of his trucks are now working on the Tarcutta Bypass for Leighton Contractors. Other projects Hungry's have worked on include the M7, Brunswick Heads section and Bonville section of the Pacific Highway upgrade for AbiGroup, and Pacific Highway at Buladehlah.

Hungry's Tipper Pty Ltd
Owner: Chris Carter
Phone (mobile) 0403 644 523

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