



## SPIRIT OF COLLABORATION ENSURES DRY CREEK RAIL DEPOT IS TRACKING WELL

It is only a matter of months before railcar maintenance and engineering moves from an existing depot along Adelaide's North Terrace to a new location at Dry Creek in the city's northern suburbs.

The State Government ordered the old facility be demolished to make way for the New Royal Adelaide Hospital. The Department for Transport, Energy and Infrastructure (DTEI) is overseeing the development of a new railcar depot at Dry Creek and, working closely with Managing Contractor Baulderstone, this \$157 million facility is due to be completed in December.

"Dry Creek was selected as the site for the new depot because of its optimum location," says DTEI Project Director Glyn Edwards. "It connects efficiently with existing rail operations, it can house a large heavy engineering depot and the facility will have minimal impact on the surrounding environment."

The depot is located near the Dry Creek railway station and is southeast of the Adelaide to Gawler rail line. Churchill Road North and Railway Terrace also lie to the south east while Stock Road forms the northern

boundary. The entire 10 hectare precinct is bounded by 3.5kms of perimeter fencing.

The new depot complements the State Government's \$2.6 billion rail program upgrade which will transform the public transport network into a vibrant, state-of-the-art, sustainable system providing faster, cleaner, more frequent and more efficient services to the public.

DTEI signed the Managing Contractor agreement with Baulderstone in December 2008 to relocate the precinct from North Terrace to Dry Creek. Baulderstone established the site in April 2009 and has overseen the construction of eight major buildings, a network of eight kilometres of track within the depot and further connections to the Adelaide to Gawler line along with extensive civil works required of a depot of this size.

Baulderstone General Manager Michael Harper says the project has required close collaboration between DTEI personnel and his team. "This project has many complex elements and it was important for everyone to work side by side, from Glyn and Chris Plumb (Baulderstone's Manager, Engineering) through to trade contractors

and designers including SKM and Grieve Gillett." A new signalling system to facilitate exit and entry to the depot and safe passage of through-trains running between Adelaide and Gawler is also required.

Seven kilometres of the depot trackwork is ballasted and one and half kilometres is slabtrack or assemblies on elevated steel columns inside workshop buildings. Railway systems around Australia have contrasted from state to state since before Federation utilising either broad or standard gauge track. The turnouts installed in the depot will cater for any future changes in gauge and can be converted from broad to standard gauge.

When commissioned, the Dry Creek Railcar Depot will have the capacity to stable up to 70 railcars. There is an automated railcar washing facility, an interior cleaning platform and a roof and bogie wash building. The maintenance facility is set on an 8000 square metre section of the site and houses railcar workshops, pits and training lifting machinery. Refuelling and eco-friendly waste disposal facilities have also been installed on the site.

The team recognised that an important aspect of the overall design of the depot was that ecological consideration and opportunities be as

environmentally sustainable as possible. For example, the City of Salisbury's recycled water and aquifer storage will provide much of the site's water, including for the washing of trains and watering of landscaped areas.

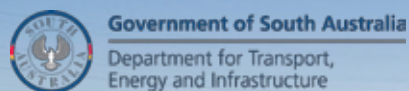
One of the high-tech features of the Dry Creek facility is the installation of a safe working system. In all, five buildings will be interconnected through dedicated systems designed to protect people working there. This will keep them safe from moving trains, maintenance equipment and high voltage.

The system will prevent the movement of trains and other hazards where a predetermined risk may be present. Administration offices are attached and there is a new purpose-built base for operations personnel. In addition to the buildings and trackwork, the whole site has been drained landscaped and lit for night-time security.

Baulderstone has a long history in major civil engineering and building projects. This experience has contributed to the successful construction of a key piece of infrastructure in the upgrade of South Australia's public transport system.

**MANAGING CONTRACTOR :** Baulderstone (SA)  
**DEVELOPER/CLIENT :** Department for Transport, Energy & Infrastructure  
**PROJECT MANAGER :** Neill Dunlop  
**COMPLETION :** December 2010  
**PROJECT END VALUE :** \$157 Million

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# DRY CREEK RAILCAR DEPOT





# TRANSFIELD ON TRACK AT DRY CREEK

**T**ransfield Services Ltd is an Australian-based service provider that undertakes a wide range of state-of-the-art services for a diverse range of clients across the world.

The Company was originally part of the Transfield Group, which began in 1956 as Transfield Holdings. Founding Chairman Dr. Franco Belgiorno-Nettis (1915 – 2006) fostered a culture based on the highest standards of health and safety, commitment to integrity and motivating employees to strive for excellence.

The strength of the business is founded on industry know-how, geographic diversity and the strength and quality of client relationships. This strong foundation combined with the value delivered by its people and a continually improving safety record, puts Transfield Services in an enviable position for future growth.

Transfield Services' Rail Division is a key contractor in TransAdelaide's Rail Car Depot relocation from North Terrace

to Dry Creek on the main Adelaide to Gawler rail corridor. They were awarded the contract in October 2009 following which a Project Manager a Project Coordinator, Graduate Engineers, skilled operators and experienced trackworkers were assigned. The planning phase is well behind them now and Transfield teams are currently completing the installation of trackwork and initiating the commissioning of the facility. The construction phase is (at the time of writing), on schedule to meet the commencement of the first stage of commissioning on the 14th August 2010. Final commissioning and handback to DTEI is planned for mid September 2010.

Transfield Services are installing the track and sidings for the entire project. Within the scope of work in the contract, they have manufactured 21 of the total 37 turnouts, (these are unique as they are gauge convertible from broad to standard gauge). Seven kilometres of the trackwork is ballasted and 300 metres is slabtrack. 600 metres of rail is elevated on steel columns inside the workshop buildings.

The complexity of the work and the site's location has presented challenges. In particular, where tasks needed to be undertaken in confined areas, collaboration between multi-disciplined contractors and TSL was essential. So the TSL team were mindful of the importance of sharing limited work space while ensuring that critical milestones were achieved for the duration of the project. These access limitations also heightened awareness that exemplary OHS standards were essential. During construction, while keeping to strict tight schedules, there have been no LTIs, to date. As is standard practice in TSL, a pro-active approach was taken to the longer term issues that would ensure a permanent safe-working environment.

From experience gained on earlier DTEI projects, such as the Adelaide Yard re-timbering, the Port Adelaide Viaduct Upgrade and Panel contract works, best practices and good working relationships have ensured smooth progress. Regular and accurate reporting to stakeholders avoided any potential element of surprise. Transfield Rail's project management office worked with the whole Dry

Creek delivery team to implement a new process for reporting and controlling project finances and tracking progress of the project as a whole. The system supports the link between estimates and scheduling, providing predictive information for greater efficiency.

In the wider picture, Transfield Services Rail Division continues to extend existing maintenance contracts and win new construction works with long term clients. Currently, Australia-wide, the rail division provides services for more than 4,700 kilometres of track and other civil infrastructure assets. The company has experience working in Alliances, Joint Ventures and Partnerships and over the years has variously undertaken work as principle contractor or sub-contractor.

Set by their founder in 1956, the safety of Transfield Services people is a core value. They strive to achieve the objective of 'no injuries to anyone, anytime', and plan to continue to develop their ethics and compliance culture to meet the challenges of the increasing world-wide diversity of the business.

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# LEED ENGINEERING AND CONSTRUCTION - IN FRONT WITH MICRO-TUNNELING TECHNOLOGY



Leed Engineering and Construction have been involved in recent South Australian projects like the Adelaide Desalination Plant, the Glenelg to Adelaide Recycled Water Pipeline and construction of a pipeline to replace the existing Torrens Aqueduct in Hope Valley. A project almost at commissioning stage is the Dry Creek Railcar Depot relocation.

Leed's Project Manager was co-opted in the Dry Creek design phase by Baulderstone, the main contractor, to assist with further development of the original plan. This was useful due to relevant experience Leed had recently had on a previous job, working with some of the same stakeholders.

Over the past seven months, Leed has been delivering works involving the construction of four micro-tunnel bores of 1.0m diameter, for the installation of 4 runs of outfall storm water pipe. These will carry flows from the new railcar depot directly into the Salisbury Wetlands.

Leed had previously undertaken drills under Greenhill Road and the rail lines at Keswick next to the Anzac Highway, as part of the Glenelg to

Adelaide Pipeline project. This shot was 164m with no interruption or speed restrictions applied to rail operations or to Greenhill Road. Much of what was learned on this project was subsequently applied at Dry Creek.

The Dry Creek project involved four micro tunnel bores run parallel with a separation of 1.5m. They lie under approximately 1.5m of cover. All bores were constructed to design gradients with final works completed to a tolerance of 10mm. The micro tunnel works were carried out underneath 6 active rail lines. One of these lines carries the mighty Ghan into and out of Adelaide. Due to the proximity of operations to the rail line and associated safety issues, a 960mm steel pipe was launched immediately behind the drill head to negate any possibility of tunnel collapse which might otherwise cause damage or delay to the rail network.

Each tunnel extended 134metres and was installed as one continuous bore with the steel pipe being installed no more than 0.5m behind the drill head. This was the first project completed in South Australia to employ a micro tunnel extraction with direct jacking of steel casing pipe completed simultaneously.

Due to the need to drill on a positive grade, it was necessary to base the drilling operations within the Salisbury Wetlands. Issues of ground water discharge meant that all water had to be passed through a purpose-built weir box to catch the sediment. High ground water levels and possible collapsible soils meant that the drill plant needed to be positioned within a large excavated area 13m x 13m, the whole of which needed to be sheet piled with well-point dewatering around the perimeter.

Once the continuous bore had been completed, a 750mm glass-reinforced sleeve was pushed through the steel pipe to carry future storm water flows.

As part of the of the storm-water drainage design, Leed constructed 700 metres of 2400 x 900 box culvert including in-situ concrete junction pits linking the new box culvert to the 4 runs of the micro-tunnel. One junction pit 9m x 3m had to be pre-cast and craned into position due to the close proximity of active rail lines. This work was completed over a two day period and had to be undertaken between scheduled rail movements.

The micro-tunnel plant and crew were deployed out of the Victorian branch of Leed, and the pipe-laying and civil construction crew were drawn from the South Australian branch. As a result of experience gained at Keswick and at Dry Creek, the Leed team now has expertise that can offer micro-tunneling as an option to upgrade large diameter underground infrastructure without disruption to surface traffic.

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## SAFETY-WISE RAIL DEPOT AUTOMATION



**S**AGE Automation is well on schedule installing a safe working system at the Dry Creek Railcar Depot in Adelaide.

Their role has been to design and install a state of the art safety system for the rail-traffic areas of the site. In all, five buildings will be interconnected through several dedicated systems.

The systems are designed to protect people working there, keeping them safe from moving trains, maintenance equipment and high voltage. The systems will also protect assets like cranes, doors, gedi jacks, derailleurs and train lifters by disallowing trains from moving where a pre-determined risk may be present.

SAGE has a long list of unique safety systems design and build projects behind them, such as the Sydney Harbour Bridge maintenance gantry which travels under the main deck of the structure. Tunnel safety systems by SAGE have been installed in Adelaide's Heysen Tunnel, and the Tugan Tunnel in Queensland. Their contracted part of the work at Dry Creek, has to be delivered in a tight window, so SAGE has allocated 5 Engineers and 14 other experienced project staff to get the job done.

SAGE is the only Australian Company accredited by the Control Systems Integration Association. (CSIA) This body sets the worldwide benchmark for excellence in the field. So integration is a key concept that SAGE applies to its projects. They constantly watch worldwide for new hardware and software elements, that can be integrated into whole systems. These have to meet the high standards required for their uniquely designed, automated control systems. For example, Allen Bradley Programmable Guardlogix Controllers made by Rockwell Automation are central to the Dry Creek safety system.

SAGE was founded in 1994 by current Managing Director Andrew Downs. The company has grown quickly having been recognised for excellence in their niche area of expertise. They have achieved a fifty million dollar annual turnover in just 16 years, having 250 employees and a national presence with seven offices around Australia.

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## TURNOUTS, SWITCHES, POINTS AND CROSSINGS



**V**AE Railway Systems Pty Ltd (Australia) were commissioned to provide turnouts and associated high technology rail-line devices for the 11 kms of trackwork specified for Adelaide's new Dry Creek Railcar Depot.

With origins in 1955 as a family foundry business, in 1990 the company became part of the world-wide VAE Group. With their Head Office in Austria, the Group now has more than 40 manufacturing locations and subsidiaries in 18 countries worldwide. They specialise in the intricacy of railway trackwork but on a broad scale of applications from international high speed main lines, high axle-load mining corridors and suburban systems, to sugar-train and other light-rail networks. Every third turnout worldwide is supplied by the VAE Group.

'Turnouts' are often called 'points', 'switches' or 'crossings'... devices which facilitate a train's transfer from one track to another. VAE's expertise in the application and manufacture of these elements in railcar/track transfers is leading edge. They have supplied the key elements to equip the new depot with safe and easy to manage track crossing systems, that are 'key' to the operation of any modern railcar handling facility.

VAERS assigned 20 skilled engineers and other personnel to the Dry Creek Railcar Depot project. They have made a particular contribution in the provision of a new type of turnout which has not previously been used in South Australia. Each turnout will have hi-tech 'Spherolocks' attached. These special locking systems automatically lock the turnout in the safe position for the next train scheduled to change tracks at that place.

The design of the 'Spherolock' guarantees that no lock-releasing forces can occur due to uncontrolled movements of the switch or the point of the crossing. Spherical lock and hydraulic setting systems reduce maintenance costs as they are completely encapsulated and have no outside movable parts which would otherwise require regular lubrication.

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## SIGNALLING A NEW ERA IN ADELAIDE RAIL MOVEMENTS

Work has begun on the biggest upgrade in the Adelaide rail network's history. A section of the main Adelaide/Gawler line, will be closed for 13 weeks to facilitate the major upgrade.

Boulderstone (the main contractor), has commissioned O'Donnell Griffin's South Australian branch to undertake installation, testing and commissioning of the new signalling system for the Dry Creek Railcar Depot Relocation Project. During the main line closure, O'Donnell Griffin will install new signalling to facilitate three safe exit and entry points to the depot. An Invensys Westrace Computer Based Interlocking System will control main line signalling prior to the turnouts. It will interface with two additional Westrace interlockings controlling the rail network within the depot as well as at existing Central Train Control located next to the Adelaide railway station.

To indicate the scope of the depot layout, O'Donnell Griffin will install thirty-five motorised point units, fourteen Derailer/Crowders, ten hand operated point mechanisms, forty new elevated shunt signals and around eighty DC Track circuits. On the Main Line, the introduction of two new crossovers, an additional passing loop and three depot entrance/exit points calls for the addition of ten new point machines,

twenty new and/or altered signals and amendments to the existing TI track circuits. All of the many daily railcar movements that will take place when the depot is fully operational, will have been made safe and efficient with systems commissioned by O'Donnell Griffin.

O'Donnell Griffin has been at the forefront of many major signalling upgrades carried out around Australia over the past 25 years and has built a reputation as one of the leading technology independent specialist contractors within the rail industry. The company has developed an excellent reputation for delivering high quality project outcomes. With innovative construction, thorough test and commissioning teams, focused engineering and disciplined project management, culminating in project delivery, O'Donnell Griffin continually exceeds project requirements and expectations.

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