DOLRE GOES FROM STRENGTH TO STRENGTH

DOLRE
LOW STRESS PARAPET SYSTEM

Building on the success of the first Australian DOLRE installation in 2022, the revolutionary DOLRE Low Stress Parapet System continues to go from strength to strength in Australia, with three additional installations in Tasmania and New South Wales, as well as a number of other projects currently underway around the country.

Together with life-saving impact protection and attractive aesthetics, another major factor in the success of the DOLRE bridge barrier both in Australia and internationally is its ground-breaking 'low stress' design which restricts the outward transverse force transmitted to the bridge deck during a vehicular impact to a fraction of the bridge deck's capacity.

DOLRE's patented post 'fuse' system, together with its innovative post and rail design enables DOLRE Regular bridge traffic barriers to deliver AS5100 'Regular' (US MASH TL4) protection, while at the same time, limiting the maximum outward transverse force to only 43 kN/post (22 kN/metre), which equates to only 14% of the allowable ultimate load under AS5100-2017.

What this means in practical terms, is that DOLRE can be installed along most bridges without the need for expensive deck strengthening works or additional reinforcement.

In the two most recent Tasmanian installations, DOLRE barriers replaced old-style steel post and rail barriers with direct connections to concrete kerbs along each of the outer edges of the bridge decks.

UPGRADING BRIDGE SAFETY TO MEET CURRENT STANDARDS

While the combination of increased traffic flows, greater vehicle loads and the rapidly-changing vehicle mix undoubtedly presents a significant challenge for many of Australia's aging bridge assets, bridge remediation is not only about load-carrying capacity. It's also about ensuring that the bridges are safe to use and comply with the current Australian Bridge Standards and safety guidelines.

Even though many road bridges - particularly those in rural, remote and urban interface areas - are now carrying vehicle numbers well in excess of their original intended design, not all older bridges are at the end of their useful design life.

Put simply, for many bridges across Australia, it's not so much a matter of upgrading structural capacity, but rather one of upgrading safety.

That said, providing upgraded AS5100-compliant bridge traffic barrier protection along an ageing bridge deck is far more complex than simply 'swapping out' an existing barrier for a newer model with greater structural capacity to cater for faster, larger and/or heavier vehicles. Indeed, when it comes to providing Standards-compliant traffic barrier protection along ageing bridge assets, one of the most common challenges is that the bridge deck lacks the structural capacity to accommodate the transfer of impact energy from higher-capacity traffic barriers.

When a bridge traffic barrier is impacted, the energy transfer is not limited to the barrier alone - it also flows through to the bridge deck and the overall bridge structure. If the amount of impact energy transferred exceeds the capacity of the bridge deck, it not only increases the risk of the barrier failing, it can also pose a significant risk to the structural integrity of both the deck and the bridge as a whole.

COST-EFFECTIVE SOLUTION FOR BRIDGE SAFETY UPGRADES

The innovative DOLRE Low Stress Parapet System is ideal for bridge refurbishment projects. DOLRE offers a cost-effective and easy-to-install method of upgrading safety along bridges that still have residual life in the bridge deck but need upgrading to meet the current Australian Bridge Standards.

Specifically engineered to minimise the risk of damage to the bridge deck and structure during a vehicular impact, DOLRE bridge traffic barriers can play a significant role in extending the serviceable life of many existing bridges - delivering AS5100 and AS3845 compliant protection without the requirement for bridge deck strengthening works.

Crash tested and certified to EU EN1317 (with additional digital model validation and verification to EN16303-2020) and simulated to US MASH-2016 and AS5100-2017 requirements using validated FEA (Finite Element Analysis) modelling, the DOLRE Low Stress Parapet system has been assessed, approved and recommended for acceptance throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel).

DOLRE is available in 'Low', 'Regular' and 'Medium' performance levels in accordance with the requirements of Australian Bridge Design Standard AS5100:2017.

LATEST TASMANIAN DOLRE INSTALLATIONS

Tasmania's most recent DOLRE bridge traffic barrier installations are located on two bridges along the Murchison Highway (A10) near Guildford in the state's north-west.

Stretching some 147 kilometres between Somerset near Burnie in the north and Zeehan in the south, the Murchison Highway runs along the western edge of the World Heritage-listed Cradle Mountain-Lake St Clair National Park, traversing some of Tasmania's most pristine wilderness areas. As well as providing access to the region's national parks and wilderness areas, the Murchison Highway also forms the primary north-south freight and transport route for Tasmania's West Coast and North-West – providing a critical link for industry, tourists and locals alike.

While the region's economy has diversified from its initial post-European settlement focus on mining and forestry in the mid-1800s, both industries still play a significant role, together with agriculture, manufacturing and, most significantly, eco-tourism. Indeed, Lake Mackintosh, Cradle Mountain and the Granite Tor Conservation Area, together with the numerous surrounding regional and forest reserves, attract tens of thousands of campers, hikers and fly-fishing enthusiasts from across Australia and around the world each year.

Not surprisingly, steadily increasing traffic flows - including a significant percentage of heavy vehicle traffic - are placing a significant strain on the ageing bridge infrastructure along the Murchison Highway.

With that in mind, the Tasmanian Department of State Growth is carrying out a series of bridge strengthening and remediation projects to increase the load-carrying capacity and improve safety on a number of key bridges across the region.

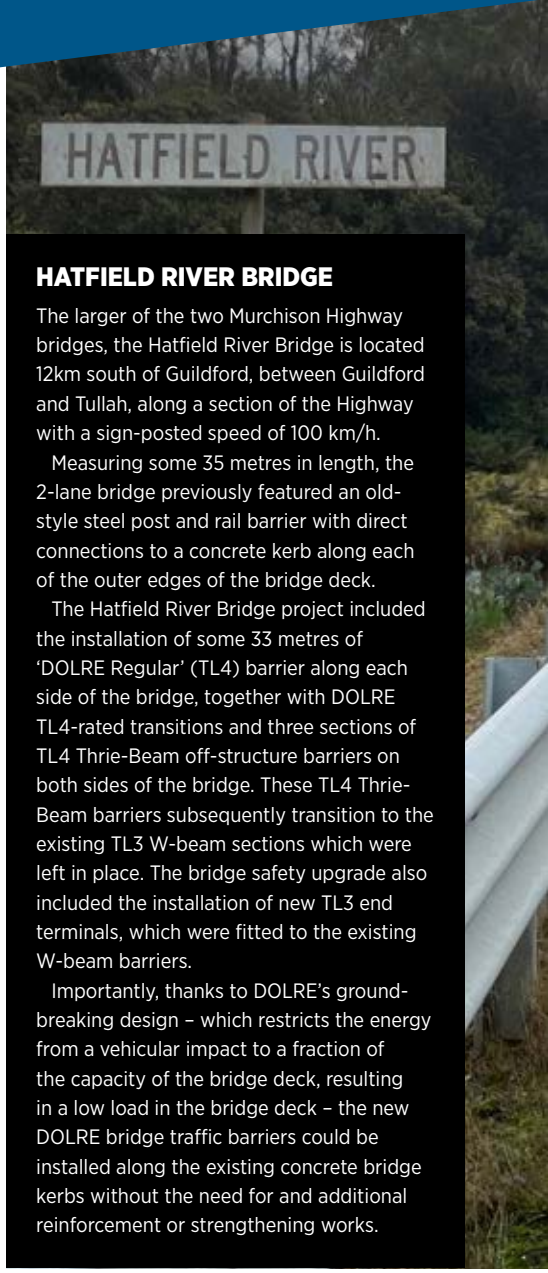
Two of the bridge remediation projects along the Murchison Highway – the Hatfield River Bridge and the Animal Creek Bridge – also included the installation of DOLRE 'Regular' (TL4) bridge traffic barriers and DOLRE TL4 transitions along both sides of the bridge.

The installation works were carried out by Tasmanian civil infrastructure specialists BridgePro Engineering Pty Ltd. Speaking about the DOLRE installations, John Nel, Project Manager with BridgePro Engineering, said they were very pleased with the installation process and the finished barriers.

"Having worked with the DOLRE barrier system previously on the Ringarooma Bridge in early 2022, we were familiar with the installation process and requirements," he said.

"Prior to the installations, we worked with the team from LB Australia who were able to standardise the sizing of the DOLRE components for the two sites, which helped to further streamline the installation process."

"All in all, everything went as planned with both the Animal Creek and Hatfield River Bridge installations, and we're very happy with the finished barriers," John Nel added.



HATFIELD RIVER BRIDGE

The larger of the two Murchison Highway bridges, the Hatfield River Bridge is located 12km south of Guildford, between Guildford and Tullah, along a section of the Highway with a sign-posted speed of 100 km/h.

Measuring some 35 metres in length, the 2-lane bridge previously featured an old-style steel post and rail barrier with direct connections to a concrete kerb along each of the outer edges of the bridge deck.

The Hatfield River Bridge project included the installation of some 33 metres of 'DOLRE Regular' (TL4) barrier along each side of the bridge, together with DOLRE TL4-rated transitions and three sections of TL4 Thrie-Beam off-structure barriers on both sides of the bridge. These TL4 Thrie-Beam barriers subsequently transition to the existing TL3 W-beam sections which were left in place. The bridge safety upgrade also included the installation of new TL3 end terminals, which were fitted to the existing W-beam barriers.

Importantly, thanks to DOLRE's ground-breaking design – which restricts the energy from a vehicular impact to a fraction of the capacity of the bridge deck, resulting in a low load in the bridge deck – the new DOLRE bridge traffic barriers could be installed along the existing concrete bridge kerbs without the need for and additional reinforcement or strengthening works.

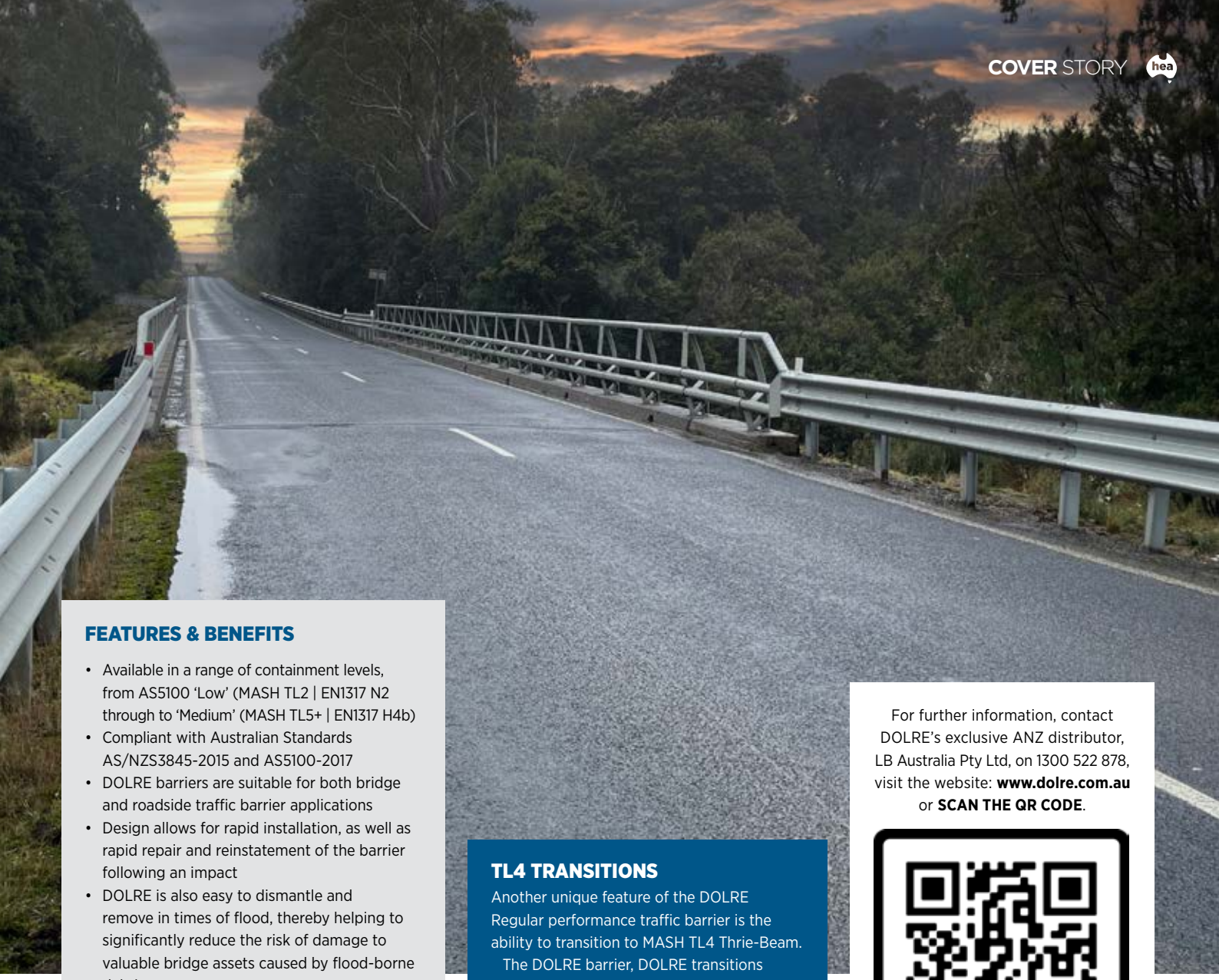
ANIMAL CREEK BRIDGE

The second of the two most recent Tasmanian DOLRE installations took place along the Animal Creek Bridge, which is located a further 14 kilometres south of the Hatfield River Bridge along the Murchison Highway. As with the Hatfield River Bridge, the 2-lane Animal Creek Bridge is also located along a section of the Highway with a sign-posted speed of 100 km/h. It too previously featured an old-style steel post and rail barrier with direct connections to a concrete kerb along each of the outer edges of the bridge deck.

For the Animal Creek Bridge, the team from BridgePro installed some 13.5 metres of 'DOLRE Regular' (TL4) barrier along each side of the bridge, together with a further 60 metres of off-structure barriers along each side of the road on both sides of the bridge.

The off-structure barriers include DOLRE's purpose-designed TL4-rated transitions, which connect the DOLRE barrier to a section of TL4 Thrie-Beam barrier. These TL4 Thrie-Beam barriers subsequently transition to TL3 W-beams with TL3 end terminals.

Together with the obvious benefit of improved safety for road users and reduced risk of damage to the bridge deck during an impact, another major benefit of the DOLRE design is the speed and ease with which it can be installed. This was highlighted during the Animal Creek Bridge installation, which was completed in just one week - including removal of the original steel post and rail barriers and the installation of the new DOLRE barriers, transitions and off-structure barriers.



FEATURES & BENEFITS

- Available in a range of containment levels, from AS5100 'Low' (MASH TL2 | EN1317 N2 through to 'Medium' (MASH TL5+ | EN1317 H4b)
- Compliant with Australian Standards AS/NZS3845-2015 and AS5100-2017
- DOLRE barriers are suitable for both bridge and roadside traffic barrier applications
- Design allows for rapid installation, as well as rapid repair and reinstatement of the barrier following an impact
- DOLRE is also easy to dismantle and remove in times of flood, thereby helping to significantly reduce the risk of damage to valuable bridge assets caused by flood-borne debris.
- Transitions at each end of a DOLRE barrier are engineered to provide a continuity of protection level and full longitudinal load transfer between the bridge traffic barrier and connecting roadside barriers
- Aesthetically pleasing design - also available with an extensive range of optional fascia designs and integrated lighting options
- One post design per system type, suitable for both sides of the bridge
- The post design (including the patented 'fuse') allows the post to yield in an outward transverse direction and fully deform - minimising load transfer to the deck while ensuring that maximum energy is absorbed or transferred along the rails
- DOLRE posts are designed to yield in multiple characteristic steps
- All DOLRE systems feature three rails - two rails for the initial vehicle impact and one rail to resist roll-over
- All rails are cylindrical sections with wall thicknesses and diameters to suit the specified design loads
- All rails manufactured in Europe in standard lengths of 6, 2 or 1.5 metres and carry CE Mark quality certification.

TL4 TRANSITIONS

Another unique feature of the DOLRE Regular performance traffic barrier is the ability to transition to MASH TL4 Thrie-Beam.

The DOLRE barrier, DOLRE transitions and the Thrie-Beams create a continuum of MASH TL4 protection for road users onto and across the bridge structure. Thus, there is an engineered continuity of MASH TL4 protection on either side of the DOLRE Regular traffic barrier.

For further information, contact DOLRE's exclusive ANZ distributor, LB Australia Pty Ltd, on 1300 522 878, visit the website: **www.dolre.com.au** or **SCAN THE QR CODE**.