Rural Bridge Systems

stahlton
ENGINEERED CONCRETE
A division of Fulton Hogan Ltd

Product brochure

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Description & features

We offer economic rural bridge systems to suit various spans, loadings and site conditions, and to provide a durable, robust and easy to construct bridging solution. Our Flat Slab or Double Tee deck units connect to abutments and piers that can be precast concrete, cast in-situ or pre-existing to suit your situation. Large pre-finished unit size results in very fast construction times.

Our bridge elements are manufactured to length in moulds which give a smooth finish to the underside and light broom finish providing grip for vehicles or an asphalt layer if required.

- The bridge deck units do not require temporary propping or works and once in place provide an immediate working platform.
- Using pre-finished units minimises the need for ready-mix concrete to be delivered to remote sites and maximises quality assurance at the production facility.
- Using high strength concrete that is accelerated cured allows traffic to use the bridge just a few days after manufacture.
- Pre-stressed concrete bridges are well proven to survive the test of time in the harshest of environments when constructed to modern standards with appropriate quality assurance.
- Our bridge systems can be designed and constructed as a package solution using shallow or deep foundations, or the components supplied for you to install.

Durability

Our standard Stahlton Double Tee, Flat Slab bridge deck units and precast abutment units meet exposure classifications A2, B1, & B2 as per table 3.6 of NZS3101:Part 1:2006 for a 50 year life. Through in-house specific design we can cater for harsh marine environments and tropical conditions to give our clients bridge elements that will provide a 100 year life.

Loadings

Stahlton Double tee, Flat Slab Rural Bridge deck units and precast abutment units are designed to meet the traffic loading criteria described in the *New Zealand Transport Agency Bridge Manual (SP/M/022) third edition 2013.*

Our design applies HN-HO-72 and HN loadings in accordance with section 3. Where appropriate we can apply appendix D for 'lightly trafficked rural bridges' if your bridge is a one lane bridge that has:

1. A traffic count less than 100 vehicles per day
2. A road that cannot become a through route
3. An alignment is such that speeds are generally below 70km/hr
4. The route is unlikely to be used by logging trucks, and
5. No significant overloads are expected to occur or the bridge can be bypassed.

We do not expect there to be an asphalt layer applied in 85% of HN rural bridge cases and we make allowance for the weight of a light handrail or barrier. For the HN-HO loaded bridges we allow 1.75kPa for asphalt surfacing.

Design scope

Stahlton engineering design and the provision of certification and documentation is applied to the substructure and superstructure elements manufactured. Specific assessment is required for each site to appropriately determine the required foundations, approach and scour protection (if across waterways).

Rural bridge systems

Typical span arrangements

625 or 650 Double Tee rural bridge deck – 2 off			
Environment	**5kPa Footbridge** Up to 2.4m unit width	**85% of HN** Up to 2.2m unit width	**HN-HO** 1.8m unit width
External 125 thick flange	Max span 17.5m	Max span 14.0m	Max span 10.7m
Marine 150 thick flange	Max span 14.8m	Max span 12.5m	Max span 10.0m

425 or 450 Double Tee rural bridge deck – 2 off			
Environment	**5kPa Footbridge** Up to 2.4m unit width	**85% of HN** Up to 2.2m unit width	**HN-HO** 1.8m unit width
External 125 thick flange	Max span 12.5m	Max span 9.0m	Max span 7.3m
Marine 150 thick flange	Max span 10.0m	Max span 8.7m	Max span 7.2m

300 Flat Slab rural bridge deck – 3 off, 1.145m wide units			
Environment	**5kPa Footbridge**	**85% of HN**	**HN-HO**
External	Max span 12.0m	Max span 8.5m	Max span 7.2m
Marine	Max span 11.0m	Max span 8.0m	Max span 6.7m

200 Flat Slab rural bridge deck – 3 off, 1.200m or 2000m wide units			
Environment	**5kPa Footbridge**	**85% of HN**	**HN-HO**
External	Max span 8.0m	Max span 5.0m	Max span 4.0m
Marine	Max span 8.0m	Max span 4.8m	Max span 3.7m

End seating & connections

Stahlton Double Tee and Flat Slab rural bridge deck units require a minimum of 150mm of seating on abutments or piers. A construction tolerance of 15mm is typically considered. Stahlton recommend the bridge deck units are seated on a 20mm thick, 150mm wide, 200mm long neoprene rubber bearing pads to allow for in-service deflections.

Double Tee deck units are tied to abutments using M24 bolts through web penetrations connected to a plate with a slotted hole cast into the abutment or pier cap.

Flat Slab deck units use cast-in sleeves at the unit ends that are aligned with dowel bars cast in the supporting abutment or pier. The sleeves are filled with cementitous, shrinkage compensated grout on site to complete the tie.

Stahlton's deck slab units have connecting pockets and bars cast-in that are later filled on site using a shrinkage compensated grout when the tie units are in place. We also cast-in inserts for bolting a handrail or guardrail of your preference, which we can confirm with you during the design phase. Refer to the details shown in the gallery of this brochure for some examples.

Exposed steel hardware for these connections is generally hot dipped galvanised. In a marine environment the hardware may need to be stainless steel or appropriately treated with an alternative corrosion protection system.

Topping & propping

Our standard rural bridge options do not require topping concrete slabs or propping during construction. We can design deck systems utilising topping slabs and propping on request.

Camber

Stahlton rural bridge deck units will arrive at site with some positive camber or hog. The amount of hog will depend on a number of factors, including amount of prestress, how long the units have been manufactured and exposed to the elements, and the length of the unit. We provide camber estimates during the design process.

We consider long term shrinkage and creep effects, and will provide estimates of the long term camber during design.

Handling & storage

Stahlton rural bridge deck units are usually designed to be lifted at the ends. Stahlton rural bridge abutment and pier elements are usually lifted at one fifth of their length from each end. Swiftlift type cast-in lifting anchors specifically designed are detailed on our shop drawings.

If the units are stored on site they will need to be dunnaged near the lifting eyes. If stacking the units dunnage blocks need to be aligned on top of each other so as to not induce large point loads on the units below. Care needs to be taken as to the suitability of the ground and dunnage block to resist the weight of the units stored on top.

Double Tee bridges

Unit/element	Weight
625/650mm deep, 2.2/1.8m wide Stahlton Double Tee rural bridge deck	1.25 tonnes per lineal metre
425/450mm deep, 2.2/1.8m wide Stahlton Double Tee rural bridge deck	1.05 tonnes per lineal metre
Double Tee rural bridge abutment or pier	1.60 tonnes per lineal metre

Flatslab bridges

Unit/element	Weight
300mm thick, 1.145m wide Stahlton Flat Slab rural bridge deck	0.85 tonnes per lineal metre
200mm thick, 1.200m or 2.000m wide Stahlton Flat Slab rural bridge deck	0.6 or 1.0 tonnes per lineal metre
Flat Slab rural bridge abutment or pier	0.95 tonnes per lineal metre

Highway guardrails on a Double Tee bridge

Double Tee bridge gallery

Timber handrails

Steel handrails

Architectural handrails

Double Tee bridge gallery

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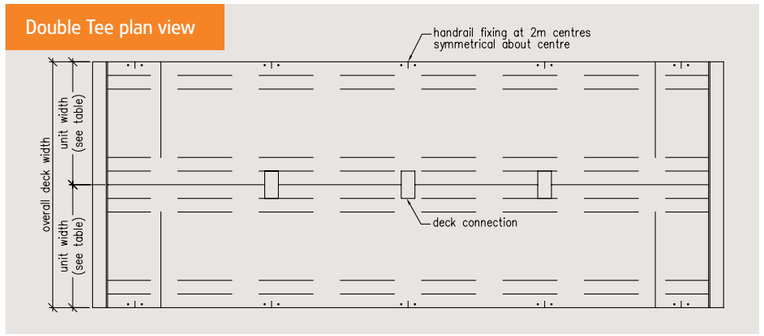
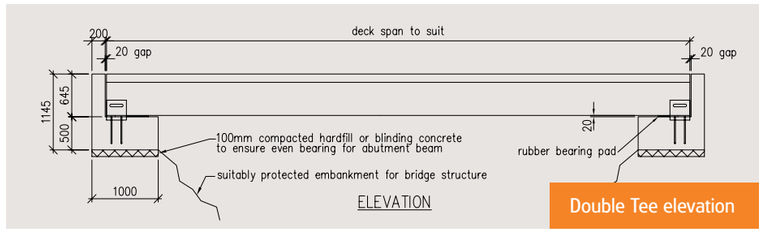
Double Tee deck unit on precast abutment

Shear keys

Double Tee plan view

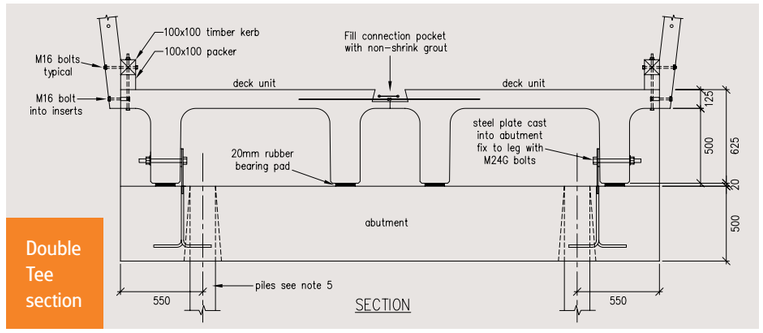


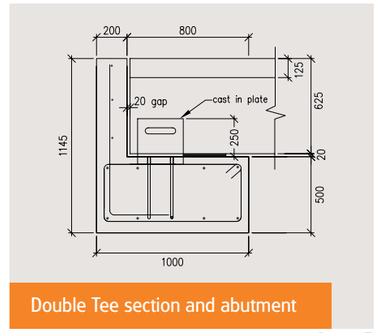


Double Tee elevation

Unit stacking for storage

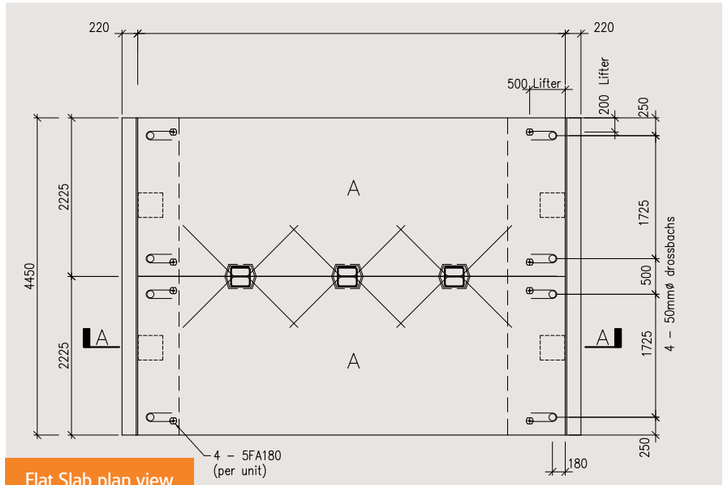
Double Tee section



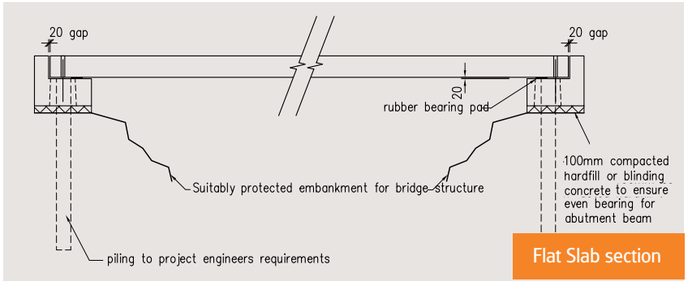


Double Tee section and abutment

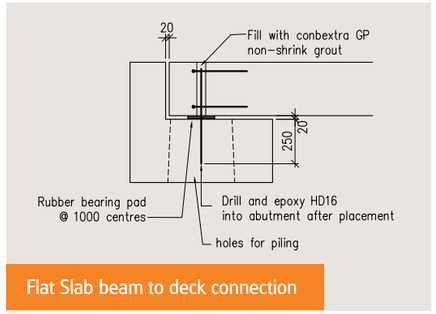
Flatslab bridge gallery



Flat Slab plan view



Flat Slab section



Flat Slab beam to deck connection

Flat Slab on precast abutment

Flat Slab on precast abutment

Flatslab bridge gallery

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Units stacked for storage

Flatslab mould

Easy construction

Pivot irrigator bridges

Description & features

We offer economic Pivot Irrigator Bridge Systems manufactured from our Stahlton Hollowcore product to suit various spans. The 1.2m wide Stahlton Hollowcore units land each end on a minimum of 500mm of even solid ground bearing.

Stahlton Hollowcore is manufactured to length in moulds which give a smooth finish to the underside and light broom finish providing grip for vehicles.

Max unit length (m)	Unit depth (mm)	Handling weight (kg/m)
8.5	200	330
14.5	300	450
19.5	400	575

Durability

Our standard Stahlton Hollowcore bridge deck units and precast abutment units meet exposure classifications A2, B1, & B2 as per table 3.6 of NZS3101:Part 1:2006 for a 50 year life.

Loadings

Our design allows for 3.5 tonne pivot loading evenly distributed by 2 wheels at 3m spacing plus a distributed live load of 1kPa. Load factors applied are 1.2G & 1.5Q. Propping and topping concrete is not required. Stahlton Hollowcore units are not designed with stirrups to support heavy vehicle loadings as our Rural Farm Bridges are.

Handling

Stahlton Hollowcore is designed to be lifted at the ends. Wire mesh sling or specially designed scissor clamps can be used to lift the units. The strops should be placed no more than 1m in from the ends of the unit. All lifting gear should be checked for any wear or damage regularly as concrete elements can be abrasive.

Storage

Stahlton Hollowcore units if stored on site need to be dunnaged near the lifting points (maximum 300mm from the end of the unit). The dunnage blocks need to be aligned on top of each other so as to not induce large point loads on the units below. Care needs to be taken as to the suitability of the ground the units are stored on.

Irrigator bridge

Customised bridges

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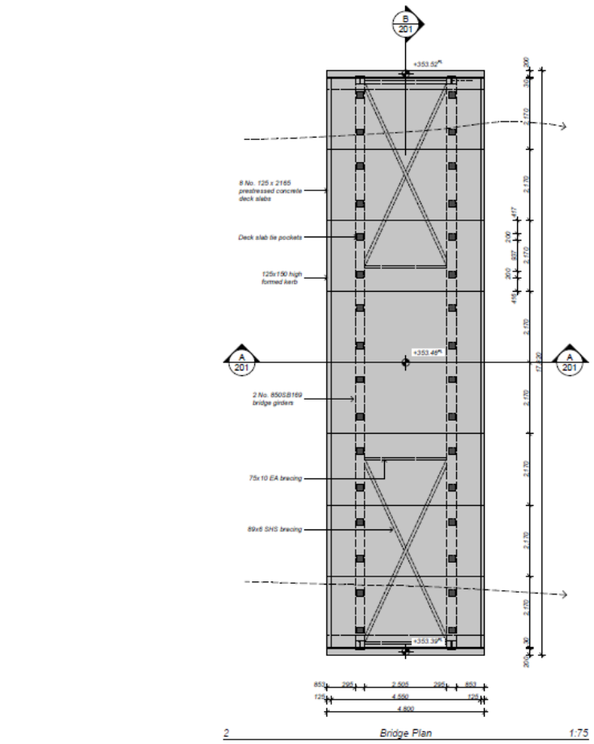
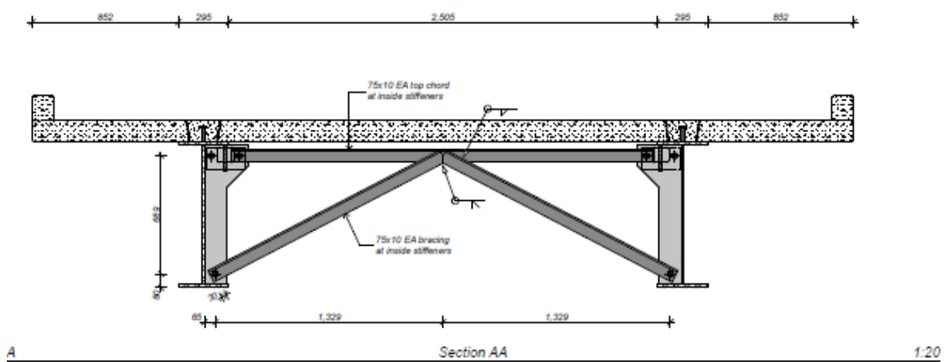
Contact us

In addition to the standard bridge beam units in this brochure, Stahlton's experienced qualified Engineers can design special bridge deck units to meet your specific needs. For example; varying depths of the Standard Stahlton Double-tee and Flatslab bridge beams, using Stahlton Rib & in-fill as well as pre-stressed concrete slabs fixed to steel beams like below.





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