BUNDABERG LEVEE

EPW00390 – Heritage Impact Assessment – Saltwater Creek Rail Bridge (30034151-RPT-13.0-001) – Revision 0

May 2024

SMEC

AUSTRALIAN HERITAGE SPECIALISTS

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Contents

List of Tables

List of Figures

1. Introduction

1.1 Background

Australian Heritage Specialists (AHS) have been commissioned by SMEC to prepare a Heritage Impact Statement (HIS) for the Ministerial Infrastructure Designation (MID) application of the proposed Bundaberg East Levee (the Project). The proposed levee alignment is located on local and state-controlled roads which are used by vehicles, cyclists, and pedestrians and the levee and its operations will need to consider the function of roads, road reserves, and their ongoing use.

Further, the proposed levee is located adjacent to the Saltwater Creek Railway Bridge (hereafter referred to as 'the Bridge') which is entered onto the Queensland Heritage Register (QHR: 600370, Appendix A) and protected under the provisions of the *Queensland Heritage Act 1992*.

A Pre-lodgement advice has been provided by the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) regarding heritage matters relevant to the proposed levee and the MID application (Appendix B). This advice confirms that the MID is exempt from any assessable development requirements triggered by planning legislation, however building works under the *Building Act 1975* (and associated Operational Works), also remain assessable under the *Queensland Heritage Act 1992* (QHA), where on a Queensland Heritage Place.

This HIS report has been prepared in accordance with the DSDILGP advice and also the principals outlined in the *Burra Charter,* the *Queensland Heritage Act (QHA) and* the *Guideline: Statement Development Assessment Provisions* (SDAP) to achieve compliance with *State Code 14: Queensland Heritage* with respect to development on a State Heritage Place.

1.2 Study Area

The Study Area (Figure 1) encompasses:

Table 1: Study Area (AHS 2024).

Item	Description
Address	Quay Street, Bundaberg
Local Government Area	Bundaberg Regional Council
Description	Saltwater Creek Railway Bridge
Heritage Status	State Heritage Place (QHR: 600370)
Property Description	Road Reserve / Waterway

Please see over page for Figure 1.

Figure 1: Study Area for the Bundaberg Levee (AHS, QGIS 2024).

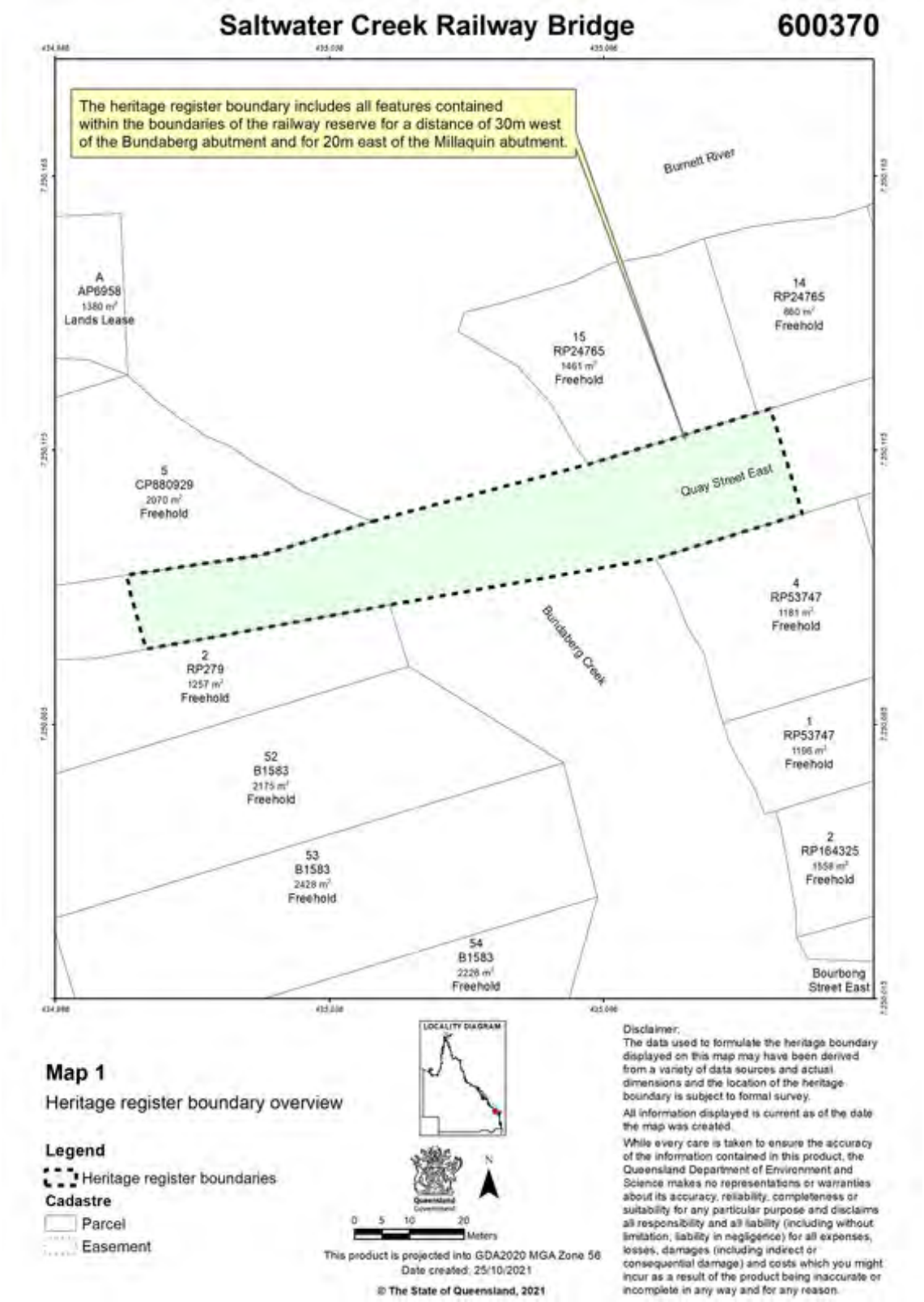


Figure 2: QHR boundary for Saltwater Creek Railway Bridge (DESI 2021).

1.3 Report Structure

The management of cultural heritage values in any site requires specialist care, attention, and consultation. This HIS therefore describes:

- What is significant about the place (Chapter 2).
- Description of the proposed works and why it is required (Chapter 3).
- Heritage Impact Statement, including management measures to be implemented (Chapter 4).

1.4 Existing Reports

The following reports have been utilised for the preparation of this report:

- Converge, *Conservation Management Plan: Saltwater Creek Railway Bridge.* Prepared for Bundaberg Regional Council.
- DESI, 2021. Heritage Citation for Saltwater Creek Railway Bridge (Appendix A).
- DSDILGP, 2023. MID Pre-lodgement Advice (Appendix B).
- SMEC, 2024. Saltwater Creek Pump Station and Flood Gate Mechanical Plan Draft (Appendix C).
- SMEC, 2024. Structural Condition Assessment (Appendix D).
- SMEC, 2024. Surface Water Technical Report (Appendix E).

1.5 Dates and Personnel

A site inspection was conducted by Benajmin Gall (AHS, Managing Director) and Julia Redshaw (AHS, Heritage Consultant) on the 2 April 2024. This HIS report was prepared by Julia Redshaw, Samantha Stephens (AHS, Heritage Consultant), and Benjamin Gall in May 2024.

1.6 Glossary of Terms

Table 2: Glossary of Terms (AHS 2024).

Abbreviation	Definition
AHS	Australian Heritage Specialists Pty Ltd
BRC	Bundaberg Regional Council
The Bridge	Saltwater Creek Railway Bridge
Burra Charter	ICOMOS Australian Burra Charter for the Conservation of Heritage Places
CMP	Conservation Management Plan
DESI	Department of Environment, Science, and Innovation
DSDILGP	Department of State Development, Infrastructure, Local Government, and Planning
EC	Exemption Certificate
HIS	Heritage Impact Statement **[this report]**
ICOMOS	International Council on Monuments and Sites
MID	Ministerial Infrastructure Designation
QHA	*Queensland Heritage Act 1992*
QHR	Queensland Heritage Register
SDAP	Guideline: State Development Assessment Provisions (Code 14: Queensland heritage)

2. Review of Significance

2.1 Historical Background

The following is a brief historical overview of the Saltwater Creek Railway Bridge, extracted verbatim (italicised) from the CMP (Converge 2022) for the place. This section is not intended to be a detailed history of the place but provides relevant information for the management of the site's heritage significance.

2.1.1 Brief Overview

The Saltwater Creek Railway Bridge (formerly the Millaquin Railway Bridge) in Bundaberg was constructed in 1894 to facilitate the Millaquin Branch Line. It is the second oldest extant bridge with screw piles in Queensland (QHR: 600370).

2.1.2 Early Development of Bundaberg

Bundaberg was established in the late 1860s. The Burnett River was identified by John Charles Burnett (after which it was named) during his exploration of the Wide Bay and Burnett regions in 1847. Pastoral stations were established throughout the Wide Bay and Burnett in the late 1840s through to the 1860s, including stations such as Gin Gin, Walla, Bingera, Electra, Monduran and Tantitha. The stations were initially stocked with sheep, but progressively were replaced with cattle. When prices were low, or there was an oversupply of stock (particularly in the 1860s), the cattle were rendered to produce tallow. A boiling down works was established in Baffle Creek to render the stock from the stations. John and Gavin Steuart secured a contract to provide the works with timber for tallow casks. The Steuarts established a camp in North Bundaberg in 1866 and erected a sawmill in the following year. Interest in the settlement grew rapidly and a town was surveyed on the southern bank of the Burnett River in 1868 on the site of the present day city.

Timber was the industry that acted as a catalyst for the creation of a European settlement. However, it was sugar that came to define the history of Bundaberg and the surrounding region. Sugar cane was planted in the 1870s and the first commercial sugar mill, located at Millbank (west of the city on the southern bank of the Burnett), began operating in 1872. The industry was thriving by the 1880s, with major mills such as Millaquin, Bingera and Fairymead processing cane juice from cane plantations and farms throughout the region, particularly in land formerly occupied by the Woongarra, Bingera and Gooburrum scrubs. From its early years, the industry relied on South Sea Islander labour (referred to as 'Kanakas' at the time). The importance of Bundaberg was further strengthened when it became the port for the Mount Perry copper mine, with a railway from Mount Perry to North Bundaberg constructed in 1884 (although a rudimentary road existed from the early 1870s). A rum distillery was established at Millaquin sugar mill in 1888, later known as the Bundaberg Rum Distillery. Bundaberg also developed a foundry and engineering industry to support the sugar and juice mills, and the copper mines at Mount Perry. The first local government, the Bundaberg Divisional Board, was gazetted in 1880.

The importance of Bundaberg was further strengthened when it became the port for the Mount Perry copper mine, with a railway from Mount Perry to North Bundaberg constructed in 1884. Calls for the railway were made as early as 1872; the mine had recently opened, but there was only a rudimentary road connecting the mine to Bundaberg. Fierce competition emerged between Bundaberg and Maryborough – well-established as a port by this time – to secure the railway. Bundaberg was ultimately successful, but ironically the output of the copper mine declined almost as soon as the railway was completed. The beginning of the railway was located in North Bundaberg. The location of the station was in proximity to the site of the Steuart's first camp in the district in 1866.

Bundaberg was connected to the North Coast railway line in 1888. The North Coast railway had been steadily constructed from the late 1870s, first linking Gympie with Maryborough, and then extending to the coal town of Howard. The line continued north throughout the 1880s, linking with (South) Bundaberg in 1888. The station was originally known as 'South Bundaberg Station', but was called 'Bundaberg Railway Station' from 1892. A rail bridge across the Burnett River was opened in 1890, allowing the North Coast line to continue north, connecting with Rosedale in 1892 (and prompting the development of settlements along its length, for example Avondale, and contributing indirectly to the continued economic success of major sugar mills such as Fairymead). Later, a branch line was also constructed from the line to the Millaquin sugar mill, running along Quay Street, with a rail bridge constructed across Saltwater Creek.

2.1.3 Saltwater Creek Railway Bridge

From the 1880s, calls were made for a railway connection from Bundaberg to the Woongarra district. A survey was undertaken in the late 1880s, and the resulting proposal for a public line, which was to include the Millaquin branch line section, went before Parliament in 1889, however the plan was shelved. Robert Cran, the owner of the Millaquin Sugar Mill, saw the benefit of a connection of the mill with the main railway line and proposed to pay for the construction of a branch line himself. For example, prior to the construction of the Millaquin branch line, coal from the Burrum Coal field was transported via rail to the town wharves and transhipped from here to the Millaquin refinery (Kerr, 1996, p45).

As the branch line was to cross Saltwater Creek, plans were prepared by Queensland Railways for a railway bridge consisting of a central plate girder span supported on cast iron cylinder piers with screw piles, with timber girder spans supported on timber trestle piers on both approaches.

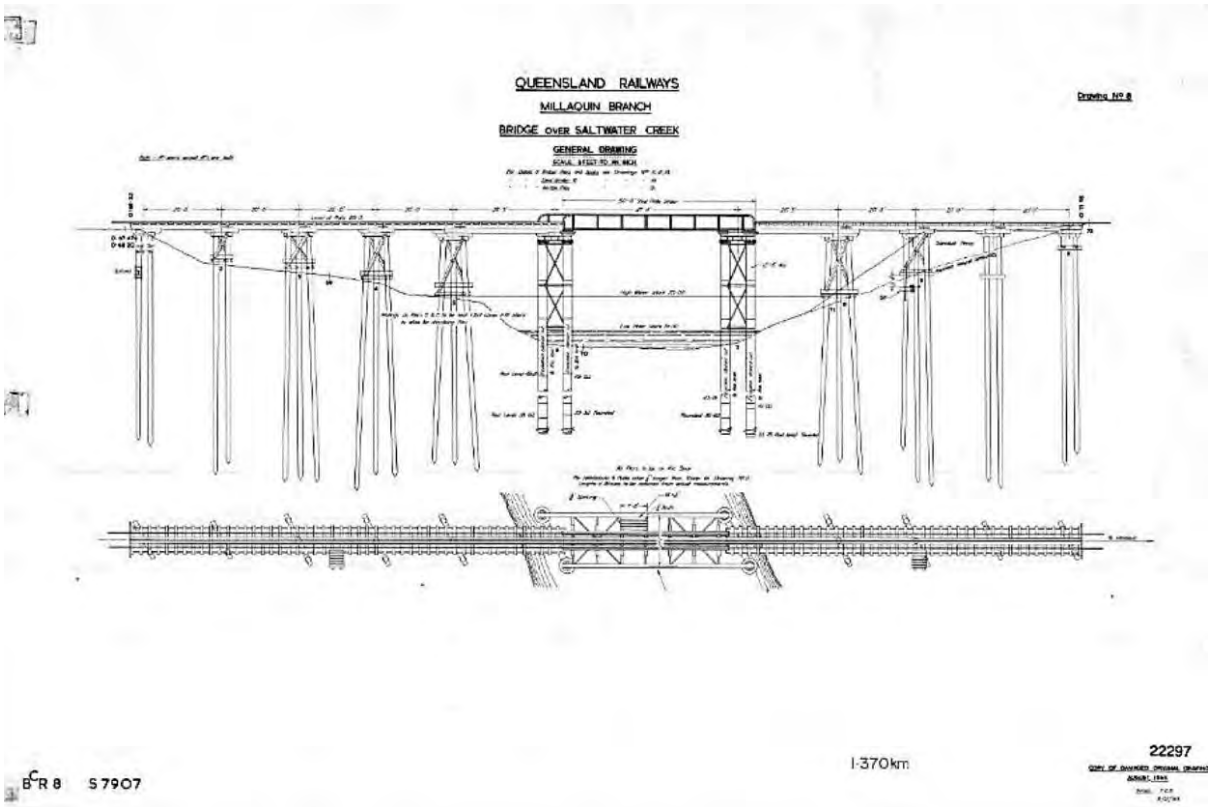


Figure 3: Drawing of the Saltwater Creek Railway Bridge (Converge 2022).

Work on the Millaquin Branch Line started in January 1894 with the cutting for the wharf branch line with the removal of 5000 yards of earth. It was expected that around 100 men would be employed including those engaged in cutting sleepers. Walkers Limited supplied the ironwork for the bridge across the Saltwater Creek (Bundaberg Mail and Burnett Advertiser, 19th January 1894, p2).

Mr Stanley, Chief Engineer for Railways, visited the construction works in April 1894 (Bundaberg Mail and Burnett Advertiser, 18th April 1894, p2), and the line was opened for traffic on the 9th of July of that year (DES 2016).

In September 1898, the modification of the Millaquin Railway Bridge to allow for foot traffic was discussed by the Kennedy Bridge Board. However, due to the heavy rail traffic on the Millaquin Branch railway line, the Secretary Railway Commissioner did not grant permission to use the bridge for foot traffic. (Bundaberg Mail and Burnett Advertiser, 14th September 1898, p2).

2.1.4 Recent History

In 1965 plans were prepared for strengthening the Saltwater Creek Railway Bridge with steel girders suitable for a 12 ton axle loading. This was subsequently undertaken with re-used girders from the Gold Coast. (DES 2016).

The exact date when the bridge ceased to be used for rail traffic, and ownership was transferred to the Department of Transport and Main Roads, is not known, however one source describes the bridge as being 'in use' in 1988 (Register of the National Estate (archived) citation, Place ID#15960).

Figure 4: Saltwater Creek Railway Bridge, date unknown (Converge 2022).

In 2007, ownership of the bridge was transferred from the Department of Transport and Main Roads to Bundaberg Regional Council. In the same year, remedial work was scheduled for the bridge structure and the former railway bridge was converted into a combined cycleway/pathway.

At this time, necessary repairs were carried out to the structure including demolition of existing\ retaining walls on both abutments and rebuilt in masonry, construction of masonry headwall to the back of both abutments, addition of anti-splitting bands on selected elements, replacement of corroded wale bracing on Pier#5, and cleaning and lanolin treatment of all timber elements where required.

2.2 Historic Aerial Imagery

The earliest available aerial imagery is from 1956 (Figure 5), in which the bridge has been operational for 62 years. No significant changes are visible across the aerial imagery until 2008, after the Bridge has been converted to a cycleway/pathway. No significant changes are visible up to the most recent aerial imagery (2023)

Figure 5: 1956 imagery of the Bridge (Google, 2022).

Figure 6: 2006 imagery of the Bridge, just prior to its conversion (Google Ea 2022)

Figure 7: 2008 imagery of the Bridge (Google Earth Pro 2024).

Figure 8: 2023 imagery of the Bridge (Google Earth Pro 2024).

2.3 Physical Description

The following physical description is extracted verbatim from the CMP (Converge 2022) of the place and confirmed during the site inspection.

2.3.1 Saltwater Creek Railway Bridge

The Bridge includes one 50-foot (15m) plate girder span with steel cross girders and longitudinally seven 20-foot (6.1m), and two 26-foot (7.9m) timber spans. The spans are supported on seven timber piers, two cast iron concrete cylinder piers, and two concrete abutments. The Bridge comprises of:

- *4x1x2 20-foot (6.1 m) timber longitudinal, concrete abutment, typical braced timber trestles, (two on timber foundations) (Piers# 1 to 5).*
- *1x2x2 26-foot (7.9 m) timber longitudinal, common braced timber trestle on a concrete foundation (pier 5), typical cast iron cylinders with screw piles11 (Pier# 6).*
- *1x2 50-foot (15 m) half-through plate girders with steel cross girders, steel longitudinal, typical cast iron cylinder piers with screw piles (Piers# 6 and 7).*
- *1x2x2 26-foot (7.9 m) timber longitudinal, typical cast iron cylinders with screw piles (Pier#7), common braced timber trestle (pier 8).*
- *3x1x2 20-foot (6.1 m) timber longitudinal, concrete abutment, typical braced timber trestles (Piers# 8 to 11).*

There are two timber platforms situated on the upstream side, one at Span#5 and the second at Span#9.

During previous works, a large number of timber elements were replaced with like-for-like material.

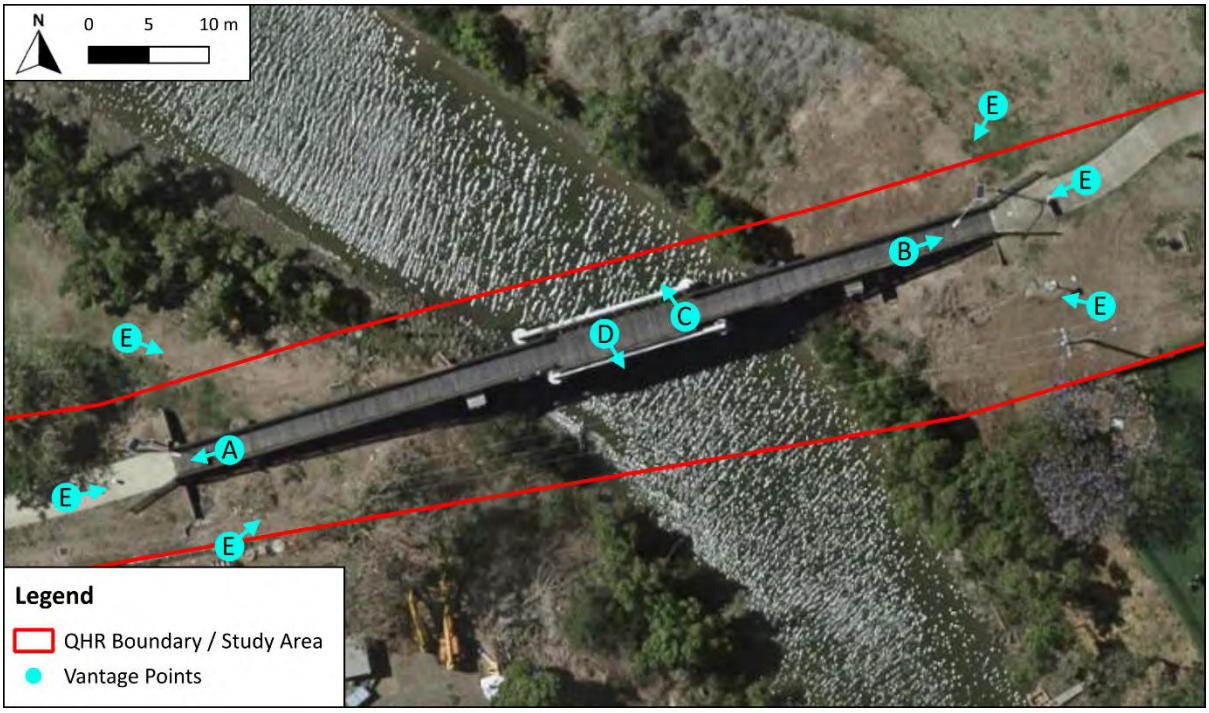


Figure 9: Vantage points & key viewsheds for the Saltwater Creek Railway Bridge (AHS, QGIS 2024).

2.3.2 Cycleway/Pathway

The combined walk and cycle path consists of composite fibre mesh decking laid on top of the railway section of the Bridge with [replaced] *sleepers and tracks remaining in situ. The path widens at the central steel girder span section of the Bridge.*

Handrails are fitted either side of the path comprising vertical metal fence panels set in timber boards at the top and bottom and finished with a timber board at the top. The handrails are continued at either side of the path and both approaches to the Bridge with three-rail timber fences.

2.3.3 Viewsheds

The Saltwater Creek Railway Bridge holds an impressive overall aesthetic, based upon a concentration of key views and vistas. These incorporate both the built elements such as the Bridge itself and views to the Kennedy Bridge, and natural elements such as the Burnett River. The primary viewsheds, including their associated vantage points are outlined below:

Table 3: Primary Viewsheds and Vantage Points (AHS 2024).

Vantage Point	Viewshed
A – Quay Street West	Viewshed of the western side of Quay Street, being the site of the former Millaquin Branch Line.
B – Quay Street East	Viewshed of the eastern side of Quay Street, being the site of the former Millaquin Branch Line.
C – Burnett River	Viewshed of the Burnett River from the Bridge.
D – Kennedy Bridge	Viewshed of the Kennedy Bridge from the Bridge.
E – Saltwater Creek Railway Bridge	Various viewsheds of the Bridge itself.

Figure 10: Vantage point A, facing west to Quay Street (AHS 2024).

Figure 11: Vantage point B, facing east to Quay Street (AHS 2024).

Figure 12: Example Vantage point E, looking northwest (AHS 2024).

Figure 13: Vantage point D, facing south to Kennedy Bridge (AHS 2024).

2.4 Significance of the Place

The Saltwater Creek Railway Bridge is an important State Heritage Registered Place (QHR: 600370). According to the Queensland Heritage Act 1992, a place is entered onto the QHR if it satisfies one or more of the following criteria:

Table 4: Statement of Significance Criteria (DESI 2013).

Criterion for entry onto the Queensland Heritage Register (State significance)	
A	The place is important in demonstrating the evolution or pattern of Queensland's history.
B	The place demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage.
C	The place has potential to yield information that will contribute to an understanding of Queensland's history.
D	The place is important in demonstrating the principal characteristics of a particular class of cultural places.
E	The place is important because of its aesthetic significance.
F	The place is important in demonstrating a high degree of creative or technical achievement at a particular period.
G	The place has a strong or special association with a particular community or cultural group for social, cultural, or spiritual reasons.
H	The place has a special association with the life or work of a particular person, group, or organisation of importance in Queensland's history.

According to the statement of significance the Saltwater Creek Railway Bridge is significant because:

Table 5: Statement of Significance (QHR: 600370).

Cultural Heritage Significance	
Criterion A	A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.
Criterion C	(Criterion under review).
Criterion D	A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.
Criterion F	(Criterion under review).

2.5 Hierarchy of Significant Elements

The Saltwater Creek Railway Bridge is comprised of a number of distinct elements. These elements are generally graded according to the extent that they demonstrate the significance of the place. The hierarchy of significant elements is guided by the following criteria:

Table 6: Criteria for hierarchy of significance (AHS 2024).

Rating	Description
Exceptional	Rare or outstanding element, exhibiting a high degree of intactness or other such quality(s) and is interpretable to a high degree, although alteration or degradation may be evident.
High	Featuring a high degree of original or early fabric or demonstrative of a key part of the place's significance, with a degree of alteration which does not unduly detract from that significance.
Moderate	Altered or modified elements. Elements with some heritage value which contribute to the overall significance of the place.
Low	Difficult or unable to be interpreted, not an important function, subject to high alteration, potentially detracting from the significance of the place.
None	The element does not contribute to or detract from the significance of the place.
Intrusive	Damaging the sites' overall significance, an aspect of the site's significance or significant fabric.

See over the page for hierarchy of significance for elements relevant to the Study Area, summarised from the current CMP for the place (Converge 2022).

Table 7: Hierarchy of significance elements, Saltwater Ck Railway Bridge (Ed., 2022).

Element	Grading	Comments
Setting	High	The setting of the bridge on the former Millaquin Branch Line is still somewhat readable, although the rail infrastructure adjacent to the bridge has been removed and replaced with concrete pathways. The connection with the former Millaquin Sugar Mill, now Bundaberg Sugar Company, can still be made. The banks of the Saltwater Creek appear to be relatively unchanged.
Views	High	The views to and from the bridge are largely intact including to the Kennedy Bridge (QHR: 600367) in the south, the Burnett River in the north, and the views along Quay Street (both directions) being the site of the former Millaquin Branch Line (See figure 9 which outlines vantage points A-E in which key viewshed exist).
Bridge as a whole	Exceptional	The bridge is potentially the oldest railway bridge of its type in Queensland.
Screw piles – Pier #6 and 7	Exceptional	Original elements.
Plate-girders – Span #6	Exceptional	Original elements.
Timber components relating to the original use and extant after replacement works.	High	Timber components include: • Bottom Girder 3 at Span#5 and Span#7. • Corbel 1 at Pier#3, Corbel 1-3 at Pier#4, Corbel 3 at Pier#5 and Pier #8, and Corbel 1 at Pier#9. • All Headstock except Headstock 2 at Pier#3, Headstock 1&2 at Pier#8, Headstock 1 at Pier#9 and Headstock 2 at Pier#10. • All Piers except Piers 2 & 3 at Pier#8. • All Bracing. • Platforms: 2 platforms are in situ and one in storage until steel repair works are completed, the timber decking of all three has been replaced with like-for-like material. Modifications undertaken during the railway operation contribute to the significance of the bridge as part of the ongoing use of the bridge as part of the railway line. Repairs appear to have been undertaken using 'like for like' materials.
Timber components replaced during recent works.	Moderate	A large number of members were replaced with like-for-like fabric. These are: • All girders except Bottom Girder 3, Span#5 and Span#7. • All corbels except Corbel 1 at Pier#3, Corbel 1-3 at Pier#4, Corbel 3 at Pier#5 and Pier#8, and Corbel 1 at Pier#9. • Headstock 2 at Pier#3, Headstock 1&2 at Pier#8, Headstock 1 at Pier#9 and Headstock 2 at Pier#10. • Piers 2 & 3 at Pier#8. The repairs were necessary to extend the life of the bridge.

Element	Grading	Comments
Railway Bars	High	The bars relate to the railway operation of the bridge and any modifications undertaken during the railway operation contribute to the significance of the bridge as part of the continuous use of the railway line. *Note: these were not located during AHS' site inspection.*
Sleepers	Moderate	All sleepers were replaced with like-for-like material during the recent work in Stage 1. The new sleepers were spaced at intervals thus following the original railway set-up. *Note: these are no longer extant.*
Decking	Intrusive	The decking required for the conversion of the bridge for foot/cycle traffic obstructs the readability of the former use of the bridge. The negative impact could be mitigated through interpretation, i.e., providing information on the Millaquin Branch Line.
Handrails	Intrusive	Like the decking, the installation of handrails impacts the readability of the former use of the bridge. The handrails have been fitted to the decking structure thus not impacting the original/early fabric. As above, the negative impact could be mitigated through interpretation at the site.
Vegetation at the creek embankments	Intrusive	The overgrown creek embankments pose a threat to the bridge through increased fire risk and pest infestation. The unkempt appearance also negatively impacts the aesthetic of the place.

3. Project Description

3.1 Reason for Proposed Works

The Queensland Government is progressing plans to reduce flood risk in the Bundaberg Region and improve the safety of the Bundaberg community. The Bundaberg East Levee project forms part of this initiative and has been designed to protect Bundaberg East from flooding. The design includes a flood gate and pump station at the outlets of both Saltwater Creek and the unnamed "Distillery Creek", with the flood gate to be closed during regional flood events to prevent backwater flooding from the Burnett River.

The floodplain shapes means that a relatively short length of levee can be built to enclose and provide protection to more than 600 properties in the CBD and East Bundaberg, with the levee height specified to provide protection from a 1% AEP flood event.

3.2 Scope of Proposed Works

As only a very small portion of the proposed works are occurring within the QHR boundary for the Saltwater Railway Bridge, this section provides a general description of the overall works and finer detail of those works occurring within the QHR boundary for the Bridge.

The overall scope of works includes the construction of a 1.7km category 3 levee on the southern side of the Burnett River. The levee is likely to be a concrete floodwall/levee to be built approximately 300mm above the 100-year ARI design flood elevation.

Associated with the levee are a pump station and flood gate structure to be constructed at the Saltwater Creek crossing. Figure 14 provides a preliminary render of the pump station and flood gates with the Bridge located within the foreground. The proposed works include the establishment of a wall extending from the flood gates. Additionally, Lot 5CP880929 (immediately north of the QHR boundary on the western side of the creek) is proposed to be reconfigured. This reconfiguration divides the lot (Figure 15) for the purpose of maintenance access to the levee. No structures are proposed to be constructed on this lot, and it has no impact to the Bridge or the QHR boundary following Performance Outcomes 5-6 of State Code 14.

Proposed works that are occurring within the QHR boundary for the Bridge include the construction of the wall to the west and also the southern wing wall on the western side of the creek associated with the flood gate (see Figure 15 and Appendix C).

A Structural Condition Assessment of the Bridge and Flood Study of the broader Project were provided by SMEC (Appendices D and E, respectively).

The QHR boundary and the proposed works (Figure 15), shows that no works are proposed to directly impact upon the Bridge fabric. Options were developed by the design team to ensure this outcome.

Figure 14: Render of proposed works, with the Bridge in foreground (SMEC 2024).

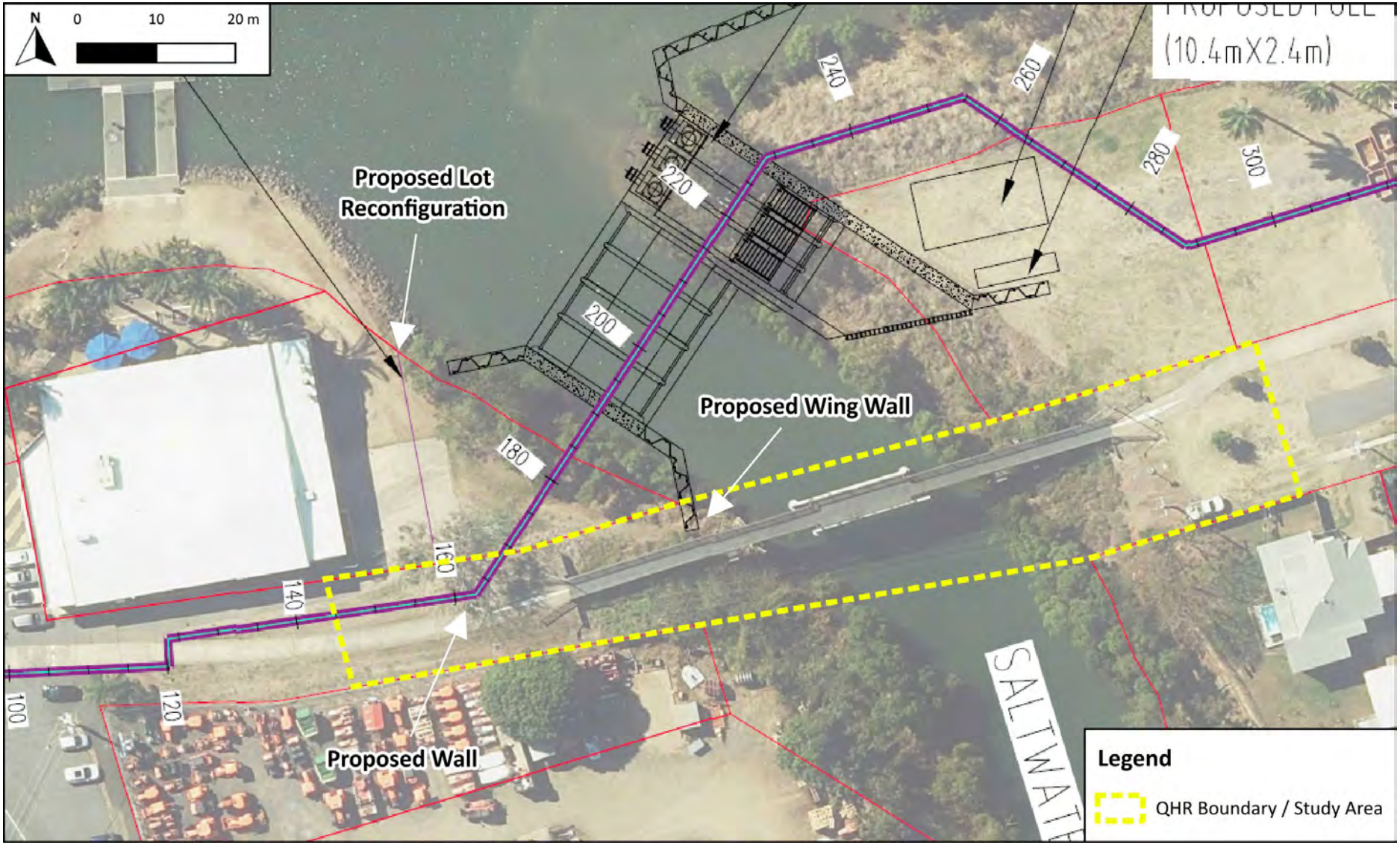


Figure 15: Site plan showing proposed activities and QHR boundary (AHS, QGIS, SMEC 2024).

4. Heritage Impact and Management

4.1 Overall Guidance

The Saltwater Creek Railway Bridge is a State heritage place, listed on the Queensland Heritage Register (QHR) for its significance to Queensland. It was constructed in 1894 to facilitate the Millaquin Branch Line and is the second oldest extant bridge with screw piles in Queensland.

4.1.1 Conservation Approach

The overall approach developed by the Project is in accordance with the information outlined in the previously prepared CMP for the place and the *Burra Charter*. The key conservation principles considered by the project are:

- Places of cultural significance should be conserved for present and future generations.
- A place's significance should be retained whilst allowing for new and adaptive uses where the original is no longer in place.
- Conservation must form part of the place's management framework.
- Respect existing fabric, uses, associations and meanings.
- Fabric may define spaces and views which form part of the significance of the place.
- Visual setting, including views to and from a place, or along a cultural route, contributes to its cultural significance and distinctive character.
- Use qualified and experienced personnel.
- Do as much as necessary but as little as possible.

State Code 14: Queensland Heritage

The purpose of this code is to ensure development on or adjoining a Queensland heritage place conserves its cultural heritage significance for the benefit of the community and future generations.

Specifically, this code seeks to ensure that development on a Queensland heritage place:

- Protects the identified elements of the Queensland heritage place that are of cultural heritage significance by substantially reducing unavoidable impacts.
- Promotes the preservation of identified elements of the Queensland heritage place that are of cultural heritage significance.
- Where practical, restores the identified elements of the Queensland heritage place that are of cultural heritage significance.
- Aligns with the ongoing conservation management of the Queensland heritage place where adaptation is proposed.

This code also seeks to ensure development (including a material change of use) adjoining a Queensland heritage place is considered, to ensure that the proposal:

- Maintains or substantially reduces unavoidable impacts on, the setting and/or streetscape where these form part of the cultural heritage significance of the Queensland heritage place.
- Avoids direct adverse impacts on the cultural heritage significance of the Queensland heritage place.

If it is demonstrated that there is no reasonable alternative to development on a Queensland heritage place and that the proposed activities potentially will destroy or substantially reduce the place's cultural heritage significance, the code requires that the place's significance is interpreted and incorporated as appropriate.

A response to State Code 14 (State Heritage) is provided in the following section (Section 4.2).

4.2 Impact Assessment

Based upon the Project description, this assessment responds directly to the significance of the place, particularly the Hierarchy of Significant Elements outlined in section 2.5. This impact assessment should be read in conjunction with the Proposed Scope of Works (Section 3.2).

The assessment of the degree of impact made by the proposed works utilises (with some minor adaptations) the ICOMOS Guidance on Heritage Impact Assessment for Cultural World Heritage Properties. The guidance provides the following grading system for assessing the magnitude of impact to built heritage and historical landscapes – noting State Code 14, PO4 is generally trigged when a 'Major' impact grading system is reached.

Table 8: *ICOMOS* Guide for Assessing Magnitude of Impact (Built and Landscape).

Impact Grading	Built Heritage	Historic Landscape Attributes	Intangible Cultural Heritage or Associations
Major	Changes to key historic building elements that contribute to the outstanding universal value such that the resource (place) is totally altered. Comprehensive changes to the setting.	Changes to most or all key historic landscape elements, parcels, or propose extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character and loss of outstanding universal value.	Major changes to area that affect the intangible cultural heritage activities or associations or visual links and cultural appreciation.
Moderate	Changes to many key historic building elements, such that the resource is significantly modified. changes to the setting of an historic building, such that it is significantly modified	Change to many key historic landscape elements, parcels, or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.	Considerable changes to area that affect the ICH activities or associations or visual links and cultural appreciation.
Minor	Change to key historic building elements, such that the asset is slightly different. change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels, or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited change to historic landscape character.	changes to area that affect the intangible cultural heritage activities or associations or visual links and cultural appreciation.
Negligible	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels, or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.	Very minor changes to area that affect the intangible cultural heritage activities or associations or visual links and cultural appreciation.
No change / Impact	No change to heritage/historic fabric or setting.	No change to elements, parcels, or components; no visual or audible changes; no changes in amenity or community factors.	No change

Table 9: Impact Assessment on the Saltwater Creek Railway Bridge (AHS 2024).

Element	Grading	Impact Grading	Comments
Setting	High	Moderate	The setting of the bridge on the former Millaquin Branch Line remains somewhat legible, although the rail infrastructure adjacent to the bridge has been removed and replaced with concrete pathways. The connection with the former Millaquin Sugar Mill, now Bundaberg Sugar Company, can still be made. The proposed activities have been assessed and whilst no works are proposed to directly impact upon the Bridge's built fabric, the proposed levee (c.3M in height) will promote a moderate impact to the place's setting within the historic landscape due to the proposed works to the north and north east (but almost entirely outside the QHR Boundary). Other significant aspects of the setting will be maintained however.
Views	High	Moderate	Similarly to the above impacts to the setting, (see also Figure 14), views to the north and north east from the Bridge looking towards the Burnett River Vantage Point C – Figure 9) will receive a major impact by the proposed works, however views south of the bridge are not affected (making an overall moderate impact score) – outlined below: • A – Quay Street West Viewshed of the western side of Quay Street, being the site of the former Millaquin Branch Line is not directly affected. • B – Quay Street East Viewshed of the eastern side of Quay Street, being the site of the former Millaquin Branch Line is not directly affected. • D – Kennedy Bridge Viewshed of the Kennedy Bridge from the Bridge is not directly affected. • E – Saltwater Creek Railway Bridge Various viewsheds of the Bridge itself receive negligible to nil impacts.
Bridge as a whole	Exceptional	No impact	The proposed works will not impact upon the bridge fabric.
Screw piles – Pier #6 & 7	Exceptional	No impact	The proposed works will not impact upon the bridge fabric.
Plate-girders – Span #6	Exceptional	No impact	The proposed works will not impact upon the bridge fabric.
Timber components relating to the original use and extant after replacement works.	High	No impact	The proposed works will not impact upon the bridge fabric.
Timber components replaced during recent works.	Moderate	No impact	The proposed works will not impact upon the bridge fabric.
Railway Bars *(No longer extant)*	High	No impact	The proposed works will not impact upon the bridge fabric. *Note: these were not located during AHS' site inspection.*
Sleepers	Moderate	No impact	The proposed works will not impact upon the bridge fabric.
Decking	Intrusive	No impact	The proposed works will not impact upon the bridge fabric.
Handrails	Intrusive	No impact	The proposed works will not impact upon the bridge fabric.

Element	Grading	Impact Grading	Comments
Vegetation at the creek embankments	Intrusive	No impact	Although some vegetation may be impacted by the proposed works, this vegetation is considered to be intrusive and holds no heritage significance and would actually enhance the heritage values of the Bridge should it be removed, as any overgrown creek embankments post a threat to the Bridge through increased fire risk and pest infestation, and the unkempt appearance negatively impacts the aesthetic of the place.

4.3 State Code 14 Project Outcomes

The below table outlines how the project responds to the performance outcomes outlined in the State Code 14: Queensland Heritage for PO1-4 (Development on a State Heritage Place.

Table 10: Applicable criteria for development on a Queensland heritage place (DES 2023).

Item	Performance Outcomes	Response
1	**Development** minimises adverse impacts on the **cultural heritage significance** of a **Queensland heritage place.**	PO1 is considered by this assessment to have been met, on the following basis: 1. The Saltwater Creek Railway Bridge (the Bridge) will not be directly impacted by the proposed works (See Section 3.2 & 4.2). 2. Options have been developed to minimise adverse impacts on the cultural heritage significance by the design team, following heritage advice. 3. Some levee elements will be directly located within the QHR Boundary, however the majority of these are outside (See Section 3.2). 4. Some (moderate) visual changes will occur to the place's setting within the historic landscape due to the proposed works (almost entirely occurring outside the QHR Boundary), which cause a major impact to viewshed C (Figure 9) from the Bridge looking towards the Burnett River (See Section 3.2 & 4.2). 5. Appropriate management measures have been proposed in Section 4.4, to ensure there are appropriate measures in place to ensure harm caused by the project is minimised, including measures during.
2	**Development** on a **Queensland heritage place** with **identified archaeological potential** manages adverse impacts on **artefacts.**	PO2 is not applicable as the place does not have any reported archaeological values.
3	**Development** employs methods and utilises materials that are compatible with the **conservation** of built and landscape **features** that form part of the **cultural heritage significance** of the **Queensland heritage place.**	PO3 is considered by this assessment to have been met, on the following basis: 1. No elements for the proposed levee directly interact with the Bridge fabric. 2. Materials for the levee are developed in accordance with relevant codes. 3. It was considered inappropriate to mimic early materials and detailing of the Bridge.
4	**Development** proposing to **destroy or substantially reduce** the **cultural heritage significance** of the **Queensland heritage place** must demonstrate that there is **no reasonable alternative** to the **development** that would conserve the **cultural heritage significance** of the **Queensland heritage place. ***	PO4 is not applicable, as the development does not propose to destroy or substantially reduce the cultural heritage significance of the Queensland heritage place. A detailed assessment of potential impacts resulting by the proposed activities is outlined in Section 4.2

4.4 Management Measures

While the preliminary design for the level does not propose a direct impact upon the Bridge itself, moderate impacts upon the views and setting have been identified, mostly due to adjoining development.

A staged approach is recommended to be undertaken for the future design development phases therefore, which includes management measures that will adequately address such impacts, including further development of flood (hydrology) and vibration studies, which have not yet been completed. Operational works are occurring within the QHR boundary and care should be taken to avoid impacts on elements of significance during construction also by way of a (construction) Heritage Management Plan, ensuring continued advice from heritage professionals (M. ICOMOS) is maintained.

As such, the following guidelines and measures (Table 11) should be followed throughout the proposed works to meet the overall conservation objectives required by the Project, in **Bold.**

Table 11: Guidelines and mitigation measures for the Project (AHS 2024).

Guideline	Details	CMP Policy
Training	**Awareness Training** should be programmed for all contractors that are involved with the proposed works undertaken on the site, to ensure that all parties are aware of the heritage significance of the place and the conditions in which the works must be completed and the measures in place to protect and conserve the heritage significance of the site.	Policies 3.1 – 3.2
Heritage Management Plan	**A Heritage Management Plan (HMP)** should be prepared, which considers necessary avoidance of the Bridge elements throughout the design, construction, and ongoing maintenance processes of the proposed levee. The HMP should also consider appropriate buffer zones and areas for avoidance of machinery and plant during construction to ensure harm to the heritage fabric of the Bridge is avoided. Continuous improvement efforts should also be included in the HMP which seek to minimise (wherever possible) the visual impacts caused to the setting and key viewsheds of the place, whereby subsequent design phases should prioritise all opportunities to reduce these impacts.	N/A
Flood Modelling Study	**A Flood (Hydrological) Study** has been prepared for the wider Project Area which considers the potential impacts (positive and negative) to the Bridge. The study found that the Bridge will be positively impacted by the proposed levee. Any potential negative impacts identified by the study will be appropriately mitigated during design development (see Appendix E).	N/A
Vibration Study	**A Vibration Study** should be prepared for the Bridge during design development, which considers the potential vibrational effects caused by the levee. Should the study predict a vibrational range exceeding 2-5mm/sec to the bridge elements during construction, a heritage engineer (M. ICOMOS) should be engaged to develop appropriate measures to protect the Bridge's condition during these periods.	N/A
Updated HIS and Approvals	An **updated HIS** should be prepared where there is any significant change to the levee design – particularly changes to layout, footprint or general heights of the levee which are not generally in accordance with the current proposal.	N/A

Guideline	Details	CMP Policy
Conservation	To assist in **conserving** the place, the Project should consider erosion control of the embankments, and monitor the creek embankments for erosion and scouring in the vicinity of the bridge piers and abutments (See Appendix D).	Policies 6.1 – 6.2 and 7.2
Ongoing Advice	**Ongoing advice** from suitably qualified heritage professionals to ensure that compliance is maintained and works undertaken in accordance with conditions of approval and the heritage values and amenity of the site is maintained for future generations.	Policies 1.3 – 1.4

4.5 Heritage Impact Statement

The Saltwater Creek Railway Bridge is of State heritage value and requires some consideration during the proposed works to ensure its heritage values are appropriately maintained for future generations.

This assessment of the preliminary design finds that overall, no direct impacts are expected to occur to the Bridge (built heritage) elements. Some (moderate) impacts will occur to the views and setting of the place, specifically the Burnett River viewshed from a landscape heritage perspective.

Management measures have been proposed to meet the overall conservation objectives required by the Project, which seeks to manage the pre-liminary nature of the current design through a staged approach.

The proposed works developed at this preliminary stage are therefore supported from a heritage perspective should the management measures be followed and should be proposed for approval under the MID application.

References

The Australia ICOMOS Charter for Places of Cultural Significance (Burra Charter). 1999.

Converge Heritage + Community. 2022. *Conservation Management Plan: Saltwater Creek Railway Bridge.* Prepared for Bundaberg Regional Council.

DSDILGP. 2023. MID Pre-Lodgement Advice.

Google Earth Pro. 2024. Satellite imagery of the Study Area.

James Semple Kerr. *The Conservation Plan (Seventh Edition)*, 2013.

Queensland Government. No date. *State code 14: Queensland heritage.* Retrieved from: https://planning.statedevelopment.qld.gov.au/__data/assets/pdf_file/0027/67275/sdap-v3.0-state-code-14-queensland-heritage.pdf

Queensland Heritage Register:

Saltwater Creek Railway Bridge – 600370

SMEC. 2024. *Saltwater Creek Pump Station and Flood Gate Mechanical Plan Draft.*

SMEC 2024. *Structural Condition Assessment.*

SMEC 2024. *Surface Water Technical Report.*

Appendices

Appendix A – QHR Citation for the Saltwater Creek Railway Bridge (QHR: 600370).

Saltwater Creek Railway Bridge

- Place ID: 600370
- Quay Street Woongarra Line, Bundaberg

General

More images...

Also known as
Millaquin Bridge
Classification
State Heritage
Register status
Entered
Date entered

21 October 1992

Type

Transport—rail: Bridge—railway

Theme

5.3 Moving goods, people and information: Using rail

Builder

Overend, James

Construction period

1894, Saltwater Creek Railway Bridge (1894 - 1894)

Historical period

1870s–1890s Late 19th century

Location

Address

Quay Street Woongarra Line, Bundaberg

LGA

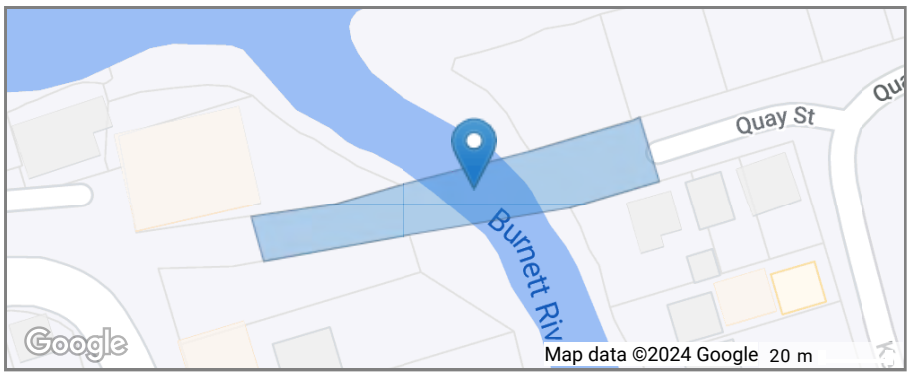
Bundaberg Regional Council

Coordinates

-24.86272456, 152.3572342

Map

- Enlarge map



Street view

Photography is provided by Google Street View and may include third-party images. Images show the vicinity of the heritage place which may not be visible.

Request a boundary map

A printable boundary map report can be emailed to you.

Email

Significance

Criterion A

The place is important in demonstrating the evolution or pattern of Queensland's history.

A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.

Criterion C

The place has potential to yield information that will contribute to an understanding of Queensland's history.

(Criterion under review)

Criterion D

The place is important in demonstrating the principal characteristics of a particular class of cultural places.

A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.

Criterion F

The place is important in demonstrating a high degree of creative or technical achievement at a particular period.

(Criterion under review)

History

Agitation for a railway from Bundaberg to the Woongarra district began in the 1880s and a line was surveyed during 1889-91. In the absence of funds for government construction and with the support of the railway commissioners, Robert Cran of the Millaquin sugar refinery near Bundaberg, was authorised by an Act of Parliament in 1892, to construct a private railway from Bundaberg to the sugar refinery. Plans were prepared for the bridge in 1893. Tenders were called by the government and a contract for construction was awarded to James Overend in January 1894. The railway was opened for traffic on 9 July 1894.

The railway was acquired by the State Government on 3 December 1912. In 1917 an Act of Parliament approved the acquisition of the railway to Woongarra. In 1918 the State Government acquired the extension of the railway which had been constructed by the Shire Council.

In 1965 plans were prepared for strengthening the bridge with steel girders suitable for a 12 ton axle loading. This was subsequently undertaken with re-used girders from the Gold Coast.

Description

Saltwater Creek bridge includes one 50 foot plate girder span with steel cross girders and longitudinals, seven 20 and two 26 foot timber spans, supported on seven timber piers, two concrete cylinder piers, and two timber abutments.

Bundaberg embankment.

4x1x2x20 foot (6.1m) timber longitudinals, concrete abutment, common braced timber trestles, (two on timber foundations) or a common concrete pier (piers 1 to 5).

1x2x2x26 foot (7.9m) timber longitudinals, common braced timber trestle on a concrete foundation (pier 5), common cast iron cylinders with screw piles (pier 6).

1x2x50 foot (15.2m) half-through plate girders with steel cross girders, steel longitudinals, common cast iron cylinder piers with screw piles (piers 6 and 7).

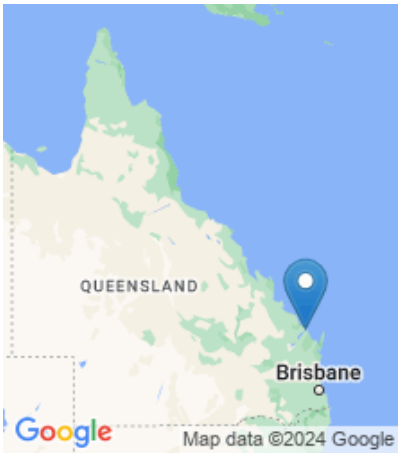
1x2x2x26 foot (7.9m) timber longitudinals, common cast iron cylinders with screw piles (pier 7), common braced timber trestle (pier 8).

3x1x2x20 foot (6.1m) timber longitudinals, common braced timber trestles (piers 8 to 11).

Image gallery




Location



Last reviewed 1 July 2022
Last updated 20 February 2022

Right to information (https://www.qld.gov.au/right-to-information/)

Queensland Government (https://www.qld.gov.au/)

Appendix B – MID Pre-Lodgement Advice (DSDILGP 2023).

Queensland Government

Department of
State Development, Infrastructure, Local Government and Planning

Our reference: MPL-0923-0465

25 October 2023

Louise McGrath
Senior Town Planner
Qbuild
Sent by email: Louise.mcgrath@epw.qld.gov.au

Dear Louise

Pre-lodgement written advice – proposed designation – Bundaberg East Levee

This pre-lodgement record provides a summary of relevant matters based on the supporting information provided in the pre-lodgment request. This record is provided in good faith and provides initial advice regarding likely issues relevant to the proposed request to designate premises for the development of infrastructure (designation).

If the proposal is changed from that which was provided in the pre-lodgement request, you may wish to seek further or amended pre-lodgment advice from Department of State Department, Infrastructure, Local Government and Planning (DSDILGP).

Meeting details

Information provided:	5 October 2023

Site details

Street address:	Quay Street, Scotland Street, Petersen Street and Cran Street, Bundaberg QLD 4670
Real property description:	To be confirmed at detailed design
Local government area:	Bundaberg Regional Council (the council)
Existing use:	Mix of commercial, residential lots, park reserve and vacant land
Relevant site history:	State Government support has been provided to construct a levee in Bundaberg to protect parts of Bundaberg East and Bundaberg South, including the CBD, from Burnett River flood events. There is no other related site history for the project or impacted area.

Proposed infrastructure details

Type of infrastructure:	Item 19: water cycle management infrastructure
Infrastructure description:	Bundaberg East levee

State interests relevant to the assessment:	• Agriculture -Important agricultural areas
	• Water Quality - Climatic regions – stormwater management design objectives
	• Biodiversity
	  - MSES Wildlife habitat (special least concern animal)
	  - MSES Regulated vegetation (category R)
	  - MSES Regulated vegetation (intersecting a watercourse)
	• Coastal Environment - Coastal Management District
	• Cultural Heritage – State Heritage Place
	• Natural Hazards Risk and Resilience
	  - Flood hazard area – level 1 – Queensland floodplain assessment overlay
	  - Flood hazard area – local government flood mapping area
	  - Erosion Prone Area
	  - High storm tide inundation area
	  - Medium storm tide inundation area
	• Transport Infrastructure
	  - State-controlled road
	• Strategic Airports and Aviation Facilities
	  - Lighting area buffer 6km
	  - Obstacle limitation surface area
	  - Wildlife hazard buffer 8km

Supporting information

Plan / Report title	Author	Ref no.	date
Prelodgement Request Report	Louise McGrath	-	11 September 2023 (rec'd)
Concept Engineering report	CDM Smith	BEN170175.02	28 March 2019
Bundaberg Flood Levee Design	JDA	-	11 September 2023 (rec'd)

Written advice

Item	Advice
Infrastructure entity overview of designation proposal	
1.	The proposal is for a 1.7km category 3 levee to be located on the southern side of the Burnett River. The levee is likely to be a concrete floodwall/levee to be built approximately 300mm above the 100-year ARI design flood elevation. Pump station and flood gate structures will be constructed at the Bundaberg Creek crossing and a penstock culvert with demountable pump is proposed at Distillery Creek. The levee is likely to be constructed in-situ with piles to depths to be determined during

	detailed design.
Cultural Heritage	
2.	The Saltwater Creek Railway Bridge is included in the Queensland Heritage Register (QHR 600370) and it appears from preliminary drawings that some works will extend into the QHR boundary, triggering development on a Queensland heritage place. Owing to the likely impacts of the excavation/construction work (i.e., building work) around the base of the bridge structure, the nature of work will exceed the threshold for an Exemption Certificate. The MID proposal should be accompanied by a Heritage Impact Statement which addresses the following: - overview of the reasons for the lot reconfiguration, including any relevant background information - include an analysis of the heritage issues affecting the proposal and the conservation priorities that have guided the lot boundary proposal - identify what elements or aspects of the heritage place are impacted by the lot reconfiguration - provides an analysis of the adverse impact on the setting which forms part of the cultural heritage significance of the place including the rationale for the change and measures or work methods that reduce any adverse impact - aspects of the development which aim to conserve the cultural significance of the place - explanation on how the development responds to the articles of the Burra Charter. <u>Note</u> Although a MID will exempt the proposal from any assessable development requirements triggered by planning legislation, building works under the Building Act 1975 still remain assessable where on a Queensland Heritage Place.
Tidal Works	
3.	Based on the information provided, the development is considered to constitute tidal works and interfering with quarry material on State Coastal Land.
4.	The MID proposal should consider and address the latest version of the State Development Assessment Provisions - *State Code 8 – Coastal development and tidal works*. Particular attention should be given to Performance Outcomes PO3, PO4, PO13, PO17, PO20 and PO23.
Constructing or raising waterway barrier works	

5.	The works within the waterways will constitute constructing or raising waterway barrier works. The proposal will need to address the site specific requirements for the fish communities within these waterways and include the following information:
	
	- relevant scaled, referenced and dated plans including:
	  o a longitudinal section of the waterway from upstream to downstream showing the existing bed level of the waterway in relation to the proposed waterway barrier works
	  o a cross-section of the waterway from bank to bank showing the existing bed and bank levels of the waterway in relation to the proposed waterway barrier works
	  o the location of waterways and any tidal land within, and adjacent to, the site

	including natural bed level, high banks, main channel, low-flow channel and the following where relevant – levels of highest astronomical tide, mean high water spring tide, and low water spring tide o registered property boundaries o contours of the bed and banks of the waterway at the site and to at least 100 m upstream and downstream of the site *Note – all plans should be able to be read to scale at A3 size* - Written documentation discussing the following: o brief overview of the proposed works o a description of the waterway proposed to be impacted (e.g. condition, size, connectivity, general hydrology) and nature of the impact o a description of the work construction method (e.g. timing, equipment to be used) o a detailed description of how the development has been planned to avoid or minimise impacts to waterways through considerations such as design, location, setbacks/buffer distances, construction, maintenance o details of on-site mitigation actions, during and after the development - the extent of any future maintenance works required for the continued safe operation of the proposed structure or facility.
6.	The design of the crossing of the unnamed tributary (identified as Distillery Creek) must provide for adequate fish passage. The specific information required to assess the crossing will depend on the proposed design, however as a guide, information on how the works will modify the hydrology of the waterway as well as hydraulic information on the conditions within the structure will need to be provided. This information should include discussion on the timing and duration of any periods where fish passage will be limited.
7.	The floodgate on Saltwater Creek is likely to have significant impacts on the waterway providing for fish passage which is a matter of state environmental significance (MSES). To assess the impact to fish passage, the operating protocol of the flood gate will need to be detailed and examples provided for a range of flow events of the expected timing and duration of the gate being closed. As fish typically migrate in response to flow events, blocking off fish passage in the waterway during the rising and falling hydrograph is likely to have a significant impact on the MSES.
8.	It is understood a pumping station will be utilised to pump water from the upstream catchment of saltwater creek into the Burnett River during times where the floodgate is closed. The details of the pumping regime will need to be provided including rate of extraction and duration. The pumping is likely to have a significant impact on fish if not designed to avoid entrapment. The pump inlet design will need to consider how fish will be prevented from being entrained, with considerations given to the location of the inlet in relation to the bank and the creation of attraction flows to fish attempting to move past the barrier. Pump inlets must be screened to ensure fish do not become drawn into the pump or impinged on the screen. Screen designs must include consideration of the changes in screen interface conditions as a result of reduced area due to blockage. Screens should be fine enough to physically exclude fish and large enough to ensure that intake velocities at the screen do not cause fish to become trapped on the screen. Guidance as to how to design pump screens to minimise impacts on fish can be found in The practical guide to modern fish-protection screening in Australia and Design specifications for fish-protection screens in Australia.

Removal destruction or damage of marine plants	
9.	The proposed works will involve the removal, destruction or damage of marine plants which are a MSES. The MID proposal should be supported by a report, prepared by a suitably qualified and experience person or entity in marine plant ecology that addresses the following: - surveys and plans showing the footprint of any temporary and permanent impacts - as the works have the potential to modify the tidal and freshwater inundation patterns of both Saltwater Creek and the unnamed tributary (identified as Distillery Creek) which the levee crosses, information on how this will impact marine plant communities in these waterways will need to be provided. This includes changes to the tidal regime as well as the potential of pooling of fresh water for extended periods - any maintenance footprints required for the works should be included as part of the permanent works - information on any remediation of impacts associated with the temporary and permanent works.
Dredging	
10.	Given the scale of the works, it is highly likely that the proposed development would constitute an Environmentally Relevant Activity (ERA) for Dredging. If dredging is triggered, a separate application to the Department of Environment and Science for an Environmental Authority will be required prior to the commencement of works. See **Attachment 2** for requirements to accompany the MCU-ERA application.
Quarry material	
11.	If the proposed development involves removing quarry material from land under tidal water to above the high-water mark (mean high water springs) on state coastal land, an allocation of quarry material under Section 73 of the *Coastal Protection and Managements Act 1995* will need to be obtained.
Regulated vegetation	
12.	Conduct a desktop analysis to identify any mapped MSES that exist on or near the proposed site/s. If MSES are identified, undertake a targeted assessment and: - demonstrate how the development avoids adverse impacts on each MSES to the greatest extent practicable - demonstrate how impacts on MSES have, or will be, minimised and/or mitigated to the greatest extent practicable - determine whether there will be a Significant Residual Impact on any MSES and identify the delivery of any potential offset.
Category 3 levees	
13.	The proposal should demonstrate that the design and management of the levee has considered the “Guideline for construction of modification of Category 2 and 3 levees” (at link) and addresses the requirements of *State Code 19: Category 3 levees.*

Flood hazard	
14.	A flood risk assessment will be required as part of the proposal that demonstrates how the proposal will not result in material worsening flooding impacts to surrounding properties.
Water quality	
15.	The proposal should be supported by an RPEQ stormwater report that demonstrates: - compliance with the SPP water quality benchmarks - no material worsening to adjoining and downstream properties - no material worsening to any part/s of the state-controlled road, particularly during events where the levee is not required/flood gates shut - the levee can be provided without increasing the frequency or level of inundation of Bourbong Street along Kendalls Flats or result in any new areas of inundation, particularly during lower than design events when the levee is not going to be activated - the direction of any flows redirected from existing flow paths and the impact on other properties, Quay Street and Bourbong Street.
State-controlled road (SCR)	
16.	For the parts of the levee proposed to be in the SCR reserve on Quay Street it is strongly recommended the project team work with DTMR to undertake a design review for acceptability well in advance of planned commencement and submission for approval of Road Corridor Permit (RCP). That way the Levee Project team will be able to develop a design that is acceptable to DTMR and can go through the RCP approval process without delay.
17.	Provide a report showing that the design does not reduce safety on Quay Street or create new issues.
18.	It is preferable to retain as much on street parking as possible.
Maritime Safety	
19.	The MID proposal should consider and address the latest version of the State Development Assessment Provisions - *State Code 7 – Maritime Safety*.
Plans and Drawings	
20.	Detailed and appropriately scaled drawings and plans should accompany your application. The drawings and plans should clearly identify the location of proposed development, including: - Location of all built structures, or structures to be modified or demolished, as a result of the proposed development - Adjacent riverbanks, walls, sandbanks, structures, the limit of vegetation, and other principal features of the immediate area - Relevant tidal planes (eg Highest Astronomical ride, Mean High Water Springs) - The location and setting out details for cross-sections - Any other information required to accurately define the area and to allow the site to be readily identified from the plan.
21.	The DTMR as-constructed drawings for the state-controlled road are contained at **Attachment 3.**

Recommended technical reporting	
22.	It is recommended that the entity consider the following matters when preparing the infrastructure designation request: - Heritage Impact Assessment - Ecological Assessment - Marine Plant Ecology Assessment - Flood Risk Assessment - Vulnerability and tolerability assessment report and information detailing the benefits and impacts to people and property under pre and post category 3 levee conditions across a range of flood event scenarios. - Stormwater management plan - Traffic impact assessment

General information

Preliminary stakeholder engagement requirements

Preliminary stakeholder engagement should include, but not be limited to, consultation with the council, Native Title and/or traditional owners for the area, letters to local, state and federal members and a letter box drop to the adjoining and surrounding properties identified on the preliminary stakeholder engagement plan submitted with the pre-lodgement request (as a minimum).

Consultation should also include with those stakeholders that will be affected by closure of the access on Quay Street. This would include the Rowers Club and Formatt Machinery who use that area for parking and access.

Any preliminary stakeholder engagement material should describe and illustrate the proposal and provide 10 business days for comment. Please provide draft material to DSDILGP for review prior to commencing preliminary stakeholder engagement activities.

Endorsement to lodge a MID proposal

Endorsement to lodge a MID proposal can be sought following completion of preliminary stakeholder engagement activities. When seeking endorsement please provide the information contained within Attachment 3.1 of the MID Operational Guidance via email to infrastructuredesignation@dsdilgp.qld.gov.au.

MID proposal

Should the proposal be endorsed, to apply for the designation, submit a MID proposal via the online portal that includes/addresses:

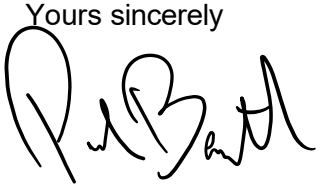
- the required material for making a MID specified in Schedule 3 of the Minister's Guidelines and Rules
- the matters raised in these pre-lodgement minutes.

Formal consultation stage

Formal consultation will include a 20-business day public consultation period which is to include as a minimum: sign/s on the land, a notice in the paper and letters to surrounding landowners, elected representatives and Native Title and/or Aboriginal or Torres Strait Islander party/parties for the area. Requirements for the formal consultation stage will be determined following endorsement to lodge a MID proposal.

If you require any further information, please contact Marisa Menin, Principal Planner on 3452 7683 or marisa.menin@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely



Paul Beutel
MANAGER

Attachment 1 - Pre-engagement plan

Minimum pre-engagement landowners

Attachment 2 – Environmentally Relevant Activity – Dredging

Based on the information it is advised that the proposed development is likely to trigger the following Environmentally Relevant Activity Threshold:

- ERA 16(1)(a) dredging 1000t to 10,000t in a year

Please note that the dredging activity includes both the removal of material, transport and placement of spoil, therefore assessment of impacts should consider each of the aspect of the project.

In the environmental authority application please provide information on, but not limited to, the following:

- Operational plans for the removal of dredge spoil including:
  - The proposed footprint of the dredge area;
  - The method by which the dredge spoil will be removed;
  - The volume of dredge spoil to be removed;
  - The proposed depth of extraction; and
  - Physical and chemical characteristics of the dredge spoil including potential contaminants in accordance with the National Assessment Guidelines for Dredging 2009 or National environment protection (Assessment of site contamination) measure (NEPM 2013), as appropriate.
- Operational plans for the disposal of dredge spoil including:
  - The proposed location for disposal of dredge spoil;
  - The method by which the dredge spoil will be transported and placed in the area;
  - The method by which the spoil is to be contained within the area;
  - The method by which the spoil will be dewatered;
  - Expected water quality parameters for any discharge;
  - The current and intended land use of proposed disposal site(s);
  - Detail on how the dredge spoil disposal area will be made fit for future land use.
- An ecological report identifying any significant ecological values (particularly matters of State environmental significance) within or adjacent to the proposed dredge footprint and disposal area that could be impacted as a result of the activity.

The application must include a technical assessment of the environmental risks to the receiving environment in relation to air, water, noise, land and waste associated with the activity/ies in accordance with section 125(1)(l). Technical guidelines detailing the minimum information that should be supplied to support an application are available in the following locations:

- Air: https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-air-impacts.pdf
- Land: https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-land-impacts.pdf
- Noise: https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-noise-impacts.pdf
- Water: https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-water-impacts.pdf
- Waste: https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-waste-impacts.pdf

A diagnostic tool has been developed which will generate a report tailored to the proposed ERA including details such as relevant forms, annual fees, typical environmental considerations and links to additional supporting resources. The diagnostic tool can be accessed via the following link: https://www.business.qld.gov.au/running-business/environment/licences-permits/form-fees-finder

Model Operating Conditions have been developed for ERA 16, including dredging activities, to enable you to gauge what conditions will likely be included in your site-specific environmental authority. These can be found at: https://environment.des.qld.gov.au/__data/assets/pdf_file/0026/89144/pr-co-extraction-and-screening.pdf

SDAP State Code 22

Any development application made should provide a response to the latest version of the State Development Assessment Provisions (SDAP) State code 22 – Environmentally Relevant Activities in its entirety, identifying how the proposed development meets each performance outcome by addressing all applicable acceptable outcomes. This can be found at: https://planning.dsdmip.qld.gov.au/planning/better-development/the-development-assessment-process/the-states-role/state-development-assessment-provisions

Environmental Authority

As outlined in section 125 of the *Environmental Protection Act 1994*, a site-specific application will need to include:

- a description of the environmental values (both onsite and offsite) likely to be affected by the proposed activity
- details of any emissions or releases likely to be generated by the proposed activity
- a description of the risk and likely magnitude of impacts on the environmental values
- details of the management practices proposed to be implemented to prevent or minimise adverse impacts
- details of how the land the subject of the application will be rehabilitated after the relevant activity
- a description of the proposed measures for minimising and managing waste generated by the relevant activity
- details of any site management plan (i.e. associated with contaminated land) that relates to the land that is the subject of the application.

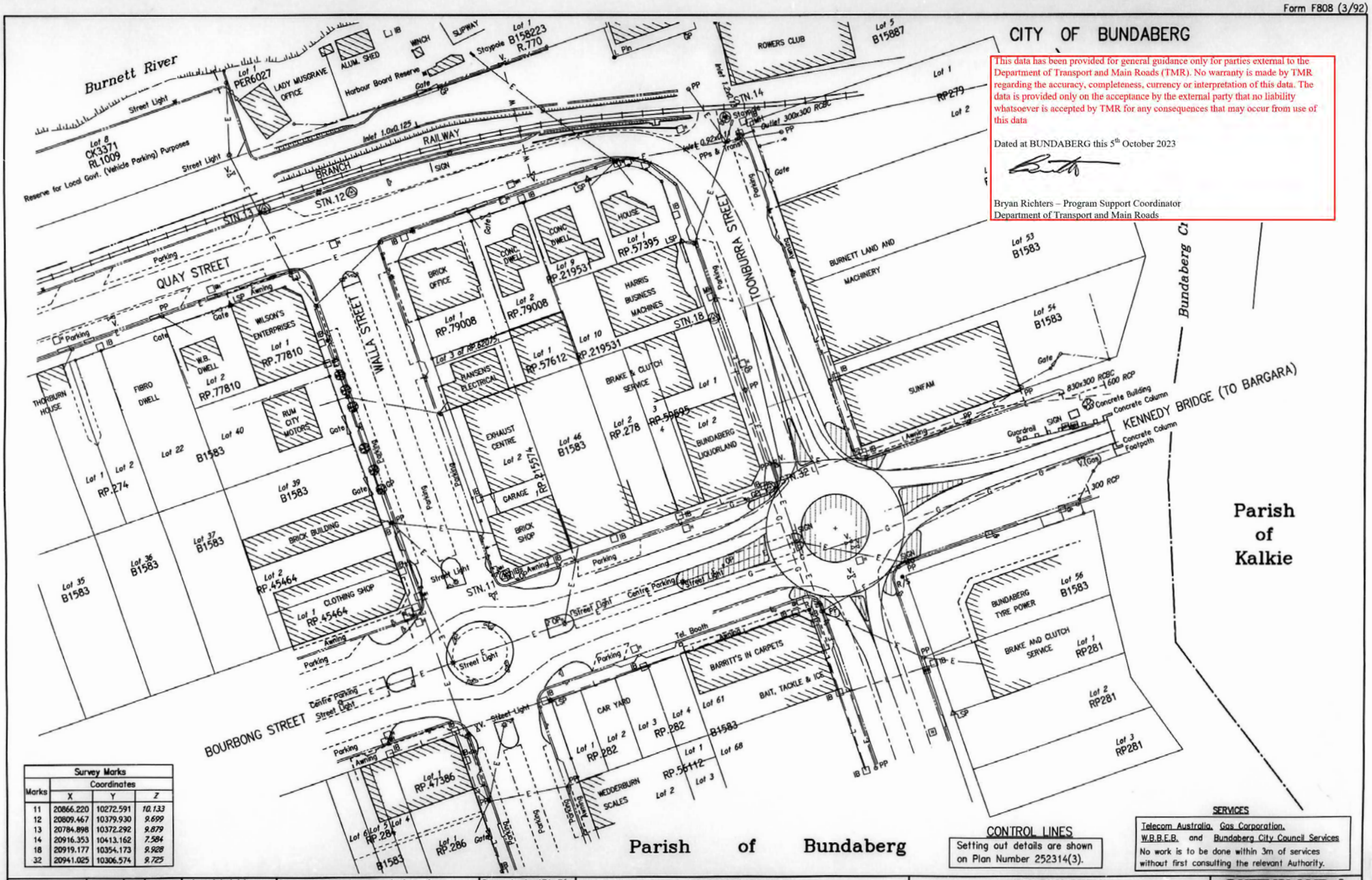
Technical guidelines have been developed to outline what information to include in an application where impacts related to air, land, noise, water or waste have been identified. These are available at: https://www.business.qld.gov.au/business/running/environment/licences-permits/applying-environmental-authority/technical-information-requirements

Information about applying for an environmental authority can be found at: https://www.business.qld.gov.au/running-business/environment/licences-permits/applying (note: run through the indented tabs on the left-hand side of the screen).

In order to hold an environmental authority you must be a 'registered suitable operator'. You can apply to be a registered suitable operator at the same time you apply for your environmental authority. The following website explains how to apply to be a registered suitable operator and how to apply for an environmental authority: https://www.business.qld.gov.au/running-business/environment/licences-permits/applying/lodging

Attachment 3 – DTMR Standard Drawings

Form F808 (3/92)



This data has been provided for general guidance only for parties external to the Department of Transport and Main Roads (TMR). No warranty is made by TMR regarding the accuracy, completeness, currency or interpretation of this data. The data is provided only on the acceptance by the external party that no liability whatsoever is accepted by TMR for any consequences that may occur from use of this data

Dated at BUNDABERG this 5th October 2023

Bryan Richters – Program Support Coordinator
Department of Transport and Main Roads

Survey Marks			
Marks	Coordinates X	Y	Z
11	20866.220	10272.591	10.133
12	20809.467	10379.930	9.699
13	20784.898	10372.292	9.879
14	20916.353	10413.162	7.584
18	20919.177	10354.173	9.928
32	20941.025	10306.574	9.725

Revisions	Certified	Date	Microfiled
A Original issue			

Associated jab nos

Auxiliary plan nos
252313
252314
252315
252316
252317
(Office use only)

Dimensions in metres except where shown otherwise.
Culvert sizes in millimetres.

Scales
0 5 10 15 20
metres

Survey books 174–76
174–79
174–83

Through chainage from Intersection 19A/176
1.02km – 1.18km

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 00(1) – 110(1) & 00(2) – 134(2)

Reference Points				
Preceding RPC	Dist. to start of job (km)	Dist. from start to end of job (km)	Dist. from end to following RPC (km)	Following RPC
174/1	1.02	0.16	0.00	174/2

INTERSECTION OF
TOONBURRA STREET AND BOURBONG STREET
WITH ROUNDABOUT SUPERIMPOSED

Survey K.D.C.	Plotted D. K. B.	Adve D. K. B.	Drawn	Design	Examined S.D.D.	APPROVED
Ckd	Ckd	Ckd	Ckd	Ckd	Certified RPEQ 6-2-95	District Manager Bundaberg 7/4/95

QUEENSLAND TRANSPORT

JOB No. 141/174/802

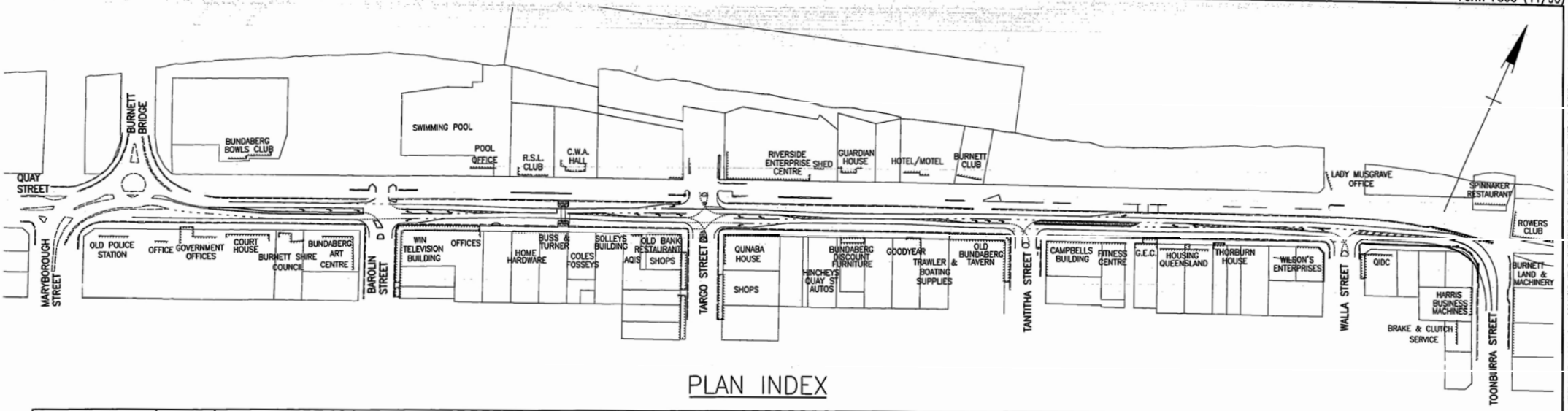
No. 1 of 6 plans
Plan No. 252303
A

Dwg. TOON252303 (Views 2,3,4,8,9)

Plotted at 11:35:15 on 3 Feb 95 with Size Factor 1.00

MICROFILMED BY

I, Roger Norman Davies, Senior Surveyor (Geographic Information) being an approved person in terms of Section 105 of the Evidence Act 1977, certify that this transparency



PLAN INDEX

PLAN NO.	NO.	DESCRIPTION
317590	1	Plan Index & General Layout
317591	2	Type Cross Sections & Details
317592	3	Type Cross Sections & Retaining Wall Detail
317593	4	Existing Features & Services Plan – Quay Street (1162.03 – 1400)
317594	5	Existing Features & Services Plan – Quay Street (1400 – 1760)
317595	6	Existing Features & Services Plan – Quay Street (1760 – 2128.089)
317596	7	Extents of Milling (1162.03 – 1400)
317597	8	Extents of Milling (1400 – 1760)
317598	9	Extents of Milling (1760 – 2128.089)
317599	10	Extents of Works by others (1217 – 1400)
317600	11	Extents of Works by others (1400 – 1760)
317601	12	Extents of Works by others (1760 – 2128.089)
317602	13	Setting out Details – Quay Street (1162.03 – 1435)
317603	14	Setting Out Details – Quay Street (1435 – 1817.38)
317604	15	Setting Out & Island Details – Quay Street (1817.38 – 2128.809)
317605	16	Kerb & Channel Setting Out & Annotated Cross Sections
317606	17	Stormwater Drainage Toonburra Street Intersection
317607	18	Private Entrance Details
317608	19	Closing of Entrance left of Ch1969 & Concrete Path Detail for Lot 1 of RP57395
317609	20	Pavement Marking, Signs & Lighting (1162.03 – 1560)
317610	21	Pavement Marking, Signs & Lighting (1560 – 1950)
317611	22	Pavement Marking, Signs & Lighting (1950 – 2128.089)
317612	23	Guardrail Setting Out, Guardrail Materials List & Lighting Details
317510	24	Traffic Signal Installation Design Layout
317511	25	Traffic Signal Installation, Phillips PSC QC8–ID Controller Cable Connections

Note: Plan No. 317509 is plan previously used for the construction of the signalised Pedestrian Crossing. Not in this Contract.

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			16-6-18

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales
NOT TO SCALE

Survey books

Through chainage from
START OF GAZETTAL
1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1162.03 – 2128.089

Reference Points					Survey	Bdys
Preceding RPC	Dist. to start of job (km)	From start to end of job	From end to following RPC	Following RPC		
174/1	0.05	0.97	0.16	174/2	Ckd	Ckd

PLAN INDEX & GENERAL LAYOUT

Drawn	Design	Examined	Certified	Approved
Ckd	Ckd	16/6/00	RPEQ 2857	DISTRICT DIRECTOR WIDE BAY 22/12/00

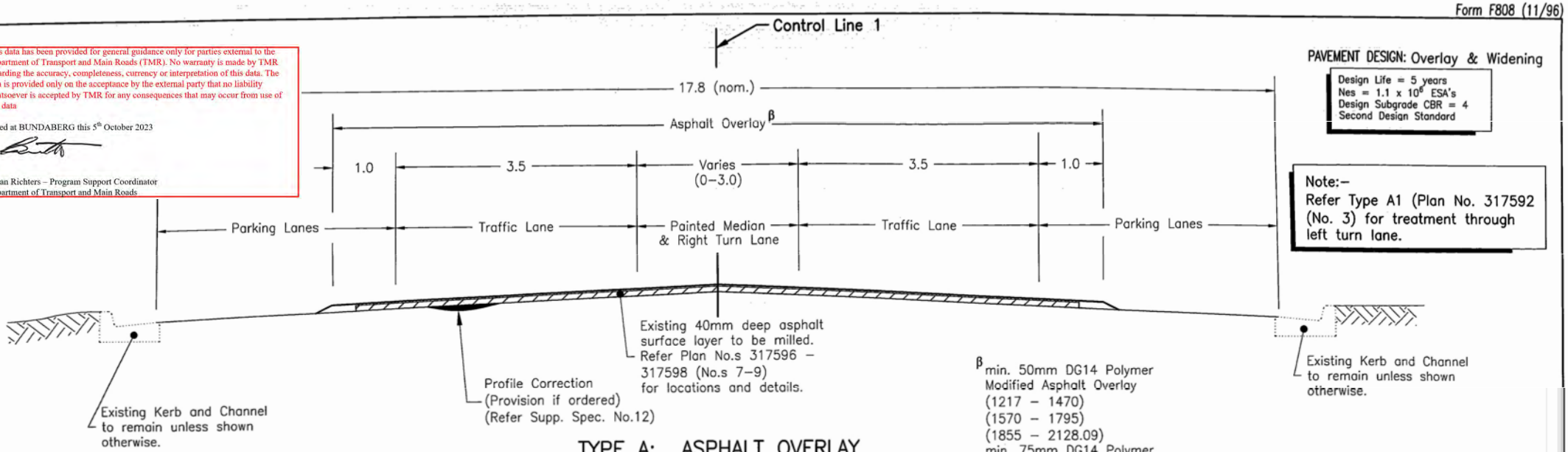
Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 1 of 25 Plans

Plan No. 317590 A

CAD REF: g:/...Data/Acad/141-174-6/317590.dwg



PAVEMENT DESIGN: Overlay & Widening

Design Life = 5 years
Nes = 1.1 x 10^6 ESA's
Design Subgrade CBR = 4
Second Design Standard

Note:–
Refer Type A1 (Plan No. 317592 (No. 3) for treatment through left turn lane.

β min. 50mm DG14 Polymer Modified Asphalt Overlay
(1217 – 1470)
(1570 – 1795)
(1855 – 2128.09)
min. 75mm DG14 Polymer Modified Asphalt Overlay
(1470 – 1570)
(1795 – 1855)

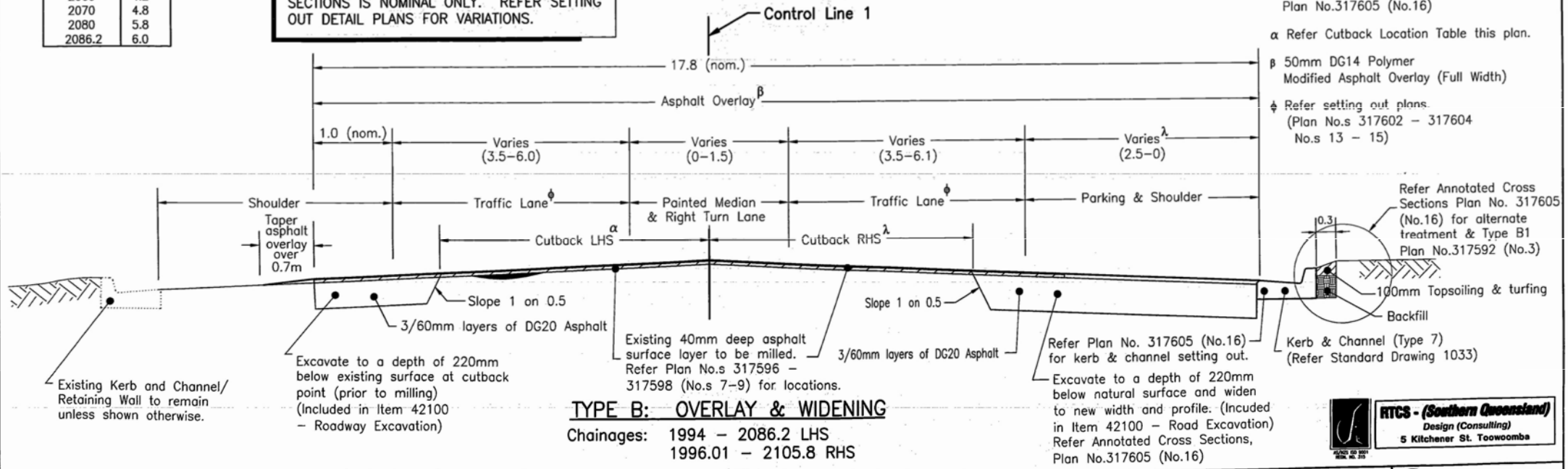
TYPE A: ASPHALT OVERLAY

Chainages: 1217 – 1994 LHS
1217 – 1996.01 RHS
2086.2 – 2128.09 LHS
2105.8 – 2128.09 RHS

CUTBACK LOCATION LHS

CHAINAGE	OFFSET
1994–2050	4.0
2060	4.2
2070	4.8
2080	5.8
2086.2	6.0

INFORMATION SHOWN ON THE TYPE CROSS SECTIONS IS NOMINAL ONLY. REFER SETTING OUT DETAIL PLANS FOR VARIATIONS.



λ Refer Annotated Cross Sections Plan No.317605 (No.16)

α Refer Cutback Location Table this plan.

β 50mm DG14 Polymer Modified Asphalt Overlay (Full Width)

Refer setting out plans. (Plan No.s 317602 – 317604 No.s 13 – 15)

TYPE B: OVERLAY & WIDENING

Chainages: 1994 – 2086.2 LHS
1996.01 – 2105.8 RHS

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			HG-018

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511

(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales: NOT TO SCALE

Survey books

Through chainage from: START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1217 – 2128.089

Reference Points					Survey	Bdys
Preceding RPC	Dist. to start of job (km)	From start to end of job	From end to following RPC	Following RPC		
174/1	0.05	0.97	0.16	174/2	Ckd	Ckd

TYPE CROSS SECTIONS & DETAILS

Drawn	Design	Examined	Certified
Ckd	Ckd	16/11/00	RPEQ 2897

Queensland Government
Department of Main Roads

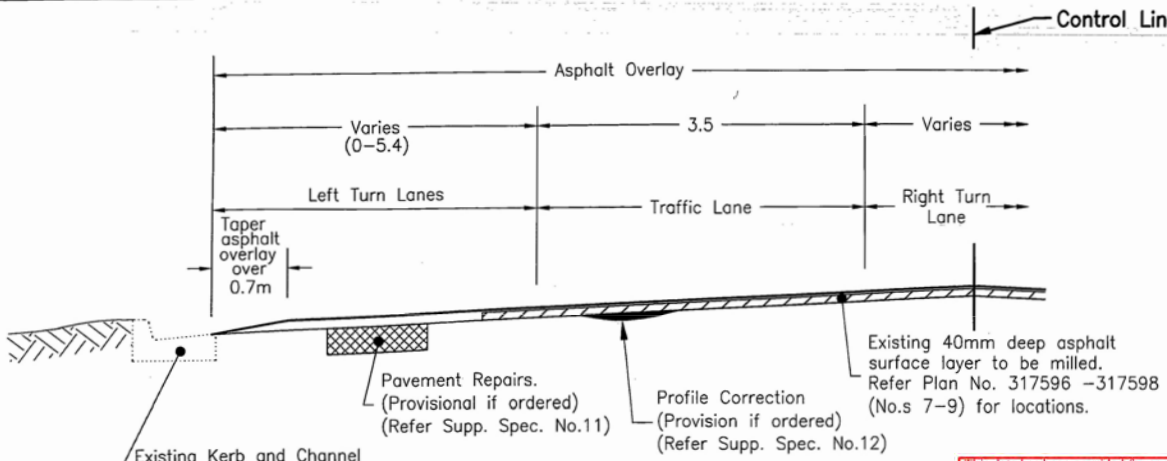
JOB No. 141/174/6

No. 2 of 25 Plans

Plan No. 317591 A

CAD REF: G:/...Data/Acad/141-174-6/317590.dwg

Roger Norman Davies, Senior Surveyor (Geographic Information), being an approved person in

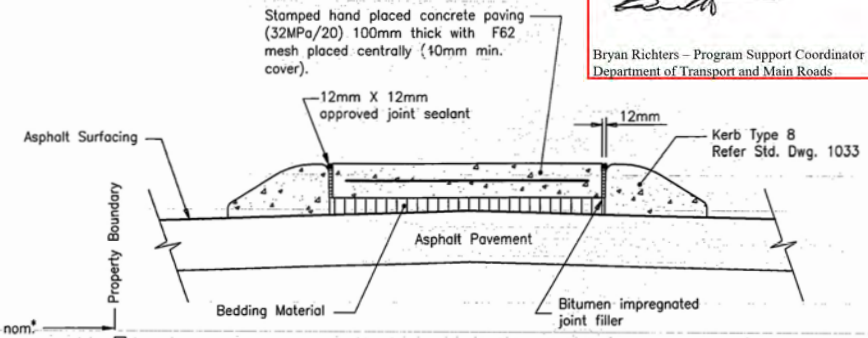


TYPE A1: ASPHALT OVERLAY

Chainages: 1270 – 1334.77 RHS
1467.39 – 1536.95 LHS
1502.04 – 1575 RHS
1797.39 – 1850 LHS

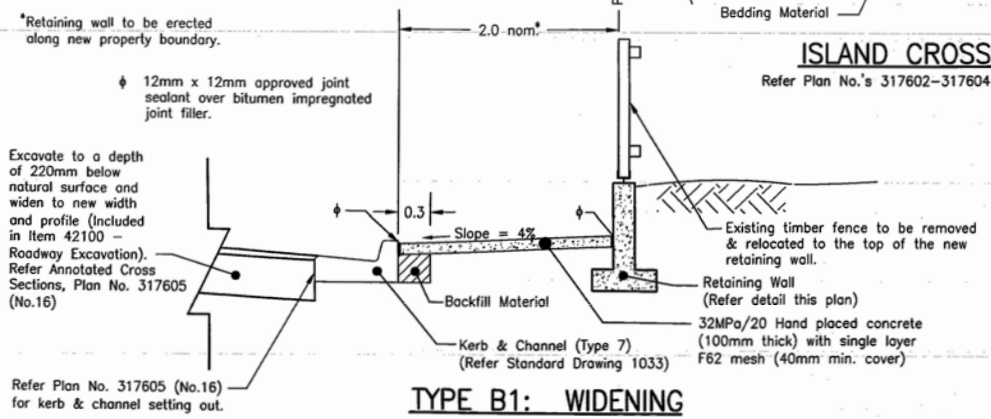
INFORMATION SHOWN ON THE TYPE CROSS SECTIONS IS NOMINAL ONLY. REFER SETTING OUT DETAIL PLANS FOR VARIATIONS.

REFER ALSO TO TYPE CROSS SECTIONS A & B PLAN NO. 317591 (NO.2)



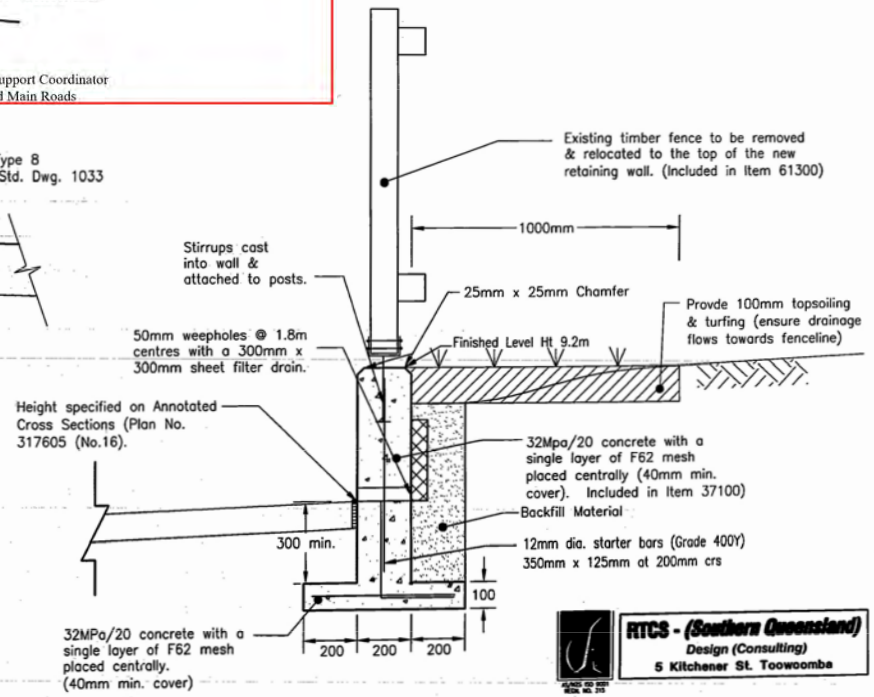
ISLAND CROSS SECTION

Refer Plan No.'s 317602–317604 (No.'s 13–15) for locations



TYPE B1: WIDENING

Chainages: 2060.53 – 2092.46 RHS



RETAINING WALL DETAIL

Dimensions in millimetres

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			nf6-018

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales: NOT TO SCALE

Survey books

Through chainage from: START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1162.03 – 2128.089

Reference Points					Survey	Bdys
Preceding RPC	Dist. to start of job (km)	From start to end of job	From end to following RPC	Following RPC		
174/1	0.05	0.97	0.16	174/2	Ckd	Ckd

TYPE CROSS SECTIONS & RETAINING WALL DETAIL

Drawn	Design	Examined	Certified
Ckd	Ckd	16/11/00	RPEQ 2077

Queensland Government
Department of Main Roads

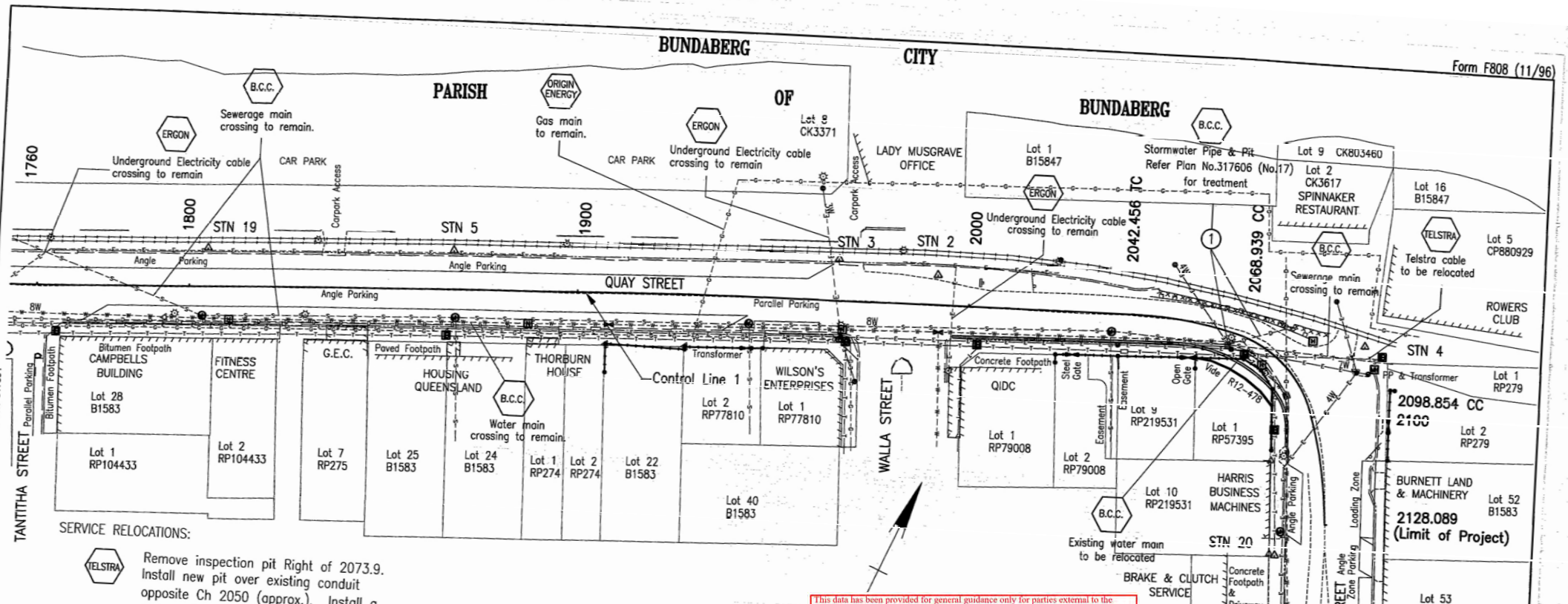
JOB No. 141/174/6

No. 3 of 25 Plans

Plan No. 317592 A

CAD REF: s:/...Data/kcad/141-174-6/317592.dwg

Form F808 (11/96)



SERVICE RELOCATIONS:

TELSTRA Remove inspection pit Right of 2073.9. Install new pit over existing conduit opposite Ch 2050 (approx.). Install a new road crossing under Toonburra Street & install a section of pipe from new pit to existing pit right of 2100.

ERGON Existing power pole at right of Chainage 2038.7 to be removed and replaced with a taller pole at approx. same location.

Existing power pole at right of Chainage 2069.7 to be removed.

Existing 2 power poles and Transformer at left of Chainage 2094.1 to be relocated behind Kerb & Channel. Taller Poles are required.

B.C.C. All existing valves, fire hydrants and manholes within the limits of the asphalt overlay are to be raised.

REFER SUPP. SPEC. NO. 6 FOR CONTRACTOR'S RESPONSIBILITIES IN RELATION TO SERVICES.

FOR CONTROL LINE SETTING OUT REFER PLAN NO.S 317602 (13) – 317604 (15)

LOCATION OF SERVICES ARE APPROXIMATE ONLY

SERVICES LEGEND

–W– –W–	WATER MAINS
–S–	SEWERAGE
–G– –G–	GAS
–T– –T–	TELSTRA
–E– –E–	OVERHEAD POWER
–E–	UNDERGROUND POWER
–D–	STORMWATER

I/S CO-ORDINATES TABLE

Station	X Co-ord.	Y Co-ord.
2	10761.239	5350.135
3	10736.677	5342.493
4	10868.117	5383.290
5	10647.789	5300.708
19	10590.325	5273.695
20	10870.954	5324.406

UNDERGROUND SERVICES: No work is to be done within 3m of underground services without first consulting the relevent authority.

ORIGIN OF SURVEY
PSM 10004
LEVEL DATUM
Ht. 12.056 AHD

Revisions	Certified	Date	Microfiled
Original issue		17-6-018	

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales 0 5 10 15 20

Survey books

Through chainage from START OF GAZETTAL 1.76km – 2.13km

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1760 – 2128.089

Reference Points				
Preceding RPC	Dist. to start of job (km)	From start to end of job	From end to following RPC	Following RPC
174/1	0.05	0.97	0.16	174/2

Survey mP Ckd | Bdys mP Ckd | Drawn mP Ckd | Design mP Ckd | Examined | Certified RPEQ 2897

EXISTING FEATURES & SERVICES PLAN
QUAY STREET

RTCS - (Southern Queensland) Design (Consulting)
5 Kitchener St. Toowoomba

Queensland Government Department of Main Roads

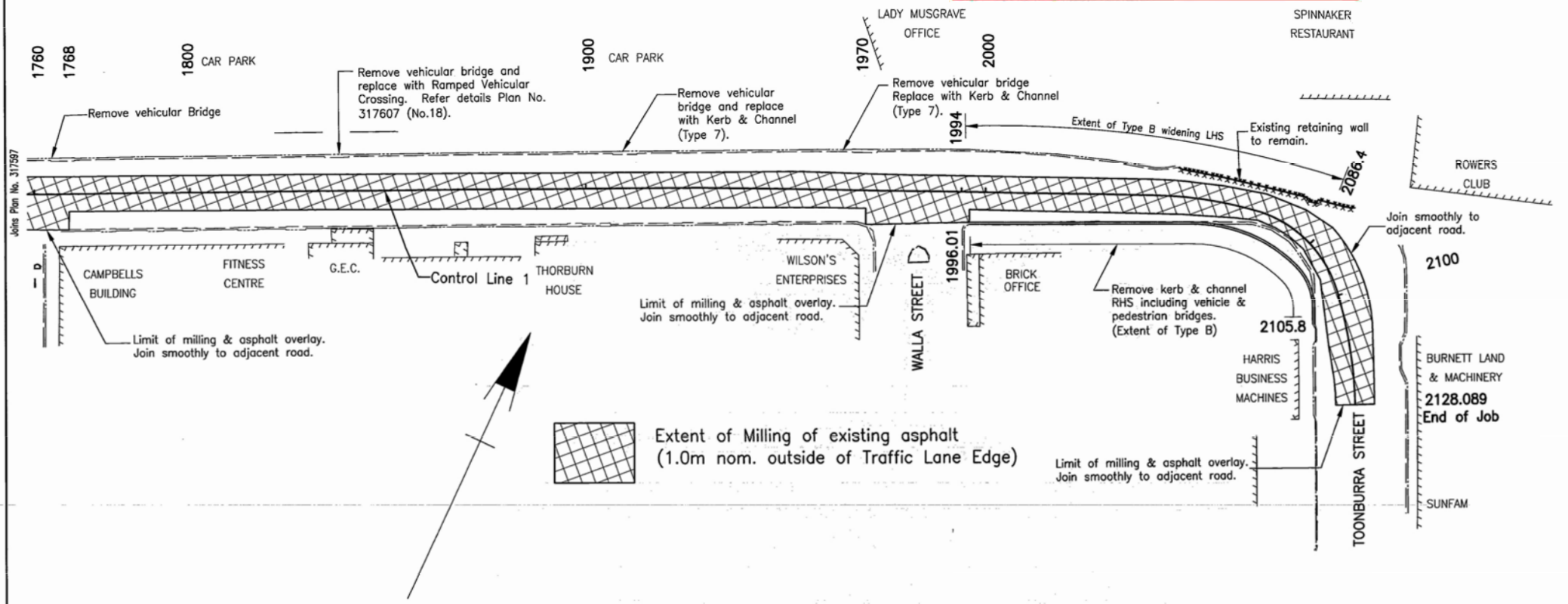
JOB No. 141/174/6

Plan No. 317595 A

CAD REF: gdata/Acad/141-174-6/317595.dwg

PARISH OF BUNDABERG

CITY OF BUNDABERG



NOTE: In areas where the existing vehicular bridge is being removed on the northern side of Quay Street, the corresponding vehicular bridge on the Service Road/Carpark side is also to be removed & replaced.
Refer details Plan No. 317607 (No.18)

NOTE: For Control Line setting out Refer Plan No.s 317602 – 317604 (No.s 13–15).

Refer Plan No. 317596 (No.7) for milling details.

UNDERGROUND SERVICES: No work is to be done within 3m of underground services without first consulting the relevent authority.

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			MF6-018

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511

(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales 0 5 10 15 20m Layout

Survey books

Through chainage from START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1760 – 2128.089

EXTENTS OF MILLING

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	Ckd	Ckd	10/11/23	RPEQ 2077

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 9 of 25 Plans

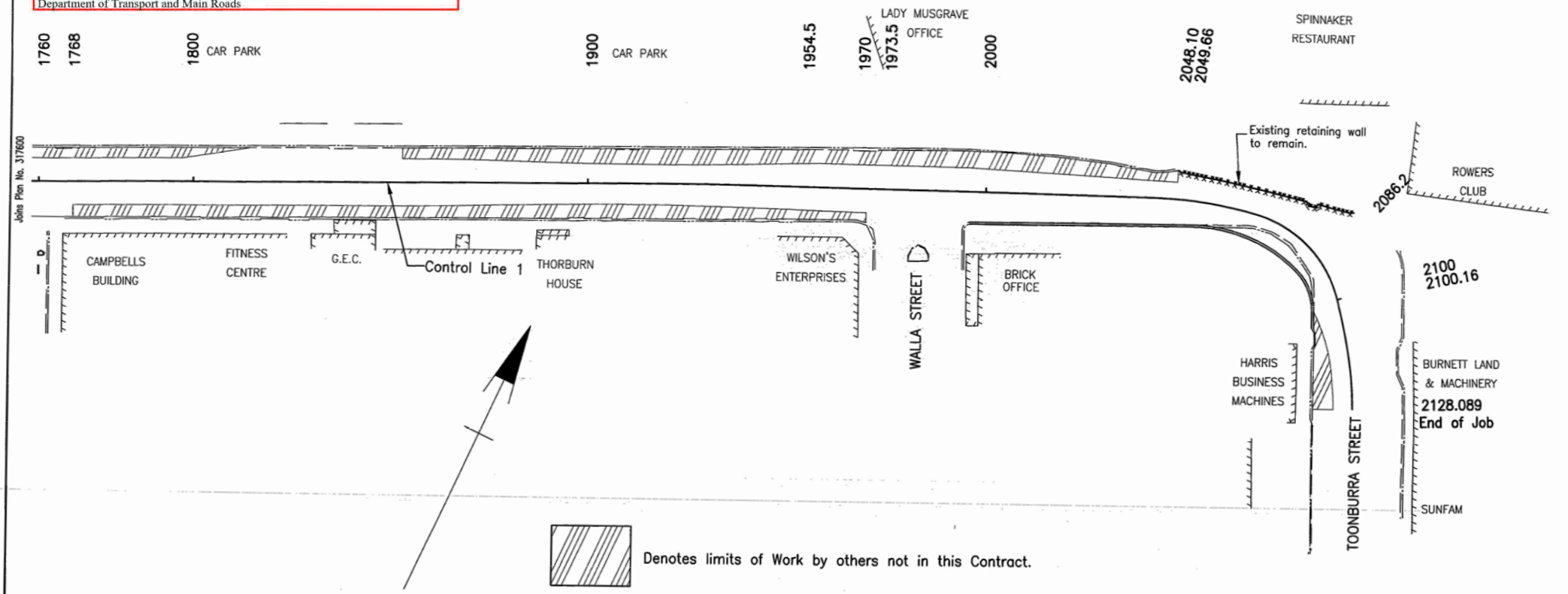
Plan No. 317598 A

CAD REF: g:/...Data/Acad/141-174-6/317598.dwg

Roger Norman Davies, Senior Surveyor (Geographic Information), being an approved person in terms of Section 105 of the Evidence Act 1977, certify that this transparency was made as a permanent record of a document in my custody or under my control.

PARISH OF BUNDABERG

CITY OF BUNDABERG



NOTE: For Control Line setting out Refer Plan No.s 317602 – 317604 (No.s 13–15)

UNDERGROUND SERVICES: No work is to be done within 3m of underground services without first consulting the relevent authority.

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			MF6.018

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales 0 5 10 15 20m Layout

Survey books

Through chainage from START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1760 – 2128.089

EXTENT OF WORK BY OTHERS

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	Ckd	Ckd		RPEQ 2697

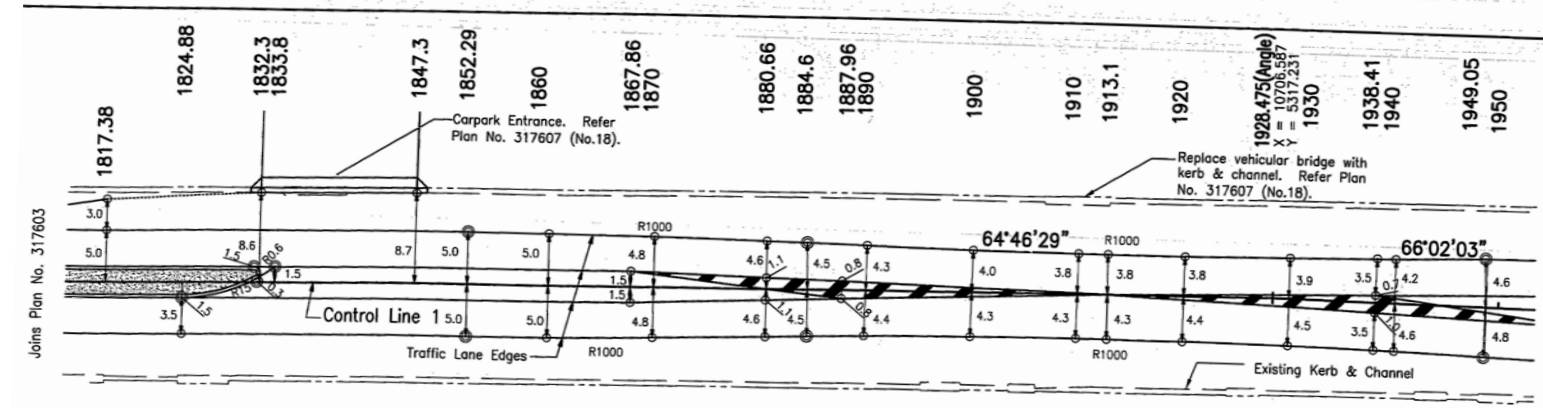
Queensland Government
Department of Main Roads

JOB No. 141/174/6

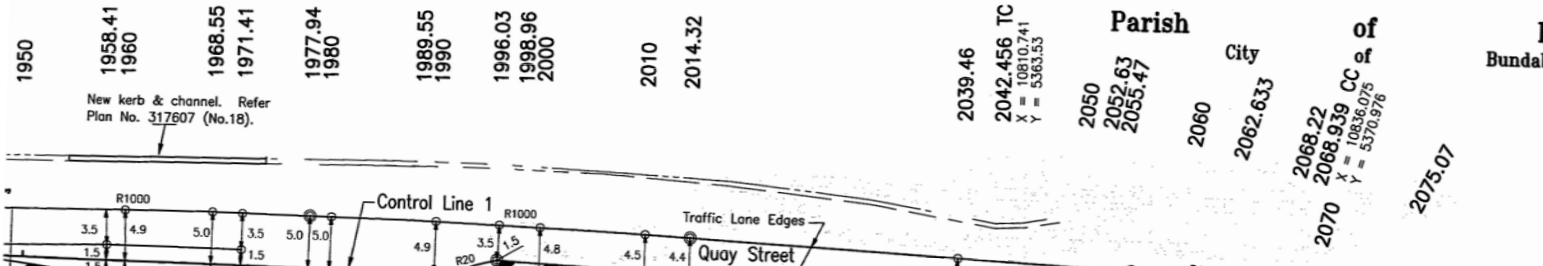
No. 12 of 25 Plans
Plan No. 317601
A

CAD REF: g:/_Data/Acad/141-174-6/317599.dwg

Form F808 (11/96)



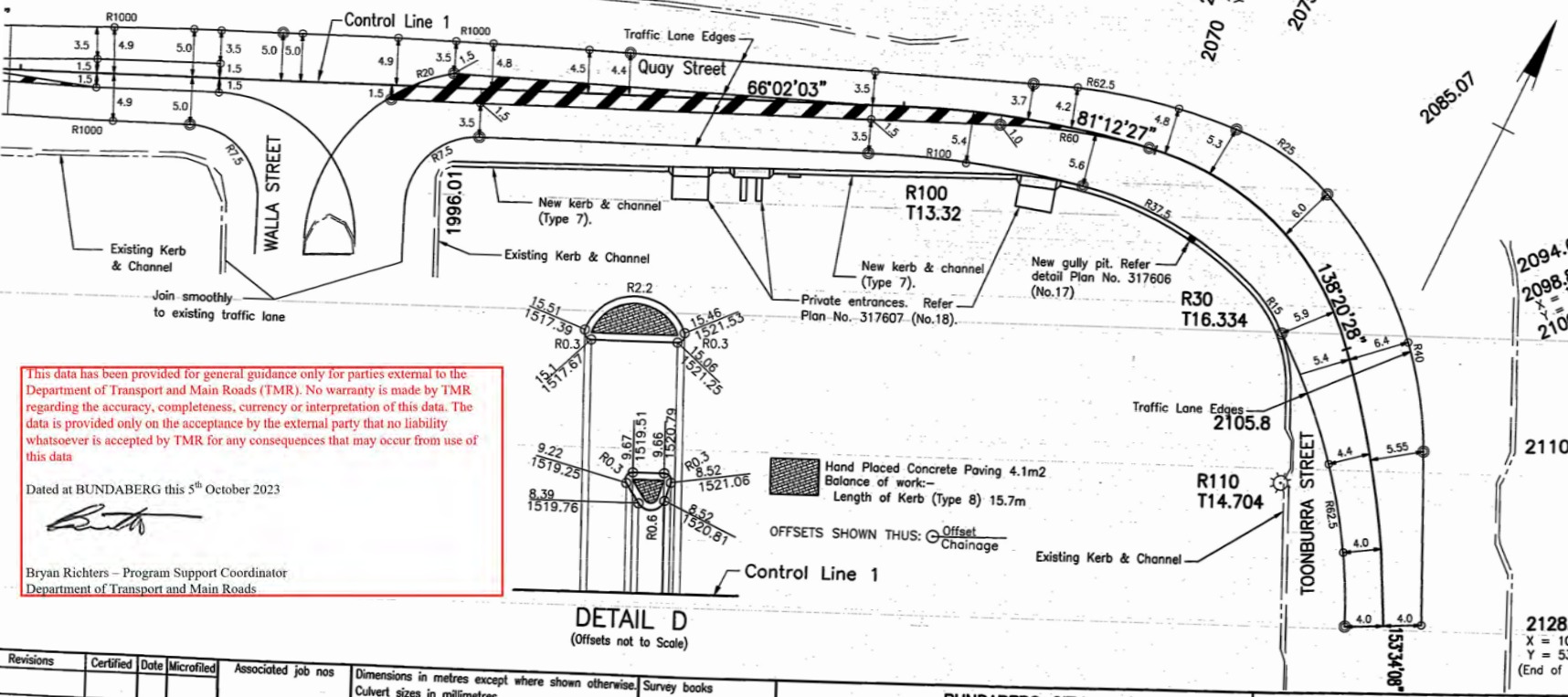
Refer Plan No.s 317609 – 317611 (No.s 20–22) for signs and pavement marking details.



NOTES: (1) For details of kerb types refer Std Dwg No.1033.
(2) Radii to be measured to the face of the kerb type 8 (Point 'A' on Std Dwg No.1033)

OFFSET (measured square from Control Line)
SEMI MOUNTABLE KERB (TYPE 8)
Offset / Chainage

◎ Tangent points on traffic lanes.
⊙ Offsets



IP CO-ORDINATES

Radius	X Co-ord.	Y Co-ord.
R100	10822.912	5368.94
R30	10852.217	5373.473
R110	10872.848	5350.283

DETAIL D
(Offsets not to Scale)

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
Original issue			

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales
0 2.5 5 7.5 10m Layout
0 1 2 3 4m Island Setting Out Details

Survey books

Through chainage from START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1817.38 – 2128.089

SETTING OUT DETAILS & ISLAND DETAILS
QUAY STREET

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	Ckd	Ckd	16/4/08	RPEQ 2897

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 15 of 25 Plans

Plan No. 317604 A

CAD REF: g:/...Data/Acad/141-174-6/317602.dwg

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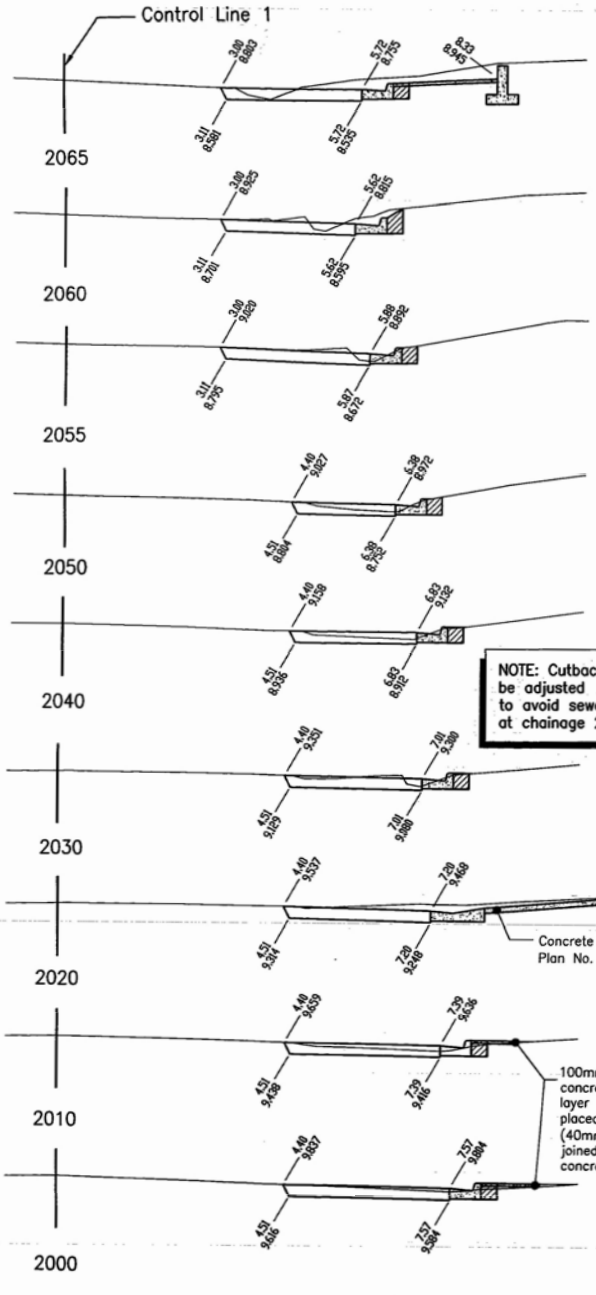
Form F808 (11/96)

KERB & CHANNEL SETTING OUT

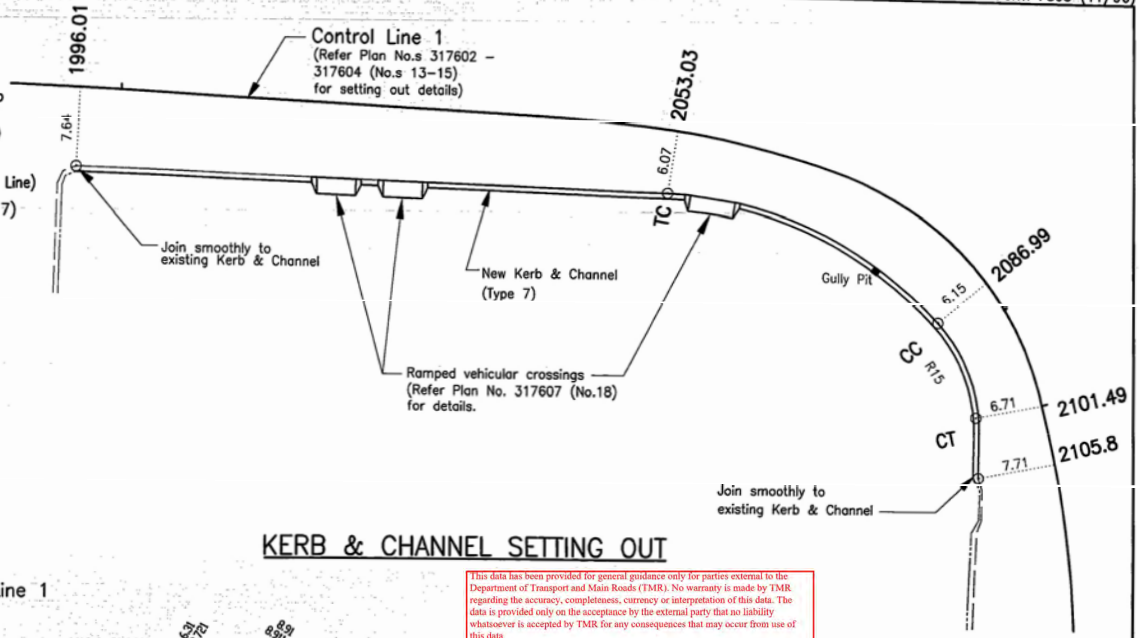


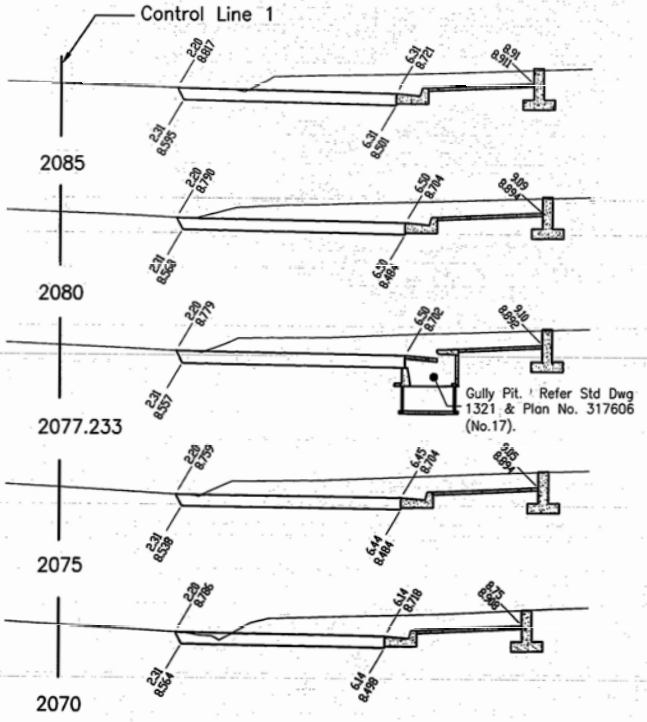
NOTES: (1) For details of kerb types refer Std Dwg No.1033.
(2) Radii to be measured to the lip of the channel for kerb type 7 (Point 'B' on Std Dwg No.1033)

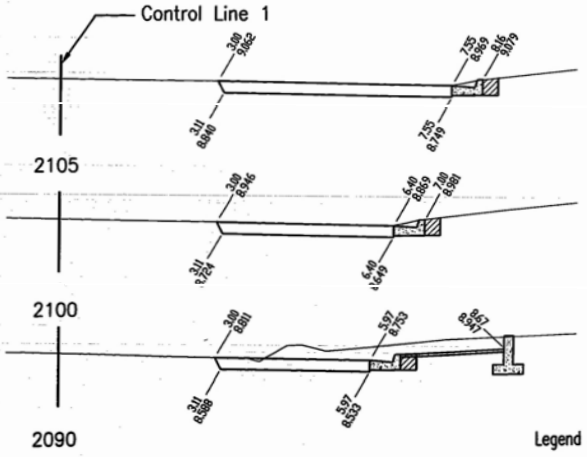
OFFSET (measured square from Control Line)
KERB & CHANNEL (TYPE 7)

NOTE: Finished Level Height of Retaining Wall is 9.2m.

NOTE: Cutback edge to be adjusted to avoid sewer manhole at chainage 2037.







RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			16/6/01A

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511
(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales
0 2.5 5 7.5 10 m KERB & CHANNEL DETAIL
0 0.5 1 1.5 2 m CROSS SECTIONS

Survey books

Through chainage from
START OF GAZETTAL
1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1996.01 – 2105.8

KERB & CHANNEL SETTING OUT AND ANNOTATED CROSS SECTIONS

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	Ckd	Ckd		RPEQ 2697

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 16 of 25 Plans

Plan No. 317605 A

CAD REF: G:/..DATA/ACAD/141-174-6/317605.DWG

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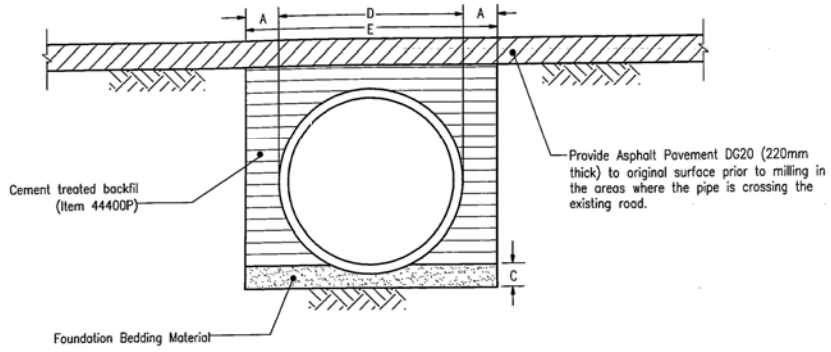
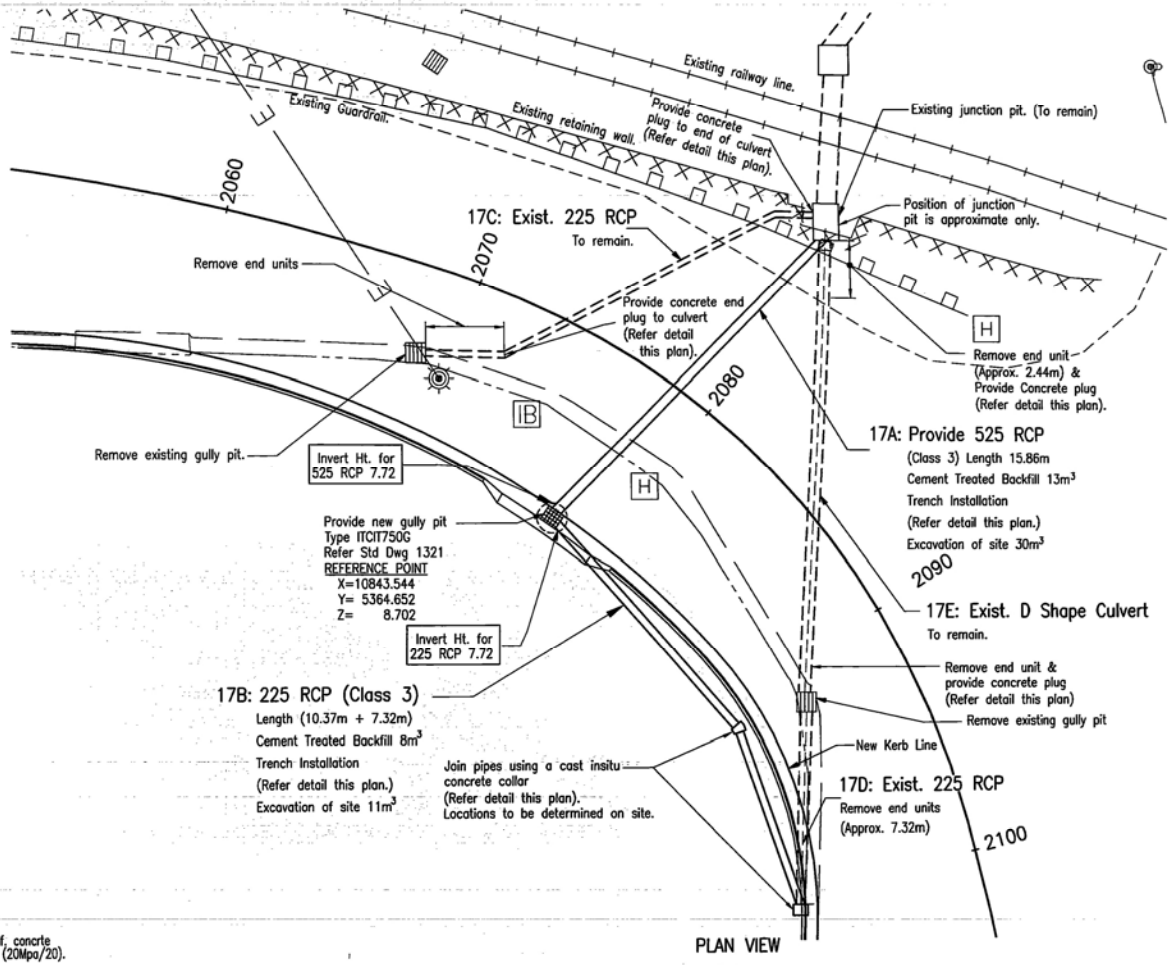


TRENCH INSTALLATION

(Refer Std. Dwg 1359 for dimensions)

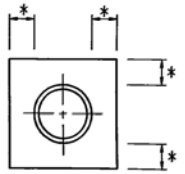
(Not to Scale)



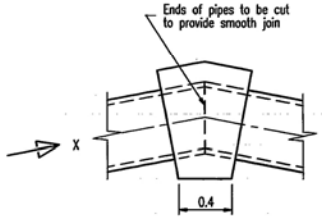
PLAN VIEW

STORMWATER DRAINAGE

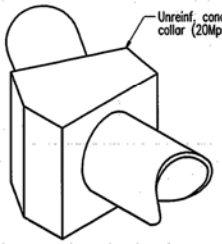
* 0.15 min. cover to RCP or PVC pipe as applicable.



VIEW X



PLAN VIEW

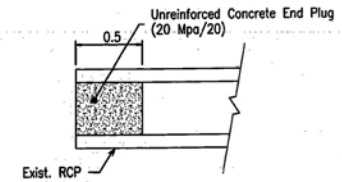


PICTORIAL VIEW

CONCRETE COLLAR TO CULVERTS

(Refer Supp. Spec. No.15)

(NOT TO SCALE)



PLUG END TO EXISTING CULVERT

(NOT TO SCALE)

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			MF6-01A

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511

(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales
0 1 2 3 4
Stormwater Drainage – Plan View

Survey books

Through chainage from
START OF GAZETTAL
1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1162.03 – 2128.089

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	MP	Ckd		RPEQ 2697

STORMWATER DRAINAGE
TOONBURRA STREET INTERSECTION

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 17 of 25 plans

Plan No. 317606 A

CAD REF: gdata/Acad/141-174-6/317606.dwg

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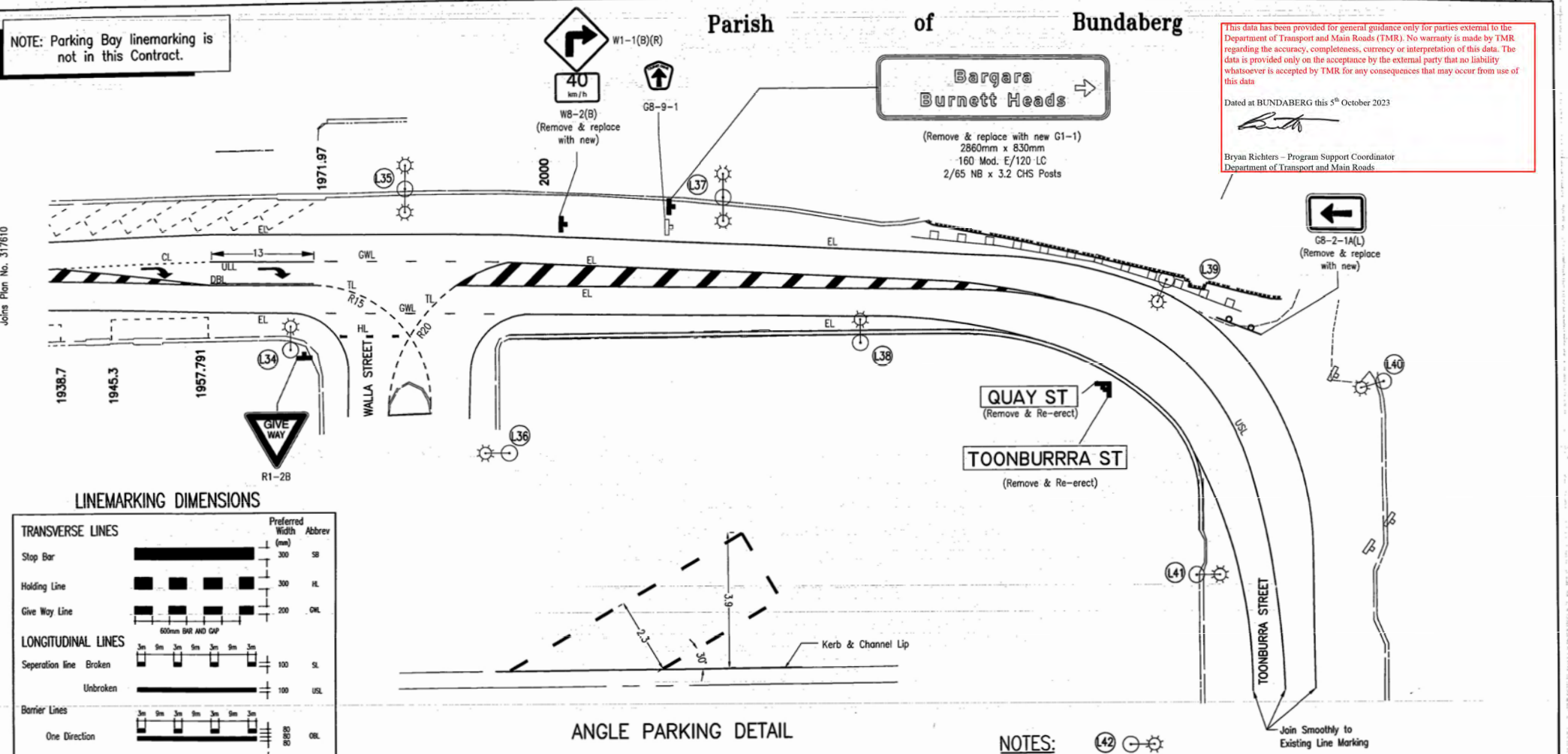
NOTE: Parking Bay linemarking is not in this Contract.

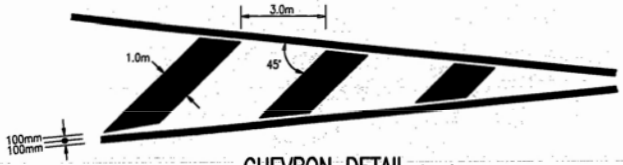
Parish of Bundaberg

Joins Plan No. 317610



LINEMARKING DIMENSIONS

ANGLE PARKING DETAIL



CHEVRON DETAIL (N.T.S.)

NOTES:

(1) Unless noted otherwise all signs =<1.0m in length shall be mounted on a single 50mm N.B. x 2.9mm C.H.S. posts.
(2) Unless noted otherwise all signs >1.0 in length shall be mounted on 2/50mm N.B. x 2.9mm C.H.S. posts.
(3) Signs & Pavement marking shall be in accordance with the Manual of Uniform Traffic Control Devices.
(4) Within the limits of the job, all existing signs are to remain unless noted otherwise.
(5) All new signs are to be in accordance with the Department's Specification ES126 – Road Signs.
(6) Refer Plan No. 317612 (No.23) for Illumination details.

LEGEND

- Road lighting Pole
- Outreach
- Luminaire
- Luminaire, Outreach, & Pole
- (L1) Pole Reference Number

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			MF6-01A

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511

(Office use only)

Dimensions in metres except where shown otherwise. Culvert sizes in millimetres.

Scales 0 5 10m

Survey books

Through chainage from START OF GAZETTAL 1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BAGARA ROAD
CTL CHGE 1950 – 2128.089

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	Ckd	Ckd		RPEQ 3697

PAVEMENT MARKING, SIGNS & LIGHTING

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 22 of 25 Plans

Plan No. 317611 A

CAD REF: gdata/Acad/141-174-6/317609.dwg

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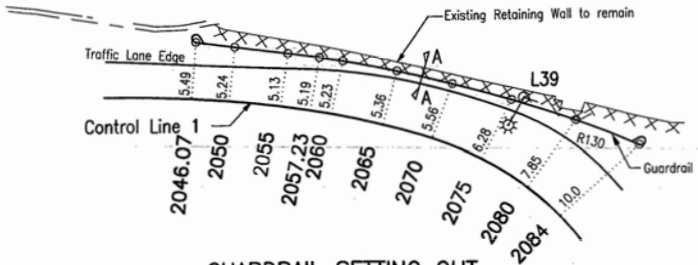
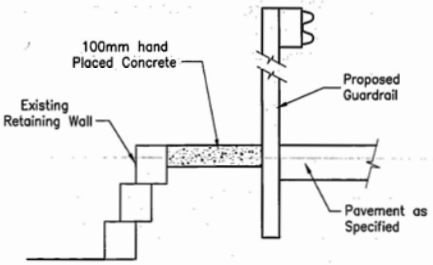


GUARDRAIL SETTING OUT

Offsets given to front face of guardrail panel
Post spacing 2m

All lighting works to be carried out by Ergon Energy



SECTION A–A

Not to Scale

GUARDRAIL MATERIALS SCHEDULE

DESCRIPTION	NO. REQD.
Single Guardrail End Panel φ	2
Guardrail Panel – 4m long (excl. outer end panel)	9
Steel Post & Block	19
Standard Stiffener	9
C1 Bolt with special nut – rail lap	64
C3 Bolt with nut & circular washer – rail to steel block	19
H1 Bolt with nut & circular washer – steel block to post	38
Delineator Bracket	4

φ Refer Std. Dwg. 1338 for End Panel Material Schedule

Refer to Std. Dwgs. 1340, 1342, 1343, 1344, 1346, 1347, & 1348 for fabrication details of Corrugated Steel Beam Guardrail Components

ILLUMINATION TABLE

Ref. No.	Luminaire Type	Pole Type	Outreach Arm	Mounting Height β	X Co-ord.	Y Co-ord.	Outreach Bearing	Comments
L1	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10028.8	5008.6	335° 00' 00"	Existing light to remain
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	
L2	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10063.7	5003.6	335° 00' 00"	
L3	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10083.9	5034.6	335° 00' 00"	Existing light to remain
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	
L4	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10121	5030.1	335° 00' 00"	
L5	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10130.1	5056.6	335° 00' 00"	Existing light to remain
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	
L6	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10144.2	5035.8	245° 00' 00"	
L7	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10162.6	5050.1	335° 00' 00"	
L8	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10186.3	5083.0	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing lig
L9	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10216.8	5075.4	335° 00' 00"	
L10	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10244.9	5110.6	335° 00' 00"	Existing lig
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	
L11	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10269	5099.9	335° 00' 00"	
L12	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10287.1	5130.4	155° 00' 00"	
	Sylvania 250W Roadster Son-T Aero						335° 00' 00"	
L13	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10329.8	5128.4	335° 00' 00"	
L14	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10312.9	5167.1	65° 00' 00"	
L15	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10353.5	5134.4	245° 00' 00"	
L16	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10349	5159.6	155° 00' 00"	
	Sylvania 250W Roadster Son-T Aero						335° 00' 00"	Requires new double outreach
L17	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10372.6	5170.8	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to remain
L18	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10406.1	5164.5	335° 00' 00"	
L19	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10435.8	5200.6	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to remain
L20	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10451.9	5185.8	335° 00' 00"	Provide new light & bracket
L21	Sylvania 250W Roadster Son-T Aero	Fixed Base	3.0 Single	9.0	10486.9	5215.1	155° 00' 00"	Provide new pole
L22	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10492.3	5205.3	335° 00' 00"	
L23	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10503.7	5232.1	335° 00' 00"	Existing light to remain
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	
L24	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10537.3	5226.5	335° 00' 00"	
L25	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10553.9	5225.4	245° 00' 00"	Provide new light & bracket
	Sylvania 250W Roadster Son-T Aero						65° 00' 00"	
L26	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10553.2	5255.4	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to remain
L27	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10591.2	5251.9	335° 00' 00"	
L28	Sylvania 250W Roadster Son-T Aero	Slip Base	2.0 Double	9.0	10612.6	5283.8	155° 00' 00"	Relocate pole
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to be reused
L29	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10622.1	5266.4	335° 00' 00"	
L30	Sylvania 250W Roadster Son-T Aero	Fixed Base	3.0 Single	9.0	10640.3	5296.8	155° 00' 00"	Provide new pole
L31	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10674	5312.4	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to remain
L32	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10684.8	5296	335° 00' 00"	Provide new light & bracket
L33	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10710.4	5308.1	335° 00' 00"	Provide new light & bracket
L34	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10746	5324.8	335° 00' 00"	
L35	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Double	9.0	10751.7	5349.1	155° 00' 00"	
	250W OptiSpec SCO Mercury Vapour						335° 00' 00"	Existing light to remain
L36	Sylvania 250W Roadster Son-T Aero	Existing	3.0 Single	9.0	10775.7	5326.4	245° 00' 00"	
L37	250W OptiSpec SCO Mercury Vapour	Existing	2.0 Double	9.0	10788.7	5364.6	335° 00' 00"	
	Sylvania 250W Roadster Son-T Aero						155° 00' 00"	Existing light to remain
L38	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10810.5	5354.7	335° 00' 00"	
L39	Sylvania 250W Roadster Son-T Aero	Fixed Base	4.5 Single	9.0	10843.7	5378.2	175° 00' 00"	Provide new pole
L40	Sylvania 250W Roadster Son-T Aero	Existing	4.5 Single	9.0	10874.7	5378.1	220° 00' 00"	Provide new light & bracket
L41	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10863	5345.8	65° 00' 00"	Provide new light & bracket
L42	Sylvania 250W Roadster Son-T Aero	Existing	2.0 Single	9.0	10882.4	5304.5	65° 00' 00"	

β Height specified is the luminaires designed height above pavement

Lighting Design is based on a 3 year maintenance period.
Pollution Catagory: Medium
Maintenance Factor: 0.74
Lighting Tariff is Rate 2
Lighting Catagory is V3.
Lamp: Sylvania S250

NOTES:

1. All poles to be provided with new luminaires as per the table unless stated otherwise.
2. All luminaires to be supplied with photo electric cells.
3. All outreaches must have a spigot upcast angle of 5° to the horizontal.
4. All new poles are 7m steel with 'curve type' outreaches with a 2.0m uplift.
5. All installations are to comply with any relevent local Electricity Supply Corporations Standards and Policies.
6. All new luminaires mounted on existing timber poles are to have aerial supply.
   Luminaire No.39 is to be powered by aerial supply.
   Luminaire No.'s 21, 28 & 30 are to be connected to the existing underground power supply.
7. Light 28 requires the construction of a slip base footing.
   Lights 21, 30 & 39 requires the construction of a fixed base footing. Refer Std Dwgs 1149, 1328, 1381, 1392
8. Lights L8, L9, L10, L11 & L12 have been upgraded prior to main works for the inclusion of the signalized Pedestrian Crossing.

RTCS - (Southern Queensland)
Design (Consulting)
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			MF601A

Associated job nos

Auxiliary drawing nos
317590 – 317612
317509 – 317511

(Office use only)

Dimensions in metres except where shown otherwise.
Culvert sizes in millimetres.

Scales
N.T.S.

Survey books

Through chainage from
START OF GAZETTAL
1.162 – 2.128

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
CTL CHGE 1162.03 – 2128.089

Survey	Bdys	Drawn	Design	Examined	Certified
Ckd	Ckd	mD	Ckd		RPEQ

GUARDRAIL SETTING OUT
GUARDRAIL MATERIALS SCHEDULE
& LIGHTING DETAILS (QUAY STREET)

Queensland Government
Department of Main Roads

JOB No. 141/174/6

No. 23 of 25 plans

Plan No. 317612 A

CAD REF: gdata/Acad/141-174-6/317612.dwg

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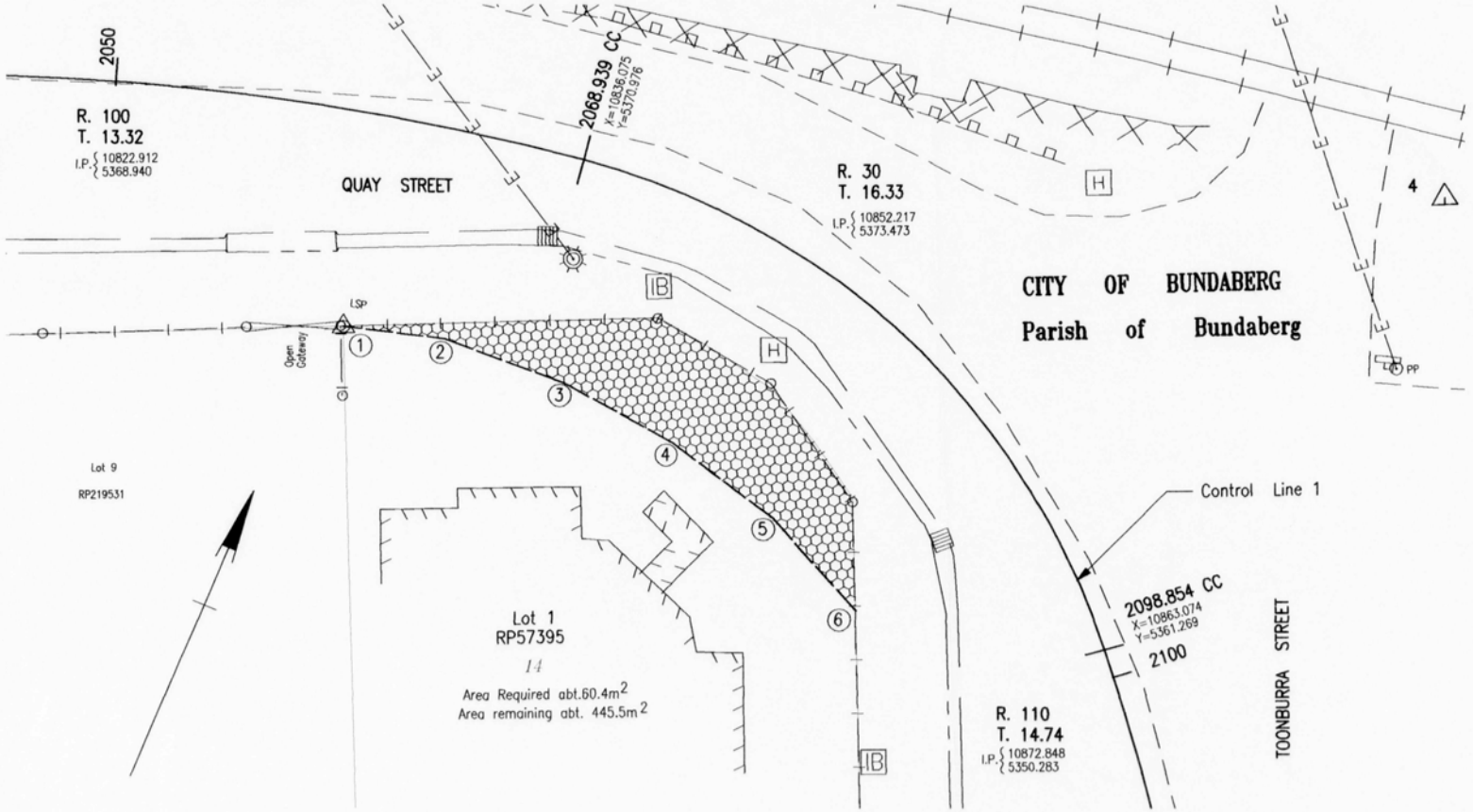


NOTES:

Chainages shown are Control Line 1 chainages
Station No's shown:- 6
Resumption Point No's shown:- (5)
X Co-ord = Easting & Y Co-ord = Northing

I/S CO-ORDINATES TABLE

Station	X Co-ord.	Y Co-ord.
4	10868.117	5383.390

RESUMPTION POINT CO-ORDINATES

Point	X Co-ord.	Y Co-ord.
1*	10829.983	5360.960
2	10833.964	5362.153
3	10838.957	5362.416
4	10843.937	5361.962
5	10848.800	5360.801
6*	10853.329	5358.682

* Resumption point on boundary line – co-ordinates are approximate.

MRD Drawing No:
434155
MF 06.08A

RTCS – (Southern)
Design Services
5 Kitchener St. Toowoomba

Revisions	Certified	Date	Microfiled
A Original issue			

File Reference and Resumption Details

File Ref.	Plan No.	Lot No.	Lot Details	Area Reqd.	Area Rem.
1	RP 57395	1	FREEHOLD	abt. 60.4m2	abt. 445.5m2

Cadastral Map 9348 – 24 | Parish of Bundaberg | County of Cook

Area required shown thus

Dimensions in metres except where shown otherwise.
Area in hectares (ha) or square metres (m2).

Survey books

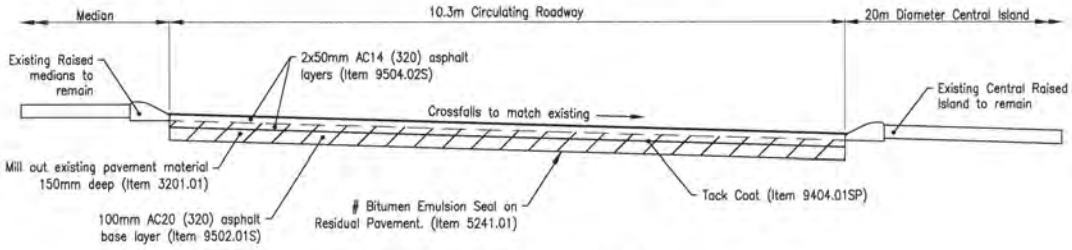
Working drawings x

Scale (m) 0 1 2 3 4

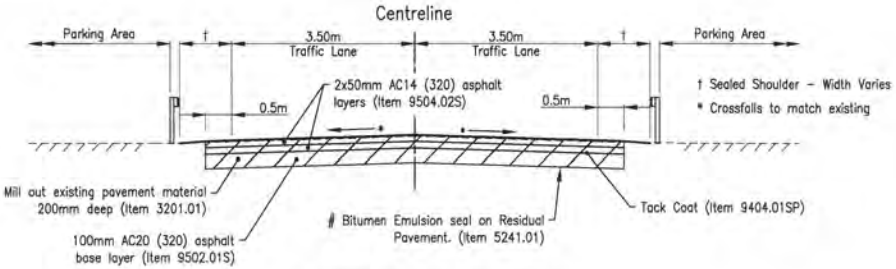
Drawn Checked | Registered Checked | Examined | Certified RPEQ | Approved Assistant Director Wide Bay 3/2/00

BUNDABERG CITY
BUNDABERG – BARGARA ROAD
Auxiliary drawings:

Main Roads
Job No. 141/174/6
No. 1 of 1 drgs
AUTH. No. 141/174/117
Drawing No. R12-478 A
CAD REF: Acad/141-174-6/R12-478



Ø A: REMOVE AND REPLACE ASPHALT
Toonburra Roundabout
Not to Scale



C: REMOVE AND REPLACE ASPHALT
Chge. 2.251km – 2.290km
Not to Scale

Pavement Design by TMR
AADT (Year 2012) = 17,267 VPD (2012)
% Heavy Vehicles = 6.24 % @ Ch 1.42km
Design ESA's = 4.31x10^6 ESA
Design Subgrade = CBR 5 (Soaked)
Design Life = 10 years

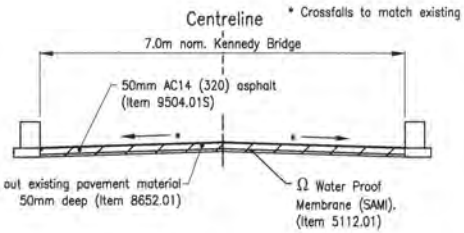
Ø PAVEMENT DESIGN & TRAFFIC DATA

The Works shown on the drawing are a factual representation of works constructed.

22/7/15

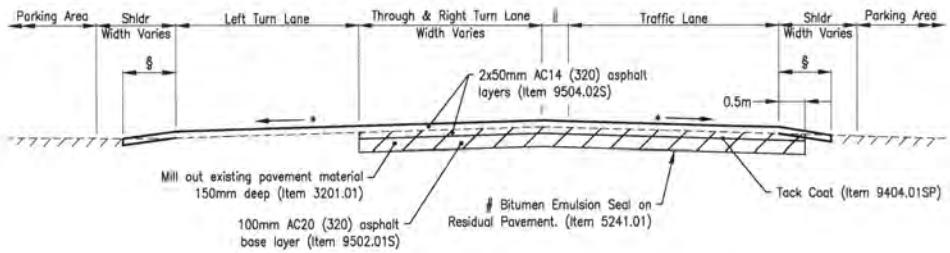
Stuart McNair | No. 8358

PAVEMENT RESURFACING DETAIL

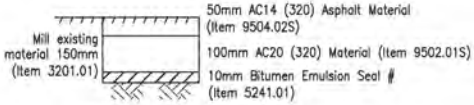


D: DECK WEARING SURFACE
KENNEDY BRIDGE
Chge. 2.29km – 2.34km
Not to Scale

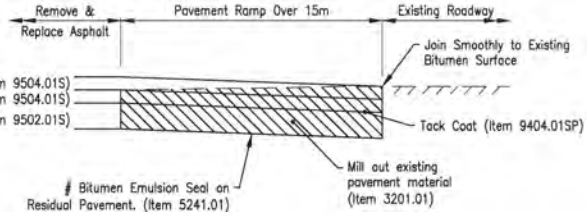
‖ Median – Width Varies
* Crossfalls to match existing
§ 1.0m Pavement Key-in



B: REMOVE AND REPLACE ASPHALT
Chge. 2.131km – 2.193km
Not to Scale



PAVEMENT STRENGTHENING DETAIL



PAVEMENT RAMP DETAIL
Transition from 150mm to 200mm Excavation
2.116km – 2.131km (RHS only); 2.236km – 2.251km
Not to Scale

Ω Water Proof Membrane (SAMI)

LOCATION	TYPE	BINDER	NOM. SPRAY RATE	COVER AGGREGATE
Kennedy Bridge	SAMI	S4.5S	2.1 litres/m2	14mm 90m2/m3

Bitumen Emulsion Seal

LOCATION	TYPE	BINDER	NOM. SPRAY RATE	COVER AGGREGATE
On residual pavement	Seal	Emulsion	1.0 litres/m2	10mm 130m2/m3

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B	AS CONSTRUCTED		22/7/15	MF 04.15
A	Issued For Construction			
	Revisions/Descriptions	Certification	Date	Microfiled

CAD FILES: C:\BUND\TechServ\Planning\174 – Bberg – Bargara\Toonburra St Roundabout Rehab\Autocad\As-Cons.dwg

Last Modified :- Jul 21, 2015 – 4:57pm XREFS :-

Associated Job Nos	
Auxiliary Drg Nos	REFER DRAWING INDEX ON DRAWING NO. 578274
Survey Books	

Survey Data	
Datum	GDA94
Horiz. Grid	MGA94 Zone 56
Height Origin	AHD Derived

Scales: Not To Scale
Dimensions shown in metres except where shown otherwise

BUNDABERG REGIONAL COUNCIL
BUNDABERG – BARGARA RD; BUNDABERG – PORT RD
CTL CHGE 1.22km – 2.34km (174); 2.176km – 2.45km (175)

Reference Points				
Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

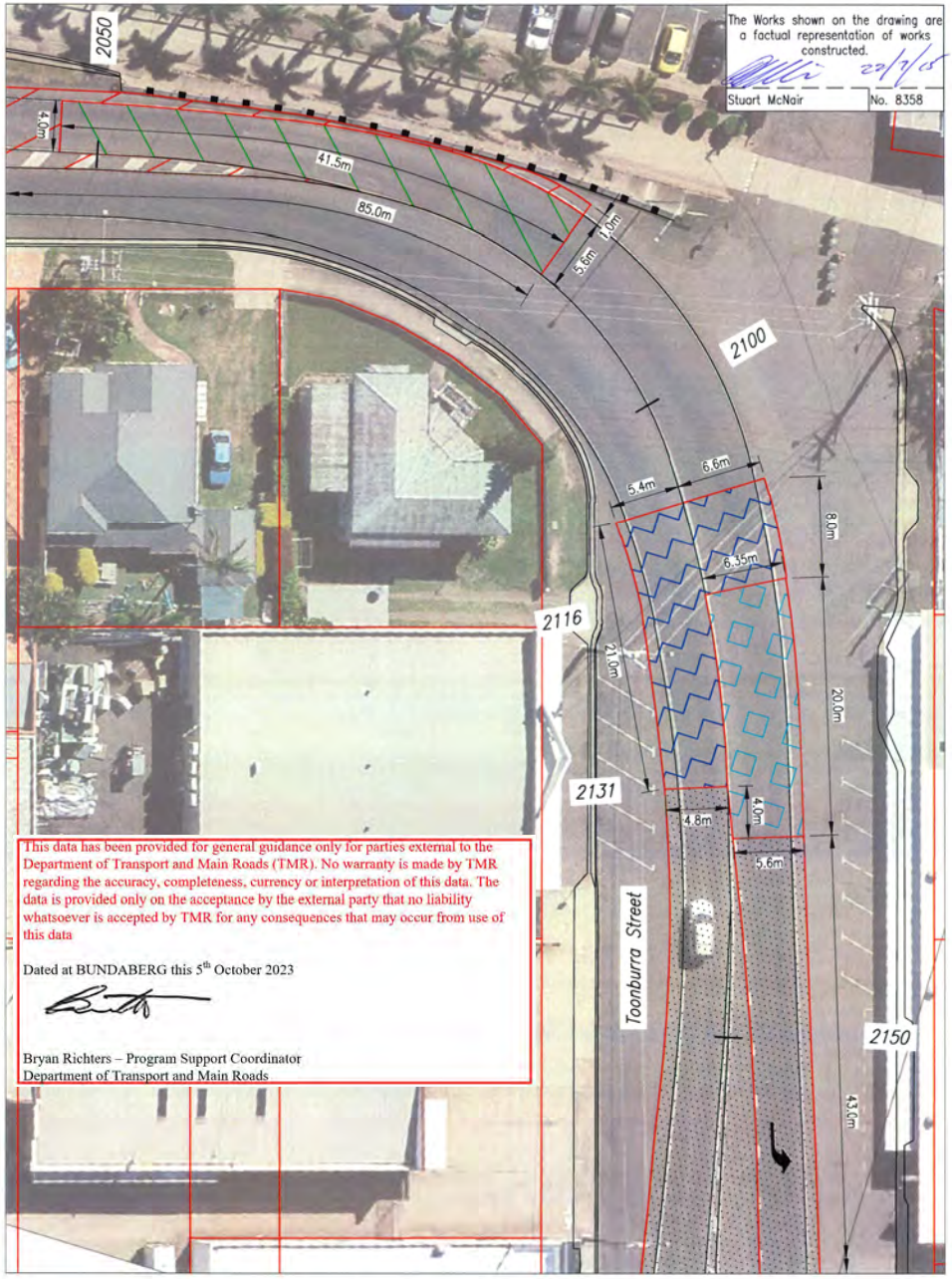
TYPE CROSS SECTIONS & MISCELLANEOUS DETAILS

Drawn: M. Salmond
Designed: M. Salmond

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	S. McNair		8358	3/11/2014

Queensland Government

Job No.	211/174/801
Contract. No.	CTWD-1205
Drawing No.	578275 B
Series Number	2 of 7
	MRR_Detail (02/14)



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Stuart McNair | No. 8358 | 22/7/15

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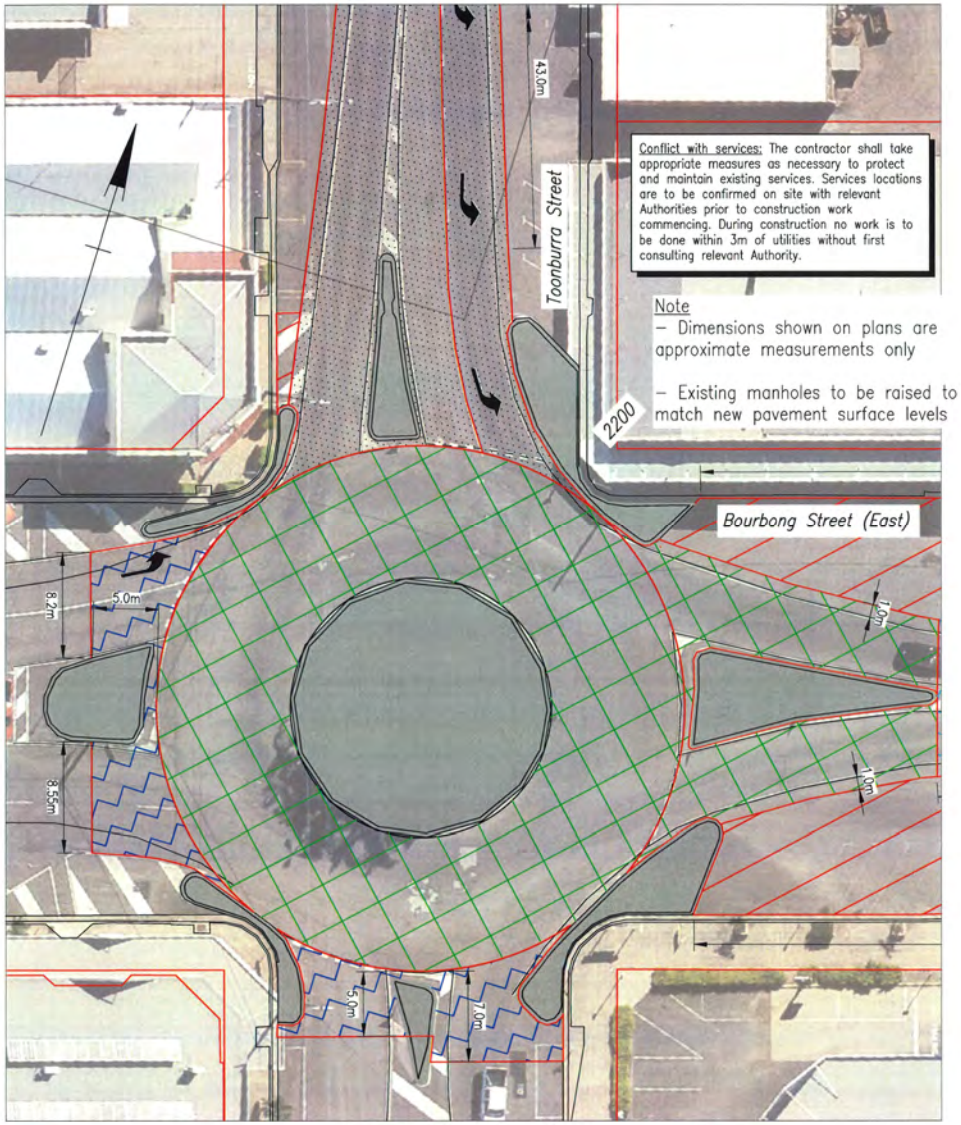
Dated at BUNDABERG this 5th October 2023

Bryan Richters – Program Support Coordinator
Department of Transport and Main Roads



Conflict with services: The contractor shall take appropriate measures as necessary to protect and maintain existing services. Services locations are to be confirmed on site with relevant Authorities prior to construction work commencing. During construction no work is to be done within 3m of utilities without first consulting relevant Authority.

Note
– Dimensions shown on plans are approximate measurements only

– Existing manholes to be raised to match new pavement surface levels

Refer to Pavement Ramp Detail, Drawing No. 578275

Refer to Type Cross Section A, Drawing No. 578275

50mm DG14 Key-in

Refer to Type Cross Section B Drawing No. 578275

Refer to Pavement Resurfacing Detail, Drawing No. 578275

Refer to Pavement Strengthening Detail, Drawing No. 578275

Joins Drawing No. 578277

Joins Drawing No. 578279

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B	AS CONSTRUCTED		22/7/15	MF 04.56
A	Issued For Construction			
	Revisions/Descriptions	Certification	Date	Microfiled

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Last Modified :- Jul 21, 2015 - 4:57pm XREFS :-

Associated Job Nos:

Auxiliary Drg Nos: REFER DRAWING INDEX ON DRAWING NO. 578274

Survey Data

Datum	GDA94
Horiz. Grid	MGA94 Zone 56
Height Origin	AHD Derived
Survey Books	

Scales: 0 2 4 6 8m

Dimensions shown in metres except where shown otherwise

BUNDABERG REGIONAL COUNCIL

BUNDABERG – BARGARA RD; BUNDABERG – PORT RD

CTL CHGE 1.22km – 2.34km (174); 2.176km – 2.45km (175)

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

GENERAL ARRANGEMENT
174 – BUNDABERG – BARGARA RD
(SHEET 3 OF 4)

Drawn: M. Salmond
Designed: M. Salmond

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	S. McNair		8358	3/11/2014

Queensland Government

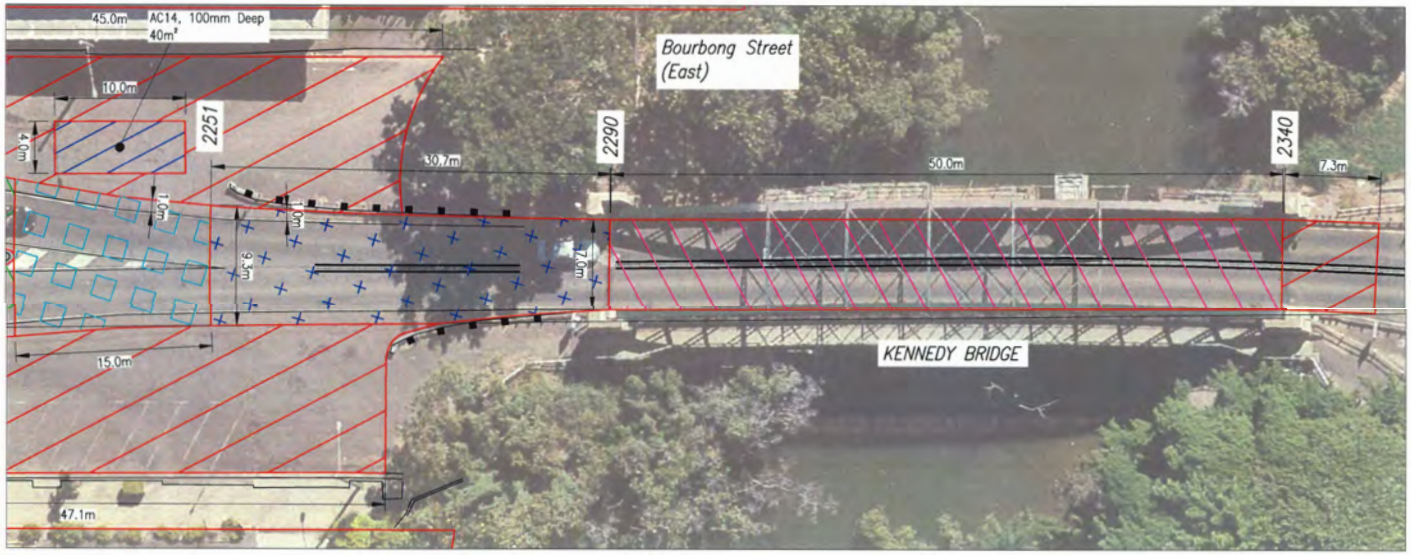
Job No.	211/174/801
Contract No.	CTWD–1205
Drawing No.	578278 B
Series Number	5 of 7

MRR_Detail (02/14)

The Works shown on the drawing are a factual representation of works constructed.

22/7/15

Stuart McNair | No. 8358



Refer to Pavement Resurfacing Detail, Drawing No. 578275

Refer to Pavement Ramp Detail, Drawing No. 578275

Refer to Type Cross Section C, Drawing No. 578275

Refer to Type Cross Section D, Drawing No. 578275

Conflict with services: The contractor shall take appropriate measures as necessary to protect and maintain existing services. Services locations are to be confirmed on site with relevant Authorities prior to construction work commencing. During construction no work is to be done within 3m of utilities without first consulting relevant Authority.

Notes
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- Existing manholes to be raised to match new pavement surface levels

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Dated at BUNDABERG this 5th October 2023

Bryan Richters – Program Support Coordinator
Department of Transport and Main Roads

Joins Drawing No. 578278

Last Modified :- Jul 21, 2015 – 4:55pm XREFS :-

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	Revisions/Descriptions	Certification	Date	Microfiled

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Associated Job Nos

Auxiliary Drg Nos: REFER DRAWING INDEX ON DRAWING NO. 578274

Survey Data: Datum GDA94; Horiz. Grid MGA94 Zone 56; Height Origin AHD Derived; Survey Books

Scales: 0 2 4 6 8m

Dimensions shown in metres except where shown otherwise

BUNDABERG REGIONAL COUNCIL

BUNDABERG – BARGARA RD; BUNDABERG – PORT RD

CTL CHGE 1.22km – 2.34km (174); 2.176km – 2.45km (175)

Reference Points: Preceding RP | Dist. to start of job (km) | From start to end of job | From end to Following RP | Following RP

Through Chainage from

GENERAL ARRANGEMENT
174 – BUNDABERG – BARGARA RD
(SHEET 4 OF 4)

Drawn: M. Salmond
Designed: M. Salmond

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	S. McNair		8358	3/11/2014

Queensland Government

Job No.	211/174/801
Contract. No.	CTWD–1205
Drawing No.	578279 B
Series Number	6 of 7

MRR_Detail (02/14)

Appendix C – Saltwater Creek Pump Station and Flood Gate Mechanical Plan Draft (SMEC 2024).

Appendix D – Structural Condition Assessment (SMEC 2024).

SMEC

Member of the Surbana Jurong Group

SMEC INTERNAL REF. 30034151-4.1

Technical Report

EPW00390 – Structural Condition Assessment (30034151-RPT-4.1-001)

Client Reference No. EPW00390
Prepared for: Department of Housing, Local Government, Planning and Public Works
23 May 2024

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Leveraging our 70-year history of delivering nation-building infrastructure, we provide technical expertise and advanced engineering services to resolve complex challenges.

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Document Control

Document Type	Technical Report
Project Title	EPW00390 – Structural Condition Assessment (30034151-RPT-4.1-001)
Project Number	30034151-4.1
File Location	\\filer.nasuni.local\smecanz\Projects\300341\30034151\100 Prelim Design\Structural
Revision Number	0

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
0	23/05/2024	Harry Pagliaro Rachel Petersen Lachlan Oberhofer	Luke Menefy Ross Pritchard Daniel Sullivan	Rob Tredger

Issue Register

Distribution List	Date Issued	Number of Copies
Department of Housing, Local Government, Planning and Public Works	23/05/2024	1

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Signature	

Important Notice

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Contents

Appendices

Figures

Tables

Photos

1. Introduction

1.1 Project background

In 2019, detailed hydrologic and hydraulic modelling for river management and the concept design was undertaken for a flood wall, large flood gates and pump station to protect East Bundaberg from flooding. The Bundaberg East Levee (BEL) design will include a flood gate and pump station at the outlets of both Saltwater Creek and the unnamed "Distillery Creek". The flood gates are to be closed during regional flood events as to prevent backwater flooding from the Burnett River.

The floodplain shape means that a relatively short length of levee can be built to enclose and provide protection to approximately 600 residential properties and approximately 350 commercial properties in the CBD and East Bundaberg, with the levee height specified to provide protection from a 1% AEP flood event. This will provide protection against a flood event equivalent to the 2013 event with circa 150mm freeboard.

1.2 Objectives of this report

The objective of this report is to:

1. Provide a summary of the Saltwater Creek Bridge site inspection.
   - Inspection methodology.
   - Review of existing information.
   - Photographs of structure.
   - Visual inspection findings.
2. Undertake a qualitative desktop structural assessment of the existing bridge.
   - Review of the site inspection.
   - Recommendations on options required to mitigate impacts from BEL to the heritage structure without compromising levee performance. This shall include impacts during and post-construction.

1.3 Scope

1.3.1 Visual inspection

The scope of the visual inspection includes a full visual defect survey of the structure and review of existing reports to ensure all defects are captured. The inspection will ascertain the extent, severity, type, and criticality of defects.

1.3.2 Structural desktop assessment

The scope of the structural desktop assessment is to summaries the construction controls and monitoring required to mitigate impacts to the heritage structure taking into consideration the information gathered from the visual inspection. Recommendations and options for temporary and/or permanent works required to support and protect the bridge during and/or post-construction will be provided.

Quantitative assessment of the bridge structure, including structural modelling and analysis, and service life calculations, is excluded from the scope of the structural assessment. SMEC has assumed that the BEL will be constructed within the next 5 years.

1.4 Bridge description

The Saltwater Creek Bridge was constructed circa 1894 and is located over Saltwater Creek, near Quay Street Bundaberg (as shown in Figure 1-1). The bridge is listed on the Queensland Heritage Register (QHR). The former railway bridge is currently being utilised as a pedestrian bridge across and is owned by Bundaberg Regional Council.

Figure 1-1 Location map of Saltwater Creek Bridge (Image Courtesy of Queensland Globe)

1.5 Location of proposed work

The location of the proposed works with respect to the existing bridge is shown in Figure 1-2.

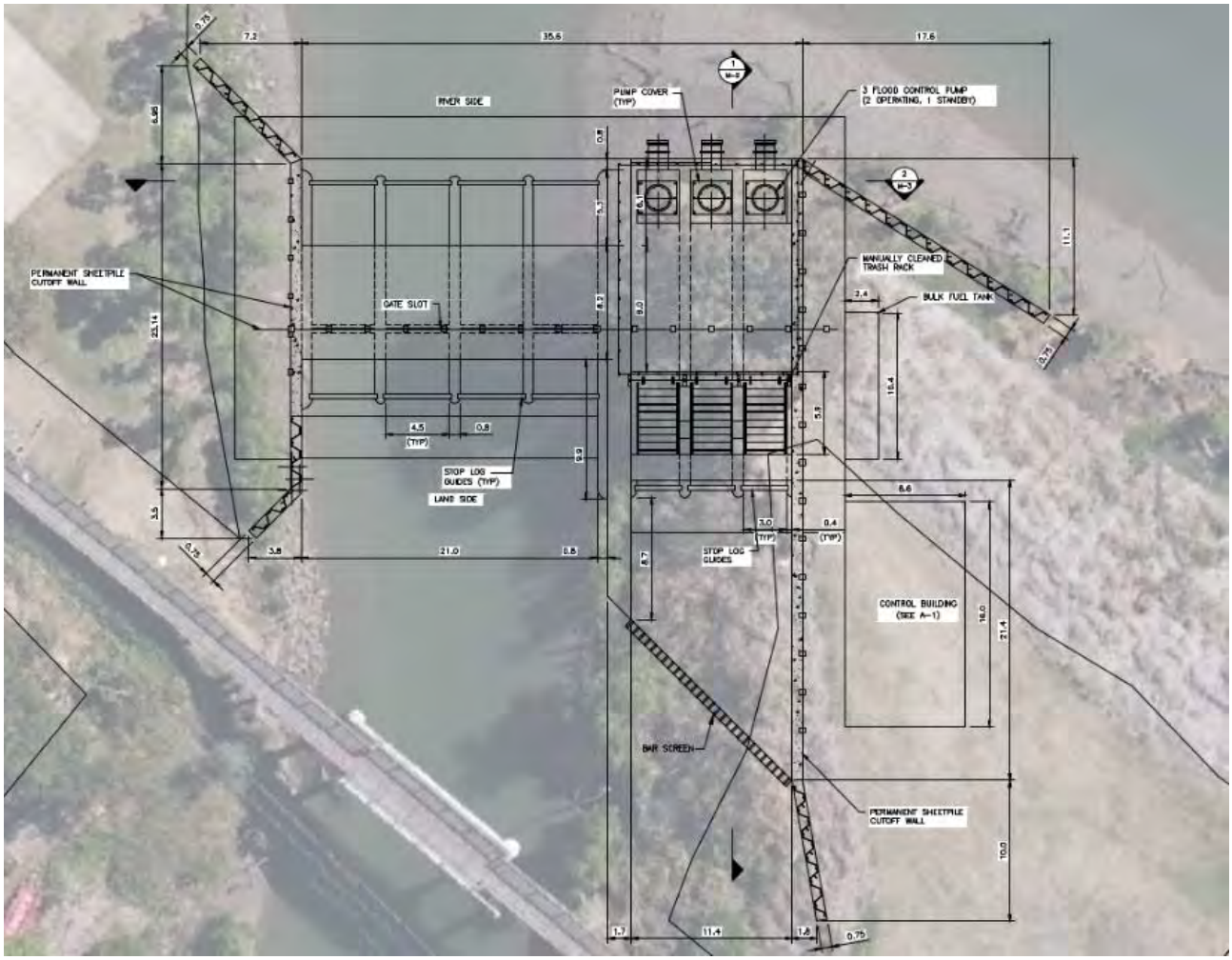

Figure 2-1 Location of Proposed Levee near the Saltwater Creek Bridge

2. Methodology

2.1 Visual inspection

2.1.1 Desktop review

All documentation provided by the Department of Housing, Planning and Public Works was reviewed prior to the commencement of site works. Details of the documents received, and the review is provided in Section 3.

2.1.2 Bridge naming convention

The bridge naming convention and component terminology is as per Transport and Main Road QLD (TMR) 'Structures Inspection Manual' (2016).

For Saltwater Creek Bridge, Abutment 1 is taken as the western abutment, which is consistent with the provided Level 2 Inspection Report and the original bridge drawings.

2.1.3 Site inspection details

Site inspections were undertaken on:

- 3 April 2024 (Saltwater Creek Bridge inspection activities by SMEC engineers).

2.1.4 Visual inspection

Visual inspections were carried out to evaluate the current condition of the bridge components in scope. The visual inspection involved the following:

- Saltwater Creek Bridge was subject to a visual inspection from ground level (creek banks) and from deck level on top of the bridge. An RPA (drone) was utilised to supplement the visual inspection.
- Recording of defects such as cracking (>0.2 mm in width), corrosion, spalling, delamination, and rust spots. Measurement of sizes of defects were recorded where appropriate.
- Hammer soundness (delamination) on reinforced concrete components. The extent of delamination of each component was recorded.
- Photographs of surfaces showing defects such as, spalling, exposed reinforcement, corrosion stains, dampness and/or moisture seepage, shall be recorded.

Results of the visual inspection and delamination survey are discussed in Section 4 of this report.

2.1.5 Limitations

The inspection was subject to the following limitations:

1. Buried components were out of scope and not inspected.
2. Underwater components were out of scope and not inspected.
3. Inaccessible components, i.e. those obstructed by untraversable vegetation were not inspected.

3. Desktop review

3.1 Structure summary

Saltwater Creek Bridge was constructed circa 1894 and consists of ten (10) spans with a deck consisting of FRP pedestrian walkway upon timber sleepers, timber girders, timber piers and two (2) sets of cast iron piers. Concrete elements include, cast in situ mass concrete abutment walls, cast in situ mass concrete pier 1, and cast in situ mass concrete footings for pier 4 and 7.

The creek waterway is tidal, flowing into the Burnett River, at the site resulting in saline exposure conditions for the substructure components (cast iron piers) in creek. The bridge is located approximately 13 km from the mouth of the river at Burnett Heads, resulting in moderately aggressive atmospheric exposure conditions for substructure components.

A summary of the structure is provided in Table 3–1. The bridge naming convention adopted is detailed in Section 2.1.2.

Table 3–1 Saltwater Creek Bridge Structure Summary

Item	Description
Queensland Heritage Register Bridge ID/Name	• 600370/Saltwater Creek Railway Bridge
Location	• Saltwater Creek (between Quay Street and Quay Street), Bundaberg Central, 4670
Number of Spans / Length	• 10 spans
Overall Width / Width Between Pedestrian Barriers	• 3.89 m/2.3 m
Date of Construction	• Circa 1894
Deck superstructure	• Timber spans have timber girders on timber corbels and headstocks • Span 5 consists of steel plate girders, steel cross girders, steel strut beams and steel cross bracing
Bearings	• Piers 5 and 6 cross beams rest on bearing plates on top of cast iron screw piles
Piers	• Pier 1 is a mass concrete (unreinforced) wall • Piers 2 – 4 are timber trestle piers • Piers 5 and 6 are cast iron screw piles with steel cross beams • Piers 7 – 9 are timber trestle piers
Abutments	• Cast in situ mass concrete (unreinforced)

A brief chronological history of the bridge follows:

- 1894 - Original construction.
- 1965 - Strengthening of the bridge superstructure with steel girders suitable for a 12-tonne axle loading, and work including addition of two cross girders, two sets of beams as lateral restraint for cross girders, and repairs to bracing on piers was carried out.
- Unknown date between 1965 and 2007 - Replacement of bracing members installed between the steel piles. Replacement of timber elements including sleepers over time. Repainting of steel elements over time.
- 2007 – Conversion of railway bridge to enable pedestrian and cycle traffic by installation of balustrades/handrails and timber decking. Repair to the structure was also carried out at this time including demolition of existing retaining walls on both abutments and rebuilt in masonry, construction of masonry headwall to the back of both abutments, addition of anti-splitting bands on selected elements, replacement of corroded wale bracing on pier 5, and cleaning and lanolin treatment of all timber elements where required.
- 2022 – Stage 1 Repair Works: Replacement of several girders, corbels, and headstock members. New bottom plate at pier 5. Replacement of all timber sleepers. Replacement of all bolts and steel connections. Replacement

of timber at platforms and placement of one platform (span 3) into storage as it obstructs access for heavy machinery to the worksite. The platform is to be re-installed following completion of steel repair works. Installation of new FRP decking. Repair/replacement of handrails where required.

3.2 Provided information

3.2.1 Design drawings

Twenty-seven (27) design drawings were provided (attached as Appendix A) as detailed in Table 3–2.

The general arrangement of the bridge was broadly consistent with the provided drawings; however, a detailed dimensional survey was not undertaken to verify. The most notable deviations from the design drawings were:

- Original design show abutment 1 as pier 1 (11 piers, 10 spans)
- Council drawings from 2007 show abutment 1 as an abutment A (9 piers, 10 spans)
- Bligh Tanner 2020 design drawings show abutment 1 as pier 1 (11 piers, 10 spans)

Table 3–2 List of drawings

Drawing number	Year	Revision	Title
8	1965 (Copy of Damaged Original Drawing)	Nil	Bridge Over Saltwater Creek – General Drawing
10	1965 (Copy of Damaged Original Drawing)	Nil	Bridge Over Saltwater Creek – Steel Superstructure
S11758	1965	Nil	Strengthening of Saltwater Creek Bridge - Woongarra Brance – Details of 50 FT. Steel Span
S11759	1965	Nil	Strengthening of Saltwater Creek Bridge - Woongarra Brance – Details of 50 FT. Steel Span
S11824	1965	Nil	Strengthening of Saltwater Creek Bridge - Woongarra Brance – Erection Procedure
S7907/1	No Date	Nil	Bridge Over Saltwater Creek – Repairs to Bracing on Piers
16116-S01	2007	Nil	Drawing Index, Locality & Structural Notes (Sheet 1 of 5)
16116-S02	2007	Nil	Existing Structure and Remedial Works (Sheet 2 of 5)
16116-S03	2007	Nil	Proposed Cycleway/Walkway (Sheet 3 of 5)
16116-S04	2007	Nil	Sections & Details (Sheet 4 of 5)
16116-S05	2007	Nil	Miscellaneous Details (Sheet 5 of 5)
S000	2020	P1	Cover sheet
S001	2020	P1	Notes sheet
S010	2020	P1	Saltwater creek bridge plan and elevation
S0101	2020	P1	Span 1 Timber Remediation Work Details
S0102	2020	P1	Span 2 Timber Remediation Work Details
S0103	2020	P1	Span 3 Timber Remediation Work Details
S0104	2020	P1	Span 4 Timber Remediation Work Details
S105	2020	P1	Span 5 Timber Remediation Work Details
S107	2020	P1	Span 7 Timber Remediation Work Details
S108	2020	P1	Span 8 Timber Remediation Work Details

Drawing number	Year	Revision	Title
S109	2020	P1	Span 9 Timber Remediation Work Details
S110	2020	P1	Span 10 Timber Remediation Work Details
S203	2020	P1	Span 6 Steel Remediation Work Details - Sheet 4
S202	2020	P1	Span 6 Steel Remediation Work Details - Sheet 3
S201	2020	P1	Span 6 Steel Remediation Work Details - Sheet 2
S200	2020	P1	Span 6 Steel Remediation Work Details - Sheet 1

3.2.2 Design loads

The structural design for the 2022 refurbishment works to Saltwater Creek Railway Bridge adopted the design loads presented below. These loads are noted on Drawing No. 16116-S01, and represent the loading for which the bridge, as it existed at the completion of these works, was designed to carry.

3.2.2.1 Dead loads

The general dead load adopted in the 2022 design was based on the material values prescribed in AS/NZS 1170.1. Additionally, the design considered with additional superimposed dead loads of 1.0kPa.

3.2.2.2 Live loads

The 2022 design considered live loads of a 5kPa and 4.5kN concentrated.

3.2.2.3 Wind loads

Wind loads consist of the following details:

- Region: C
- Terrain Category: 2
- $M_{z.CAT}$: 1.0
- M_s: 1.0
- M_t: 1.0
- M_d: 0.95
- Regional Wind Speed V_R: 69.3m/s
- Design Wind Velocity V_U: 65.8m/s

3.2.2.4 Earthquake Loads

The Earthquake loads were determined in accordance with AS 1170.4 and adopted the following values:

- S = 1.0
- O = 0.12
- I = 1.0
- Structure Type = I
- Design Category = B

3.2.3 Past reports

A summary of the reports made available for SMEC's review is provided below. SMEC's review has highlighted components in condition state (CS) 3 and 4.

Bligh Tanner ReportsBligh Tanner was engaged to complete a Level 2 and subsequent Level 3 inspection in 2020 and report their findings. Key assessment findings includes:

- Fungal decay was observed within numerous timber members along each span of the bridge. All of the main timber members were observed with some level of decay ranging from minor to moderate. Several members were observed with very high levels of decay and required replacement (Condition State 4). Pile 2 located at Pier 5 was observed with extensive termite damage and fungal decay.
- Timber splitting defects were observed at numerous timber piles/columns, girders, corbels, headstocks, and bracing members. A number of wale beams along the bridge were also observed with significant splitting. Large pipes or hollow decay regions within the timber girders and corbels were observed and identified through the drill testing completed onsite during the inspections (Condition State 3)
- A large number of existing timber railway sleepers were observed to have a high degree of fungal decay and damage (Condition State 4). In some areas, existing damaged and decayed sleepers were observed to have been left in place with new sleepers installed for pedestrian bridge decking purposes.
- Some timber longitudinal cracks or splitting, shrinking, and deterioration were identified on the handrail timber members were identified (Condition State 3).
- Corrosion was observed along with some areas on the main girders, cross girders, and longitudinal girders associated with the central Span 6 and also at this location the protective coating for the steel bridge was observed to be failing at multiple locations. Higher corrosion was noted on Main Girder 1, potentially as a as a result of the timing or uneven application of the protective coating system over the lifespan of the structure.
- High levels of corrosion were also observed in the bracing members installed between the steel piles (Condition State 4). These bracings have been replaced during a previous maintenance period.
- Moderate levels of corrosion were also observed to be occurring within the four steel piles (Condition State 3). The steel piles were observed to be still structurally adequate to resist pedestrian loads.
- Significant corrosion was also observed on all bolts, plates, and washers throughout the extent of the timber spans of the bridge (Condition State 3)
- Spalling of concrete piers was noted in several locations. Subsequent Level 3 investigation however confirmed that no rehabilitation work was required for the concrete work as it is entirely mass concrete only without reinforcing steel.

Saltwater Creek Railway Bridge – Conservation Management Plan – Converge (October 2022)

Converge undertook a site visit at the completion of the Stage 1 works in May 2022 to report their findings. Key assessment findings includes:

- Several top handrail bolts are installed incorrectly and holes from previous installations are not filled, potentially resulting in water penetration and decay. Not all replacement handrail boards match the size of the existing and some members are too short.
- Major timber splitting was observed at the toe kick handrailing in some places. The connector plates are missing in some places on the bottom hand rails and some plates are missing some screws.
- Corrosion was observed along with some areas on the main girders, cross girders, and longitudinal girders associated with the central Span 6 and also at this location the protective coating for the steel bridge was observed to be failing at multiple locations. Higher corrosion was noted on Main Girder 1, potentially as a result of the timing or uneven application of the protective coating system over the lifespan of the structure.
- High levels of corrosion were also observed in the bracing members installed between the steel piles. These bracings have been replaced during a previous maintenance period.
- Moderate levels of corrosion were also observed to be occurring within the four steel piles. The steel piles were observed to be still structurally adequate to resist pedestrian loads.

- Spalling of concrete piers was noted in several locations. A subsequent Level 3 investigation confirmed that no rehabilitation work was required for the concrete work as it is entirely mass concrete only without reinforcing steel.

4. Visual inspection findings

Visual inspection findings are detailed below. Defects maps are provided in Appendix B. Photographs are provided throughout.

4.1 Substructure

4.1.1 Piers

For piers 5 and 6, approximately 4 m of pile was exposed above waterline at the time of SMEC's inspection on 3 April 2024. The following defects are above the waterline at the time of inspection.

Findings were as follows:

- Pier 1 – Mass concrete (unreinforced)
  - Mass concrete pier was in sound condition (Photo 1, Photo 2). One (1) x isolated defective area was observed, a 300 mmm x 200 mm delaminated area on the left hand side top corner of the mass concrete pier (Photo 3).
- Pier 2 – Timber
  - Timber piles were in fair condition (Photo 4). Vertical splitting was observed in all piles (Photo 5).
- Pier 3 – Timber
  - Timber piles were in sound condition. Vertical splitting below the headstock was observed on one (1) pier (Photo 7).
  - Several fixings exhibited surface corrosion, including cross bracing bolts on both pier faces (Photo 7).
- Pier 4 – Timber with Mass Concrete (Unreinforced) Footing
  - Timber piles were in fair condition (Photo 8). Vertical splitting was observed in all piles (Photo 9, Photo 11).
  - Several fixings exhibited surface corrosion, including cross bracing bolts on both pier faces (Photo 11) and three (3) base plates from the piers to timber footing (Photo 10).
  - Mass concrete footing was in sound condition (Photo 12). One (1) x isolated defective area was observed, an approximately 300 mm x 300 mm concrete spall on the left hand side corner of the concrete footing (Photo 13).
- Pier 5 – Cast Iron
  - Corrosion resulting in section loss was typically observed on the bracing elements and fixings near the tidal zone (Photo 15, Photo 16).
  - Surface corrosion was typically observed on the pier surfaces in the tidal zone (Photo 17).
  - Pitting corrosion was occasionally observed on the pier surfaces in the tidal zone (Photo 18).
  - Corrosion staining was typically observed at the welds in the tidal zone (Photo 18).
- Pier 6 – Cast Iron
  - Corrosion resulting in section loss was typically observed on the bracing elements and fixings near the tidal zone (Photo 20).
  - Surface corrosion was typically observed on the pier surfaces in the tidal zone (Photo 21).
  - Pitting corrosion was occasionally observed on the pier surfaces in the tidal zone (Photo 21).
  - Corrosion staining was typically observed at the welds in the tidal zone (Photo 22).
- Pier 7 – Timber with Mass Concrete (Unreinforced) Footing

  - Some timber piles were in poor condition (Photo 23). Vertical splitting below the headstock was observed all piers (Photo 24).
  - Several of the timber footing bolts exhibited surface corrosion (Photo 25).
  - One (1) tie road on the abutment 1 face was bent (Photo 26).
  - Mass concrete footing was in sound condition. Poor concrete compaction was typically observed (Photo 27).
- Pier 8 – Timber
  - Some timber piles were in poor condition (Photo 28). Both outer piers had significant vertical splitting near the headstock (Photo 29)
  - Several fixings exhibited surface corrosion, including cross bracing bolts on both pier faces (Photo 29).
- Pier 9 – Timber
  - Timber piles were in sound condition.

Photo 1 General view of pier 1 (1)

Photo 2 General view of pier 1 (2)

Photo 3 Pier 1 side 1 concrete delamination, 300 mm x 200 mm

Photo 4 General view of pier 2

Photo 5 Pier 2 vertical splitting

Photo 6 General view of pier 3

Photo 7 Pier 3 cross bracing bolts surface corrosion, vertical splitting below headstock

Photo 8 General view of pier 4

Photo 9 Pier 4 vertical splitting

Photo 10 Base plates from the piers to timber footing exhibiting surface corrosion

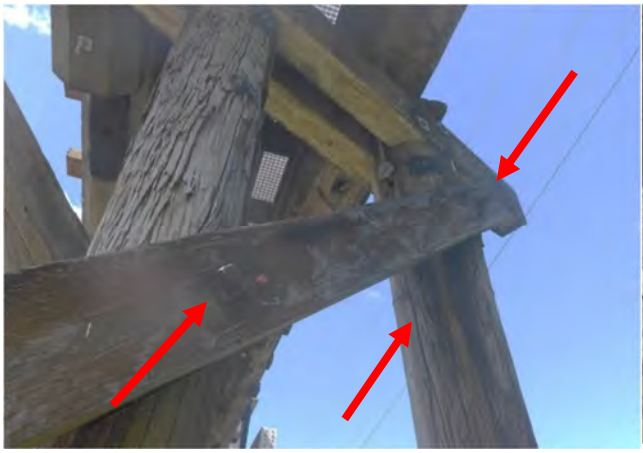

Photo 11 Pier 4 cross bracing bolts surface corrosion, vertical splitting in piers

Photo 12 General view of pier 4 mass concrete footing

Photo 13 Pier 4 footing corner spall, 300 mm x 300 mm

Photo 14 General view of pier 5

Photo 15 Pier 5 corrosion on bracing elements

Photo 16 Pier 5 corrosion on bracing element fixings

Photo 17 Pier 5 surface corrosion in tidal zone

Photo 18 Pier 5 corrosion staining at welds and pitting corrosion in tidal zone

Photo 19 General view of pier 6

Photo 20 Pier 6 corrosion on bracing elements

Photo 21 Pier 6 surface corrosion and pitting corrosion in tidal zone

Photo 22 Pier 6 corrosion staining at welds in tidal zone

Photo 23 General view of pier 7

Photo 24 Pier 7 vertical splitting below headstock

Photo 25 Pier 7 timber footing bolts exhibiting surface corrosion

Photo 26 Pier 7 tie road on abutment 1 face bent

Photo 27 General view of pier 7 mass concrete footing, poor compaction typical

Photo 28 General view of pier 8

Photo 29 Pier 8 timber splitting, cross bracing bolts exhibiting surface corrosion

Photo 30 General view of pier 9

4.1.2 Pier Corbels/Headstocks/Cross Beams

Findings were as follows:

- Pier corbels/headstocks/cross beams were in generally sound condition (Photo 31 to Photo 40). Isolated defects were observed:
  - Pier 5 cross beam had two (2) areas of severe section loss of approximately 200 mm x 100 mm on the top flange, abutment 1 face (Photo 36). Surface corrosion was typically observed on the top and bottom flanges. Isolated areas of surface corrosion were typically observed on the web.
  - Pier 6 cross beam typically had isolated areas of surface corrosion on the web and flanges (Photo 37).

Photo 31 General view pier 1 corbels

Photo 32 General view pier 2 corbels/headstock

Photo 33 General view pier 3 corbels/headstock

Photo 34 General view pier 4 corbels/headstock

Photo 35 General view pier 5 cross beam

Photo 36 Pier 5 cross beam top flange section loss

Photo 37 General view pier 6 cross beam, isolated areas of surface corrosion

Photo 38 General view pier 7 corbels/headstock

Photo 39 General view pier 8 corbels/headstock

Photo 40 General view pier 9 corbels/headstock

4.1.3 Abutment Walls

Findings were as follows:

- Abutment 1 and 2 walls were in generally sound condition (Photo 41 to Photo 44).

Photo 41 General view abutment 1 wall (1)

Photo 42 General view abutment 1 wall (2)

Photo 43 General view abutment 2 wall (1)

Photo 44 General view abutment 2 wall (2)

4.2 Superstructure

4.2.1 Girders

Findings were as follows:

- Girders in all spans were in generally sound condition (Photo 45 to Photo 64). Isolated defects were observed:
  - Span 6 main girder top flanges had significant pitting corrosion concentrated on the left hand side, near the beginning of the span (Photo 53). Rivets were also heavily corroded in the immediate area.
  - Span 6 main girders top and bottom flanges had isolated areas of significant corrosion on the left hand side (Photo 54). Isolated areas were also observed on the right hand side.
  - Span 6 main girder had an isolated area of corrosion on the web, left hand side above the bearing plate for pier 5 (Photo 55).
  - Span 6 main girders bottom flange rivets typically exhibited surface corrosion (Photo 56).

- Span 6 cross girders typically had corrosion spots or surface corrosion (Photo 57). There were isolated areas of more significant corrosion (Photo 57).
- Span 6 strut beams typically had corrosion spots and surface corrosion (Photo 58).
- Span 6 cross bracing typically exhibited surface corrosion (Photo 59). Cross bracing cleats exhibited more significant corrosion at main girder connections (Photo 60).

Photo 45 General view span 1 girders

Photo 46 General view span 2 girders

Photo 47 General view span 3 girders

Photo 48 General view span 4 girders

Photo 49 General view span 5 girders

Photo 50 General view span 6 girders

Photo 51 General view of span 6 main girders left hand side

Photo 52 General view of span 6 main girders right hand side

Photo 53 Span 6 main girder pitting corrosion

Photo 54 Span 6 main girder left hand side flange corrosion

Photo 55 Span 6 main girder left hand side web corrosion

Photo 56 Span 6 main girder bottom flange rivets surface corrosion

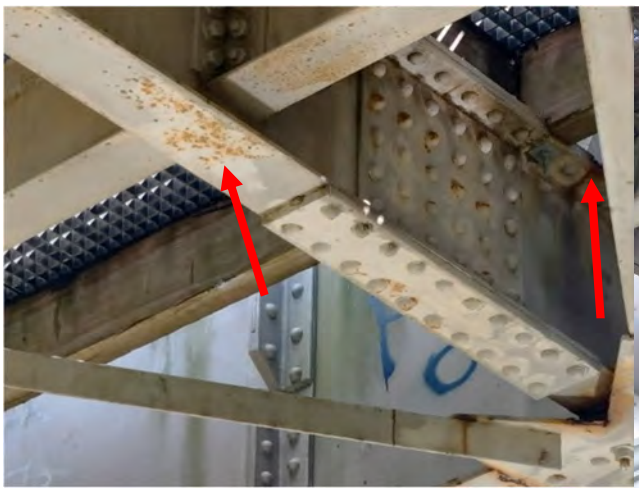

Photo 57 Span 6 cross girders surface corrosion and more significant corrosion

Photo 58 Span 6 strut beams surface corrosion

Photo 59 Span 6 cross bracing surface corrosion

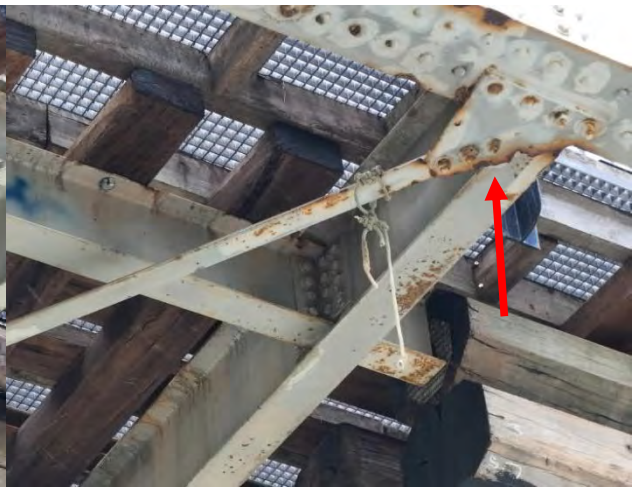

Photo 60 Span 6 cross bracing cleats corrosion at main girder connections

Photo 61 General view span 7 girders

Photo 62 General view span 8 girders

Photo 63 General view span 9 girders

Photo 64 General view span 10 girders

4.2.2 Bearing Plates

Findings were as follows:

- Bearing plates at piers 5 and 6 were in generally sound condition. Isolated defects were observed:
  - Main girder to bearing plate bolts exhibited corrosion on both sides of the bridge (Photo 65).
  - Surface corrosion and crevice corrosion was observed on the bearing plate at pier 5, left hand side (Photo 66).
  - Bearing plates typically had corrosion staining and corrosion spots (Photo 67, Photo 68).

Photo 65 Main girder to bearing plate bolts corrosion

Photo 66 Bearing plate surface and crevice corrosion

Photo 67 Bearing plate corrosion staining

Photo 68 Bearing plate corrosion spots

4.3 Deck Surface

4.3.1 Footway

Findings were as follows:

- The bridge and approach footway segments were in generally sound condition (Photo 69, Photo 71). Minor defects observed included:
  - Cracks up to 0.3 mm were observed in the approach 2 footway slab (Photo 72).
  - Minor unevenness in the approach slab to FRP footway at approach 2 (Photo 73).

Photo 69 Approach 1 footway sound

Photo 70 Approach 2 footway sound

Photo 71 FRP footway sound

Photo 72 Cracks up to 0.3 mm in approach 2 footway slab

Photo 73 Approach 2 minor unevenness

4.3.2 Pedestrian Railings

Findings were as follows:

- Bridge pedestrian railings were in generally sound condition (Photo 74 to Photo 76). Observations included:
  - Railing fixings typically had surface corrosion (Photo 77). Top railing fixings were typically installed incorrectly (Photo 78).
  - Isolated timber splitting was observed at toe boards near the centre of the bridge (Photo 79).
  - Several connecter plates were not installed on the toe boards near the centre of the bridge (Photo 80).
  - Left hand side railing near approach 2 had excessive vegetation (Photo 81).

Photo 74 Approach 1 railings sound

Photo 75 Approach 2 railings sound

Photo 76 Bridge railing sound

Photo 77 Bridge railing fixings surface corrosion

Photo 78 Top railing fixings installed incorrectly

Photo 79 Timber splitting at toe boards

Photo 80 Connector plates not installed toe boards

Photo 81 Excessive vegetation on left hand side railing near approach 2

5. Structural desktop assessment

5.1 Overview

SMEC has conducted a qualitative structural desktop assessment of Saltwater Creek to provide a basis for recommendations regarding loading of the bridge during planned construction activities. The following items have been considered:

- Defects observed during SMEC's visual inspection and corresponding remedial recommendations for the duration of the construction process.
- Defects and recommendations noted in previous inspection reports:
  - Bligh Tanner, Saltwater Creek Railway Bridge – Level 2 Inspection Report, September 2020.
  - Bligh Tanner, Inspection Report, May 2022.
  - Bligh Tanner, Level 3 Inspection Report, August 2022.
  - Saltwater Creek Bridge Conservation Management Plan, October 2022.
- Structural drawings relating to the bridge's 2022 refurbishment:
  - 16116-S01 - Drawing Index, Locality & Structural Notes (Sheet 1 of 5)
  - 16116-S02 – Existing Structure and Remedial Works (Sheet 2 of 5)
  - 16116-S03 – Proposed Cycleway/Walkway (Sheet 3 of 5)
  - 16116-S04 – Sections & Details (Sheet 4 of 5)
  - 16116-S05 – Miscellaneous Details (Sheet 5 of 5)
- Future works for the BEL project that could affect the existing bridge.
- Construction controls for the BEL project.

Based on this assessment, recommendations are presented for design, construction, and post-construction strategies and controls to mitigate risk associated with planned construction activities in the vicinity of the bridge.

5.2 Visual inspection conclusion and recommendations

The following recommendations have been developed to provide temporary and/or permanent works to support and protect the bridge during and/or post construction of the BEL. This phase of construction is assumed to project for approximately 5 years. Any construction after this period may require another review to access the structures adequacy. The below does not constitute repair specifications or project scoping documents. Repair specifications shall be developed by an appropriately qualified and experienced RPEQ engineer, in consultation with the heritage consultant, and endorsed by the Asset Owner.

5.2.1 Piers

The piers were in generally sound condition. The cast iron piers 5 and 6 typically had surface corrosion on the pier surface and welds in the tidal zone. Pitting corrosion was occasionally observed on the pier 5 surfaces in the tidal zone. Corrosion resulting in section loss was typically observed on the pier bracing elements and fixings near the tidal zone. Several timber piers had vertical splitting below the headstock.

The following works are recommended prior to construction:

- Replace CS4 steel pier bracing elements and corresponding fixings within the tidal zone.
- Steel components that will be inundated more frequently or permanently due to increased afflux from BEL should be suitable coated for the increased aggressivity. This should be assessed during future stages once the afflux from the project has been confirmed.

- Apply banding to piles with large timber splitting under headstock seating.

5.2.2 Pier Corbels/Headstocks/Cross Beams

The timber pier corbels and headstocks were in generally sound condition. The steel cross beams were in generally sound condition. Pier 5 and 6 cross beams typically had surface corrosion on the flanges and web. Pier 5 cross beam had isolated areas of steel section loss on the top flange. No actions required prior to the construction of future works (approximately 5 years).

5.2.3 Abutment Walls

The abutment walls were in sound condition. No actions required prior to the construction of future works (approximately 5 years).

5.2.4 Girders

The timber girders in all spans were in generally sound condition. Steel components in span 6 had a number of issues, including the following. The main girders had isolated areas of significant pitting corrosion and other isolated areas of significant corrosion on the flange and web. The main girders bottom flange rivets typically exhibited surface corrosion. The cross girders typically had corrosion spots or surface corrosion, while there were isolated areas of more significant corrosion. Span 6 strut beams and cross bracing typically had corrosion spots and surface corrosion. Cross bracing cleats exhibited more significant corrosion at main girder connections. No actions required prior to the construction of future works (approximately 5 years).

5.2.5 Bearing Plates

The bearing plates at piers 5 and 6 were in generally sound condition. No actions required prior to the construction of future works (approximately 5 years).

5.2.6 Footway

The footways were in sound condition. No actions required prior to the construction of future works (approximately 5 years).

5.2.7 Pedestrian Railings

The bridge pedestrian railings were in generally sound condition. No actions required prior to the construction of future works (approximately 5 years).

5.3 Findings

Historically, there have been multiple amendments to the Saltwater Creek Bridge structure. Refurbishment and rehabilitation works undertaken in 2022 were designed to accommodate the loads presented in Section 3.2.2. A high level review of the design drawings suggests the design presented is adequate to accommodate its current design loads. Assuming the bridge's condition is consistent with that at the time these works were completed, the following is known:

- The bridge girders can accommodate a 12-tonne axle load.
- The bridge can accommodate a uniformly distributed live load of 5kPa, or a 4.5kN concentrated load.
- The capacity of the bridge's screw piles is unknown. Historically, this type of pile is known to exhibit post-construction durability issues, which suggests reasonable likelihood the pile capacity is reduced (compared to original design capacity).
- Defects noted in past inspection reports have all been accounted for, either by:
  - Remediation in past works.
  - Identification in the present report.

5.4 Recommendations

Based on the visual site inspection of the existing bridge conducted by SMEC 3 April 2024 and subsequent desktop structural assessment, the following items are recommended to mitigate impacts during and post-construction from the BEL project to the heritage structure:

a. Maintenance of the following components is undertaken prior to construction:

   i. Replace Condition State 4 (CS4) steel pier bracing elements and corresponding fixings within the tidal zone.

   ii. Steel components that will be inundated more frequently or permanently due to increased afflux from BEL should be suitable coated for the increased aggressivity. This should be assessed during future stages once the afflux from the project has been confirmed.

   iii. Apply banding to piles with large timber splitting under headstock seating.

b. Flood modelling is required to be further developed in future stages to enable a lateral assessment of the bridge for the changed conditions. Additional recommendations are contained within the Heritage Impact Statement.

c. Other recommendations listed in the Heritage Impact Statement, including but not limited to:

   i. A Vibration Study should be prepared for the [Saltwater Creek] Bridge during design development, which considers the potential vibrational effects on caused by the levee. Should the study predict a vibrational range exceeding 2-5mm/sec to the bridge elements during construction, a heritage engineer (M. ICOMOS) should be engaged to develop appropriate measures to protect the Bridge's condition during these periods.

d. Requirements for future maintenance provisions of the existing bridge are to be agreed in writing with the Asset Owner. This may include but is not limited to providing appropriate vehicle access to the bridge, unrestricted access to piers and underbridge inspection access. It must be noted that TMR's 'Design Criteria for Bridges and Other Structures' states that a 10 m minimum lateral clear distance shall be maintained either side of the bridge from permanent widest parts of the bridge structures for these activities, and the lateral clearance shall be maintained from all areas including underneath of the bridge and for the full length of the bridge footprint.

e. No unsupported excavation within 10 m of any part of the bridge structure. If the proposed works require earthworks within 10 m of the structure, a geotechnical assessment and structural or civil design shall be completed to access potential impacts to the existing bridge.

f. A dilapidation survey shall be undertaken prior to commencing works and at the end of the works. This shall include a survey to establish baseline levels so the deflection can be monitored at during and at the end of the works as agreed with the Asset Owner.

g. An assessment shall be undertaken in consultation with the Asset Owner to assess the bridge for a potential change in use due to the bridge may becoming a vantage point for crowds during flood events or during construction works. Temporary and/or permanent measures will need to be agreed with the Asset Owner to mitigate this risk prior to construction works. Crowd loads pose a safety risk to the current balustrade arrangement.

Appendix A

Supplied Information

SALTWATER CREEK RAILWAY BRIDGE

Conservation Management Plan

FINAL

Bundaberg Regional Council

October 2022

Project No. 21011
Version 5

CONVERGE
HERITAGE + COMMUNITY

DOCUMENT CONTROL

DOCUMENT	
Project	Saltwater Creek Railway Bridge
Project Number	21011
Document Title	Conservation Management Plan
File Location	Shared Data
Client	Bundaberg Regional Council

VERSION	AUTHOR	QUALITY REVIEW	DATE
0	U Oppermann	N/A	13/9/2020
1	U Oppermann	N/A	05/07/2021
2	U Oppermann	Samantha Negoita	14/06/2022
3	U Oppermann	N/A	05/08/2022
4	U Oppermann	N/A	4/10/2022
5	U Oppermann	N/A	17/10/2022

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS

ABBREVIATION	TERM
Bligh Tanner	Bligh Tanner Structural Engineers
Council	Bundaberg Regional Council
CMP	Conservation Management Plan
Converge	Converge Heritage + Community
DES	Department of Environment and Science
LHR	Local Heritage Register
QHA	*Queensland Heritage Act*
QHR	Queensland Heritage Register
QR	Queensland Railways
RPEQ	Registered Professional Engineer of Queensland
TMR	Department of Transport and Main Roads
SIM	Structures Inspection Manual

Definition of Heritage Terms (based on the Burra Charter 2013)

TERM	MEANING
Place	A geographically defined area (e.g., curtilage such as lot on plan) that may include elements, objects, spaces, and views and can have tangible and intangible dimensions.
Fabric	The physical material of the place including elements, fixtures, contents, and objects.
Setting	The immediate and extended environment of a place that is part of or contributes to its significance; this includes the views to and from.
Conservation	Is a broad term meaning all the processes of looking after a place, so it retains its significance, including: • Preservation • Restoration • Reconstruction • Adaptation • Interpretation
Preservation	Maintaining the place in its existing state and preventing deterioration.
Restoration	Return a place to a known earlier state by • Removing later additions • Reassembling existing elements without adding anything new/recycled.
Reconstruction	Return a place to a known earlier state by introducing new or recycled material. • Only appropriate when sufficient historic evidence exists. • Use like-for-like material. • Needs to be identifiable on close inspection.
Adaptation	Changing the place to suit an existing or proposed use.
Maintenance	Looking after the place and its setting, including regular cleaning, pest inspections, pruning of trees etc.
Repair	Distinguished from maintenance as it involves restoration and reconstruction of fabric.
Interpretation	All the ways of presenting the cultural significance of a place.
Use	Means the functions of a place, including the activities and traditional and customary practices that may occur at the place or are dependent on the place.

1 Introduction

1.1 Background

Saltwater Creek Railway Bridge is a late 19th century railway bridge located in Bundaberg and is listed on the Queensland Heritage Register (QHR). The former railway bridge is currently utilised as a pedestrian and cyclist bridge across Saltwater Creek and is owned by Bundaberg Regional Council (Council). Council requested a Level 2 engineering inspection of the bridge as well as a Conservation Management Plan (CMP) for the repair, conservation, and ongoing maintenance of the structure.

Council commissioned Converge Heritage + Community (Converge) and Bligh Tanner Structural Engineers (Bligh Tanner) in June 2020 to undertake the work in partnership, with Bligh Tanner conducting the Level 2 inspection and Converge preparing the CMP.

Based on recommendations following the Level 2 inspection in June 2020, the scope of work was extended to include Level 3 inspections; these were carried out in part in October and November 2020.

Converge prepared a draft CMP report including history, description, the findings of the Level 2 and 3 inspections including recommendations for repair works, preliminary policies, and maintenance regime for the ongoing management of the structure; the draft was completed in July 2021. At the time, Council was undertaking repairs to the timber structure of the bridge based on Bligh Tanner's recommendations and an upgrade of the pedestrian path under two exemption certificates (Stage 1).

Staff from Council, Converge and Bligh Tanner attended an information session on site in September 2021 to inspect the ongoing Stage 1 works and to provide information on the project for Council's community engagement program.[1]

Following the completion of the Stage 1 works in late February 2022 and a final site visit to document the completion of the Stage 1 works, the CMP was revised to document the current status of the bridge and to provide heritage management policies and implementation plans to guide outstanding repair works (Stage 2) and ongoing maintenance.

1.2 Place Details

1.2.1 Location

The Saltwater Creek Rail Bridge is located in Bundaberg close to the confluence of the Saltwater Creek and the Burnett River connecting Quay Street and Quay Street East.

[1] See podcast transcript in: Hidden Histories: 'unusual bridge' undergoes restoration – Bundaberg Now.

Figure 1: Location map (Base image Queensland Globe 2020).

Figure 2: Close-up of bridge location, the QHR boundary is denoted in pink shading (Base image Queensland Globe 2020).

1.2.2 Cultural Heritage Significance

The Saltwater Creek Rail Bridge is listed on one statutory heritage register:

Table 1: Cultural Heritage listings.

REGISTER	ID NUMBER	EXTENT
Queensland Heritage Register	600370	See Figure 2.

The heritage significance of the place is also recognised by the inclusion on the Register of the National Estate (RNE), Place ID#15960. The RNE is an archived, non-statutory register.

1.3 Objectives

This CMP is to be a practical tool to assist Council and other assessing authorities to make sound decisions about conserving and managing the property. It identifies the heritage significance of the site and sets out conservation policies to protect that significance, particularly in the event of change. It also provides strategies for putting policies into action.

The CMP provides:

- Historical context and description of the place.
- An analysis of the existing fabric (integrity and condition survey).
- An assessment of the significance of the structure.
- An assessment of the relative significance of the principal elements.
- Conservation policies.
- Maintenance and conservation work schedules and likely approval pathways.

1.4 Plan Methodology

This CMP has been prepared in accordance with the principles set out in *the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter)* and the *Guidelines to the Burra Charter*.[2] The CMP generally follows the methodology set out in the Department of Environment and Science's (DES – formerly known as Department of Environment and Heritage Protection) guidelines for the preparation of conservation management plans for heritage places.[3]

The Level 2 Condition Report by Bligh Tanner has generally been prepared and formatted per the Level 2 inspection requirements defined by the Department of Transport and Main Roads. See the full report for details (Bligh Tanner 2020).

1.5 Plan Team

The CMP was prepared by Converge in cooperation with Bligh Tanner. The team included:

- Simon Gall, Managing Director, Senior Archaeologist, Converge.
- Ulrike Oppermann, Senior Cultural Heritage Consultant, Converge.
- Ferenc Gall, Drone Operator, Converge.
- Simon Kochanek, Associated Director, Structural Engineer, Bligh Tanner.
- Anthony Chen, Principal Engineer, Bligh Tanner.

[2] The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013 and Guidelines to the Burra Charter.

[3] https://www.qld.gov.au/__data/assets/pdf_file/0023/68018/gl-conservation-management-plans.pdf.

1.6 Dates

The inception meeting and site visit took place on 24th June 2020 with Level 2 inspections conducted on 24th and 25th of June 2020. The draft Level 2 Inspection Report was completed in August 2020.

Staff from Council, Converge and Bligh Tanner took part in a consultation session on 1st September 2020 to discuss the draft engineering assessment of the Saltwater Creek Railway Bridge by Bligh Tanner, and to propose the next steps for the project. A revised, third version of the Level 2 Inspection Report was issued on the 10th September 2020.

A second site visit attended by Council staff, Converge and Bligh Tanner was undertaken on 9th October 2020. Level 3 inspections were carried out on 9th October 2020 and from 3rd to 6th November 2020. The Level 3 Inspection Report was completed in August 2022.

Staff from Council, Converge and Bligh Tanner attended an information session on site in September 2021 to inspect the ongoing Stage 1 works and to provide information on the project for Council's community engagement program.[4]

Staff from Converge undertook the final site visit to document the completed Stage 1 works in May 2022. Bligh Tanner conducted a final inspection of the bridge in June 2022.

The draft CMP was completed in September 2020, the revised draft CMP including updated information was completed in July 2021 (Version 1), and the updated preliminary draft CMP following completion of the Stage 1 works was completed in June 2022 and internally reviewed by Samantha Negoita. The final draft was complete in August 2022 incorporating findings from Bligh Tanner's Level 3 and final report of the stage 1 completion (Bligh Tanner August 2022). The final draft was updated incorporating feedback by Council (Version 4) and reviewed by Bligh Tanner. The final report including minor amendments was completed in October 2022 (Version 5, this report).

1.7 Sources of Information

Sources used for the preparation of this CMP include:

- QHR citations.
- Register of the National Estate (archived) citations.
- Historic newspapers online at Trove.
- Historic maps and aerial photographs.
- State Library of Queensland/John Oxley Library.
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- Bligh Tanner, Saltwater Creek Railway Bridge – Level 2 Inspection Report, Version 3, September 2020.

[4] See podcast transcript in: Hidden Histories: 'unusual bridge' undergoes restoration – Bundaberg Now.

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- Converge, Historic Heritage Tourism Strategy, Draft Report for Bundaberg Regional Council, November 2016.
- Department of Environment and Science, Exemption Certificate Permit 202106-14056 (superseding EC no#202101-11198EC) and Permit 202104-13663EC.

1.8 Limitations

The following limitations apply:

- The physical inspection of the bridge was restricted to visible areas and did not extend to areas difficult to access including underwater areas.

2 Historical Context

The following section provides historical background information and is not intended to be exhaustive.

2.1 Brief Historic Overview of the Study Area

2.1.1 Early development of the Bundaberg region

The following text is taken *verbatim* from the Bundaberg Regional Council Local Heritage Register (LHR) place card for the Bundaberg Railway Station (Converge 2015) with additional information added in the last section.

Bundaberg was established in the late 1860s. The Burnett River was identified by John Charles Burnett (after which was it named) during his exploration of the Wide Bay and Burnett regions in 1847. Pastoral stations were established throughout the Wide Bay and Burnett in the late 1840s through to the 1860s, including stations such as Gin Gin, Walla, Bingera, Electra, Monduran and Tantitha. The stations were initially stocked with sheep, but progressively were replaced with cattle. When prices were low, or there was an oversupply of stock (particularly in the 1860s), the cattle were rendered to produce tallow. A boiling down works was established in Baffle Creek to render the stock from the stations. John and Gavin Steuart secured a contract to provide the works with timber for tallow casks. The Steuarts established a camp in North Bundaberg in 1866 and erected a sawmill in the following year. Interest in the settlement grew rapidly and a town was surveyed on the southern bank of the Burnett River in 1868 on the site of the present day city.

Timber was the industry that acted as a catalyst for the creation of a European settlement. However, it was sugar that came to define the history of Bundaberg and the surrounding region. Sugar cane was planted in the 1870s and the first commercial sugar mill, located at Millbank (west of the city on the southern bank of the Burnett), began operating in 1872. The industry was thriving by the 1880s, with major mills such as Millaquin, Bingera and Fairymead processing cane juice from cane plantations and farms throughout the region, particularly in land formerly occupied by the Woongarra, Bingera and Gooburrum scrubs. From its early years, the industry relied on South Sea Islander labour (referred to as 'Kanakas' at the time). The importance of Bundaberg was further strengthened when it became the port for the Mount Perry copper mine, with a railway from Mount Perry to North Bundaberg constructed in 1884 (although a rudimentary road existed from the early 1870s). A rum distillery was established at Millaquin sugar mill in 1888, later known as the Bundaberg Rum Distillery. Bundaberg also developed a foundry and engineering industry to support the sugar and juice mills, and the copper mines at Mount Perry. The first local government, the Bundaberg Divisional Board, was gazetted in 1880.

The importance of Bundaberg was further strengthened when it became the port for the Mount Perry copper mine, with a railway from Mount Perry to North Bundaberg constructed in 1884. Calls for the railway were made as early as 1872; the mine had recently opened, but there was only a rudimentary road connecting the mine to Bundaberg. Fierce competition emerged between Bundaberg and Maryborough – well-established as a port by this time – to secure the railway. Bundaberg was ultimately successful, but ironically the output of the copper mine declined almost as soon as the railway was completed. The beginning of the railway was located in North Bundaberg. The location of the station was in proximity to the site of the Steuart's first camp in the district in 1866.

Bundaberg was connected to the North Coast railway line in 1888. The North Coast railway had been steadily constructed from the late 1870s, first linking Gympie with Maryborough, and then extending to the coal town of Howard. The line continued north throughout the 1880s, linking with (South) Bundaberg in 1888. The station was originally known as 'South Bundaberg Station', but was called 'Bundaberg Railway Station' from 1892. A rail bridge across the Burnett River was opened in 1890, allowing the North Coast line to continue north, connecting with Rosedale in 1892 (and

prompting the development of settlements along its length, for example Avondale, and contributing indirectly to the continued economic success of major sugar mills such as Fairymead). Later, a branch line was also constructed from the line to the Millaquin sugar mill, running along Quay Street, with a rail bridge constructed across Saltwater Creek. (Converge 2015)

Road Bridges across Saltwater Creek and the Burnett River

Two substantial metal road and pedestrian bridges of similar design were built in the late 1890s; the Burnett Bridge across the Burnett River connecting the north and south parts of the town, and the Kennedy Bridge across the Saltwater Creek at Bourbong Street connecting the commercial centre of Bundaberg with the eastern parts of the town and beyond. The Kennedy Bridge replaced an earlier timber bridge.

Figure 3: Old and new Kennedy Bridge over Saltwater Creek, 1899 (Picture Bundaberg Ref#01074).

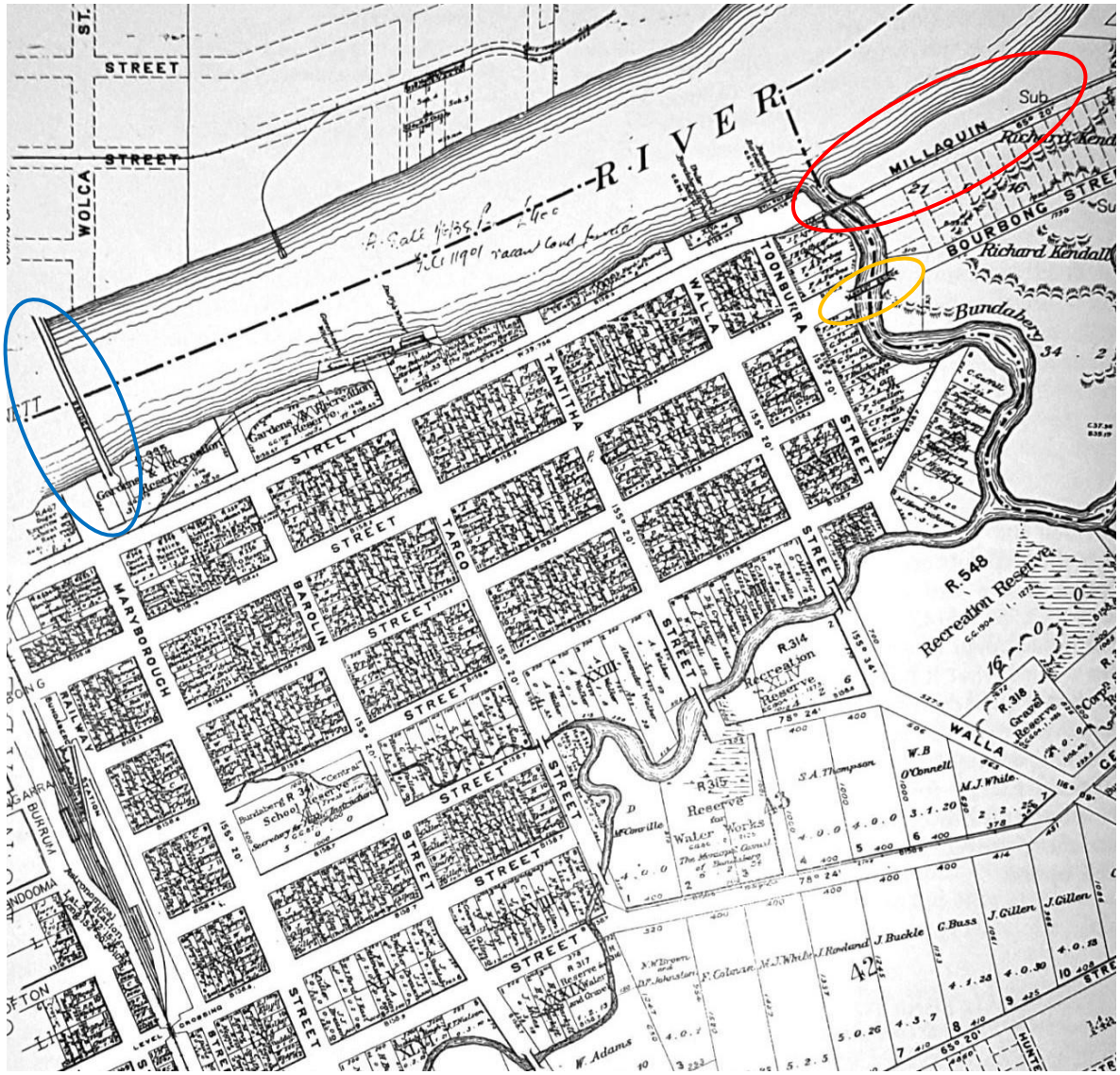


Figure 4: Section of 1916 map showing the Millaquin branch railway including the Saltwater Creek Bridge (red). Also shown is the Kennedy Bridge (yellow) to the south and the Burnett Bridge (blue) to the west (not visible is the rail bridge across the Burnett River to the east) (QLD State Archives, Map of Bundaberg 1916, D3/6 Sheet 2 in: John Kerr, 1996, p22).

2.1.2 Millaquin Sugar Mill

The following text is taken *verbatim* from the unpublished history for the Millaquin Sugar Mill (Converge 2016) with additional information added in the last section and referenced in text.

The Millaquin Sugar Mill was established by Robert Cran in 1880. Cran, along with Robert Tooth, erected a sugar mill at Yengarie, near Maryborough, producing its first sugar in 1868. The farmers of the Woongarra Scrub convinced Cran to establish a juice refinery in Bundaberg. Cran proceeded with the erection of the refinery, and it was seen by the local populace as a significant investment, particularly as the colony was in the grip of a sugar boom at that time. The refinery processed juice piped from the Woongarra district, or punted along the river (the only exception to the pipe/punt system was the transport of juice from the Fairymead juice mill; the mill owners constructed a tramway, the first in the district). The impact of the refinery was substantial: by the second year of operation, the refinery produced a fifth of Queensland's sugar, up from 3% for the entire Bundaberg region in 1882. Cran went on to purchase the Doolbi Juice Mill in the Isis district.

Cran died in 1894 and his sons discovered that their father's debt exceeded the value of the mills. The Queensland National Bank, to which Cran owed his debt, became the owner of Millaquin, Doolbi and Yengarie. The Queensland National Bank was a prominent institution in the sugar industry in Bundaberg, becoming intimately involved in the industry as the bank preferred to continue operating businesses it foreclosed on rather than selling at a loss. The bank acquired other mills in the district, including the Mon Repos plantation and mill, which was renamed Qunaba after the first two letters in each word of the bank's title. In 1911, the bank created a limited liability company called the Millaquin Sugar Company.

Millaquin continued to grow in the twentieth century, becoming Bundaberg's largest refinery and mill. Millaquin began refining raw sugar in the early 1900s, building a 7000 tonne shed and adding to the existing wharf facilities; up until this time only the Colonial Sugar Refinery company (CSR) refined raw sugar. It then became a full crushing mill in 1906, combining the crushing of the cane with its refinement into a sugar product on the same site. By 1915, Millaquin was the only non-CSR refinery in Australia. (Converge 2016)

Figure 5: Millaquin Mill from the north bank of the Burnett River, 1888 (Picture Bundaberg, Ref#bun00075).

From 1889, a rum distillery operated next to the Millaquin Sugar Mill using molasses from the sugar refining process. In 1907 and again in 1936, the distillery was destroyed by fire. Caused by lightning, the 1936 fire resulted in large quantities of rum and methylated spirits to ignite and flowing down the Burnett River, setting fire to jetties in the vicinity (potentially affecting the Saltwater Creek Railway Bridge structure also) (Northern Herald, 28 November 1936, p24).

Figure 6: Millaquin Mill and distillery, no date (Picture Bundaberg Ref#bun06694)

2.2 The Millaquin Branch Line

From the 1880s, calls were made for a railway connection from Bundaberg to the Woongarra district. A survey was undertaken in the late 1880s, and the resulting proposal for a public line, which was to include the Millaquin branch line section, went before Parliament in 1889, however the plan was shelved. Robert Cran, the owner of the Millaquin Sugar Mill, saw the benefit of a connection of the mill with the main railway line and proposed to pay for the construction of a branch line himself. For example, prior to the construction of the Millaquin branch line, coal from the Burrum Coal field was transported via rail to the town wharves and transhipped from here to the Millaquin refinery (Kerr, 1996, p45).

The Secretary for Railways, Hon TO Unmack, “cheerfully accepted his proposition, considering that it would prove of immense benefit to the Government by inducing the carriage of freight and the passengers on our own lines” (Hansard, p1355).

Cran had the support of the railway commissioners who gave the following report:

> "This line, it will be observed from the plan, leaves the North Coast Railway at a point between Bourbon and Quay streets, in the township of South Bundaberg, follows the south bank of the river, and runs along the Esplanade and open streets almost the entire distance and ends at the Millaquin Refinery Works, about 1 mile and 70 chains from its junction with the main line.
>
> "From the report of the Chief Engineer, who has been appointed advising engineer to the Government for the purpose of this line, it appears that the survey is almost identical with that which was made for a portion of the rail way to Woongarra, the plans for which were laid before Parliament on the 24th September 1889.
>
> "The Commissioners have no hesitation in recommending that the necessary statutory authority be given for the construction of this branch, as, when completed, it will tend to promote an extensive traffic in cane-juice and sugar over the Government railways on the north and south sides of the Burnett River, and very greatly facilitate the delivery of

limestone and coal to the refinery from the mines in the Gympie and Maryborough districts; also materially assist the proprietors of the two sawmills which are established on the river bank close to the proposed route of the line in procuring timber for their mills, and will also admit of a connection with the present town wharves.

"The cost of constructing this branch, exclusive of rolling-stock, is estimated at £5,200, and the land resumption at £300, the whole of which will be defrayed by Mr. Cran." (Hansard, p1355).

The Millaquin Branch Railway Bill, which included a clause giving the Government the power to purchase the railway (or any part thereof) passed, and became the *Millaquin Branch Railway Act 1892*.[5]

As the branch line was to cross Saltwater Creek, plans were prepared by Queensland Railways for a railway bridge consisting of a central plate girder span supported on cast iron cylinder piers with screw piles, with timber girder spans supported on timber trestle piers on both approaches.

See Figure 7 for a copy of the original general arrangement drawing and refer to Appendix B for detailed drawings.

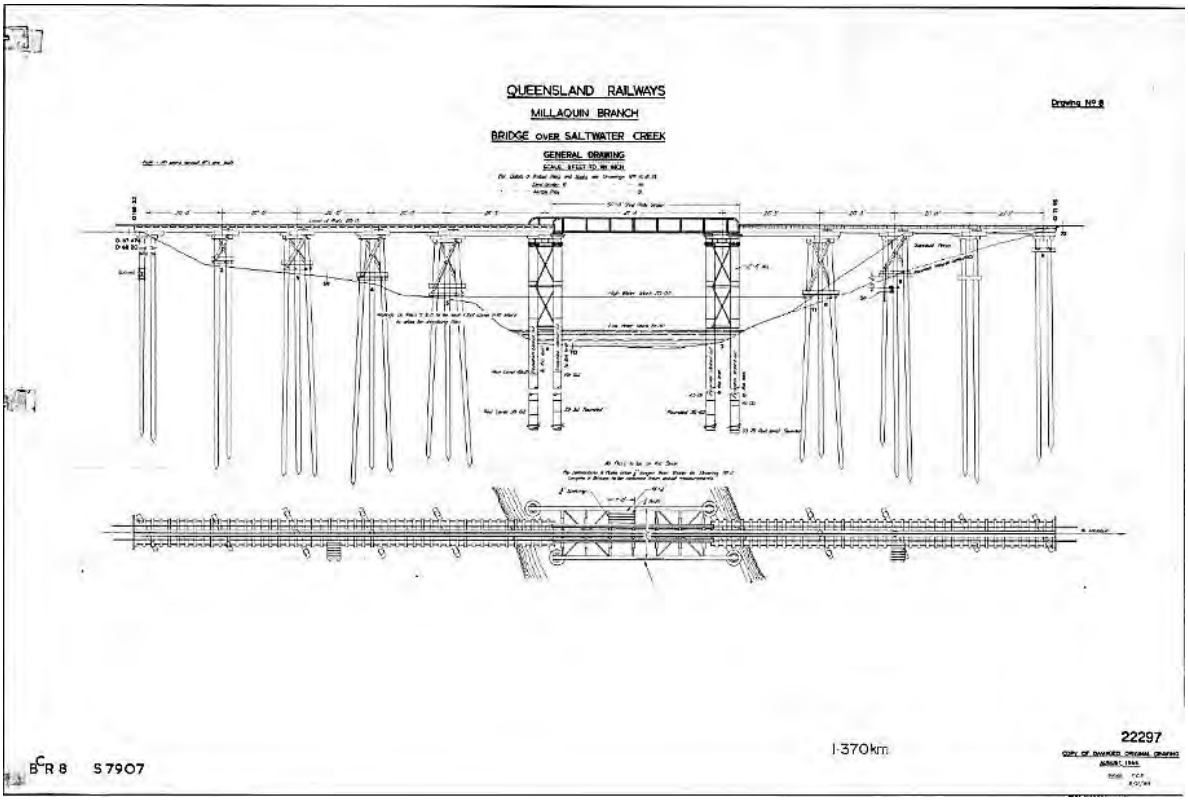


Figure 7: Original General Arrangement Drawing, copy of damaged original (Provided by BRC).

[5] The act was repealed in September 1991 (Queensland Government, *Acts Repeal Act 1991*, Act No.53p3).

Tenders for the construction of the branch line were called in December 1893, and the contract was awarded to James Overend in January 1894.

QUEENSLAND.

Office of the Railway Commissioners,
Brisbane, 27th November, 1893.

WIDE BAY & BURNETT DISTRICT.

MILLAQUIN BRANCH.

CONTRACT FOR WORKS.

TENDERS are invited for the CONSTRUCTION of above RAILWAY, with LINE to WHARVES, commencing near South Bundaberg Station, and ending at Millaquin Refinery, total length 2 miles, 16 chains, 13 links, in accordance with the Plans, Sections, Drawings, General Conditions and Specification, which may be seen at the office of the Chief Engineer, Brisbane, on and after MONDAY, the 4th of December, 1893, where also form of tender and other information can be obtained.

Tender endorsed "Tender for Construction of Millaquin Branch Railway," must be deposited at the office of the Railway Commissioners not later than 3 p.m. on WEDNESDAY, the 27th of December, and be accompanied by a preliminary deposit of £100. The lowest or any tender will not necessarily be accepted.

ALBERT PREWETT,
Secretary.

Figure 8: Call for tenders for the construction of the Millaquin Branch Line connecting the South Bundaberg Station with the Millaquin Refinery and running along Quay Street with access to the wharves (Bundaberg Mail and Burnett Advertiser, 11th December 1893, p3).

Work on the Millaquin Branch Line started in January 1894 with the cutting for the wharf branch line with the removal of 5000 yards of earth. It was expected that around 100 men would be employed including those engaged in cutting sleepers. Walkers Limited supplied the ironwork for the bridge across the Saltwater Creek (Bundaberg Mail and Burnett Advertiser, 19th January 1894, p2).

Mr Stanley, Chief Engineer for Railways, visited the construction works in April 1894 (Bundaberg Mail and Burnett Advertiser, 18th April 1894, p2), and the line was opened for traffic on the 9th July of that year (DES 2016).

In September 1898, the modification of the Millaquin Railway Bridge to allow for foot traffic was discussed by the Kennedy Bridge Board. However, due to the heavy rail traffic on the Millaquin Branch railway line, the Secretary Railway Commissioner did not grant permission to use the bridge for foot traffic. (Bundaberg Mail and Burnett Advertiser, 14th September 1898, p2).

In 1912, an extension of the Bundaberg-Millaquin Branch Line was opened, named the Woongarra Railway line, and paid for by the Woongarra Shire Council. The extension started at Millaquin and ran past Qunaba and Windermere before terminating in Pemberton. The train carried goods, sugar cane and passengers, including weekend travellers to Neilson Park and Bargara. The section between Qunaba and Pemberton eventually became economically unviable, and it was closed in May 1948. (Converge 2016).

The railway section up to Woongarra Junction near the Millaquin Mill was acquired by the State Government on 3 December 1912. In 1918 the State Government acquired the remaining line from Woongarra Junction to Pemberton.

In 1965 plans were prepared for strengthening the Saltwater Creek Railway Bridge with steel girders suitable for a 12 ton axle loading. This was subsequently undertaken with re-used girders from the Gold Coast. (DES 2016).

See Figure 9 for a drawing of the strengthening work and refer to Appendix B for detailed drawings.

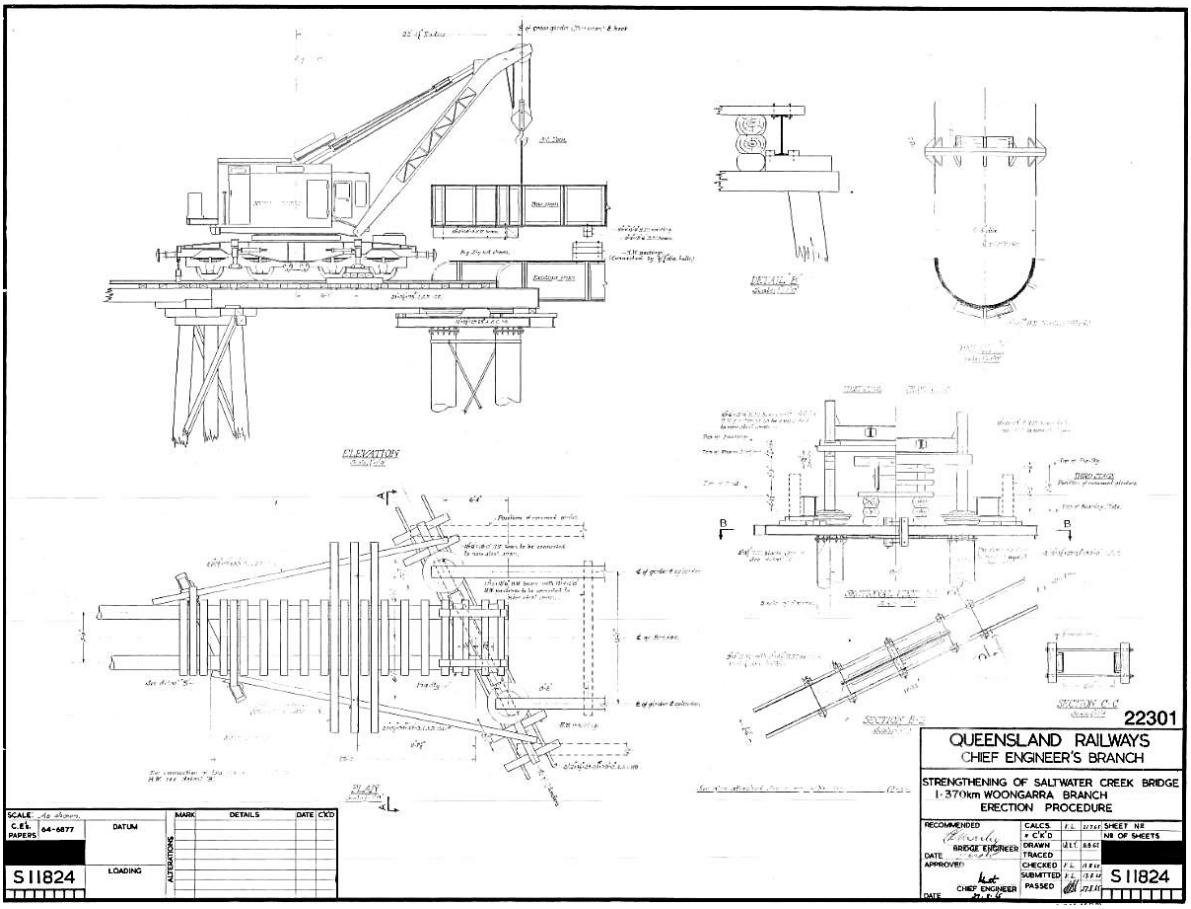


Figure 9: Drawing of strengthening work and procedure undertaken in 1965 (Queensland Railways).

The exact date when the bridge ceased to be used for rail traffic, and ownership was transferred to the Department of Transport and Main Roads, is not known, however one source describes the bridge as being 'in use' in 1988 (Register of the National Estate (archived) citation, Place ID#15960).

Figure 10: View west of the Saltwater Creek Railway Bridge when still in operation, date unknown (Department of the Environment and Energy).

2.2.1 Floods

The Burnett River and Saltwater Creek have been subject to flooding at various times in the past ranging from moderate to severe. Flood events occurred during the summer months (December to February) and were generally caused by high rainfalls. Notable events were recorded in 1942, 1971, 2010, 2011 and the most significant in history to date in 2013, leading to scour[6] at the banks of the river and creeks and also structures including bridges.

Historic images and records show the Saltwater Creek Railway Bridge submerged in flood waters in the 1971, 2010 and 2013 events. (Bundaberg Regional Council website).

Figure 11: 1971 flood, showing boats in Saltwater Creek level with the railway tracks of the bridge (Picture Bundaberg, Ref#bun01542).

Figure 12: 2010 flood, showing water over the bridge decking (Picture Bundaberg, Ref#02403).

[6] Bridge scour is the removal of sediment such as sand and gravel from around bridge abutments or piers. Scour is caused by fast moving water creating scour holes that can compromise the integrity of a structure. (Wikipedia).

2.2.2 From rail bridge to pedestrian/cycleway bridge

In 2007, ownership of the bridge was transferred from the Department of Transport and Main Roads to Bundaberg Regional Council[7]. In the same year, remedial work was scheduled for the bridge structure and the former railway bridge was converted into a combined cycleway/pathway. See Figure 13 for the drawing of the proposed conversion.

At this time, necessary repairs were carried out to the structure including demolition of existing retaining walls on both abutments and rebuilt in masonry, construction of masonry headwall to the back of both abutments, addition of anti-splitting bands on selected elements, replacement of corroded wale bracing on Pier#5, and cleaning and lanolin treatment of all timber elements where required.

Refer to Appendix B for detailed plans.

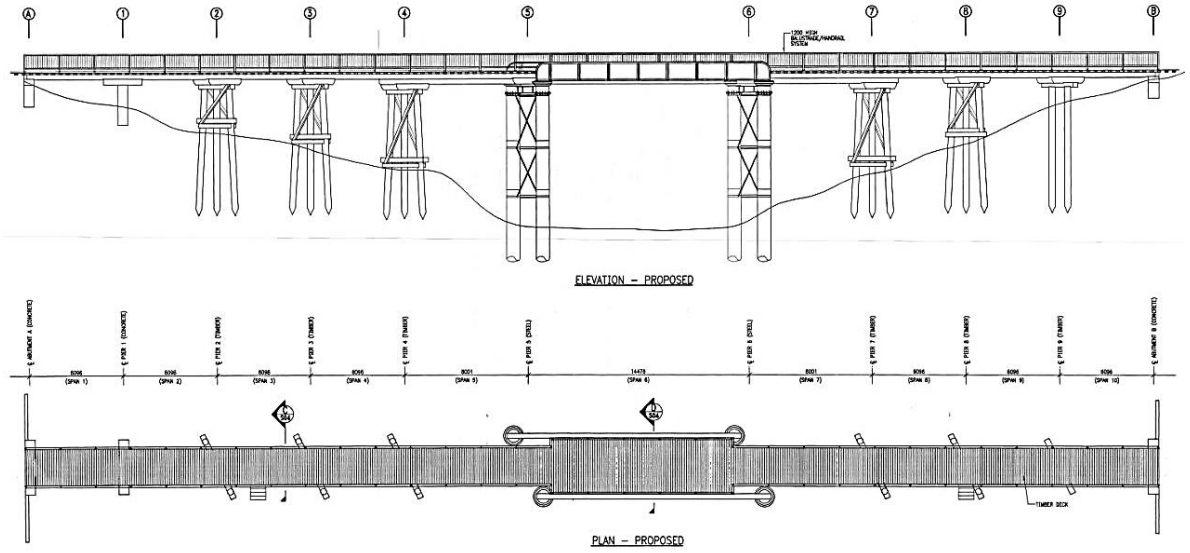


Figure 13: Drawing of proposed cycleway/pathway, 2007 (CSA).

2.2.3 Aerials

The following aerial images show the development of the site over time. Figure 15 shows trains on the eastern section of the Millaquin Branch Line from Saltwater Creek Bridge to the Millaquin Mill.

[7] Department of Environment and Heritage Protection, Letter to Bundaberg Regional Council dated 10/07/2017.

Figure 14: The bridge and site in 1956 (QImagery). Note the number of buildings on the north side of the tracks (Quay Street east).

Figure 15: The bridge (red) in 1976, showing trains (yellow) on the Millaquin Branch Line (QImagery).

Figure 16: The bridge in September 2006 before the conversion to pedestrian/cycle use (QImagery). Note that the approaching tracks are removed and also that the area on the north side of Quay Street east is now vacant.

2.3 Recent History

Converge and Bligh Tanner conducted site visits in mid and late 2020 to document the bridge and its setting and to assess the condition at the time.[8] The following images illustrate the place at that time.

Figure 17: West bank (Converge 2020).

Figure 18: West bank, arrows mark platforms at Pier#3 and 5 (Converge 2020).

[8] Refer to the Level 2 and 3 Inspection Reports for details.

Figure 19: West termination (Bligh Tanner 2020).

Figure 20: West abutment (Bligh Tanner 2020).

Figure 21: Pier 2 (Bligh Tanner 2020).

Figure 22: Pier 2 (Bligh Tanner 2020).

Figure 23: Pier 3 (Bligh Tanner 2020).

Figure 24: Pier 3 (Bligh Tanner 2020).

Figure 25: Pier 4 (Bligh Tanner 2020).

Figure 26: Pier 4 (Bligh Tanner 2020).

Figure 27: Pier 5 (Bligh Tanner 2020).

Figure 28: Pier 5 (Bligh Tanner 2020).

Figure 29: Pier 6 and 7 (Converge 2020).

Figure 30: Span 6 and pier 7 (Converge 2020).

Figure 31: Pier 6 (Bligh Tanner 2020).

Figure 32: Pier 6 (Bligh Tanner 2020).

Figure 33: Pier 6 (Bligh Tanner 2020).

Figure 34: Pier 6 (Bligh Tanner 2020).

Figure 35: Pier 7 (Bligh Tanner 2020).

Figure 36: Pier 7 (Bligh Tanner 2020).

Figure 37: East bank (Converge 2020).

Figure 38: East bank (Converge 2020).

Figure 39: Pier 8 (Bligh Tanner 2020).

Figure 40: Pier 8 (Bligh Tanner 2020).

Figure 41: Pier 9 (Bligh Tanner 2020).

Figure 42: Pier 9 (Bligh Tanner 2020).

Figure 43: Pier 10 (Bligh Tanner 2020).

Figure 44: Pier 10 (Bligh Tanner 2020).

Figure 45: Pier 11 – east abutment (Bligh Tanner 2020).

Figure 46: Pier 11 (Bligh Tanner 2020).

2.4 Key Inspection observations in 2020

The Level 2 and subsequent Level 3 inspections found the following defects:

Table 2: Inspection observations.

Element	Observation
Timber	Fungal decay was observed within numerous timber members along each span of the bridge. All of the main timber members were observed with some level of decay ranging from minor to moderate. Several members were observed with very high levels of decay and require replacement (Condition Rating 4). Areas observed with significant levels of decay are detailed in Section 4.4 of the Level 2 Inspection report. The most significant decay defect observed was at Span# 5 girder. Pile# 2 located at Pier# 5 was observed with extensive termite damage and fungal decay. Timber splitting defects were observed at numerous timber piles/columns, girders, corbels, headstocks, and bracing members. A number of wale beams along the bridge were also observed with significant splitting. Large pipes or hollow decay

Element	Observation
	regions within the timber girders and corbels were observed and identified through the drill testing completed onsite during the inspections. A large number of existing timber railway sleepers were observed to have a high degree of fungal decay and damage (Condition Rating 4). In some areas, existing damaged and decayed sleepers were observed to have been left in place with new sleepers installed for pedestrian bridge decking purposes. Some timber longitudinal cracks or splitting, shrinking, and deterioration were identified on the handrail timber members were identified (Rating 3). Refer to Section 4.4 of the Level 2 Inspection report for further details of the condition prior to Stage 1 works.
Steel	Corrosion was observed along with some areas on the main girders, cross girders, and longitudinal girders associated with the central Span# 6 and also at this location the protective coating for the steel bridge was observed to be failing at multiple locations. Higher corrosion was noted on Main Girder#1, potentially as a as a result of the timing or uneven application of the protective coating system over the lifespan of the structure. High levels of corrosion were also observed in the bracing members installed between the steel piles (Rating 4). These bracings have been replaced during a previous maintenance period. Moderate levels of corrosion were also observed to be occurring within the four steel piles (Rating 3). The steel piles were observed to be still structurally adequate to resist pedestrian loads. Please note: A thorough investigation of the corrosion losses was not possible due to access difficulties.[9] Significant corrosion was also observed on all bolts, plates, and washers throughout the extent of the timber spans of the bridge.
Concrete	Spalling of concrete piers was noted in several locations, and typically these spalls are significant. Subsequent Level 3 investigation however confirmed that no rehabilitation work was required for the concrete work as it is entirely mass concrete only without reinforcing steel.
Other	Graffiti was noted at the site generally, and in particular on the fabric of the bridge impacting the aesthetic of the place. The overgrown Saltwater Creek banks pose a threat to the bridge through increased fire risk and pest infestation. The unkempt appearance also impacts the aesthetic of the place. Some minor scour was noted around Pier#7.

Refer to Section 3.5 for the current condition including illustrations.

[9] A summary for the Level 3 Inspection findings is provided in Bligh Tanner Report dated August 2022..

2.5 Stage 1 Works

Based on the Level 2 and 3 investigation results, Bligh Tanner prepared a detailed methodology and schedule for the repair and replacement of timber and steel components of the bridge. The specified work also included the removal of additional sleepers underneath the pathway to reinstate the original spacing layout and thus improving the readability of the railway track and to allow for better air circulation. The proposed work was approved by DES under exemption certificate (EC) no# 202106-14056 (superseding EC no#202101-11198EC).

During the removal of the pathway decking, it was discovered that the railway sleepers were in poor condition and could not be reused. Alternative decking material was also proposed to be installed requiring less maintenance and replacement over time, and reducing moisture retention under the deck therefore assisting with the general maintenance and conservation of the bridge. The proposed work was approved by DES under EC no#202104-13663EC.

See Appendix D for details of both ECs including detailed work methodology and drawings of the proposed works.

The repair/replacement of the timber elements (including the pathway) started around mid-2021 and was completed in February 2022.[10]

The repair works of the steel elements was postponed and Council proposes the work as a Stage 2 to commence in the 2024/25 financial year.

Refer to Sections 3.5 and 3.6 for the current condition and outstanding works.

Figure 47: Stage 1 work in progress in September 2021 (Converge 2021).

Figure 48: Stage 1 work in progress in September 2021 (Converge 2021).

[10] For details refer to Bligh Tanner, Inspection Report, August 2022.

Figure 49: Dismantling work in progress (Bligh Tanner 2022)

Figure 50: Heavily corroded bolts and steel connections (Bligh Tanner 2022).

Figure 51: View from Span 1 to 5, almost all girders badly deteriorated (Bligh Tanner 2022).

Figure 52: Badly deteriorated timber sleepers (Bligh Tanner 2022).

Figure 53: Badly deteriorated girder (Bligh Tanner 2022).

Figure 54: Replacement girder, corbel, and headstock (Bligh Tanner 2022).

Figure 55: Replacement timber sleepers (Bligh Tanner 2022).

2.6 Chronological History

Table 3: Chronological history.

YEAR	DETAILS
1892	Cran received permission to build private railway line connecting the Millaquin Sugar Mill to the North Coast Line.
1893	Call for tenders of Millaquin Branch Line.
January 1894	Start of construction.
9 July 1894	Branch line opened for traffic.
3 December 1912	The railway was acquired by the State Government.
1936	Fire at the distillery resulting in large quantities of burning spirits flowing down the Burnett River and also the Saltwater Creek, setting fire to timber structures in the vicinity.
January 1942	Flood event.
1965	Plans were prepared for strengthening the bridge superstructure with steel girders suitable for a 12-tonne axle loading, and work including addition of two cross girders, two sets of beams as lateral restraint for cross girders, and repairs to bracing on piers was subsequently carried out. See plans in Appendix B for details.
February 1971	Flood event
April 1988	Inclusion of the bridge, in use at the time, in the Register of the National Estate.
Date unknown	Closure of bridge for rail traffic.
October 1992	Listing of the bridge on QHR.
Date unknown	Relocation of platforms.
Date unknown	Replacement of bracing members installed between the steel piles.
Date unknown	Replacement of timber elements including sleepers over time.
Date unknown	Repainting of steel elements over time.
2007	Ownership of bridge transferred from the Department of Transport and Main Roads to Bundaberg Regional Council.
2007	Conversion of railway bridge to enable pedestrian and cycle traffic by installation of balustrades/handrails and timber decking. Repair to the structure was also carried out at this time including demolition of existing retaining walls on both abutments and rebuilt in masonry, construction of masonry headwall to the back of both abutments, addition of anti-splitting bands on selected elements, replacement of corroded wale bracing on Pier#5, and cleaning and lanolin treatment of all timber elements where required. See plans in Appendix B for details.
Dec 2010 / Jan 2011	Bridge submerged during flood events.
January 2013	Most significant flood in the history of Bundaberg to date.

YEAR	DETAILS
From June 2020	Structural engineering assessment of the bridge and preparation of recommended conservation management strategy including preparation of CMP.
From mid-2021	Commencement of timber structure repairs and deck replacement under exemption certificates (Stage 1).
February 2022	Completion of timber structure repairs (Stage 1) and upgrade of pedestrian/cycle pathway. Works included: • Replacement of several girders, corbels, and headstock members. • New bottom plate at Pier#5. • Replacement of all timber sleepers. • Replacement of all bolts and steel connections. • Replacement of timber at platforms and placement of one platform (Span#3) into storage as it obstructs access for heavy machinery to the worksite. The platform is to be re-installed following completion of steel repair works. • Installation of new decking. • Repair/replacement of handrails where required. Refer to Bligh Tanner Saltwater Creek Rail Bridge Conservation – Saltwater Creek Bridge Inspection Report (2022).
August 2022	Completion of final draft CMP.

3 The Place today – Physical Evidence

The following section is based on the site inspection undertaken in June/October 2020 and amended to include information from the visit in May 2022 at the completion of Stage 1.

3.1 Setting and Landscape

Figure 56: Setting of the Saltwater Creek Railway Bridge (Queensland Globe 2020).

Figure 57: Setting of bridge in context with Millaquin Mill (Queensland Globe 2020).

The Saltwater Creek Railway Bridge, also known as Millaquin Bridge, is located across the Saltwater Creek, a branch of the Burnett River separating Central Bundaberg from East Bundaberg. The bridge is situated close to the confluence with the river in the north and forms the pedestrian/cyclist connection between Quay Street and Quay Street East, on the route of the former Millaquin Branch Line. A concrete path joins onto either side of the bridge.

On the west bank of the creek is a restaurant on the north side of Quay Street and commercial premises are situated on the south side of Quay Street. On the east bank of the creek is a vacant grassed area along the bank of the Burnett River with some mature trees including palm trees. The area offers views to the bridge as well as glimpses of the Millaquin Mill in the northeast. South of Quay Street east are residences.

The bridge provides a vantage point for views to the Burnett River in the north and also of the QHR listed Kennedy Bridge across the Saltwater Creek in the south.

Figure 58: Aerial view of bridge (Converge 2020).

Figure 59: View south to bridge from Burnett River (Converge 2020).

Figure 60: View north to Burnett River (Converge 2020).

Figure 61: View south to Kennedy Bridge (Converge 2020).

Figure 62: View east from bridge (Converge 2022).

Figure 63: View west from bridge (Converge 2022).

Figure 64: NW view to restaurant and river (Converge 2020).

Figure 65: NE view to river (Converge 2020).

Figure 66: Grassed area in the NE at the termination of bridge (Converge 2020).

Figure 67: Aerial view west to Quay Street following the former Millaquin Branch Line (Converge 2020).

The banks of Saltwater Creek consist of grassed sloping terrain with what appears to be rock reinforcement towards the water's edge. Generally, the banks are overgrown with grass, self-seeded shrubs, mangroves, castor oil plants (*Ricinus communis*) and small trees, and show signs of erosion in places, particularly on the west side exacerbated by a stormwater drain on the south side discharging water causing dirt to wash down the banks and accumulating around the bridge structure.

Short concrete masonry retaining walls are located on either side of the bridge abutments.

On the northwest side an unformed path leads to a flat area at the water's edge and on the southeast side the area around a monitoring station was slashed and provided access towards the river bank.

Figure 68: View to NW embankment (Converge 2022).

Figure 69: Close-up of rocks on NW river bank (Converge 2022).

Figure 70: Overgrown area on the SW side with erosion noticed caused by water from a drain up top (Converge 2022).

Figure 71: Erosion on the NW river bank (Converge 2022).

Figure 72: View to east embankment (Converge 2022).

Figure 73: Slashed area around monitoring station on SE embankment (Converge 2022).

Figure 74: Short retaining wall on the SE side (Converge 2022).

Figure 75: Short retaining wall on the NW side (Converge 2022).

Figure 76: View east along south side of bridge; note overgrown embankment and short retaining wall (Converge 2022).

Figure 77: View west along north side of bridge, note the overgrown embankment (Converge 2022).

3.2 Bridge structure

The following description of the bridge structure was adapted for this report from the description prepared by Bligh Tanner for the Level 2 Inspection Report (September 2020) of the bridge.

The original Saltwater Creek Railway Bridge includes one 50-foot (15 m) plate girder span with steel cross girders and longitudinally seven 20-foot (6.1m), and two 26-foot (7.9 m) timber spans. The spans are supported on seven timber piers, two cast iron concrete cylinder piers and two concrete abutments.

The bridge comprises of:

- 4x1x2 20-foot (6.1 m) timber longitudinal, concrete abutment, typical braced timber trestles, (two on timber foundations) (Piers# 1 to 5) – see Figure 78 to Figure 90.
- 1x2x2 26-foot (7.9 m) timber longitudinal, common braced timber trestle on a concrete foundation (pier 5), typical cast iron cylinders with screw piles[11] (Pier# 6) – see Figure 89/50 and Figure 92 to Figure 97.
- 1x2 50-foot (15 m) half-through plate girders with steel cross girders, steel longitudinal, typical cast iron cylinder piers with screw piles (Piers# 6 and 7) – see Figure 92 to Figure 99.
- 1x2x2 26-foot (7.9 m) timber longitudinal, typical cast iron cylinders with screw piles (Pier#7), common braced timber trestle (pier 8) – see Figure 98/59 and Figure 103/64.
- 3x1x2 20-foot (6.1 m) timber longitudinal, concrete abutment, typical braced timber trestles (Piers# 8 to 11) – see Figure 100 to Figure 110.

[11] Screw piles are auger-like screwed into the stream bed.

The central steel girder span of the bridge crosses the main central zone of Saltwater Creek and can be seen in the original general arrangement drawing (Figure 91).

There are two timber platforms situated on the upstream side, one at Span#5 (Figure 80) and the second at Span#9 (Figure 80 and Figure 105). [12]

During Stage 1 works a large number of timber members have been replaced with like-for-like material and it appears that pest/fungal treatment has been undertaken. Some timber piers have been fitted with weed matting at the base.

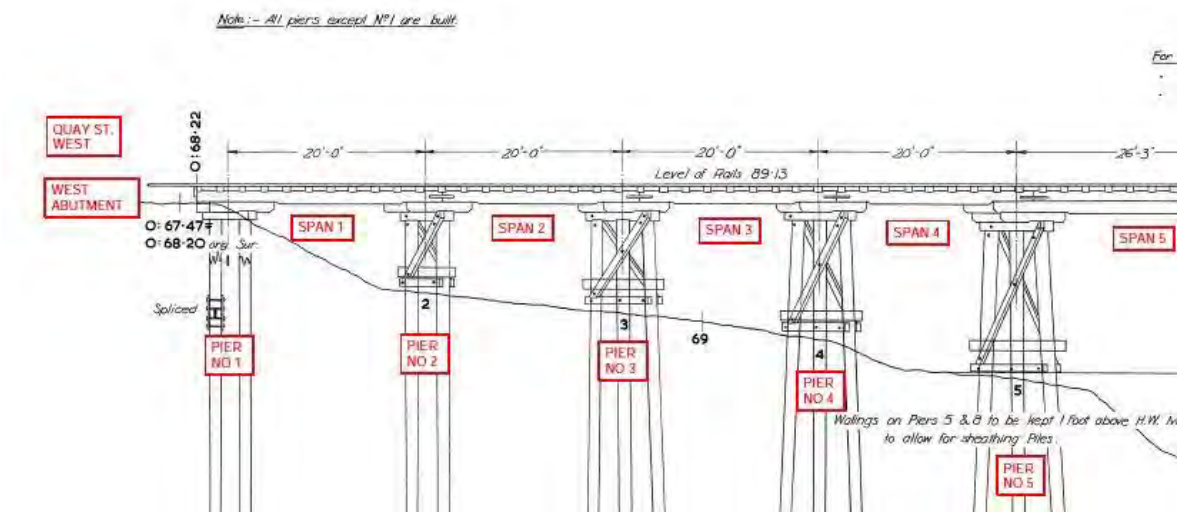


Figure 78: Location of Piers 1 to 5 (Bligh Tanner 2020).

Figure 79: West bank (Converge 2022).

Figure 80: Southside of bridge, arrows mark platforms at Span#5 and 9 (Converge 2022).

[12] Prior to Stage 1 works there were three timber platforms; one platform situated at Span#3 on the downstream side has been moved into storage until the completion of the steel repair works to enable access for machinery.

Figure 81: West termination (Converge 2022).

Figure 82: West abutment (Converge 2022).

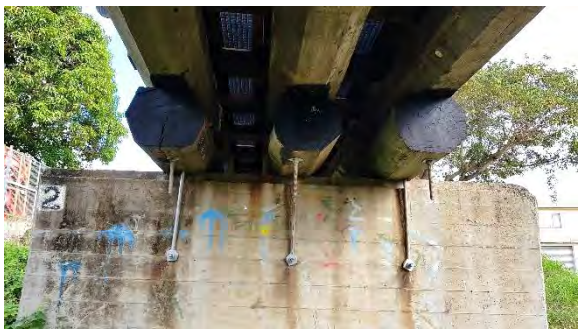


Figure 83: Pier 2 (Converge 2022).

Figure 84: Pier 2 (Converge 2022).

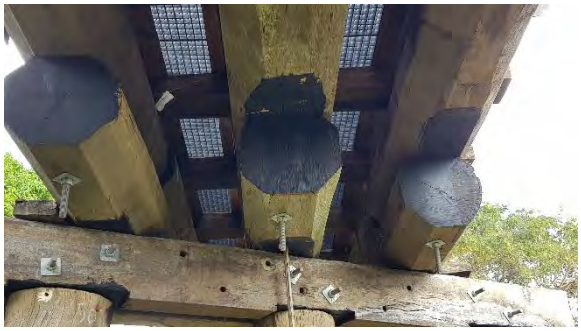


Figure 85: Pier 3 (Converge 2022).

Figure 86: Pier 3 (Converge 2022).

Figure 87: Pier 4 (Converge 2022).

Figure 88: Pier 4 (Converge 2022).

Figure 89: Pier 5 (Converge 2022).

Figure 90: Pier 5 (Converge 2022).

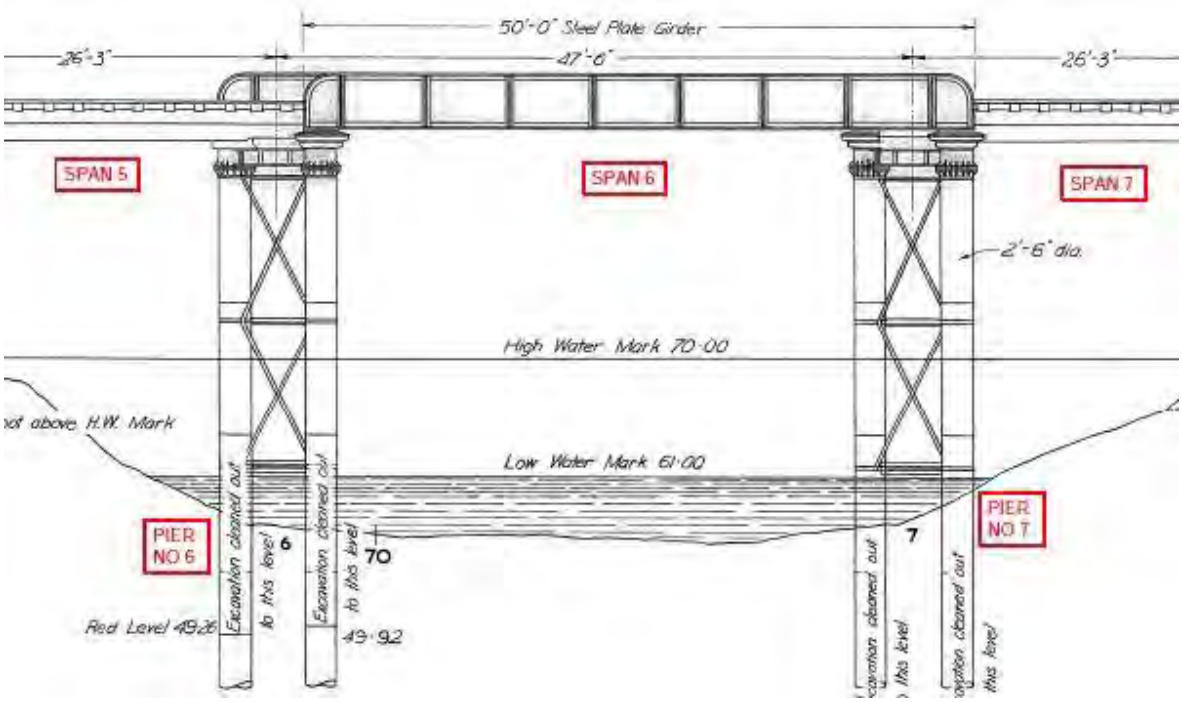


Figure 91: Location of Piers 6 and 7 (Bligh Tanner 2020).

Figure 92: Pier 6 and 7 (Converge 2020).

Figure 93: Span 6 and pier 7 (Converge 2020).

Figure 94: Pier 6 (Converge 2022).

Figure 95: Pier 6 (Converge 2022).

Figure 96: Pier 6 (Converge 2022).

Figure 97: Pier 6 (Converge 2022).

Figure 98: Pier 7 (Converge 2022).

Figure 99: Pier 7 (Converge 2022).

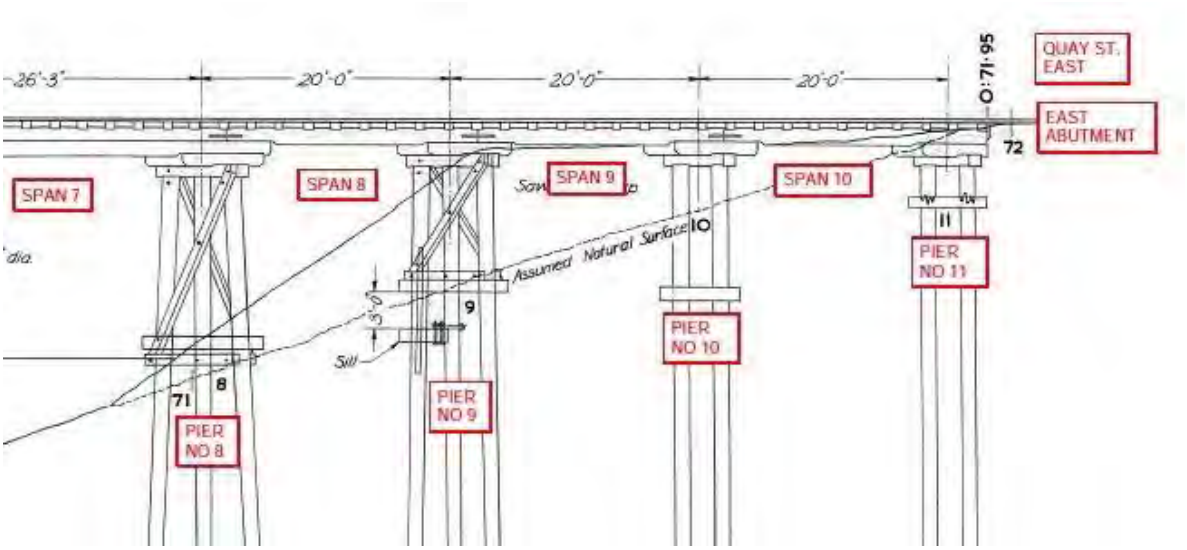


Figure 100: Location of Piers 8 to 11 (Bligh Tanner 2020).

Figure 101: East bank, south side (Converge 2022).

Figure 102: East bank, north side (Converge 2022).

Figure 103: Pier 8 (Converge 2022).

Figure 104: Pier 8 (Bligh Tanner 2022).

Figure 105: Pier 9 (Converge 2022).

Figure 106: Pier 9 (Converge 2022).

Figure 107: Pier 10 (Converge 2022).

Figure 108: Pier 10 (Converge 2022).

Figure 109: Pier 11 – east abutment (Converge 2022).

Figure 110: Pier 11 (Converge 2022).

Figure 111: Cap visible on timber pier indicating pest/fungal treatment (Converge 2022).

Figure 112: Example of weed matting found on some timber piers. Note the soil built-up in between the fabric and the timber (Converge 2022).

3.3 Pedestrian and cyclist path

The combined walk and cycle path consists of composite fibre mesh decking laid on top of the railway section of the bridge with sleepers (recent replacement) and tracks remaining *in situ*. The path widens at the central steel girder span section of the bridge.

Handrails are fitted either side of the path comprising vertical metal fence panels set in timber boards at the top and bottom and finished with a timber board at the top. The handrails are continued at either side of the path and both approaches to the bridge with three-rail timber fences. A plaque is fixed to the top timber board at the widened section.

Figure 113: Walk/cycle path (Converge 2022).

Figure 114: View of path constructed over railway line (Converge 2022).

Figure 115: Plaque fixed to handrail (Converge 2022).

Figure 116: Approach on east side (Converge 2022).

3.4 General Condition of Fabric (Physical Condition)

A Level 2 inspection was undertaken in June 2020 followed by Level 3 inspections in October and November 2020.

Following the completion of the Stage 1 works, Converge undertook a site visit in May 2022. Bligh Tanner conducted a final inspection in June 2022. Unresolved key inspection observations from 2020 (Bligh Tanner 2020) and general condition observations from the recent site visits are provided in Table 5.

Please note:

Bligh Tanner prepared naming and numbering convention plans for the Level 2 Inspection of the bridge generally based on available drawings – refer to Appendix C for details.

The Department of Transport and Main Roads (TMR) Structures Inspection Manual (SIM) outlines a naming convention and element code for components of standard bridge structures. The purpose of the naming convention is to enable correlation with the Inspection Form A2/3 Defective Component Record, which should be referred to for further detail.

The West Abutment is identified as being on the west side of Quay Street, with the East Abutment being designated as being on the east side of Quay Street.

3.5 Key inspection observations in 2022

The condition of the structure was observed in the Level 2 and 3 inspections in 2020. Since that time Stage 1 repair works have been carried out by Council – see Sections 2.4 and 2.5 for details.

Converge undertook a site visit at the completion of the Stage 1 works in May 2022 and updated images were added where applicable

The following observations are adapted from the key defect findings of the Level 2 inspection undertaken by Bligh Tanner in June 2020 and the final inspection in June 2022 and relate to outstanding tasks.

The following key exceptions apply:

- Following the TMR SIM, any items where less than 25% of the structure is accessible or could not be inspected are recorded on the Standard Procedure Exception Report with details of accessibility. It should also be noted that the following elements will be included on this exception report:
    - Steel Piers or Piles (Pier# 6 and 7) under the water level.
    - The top surface of steel girders which were covered by timber decking and timber sleepers.
    - The soffit level of steel girders which could only be observed from the top of a paddleboard, and drone video surveillance.
    - Concrete foundation or pedestals for Pier# 4, 5, and 8 where only the top surface could be examined.
    - Concrete pedestal for pier no 4, 5, and 8. (Bligh Tanner 2020)

For the detailed inspection report refer to Bligh Tanner, Saltwater Creek Railway Bridge – Level 2 Inspection Report, Revision 3, September 2020.

Table 4 provides a definition of the five ratings used in the condition observation in Table 5, and is based on the 'Condition State' descriptions as defined within the TMR SIM (Bligh Tanner 2020).

Table 4: Component condition state description (Bligh Tanner 2020).

CONDITION STATE	SUBJECTIVE RATING	DESCRIPTION
1	Good ('as new')	Free of defects with little or no deterioration evident.
2	Fair	Free of defects affecting structural performance, integrity, and durability. Deterioration of a minor nature in the protective coating and/or parent material is evident.
3	Poor	Defects affecting the durability/serviceability which may require monitoring and/or remedial action or inspection by a structural engineer. Component or element shows marked and advancing deterioration including loss of protective coating, and minor loss of section from the parent material is evident. Intervention is normally required.
4	Very poor	Defects affecting the performance and structural integrity which require immediate intervention including inspection by a structural engineer if principal components are affected. Component or element shows advanced deterioration, loss of section from the parent material, signs of overstressing or evidence that it is acting differently to its intended design mode or function.
5	Unsafe	This state is only intended to apply to the **overall structure rating.** Structural integrity is severely compromised, and the structure **must** be taken out of service until a structural engineer has inspected the structure and recommended the required remedial action.

Table 5: Condition observations of the bridge

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION		
Walkway			
Handrail members	<u>Incorrect bolt installation</u> Several bolts are installed incorrectly and holes from previous installations are not filled, potentially resulting in water penetration and decay.	 Bolts installed incorrectly and holes left open (Bligh Tanner 2022).	 Bolts installed incorrectly and holes left open (Bligh Tanner 2022).
	<u>Mismatched replacement timber boards</u> Not all replacement boards match the size of the existing and some members are too short.	 Mismatched size of timber board (Converge 2022).	 Some members are too short (Bligh Tanner 2022).

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION		
Kick railing	Splitting of timber boards Major timber splitting was observed at the toe kick railing in some places.	 Splitting timber (Bligh Tanner 2022).	 Splitting timber (Bligh Tanner 2022).
	Missing or connector plates/screws The connector plates are missing in some places and some plates are missing some screws.	 Missing connectore plate (Bligh Tanner 2022).	 Missing screws (Bligh Tanner 2022).

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION		
Approach	The concrete approach level is not flush with the bridge decking level and potentially could create a trip hazard.	 (Bligh Tanner 2022).	
ELEMENT	**CONDITION DESCRIPTION AND ILLUSTRATION**		
Steel	Adapted from Bligh Tanner 2020.		
Structural members	Corrosion, pitting and delamination Corrosion was observed along with some areas on the main girders, cross girders, and longitudinal girders associated with the central Span# 6 and also at this location the protective coating for the steel bridge was observed to be failing at multiple locations. Higher corrosion was noted on Main Girder#1, potentially as a result of the timing or uneven application of the protective coating system over the lifespan of the structure. High levels of corrosion were also observed in the bracing members installed between the steel piles (Rating 4). These bracings have been replaced during a previous maintenance period. Moderate levels of corrosion were also observed to be occurring within the four steel piles (Rating 3). The steel piles were observed to be still structurally adequate to resist pedestrian loads. Please note: The Level 3 Inspection was conducted on the above water level elements only.[13]		

[13] A summary for the Level 3 Inspection is provided in Bligh Tanner Report dated August 2022.

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION			
Structural members	 Typical corrosion on the bearing plate of the main girder (Bligh Tanner 2020).	 Typical pitting and delamination on the main girder (Bligh Tanner 2020).	 Typical pitting and delamination on the cross girder (Bligh Tanner 2020).	 Typical pitting and delamination on the bracing members (Bligh Tanner 2020).
Structural members	 Typical corrosion on the bracing members (Bligh Tanner 2020).	 Heavy corrosion on pile bracings and tees member (Bligh Tanner 2020).	 Heavy corrosion on pile bracings member (Bligh Tanner 2020).	 Typical corrosion on steel pile (Bligh Tanner 2020).

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION			
Concrete	Adapted from Bligh Tanner 2020.			
Piers and pedestals	Cracking and spalling Spalling of concrete piers was noted in several locations, and typically these spalls are significant. Subsequent Level 3 Inspections however confirmed that no rehabilitation work was required for the concrete elements as it is entirely mass concrete only without reinforcing steel.[14]			
	 Corner spalling of Pier#2 (Bligh Tanner 2020).	 Corner spalling of concrete pedestal at Pier#4 (Bligh Tanner 2020).	 Corner spalling of concrete pedestal at Pier#5 (Bligh Tanner 2020).	 Corner spalling of concrete pedestal at Pier#5 (Bligh Tanner 2020).

[14] A summary for the Level 3 Inspection is provided in Bligh Tanner Report dated August 2022..

ELEMENT	CONDITION DESCRIPTION AND ILLUSTRATION		
OTHER			
Various	<u>Graffiti and discolourations</u> Graffiti was noted at the site generally, and in particular on the fabric of the bridge impacting the aesthetic of the place.		
	 Graffiti on steel plate girder Span#5 (Converge 2022).	 Graffiti on concrete pier (Converge 2022).	 Discolourations were noted on concrete pier and abutment on both sides (Converge 2022).
Vegetation	The overgrown Saltwater Creek banks pose a threat to the bridge through increased fire risk and potential pest infestation. The unkempt appearance also impacts the aesthetic of the place.		
	 Long grass and self-seeded vegetation on the west bank (Converge 2022).	 View to overgrown east bank (Converge 2022).	 Overgrown east bank (Converge 2020).
Drainage	Ineffective stormwater drainage has caused built-up of soil around timber piers as well as erosion (adapted from Bligh Tanner 2020).		

<table>
<tr><th>ELEMENT</th><th colspan="3">CONDITION DESCRIPTION AND ILLUSTRATION</th></tr>
<tr><td>OTHER</td><td colspan="3"></td></tr>
<tr><td></td><td> 
Above ground drainage leading to erosion issues (Converge 2022).</td><td> 
Soil built-up around Pier#4 (Converge 2022). A number of piers have a fabric weed barrier, however washed up soil has deposited in between.</td><td> 
Erosion on the west abutment (Converge 2022).</td></tr>
<tr><td>Area around Steel Piers</td><td colspan="3">Scour (adapted from Bligh Tanner 2020).
Some minor scour was noted around Pier#7 (no images).</td></tr>
</table>

3.6 Recommendation Action in Engineering Report after site inspection (Bligh Tanner 2020)

The following table lists the recommended actions including time frames after the Level 2 inspection. It has been amended to reflect the progress of the repairs (Stage 1) and list the outstanding repair items as per final engineering inspection report (Bligh Tanner August2022).

Figure 117: Amended recommended actions following Level 2 inspection (Bligh Tanner, 2020:37 and Bligh Tanner 2022).

Structure:	Railway Bridge Structure	**Critical ®**	**Immediate action required**	
Location:	Quay Street, Bundaberg	**High (H)**	**Action within 6 Months**	
Date of Inspection:	24th and 25th June 2020	**Elevated ®**	**Action within 12 Months**	
		Routine ®	**Action within 2 years**	
		Cyclic Monitoring (C/M)		

Defective Component	**Recommendation**	**Sketch No**	**Priority and Frequency**	**Comments following 2021/2 inspections**
Bolts, nuts, washer plates, and connection plates	All the bolts, nuts, and washer plates are corroded, and some of them heavily corroded. Consider replacing it with new fasteners with hot-dip galvanised coating.	**N.A.**	**R**	Completed in Stage 1 timber repair works.
Pier no 2 Corbels and Girders	Refer to Figure 22 for a timber drilling survey on corbels and girders, consider to replace it.	**N.A.**	**H**	Completed in Stage 1 timber repair works.
				The following structural steel defects have not been rectified at the time of preparing this report and repairs are still required to be undertaken in accordance with Bligh Tanner recommendations.

Defective Component	Recommendation	Sketch No	Priority and Frequency	Comments following 2021/2 inspections
Steel pier bracing members	Corrosion heavily on bracing members, consider to replate it. The new bracing member should be coated with the marine coatings system.	**N.A.**	**H**	Outstanding – In June 2020 this was rated 'High' with repairs to be undertaken within 6 months. **The work should be undertaken as soon as possible.** Yearly engineering inspections by RPEQ engineer are recommended until steel rehabilitation is completed.
Span 6 Steel Structures	It is recommended that a Level 3 inspection is required for all steel members of Span 6. Severe corrosion with obvious loss of section was observed during the inspection, and the inspection was from the creek embankments.	**N.A.**	**H**	Level 3 inspection completed. **Repairs are outstanding and should be undertaken as soon as possible.** Yearly engineering inspections by RPEQ engineer are recommended until steel rehabilitation is completed.
Steel Columns / Screw Piles (4 Each)	It is recommended that a Level 3 inspection is required for all steel columns	**N.A.**	**H**	Level 3 inspection of above water elements completed. Below water level inspection deferred. **Repairs are outstanding and should be undertaken as soon as possible.** Yearly engineering inspections by RPEQ engineer are recommended until steel rehabilitation is completed.
Steel Girders, and bracings (Span no 6)	Reinstate protective coating and loss cross-section to steelwork, including girders and bracings.	**N.A**	**R**	Outstanding – In June 2020 this was rated 'Routine' with repairs to be undertaken within 2 years. **This work should be undertaken as soon as possible.** Yearly engineering inspections by RPEQ engineer are recommended until steel rehabilitation is completed.

Defective Component	Recommendation	Sketch No	Priority and Frequency	Comments following 2021/2 inspections
N.A.	Inspect the bridge for loose items, planks, bolts, or other features that could fall and cause injury.	**N.A**	**C/M every 6 months**	Ongoing.
Abutments and creek embankments	Inspect abutments and creek embankments for erosion and scouring. Complete the repair works as identified.	**N.A**	**C/M every 12 months or after significant rainfall events**	Ongoing.
N.A	Remove soils and debris build-up from contact with timber and timber piles	**N.A**	**C/M program it every 6 months**	Ongoing.
N.A	Install termite treatment or barrier to stop or prevent termite attack to timber substructure and timber superstructure.	**N.A**	**As specified by Termite Professional**	Unknown status.
Stormwater pipe discharge near the West Abutment	Refer to Photograph 6 in Appendix A. We recommend the stormwater discharge can be redirected to the creek rather than to the banks of the creek. It will cause erosion and scouring to the bridge substructure.	**N.A.**	**R**	Outstanding – In June 2020 this was rated 'Routine' with repairs to be undertaken within 2 years. **The work should be undertaken as soon as possible.**
N.A	Undertake a routine engineering inspection of the bridge and complete critical repairs as identified.	**N.A**	**R***	Ongoing. **It is recommended that a yearly engineering inspection of the structure and in particular the steel elements by RPEQ engineer is carried out until the outstanding steel repairs are completed.**
N.A	Install fungal decay prevention measures to the timber piles and girders, including the installation of preservative treatments to the timber pile and ground interface and the installation of borate salt tubes into the timber to reduce the rate of fungal decay.	**N.A**	**C/M every 5 years**	Unknown status.

Additional recommendations:

Regarding the defects of the concrete pedestals at Piers 1, 2, 4, 5, 8 and 11, Bligh Tanner recommended to cut back all soft and loose concrete and reinstate the pedestals to the original profile within the next twelve months during routine maintenance (Bligh Tanner 2000:27). The Level 3 inspection concluded that no strengthening or rehabilitation actions are required for the existing concrete Pier 5 and 8 (Bligh Tanner August 2022).

For recommendation regarding the repair of the identified defects of the pedestrian walkway refer to Stage 1 Inspection Report (Bligh Tanner August 2022).

For a detailed list of repair items, specifications and notes see Chapter 10 of the Level 2 Inspection Report (Bligh Tanner 2000) and refer the Level 3 inspection and recommendations (Bligh Tanner August 2022).

The following drawings illustrate the identified steel repair items.

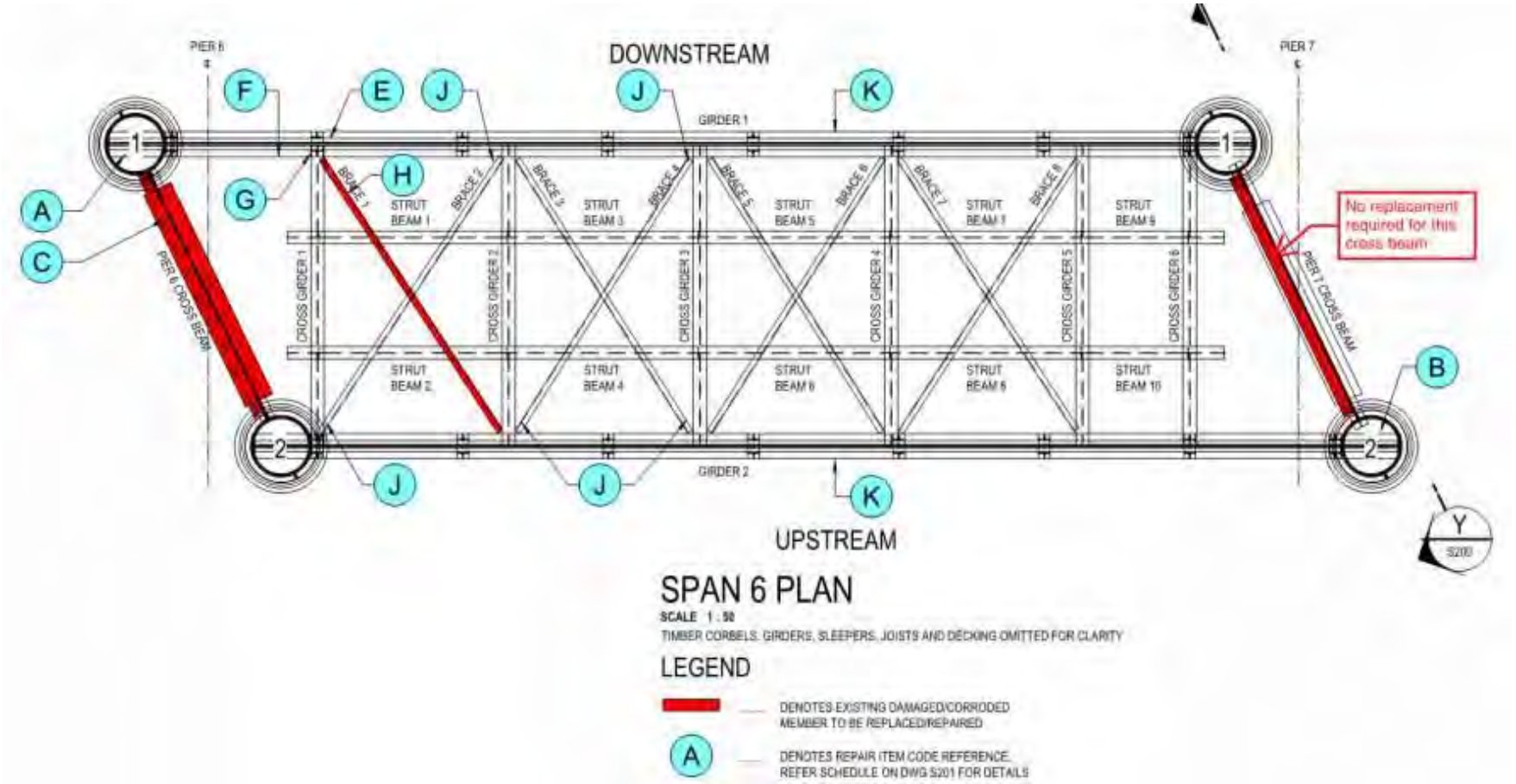


Figure 118: Extent of Superstructure Repair for the Bridge Steel Structure (Bligh Tanner August 2022).

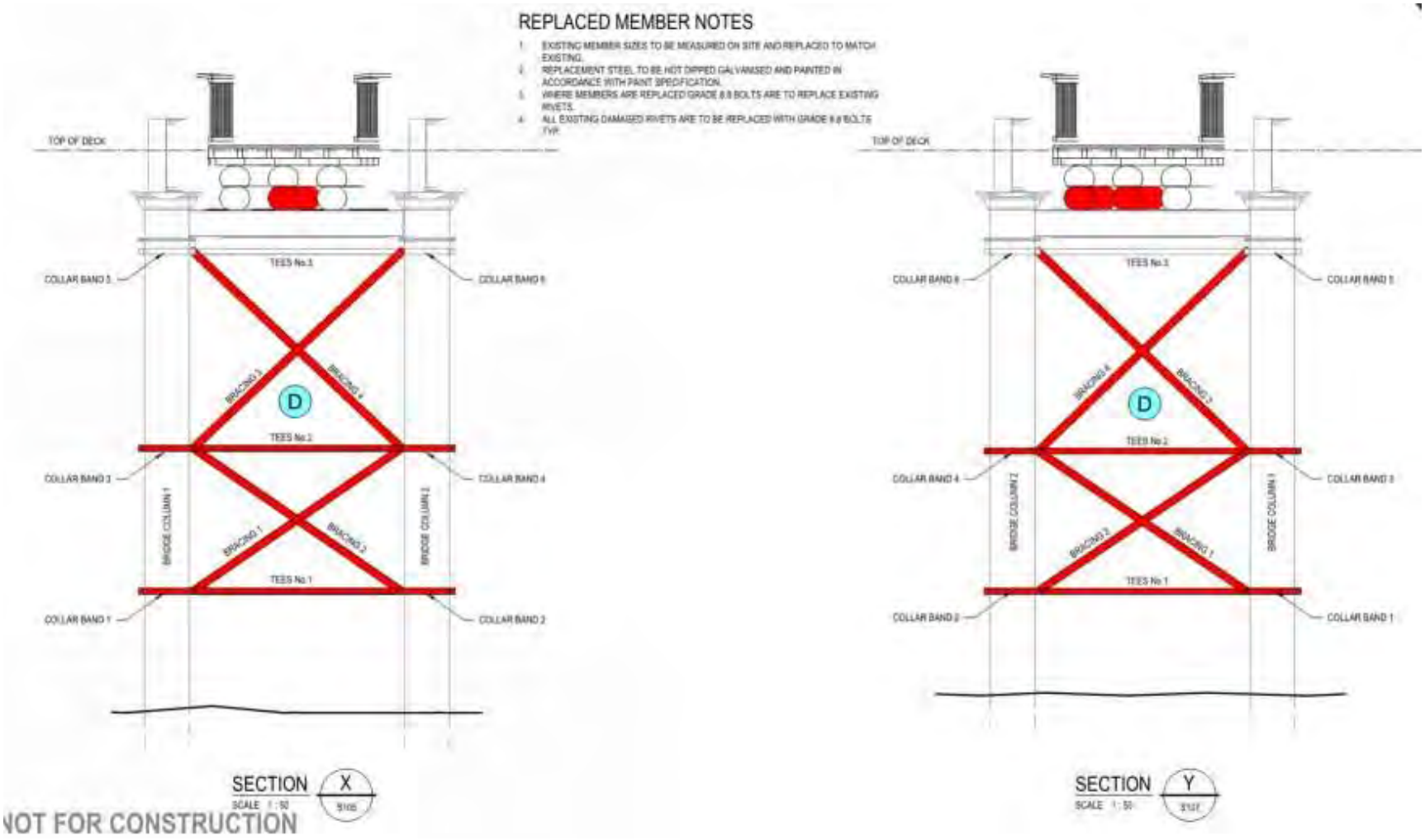


Figure 119: Extent of Substructure Repair for the Bridge Steel Structure (Bligh Tanner August 2022).

4 Cultural Heritage Significance

4.1 Determining Cultural Heritage Significance

The heritage significance of a place is determined through the application of heritage criteria. The best-practice framework for the conservation of tangible cultural heritage in Australia is the *Burra Charter (2013)*, which guides cultural heritage management in Australia. The *Burra Charter (2013)* defines conservation as 'the process of looking after a place to retain its cultural significance' (Article 1.4). A place is considered significant if it possesses aesthetic, historic, scientific, social, or spiritual value for past, present, or future generations (Article 1.2). The definition given for each of these values is as follows:

Aesthetic value refers to the sensory and perceptual experience of a place—that is, how we respond to visual and non-visual aspects such as sounds, smells and other factors having a strong impact on human thoughts, feelings, and attitudes. Aesthetic qualities may include the concept of beauty and formal aesthetic ideals. Expressions of aesthetics are culturally influenced.

Historic value is intended to encompass all aspects of history—for example, the history of aesthetics, art and architecture, science, spirituality, and society. It therefore often underlies other values. A place may have historic value because it has influenced, or has been influenced by, an historic event, phase, movement or activity, person, or group of people. It may be the site of an important event. For any place, the significance will be greater where the evidence of the association or event survives at the place, or where the setting is substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of such change or absence of evidence.

Scientific value refers to the information content of a place and its ability to reveal more about an aspect of the past through examination or investigation of the place, including the use of archaeological techniques. The relative scientific value of a place is likely to depend on the importance of the information or data involved, on its rarity, quality or representativeness, and its potential to contribute further important information about the place itself or a type or class of place or to address important research questions. To establish potential, it may be necessary to carry out some form of testing or sampling. For example, in the case of an archaeological site, this could be established by a test excavation.

Social value refers to the associations that a place has for a community or cultural group and the social or cultural meanings that it holds for them.

Spiritual value refers to the intangible values and meanings embodied in or evoked by a place which give it importance in the spiritual identity, or the traditional knowledge, art, and practices of a cultural group. Spiritual value may also be reflected in the intensity of aesthetic and emotional responses or community associations and be expressed through cultural practices and related places.

These values are reflected in established heritage criteria that are used by all heritage agencies and statutory heritage Acts in Australia. The criteria are generally broadened from the five *Burra Charter (2013)* values to eight and are represented by the letters A-H.

The criteria in the *Queensland Heritage Act 1992* (QHA):

A. If the place is important in demonstrating the evolution or pattern of Queensland's history.

B. If the place demonstrates rare, uncommon, or endangered aspects of Queensland's cultural heritage.

C. If the place has potential to yield information that will contribute to an understanding of Queensland's history.

D. If the place is important in demonstrating the principal characteristics of a particular class of cultural places.

E. If the place is important because of its aesthetic significance.

F. If the place is important in demonstrating a high degree of creative or technical achievement at a particular period.

G. If the place has a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

H. If the place has a special association with the life or work of a particular person, group or organisation of importance in Queensland's history.

The relevant criteria for a place are grouped together into statements, which are collectively referred to as the statement of significance.

4.2 Statement of Heritage Significance

The following statement of significance is sourced *verbatim* from the QHR citation for the Saltwater Creek Railway Bridge, Place ID#600370 (DES 2016).

Table 6: Statement of Significance.

CRITERIA	STATEMENT
A	A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.
C	The place has potential to yield information that will contribute to an understanding of Queensland's history. (Criterion is under review)
D	A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.
F	The place is important in demonstrating a high degree of creative or technical achievement at a particular period. (Criterion is under review)

4.3 Analysis of Statement of Significance

The assessment found that the citation including the Statement of Significance is generally lacking in detail and should be updated. The following key points should be considered:

4.3.1 Statement of Significance

Four criteria (criterion A, C, D and F) are applied, two of which are under review (criterion C and F).

We agree with the application of criterion A and D, however, do not believe that the Saltwater Creek Railway Bridge thresholds for criterion C and F as the bridge design of cast iron cylinder piers on screw piles was common at the time of construction – see RNE citation Place ID#15960.

We found that the bridge thresholds for criterion B and H and recommend the inclusion of those criteria in the Statement of Significance.

- Criterion B – *The place demonstrates rare, uncommon, or endangered aspects of Queensland's cultural heritage.*
  The Saltwater Creek Railway Bridge is a rare example of a screw pile plate girder bridge. The comparative analysis has shown that the Saltwater Creek Railway Bridge is a rare surviving example of a design that was once common, with only two examples uncovered, one being a road bridge.

  Criterion H – *The place has a special association with the life or work of a particular person, group, or organisation of importance in Queensland's history.*

  The Saltwater Creek Railway Bridge was part of the Millaquin Branch Line, a private railway line instigated and financed by Robert Cran, the owner of Millaquin Sugar Mill in East Bundaberg, to connect the mill to the North Coast Railway Line in the west. The railway line, and by extension the bridge, is intrinsically connected with the mill as it provided a vital supply link.

4.3.2 Overall citation

- Name – Consider changing the name to 'Saltwater Creek Railway Bridge, former' as the bridge is no longer part of a railway line with the adjacent rail infrastructure having been removed.
- Address – Update the address regarding the reference to the 'Woongarra Line' as this line is no longer extant.
- History and description – Update and amend the context history and description of the bridge to provide more complex background information, especially regarding the connection to the sugar industry and the importance of the railway for the development of the Bundaberg region, and also to adequately reflect changes of the bridge structure and use over time.

4.4 Integrity

This section provides an overview of the known changes to the bridge and is based on the history and the site assessment. The level of integrity of a place contributes to its significance.

Table 7: Integrity of Saltwater Creek Railway Bridge

YEAR	DETAILS
9 July 1894	Branch line opened for traffic.
1965	Plans were prepared for strengthening the bridge superstructure with steel girders suitable for a 12-tonne axle loading, and work including addition of two cross girders, two sets of beams as lateral restraint for cross girders, and repairs to bracing on piers was subsequently carried out. See plans in Appendix B for details.
Exact dates unknown	Repainting of steel elements over time.
Exact date unknown	Relocation of platforms.
Exact date unknown	Replacement of bracing members installed between the steel piles.
Exact dates unknown	Replacement of timber elements including sleepers over time.
2007	Conversion of railway bridge to enable pedestrian and cycle traffic by installation of balustrades/handrails and timber decking. Repair to the structure was also carried out at this time including demolition of existing retaining walls on both abutments and rebuilt in masonry, construction of masonry headwall to the back of both abutments, addition of anti-splitting bands on selected elements, replacement of corroded wale bracing on Pier#5, and

YEAR	DETAILS
	cleaning and lanolin treatment of all timber elements where required. See plans in Appendix B for details.
2021/22	Completion of timber structure repairs (Stage 1). Work was undertaken using like-for-like material including repurposed and new timber and included: • Replacement of o Girders: 31 of 33. o Corbels: 14 of 21 o Headstock: 5 of 14 o Piers: 2 of 18 • New bottom plate at Pier#5. • Replacement of timber of the platforms and temporary storage of platform at Pier#3 into storage until steel repair works are completed. • Replacement of all timber sleepers. • Replacement of all bolt connections including bolt studs, washers, nuts and screws. Refer to Bligh Tanner Saltwater Creek Bridge Inspection Report (2022). Updating of the pedestrian/cycle pathway with the installation of new decking and repair to the balustrades and handrails.

4.5 Comparative Analysis

A comparative analysis is an examination of a place in relation to similar places and is used to assist in the understanding of significance, to establish its rarity and representativeness.

In his 1985 history of Australian bridges[15], O'Connor lists six extant screw pile bridges, with four being located in Queensland including the Saltwater Creek Railway Bridge. Heritage register searches found that three are extant. Two are listed on QHR, the Saltwater Creek Railway Bridge and the Annan River Bridge (road bridge), while the third, the Cabbage Tree Creek Railway Bridge, is listed on the Brisbane City Council local heritage register. The fourth railway bridge listed in O'Connor at Nundah Creek appears to have been replaced.

A further search of the QHR was undertaken to ascertain the rarity of plate girder timber trestle railway bridges of the late 19th century in Queensland. The search yielded three results including the Saltwater Creek Railway Bridge.

See Table 8 overleaf for details.

[15] O'Connor, Spanning Two Centuries – Historic Bridges of Australia, 1985, University of Queensland Press, p154, 177, 202

Table 8: Comparative analysis of screw pile and plate girder bridges in Queensland.

QHR #	HIST. PERIOD	NAME	SCREW PILE	PLATE GIRDER	CRITERIA	OVERVIEW	IMAGE
600370	Late 19th century	Saltwater Creek Railway Bridge	Yes	Yes	A, D (C, F under review)	Built in 1894 as part of the Millaquin Branch Line, a private railway line constructed to government standards, the timber trestle bridge with screw piles and plate girders spans the Saltwater Creek in Bundaberg. The railway line including the bridge was bought by the QLD Government in 1912 and strengthened over time. The bridge was converted to accommodate foot and cycle traffic in 2007. The bridge is the oldest railway bridge of its type in Queensland.	 Image: Converge 2020.
600417	Late 19th century	Annan River Bridge (road bridge)	Yes	Yes	A, B, C, D, E, F, G, H	Built in 1886-89 in the Cooktown Hinterland, the screw pile and plate girder low-level road bridge is one of the last remaining of its type in Australia. The screw piles design had to be redesigned during the construction process to allow for sleeve sinking facilities as the site proofed unsuitable for screw pile construction. The metal bridge was constructed of wrought and cast iron, steel and gunmetal and is associated with JH Daniells, QLD Engineer for Bridges at the time. The bridge is a popular recreational fishing spot and has aesthetic qualities.	 Image: DES, no date.
BCC LHR	Federation	Cabbage Tree Creek Railway Bridge	Yes	No	A, B, D, F	Reconstruction of an original timber railway bridge (1881) in connection with a rail duplication project on the Sandgate Line north of Brisbane due to increased traffic. The bridge was constructed in 1901-2 using cast iron and screw-pile piers. The bridge is one of three rail bridges constructed for Brisbane's first suburban rail line in 1881, and is a rare but representative example of a screw-pile cast iron pier railway bridge within the	 Image: Brisbane City Council, no date.

QHR #	HIST. PERIOD	NAME	SCREW PILE	PLATE GIRDER	CRITERIA	OVERVIEW	IMAGE
						Brisbane rail network utilising 19th century colonial rail bridge construction techniques.	
600529	Late 19th century	Splitters Creek Railway Bridge	No	Yes	B, D (A, E under review)	The bridge, located on the railway line between North Bundaberg and Moolboolaman on the Mount Perry Line, was completed in 1881. The design of the piers had to be altered from screw pile foundation to cast iron caissons filled with concrete and brickwork, due to a deep bed of boulders present on site. The timber trestle bridge has a continuous plate girder main span and represents a bridge type that was once common, and which is one of the oldest extant of the type in Queensland.	 Image: DES, no date.
600756	Late 19th century	Angellala Rail Bridge	No	Yes	A, B, E, G, H	The bridge, located on the Roma – Cunnamulla Line at Angellala Creek near Charleville, was completed in c1885. The timber trestle/concrete/cast iron pier bridge has riveted gusseted half through continuous plate girder spans that are the second oldest of their type in Queensland. The bridge has been strengthened through the installation of columns and additional steel pillars. The bridge has landmark qualities and is associated with the life and work of its designer Henry C Stanley, Chief Engineer for Railways at the time of construction.	 Image: DES, no date.

4.5.1 Conclusion of Analysis

The comparative analysis has revealed that the Saltwater Creek Railway Bridge is rare, in fact there are only three bridges featuring screw pile construction extant in Queensland with one being a road bridge. Of the two railway bridges the Saltwater Creek bridge is the older one. Furthermore, the bridge is a rare representative example of a railway bridge of the late 19th century featuring a plate girder and timber trestle construction with only two others listed on the QHR.

4.6 Schedule of Significant Elements

The elements and features of the bridge possess varying levels of significance. The following hierarchy of significance was prepared to assist the restoration and ongoing conservation of the place. The various gradings entail different management requirements. For example – an element of exceptional significance should be retained and conserved *in-situ* with as little intervention as possible, whereas an element of low significance may be altered or removed if there is sufficient justification to do so.

The gradings of the significant elements is guided by the following criteria:

Table 9: Criteria for relative levels of significance.

GRADING	JUSTIFICATION
Exceptional	Rare or outstanding element, exhibiting a high degree of intactness or other such quality(s) and is interpretable to a high degree, although alteration or degradation may be evident.
High	Featuring a high degree of original or early fabric or demonstrative of a key part of the place's significance, with a degree of alteration which does not unduly detract from that significance
Moderate	Altered or modified elements. Elements with some heritage value which contribute to the overall significance of the place.
Low	Difficult or unable to be interpreted, not an important function, subject to high alteration, potentially detracting from the significance of the place.
None	Neither significant nor intrusive.
Intrusive	Damaging the site's overall significance, an aspect of the site's significance and/or significant fabric.

As noted in the history, the bridge has been significantly altered on two occasions; in 1965, the structure was strengthened to enable rail traffic with 12-tonne axle loading and in 2007, the bridge was converted into a pedestrian/cycle bridge with the installation of a timber deck and handrails. Other work included replacement of deteriorated timber elements with what appears to be 'like for like' material and repainting of the steel elements. See Section 2.2 and 4.4 for details.

The relative levels of significance are as follows:

Table 10: Relative levels of significance of the bridge.

ELEMENT	GRADING	JUSTIFICATION
Setting	High	The setting of the bridge on the former Millaquin Branch Line is still somewhat readable, although the rail infrastructure adjacent to the bridge has been removed and replaced with concrete pathways. The connection with the former Millaquin Sugar Mill, now Bundaberg Sugar Company, can still be made. The

ELEMENT	GRADING	JUSTIFICATION
		banks of the Saltwater Creek appear to be relative unchanged.
Views	High	The views to and from the bridge are largely intact including to the Kennedy Bridge (QHR ID#600367) in the south, the Burnett River in the north, and the views along Quay Street (both directions) being the site of the former Millaquin Branch Line.
Bridge as a whole	Exceptional	The bridge is the oldest railway bridge of its type in Queensland.
Screw piles Pier#6 and 7	Exceptional	Original elements.
Plate-girders Span#6	Exceptional	Original elements.
Timber components relating to the original use and extant after Stage 1 works	High	Timber components include: • Bottom Girder 3 at Span#5 and Span#7. • Corbel 1 at Pier#3, Corbel 1-3 at Pier#4, Corbel 3 at Pier#5 and Pier#8, and Corbel 1 at Pier#9. • All Headstock except Headstock 2 at Pier#3, Headstock 1&2 at Pier#8, Headstock 1 at Pier#9 and Headstock 2 at Pier#10. • All Piers except Piers 2 & 3 at Pier#8. • All Bracing. • Platforms: 2 platforms are in situ and one in storage until steel repair works are completed, the timber decking of all three has been replaced with like-for-like material. Modifications undertaken during the railway operation contribute to the significance of the bridge as part of the ongoing use of the bridge as part of the railway line. Repairs appear to have been undertaken using 'like for like' materials.
Timber components replaced during Stage 1 works	Moderate	A large number of members were replaced with Like-for-Like fabric. These are: • All girders except Bottom Girder 3, Span#5 and Span#7. • All corbels except Corbel 1 at Pier#3, Corbel 1-3 at Pier#4, Corbel 3 at Pier#5 and Pier#8, and Corbel 1 at Pier#9. • Headstock 2 at Pier#3, Headstock 1&2 at Pier#8, Headstock 1 at Pier#9 and Headstock 2 at Pier#10. • Piers 2 & 3 at Pier#8. The repairs were necessary to extend the life of the bridge. See Bligh Tanner Report August 2022 for further details of replaced members.
Railway bars	High	The bars relate to the railway operation of the bridge and any modifications undertaken during the railway operation contribute to the significance of the bridge as part of the continuous use of the railway line.

ELEMENT	GRADING	JUSTIFICATION
Sleepers	Moderate	All sleepers were replaced with Like-for-Like material during the recent work in Stage 1. The new sleepers were spaced at intervals thus following the original railway set-up.
Decking	Intrusive	The decking required for the conversion of the bridge for foot/cycle traffic obstructs the readability of the former use of the bridge. The negative impact could be mitigated through interpretation i.e. providing information on the Millaquin Branch Line.
Handrails	Intrusive	Like the decking, the installation of handrails impacts the readability of the former use of the bridge. The handrails have been fitted to the decking structure thus not impacting the original/early fabric. As above, the negative impact could be mitigated through interpretation at the site.
Vegetation at the creek embankments	Intrusive	The overgrown creek embankments pose a threat to the bridge through increased fire risk and pest infestation. The unkempt appearance also negatively impacts the aesthetic of the place.

5 Heritage Conservation Management

5.1 Statutory Framework

Owning and managing a Queensland heritage place entails a range of obligations from basic maintenance to submitting applications for development at a place.

As a state heritage place, works to the structure are subject to the requirements of the *Queensland Heritage Act 1992*, administered by the Department of Environment and Science (DES) Cultural Heritage Branch.

5.1.1 Essential Maintenance

The primary obligation for an owner of a QHR place is essential repair and maintenance.

DES may give a notice to the owner of a Queensland heritage place that requires them to undertake essential maintenance work. According to the Act, 'the work is required to be carried out to protect the place from damage or deterioration caused by weather, fire, vandalism, or insects' (s.84 (1) (b)).

- DES will generally identify the need for essential maintenance during a review of places on the QHR.
- DES will contact the owner and advise them of the required work.
- If the work is not carried out, then DES will issue the notice requiring the work to be completed in a reasonable period of time.

5.1.2 General Exemption Certificate

Maintenance and repair of a QHR place is supported by the General Exemption Certificate. Work included in the General Exemption Certificate does not require approval from DES to be carried out. Work can include:

General Exemption Certificate	Approval, with conditions, for: • Regular maintenance and cleaning of structures to preserve their condition, prevent deterioration and monitor maintenance issues. • Maintaining surface condition of painted finishes to extend the workable life of a paint system and protect building fabric from deterioration. • Minor repairs, following the *Burra Charter (2013)* principle of 'doing as little as possible and only as much as is necessary' to retain and protect the element. • Regular maintenance and ongoing care of landscape to preserve plants and keep important specimens in good health and monitor arising maintenance issues. **Always read the General Exemption Certificate for approved activities before undertaking work. Approved actions are supported by technical notes.**

Refer to https://www.qld.gov.au/__data/assets/pdf_file/0017/66212/genex_certificate.pdf for more information.

5.1.3 Development Approval

All other work to a place requires approval from DES. Approval will fall under one of the following categories:

1. Exemption Certificate: Required for work that is not covered by the General Exemption Certificate but will have a low impact on the significance of a place. Application is made directly to DES. Refer to https://www.qld.gov.au/environment/land/heritage/development/certificate for more information and to download the application form.
2. Development Approval: Required for all activities that will impact the significance of the place and includes types of work that normally would not be thought of as development. Refer to the *Planning Act 2016* for a full definition of development: https://www.legislation.qld.gov.au/view/html/inforce/current/act-2016-025

Always contact DES to discuss work that is not covered by the General Exemption Certificate. Heritage professionals can provide initial advice, but ultimately DES should be contacted to confirm the relevant approval pathway and to determine whether pre-lodgement advice should be sought. The owner of a QHR place should always exercise caution and prudence when determining what the impact of a proposed action or change may be.

5.1.4 Material Change of Use on adjacent property

The Material Change of Use (MCU) of a property adjacent to a Queensland heritage place is subject to assessment by DES, using State code 14. Refer to the Queensland Government, *Guideline: State Development Assessment Provisions: State Code 14: Queensland heritage*.

The heritage boundary specifies the extent of the heritage place – see Figure 2 for details.

5.1.5 Archaeological Potential

Archaeological potential is protected under the QHA. Section 89 and 90 of the QHA state:

S89 Requirement to give notice about discovery of archaeological artefact

1) A person who discovers a thing the person knows or ought reasonably to know is an archaeological artefact that is an important source of information about an aspect of Queensland's history must give the chief executive a notice under this section.
2) The notice must
   a) Be in the approved form; and
   b) be given to the chief executive as soon as practicable after the person discovers the thing; and
   c) state where the thing was discovered; and
   d) include a description or photographs of the thing.

S90 Offence about interfering with discovery

1) This section applies to an archaeological artefact for which a person has, under section 89, given the chief executive a notice.
2) A person who knows that the notice has been given must not, without the chief executive's written consent or unless the person has a reasonable excuse, interfere with the archaeological artefact until at least 20 business days after the giving of the notice.

5.1.6 Emergency Work

Emergency work is sometimes required if a structure fails and becomes a safety hazard (typically following a severe storm, fire, or flooding). Immediate emergency work to stabilise the structure is permissible according to the following conditions (*verbatim* from DES 2020):

If there is an emergency at a place in the Queensland Heritage Register that endangers the life or health of a person; or, the structural safety of a heritage building; or, the operation or safety of community infrastructure (other than a building) you may carry out emergency work without first obtaining approval.

The *Planning Act 2016* defines an emergency as an event or situation involving imminent and definite threat requiring immediate action (before, during or after an event or situation), for example emergency work relating to disaster response and recovery. If safe to do so photograph the place prior to undertaking emergency work.

To carry out emergency work you must:

- Obtain the advice of a registered professional engineer before starting work, if it is practical to do so.
- Take all reasonable steps to ensure the emergency work is reversible, or, if the emergency work is not reversible take all reasonable steps to ensure the impact of the works on the cultural heritage significance of the place is minimised.
- Give written notice to us that you are carrying out the emergency work as soon as possible after starting work.
- Apply for any approvals that would otherwise have been required as soon as reasonably practicable after starting the emergency work - if approval is subsequently refused emergency work must be removed.

For further information contact the Department.

5.1.7 Heritage Agreements

To avoid the need for ongoing approvals for certain activities, owners of QHR places can enter into a 'heritage agreement' with the State. A heritage agreement is a joint agreement between the owner and DES, that sets out provisions for future work, conservation actions, or use of a heritage place. It specifies an agreed range of activities such as development work, use, public access, and maintenance and conservation work standards that can be undertaken without having to seek ongoing approval from DES (unless required in the agreement). Heritage agreements are usually listed on the Certificate of Title of a place and are binding on its owner. This ensures that if the place is sold, the agreement remains in place.

Currently we see no obvious reason for Council to enter into an agreement covering the bridge.

5.2 Current Use

The railway bridge is currently used as a combined pedestrian and cycle path. This change from the original use in 2007 made the installation of handrails and decking necessary, elements which are rated intrusive to the significance of the bridge – see Section 4.6 for details.

5.3 Opportunities

A common misconception about heritage is that entry to a statutory register only ever implies obligations. However, whilst there are certain obligations relating to the listing, entry of a place to a register identifies that a place is significant to the community and that there are also opportunities that may be explored and developed that focus on the uniqueness and history of the place.

The following two areas have been identified to provide opportunities that will benefit the Saltwater Creek Railway Bridge and the overall management of the site.

5.3.1 Interpretation opportunities

Interpretation is a key element of heritage conservation as it provides the opportunity to tell the story of a place and therefore enabling the community and visitors alike to engage with the place and its wider context.

There is an opportunity to tell the story of Millaquin Sugar Mill, the establishment of the Millaquin Branch Line and the later extension to become the Woongarra Line extending to Bargara, and also the story of the Railway Picnics at Neilson Park in Bargara. These stories can be told at the Saltwater Creek Railway Bridge via interpretive signage, potentially integrated into the handrails, including incorporating QR codes. Low-height signage that does not impact the views to and from the bridge could be placed at both approaches. This would also mitigate the fact that the installation of the decking and handrails obscures the readability of the former use of the bridge as part of the railway line.

A further opportunity exists to establish a small, landscaped area on the vacant grassed site along the bank of the Burnett River on the east bank of the creek (L/P 15RP24765). This area offers a good vantage point of the bridge and also of the sugar mill, providing an excellent opportunity for interpretation and potentially incorporating artwork installations relating to the rail and sugar theme. It is understood that the land is currently privately owned, and discussions/negotiations between Council and the owners would be required.

The Bundaberg Heritage Tourism Strategy developed in 2016 proposes a Sugar Cane Rail Trail that could include the Saltwater Creek Railway Bridge. The following excerpt is taken *verbatim* from the draft report:

The sugar mills of Bundaberg relied - and to some extent still do - on an extensive network of cane tramways to bring sugar cane to the mills for crushing. Whilst some are still in use, others are no longer operational - but the easement for the line still exists. There is a great opportunity to convert sections of the tramway from Bundaberg's CBD to Bargara for use as a rail trail. Bike trails are increasingly popular with tourists and the Sugar Cane Rail Trail offers a truly unique experience.

Visitors can cycle through glorious cane fields, ride past beautiful Queenslander houses, and appreciate the unique industrial landscape surrounding the Millaquin sugar mill - all along a flat route that won't be too taxing. The beginning of the rail - or the turnaround point, depending on where one begins riding from - is Nielson Park at Bargara. The park became hugely popular in the early twentieth century as a venue for railway picnics; people from the region and even beyond would travel to the park on the romantic steam engines for a fun day by the beach.

The trail offers wonderful opportunities for interpretation along its length, giving riders the option to stop, learn about the history of the tramway and its importance in the history of the sugar industry, and simply take in the smells and sounds of a cane farming landscape. (Converge 2016, p34).

5.3.2 Landscape concept plan

An unformed path currently leads down to the water edge on the west bank of the creek, indicating the practice by the public to access the site. This might be out of interest for the bridge or for recreational fishing, in any case it is not safe and poses a risk for the public. Rather than restricting access, the area could be landscaped to include a formed safe pathway leading to a platform or viewing area from which the bridge including its underside can be seen.

Interpretation signage as described in the previous section could be included providing details on the visible elements of the bridge and their function. A landscape concept plan prepared by a qualified landscape professional, ideally with experience working at heritage places, would provide the best approach to realising this.

6 Heritage Conservation Policies

The purpose of conservation policies is to guide the management of a place's heritage values. The following policies have been developed to reflect and support the assessment presented in this CMP.

The core significant values of the Saltwater Creek Railway Bridge is its ability:

- To illustrate the historical significance of a privately built railway section designed to Queensland government standards.
- To demonstrate the principal characteristics of a screw pile plate girder bridge, a structure that was once common and is now rare.
- To illustrate the connection between the Millaquin Sugar Mill and the Millaquin Branch line as the last remaining element of this important railway link instigated and financed by Robert Cran, the owner of the mill.

6.1 Conservation Approach

The *Burra Charter (2013)* sets out the best practice approach to the conservation of heritage places. It is not a long document, and it follows a logical and easy-to-read structure.

It defines conservation as 'all the processes of looking after a place so as to retain its cultural significance.'

This is the most basic principle that a manager of a heritage place must understand.

The *Burra Charter (2013)* approach is based on the following seven principles:

1. The place itself is important.
2. Understand the significance of the place.
3. Understand the fabric (see below).
4. Significance should guide decisions.
5. Do as much as necessary and as little as possible.
6. Keep records.
7. Do everything in logical order.

Managing a heritage place according to the *Burra Charter (2013)* is the only viable method to conserve the significance of a place consistent with its entry in the Queensland Heritage Register and the assessment of significance presented in this CMP.

Avoidance of impact on the heritage fabric at all levels of significance should be prioritised wherever possible. Refer to Section 4.6 for the identified significance of individual elements.

Table 11 gives the definition of heritage terms based on the *Burra Charter* used throughout this document and is provided again at this point to aid the understanding of the following conservation policies.

Table 11: Definition of Heritage Terms based on the Burra Charter.

TERM	MEANING
Place	A geographically defined area (e.g., curtilage such as lot on plan) that may include elements, objects, spaces, and views and can have tangible and intangible dimensions.
Fabric	The physical material of the place including elements, fixtures, contents, and objects.
Setting	The immediate and extended environment of a place that is part of or contributes to its significance; this includes the views to and from.
Conservation	Is a broad term meaning all the processes of looking after a place, so it retains its significance, including: • Preservation • Restoration • Reconstruction • Adaptation • Interpretation
Preservation	Maintaining the place in its existing state and preventing deterioration.
Restoration	Return a place to a known earlier state by • Removing later additions • Reassembling existing elements without adding anything new/recycled.
Reconstruction	Return a place to a known earlier state by introducing new or recycled material. • Only appropriate when sufficient historic evidence exists. • Use like-for-like material. • Needs to be identifiable on close inspection.
Adaptation	Changing the place to suit an existing or proposed use.
Maintenance	Looking after the place and its setting, including regular cleaning, pest inspections, pruning of trees etc.
Repair	Distinguished from maintenance as it involves restoration and reconstruction of fabric.
Interpretation	All the ways of presenting the cultural significance of a place.
Use	Means the functions of a place, including the activities and traditional and customary practices that may occur at the place or are dependent on the place.

6.2 Conserving the Place

POLICY 1: CONSERVATION BEST PRACTICE	
1.1	The Saltwater Creek Railway Bridge should be managed in accordance with the significance of the place and the principles established in the *Burra Charter (2013)*.
1.2	People skilled and experienced in the conservation of historic places should assist with the planning, design and implementation of maintenance and development programs for the Saltwater Creek Railway Bridge.
1.3	Activities that occur at the Saltwater Creek Railway Bridge, including use, maintenance, and new development, should not impact the significance of the place as identified in the QHR citation and this CMP.
1.4	All work undertaken at the Saltwater Creek Railway Bridge should be in accordance with the *Queensland Heritage Act 1992* and the required policies and procedures.
1.5	Work undertaken to any element and feature of the Saltwater Creek Railway Bridge should be undertaken by suitably qualified professionals, ideally with experience in

	heritage places and fabric. It is recommended that these works be specified in cooperation with a team of heritage specialists.

POLICY 2: KEEPING RECORDS

2.1	This CMP should be endorsed by Council and be used as the guide for the management of the Saltwater Creek Railway Bridge's heritage values. A copy of this CMP should be kept in the office of the relevant department at Council and also be submitted to DES's Cultural Heritage Branch.
2.2	Council should establish a document file for both hard copy and digital material relating to the property to keep comprehensive records of all changes, alterations, and modifications to heritage features and the place more generally. Any significant changes to heritage features should be recorded guided by the archival standards, as described in DES's guidelines for 'Archival Recording of Heritage Places'.
2.3	Original details and finishes should be recorded prior to any major refurbishment or alterations. Archival recording should be undertaken by a suitably experienced heritage specialist and recorded data must be included in the document file. Archival recording should include at a minimum drawings and photographs, and record changes through use of measured drawings and building plans and provide relevant specification data before changes occur.
2.4	This CMP should be reviewed within ten years of endorsement, and revisions and amendments undertaken as necessary to maintain a current and relevant guide for the place's heritage values.

POLICY 3: TRAINING

3.1	Cultural heritage training material that outlines the significance of the Saltwater Creek Railway Bridge and the responsibilities required to manage this significance should be developed and form the basis for staff, volunteers and contractor induction and training.
3.2	The training should include all staff and volunteers that are involved with the maintenance and work undertaken on the site.
3.3	The material used to develop training should be based on the information included in this CMP.

POLICY 4: CONSERVATION – GENERAL

4.1 Significant fabric, as described in Section 4.6, will require specific care depending on the assigned heritage value, as follows:

- **Exceptional**: Retain, conserve, and maintain in accordance with the Burra Charter. No adaptation should occur unless essential for the ongoing protection or preservation of the structure, feature and/or overall complex. Any proposed change must be preceded by careful consideration, assessment, and recording.
- **High:** Retain and conserve in accordance with the Burra Charter. Minor adaptation may be considered provided significant fabric is conserved and careful assessment and recording occurs. The items should be retained as is, subject to essential maintenance. The items should not be removed unless essential to comply with other statutory requirements.
- **Moderate:** Maintain, conserve, restore, reconstruct, and adapt or otherwise act in accordance with the Burra Charter. Removal in part or full may be acceptable if no prudent or feasible alternative option is available, however there would need to be a compelling reason for removal of heritage features.
- **Low:** Maintain, conserve, restore, reconstruct, and adapt or otherwise act in accordance with the *Burra* Charter wherever possible. Alterations and adaptation are generally acceptable but should be sympathetic to the surrounding heritage features and values.
- **None:** Retain, adapt, remove, or modify as required.
- **Intrusive:** Modify or remove, where appropriate, to reduce impacts to surrounding heritage features.

4.2 Repair to fabric should use the same or, where not available, similar 'like-for-like' materials to that used in the construction of the structure. Replacement should be clearly identifiable as such by e.g., marked with a date stamp. Expert advice should be sought as to the correct specification of materials and methods of repair.

4.3 Consider changes to the structure carefully. If changes are unavoidable, ensure the impact to significant fabric is minimal and is reversible where possible (see Section 5.1.2 and 5.1.3 regarding the necessary approval process).

Changes should be distinct from heritage fabric, but sympathetic. When introducing new fabric, do not mimic heritage fabric, including finishes and material.

New work should be clearly identifiable as such e.g., marked with a date stamp.

4.4 A regular maintenance schedule, including termite protection, should be maintained for the bridge and its surrounds. This should include:

- Inspection of bridge regarding loose items.
- Remove soil and built-up from around piers.
- Fungal treatment for timber elements.

A Maintenance Plan is provided at Section 7.2.

4.5 Future works and maintenance projects should consider the option of removing intrusive elements where practical and in case of replacing them use material more appropriate to the heritage significance of the place.

4.6	The demolition of all or part of any feature intrinsic to the significance of the place (refer to section 4.6) should not occur except where all 'prudent and feasible' measures are examined first. Prior to any demolition works being undertaken to elements of significance it should be demonstrated that: • The element is so structurally unsound as to be beyond reasonable economic repair; or • The existing condition of the element poses a significant health or safety risk that is beyond reasonable economic repair. In such cases, a structural report should be prepared by an engineer with experience working on heritage structures. The structural report must clearly and succinctly outline the process of exploring all 'prudent and feasible' alternatives and the subsequent justification for proceeding with the demolition of all or part of any feature considered intrinsic to the significance of the place.

POLICY 5: BRIDGE STRUCTURE

Follow the recommendations provided in:

- **Level 2 Inspection Report in particular Chapters 9, 10 and 12 (Bligh Tanner 2020).**
- **Level 3 Inspection Report in particular Chapter 7 (Bligh Tanner 2022).**
- **Saltwater Creek Inspection Report – Stage 1 (Bligh Tanner 2022).**

5.1	Complete the outstanding work as described in the Exemption Certificate (Permit No: Exemption Certificate 202106-14056 (superseding EC no#202101-11198EC)) Repairs/replacement steel & timber components of the bridge, issued by DES (February 2021). Refer to Appendix D for the Exemption Certificate and the Structural Drawings including notes (Bligh Tanner Nov/Dec 2020). The work has been approved by DES and work on the repair/replacement of the timber components has been completed in February 2022.
5.2	<u>Steel elements</u> • Carry out the approved repair works as described in the documents/drawings in Appendix C. Note the specifications for Steelwork (S1 – S19) and Steel Welding Notes (W1 – W 11) on the Notes Sheet of the Structural Drawings (Bligh Tanner Nov/Dec 2020). • Refer to the Level 3 Inspection Report, in particular Chapter 7 and the Stage 1 Inspection Report, in particular Chapter 4.2 (Bligh Tanner 2022) for details on the outstanding repairs. • **<u>Note:</u>** o All steel repairs are now considered <u>urgent</u>, and repairs should be carried out as soon as possible. <u>Of particular concern are</u>: ▪ Grid 6 girder ▪ Steel pier bracing members, especially during flood events. o <u>Yearly inspections</u> should be carried out by a RPEQ structural engineer until all steel repairs have been completed.

5.3 Concrete elements

- Concrete pedestals at Piers 1, 2, 4, 5, 8 and 11:
  Cut back all defective, spalled and loose concrete and reinstate the pedestals to the original profile within the next twelve months during routine maintenance.
- Clean the concrete elements and remove the graffiti. See Policy 5.5 for details.
- Reapply the existing numbering to the concrete surface using the same font and colour where applicable.

5.4 Pedestrian walkway

- Rectify the condition issues identified in Chapter 3.5 including:
  - Correct installation of bolts.
  - Fill holes left by previous screws.
  - Repair/replace splitted timber.
  - Install connector plates and missing screws.
  - Level decking at approach.

5.5 **Paint**

Steel elements

All steel elements should be protected by a marine coating system – refer to the Level 2 Inspection Report (Bligh Tanner 2000) and Level 3 Inspection Report, in particular Chapter 7.2.1 (Bligh Tanner 2022) for paint specifications.

Note: The repainting of the whole bridge is not covered under the current Exemption Certificate.

Timber elements

CN Emulsion (on large timber, i.e. the girders and headstocks) or CN Oil (on joists and decking where not visible) should be applied in a continuous liberal coating between the interface of all timber to timber connections and junctions – refer to HS1 on the Notes Sheet of the Structural Drawings (Bligh Tanner Nov 2020).

Graffiti

Remove graffiti from steel, timber, and concrete elements. Seek specialist advice before proceeding with any treatments. There is no general solution to the removal of graffiti as different methods will be required depending on the surface graffitied and the material used, but it is important to begin treatment as soon as possible so paint/ink does not have time to harden. Include regular inspections for graffiti as part of a maintenance program.

5.6 Maintenance

Prepare and implement a maintenance plan for the bridge and surrounds; the plan should incorporate the vegetation management plan. See Policy 4.4, 6.2 and Section 7.2 for details.

POLICY 6: VEGETATION

6.1	Clear overgrown vegetation at both embankments and especially around the bridge to remove fire and pest hazards.
6.2	Prepare and implement a vegetation management plan to plant and/or retain suitable vegetation to prevent erosion of the embankments at an appropriate level as not to impact the bridge structure.

POLICY 7: ABUTMENTS AND CREEK EMBANKMENTS INCLUDING STORMWATER MANAGEMENT

7.1	Redirect stormwater discharge to the creek bed via below-ground pipe to avoid long term erosion issues.
7.2	Monitor abutments and creek embankments for erosion and scouring. Complete the repair works as identified.

POLICY 8: LANDSCAPING

8.1	Prepare a landscape concept plan for the northwest embankment of Saltwater Creek to include a formed path down to the water edge, and a viewing area including interpretation (see Policy 11). The plan should be prepared by a qualified landscape professional, ideally with experience working at heritage places.

6.3 Understanding the Place

POLICY 9: STATUTORY LISTING

9.1	The Department of Environment and Science Cultural Heritage Branch should update the current QHR citation when it has the opportunity to do so. The update should consider the points raised in this CMP and any other relevant information subsequently discovered for the Saltwater Creek Railway Bridge.

POLICY 10: INTERPRETATION

10.1	The interpretation of the place is an integral part of conservation management. By telling the story of the place in an engaging way the awareness of the community about the significance of the structure is increased. Interpretation measures should therefor actively be undertaken. Develop an interpretation strategy and plan incorporating the bridge and also considering the vacant site along the bank of the Burnett River on the east bank of the Saltwater Creek (L/P 15RP24765). The strategy and plan should be based on the *ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites* (ICOMOS 2008), an international benchmark for interpretation of heritage places.[16]

[16] http://icip.icomos.org/downloads/ICOMOS_Interpretation_Charter_ENG_04_10_08.pdf, accessed April 2021.

	Interpretation of the bridge and the broader settings including the relationship with the Millaquin Sugar Mill will benefit from a connection with individual people associated with the places over time to give the stories 'a face'. Oral history recording is a valuable tool to collect associated stories.
10.2	Develop and install interpretation measures at both terminations of the bridge making sure that any signage does not impact on the significance of the bridge. This entails that all interpretation should generally be free-standing, and no signage etc should be fixed to the bridge structure. Incorporation of interpretation into the railing of the walkway is acceptable provided it does not impact the views to and from the bridge. Include interpretation about the bridge structure at the proposed viewing area on the west embankment.
10.3	Investigate the establishment of a small, landscaped area on the vacant grassed site on the east bank of Saltwater Creek (L/P 15RP24765) to tell the story of the rail and sugar theme of the Woongarra area. This includes discussions with the current property owners of the land.
10.4	Implement the Sugar Cane Rail Trail and include the Saltwater Creek Railway Bridge and potentially the area along the Burnett River.

POLICY 11: USE	
11.1	No proposed new use of the bridge should have a negative impact on the structure.
11.2	Should the current use as pedestrian/cycle path cease in the future, the handrails and decking should be removed to restore the bridge to its earlier state and thus improving the readability of the structure as a railway bridge.

7 Implementation

The implementation of the policies of the CMP is guided by two plans:

- The Action Plan and
- The Maintenance Plan.

The action plan applies to recommended actions identified in this document for elements of the Saltwater Creek Railway Bridge.

The maintenance plan includes recommended maintenance tasks that should occur at regular intervals.

7.1 Action plan

The following action plan includes recommendation including time frames provided by Bligh Tanner in the Level 2 Inspection Reports (Bligh Tanner 2020) and the Level 3 Inspection Report and Saltwater Creek Inspection Report – Stage 1 (Bligh Tanner August 2022).

Actions identified in this plan are organised according to priority. The time frame is based on a period of ten years.

Note: All high priority work (6 to 12 months) ideally should be undertaken as part of a single, coordinated program. This will enable an efficient and logical approach to urgent conservation matters and reduce the number of applications made to DES, thereby saving time and cost.

Table 12: Action Plan.

Please note:

The following table includes a 'likely approval pathway' for the specified tasks based on our experience. It is important to note however that the approval pathway is determined by DES and therefore the department should be contacted before undertaking work on the heritage place.

ELEMENT	ACTION	POLICY	PRIORITY	LIKELY APPROVAL PATHWAY	PLANNING
Documentation	Ensure that this CMP is endorsed, and a copy is kept at the respective Council departmental office.	2.1; 2.2	**WITHIN 1-2 YEARS**	No approval required.	• It is essential that the CMP is accessible to assist with the management of the place.
	Document all changes to the place prior to alteration.	2.3; 2.4	**WITHIN 1-2 YEARS**	No approval required.	• Put a procedure in place to take photos prior to starting work. • Record details of work i.e. materials, methods and/or contractors used.
	Engage heritage professional to review CMP.	2.5	**WITHIN 10 YEARS**	No approval required.	• Engage a heritage professional with the relevant experience to undertake a review of the CMP and update as required.
Training	Undertake training for staff and contractors.	3.1 – 3.3	**WITHIN 1-2 YEARS**	No approval required.	• Develop cultural heritage training material based on this CMP and make available for all staff and contractors working on site. • Conduct training for a staff and contractors involved in maintenance and work.
Maintenance Plan	Implement a maintenance plan for the whole site.	4.4, 5.6	**WITHIN 6 MONTHS**	No approval required.	• The maintenance plan should cover the bridge and surrounding area including the embankments. • See the plan provided in Section 7.2 as a guide.

ELEMENT	ACTION	POLICY	PRIORITY	LIKELY APPROVAL PATHWAY	PLANNING
BRIDGE STRUCTURE INCLUDING PATHWAY					
Steel elements	Complete the steel repair/replacement work as described in DES Exemption Certificates. <u>All steel repair work is now regarded as urgent and should be carried out as soon as possible.</u> <u>Of particular concern are:</u> • Grid 6 girder • Steel pier bracing members, especially during flood events. **As Council has scheduled the work to be undertaken in the 2024/25, carry out yearly engineering structural inspections by a RPEQ structural engineer until the steel repair works are completed.**	5.1, 5.2	**As soon as possible**	Approval received – conditions apply	• Complete the work as described in the Exemption Certificates issued by DES (Feb & April 2021) taking the 'Conditions for Approval' into account. • Follow the instructions on the Structural Drawings including notes in Appendix C (Bligh Tanner Nov/Dec 2020). • Refer to Level 2 Inspection report Chapters 9, 10 and 12. • Refer to Level 3 Inspection Report Chapter 7, and Stage 1 Inspection Report, Chapter 4.2 (Bligh Tanner 2022). • Use experienced and qualified tradespeople.
Steel elements, paint	• Reinstate protective coating to steelwork, including girders and bracing at Span#6 .	5.5	**Once the repair work is completed.**	The work will most likely require an exemption certificate.	• Refer to Appendix F in the Level 2 Inspection Report for paint specifications. (Bligh Tanner 2000). • Refer to Level 3 Inspection Report Chapter 7, and Stage 1 Inspection Report, Chapter 4.2 (Bligh Tanner 2022). •
	• Remove graffiti.	5.5	**Once the repair work is completed.**	The work might potentially require an exemption certificate depending on the proposed graffiti removal method.	• Seek specialist advice regarding the removal of the graffiti. • Depending on the timeframe for the repainting of the whole bridge, the removal of the current graffiti might not be necessary as it would be removed in the repainting process. •

ELEMENT	ACTION	POLICY	PRIORITY	LIKELY APPROVAL PATHWAY	PLANNING
Concrete elements	• Reinstate the pedestals to the original profile. • Clean the concrete elements and reapply existing numbering.	5.3	**WITHIN 12 MONTHS**	The work might potentially require an exemption certificate depending on the proposed graffiti removal method.	• Repair the concrete elements as described in Policy 5.3. • Clean the surface following the guidelines in the 'technical note: cleaning'. See Section 7.4 for a link to the document. • Seek specialist advice regarding the removal of the graffiti. • Based on photographs prior to repair/replacement work re-apply the numbering to the clean concrete surface using the same font and colour where applicable.
Pedestrian walkway	• Correct installation of bolts. • Fill holes left by previous screws. • Repair/replace splitted timber. • Install connector plates and missing screws. • Level decking at approach.	5.4	**WITHIN 12 MONTHS**	Approval received – conditions apply	• Refer to Stage 1 Inspection Report, Chapter 4.2 (Bligh Tanner 2022) for rehabilitation measures. • Use experienced and qualified tradespeople.
OTHER					
Vegetation	Clear overgrown vegetation and prepare and implement a vegetation management plan.	6	**WITHIN 6 MONTHS**	No heritage approval required for removal of overgrown grass. Conditions apply for the removal of trees unless it is an identified pest plant species.	• Clear overgrown vegetation and remove self-seeded trees by cutting and poisoning to prevent regrowth. • Implement a vegetation management plan. • Refer to DES General Exemption Certificate guidelines. See Section 7.4 for a link to the document.
Stormwater management	Install below ground stormwater pipe at the west abutment to discharge into creek rather than creek bank.	7.1	**WITHIN 6 MONTHS**	The work will most likely require an exemption certificate.	• Consult DES for further information prior to commencing work.

ELEMENT	ACTION	POLICY	PRIORITY	LIKELY APPROVAL PATHWAY	PLANNING
	Inspect abutments and creek embankments for erosion and scouring.	7.2	**ONGOING –** see Maintenance Plan for frequency	No approval required.	• Include in maintenance plan.
Landscaping	Prepare and implement a landscape plan for the management of the overall site and including a path and viewing area on the west bank.	8.1	**WITHIN 1-3 YEARS**	No approval is required for the preparation of the plan. The approval pathway for the implementation depends on the proposed work.	• Use qualified landscape professional, ideally with experience working at heritage places. • Follow recommendation in Policy 8. • Discuss the plan with DES prior to implementation.
Statutory Listing	Contact DES to discuss revision and update of citation.	9.1	**WITHIN 1-3 YEARS**	No approval required.	• No particular planning required.
Interpretation, planning	Develop and implement an interpretation strategy and plan.	10.1	**WITHIN 1-3 YEARS**	No approval required.	• The strategy and plan should be based on the *ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites* (ICOMOS 2008). • The strategy and plan should include the themes identified in Section 5.3. • Engage a suitable professional with the relevant experience in heritage interpretation to undertake the task. • Consult with DES to discuss the interpretation strategy and plan prior to further work. • Discuss the project with the property owners of the small area on the east side.

ELEMENT	ACTION	POLICY	PRIORITY	LIKELY APPROVAL PATHWAY	PLANNING
Interpretation, installation	Develop and install interpretive signage at the bridge and the proposed viewing area.	10.2	**WITHIN 1-3 YEARS**	Exemption certificate required for the installation of permanent signage.	• Follow the Interpretation Strategy and Plan. • Signage should be designed as not to impact the significance of the bridge including the views to and from the bridge. • Consult DES for further information prior to commencing work.
	Investigate the establishment of a small, landscaped area on the vacant grassed site on the east bank of Saltwater Creek to tell the story of the rail and sugar theme of the Woongarra area.	10.3	**WITHIN 1-3 YEARS**	No approval required.	• Follow the Interpretation Strategy and Plan. • Refer to the information in Section 5.3.1 for details. • Discuss the project with the owner of the area.
	Implement the Sugar Cane Rail Trail.	10.4	**WITHIN 3-10 YEARS**	Heritage approval may be required depending on the infrastructure to be installed.	• Consult DES for further information prior to commencing work.

7.2 Maintenance plan

It is important that regular maintenance occurs at the Saltwater Creek Railway Bridge See Table 13.

7.3 Regular Condition Survey

A regime should be established for the key elements of the Saltwater Creek Railway Bridge. This regime should be undertaken by the Council staff and should include the following:

- Significant fabric should be regularly checked for defects/damage to condition and other maintenance issues. This should include survey sheets and, where relevant, a copy of measured drawings to be annotated as a record of condition.
- The Saltwater Creek Railway Bridge should be inspected regularly with a basic condition report completed at each inspection. The Level 1 Bridge Inspection Report currently used by Council can be used for documenting the inspection results, but drawings as noted above should be included for illustration purposes.

7.4 General Works and Activities

A program of general maintenance should be continued for the Saltwater Creek Railway Bridge, which includes the following tasks:

- General cleaning and maintenance of the built heritage elements.
    - Ensure that only necessary cleaning is carried out. 'Over cleaning' can accelerate deterioration and wear of older building fabric.
    - Note the areas identified in the CMP that require special care or advice, such as early or fragile fabrics and finishes and areas.
    - Select a cleaning method that is appropriate for the job and the condition of the feature/ fabric being cleaned.
    - Be mindful that some cleaning methods may damage early or fragile fabrics and finishes and take steps to guard against this, i.e. avoid strong alkalis or acids or any abrasive methods.
    - Use cleaning as an opportunity to check the condition of finishes.
- Repair of significant elements.
    - Focus on repairing rather than replacing significant fabric, where possible.
    - Investigate the cause of the damage and endeavour to correct this before commencing repairs.
- Re-painting of previously painted heritage elements.
    - Do not disturb or remove earlier paint layers, other than small areas that have failed by chalking, flaking, peeling, or blistering.
    - Ensure paint finishes are properly conserved.
    - Ensure paint removal methods do not harm significant heritage fabric.
    - If the surface requiring repainting is sound, cleaning is most often all that is required to prepare it for repainting.
- Scheduled pest inspections and implementation of associated management strategy.
- Scheduled risk management inspections of the site.
- Scheduled structural inspections.

A plan is provided overleaf to guide the general maintenance and cleaning of the Saltwater Creek Railway Bridge (see Table 13). The actual timing and tasks may differ depending on the individual needs of the place combined with existing management practices.

Refer to the links below for further guidance on maintenance and repairs. Where works can be undertaken in accordance with the following guidelines, no heritage approval is required from DES:

General

General Exemption Certificate:

https://www.qld.gov.au/__data/assets/pdf_file/0017/66212/genex_certificate.pdf

Repair and maintenance

Cleaning:

https://www.qld.gov.au/__data/assets/pdf_file/0030/67755/tn-inspect-clean-maintenance.pdf

Painting/repainting:

https://www.qld.gov.au/__data/assets/pdf_file/0022/67153/tn-painting-maintenance.pdf

https://www.qld.gov.au/__data/assets/pdf_file/0023/67433/tn-painting-surface-prep.pdf

Minor metal repairs:

https://www.qld.gov.au/__data/assets/pdf_file/0022/67054/tn-minor-repairs-timber.pdf

Minor timber repairs:

https://www.qld.gov.au/__data/assets/pdf_file/0031/67639/tn-minor-repairs-metal-work.pdf

Landscaping:

https://www.qld.gov.au/__data/assets/pdf_file/0028/66295/tn-parks-gardens.pdf

Table 13: Ongoing maintenance plan.

FREQUENCY	ITEM	CHECK FOR
6 months	Bridge, overall	• Inspect for loose items, planks, bolts, or other features that could fall and cause injury. • Check for graffiti and remove immediately if present.
	Around piers	• Remove soils and debris built-up from contact with timber and timber piles.
	Termite and insect inspections	• For termite infestations and other notable insect or vermin attack.
	Vegetation	• Follow the Vegetation Management Plan.
12 months or after significant rainfall	Abutments and embankments	• Inspect abutments and creek embankments for erosion and scouring. • Complete the repair works as identified.
2 years	Bridge, overall	• Undertake a routine engineering inspection of the bridge and complete critical repairs as identified.
5 years	Bridge, timber elements	• Install fungal decay prevention measures to the timber piles and girders, including the installation of preservative treatments to the timber pile and ground interface and the installation of borate salt tubes into the timber to reduce the rate of fungal decay.

References

Kerr, John, 1996, Bundaberg: The Persistent Port, Bundaberg Port Authority.
Kerr, John, 1983, Southern Sugar Saga: A History of the Bundaberg Sugar District, Bundaberg Sugar Company.
Kerr, John, 1990, Triumph of the Narrow Gauge – A History of Queensland Railways, Brisbane.

O'Connor, Colin, 1985, Spanning two Centuries – Historic Bridges of Australia, University of Queensland Press.

Queensland Parliamentary Debates [Hansard], Legislative Assembly, Tuesday, 27 September 1892, Millaquin Branch Railway Bill, p1355

Department of Environment and Science, Exemption Certificate Permit 202106-14056 (superseding EC no#202101-11198EC) and Permit 202104-13663EC.

Reports

Bligh Tanner, Saltwater Creek Railway Bridge – Level 2 Inspection Report, September 2020.
Bligh Tanner, Saltwater Creek Rail Bridge Conservation – Saltwater Creek Bridge Plan and Elevations, Marked-Up Plans showing Replacement and Existing Members, May 2022.
Bligh Tanner, Inspection Report, May 2022.
Bligh Tanner, Level 3 Inspection Report, August 2022.
Bligh Tanner Saltwater Creek Bridge Inspection Report – Stage 1, Version 3, August 2022.

Converge, selected place cards from the Bundaberg Regional Council local heritage register, 2015.
Converge, selected histories (unpublished) from Stage 2 of the Bundaberg Regional Council Heritage Study, 2016.
Converge, Historic Heritage Tourism Strategy, Draft Report for Bundaberg Regional Council, November 2016.

Citations

Brisbane City Council local heritage Register, accessed online at https://heritage.brisbane.qld.gov.au/heritage-places/256 :

- Cabbage Tree Creek Railway Bridge, Boondall.

Department of Environment and Science, Queensland Heritage Register, accessed online at https://apps.des.qld.gov.au/heritage-register/:

- Annan River Bridge, Cook Shire Council, Place ID#600417
- Angellala Rail Bridge, Murweh Shire Council, Place ID#600756
- Kennedy Bridge, Bundaberg, Place ID#600367
- Saltwater Creek Railway Bridge, Bundaberg, Place ID#600370
- Splitters Creek Railway Bridge, Bundaberg, Place ID#600529

Register of the National Estate, accessed online at http://www.environment.gov.au/cgi-bin/ahdb/search.pl

- Saltwater Creek Rail Bridge, Bundaberg, Place ID#15960

Newspaper articles

Bundaberg Mail and Burnett Advertiser:

- 11th December 1893.
- 19th January 1894.
- 14th September 1898.

Northern Herald, 25th November 1936.

Other

QImagery accessed online at https://qimagery.information.qld.gov.au/

Appendix A: QHR Citation

Queensland Government

Saltwater Creek Railway Bridge

- Place ID: 600370
- Quay Street Woongarra Line, Bundaberg

General

More images...

Also known as
Millaquin Bridge
Classification
State Heritage
Register status
Entered
Date entered
21 October 1992
Type
Transport—rail: Bridge—railway
Theme
5.3 Moving goods, people and information: Using rail
Builder
Overend, James
Construction period
1894, Saltwater Creek Railway Bridge (1894 - 1894)
Historical period

1870s–1890s Late 19th century

Location

Address

Quay Street Woongarra Line, Bundaberg

LGA

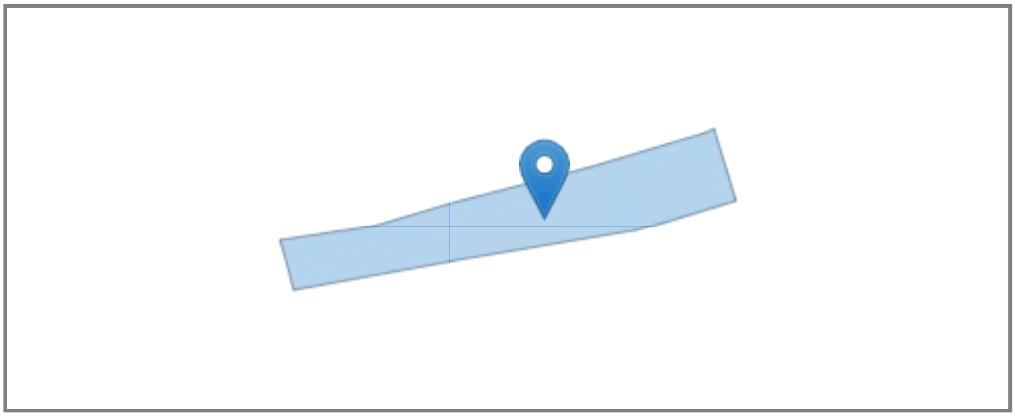
Bundaberg Regional Council

Coordinates

-24.86275068, 152.35727522

Map

- Enlarge map



Street view

Photography is provided by Google Street View and may include third-party images. Images show the vicinity of the heritage place which may not be visible.

Request a boundary map

A printable boundary map report can be emailed to you.

Email

*

Significance

Criterion A

The place is important in demonstrating the evolution or pattern of Queensland's history.

A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.

Criterion C

The place has potential to yield information that will contribute to an understanding of Queensland's history.

(Criterion under review)

Criterion D

The place is important in demonstrating the principal characteristics of a particular class of cultural places.

A late 19th century bridge which is the second oldest extant with screw piles in Queensland, on what was constructed as a private railway to government standards.

Criterion F

The place is important in demonstrating a high degree of creative or technical achievement at a particular period.

(Criterion under review)

History

Agitation for a railway from Bundaberg to the Woongarra district began in the 1880s and a line was surveyed during 1889-91. In the absence of funds for government construction and with the support of the railway commissioners, Robert Cran of the Millaquin sugar refinery near Bundaberg, was authorised by an Act of Parliament in 1892, to construct a private railway from Bundaberg to the sugar refinery. Plans were prepared for the bridge in 1893. Tenders were called by the government and a contract for construction was awarded to James Overend in January 1894. The railway was opened for traffic on 9 July 1894.

The railway was acquired by the State Government on 3 December 1912. In 1917 an Act of Parliament approved the acquisition of the railway to Woongarra. In 1918 the State Government acquired the extension of the railway which had been constructed by the Shire Council.

In 1965 plans were prepared for strengthening the bridge with steel girders suitable for a 12 ton axle loading. This was subsequently undertaken with re-used girders from the Gold Coast.

Description

Saltwater Creek bridge includes one 50 foot plate girder span with steel cross girders and longitudinals, seven 20 and two 26 foot timber spans, supported on seven timber piers, two concrete cylinder piers, and two timber abutments.

Bundaberg embankment.

4x1x2x20 foot (6.1m) timber longitudinals, concrete abutment, common braced timber trestles, (two on timber foundations) or a common concrete pier (piers 1 to 5).

1x2x2x26 foot (7.9m) timber longitudinals, common braced timber trestle on a concrete foundation (pier 5), common cast iron cylinders with screw piles (pier 6).

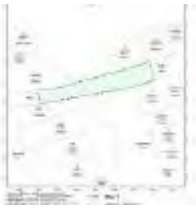
1x2x50 foot (15.2m) half-through plate girders with steel cross girders, steel longitudinals, common cast iron cylinder piers with screw piles (piers 6 and 7).

1x2x2x26 foot (7.9m) timber longitudinals, common cast iron cylinders with screw piles (pier 7), common braced timber trestle (pier 8).

3x1x2x20 foot (6.1m) timber longitudinals, common braced timber trestles (piers 8 to 11).

Image gallery




Location

Last updated 20 January 2016

Appendix B: Historic Plans

QUEENSLAND RAILWAYS

MILLAQUIN BRANCH

BRIDGE over SALTWATER CREEK

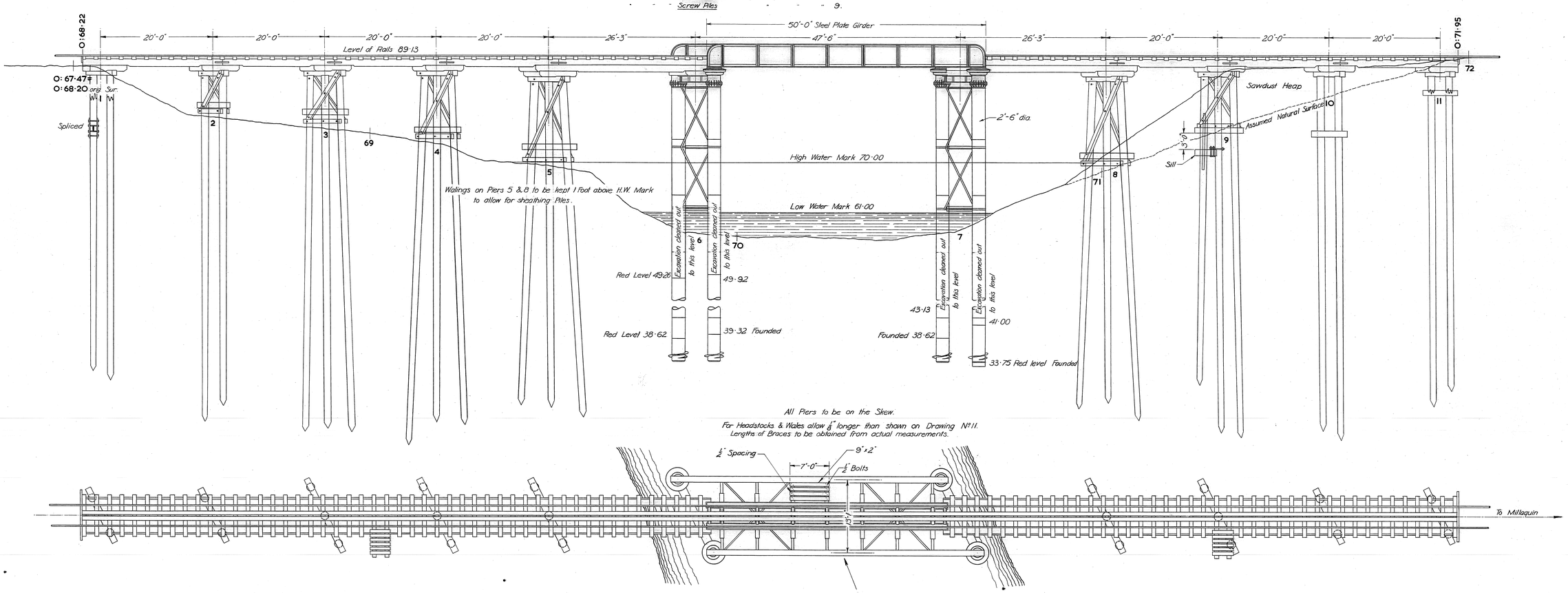
GENERAL DRAWING

SCALE: 8 FEET TO AN INCH

Drawing Nº 8

For Details of Timber Piers and Spans see Drawings Nos 11, 12, 13.
" " " Steel Girder &c " " " 10.
" " " Screw Piles " " " 9.

Note:- All piers except Nº1 are built.



All Piers to be on the Skew.
For Headstocks & Wales allow 6" longer than shown on Drawing Nº11.
Lengths of Braces to be obtained from actual measurements.

1·370km

QUEENSLAND RAILWAYS

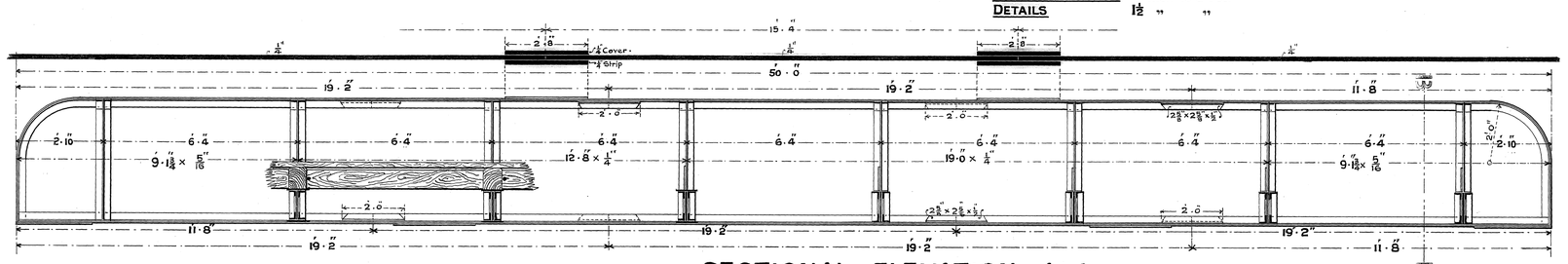
MILLAQUIN BRANCH

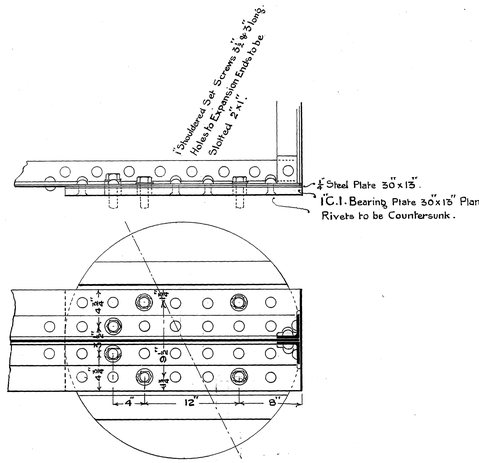
BRIDGE OVER SALTWATER CREEK

STEEL SUPERSTRUCTURE

Drawing № 10

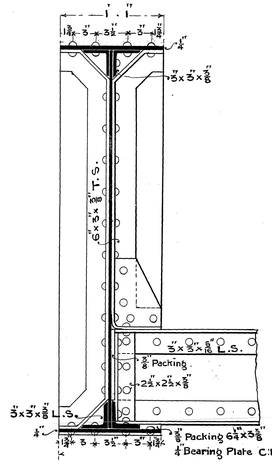
SCALES
GENERAL DRAWING ½ Inch to a Foot
DETAILS 1½ " "



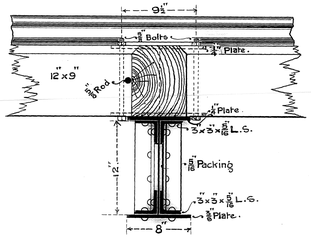


DETAIL OF C.I. BEARING PLATE

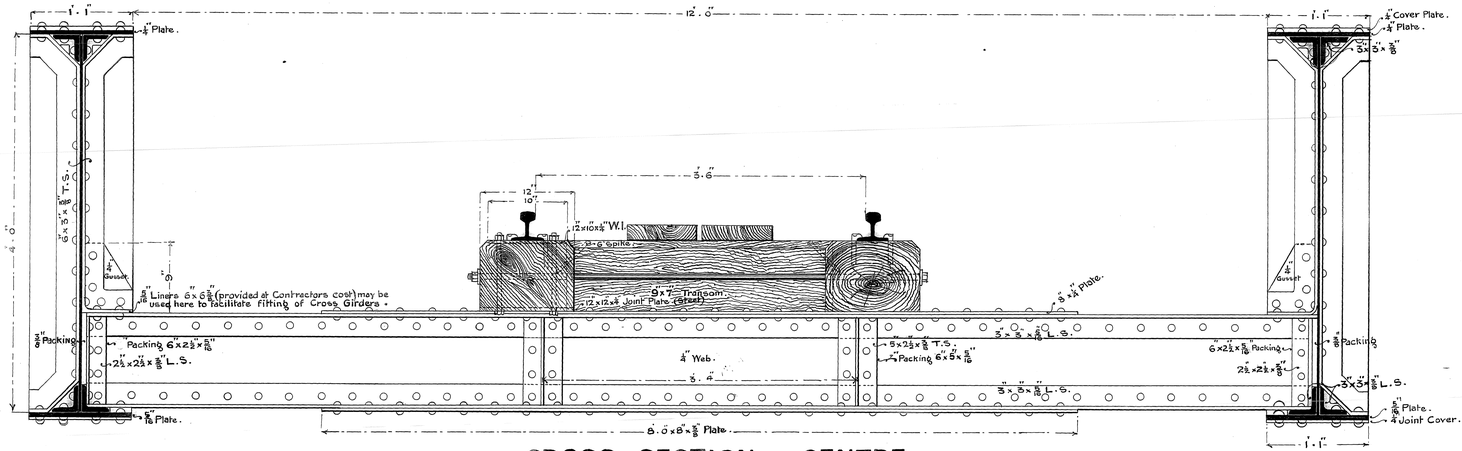
NOTE. Girders to camber 1" at centre
All Rivets ⅞" dia: 4" pitch except where otherwise shewn.



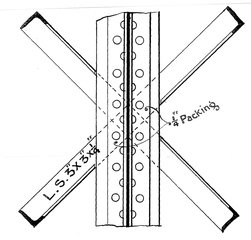
SECTION B B



SEC: OF CROSS GIRDER



CROSS SECTION AT CENTRE



WIND BRACING

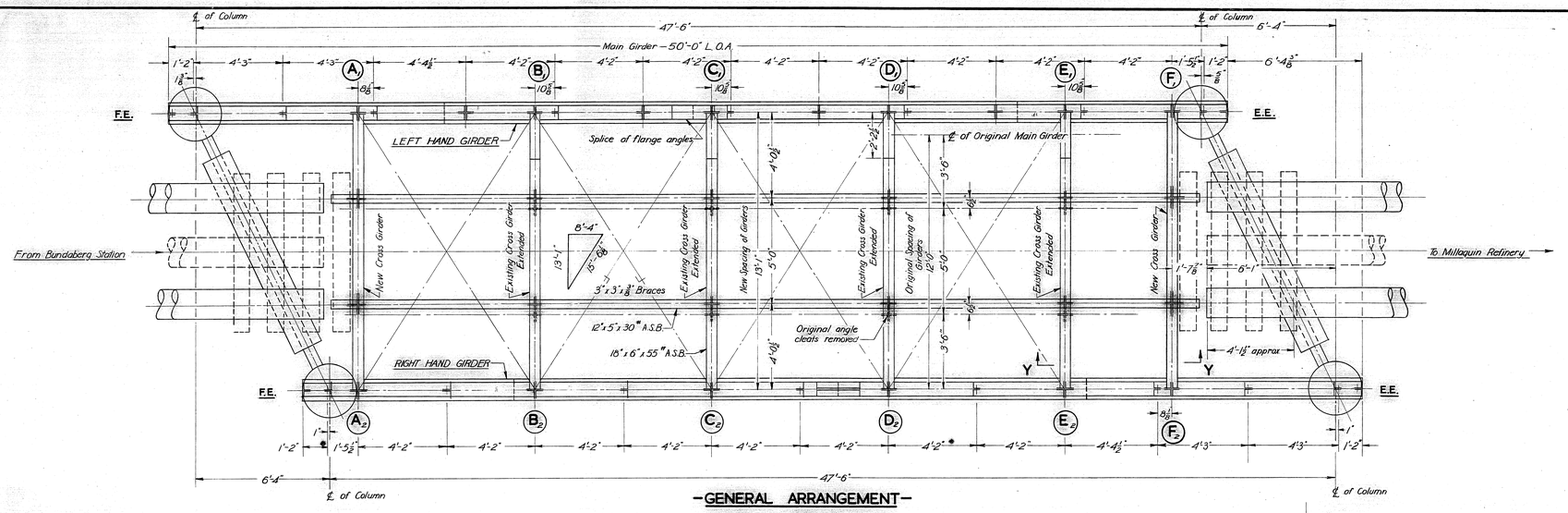
1·370km **22298**
WOONGARRA BRANCH

S7907/2

12·93. MILLAQUIN BRANCH.
SALTWATER CREEK BRIDGE.

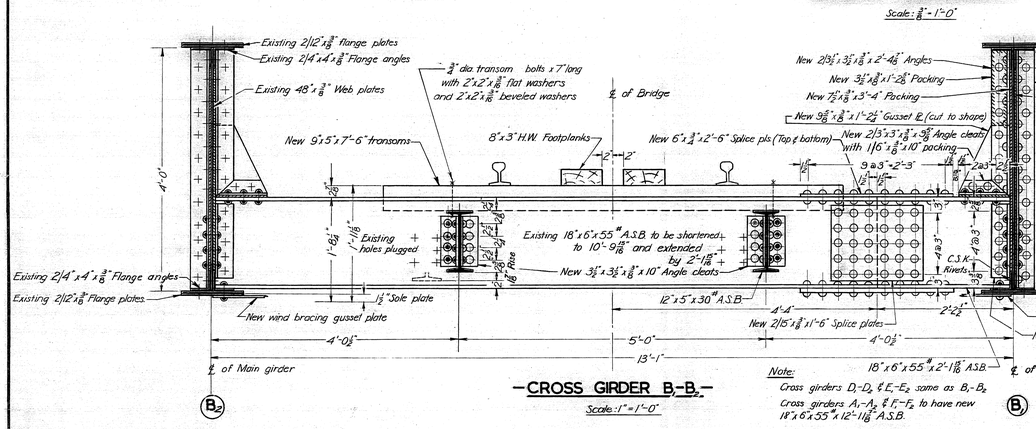
SALTWATER CREEK BRIDGE.

MICROFILMED



—GENERAL ARRANGEMENT—

Scale: ⅜"=1'-0"



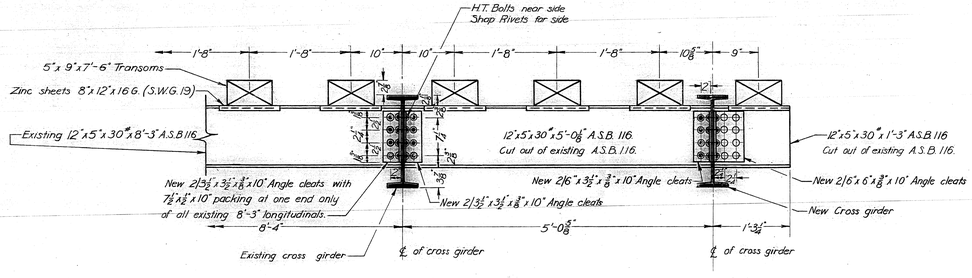
—CROSS GIRDER B1–B2—

Scale: 1"=1'-0"

—PART OF CROSS GIRDER C1–C2—

Scale: 1'-1'-0"

Cross girder's end C2 same as B2



—SECTIONAL VIEW Y–Y—

Scale: 1"=1'-0"

Note:
All rivets and H.T. bolts to be ⅞" dia.
Existing rivets and bolts shown
New { Rivets shown / Bolts shown
New countersunk rivets near side shown
- - - for - - -
Packing shown hatched

1·370km

Note:
Steel span is modified from the span dismantled from 18 M. 45½ C. P.M. S.C.L. near Quenford. See original dwg. No S8274.

22299

LIST OF MEMBERS TO BE FABRICATED FROM NEW STEEL MATERIAL OR MODIFIED FROM EXISTING MEMBERS OF THE OXENFORD SPAN

Item	Description	No	Size	Length	Weight in lbs. Each	Weight in lbs. Total	Remarks
	Longitudinals						
	A.S.B. 116	2	12"x5"x30"	5'-0⅝"	–	–	Cut out of existing A.S.B.12"x5"x30"x 17'-10½"
	A.S.B. 116	4	12"x5"x30"	1'-3"	–	–	
	Angle Cleats	8	6"x6"x⅜"	10"	12·35	99	
	" "	8	6"x3½"x⅜"	10"	9·69	78	
	" "	32	3½"x3½"x⅜"	10"	7·04	225	
	Main Girders						
	Angles	10	3½"x3½"x⅜"	3'-11¼"	33·27	333	
	"	2	3½"x3½"x⅜"	3'-10¼"	32·57	65	
	"	10	3½"x3½"x⅜"	2'-4⅝"	20·33	203	
	"	2	3½"x3½"x⅜"	2'-4⅜"	19·98	40	
	Packings	5	7½"x⅜"	3'-4"	31·87	159	
	"	5	7"x⅜"	3'-4"	29·75	149	
	"	1	7½"x⅜"	3'-4"	74·37	74	
	"	1	7"x⅜"	3'-4"	69·41	69	
	"	5	3½"x⅜"	1'-2⅜"	5·44	27	
	"	1	3½"x⅜"	1'-2⅛"	5·25	5	
	"	4	3½"x½"	8⅜"	4·03	16	Cut to shape
	"	4	3½"x⅜"	1'-2½"	5·30	21	
	"	4	3½"x 0·42"	1'-2½"	6·04	24	
	Sole plates	2	13"x1½"	2'-7½"	164·02	328	Cut to shape Nett area=2·68sq.ft
	" "	2	13"x1⅛"	2'-6⅜"	167·82	336	
	Gross Girders						
	A.S.B. 123	2	18"x6"x55"	12'-11⅜"	714·43	1,429	
	" "	4	18"x6"x55"	10'-9⅜"	–	–	Cut out of existing A.S.B.18"x6"x55"x11'-10½"
	" "	3	15"x6"x55"	2'-1⅜"	–	–	Cut out of existing A.S.B.18"x6"x55"x8'-11⅜"
	" "	1	18"x6"x55"	2'-1⅛"	–	–	
	Angle cleats	12	3½"x3½"x⅜"	1'-2½"	10·21	123	
	" "	12	3"x3"x⅜"	9⅜"	5·75	69	
	Packings	6	6"x⅜"	10"	6·37	38	
	Splice plates	8	15"x⅜"	1'-6"	28·69	230	
	" "	8	6"x⅜"	2'-6"	38·25	306	
	Gusset plates	6	9⅜"x⅜"	1'-2½"	9·94	60	Cut to shape Nett area=0·65 sq.ft
	Wind Bracing						
	Angles	8	3"x3"x⅜"	14'-0½"	100·68	805	
	Gusset plate A_1	1	14⅜"x⅜"	1'-3⅛"	15·30	15	Cut to shape Nett area=1·02sq.ft
	" " A_2	1	14⅛"x⅜"	1'-3"	15·61	16	Cut to shape Nett area=1·02sq.ft
	" " B_1	1	14⅜"x⅜"	1'-9"	24·79	25	Cut to shape Nett area=1·62sq.ft
	" " B_2	1	14⅛"x⅜"	1'-9⅜"	22·80	23	Cut to shape Nett area=1·49sq.ft
	" " C_1	1	14⅜"x⅜"	1'-9⅜"	25·40	25	Cut to shape Nett area=1·66sq.ft
	" " C_2	1	14⅛"x⅜"	1'-9⅜"	25·40	25	Cut to shape Nett area=1·65sq.ft
	" " D_1	1	14⅜"x⅜"	1'-9"	24·79	25	Cut to shape Nett area=1·62sq.ft
	" " D_2	1	14⅛"x⅜"	1'-9⅜"	25·40	25	Cut to shape Nett area=1·66sq.ft
	" " E_1	1	14⅜"x⅜"	1'-13⅜"	13·77	14	Cut to shape Nett area=0·90sq.ft
	" " E_2	1	14⅛"x⅜"	1'-23⅛"	13·16	13	Cut to shape Nett area=0·86 sq.ft
	Packings	1	5"x⅜"	1'-3⅜"	8·04	8	Cut to shape
	"	1	5"x⅜"	1'-3"	7·97	8	Cut to shape
	"	4	3"x⅜"	3½"	1·16	5	Cut to shape
	"	1	5"x⅜"	1'-1⅜"	7·11	7	Cut to shape
						5,545 lbs.	
	Set screws	16	1" dia.	4"			
	" "	8	1" dia.	4½"			
	Zinc sheets (S.W.G.19)	50	8"x 16 G.	1'-0"			
	Transom bolt with 2 washers	50	¾" dia.	7"			

QUEENSLAND RAILWAYS
CHIEF ENGINEER'S BRANCH

STRENGTHENING OF SALTWATER CREEK BRIDGE WOONGARRA BRANCH DETAILS OF 50 FT. STEEL SPAN

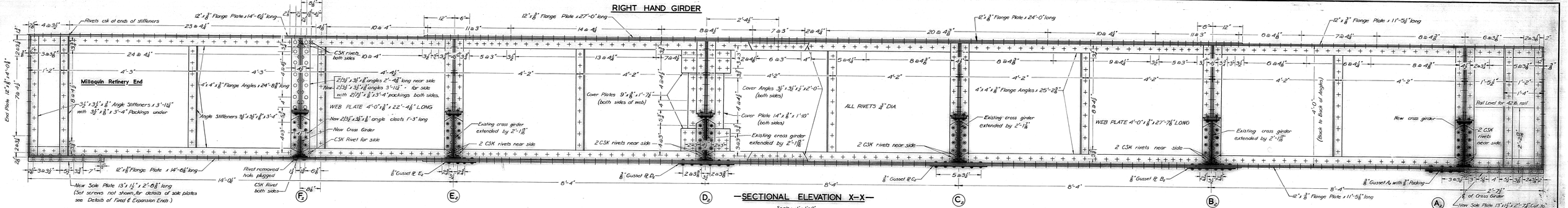
RECOMMENDED	CALCS.	V.L.	11.12.64
BRIDGE ENGINEER	" C'K'D.		
DATE 12 Apr 65	DRAWN	W.K.T.	23.3.65
APPROVED	TRACED	G.C.	20.5.65
	CHECKED	W.K.T.	25.5.65
	SUBMITTED	V.L.	28.5.65
CHIEF ENGINEER	PASSED		29.7.65
DATE 12-8-65			

SHEET No 1
No OF SHEETS 2

S11758

SCALE: As shown	DATUM	ALTERATIONS	MARK	DETAILS	DATE	C'K'D
C. E's PAPERS 64-6877						
S11758	LOADING 12 T.A.L.					

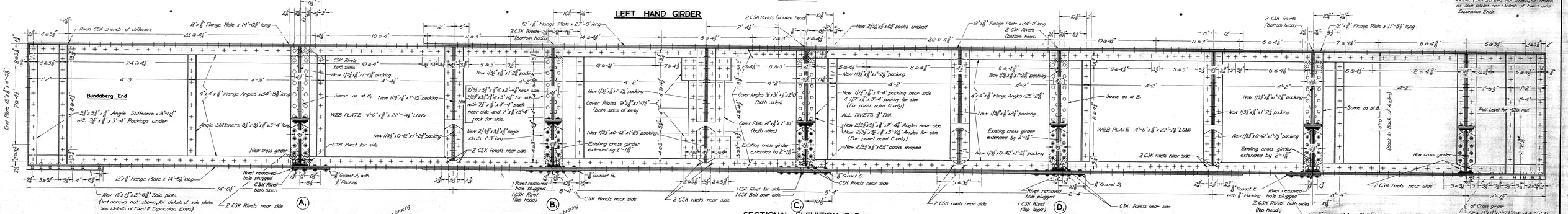
RIGHT HAND GIRDER



—SECTIONAL ELEVATION X–X—

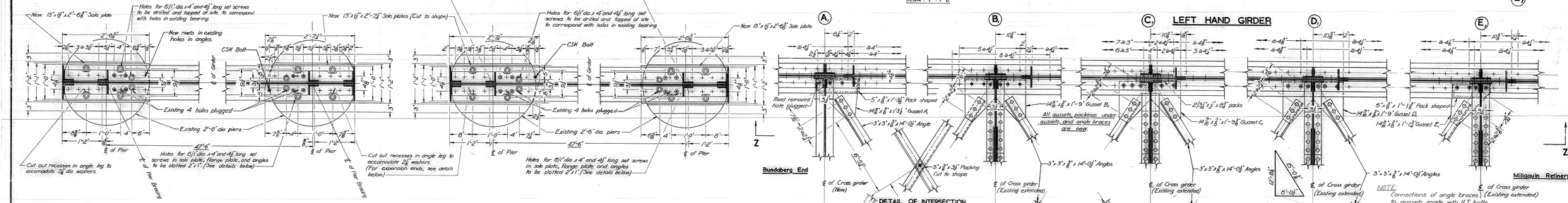
Scale : 1'-1"-0"

LEFT HAND GIRDER



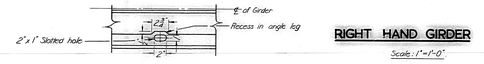
—SECTIONAL ELEVATION Z–Z—

Scale : 1'-1"-0"



LEFT HAND GIRDER

Scale : 1"-1'-0"



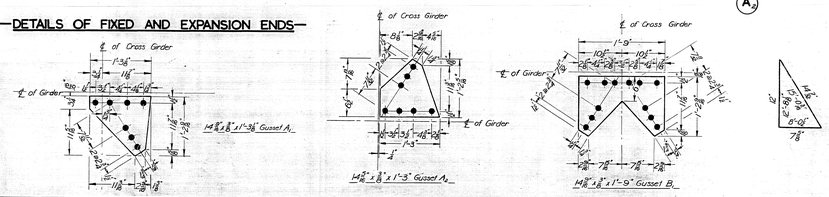
RIGHT HAND GIRDER

Scale : 1"-1'-0"

DETAILS OF RECESSES AND SLOTTED HOLES FOR 1 DIA. SET SCREWS IN EXPANSION ENDS.

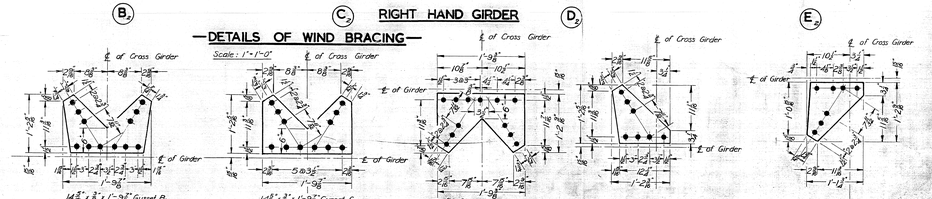
Scale : ½"-1'-0"

—DETAILS OF FIXED AND EXPANSION ENDS—



—DETAILS OF WIND BRACING—

Scale : 1"-1'-0"



Notes:

(a) Steel span is modified from the span dismantled from 18.M. 45¾ C. P.M. S.C.L. near Dannford. See original dwg. No. 38274.
(b) For details of pier tops and existing bearing plates see dwg. No. 57907.
(c) All rivets in sole plates to be countersunk underneath.
(d) All rivets and H.T. bolts to be ⅞" dia.
Existing rivets and bolts shown thus
New rivets shown thus
(Bolts)
New countersunk rivets near side shown thus
Packing shown hatched

SCALE	As shown
C.E's PAPERS	64-6877
DATUM	
SLI759	
LOADING	12 T.A.L.

MARK	DETAILS	DATE	CK'D
ALTERATIONS			

1·370 km 22300

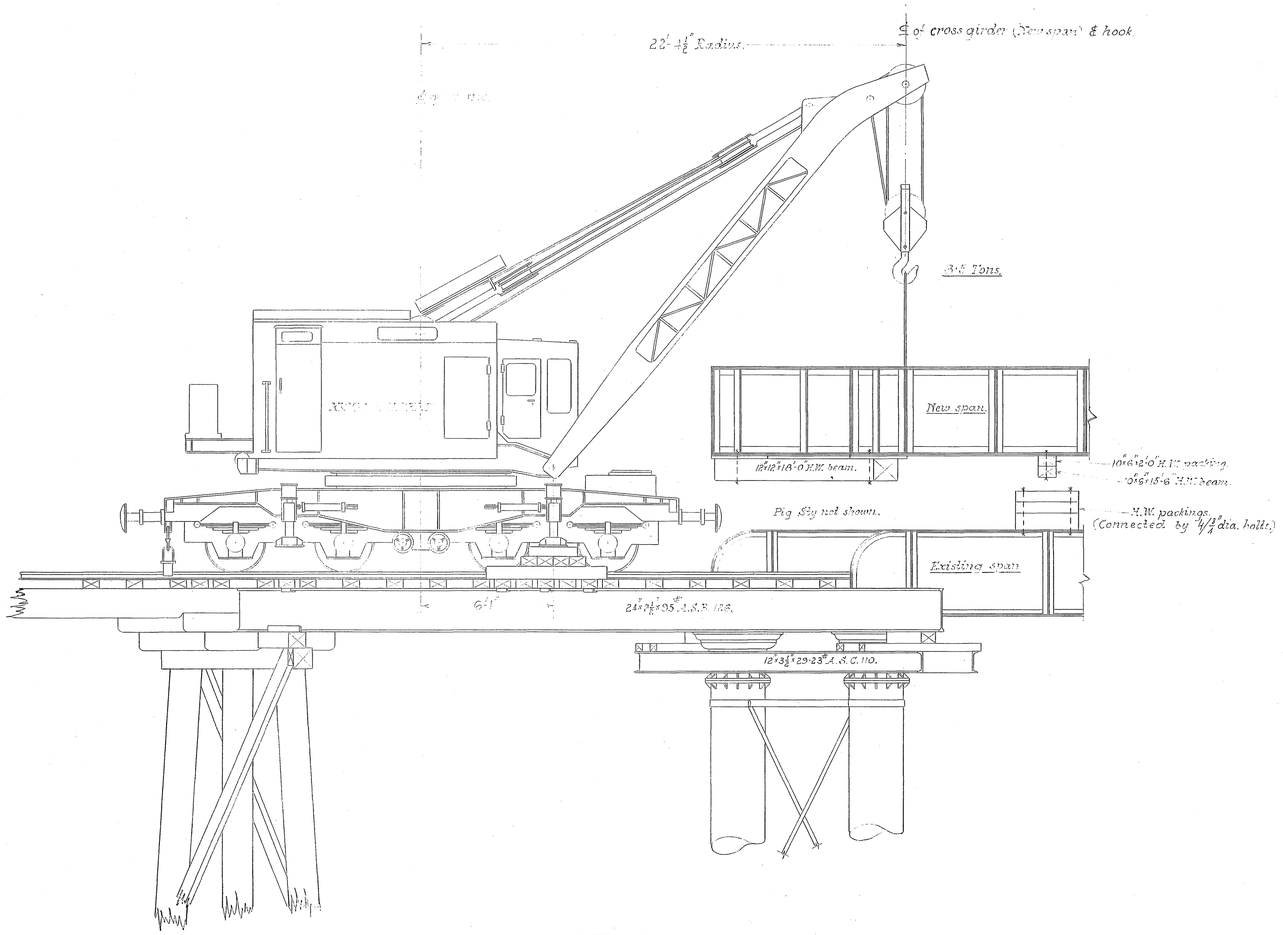
QUEENSLAND RAILWAYS
CHIEF ENGINEER'S BRANCH

STRENGTHENING OF SALTWATER CREEK BRIDGE WOONGARRA BRANCH
DETAILS OF 50FT. STEEL SPAN

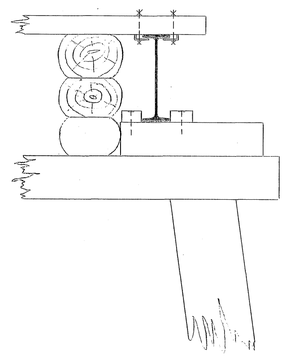
RECOMMENDED	CALCS.	V.L.	SHEET No. 2
BRIDGE ENGINEER	" CK'D		No. OF SHEETS 2
DATE 12 May 65	DRAWN	W.K.L.	P.3.65
APPROVED	TRACED	G.C.	M.5.65
	CHECKED	W.K.	S.5.65
CHIEF ENGINEER	SUBMITTED	F.J.	29.6.65
DATE 12.7.65	PASSED		7/7/65

SLI759

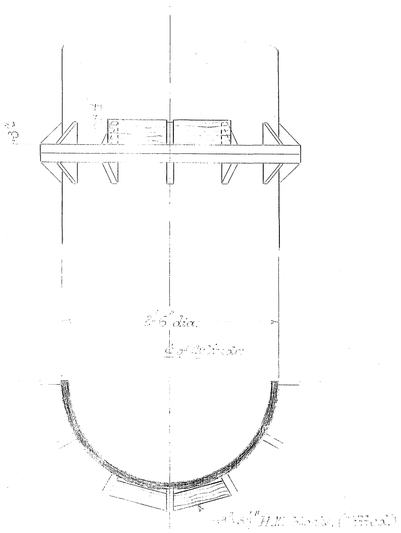
MICROFILMED



ELEVATION
Scale: 1"=10'-0"

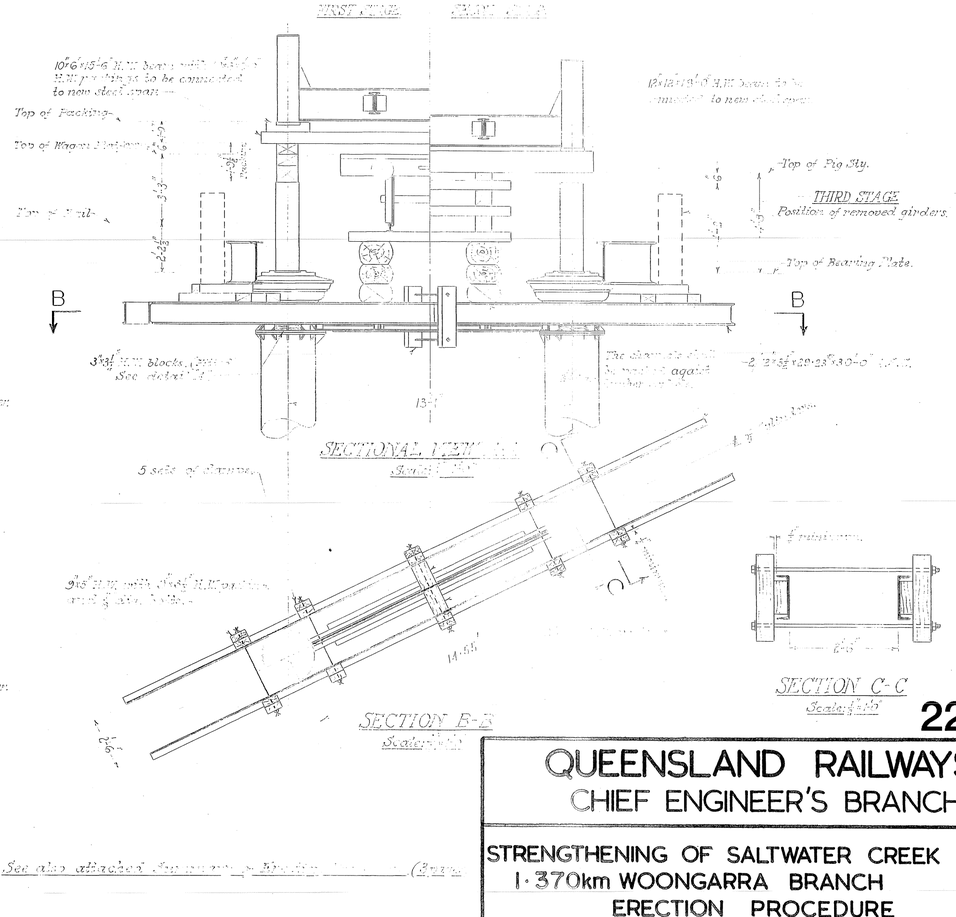


DETAIL "B"
Scale: 1"=1'0"



Scale: 1"=1'0"

PLAN
Scale: 1"=10'-0"



See also attached [illegible]

22301

QUEENSLAND RAILWAYS
CHIEF ENGINEER'S BRANCH

STRENGTHENING OF SALTWATER CREEK BRIDGE 1·370km WOONGARRA BRANCH ERECTION PROCEDURE

RECOMMENDED	CALCS.	V.L.	21.7.65	SHEET Nº
BRIDGE ENGINEER	" C'K'D			Nº OF SHEETS
DATE	DRAWN	W.K.T.	13.8.65.	
APPROVED	TRACED			
	CHECKED	V.L.	13.8.65	
	SUBMITTED	V.L.	13.8.65	S 11824
CHIEF ENGINEER	PASSED		17.8.65	
DATE 17.8.65				

SCALE: As shown.

C.E's. PAPERS 64-6877 DATUM

S 11824 LOADING

ALTERATIONS

MARK	DETAILS	DATE	C'K'D

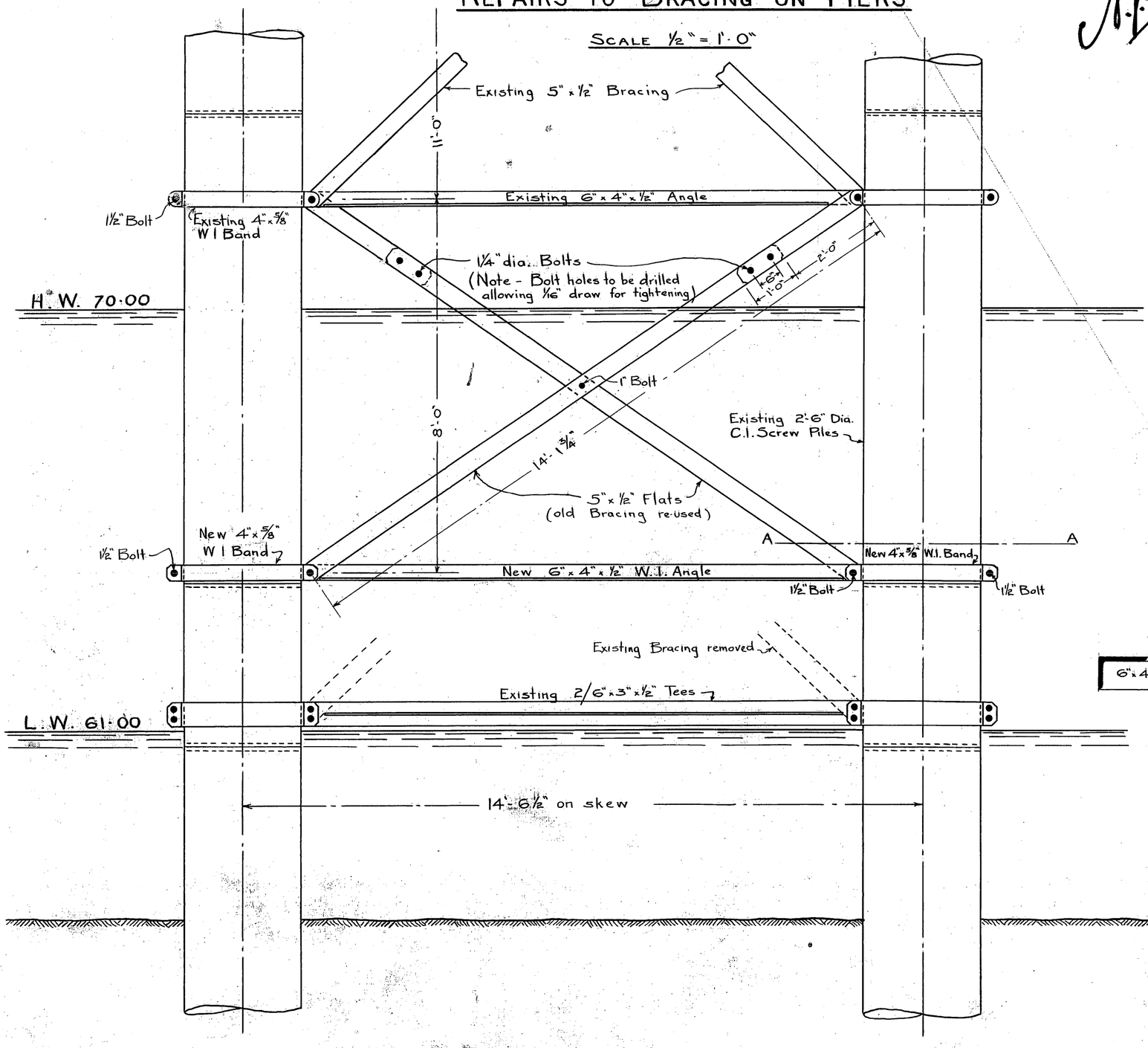
MICROFILMED

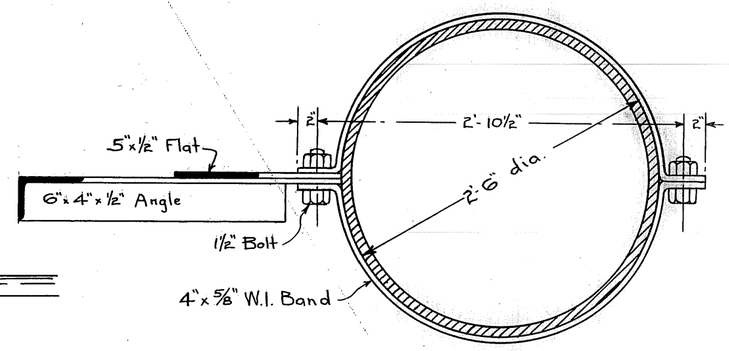
Q. R. MILLAQUIN BRANCH

BRIDGE OVER SALTWATER CREEK

REPAIRS TO BRACING ON PIERS

SCALE ½" = 1'-0"





SECTION AA
Scale 1" = 1'-0"

Dr. 3# 41

BUNDABERG CITY COUNCIL

PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAILWAY BRIDGE

DRAWING INDEX

DRAWING No.	SHEET	DESCRIPTION
16116-S01	1	DRAWING INDEX, LOCALITY PLAN and STRUCTURAL NOTES
16116-S02	2	EXISTING STRUCTURE/REMEDIAL WORKS
16116-S03	3	PROPOSED CYCLEWAY/PATHWAY
16116-S04	4	SECTIONS & DETAILS
16116-S05	5	MISC DETAILS

TIMBER NOTES

1. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS1720.1
2. TIMBER SECTIONS SHALD BE HARDWOOD STRESS GRADE F17, PRESERVATIVE TREATED TO HAZARD LEVEL H3. CONTINUOUS OVER MIN. 2 No. SPANS AND FREE OF WATER HOLDING DEFECTS SUCH AS LOOSE & UNSOUND KNOTS/SHAKES, LOOSE GUM VEINS, KNOTHOLES, TERMITE GALLERIES, WANT, WANE & BARK, CHECKS WIDER THAN 1mm, END SPLITS WIDER THAN 1mm, INCLUDED BARK & BORDER HOLES LARGER THAN 3mm ON THE UPPER SURFACE. IN ADDITION, PERMITTED DEFECTS SHALL NOT COVER MORE THAN 15% OF THE TOP FACE.
3. DECKING IS TO BE DRESSED ON BOTTOM & SIDES & ROUGH SAWN ON TOP. MACHINE 3mm ARRIS ON UPPER EDGE.

   ADJACENT BOARDS SHALL NOT HAVE MORE THAN 3mm DIFFERERNCE IN THE THICKNESS.

   DECKING IS TO BE SCREW FIXED TO JOISTS WITH 2/No. 14x75mm STAINLESS STEEL GRADE 304 BATTEN SCREWS PER JOIST (STAGGERD). PREDRILLED & COUNTERSUNK & HAVING A GAP OF 6mm BETWEEN BOARDS.

   WHEN DECKING BOARDS ARE BUTTED LENGTHWISE, THE FIT SHALL BE TIGHT WITH NO GAP. AT CHANGES IN HORIZONTAL ALIGNMENT, NEATLY MATCH ABUTTING ENDS OF MITRED DECKING BOARDS.

   COAT DECKING ALL AROUND WITH KOPPERS ARCH ON TIMBER PROTECTIVE EMULSION BEFORE LAYING. TRAFFIC SHALL BE KEPT OFF THE DECK FOR SEVERAL WEEKS AFTER OILING UNTIL THE OIL HAS PENETRATED SUCH THAT THE WALKING SURFACE OF THE DECK IS NOT SLIPPERY.

   DECKING IS TO BE A CONSISTENT COLOUR.

   DECKING TO BE LAID CUPPING DOWN.
4. TIMBER (INCLUDING DECKING) SHALL BE SUPPLIED WITH THE END GRAIN SEALED WITH A SUITABLE WATER REPELLANT SEALER (EG. MOBILCER M. WAX EMULSION). IF THE TIMBER IS CUT TO LENGTH ON SITE, THE END GRAIN SHALL BE RESEALED AS SOON AS POSSIBLE AFTER CUTTING. ALL ENDS SHALL BE SQUARE CUT U.N.O.
5. EDGES OF ALL TIMBER SECTIONS SHALL BE ARRISED.
6. ALL DRILLINGS, SCARFINGS AND NOTCHINGS TO BE FLOODED WITH KOPPERS 'RESEAL'. IN THE CASE OF BOLT HOLDS, THE HOLES SHALL BE SQUIRTED FROM BOTH ENDS WITH 6 SHOTS OF 'RESEAL' BY MEANS OF A STANDARD HAND SPRAY.
7. PLACE SQUARE GALV. WASHERS UNDER EACH NUT & BOLT HEAD. WASHER SIZE SHALL BE AS NOTED IN THE FOLLOWING TABLE.

BOLTS	MIN. WASHER SIZE
M12	50x50x3
M16	57x57x4
M20	65x65x4

8. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT DIP GALVANISED COMMERCIAL STRENGTH & CONFIRM TO AS1111. ALL NUTS SHALL BE TURNED SNUG TIGHT AS DEFINED IN AS1511. ALL BOLTS IN TOP RAILS, BOTTOM RAILS AND BALUSTRADE POSTS SHALL BE CUPHEAD SQUARE NECK BOLTS WITH LOCKNUTS. GREASE BOLTS BEFORE INSTALLATION.
9. BOLT HOLES SHALL BE DRILLED APPROX. 10% LARGER THAN THE BOLT DIA. HOLES SHALL BE BORED STRAIGHT & BOLTS SHALL NOT BE BENT OR EXCESSIVELY FORCED INTO HOLES.
10. TIMBER DAMAGE BECAUSE OF POOR HANDLING OR STORAGE SHALL BE RE-GRADED.
11. ALL JOINTS LESS THAN 1.0mm ABOVE HIGEST ASTRONOMICAL TIDE MARK TO BE SEALED WITH A BITUMASTIC OR PRESERVATIVE TYPE SEALER.
12. PRESERVATIVE TREATMENT SHALL CONFORM TO AS1604 & TUMA (TIMBER UTILISATION AND MARKETING QLD 1987).
13. AT THE COMPLETION OF THE PROJECT ALL BOLTS SHALL BE RE-TIGHTENED.

GENERAL NOTES

1. These drawings to be read in conjunction with all architectural and other consultants drawings and specifications and with such other written instructions issued during construction. All discrepancies to be referred to the engineer for decision before proceeding with the work.
2. Dimensions shall not be obtained by scaling the engineers drawings. Verify all dimensions relating to setting out and off-site work prior to commencement of construction and/or fabrication.
3. 'UNO' denotes 'Unless Noted Otherwise.
4. All dimensions in millimetres UNO.
5. All levels in metres to AHD datum UNO.
6. During construction the structure is to be maintained in a stable condition and no part is to be overstressed. Supply temporary bracing as required to comply.
7. All workmanship and materials to be in accordance with the requirements of the current editions and amendments of the SAA codes and the by-laws and ordinances of the relevant building authority.
8. Trade names have been used to establish a basic requirement. Any substitution is to be submitted for approval to the engineer. Any such approval does not constitute an authorisation for an extra unless approval is obtained from the architect before commencement of the work.
9. Contractor to be responsible for the location of all existing services whether indicated or note and any damage caused to be repaired at the contractor's expense.
10. Safety requirements to be in accordance with occupational health and safety management regulations as specified.
11. All propping and formwork for floor beams and slabs to be removed as specified prior to construction of any masonry walls on that floor.
12. All non-loadbearing walls to be kept 20 clear of the soffit of the structure over UNO.

LOADING NOTES

1. The structural work shown on these drawings has been designed for the following loads.
2. Dead Loads
   Determined from materials and thicknesses to AS1170.1 UNO. Additional superimposed dead loads:

Location	kPa
General	1.0

3. Live Loads

Location	kPa
Cycleway/Pathway	5.0 (4.5kN Concentrated)

4. Wind Loads

   Region: C
   Terrain Category: 2
   MzCAT: 1.0
   Ms: 1.0
   Mt: 1.0
   Md: 0.95
   Regional Wind Speed Vr: 69.3m/s
   Design Wind Velocity Vu: 65.8m/s

5. Earthquake Loads
   To AS1170.4 and the following:

   S = 1.0
   a = 0.12
   I = 1.0
   Structure Type = I
   Design Category = B

NOTE
All dimensions, details and levels to be verified prior to ordering or construction
Do not scale off drawing.
Dimensions in millimetres unless shown otherwise.

CONCRETE NOTES

1. Materials and workmanship to comply with the current editions and amendments of AS3600 UNO.
2. Concrete Strength:

Element	Max Agg. Size	Slump	fc(MPa)
Footings	20	80	25
Block Core Fill	10	230	20

   N32 = Normal class and project assessment.
   S32 = Special class with maximum shrinkage of 650 microstrain and project assessment.

   Concrete to be normal density UNO.
   Cement to be type GP UNO.
   Obtain written approval from engineer for any proposed admixtures.
   Use of calcium chloride is prohibited.
3. Clear Cover to Reinforcement UNO:

Element	Exposure Condition 1	2	3	4
Footings	–	–	50	–

   1 = finished and cured surface or cast against form – interior, exposure classification A1.
   2 = as 1 but exposed, exposure classification B1.
   3 = cast in contact with ground – exposure classification A2.
   4 = cast on WPM against the ground – exposure classification A2.

   Exposed denotes surface, edge or soffit not in 'interior' environment.
4. Documented element sizes do not include the thickness of applied finishes. Beam sizes show depth first and include slab thickness. Formed edges and corners to have 20 chambers UNO.
5. Exact size and location of penetrations to be obtained from workshop drawings prior to scheduling reinforcement and are not to exceed dimensions shown on engineer's drawings.
6. No chases, holes greater than 150 diameter, or embedment of pipes over 40 diameter UNO to be made in slabs or walls. For all other elements no penetrations, chases or embedments to be made without engineer's prior approval.

   Conduits cast into members to be spaced at maximum possible separation and under no circumstances closer than a clear spacing of twice the larger conduit diameter from parallel reinforcement or any other conduit.
7. Construction break locations and details to be approved by the engineer prior to construction.

   All construction joints to be thoroughly scabbled and cleaned exposing the aggregate matrix prior to next pour.
8. All concrete to be mechanically vibrated without segregation and vibrator not to be used to spread concrete.
9. All concrete to be cured by keeping wet for 7 days. Apply water as soon as concrete becomes firm. Alternative curing methods conforming to AS3799 and compatible with the finishes to be submitted for approval.
10. Ceramic tile finishes to be laid on a flexible adhesive minimum 3 months after floor construction.
11. Reinforcement grades to AS1302, AS1303, AS1304 or AS/NZS 4671 as applicable:
    N: Deformed Bar, D500N, fsy = 500Mpa
    R: Plain Bar, R250N, fsy = 250Mpa
    SL: Slab Mesh, D500L, fsy = 500Mpa
    TM: Trench Mesh, D500L, fsy = 500Mpa
    L: Fitments, D500L, fsy = 500Mpa

    The number following the bar symbol is the numerical bar diameter.
12. Reinforcement is shown diagrammatically and not necessarily in true projection.
13. All reinforcement to be placed in the position shown, tied and adequately supported with steel or plastic chairs to give specified cover. Bar chair material to suite the exposure classification. Maximum bar chair centres to be 600 for fabric and bars up to 12 diameter thence 900.
14. Do not cut reinforcement to clear penetrations without engineer's approval. Displace reinforcement slightly as necessary to clear blockouts.
15. Welding of reinforcement is not permitted without engineer's approval.
16. Reinforcement to be bent cold to AS3600 except where approved by the engineer. No rebending is permitted unless approved by the engineer. Hot bending is prohibited.
17. Laps in reinforcement to be made only in the position shown unless approved by the engineer and to be sufficient to develop the full strength of the reinforcement.

    Minimum laps in beams and slabs to be:

Bar Size	Top Bar	Bottom Bar
N12	400	400
N16	600	600
N20	800	800

18. 'Continuous' denotes bar to be full length of member, cogging vertically (if top or bottom bar) and horizontally (side bars) at form ends. Lap as scheduled where required, continue into slab or abutting beam where possible for a distance equal to the lap length UNO.
19. Where distribution bars are not shown provide N12–300, lap where necessary and lap with main bars 500.
20. Slabs and beams to bear only on the columns, walls etc shown shaded on the documents. All other non-loadbearing elements including windows, architectural attachments, non-loadbearing masonry walls or partitions etc to be kept 20 clear from soffit of structure over. Allowance for 20 deflection to be made in any connections to soffit.
21. Where slabs or beams bear on masonry, top course to be level, smooth and covered with approved sliding joint material UNO.
22. Formwork to be designed and constructed to AS3710. Stripping of forms and removal of formwork supports to be in accordance with AS3710 unless specifically approved by engineer. Reshoring is not permitted.
    Refer to architectural specification for classes of surface finish.

MASONRY NOTES

1. Materials and workmanship to comply with the current edition and amendments of AS3700.
2. Provide temporary propping to walls during construction to comply with AS3700.
3. Unit Type fuc(Mpa)

   Masonry Block 15

   All units to AS/NZS4455 and AS/NZS4456, with 'General Purpose' grade durability to AS/NZS4456.10.

   Hollow units to have recessed webs for horizontal reinforcement as applicable.

   Provide manufacturer's recent test certificate confirming clay units exhibit a maximum 5 year expansion not exceeding 1.00mm/m.
4. Mortar below DPC or in contact with the ground to be M4 classification mechanically mixed in the proportions of 1:0.25:3 (cement:lime:sand); mortar above DPC to be M3 – (1:1:6).

   Sand shall be clean sharp silica sand – 'brickies loam' shall not be used.

   No remixing permitted.
5. Fully bed face shells and end crosswebbs of hollow units – lay bottom course on full mortar bed. Solid or cored units to be laid on full mortar bed. All perpends except weepholes to be fully filled with mortar.

   Nominal joint thickness = 10
   Nominal joint tooling = 3
   No joint raking permitted
6. Tolerances to comply with AS3700. All perpends to be properly aligned.
7. All walls to be fully bonded at intersections. Tying is permitted if vertical joints are specifically detailed.
8. Vertical control joints to be as documented. If not detailed, comply with recommendations of Chapter 12 of the Australian Concrete Masonry Design and Construction Manual, with joints at not more than 12m spacings and 6m from corners for concrete units, 8m spacings and 6m from corners for clay units.

   All masonry supported or supporting concrete slabs to be provided with vertical joints at slab joint locations UNO.
9. Cavity wall ties to be heavy duty Type 1 with durability classification R4 (stainless steel). Embedment of ties in mortar joint to be 50 minimum.

   Space ties as follows:

   (i) Generally – 400 centres maximum UNO.
   (ii) At lateral supports, control joints and around openings – 200 centres maximum within 300 of the line of support, edge of control joint or opening UNO.

   Submit wall tie proposal with relevant test data if cavity exceeds 50.

   Cavity between 2 leaves to be clean and clear of any obstructions or mortar droppings.
10. Openings in non-loadbearing masonry to be supported using lintels as documented. Exposed lintels to be treated to durability classification R4.
11. Provide cleanout and inspection openings to bottom course of each grout pour – grouted cores only.

    Clean out mortar protrusions from cores to be grouted for full height – remove progressively as wall is built, or rod prior to reinforcement placement.

    Surface of cleanout openings to be mechanically cleaned of all mortar droppings and laitance – all openings to be available for inspection.
12. Reinforcement to comply with the concrete notes.

    Starter bars to be same size as vertical bars UNO.
13. Wall chases or holes not permitted unless approved by the engineer. Embedded items not permitted in reinforced cores.
14. Provide 15 minimum grout cover from inside unit surface to reinforcement UNO.

    Tie vertical bars in contact with starter bars at inspection openings.
15. Core fill grout to be fc = 20Mpa to AS3600 with 300kg/m3 minimum cement content, 10 maximum aggregate size and 230 ± 25 slump.
16. Grout units greater than 200 wide to 2400 maximum height pour.

    Grout units less than 200 wide to 1400 maximum height pour.

    Stop pour 50 below top to provide key for following pour.
17. Grout to be compacted by mechanical vibrator or by thoroughly rodding with a plain bar to ensure complete filling of all cores.
18. Where slabs or beams bear on masonry the top course shall be solid block or core filled to a smooth level surface. Provide an approved sliding joint material.
19. All non-loading walls to be kept 20 clear from soffit of structure over UNO. Provide sealant and movement ties as specified.
20. All roof tiedowns embedded in masonry to be hot dip galvanised.
21. Mortar pack to be 1:2 (cement:sand) mixed 'just moist' and rammed solid.

STRUCTURAL STEEL NOTES

1. Materials and workmanship to comply with current editions and amendments of AS4100 and AS1154.
2. During construction the structure is to be maintained in a stable condition and no part is to be overstressed. Supply temporary bracing as required to comply.
3. All steel to be in accordance with the following UNO:

   300 PLUSTM grade 300 for open sections
   AS1163 grade 350 for SHS and RHS
   AS1163 grades 350 and 250 for CHS
   AS/NZS4600 for cold formed sections
4. Fabricator to prepare workshop drawings and submit 3 copies for review prior to commencing fabrication.
5. Welds noted as follows:

   CFW = continuous fillet weld, structural purpose E48XX
   CPBW = completed penetration butt weld, structural purpose E48XX

   All welds to be CFW UNO with throat of 6mm or the thickness of the smaller plate UNO.
6. All bolts to be M20 grade 8.8/S hot dip galvanised minimum 2 per connection UNO.

   All holdown bolts to be grade 4.6/S hot dip galvanised.

   Grade 8.8 (high strength) bolts and nuts to comply with AS1252.
   Grade 4.6 bolts and nuts to comply with AS1111 and AS1112.
7. All bolt holes at steel to steel connections to be 2mm larger than the nominal bolt diameter.

   All bolt holes at holddown bolts to concrete elements to be 6mm larger than the nominal bolt diameter UNO.
8. Ends of all tubular members to be sealed with nominal thickness plates and continuous fillet welds UNO.
9. All plates to be 10mm UNO.

   Provide all cleats and holes for fixing of steel to steel, timber to steel and timber to timber required by engineering and architectural intent whether or not specifically detailed.
10. Surface treatment to comply with architect's specification with the following as minimum UNO:
    - Interior steel to be abrasive blast cleaned to Class 2 finish and painted with 1 coat of red oxide zinc chromate primer.
    - Exposed steel to be blast cleaned to Class 2 finish and hot dip galvanised to AS/NZS4680.

    Touch up all site welding with an approved treatment matching the existing coating.

    Members cast in concrete or interfaces of friction-type joints must not be pained UNO.
11. Install sheeting, purlins and accessories to comply with manufacturer's specification.

    Purlins to be at maximum centres noted with 2M12 4.6/S per connection UNO.
12. Bracing members to be hung from purlins at 3000 maximum centres.
13. Concrete encased members to be wrapped with 10 gauge 3.25mm) wire at 100 pitch and 50 cover.
14. Members in the ground to be encased with 75 minimum mass concrete.
15. Grout under base plates to be high strength non-shrink cement based.
16. All mechanical and chemical anchors to be hot dip galvanised. Install and test anchors in accordance with manufacturer's recommendation.

    CIA – Ramset chemical injection anchor or equal.

    Test anchors to twice the specified working tension at the following rates:

All chemical anchors installed from below	100 %
Other chemical capsule anchors	20 %
Other chemical injection anchors	10 %
All mechanical anchors	5 %

    If a test results in a failure, carry out additional testing to engineer's direction.

22884

REV.	DESCRIPTION	BY	DATE

SCALES

DRAWN	LRO
CHECKED	CS
DESIGNED	CS
APPROVED	LL
DATE	4/07

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CLIENT
BUNDABERG CITY COUNCIL

PROJECT
PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAIL BRIDGE

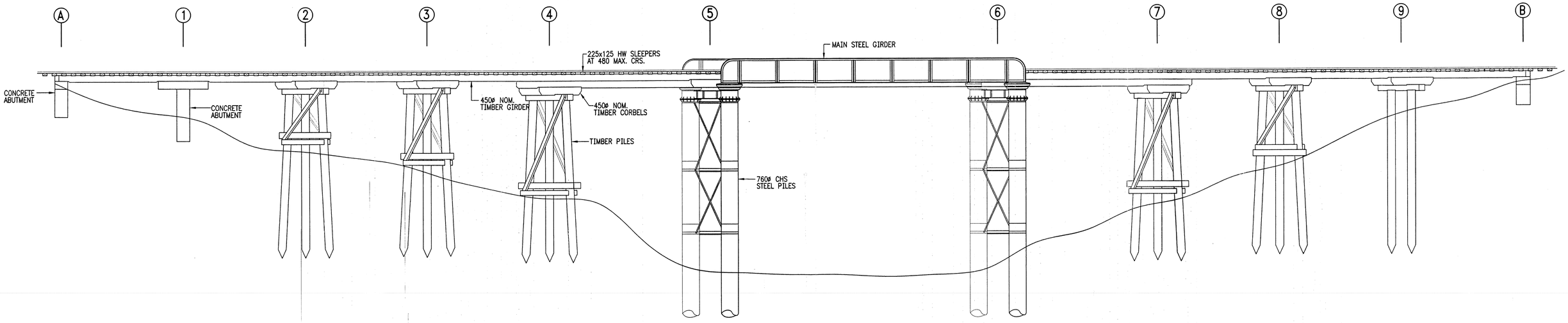
LOCATION
SALTWATER CREEK, BUNDABERG

TITLE
DRAWING INDEX, LOCALITY & STRUCTURAL NOTES

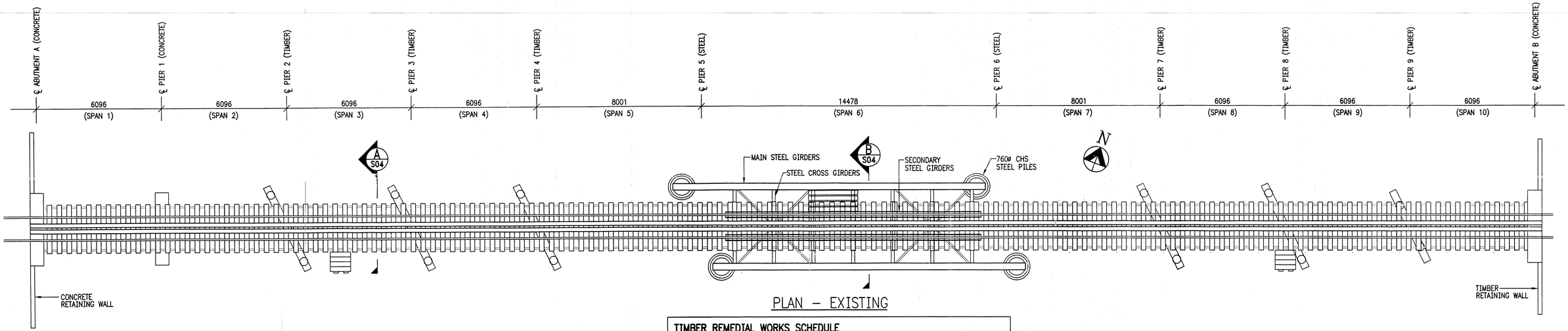
DRAWING NO.
16116-S01

SHEET 1 OF 5

REV.



ELEVATION – EXISTING



PLAN – EXISTING

TIMBER REMEDIAL WORKS SCHEDULE

LOCATION	ELEMENT	REMEDIAL WORKS REQUIRED
ABUTMENT A	ABUTMENT WING WALLS	DEMOLISH & REBUILD (REFER DRAWING NUMBER S05)
PIER 1	CORBEL 1	FIT WITH ANTI SPLITTING METAL BANDS
PIER 1	CORBEL 2	" " "
PIER 1	CORBEL 3	" " "
SPAN 4	GIRDER 2	FIT WITH ANTI SPLITTING METAL BANDS
SPAN 4	GIRDER 3	" " "
SPAN 5	GIRDER 2 (LOWER)	" " "
PIER 5	WALE BRACING	REMOVE BADLY CORRODED WALE BRACING & REPLACE IN NEW (STEELWORK TO BE CORROSION PROTECTED IN ACCORDANCE WITH SERVERE MARINE ENVIRONMENT)
SPAN 7	GIRDER 2 (UPPER)	FIT WITH ANTI SPLITTING METAL BANDS
SPAN 7	GIRDER 2 (LOWER)	" " "
SPAN 9	GIRDER 3	" " "
PIER 9	CORBEL 2	" " "
PIER 9	CORBEL 3	" " "
SPAN 10	GIRDER 1	" " "
SPAN 10	GIRDER 2	" " "
ABUTMENT B	ABUTMENT WING WALLS	DEMOLISH & REBUILD (REFER DRAWING NUMBER S05)
GENERAL	ALL TIMBER ELEMENTS	ALL OLD DRILL HOLES/SPIKE HOLES ETC. TO BE FILLED WITH LANOLIN GREASE & PLUGGED WITH A TIMBER DOWEL. ALL HOLES & CRACKS ARE TO BE CLEANED OF DIRT & DEBRIS AND FILLED WITH LANOLIN GREASE. TIMBER ELEMENTS TO BE TREATED FOR & PROTECTED FROM TERMITE ACTIVITY.

NOTE: REFER TO ROADTEK BRIDGE INSPECTION REPORT DATED 13 MARCH 2007 FOR FURTHER DETAILS.

NOTE

All dimensions, details and levels to be verified prior to ordering or construction
Do not scale off drawing.
Dimensions in millimetres unless shown otherwise.

22885

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REV.	DESCRIPTION	BY	DATE

SCALES
0 1 2 3 4m
1:100 (A1 SIZE)

DRAWN	LRO
CHECKED	
DESIGNED	
APPROVED	
DATE	4/07

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BUNDABERG CITY COUNCIL

PROJECT
PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAIL BRIDGE

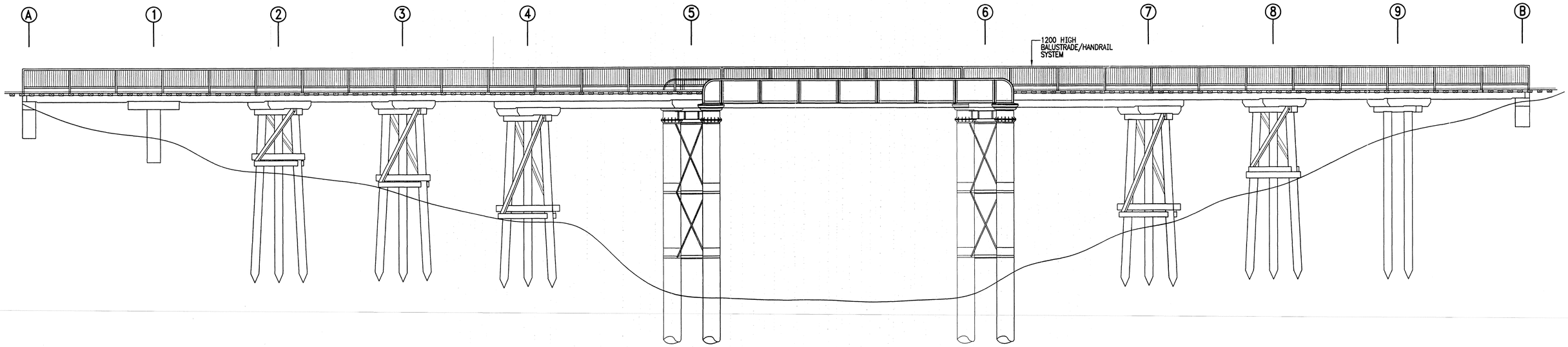
LOCATION
SALTWATER CREEK, BUNDABERG

TITLE
EXISTING STRUCTURE AND REMEDIAL WORKS

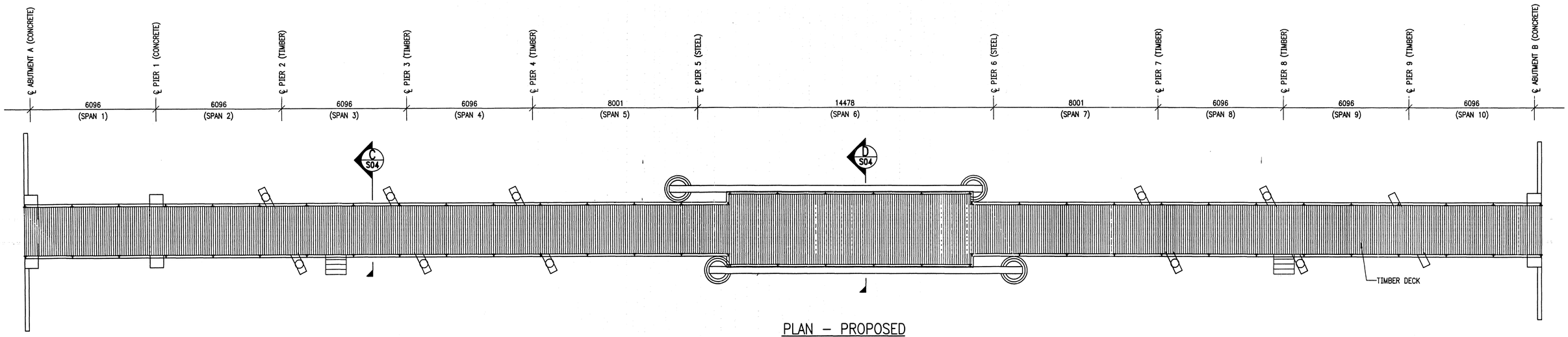
DRAWING NO.
16116-S02

SHEET **2** OF **5**

REV.



ELEVATION – PROPOSED



PLAN – PROPOSED

NOTE
All dimensions, details and levels to be verified prior to ordering or construction
Do not scale off drawing.
Dimensions in millimetres unless shown otherwise.

22886

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REV.	DESCRIPTION	BY	DATE

SCALES
0 1 2 3 4m
1:100 (A1 SIZE)

DRAWN	LRO
CHECKED	CS
DESIGNED	CS
APPROVED	
DATE	4/07

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PROJECT
PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAIL BRIDGE

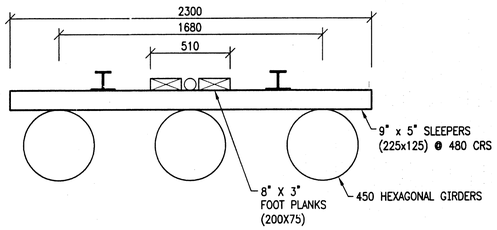
LOCATION
SALTWATER CREEK, BUNDABERG

TITLE
PROPOSED CYCLEWAY/ WALKWAY

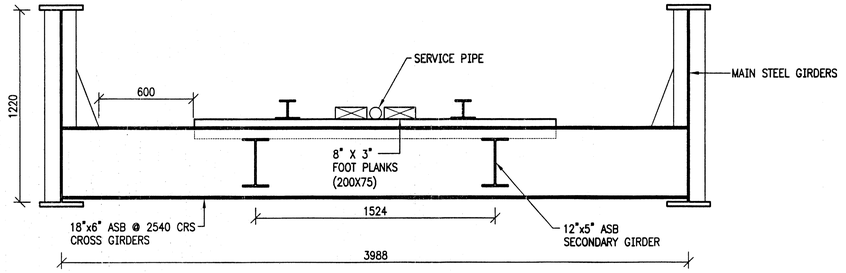
DRAWING NO.
16116-S03

SHEET **3** OF **5**

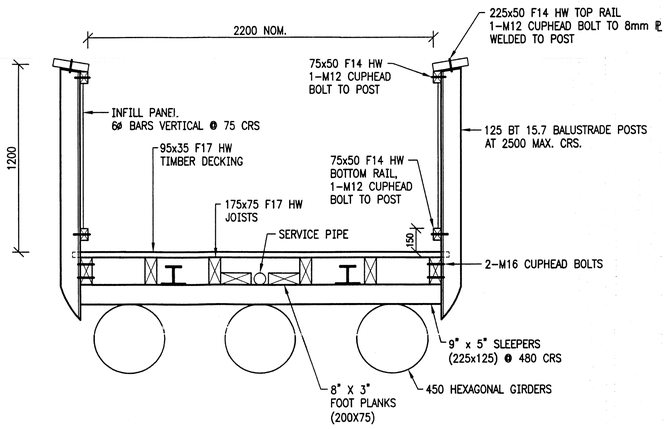
REV.



SECTION A
SCALE 1:20
(EXISTING)
S02



SECTION B
SCALE 1:20
(EXISTING)
S02



SECTION C
SCALE 1:20
(PROPOSED)
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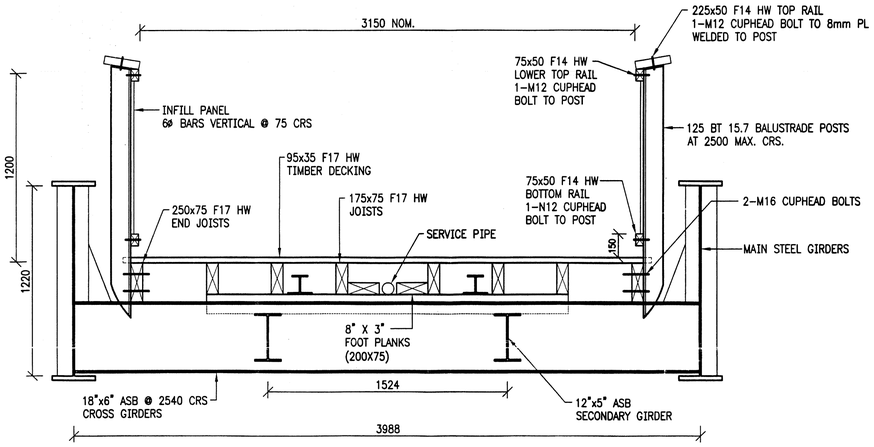
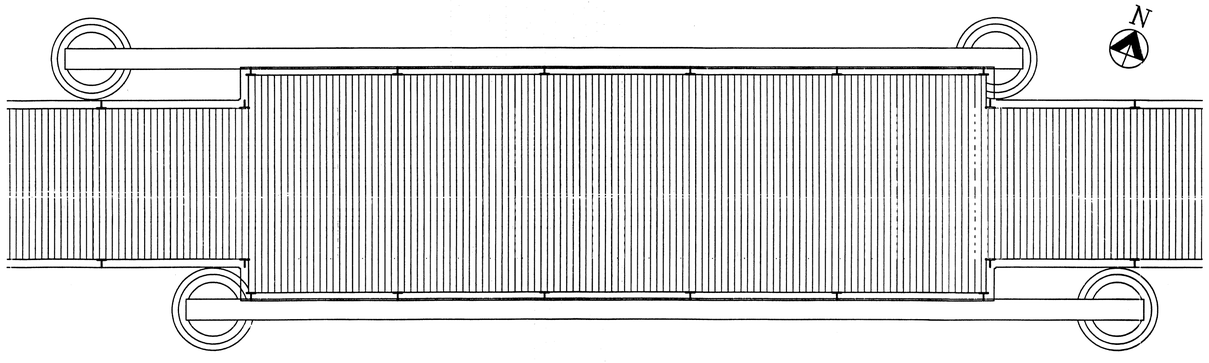


SECTION D
SCALE 1:20
(PROPOSED)
S03



CENTRAL SECTION PLAN VIEW
SCALE 1:50

NOTE
All dimensions, details and levels to be verified prior to ordering or construction
Do not scale off drawing.
Dimensions in millimetres unless shown otherwise.

22887

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REV.	DESCRIPTION	BY	DATE

SCALES
0 400 800mm
1:20 (A1 SIZE)
0 1000 2000mm
1:50 (A1 SIZE)

DRAWN	LRO
CHECKED	GS
DESIGNED	GS
APPROVED	GS
DATE	4/07

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PROJECT
PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAIL BRIDGE

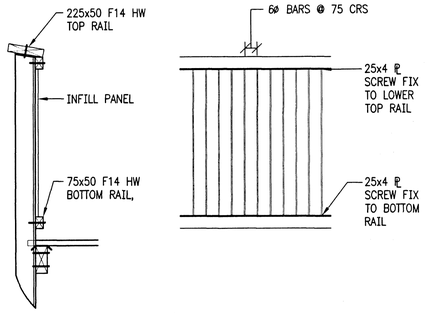
LOCATION
SALTWATER CREEK, BUNDABERG

TITLE
SECTIONS & DETAILS

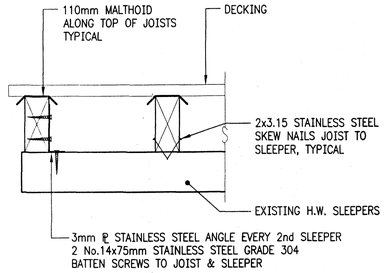
DRAWING NO.
16116-S04

SHEET 4 OF 5

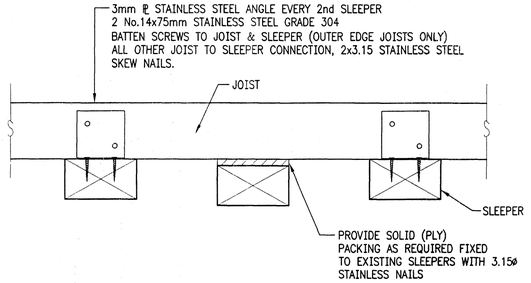
REV.



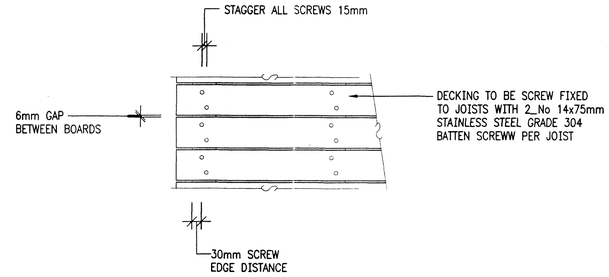
TYPICAL INFILL PANEL DETAIL
SCALE 1:20



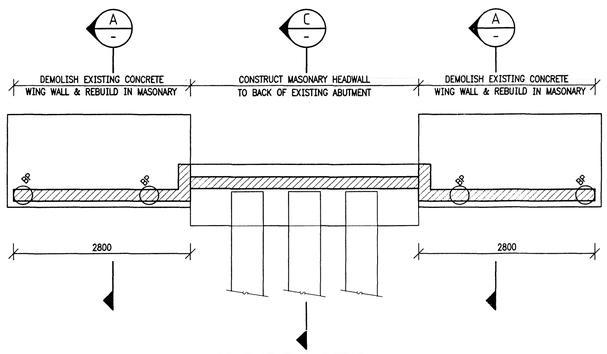
TYPICAL JOIST TO EXISTING SLEEPER DETAIL
SCALE 1:10



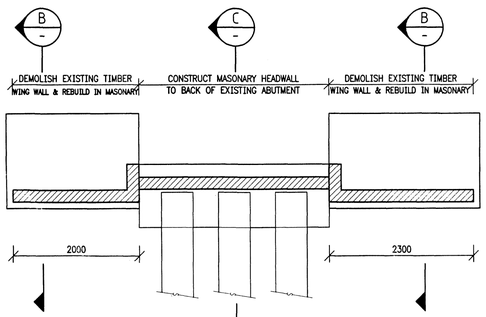
TYPICAL JOIST TO SLEEPER & PACKING DETAIL
SCALE 1:10



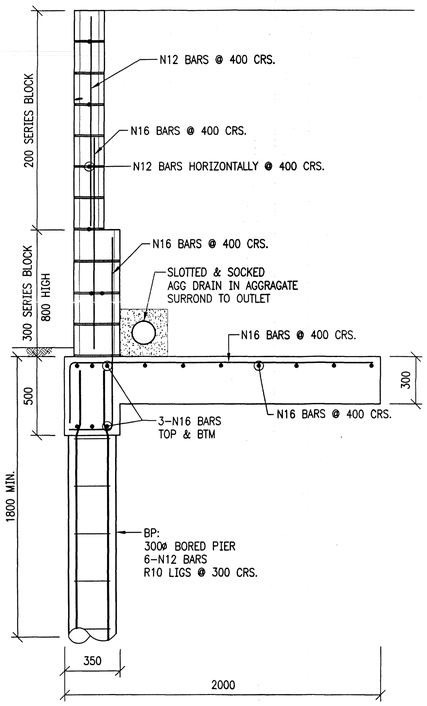
TYPICAL SCREW FIXING DETAIL
SCALE 1:10



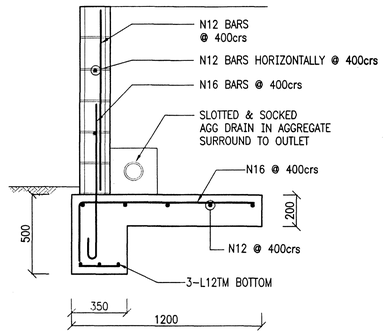
ABUTMENT A DETAIL (PLAN VIEW)
SCALE 1:50



ABUTMENT B DETAIL (PLAN VIEW)
SCALE 1:50



SECTION A
SCALE 1:20



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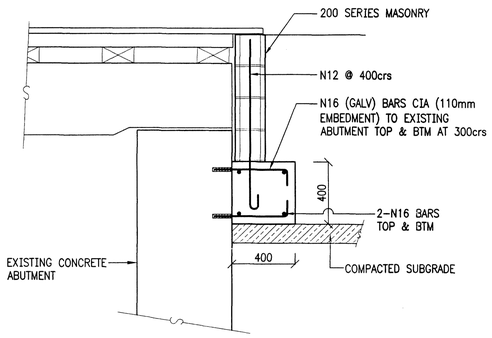
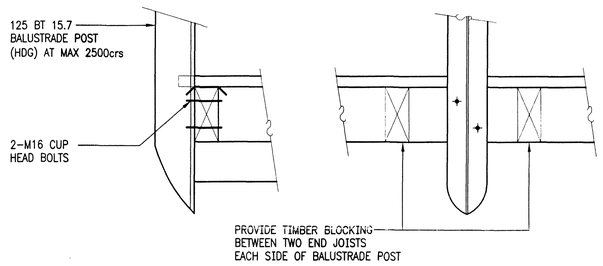
SCALE 1:20



SECTION C
SCALE 1:20



TYPICAL BALUSTRADE POST CONNECTION DETAIL
SCALE 1:10

NOTE
All dimensions, details and levels to be verified prior to ordering or construction
Do not scale off drawing.
Dimensions in millimetres unless shown otherwise.

22888

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REV.	DESCRIPTION	BY	DATE

SCALES
0 400 800mm
1:20 (A1 SIZE) UNO
0 200 400mm
1:10 (A1 SIZE) UNO

DRAWN	LRO
CHECKED	
DESIGNED	
APPROVED	
DATE	4/07

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CLIENT
BUNDABERG CITY COUNCIL

PROJECT
PROPOSED CYCLEWAY/PATHWAY SALTWATER CREEK RAIL BRIDGE

LOCATION
SALTWATER CREEK, BUNDABERG

TITLE
MISCELLANEOUS DETAILS

DRAWING NO.
16116-S05

SHEET **5** OF **5**

REV.

Appendix C: Naming and Numbering Convention

Below is the detailed naming convention that was applied to the structural members that compose the Saltwater Creek Bridge (Bligh Tanner 2020).

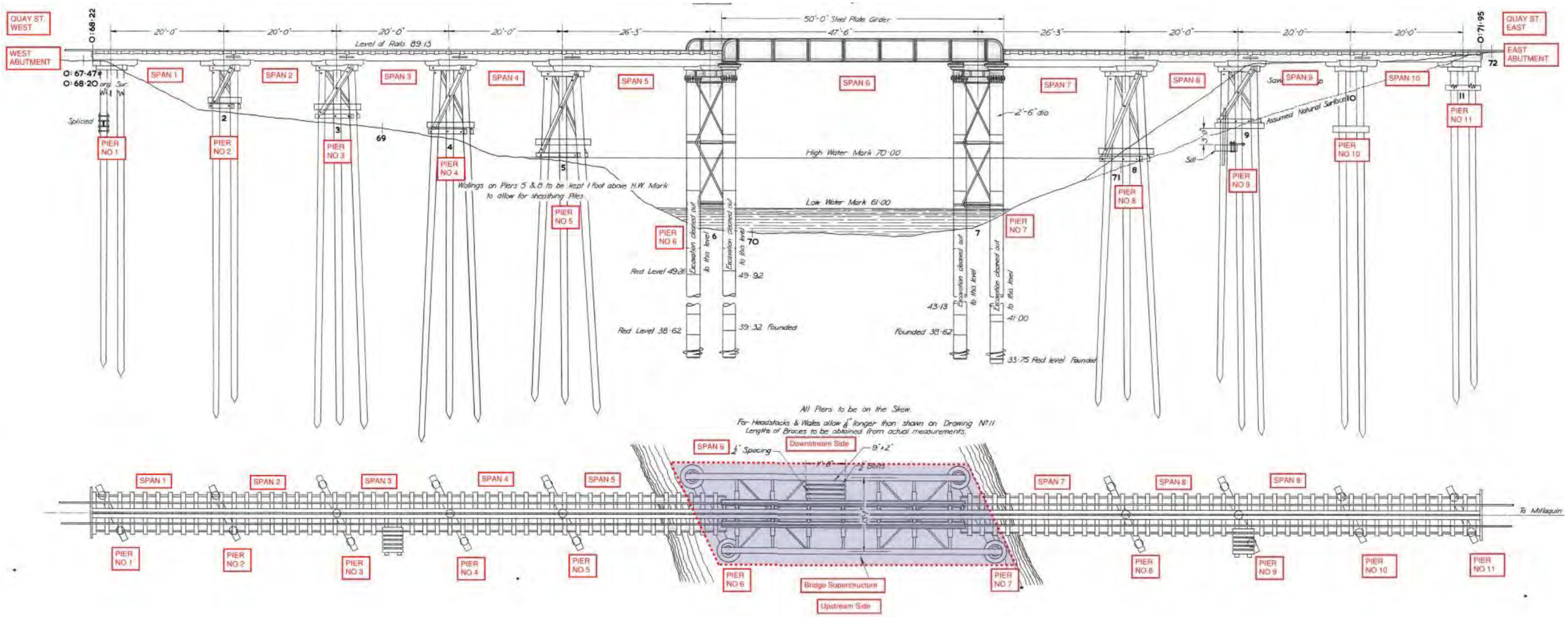


Figure 120: Railway bridge elements names and numbering (Bligh Tanner 2020).

CONVERGE
HERITAGE + COMMUNITY

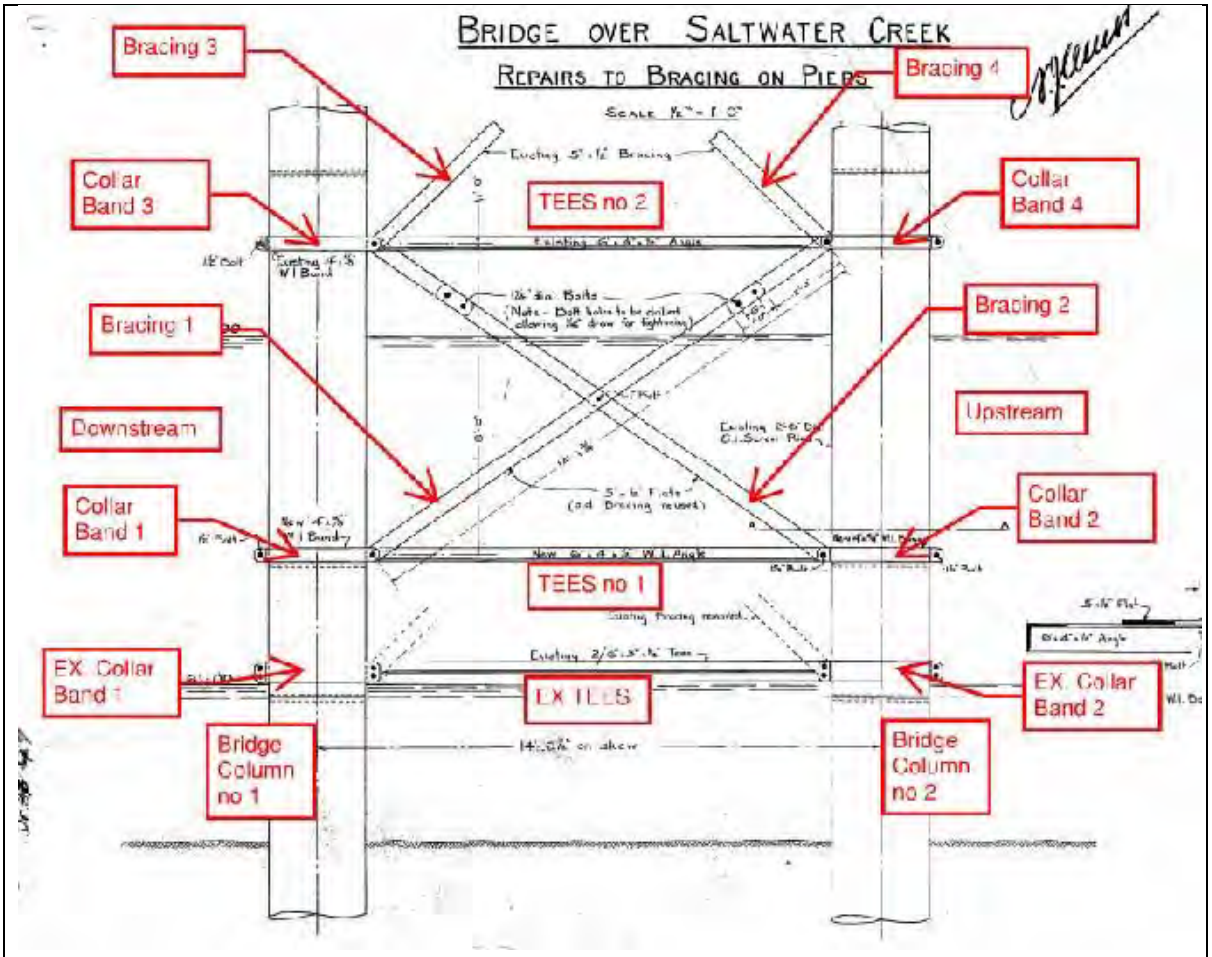


Figure 121: Railway bridge elements names and numbering: Pier 6 and 7 (Bligh Tanner 2020).

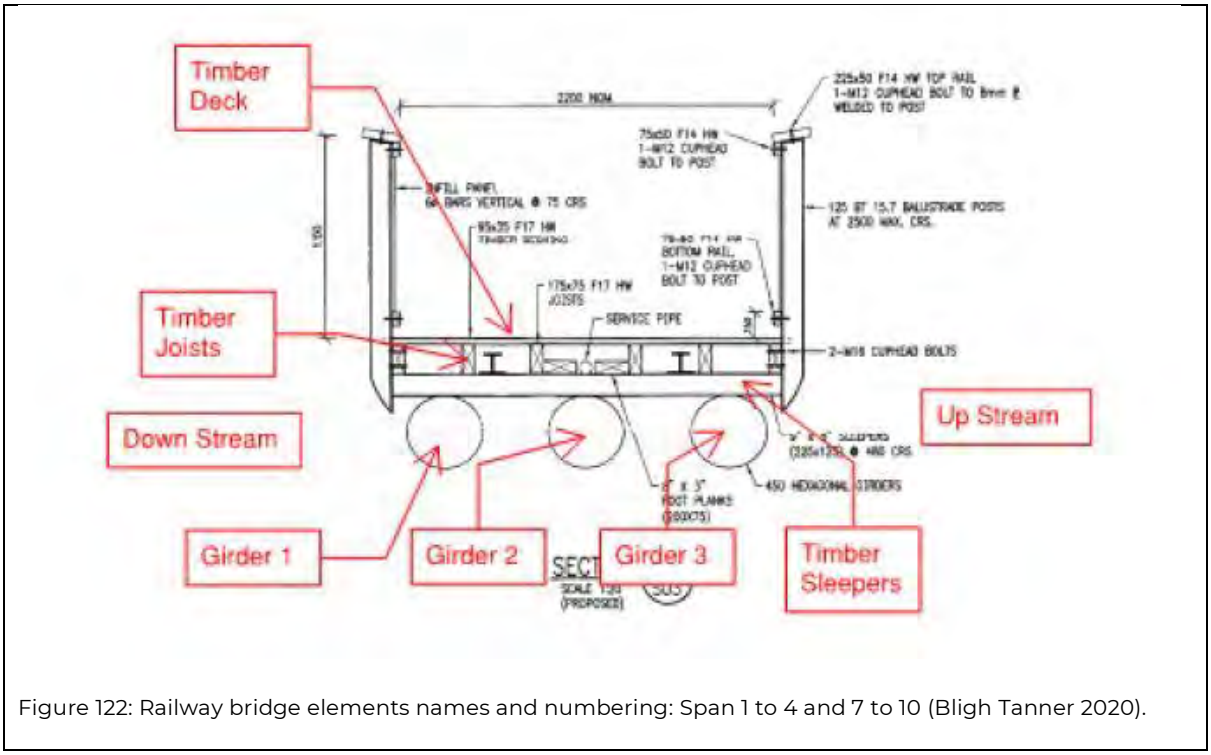


Figure 122: Railway bridge elements names and numbering: Span 1 to 4 and 7 to 10 (Bligh Tanner 2020).

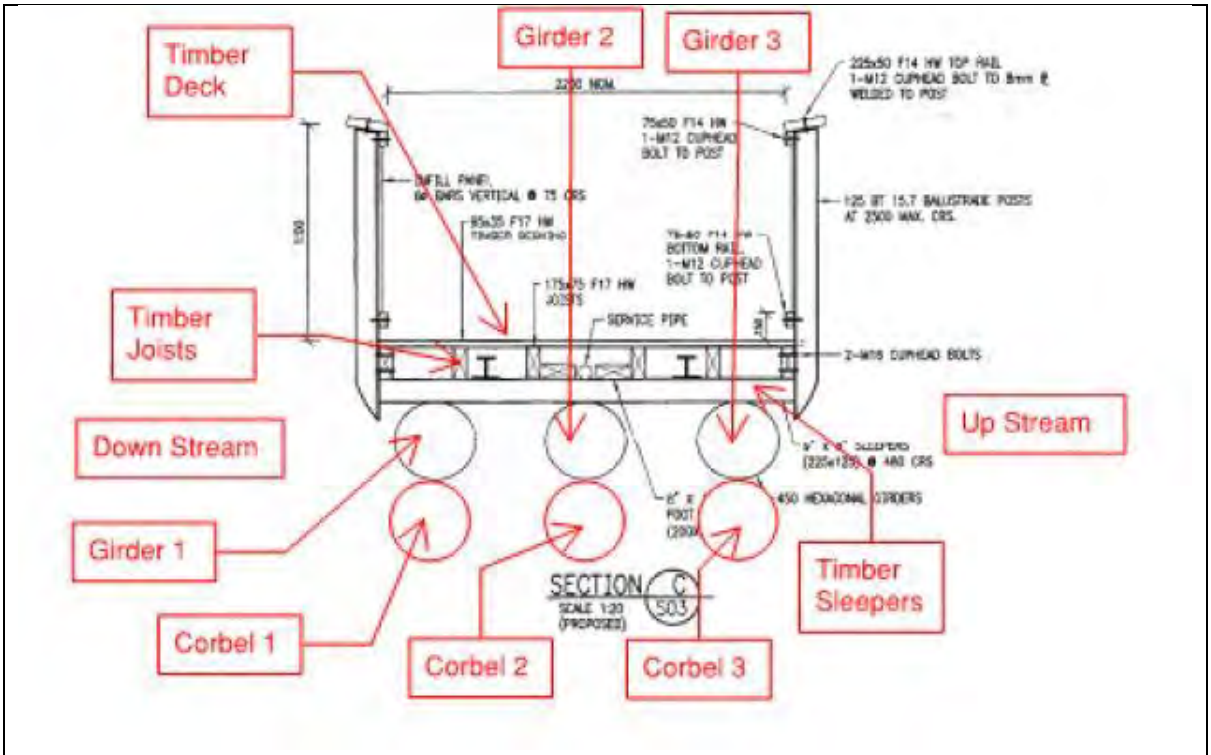


Figure 123: Railway bridge elements names and numbering: Pier 2, 3, 4, 8, 9 and 10 (Bligh Tanner 2020).

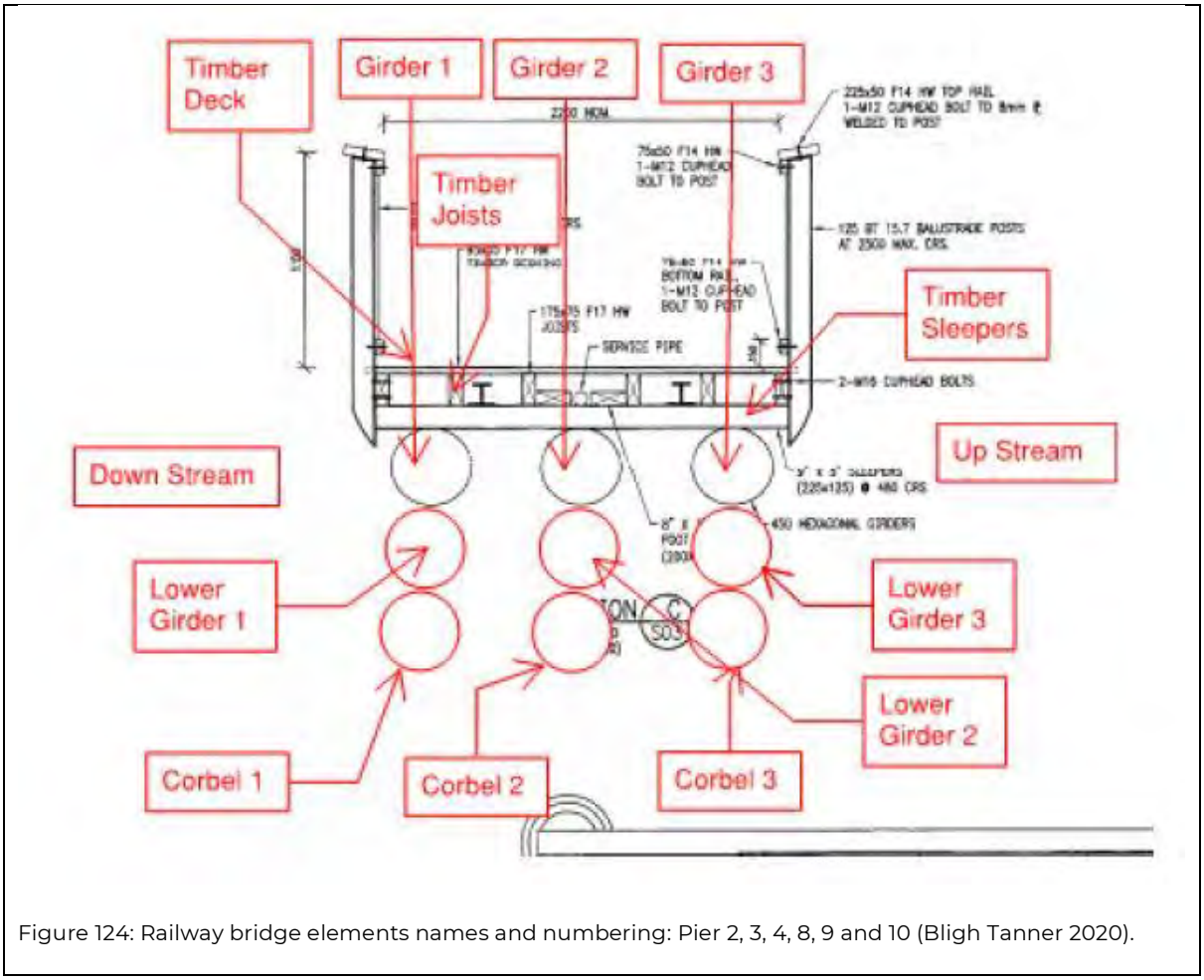


Figure 124: Railway bridge elements names and numbering: Pier 2, 3, 4, 8, 9 and 10 (Bligh Tanner 2020).

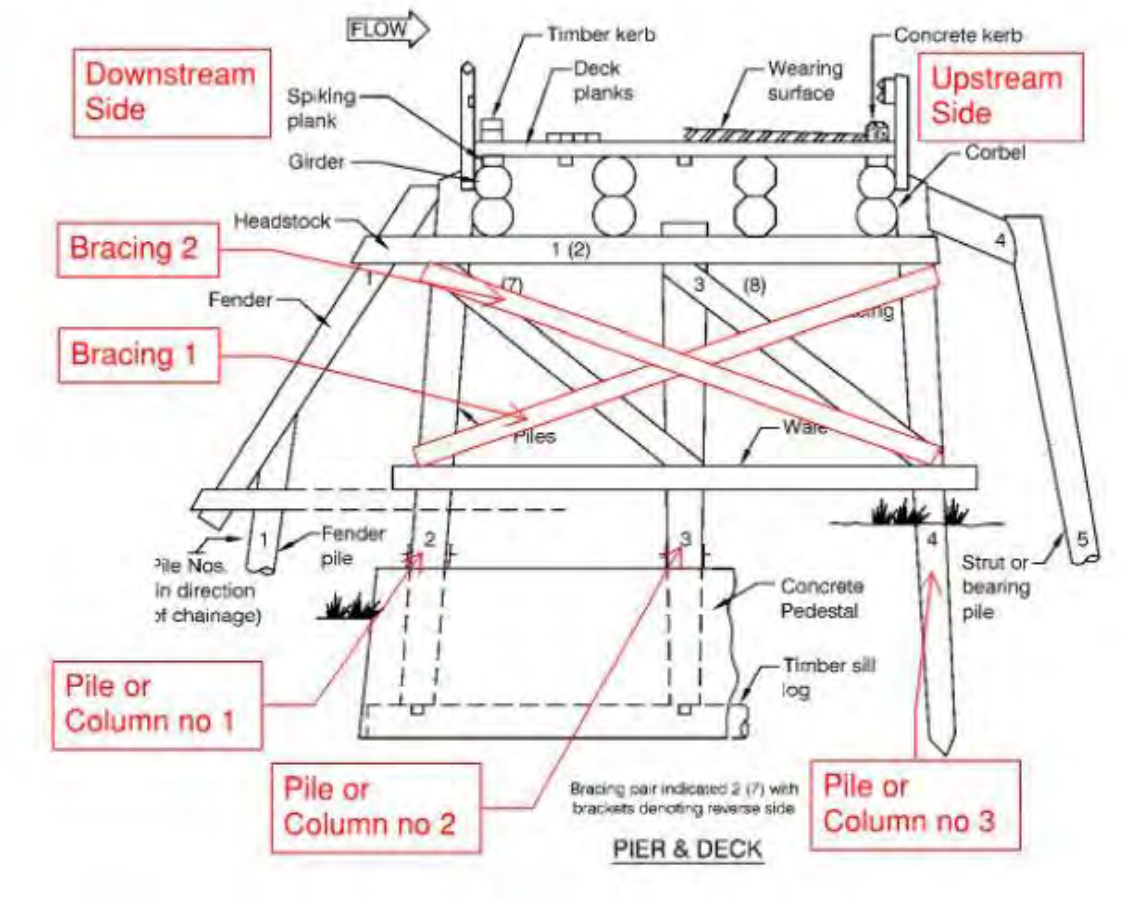


Figure 125: Railway bridge elements names and numbering: Pier and deck (Bligh Tanner 2020).

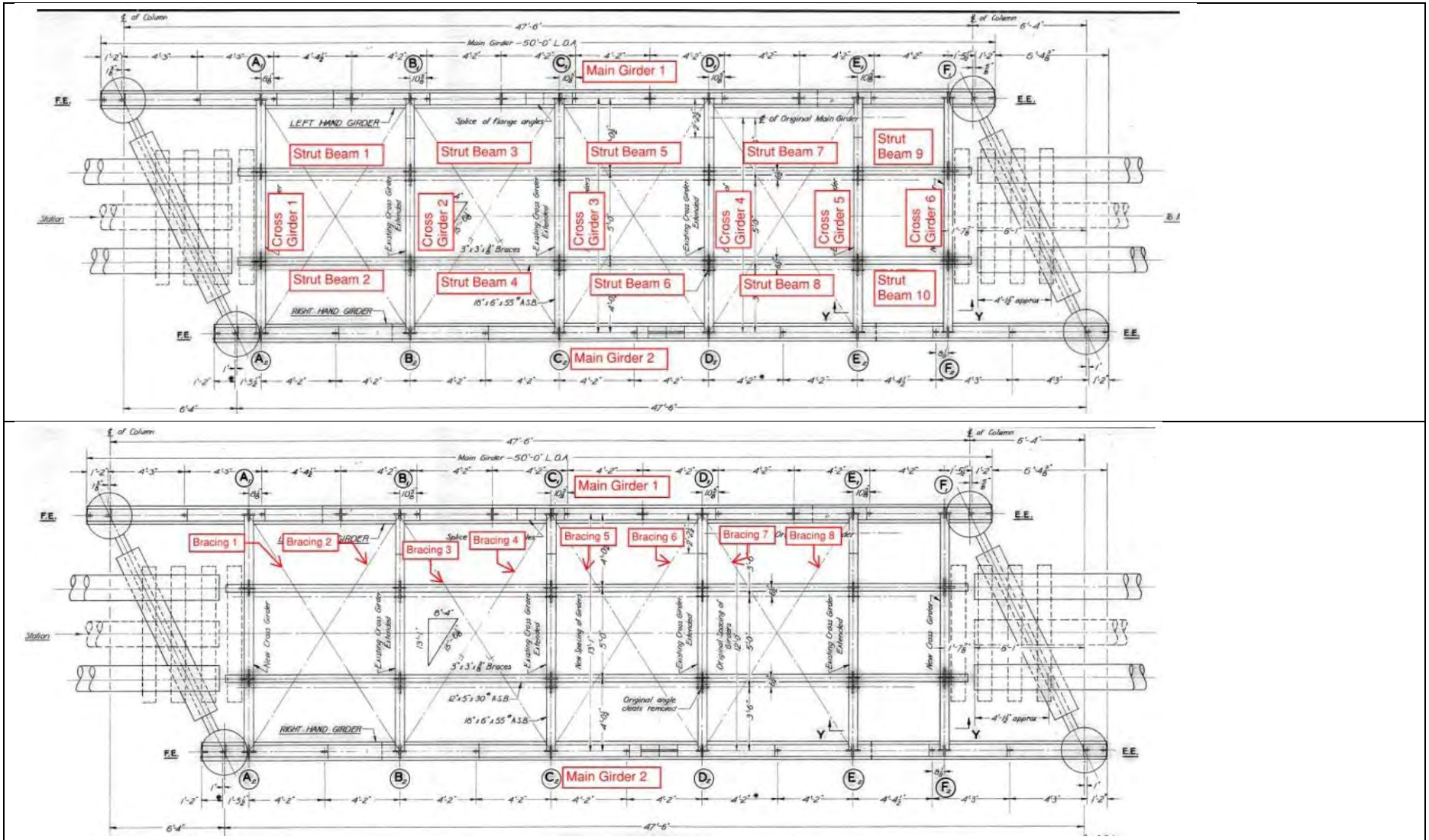


Figure 126: Railway bridge elements names and numbering: Steel superstructure (Bligh Tanner 2020).

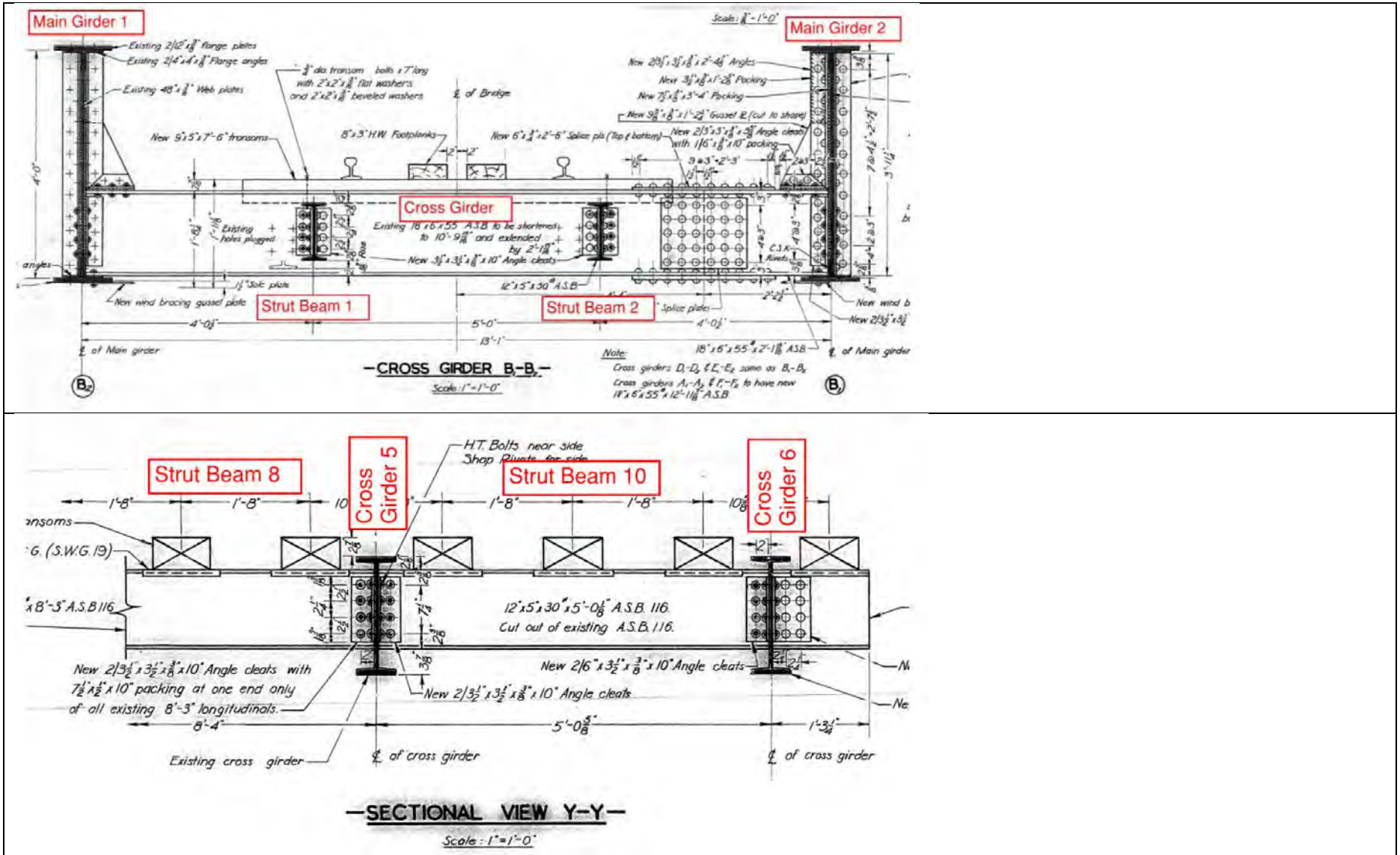


Figure 127: Railway bridge elements names and numbering: Steel superstructure – typical cross-section (Bligh Tanner 2020).

Appendix D: Exemption Certificates including Structural Drawings for the Conservation Works

Queensland Heritage Act 1992

Section 75 Exemption Certificate

Application no:	**202106-14056 EC** ~~202101-11198 EC~~
Date application received:	5 January 2021
Date of decision:	**13 July 2021** ~~2 February 2021~~
Applicant:	Bundaberg Regional Council c/- Stuart Randle, General Manager - Infrastructure ceo@bundaberg.qld.gov.au
QHR place ID:	600370
QHR place name:	Saltwater Creek Railway Bridge
Location:	Quay Street Woongarra Line, BUNDABERG, 4670 – Lot 1 on ROAD0
Approval summary:	This approval SUPERCEDES Exemption Certificate notice number 20211-11198 EC and amendments to the original approval are shown in **bold text**, or ~~strikethrough~~. Development type: Building work - Repair and replacement of timber and steel components of the bridge. • Existing members sizes to be measured and replaced to match existing; • Replacement timbers are to be profiled to match existing and F27 seasoned hardwood or recycled timber; • Replacement steel to be hot dipped galvanised and painted; and • Replacement fixings are to be replaced with grade 8.8 bolts. **The notice allows for replacement of all members of the bridge which are beyond their useful life where the development works aligns with the current methodology and detail as shown in the 'Approved Documents' section of this notice.**

The application for an exemption certificate to carry out the development described above, is approved with conditions under section 75 of the *Queensland Heritage Act 1992*.

This exemption certificate attaches to the premises. Any person, including the owners, owners' successors in title and occupiers of the premises, may carry out development permitted by this exemption certificate and is bound by the conditions.

This exemption certificate only applies to development substantially started within 4 years of this decision.

Terms and phrases used in this document are defined principally in the *Queensland Heritage Act 1992,* and in the *Planning Act 2016* and its Regulation.

If more information is required, contact the project manager, Marie-Anne Ammons, **A/Cultural Heritage Coordinator** ~~Principal Heritage Officer~~, on (07) 3330 5026 or via email marieanne.ammons@des.qld.gov.au.

Anthony Simmons
A/Manager ~~Cultural Heritage Coordinator~~, Heritage
Department of Environment and Science
Delegate for the Chief Executive
administering the *Queensland Heritage Act 1992*

Conditions of approval:

No.	Condition	Condition timing
1.	**Scope of development approved** Carry out the development as described in the application received on 5 January 2021 from the applicant Stuart Randle, General Manager – Infrastructure, Bundaberg Regional Council, **email correspondence dated 17 June 2021 to 11 June 2021** and the documents listed in 'Approved documents'. In the case of a discrepancy between application documents and conditions, conditions take precedence. *(Reason - To ensure development is carried out as approved)*	At all times.
2.	**Keep a copy of the approval on site** A copy of this exemption certificate and a copy of any documents that describe the approved development must be retained at the State heritage place. *(Reason – To facilitate the monitoring of development for compliance purposes)*	For the duration of the development.
3.	**Notify start of development** Provide written notice of the start of development to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au. The notice must state: name of State heritage place, application number and condition number 3. *(Reason – To facilitate the monitoring of development for compliance purposes)*	No later than 2 business days prior to the commencement of the development.
4.	**Photograph effect of development** Submit photographs of the area where the development is undertaken, both before and after the development is completed to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au. The submission must state: name of State heritage place, application number and condition number 4. *(Reason – To facilitate the monitoring of development for compliance purposes and to ensure change is adequately recorded)*	Within 10 business days of completion of the development.
5.	**Permit access to the State heritage place** Permit access to the State heritage place by Department of Environment and Science officers if requested. *(Reason – To facilitate the monitoring of development for compliance purposes)*	For the duration of the development.
6.	**Protect the State heritage place from damage** Protect the existing features of the State heritage place from incidental damage and maintain protective measures to ensure the development does not result in damage to, or deterioration of, the State heritage place caused by weather, fire, vandalism, insects or other factors. *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	For the duration of the development.
7.	**Report any damage to the State heritage place that occurs** During development, should damage occur to any features of the State heritage place report such incidents immediately to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au . *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	Immediately, should damage occur.

No.	Condition	Condition timing
8.	**Repainting** Repainting of elements must be colour matched to the existing colour finish or must match the tonal shade. *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	For the duration of the development.
9.	**Replacement Fixings** Damaged rivets and bolts where proposed for replacement, are to match the head type of the existing fixing, eg. domed head rivets are to be matched with cup head bolts and existing hex head fixings are to be matched with hex head bolts. *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	For the duration of the development.
10.	**Reporting** **Where the works includes replacing elements that are not specifically identified in the structural drawings under the 'Approved Documents' section, a report and drawings detailing the additional elements and their location replaced during the works is to be prepared and submitted to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au. The submission must state: name of State heritage place, application number and condition number 10.**	**Within 10 business days of completion of the development.**

Approved documents:

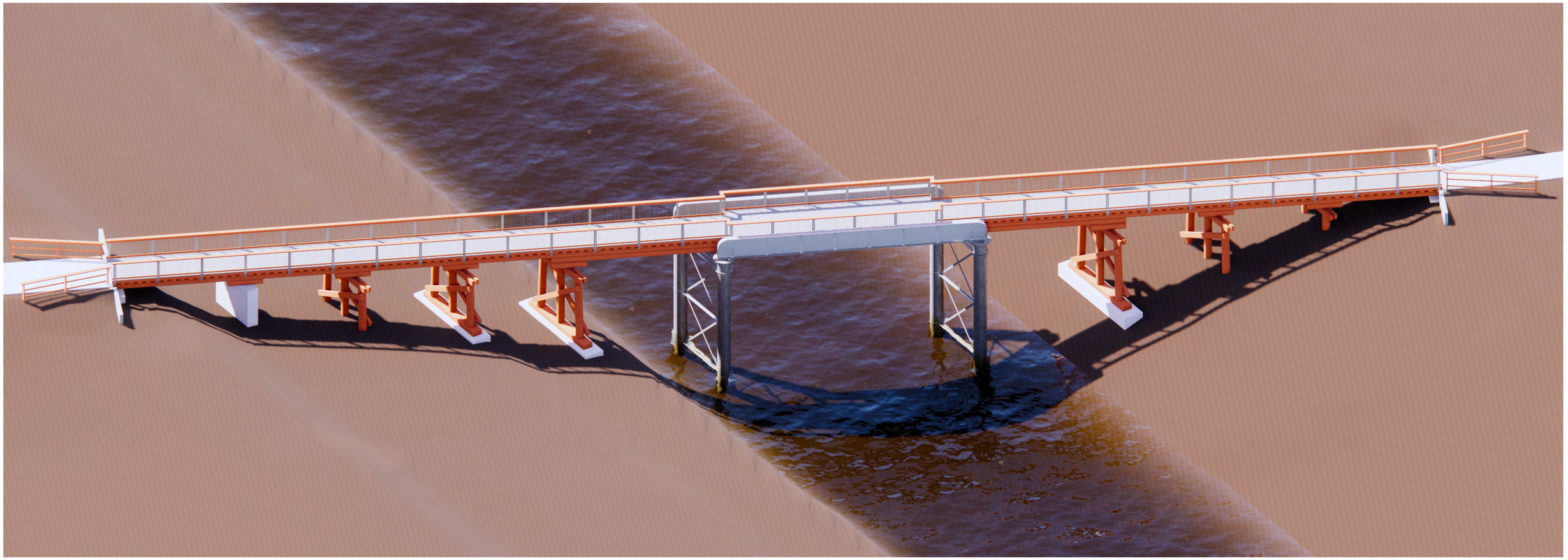
Document no.	Document title	Date
2020.0348 Version 03	Saltwater Creek Railway Bridge – Level 2 Inspection	10/09/2020
S000 Rev P1	Cover Sheet	02/11/2020
S001 Rev P1	Notes Sheet	02/11/2020
S010 Rev P1	Saltwater Creek Bridge Plan and Elevation	02/11/2020
S101 Rev P1	Span 1 Timber Remediation Work Details	02/11/2020
S102 Rev P1	Span 2 Timber Remediation Work Details	02/11/2020
S103 Rev P1	Span 3 Timber Remediation Work Details	02/11/2020
S104 Rev P1	Span 4 Timber Remediation Work Details	02/11/2020
S105 Rev P1	Span 5 Timber Remediation Work Details	02/11/2020
S107 Rev P1	Span 7 Timber Remediation Work Details	02/11/2020
S108 Rev P1	Span 8 Timber Remediation Work Details	02/11/2020
S109 Rev P1	Span 9 Timber Remediation Work Details	02/11/2020
S110 Rev P1	Span 10 Timber Remediation Work Details	02/11/2020
S200 Rev P1	Span 6 Steel Remediation Work Details – Sheet 1	17/12/2020
S201 Rev P1	Span 6 Steel Remediation Work Details – Sheet 2	17/12/2020
S202 Rev P1	Span 6 Steel Remediation Work Details – Sheet 3	17/12/2020
S203 Rev P1	Span 6 Steel Remediation Work Details – Sheet 4	17/12/2020

Document no.	Document title	Date
-	**Email Correspondence dated 17 June 2021 to 11 June 2021 – authors Rhiess Honor, Marie-Anne Ammons and Simon Kochanek**	**17/06/2021** **16/06/2021** **11/06/2021**

Take Notice: This certificate does not exempt the applicant from the need to obtain such other approvals as may be required under other legislation.

SALTWATER CREEK RAIL BRIDGE CONSERVATION

SALTWATER CREEK, BUNDABERG



STRUCTURAL DRAWING LIST

DRAWING No.	DRAWING NAME	REV
S000	COVER SHEET	P1
S001	NOTES SHEET	P1
S010	SALTWATER CREEK BRIDGE PLAN AND ELEVATION	P1
S101	SPAN 1 TIMBER REMEDIATION WORK DETAILS	P1
S102	SPAN 2 TIMBER REMEDIATION WORK DETAILS	P1
S103	SPAN 3 TIMBER REMEDIATION WORK DETAILS	P1
S104	SPAN 4 TIMBER REMEDIATION WORK DETAILS	P1
S105	SPAN 5 TIMBER REMEDIATION WORK DETAILS	P1
S107	SPAN 7 TIMBER REMEDIATION WORK DETAILS	P1
S108	SPAN 8 TIMBER REMEDIATION WORK DETAILS	P1
S109	SPAN 9 TIMBER REMEDIATION WORK DETAILS	P1
S110	SPAN 10 TIMBER REMEDIATION WORK DETAILS	P1

NOT FOR CONSTRUCTION

BLIGH TANNER

LEVEL 9, 269 WICKHAM STREET, PO BOX 612
FORTITUDE VALLEY QLD 4006 AUSTRALIA
T 07 3251 8555 F 07 3251 8599

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: COVER SHEET	SCALES: AT A1	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S000	REVISION: P1

PRINT THIS DRAWING IN COLOUR

STRUCTURAL NOTES

GENERAL

G1. THE BUILDER SHALL BE RESPONSIBLE FOR MAINTAINING STABILITY OF THE STRUCTURE UNTIL COMPLETION OF CONSTRUCTION AND SHALL ENSURE THAT NO PART OF THE STRUCTURE IS OVER STRESSED BY EXCESSIVE CONSTRUCTION LOADING.

G2. TEMPORARY WORKS ARE THE RESPONSIBILITY OF THE CONTRACTOR, THESE INCLUDE SUCH ITEMS AS PROPPING, TEMPORARY SHORING & RETENTION, MAINTAINING TEMPORARY STABILITY OF THE STRUCTURE, FORMWORK, CRANE BASE, TEMPORARY WORKING PLATFORMS, FACADE RETENTION SYSTEMS AND GROUND IMPROVEMENT TO SUPPORT CONSTRUCTION PLANT.
THE DESIGN OF ALL TEMPORARY WORKS WILL BE UNDERTAKEN BY A RPEQ TEMPORARY WORKS ENGINEER APPOINTED BY THE CONTRACTOR.

G3. STRUCTURAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL & OTHER CONSULTANTS DRAWINGS & SPECIFICATIONS.

G4. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE FOLLOWING CODES EXCEPT WHERE VARIED BY THE SPECIFICATION AND / OR DRAWINGS.

AS.1720	TIMBER STRUCTURES
AS.2159	PILING CODE
AS.3600	CONCRETE STRUCTURES
AS.3610	FORMWORK FOR CONCRETE
AS.3700	MASONRY STRUCTURES
AS.4100	STEEL STRUCTURES
AS.2269	STRUCTURAL PLYWOOD
NATIONAL CONSTRUCTION CODE OF AUSTRALIA	

G5. DIMENSIONS NOT TO BE SCALED.
SET OUT DIMENSIONS ARE TO BE VERIFIED WITH ARCHITECT.

G6. ALL PROPRIETARY PRODUCTS NOT DEEMED TO COMPLY WITH BCA SHALL HAVE THIRD PARTY CERTIFICATION, WITH RELEVANT TESTING AND SIGN-OFF BY AN RPEQ ENGINEER.
PROPRIETARY PRODUCTS INCLUDES PRE-FABRICATED TRUSSES, LIGHT GAUGE STEEL FRAMING TO INTERNAL OR EXTERNAL WALLS, CEILINGS, BULKHEADS, ROOFS AND WALL BATTENS, FLOORING PRODUCTS, RECYCLED TIMBER AND PLASTICS, BALUSTRADES, SCREENS JOINERY, PARTITIONS & OPERABLE WALLS.

G7. ALL FABRICATION SHOP DRAWINGS TO BE PREPARED AND SUBMITTED TO BLIGH TANNER FOR REVIEW & COMMENT IN ELECTRONIC AND HARDCOPY A4 OR A3 FORMAT. ALLOW FIVE WORKING DAYS FOR REVIEW PRIOR TO COMMENCEMENT OF FABRICATION.

G8. ANY 3D IMAGERY IS FOR VISUALISATION PURPOSES ONLY AND DOES NOT CONSTITUTE PART OF THE CONTRACT DOCUMENTATION. REFER TO DRAWINGS FOR ALL ENGINEERING DETAIL WHERE STRUCTURAL ELEMENTS ARE DESIGNED AND CERTIFIED BY OTHER PARTIES, THE

G9. CONTRACTOR SHALL OBTAIN WRITTEN CERTIFICATION PRIOR TO PROCEEDING WITH ANY CONSTRUCTION WHICH MAY PREVENT INSPECTION OR REMEDIAL WORKS BEING UNDER TAKEN TO THESE ITEMS.

G10. COMPLETE TERMITE INSPECTION AND TREATMENT OF ENTIRE BRIDGE WORK TO BE COMPLETED BY PROFESSIONAL LICENSED TERMITE TREATMENT CONTRACTOR. IMPLEMENT TERMITE MANAGEMENT PLAN AS ADVISED.

ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
B or BTM	BOTTOM FACE	MIN	MINIMUM
CENT	CENTRALLY PLACED	NF	NEAR FACE
CFW	CONTINUOUS FILLET WELD	NLB	NON LOAD BEARING
CL	CENTRE LINE	NOM	NOMINAL
CPBW	COMPLETE PENETRATION BUTT WELD	NSOP	NOT SHOWN ON PLAN
		NSOE	NOT SHOWN ON ELEVATION
CRS	CENTRES	NTS	NOT TO SCALE
C/W	COMES WITH	(o)	OVER
d	DEPTH/DEEP	OPP	OPPOSITE
DRG	DRAWING	PL	PLATE
EF	EACH FACE	PT	POST TENSION
EQ	EQUAL	REQ'D	REQUIRED
EW	EACH WAY	REINF	REINFORCEMENT
FF	FAR FACE	SDL	SUPERIMPOSED DEAD LOAD
FL	FLAT	SIM	SIMILAR
GA	GENERAL ARRANGEMENT	T	TOP FACE
h	HEIGHT/HIGH	T&B	TOP & BOTTOM
HORIZ	HORIZONTAL	THRU	THROUGH
HWD	HARDWOOD	TYP	TYPICAL
KD	KILN DRIED	(u)	UNDER
LG	LENGTH/LONG	UNO	UNLESS NOTED OTHERWISE
LL	LIVE LOAD	VERT	VERTICAL
MAX	MAXIMUM	w	WIDTH/WIDE

ANCHOR NOTES

A1. ALL ANCHORS MUST COMPLY WITH AS 5216:2018. THE CONTRACTOR IS TO PROPOSE A COMPLIANT ALTERNATIVE AND SUBMIT TO THE ENGINEER FOR APPROVAL WITH RELEVANT TEST DATA.

A2. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND USING THE TOOLS WHICH ARE INDICATED IN THE PRODUCT'S TEST REPORT.

A3. CHEMICAL ANCHOR UNO.

	ANCHOR SIZE	MIN EDGE (mm)	MIN SPACING (mm)	TYPICAL EMBEDMENT (mm)
CONCRETE	M12	80	80	110
	M16	100	100	125
	M20	120	120	170
	M24	150	150	210
SOLID CONCRETE MASONRY	M12	80	80	110
	M16	100	100	125
	M20	120	120	170
HOLLOW CONCRETE MASONRY OR CLAY MASONRY	M12	100	100	80

	HILTI	RAMSET
CONCRETE	HILTI HIT HY200-R C/W HAS-U 5.8 STUD	CHEMSET 801 EXTREM XC² C/W GRADE 5.8 ANCHOR STUD
SOLID CONCRETE MASONRY	HILTI HIT HY 200-R MAX C/W HAS-U 5.8 STUD	CHEMSET 801 EXTREM XC² C/W GRADE 5.8 ANCHOR STUD
HOLLOW CONCRETE MASONRY OR CLAY MASONRY	HILTI HIT HY 170 C/W HAS-U 5.8 STUD. PROPRIETARY SLEEVE INTO HOLLOW	INJECTION 101 C/W GRADE 5.8 ANCHOR STUD. PROPRIETARY SLEEVE INTO HOLLOW

A4.

MECHANICAL ANCHORS UNO.	HILTI	RAMSET
STANDARD - CONCRETE	HST-3	RAMSET TRUBOLT EXTREM
HEAVY DUTY - CONCRETE	HSL-3	RAMSET SPATEC EXTREM

A5. ALL ANCHORS TO SLAB SOFFITS SHALL BE MECHANICAL ANCHORS WITH LOCTITE U.N.O.

A6. COATINGS AND CORROSION PROTECTION OF ANCHORS AND ANCHOR STUDS TO BE AS PER STEELWORK NOTES AND ANCHOR MANUFACTURER'S SPECIFICATION.

A7. ALL ANCHOR HOLES MUST BE HAMMER DRILLED.

A8. DUST REDUCING DRILLING SYSTEM TO BE USED FOR DRILLING OF HOLES.

A9. 5% OF ALL ANCHORS TO BE LOAD TESTED. IN THE EVENT OF A FAILED TEST 100% OF ALL ANCHORS ARE TO BE TESTED.

A10 ALL EPOXIES USED TO FIX REINFORCEMENT TO EXISTING SLABS SHALL BE 'CHEMSET REO 502 PLUS' OR 'HILTI HIT-RE500 V3' AND MUST BE COMPLIANT WITH AS3600.

STEELWORK

S1. STEELWORK GRADES (UNLESS NOTED OTHERWISE) TO BE :

HOT ROLLED SECTIONS	GRADE 300
RHS AND SHS	GRADE 350
CHS	GRADE 250
RODS AND PLATES	GRADE 250
COLD FORMED SECTION	GRADE 450

WHERE SIZE SPECIFIED IS ONLY AVAILABLE IN A HIGHER GRADE, THE HIGHER GRADE SECTION IS TO BE USED.

S2. PROVIDE BEAM CAMBER AS NOTED.

S3. ENDS OF HOLLOW SECTIONS TO BE CAPPED WITH WELDED NOMINAL THICKNESS PLATE, PROVIDE VENT HOLES IN LENGTHS TO BE HOT DIP GALVANISED.

S4. UNLESS NOTED OTHERWISE :
-PLATES, CLEATS, ETC. TO BE 10mm
-PURLIN CLEATS
< 300 HIGH TO BE 8 PLATE
< 600 HIGH TO BE 65x65x5 EA
-NUTS, BOLTS, WASHERS ETC.

GENERAL	HOT DIPPED GALVANISED
SALT AIR	STAINLESS STEEL

-BOLTS
MINIMUM 2 No. BOLTS FOR STEEL TO STEEL CONNECTIONS UNO
M16 8.8/S FOR SECTION DEPTH <250mm
M20 8.8/S FOR SECTION DEPTH =>250mm
-FOR OVERSIZED OR SLOTTED HOLES PROVIDE PLATE WASHERS IN ACCORDANCE CL.14.3.5.2 OF AS4100 TO COMPLETELY COVER HOLE PLUS 0.5 TIMES HOLE DIAMETER
-WELDS SHALL BE 6mm SP CONTINUOUS FILLET WELD UNO:
SP DENOTES STRUCTURAL PURPOSE IN ACCORDANCE WITH AS.1554.
WELDING CONSUMABLES TO HAVE A NOMINAL TENSILE STRENGTH (fuw) OF 490 MPa.
GP DENOTES GENERAL PURPOSE IN ACCORDANCE WITH AS.1554. WELDING CONSUMABLES TO HAVE A NOMINAL TENSILE STRENGTH (fuw) OF 490 MPa.

S5. CORROSION PROTECTION TO BE

INTERNAL	ABRASIVE BLAST AS1627.4 CLASS 2.5 HIGH BUILD ZP PRIMER TO 75 µm DRY FILM THICKNESS
EXTERNAL	HDG600 HOT DIPPED GALVANISED TO AS/NZS 4680. ALL ELEMENTS IN CONTACT WITH CONCRETE TO BE PASSIVATED.
COLD FORMED	Z 350 GALVANISED

S6. CONCRETE ENCASED, FIRE SPRAYED AND FRICTION BOLTED CONNECTIONS SHALL NOT BE PAINTED.

S7. BOLT HOLES SHALL NOT BE ENLARGED DURING ERECTION.

S8. STEELWORK EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANISED. DAMAGED GALVANISING IS TO BE REPAIRED WITH HIGH ORGANIC ZINC CONTENT EPOXY TREATMENT WATTYL GALVIT OR SIMILAR.

S9. PROVIDE ALL MISCELLANEOUS STEELWORK TO SUPPORT NON STRUCTURAL ELEMENTS.

S10. ALL BOLTS, NUTS AND WASHERS ARE TO BE GRADE 8.8 STRUCTURAL STEEL UNLESS NOTED OTHERWISE AND COMPLY FULLY WITH AS1252:1996 ALL FOUNDATION BOLTS , NUTS AND WASHERS ARE TO BE GRADE 4.6 UNLESS OTHERWISE NOTED. BOLT LENGTHS TO BE SCHEDULED TO ENSURE THAT A MINIMUM OF TWO THREADS EXTEND PAST THE NUT.

S11. AS1252:1996 COMPLIANCE CERTIFICATES ARE TO BE PROVIDED TO THE SUPERINTENDENT FOR ALL STRUCTURAL STEEL BOLTS.

S12. ALL STRUCTURAL STEEL HOT ROLLED BARS AND SECTIONS MUST CONFORM WITH AS/NZS3679.1 : 2010 : "STRUCTURAL STEEL HOT ROLLED BARS AND SECTIONS". ALL STRUCTURAL STEEL WELDED SECTIONS MUST CONFORM WITH AS/NZS3679.2 : 2010 : "STRUCTURAL STEEL - WELDED I SECTIONS", ALL STRUCTURAL STEEL HOLLOW SECTIONS MUST CONFORM WITH AS/NZS1163 : 2009 : "COLD FORMED STEEL HOLLOW SECTIONS".

S13. THE STRUCTURAL STEEL FABRICATOR IS TO PROVIDE TO THE SUPERINTENDENT, AUSTRALIAN STANDARD COMPLIANCE CERTIFICATES FOR ALL STRUCTURAL STEELWORK PRIOR TO COMMENCING FABRICATION.

S14. OVERSEAS SOURCED STRUCTURAL STEEL IS NOT PERMITTED UNLESS THE STRUCTURAL STEEL MATERIAL SUPPLIER IS CERTIFIED BY ACRS (AUSTRALIAN STANDARDS CERTIFICATION & VERIFICATION OF REINFORCING, PRESTRESSING & STRUCTURAL STEELS) FOR THE SUPPLY OF STRUCTURAL STEEL. CURRENT ACRS CERTIFICATES ARE TO BE SUBMITTED TO BLIGH TANNER. REFER www.steelcertification.com FOR CURRENT CERTIFICATE HOLDERS.

S15. PROVIDE TA8525G GALVANISED TEXTOR ANGLE TRIMMERS TO SUPPORT SHEETING TO ALL HIPS, VALLEYS, GABLES, CORNERS AND THE LIKE. SCREW FIX / WELD AS REQUIRED.

S16. PROVIDE TA8525G GALVANISED TEXTOR ANGLE TO FACE OF SHS,RHS,UB & UC MEMBERS FOR ROOF SHEETING FIXING WHERE REQUIRED

S17. ALL NON-SHRINK GROUT TO BE 30mm THICK 40 MPa U.N.O.

S18. ALL STRUCTURAL STEELWORK SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AS/NZS 5131. ALL WORK ON THIS PROJECT SHALL BE UNDERTAKEN BY COMPETENT PERSONNEL. REQUIREMENTS AND EXAMPLES OF QUALIFICATIONS FOR COMPETENT PERSONNEL ARE CONTAINED IN AS/NZS 5131.

S19. IN ACCORDANCE WITH THE REQUIREMENTS OF AS/NZS 5131 THE CONSTRUCTION CATEGORIES FOR THIS PROJECT ARE DEFINED IN THE TABLE BELOW.

	ELEMENT	IMPORTANCE LEVEL	SERVICE CATEGORY	FABRICATION CATEGORY	CONSTRUCTION CATEGORY
1.	ALL STRUCTURAL STEEL WORK UNO	IL2	SC1	FC1	CC2

STEEL WELDING NOTES

W1. SITE WELDS SHALL ONLY BE USED AT LOCATIONS SPECIFIED IN DRAWINGS.

W2. OTHER THAN ANY SITE WELDS SPECIFIED IN DRAWINGS; DO NOT WELD ON SITE WITHOUT PRIOR APPROVAL FROM THE SUPERINTENDENT, WHEREVER POSSIBLE, LOCATE SITE WELDS IN POSITIONS FOR DOWN HAND WELDING.

W3. ALL WELDING SHALL COMPLY WITH AS 1554 AND AS 4100

W4. ALL WELDS ARE TO BE CATEGORY GP U.N.O. IN ACCORDANCE WITH AS 1554, MINIMUM NOMINAL TENSILE STRENGTH OF WELD METAL TO BE fuw= 490 MPa AND ALL BUTT WELDS SHALL BE FULL STRENGTH COMPLETE PENETRATION BUTT WELD UNLESS NOTED OTHERWISE.

W5. ALL SITE WELDS ARE TO BE PREPPED AND COATED AS PER STEELWORK NOTES AND ARCHITECTURAL SPECIFICATIONS.

W6. WELDING INSPECTIONS SHALL BE PERFORMED BY AN INDEPENDENT NATA APPROVED TESTING AUTHORITY AT THE CONTRACTORS EXPENSE. DEFAULT TESTING SHALL BE AS FOLLOWS:

NON-DESTRUCTIVE WELD EXAMINATION SCHEDULE				
WELD TYPE	VISUAL SCANNING	VISUAL EXAMINATION	MAGNETIC PARTICLE OR LIQUID PENETRANT	ULTRASONIC OR RADIOGRAPHY
GP FILLET WELD	100%	10%	2%	NIL
SP FILLET WELD	100%	*25%	10%	10%
BUTT WELDS IN TRUSSES, BRACES OR PORTALS	100%	100%	100%	10%
BUTT WELDS IN OTHER MEMBERS	100%	*50%	10%	2%
SITE BUTT WELDS	100%	100%	N/A	100%

* IF DEFECTS ARE FOUND IN THESE THEN 100% OF WELDS ARE TO BE TESTED.

W7. ALL WELD TESTING SHALL BE IN ACCORDANCE WITH AS/NZS 1554.1

W8. BEFORE COMMENCING FABRICATION SUBMIT DETAILS OF PROPOSED WELDING PROCEDURES USING THE FORM IN APPENDIX C OF AS 1554.1 DO NOT COMMENCE FABRICATION UNTIL WELDING PROCEDURES HAVE BEEN ACCEPTED.

W9. WELDING SHALL BE CARRIED OUT UNDER THE IMMEDIATE AND CONTINUOUS SUPERVISION OF A SUPERVISOR EMPLOYED BY THE FABRICATOR. THIS PERSON SHALL HAVE QUALIFICATIONS AS DESCRIBED IN AS 1554 SECTION 4.12.1 AND THESE QUALIFICATIONS SHALL BE SUBMITTED TO THE SUPERINTENDENT UPON REQUEST.

W10. WELDING SHALL BE PERFORMED OUT ONLY BY WELDERS WITH QUALIFICATIONS AS DESCRIBED IN AS 1554 SECTION 4.12.2

W11. ALL BUTT WELDS, EXCEPT WHEN PRODUCED WITH THE AID OF BACKING MATERIAL, SHALL HAVE THE ROOT OR INITIAL LAYER GOUGED OR CHIPPED OUT ON THE BACK SIDE BEFORE WELDING IS STARTED FROM THAT SIDE. BUTT WELD MADE WITH THE USE OF A BACKING STRIP SHALL HAVE THE WELD METAL FUSED WITH THE BACKING STRIP. ENDS OF BUTTS SHALL HAVE THE START AND STOP ZONES REMOVED BY THE USE OF RUN ON AND RUN OFF PLATES. SUCH PLATES SHALL BE REMOVED AFTER USE.

TIMBER

T1. ALL TIMBER FRAMING TO BE MIN. H3 TREATED. H5 FOR IN-GROUND OR IN CONTACT WITH GROUND.

T2. EXPOSED FRAMING
(EXPOSED FRAMING REFERS TO ALL TIMBER FRAMING THAT MAY BE SUBJECT TO PERIODIC WETTING)
- ALL EXPOSED FRAMING TO BE EITHER H3 PRESSURE TREATED OR DURABILITY CLASS 1 (MINIMUM) SAWN TIMBER (U.N.O.)
- FRAMING MEMBERS EXPOSED TO MOISTURE (JOISTS, BEARERS, ETC.) ARE TO BE MALTHOID CAPPED AND PENETRATING NAILS SHOULD BE CONSTRUCTED TO LIMIT MOISTURE PENETRATION ALONG NAIL SHANK.
- MANUFACTURED TIMBER PRODUCTS, IF SPECIFIED, ARE TO BE MINIMUM H3 TREATED AND PROTECTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION (EG HYNE TECH DATA SHEETS 6 AND 8). USE A HIGH QUALITY EXTERIOR PAINT FINISH TO EXPOSED SURFACES.

T3. ALL FASTENERS TO BE HOT DIPPED GALVANISED. EXTERNAL ANCHORS WHERE SUBJECT TO SALT AIR TO BE STAINLESS STEEL.
- NAILS TO BE 2.8 mm DIA. x 30 mm LONG.
- SCREWS TO BE No.14 TYPE 17 WITH 50mm EMBEDMENT (U.N.O.)
- ALL JOIST HANGERS, FRAMING ANCHORS AND TRIPLE GRIPS TO BE MANUFACTURED BY PRYDA OR EQUIVALENT. FULLY NAILED - 4 NAILS MINIMUM. INSTALL PER MANUFACTURERS SPECIFICATION.

T4. WASHERS TO TIMBER TO BE:
M12 BOLTS 55 SQ. X 3 THK
M16 BOLTS 65 SQ. X 5 THK

T5. ALL BOLTS ARE TO BE HEX HEAD BOLTS WITH CORRECT SIZED WASHERS. DO NOT USE CUPHEAD BOLTS.

T6. BOLTS TO BE INSTALLED INTO PRE-DRILLED HOLES OF DIAMETER NOT EXCEEDING 10% OF BOLT DIAMETER.

T7. COACH SCREWS SHALL BE SCREWED INTO PRE-DRILLED HOLES AND NOT HAMMERED.

T8. PRE-DRILLED HOLES FOR THE SHANK SHALL NOT BE LESS THAN THE SHANK DIAMETER AND SHALL NOT EXCEED IT BY MORE THAN 1mm.

T9. PRE-DRILLED HOLES FOR THE THREADED PORTION SHALL NOT EXCEED THE ROOT DIAMETER OF THE SCREW.

T10. FIXINGS SHALL BE INSTALLED TO THE DIMENSIONS SHOWN IN DETAILS. IN ANY CASE, ALL FIXINGS SHALL BE INSTALLED WITHIN MINIMUM EDGE DISTANCES, END DISTANCES AND SPACINGS AS PER AS1720.1 (TYPICALLY 4d, 5d AND 5d RESPECTIVELY) U.N.O.

T11. TIMBER BEARERS AND JOISTS WITH D / B >= 4
- PROVIDE BLOCKING OVER SUPPORTS AT 1800 MAX. CRS IN ACCORDANCE WITH AS1684.
- FOR JOISTS WITH SPAN > 3000 AND BOTTOM OF JOIST UNRESTRAINED BY CEILING DIAPHRAGM;
  - PROVIDE 1 ROW OF BLOCKING BETWEEN EACH JOIST AT MIDSPAN FOR SPANS < 4200.
  - PROVIDE 2 ROWS OF BLOCKING BETWEEN EACH JOIST AT MIDSPAN FOR SPANS > 4200.

HERITAGE TIMBER SPECIFICATIONS

HS1 CN EMULSION TO BE APPLIED IN A CONTINUOUS LIBERAL COATING BETWEEN THE INTERFACE OF ALL TIMBER TO TIMBER CONNECTIONS AND JUNCTIONS. INCLUDING THE INTERFACE BETWEEN ALL REPLACED TIMBER JOISTS AND DECKING AND BEARER TO JOIST INTERFACES.

HS2 ALL HARDWOOD AS SPECIFIED IS TO BE SEASONED RECYCLED TIMBER, DURABILITY CLASS 1 OR 2, AND JOINT GROUP J2 MINIMUM.
APPROVED SPECIES INCLUDE GREY IRONBARK, RED IRON BARK, TALLOW WOOD, TURPENTINE, SPOTTED GUM.
EXCLUDING EXTERNAL NEW TIMBER DECK WHICH IS PERMITTED TO BE SUPPLIED AS UNSEASONED.

HS3 HARDWOOD IS NOT PERMITTED TO CONTAIN HEARTWOOD.

HS4 ALL TIMBER FASTENERS ARE TO BE STRICTLY INSTALLED IN ACCORDANCE WITH THE STRUCTURAL DOCUMENTATION.

HS5 EXPOSED TIMBER TO BE SUPPLIED AS F22 GRADE TIMBER. ALL OTHER HARDWOOD TO BE MIN. F17.HARDWOOD.

HS6 RECYCLED TIMBER TO BE GRADED TO 'SMALL END SECTION, RECYCLED GRADE 1 (RG1)' IN ACCORDANCE WITH 'INTERIM INDUSTRY STANDARD RECYCLED TIMBER = VISUALLY STRESS GRADED RECYCLED TIMBER FOR STRUCTURAL PURPOSES - 2008'.

HS7 TIMBER WITH LYCTUS SUSCEPTIBLE SAPWOOD IS NOT PERMITTED.

HS8 UNSEASONED TIMBER IS NOT PERMITTED.

HS9 ALL SAP WOOD IS TO BE H3 TREATED.

HS10 ALL NEW AND REPLACED TIMBER DECKING IS TO BE LAID WITH 2mm GAPS.

HS11 THE BUILDER IS REQUIRED TO BRING TO THE ATTENTION OF BLIGH TANNER CONSULTING ENGINEERS ANY EXISTING TIMBER MEMBERS WITHIN THE STRUCTURE WHICH ARE IDENTIFIED TO BE IN A SIGNIFICANT STATE OF DETERIORATION THAT HAVE NOT ALREADY BEEN IDENTIFIED FOR REPLACEMENT. IN PARTICULAR, ANY TIMBER MEMBER WHERE ONE OR FACES HAS BEEN PREVIOUSLY CONCEALED.

HS12 OVERCUTS AT NOTCHES ARE NOT PERMITTED.

HS13 NOTCHES TO GIRDERS ARE TO BE TAPERED AT 1 IN 4.

HS14 ALL NEW TIMBER THAT INSTALLED WITHIN THE BUILDING IS TO BE DATE STAMPED WITH MIN. 10MM HIGH NUMERALS STATING [2018].

HS15 SURFACE FINISH TO HARDWOOD TO BE TO AS2796.1 TABLE B1.

HS16 VISUAL GRADING OF SOFTWOOD TO BE IN ACCORDANCE WITH AS2858 – 2008.

HS17 VISUAL GRADING OF HARDWOOD TO BE IN ACCORDANCE WITH AS2082 – 2007.

HS18 ALL NEW HOLES FOR BOLTS IN TIMBER ARE TO BE DRILLED TIGHT.

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BLIGH TANNER
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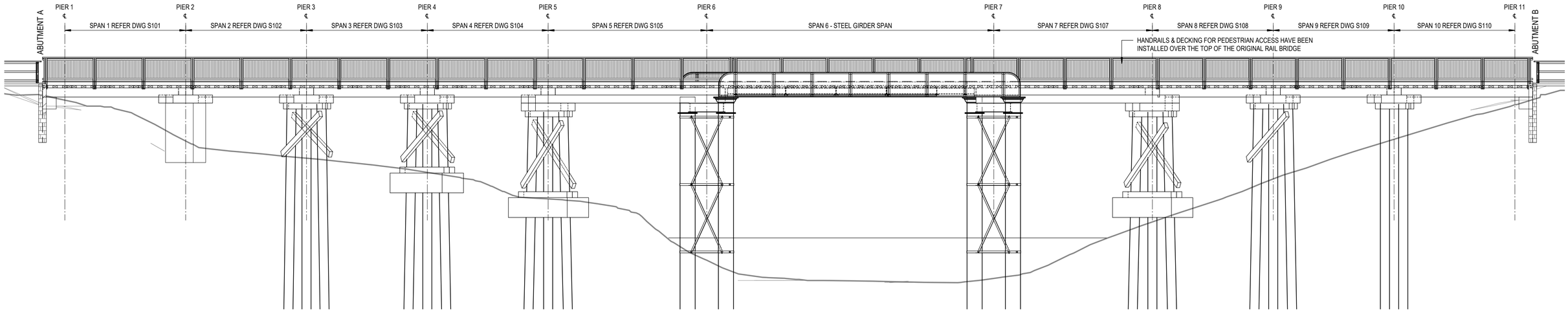
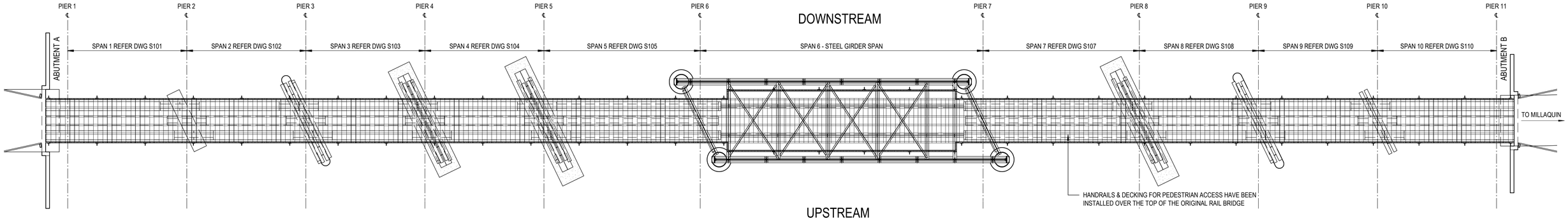
REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION
DRAWING TITLE: NOTES SHEET
SCALES: AT A1
PRINT THIS DRAWING IN COLOUR
LOCATION: SALTWATER CREEK, BUNDABERG
HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY
JOB NO: 2020.0348
CLIENT: BUNDABERG REGIONAL COUNCIL
ASSOCIATE CONSULTANT:
DRAWING NUMBER: S001
REVISION: P1



SALTWATER CREEK RAIL BRIDGE ELEVATION

SCALE 1 : 100



DOWNSTREAM

UPSTREAM

SALTWATER CREEK RAIL BRIDGE PLAN

SCALE 1 : 100

NOT FOR CONSTRUCTION

1m 0 1000 2000 3000 4000
1 :100

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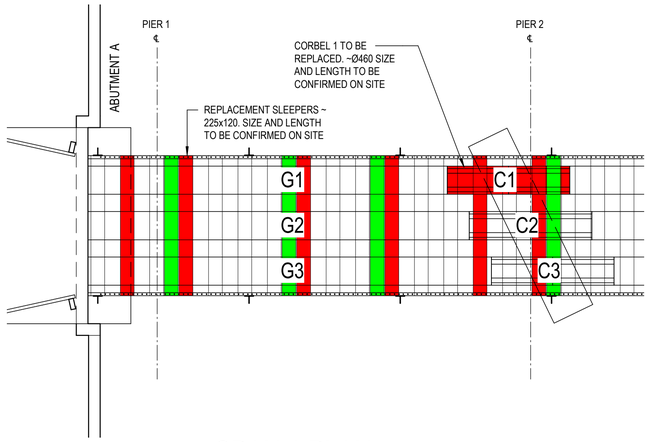
PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SALTWATER CREEK BRIDGE PLAN AND ELEVATION	SCALES: 1 : 100 AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S010	REVISION: P1



SPAN 1 PLAN

SCALE 1 : 50

NOTE

1. EXISTING SLEEPERS AND HIGHLIGHTED REPLACEMENTS OF SLEEPERS SHOWN INDICATIVELY FOR COSTING PURPOSES. ENSURE EACH SLEEPER IS ASSESSED ON SITE AND REPLACED AS REQUIRED.

LEGEND

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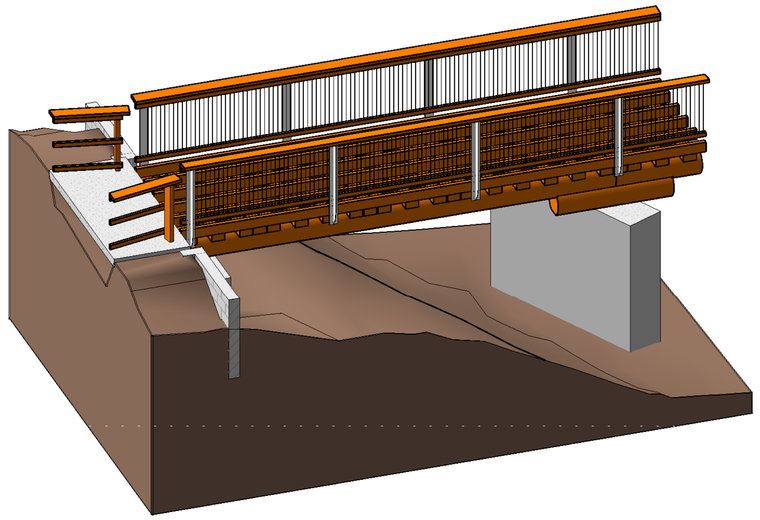
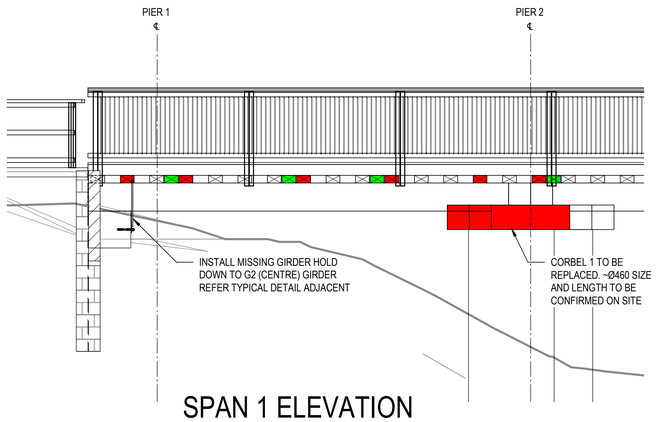
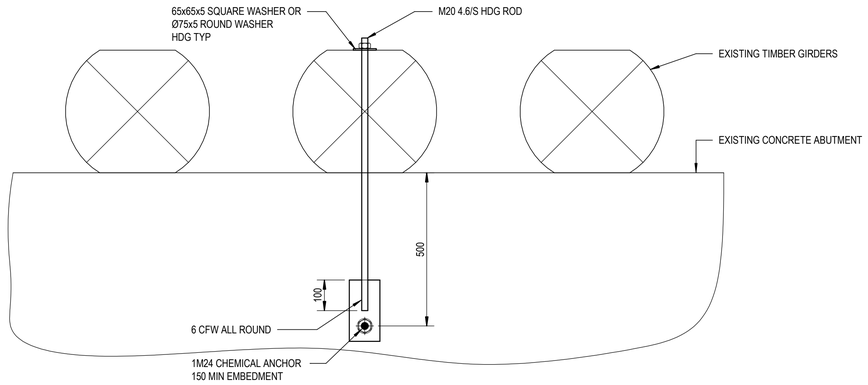


SPAN 1 3D PERSPECTIVE VIEW



SPAN 1 ELEVATION

SCALE 1 : 50



TYPICAL GIRDER HOLD DOWN DETAIL

SCALE 1 : 10

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER

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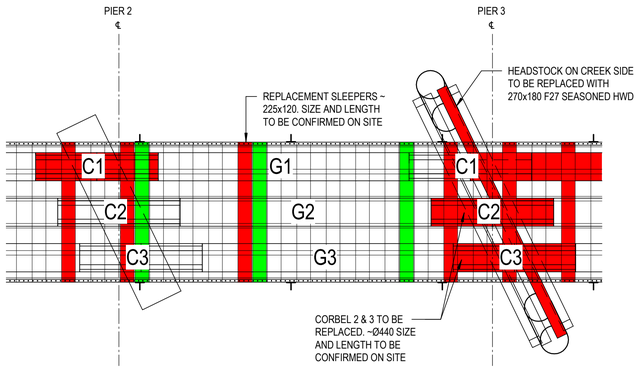
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 1 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S101 REVISION: P1



SPAN 2 PLAN

SCALE 1 : 50

NOTE

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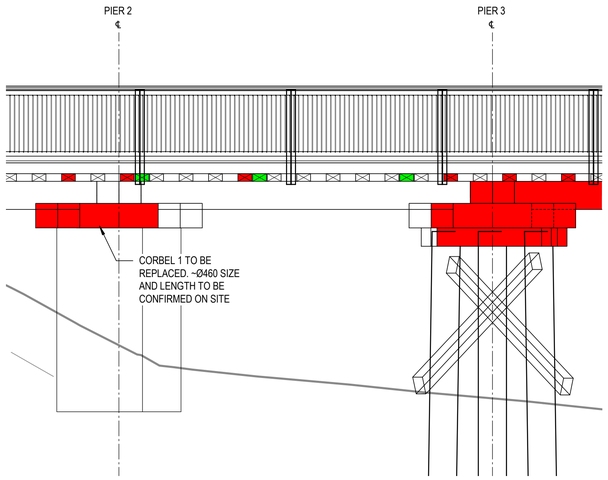
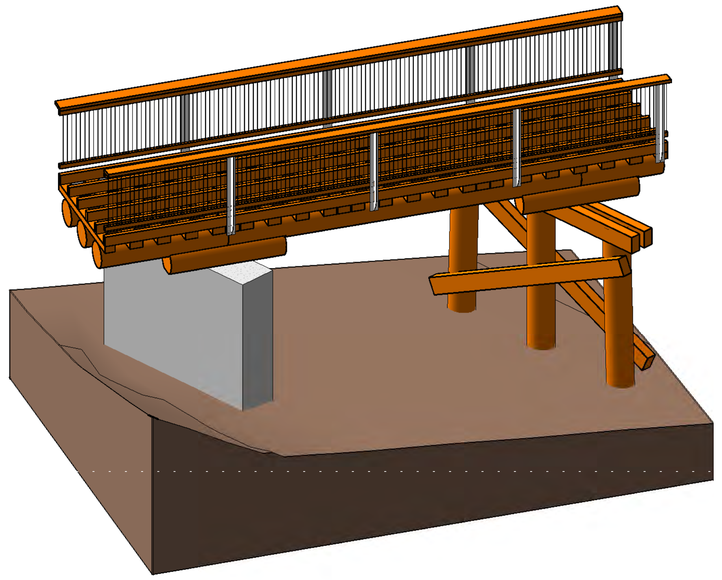


SPAN 2 ELEVATION

SCALE 1 : 50



SPAN 2 3D PERSPECTIVE VIEW

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER

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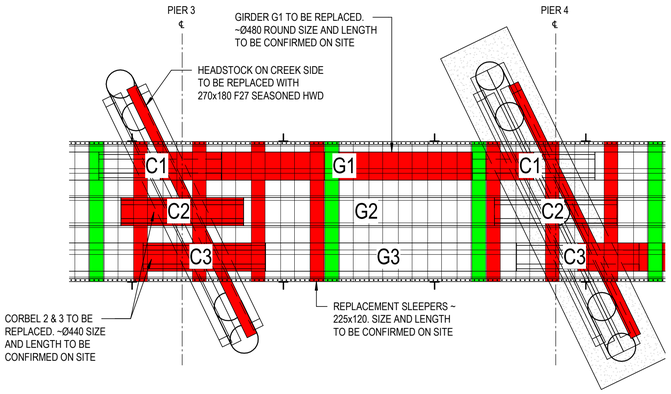
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 2 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S102 REVISION: P1



SPAN 3 PLAN

SCALE 1 : 50

NOTE

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LEGEND

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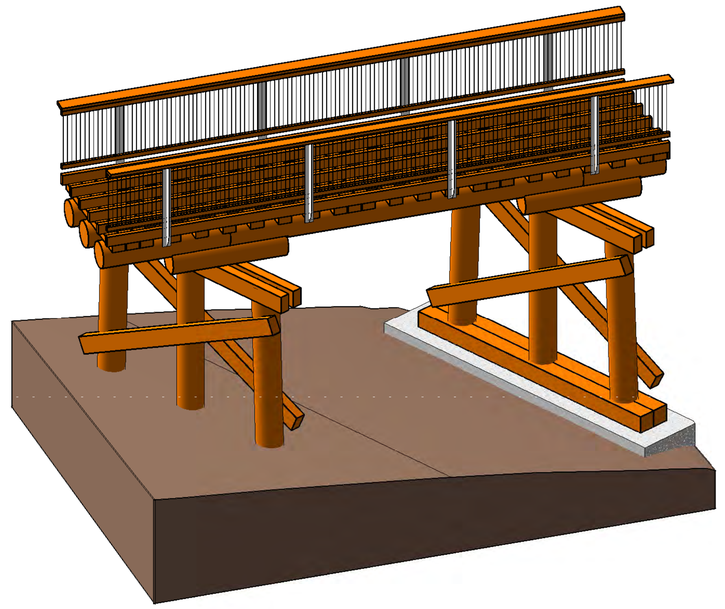
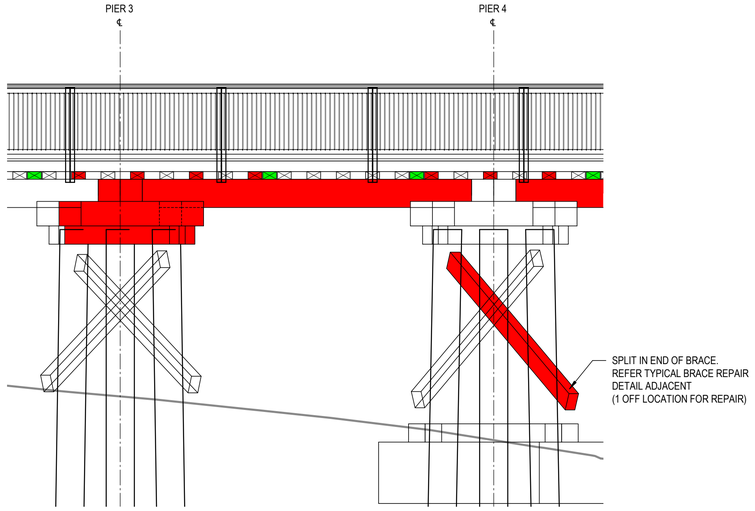
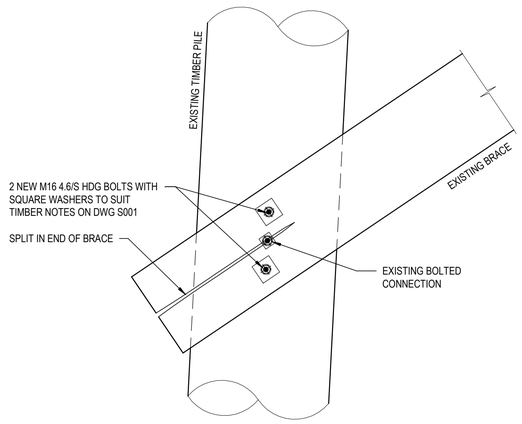


SPAN 3 3D PERSPECTIVE VIEW



SPAN 3 ELEVATION

SCALE 1 : 50



TYPICAL BRACE REPAIR DETAIL

SCALE 1 : 10

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER

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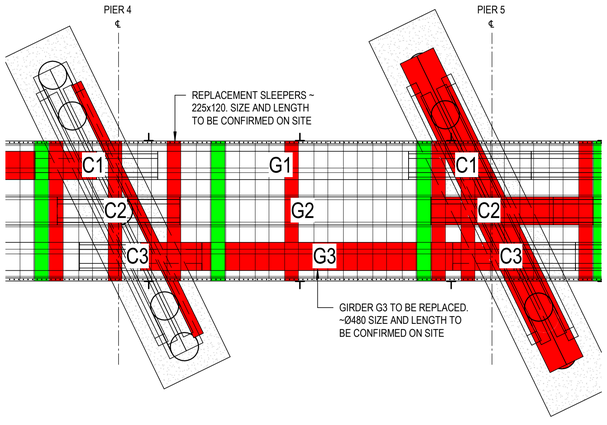
PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 3 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S103	REVISION: P1



SPAN 4 PLAN

SCALE 1 : 50

NOTE

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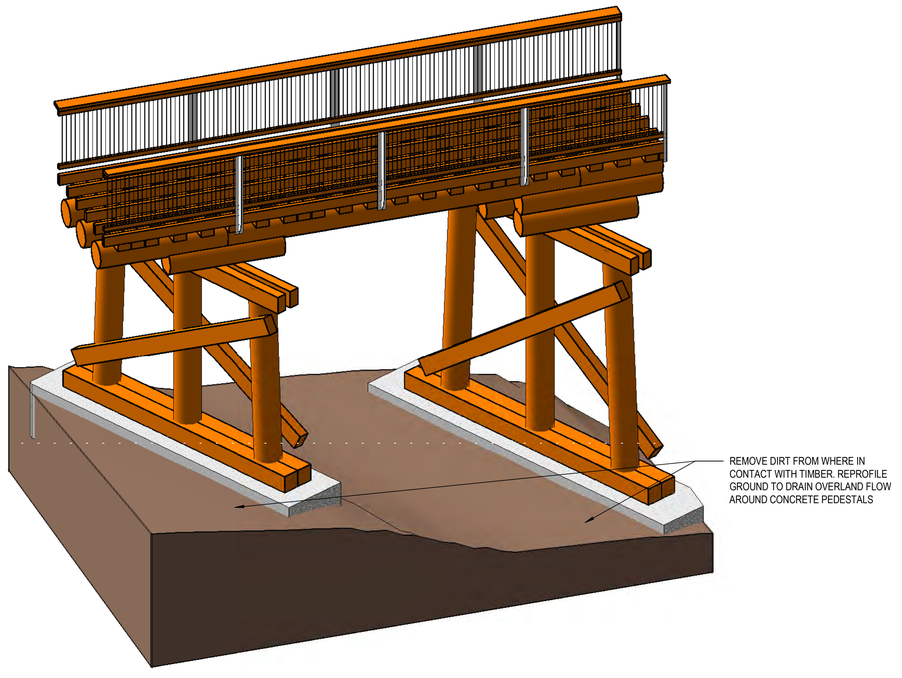
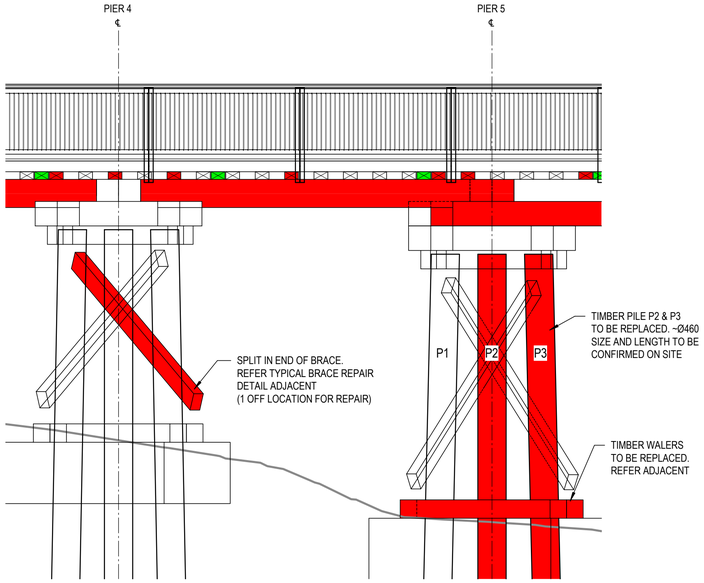
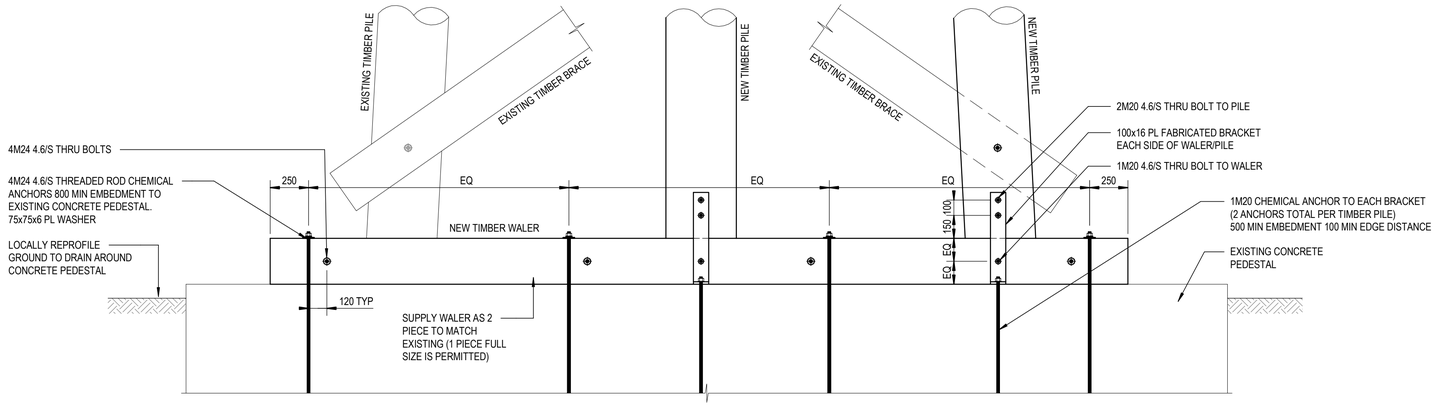


SPAN 4 3D PERSPECTIVE VIEW



SPAN 4 ELEVATION

SCALE 1 : 50



PIER 5 WALER REPAIR DETAILS

SCALE 1 : 20

NOT FOR CONSTRUCTION

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1 :50

BLIGH TANNER

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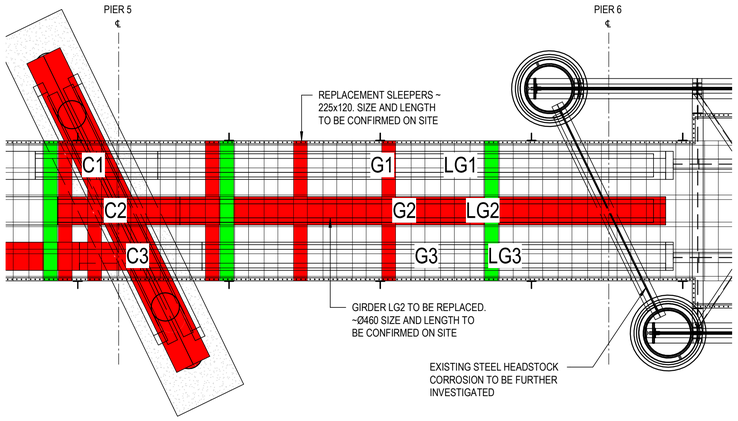
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 4 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S104	REVISION: P1



SPAN 5 PLAN

SCALE 1 : 50

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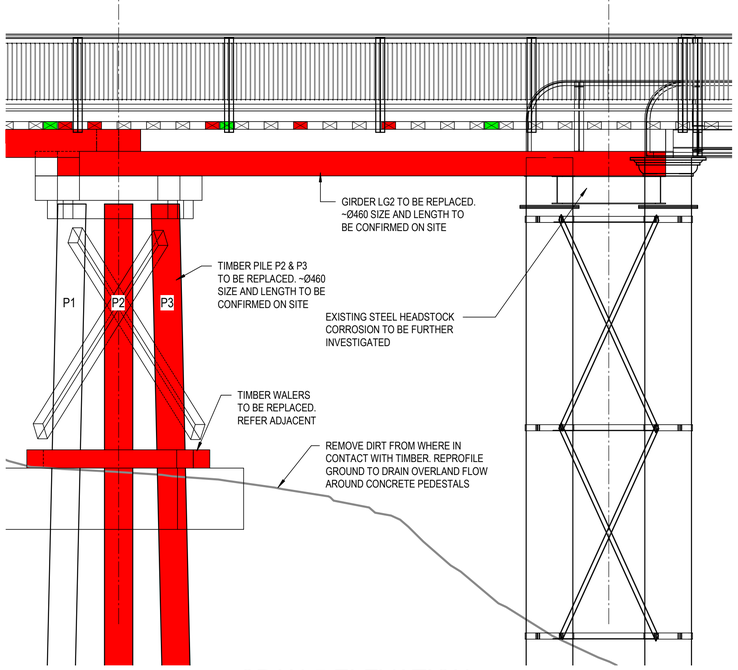
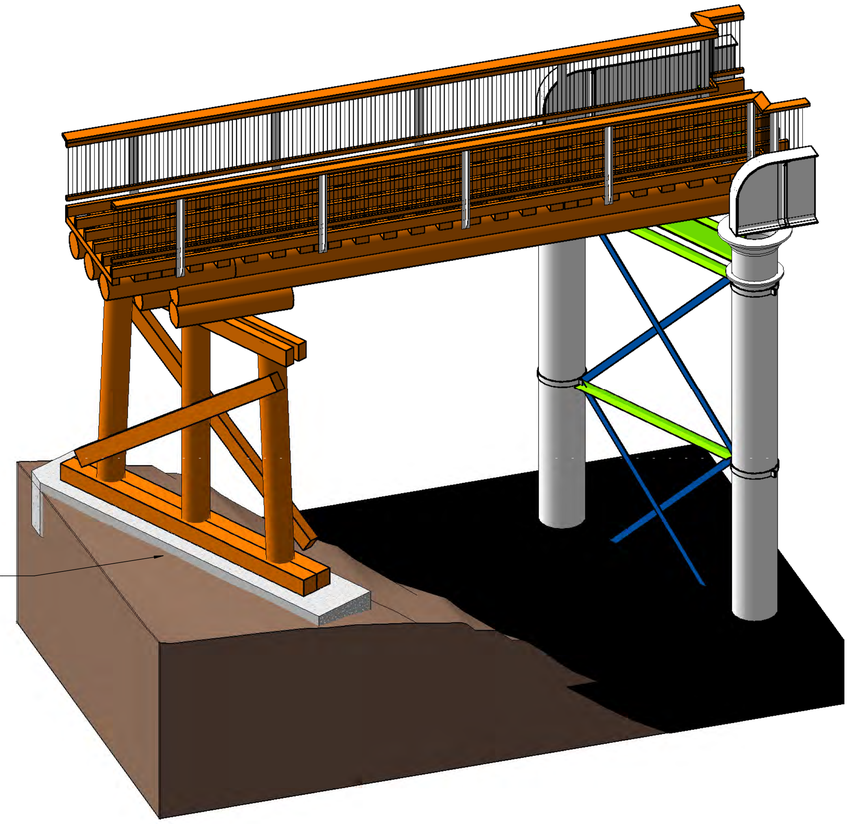


SPAN 5 ELEVATION

SCALE 1 : 50



SPAN 5 3D PERSPECTIVE VIEW

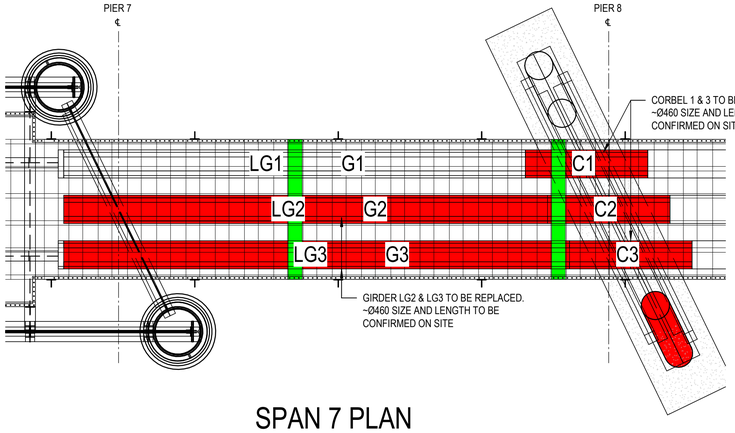
NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER
LEVEL 9, 269 WICKHAM STREET, PO BOX 612
FORTITUDE VALLEY QLD 4006 AUSTRALIA
T 07 3251 8555 F 07 3251 8599

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 5 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S105 REVISION: P1



SPAN 7 PLAN

SCALE 1 : 50

NOTE

1. EXISTING SLEEPERS AND HIGHLIGHTED REPLACEMENTS OF SLEEPERS SHOWN INDICATIVELY FOR COSTING PURPOSES. ENSURE EACH SLEEPER IS ASSESSED ON SITE AND REPLACED AS REQUIRED.

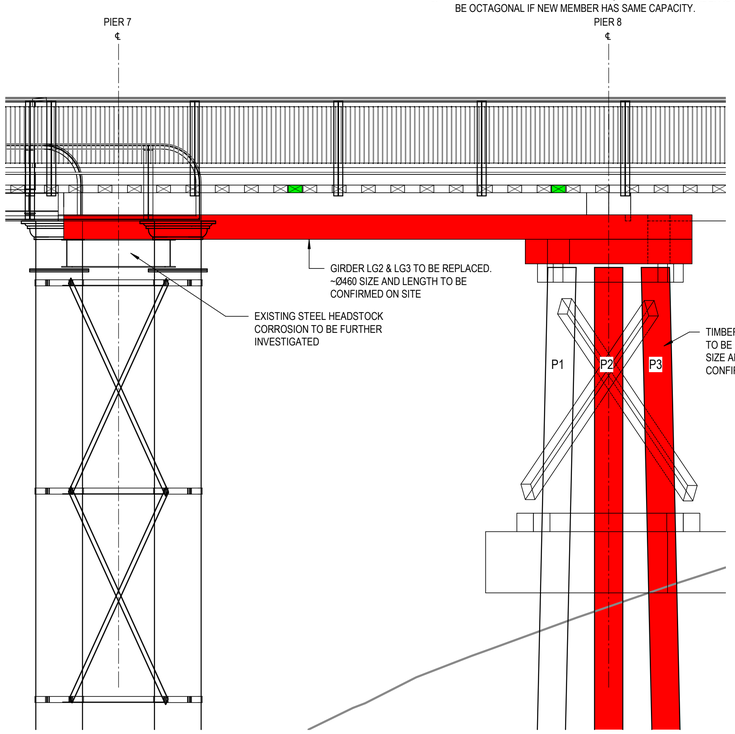
LEGEND

..... DENOTES EXISTING DAMAGED/DECAYED MEMBER TO BE REPLACED/REPAIRED

..... DENOTES EXISTING EXTRA MEMBER TO BE REMOVED ONCE DAMAGED MEMBERS ARE REPLACED

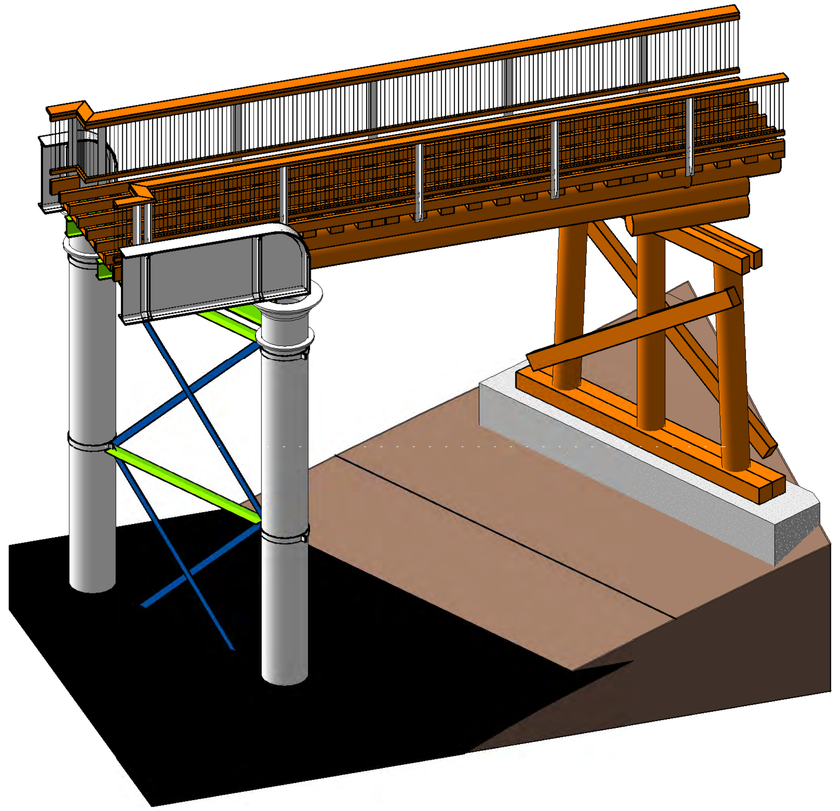
REPLACED MEMBER NOTES

1. EXISTING MEMBER SIZES TO BE MEASURED ON SITE AND REPLACED TO MATCH EXISTING.
2. REPLACEMENT TIMBER TO BE DURABILITY CLASS 1, F27 SEASONED HARDWOOD OR RECYCLED TIMBER (NEW SLEEPERS ARE PERMITTED TO BE F17).
3. WHERE TIMBER MEMBERS ARE REPLACED CONNECTIONS ARE TO MATCH EXISTING.
4. REPLACEMENT TIMBERS TO BE PROFILED TO MATCH EXISTING.
5. WHERE EXISTING GIRDER IS ROUND, REPLACEMENT GIRDER IS PERMITTED TO BE OCTAGONAL IF NEW MEMBER HAS SAME CAPACITY.



SPAN 7 ELEVATION

SCALE 1 : 50



SPAN 7 3D PERSPECTIVE VIEW

NOT FOR CONSTRUCTION

BLIGH TANNER

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FORTITUDE VALLEY QLD 4006 AUSTRALIA
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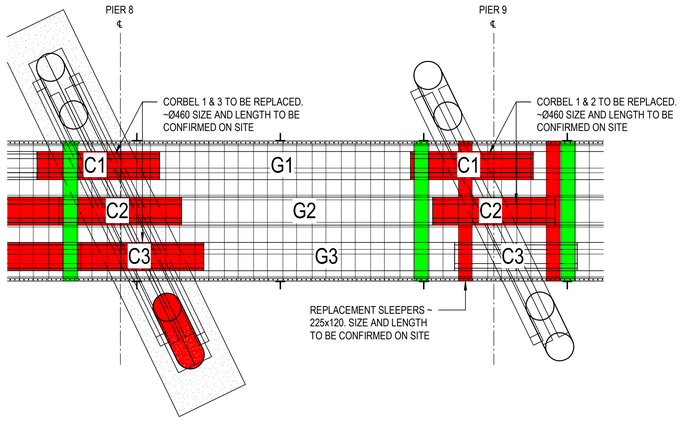
REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 7 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S107	REVISION: P1



SPAN 8 PLAN

SCALE 1 : 50

NOTE

1. EXISTING SLEEPERS AND HIGHLIGHTED REPLACEMENTS OF SLEEPERS SHOWN INDICATIVELY FOR COSTING PURPOSES. ENSURE EACH SLEEPER IS ASSESSED ON SITE AND REPLACED AS REQUIRED.

LEGEND

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REPLACED MEMBER NOTES

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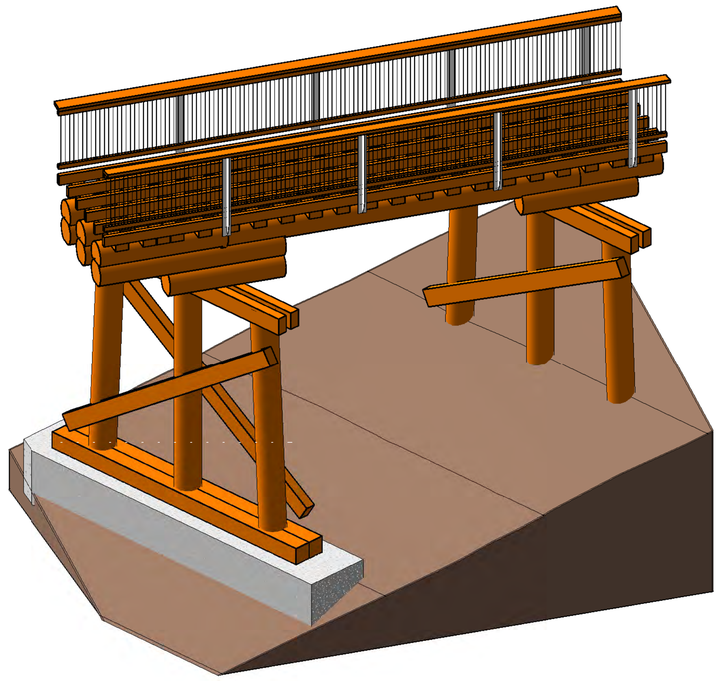
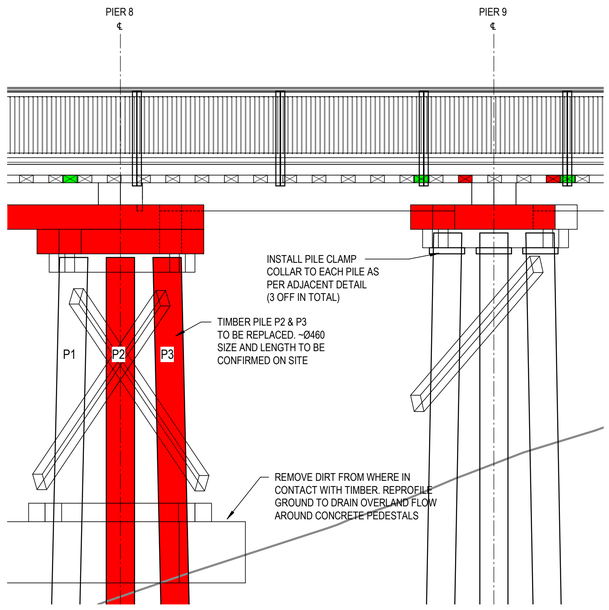
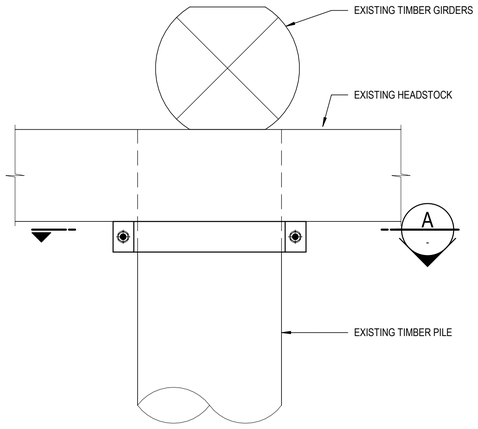


SPAN 8 3D PERSPECTIVE VIEW



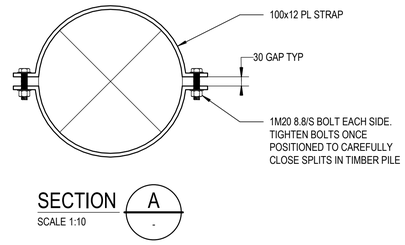
SPAN 8 ELEVATION

SCALE 1 : 50



TYPICAL TIMBER PILE CLAMP DETAIL

SCALE 1 : 10



SECTION A-A

SCALE 1:10

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000

1 :50

BLIGH TANNER

LEVEL 9, 269 WICKHAM STREET, PO BOX 612

FORTITUDE VALLEY QLD 4006 AUSTRALIA

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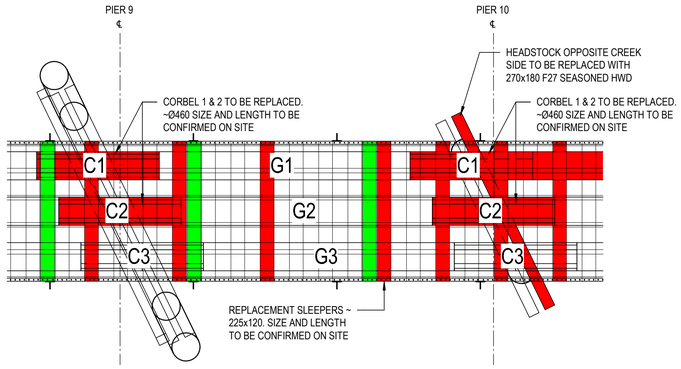
REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 8 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S108	REVISION: P1



SPAN 9 PLAN

SCALE 1 : 50

NOTE

1. EXISTING SLEEPERS AND HIGHLIGHTED REPLACEMENTS OF SLEEPERS SHOWN INDICATIVELY FOR COSTING PURPOSES. ENSURE EACH SLEEPER IS ASSESSED ON SITE AND REPLACED AS REQUIRED.

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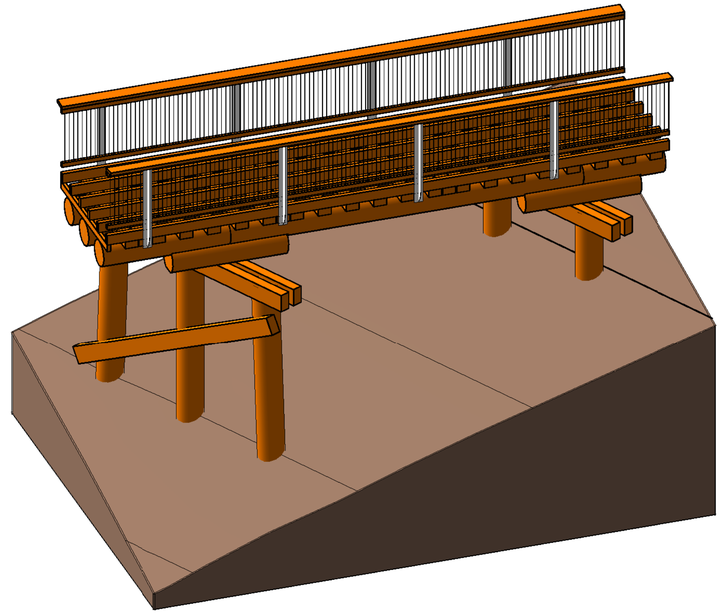
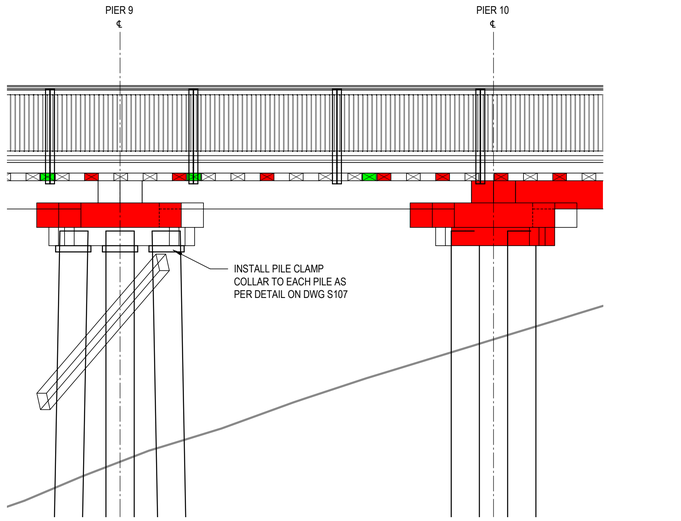


SPAN 9 3D PERSPECTIVE VIEW



SPAN 9 ELEVATION

SCALE 1 : 50

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER
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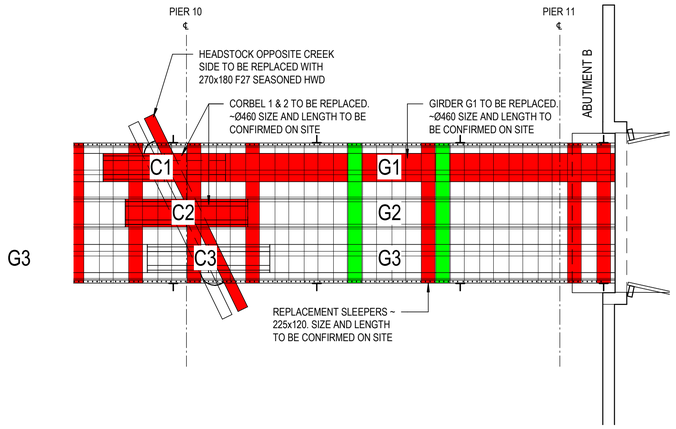
REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 9 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S109	REVISION: P1



SPAN 10 PLAN

SCALE 1 : 50

NOTE

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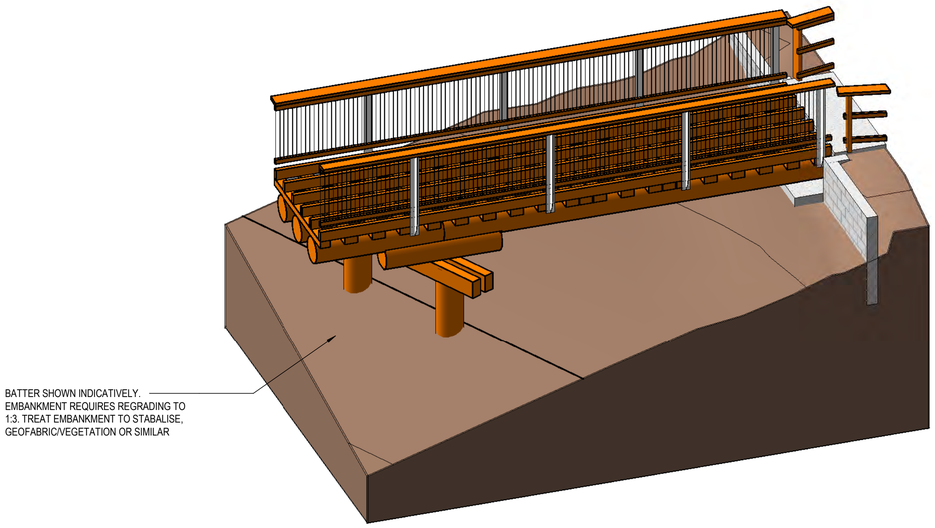
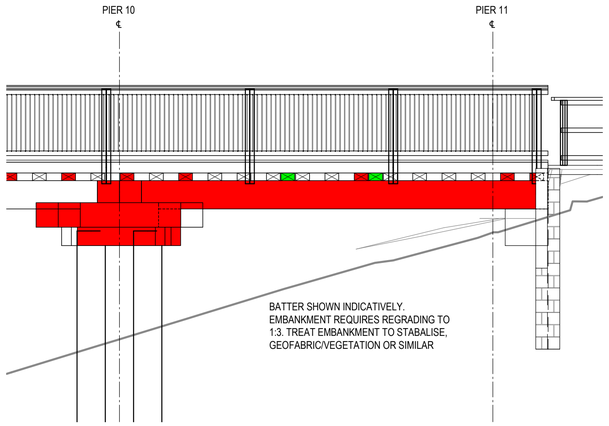


SPAN 10 3D PERSPECTIVE VIEW



SPAN 10 ELEVATION

SCALE 1 : 50

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

BLIGH TANNER
LEVEL 9, 269 WICKHAM STREET, PO BOX 612
FORTITUDE VALLEY QLD 4006 AUSTRALIA
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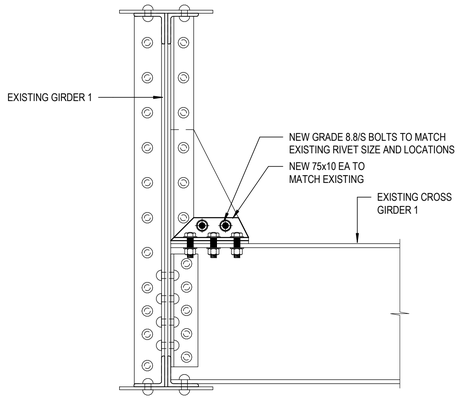
REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	02.11.2020	INFORMATION ISSUE	SK	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 10 TIMBER REMEDIATION WORK DETAILS	SCALES: As indicated AT A1 PRINT THIS DRAWING IN COLOUR	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S110	REVISION: P1

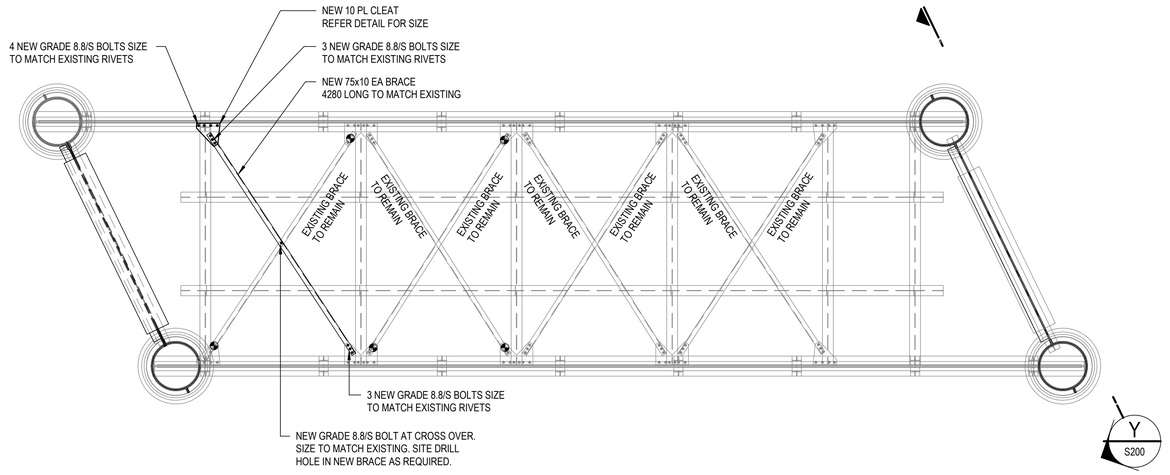


TYPICAL CROSS GIRDER REPAIR DETAIL

SCALE 1 : 10

CROSS GIRDER REPAIR METHODOLOGY:

1. REMOVE EXISTING CORRODED RIVETS AND ANGLE.
2. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING CROSS GIRDER AND MAIN GIRDER LOCALLY.
3. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH PAINT SPECIFICATION.
4. INSTALL NEW EA TO MATCH EXISTING WITH NEW GRADE 8.8 BOLTS.
5. APPLY FURTHER PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.



DIAGONAL HORIZONTAL BRACING AND CLEAT REPAIR PLAN

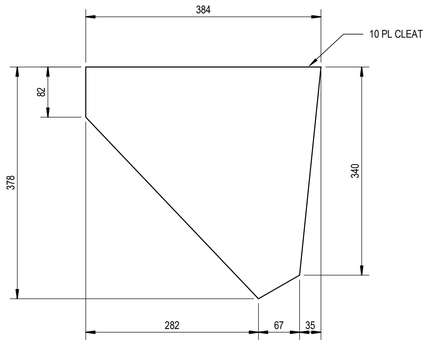
SCALE 1 : 50

LEGEND

⚽ ..... DENOTES LOCATION OF EXISTING CORRODED RIVET/RIVETS REQUIRING REPLACEMENT WITH NEW GRADE 8.8/S BOLTS SIZED TO MATCH EXISTING RIVET

DIAGONAL HORIZONTAL BRACING AND CLEAT REPAIR METHODOLOGY:

1. REMOVE EXISTING CORRODED RIVETS AT BRACING CLEATS AS INDICATED. ONE AT A TIME ONLY.
2. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING CLEAT PLATE LOCALLY.
3. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH PAINT SPECIFICATION.
4. INSTALL NEW GRADE 8.8 BOLT TO MATCH EXISTING RIVET.
5. APPLY FURTHER PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.
6. REPEAT STAGES 1 TO 5 FOR ALL CORRODED EXISTING RIVETS.
7. REMOVE EXISTING CORRODED HORIZONTAL BRACE AND CLEAT PLATE.
8. ABRASIVE BLAST EXISTING GIRDER 1 AND GIRDER 2 LOCALLY AROUND EXISTING CLEAT PLATES.
9. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH PAINT SPECIFICATION.
10. INSTALL NEW CLEAT PLATE TO GIRDER 1.
11. INSTALL NEW EA HORIZONTAL BRACE.
12. APPLY FURTHER PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.



NOTE: ALL HOLES TO BE SITE DRILLED TO SUIT EXISTING LOCATIONS AND SIZES

NEW BRACING CLEAT PLATE DETAIL

SCALE 1 : 5

NOT FOR CONSTRUCTION

100mm 0 100 200 300 400
1 : 10

BLIGH TANNER
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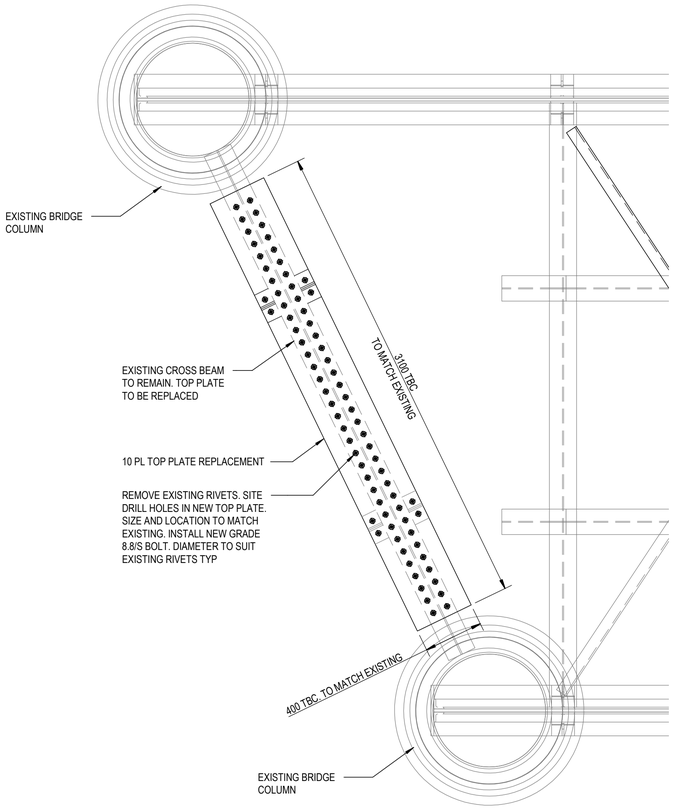
FORTITUDE VALLEY QLD 4006 AUSTRALIA
T 07 3251 8555 F 07 3251 8599

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	17.12.2020	INFORMATION ISSUE	AC	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 6 STEEL REMEDIATION WORK DETAILS - SHEET 4	SCALES: As indicated AT A1	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT:	DRAWING NUMBER: S203	REVISION: P1

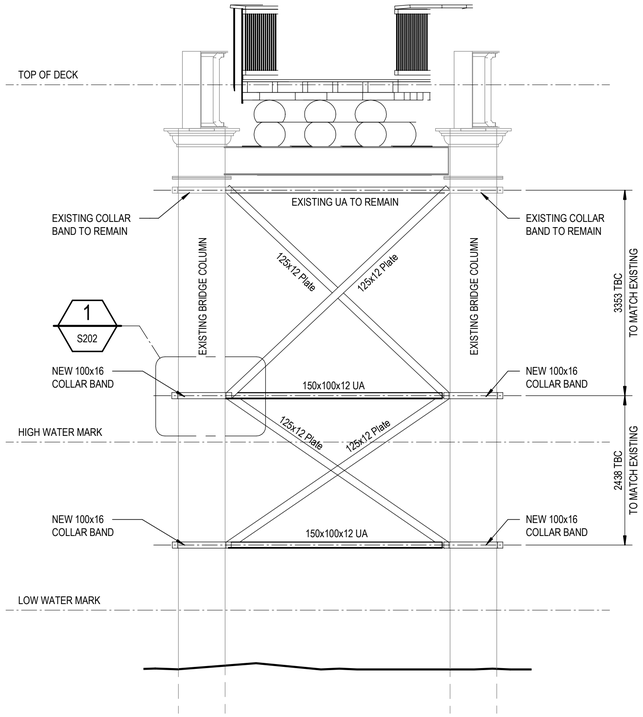


PIER 6 CROSS BEAM TOP PLATE REPLACEMENT DETAIL

SCALE 1 : 20

PIER 6 CROSS BEAM TO PLATE REPLACEMENT METHODOLOGY:

1. REMOVE EXISTING TIMBER CORBELS AND GIRDERS ABOVE CORRODED PIER 6 CROSS BEAM.
2. REMOVE ALL EXISTING RIVETS CONNECTING CORRODED TOP PLATE TO EXISTING CROSS BEAM.
3. REMOVE EXISTING SEVERELY CORRODED TOP PLATE.
4. ABRASIVE BLAST AND THOROUGHLY CLEAN REMAINING EXISTING STEEL BEAM.
5. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.
6. INSTALL NEW TOP PLATE TO MATCH EXISTING WITH GRADE 8.8/S BOLTS TO REPLACE EXISTING RIVETS.
7. APPLY FURTHER PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.

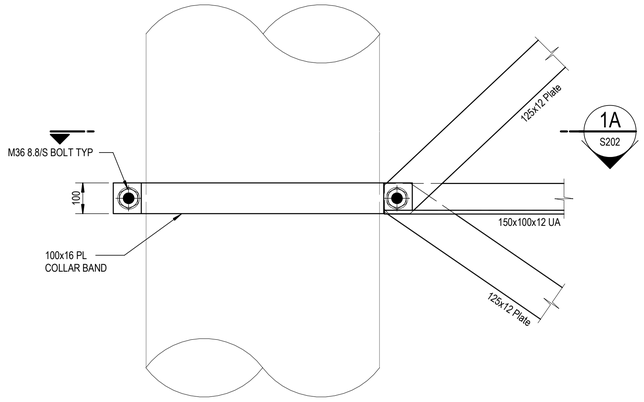


PIER 6 & 7 VERTICAL BRACING TYPICAL REPAIR ELEVATION

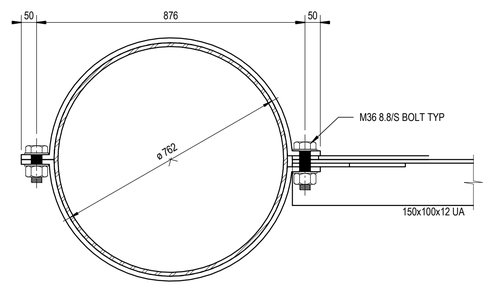
SCALE 1 : 50

PIER 6 & 7 VERTICAL BRACING REPAIR METHODOLOGY:

1. REMOVE VERTICAL BRACING, PIER COLLARS AND TEES AS INDICATED.
2. ABRASSIVE BLAST AND THOROUGHLY CLEAN EXISTING BRIDGE COLUMNS.
3. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.
4. INSTALL NEW VERTICAL BRACING, PIER COLLARS AND TEES.
5. APPLY FURTHER PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION.



DETAIL 1 / S202
SCALE 1 : 10



SECTION 1A / S202
SCALE 1 : 10

NOT FOR CONSTRUCTION

100mm 0 100 200 300 400
1 : 10

500mm 0 500 1000 1500 2000
1 : 50

BLIGH TANNER
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PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 6 STEEL REMEDIATION WORK DETAILS - SHEET 3	SCALES: As indicated AT A1	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S202	REVISION: P1

SCHEDULE OF DAMAGE AND REPAIR			
ANNOTATION	IMAGE	NOTED DAMAGE	DAMAGE REPAIR
A		PIER 6, COLUMN 1 - CORRODED BEARING PLATES AND BOLTS	REMOVE EXISTING BOLTS. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING SURFACE. INSTALL NEW SAE GRADE 8 BOLTS TO MATCH EXISTING. APPLY PROTECTIVE PAINT COATING AS PER SPECIFICATION.
B		PIER 7, COLUMN 1 - CORRODED BEARING PLATES AND BOLTS	REMOVE EXISTING BOLTS. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING SURFACE. INSTALL NEW SAE GRADE 8 BOLTS TO MATCH EXISTING. APPLY PROTECTIVE PAINT COATING AS PER SPECIFICATION.
C		PIER 6 CROSS BEAM - SEVERELY CORRODED TOP PLATE TO EXISTING BEAM	REFER DETAIL AND METHODOLOGY ON DWG S202.
D		PIER 6 & 7 VERTICAL BRACING, PIER COLLARS AND TEES - SEVERELY CORRODED	REFER DETAIL AND METHODOLOGY ON DWG S202.
E		GIRDER 1 - TOP FLANGE RIVETS SEVERELY CORRODED	REMOVE EXISTING SEVERELY CORRODED RIVETS ONE AT A TIME. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING GIRDER LOCALLY INSTALL NEW GRADE 8.8/S BOLT TO REPLACE EXISTING RIVET. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION. REPEAT FOR ALL SEVERLY CORRODED RIVETS.

SCHEDULE OF DAMAGE AND REPAIR			
ANNOTATION	IMAGE	NOTED DAMAGE	DAMAGE REPAIR
F		MAIN GIRDERS - CREVICE CORROSION BETWEEN BOTTOM PLATES	ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING GIRDER. APPLY PROTECTIVE PAINT COATING AS PER SPECIFICATION.
G		CROSS GIRDER CONNECTION TO MAIN GIRDER - CORRODED RIVETS AND ANGLE	REFER DETAIL AND METHODOLOGY ON DWG S203.
H		DIAGONAL HORIZONTAL BRACE 1 - SEVERELY CORRODED	REFER DETAIL AND METHODOLOGY ON DWG S203.
J		DIAGONAL HORIZONTAL BRACING CLEATS - CREVICE CORROSION AND CORRODED RIVETS	REFER DETAIL AND METHODOLOGY ON DWG S203.
K		GIRDER 1 & GIRDER 2 - CORROSION TO RIVETS.	REPLACE EXISTING CORRODED RIVETS WITH GRADE 8.8/S BOLTS TO MATCH RIVET DIAMETER ONE AT A TIME. ABRASIVE BLAST AND THOROUGHLY CLEAN EXISTING GIRDER AS REQUIRED. APPLY PROTECTIVE PAINT COATING IN ACCORDANCE WITH SPECIFICATION. ALLOW FOR: GIRDER 1 - 55 BOLTS TO TOP PLATE AND 18 BOLTS TO BOTTOM PLATE. GIRDER 2 - 9 BOLTS TO TOP PLATE AND 14 BOLTS TO BOTTOM PLATE

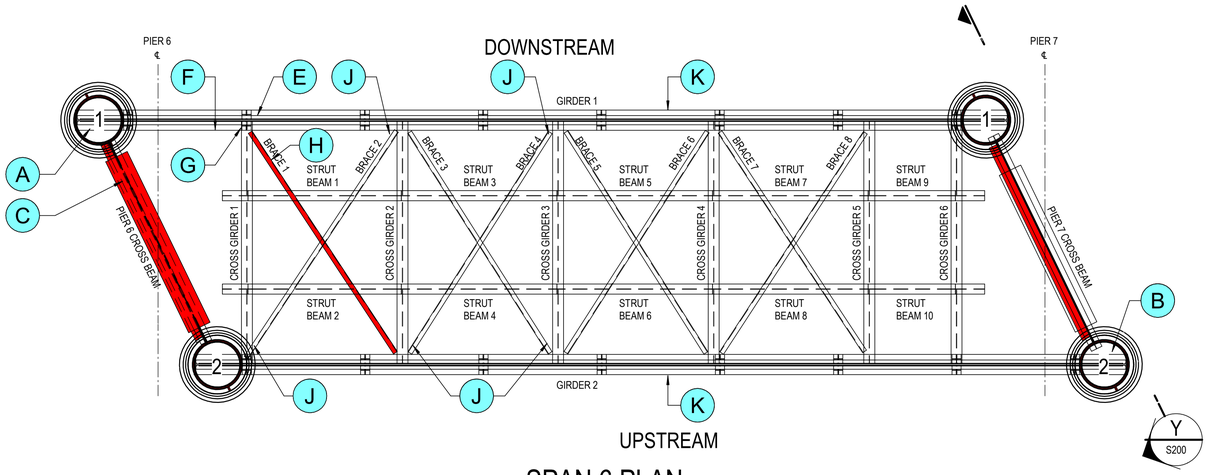
NOT FOR CONSTRUCTION

BLIGH TANNER

LEVEL 9, 269 WICKHAM STREET, PO BOX 612
FORTITUDE VALLEY QLD 4006 AUSTRALIA
T 07 3251 8555 F 07 3251 8599

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	17.12.2020	INFORMATION ISSUE	AC	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION	DRAWING TITLE: SPAN 6 STEEL REMEDIATION WORK DETAILS - SHEET 2	SCALES: AT A1	
LOCATION: SALTWATER CREEK, BUNDABERG	HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY	JOB NO: 2020.0348	
CLIENT: BUNDABERG REGIONAL COUNCIL	ASSOCIATE CONSULTANT	DRAWING NUMBER: S201	REVISION: P1



SPAN 6 PLAN

SCALE 1 : 50

TIMBER CORBELS, GIRDERS, SLEEPERS, JOISTS AND DECKING OMITTED FOR CLARITY

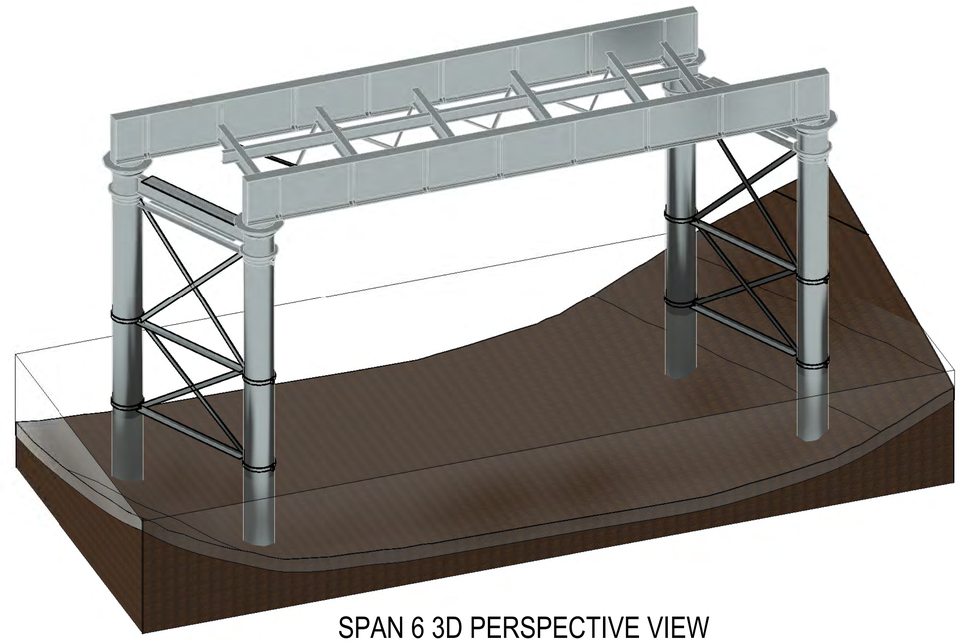
LEGEND

..... DENOTES EXISTING DAMAGED/CORRODED MEMBER TO BE REPLACED/REPAIRED

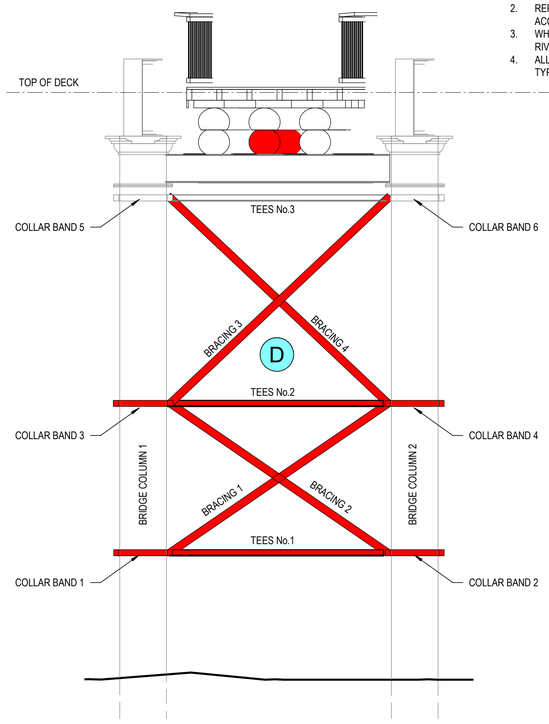
A ..... DENOTES REPAIR ITEM CODE REFERENCE. REFER SCHEDULE ON DWG S201 FOR DETAILS

REPLACED MEMBER NOTES

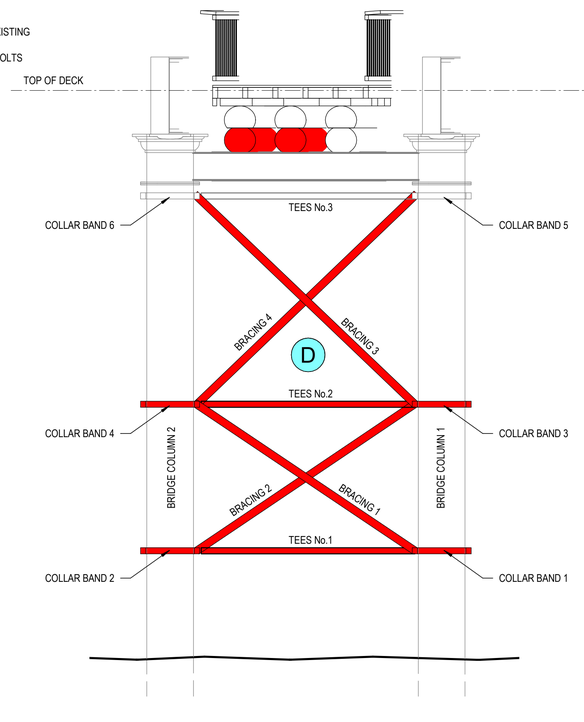
1. EXISTING MEMBER SIZES TO BE MEASURED ON SITE AND REPLACED TO MATCH EXISTING.
2. REPLACEMENT STEEL TO BE HOT DIPPED GALVANISED AND PAINTED IN ACCORDANCE WITH PAINT SPECIFICATION.
3. WHERE MEMBERS ARE REPLACED GRADE 8.8 BOLTS ARE TO REPLACE EXISTING RIVETS.
4. ALL EXISTING DAMAGED RIVETS ARE TO BE REPLACED WITH GRADE 8.8 BOLTS TYP.



SPAN 6 3D PERSPECTIVE VIEW



SECTION X S105
SCALE 1 : 50



SECTION Y S107
SCALE 1 : 50

NOT FOR CONSTRUCTION

500mm 0 500 1000 1500 2000
1 :50

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REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED	RPEQ No.
P1	17.12.2020	INFORMATION ISSUE	AC	JAL			

PROJECT: SALTWATER CREEK RAIL BRIDGE CONSERVATION
LOCATION: SALTWATER CREEK, BUNDABERG
CLIENT: BUNDABERG REGIONAL COUNCIL

DRAWING TITLE: SPAN 6 STEEL REMEDIATION WORK DETAILS - SHEET 1
HERITAGE CONSULTANT: CONVERGE HERITAGE + COMMUNITY
ASSOCIATE CONSULTANT:

SCALES: As indicated AT A1
PRINT THIS DRAWING IN COLOUR
JOB NO: 2020.0348
DRAWING NUMBER: S200
REVISION: P1

Queensland Heritage Act 1992

Section 74 Exemption Certificate

Application no:	202104-13663 EC
Date application received:	07 April 2021
Date of decision:	19 April 2021
Applicant:	Bundaberg Regional Council C/- Stuart Randle, General Manager – Infrastructure Services ceo@bundaberg.qld.gov.au
QHR place ID:	600370
QHR place name:	Saltwater Creek Railway Bridge
Location:	Quay Street Woongarra Line, BUNDABERG, 4670
Approval summary:	Building work: Installation of a composite fibre mesh deck on the bridge. The decking option will replace the previous timber decking. *Note this approval is for works in conjunction with Exemption Approval 202101-11198 EC issued for the repair of timber and steel components of the bridge.

The application for an exemption certificate to carry out the development described above, is approved with conditions under section 74 of the *Queensland Heritage Act 1992*.

This exemption certificate attaches to the premises. Any person, including the owners, owners' successors in title and occupiers of the premises, may carry out development permitted by this exemption certificate and is bound by the conditions.

This exemption certificate only applies to development substantially started within 4 years of this decision.

Terms and phrases used in this document are defined principally in the *Queensland Heritage Act 1992,* and in the *Planning Act 2016* and its Regulation.

If more information is required, contact the project manager, Nicole Woodward, Principal Heritage Officer, on (07) 3330 5832 or via email nicole.woodward@des.qld.gov.au.

Anthony Simmons
Cultural Heritage Coordinator, Heritage
Department of Environment and Science
Delegate for the Chief Executive
administering the *Queensland Heritage Act 1992*

Conditions of approval:

No.	Condition	Condition timing
1.	**Scope of development approved** Carry out the development as described in the application received on 07 April 2021 from the applicant Stuart Randle, General Manager (Infrastructure Services) Bundaberg Regional Council and the documents listed in 'Approved documents'. In the case of a discrepancy between application documents and conditions, conditions take precedence. *(Reason - To ensure development is carried out as approved)*	At all times.
2.	**Keep a copy of the approval on site** A copy of this exemption certificate and a copy of any documents that describe the approved development must be retained at the State heritage place. *(Reason – To facilitate the monitoring of development for compliance purposes)*	For the duration of the development.
3.	**Notify start of development** Provide written notice of the start of development to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au. The notice must state: name of State heritage place, application number and condition number 3. *(Reason – To facilitate the monitoring of development for compliance purposes)*	No later than 2 business days prior to the commencement of the development.
4.	**Photograph effect of development** Submit photographs of the area where the development is undertaken, both before and after the development is completed to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au. The submission must state: name of State heritage place, application number and condition number 4. *(Reason – To facilitate the monitoring of development for compliance purposes and to ensure change is adequately recorded)*	Within 10 business days of completion of the development.
5.	**Permit access to the State heritage place** Permit access to the State heritage place by Department of Environment and Science officers if requested. *(Reason – To facilitate the monitoring of development for compliance purposes)*	For the duration of the development.
6.	**Protect the State heritage place from damage** Protect the existing features of the State heritage place from incidental damage and maintain protective measures to ensure the development does not result in damage to, or deterioration of, the State heritage place caused by weather, fire, vandalism, insects or other factors. *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	For the duration of the development.
7.	**Report any damage to the State heritage place that occurs** During development, should damage occur to any features of the State heritage place report such incidents immediately to Environmental Services and Regulation, Department of Environment and Science at palm@des.qld.gov.au . *(Reason - To ensure the cultural heritage values of the State heritage place are appropriately recognised and managed)*	Immediately, should damage occur.

Approved documents:

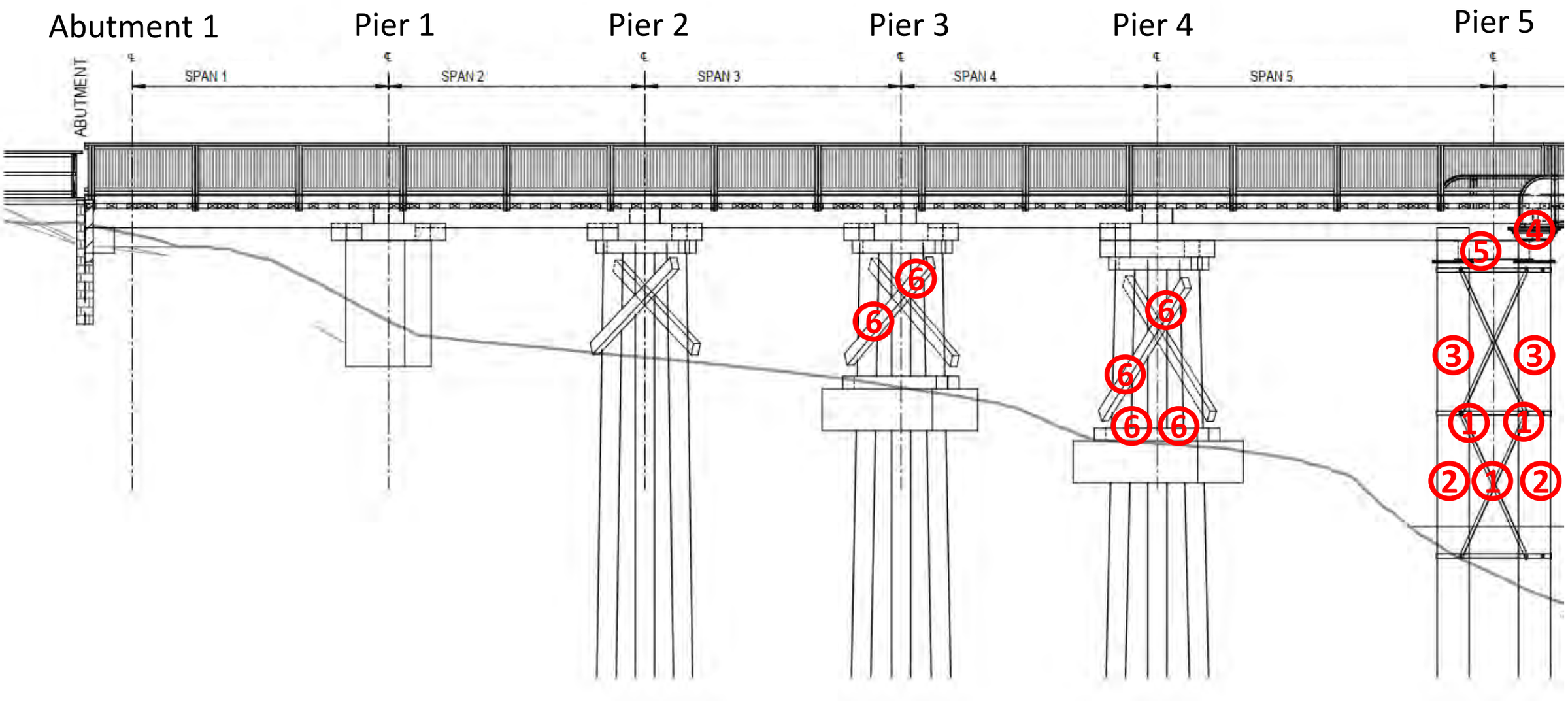
Document no.	Document title	Date
-	Saltwater Creek Bridge Deck Replacement – Mandatory Information prepared by Converge Heritage + Community	March 2021
S300/C1	Replacement Walkway Details	-

Take Notice: This certificate does not exempt the applicant from the need to obtain such other approvals as may be required under other legislation.

Appendix B

Defect Maps

Saltwater Creek Bridge – Defect Mark Up



Defect Map Legend

All defect locations are approximate

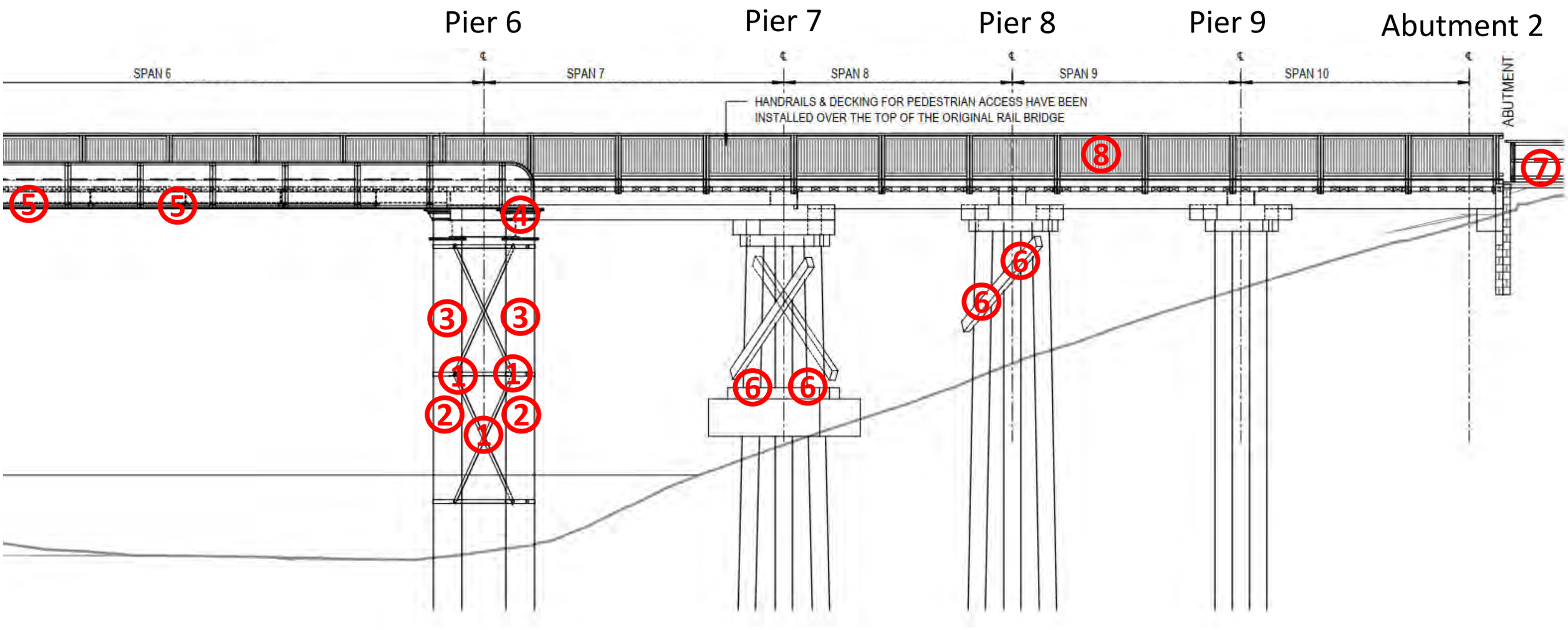
1. Corrosion on pier bracing
2. Surface and pitting corrosion on pier surface
3. Corrosion staining at pier welds
4. Corrosion staining and spots on bearing plate
5. Two (2) x areas section loss on pier 5 cross beam
6. Pier fixings surface corrosion

- Pier 1, LHS, 300 mm x 200 mm concrete delamination
- Pier 4, LHS, 300 mm x 200 mm concrete spall
- Excessive vegetation at base of piers 1, 2 and 3
- Vertical splitting observed on timber piers 2, 3 and 4
- Pier cross bracing bolts had surface corrosion on pier 3, 4
- Pier base plates had surface corrosion on pier 4
- Surface corrosion on pier 5 cross beam
- Pedestrian railing fixings typically had surface corrosion

April 3, 2024

Saltwater Creek Bridge – Defect Mark Up

SMEC
Member of the Surbana Jurong Group



Defect Map Legend

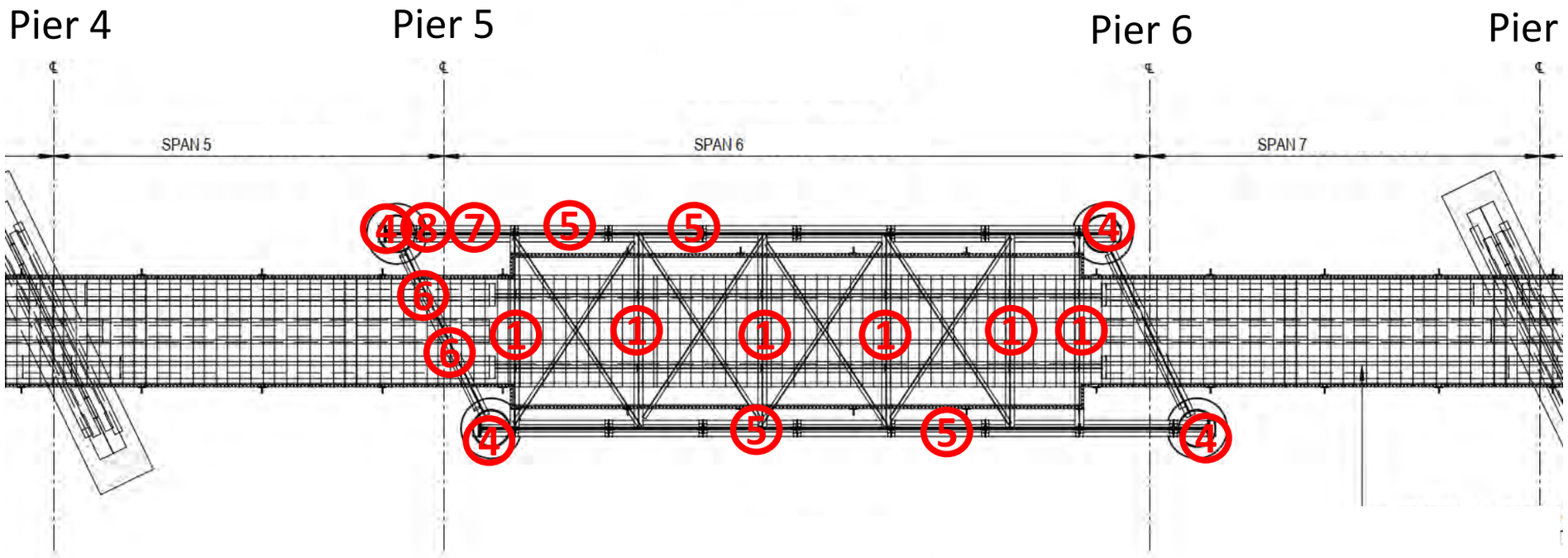
All defect locations are approximate

1. Corrosion on pier bracing
2. Surface and pitting corrosion on pier surface
3. Corrosion staining at pier welds
4. Corrosion staining and spots on bearing plate
5. Main girder corrosion (flanges)
6. Pier fixings surface corrosion
7. Crack up to 0.3 mm in approach 2 footway slab
8. Excessive vegetation at pedestrian railing

- Excessive vegetation at base of piers 8, 9
- Vertical splitting observed on timber piers 7, 8
- Pier 7 timber footing bolts had surface corrosion
- One (1) x bent tie rod at top of pier 7
- Poor concrete compaction at pier 7 footing
- Surface corrosion on pier 6 cross beams
- Pedestrian railing fixings typically had surface corrosion

April 3, 2024

Saltwater Creek Bridge – Defect Mark Up



Defect Map Legend

All defect locations are approximate

1. Corrosion spots and surface corrosion on cross girders
4. Corrosion staining and corrosion spots on bearing plate
5. Main girder corrosion (flanges)
6. Corrosion and steel section loss on cross beam
7. Pitting corrosion on main girder
8. Web corrosion on main girder

- Span 6 main girders bottom flange rivets typically exhibited surface corrosion
- Span 6 strut beams typically had corrosion spots and surface corrosion
- Span 6 cross bracing typically exhibited surface corrosion. Cross bracing cleats exhibited more significant corrosion at main girder connections
- Pedestrian railing fixings typically had surface corrosion

April 3, 2024

SMEC

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Appendix E – Surface Water Technical Report
(Refer to EPW00390 – Surface Water Technical Report
(30034151-RPT-5.1-001) – Revision 0).