Review of Environmental Factors

Mick Maher's Bridge

Quality solutions. Sustainable future.

GeoLINK Consulting Pty Ltd

PO Box 119
Lennox Head NSW 2478
T 02 6687 7666

PO Box 1446
Coffs Harbour NSW 2450
T 02 6651 7666

PO Box 1267
Armidale NSW 2350
T 02 6772 0454

info@geolink.net.au

Prepared for: Tamworth Regional Council

UPR	Description	Issued By	Date Issued
4740-1008	Draft v1	Michelle Campione-van Zetten	20/03/2024
4740-1016	Final v2	Michelle Campione-van Zetten	30/05/2024
4740-1017	Final v3	Michelle Campione-van Zetten	7/08/2024

Table of Contents

Illustrations

Tables

Plates

Figures

Appendices

Executive Summary

Proponent and Determining Authority	Tamworth Regional Council
Location	Mick Maher's Bridge, Gaol Creek Road, Moonbi, NSW
Background	This project would involve the demolition of the existing timber bridge and the installation of a concrete box culvert.
Statutory and Planning Framework	All relevant statutory planning instruments have been examined in relation to the proposed roadworks. Development consent is not required for the proposal by virtue of Section 2.109 of the Transport and Infrastructure SEPP. However, the proposal becomes an 'Activity' for the purposes of Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is subject to an environmental impact assessment (this REF).
Environmental Assessment	A comprehensive environmental assessment of the proposed Activity has been undertaken. Some minor impacts would occur as a result of the Activity; however, no significant or long-term adverse impacts are expected. To help ensure that the extent of impacts is limited and that unavoidable impacts are managed and minimised, mitigation measures and safeguards have been recommended and would be implement and monitored.
Justification and Conclusion	The Activity is considered justified taking into account the potential and residual environmental impacts, including the associated mitigation measures and safeguards. The Activity is in accordance with ecologically sustainable development principles and consistent with the objectives of the EP&A Act. As the potential environmental impacts of the Activity are not likely to be significant, it is not necessary for an Environmental Impact Statement to be prepared under Division 5.1, Subdivision 3 of the EP&A Act, or approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. The Activity is unlikely to significantly affect threatened species or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The Activity is also not expected to affect Commonwealth land or have a significant impact on any matters of national environmental significance. Accordingly, the proposed Activity does not require referral to the Australian Government Department of Climate Change, Energy, the Environment and Water.

1. Introduction

1.1 Background and Activity Identification

Tamworth Regional Council (TRC) proposes to replace the existing Mick Maher's Bridge located on Gaol Creek Road, Moonbi, NSW, with a concrete box culvert. The works would be undertaken as part of the TRC Timber Bridge Replacement Program and would be funded by the NSW Government's Fixing Country Bridges Program.

All construction and operational activities associated with the proposed works are referred to herein as 'the Activity'.

1.2 Purpose of this Report

The purpose of this Review of Environmental Factors (REF) is to describe the Activity, assess and document the likely impacts of the Activity on the environment, detail safeguards and mitigation measures to be implemented, and to determine whether or not the Activity can proceed. For the purposes of this work TRC is the proponent and determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The description of the proposed works and assessment of associated environmental impacts has been undertaken in the context of section 171 of the Environmental Planning and Assessment Regulation 2021, *Guidelines for Division 5.1 Assessments* (DPE, 2022), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act) and the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so the REF helps to fulfil the requirements of section 5.5 of the EP&A Act, which requires TRC as the determining authority to examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Activity.

The findings of the REF would be considered when assessing:

- Whether the Activity is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared under Division 5.1, Subdivision 3 of the EP&A Act or approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/ or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The potential for the Activity to significantly impact a matter of national environmental significance, including nationally listed threatened biodiversity matters, or the environment of Commonwealth land, and determine the need to make a referral to the Australian Government Department of Climate Change, Energy, the Environment and Water for a decision on whether assessment and approval is required under the EPBC Act.

2. Description of the Activity

2.1 Site Location

The Activity would be located on Gaol Creek Road and Gill Street, approximately 1 km north of the Moonbi town centre. The town of Moonbi is located approximately 16.5 km north-east of Tamworth (refer to **Illustration 2.1**).

The site for the Activity includes the existing Mick Maher's Bridge and adjacent road areas (refer to **Plate 2.1** and **Plate 2.2**) and an ancillary site approximately 400 m south of the bridge (refer to **Plate 2.5**). A site plan is provided in **Illustration 2.2**.

The locality surrounding the Activity consists of rural residential properties, agricultural landscape, and pockets of forested areas.

Plate 2.1 View looking north towards Mick Maher's Bridge

Plate 2.2 View under Mick Maher's Bridge

0 5 km

Site Locality - Illustration 2.1

GeoLINK environment | engineering | planning | design

Review of Environmental Factors - Mick Mahers Bridge
4740-1014

Information shown is for illustrative purposes only
Drawn by: AEA Checked by: AB Reviewed by: MCZ
Source of base data: Open Street Map
Date: 12/03/2024

LEGEND

- Extent of work
- Cadastre
- Proposed compound storage
- Crown land
- Contours at 10m intervals
- Watercourse

0 60 Metres

The Site - Illustration 2.2

GeoLINK environment | engineering | planning | design

Review of Environmental Factors - Mick Mahers Bridge
4740-1014

Information shown is for illustrative purposes only
Drawn by: AEA Checked by: AB Reviewed by: MCZ
Source of base data: ESRI World Imagery
Date: 12/03/2024

2.2 The Activity

Mick Maher's Bridge is a 4.8 m wide single lane bridge with timber girders and piers, concrete abutments and decking, and timber and concrete wingwalls. The timber components are showing signs of damage and in need of repair (refer to **Plate 2.3**).

The Activity would remove the existing bridge and replace it with a two cell concrete box culvert structure with a 100-year design life (refer to **Figure 2.1**). The new box culvert has cells of 3.6 m width (each) and would be set 300 mm below the exiting creek bed level and allowed to silt up naturally over time. The Activity would include installation of scour protection on either side of the new box culvert. Installation of the box culvert and the scour protection works would extend approximately 12 m into the creek on either side of the bridge.

A compound area for material storage would be established in the formed road reserve of Wiliam Street west of Gill Street, approximately 400 m south of Mick Maher's Bridge (refer to **Illustration 2.2**).

Design drawings have been provided in **Appendix A** of this report.

Plate 2.3 View showing condition of Mick Maher's Bridge

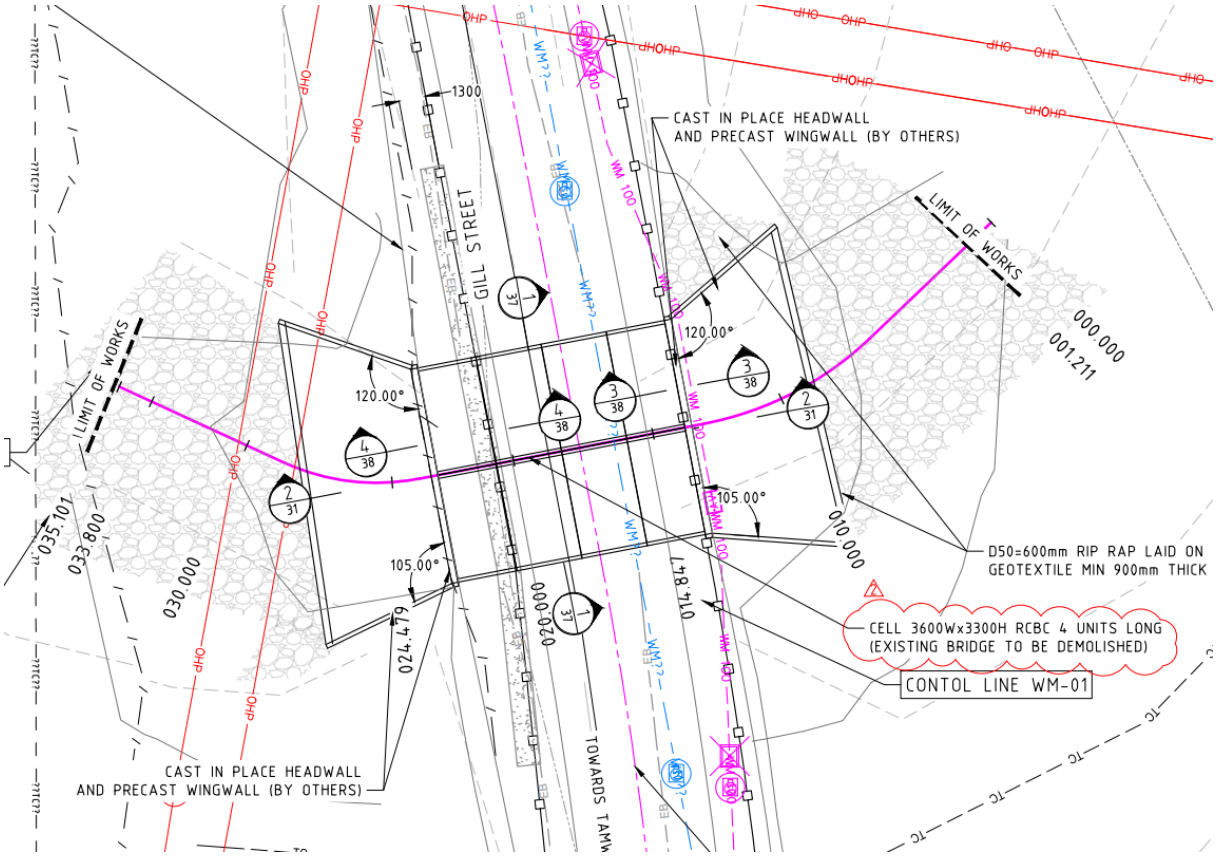


Figure 2.1 Proposed Layout

2.3 Consideration of Selection and Options Considered

A box culvert is a cost-effective option for this location. The existing Mick Maher's Bridge has a span of approximately 8.65 m. Gaol Creek had flow at the time of the site visit (refer to **Plate 2.2** and **Plate 2.4**). Concrete box culverts are an appropriate choice for waterways that are not expected to have permanent significant flow and where spans are relatively short (Fairfull, S. and Witheridge, G., 2003).

Gaol Creek at Mick Maher's Bridge is mapped as key fish habitat. To improve conditions for fish crossing, the culvert would be set 300 mm below the existing creek bed level and allowed to silt up over time. TRC has instructed that this approach has been supported by NSW Department of Primary Industries (DPI) Fisheries.

Plate 2.4 View of Gaol Creek at time of inspection

2.3.1 Alternative Options Considered

Do Nothing

The existing Mick Maher's Bridge is in poor condition and potentially poses a safety risk to residents. Leaving the bridge as is would likely result in it becoming unserviceable and allowing it to continue to deteriorate could possibly be negligent.

Maintain Existing

Ongoing maintenance or rehabilitation is not typically considered a viable option to extend the life of a timber structure, and at significant cost, would likely result in only a short increase in life span. For the Mick Maher's Bridge, rehabilitation of the deteriorated timber members and the cost/ benefit of such action represents a poor return on investment.

Replace with Single Span Bridge

Replacing the existing Mick Maher's Bridge with a single span bridge was considered; however, this option was considered to be cost prohibitive for the scenario.

Replace with Concrete Box Culvert (Preferred Option)

The NSW Government's Fixing Country Bridges program provides an opportunity for Council to replace failing rural infrastructure with modern concrete structures which are designed for a 100-year life span with no significant maintenance requirements. The concrete box culvert is a low-cost, low-maintenance crossing that is well suited to short, low traffic spans and is the preferred option for this location and context.

2.4 Construction Methodology

2.4.1 Construction Methods

The construction works methods are described as follows:

- Establish site.
- Set up erosion and sedimentation control in accordance with management plans, REF and fisheries permit.
- Decommission existing watermain.
- Demolition of existing bridge.
- Excavation and blinding for new culvert base slab.
- Base slab form, reinforce and pour.
- Culvert and precast wingwall installation.
- Apron slab and headwall form, reinforce and pour.
- Scour protection installation.
- Culvert sub soil installation and backfill.
- Road pavement reinstatement.
- New watermain construction and cut in.
- Balustrade and guardrail installation.
- Road sealing.
- Signage and line marking installation.
- Site remediation and demobilisation.

2.4.2 Plant and Equipment

The main plant and equipment required for the works may include (but not be limited to):

- Large excavator.
- Small excavator.
- Trucks.
- Skid steer.
- Grader.
- Watercart.
- Rollers and trench roller.
- Wheel loader.
- Concrete agitator.
- Concrete pump for concrete pours.
- Mobile crane/ Franna for culvert/ wingwall installation.

2.4.3 Construction Duration and Work Hours

Construction activities would be undertaken in accordance with standard construction work hours:

- Monday to Friday 7:00 am to 6:00 pm.
- Saturday 8:00 am to 1:00 pm.
- Sunday and Public Holidays No work.

The work is proposed to commence by mid-2024 and is expected to take eight weeks to complete.

2.4.4 Ancillary Facilities

An ancillary site would be located within the road reserve of William Street west of Gill Street, which is approximately 400 m south of Mick Maher's Bridge (refer to **Plate 2.5** and **Illustration 2.2**).

Ancillary facilities have been included within the overall scope and environmental considerations undertaken as part of this assessment. The impact assessment and recommended mitigation measures in this REF would also be applicable to any ancillary facilities.

Plate 2.5 Ancillary site facility entry from Gill Street

2.4.5 Utility/ Services Adjustment and Property Acquisition

The existing watermain would be replaced with a new 100 mm line, attached along the side of the new culvert structure and would be tied in at the road approaches.

Overhead powerlines run along Gaol Creek Road and Gill Street, and cross over the road in proximity to the Activity site (bridge and ancillary site). Access and working at the site would be under the existing power lines. No adjustments to the powerlines would be required as part of the Activity.

2.5 Tree Removal

No tree removal is proposed for the Activity. Discussion of biodiversity impacts can be found in **Section 5.1** of this REF.

2.6 Traffic Control

The Activity would require Gaol Creek Road to be closed to traffic between approximately the transition from Gill Street and south of James Street. A detour route would use James Street; however, at the time of the site visit James Street had culvert damage that did not allow for traffic to pass. This REF assumes that the repairs to James Street will have taken place prior to this Activity commencing. Traffic impacts can be found in **Section 5.9** of this REF.

2.7 Spoil Material

Spoil material would be generated from the Activity where sediment and rock are removed. This material would be reused for the Activity works where possible and relevant. Any surplus material will be disposed of at a licensed waste recovery facility or reused in accordance with relevant beneficial reuse resource recovery exemptions.

2.8 Crown Land

Searches of the NSW ePlanning Portal Spatial Viewer identifies Lot 7003 DP96448 as Crown Reserves LRegNpo – R37264, which is mapped overlapping Gill Street and Gaol Creek Road at the Activity site (refer to **Illustration 2.2**).

2.9 Acquisition

No land acquisition is anticipated for the Activity.

3. Statutory Planning Framework

3.1 Environmental Planning and Assessment Act 1979

The Activity does not require development consent; however, it requires environmental assessment and approval pursuant to Division 5.1 and Section 5.5 of the EP&A Act whereby determining authorities, when assessing activities under Part 5, Division 5.1, must examine and take into account, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity. To ensure the Activity adequately addresses the requirements of Section 5.5, an assessment of the Activity's consistency with relevant EPIs including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) has been completed.

3.2 State Environmental Planning Policies

3.2.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State and allows certain development by or on behalf of public authorities to be undertaken without consent.

Section 2.109 of the Transport and Infrastructure SEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the proposal is appropriately characterised as development for the purposes of a road or road infrastructure facilities and is to be carried out by or on behalf TRC (a public authority), it can be assessed under Division 5.1 of the EP&A Act. Development consent is therefore not required, and the proposal is defined as an 'Activity' for the purposes of Part 5, Division 5.1 of EP&A Act.

The Activity does not affect land mapped as Coastal Wetland or Littoral Rainforest under the State Environmental Planning Policy (Resilience and Hazards) 2021. The Activity is not development identified as State or Regional development under Chapter 2 of State Environmental Planning Policy (Planning Systems) 2021.

The lot to the east of the Activity at Mick Maher's Bridge, which is mapped as overlapping with the bridge and Gaol Creek Road, is identified in the NSW ePlanning Portal Spatial Viewer as Crown Reserve LRegNo – R37264. Consultation with Crown Lands is discussed in **Section 4** of this REF.

Part 2.2, Division 1 of the Transport and Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development unless there is an exception. Consultation as required by Transport and Infrastructure SEPP is discussed in **Section 4** of this REF.

3.2.2 State Environmental Planning Policy (Biodiversity & Conservation) 2021

State Environmental Planning Policy (Biodiversity and Conservation) 2021 came into force on 1 March 2022 and incorporated the repealed provisions of SEPP (Koala Habitat Protection) 2020, SEPP (Koala Habitat Protection) 2021, and the Vegetation in non-rural areas SEPP, amongst others.

Chapter 4 of the Biodiversity and Conservation SEPP applies to land zoned R5 in Local Government Areas (LGA) which are listed in Schedule 2 of the SEPP, including the Tamworth Regional LGA.

The aim of the Koala Habitat Protection 2021 chapter from the Biodiversity and Conservation SEPP is to:

encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

Chapter 4 of Biodiversity and Conservation SEPP only applies to Part 4 development applications under the EP&A Act. As the proposal is an Activity under Part 5, Division 5.1 of the EP&A Act, the chapter does not technically apply. It is Council's responsibility, however, to consider environmental issues relating to their works, to the fullest extent possible, including impacts on Koalas. An assessment of the impacts of the Activity on biodiversity (including Koalas) is provided in **Section 5.1**.

3.2.3 State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 4 of the State Environmental Planning Policy (Resilience and Hazards) 2021 deals with Remediation of Land.

A search of the contaminated land database (NSW Environment Protection Authority, 2024) and cattle dip site locator (NSW Department of Primary Industries, 2024) was undertaken for the TRC area. No records were found in proximity to the Activity areas.

The site is not declared to be 'significantly contaminated land' under Part 3 of the *Contaminated Land Management Act 1997* and is not subject to a 'management order' within the meaning of the *Contaminated Land Management Act 1997.* The land is not the subject of an approved voluntary management proposal or an 'ongoing maintenance order'.

There is no proposed change of use, and the site is unlikely to be contaminated from past activities. There is no known contamination to note, and the Activity is unlikely to disturb contaminated land.

Overall, the site is considered suitable for the Activity.

3.3 Local Environmental Plans

The Activity is located within the Tamworth Regional Local Government Area (LGA) and the Tamworth Regional Local Environmental Plan 2010 (TRLEP) applies. In accordance with the TRLEP, the Activity is located on land zoned R5 Large Lot Residential. The objectives of the R5 Zone are:

- *To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.*
- *To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.*
- *To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To provide a mix of housing that supports and encourages neighbouring equine-related facilities and is compatible with surrounding land uses and activities.*

The proposed Activity is not inconsistent with the zone objectives and is precluded from requiring consent as it is permitted without consent pursuant to Section 2.109 of the Transport and Infrastructure SEPP. Pursuant to Clause 5.12 of the TRLEP, the TRLEP does not restrict or prohibit the carrying out of any development that is permitted to be carried out without development consent by a public authority under Chapter 2 of the Transport and Infrastructure SEPP.

The Tamworth Regional Development Control Plan 2010 does not apply as development consent is not required.

3.4 Other NSW Legislation

Table 3.1 below lists other NSW legislation relevant to the assessment of the Activity and comments on their implications for the Activity.

Table 3.1 NSW Legislation

Legislation	Section(s)	Comment
Environmental Planning and Assessment Act 1979 (as amended)	Section 1.7	Section 1.7 of the EP&A Act relates to the application of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) and Part 7A of the *Fisheries Management Act 1994* (FM Act). Biodiversity has been assessed in **Section 5.1**. The Activity is unlikely to have a significant impact on biodiversity or threatened species or communities.
	Section 5.5	The determining authority in its consideration of an activity shall examine and consider, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity. This assessment provides Council with the information required in regard to the environment to assess the Activity.
Environmental Planning and Assessment Regulation 2021	Section 171	As per Section 171(1) the environmental factors specified in the *Guidelines for Division 5.1 Assessments* issued under Section 170, have been considered in **Section 5**. It is not expected that the Activity would result in a significant impact.
Fisheries Management Act 1994	Section 200	A permit is required when carrying out dredging and reclamation work on water land. As the site is mapped as key fish habitat, a permit under Part 7 of the FM Act is required. TRC would obtain a permit prior to works commencing.
	Sections 219-220	A permit is required when barriers to the movement of fish including water course crossings are to be constructed or modified. The Activity will require temporary blocking of fish passage during construction. A permit would be obtained prior to commencing any activities that block fish passage.
	Section 205	The Activity is not within a marine environment and no marine vegetation would be affected.
Protection of the Environment Operations Act 1997		No Protection of the Environment Policies (PEPs) are relevant to the Activity. No licenses would be required pursuant to the *Protection of the Environment Operations Act 1997*. TRC and/ or contractors working on behalf of TRC are required to notify EPA when a 'pollution incident' occurs that is likely to impact upon the environment.
	Section 115	It is an offence to negligently dispose of waste in a manner that harms the environment. Waste would be managed in accordance with the *Waste Avoidance and Resource Recovery Act 2001.* The Activity would aim to reduce the environmental impact of dumping waste and include mechanisms to recover resources and reduce the production of waste where possible.
	Section 120	It is an offence to pollute any waters of the State.

Legislation	Section(s)	Comment
		This REF includes safeguard and mitigation measures to minimise the risk of the Activity resulting in pollution of waters.
National Parks and Wildlife Act 1974	Sections 87(1), 90	The Activity occurs on disturbed land and the provisions of the Act are unlikely to be triggered by the Activity (refer to **Section 5.2**). Works would cease if any potential artefact or place of significance is encountered during the Activity; and TRC and Tamworth Local Aboriginal Land Council (LALC) would be notified immediately.
Biodiversity Conservation Act 2016	Schedules 1, 2 and 3	Threatened species and communities have been assessed in accordance with the BC Act.No significant impact is expected. Refer to **Section 5.1**.
Biosecurity Act 2015		The Department of Primary Industries (DPI) biosecurity risk weed declarations for the Northern Tablelands, including the Tamworth Regional LGA, lists numerous weed species. The Blackberry (*Rubus fruticosus spp. agg.*) declared weed species listed in the *Biosecurity Act 2015* occurs within the work footprint of the Activity. Refer to **Section 5.1**.
Heritage Act 1977		Searches of the State Heritage Register, State Heritage Inventory and TRLEP heritage listings were undertaken. The searches did not locate any heritage items within or proximate to the site. No adverse impacts to heritage are expected. Refer to **Section 5.3**.
Crown Land Management Act 2016		Based on mapping from the NSW ePlanning Portal Spatial Viewer, it appears the site is mapped as Crown Land. Council should consult with Crown lands to confirm and determine if a licence or agreement is required, and if so, obtain this prior to works.
Roads Act 1993	Section 138	Section 138 of the *Roads Act 1993* requires approval from the relevant road's authority for the erection of a structure, or the carrying out of work in, on or over a public road, or the digging up or disturbance of the surface of a road. Council is both the proponent and relevant roads authority in this instance.

3.5 Commonwealth Legislation

3.5.1 Environmental Protection and Biodiversity Conservation Act 1999

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any action that has, or is likely to have, a significant impact on matters of national environmental significance or other aspects of the environment, such as on commonwealth land, may progress only with approval of the Commonwealth Minister for the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under Part 9 of the EPBC Act. There are no matters of national environmental significance or Commonwealth land that would be significantly affected by the proposed Activity and therefore no Commonwealth referral or approval is necessary for the Activity (refer to **Section 7.2**).

3.5.2 Native Title Act 1993

A search of the National Native Title Register was undertaken in March 2024. The search confirmed there is one registration for Native Title Claim by the Gomeroi People (Tribunal File No: NC2011/006/ Federal Court file no. NSD37/2019) that includes the Activity area (refer to **Appendix B**).

Council would abide by any relevant native title requirements as necessary under the *Native Title Act 1993*.

3.6 Confirmation of Statutory Position

An assessment of the relevant statutory provisions and planning instruments has concluded that the proposed Activity can be carried out as development without consent under the State Environmental Planning Policy (Transport and Infrastructure) 2021 and can be assessed and determined under Part 5, Division 5.1 of the EP&A Act.

4. Notification and Consultation

4.1 Community Consultation

No community consultation has been undertaken to date. Notice of proposed works and road changes would be given to adjoining/ affected properties and road users prior to works commencing. Roadworks and changed access conditions would be detailed on Council's website, via road signage, and on social media.

4.2 State Environmental Planning Policy (Transport and Infrastructure) 2021 – Consultation

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State. Part 2 of the Transport and Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development.

Pursuant to Section 2.17 (1)(c) (exceptions) of the Transport and Infrastructure SEPP, Sections 2.10–2.12 and 2.14 do not apply with respect to the development to the extent that (as relevant), they would require notice to be given to a council or public authority that is carrying out the development or on whose behalf it is being carried out. Given the Proposal is being carried out by or on behalf of TRC, and TRC is the determining authority, these Sections do not apply.

Section 2.13 contains provisions requiring consultation with the State Emergency Service (SES) for development with impacts on flood liable land, including development without consent under Division 17 (roads and traffic). As the land is mapped as being located within the Flood Planning Area within the TRLEP, consultation with the SES was undertaken.

A consultation letter was sent to the NSW SES on 30 November 2023. A response from SES to the notification was received within the 21-day notification period and is discussed further in **Section 5.7** and **Section 5.9**. Copies of the letter and response are attached at **Appendix C**.

4.3 Other Consultation

4.3.1 Crown Lands

TRC should consult with Crown Lands prior to works to confirm whether any licence or agreements are required prior to the commencement of works.

4.3.2 Aboriginal Community

Council would abide by any relevant native title requirements, including consultation, as necessary under the *Native Title Act 1993*.

The proposed Activity is to take place within an area which has been disturbed and modified. No significant risk or impact to Aboriginal heritage is expected. Consultation with the Aboriginal community is not required under point 5 (p.3) of the document *Due Diligence Code of practice for the protection of Aboriginal Objects 2010* (Department of Environment, Climate Change and Water, 2010; refer to **Section 5.2** for further details).

5. Environmental Assessment

5.1 Biodiversity

An ecological assessment carried out by North West Ecological Services in 2021 and is presented in **Appendix D**. This document has been reviewed by GeoLINK Ecologists against updated database searches and a new site visit was conducted by GeoLINK in November 2023. The site visit found no additional threatened species, ecological communities or legislative requirements that were not previously addressed in the 2021 report.

While the EPBC Act Protected Matters Search Tool (PMST) search did identify additional species (i.e. Southern Whiteface, South-eastern Glossy Black-Cockatoo, Blue-winged Parrot, South-eastern Hooded Robin, Diamond Firetail etc.), no habitat for the additional species occurs within the site.

5.1.1 Desktop Assessment

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) BioNet Atlas of NSW Wildlife and Commonwealth PMST database searches were completed in November 2023. BioNet searches encompassed a 20 km x 20 km grid centred on the site and PMST searches encompassed a 10 km radius on the site.

BioNet Atlas Search

BioNet search results identified records of one threatened flora species and 24 threatened fauna species listed under the BC Act (nine of which are also listed in the EPBC Act) within the search area (refer to **Appendix E**). The search results also identified 10 Threatened Ecological Communities (TECs) listed under the BC Act and four TECs under the EPBC Act which were recorded within the search area.

EPBC Protected Matters Report

The PMST identified 42 threatened species (30 fauna, 12 flora) and four TECs listed under the EPBC Act as being likely to occur within 10 km of the site. Relevant species are included in the potential occurrence assessments in **Appendix E**.

A total of 10 migratory species (which includes migratory marine birds, mammals, reptiles and fish, terrestrial birds and wetlands birds) listed under the EPBC Act were identified within the search area. The site does not comprise Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) defined important habitat for any of these species and therefore EPBC Act listed migratory species are not considered a constraint for the Activity.

Areas of Outstanding Biodiversity Value

A search of the BC Act indicates that no Areas of Outstanding Biodiversity Value occur at or in proximity to the site.

Key Fish Habitat/ Fisheries NSW Spatial Data

The waterway ‘Gaol Creek’ which traverses the site is mapped as Key Fish Habitat (KFH). No mapped threatened species habitat under the FM Act occurs within the site. A review of threatened species threatened populations, and endangered ecological communities (EECs) listed under the FM Act found that the site is associated with the EEC: Aquatic ecological community in the natural drainage systems of the lowland catchment of the Darling River. The study area is not associated with any other FM Act listed threatened entities.

Wildlife Corridors

The site does not form part of a regional or subregional wildlife corridor as per Scotts (2003).

5.1.2 Existing Environment

Vegetation

The riparian zone was observed to be highly degraded by historical clearing and weed invasion. The site was recorded with a high cover and diversity of weed species (11) and a low presence of natives (5). No trees or shrubs were in the works area. Due to the disturbed state of vegetation within the site, the vegetation does not correspond to any Plant Community Type (PCT) under the NSW BioNet Vegetation Classification System. No clearing of native vegetation community is expected as part of the Activity. The ground cover is dominated by exotic pasture plants including, Johnson Grass (*Sorghum halepense**), Blue Heliotrope (*Heliotropium amplexicaule**), and Feathertop Rhodes Grass (*Chloris virgata**) are serious environmental weeds present.

Threatened Flora

No threatened flora species listed under the BC Act and/ or EPBC Act were recorded at the time of the site visit.

Threatened Ecological Communities

No TECs occur within the site at the time of inspection.

FM Act Endangered Ecological Communities

Due to its elevation and position within the catchment of the Darling River, the waterway below the site is listed as an Endangered Ecological Community (EEC) under the FM Act. This stretch of Gaol Creek forms part of the Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River. Due to the ephemeral nature of Gaol Creek, it is unlikely that the Activity would pose a risk to this EEC.

Priority Weeds

The 2023 GeoLINK field assessment confirmed the presence of one North West region priority weed, Blackberry (*Rubus fruticosus spp. agg.*) listed under the *Biosecurity Act 2015*. Blackberry is managed under the following biosecurity duties:

- *Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Rubus fruiticosus species aggregate have this requirement, except for the varietals Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree.*
- *Land managers mitigate the risk of new weeds being introduced to their land. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found. Within core infestation: Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value.*

Threatened Fauna

No threatened fauna species listed under the BC Act and/ or EPBC Act were recorded at the site. The site provides minimal habitat for any listed threatened fauna species likely to occur within the locality, due to the lack of intact vegetation/ habitat within the site. No microbats were observed during the ecological assessment undertaken by North West Ecological Services in 2021.

An assessment of threatened species likely to be impacted are further assessed in **Appendix D** by North West Ecological Services in 2021. Overall due to the minimal impacts to biodiversity values as a result of the Activity, it is unlikely the Activity would significantly impact any threatened entity listed under the BC or EPBC Act.

5.1.3 Potential Impacts

Potential direct biodiversity impacts of the Activity include:

- The spread of environmental weeds to newly disturbed areas.
- Topsoil stripping and earthworks within the channel could impact a small area of Gaol Creek as part of the new bridge and abutment construction.
- Direct mortality or injury to fauna during vegetation clearing or bridge removal.

Potential indirect biodiversity impacts of the Activity include:

- Habitat degradation of adjacent habitat due to potential construction phase impacts (e.g. erosion and sedimentation impacts or chemical spills).
- Unintentional damage to adjacent habitat during clearing.

5.1.4 Conclusion

The proposed bridge replacements would not have a significant impact on threatened fauna or flora or migratory species. Apart from the stream, the road verges and construction area were found to have low conservation value for the threatened and migratory species likely to occur in the region.

5.1.5 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented in order to prevent adverse impacts relating to biodiversity:

1. Removal of native vegetation will be kept to the minimum required to complete the Activity.
2. Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges.
3. Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites.
4. Works would be undertaken in accordance with conditions outlined within an approved DPI Fisheries Permit (the DPI Fisheries Permit application will be prepared and submitted by TRC prior to the work commencing).
5. Erect silt curtain sediment traps below works in all drainage lines: where risks are increased with steeper slopes and larger catchments, multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions.
6. Under no circumstances are streams to be blocked or dammed, minimise temporary diversion.
7. If floating debris is likely, capture it by erecting a floating boom downstream of the works.
8. To prevent weed seed dispersal, ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds.

Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion.

9. No mature or hollow trees are to be removed. No instream logs or debris will be removed.
10. Where possible retain the debris from clearing and construction in the works area to provide habitat.
11. There is to be no blasting within the streams.
12. If unexpected threatened flora or fauna is detected, then stop works immediately and notify the TRC Project Manager who would then contact an ecologist to determine the most appropriate course of action.
13. Contact an animal rescue agency/ wildlife care group or vet in the event that native fauna are injured. WIRES Central Northern: 1300 094 737.

5.2 Aboriginal Heritage

5.2.1 Existing Environment

A basic search of the Aboriginal Heritage Information Management System (AHIMS) (NSW Department of Planning and Environment) was undertaken in March 2024 (refer to **Appendix G**). The search shows two registered items/ places of Aboriginal significance; however, these are both more than 1 km from the Activity sites.

5.2.2 Potential Impacts

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (Department of Climate Change, Energy, the Environment and Water, 2010) provides an assessment process to determine if the proposed activity may harm Aboriginal objects and to determine whether an Aboriginal Heritage Impact Permit (AHIP) is required. An overview of an application of the Due Diligence Code of Practice for the Protection of Aboriginal Objects is presented at **Table 5.1**.

Table 5.1 Generic Due Diligence Process

Step		Comment
1	Will the activity disturb the ground surface or any culturally modified trees? Disturbed land is defined under the code as: *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable.* *Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.*	The ground surface would be disturbed by the Activity; however, the construction works would occur within the disturbed land of the road reserve and where the existing bridge was constructed. A site compound and laydown area has been proposed at Wiliam Street west of Gill Street and is land that has previously been cleared of vegetation as part of the adjacent sports grounds. Therefore, the site is already modified and disturbed, including the location of the site compound and laydown area. The new culvert crossing would be constructed within the existing disturbed road alignment and the scour protection would occur in an area that would have been previously disturbed when the existing bridge was constructed and partly in an area that undergoes continued disturbance. No culturally modified trees would be disturbed.

Step		Comment
2	Are there any: a) Relevant confirmed site records or other associated landscape feature information on AHIMS? and/ or b) Any other sources of information of which a person is already aware? and/ or c) Landscape features that are likely to indicate presence of Aboriginal objects? Landscape features include: ■ Within 200 m of waters. ■ Located within a sand dune system. ■ Located on a ridge top, ridge line or headland. ■ Located within 200 m below or above a cliff face. ■ Within 20 m of or in a cave, rock shelter, or a cave mouth. ■ Is on land that is not disturbed land. If after completing steps 2a and 2b it is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity, you can proceed with caution without applying for an AHIP.	a) An AHIMS search was undertaken for the site. Search results indicate that there are no Aboriginal sites or Aboriginal places recorded within 1 km of the Activity (refer to **Appendix G**). b) Tim Hill, who has done previous Aboriginal Cultural Heritage Assessment Reports (ACHARs) for other sites associated with the Fixing Country Bridges program in the Tamworth Regional LGA, and has provided advice that there is low probability of objects occurring within the waterway/ creek beds and immediate banks and when within 200 m of water, the increase in the likelihood of finding Aboriginal artefacts is when the location is above the flood channel (refer to **Appendix H**). c) While the works are located near a watercourse, the works are not located within a sand dune system, ridge top, ridge line or headland. The site is not within 200 m of a cliff face or within 20 m of a cave, rock shelter or cave mouth. The land upon which the Activity is proposed is unlikely to retain any potential undiscovered archaeological sites or heritage items.

Given the above, it is reasonable to conclude that there are no known Aboriginal site/ objects at the site, and it is unlikely that objects/ sites would occur. The due diligence process indicates the proposed Activity is not anticipated to impact upon Aboriginal heritage and can proceed without further assessment or applying for an Aboriginal Heritage Impact Permit (AHIP).

Safeguards and mitigation measures would be implemented to minimise potential adverse impacts to any undiscovered items of Aboriginal heritage.

5.2.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented in order to prevent adverse impacts to any items of Aboriginal heritage:

14. All personnel working on site will be inducted and receive information on the required process, should a potential Aboriginal object be found.
15. Unexpected Aboriginal objects remain protected by the NPW Act. If any such objects, or potential objects, are uncovered in the course of the activity, work in the vicinity must cease, and Heritage NSW, and T LALC be contacted for advice.
16. If suspected Aboriginal objects have been uncovered as a result of construction within the Activity area, the following actions must be undertaken:
    a. work in the surrounding area is to stop immediately and records are made of the finds via project incident reporting procedures;
    b. a temporary fence is to be erected around the site and appropriate controls put in place to ensure that no additional ground disturbance happens in the vicinity of the find;

c. an appropriately qualified archaeological consultant and a representative of the Tamworth LALC are to be engaged to identify the material and provide an initial assessment of the significance of the object and the likely nature and extent of any associated archaeological sites;
d. if the material is found to be of Aboriginal origin, the find must be reported on the AHIMS database;
e. in the event that the aboriginal objects are considered to have been damaged or disturbed, the incident must be reported through the NSW Environment hotline, and
f. works may only recommence after advice from Heritage NSW on the requirement for an AHIP or where design, engineer or construction measures are identified to mitigate further damage to the Aboriginal site.

17. If suspected human remains are discovered and/ or harmed in, on or under the land within the Activity area, the following actions must be undertaken:
    a. The remains must not be harmed/ further harmed.
    b. Immediately cease all works at that particular location.
    c. Secure the area so as to avoid further harm to the remains.
    d. Notify the nearest Police Station (Tamworth) as soon as practicable and provide any details of the remains and their location.
    e. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the site for criminal activities, the Aboriginal community (Tamworth LALC) and Heritage NSW (Parramatta) should be notified and consulted as to how the remains should be dealt with.
    f. Do not recommence any work at the Activity site until after an agreement is reached between all parties, provided it is in accordance with all parties' statutory obligations.

5.3 Non-Aboriginal Heritage

5.3.1 Existing Environment

Searches of the Australian Heritage Database (Department of Climate Change, Energy, the Environment and Water, 2023), the NSW State Heritage Inventory (NSW Department of Planning and Environment, 2023), and environmental heritage schedule of the TRLEP (Schedule 5) indicated that no known non-Aboriginal heritage items are within the vicinity of the Activity. The closest locally listed heritage item is the Moonbi War Memorial Hall and Recreation Reserve (I245 in the TRLEP), located approximately 800 m south of Mick Maher's Bridge and approximately 400 m south of the ancillary site at William Street and Gill Street.

5.3.2 Potential Impacts

The Activity would not impact any known non-Aboriginal heritage sites or items. The main potential non-Aboriginal heritage impact is associated with unexpected finds, which is also considered low risk and can be managed.

5.3.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented in order to prevent adverse impacts to any items of non-Aboriginal heritage:

18. Should non-Aboriginal heritage items be uncovered during works, all works in the vicinity of the find will cease and TRC and NSW Heritage will be contacted. Works will not re-commence until appropriate clearance has been received.

19. If any items defined as relics under the *NSW Heritage Act 1977* are uncovered during the works, all works will cease in the vicinity of the find and TRC Project Manager will be contacted immediately. Works will not re-commence until appropriate clearance has been received.

5.4 Visual

5.4.1 Existing Environment

The existing environment within the vicinity of the Activity is disturbed agricultural land with forested area occurring along the riparian zone. The wider area surrounding the Activity consists of rural residential properties, agricultural landscape, and forested areas. The quality of the visual environment associated with the Activity is moderate with value at a local scale.

5.4.2 Potential Impacts

There would be temporary local visual impacts during construction as a result of the presence of machinery, plant and equipment, and general construction activities. This is considered temporary and short-term in nature.

Following construction, the visual amenity of the Activity area would have been subject to limited change. The timber bridge would be replaced with a concrete culvert and scour protection, resulting in a modest change of look at the crossing. The existing approach along the road to the bridge presents a paved roadway with a concrete bridge surface, which would be similar to the concrete culvert design. The main visual difference would be from the side view where the timber elements would be replaced with concrete. This view change could impact one nearby resident; however, existing vegetation within the vicinity would be expected to soften the visual change.

Overall, the visual quality of the environment is considered to undergo limited visual change following completion of the Activity with the local visual character and values remaining intact.

5.4.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to visual amenity:

20. All working areas would be maintained, kept free of rubbish, and cleaned up at the end of each working day.
21. Vegetation removal would be minimised and limited to the extent necessary to achieve the design requirements of the works.
22. Upon completion of the works, any works areas would be restored to an acceptable visual state.

5.5 Bushfire

5.5.1 Existing Environment

According to the NSW Government's ePlanning Spatial Viewer (NSW Department of Customer Service, 2020), the Activity is mapped mostly as Vegetation Category 3 and partly at Vegetation Buffer (refer to **Figure 5.1**). Vegetation Category 3 is considered to be medium bush fire risk vegetation (NSW Rural Fire Service, 2015).

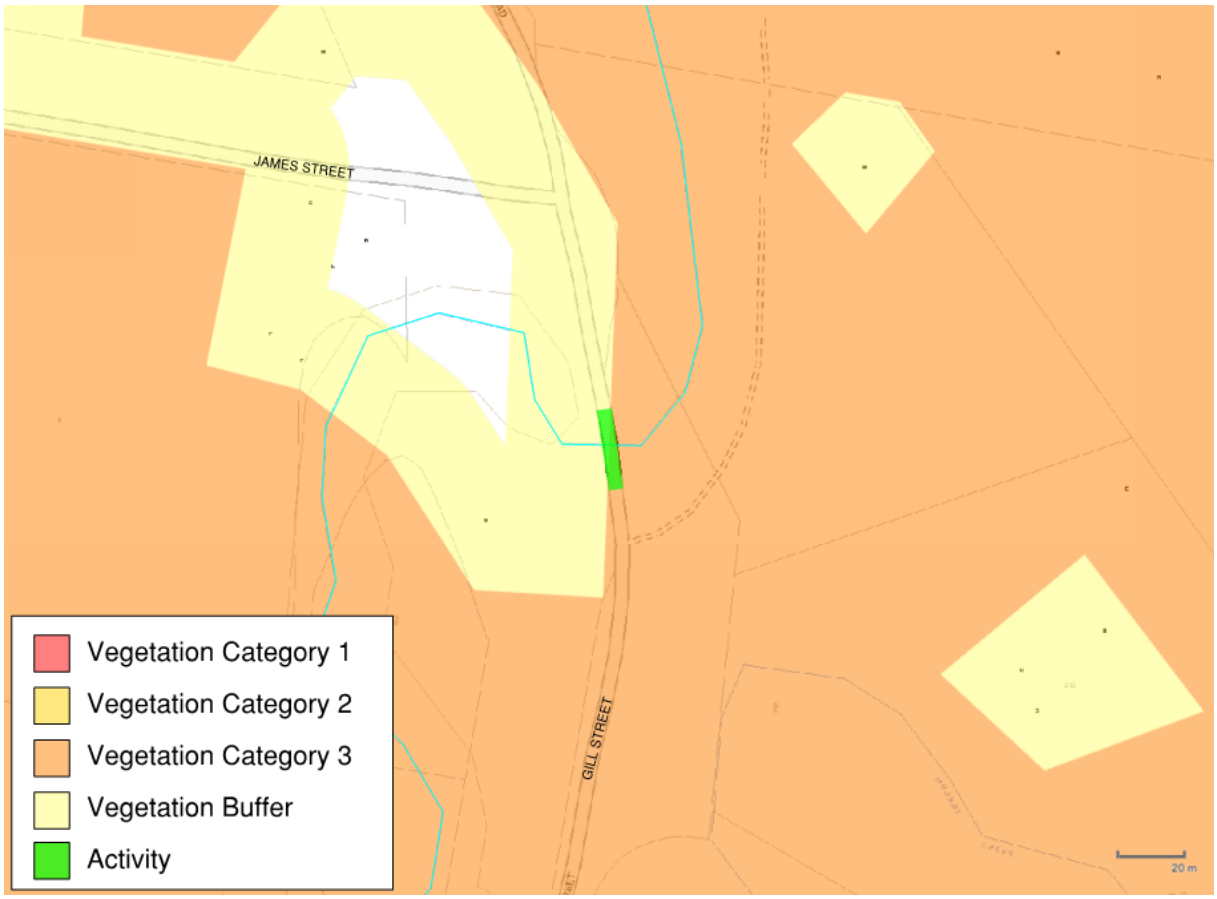


Figure 5.1 Activity area Bush Fire Risk Map

5.5.2 Potential Impacts

Given the site context and the nature of the Activity, the expected risk from bushfire is considered relatively minor. Evacuation routes via established roads would be utilised in an emergency situation. James Street would be expected to have been repaired prior to the commencement of the Activity works to maintain evacuation routes.

The Activity is not a Special Fire Protection Purpose and does not require a bushfire safety authority under Section 100B of the *Rural Fires Act 1997*. The Activity is not considered to increase bushfire risk.

5.5.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented in order to prevent adverse impacts relating to bushfire:

23. Works that are likely to cause a fire, such as general purpose hot works (welding, grinding or gas cutting), or any activity that is likely to produce a spark or flame are not to be carried on days with an elevated fire danger or a total fire ban in effect.
24. A fire extinguisher will be available on machinery for quick response if ignition occurs. All personnel will be made aware of the location of the extinguisher and trained in its effective deployment.
25. The contractor/ site manager is to maintain awareness of bushfire emergency information, in particular during a bushfire danger period, and be aware of all current bushfire alerts in the wider vicinity of the Activity area.

26. James Street will be repaired prior to the commencement of the Activity to provide access routes from north of the Activity.

5.6 Soils, Erosion and Contamination

5.6.1 Existing Environment

The site visit conducted by GeoLINK indicated that the Activity area may be dominated by Sodosols, likely derived from Moonbi Monzogranite parent material (Offenberg, 1971). At the time of site inspection the soils in Gaol Creek were observed to be predominantly silty sand texture with a defined gully formed where water typically flows during low flow events (refer to **Plate 2.4** in **Section 2.3**).

The eSpade Soils mapping also indicates that the area is mapped is Sodosol soils. Sodosols typically have light sandy topsoil and a clay subsoil, they often have dense and coarsely structured subsoils that are sodic and usually disperse strongly in water. As such disturbance of these soils will need to be appropriately managed as part of the Activity works.

A search of the contaminated land record of notices (NSW Environment Protection Authority, 2024) was undertaken to identify the presence of contaminated land within the Activity area. No known contaminated land exists within or proximate to the Activity area.

A search of the cattle dip site locator database (NSW Department of Primary Industries, 2024) was undertaken to identify the presence of operating or historical cattle dip sites within the Activity area. No known operating or historical cattle dip sites exist within or proximate to the Activity area.

A search of the Naturally Occurring Asbestos dataset (Department of Regional NSW, 2015) was undertaken to identify the presence of naturally occurring asbestos soils and regolith within the Activity area. No known naturally occurring asbestos soils or regolith exist within or proximate to the Activity area.

The Activity areas are not impacted by acid sulfate soils as per the NSW Planning Portal Spatial Viewer.

A search of the Hydrogeological Landscapes of NSW and the ACT dataset (NSW Department of Planning and Environment, 2023) was undertaken to identify the salinity hazard within the Activity area. The Activity area is understood to have a very low salinity hazard.

The Activity is situated at an elevation of 477 mAHD within gently undulating rises and plains.

5.6.2 Potential Impacts

5.6.2.1 Land Contamination

The Activity would impact a previously modified area that has historically been disturbed for the installation and maintenance of the existing roadway and bridge. There is no proposed change in land use, nor evidence to suggest that contamination is likely to be present. Safeguards would be implemented to ensure that any unexpected potential exposure of contaminated material would be dealt with effectively and in accordance with EPA and/ or TRC policy and guidelines.

During construction, spills of lubricants, oils and fuels may impact the soils locally. Contamination of soils with these materials may reduce permeability and shear strength and may reduce the potential for contaminated soils to be rehabilitated successfully (Sakshi, Singh, & Haritash, 2019).

The potential impacts to land contamination as a result of the Activity are limited to the construction phase, and no significant increase in contamination risk is anticipated as a result of the Activity post construction.

5.6.2.2 Soil and Erosion Control

The mean rate of soil erosion within Australia is estimated to be approximately 10-1000 mm per thousand years (Bui, Hancock, Chappell, & Gregory, 2010). This net loss of fertile topsoil reduces the productive capacity of land and exports nutrients into waterways (Yang, Leys, Zhang, & Gray, 2023);eroded sediment entering waterways may then increase the turbidity and trophic status of downstream waters, increasing the likelihood of algal blooms, deoxygenation, and increased mortality rates for aquatic organisms (Henly, Patterson, Neves, & Lemly, 2000).

The Activity may potentially experience erosion and sedimentation impacts due to soil exposure during bridge demolition and culvert construction. As well as impacting on biodiversity (refer to **Section 5.1**) and visual amenity (refer to **Section 5.4**), the exposure of soil may increase the potential volume of material eroded by wind (Fryrear, 1985) and rainfall (Renard, Foster, Weesies, & Porter, 1991).

5.6.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented in order to prevent adverse impacts relating to soils, erosion and contamination:

27. A site-specific erosion and sediment control plan (ESCP) will be developed, approved and implemented prior to commencement of the works.
28. Erosion and sediment controls (ESC's) will be implemented in accordance with the Landcom/ Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book) (Landcom, 2004) and will be maintained to prevent sediment moving off-site and sediment laden water entering any water course during the construction process.
29. The ESCP will incorporate appropriate management methods for dealing with potentially dispersive material.
30. Works will only commence once all erosion and sediment controls have been established. The controls will be maintained in place until the works are complete and all exposed erodible materials are stabilised.
31. ESC's will be inspected at least weekly for damage or accumulation of sediment, and after each rain event. Records of inspection should be kept on file.
32. If unexpected contaminated land is encountered during the works, works will stop immediately, and relevant procedures outlined in a Construction Environmental Management Plan (CEMP) will be followed. The EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of *the Protection of the Environment Operations Act 1997* (PoEO Act) (via EPA Environment Line on 131 555).
33. Only clean equipment and vehicles will be used, with equipment being cleaned down before being brought to the site.
34. All concrete washouts are to be lined and located at least 50 m away from any watercourse or drainage line.

5.7 Water Quality and Flooding

5.7.1 Existing Environment

5.7.1.1 Surface Water

The Activity crosses Gaol Creek, which at the point of intersection with Gill Street is a 4th order tributary stream. Gaol Creek forms part of the Peel/ Namoi catchment and converges with Moonbi Creek approximately 60 m south of the Activity area.

Gaol Creek within the vicinity of the Activity is mapped as key fish habitat (NSW Department of Primary Industries, 2023).

The waterways are located within the Flood Planning Area as described in the TRLEP.

At the time of site inspection the surface water in Gaol Creek was flowing with low turbidity in the vicinity of the proposed Activity location (refer to **Plate 2.4** in **Section 2.3**).

5.7.1.2 Groundwater

The groundwater below the Activity forms part of the Peel Fractured Rock Water Source. The groundwater is understood to have a low to moderate connection with surface water (NSW Office of Water, 2010).

5.7.2 Potential Impacts

The Activity could present risks to Gaol Creek and downstream waterways if not managed effectively. Construction activities that could present a risk to sensitive environments in the broader landscape include:

- Erosion and sediment disturbance that could disperse from the site and impact local drainage lines and waterways.
- Turbidity and sedimentation of local aquatic habitats and waterways.
- Pollution of local water quality (both ground and surface water) from pollutants from machinery and construction materials and spills.
- A variety of dispersible liquid materials would be used which pose a potential pollutant threat to local water quality. These liquids include, but are not limited to, diesel, unleaded petrol, machinery oils and lubricants. The nature of these liquids and their ability to disperse away from the work site means that they could have a negative impact on ground or surface water on or adjacent to the site, especially during rain.
- Concrete materials and concrete laden wastewaters have the potential to enter drainage lines and waterways, where they may result in elevated pH, increased concentrations of phosphates, nitrates, and heavy metals (e.g., lead), and higher levels of turbidity in nearby waterways.
- Periods of high rainfall or flood could exacerbate potential water quality impacts if works are in progress during such an event.

Whilst the Activity could pose these risks, such risks can be suitably avoided, minimised, and managed by implementing appropriate mitigation measures and timing works to outside high risk periods. With appropriate mitigation measures in place during construction, the Activity is considered unlikely to present significant risk to nearby water environments in the surrounding area.

The Activity would not adversely affect the biophysical, hydrological, or ecological integrity of the waterways in the surrounding area, nor would it significantly impact or alter the quantity and quality of surface and ground water flows to and from such.

Consultation with the NSW SES was undertaken as part of the Transport and Infrastructure SEPP requirements and the advice has been incorporated into the safeguards and mitigation measures (refer to **Appendix C**). The Activity would not alter the hydrological or flooding regime of the area.

The potential impacts to water quality as a result of the Activity are limited to the construction phase, and no significant increase in risk of impact to water quality, nor riparian or wetland environments, is anticipated as a result of the Activity post construction.

5.7.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to water quality and flooding:

35. Works will avoid forecast high rainfall events and works will be planned to occur during a period of no or low flow.
36. Any accumulated water inside the Activity works area will be de-watered in accordance with methods stipulated in the ESCP and CEMP.
37. All clean water will divert around the site where possible, where not possible, appropriate ESC's will be established to manage suitable water flow through this site, including accounting for high flow events.
38. No stockpiles or material will be stored in the high water mark of the Activity area. All construction materials and equipment must be located outside the designated flood zone.
39. A spill containment kit will be available during the works. All personnel will be made aware of the location of the kit and trained in its effective deployment.
40. Any required fuels and other liquids will be stored in self-safe chemical storage containers and outside the high water mark.
41. If required, all refuelling of plant and equipment will be in appropriately designated areas away from drainage lines or watercourses (at least 40 m) and managed in order to prevent any potential spills leaving the refuelling area (e.g., use of bunded areas).
42. Cleaning or washing will not occur near waterways or drainage lines.
43. All equipment will be maintained in good working order and operated according to manufacturer's specification.
44. No waste and/ or wastewater will be discharged directly or indirectly in waterways.
45. If small amounts of groundwater are encountered as a result of excavations, it will be pumped out and discharged to the surrounding area utilising appropriate de-watering controls in accordance with the BLUE book.
46. Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/ slicks) within construction site and adjacent area will be undertaken on a regular basis to identify any potential spills or deficient erosion and sediment controls during construction.
47. The Council and EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the PoEO Act (via EPA Environment Line on 131 555).
48. During site works, the contractor will check the Bureau of Meteorology website prior to the start of the workday for any Flash Flood Warnings and consider closing the worksite and securing all materials and equipment if there is a risk of riverine or flash flooding.
49. Ensure any imported material along with any excess material is removed from the site, temporarily stockpiled at a laydown and is appropriately secured during a weather event.
50. Ensure workers and people using the bridge during and after the Activity are award of the flood risk, for example by using signage.
51. Provide notification to NSW SES where there are likely to be significant delays in the operation of the roads affected by the Activity.
52. An emergency management procedure should be developed for the Activity site that details emergency preparation and management measures for any flood or fire events that may occur in the area. This procedure would form part of the CEMP.

5.8 Noise and Vibration

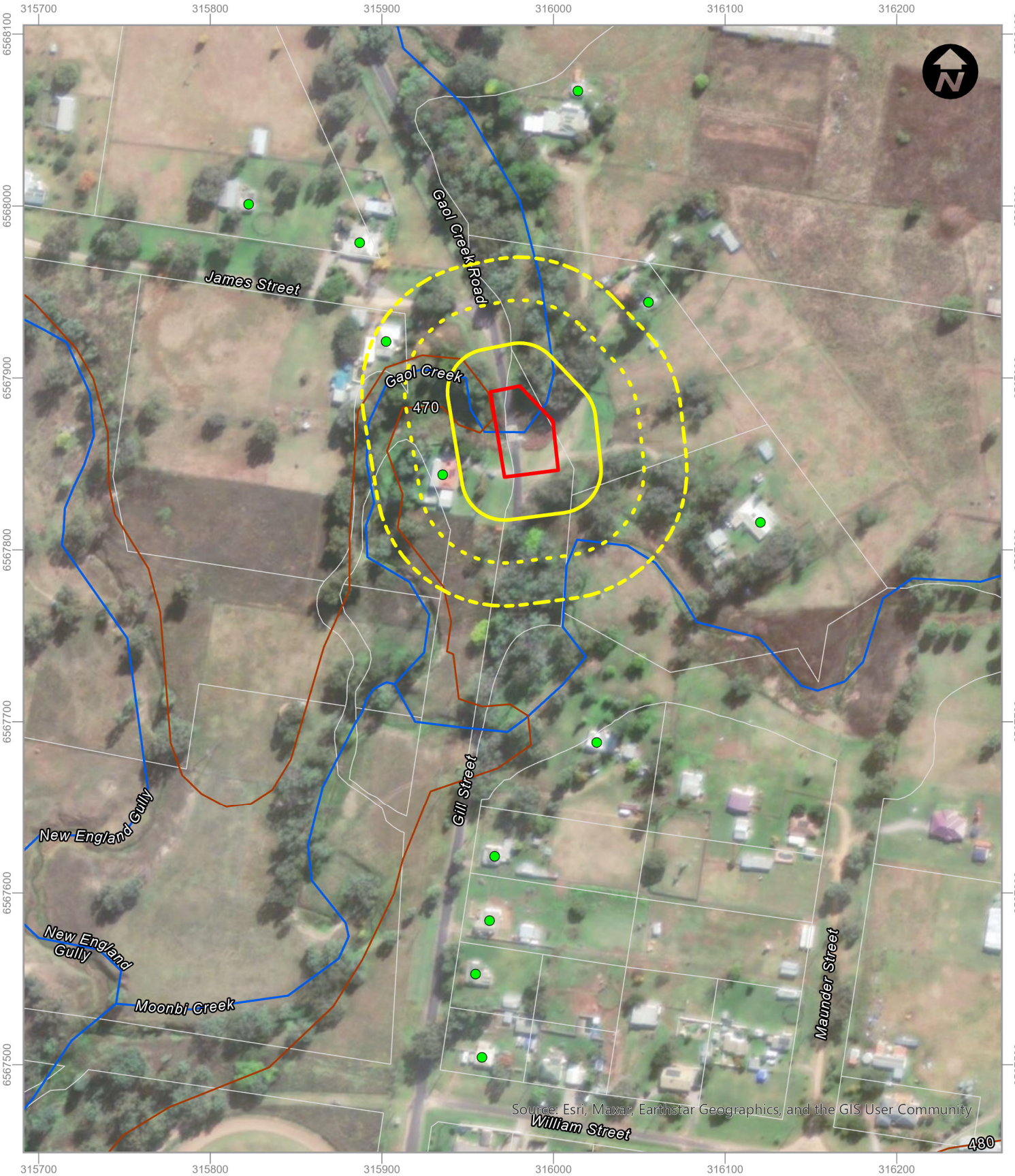
5.8.1 Existing Environment

The Activity site is located within a rural landscape and surrounded by residential dwellings, it is subject to existing noise associated with agricultural activities; traffic noise would also be generated from Gill Street/ Gaol Creek Road and the Oxley/ New England Highway approximately 880 m to the south-east of the Activity.

The closest sensitive receiver (dwelling) is immediately adjacent to the Activity. The remaining sensitive receivers in close proximity are listed in **Table 5.2**. There is also block of lots to the south with the closest of those residents approximately 150 m south of the Activity. Refer to **Illustration 5.1**.

Table 5.2 List of sensitive receivers in close proximity

Receiver	Distance and direction from bridge
Residential	Immediately adjacent
Residential	70 m north-west
Residential	80 m north-east
Residential	90 m east
Residential	110 m north-west
Residential	130 m north of the site



LEGEND

- Extent of work
- Cadastre

Distance (m) from the extent of work

- 25
- 50
- 75

- Contours at 10m intervals
- Watercourse
- Sensitive receiver

0 60 Metres

Sensitive Receivers - Illustration 5.1

GeoLINK environment | engineering | planning | design

Review of Environmental Factors - Mick Mahers Bridge
4740-1014

Information shown is for illustrative purposes only
Drawn by: AEA Checked by: AB Reviewed by: MCZ
Source of base data: ESRI World Imagery
Date: 13/03/2024

5.8.2 Potential Impacts

Noise from the Activity would be typical of that associated with road construction work and would result from the use of plant and machinery, work vehicles, earthworks, and infrastructure installation.

Under the EPA's Interim Construction Noise Guidelines:

- The noise management level for works during the recommended standard hours is background + 10 dB(A). Above this noise level, the proponent needs to implement all feasible and reasonable work practices, as defined in the Guideline, to minimise noise impacts.
- For works outside the recommended standard hours, the noise management level is background + 5 dB(A).
- The highly noise-affected level of LAeq 75 dB(A) represents the point above which there may be strong community reaction to noise and indicates a need to consider other feasible and reasonable ways to reduce noise, such as restricting the times of very noisy works to provide respite to affected residences.

A distance-based assessment of noise has been undertaken using the Transport for NSW Construction and Maintenance Noise Estimator Tool (TfNSW 2022; refer to **Appendix I**). The background noise was determined to be 40 dB(A) during the day. The assessment found that moderately intrusive noise levels (60 dB(A)) would affect sensitive receivers within a distance of 75 m of the Activity during the construction phase and notification in the form of a letterbox drop or equivalent is recommended to the sensitive receivers that fall within this distance. The assessment also found that one of the sensitive receivers falls within the highly affected proximity of within 20 m, being the property immediately adjacent to the Activity. The measures recommended for this highly affected sensitive receiver is notification (letterbox drop or equivalent), phone calls, and a respite offer. During construction noise would be audible, however, if safeguards and mitigation measures are implemented no significant noise impacts are expected.

Adverse vibration impacts resulting from the Activity are not expected based on the recommended minimum working distances for vibratory roller plant (TfNSW 2023); however, depending on the size of the plant used there is potential for a human response to the vibration. Therefore, it is recommended to notify and consult with the closest sensitive receiver to mitigate and manage their expectations and concerns.

The Activity would be of a short-term duration and all works would be undertaken during standard construction hours. Appropriate noise and vibration management measures would be documented in a Construction Environmental Management Plan (CEMP) and implemented to minimise the impact and ensure receivers are informed of the works.

No long-term adverse noise and vibration impacts are expected to result from the Activity.

5.8.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to noise and vibration:

53. The sensitive receivers within 75 m to the Activity (refer to **Illustration 5.1**) would be given advance notice (minimum 5 days) of the works and potential disruptions including details of the work activities, time periods over which these will occur, impacts, and mitigation measures.
54. The sensitive receiver immediately adjacent to the Activity would, in addition to the advance notice mentioned above, be consulted via phone call and offered a respite offer. Where practicable, the Activity is to accommodate reasonable requests of the adjacent sensitive receiver, to be negotiated prior to the commencement of construction.

55. Construction activities will be undertaken in within standard construction hours:

    - Monday to Friday 7:00 am to 6:00 pm.
    - Saturday 8:00 am to 1:00 pm.
    - No work on Sundays or public holidays.

56. Where practicable, noise control should occur at the source and modifications to noise control should be investigated and implemented, such as sourcing low noise power tools or hydraulic or electrically controlled equipment instead of petrol or pneumatic equipment.
57. The most appropriately sized tool for the respective job will be used, keeping in mind that the smaller the tool, the less potential noise generated.
58. All vehicles and equipment will be turned off and not left idling when not required for work uses.
59. All plant will be fitted with appropriate exhaust systems to ensure compliance with pollution and noise emission standards.
60. Any noise complaints will be recorded and include suitable identification/ description of the noise source (e.g. continual/ impulsive) and general location of the complaint. Any noise complaints will be investigated and actioned as required.

5.9 Traffic, Access and Parking

5.9.1 Existing Environment

Gaol Creek Road is a single lane (<5 m width) sealed road with no posted speed limit (refer to **Plate 5.1**). North of Mick Maher's Bridge, Gaol Creek Road continues as a sealed road for approximately 3 km before changing to an unsealed road and then terminating. The nearest residential access to Gaol Creek Road on the north side of Mick Maher's Bridge is via James Street.

Gill Street is also a is a single lane (<5 m width) sealed road with no posted speed limit (refer to **Plate 5.2**). There are two driveway entrances off Gill Street approximately 15 m south of the bridge, which would be within the Activity area (refer to **Appendix A**).

All traffic related to this Activity would be accessing the site from the southern direction, Gill Street, which connects to the Oxley/ New England Highway via Charles Street intersection approximately 1 km south of the Activity area.

*source: (Google LLC, 2024)

Plate 5.1 Goal Creek Road Existing Condition

*source: (Google LLC, 2024)

Plate 5.2 Gill Street Existing Condition

5.9.2 Potential Impacts

During demolition and construction works, Mick Maher's Bridge would be closed with a detour via James Road, which would add under five minutes of additional travel time for those accessing the north side of Mick Maher's Bridge and Gaol Creek Road. At the time of writing this report, James Street is closed due to required culvert repairs (refer to **Plate 5.3**). This assessment assumes the repairs would be completed prior to the Activity at Mick Maher's Bridge commencing.

The two driveways located immediately south of Mick Maher's Bridge provide access to one residence on the west side and three residences on the east side. Based on the design drawings (refer to **Appendix A**), the Activity extends to the south beyond these driveways and would result in access for the residents to be cutoff; therefore, alternative access to these properties is to be established. Consultation with the affected properties is to occur prior to construction. The preferred solution would be to provide access for these residents outside the Activity, traveling alongside the works and within the road reserve. If access through the Activity is required for these residents to reach their driveways, then a Traffic Control Plan and traffic control measures would need to be established. Driveway access will also need to be kept clear of plant, equipment, and material laydowns.

Consultation with the NSW SES was undertaken as part of the Transport and Infrastructure SEPP requirements (refer to **Appendix C**). In their response, SES asked for notification to be provided where there are likely to be significant delays in the operation of the roads affected by the upgrades. This would include notification about accessing the driveways, and subsequent residences, located within the Activity.

Provided safeguards and mitigation measures are in place, disturbance to local traffic during the construction phase would be temporary and not significant. No operation phase traffic impacts are expected.

The Activity would have a long-term positive impact for local traffic by maintaining road infrastructure and improving safety.

Plate 5.3 James Street Road Closure

5.9.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to traffic, access and parking:

61. Construction for the Activity will not commence until the repairs to James Street have been completed.
62. Consultation with the affected properties whose driveway access would be impacted by the Activity is to occur prior to the commencement of construction.
63. Based on how access to residences will be maintained during the Activity, if required, works will be undertaken under an approved Traffic Control Plan (TCP) and private driveway access will be maintained during the works through the use of traffic control measures.
64. Regard to public safety will be maintained at all times.
65. Advanced warning signage would be established at appropriate and strategic locations, prior to and during the work to ensure road users and pedestrians are made aware of changed traffic/ access conditions.
66. All traffic closures/ disruptions/ changed road conditions would be communicated to road users in accordance with Council via suitable means/ media, including use of, but not limited to, letters, social media, Council website, Livetraffic website, and VMS boards.
67. Prior notification will be provided to emergency services providers, advising of the temporary road closure and of the access changes to driveways immediately south of Mick Maher's Bridge.

5.10 Air Quality

5.10.1 Existing Environment

The Activity is located in a rural environment and is close to a waterway and residential properties. Potential airborne particles within the locality are largely restricted to minor dust generated by vehicle movements and agricultural activities in the broader landscape.

5.10.2 Potential Impacts

The Activity may temporarily affect air quality in a minor way through exhaust emissions from machinery and associated transportation. There may also be minor dust generated during earthworks and the removal of the existing bridge and sediments. Given the temporary duration of the works and nature of the Activity, the level of potential impact is not considered significant and can be managed or minimised through implementation of standard mitigation measures.

The Activity would contribute to greenhouse gas emissions to a minor extent via the emissions from construction vehicles, as well as the consumption of materials requiring carbon emissions. Given the scale of the works, the influence on greenhouse gas emissions will be negligible. However, it is appropriate to implement measures that can reduce or minimise such effects.

5.10.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to air quality:

68. Vegetation or other materials will not be burnt on-site.
69. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.
70. Construction works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
71. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle.
72. Vehicles, machinery, and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulation.
73. Dust suppression techniques would be utilised to minimise the potential for dust generation/ dispersal during works, as required.
74. Any complaints will be responded to within a timely manner to address resident concerns.

5.11 Waste

The existing Mick Maher's Bridge would be removed as part of the Activity as such a substantial of amount of demolition waste include wood, concrete and metal would be generated as part of the Activity works.

5.11.1 Potential Impacts

Waste generated from the construction of the Activity may include, but is not limited to:

- Bridge demolition materials.
- Packaging materials.

- General site rubbish.
- Oils and grease from machinery.
- Spoil material from excavation.

Waste has the potential to disperse into the surrounding environment and cause potential harm to stock and terrestrial and aquatic flora and fauna. Waste products may also transport contaminants that may degrade local water quality (e.g. fuels, lead-based paint and oils). This risk can be reduced and managed through the implementation of safeguards.

5.11.2 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to waste:

75. Working areas will be maintained, kept free of rubbish, and cleaned up at the end of each day.
76. Resource management hierarchy principles are to be followed:
    - Avoid unnecessary resource consumption as a priority.
    - Avoidance is followed by resource recovery (including re-use of materials, reprocessing, recycling, and energy recovery).
    - Disposal is undertaken as a last resort.
77. Waste material will not be left on-site once the works have been completed.
78. Concrete washout waste material is to be removed as soon as possible after use on site.
79. Any contaminated waste generated would be disposed of in accordance with the EPA approved methods of waste disposal.
80. Waste will be disposed of at a licensed waste or recycling facility as appropriate.

5.12 Socio-economic

5.12.1 Existing Environment

The Activity site comprises the existing Mick Maher's Bridge on Gaol Creek Road. The road provides access to the north to a number of residential properties for approximately 4 km before terminating. The road and associated infrastructure are of socio-economic value for the local residents.

The Activity would be located within the existing formed road corridor and does not require any permanent realignment of the road. There is Crown land on the adjoining lot to the east of the existing bridge.

5.12.2 Potential Impacts

The Activity is expected to take approximately eight weeks to complete, weather permitting, with the road closed during this time. No businesses or school buses would be impacted by the closure.

At the time of writing this document, the street required for the proposed detour requires repairs and this REF has assumed the repairs would be completed prior to this Activity commencing construction (refer to **Section 5.9**). The detour adds less than five minutes of travel time and is considered a negligible impact. A sidetrack is not considered an economical option for this area due to topographical constraints and environmental risks (e.g. flooding).

Following completion of the Activity, normal operation of Gaol Creek Road would resume and there would be no operational impacts to transport. The replacement culvert/ bridge structure would benefit

the local residents by replacing the existing dilapidated timber bridge with structurally sound and safe long-life concrete crossing.

Given the nature of the Activity and the site context no other adverse long-term socio-economic impacts are anticipated.

Overall, the Activity would have a positive socio-economic impact by maintaining the local road infrastructure and safety.

Safeguards and mitigations in this section and throughout this REF would assist in reducing the risks of negative socio-economic impacts of the Activity.

5.12.3 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse socio-economic impacts:

81. Contractors/ workers will be mindful of the needs of the local community.
82. Any potentially impacted parties or landholders, including those whose driveways will be blocked, will be consulted prior to construction with a goal of minimising or eliminating any adverse impacts.
83. Any changes to public or private roads (including private driveways) as a result of the works will be reinstated to an acceptable standard upon completion of the works.
84. Any complaints will be responded to within a timely manner to address resident concerns.

5.13 Climate Change

Human activities, such as the burning of fossil fuels, the clearing of land, and the production of food, have warmed the atmosphere, ocean, and land since pre-industrial times (Eyring, et al., 2021). Anthropogenic greenhouse gas emissions and their associated impacts on the climate are listed as a key threatening process under the EPBC Act (Department of Climate Change, Energy, the Environment and Water, 2022) and the *Threatened Species Conservation Act 1995*.

Construction works involve the use of fossil fuels and non-renewable products that may potentially contribute to future climate issues.

5.13.1 Potential Impacts

Only minor vegetation disturbance is anticipated due to the Activity, which would have a negligible impact on reducing the amount of carbon dioxide otherwise captured during photosynthesis by the local vegetation.

In addition to potentially placing greater strain on existing waste infrastructure (refer to **Section 5.11**), any waste not beneficially reused would indirectly result in carbon emissions being generated by either its remanufacture or transport.

The Activity would also contribute to carbon emissions and anthropogenic climate change to a minor extent via the production of greenhouse gas emissions by construction equipment and traffic.

Given the scale of the works, the influence on emissions and climate change would be negligible. However, it is appropriate to implement measures that can reduce or minimise cumulative emissions and related effects.

5.13.2 Safeguards and Mitigation Measures

The following safeguards and mitigation measures will be implemented to prevent and/ or minimise adverse impacts relating to climate change:

85. Vehicles and equipment will be switched off when not required for direct construction activities.
86. Waste will be minimised and is otherwise to be recycled or disposed of appropriately.
87. Vegetation removal will be minimised as far as practical.

5.14 Ecologically Sustainable Development

The objectives of the EP&A Act require that the principles of Ecologically Sustainable Development (ESD) are considered and evaluated in the environmental assessment process and in the determination of a development application. Whilst a development application is not required for this project, consideration of these principles is useful.

5.14.1 Precautionary Principle

The EP&A Regulation 2021 defines the precautionary principle as the following:

> *If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

To satisfy the precautionary principle, this REF has conducted a thorough analysis of potential environmental, economic and social concerns. This assessment has identified and examined potential impacts and developed appropriate mitigation measures and safeguards to help avoid and/ or minimise impacts and safeguard the environment. Considering this assessment's findings, the Activity is unlikely to impose significant and/ or long-term adverse impacts on the environment, economy, or community. The mitigation measures and safeguards outlined in this REF would be implemented to ensure sound environmental outcomes in all aspects of the Activity.

5.14.2 Inter-generational Equity

The EP&A Regulation 2021 defines inter-generational equity as the following:

> *That the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

The Activity would not significantly affect the viability of threatened species, or any TECs or other environmental resources including water, soil and air. Therefore, local environmental values would not be substantially adversely affected by the Activity and would be maintained for future generations. The Activity would have positive socio-economic effects in relation to maintenance of access and existing road infrastructure.

5.14.3 Conservation of Biological Diversity and Ecological Integrity

The EP&A Regulation 2021 defines the conservation of biological diversity and ecological integrity as the following:

> *That conservation of biological diversity and ecological integrity should be a fundamental consideration.*

The impacts to ecological integrity and conservation of biological diversity at the site have been assessed as part of this REF. No threatened species, endangered populations or TECs are likely to be significantly affected by the Activity. No populations of native species are likely to be made locally rare or unviable as a result of the Activity. Consequently, the ecological integrity and biological diversity would be maintained locally.

5.14.4 Improved Valuation, Pricing and Incentive Mechanisms

The EP&A Regulation 2021 defines improved valuation, pricing and incentive mechanisms as the following:

> *That environmental factors should be included in the valuation of assets and services.*

It is difficult to assign a monetary value to the environment of a locality or to environmental resources not considered for commercial use. The proponent has taken an approach to manage the potential environmental impacts of the Activity by identifying appropriate measures and safeguards to avoid or mitigate adverse environmental effects. This would ensure that the integrity of the environment is not degraded, is managed and where possible enhanced.

5.15 Cumulative Impacts

Under Section 171 of the EP&A Regulation 2021, any cumulative environmental effect with other existing or likely future activities must be taken into account when assessing the impact of an activity for the purposes of Part 5 of the EP&A Act.

The Activity is expected to add to a number of cumulative impacts including resource consumption, land disturbance and generation of greenhouse gas emissions (e.g. through operation of vehicles and equipment, use of resources). However, the relevant mitigation measures stated throughout **Section 5** and the methodology for completion of the Activity aim to minimise the extent to which it contributes to cumulative adverse environmental impacts.

There are no other known significant developments or works that would coincide with the proposed Activity that have the potential to result in adverse cumulative amenity and environmental impacts. No significant cumulative impacts are expected.

6. Environmental Management

6.1 Summary of Safeguards and Mitigation Measures

The following table provides a summary of the mitigation measures detailed in this report that would be implemented for the Activity. The identified measures would be incorporated by the Contractor into a detailed CEMP prior to commencement of works, which also outlines how risks would be minimised and the construction processes would be undertaken and managed. The objective of the CEMP is to outline parameters for site management practices during construction. All construction staff and site personnel would be inducted and made aware of their obligations working on the project, their environmental responsibilities, and the safeguard measures to avoid and minimise potential impacts. Induction and toolbox talks would commence early in the program and continue as new personnel/ contractors are engaged.

Table 6.1 Summary of Safeguards and Mitigation Measures

Environmental Attribute	Safeguards/ Mitigation Measures
Biodiversity	1. Removal of native vegetation will be kept to the minimum required to complete the Activity. 2. Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges. 3. Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites. 4. Works would be undertaken in accordance with conditions outlined within an approved DPI Fisheries Permit (the DPI Fisheries Permit application will be prepared and submitted by TRC prior to the work commencing). 5. Erect silt curtain sediment traps below works in all drainage lines: where risks are increased with steeper slopes and larger catchments, multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions. 6. Under no circumstances are streams to be blocked or dammed, minimise temporary diversion. 7. If floating debris is likely, capture it by erecting a floating boom downstream of the works. 8. To prevent weed seed dispersal, ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds. Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion. 9. No mature or hollow trees are to be removed. No instream logs or debris will be removed. 10. Where possible retain the debris from clearing and construction in the works area to provide habitat. 11. There is to be no blasting within the streams. 12. If unexpected threatened flora or fauna is detected, then stop works immediately and notify the TRC Project Manager who would then contact an ecologist to determine the most appropriate course of action. 13. Contact an animal rescue agency/ wildlife care group or vet in the event that native fauna are injured. WIRES Central Northern: 1300 094 737.
Aboriginal Heritage	14. All personnel working on site will be inducted and receive information on the required process, should a potential Aboriginal object be found. 15. Unexpected Aboriginal objects remain protected by the NPW Act. If any such objects, or potential objects, are uncovered in the course of the

Environmental Attribute	Safeguards/ Mitigation Measures
	activity, work in the vicinity must cease, and Heritage NSW, and T LALC be contacted for advice. 16. If suspected Aboriginal objects have been uncovered as a result of construction within the Activity area, the following actions must be undertaken: a. work in the surrounding area is to stop immediately and records are made of the finds via project incident reporting procedures; b. a temporary fence is to be erected around the site and appropriate controls put in place to ensure that no additional ground disturbance happens in the vicinity of the find; c. an appropriately qualified archaeological consultant and a representative of the Tamworth LALC are to be engaged to identify the material and provide an initial assessment of the significance of the object and the likely nature and extent of any associated archaeological sites; d. if the material is found to be of Aboriginal origin, the find must be reported on the AHIMS database; e. in the event that the aboriginal objects are considered to have been damaged or disturbed, the incident must be reported through the NSW Environment hotline, and f. works may only recommence after advice from Heritage NSW on the requirement for an AHIP or where design, engineer or construction measures are identified to mitigate further damage to the Aboriginal site. 17. If suspected human remains are discovered and/ or harmed in, on or under the land within the Activity area, the following actions must be undertaken: a. The remains must not be harmed/ further harmed. b. Immediately cease all works at that particular location. c. Secure the area so as to avoid further harm to the remains. d. Notify the nearest Police Station (Tamworth) as soon as practicable and provide any details of the remains and their location. e. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the site for criminal activities, the Aboriginal community (Tamworth LALC) and Heritage NSW (Parramatta) should be notified and consulted as to how the remains should be dealt with. f. Do not recommence any work at the Activity site until after an agreement is reached between all parties, provided it is in accordance with all parties' statutory obligations.
Non-Aboriginal Heritage	18. Should non-Aboriginal heritage items be uncovered during works, all works in the vicinity of the find will cease and TRC and NSW Heritage will be contacted. Works will not re-commence until appropriate clearance has been received. 19. If any items defined as relics under the *NSW Heritage Act 1977* are uncovered during the works, all works will cease in the vicinity of the find and TRC Project Manager will be contacted immediately. Works will not re-commence until appropriate clearance has been received.
Visual	20. All working areas would be maintained, kept free of rubbish, and cleaned up at the end of each working day. 21. Vegetation removal would be minimised and limited to the extent necessary to achieve the design requirements of the works. 22. Upon completion of the works, any works areas would be restored to an acceptable visual state.
Bushfire	23. Works that are likely to cause a fire, such as general purpose hot works (welding, grinding or gas cutting), or any activity that is likely to produce

Environmental Attribute	Safeguards/ Mitigation Measures
	a spark or flame are not to be carried on days with an elevated fire danger or a total fire ban in effect. 24. A fire extinguisher will be available on machinery for quick response if ignition occurs. All personnel will be made aware of the location of the extinguisher and trained in its effective deployment. 25. The contractor/ site manager is to maintain awareness of bushfire emergency information, in particular during a bushfire danger period, and be aware of all current bushfire alerts in the wider vicinity of the Activity area. 26. James Street will be repaired prior to the commencement of the Activity to provide access routes from north of the Activity.
Soils, Erosion and Contamination	27. A site-specific erosion and sediment control plan (ESCP) will be developed, approved and implemented prior to commencement of the works. 28. Erosion and sediment controls (ESC's) will be implemented in accordance with the Landcom/ Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book) (Landcom, 2004) and will be maintained to prevent sediment moving off-site and sediment laden water entering any water course during the construction process. 29. The ESCP will incorporate appropriate management methods for dealing with potentially dispersive material. 30. Works will only commence once all erosion and sediment controls have been established. The controls will be maintained in place until the works are complete and all exposed erodible materials are stabilised. 31. ESC's will be inspected at least weekly for damage or accumulation of sediment, and after each rain event. Records of inspection should be kept on file. 32. If unexpected contaminated land is encountered during the works, works will stop immediately, and relevant procedures outlined in a Construction Environmental Management Plan (CEMP) will be followed. The EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of *the Protection of the Environment Operations Act 1997* (PoEO Act) (via EPA Environment Line on 131 555). 33. Only clean equipment and vehicles will be used, with equipment being cleaned down before being brought to the site. 34. All concrete washouts are to be lined and located at least 50 m away from any watercourse or drainage line.
Water Quality and Flooding	35. Works will avoid forecast high rainfall events and works will be planned to occur during a period of no or low flow. 36. Any accumulated water inside the Activity works area will be de-watered in accordance with methods stipulated in the ESCP and CEMP. 37. All clean water will divert around the site where possible, where not possible, appropriate ESC's will be established to manage suitable water flow through this site, including accounting for high flow events. 38. No stockpiles or material will be stored in the high water mark of the Activity area. All construction materials and equipment must be located outside the designated flood zone. 39. A spill containment kit will be available during the works. All personnel will be made aware of the location of the kit and trained in its effective deployment. 40. Any required fuels and other liquids will be stored in self-safe chemical storage containers and outside the high water mark. 41. If required, all refuelling of plant and equipment will be in appropriately designated areas away from drainage lines or watercourses (at least 40 m) and managed in order to prevent any potential spills leaving the refuelling area (e.g., use of bunded areas).

Environmental Attribute	Safeguards/ Mitigation Measures
	42. Cleaning or washing will not occur near waterways or drainage lines. 43. All equipment will be maintained in good working order and operated according to manufacturer's specification. 44. No waste and/ or wastewater will be discharged directly or indirectly in waterways. 45. If small amounts of groundwater are encountered as a result of excavations, it will be pumped out and discharged to the surrounding area utilising appropriate de-watering controls in accordance with the BLUE book. 46. Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/ slicks) within construction site and adjacent area will be undertaken on a regular basis to identify any potential spills or deficient erosion and sediment controls during construction. 47. The Council and EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the PoEO Act (via EPA Environment Line on 131 555). 48. During site works, the contractor will check the Bureau of Meteorology website prior to the start of the workday for any Flash Flood Warnings and consider closing the worksite and securing all materials and equipment if there is a risk of riverine or flash flooding. 49. Ensure any imported material along with any excess material is removed from the site, temporarily stockpiled at a laydown and is appropriately secured during a weather event. 50. Ensure workers and people using the bridge during and after the Activity are award of the flood risk, for example by using signage. 51. Provide notification to NSW SES where there are likely to be significant delays in the operation of the roads affected by the Activity. 52. An emergency management procedure should be developed for the Activity site that details emergency preparation and management measures for any flood or fire events that may occur in the area. This procedure would form part of the CEMP.
Noise and Vibration	53. The sensitive receivers within 75 m to the Activity (refer to **Illustration 5.1**) would be given advance notice (minimum 5 days) of the works and potential disruptions including details of the work activities, time periods over which these will occur, impacts, and mitigation measures. 54. The sensitive receiver immediately adjacent to the Activity would, in addition to the advance notice mentioned above, be consulted via phone call and offered a respite offer. Where practicable, the Activity is to accommodate reasonable requests of the adjacent sensitive receiver, to be negotiated prior to the commencement of construction. 55. Construction activities will be undertaken in within standard construction hours: – Monday to Friday 7:00 am to 6:00 pm. – Saturday 8:00 am to 1:00 pm. – No work on Sundays or public holidays. 56. Where practicable, noise control should occur at the source and modifications to noise control should be investigated and implemented, such as sourcing low noise power tools or hydraulic or electrically controlled equipment instead of petrol or pneumatic equipment. 57. The most appropriately sized tool for the respective job will be used, keeping in mind that the smaller the tool, the less potential noise generated. 58. All vehicles and equipment will be turned off and not left idling when not required for work uses. 59. All plant will be fitted with appropriate exhaust systems to ensure compliance with pollution and noise emission standards.

Environmental Attribute	Safeguards/ Mitigation Measures
	60. Any noise complaints will be recorded and include suitable identification/ description of the noise source (e.g. continual/ impulsive) and general location of the complaint. Any noise complaints will be investigated and actioned as required.
Traffic, Access and Parking	61. Construction for the Activity will not commence until the repairs to James Street have been completed. 62. Consultation with the affected properties whose driveway access would be impacted by the Activity is to occur prior to the commencement of construction. 63. Based on how access to residences will be maintained during the Activity, if required, works will be undertaken under an approved Traffic Control Plan (TCP) and private driveway access will be maintained during the works through the use of traffic control measures. 64. Regard to public safety will be maintained at all times. 65. Advanced warning signage would be established at appropriate and strategic locations, prior to and during the work to ensure road users and pedestrians are made aware of changed traffic/ access conditions. 66. All traffic closures/ disruptions/ changed road conditions would be communicated to road users in accordance with Council via suitable means/ media, including use of, but not limited to, letters, social media, Council website, Livetraffic website, and VMS boards. 67. Prior notification will be provided to emergency services providers, advising of the temporary road closure and of the access changes to driveways immediately south of Mick Maher's Bridge.
Air Quality	68. Vegetation or other materials will not be burnt on-site. 69. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation. 70. Construction works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely. 71. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle. 72. Vehicles, machinery, and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulation. 73. Dust suppression techniques would be utilised to minimise the potential for dust generation/ dispersal during works, as required. 74. Any complaints will be responded to within a timely manner to address resident concerns.
Waste	75. Working areas will be maintained, kept free of rubbish, and cleaned up at the end of each day. 76. Resource management hierarchy principles are to be followed: – Avoid unnecessary resource consumption as a priority. – Avoidance is followed by resource recovery (including re-use of materials, reprocessing, recycling, and energy recovery). – Disposal is undertaken as a last resort. 77. Waste material will not be left on-site once the works have been completed. 78. Concrete washout waste material is to be removed as soon as possible after use on site. 79. Any contaminated waste generated would be disposed of in accordance with the EPA approved methods of waste disposal. 80. Waste will be disposed of at a licensed waste or recycling facility as appropriate.
Socio-economic	81. Contractors/ workers will be mindful of the needs of the local community.

Environmental Attribute	Safeguards/ Mitigation Measures
	82. Any potentially impacted parties or landholders, including those whose driveways will be blocked, will be consulted prior to construction with a goal of minimising or eliminating any adverse impacts. 83. Any changes to public or private roads (including private driveways) as a result of the works will be reinstated to an acceptable standard upon completion of the works. 84. Any complaints will be responded to within a timely manner to address resident concerns.
Climate Change	85. Vehicles and equipment will be switched off when not required for direct construction activities. 86. Waste will be minimised and is otherwise to be recycled or disposed of appropriately. 87. Vegetation removal will be minimised as far as practical.

6.2 Licensing and Other Approvals

As Gaol Creek at the Activity is mapped as key fish habitat, a permit under Part 7 of the FM Act will be required.

7. Summary of Consideration of Environmental Factors

7.1 Section 171 Checklist (NSW Legislation)

As part of its obligation under Section 5.5 of the EP&A Act, the determining authority is required to take into account, to the fullest extent possible, all matters likely to affect the environment. The determining authority is required by Section 171 of the Environmental Planning and Assessment Regulation 2021 to give consideration to a number of factors that are listed below. **Table 7.1** provides a summary of the key issues relevant to each factor and the key mitigation measures proposed.

Table 7.1 Section 171 Checklist (NSW Legislation)

	Factor	Impact
a	**The Environmental Impact on a Community**	
	The community would not be affected by declines in the local environment as a result of the Activity. Mitigation measures have been designed to reduce environmental impacts on the community to negligible levels.	Nil to Negligible
b	**The Transformation of a Locality**	
	The Activity will result in a minor change to the locality.	Minor
c	**The Environmental Impact on the Ecosystems of the Locality**	
	No vegetation of significance will be removed to allow for the Activity. The impact of that vegetation removal is discussed in this REF. Extensive mitigation measures have been designed to reduce environmental impacts.	Minor
d	**Reduction of the Aesthetic, Recreational, Scientific or Other Environmental Quality or Value of a Locality**	
	Although the aesthetic will be different, it is expected that the change in aesthetic quality of the locality will be minor. No reduction in the quality of the environment will occur due to the mitigation measures detailed in this REF. No significant changes to the locality will occur.	Negligible
e	**The Effects on a Locality, Place or Building Having Aesthetic, Anthropological, Archaeological, Architectural, Cultural, Historical, Scientific or Social Significance or Other Special Value for Present or Future Generations**	
	The Activity will not impact existing land uses. There will be no significant impacts to heritage, visual amenity or social significance and as such impacts are therefore considered to be negligible.	Nil to Negligible
f	**The Impact on the Habitat of Protected Fauna (Within the Meaning of the *Biodiversity Conservation Act 2016***)	
	With effective implementation of the mitigation measures provided in this REF, the Activity is not considered likely to have a significant negative impact on the habitat of any other protected fauna.	Nil to Negligible
g	**The Endangering of any Species of Animal, Plant or Other Form of Life Whether Living on Land, in Water or in the Air**	
	With effective implementation of the mitigation measures provided in this REF, the Activity is not considered likely to significantly endanger any species of animal, plant or other form of life.	Nil to Negligible

	Factor	Impact
h	**Long-Term Effects on the Environment**	
	No negative long-term impacts will occur in the locality given the implementation of the proposed mitigation measures in this REF.	Nil to Negligible
i	**Degradation of the Quality of the Environment**	
	Degradation of the quality of the environment is not expected. With the mitigation measures in this REF, any impacts are unlikely to be substantial.	Negligible
j	**Risk to the Safety of the Environment**	
	No negative long-term impacts will occur in the locality given the implementation of the mitigation measures in this REF.	Nil to Negligible
k	**Reduction in the Range of Beneficial Uses of the Environment**	
	The Activity will not result in any reduction in the range of beneficial uses of the environment.	Nil
l	**Pollution of the Environment**	
	The Activity has minor potential to affect water quality during the works. The mitigation measures will minimise the duration and impact. Given the proposed mitigation measures detailed in this REF and all waste being disposed within an appropriate/ approved waste disposal facility, pollution to the environment will be minimised.	Minor
m	**Environmental Problems Associated with the Disposal of Waste**	
	Any wastes would be disposed of in a manner which would not damage or disturb any native flora or fauna or the physical environment. The disposal of such waste would be within a waste management facility in accordance with EPA approved methods of waste disposal. Mitigation measures detailed in this REF would protect the environment from problems associated with waste disposal.	Nil to Negligible
n	**Increased Demands on Resources (Natural or Otherwise) that are likely to Become in Short Supply**	
	The Activity does not create any demand for resources that are in short supply nor is it likely to result in an increased demand on any natural resources that are likely to become in short supply.	Negligible
o	**The Cumulative Environmental Effect with Other Existing or Likely Future Activities**	
	The Activity would have minor cumulative impacts (e.g., resource consumption; greenhouse gas emissions; vegetation loss) but is unlikely to significantly contribute to any cumulative impacts.	Nil to Negligible
p	**The impact on coastal processes and coastal hazards, including those under projected climate change conditions**	
	The Activity could contribute to cumulative impacts to a negligible extent (e.g., greenhouse gas emissions, consumption of resources) contributing to climate change and associated impacts, however there would be no direct impact on coastal process or hazards.	Nil to Negligible
q	**Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1**	
	Not applicable	Nil
r	**Other relevant environmental factors**	
	Nil	Nil

7.2 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth Legislation)

The EPBC Act protects/ regulates matters of national environmental significance (MNES), including:

- World Heritage.
- National heritage places.
- Wetlands of international importance.
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. A database search was completed in November 2023 encompassing a 10 km radius search area from the centre of the proposed Activity (refer to **Appendix F**). Search results following the site assessment are considered in **Table 7.2**.

Table 7.2 EPBC Act Considerations

Matter	Impact
Any impact on a World Heritage property?	
No World Heritage properties occur at or proximal to the site.	Nil
Any impact on a National Heritage place?	
No National Heritage places occur at or proximal to the site.	Nil
Any impact on a wetland of international importance?	
Three wetlands of international importance (Ramsar Sites) were identified in the database search, being Banrock Station Wetland Complex, Riverland, and the Coorong, and Lakes Alexandrina and Albert Wetland. All three of these sites are located in South Australia and are far from the Activity. None of the wetlands are anticipated to be impacted.	Nil
Any impact on nationally threatened species and ecological communities?	
Habitat for four TECs, 42 threatened species and 10 migratory species were listed within the 10 km search area. No Commonwealth listed threatened flora, fauna or TECs are likely to be significantly affected by the Activity (refer to biodiversity assessment at **Section 5.1**) and mitigation measures have been provided to minimise any potential impacts. No marine habitat would be impacted.	Minor
Any impact on a Nationally Important Wetland?	
No nationally important wetlands occur at or near the site. Nationally Important Wetlands are not likely to be affected by the Activity.	Nil
Any impact on Migratory species?	
Based on the minor nature of the works, no listed migratory species are likely to be significantly affected by the Activity (refer to **Section 5.1**).	Nil to negligible
Any impact on a Commonwealth marine area?	
No Commonwealth marine areas occur at or near the site.	Nil
Any impact on the Great Barrier Reef Marine Park?	

Matter	Impact
The Great Barrier Reef Marine Park is distant from the site.	Nil
Does the Proposal involve a nuclear action (including uranium mining)?	
The Activity does not involve a nuclear action.	Nil
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	
The Activity does not involve any impact on a water resource, in relation to coal seam gas development and large mining development.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	
The Activity is not expected to impact upon such land.	Nil

The assessment of the impact of the Activity on MNES and the environment of Commonwealth land has found that there is unlikely to be significant impact on relevant MNES. Accordingly, the Activity does not require referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW).

8. Conclusion and Certification

The Activity is the replacement of the existing timber Mick Maher's Bridge with a concrete culvert bridge.

The Activity is permitted without development consent and subject to assessment under Part 5 of the EP&A Act. This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed Activity. The Activity would result in some impacts; however, these are not likely to be significant and can be effectively managed/ ameliorated through the implementation of the safeguards and mitigation measures recommended in this REF.

The Activity described will not affect areas of outstanding biodiversity value or Wilderness Areas. The Activity is unlikely to significantly affect threatened species or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement (or Biodiversity Development Assessment Report (BDAR) if the Proponent elected) is not required. The Activity is also unlikely to affect Commonwealth land or have a significant impact on any matters of national environmental significance in relation to the EPBC Act.

I certify to the best of my knowledge that:

- this REF provides a true and fair review of the Activity in relation to its potential effects on the environment, and
- the assessment satisfies the requirements of Sections 5.5 to 5.7 of the EP&A Act, the Division 5.1 Guidelines, Section 171 of the EP&A Regulation 2021, and other relevant legislation and guidelines, and
- the assessment has been adequately completed, and
- subject to the inclusion of the safeguards/ measures included in this REF, it is reasonable to conclude that the project will not likely have a significant impact on the environment during both the construction and operation phases, and
- given the impacts of the Activity are not likely to be significant, an Environmental Impact Statement is not required under Section 5.7 of the EP&A Act, and
- a Species Impact Statement or BDAR is not required, and
- the Activity does not warrant/ require referral to the Australian Department of Agriculture, Water and the Environment under the EPBC Act, and
- the Activity is not State Significant Infrastructure and does not require approval under Division 5.2 of the EP&A Act.

REF Prepared by	
Signature:	
Name:	Michelle Campione-van Zetten
Position:	Environmental Planner
REF Reviewed by	
Signature:	
Name:	Lauren Buchanan
Position:	Senior Environmental Scientist

9. Determining Authority Sign Off

Determining Authority Certification

I certify to the best of my knowledge and on behalf of Tamworth Regional Council that:

☒ Based on the completed REF and my knowledge of the project, the assessment has been adequately completed, the project has predictable impacts which would not be significant, the conclusion as to the likely environmental impact of the project is reasonable, and the project can proceed subject to the relevant measures and conditions in this REF, any approval, license or permit.

☐ The project requires additional environmental assessment.

Reasons:

Enter Reasons.

☐ The project should not proceed in its current form.

Reasons:

NOTE: A site visit may be required depending on the level of confidence and risk to the environment.

REF reviewed and endorsed by:	Mark Gardiner		
Signature		**Date:**	8 August 2024
Name	Peter Resch		
Position	Director Regional Services		
Determining Authority Name	Tamworth Regional Council		

References

Biodiversity Conservation Act 2016. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-2016-063

Biosecurity Act 2015. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-2015-024

Contaminated Land Management Act 1997. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1997-140

Department of Climate Change, Energy, the Environment and Water. (2023). Australian Heritage Database. Retrieved from http://www.environment.gov.au/cgi-bin/ahdb/search.pl

Department of Climate Change, Energy, the Environment and Water. (2022). Listed Key Threatening Processes. Retrieved from Species Profile and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl

Department of Climate Change, Energy, the Environment and Water. (n.d.). Protected Matters Search Tool. Retrieved from https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.671310915880834&zoom=5&baseLayers=Imagery,ImageryLabels

Department of Environment, Climate Change and Water. (2010). Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. Sydney: Department of Environment, Climate Change and Water. Retrieved from https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Aboriginal-cultural-heritage/due-diligence-code-of-practice-aboriginal-objects-protection-100798.pdf

Department of Regional NSW. (2015). Naturally Occurring Asbestos. Retrieved from https://datasets.seed.nsw.gov.au/dataset/naturally-occurring-asbestos

Environment Protection and Biodiversity Conservation Act 1999. Retrieved from https://www.legislation.gov.au/Details/C2021C00182

Environmental Planning and Assessment Act 1979. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1979-203

Eyring, V., Gillett, N. P., Achuta Rao, K. M., Barimalala, R., Barreiro Parrillo, M., Bellouin, N., . . . Sun, Y. (2021). Human Influence on the Climate System. In V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, . . . B. Zhou (Eds.), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 423–552). Cambridge and New York, United Kingdom and United States: Cambridge University Press. doi:10.1017/9781009157896.005.

Fairfull, S. and Witheridge, G. (2003). Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16 pp.

Fisheries Management Act 1994. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1994-038

Heritage Act 1977. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1977-136

Land Acquisition (Just Terms Compensation) Act 1991. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1991-022

National Parks and Wildlife Act 1974. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1974-080

Native Title Act 1993. Retrieved from https://www.legislation.gov.au/Details/C2023C00216

Native Title Tribunal. (undated). Native Title: an overview. Retrieved from http://www.nntt.gov.au/Information%20Publications/Native%20Title%20an%20overview.pdf

NSW Department of Customer Service. (2020). NSW Planning Portal Spatial Viewer. Retrieved from https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

NSW Department of Planning and Environment. (2023). State heritage inventory. Retrieved from https://www.environment.nsw.gov.au/topics/heritage/search-heritage-databases/state-heritage-inventory

NSW Department of Planning and Environment (DPE). (2022). Guidelines for Division 5.1 assessments. [Online]. Retrieved Nov 2023, from (https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/SSI-Guidelines/Guidelines-for-Division-51-assessments.pdf?la=en)

NSW Department of Planning and Environment. (2021). Anthropogenic Climate Change - key threatening process listing. Retrieved from https://www.environment.nsw.gov.au/Topics/Animals-and-plants/Threatened-species/NSW-Threatened-Species-Scientific-Committee/Determinations/Final-determinations/2000-2003/Anthropogenic-Climate-Change-key-threatening-process-listing

NSW Department of Planning and Environment. (n.d.). Aboriginal Heritage Information Management System. Retrieved from https://www.environment.nsw.gov.au/awssapp/login.aspx

NSW Department of Planning and Environment. (n.d.). BioNet Atlas of NSW Wildlife. Retrieved from https://www.environment.nsw.gov.au/atlaspublicapp/ui_modules/atlas_/atlassearch.aspx

NSW Department of Planning, Industry and Environment. (2020). Saving Our Species Hygiene Guidelines. Retrieved from https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Wildlife-management/saving-our-species-hygiene-guidelines-200164.pdf

NSW Department of Primary Industries. (2023). Cattle dip site locator. Retrieved from https://www.dpi.nsw.gov.au/animals-and-livestock/beef-cattle/health-and-disease/parasitic-and-protozoal-diseases/ticks/cattle-dip-site-locator

NSW Department of Primary Industries. (2023). Fisheries NSW Spatial Data Portal. Retrieved from https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

NSW Environment Protection Authority. (2023). Contaminated land record of notices. Retrieved from https://app.epa.nsw.gov.au/prclmapp/searchregister.aspx

Protection of the Environment Operations Act 1997. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1997-156

Roads Act 1993. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/act-1993-033

Scotts, D. (2003). Key Habitats and Corridors for Forest Fauna. Occasional Paper 32. NSW NPWS.

State Environmental Planning Policy (Biodiversity and Conservation) 2021. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0722

State Environmental Planning Policy (Planning Systems) 2021. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0724

State Environmental Planning Policy (Resilience and Hazards) 2021. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0730

State Environmental Planning Policy (Transport and Infrastructure) 2021. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732

Tamworth Regional Local Environmental Plan 2010. Retrieved from https://legislation.nsw.gov.au/view/html/inforce/current/epi-2011-0027

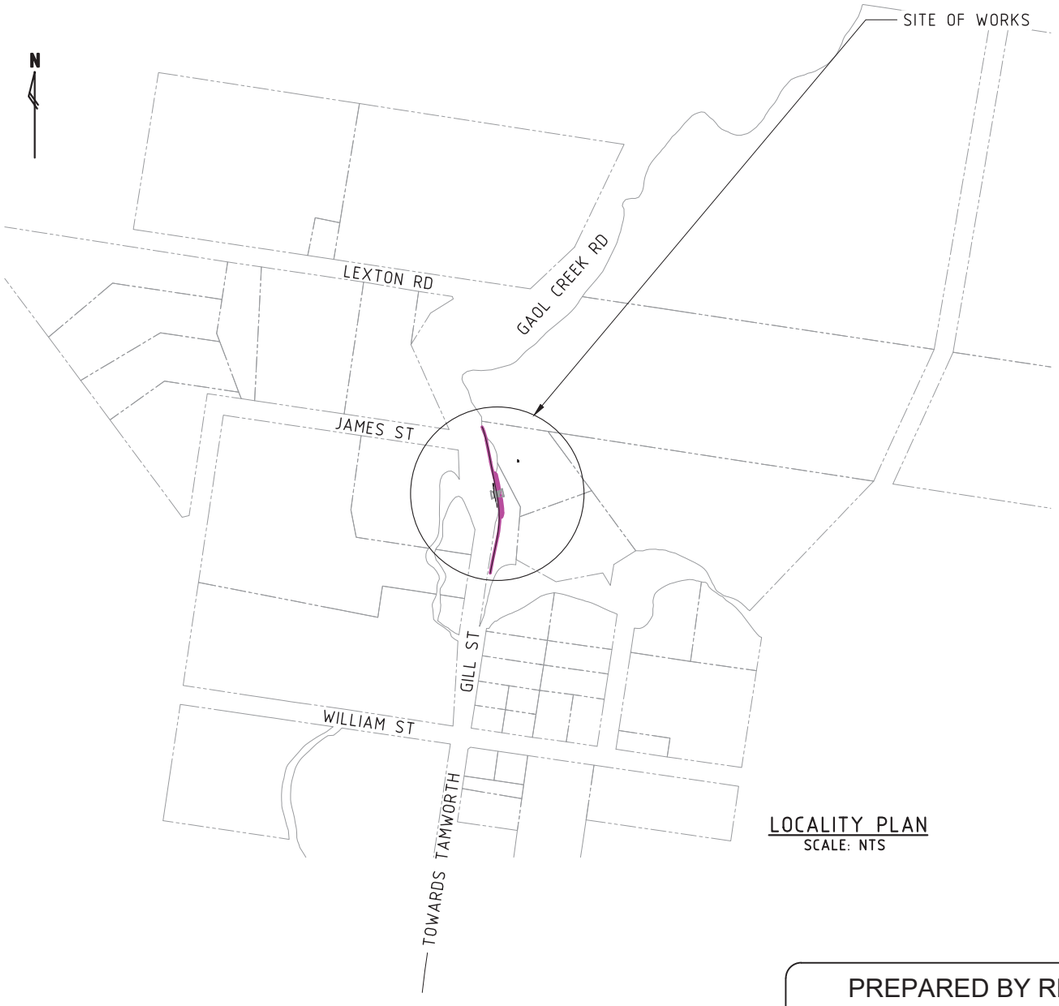
TfNSW (2022). Construction and Maintenance Noise Estimator Tool [Online] (https://roads-waterways.transport.nsw.gov.au/about/environment/reducing-noise/index.html). [Accessed October 2022].

Copyright and Usage

Appendix A

Design Drawings

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI
ISSUED FOR CONSTRUCTION



LOCALITY PLAN
SCALE: NTS

CULVERT DESIGN CRITERIA & LOADING
1: CULVERT AND BASE SLAB DESIGNED TO SM1600 LOADING
2: CULVERT DESIGNED FOR A 1% AEP EVENT
3: Q 1% AEP=85m^3/s
4: V 1% AEP=2.4m/s

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

"Take 5"

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

PREPARED BY REGIONAL SERVICES DIRECTORATE SURVEY & DESIGN

CLIENT APPROVAL

NAME	DIRECTORATE
L.MACKIEWICZ	REGIONAL SERVICES
SIGNATURE	DATE
L.MACKIEWICZ	22-08-23

ECM REF. 3440

DRAWING NO. 1323-001

SHEET INDEX

PLAN	DESCRIPTION	REV
1323-001	COVER SHEET	1
1323-002	SHEET INDEX, LEGEND, CONTROL TABLE AND BARRIER SCHEDULE	1
1323-003	TYPICAL SECTIONS AND PAVEMENT DETAILS	1
1323-010	OVERALL LAYOUT PLAN	1
1323-011	MC-01 LAYOUT PLAN CH020.000 - CH180.000	2
1323-012	MC-01 LONGITUDINAL SECTION CH020.000 - CH100.364	2
1323-013	MC-01 LONGITUDINAL SECTION CH100.364 - CH180.000	2
1323-020	MC-01 CROSS SECTION CH020.000 - CH080.000	2
1323-021	MC-01 CROSS SECTION CH100.000 - CH120.000	2
1323-022	MC-01 CROSS SECTION CH126.633 - CH140.000	2
1323-023	MC-01 CROSS SECTION CH160.000 - CH180.000	2
1323-030	SW-01 LAYOUT PLAN CH000.000 - CH035.101	2
1323-031	SW-01 LONGITUDINAL CH000.000 - CH035.101	2
1323-032	SW-01 CROSS SECTION CH000.000 - CH012.949	1
1323-033	SW-01 CROSS SECTION CH020.000 - CH35.101	1
1323-035	WM-01 LAYOUT PLAN & CONNECTION DIAGRAM	1
1323-036	WM-01 LONGITUDINAL SECTION CH0.000 - CH66.621	2
1323-037	CULVERT DETAIL SHEET 1 OF 2	2
1323-038	CULVERT DETAIL SHEET 2 OF 2	2
1323-039	WATERMAIN BRACKET DETAIL	1

CONTROL TABLE (MGA2020)

Point #	Easting	Northing	R.L.	Description
100	315959.667	6567829.105	471.484	Dumpy
101	316010.296	6567863.019	471.844	Dumpy
102	315945.797	6567933.928	473.918	Dumpy
103	315945.006	6567966.789	474.465	Dumpy

BARRIER SCHEDULE

LABEL ID	BARRIER TYPE	CONTROL STRING	START - CORRESPONDING MC-01 CH	END - CORRESPONDING MC-01 CH	LENGTH	APPROACH TERMINAL	TRAILING TERMINAL	COMMENT
SB1	MASH TL3 SAFETY BARRIER	MC-01	106.000	147.000	38.427m	MASH TL2 COMPLIANT END TERMINAL	MASH TL2 COMPLIANT END TERMINAL	TL4 ACROSS CULVERT LENGTH SEE SHEET 013 FOR BREAKDOWN; TRANSITION PIECE EITHER SIDE OF CULVERT. PROVIDE 22m STRIP FOOTING ACROSS CULVERT. SEE SHEET 036 FOR DIMENSIONS AND 030 FOR EXTENTS
SB2	MASH TL3 SAFETY BARRIER	MC-01	96.500	156.000	60.943m	MASH TL2 COMPLIANT END TERMINAL	MASH TL2 COMPLIANT END TERMINAL	TL4 ACROSS CULVERT LENGTH SEE SHEET 013 FOR BREAKDOWN. TRANSITION PIECE EITHER SIDE OF CULVERT. SEE SHEET 036 FOR DIMENSIONS AND 030 FOR EXTENTS
EXISTING SAFETY BARRIER - EX-SB4, EX-SB5	EXISTING SAFETY BARRIER	MC-01	122.500	131.000	8.000			DEMOLISH EXISTING SAFETY BARRIER

LEGEND

- EDGE OF BITUMEN — EB
- GAS MAIN AND PIT — GAS
- GATE, FENCE
- GUARD RAIL
- MAIL BOX
- OPTIC FIBRE (OPTUS) — OPTO
- OPTIC FIBRE (AARNET) — OPTP
- OPTIC FIBRE (TELSTRA) — OPTT
- PROPERTY BOUNDARY
- OVERHEAD POWER HV
- UNDERGROUND ELECTRICITY — UGE
- POWER POLE
- LIGHT POLE
- STAY ANCHOR
- SEWER MAIN (& SIZE) — SM 150
- SEWER SERVICE CONNECTION — SM
- SEWER MANHOLE
- STORMWATER (& SIZE) — SW 375
- STORMWATER MANHOLE
- TELSTRA CABLES AND PIT — TC
- INDICATIVE SERVICE NOT ABLE TO BE LOCATED — ?? GAS ??
- SIGN
- TREE
- POTHOLE
- CONTROL POINT
- WATER MAIN (& SIZE) — WM 100
- WATER SERVICE CONNECTION — W
- WATER SERVICES
- PROPOSED WATER MAIN — WM 150
- PROPOSED SEWER MAIN — SM 150
- PROPOSED STORMWATER LINE
- PROPOSED DESIGN ALIGNMENT
- TREE REMOVAL

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

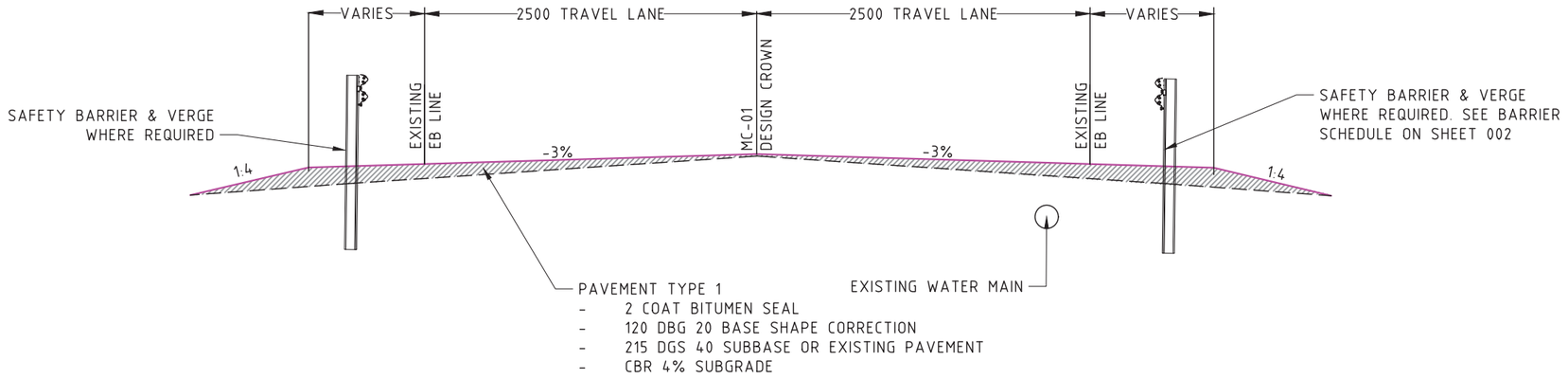
SHEET INDEX, LEGEND, CONTROL TABLE AND BARRIER SCHEDULE

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

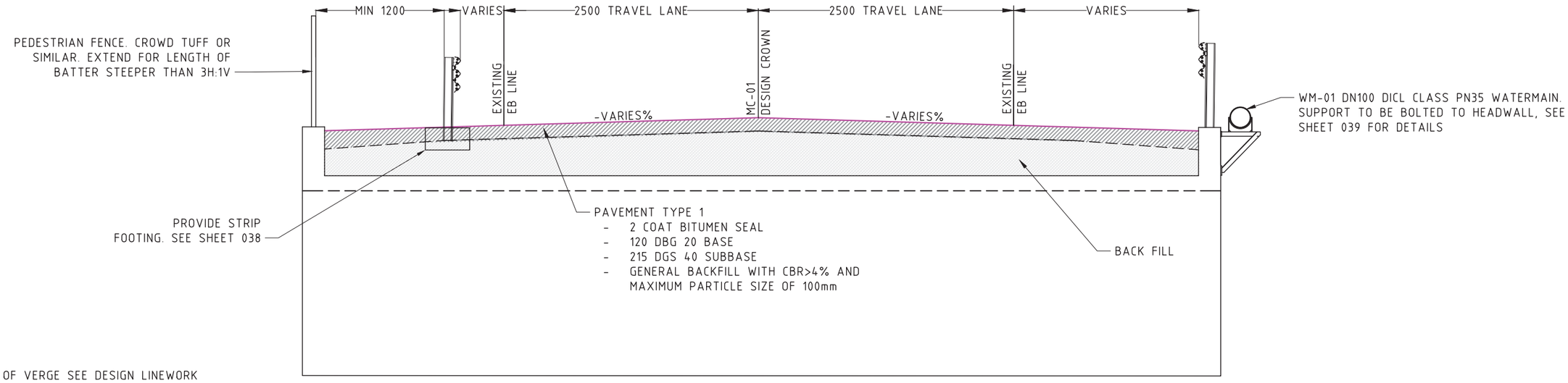
DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-002



TYPICAL CROSS SECTION (ROAD ONLY)

SCALE 1:50 AT A3

CREEK FLOW DIRECTION



\# FOR EXTENT OF VERGE SEE DESIGN LINEWORK

CROSS SECTION (OVER CULVERT)

SCALE 1:50 AT A3

NOTE:
1. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. FOR EXTENT OF VERGE SEE DESIGN LINEWORK
3. EXISTING SEAL WITHIN LIMIT OF WORKS TO BE STRIPPED

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

SCALE
0.00 0.50 1.00 1.50 2.00 2.50
SCALE 1:50

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

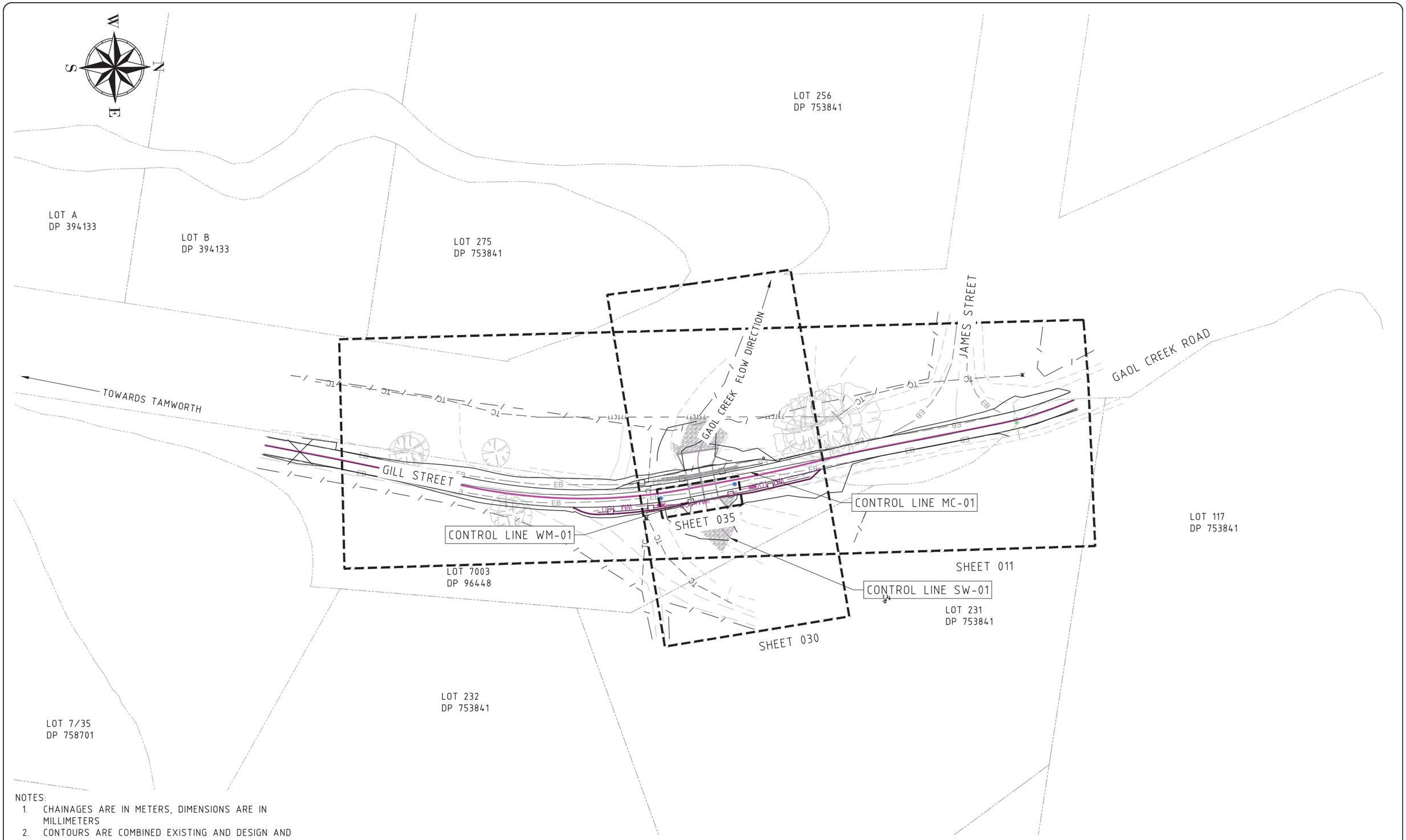
TYPICAL SECTIONS AND PAVEMENT DETAIL

SURVEYED: WQ | CLIENT REP: CF | DESIGNED: LM | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-003



NOTES:
1. CHAINAGES ARE IN METERS, DIMENSIONS ARE IN MILLIMETERS
2. CONTOURS ARE COMBINED EXISTING AND DESIGN AND ARE SHOWN AT AN INTERVAL OF 0.25m

PLAN - LAYOUT
SCALE 1:1000 AT A3

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

SCALE 1:1000

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

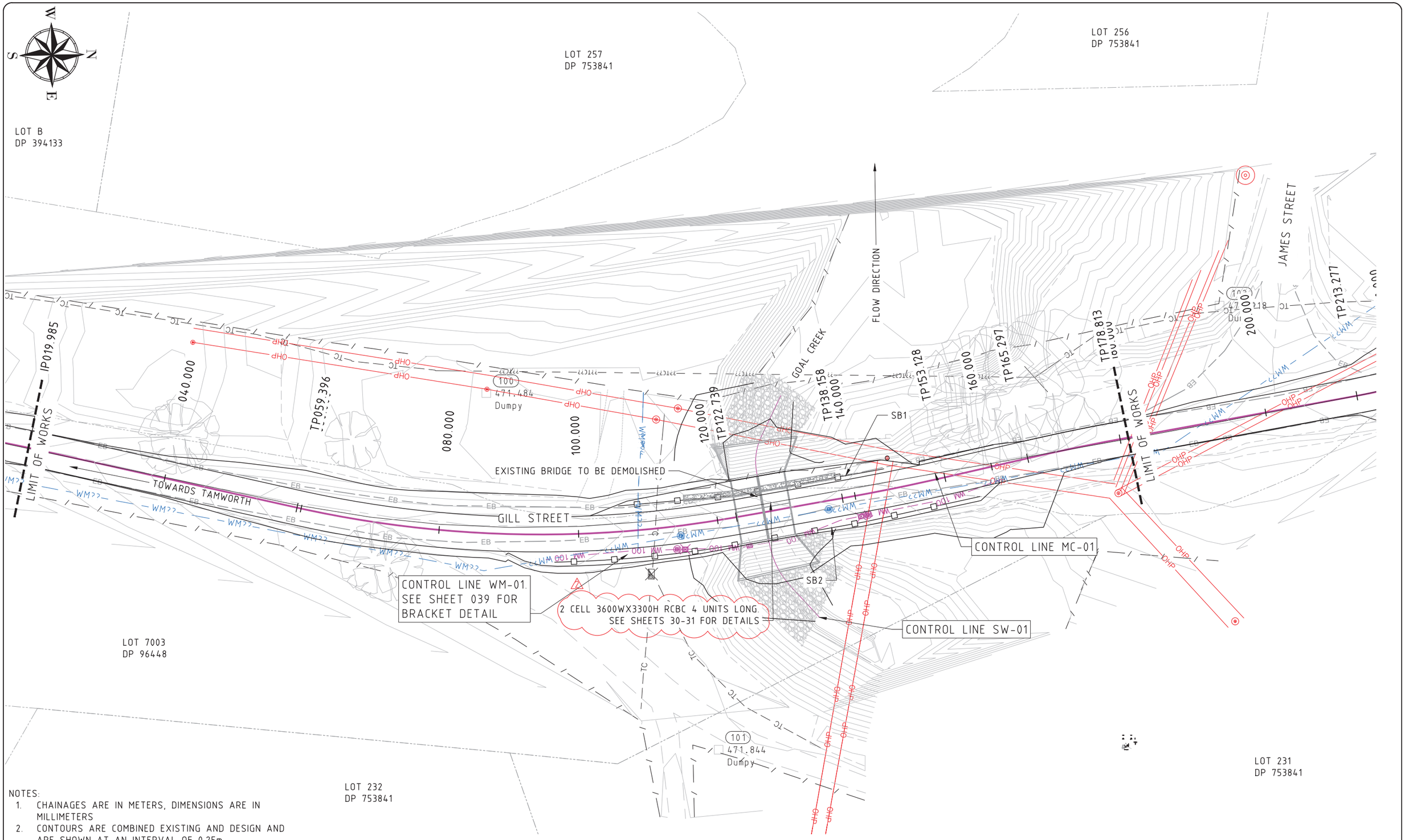
OVERALL LAYOUT PLAN

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-010



NOTES:
1. CHAINAGES ARE IN METERS, DIMENSIONS ARE IN MILLIMETERS
2. CONTOURS ARE COMBINED EXISTING AND DESIGN AND ARE SHOWN AT AN INTERVAL OF 0.25m

PLAN - MC-01
SCALE: 1:500 AT A3

www.dialbeforeyoudig.com.au
DIAL1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

0.00 5.00 10.00 15.00 20.00 25.00
SCALE 1:500

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

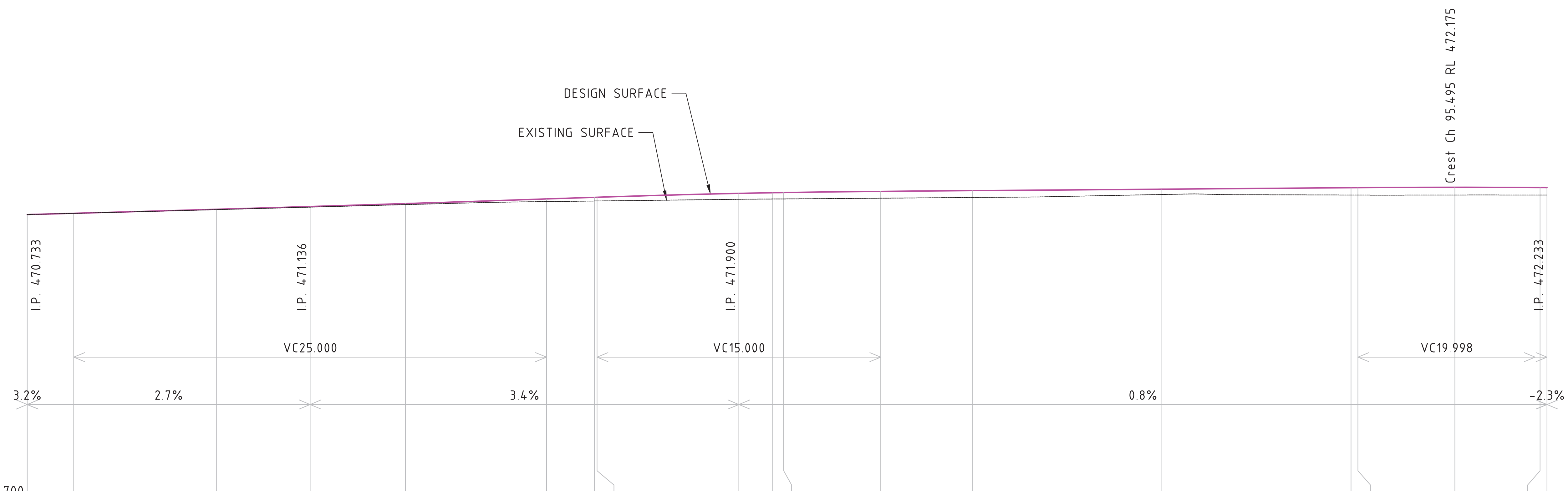
MC-01 LAYOUT PLAN CH020.000 - CH180.000

SURVEYED: WQ | CLIENT REP: CF | DESIGNED: LM | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-011



CHAINAGE	CONTROL LINE CUT / FILL	DESIGN SURFACE	EXISTING SURFACE
20.000	-0.001	470.733	470.734
22.461	0.002	470.799	470.797
30.000	0.017	471.010	470.993
34.961	0.033	471.157	471.124
40.000	0.056	471.314	471.258
47.461	0.140	471.558	471.418
50.000	0.195	471.643	471.448
50.133	0.198	471.648	471.450
57.633	0.312	471.852	471.540
59.396	0.332	471.886	471.554
60.000	0.337	471.896	471.559
65.133	0.362	471.959	471.597
70.000	0.361	471.997	471.636
80.000	0.282	472.074	471.792
90.000	0.388	472.152	471.764
90.365	0.393	472.155	471.762
95.495	0.410	472.175	471.765
100.000	0.399	472.160	471.761
100.364	0.396	472.157	471.761

HORIZONTAL GEOMETRY

L=39.410
B=11°50'30"
59.396
L=63.343
R=160.000

LONGITUDINAL SECTION 1323 MC-01
SCALES: HORIZONTAL 1:250 (A3) VERTICAL 1:250 (A3)

1323 MC-01

www.dialbeforeyoudig.com.au DIAL 1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250
VERTICAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250

CHECKED: C.MCKINNON DATE: 22-08-23 DESIGNER
CHECKED: D. STEWART DATE: 22-08-23 SENIOR DESIGN & PROJECT ENGINEER
CHECKED: L.MACKIEWICZ DATE: 22-08-23 CLIENT REPRESENTATIVE

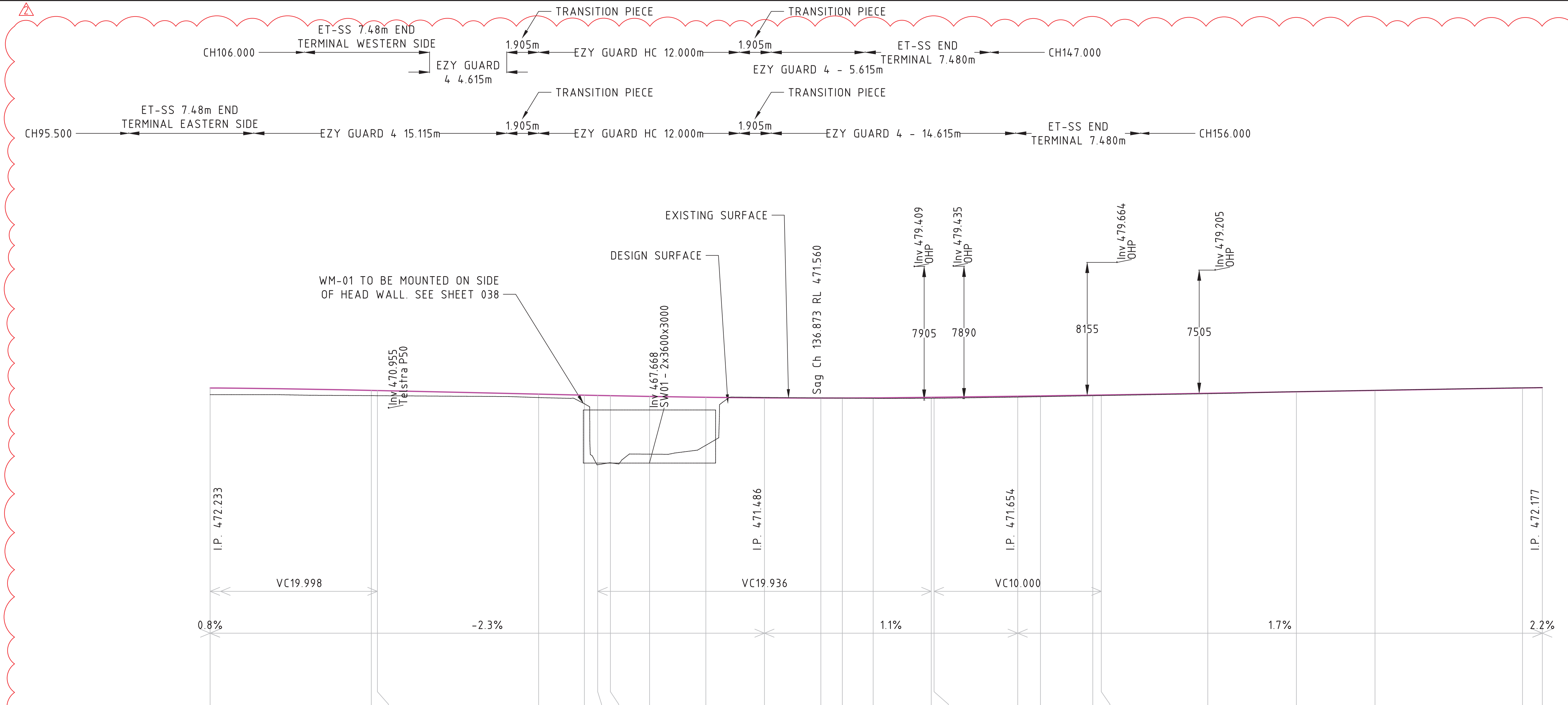
MC-01 LONGITUDINAL SECTION CH020.000 - CH100.364

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM A.H.D. | SCALES AS SHOWN
A3 | DRAWING NO. 1323-012



R.L. 452.500

CONTROL LINE CUT / FILL	0.396	0.317	0.310	0.206	0.517	4.141	4.010	3.448	2.867	-0.025	-0.002	0.010
DESIGN SURFACE	472.157	472.016	472.007	471.790	471.728	471.710	471.694	471.649	471.600	471.570	471.560	471.561
EXISTING SURFACE	471.761	471.699	471.697	471.584	471.211	467.569	467.684	468.201	468.733	471.595	471.562	471.551
CHAINAGE	100.364	110.000	110.363	120.000	122.739	123.534	124.295	126.633	130.000	133.502	136.873	138.158

CONTROL LINE CUT / FILL	0.033	0.053	0.054	0.047	0.043	0.034	0.034	0.029	-0.005	-0.009	-0.011	0.000
DESIGN SURFACE	471.568	471.597	471.599	471.661	471.681	471.729	471.738	471.844	471.932	472.010	472.157	472.177
EXISTING SURFACE	471.535	471.544	471.545	471.614	471.638	471.695	471.704	471.815	471.937	472.019	472.168	472.177
CHAINAGE	140.000	143.470	143.638	148.638	150.000	153.128	153.638	160.000	165.297	170.000	178.813	180.000

HORIZONTAL GEOMETRY

L=63.343 R=160.000 | 122.739 | L=15.419 B=349°09'31" | 138.158 | L=14.970 R=300.000 | 153.128 | L=12.169 B=346°17'58" | 165.297 | L=13.517 R=300.000 | 178.813 | L=34.463 B=348°52'51"

LONGITUDINAL SECTION 1323 MC-01
SCALES: HORIZONTAL 1:250 (A3) VERTICAL 1:250 (A3)

1323 MC-01

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250
VERTICAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

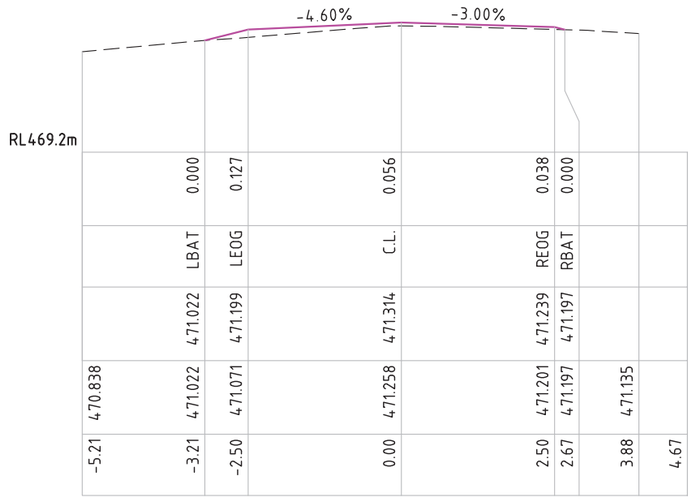
MC-01 LONGITUDINAL SECTION CH100.364 - CH180.000

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

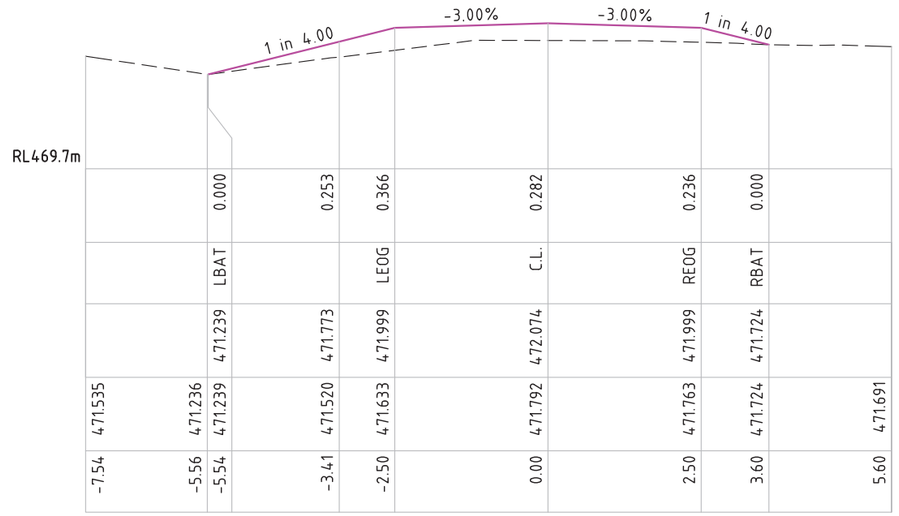
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM: A.H.D. | SCALES AS SHOWN | **A3** | DRAWING NO. 1323-013



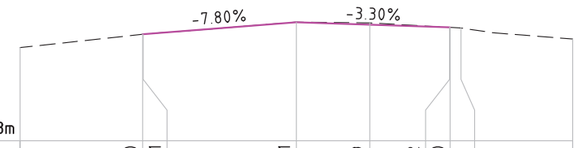
			0.000	0.127	0.056	0.038	0.000		
			LBAT	LEOG	C.L.	REOG	RBAT		
			471.022	471.199	471.314	471.239	471.197		
	470.838	471.022	471.071		471.258	471.201	471.197	471.135	
-5.21		-3.21	-2.50		0.00	2.50	2.67	3.88	4.67

Ch 40.000 m
1323 MC-01



		0.000	0.253	0.366	0.282	0.236	0.000	
		LBAT		LEOG	C.L.	REOG	RBAT	
		471.239	471.773	471.999	472.074	471.999	471.724	
471.535	471.236	471.239	471.520	471.633	471.792	471.763	471.724	471.691
-7.54	-5.56	-5.54	-3.41	-2.50	0.00	2.50	3.60	5.60

Ch 80.000 m
1323 MC-01



CL CUT AND FILL		0.000	0.001	-0.001	-0.029	0.002	0.000	
DESIGN CODE		LBAT	LEOG	C.L.		REOG	RBAT	
DESIGN		470.536	470.538	470.733	470.693	470.650	470.648	
EXISTING	470.319	470.536	470.537	470.734	470.722	470.649	470.648	470.638	470.458
OFFSET	-4.51	-2.51	-2.50	0.00	1.20	2.50	2.51	2.69	4.51

Ch 20.000 m
1323 MC-01

	0.000	0.362	0.415	0.337	0.280	0.000	
	LBAT		LEOG	C.L.	REOG	RBAT	
	471.076	471.741	471.821	471.896	471.821	471.519	
471.065	471.076	471.378	471.406	471.559	471.541	471.519	471.506
-7.48	-5.48	-2.82	-2.50	0.00	2.50	3.71	5.71

Ch 60.000 m
1323 MC-01

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100
VERTICAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

MC-01 CROSS SECTION CH020.000 - CH080.000

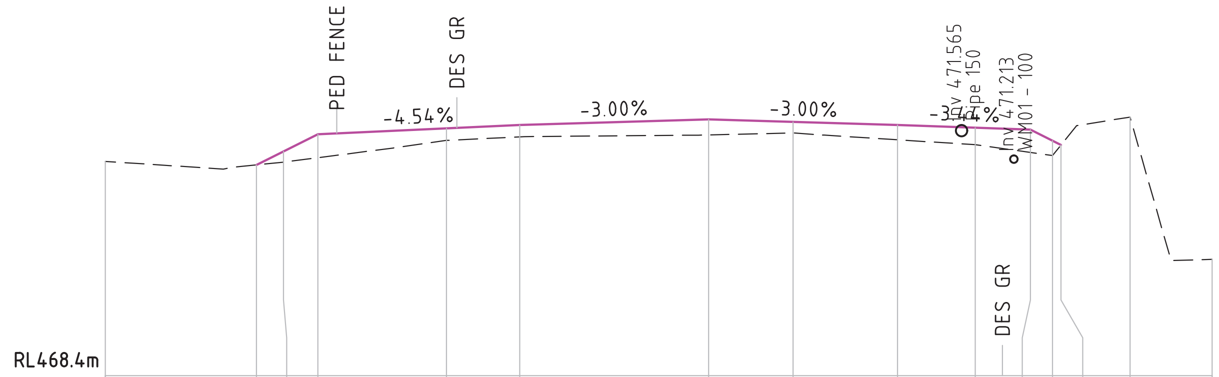
SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-020

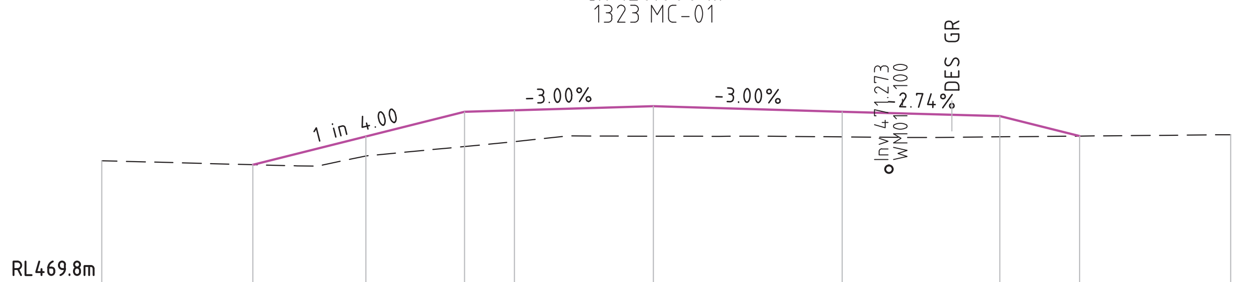
Ch 120.000 m — 1323 MC-01



CL CUT AND FILL	DESIGN CODE	DESIGN	EXISTING	OFFSET
			471.234	-7.98
0.000	LBAT	471.188	471.188	-5.98
0.143		471.367	471.224	-5.63
0.311	LVRG	471.594	471.283	-5.17
0.159		471.671	471.512	-3.47
0.156	LEOG	471.715	471.559	-2.50
0.206	C.L.	471.790	471.584	0.00
0.146		471.757	471.611	1.12
0.195	REOG	471.715	471.520	2.50
0.225		471.680	471.454	3.53
0.302	RVRG	471.655	471.352	4.26
0.197		471.509	471.311	4.55
0.000	RBAT	471.452	471.452	4.66
			471.821	5.58
			469.937	6.66

Ch 120.000 m
1323 MC-01

Ch 100.000 m — 1323 MC-01



CL CUT AND FILL	DESIGN CODE	DESIGN	EXISTING	OFFSET
			471.437	-7.30
0.000	LBAT	471.384	471.384	-5.30
0.258		471.758	471.500	-3.81
0.460	LEOG	472.085	471.625	-2.50
0.416		472.105	471.688	-1.84
0.399	C.L.	472.160	471.761	0.00
0.332	REOG	472.085	471.753	2.50
0.274	RVRG	472.028	471.754	4.59
0.000	RBAT	471.763	471.763	5.64
			471.782	7.64

Ch 100.000 m
1323 MC-01

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100
VERTICAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100

CHECKED: C.MCKINNON DATE: 22-08-23 DESIGNER
CHECKED: D. STEWART DATE: 22-08-23 SENIOR DESIGN & PROJECT ENGINEER
CHECKED: L.MACKIEWICZ DATE: 22-08-23 CLIENT REPRESENTATIVE

MC-01 CROSS SECTION CH100.000 - CH120.000

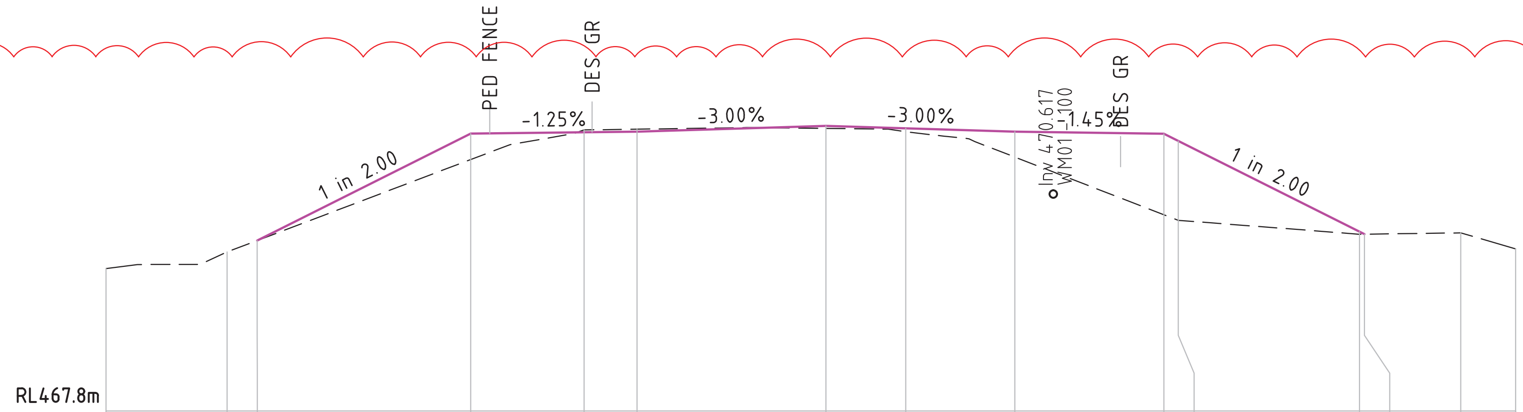
SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

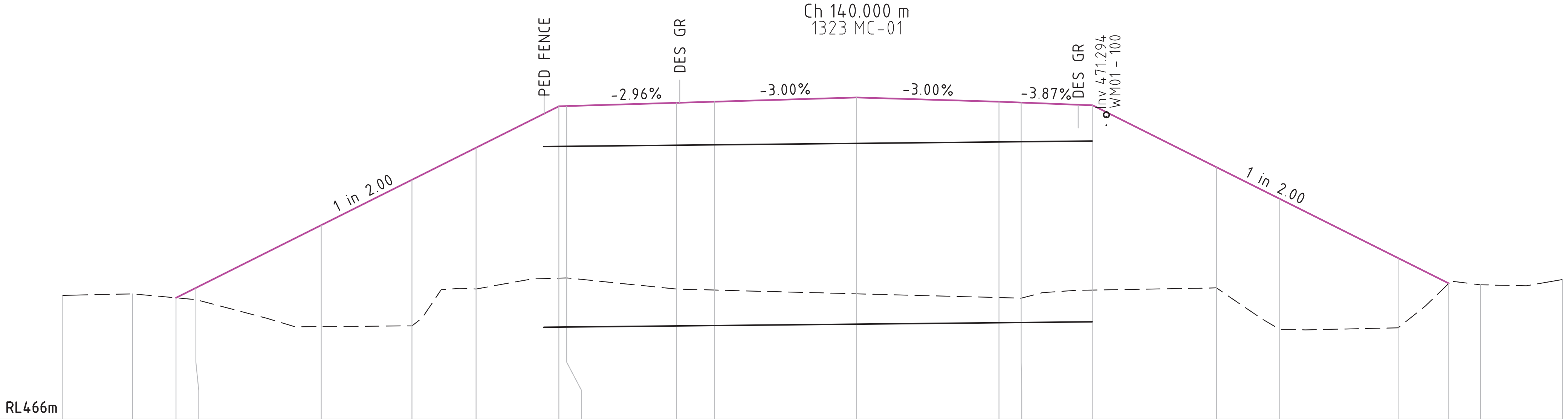
DATUM: A.H.D. | SCALES AS SHOWN | A3 | DRAWING NO. 1323-021

Document Set ID: 3440
Version: 9, Version Date: 04/12/2023



			0.000	0.342	-0.030	-0.032	0.033	0.047	0.337	1.071	1.049	0.034	0.000		
			LBAT	LVRG		LEOG	C.L.		REOG	RVRG			RBAT		
			470.053	471.466	471.485	471.493	471.568	471.537	471.493	471.465	471.370	470.170	470.137		
	469.682	469.902	470.053	471.124	471.515	471.525	471.535	471.490	471.157	470.394	470.321	470.137	470.137	470.154	469.944
	-9.53	-7.92	-7.53	-4.70	-3.20	-2.50	0.00	1.06	2.50	4.47	4.66	7.06	7.13	8.40	9.13

Ch 140.000 m
1323 MC-01



CL CUT AND FILL			0.000	0.206	1.780	2.565	2.481	3.017	3.017	3.270	3.307	3.448	3.439	3.434	3.242	2.119	2.290	1.225	0.000		
DESIGN CODE			LBAT					LVRG			LEOG	C.L.	REOG		RVRG				RBAT		
DESIGN			468.131	468.306	469.406	470.203	470.766	471.493	471.497	471.554	471.574	471.649	471.574	471.559	471.510	470.424	469.867	468.829	468.384		
EXISTING	468.173	468.200	468.131	468.100	467.626	467.638	468.285	468.476	468.481	468.285	468.267	468.201	468.135	468.125	468.268	468.305	467.578	467.604	468.384	468.359	468.452
OFFSET	-13.95	-12.72	-11.95	-11.60	-9.40	-7.81	-6.68	-5.23	-5.09	-3.16	-2.50	0.00	2.50	2.89	4.15	6.32	7.43	9.51	10.40	10.96	12.40

Ch 126.633 m
1323 MC-01

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100
VERTICAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100

CHECKED: C.MCKINNON DATE: 22-08-23
DESIGNER
CHECKED: D. STEWART DATE: 22-08-23
SENIOR DESIGN & PROJECT ENGINEER
CHECKED: L.MACKIEWICZ DATE: 22-08-23
CLIENT REPRESENTATIVE

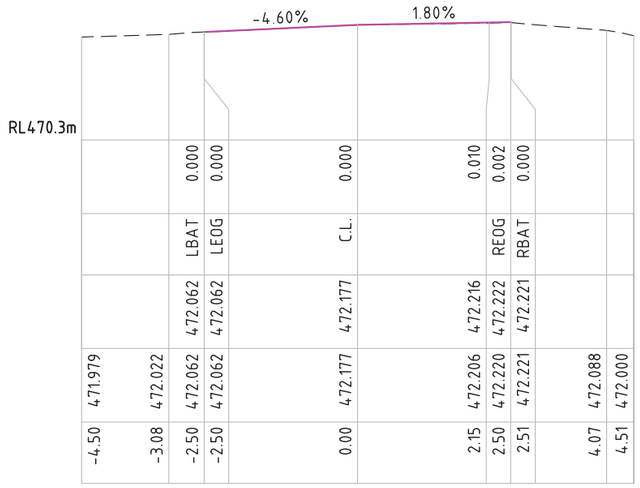
MC-01 CROSS SECTION CH126.633 - CH140.000

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

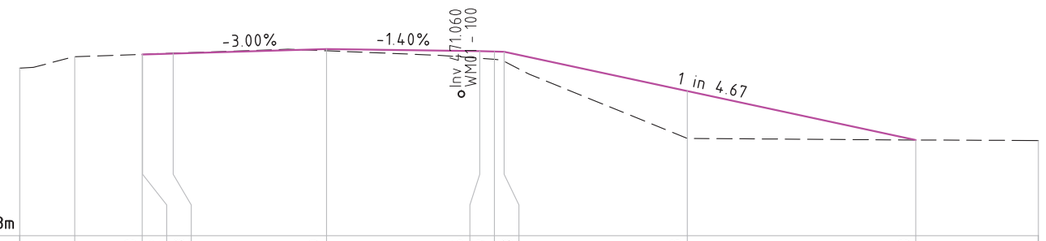
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM A.H.D. | SCALES AS SHOWN
A3 | DRAWING NO. 1323-022



			0.000	0.000	0.000	0.010	0.002	0.000				
			LBAT	LEOG	C.L.		REOG	RBAT				
			472.062	472.062	472.177	472.216	472.222	472.221				
471.979	472.022	472.062	472.062	472.177	472.206	472.220	472.221		472.088	472.000		
-4.50	-3.08	-2.50	-2.50	0.00	2.15	2.50	2.51		4.07	4.51		

Ch 180.000 m
1323 MC-01



CL CUT AND FILL			0.000	-0.002	-0.008	0.029	0.115	0.127	0.158	0.773	0.000	
DESIGN CODE			LBAT	LVRG	LEOG	C.L.	REOG		RVRG		RBAT	
DESIGN			471.755	471.754	471.769	471.844	471.809	471.803	471.799	471.159	470.360	
EXISTING	471.533	471.719	471.755	471.755	471.776	471.815	471.694	471.676	471.642	470.386	470.360	470.352
OFFSET	-5.01	-4.11	-3.01	-3.00	-2.50	0.00	2.50	2.74	2.90	5.89	9.62	11.62

Ch 160.000 m
1323 MC-01

www.dialbeforeyoudig.com.au
DIAL1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323_design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED ROAD LEVELS
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100
VERTICAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

MC-01 CROSS SECTION CH160.000 - CH180.000

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM: A.H.D.
SCALES AS SHOWN
DRAWING NO.
A3
1323-023

N
W E
S

2

GENERAL NOTES

DIMENSIONS ARE IN MILLIMETRES.
CHAINAGES, REDUCED LEVELS AND COORDINATES ARE IN METRES.
REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM.
CONTOURS ARE COMBINED EXISTING AND DESIGN AND ARE SHOWN AT AN INTERVAL OF 0.25m

ASSUMED PRECAST CONCRETE CROWN UNIT DETAILS

NOMINAL SIZE	OVERALL WIDTH	OVERALL HEIGHT	UNIT LENGTH	LEG THICKNESS AT BASE
3600Wx3300H	4020	3580	2400	150

IF THE ACTUAL PRECAST CROWN UNIT DIMENSIONS VARY FROM THE VALUES SHOWN ABOVE, THE BASE SLAB, HEADWALL AND WINGWALL DIMENSIONS MAY NEED TO BE ADJUSTED.

CROWN UNITS

3600 SPAN x 3300 HIGH x 2400 LENGTH, FOR FILL HEIGHT 0 TO 2000
CONCRETE EXPOSURE CLASSIFICATION FOR PRECAST UNITS: B1.
4 PRECAST REINFORCED CONCRETE CROWN END UNITS 2400 LONG
4 PRECAST REINFORCED CONCRETE UNITS 2400 LONG.

CONCRETE

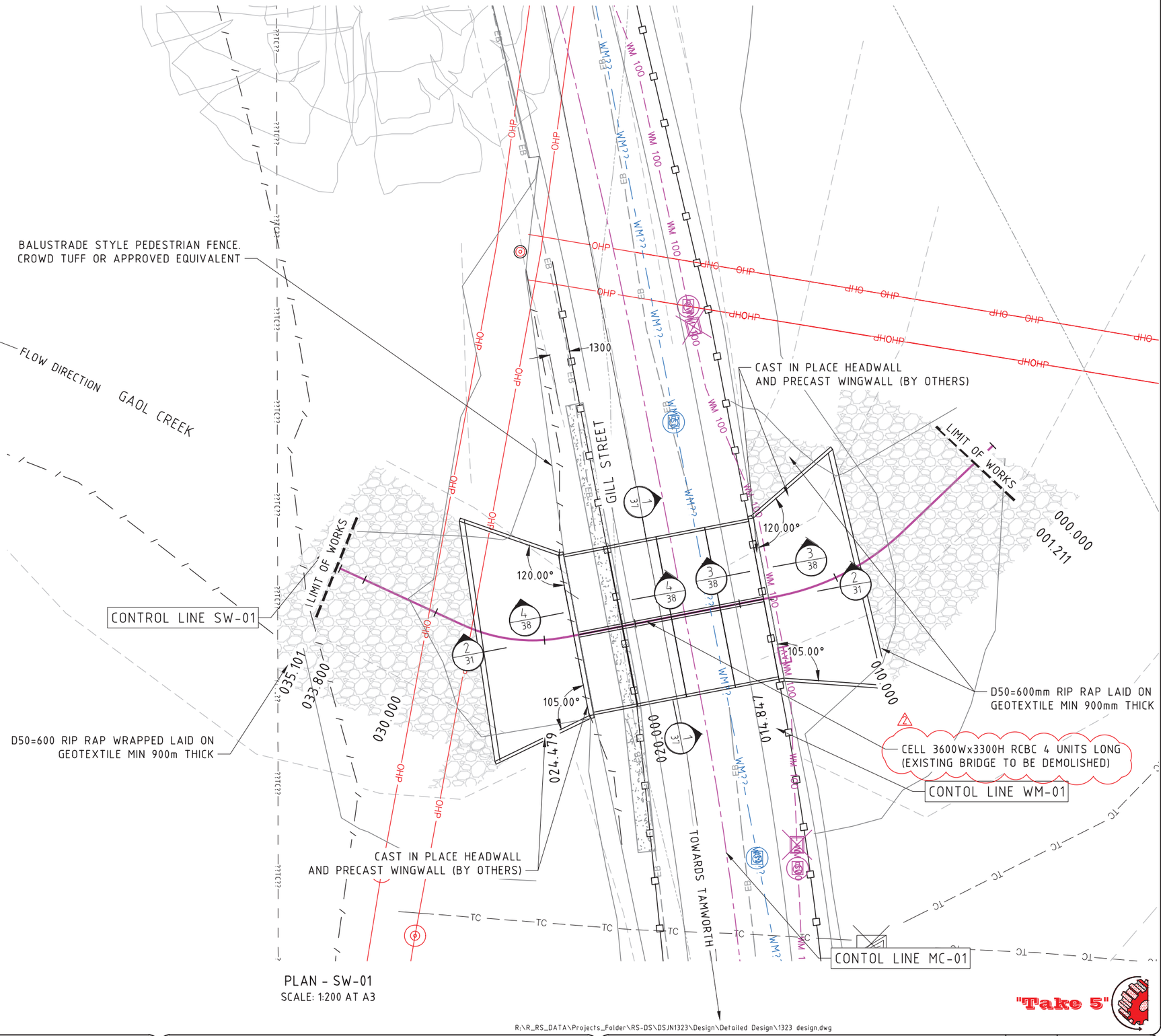
MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE MIN 40MPa.
CONCRETE WORKS SHALL BE IN ACCORDANCE WITH RMS SPECIFICATION B80.

REINFORCEMENT

NOMINAL COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SURFACE SHALL BE 45mm UNLESS NOTED OTHERWISE.
REINFORCEMENT SHALL BE ADJUSTED AT WEEP HOLE LOCATIONS TO MAINTAIN COVER.
UNLESS OTHERWISE SPECIFIED, THE MINIMUM DEVELOPMENT LENGTHS AND LENGTHS OF STAGGERED LAPS SHALL BE AS FOLLOWS:

DEVELOPMENT AND STAGGERED LAP LENGTHS

BAR SIZE	N12	N16	N20	N24
a) HORIZONTAL BARS WITH >300mm OF CONCRETE CAST BELOW THE BAR	600	800	950	1250
b) OTHER BARS	450	600	750	1000



PLAN - SW-01
SCALE: 1:200 AT A3

www.dialbeforeyoudig.com.au
DIAL1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

0.00 2.00 4.00 6.00 8.00 10.00
SCALE 1:200

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

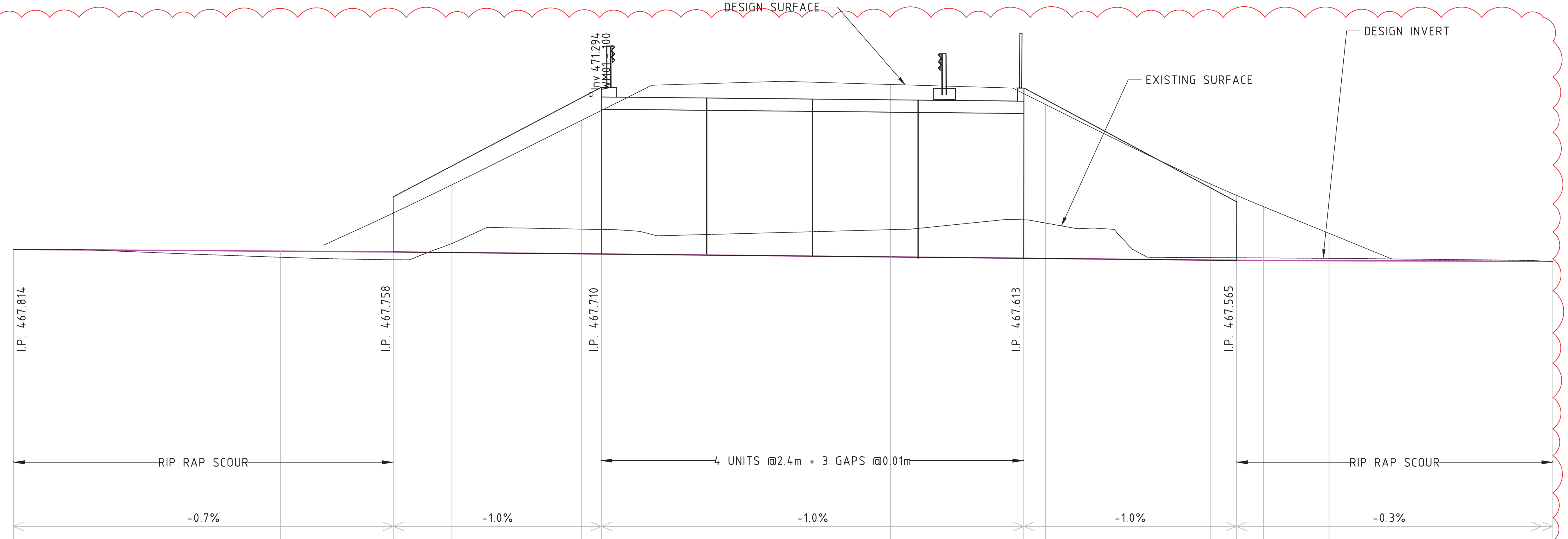
SW-01 LAYOUT PLAN CH0.000 - CH35.101

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-030



R.L. 459.500

CONTROL LINE CUT / FILL	0.000	0.139	0.179	-0.203	-0.562	-0.559	-0.621	-0.876	-0.807	-0.056	-0.059	-0.057	-0.054	0.000
DESIGN SURFACE			468.644	469.288	470.754	470.984	471.574	471.366	471.117	469.307	469.047	468.787	468.180	
DESIGN INVERT	467.814	467.774	467.758	467.744	467.715	467.710	467.644	467.613	467.608	467.571	467.565	467.563	467.558	467.542
EXISTING SURFACE	467.814	467.635	467.579	467.947	468.277	468.269	468.265	468.489	468.415	467.627	467.624	467.620	467.612	467.542
CHAINAGE	0.000	6.095	8.664	10.000	12.949	13.409	20.000	23.039	23.537	27.291	27.887	28.508	30.000	35.101

HORIZONTAL GEOMETRY:
0.000 — L=6.095 B=226°23'23" — 6.095
L=6.854 R=12.000 — 12.949
L=10.588 B=259°06'58" — 23.537
L=4.971 R=8.000 — 28.508
L=6.592 B=294°42'57" — 35.101

SECTION 2/030
SCALE:1:500
LONGITUDINAL SECTION sw1

sw1

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100
VERTICAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100

CHECKED: C.MCKINNON DATE: 22-08-23 DESIGNER
CHECKED: D. STEWART DATE: 22-08-23 SENIOR DESIGN & PROJECT ENGINEER
CHECKED: L.MACKIEWICZ DATE: 22-08-23 CLIENT REPRESENTATIVE

SW-01 LONGITUDINAL SECTION CH000.000 - CH35.101

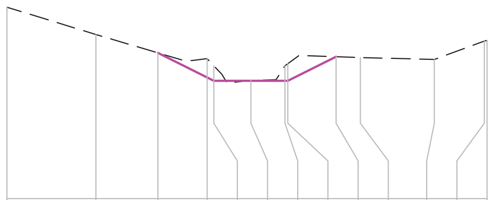
SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

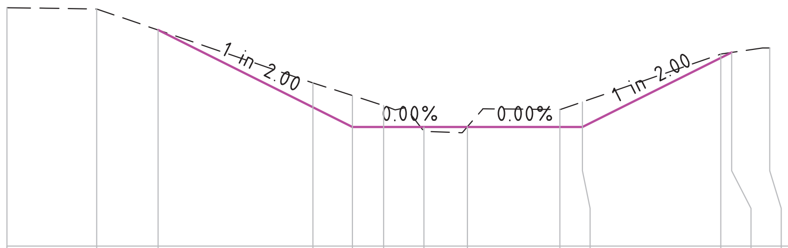
DATUM A.H.D. | SCALES AS SHOWN
A3 | DRAWING NO. 1323-031

Document Set ID: 3440
Version: 9, Version Date: 04/12/2023



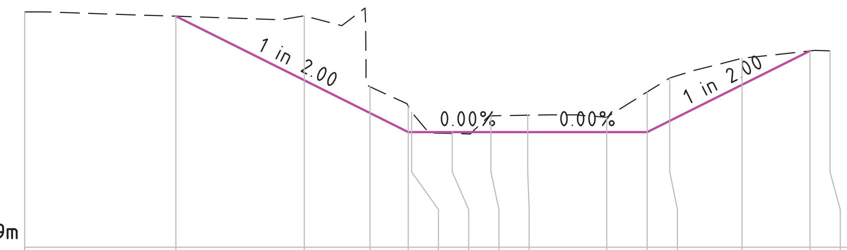
OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-8.08	470.246			
-5.13	469.340			
-3.08	468.732	468.732	LBAT	0.000
-1.45	468.542	467.918		-0.625
-1.23	468.305	467.806	LTOE	-0.499
0.00	467.816	467.806	C.L.	-0.010
1.13	468.305	467.806		-0.499
1.23	468.374	467.806	RTOE	-0.568
2.82	468.604	468.604	RBAT	0.000
3.62	468.578			
6.08	468.513			
7.73	469.123			
7.82	469.146			

Ch 1.211 m
sw1



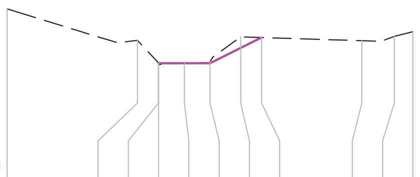
OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-15.24	471.699			
-12.27	471.661			
-10.24	470.966	470.966	LBAT	0.000
-5.11	469.209	468.403		-0.806
-3.80	468.791	467.749	LTOE	-1.042
-2.78	468.461	467.749		-0.712
-1.44	467.607	467.749		0.142
0.00	467.761	467.749	C.L.	-0.012
3.06	468.330	467.749		-0.581
3.80	468.582	467.749	RTOE	-0.833
8.38	470.165	470.037		-0.128
8.74	470.218	470.218	RBAT	0.000
10.00	470.367			
13.74				

Ch 9.522 m
sw1



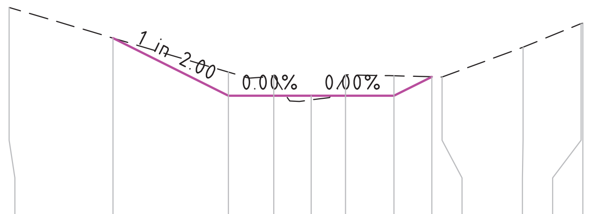
OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-16.64	471.704			
-11.64	471.558	471.558	LBAT	0.000
-7.39	471.572	469.434		-2.138
-5.22	469.219	468.348		-0.870
-3.95	468.578	467.715	LTOE	-0.863
-3.84	468.377	467.715		-0.663
-2.50	467.673	467.715		0.042
-1.22	468.259	467.715		-0.545
0.00	468.277	467.715	C.L.	-0.562
2.61	468.210	467.715		-0.495
3.95	469.047	467.715	RTOE	-1.333
4.70	469.513	468.087		-1.426
7.09	470.164	469.283		-0.880
9.34	470.408	470.408	RBAT	0.000
10.00	470.412			
14.34				

Ch 12.949 m
sw1



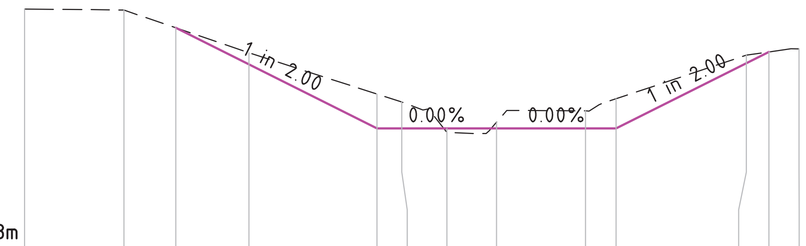
OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-5.85	469.612			
-1.55	468.572			
-0.85	467.812	467.812	LBAT	0.000
-0.85	467.806	467.814	LTOE	0.008
0.00	467.814	467.814	C.L.	0.000
0.85	467.869	467.814	RTOE	-0.055
1.86	468.687	468.321		-0.366
2.55	468.665	468.665	RBAT	0.000
5.86	468.560			
6.94	468.702			
7.55	468.860			

Ch 0.000 m
sw1



OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-11.56				
-10.00	470.702			
-6.56	469.686	469.686	LBAT	0.000
-2.74	468.555	467.774	LTOE	-0.781
-1.24	468.442	467.774		-0.667
0.00	467.635	467.774	C.L.	0.139
1.13	468.466	467.774		-0.692
2.74	468.435	467.774	RTOE	-0.660
3.99	468.401	468.401	RBAT	0.000
4.33	468.392			
7.02	469.381			
8.94	470.166			
8.99	470.176			

Ch 6.095 m
sw1



OFFSET	EXISTING	DESIGN	DESIGN CODE	CL CUT AND FILL
-15.60	471.690			
-12.32	471.657			
-10.60	471.070	471.070	LBAT	0.000
-8.19	470.244	469.862		-0.382
-3.95	468.878	467.744	LTOE	-1.134
-3.13	468.614	467.744		-0.870
-1.64	467.608	467.744		0.136
0.00	467.947	467.744	C.L.	-0.203
2.94	468.325	467.744		-0.580
3.95	468.722	467.744	RTOE	-0.978
8.26	470.165	469.898		-0.267
9.01	470.271	470.271	RBAT	0.000
10.00	470.373			
14.01				

Ch 10.000 m
sw1

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100
VERTICAL SCALE 0.00 1.00 2.00 3.00 4.00 5.00 SCALE 1:100

CHECKED: C.MCKINNON DATE: 22-08-23
DESIGNER
CHECKED: D. STEWART DATE: 22-08-23
SENIOR DESIGN & PROJECT ENGINEER
CHECKED: L.MACKIEWICZ DATE: 22-08-23
CLIENT REPRESENTATIVE

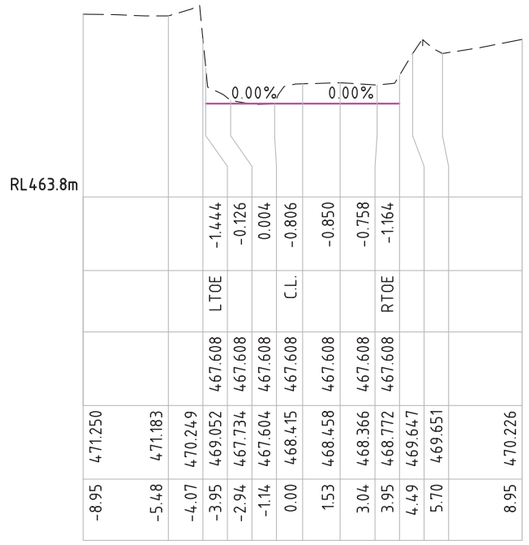
SW-01 CROSS SECTION CH000.000 - CH012.949

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

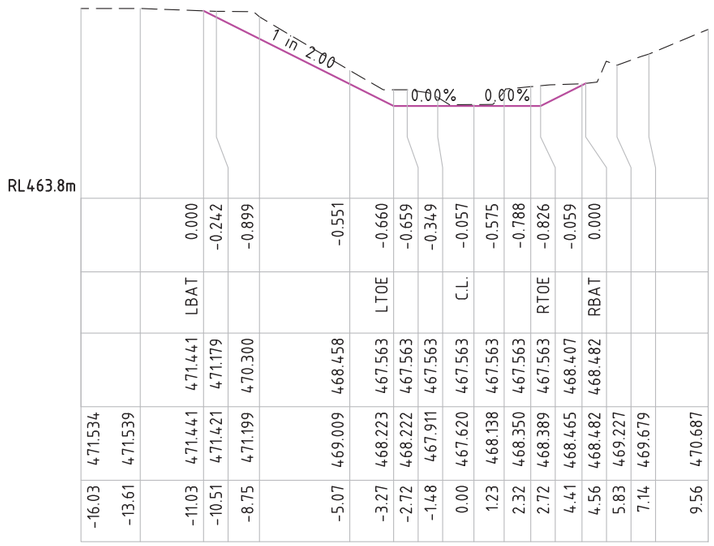
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM: A.H.D. | SCALES AS SHOWN | A3 | DRAWING NO. 1323-032



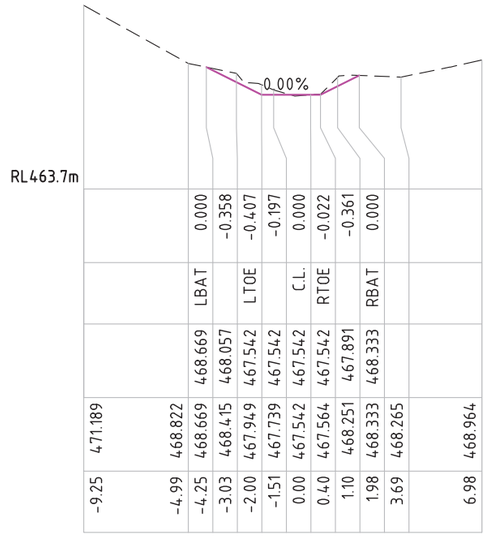
				-1.444	-0.126	0.004	-0.806	-0.850	-0.758	-1.164				
				LTOE			C.L.			RTOE				
				467.608	467.608	467.608	467.608	467.608	467.608	467.608				
-8.95	471.250		470.249	469.052	467.734	467.604	468.415	468.458	468.366	468.772	469.647	469.651		470.226
-5.48	471.183		-4.07	-3.95	-2.94	-1.14	0.00	1.53	3.04	3.95	4.49	5.70		8.95

Ch 23.537 m
SW1



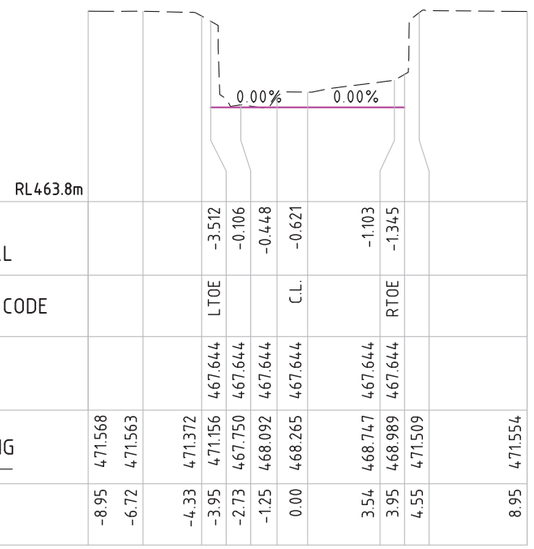
			0.000	-0.242	-0.899		-0.551	-0.660	-0.659	-0.349	-0.057	-0.575	-0.788	-0.826	-0.059	0.000				
		LBAT						LTOE			C.L.			RTOE		RBAT				
		471.441	471.179	470.300		468.458	467.563	467.563	467.563	467.563	467.563	467.563	467.563	467.563	468.407	468.482				
471.534	471.539	471.441	471.421	471.199		469.009	468.223	468.222	467.911	467.620	468.138	468.350	468.389	468.465	468.482	469.227	469.679		470.687	
-16.03	-13.61	-11.03	-10.51	-8.75		-5.07	-3.27	-2.72	-1.48	0.00	1.23	2.32	2.72	4.41	4.56	5.83	7.14		9.56	

Ch 28.508 m
SW1



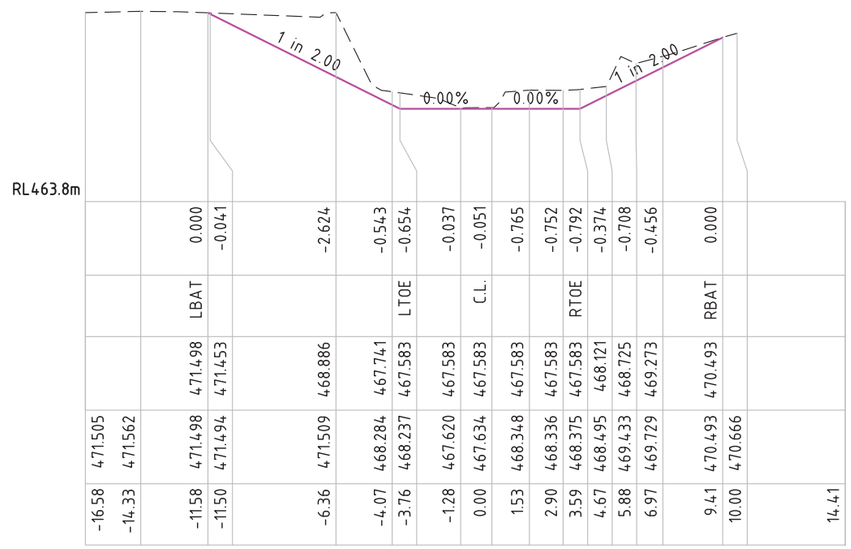
			0.000	-0.358	-0.407	-0.197	0.000	-0.022	-0.361	0.000										
		LBAT			LTOE		C.L.	RTOE		RBAT										
		468.669	468.057		467.542	467.542	467.542	467.542	467.891	468.333										
471.189		468.822	468.669	468.415	467.949	467.739	467.542	467.564	468.251	468.333	468.265			468.964						
-9.25		-4.99	-4.25	-3.03	-2.00	-1.51	0.00	0.40	1.10	1.98	3.69			6.98						

Ch 35.101 m
SW1



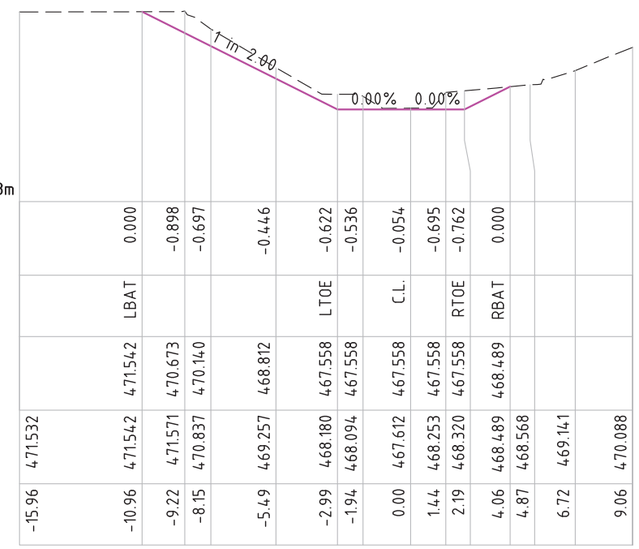
CL CUT AND FILL			-3.512	-0.106	-0.448	-0.621	-1.103	-1.345						
DESIGN CODE			LTOE			C.L.		RTOE						
DESIGN			467.644	467.644	467.644	467.644	467.644	467.644						
EXISTING	471.568	471.563	471.372	471.156	467.750	468.092	468.265	468.747	468.989	471.509				471.554
OFFSET	-8.95	-6.72	-4.33	-3.95	-2.73	-1.25	0.00	3.54	3.95	4.55				8.95

Ch 20.000 m
SW1



			0.000	-0.041	-2.624	-0.543	-0.654	-0.037	-0.051	-0.765	-0.752	-0.792	-0.374	-0.708	-0.456	0.000				
		LBAT					LTOE		C.L.			RTOE				RBAT				
		471.498	471.453		468.886	467.741	467.583	467.583	467.583	467.583	467.583	467.583	468.121	468.725	469.273	470.493				
471.505	471.562	471.498	471.494		471.509	468.284	468.237	467.620	467.634	468.348	468.336	468.375	468.495	469.433	469.729	470.493	470.666			14.41
-16.58	-14.33	-11.58	-11.50		-6.36	-4.07	-3.76	-1.28	0.00	1.53	2.90	3.59	4.67	5.88	6.97	9.41	10.00			

Ch 26.023 m
SW1



			0.000	-0.898	-0.697	-0.446	-0.622	-0.536	-0.054	-0.695	-0.762	0.000								
		LBAT					LTOE		C.L.		RTOE	RBAT								
		471.542	471.673	470.140		468.812	467.558	467.558	467.558	467.558	467.558	468.489								
471.532		471.542	471.571	470.837		469.257	468.180	468.094	467.612	468.253	468.320	468.489	468.568		469.141		470.088			
-15.96		-10.96	-9.22	-8.15		-5.49	-2.99	-1.94	0.00	1.44	2.19	4.06	4.87		6.72		9.06			

Ch 30.000 m
SW1

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100
VERTICAL SCALE
0.00 1.00 2.00 3.00 4.00 5.00
SCALE 1:100

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

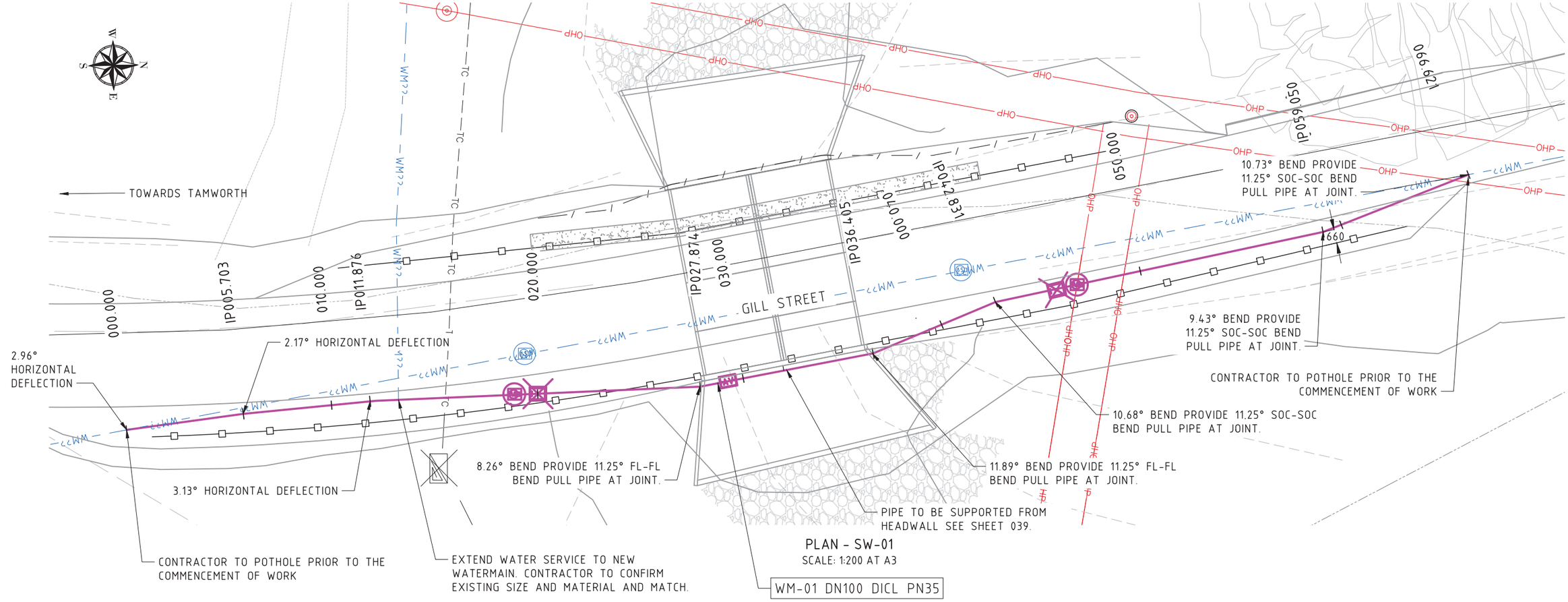
SW-01 CROSS SECTION CH020.000 - CH35.101

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

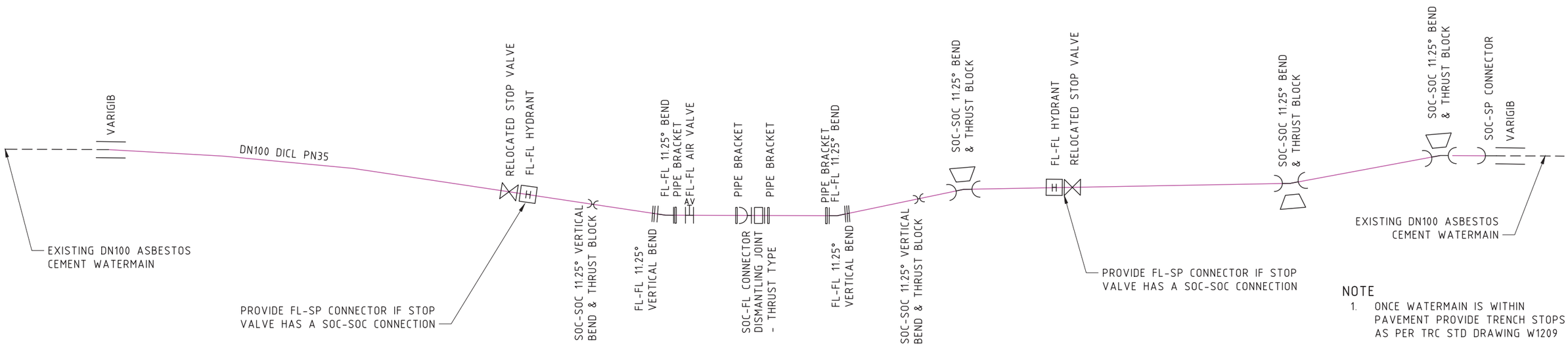
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM: A.H.D.
SCALES AS SHOWN
DRAWING NO.: 1323-033
A3



PLAN - SW-01

SCALE: 1:200 AT A3



CONNECTION DIAGRAM - SW-01

SCALE: NTS

NOTE

1. ONCE WATERMAIN IS WITHIN PAVEMENT PROVIDE TRENCH STOPS AS PER TRC STD DRAWING W1209

www.dialbeforeyoudig.com.au
DIAL1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

0.00 2.00 4.00 6.00 8.00 10.00
SCALE 1:200

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

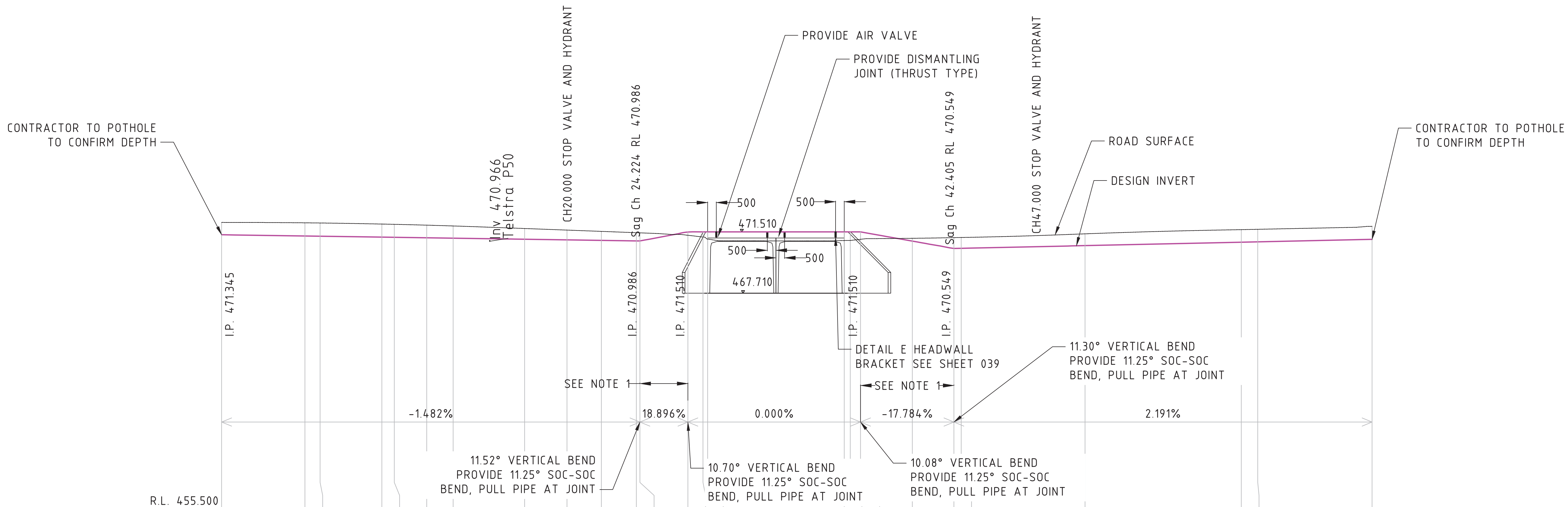
WM-01 LAYOUT PLAN AND CONNECTION DIAGRAM

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-035



CHAINAGE	CONTROL LINE CUT / FILL	INVERT LEVEL	EXISTING SURFACE
0.000	-0.714	471.345	472.059
4.825	-0.763	471.273	472.036
5.703	-0.766	471.260	472.026
9.280	-0.757	471.207	471.964
10.000	-0.752	471.196	471.948
11.876	-0.732	471.169	471.901
13.407	-0.708	471.146	471.854
17.543	-0.621	471.085	471.706
20.000	-0.566	471.048	471.614
21.990	-0.521	471.019	471.540
24.016	-0.474	470.989	471.463
24.225	-0.469	470.986	471.455
27.000	0.195	471.510	471.315
27.874	0.299	471.510	471.211
28.147	0.415	471.510	471.095
36.053	0.500	471.510	471.010
36.405	0.496	471.510	471.014
37.000	0.429	471.510	471.081
40.000	-0.163	470.976	471.139
42.404	-0.629	470.549	471.178
42.831	-0.629	470.558	471.187
50.000	-0.683	470.715	471.398
59.050	-0.726	470.914	471.640
60.000	-0.726	470.934	471.660
66.621	-0.753	471.079	471.832

HORIZONTAL GEOMETRY

Start	Length	Bearing	End
0.000	L=5.703	B=352°12'11"	5.703
5.703	L=6.173	B=354°22'28"	11.876
11.876	L=15.998	B=357°26'47"	27.874
27.874	L=8.531	B=349°08'41"	36.405
36.405	L=6.425	B=337°15'20"	42.831
42.831	L=16.219	B=347°56'13"	59.050
59.050	L=7.571	B=338°30'42"	66.621

LONGSECTION- WM01

SCALE: 1:250 AT A3

SCALES: HORIZONTAL 1:250 VERTICAL 1:250

WM-01 (3)

www.dialbeforeyoudig.com.au DIAL 1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

LONGITUDINAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250

VERTICAL SCALE 0.00 2.50 5.00 7.50 10.00 12.50 SCALE 1:250

CHECKED: C.MCKINNON DATE: 22-08-23 DESIGNER

CHECKED: D. STEWART DATE: 22-08-23 SENIOR DESIGN & PROJECT ENGINEER

CHECKED: L.MACKIEWICZ DATE: 22-08-23 CLIENT REPRESENTATIVE

WM-01 LONGITUDINAL SECTION CH0.000 - CH66.621

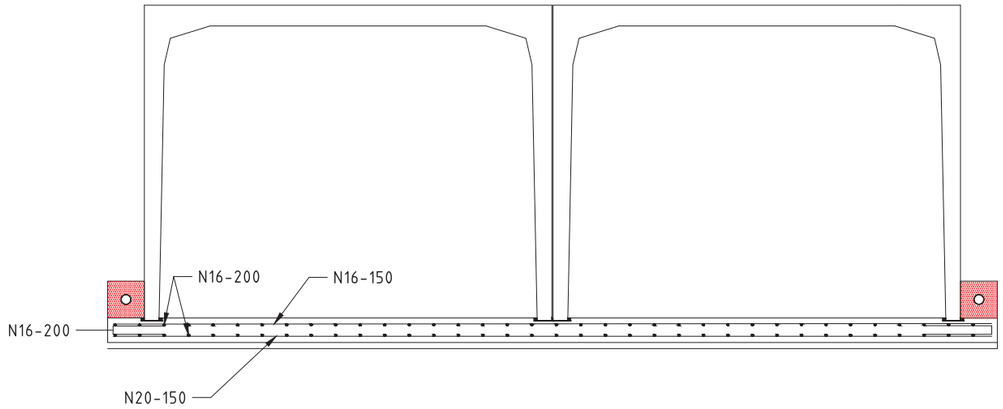
SURVEYED: WQ | CLIENT REP: CF | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

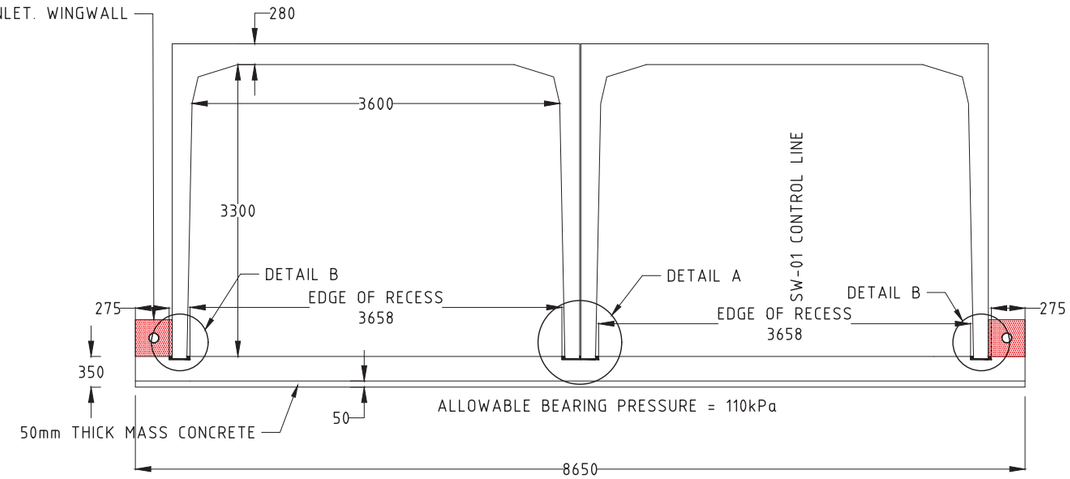
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM: A.H.D. | SCALES AS SHOWN | A3 | DRAWING NO. 1323-036

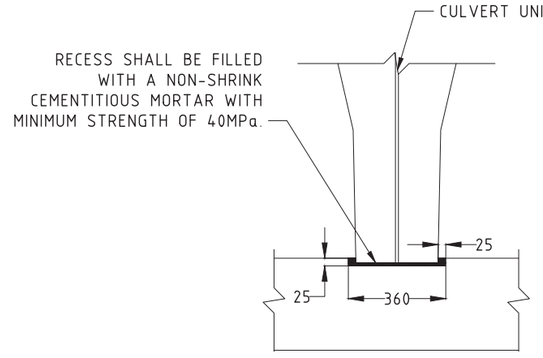
Document Set ID: 3440
Version: 9, Version Date: 04/12/2023



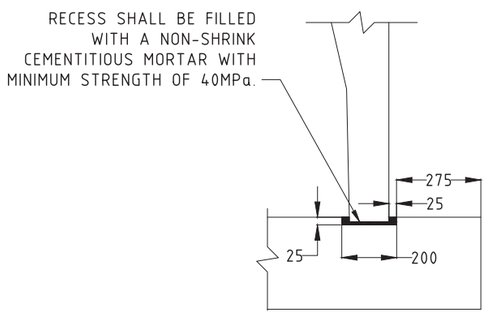
SECTION 1/030
SCALE:NTS



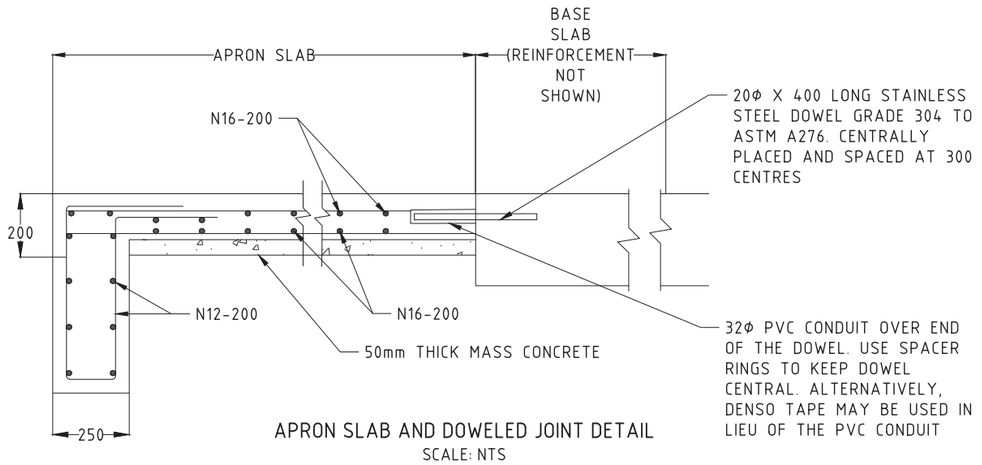
SECTION 1/030
SCALE:NTS



DETAIL A - CULVERT LEG TO BASE SLAB CONNECTION
SCALE: NTS



DETAIL B - CULVERT LEG TO BASE SLAB CONNECTION
SCALE: NTS



APRON SLAB AND DOWELED JOINT DETAIL
SCALE: NTS

www.dialbeforeyoudig.com.au
DIAL1100 BEFORE YOU DIG

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

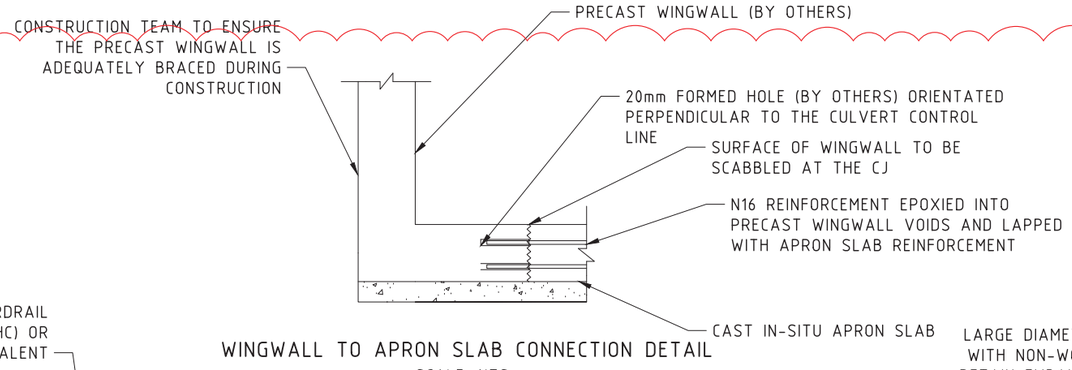
CULVERT DETAIL SHEET 1 OF 2

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

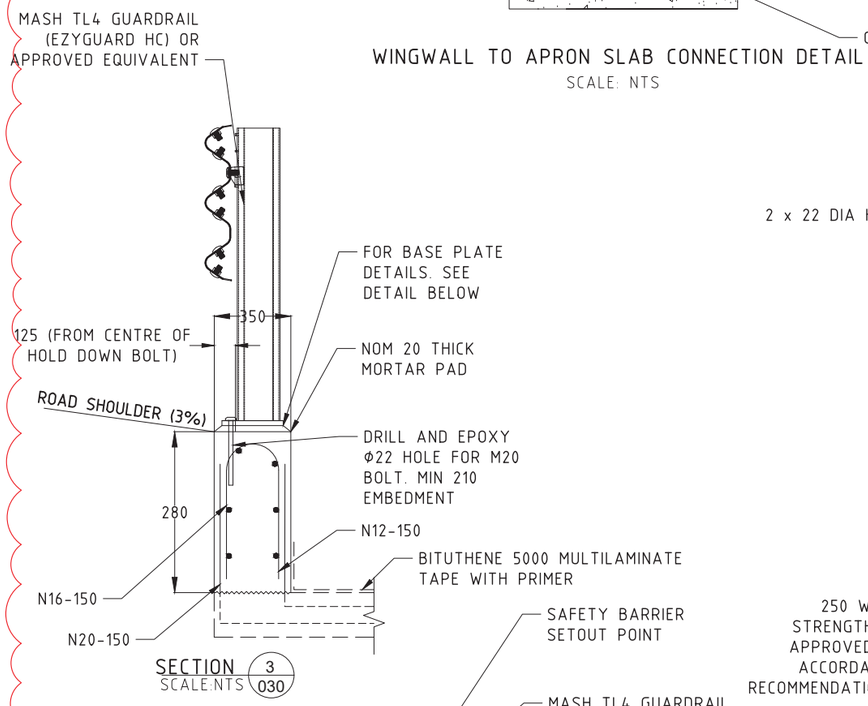
REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-037



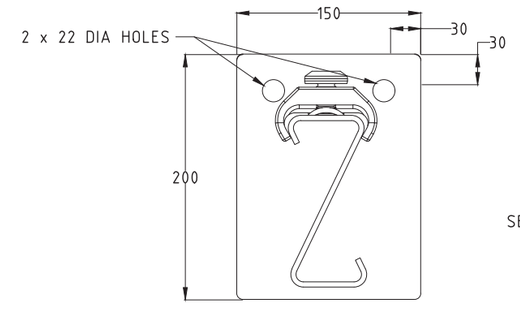
WINGWALL TO APRON SLAB CONNECTION DETAIL

SCALE: NTS



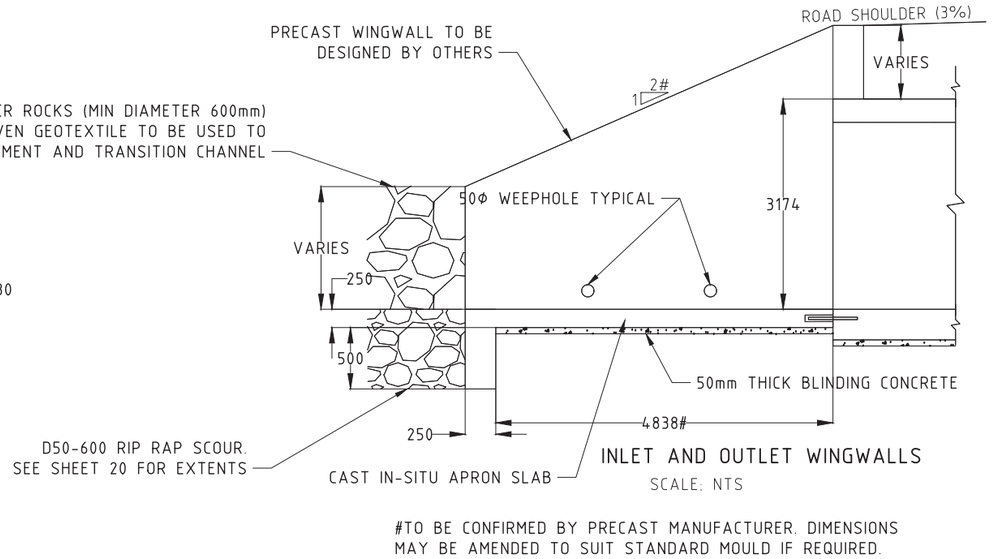
SECTION 3 / 030

SCALE:NTS



EZYGAURD HC SAFETY BARRIER:
BASE PLATE DETAIL

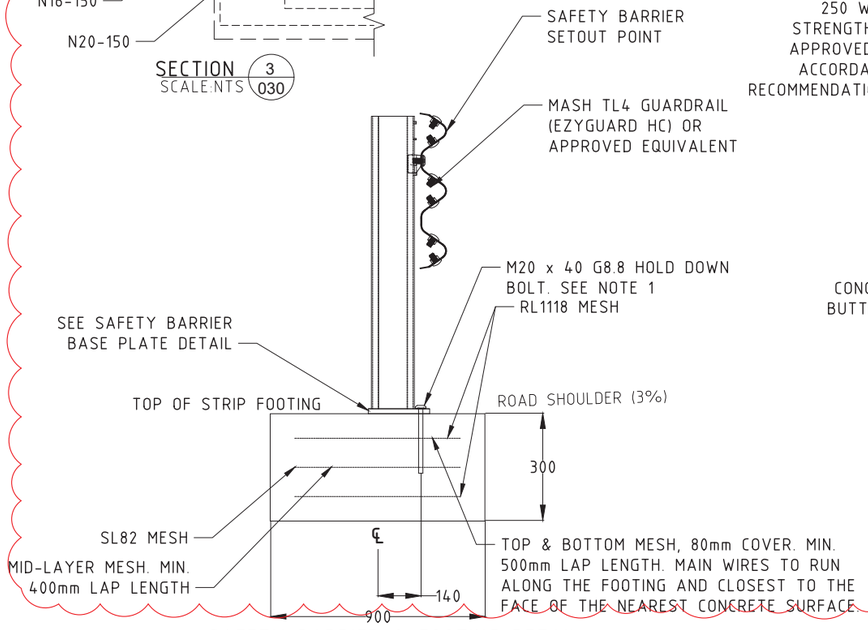
SCALE: 1:5



INLET AND OUTLET WINGWALLS

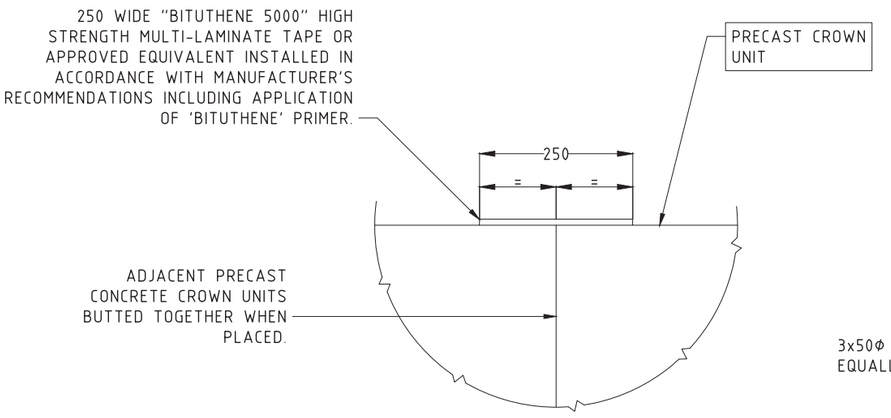
SCALE: NTS

#TO BE CONFIRMED BY PRECAST MANUFACTURER. DIMENSIONS MAY BE AMENDED TO SUIT STANDARD MOULD IF REQUIRED.



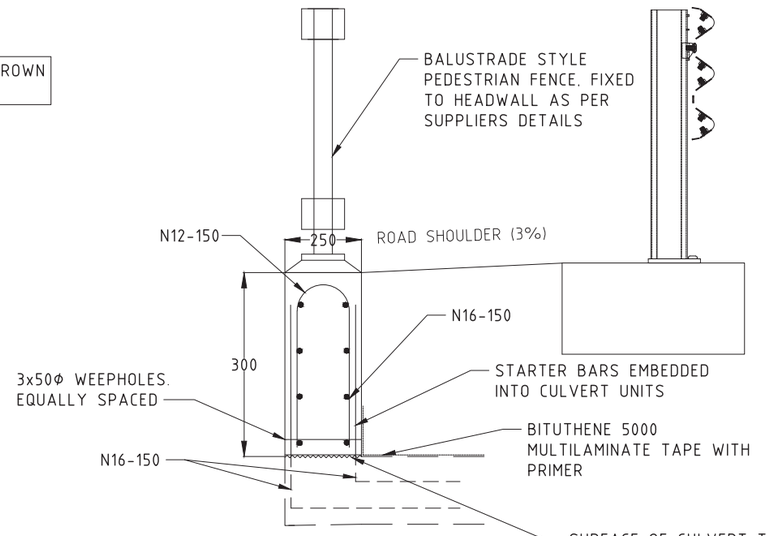
SAFETY BARRIER & FOOTING DETAIL

SCALE: NTS



TYPICAL PCBC JOINT DETAIL

SCALE: NTS



SECTION 4 / 030

SCALE:NTS

NOTES

1. RAMSET CHEMSET ANCHOR STUDS WITH EPCON C8 CHEMICAL ANCHOR EPOXY M20x215m GRADE 8.8 WITH MIN EMBEDMENT 150mm.

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
2	01-12-23	UPDATED CULVERT SIZE
1	22-08-23	ISSUED FOR CONSTRUCTION

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23

CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23

CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

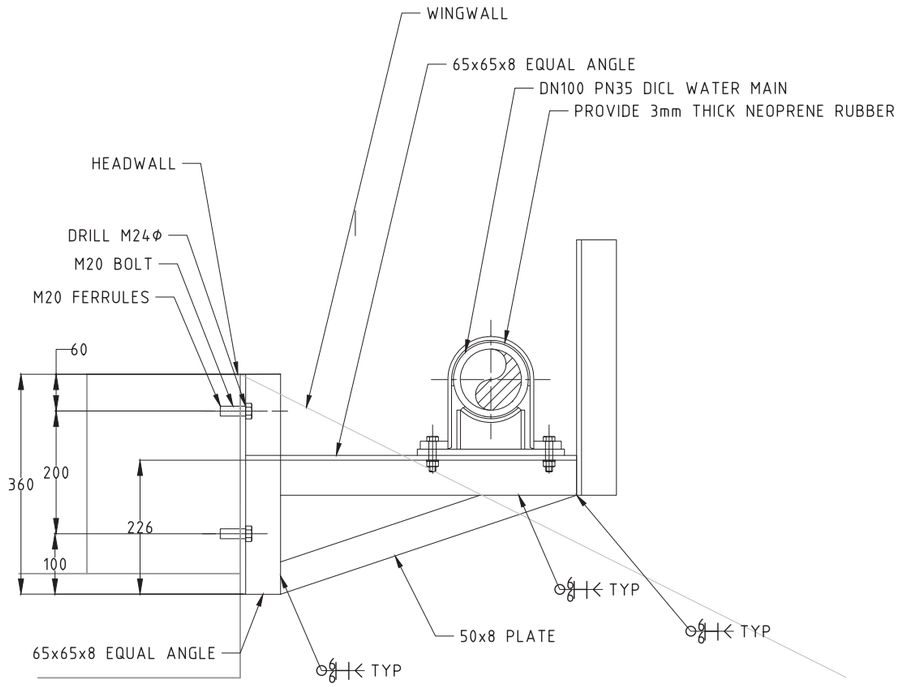
CULVERT DETAIL SHEET 2 OF 2

SURVEYED: WQ | CLIENT REP: LM | DESIGNED: MN | JOB NO: DSJN1323

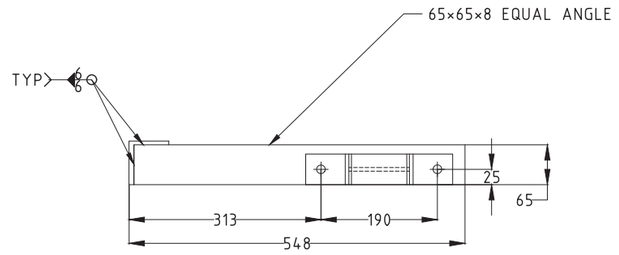
TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

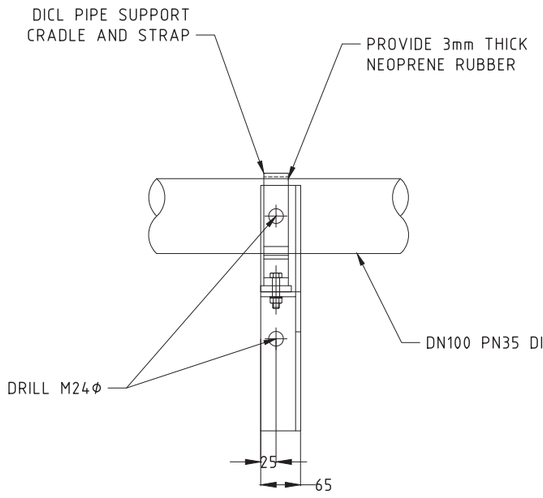
DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-038



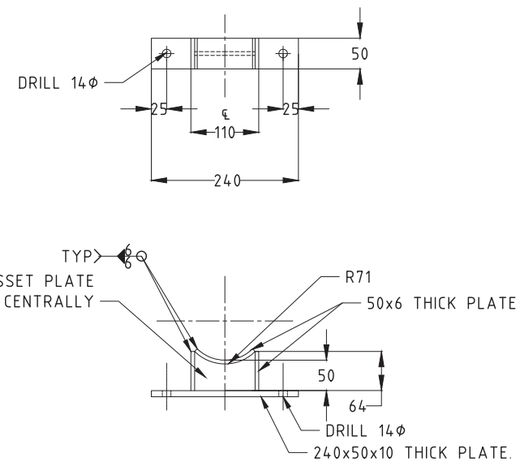
SIDE VIEW - HEADWALL BRACKET
SCALE: 1:10 AT A3



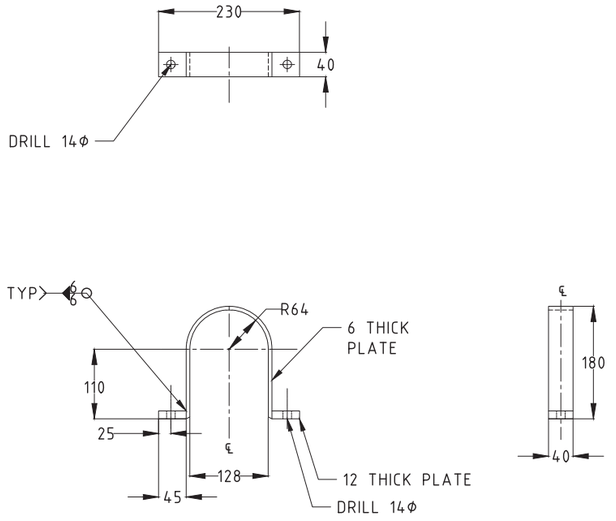
TOP VIEW - HEADWALL BRACKET
SCALE: 1:10 AT A3



FRONT VIEW - HEADWALL BRACKET
SCALE: 1:10 AT A3



PIPE CRADLE
SCALE: 1:10 AT A3



PIPE STRAP
SCALE: 1:10 AT A3

NOTE
ALL BOLTS M12 GRADES 8.8 HDG. STRUCTURAL BOLTS UNLESS NOTED ~~OTH~~ERWISE

"Take 5"

R:\R_RS_DATA\Projects_Folder\RS-DS\DSJN1323\Design\Detailed Design\1323 design.dwg

REV	DATE	DESCRIPTION
1	22-08-23	ISSUED FOR CONSTRUCTION

0.00 0.10 0.20 0.30 0.40 0.50
SCALE 1:10

CHECKED: C.MCKINNON DESIGNER DATE: 22-08-23
CHECKED: D. STEWART SENIOR DESIGN & PROJECT ENGINEER DATE: 22-08-23
CHECKED: L.MACKIEWICZ CLIENT REPRESENTATIVE DATE: 22-08-23

WATERMAIN BRACKET DETAIL

SURVEYED: WQ | CLIENT REP: CF | DESIGNED: MN | JOB NO: DSJN1323

TAMWORTH REGIONAL COUNCIL

REPLACEMENT OF MICK MAHERS BRIDGE
GILL STREET MOONBI

DATUM	SCALES AS SHOWN
A.H.D.	DRAWING NO.
A3	1323-039

Appendix B

Native Title Search

National Native Title Tribunal

Register of Native Title Claims Details

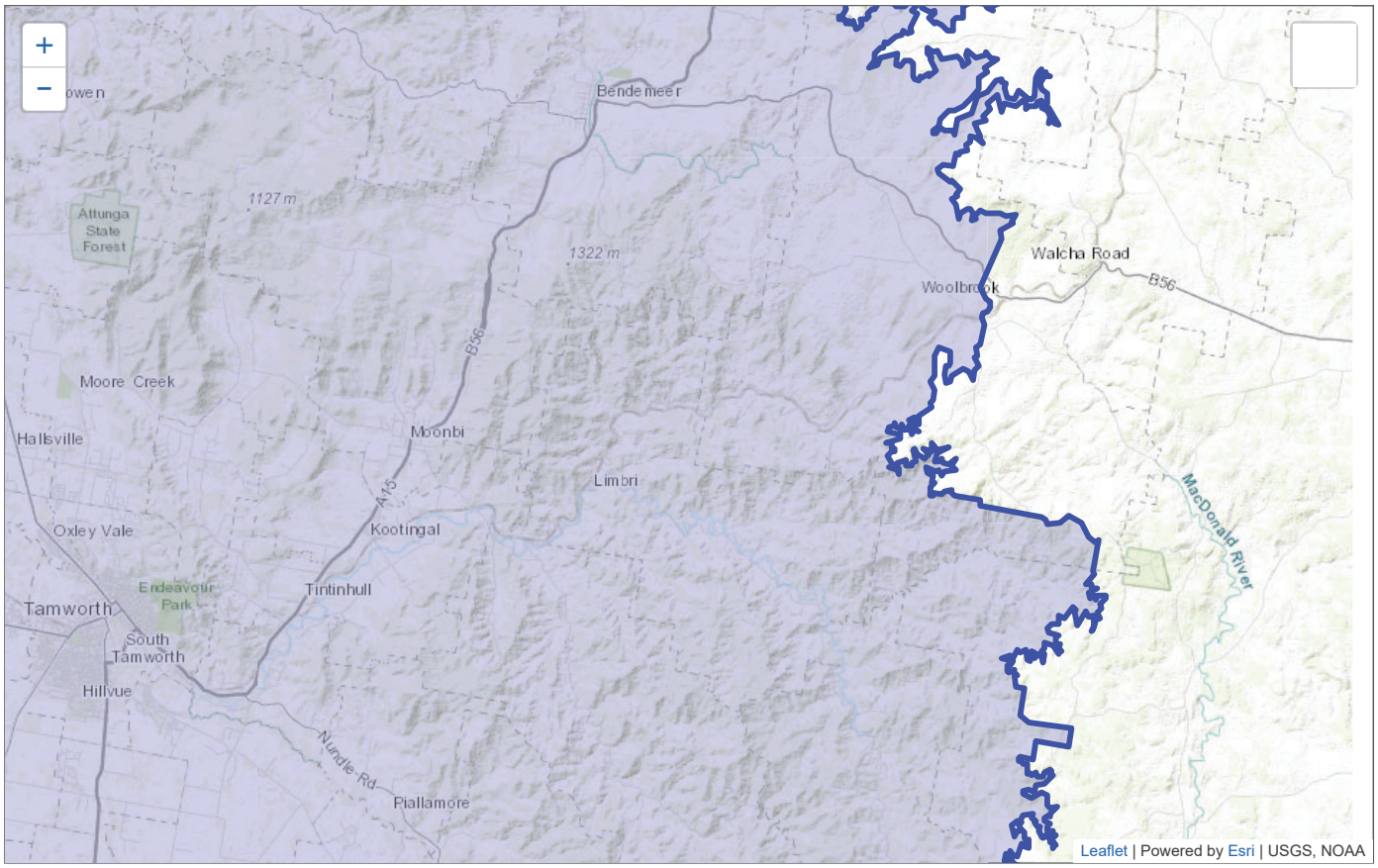
Back to search results

NC2011/006 - Gomeroi People

Tribunal file no.	NC2011/006
Federal Court file no.	NSD37/2019
Application name	Gomeroi People
State or Territory	New South Wales;
Representative A/TSI body area(s)	New South Wales
Local government area(s)	Armidale Regional Council,Coonamble Shire Council,Gilgandra Shire Council,Glen Innes Severn Shire Council,Gunnedah Shire Council,Gwydir Shire Council,Inverell Shire Council,Liverpool Plains Shire Council,Mid-Western Regional Council,Moree Plains Shire Council,Muswellbrook Shire Council,Narrabri Shire Council,Tamworth Regional Council,Upper Hunter Shire Council,Uralla Shire Council,Walcha Council,Walgett Shire Council,Warrumbungle Shire Council
Date filed	20/12/2011
Date claim entered on Register	20/01/2012

Register extract and attachments

Register extract	**RNTCExtract_NC2011_006.pdf**
Register extract attachment/s	**NC2011_006 Map of the area covered by the application.pdf** **NC2011_006 Details of any s251BA conditions.pdf** **NC2011_006 External boundary description.pdf**



View this map in NTV: **NC2011/006**

Appendix C

SEPP Notification Letter and Response

30/11/2023
Ref No: 4740-1010

NSW State Emergency Services
By email: rra@ses.nsw.gov.au

To whom it may concern

Notification of Activity on behalf of Tamworth Regional Council – Mick Mahers Bridge Review of Environmental Factors

Tamworth Regional Council (TRC) proposes to carry out the replacement of Mick Mahers Bridge, located on Gaol Creek Road, Moonbi, NSW (refer to **Figure 1**). The current timber bridge has been determined to be unsafe and requires replacement. The replacement is part of the NSW Governments Fixing Country Bridges Program.

The timber bridge is intended to be replaced with a concrete box culvert structure with a 100-year design life. The box culvert is to be set 300 mm below the existing bed level of the Gaol Creek and will be allowed to silt up naturally over time. The existing bridge is located on a key fish habitat stream and the box culvert design with lowered bed has been supported by NSW DPI Fisheries.

Mick Mahers bridge is located on flood liable land (refer to **Figure 2**).

Figure 1 Mick Mahers bridge replacement site.

PO Box 119
Lennox Head
NSW 2478
Bundjalung Nation
02 6687 7666

PO Box 1446
Coffs Harbour
NSW 2450
Gumbaynggir Country
02 6651 7666

PO Box 1267
Armidale
NSW 2350
Nganyaywana Country
02 6772 0454

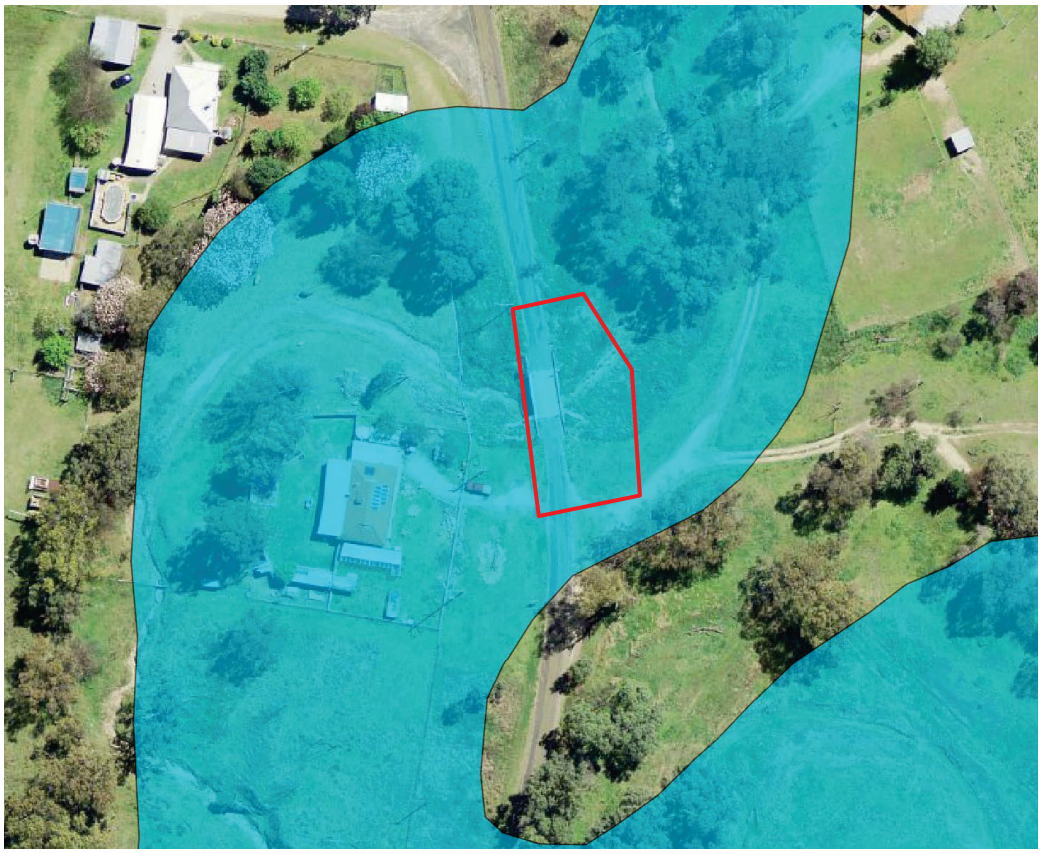


Figure 2 Flood mapping showing Mick Mahers bridge within flood mapped area.

The works are to be carried out without development consent under Division 17 (Roads and traffic) of the State Environmental Planning Policy (Transport and Infrastructure) 2021. A public authority is required to consult with NSW State Emergency Services (SES) under Section 2.13 where development is to be carried out under Division 17 on flood liable land. While we do not expect any changes to flood regimes because of the proposed works, we hereby give notice of the intention to carry out the development.

GeoLINK has been engaged by TRC to prepare a Review of Environmental Factors (REF) for these works to fulfil the requirements of Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In accordance with Section 2.13 we are notifying the SES of TRC's intention to carry out the activity and ask that you provide any comments on the proposal within 21 days from the date of this letter. Any comments/ response to this notice received within 21 days from the date of this letter will be considered in preparation of the REF.

If any further information is required, please contact me or Shannon Waddy on (02) 6772 0454 or mcampione-vanzetten@geolink.net.au or ShannonW@geolink.net.au.

Yours sincerely
GeoLINK

Michelle Campione-van Zetten
Environmental Planner

Our Ref: ID 2227
Your Ref: 4740-1010

15 December 2023

Michelle Campione-van Zetten
GeoLINK
PO Box 1267
Armidale NSW 2350

email: mcampione-vanzetten@geolink.net.au
CC: sonya.vickery@ses.nsw.gov.au

Dear Michelle,

Notification under section 2.13 of the State Environmental Planning Policy (Transport and Infrastructure) 2021 in relation to the proposed Mick Mahers Bridge Replacement

Thank you for the notification under section 2.13 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* in relation to the proposed replacement of Mick Mahers Bridge on Gaol Creek Road, Moonbi. It is understood that the proposed works include:

- Replacement of the damaged timber Mick Mahers Bridge over Gaol Creek with a concrete box culvert structure with a design life of 100 years.

The NSW State Emergency Service (NSW SES) is the agency responsible for dealing with floods, storms and tsunami in NSW. This role includes, planning for, responding to and coordinating the initial recovery from floods. As such, the NSW SES has an interest in the public safety aspects of the development of flood prone land, particularly the potential for changes to land use to either exacerbate existing flood risk or create new flood risk for communities in NSW.

The NSW SES has reviewed the proposed upgrade and the flood risk information available to the NSW SES (including the provided referral and supporting documentation, Tamworth Local Flood Plan and Tamworth City-Wide Flooding Investigation)[1]. The NSW SES are not aware of any flood study covering Gaol Creek in particular and note your referral letter states the site falls in flood liable land as shown in Figure 2[2].

Based on the imaging provided in the referral, the site becomes inundated by flooding and access and egress to the south is cut. It appears that evacuation to the north remains viable.

[1] Lyall & Associates. 2019. Tamworth City-Wide Flooding Investigation.
[2] GeoLink (2023) - Notification of Activity on behalf of Tamworth Regional Council – Mick Mahers Bridge Review of Environmental Factors. Figure 2.

In areas affected by flash flooding, which is characterised as flooding that occurs within 6 hours, Severe Weather Warnings are the most appropriate form of advice. NSW SES does not have the operational capacity to provide individualised flood warnings for each business site. Therefore, it is important that business owners and operators are weather aware and act early on severe weather warnings. The Australian Government Bureau of Meteorology website lists all current warnings.

The proposed works appear to have minimal impact to the NSW SES response operations, however any improvements that GeoLINK can make to reduce any flood risk will benefit the current and future community. Based on this review, the NSW SES provides the following advice:

- **Consider** the impact of flooding on the infrastructure, including people using the bridge, from overland and mainstream flooding up to and including the PMF.
- **During** site works, check the Bureau of Meteorology website prior to start of the workday for any Flash Flooding Warnings, and consider closing the worksite and securing all materials and equipment prior to the start of the working day if there is a risk of riverine or flash flooding.
- **Ensure** that any imported material along with any excess material is removed from the site, temporarily stockpiled at a laydown and is appropriately secured during a weather event.
- **Pursue** site design and stormwater management that minimises any risk to the community.
- **Ensure** workers and people using the bridge during and after the upgrades are aware of the flood risk, for example by using signage.
- **Consider** how the installed temporary traffic controls will affect the flow of traffic, including emergency vehicles, during a weather event.

In addition, if the construction phase of the upgrades causes disruption to the operation of local roads, this may impact the ability for emergency vehicles to use these routes. The NSW SES requests that notification be provided where there are likely to be significant delays in the operation of the roads affected by the upgrades.

Please feel free to contact Belinda Lewthwaite via email at rra@ses.nsw.gov.au should you wish to discuss any of the matters raised in this correspondence. The NSW SES would also be interested in receiving future correspondence regarding the outcome of this referral via this email address.

Yours sincerely

Gillian Webber
Coordinator Emergency Risk Management - Regional
NSW State Emergency Service

Appendix D

Ecological Assessment

Environmental Assessment of Nine Bridges Proposed for Reconstruction in the Tamworth Regional Council Area

Prepared by Phil Spark

North West Ecological Services

For

Tamworth Regional Council

January 2021

Contents

This report details the potential impacts on flora and fauna associated with the proposed bridge replacements at nine locations within the Tamworth Regional Council region. It has been prepared for Tamworth Regional Council, in accordance with the requirements of Section 5a of the Environmental Planning & Assessment Act 1979, the Biodiversity Conservation Act 2016, Fisheries Management Act 1994 (FM Act), State Environmental Planning Policy 44, and the Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act).

The information presented in this report is based on an objective study undertaken in response to a brief provided by the client. While every attempt has been made to ensure the accuracy and objectivity of the report, the variability of the natural environment and the paucity of comparative research data may require that professional judgement be applied in reaching conclusions.

Any opinions expressed in the report are the professional opinions of the author Philip Spark of North West Ecological Services. They are not intended to advocate any specific proposal or position.

12th January 2021

Author Date

Philip Spark

North West Ecological Services
Tamworth 2340

Mob 0427642245 Email: pdspark@activ8.net.au

Accredited Biodiversity Assessment Method Assessor Number BAAS 20031

Cover: Retreat Bridge over the Macdonald River

1.0 Summary

The inspection of the nine bridges was conducted by Philip Spark and Dr John Hosking between the 14th Dec 2020 and 12th Jan 2021. The aim of the inspection was to identify environmental issues to be considered in the review of environmental factors for each bridge construction proposal.

The impact of the proposed bridge replacements will be limited to the immediate surrounds of the bridges.

The environmental issues considered were the potential impacts to endangered ecological communities, threatened species and migratory species as listed in:

The Biodiversity Conservation Act 2016 (BC Act)
The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
And the Fisheries Management Act 1994 (FM Act)

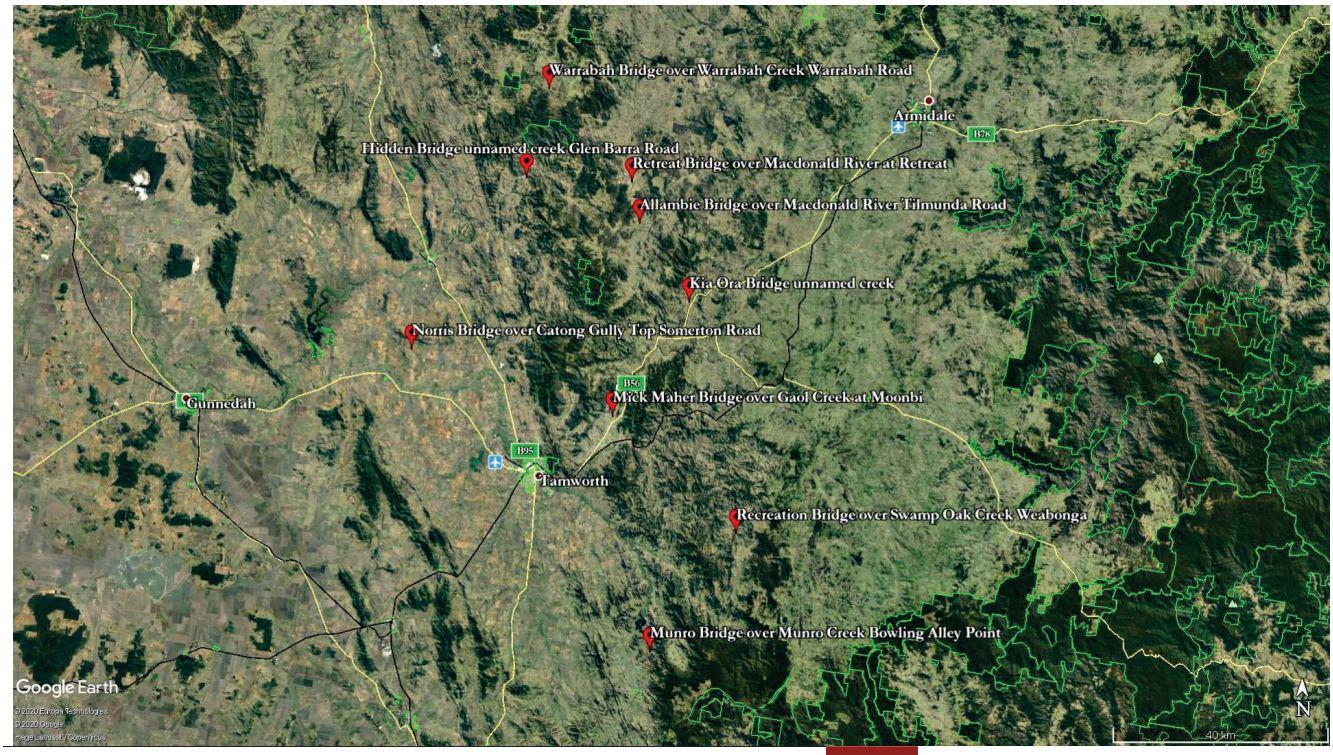
The potential impact areas in the immediate vicinity of the nine bridges were found to be highly degraded communities. No threatened plant species were recorded in the impact zone of any of the bridges, and none are likely to occur due to the history of disturbance.

Two of the bridges inspected span streams that are included in the area of the Fisheries Management Act 1994 endangered ecological community (EEC) of "aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River". Those were the Norris and Mick Maher bridges; the other seven bridges are above the 500m elevation limit of the EEC.

The upper limit of that EEC community is described as being Split Rock Dam, Chaffey Dam, and the junction of Manilla River and the Namoi River, or 500m elevation on all other tributaries.

Norris bridge below, is the only bridge adjoining native vegetation community that is listed as a critically endangered ecological community (CEEC). The White box trees shown in the photo below are to be avoided if possible, weeds are to be sprayed, and the adjoining vegetation cordoned off for protection during construction.

Figure 1. Map of the region showing the locations of the nine bridges inspected



Waypoint locations of the nine bridges

No.	Bridge location	Zone Easting Northing GDA	Altitude
1	Allambie Bridge over Macdonald River Tilmunda Road	56 J 320328 6603100	755 m
2	Hidden Bridge unnamed creek Glen Barra Road	56 J 299403 6611128	427 m
3	Kia Ora Bridge unnamed creek	56 J 329663 6588899	825 m
4	Mick Maher Bridge over Gaol Creek at Moonbi	56 J 315977 6567866	484 m
5	Munro Bridge over Munro Creek Bowling Alley Point	56 J 323581 6524964	529 m
6	Norris Bridge over Catong Gully Top Somerton Road	56 J 278870 6579427	408 m
7	Recreation Bridge over Swamp Oak Creek Weabonga	56 J 339001 6546817	699 m
8	Retreat Bridge over Macdonald River at Retreat	56 J 318783 6610618	740 m
9	Warrabah Bridge over Warrabah Creek Warrabah Road	56 J 303277 6627375	843 m

Table 2 Identifies the threatened species that could potentially occur at the nine bridge locations. It shows a suite of threatened woodland birds are likely to occur at bridges 1, 2, 6, 7, & 8; those bridges are located in landscape riparian corridors or adjoin woodlands.

The threatened Speckled Warber was recorded during the assessment at Hidden Bridge. The demolition at that bridge is to occur outside of its breeding season between August to February.

The threatened species assessment found that Recreation and Munro bridges span creeks that were known Booroolong Frog habitat in 2017. Since then the frog has dramatically declined -none were found during this assessment, but a precautionary approach will be taken as they may recolonise those sites in the future.

The Macdonald River at the Retreat Bridge and Allambie Bridge is known habitat for the Murray Cod and Bell's Turtle and potential habitat for the endangered population of Freshwater Catfish and the vulnerable species of Silver Perch. The Silver Perch is listed as vulnerable in the FM Act, and the Freshwater Catfish is listed as an Endangered Population in the FM Act. Murray Cod are listed as vulnerable in the EPBC Act.

The generic recommendations for mitigation measures to be implemented at all bridges will ensure protection of streams, riparian vegetation and habitat. A Fisheries Officer will be requested to inspect the protection measures of streams with potential fish habitat to ensure they provide adequate protection.

In addition to the generic recommendations for the protection of stream banks, and riparian vegetation, there are also specific recommendations for the Booroolong Frog at Recreation and Munro bridges.

An ecologist will be required to conduct a pre-construction search for the Booroolong frog in the works area on the night prior to works commencing. That preconstruction survey will capture and relocate all frogs found in the substructure works area.

After construction commences, the survey is to be repeated the following Sunday to remove any frogs that may have reoccupied the works area over the weekend. If frogs are found again it is to be repeated the following Sunday and each Sunday until no more Booroolong frogs are found or until completion of the bridge substructure. Works other than the substructure that are outside of the creek bed will not require further frog surveys.

The construction of the substructure will need to be completed in the warmer months (Nov to March) to minimise impacts to the Booroolong frog. There is no seasonal timing required for the other six bridges as there will be minimal impact to the fish.

The clearing impact at the bridges is very minimal; a few juvenile River Oaks, White Cypress, Callistemon shrubs & other native shrubs, Willows, and potentially two Blakeys Red Gums and two White box trees. All disturbances are to occur in areas highly disturbed by previous clearing and construction.

Hidden bridge below will require considerably more clearing than the other bridges as shown below

Table 1. Clearing of vegetation required at the identified bridges

No.	Bridge location	Clearing Impact
1	Allambie Bridge over Macdonald River Tilmunda Road	4 young River Oak, 2 Callistemon shrubs and Willows
2	Hidden Bridge unnamed creek Glen Barra Road	2 juv Kurrajong, 2 juv White Cypress, 1 dead tree, shrubs of Native olive, Hopbush, Hickory Wattle, Iamboto and Wonga Vine and potentially 2 Blakelys Red Gum trees on the SW corner of the southern approach
3	Kia Ora Bridge unnamed creek	None
4	Mick Maher Bridge over Gaol Creek at Moonbi	None
5	Munro Bridge over Munro Creek Bowling Alley Point	Few dead and alive exotic trees and shrubs, possibly 1 juvenile River Oak
6	Norris Bridge over Catong Gully Top Somerton Road	Shrubs of Acacia decora, and potentially 2 White box trees close to SW corner abutment
7	Recreation Bridge over Swamp Oak Creek Weabonga	Likely lopping of two River Oak trees close to the bridge.
8	Retreat Bridge over Macdonald River at Retreat	Likely lopping of 4 River Oak, and removal of 4 Callistemon shrubs.
9	Warrabah Bridge over Warrabah Creek Warrabah Road	None

The Mick Maher bridge below is typical of the bridges that are weedy and require no clearing

There will be no impact to hollow dependent fauna as there are no hollow trees in the impact areas to be removed. There will be very minimal impact to the nectar food resource for birds and gliders, or the foliage resource for the Koala.

The spread of environmental weeds is considered a potential impact of the proposed works. The assessment identified that the ground cover vegetation in the approaches and construction area of the nine bridges is dominantly exotic plants (mostly pasture species), see Appendix 2. Norris bridge is the only bridge where there is significant native ground cover to be avoided. In addition to those weeds recorded there are numerous additional roadside weeds in the region that require mitigation measures to prevent their spread to the construction sites.

Searches of the Office of Environment and Heritage Wildlife Atlas (NSW) database and the Department of the Environment, Water, Heritage and Arts (Commonwealth) website and other sources of information were used to identify threatened flora and fauna species that may occur in or near the study areas (Appendices 4, 5, & 6).

The Koala habitat assessment found that bridges 1, 2, 7 & 8 are potential Koala habitat, but not core Koala habitat as defined in the State Environment Planning Policy No. 44.

The Booroolong Frog has disappeared from the Recreation and Munro bridges since 2017, but was recorded below Shearins Bridge on Swamp Oak Creek Dec 2020.

Table 2. Threatened And Migratory Species Considered For Potential Impacts At The Identified Bridges

Scientific Name	Common Name	NSW status	Comm status	TRC Records	Bridges
Litoria booroolongensis	Booroolong Frog	E1,P	E	1568	5 & 7
Myuchelys bellii	Bell's Turtle	E1,P	V	523	1 & 8
Uvidicolus sphyrurus	Border Thick-tailed Gecko	V,P	V	49	2
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	Mig	3	1 & 8
Hieraaetus morphnoides	Little Eagle	V,P		57	1, 2, 6, 7, & 8
Lophoictinia isura	Square-tailed Kite	V,P,3		7	1, 2, 6, 7, & 8
Falco subniger	Black Falcon	V,P		6	1, 2, 6, 7, & 8
Glossopsitta pusilla	Little Lorikeet	V,P		243	1, 2, 6, 7, & 8
Lathamus discolor	Swift Parrot	E1,P,3	CE, Mig	14	1, 2, 6, 7, & 8
Neophema pulchella	Turquoise Parrot	V,P,3		121	1, 2, 6, 7, & 8
Ninox connivens	Barking Owl	V,P,3		10	1, 2, 6, 7, & 8
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		272	1, 2, 6, 7, & 8
Chthonicola sagittata	Speckled Warbler	V,P		158	1, 2, 6, 7, & 8
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	141	1, 2, 6, 7, & 8
Grantiella picta	Painted Honeyeater	V,P	V	4	1, 2, 6, 7, & 8
Melithreptus gularis gularis	Black-chinned Honeyeater	V,P		61	1, 2, 6, 7, & 8
Daphoenositta chrysoptera	Varied Sittella	V,P		56	1, 2, 6, 7, & 8
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		155	1, 2, 6, 7, & 8
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P		57	1, 2, 6, 7, & 8
Petroica phoenicea	Flame Robin	V,P		15	1, 2, 7, & 8
Stagonopleura guttata	Diamond Firetail	V,P		157	1, 2, 6, 7, & 8
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	102	7
Phascolarctos cinereus	Koala	V,P	V	86	1, 2, 7, & 8
Petaurus norfolcensis	Squirrel Glider	V,P		68	1, 2, 6, 7, 8
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	41	4
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		33	1, 2, 3, 4, 5, 6, 7, 8, 9
Chalinolobus picatus	Little Pied Bat	V,P		10	6
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		94	1, 7, 8
Nyctophilus corbeni	Corben's Long-eared Bat	V,P	V	22	4 & 6
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		14	1, 7, 8

Threatened Fish Species Listed in FM Act and EPBC Act

Scientific Name	Common Name	NSW status	Comm status	Bridges
Murray Cod	*Maccullochella peelii*		V	1 & 8
Silver Perch	*Bidyanus bidyanus*	V		1 & 8
Freshwater Catfish	*Tandanus tandanus*	E Pop FM Act		1 & 8

Additional Migratory Species Listed in EPBC Act

Scientific Name	Common Name	Bridges
Hirundapus caudacutus	White-throated Needletail	All bridges
Merops ornatus	Rainbow Bee-eater	All bridges
Apus pacificus	Fork-tailed Swift	All bridges
Gallinago hardwickii	Latham's Snipe	1, 3, 4, 5, 7, 8, & 9
Haliaeetus leucogaster	White-bellied Sea- eagle	1 & 8
Myiagra cyanoleuca	Satin Flycatcher	1, 7 & 8
Ardea alba	White Egret	1, 3, 4, 5, 7, 8, & 9
Ardea ibis	Cattle Egret	1, 3, 4, 5, 7, 8, & 9

In considering the potential impact on the threatened and migratory species likely to occur and the endangered ecological communities recorded on site, an application of the Assessment of Significance (Five Part Test, Section 4A NSW Biodiversity Conservation Act 2016 [BC Act]) and the Commonwealth Administrative Guidelines (Environment Protection and Biodiversity Conservation [EPBC] Act 1999) determined that the proposal would not have a significant impact on any threatened species or ecological communities.

This assessment concluded that the proposed bridge replacements will not have a significant impact on threatened fauna or flora or migratory species. Apart from the streams, the road verges and construction sites were found to have low conservation value for the threatened and migratory species likely to occur in the region. The recommendations will ensure protection of stream banks, and riparian vegetation along the streams.

Therefore, the preparation of Species Impact Statements is not necessary, nor is the proposal a matter of National Environmental Significance that requires referral.

1.1 Generic recommendations to mitigate the potential impact of construction and minimise key threatening processes

The implementation of the following mitigation measures will result in minimal impact to streams and their riparian zones. The mitigation measures at streams with potential fish habitat are to be inspected by a Fisheries Officer.

The proposed works will result in minimal clearing and negligible loss of potential habitat and resources for threatened species. No mature or hollow trees are to be removed. No instream logs or debris will be removed. The proposed works will not result in damming or major alteration to the stream flows.

Most of the works areas are dominated by environmental weeds. It is important that all vehicles and personnel involved in the works, practice strict weed hygiene to ensure that their vehicles, equipment and clothing are kept free of weed seeds to ensure that weed seeds are not transferred into, or off the site.

Environmental Protection Measures to Be Implemented At Each Works Location

- Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges. Norris bridge has areas of native vegetation nearby that are fitting of the description of an endangered ecological community: those areas are to be cordoned off as 'no go' areas.

- Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites.

- Minimise disturbance to vegetation and soil between the top flood level and the stream. If instream or water level disturbance is required, a fisheries officer is to inspect the site to assess the suitability of the stream protection measures.

- Erect silt curtain sediment traps below works in all drainage lines: where risks are increased with steeper slopes and larger catchments, multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions.

- Under no circumstances are streams to be blocked or dammed, minimise temporary diversion.

- If floating debris is likely, capture it by erecting a floating boom downstream of the works.

- To prevent weed seed dispersal ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds. Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion.

- No mature or hollow trees are to be removed. No instream logs or debris will be removed.
- Where possible retain the debris from clearing and construction in the works area to provide habitat.
- There is to be no blasting within the streams.

The Speckled Warbler above was recorded at Hidden Bridge 2 and the Bells Turtle below is known to occur at Allambie Bridge 1 and Retreat Bridge 8

2.0 Results from field assessment

Table 3. The Environmental Issues Identified At The Nine Bridge Locations

Bridge No.	Bridge Location	Stream FM Act EEC	Vegetation BC Act EEC	Vegetation EPBC Act EEC	Habitat for Threatened Species listed in BC Act and EPBC Act	Issues identified
1	Allambie Bridge over Macdonald River Tilmunda Road	Not Present	Not present	Not Present	Known habitat for threatened fish, Bells Turtle, and woodland birds No threatened plants or ecological communities in the construction area	Major river, a permanent stream that is known to provide habitat for threatened fish species, and the Bells Turtle. No potential nestings sites for the Bells Turtle to avoid in the works area. No plants or communities of significance in the approaches. Minimal clearing of four juvenile River Oak and two Callistemon shrubs and Willows. No bypass track, may need road closure. The generic stream protection measures are required to protect threatened fish and Bells Turtle.
2	Hidden Bridge unnamed creek Glen Barra Road	Not Present	Not Present	Not Present	Recorded Speckled Warbler, and potential habitat for other threatened woodland birds, Border Thick-tailed Gecko, and Squirrel Glider. No threatened flora. Nil habitat for threatened fish or frogs in the construction area	Appears to be an ephemeral stream, too small to provide potential habitat for threatened fish species, very shallow less than 10cm deep. Reguires clearing 2 juv Kurrajong, 2 juv White Cypress, 1 dead Blakelys Red Gum and potentially 2 more on SW corner, shrubs of Native olive, Hopbush, Hickory Wattle, Iamboto and Wonga Vine. No mature or hollow trees in impact area to protect. Has high diversity of weeds and native plants. Conduct demolition outside of Speckled Warbler breeding season August to February. No mature hollow trees to protect. Relocate timber debris to provide habitat for Gecko. No bypass track, may need road closure. Generic stream protection measures required.

Bridge No.	Bridge Location	Stream FM Act EEC	Vegetation BC Act EEC	Vegetation EPBC Act EEC	Habitat for Threatened Species listed in BC Act and EPBC Act	Issues identified
3	Kia Ora Bridge unnamed creek	Not Present	Not Present	Not Present	No threatened flora. No potential habitat for threatened fish, frog, birds, mammals, or turtle in the impact area.	Located in stock grazing paddock. Appears to be an ephemeral stream, too small to provide potential habitat for threatened fish species. Heavily grazed, dominantly weeds, low diversity of native flora. May require clearing of Poplar trees. No existing bypass track. Generic stream protection measures required.
4	Mick Maher Bridge over Gaol Creek at Moonbi	Yes	Not present	Not Present	No threatened flora. Nil habitat for threatened fish, frog and turtle. No potential habitat for threatened birds and mammals in the impact area.	Appears an ephemeral stream included in the FM Act EEC. Low diversity of native flora, heavily degraded by exotic trees and ground cover plants. Would have once been White box EEC. No mature or hollow trees in impact area to protect. No existing bypass track. Generic stream protection measures required.
5	Munro Bridge over Munro Creek Bowling Alley Point	Not Present	Not Present	Not Present	Known Booroolong Frog habitat in 2017, possibly now locally extinct. No threatened flora. No potential habitat for threatened fish No potential habitat for threatened birds, or mammals in the impact area	Appears to be a permanent stream, heavily degraded by exotic trees and ground cover plants. Stream considered too small and shallow for threatened fish. No mature or hollow trees to protect. Conduct the demolition/ construction Nov – March during warmer months when frogs are visible at night.. Requires an inspection prior to demolition to see if Booroolong Frogs have returned. If so, repeated monitoring during demolition and substructure construction. No existing bypass track. Generic stream protection measures required.
6	Norris Bridge over Catong Gully Top Somerton Road	Yes	White box woodland EEC	White box woodland EEC	No threatened flora. No habitat for threatened fish, or frogs. Adjoining EEC woodland provides potential habitat for threatened birds and mammals shown in Table 2.	Appears to be a highly ephemeral stream mostly dry. The critically endangered ecological community is to be cordoned off during works. If possible avoid the White box trees adjoining the SW abutment. May need to clear a few *Acacia decora* in the approaches. Ground cover of verges & approaches weedy. Spray Coolatai grass, Johnsons grass and African Olive. Steep gully no bypass track, high erosion potential. Apply generic stream protection measures.

Bridge No.	Bridge Location	Stream FM Act EEC	Vegetation BC Act EEC	Vegetation EPBC Act EEC	Habitat for Threatened Species listed in BC Act and EPBC Act	Issues identified
7	Recreation Bridge over Swamp Oak Creek Weabonga	Not Present	Not Present	Not Present	The works area was known Booroolong Frog habitat in 2017, possibly now locally extinct. No threatened flora. No potential habitat for threatened fish. Adjoining woodland is habitat for threatened birds, bats, and other mammals.	The Booroolong Frog was known to occur in Swamp Oak Creek under the bridge in 2017. The 2019 drought caused serious decline, none were found the night the survey was conducted, but were still present below Shearins Bridge. If present, Booroolong Frogs are likely to shelter over winter under rocks and debris making them very difficult to find. Conduct the demolition/ construction Nov – March during warmer months when frogs are visible at night. Conduct a survey the night prior to demolition/construction to remove frogs from the impact area. If present, Booroolong frogs could re-occupy the site over weekends. If the Booroolong frog is found prior to demolition, repeat that survey and frog removal each Sunday evening until no frogs are found. Two River Oaks require lopping. Work in the creek bed to be minimised. Has a good existing bypass track. Generic stream protection measures required.
8	Retreat Bridge over Macdonald River at Retreat	Not Present	Not Present	Not Present	Known habitat for threatened fish, Bells Turtle, and woodland birds. No threatened plants or ecological communities in the construction area	Major river, a permanent stream that is known to provide habitat for threatened fish species and the Bells Turtle. No potential nestings sites for the Bells Turtle to avoid in the works area or bypass track. Approaches to the bridge are weedy, no plants or communities of significance in the works area or approaches. Likely to require the lopping of 4 River Oak, and removal of 4 Callistemon shrubs. There are no mature hollow trees to protect. Threatened fish and Bells turtle require generic stream protection measures. Has a good bypass track.

Bridge No.	Bridge Location	Stream FM Act EEC	Vegetation BC Act EEC	Vegetation EPBC Act EEC	Habitat for Threatened Species listed in BC Act and EPBC Act	Issues identified
9	Warrabah Bridge over Warrabah Creek Warrabah Road	Not Present	Not Present	Not Present	No threatened flora. Nil habitat for threatened fish, birds, mammals, reptiles or frogs in the construction area	A small shallow stream, likely to be ephemeral judging by the wetland plants. Grazed by stock in adjoining paddocks. Low diversity of native plants, dominantly weeds. No clearing of trees or shrubs required. Maybe an old bypass track on downstream side of bridge. Generic stream protection measures required.

3.0 Description of the nine bridge locations

3.1 Allambie Bridge over Macdonald River Tilmunda Road

The western approach to the bridge showing the 4 juvenile River Oak, 2 Willows, and 2 Callistemon shrubs that may require removal

Description of the environment within the works area of Allambie Bridge

Works proposed:

The existing one span timber bridge will be demolished and replaced with a concrete bridge. There is no obvious bypass potential; may require temporary road closure.

Significant communities considered

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 -Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 - Nil in construction impact area.

Threatened species present in works area:

BC Act - Bell's Turtle
EPBC Act - Bell's Turtle and Murray Cod
FM Act - Nil identified

Threatened species likely to occur in works area:

BC Act - 24 species of woodland birds and mammals as per list in Table 2

EPBC Act - Swift Parrot, Regent Honeyeater, Painted Honeyeater, & Koala

FM Act - Potential habitat for the Silver Perch, and Eel-tailed Catfish

Migratory species present or likely to occur in impact area - Migratory birds per list Table 2

Description of the environment within the proposed works area:

Stream - A permanent stream 15m wide x 0.5m deep, has a rock and gravel bed. The stream and banks are degraded by grazing, clearing and weed invasion.

Vegetation - the bridge surrounds and approaches are dominantly weedy. Native River Oaks and Callistemon shrubs and exotic Willows grow in the river bed and banks. Potentially four of the juvenile River Oaks, two Callistemon shrubs and Willows will require removal. No mature or hollow trees in impact area. The ground cover is dominated by environmental and noxious weeds (15 exotic, 9 native) of African Lovegrass, Beggars Ticks, Purple top, and Blackberry which present problems for weed dispersal and regeneration of disturbed areas.

Likely impact - The implementation of the generic environmental protection measures will protect the Murray Cod and Bell's Turtle, minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream. A Fisheries Officer is required to inspect the stream protection measures.

3.2 Hidden bridge on the Glen Barra Road to Halls Creek

Hidden bridge set in a riparian corridor & regenerating agricultural landscape

**View of the southern approach to Hidden Bridge,
showing the Blakely's Red Gum trees to be avoided if possible**

View of the northern approach to Hidden Bridge, showing the Blakely's Red Gum trees to be avoided if possible

Description of the environment within the Hidden Bridge works area

Works proposed

The existing single span timber bridge will be demolished and replaced with a concrete bridge. There is no causeway established for a bypass, will likely require road closure.

Significant communities considered

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 - Nil in construction impact area.

Threatened species present in works area:

BC Act - Speckled Warbler
EPBC Act - Nil identified
FM Act - Nil identified

Threatened species likely to occur in works area:

BC Act - 21 species listed in Table 2

EPBC Act - five species listed in Table 2

FM Act - Nil identified.

Migratory species present or likely to occur in impact area - 3 species listed in Table 2

Description of the environment within the proposed works area:

Stream - A highly ephemeral creek, would be mostly dry, a trickle of water at present. Lacks holes to provide fish habitat. The works will maintain the trickle flow.

Vegetation - The surrounds have been very heavily cleared in the past, now regenerating a multi-layered woodland. Dominantly native trees and shrubs, 2 juv Kurrajong, 2 juv White Cypress, 1 dead tree, shrubs of Native olive, Hopbush, Hickory Wattle, Iamboto and Wonga Vine and potentially 2 Blakelys Red Gum trees on the SW corner of the southern approach will require removal. Ground cover is very weedy with Coolatai grass, Cobblers pegs, and Purple top, high diversity of both exotic (13) and native plants (29).

Likely impact - Loss of juvenile trees and shrubs that provide potential nesting and foraging habitat for the Speckled Warbler. Clearing to occur outside of breeding period Aug – Feb. Retain the log debris to provide habitat for the Gecko. The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream.

3.3 Kia Ora Bridge No.1 on Rocky Gully Road

Location of Kia Ora Bridge No 1 set in an over-cleared agricultural landscape

The bridge is located in a grazing pasture paddock with no native trees or shrubs

The water pool currently under the bridge, would normally be dry in an average season

Description of the environment within the Kia Ora No 1 Bridge works area

Works proposed: The existing one span timber bridge will be demolished and replaced with a concrete bridge of similar length. A bypass may be constructed in the paddock to enable construction.

Significant communities considered

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 -Nil

Threatened species present in works area:

BC Act - Nil identified.
EPBC Act - Nil identified.
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - Yellow-bellied Sheathtail Bat is likely to forage in the area
EPBC Act - Nil identified.
FM Act - Nil identified.

Migratory species present or likely to occur in impact area -six species listed in Table 2 may forage in the area; none would breed or roost in the works area.

Description of the environment within the proposed works area:

Stream - A small ephemeral creek running through a pasture paddock with a gravel and rock stream bed, hole under bridge approximately 2 m wide and 50cm deep. Too small and ephemeral to provide habitat for the threatened fish considered.

Vegetation -The riparian zone has been highly degraded by clearing: no native trees, few exotic Poplar trees adjoining. High diversity of exotic species (16), low in native species (4). No clearing required. The ground cover is dominantly exotic pasture plants. African Lovegrass is the serious environmental weed present.

Likely impact - The threatened and migratory species likely to occur would not breed, roost or shelter in the works area. A new bypass track may be required. The works will require minimal disturbance to the stream and banks to construct new bridge.

The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream

3.4 Mick Maher Bridge over Gaol Creek at Moonbi

Location of Mick Maher Bridge over Gaol Creek at Moonbi, set in an urban landscape

View of the bridge from the southern approach showing the cleared, weedy works area

View of the bridge from the northern approach showing the cleared, weedy works area

View under the bridge showing trickle of water; in an average season it would be dry

Description of the environment within the Mick Maher Bridge works area

Works proposed - The existing one span timber bridge will be demolished and replaced with a concrete bridge of similar length. An existing road will provide access during construction.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:

BC Act - Nil identified.
EPBC Act - Nil identified.
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - Grey-headed Flying Fox, Yellow-bellied Sheathtail Bat, Corben's Long-eared Bat are likely to forage in the area
EPBC Act -Grey-headed Flying Fox, Corben's Long-eared Bat
FM Act - Nil identified.

Migratory species present or likely to occur in impact area - six species listed in Table 2 may forage in the area. None would breed or roost in the works area.

Description of the environment within the proposed works area:

Stream - A small ephemeral creek with a sandy stream bed, approximately 1m wide and 30cm deep. Too small and ephemeral to provide habitat for the threatened fish considered.

Vegetation - The riparian zone has been highly degraded by clearing and weed invasion, high diversity of weed species (11), low natives (5). No trees or shrubs in the works area. No clearing required. The ground cover is dominantly exotic pasture plants: Johnsons grass, Blue Heliotrope, and Feathertop Rhodes grass are the serious environmental weeds present.

Likely impact - The threatened and migratory species likely to occur would not breed, roost or shelter in the works area. The works will require minimal disturbance to the stream and banks to install the new bridge. Where possible retain the timber debris to provide habitat outside of the works area.

The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream

3.5 Munro Creek Bridge over Munro Creek at Bowling Alley Point

Location of Munro Creek Bridge 5 set in an over-cleared agricultural landscape

View looking east at Munro Bridge and its degraded riparian zone dominated by exotics

View looking west at Munro Bridge and its degraded riparian zone dominated by exotics

Below view of the Booroolong Frog habitat under the bridge

Description of the environment within the Munro Creek Bridge works area

Works proposed: the existing single span load limited timber bridge will be demolished and replaced with a concrete bridge of similar length. A bypass will need to be constructed for public access during construction.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:

BC Act - Booroolong Frog 2017
EPBC Act - Booroolong Frog 2017
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - Yellow-bellied Sheathtail Bat likely to forage in the area
EPBC Act - Nil identified.
FM Act - Nil identified.

Migratory species present or likely to occur in impact area - six species listed in Table 2 may forage in the area: none would breed or roost in the works area.

Description of the environment within the proposed works area:

Stream - A small permanent creek with a gravel and rock stream bed, approximately 1m wide and 20cm deep. Too small to provide habitat for the threatened fish considered. The Booroolong frog occurred in 2017, this field assessment failed to find it, likely declined due to drought, may recolonise in the future.

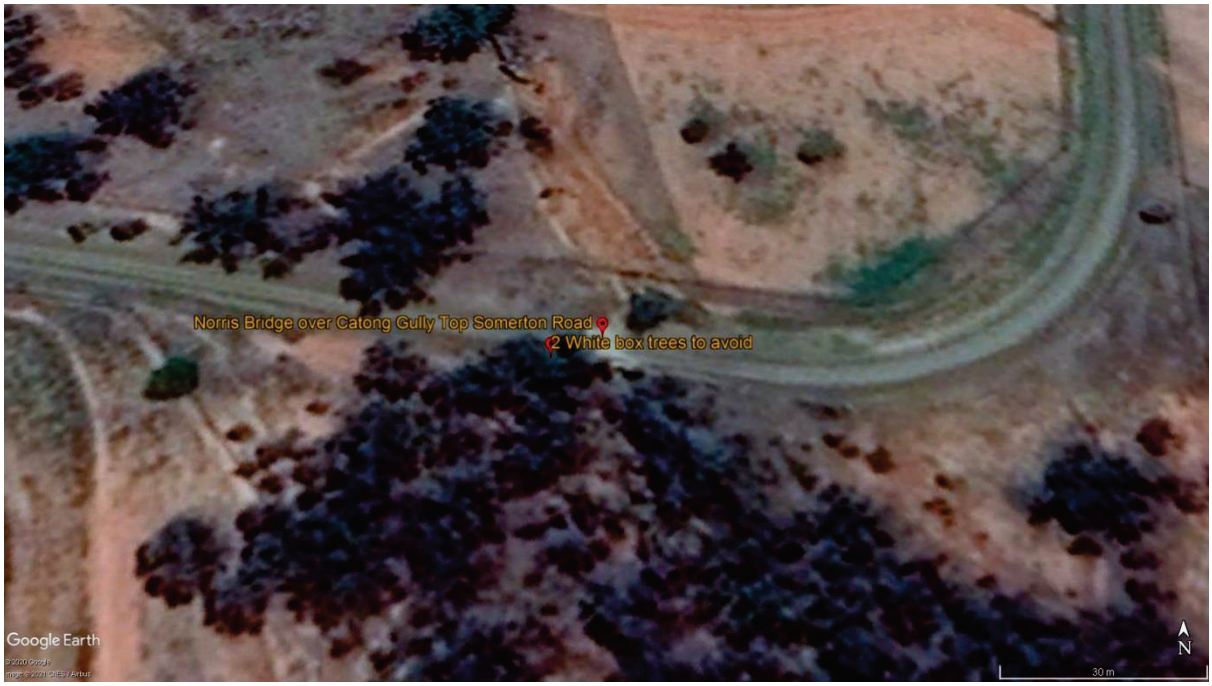
Vegetation - The riparian zone is highly degraded, now dominantly exotic trees, shrubs and ground cover. Has high diversity of exotics (31), low natives (11). The exotic trees and one immature River Oak will likely require removal. Serious weeds are Johnsons grass, St John's Wort, Broadleaf Privet, Orange Thorn, Castor Oil Plant and Paterson's Curse.

Likely impact - Conduct the demolition/ construction Nov – March during warmer months when frogs are visible at night. Conduct a survey the night prior to demolition/construction to remove frogs from the impact area. If the Booroolong frog is found prior to demolition, it could re-occupy the site over weekends. To confirm, repeat the survey and frog removal each Sunday evening until no frogs are found. Work in the creek bed to be minimised. The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream.

3.6 Norris Bridge over Catong Gully Top Somerton Road

Norris Bridge set adjoining Box woodland in an over-cleared agricultural landscape

Enlarged view showing the two White box trees on SW abutment to avoid if possible



Above a view from the western approach showing White box trees to avoid if possible
Below the timber bridge and weedy dry ephemeral creek

Description of the environment within the Norris Bridge works area

Works proposed: The existing single span load limited timber bridge will be replaced with a concrete bridge of similar length. The deep gully limits bypass potential during construction.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Grassy Box – Gum woodland adjoins the southern side of construction impact area.

Endangered Ecological Communities listed in EPBC Act 1999 - Grassy Box – Gum woodland adjoins the southern side of construction impact area.

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:
BC Act - Nil identified.
EPBC Act - Nil identified.
FM Act - Nil identified.

Threatened species likely to occur in works area:
BC Act - 20 species of woodland birds and mammals as per list in Table 2, and one vulnerable plant Blue grass - *Dichanthium setosum*

EPBC Act - Swift Parrot, Regent Honeyeater, Painted Honeyeater, Corben's Long-eared bat and one vulnerable plant Blue grass - *Dichanthium setosum*

FM Act - Nil identified.

Migratory species present or likely to occur in impact area - Rainbow Bee-eater, White-throated Needletail, Fork-tailed Swift. Foraging only, no nesting or roosting habitat present.

Description of the environment within the proposed works area:

Stream - The eroded gully has a dry gravel bed, it is highly ephemeral, rarely runs water, been degraded by clearing, grazing and weeds. Too dry and small to provide habitat for the threatened fish considered.

Vegetation - The bridge surrounds and approaches are weedy, has high native diversity (28) and exotic species (17). Downstream side of the impact area there is grassy Box – Gum woodland EEC to be cordoned off and avoided. The two White box trees on the SW abutment are to be avoided if possible. Serious weeds to be sprayed: Coolatai grass, Johnsons grass, & African Olive.

Likely impact - The adjoining woodland provides potential habitat for 21 threatened species and three migratory species. None were recorded in impact area; no significant habitats for threatened species will be impacted. Retain timber debris outside of the works area to provide habitat. The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream.

3.7 Recreation Bridge over Swamp Oak Creek on Weabonga Road

Location of Recreation Bridge set in corridor between forests of conservation value

View from the western approach showing the bridge, side track and adjoining vegetation

View under the bridge and the bypass track on the 14th Dec 2020

Description of the environment within the Recreation Bridge works area

Works proposed: The existing three span load limited timber bridge will be demolished and replaced with a reinforced concrete bridge of similar length. A bypass already exists that will be used during construction.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Nil in impact area.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in impact area.

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:

BC Act - Booroolong Frog in 2017
EPBC Act - Booroolong Frog in 2017
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - 22 threatened species could occur as per list Table 2
EPBC Act - Swift Parrot, Regent Honeyeater, Painted Honeyeater, Spotted-tailed Quoll & Koala
FM Act - Nil identified.

Migratory species present or likely to occur in impact area - Seven migratory species could occur as listed in Table 2. None of those would nest or seek shelter in the works area.

Description of the environment within the proposed works area

Stream - A small, mostly permanent creek with a gravel and rock stream bed that is approximately 1 – 2m wide and 20cm deep. The works will require minimal disturbance to the stream and banks to reconstruct the abutments.

Vegetation - The riparian zone is a high value landscape corridor. Only two River Oaks will likely require lopping. The ground cover is a mix of 12 exotic species and 12 native species; no serious weeds.

Likely impact - There are numerous threatened species likely to occur due to the significant corridor linking the remnants via the creek. The only species that could be impacted is the Booroolong Frog; it was known to occur in the riffles below the bridge in 2017. Conduct the demolition Nov – March during warmer months when frogs are visible at night. Conduct a survey the night prior to demolition to remove frogs from the impact area. If the Booroolong frog is found prior to demolition, it could re-occupy the site over weekends. To confirm, repeat the survey and frog removal each Sunday evening until no frogs are found. Work in the creek bed is to be minimised. The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream.

3.8 Retreat Bridge over Macdonald River at Retreat

Location of Retreat Bridge set in over-cleared agricultural landscape & riparian corridor

View from the western approach showing the four immature River Oak trees that will require lopping or removal that are close to the bridge

Above view of upstream side looking west, below is downstream side looking west

View of eastern upstream side, preferred construction area, below is bypass track

Description of the environment within the Retreat Bridge works area

Works proposed: The existing nine span load limited timber bridge will be demolished and replaced with a concrete bridge of similar length. The new bridge design will ensure the waterway area of the existing bridge is maintained. A bypass already exists to use during construction.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Nil in impact area

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in impact area

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:
BC Act - Bell's Turtle
EPBC Act - Bell's Turtle, Murray Cod
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - 24 species of woodland birds and mammals as per list in Table 2
EPBC Act - Swift Parrot, Regent Honeyeater, Painted Honeyeater, Koala
FM Act - Potential habitat for the Silver Perch, and Eel-tailed Catfish

Migratory species present or likely to occur in impact area - 8 migratory birds as per list Table 2, none of those would nest, roost or seek shelter in the works area.

Description of the environment within the proposed works area:

Stream - A permanent stream 15m wide x 1m deep, has a rock and gravel bed. The stream and banks are degraded by grazing, clearing and weed invasion.

Vegetation - The bridge surrounds and approaches are dominantly weedy. River Oaks, Callistemon shrubs and exotic Willows grow in the river bed and banks. Potentially four immature River Oaks will require lopping or removal and four Callistemon shrubs will require removal. No mature or hollow trees are in impact area. The ground cover is dominated by 21 environmental and noxious weeds; there are 16 native species. Serious weeds are African lovegrass, Feathertop Rhodes grass, and Blue Heliotrope.

Likely impact - There are numerous threatened species likely to occur due to the regional riparian corridor. The loss of 4 trees and shrubs is not going to impact those species. There are no turtle nesting sites in the impact area. The implementation of the generic environmental protection measures will protect the Murray Cod and Bell's Turtle, and minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream. A Fisheries Officer is required to inspect the stream protection measures.

3.9 Warrabah Bridge over Warrabah Creek on Warrabah Road

Location of Warrabah Bridge set in an over-cleared agricultural landscape

View of the bridge from the eastern approach, no trees or shrubs, weedy ground cover

Above view from upstream, below view from downstream of creek/wetland

Description of the environment within the Warrabah Bridge works area

Works proposed: The existing two span load limited timber bridge will be demolished and replaced with a concrete bridge of similar length. The new bridge design will ensure the waterway area of the existing bridge is maintained. A bypass should be possible via the pasture paddock.

Significant communities considered:

Endangered Ecological Communities listed in BC Act 2016 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in EPBC Act 1999 - Nil in construction impact area or in adjoining land.

Endangered Ecological Communities listed in FM Act 1994 - Nil

Threatened species present in works area:

BC Act - Nil identified.
EPBC Act - Nil identified.
FM Act - Nil identified.

Threatened species likely to occur in works area:

BC Act - Yellow-bellied Sheathtail bat
EPBC Act - Nil identified.
FM Act - Nil identified.

Migratory species present or likely to occur in impact area - Five of the migratory species listed in Table 2 may forage in the area. None of those would nest, roost or seek shelter in the works area.

Description of the environment within the proposed works area:

Stream - A small ephemeral creek highly degraded from clearing, grazing and weed invasion. Unsuitable for the threatened fish and frog considered.

Vegetation - The riparian zone is part of a grazing paddock that has been cleared and grazed for a long time; there are no trees in the riparian zone. The ground cover is a mix of 19 exotic and 14 native plants.

Likely impact - The migratory species may occur when the creek is suitable for foraging or when there is an abundance of airborne insects. None would be impacted by the proposed works. The implementation of the generic environmental protection measures will minimise soil disturbance, prevent erosion, prevent weed dispersal and introduction, and prevent contamination and pollution of the stream.

4.0 Consideration of Key Threatening Processes

The key threatening processes identified and considered in this assessment that are relevant to bridge construction and repair, as listed in the FM Act 1994, EPBC Act 1999, and BC Act 2016 are:

1. Key threatening processes listed under the *Fisheries Management Act 1994* relating to stream and habitat protection

- Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams,
- Degradation of native riparian vegetation along NSW Waterways,
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands,
- Alteration to the natural flow regimes of rivers and streams,
- The prevention of passage of aquatic biota,
- Alteration to the natural temperature of rivers and streams,
- Increased sediment input into rivers, and
- Predation by *Gambusia holbrooki* (*Biodiversity Conservation Act 2016*).

2. Key threatening processes listed under the *Biodiversity Conservation Act 2016* relevant to bridge construction and repair.

- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands,
- Clearing of native vegetation,
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidate,*
- Invasion of native plant communities by exotic perennial grasses (Coolatai grass),
- Loss of hollow-bearing trees, and
- Removal of dead wood and dead trees.

3. Key threatening processes listed under the *Environment Protection and Biodiversity Conservation Act 1999* relating to bridge construction and repair.

- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants,
- Land clearance.

5.0 Preliminary Assessment to Determine the Species Likely to Occur at the Bridges and those Requiring Application of the Five Part Test

Table 4. Threatened and migratory species recorded in the Wildlife Atlas for the Tamworth region

Identifies threatened species not recorded this survey, but have been recorded within the broader region that includes the study area. Identifies the species that require a full impact assessment that have potential habitat or are known to occur in the study area hence could be impacted

Key; Vul = vulnerable, End = endangered, Mig = Migratory EPBC Act

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
BIRDS				
Xanthomyza phrygia	Regent Honeyeater	End BC & EPBC Mig EPBC	Box – Ironbark Woodlands, with rich nectar source. Mistletoe in River Oak riparian woodland.	Not recorded, may seasonally occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Recorded in the broad region. Minimal removal of immature trees and shrubs & nectar resource. Insignificant impact.
Neophema pulchella	Turquoise Parrot	Vul BC	Grassy and shrubby woodlands, feeds on seeds, nests in hollows	Not recorded, may occur at Allambie, Hidden, Recreation and Retreat bridges. Recorded in the broad region. Minimal removal of immature trees and shrubs, no hollow trees impacted. Insignificant impact.
Melithreptus gularis gularis	Black-chinned Honeyeater	Vul BC	Box – Ironbark, & River Red Gum Woodlands west of the range, feeds on insects, nectar, and lerps. Mistletoe in River Oak riparian woodland	Not recorded, may seasonally occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Recorded in the broad region. Minimal removal of immature trees and shrubs & nectar resource. Insignificant impact.
Pandion cristatus	Eastern Osprey	Vul BC, Mig EPBC	Large water bodies like Split Rock Dam	Not recorded in study areas, the bridge locations are unsuitable habitat. Nil impact.
Lathamus discolor	Swift Parrot	End BC & EPBC, Mig	East coast of Australia south of Bowen, forests and woodlands, feeds on blossom nectar from nectar rich trees, breeds	Not recorded, may seasonally occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Recorded in the broad region. Minimal removal of

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
			Tasmania	immature trees and shrubs & nectar resource. Very low possibility of occurring seasonally when trees are flowering. Breeds in Tasmania, minimal – nil impact.
Daphoenositta chrysoptera	Varied Sittella	Vul BC	Eucalypt forests and woodlands Australia wide, prefers rough-barked tree species with dead branches, feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, and from small branches in the tree canopy, builds a cup-shaped nest in an upright tree fork high in the tree canopy.	Not recorded in study areas. Recorded in the region. Transient flocks may occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Minimal removal of marginal habitat in immature trees and shrubs. Minimal – nil impact.
Pyrrholaemus sagittata	Speckled Warbler	Vul BC	Open forests and woodlands mostly west of the range, prefers shrub understorey. Forages on ground for insects and seeds. Nests under debris or in rock crevices.	Recorded at Hidden Bridge. Recorded in the broad region, may occur at Allambie, Norris, Recreation and Retreat bridges. Minimal removal of marginal habitat in immature trees and shrubs. Demolish bridge outside of breeding season Aug to Feb. Insignificant impact.
Glossopsitta pusilla	Little Lorikeet	Vul BC	Great dividing range and coast, woodlands and open forests, watercourses, feeds on nectar, nests in small hollows high in trees.	Not recorded, may seasonally occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Recorded in the broad region. Minimal removal of immature trees and shrubs & nectar resource. No hollow habitat to be impacted. Insignificant impact.
Climacteris picumnus victoriae	Brown Treecreeper	Vul BC	Large remnants of Woodlands and Open Forests > 200 ha on the western slopes of the range, nests in tree hollows, forages on trunks, limbs and ground for insects.	Not recorded. Recorded in the broad region. May occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Minimal removal of marginal habitat in immature trees and shrubs, no suitable hollow habitat impacted. Insignificant impact.
Stagonopleura guttata	Diamond firetail	Vul. BC	Grassy Box – Ironbark- Red Gum woodlands & forests west of the range. Feeds on ground for seeds and insects, builds bottle shaped nest.	Not recorded in study areas. Recorded on road to Warrabah bridge, occurs widely in the broad region. May occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Minimal removal of marginal habitat in immature trees and shrubs. Insignificant impact.

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
Melanodryas cucullata cucullata	Hooded Robin	Vul BC	Shrublands, grassy woodlands and open forests of eastern NSW, ecotone areas of large remnants > 100 ha. Forages for insects on ground.	Not recorded in study areas. Recorded in the broad region. May occur at Allambie, Hidden, Norris, Recreation and Retreat bridges. Minimal removal of marginal habitat in immature trees and shrubs. Insignificant impact.
Hieraaetus morphnoides	Little Eagle	Vul BC	Australia wide, plains, ranges, woodlands, open forests, scrublands, watercourses. Nests in high leafy tree.	Not recorded in study areas. Recorded in the broad region. Can occur anywhere. No suitable nesting habitat to be impacted. Nil impact.
Lophoictinia isura	Square-tailed Kite	Vul BC	Nests in large tree along water course, preys on bird nests in woodlands and open forests	Not recorded in study areas. Recorded in the broad region. Can occur anywhere. No suitable nesting habitat to be impacted. Nil impact.
Falco subniger	Black Falcon	Vul BC	Inland NSW and the continent, nests in large trees	Not recorded in study areas. Recorded in the broad region. No possibility of occurring, no suitable habitat to be impacted. Nil impact.
Petroica boodang	Scarlet Robin	Vul BC	Dry eucalypt forests and woodlands of great dividing range, understorey open and grassy with few scattered shrubs, mid to high elevations during warm months, low elevations in winter, nest in fork of tree or shrub usually more than 2 metres above ground, pounces on insects on the ground	Not recorded in study areas. Recorded in the broad region. Low possibility of occurring in winter, no suitable breeding habitat to be impacted. Nil impact.
Petroica phoenicea	Flame Robin	Vul BC	Dry eucalypt forests and woodlands of great dividing range, understorey open and grassy with few scattered shrubs, mid to high elevations during warm months, low elevations in winter, nest in fork of tree or shrub usually more than 2 metres above ground, pounces on insects on the ground.	Not recorded in study areas. Recorded in the broad region. Low possibility of occurring in winter, no suitable breeding habitat to be impacted. Nil impact.
Pomatostomus temporalis temporalis	Grey-crowned Babbler	Vul BC	Woodlands and Open Forests of slopes and plains west of the range, feeds on insects on the ground, builds a large dome nest.	Not recorded in study areas, not likely to occur - Nil impact.

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
Grantiella picta	Painted Honeyeater	Vul BC	Woodlands with abundant Mistletoe fruit and nectar source, prefers Myall woodland	Not recorded in study areas, or in the region. Can occur anywhere there is abundant Mistletoe fruit. Minimal amount of Mistletoe removal at bridges. Nil impact.
Calyptorhynchus lathami	Glossy Black Cockatoo	Vul BC & EPBC	Woodlands & Open forests of the plains, slopes, and tablelands containing large fruited Allocasuarina tree species, and large hollow trees	Not recorded in study areas, not recorded in the region, no food source trees present, no clearing of big hollow trees. Nil impact.
Burhinus grallarius	Bush Stone-curlew	End BC	Woodlands with scattered shrub layer, and litter layer, nesting in spring-summer	Not recorded in study areas, unlikely to occur, locally extinct, Minimal - Nil impact.
Rostratula benghalensis	Painted Snipe	Vul BC & EPBC, Mig	Swamps, wetlands	Not recorded, marginal potential habitat prefers ephemeral swamps to streams. Nil impact.
Oxyura australis	Blue-billed duck	Vul BC	Dams, lakes, wetlands	Not recorded, unsuitable habitat, likes large water bodies. Nil impact.
Ephippiorhynchus asiaticus	Black-necked Stork	End BC	Swamps, wetlands	Not recorded, marginal potential habitat, likes large ephemeral wet areas. Nil impact.
Ninox connivens	Barking Owl	Vul BC	Woodlands and Open Forests, nests in large hollows.	Not recorded in study areas or in the region. No clearing of large hollow trees that may provide nesting sites or shelter for its prey. Nil impact.
Tyto novaehollandiae	Masked Owl	Vul BC	Woodlands and Open Forests, nests in large hollows.	Not recorded in study areas. Not likely. Nil impact.
Alectura lathami	Australian Brush-turkey population in Nandewar and Brigalow Belt South Bioregions	End Pop	Semi-evergreen Vine Thicket, Ooline open forest, multi-layered open forest	Not recorded in study areas or the region, no habitat. Nil impact.
Hamirostra melanosternon	Black-breasted Buzzard	Vul BC	Central and Northern Australia	Not recorded in study areas, no habitat, out of range. Nil impact.

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
Mammals				
Petaurus norfolcensis	Squirrel Glider	Vul BC	Box – Ironbark Woodlands and Open Forests, hollow tree dependent	Not recorded in study areas. Recorded in the broad region. Low possibility of occurring at Allambie, Hidden, Norris, Recreation and Retreat bridges, no suitable hollow habitat to be impacted. Nil impact.
Phascolarctos cinereus	Koala	Vul BC	Box, Gum, Stringybark woodlands and open forest	Not recorded in the study areas. Low possibility of occurring at Allambie, Hidden, Recreation and Retreat bridges, minimal clearing of food source trees. Insignificant impact.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	Vul BC	Woodland and Open Forests, roosts in hollow trees.	Not recorded in study areas. Recorded in the broad region. Low possibility of occurring, no suitable hollow habitat impacted. Nil impact.
Chalinolobus dwyeri	Large-eared Pied Bat	Vul BC & EPBC	Rocky areas, mine shafts, caves, rock overhang roosting sites, abandoned buildings. Few known maternity sites.	Not recorded in study areas, recorded in the region. No caves, mines, or buildings will be impacted. Nil impact.
Miniopterus schreibersii	Large Bent-wing Bat	Vul BC	Rocky areas, mine shafts, caves, abandoned buildings, or rock overhangs for roosting sites. Few known maternity sites.	Not recorded in study areas, recorded in the region. No caves, mines, or building habitat will be impacted. Nil impact.
Dasyurus maculatus	Spotted-tailed Quoll	Vul BC & End EPBC	Less disturbed large remnant woodlands and open forests, rock crevices, hollow trees and logs.	Not recorded in study areas. May occur at Recreation bridge which is a riparian corridor, recorded in the broad region. No suitable habitat at other bridges, no clearing impact. Nil impact.
Petrogale penicillata	Brush-tailed Rock-wallaby	End SC & EPBC	Rocky escarpments, boulder scree, and dry rainforest	Not recorded, no suitable habitat. Nil impact.
Scoteanax rueppellii	Greater Broad-nosed Bat	Vul BC	High altitude Woodland and Open Forests, hollow tree dependent.	Not recorded, recorded in broader region, unlikely to occur. Minimal removal of marginal habitat in immature trees and shrubs, no hollow trees impacted. Nil impact.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vul BC	High altitude Woodland and Open Forests, hollow tree dependent.	Not recorded, recorded in broader region, unlikely to occur, unsuitable habitat, no hollow trees impacted. Nil impact.

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
Nyctophilus corbeni	South-eastern Long-eared Bat	Vul BC & EPBC	Inland Woodlands and Open Forests west of dividing range, hollow tree dependent	Not recorded, recorded in broader region, unlikely to occur, marginal habitat, no hollow trees impacted, Nil impact
Vespadelus troughtoni	Eastern Cave Bat	Vul BC	Low altitude sandstone areas of woodlands and open forests, mine shafts, caves, old building roosting sites.	Not recorded in the study areas, no potential habitat. Nil impact.
Pteropus poliocephalus	Grey-headed Flying-fox	Vul BC & EPBC	Woodlands, wet and dry forests, rainforests, mangroves, riparian zones and paperbark swamps, in vicinity of fruit & blossoms	Not recorded in the study areas, would occur seasonally – Minimal loss of potential nectar source trees. Insignificant impact.
Cercartetus nanus	Eastern Pygmy-possum	Vul BC	Pilliga multi-layered open forest of Narrow-leaf Ironbark, White Cypress with shrub layer of nectar producing plants	Not recorded in the study areas or the region, nil suitable habitat. Nil impact
Macropus dorsalis	Black-striped Wallaby	End BC	Pilliga outwash area in open forest of Multi-layered Pilliga box and Brigalow	Not recorded in the study areas or the region, nil suitable habitat. Nil impact
FROG				
Litoria booroolongensis	Booroolong Frog	End BC & EPBC	Rocky/gravelly mid elevation stream in unregulated rivers	Not recorded in study areas Jan 2021. Previously recorded at Recreation and Munro bridges in 2017. Conduct frog surveys preconstruction to relocate frogs, if present inspect site again a week later, repeat if present during substructure construction. Insignificant impact
REPTILES				
Elseya bellii		End BC & Vul EPBC	Known from headwaters of Macdonald and Gwydir Rivers	Recorded recently at Allambie and Retreat bridges. Implement generic protection guidelines to protect turtles, fish, and stream. No nesting beds in impact areas. Minimal impact
Hoplocephalus bitorquatus	Pale-headed Snake	Vul BC	Woodland & open forest with small hollow trees & prefers red gums with loose bark on trunks	Not recorded in the study areas or the region, nil suitable habitat. Nil impact
			Woodland & open forests of western slopes	Not recorded in study areas. Potential habitat at Hidden

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
Uvidicolus sphyrurus	Border Thick-tailed Gecko	Vul BC & EPBC	with 40 – 50% canopy cover, litter dominant ground cover, moist niches under logs and rocks.	Bridge none in the riparian corridors of the other bridges. Very small area of impact to habitat. Apply generic recommendations to minimise demolition and construction impact. Insignificant impact.
Aprasia parapulchella	Pink-tailed Worm Lizard	Vul BC & EPBC	Sandstone outcrops, shrubby woodland at Gunnedah	Nil impact, limited to Gunnedah, not likely to occur, no potential habitat. Nil impact
FISH				
Bidyanus bidyanus	Silver Perch	Vul BC	Silver Perch are known to occur throughout the Peel and Namoi River catchments.	Recorded in Peel and Namoi rivers, may occur at Allambie and Retreat bridges, stream and riparian zone to be protected. Fisheries to review and inspect protection measures. Minimal Impact
Maccullochella peelii peelii	Murray Cod	Vul EPBC	Known to occur throughout the Peel and Namoi River catchments	Recorded in Peel, Macdonald and Namoi rivers, known to occur at Allambie and Retreat bridges, stream and riparian zone to be protected. Fisheries to review and inspect protection measures. Minimal Impact
Morgunda adspersa	Purple-spotted Gudgeon population in Western NSW	E pop FM Act	The Purple spotted Gudgeon has been re-introduced into the Namoi Catchment at Boggabri, occurs in the Gwydir and Macintyre catchments in slow flowing pools with aquatic vegetation	Not recorded in study areas or in the region, recently released in the Namoi river near Boggabri, not likely to occur, unsuitable habitat in study areas, stream and riparian zone to be protected. Fisheries to review and inspect protection measures. Nil impact
Tandanus tandanus	Freshwater Catfish	E pop FM Act	Known to occur throughout the Peel catchment, declining in the western stream	Recorded in Peel, Macdonald and Namoi rivers likely to occur at Allambie and Retreat bridges: stream and riparian zone to be protected. Fisheries to review and inspect protection measures. Minimal Impact
Ambassis agassizii	Olive Perchlet	E pop FM Act	A small fish up to eight cm long, hasn't been recorded in the Namoi Catchment however, it is likely to have once occurred throughout the Darling River catchment, nearest at Walgett	Not recorded in the study areas or the region, not likely to occur, marginal habitat in study areas, stream and riparian zone to be protected. Fisheries to review and inspect protection measures. Nil Impact

Scientific Name	Common Name	Code	Habitat Requirements	Likelihood of Occurrence and Likely Impacts
MIGRATORY SPECIES				
Hirundapus caudacutus	White-throated Needletail	Migratory EPBC	Air space over eastern Australia, summer migrant, breeds northern hemisphere.	Not recorded in the study areas, but recorded in the region – Feeds on airborne insects, not likely to utilise habitat of study areas. Nil impact.
Merops ornatus	Rainbow Bee-eater	Migratory EPBC	Dry grassy woodlands & open forests, Nests in soil burrows in vertical banks.	Not recorded in the study areas, but likely to occur in locality seasonally - no potential nest sites in works areas. Nil impact.
Apus pacificus	Fork-tailed Swift	Migratory EPBC	Air space over eastern Australia, summer migrant, breeds northern hemisphere.	Likely to occur – Feeds on airborne insects, not likely to utilise habitat of study areas. Nil impact.
Gallinago hardwickii	Latham's Snipe	Migratory EPBC	Wetlands	Not recorded, marginal habitat in the study areas, requires wetland fringing vegetation. Nil impact.
Haliaeetus leucogaster	White-bellied Sea-eagle	Migratory EPBC	Coastal waters and rivers and inland dams	Not recorded at study areas, recorded in region can occur anywhere along the major rivers and large dams - no nest sites in works areas to be cleared. Nil impact.
Myiagra cyanoleuca	Satin Flycatcher	Migratory EPBC	Thick vegetation in forests and tall woodlands	Not recorded but likely to occur in the locality, potential habitat. Minimal clearing, insignificant impact.
Ardea alba	White Egret	Migratory EPBC	Wetlands, stream, dams	Not recorded in the study areas, but likely to occur in the locality - no potential nest sites in works areas to be cleared. Nil impact.
Ardea ibis	Cattle Egret	Migratory EPBC	Farm paddocks, stream, wetlands	Not recorded in the study areas, but likely to occur in the locality - no potential nest sites in works areas to be cleared. Nil impact.

Table 5. Consideration of flora species of conservation significance known and likely to occur in the region

Considered in the assessment for potential impact Key: V = vulnerable E = endangered

Threatened Plants Recorded in the Tamworth Regional Council area

Scientific Name	Common Name	NSW status	Comm. status	TRC Records	Likely at bridges
Tylophora linearis		V	E	1	No – not present
Stenopetalum velutinum	Velvet Thread-petal	E4		1	No – not present
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	1	No – not present
Prasophyllum petilum	Tarengo Leek Orchid	E1,P,2	E	1	No – not present
Prasophyllum sp. Wybong		P	CE	1	No – not present
Homopholis belsonii	Belson's Panic	E1	V	1	No – not present
Polygala linariifolia	Native Milkwort	E1		1	No – not present
Hakea pulvinifera	Lake Keepit Hakea	E1,2	E	1	No – not present
Cadellia pentastylis	Ooline	V	V	1	No – not present
Tasmannia glaucifolia	Fragrant Pepperbush	V	V	1	No – not present
Cynanchum elegans	White-flowered Wax Plant	E1	E	2	No – not present
Eucalyptus rubida subsp. barbigerorum	Blackbutt Candlebark	V	V	2	No – not present
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V	3	No – not present
Diuris pedunculata	Small Snake Orchid	E1,P,2	E	3	No – not present
Swainsona sericea	Silky Swainson-pea	V		5	No – not present
Chiloglottis platyptera	Barrington Tops Ant Orchid	V,P,2		6	No – not present
Euphrasia ciliolata	Polblue Eyebright	V		6	No – not present
Digitaria porrecta	Finger Panic Grass	E1		7	No – not present
Euphrasia arguta		E4A	CE	8	No – not present

Scientific Name	Common Name	NSW status	Comm. status	TRC Records	Likely at bridges
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	10	No – not present
Acacia pubifolia	Velvet Wattle	E1	V	12	No – not present
Tasmannia purpurascens	Broad-leaved Pepperbush	V		12	No – not present
Eucalyptus mckieana	McKie's Stringybark	V	V	13	No – not present
Asterolasia beckersii	Dungowan Starbush	E1		14	No – not present
Callistemon pungens			V	28	No – not present
Homoranthus prolixus	Granite Homoranthus	V	V	28	No – not present
Eucalyptus oreshia	Small-fruited Mountain Gum	V		33	No – not present
Dichanthium setosum	Bluegrass	V	V	37	Possible – not present
Zieria odorifera subsp. warrabahensis		E4A		40	Possible – not present
Thesium australe	Austral Toadflax	V	V	86	Possible – not present
Boronia ruppii	Rupp's Boronia	E1,P		495	No

Table 6. Consideration of Endangered and Critically Endangered Ecological Communities known and likely to occur in the North West Slopes and Plains and Tablelands regions

Endangered Ecological Community	NSW status	Comm status	Area / Location
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	End	End	Not present
Cadellia pentastylis (Ooline) community in the Nandewar and Brigalow Belt South Bioregions	End		Not present
Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions	End		Not present
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregion	End	End	Not present
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	End		Not present
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	End	End	Not present
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	End	End	Not present
Native Vegetation on Cracking Clay Soils of the Liverpool Plains	End	End	Not present
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and Qld		Crit End	Not present
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	End	End	Not present
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	End	Crit End	Adjoining Norris bridge

Endangered Ecological Community	NSW status	Comm status	Area / Location
Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River FM Act 1994	End		Present at Norris and Mick Maher bridges
New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion	End	End	Not present
Howell Shrublands in the New England Tableland and Nandewar Bioregions	End		Not present
McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions	End		Not present
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps	End	End	Not present
Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion	End	End	Not present
Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions - endangered ecological community	End		Not present
Ribbon Gum, Mountain Gum, Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	End		Not present

6-0. Assessment of Significance Biodiversity Conservation Act

Biodiversity Conservation Act 2016 No 63 section 7.3 (Five part test)

This test identifies the significance of effects resulting from the proposed bridge construction on threatened species, communities, populations, and their habitats that are listed in the *Biodiversity Conservation Act 2016* (BC Act), and *Fisheries Management Act 1994* (FM Act).
Here it is applied to the following species and endangered ecological communities

Common Name	Scientific Name	Status	Bridges
Silver Perch	*Bidyanus bidyanus*	Vulnerable FM Act	Allambie 1 & Retreat 8
Freshwater Catfish	*Tandanus tandanus*	Endangered Population FM Act	Allambie 1 & Retreat 8
Booroolong frog	*Litoria booroolongensis*	Endangered	Munro 5 & Recreation 7
Speckled Warbler	*Chthonicola sagittata*	Vulnerable	Hidden Bridge 2
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland			Norris Bridge 6
Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River FM Act 1994			Maher 4 & Norris 6

(a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Booroolong Frog – *Litoria booroolongensis* listed as Endangered

The Booroolong Frog was known to occur at both the Munro Creek Bridge and Recreation Bridge as recently as 2017. It was not present at either of those sites when surveyed for this assessment in Dec 2020. However a small population was found below the Shearins Creek junction with the Swamp Oak Creek approximately 10km downstream from Recreation bridge.

Recent surveys of the Cockburn and Peel River catchments found its decline is widespread across both catchments; it appears the frogs were unable to cope with the record breaking drought of 2018 – 2019.

The Booroolong Frog is a small riverine frog that is known to inhabit rocky permanent streams in the Peel and Cockburn River catchments. It once occurred in a broader range of habitats, ranging from small slow-flowing creeks to large rivers from 1100 metres to 350 metres altitude.

The species was historically known to occur in catchments between the Northern Tablelands in New South Wales and the Southern Highlands of eastern Australia, predominantly in western-flowing streams of the Great Dividing Range.

Survey data indicates that the Booroolong Frog has undergone a severe decline in distribution, particularly in the Northern Tablelands where the species is no longer present.

Though once common, the species is now considered rare in the Central Tablelands and the majority of extant populations of the Booroolong Frog are restricted to the western flowing streams on the Southern Tablelands.

Due to the observed decline in the species distribution, it is inferred that the Booroolong Frog has undergone a severe reduction in numbers.

Since 1998, surveys have been undertaken to determine the extent and cause of decline in the species. Though no definite causes have been identified, several threatening processes have been proposed as contributing to the decline in the distribution of the Booroolong Frog, including;

- habitat disturbance,
- river regulation,
- the disease *chytridiomycosis,* and
- predation of tadpoles by introduced fish.

There is a Threat Abatement Plan for mitigating the impact of the disease *chytridiomycosis* which identifies actions to prevent the spread of *chytridiomycosis* to populations of the Booroolong Frog that are currently disease free.

The priority recovery and threat abatement actions required for this species are:

- Protect known sites from disturbance
- Prevent the spread of disease during monitoring, research and survey activities
- Determine the current distribution and abundance of the Booroolong Frog through further surveys.

This list does not encompass all actions that may be of benefit to this species but highlights those that are considered to be of the highest priority at the time of listing.

The demolition and construction of the Recreation and Munro Creek bridges are to be completed during the warmer months of November to March. Work in the streams will be limited to the immediate vicinity of the bridges and kept to the shortest possible time frame to have the least impact.

The stream above and below the bridges will be surveyed by an ecologist prior to the demolition and construction. Any frogs found in the close proximity will be relocated to suitable habitat outside of the works area but in the near vicinity.

If frogs are found during the pre-demolition survey, weekly monitoring will be conducted each Sunday to remove any frogs that have reoccupied the site over the weekend. Those surveys will be repeated until no Booroolong frogs are found or completion of the substructure.

The construction impact on the frogs will be assessed and if necessary, further recommendations will be made for actions to minimise potential impacts.

No work is to be conducted at those sites during the cooler months of the year when the frogs are likely to be hibernating hidden under rock or debris. During the summer months the frogs gather around rocky rapids, avoiding those rapids during the works provides protection from impact. Both bridges have suitable rocky rapid and riffle habitat below the bridges.

The combination of searching, monitoring, removal and restricting the seasonal timing of the works to summer, will minimise potential impacts to this endangered frog.

Hence it is highly unlikely that the proposed works will impact on the life cycle of the Booroolong Frog such that a viable local population of the species is likely to be placed at risk of extinction.

Silver Perch (*Bidyanus bidyanus)* - listed as Vulnerable under the FM Act

Silver Perch are known to be widespread in the major streams throughout the Namoi River catchment that is the Tamworth Regional Council region.

It is a medium to large fish with a body that becomes deeper and more laterally compressed with age. Maximum length ~500 mm and maximum weight eight kg; usually 350 mm and two kg. The single dorsal fin has a higher, spinous anterior section and a lower, rayed section at the rear. The body colour is grey to grey-brown with a lighter belly. The scales are much smaller than those on Golden or Macquarie perch, and the head and mouth are small. The tail is weakly forked.

Distribution

Formerly widespread over much of the Murray-Darling Basin excluding the most upper reaches, Silver perch has declined over most of its range.

Numbers moving through a fishway at Euston Weir on the Murray River declined by 93% between 1940 and 1990. Only nine Silver perch were recorded in a two-year survey of 40 randomly selected sites in the NSW portion of the Basin in the mid-1990s. Similarly, the first two sampling rounds of the Sustainable Rivers Audit has so far only recorded a total of 20 Silver perch whilst surveying 351 randomly selected sites covering 16 river valleys.

The species is still patchily abundant in the mid-Murray. The ACT probably represented the upstream limit of distribution in the Murrumbidgee catchment. The large spawning run of fish that occurred in summer from Lake Burrinjuck is unfortunately a thing of the past.

Biology and Habitat

Silver perch are found in similar habitats to Murray cod and Golden perch, i.e. lowland, turbid and slow-flowing rivers. This species is bred artificially in a number of government and commercial hatcheries and widely stocked into farm dams and reservoirs. It has been the subject of considerable interest for its potential as an aquaculture species.

Individuals mature at 3-5 years-males earlier than females. They spawn in spring and summer after an upstream migration, when large schools often form. Spawning possibly occurs at night, just after dusk. Whilst spawning can occur during non-flood conditions, spawning activity was significantly increased during a flood and environmental water release in 2005 in the mid-Murray River. Immature individuals have been recorded moving through fishways in the Murray and Murrumbidgee rivers. Murrumbidgee fish moved during afternoon and dusk periods, and fish as small as 68 mm were involved.

Silver perch are omnivorous. The diet contains aquatic plants, snails, shrimps and aquatic insect larvae. Reports that the species becomes mainly herbivorous once it reaches lengths of 250 mm are incorrect, at least for lake populations, as diet in Googong Reservoir near Canberra shows little change with fish size (MDBA 2009b).

Potential Threats

River regulation has severely affected this species through disruption of migration and reproductive behaviour. Thermal pollution and interactions with alien species (Carp and Redfin perch) are also suspected to be a threat.

Mitigation Measures to Minimise Construction Impact on the Silver Perch

The Macdonald River at the Retreat and Allambie Bridges contains Murray Cod hence is also likely to be potential Silver Perch habitat. The recommendations for stream protection include:

- Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges.
- Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites.
- Minimise disturbance to vegetation and soil between the top flood level and the stream. If instream or water level disturbance is required, a fisheries officer is to inspect the site to assess the suitability of the stream protection measures.
- Erect silt curtain sediment traps below works in all drainage lines. Where risks are increased with steeper slopes and larger catchments, multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions.
- Under no circumstances are streams to be blocked or dammed, minimise temporary diversion.
- If floating debris is likely, capture it by erecting a floating boom downstream of the works.
- To prevent weed seed dispersal ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds. Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion.
- No mature or hollow trees are to be removed. No instream logs or debris will be removed.
- Where possible retain the debris from clearing and construction in the works area to provide habitat.
- There is to be no blasting within the streams.

The work site is to be managed in such a way that sediments are trapped within curtains and formwork, and upon completion the sediment and fill material is removed from the creek. The stream protection measures are to be inspected by a Fisheries Officer to ensure they are adequate.

Hence it is highly unlikely that the proposed works will impact on the life cycle of the Silver Perch such that a viable local population of either species is likely to be placed at risk of extinction.

Eel-tailed or Freshwater catfish – *Tandanus tandanus* - Endangered Population Fisheries Management Act

The Eel-tailed or Freshwater catfish (*Tandanus tandanus)* (Mitchell, 1838) is widely distributed throughout inland rivers. It is relatively common in the Namoi catchment.

Description

It has an elongate eel-like body with the tail tapering to a point. Colour varies with size; small fish to 15 cm are grey or brown on the back and the sides are often mottled with dark brown to black blotches; a white or yellowish belly. Larger fish lack the mottling and vary from olive-green to brown, black or purplish on the back and upper sides with a white belly (DPI NSW 2012b).

Distribution

The western population of *Tandanus tandanus* was originally widely distributed throughout the Murray-Darling River System in NSW, Queensland, Victoria and South Australia, with the exception of the cooler parts of the southern tributaries. It was relatively uncommon upstream of Wagga Wagga on the Murrumbidgee River and Lake Mulwala on the Murray River. There are potentially a number of eastern drainage populations and their taxonomic status is currently under investigation. There is also an investigation of the eastern and western populations and their genetics.

It is found in freshwater areas, including tidal reaches of coastal rivers from the Shoalhaven River to the Tweed River in NSW. Native fish, including catfish have been translocated into coastal rivers from the Murray-Darling Basin and it is not known if the populations of *T. tandanus* in those catchments south of the Karuah River are endemic to the eastern river systems (DPI NSW 2012b).

Biology and Habitat

Tandanus tandanus is non-migratory and lives in a wide range of habitats including rivers, creeks, lakes, billabongs and lagoons, and although it inhabits flowing streams, it prefers sluggish or still waters. It can be found in clear to turbid waters, and over substrates ranging from mud to gravel and rock. They are found in weedy areas on mud substrate and live and feed on the substrate.

The adults are usually solitary fish whereas juveniles form loose schools. They appear to be sedentary fish with very limited movement along the river. They are most active at night.

It is rare in natural riverine habitats but can be found in farm dams through-out inland NSW and southern Queensland.

Moderate remnant populations occur in the Macquarie catchment upstream of Warren, the Castlereagh catchment upstream of Mendooran, the Namoi catchment upstream of Wee Waa, the Gwydir catchment upstream of Moree and the Border Rivers catchment upstream of Goondiwindi (DPI NSW 2012b).

Biology

Recorded to 90 cm in length and 6.8 kg in weight, individuals above two kg are uncommon. They are essentially carnivorous bottom feeders, capable of exploiting a wide range of food sources. Crustaceans are the most important dietary item, followed by insects, snails and small fish. Water temperatures between 20 and 24°C are considered the primary stimulus for spawning. Spawning involves construction of nests in sand or gravel by the male fish.

If the nest is exposed by a drop in water level, another nest is built. If several nests are built and abandoned because of fluctuating water, spawning will not occur. Females deposit eggs, leaving the male to fan, clean and guard the nest for up to two weeks, although eggs usually hatch within seven days. Nests have been observed to be used for several consecutive years, whether by the same or a different pair of fish is not known.

Mature fish apparently have very limited range of movement, usually less than five km, and local populations could be greatly affected by heavy fishing, pollution or destruction of habitat and spawning areas (DPI NSW 2012b).

Mitigation Measures to Minimise Construction Impact on the Eel-tailed Catfish

The Macdonald River at the Retreat and Allambie Bridges contains Murray Cod hence is also likely to be potential Eel-tailed Catfish habitat. The recommendations for stream protection include:

- Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges.
- Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites.
- Minimise disturbance to vegetation and soil between the top flood level and the stream. If instream or water level disturbance is required, a fisheries officer is to inspect the site to assess the suitability of the stream protection measures.

- Erect silt curtain sediment traps below works in all drainage lines. Where risks are increased with steeper slopes and larger catchments, multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions.
- Under no circumstances are streams to be blocked or dammed, minimise temporary diversion.
- If floating debris is likely, capture it by erecting a floating boom downstream of the works.
- To prevent weed seed dispersal ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds. Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion.
- No mature or hollow trees are to be removed. No instream logs or debris will be removed.
- Where possible retain the debris from clearing and construction in the works area to provide habitat.
- There is to be no blasting within the streams.

The work sites are to be managed in such a way that sediments are trapped within curtains and formwork, and upon completion the sediment and fill material is removed from the river. The stream protection measures are to be inspected by a Fisheries officer to ensure they are adequate.

Hence it is highly unlikely that the proposed works will impact on the life cycle of the Freshwater Catfish that would occur as an endangered population, such that a viable local population of either species is likely to be placed at risk of extinction.

Speckled Warbler – (*Pyrrholaemus sagittata*)
Status – Vulnerable BC Act

The Speckled Warbler was recorded at Hidden Bridge 2 in the adjoining shrubby habitat.

The Speckled Warbler is threatened by clearance and fragmentation of habitat including removal of dead timber. It has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, and as far west as the Grampians, rarely seen on the coast.

There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100 ha remain (Barrett et al. 1994). Large, relatively undisturbed remnants are required for the species to persist in an area.

The Speckled Warbler lives in a wide range of Eucalypt dominated communities that have a grassy understorey, scattered shrub layer, tree regrowth and canopy cover of 30 – 60%.
The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees.

Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The nest is a rounded, domed shape, roughly built with dry grass and strips of bark and located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside (Ford et al.1986).

A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'.
Warblers often join mixed species feeding flocks in winter with species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.

Being a ground nesting bird that prefers patchy heathy shrub cover, it is particularly vulnerable to predation and habitat clearance.

The habitat of shrubs and grassy ground cover at Hidden Bridge is considered suitable for the Speckled Warbler.

A very small area of clearing will be required for the demolition and construction of the new bridge, clearing will be kept to the minimum required to do the work. That small area cleared will regenerate similar habitat post construction. Similar regeneration is occurring throughout the adjoining hills and riparian zone. Avoiding the birds breeding time between August and February will ensure that the demolition won't harm the nest which would be hidden on the ground in the vicinity.

Hence, it is highly unlikely that the proposed works will impact on the life cycle of the Speckled Warbler such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Consideration of the Fisheries Management Act Endangered Ecological Community

View of the FM Act Endangered Ecological Community at Mick Maher Bridge

The Fisheries Management Act Endangered Ecological Community of "aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River" was found to occur in streams spanned by Mick Maher Bridge at Moonbi and Norris Bridge at Top Somerton Road.

The Darling River endangered ecological community includes all native fish and aquatic invertebrates within all natural creeks, rivers, streams and associated lagoons, billabongs, lakes, flow diversions to anabranches, the anabranches, and the floodplains of the Darling River within the State of New South Wales, and including Menindee Lakes and the Barwon River.

Within the Namoi river catchment this EEC area includes:

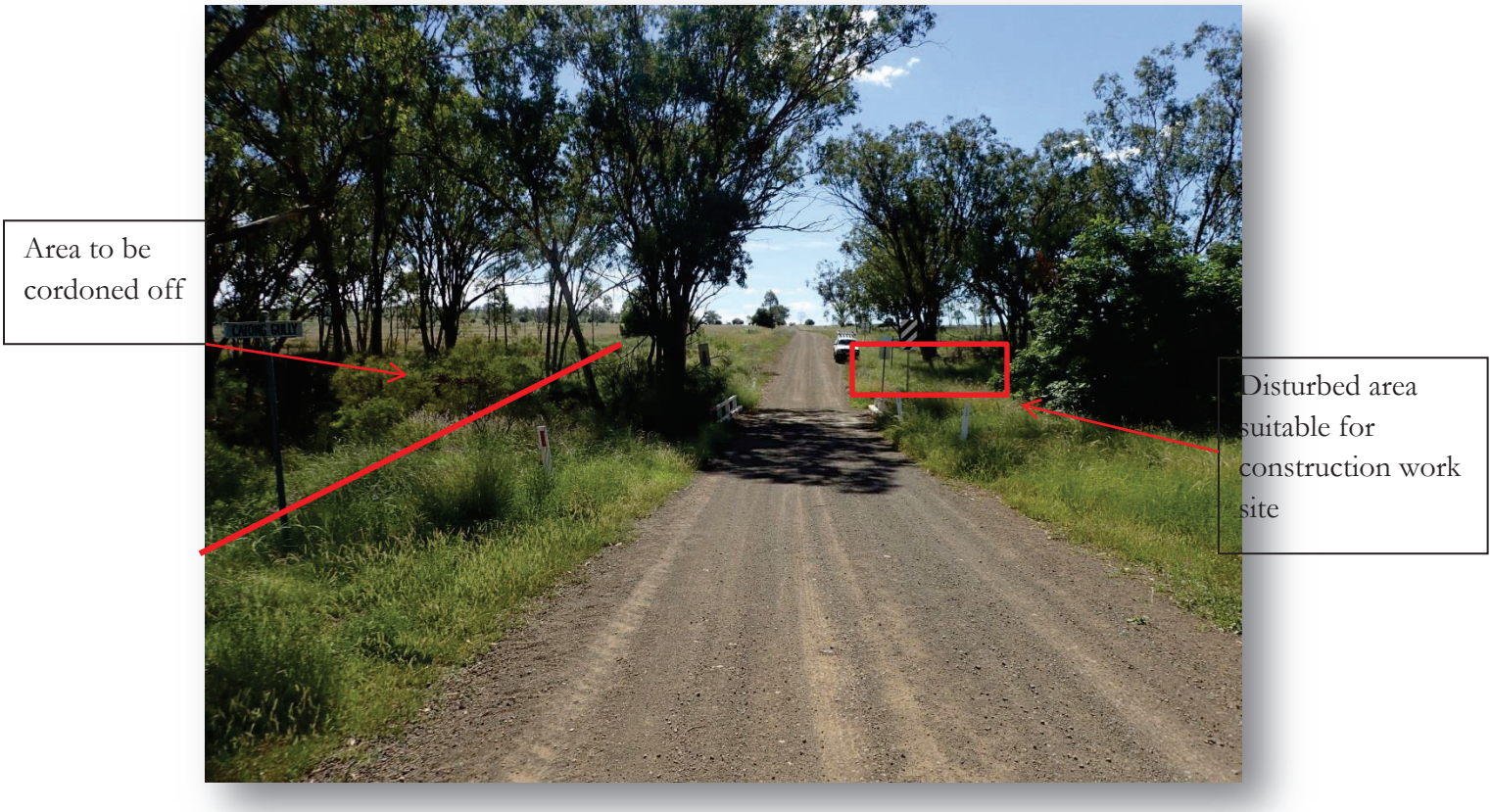
- the Namoi River from the junction of the Manilla River at Manilla (including Mehi River channel west of Moree) (30°46'S; 150°44'E) downstream;
- the Manilla River from Split Rock Dam (30°35'S; 150°42'E) downstream; and
- the Peel River from Chaffey Dam (31°31'S; 151°08'E) downstream.

Excluded from this recommendation are the man-made/artificial canals, water distribution and drainage works, farm dams and off-stream reservoirs. Other watercourses above 500m not specifically named in this recommendation are excluded.

The generic stream protection measures mentioned previously, coupled with the inspection of mitigation measures at each of the bridge locations considered to be potential fish habitat, will ensure that proposed works will not have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The implementation of those mitigation measures will ensure that the works are managed in a way that they are unlikely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

View of the Grassy Box – Gum Woodland Endangered Ecological Community adjoining Norris Bridge



Vegetation fitting the description of the White Box – Yellow Box – Blakely's Red Gum grassy woodland Endangered Ecological Community was recorded in the road easement adjoining the works area at Norris Bridge over Catong Gully.

The road verges on the approaches to the bridge and the area previously disturbed by the original construction of the bridge abutments were found to be weedy. However adjoining those disturbed areas on the southern downstream side is relatively undisturbed grassy woodland of high conservation value that is to be protected by cordoning it off with barrier tape as shown above with the red line. Of the nine sites assessed, the vegetation adjoining the works area of

Norris Bridge was the least disturbed woodland with high native plant diversity and least weeds. The barrier tape is to be erected 3m from the road verge to exclude the woodland area from disturbance.

These bridge constructions are a major threat for spreading weeds. To prevent the introduction of new weeds into the area all machinery and vehicles are to be thoroughly cleaned before entering the works site. All personnel involved in the works must practice strict weed hygiene to ensure that their vehicles, equipment and clothing are kept free of weed seeds.
Significant environmental weeds of Johnsons Grass & Coolatai Grass are already present as shown in Appendix 2; with construction comes the potential threat of spreading the existing weeds and introducing other environmental weeds into the area.

Those weeds are to be controlled by spraying before construction and the construction impact area is to be concentrated to the weedy disturbed areas on the northern side of the road as shown by the red rectangle. Adjoining the northern side upstream side of the bridge there is a cleared disturbed area where there is ample disturbed area for the construction and works site.

The recommended mitigation measures will confine disturbance to existing disturbed areas, control the existing weeds, and prevent the spread and introduction of new weeds.

Hence, it is unlikely that the proposed works will have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The implementation of the mitigation measures will ensure that the works are managed in a way that they are unlikely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

There will be no loss or removal of habitat for the Booroolong Frog. The riparian zone will have minimal disturbance and the bridge construction area will be fully rehabilitated.

Likewise the extent of riparian habitat along Swamp Oak and Munro creeks will not be fragmented. In addition to the generic protection measures the construction will avoid the winter dormancy period for the frog, and a pre-construction survey the night before demolition will ensure frogs will not be impacted.

The extent of the endangered ecological community will not be reduced by the bridge construction nor will it be further fragmented. The area of EEC will be cordoned off and will have minimal removal or modification of the existing habitat. No mature or hollow trees will be removed. Construction and earthworks will be limited to areas previously disturbed for bridge construction and maintenance.

Where significant habitats exist for the threatened fish, impacts to the stream will be minimised by the generic recommendations, the natural stream flow will be maintained, and the mitigation measures will be approved by a fisheries officer.
The mitigation measures proposed are consistent with the objectives and actions of the Silver Perch and Booroolong Frog recovery and threat abatement plans. The other species as yet don't have recovery plans.

Hence the clearing and earthworks proposed will not fragment or isolate an area of habitat from other areas of habitat, and will not remove habitat important for the long-term survival of any of the species or endangered ecological community considered in this report.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

None of nine bridge locations are declared areas of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The clearing of native plants is listed as a key threatening process.

Table 1 below shows there will be minimal clearing for the proposed bridge constructions, it will be limited to the removal of immature River Oak trees, native shrubs, exotic trees and shrubs, and potentially two Blakely's Red Gum and two White box trees.

No.	Bridge location	Clearing Impact
1	Allambie Bridge over Macdonald River Tilmunda Road	4 young River Oak, 2 Callistemon shrubs and Willows
2	Hidden Bridge unnamed creek Glen Barra Road	2 juv Kurrajong, 2 juv White Cypress, 1 dead tree, shrubs of Native olive, Hopbush, Hickory Wattle, Iamboto and Wonga Vine and potentially 2 Blakelys Red Gum trees on the SW corner of the southern approach
3	Kia Ora Bridge unnamed creek	None
4	Mick Maher Bridge over Gaol Creek at Moonbi	None
5	Munro Bridge over Munro Creek Bowling Alley Point	Few dead and alive exotic trees and shrubs, possibly 1 juvenile River Oak
6	Norris Bridge over Catong Gully Top Somerton Road	Shrubs of Acacia decora, and potentially 2 White box trees close to SW corner abutment
7	Recreation Bridge over Swamp Oak Creek Weabonga	Likely lopping of two River Oak trees close to the bridge.
8	Retreat Bridge over Macdonald River at Retreat	Likely lopping of 4 River Oak, and removal of 4 Callistemon shrubs.
9	Warrabah Bridge over Warrabah Creek Warrabah Road	None

Construction disturbance has been directed and limited to the most highly disturbed areas adjacent to each of the bridges.
As no threat abatement plan has yet been prepared, clearing of native vegetation will be considered as a threatening process in a generic sense i.e. is the proposal likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

The removal of exotic ground cover, and juvenile trees in areas already highly disturbed and degraded by weed infestation and previous clearing, will not fragment any ecological communities, further disrupt ecological functions, result in the loss of biological diversity, or lead to erosion, and would therefore be unlikely to have a significant effect on any threatened species assessed in this report as potentially utilising the study sites.

The key threatening process of invasion by exotic perennial grasses, namely African Lovegrass (*Eragrostis curvula*) and Coolatai grass (*Hyparrhenia hirta*) are not present at the two bridges.

The highly invasive perennial grass Coolatai Grass and African Lovegrass was identified at five of the nine bridges as shown in Appendix 2. They are widespread throughout the region along road verges, and being dispersed by council slashing and road maintenance.

Every aspect of the project planning must prevent the dispersal of Coolatai grass and African Lovegrass seed which are listed as a key threatening process in the *Biodiversity Conservation Act 1994*.

Without control they will continue to spread and in time will dominate the entire landscape leading to local extinctions of plants and animals and reduced grazing production.
They have already invaded extensive areas of roadside beyond control, however there are still extensive areas of road easement yet to be affected that should be protected.

The transportation of exotic grass seed from the construction sites to other areas could potentially put native plant communities at risk elsewhere.

Hence, it is very important that the existing weeds are controlled by spraying before construction and all vehicles and personnel frequenting the works areas practice strict weed hygiene to ensure that their vehicles, equipment and clothing are free of weed seeds. No soil is to be removed off-site; it is to be dumped in the immediate vicinity in areas already dominated by environmental weeds. Thorough cleaning will be required at the completion of the works or when any vehicle is to leave the project areas to ensure that weed seeds are not transferred elsewhere in the region.

The considerations detailed in the above assessment indicate that a Species Impact Statement will not be required for the Silver Perch, Eel-tailed Catfish, Booroolong frog, Speckled Warbler, the Box – Gum woodland CEEC, or the riparian endangered ecological community listed in the Fisheries Management Act.

7-0. EPBC Act Administrative Guidelines

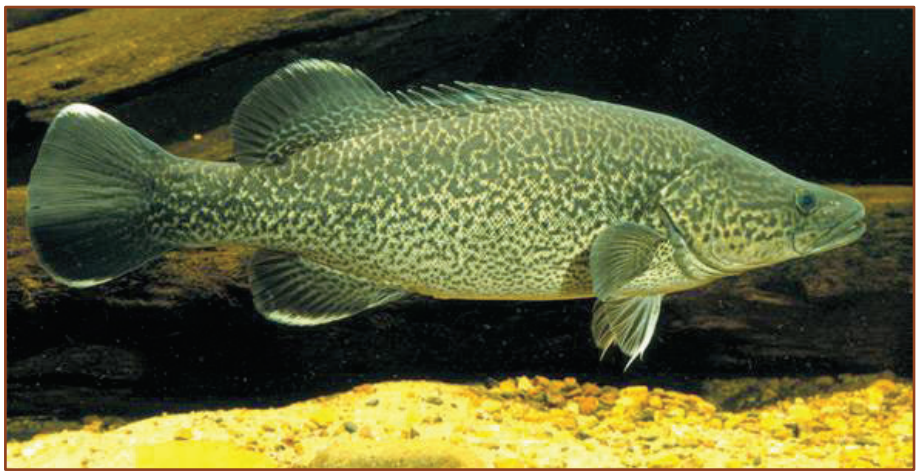
7-1. EPBC Act 1999 Administrative Guidelines applied to predicted threatened species habitat

The administrative guidelines have been applied to important habitat features of the three species listed as a threatened species under the EPBC Act 1999, which are known to occur in the headwater streams of the Namoi catchment.

Common Name	Scientific Name	Status	Bridges
Murray Cod	*Maccullochella peelii*	Vulnerable	Allambie and Retreat
Booroolong Frog	*Litoria booroolongensis*	Endangered	Recreation and Munro Creek
Bell's Turtle	*Myuchelys bellii*	Vulnerable	Allambie and Retreat

a) Does, would, or is the activity likely to lead to a long-term decrease in the size of a population/ important population?

Murray Cod - *Maccullochella peelii*
National: Vulnerable under *Environment Protection and Biodiversity Conservation Act 1999*
Victoria: Threatened Species List under the *Flora and Fauna Guarantee Act 1988*.
International: Listed as Critically Endangered under the *2009 International Union for the Conservation of Nature Red List of Threatened Species*.



The Murray Cod is widespread in the streams of the Namoi River Catchment, suitable habitat exists in the Macdonald River beneath the Allambie and Retreat bridges

The proposed bridge construction will not lead to a long-term decrease in the size of the Murray cod population. There will be no removal of potential habitat from the streams, no barriers put

in place that would restrict fish movement, no erosion or siltation of the stream, and no blasting in the stream. A Fisheries Officer will inspect the adequacy of the stream protection measures.

The Murray cod was formerly widespread and abundant in the lower and mid-altitude reaches of the Murray-Darling Basin. Commercial fisheries data indicate that natural populations declined in the 1920s and then again dramatically in the 1950s. The species now has a patchy distribution and abundance across its historic range and was listed as nationally threatened in 2003.

The Murray cod is an icon of the Murray Darling Basin and forms the basis of a popular recreational fishery in south-eastern Australia where it is often stocked into dams and lakes. The species is important in Aboriginal mythology: a huge Murray cod is responsible for forming the Murray River and all its fishes (MDBA 2009c).

Identification

It is the largest Australian freshwater fish, reaching 113.6 kg and 1800 mm length. It is easily identified by its large mouth, cream to white belly, and green mottled pattern on the body and head. Adults have a broad head with a concave profile. The spiny front portion of the long, single dorsal fin is lower than the softer rear portion. The tail is rounded (MDBA 2009c).

Biology and Habitat

It is generally associated with deep holes in rivers, the Murray cod prefers habitats with instream cover such as rocks, stumps, fallen trees or undercut banks. The species is a long-lived predator that is highly territorial and will aggressively attack any fish entering its area, its diet contains fish, crayfish and frogs.

It has only recently been discovered that Murray cod make an upstream migration to spawn. This movement can be up to 120 km and generally occurs in late winter/early spring when river levels are high. After spawning the fish move downstream again, returning to the same area they occupied before the migration, usually to exactly the same snag.

The species matures at 4-5 years of age and 500-600 mm total length, and spawns in spring and early summer when water temperatures exceed about 15°C. Eggs are large (3-3.5 mm diameter) adhesive, and usually deposited onto a hard surface such as logs, rocks or clay banks. The male guards the eggs during incubation and they hatch after 5-13 days. The larvae are about 5-8 mm long at hatching and have a large yolk sac. Larvae drift downstream for 5-7 days, particularly by night in spring and summer (late-October-mid-January, peaking from mid-November-mid-December).

Murray cod are a long-lived species: average weights for fish from rivers aged 5, 10, 15, 20 and 30 years is approximately 5, 10, 15, 20 and 36 kg respectively. The oldest cod that has been accurately aged was 48 years old, 1280 mm long and weighed 32.5 kg, but younger fish may be larger, e.g. one was 29 years and 34 kg (MDBA 2009c).

Potential Threats - Threats include: overfishing, particularly during the breeding season when fish are aggressive and easily caught; habitat destruction through sedimentation; and, in the lower reaches of the Murray-Darling system, river regulation (altered flows and thermal pollution) and removal of structural woody habitat (snags) (MDBA 2009c).

Booroolong Frog – *Litoria booroolongensis* listed as Endangered

The proposed bridge constructions at the Recreation and Munro Creek bridges will not lead to a long-term decrease in the size of the Booroolong Frog populations at those sites. It appears the 2018 – 2019 record drought has caused serious decline of the frog, suggesting that it may no longer occur where it was known to occur at those bridges in 2017.

The Booroolong Frog was historically known to occur throughout the slopes and tablelands streams of the Namoi Catchment. The frog is considered locally extinct in the tableland streams of the Macdonald River and the Manilla River.

Construction of the substructures for the Recreation and Munro bridges are to be completed during the warmer months of November to March. Work in the stream will be limited to the immediate vicinity of the bridge and kept to the shortest possible time frame to have the least impact.

The streams at both bridges will be surveyed by an ecologist prior to the construction proposed. Any frogs found in the close proximity will be relocated to suitable habitat in the near vicinity.

If frogs are found, weekly monitoring will be conducted each Sunday to remove any frogs that have reoccupied the site over the weekend. Those surveys will be repeated until no Booroolong frogs are found or completion of the substructure.

The construction impact on the frogs will be assessed and if necessary further recommendations will be made for actions to minimise potential impacts.

The combination of searching, monitoring, removal and restricting the seasonal timing of the works to summer, will minimise potential impacts to this endangered frog.

Hence, it is highly unlikely that the proposed bridge works will lead to a long-term decrease in the size of the Booroolong Frog population.

Bell's Turtle – *Myuchelys belli* listed as endangered in the BC Act and vulnerable in the EPBC Act

The proposed bridge demolition and construction will not lead to a long-term decrease in the size of the Bell's Turtle population. Monitoring of the Bell's Turtle population has recorded over 1,000 individuals since 2015 in the Macdonald River from 6km below Retreat Bridge to the Flags Road east of Niangala.

There will be no removal of potential habitat from the streams, no barriers put in place that would restrict turtle movement, no erosion or siltation of the stream, and no blasting in the stream. Turtles are not likely to nest in the vicinity of the Retreat and Allambie bridge construction and bypass areas; they require loamy deposits adjoining deeper holes, none of which were found in the impact areas of the bridges.

The Bell's Turtle is known from the headwaters of the Namoi, Severn, Beardy and Gwydir Rivers, north and west of Armidale NSW, between 700 and 1200 m asl (Cogger *et al.* 1993; Cann 1998). Localities in the Namoi and Gwydir catchments are separated narrowly by the Nandewar Range. Known localities include the Macdonald River, Gwydir River west of Uralla, and Roumalla Creek near Kingston (Cogger *et al.* 1993). North West Ecological Services has recorded them at the Retreat Bridge and Allambie Bridge on the Macdonald River, and in the Rocky Gully and Carlisle Gully catchments.

The turtles preferred habitat is in the upper reaches and smaller tributaries of major rivers flowing through granitic bedrock (Cogger *et al.* 1993; Cann 1998). Turtles prefer narrow stretches of river, 30 to 40 m wide, with pools up to three meters deep. The riverbed is sandy and rocky, with small beds of weed (Cann 1998).

The turtle feeds on plant material such as fine aquatic weeds, stems of plants up to 30 mm long and terrestrial leaves form the bulk of the diet. Invertebrates are also taken, including crayfish (*Carex* sp.) and aquatic insects. All turtles examined had consumed large amounts of sediment (Cann 1998).

Nesting occurs between October and mid-January, when females lay eight to 23 firm eggs. Hatchlings emerge after 80 days when incubated at 27°C (Cann 1998).

One captive female laid 20 eggs in January, five of which were infertile. The female had not been kept with any male turtles for four years (Cann 1998).

North West Ecological Services has observed egg laying in sand drifts and loam soils adjoining the Macdonald River after floods.

Earthmoving and construction activity is to be confined to the immediate works area. If temporary fill is required it is to be sourced from the immediate vicinity or away from the stream. Sediment deposits from water level to 3m above water level are to be avoided.

The stream protection measures are to be inspected by a Fisheries officer to ensure they are adequate.

Hence it is highly unlikely that the proposed works will lead to a long-term decrease in the size of the Bell's Turtle population.

b) Does, would, or is the activity likely to reduce the area of occupancy of the species/important population?

NO. The proposal will not reduce the area of occupancy of the Booroolong Frog, Bell's Turtle or Murray Cod.

There will be no removal of potential habitat from the streams, no barriers put in place that would restrict frog, or fish movements, no erosion or siltation of the stream, and no blasting in the stream. A Fisheries Officer will inspect the adequacy of the stream protection measures.

After completion of the bridges the streams and banks will be fully rehabilitated to the same condition as prior to the works.

c) Does, would, or is the activity likely to fragment an existing population/important population into two or more populations?

NO. The proposal will not fragment existing populations of the Booroolong Frog, Bell's Turtle or Murray Cod. At no time will the flows be stopped or diverted and no instream habitats will be removed.

After completion of the bridge projects the streams and banks will be fully rehabilitated to the same condition as prior to the works.

d) Does, would, or is the activity likely to adversely affect habitat critical to the survival of a species?

NO. The area to be impacted at those bridge sites does not contain habitat critical to the survival of the species considered. The habitat present is similar to the habitat which occurs above and below the bridges. After completion of the bridge projects the streams and banks will be fully rehabilitated to the same condition as prior to the works.

e) Does, would, or is the activity likely to disrupt the breeding cycle of a population/important population?

NO. The proposed activity will not disrupt the breeding cycle of these species. A small area of stream and riparian habitat will be disturbed for a short period. The seasonal timing of the works at Recreation and Munro bridges will be outside of the hibernation period for the frog. After completion of the bridge projects the streams and banks will be fully rehabilitated to the same condition as prior to the works. No instream habitat important for frog or fish breeding will be removed.

f) Does, would, or is the activity likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

NO. The proposed construction will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that these species are likely to decline. A small area of stream and riparian habitat will be disturbed for a short period. After completion of the bridge projects the streams and banks will be fully rehabilitated to the same condition as prior to the works. No instream habitat important for frog or fish breeding will be removed.

g) Does, would, or is the activity likely to result in invasive species that are harmful to endangered/vulnerable species becoming established in the endangered/vulnerable species' habitat?

Potentially Yes. Exotic plant species threaten all streams, riparian zones and roadways, many of the bridge locations are already dominated by environmental weeds.

Serious environmental weeds that could invade the bridge locations are: Willows, Johnsons grass, African Lovegrass, Cobblers Peg, and Coolatai grass; all threaten to exclude native plant species and modify native fauna species habitat.

The transportation of weed seeds to other non-contaminated areas could potentially put native plant communities at risk elsewhere.

Hence it is very important that all vehicles and personnel frequenting the works areas practice strict weed hygiene to ensure that their vehicles, equipment and clothing are free of weed seeds. The movement and transportation of excavated soil is also to be minimised to stop contaminated soil coming into and leaving the project areas.

At the completion of the works or when any vehicle is to leave the project areas will require it to be thoroughly cleaned to ensure that weeds seeds are not transferred elsewhere in the region.

h) Does, would, or is the activity likely to interfere with the recovery of the species?

NO. The impact of the proposed construction will not interfere with the recovery of the Booroolong Frog, Bell's Turtle or Murray Cod. A small area of stream and riparian habitat will be disturbed for a short period. After completion of the bridge projects the streams and banks will be fully rehabilitated to the same condition as prior to the works. No instream habitat important for frog or fish breeding will be removed.

Each area will regenerate tree and shrub cover to provide increasing habitat and resources for the threatened species.
The assessment undertaken above, when considered in conjunction with the recommendations below, indicates that there would not be a significant impact on Commonwealth listed threatened species.

7-2. EPBC Act 1999 Administrative Guidelines applied to critically endangered ecological communities

Vegetation fitting the description of the White Box – Yellow Box – Blakely's Red Gum grassy woodland Critically Endangered Ecological Community was recorded in the road easement adjoining the works area at Norris Bridge over Catong Gully.

a) Does, would, or is the action likely to reduce the extent of an ecological community

The action will not reduce the extent of the critically endangered ecological community. The bridge construction impact area is located at the northern edge of the community which extends to the south. The works area is to be concentrated to the weedy disturbed areas on the northern side upstream side of the bridge, shown on page 70 within the red rectangle. There is ample disturbed area for the construction and works site.

The relatively undisturbed grassy woodland CEEC of high conservation value is on the southern downstream side of the bridge, it is to be protected by cordoning it off with barrier tape as shown with the red line on page 70.

Significant environmental weeds of Johnsons Grass and Coolatai grass are already present as shown in Appendix 2 - with construction comes the potential threat of spreading the existing weeds and introducing other environmental weeds into the area.

To prevent that occurring, the existing weeds are to be sprayed for control in the spring when they are growing actively, and the introduction of new weeds is to be prevented by ensuring that all personnel involved in the works practice strict weed hygiene to ensure that their vehicles, equipment and clothing are kept free of weed seeds.

Of the nine sites assessed the vegetation adjoining the works area of Norris Bridge was the least disturbed woodland with high native plant diversity and least weeds. The barrier tape is to be erected 3m from the road verge to exclude the woodland area from disturbance.

The recommended mitigation measures will confine disturbance to existing disturbed areas, control the existing weeds, and prevent the spread and introduction of new weeds.

Hence, it is unlikely that the proposed works will have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The implementation of the mitigation measures will ensure that the works are managed in a way that they are unlikely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

b) Is there a real chance or possibility that the action will fragment or increase fragmentation of an ecological community

No. The clearing will be confined to the immediate vicinity of the bridge that was disturbed by the initial bridge construction. The existing riparian corridor will remain unbroken hence the action will not fragment or increase fragmentation of the adjoining area of the critically endangered ecological community.

c) Is there a real chance or possibility that the action will modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns?

There is no real chance or possibility that the action will modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns. There will be no alteration of surface water drainage patterns.

d) Is there a real chance or possibility that the action will cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?

No. The mitigation measure proposed for preventing the dispersal of weeds will ensure that the project will not cause a substantial change to the species composition of the endangered ecological community in the road easement, or elsewhere.

e) Is there a real chance or possibility that the action will cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

-assisting invasive species, that are harmful to the listed ecological community, to become established; or

-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community

The dispersal of environmental weeds such as Coolatai grass and Johnsons grass, and introduction of other weeds is a real possibility that has been considered and mitigated by requesting that all vehicles entering the study area be thoroughly cleaned and the weeds sprayed.

The invasive species Coolatai grass which is listed as a key threatening process is already present. Mitigation measures have been recommended to address that threat by requiring that environmental weeds be controlled before construction and all vehicles coming to and leaving the area are to be thoroughly cleaned to prevent the spread of environmental weeds. There is to be no movement of contaminated soil into or out of the construction site.

If left unchecked Coolatai grass will continue to invade adjoining areas of the endangered ecological community and substantially change its species composition causing its local extinction.

f) Is there a real chance or possibility that the action will interfere with the recovery of an ecological community?

No. The area of critically endangered ecological community will be protected from construction impacts. Adjoining the bridge there is a cleared disturbed area on the upstream side that is to be the works area to avoid impacting of the native vegetation on the downstream side of the bridge. Barriers of flagging tape are to be erected to exclude the woodland areas from all disturbances.

The dispersal of environmental weeds such as Coolatai grass and Johnsons grass, and introduction of other weeds is a real possibility that has been considered and mitigated by requesting that all vehicles entering the study area be thoroughly cleaned and the weeds sprayed.

Decision as to whether the proposed action needs to be referred

Approval is NOT required from the Minister in regard to endangered ecological communities listed under the EBPC Act 1999.

7-3. Migratory species listed in EPBC Act

There are no migratory species likely to nest, breed, roost or shelter in the impact area of the bridges. Seasonally they may forage in the area when food sources are present.

7-4. Migratory Wetland species listed in EPBC Act

There are no wetland migratory species likely to nest, breed, roost or shelter in the impact area of the bridges. Seasonally they may forage in the area when food sources are present.

Further EPBC Act considerations

The study areas:

- is not part of a world heritage area;
- is not a wetland protected by international treaty;
- is not a Commonwealth Marine area; and
- is not a nuclear action.

Decision as to whether the proposed action needs to be referred

- Is the proposed action likely to have a significant impact on a matter of national environmental significance? NO
- Is the proposed action likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land)? NO

Therefore the proposal does not require referral to the Federal Environment Minister for approval.

8-0. State Environmental Planning Policy (SEPP) No. 44 Koala Habitat Assessment

This State Environmental Planning Policy was gazetted on 6 January 1995 and commenced operation on 13 February 1995 in response to the state-wide decline of Koala populations.

The policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline.

The policy requires the following criteria to be addressed:

- Q. Does the subject land occur in a Local Government Area identified in Schedule 1?
  A. YES. Tamworth Regional Council is listed in Schedule 1.

- Q. Is the landholding to which the DA applies greater than one hectare in area?
  A. YES.

- Q. Is the land potential Koala habitat (that is, does the subject site contain areas of native vegetation where the trees of types listed in Schedule 2 constitute at least 15% the total number of trees in the upper or lower strata of the tree component?)
  A. YES.

- Q. Is there core Koala habitat on the subject land (that is, is there a resident population of koalas, evidenced by attributes such as breeding females and recent sightings of and historical records of a population?

A. NO.

- Q. Is there a requirement for the preparation of a Plan of Management for identified core Koala habitat?
  A. NO.

Result of SEPP 44 Assessment

The Local Government Area of Tamworth is listed in Schedule 1 of the Local Government Areas to which SEPP 44 policy applies and is recognised as potential Koala habitat.

The study area does contain Schedule 2 feed trees, however there are no records of Koalas being recorded within 10 km, and no evidence of Koalas being present.

Consequently, the study areas are not core Koala habitat, and State Environmental Planning Policy No. 44 does not apply.

9-0. CONCLUSION

9-1 Summary of expected impacts on fauna and flora species of conservation significance

The bridge sites have been cleared to some extent over time and have been disturbed by road and bridge construction, grazing, and weed invasion.

The areas to be impacted by each of the proposed works are those most degraded and weedy due to previous road and bridge construction. Where there are adjoining areas that are less disturbed and dominated by native ground cover plants, they have been identified to be cordoned off to be protected from construction impacts.

The Box – Gum endangered ecological community occurs at Norris bridge over Catong Gully. Where it occurs downstream of the bridge will be protected by a barrier flagging tape. No threatened plants were found at the nine bridges.

Streams that require protection under the Fisheries Management Act endangered ecological community are bridges Maher's 4 & Norris 6. The demolition and construction of all bridges will require the generic recommendations applied to protect fish habitat and the riverine ecosystem. Where fish are likely to occur those measures are to be inspected by a Fisheries officer.

Streams that provide habitat for threatened fish are Allambie 1 and Retreat 8.

Streams that provide habitat for the Booroolong Frog are Recreation 7 and Munro 5. Construction of those two bridges is to be completed during the warmer months of November to March. Work in the stream will be limited to the immediate vicinity of the bridges and kept to the shortest possible time frame to have the least impact. An ecologist is to conduct a preconstruction frog survey of Recreation and Munro Creek to capture and relocate frogs found in the substructure works area, the night prior to demolition. If found, the survey will be repeated the following Sunday to remove frogs that may have reoccupied the works area over the weekend. Those surveys will be repeated until no Booroolong frogs are found or completion of the substructure

There were no potential hollow tree habitats for threatened birds, bats and gliders (nesting, roosting, and denning) found in the impact areas.

Habitat for threatened woodland birds was found in close proximity to bridges 1, 2, 6, 7, and 8 that are part of significant riparian landscape corridors and/or adjoin significant remnants. Those same bridges have logs and debris that provide habitat for frogs, small mammals, and reptiles. That debris will be retained to provide habitat at a suitable location nearby to the works area.

Review of Key Threatening Processes (NSW Biodiversity Conservation Act 2016) found the Invasion of Native plants by Exotic Perennial Grasses requires consideration to prevent the potential introduction and dispersal of the invasive exotic species African Lovegrass (*Eragrostis curvula*) and Coolatai Grass (*Hyparrhenia hirta*). Recommendations have been made to minimise the impact of the Key threat.

9-2 Recommendations for conservation measures to mitigate potential impacts to species of conservation significance

The Macdonald River at Allambie 1 and Retreat 8 bridges is known habitat for threatened fish species. The implementation of the recommended mitigation measures will result in minimal impact to streams and their riparian zones. The stream protection mitigation measures are to be inspected by a Fisheries Officer.

The proposed works will result in minimal clearing of juvenile and immature trees and negligible loss of potential habitat and resources for threatened species. The Speckled Warbler was found at Hidden Bridge 2; work on that bridge is to be done outside of its breeding season between August and February. No mature or hollow trees are to be removed. No stream logs or debris will be removed. The proposed works will not result in alteration to the stream flows.

An ecologist is to conduct preconstruction frog surveys of Recreation and Munro Creek bridges to capture and relocate frogs found in the substructure works area. If found the survey will be repeated the following Sunday to remove frogs that may have reoccupied the works area over the weekend. Those surveys will be repeated until no Booroolong frogs are found or completion of the substructure.

Most of the works areas are weedy with environmental weeds. The weeds of Coolatai grass, Johnsons grass and African Olive are to be sprayed at Norris bridge before demolition. It is important that all vehicles and personnel involved in the works practice strict weed hygiene to ensure that their vehicles, equipment and clothing are kept free of weed seeds to ensure that weed seeds are not transferred into or off the site.

Generic recommendations to mitigate the potential impact of construction and key threatening processes at each of the works locations

The implementation of the following mitigation measures will result in minimal impact to streams and their riparian zones. The mitigation measures at streams with potential fish habitat are to be inspected by a Fisheries Officer.

The proposed works will result in minimal clearing and negligible loss of potential habitat and resources for threatened species. No mature or hollow trees are to be removed. No instream logs or debris will be removed. The proposed works will not result in damming or major alteration to the stream flows.

Environmental Protection Measures to Be Implemented At Each Works Location

- Confine construction impacts to the most disturbed and weedy areas in the immediate surrounds of the bridges. Norris bridge has areas of native vegetation nearby that are fitting of the description of an endangered ecological community; those areas are to be cordoned off as 'no go' areas.

- Ensure all vehicles and equipment are thoroughly cleaned of weed seeds before and after work at each of the construction sites.
- Minimise disturbance to vegetation and soil between the top flood level and the stream. If instream or water level disturbance is required, a fisheries officer is to inspect the site to assess the suitability of the stream protection measures.
- Erect silt curtain sediment traps below works in all drainage lines. Where risks are increased with steeper slopes and larger catchments multiple sediment traps are to be erected on contours two metres apart down the slope. Divert surface water runoff away from entering the works site, and erect silt traps on those diversions.
- Under no circumstances are streams to be blocked or dammed, minimise temporary diversion.
- If floating debris is likely, capture it by erecting a floating boom downstream of the works.
- To prevent weed seed dispersal ensure any fill material (soil or gravel) is sourced in the immediate proximity, if not possible, ensure that source is not contaminated by weed seeds. Ensure that source is not in a location that will erode or lead to erosion elsewhere. Where temporary fill is used it is to be replaced upon completion.
- No mature or hollow trees are to be removed. No instream logs or debris will be removed.
- Where possible retain the debris from clearing and construction in the works area to provide habitat.
- There is to be no blasting within the streams.

Hence the proposed constructions will not have a significant impact on threatened fauna, flora, endangered ecological communities, or migratory species likely to occur in the region.

9-3 An indication as to whether a Species Impact Statement would need to be prepared

The results from the flora and fauna survey and habitat assessment, and application of section 5A of the EP&A Act 1979 to the threatened species considered likely to occur in the region, found that no Threatened Species or Endangered Ecological Community or Endangered Population listed by the BC Act 2016 or FM Act 1994 is likely to be impacted upon by the proposal.

Therefore, a Species Impact Statement would not need to be prepared.

9-4 An indication as to whether the approval of the Federal Environment Minister would be required

The assessment of the proposal applying the requirements of the EPBC Act Administrative Guidelines indicated that referral to the Federal Environment Minister would not be required.

9-5 An indication as to whether a Plan of Management for core Koala habitat is required under State Environmental Planning Policy No. 44

The study areas are not core Koala habitat, and State Environmental Planning Policy No. 44 does not apply.

References

Ayers, D. (1995). Endangered Fauna of Western New South Wales, Pub. by National Parks and Wildlife Service, Hurstville, NSW.

Ayers D., Nash S. and Baggett K. 1996. Threatened Species of Western New South Wales. NPWS, Hurstville.

Barrett, G.W., Ford, H.A. and Recher, H.F. (1994). Conservation of woodland birds in a fragmented rural landscape. *Pacific Conservation Biology* **1**, 245-256.

Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984). 'The Atlas of Australian Birds'. Melbourne University Press: Melbourne.

Bromham, L., Cardillo, M., Bennett, A. and Elgar, M. (1999). Effects of stock grazing on the ground invertebrate fauna of woodland remnants. *Australian Journal of Ecology* **24**, 199-207.

Cann, J. 1998. *Australian Freshwater Turtles*. Singapore: Beaumont Publishing Pty Ltd.

Cogger, H.G. 2000. *Reptiles and Amphibians of Australia - 6th edition*. Sydney, NSW: Reed New Holland.

Cogger, H.G., E.E. Cameron, R.A. Sadlier & P. Eggler..1993. *The Action Plan for Australian Reptiles*. [Online]. Canberra, ACT: Australian Nature Conservation Agency. Available from: http://www.environment.gov.au/biodiversity/threatened/action/reptiles/index.html.

Crome F. and Shields J. 1992. Parrots and Pigeons of Australia. Angus and Robertson, Sydney.

Department of Primary Industries (DPI NSW). 2012a. Olive Perchlet Fact Sheet. Available from: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/426594/Western-population-olive-perchlet-ambassis-agassizii.pdf.

Department of Primary Industries (DPI NSW). 2012b. Eel tailed cat fish. *Endangered Populations*. Available from: http://www.dpi.nsw.gov.au/fisheries/species-protection/conservation/what-current/endangered-populations/eel-tailed-catfish.

Dickman, C.R., R.L.Pressey, L.Lim and H.E. Parnaby. 1993. Mammals of particular conservation concern in the Western Division of New South Wales. *Biol.Conserv.* 65: 219 - 248

Egan, K., Farrell, J. and Pepper-Edward, D. (1997). Historical and seasonal changes in the community of forest birds at Longneck Lagoon Nature Reserve, Scheyville, New South Wales. *Corella* **21**, 1-16.

Fitri, L. and Ford, H. (1997). Status, habitat and social organisation of the Hooded Robin, *Melanodryas cucullata* in the New England Region of New South Wales. *Australian Birdwatcher* **17**, 142-155.

Georges, A. & M. Adams 1992. A phylogeny for Australian chelid turtles based on allozyme electrophoresis. *Australian Journal of Zoology*. **40**:453-476.

Higgins P.J. 1999. Handbook of Australian, New Zealand and Antarctic Birds Volume 4. Oxford University Press, Melbourne.
Jarman H. 1973. The Turquoise Parrot. *Australian Bird Watcher* 4: 239-250.

Morris A.K. 1980. The status and distribution of the Turquoise Parrot in New South Wales. *Australian Birds* 14: 57-67.

Major, R., Christie, F. and Gowing, G. (1998). 'The Value of Remnant Vegetation for Birds in the New South Wales Wheatbelt'. Australian Museum: Sydney.

Major, R., Gowing, G. and Kendal, C. (1996). Nest predation in Australian urban environments and the role of the Pied Currawong, *Strepera graculina*. *Australian Journal of Ecology* **21**, 399-409.

Murray Darling Basin Authority (MBDA). 2009a. Purple Spotted Gudgeon Fact Sheet. *Native Fish Strategy*. Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-32-Southern-purple-spotted-gudgeon.pdf.

Murray Darling Basin Authority (MDBA). 2009b. Silver Perch Fact Sheet. *Native Fish Strategy*. Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-30-Silver-perch.pdf.

Murray Darling Basin Authority (MDBA). 2009c. Murray Cod Fact Sheet. *Native Fish Strategy*. Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-21-Murray-cod.pdf.

NSW NPWS 1997b. North-east NSW Draft Priority Species. Northern Zone, New South Wales National Parks and Wildlife Service, Coffs Harbour.

Noske, R.A. (1979). Co-existence of three species of treecreepers in north-eastern New South Wales. *Emu* **79**, 120-128.

Noske, R.A. (1991). A demographic comparison of cooperatively breeding and non-cooperative treecreepers (Climacteridae). *Emu* 91, 73-86.

Oliver, D., Ley, A., Ford, H. and Williams, B. (1999). Habitat of the Regent Honeyeater, *Xanthomyza phrygia* and the value of the Bundarra-Barraba region for the conservation of avifauna. *Pacific Conservation Biology* **5**, 224-239.

Quinn B.R. and Baker-Gabb D.J. 1993. Conservation and Management of the Turquoise Parrot in North-east Victoria. Arthur Rylah Institute for Environmental Research. Technical Report Series 125.

Quinn B.R. and Reid A.J. 1996. The Turquoise Parrot *Neophema pulchella* in the Yea and Yarra River Valleys, Central Southern Victoria. *Australian Bird Watcher* 16: 250-254.

Read, J.L. (1994). The diet of three species of firetail finches in temperate South Australia. *Emu* **94**, 1-8.

Reid, J. (1999). 'Threatened and Declining Birds in the New South Wales Sheep-wheatbelt: Diagnosis, Characteristics and Management'. Report to NSW NPWS, Sydney.
Richards, G.C. 1983a.. Yellow-bellied Sheathtail Bat pp 315 in The complete book of

Australian mammals (Ed. R. Strahan). Angus and Robertson Publishers. Sydney

Schodde, R. and Mason, I.J. (1999) 'The Directory of Australian Birds: Passerines'. CSIRO: Melbourne.

State Forests 1995. Dorrigo State Forest Management Area, Fauna Impact Study

Traill, B.J. (1995). Competition and co-existence in a community of forest vertebrates. Ph.D. Thesis, Monash University, Melbourne.

Walters, J., Ford, H. and Cooper, C. (1999). The ecological basis of sensitivity of Brown Treecreepers to habitat fragmentation: a preliminary assessment. *Biological Conservation* 90, 13-20.

Website References

Weed Management Guide for Coolatai Grass
http://www.weedscrc.org.au/documents/wmg_coolatai.pdf

Wildlife Atlas database
http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp

EPBC Listed species
http://www.environment.gov.au/biodiversity/threatened/

Conservation advice: *Bothriochloa Biloba*
http://www.environment.gov.au/biodiversity/threatened/species/pubs/3153-conservation-advice.pdf

Declared Noxious Weeds advice

http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed

Species Identification References

Churchill, S. (1998). Australian Bats. New Holland Publishers (Australia) Pty Ltd

Cogger, H.G. (1994). Reptiles and Amphibians of Australia. Reed Books, Sydney.

Pizzey, G. (1980). A Field Guide to the Birds of Australia. Collins, London

Simpson, K. and N. Day. (1993). Field Guide to the Birds of Australia. Viking O'Neil; Melbourne.

Slater, P. (1986). The Slater Field Guide to Australian Birds. Rigby, Sydney.

Strahan, R. (1991). The Complete Book of Australian Mammals. Angus and Robertson, Sydney.

Swan, G. (1990). Snakes and Lizards of New South Wales. Three Sisters Publications, Winmalee.

Appendix 1. Fauna Recorded At The Nine Bridges

Species	1 Allambie	2 Hidden	3 Kia Ora	4 Mahers	5 Munroes	6 Norris	7 Recreation	8 Retreat	9 Warrabah
Native	13	18	7	4	9	12	19	13	15
Exotic	2	1	0	2	1	0	0	0	0

Scientific Name	Common Name	NSW status	Comm. status	1	2	3	4	5	6	7	8	9
Crinia signifera	Common Eastern Froglet	P						X		X		
Limnodynastes dumerilii	Eastern Banjo Frog	P										X
Platyplectrum ornatum	Ornate Burrowing Frog	P			X							
Litoria booroolongensis	Booroolong Frog	E1,P	E					2017		2017		
Litoria wilcoXii		P						X		X		
Chelodina longicollis	Eastern Snake-necked Turtle	P		X							X	X
Myuchelys bellii	Western Sawshelled Turtle, Bell's Turtle	E1,P	V	X							X	
Ctenotus robustus	Robust Ctenotus	P										X
Eulamprus quoyii	Eastern Water-skink	P		X				X		X		X
Intellagama lesueurii	Eastern Water Dragon	P		X								X
Macropus robustus	Common Wallaroo	P			X					X		
Wallabia bicolor	Swamp Wallaby	P			X							
Mus musculus	House Mouse							X				
Rattus rattus	Black Rat				X							

Scientific Name	Common Name	NSW status	Comm. status	1	2	3	4	5	6	7	8	9
Anas gracilis	Grey Teal	P		X								X
Anas superciliosa	Pacific Black Duck	P		X								X
Chenonetta jubata	Australian Wood Duck	P		X						X		
Geopelia striata	Peaceful Dove	P							X	X		
Ocyphaps lophotes	Crested Pigeon	P			X		X		X			X
Egretta novaehollandiae	White-faced Heron	P							X			
Falco berigora	Brown Falcon	P						X				
Gallinula tenebrosa	Dusky Moorhen	P										X
Elseyornis melanops	Black-fronted Dotterel	P									X	
Cacatua galerita	Sulphur-crested Cockatoo	P			X							
Cacatua sanguinea	Little Corella	P		X								
Eolophus roseicapillus	Galah	P		X						X		
Platycercus eXimius	Eastern Rosella	P								X		X
Psephotus haematonotus	Red-rumped Parrot	P		X					X			X
Trichoglossus haematodus	Rainbow Lorikeet	P					X					
Merops ornatus	Rainbow Bee-eater	P			X		X					
Eurystomus orientalis	Dollarbird	P		X		X						
Malurus cyaneus	Superb Fairy-wren	P			X	X			X	X		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	P			X			X				
Chthonicola sagittata	Speckled Warbler	V,P			X							
Pardalotus striatus	Striated Pardalote	P			X					X		X
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	P									X	
Anthochaera carunculata	Red Wattlebird	P				X				X		
Manorina melanocephala	Noisy Miner	P							X			X
Ptilotula fuscus	Fuscous Honeyeater	P							X			

Scientific Name	Common Name	NSW status	Comm. status	1	2	3	4	5	6	7	8	9
Ptilotula penicillatus	White-plumed Honeyeater	P								X		
Lalage sueurii	White-winged Triller	P			X							
Colluricincla harmonica	Grey Shrike-thrush	P			X					X		
Pachycephala rufiventris	Rufous Whistler	P			X					X		
Artamus superciliosus	White-browed Woodswallow	P									X	
Cracticus nigrogularis	Pied Butcherbird	P									X	X
Cracticus tibicen	Australian Magpie	P				X				X	X	
Cracticus torquatus	Grey Butcherbird	P							X			
Strepera graculina	Pied Currawong	P			X					X	X	
Rhipidura leucophrys	Willie Wagtail	P		X	X	X		X	X	X		
Corvus coronoides	Australian Raven	P						X	X			X
Grallina cyanoleuca	Magpie-lark	P				X					X	
Struthidea cinerea	Apostlebird	P			X							
Cincloramphus mathewsi	Rufous Songlark	P		X	X	X	X		X		X	
Hirundo neoXena	Welcome Swallow	P						X			X	
Petrochelidon ariel	Fairy Martin	P									X	
Petrochelidon nigricans	Tree Martin	P			X							
Sturnus tristis	Common Myna			X			X					
Sturnus vulgaris	Common Starling			X			X					
Dicaeum hirundinaceum	Mistletoebird	P							X	X		
Neochmia modesta	Plum-headed Finch	P									X	
Taeniopygia bichenovii	Double-barred Finch	P						X				
Neochmia temporalis	Red-browed Finch	P								X		
				15	19	7	4	10	12	19	13	15

Appendix 2 Common Plants Recorded At The Nine Bridge Locations

Species	1 Allambie	2 Hidden	3 Kia Ora	4 Mahers	5 Munroes	6 Norris	7 Recreation	8 Retreat	9 Warrabah
Native	9	29	4	5	11	28	12	16	14
Exotic	15	13	16	11	31	17	12	21	19

Seventy Nine Native Plants Recorded At The Bridge Locations

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Abutilon tubulosum			X							
Acacia dealbata subsp. dealbata	Silver Wattle	X								
Acacia decora	Golden Wattle						X			
Acacia implexa	Hickory Wattle		X							
Anthosachne rectiseta	grass									X
Aristida ramosa	Purple Wiregrass		X				X		X	
Austrostipa scabra subsp. scabra	Spear grass						X	X		
Austrostipa verticillata	Slender bamboo grass		X					X		
Boerhavia dominii	Tarvine							X		
Bothriochloa biloba	Lobed Red grass						X			
Bothriochloa macra	Red grass						X			
Brachychiton populneus subsp. populneus	Kurrajong		X				X			
Callistemon sieberi (= Melalecua paludicola)	River Bottlebrush	X							X	
Callitris glaucophylla	White Cypress		X							
Calotis lappulacea	Yellow Burr-daisy						X			
Carex appressa (abundant on edge of watercourse)	Tall Sedge			X		X				
Carex inversa	sedge									X
Casuarina cunninghamiana subsp. cunninghamiana	River Oak	X				X		X	X	
Cheilanthes sieberi subsp. sieberi	Rock Fern		X							
Chloris truncata	Windmill Grass		X		X					
Chloris ventricosa	Tall Chloris						X			
Commelina cyanea	Native Wandering Jew	X				X			X	
Cymbopogon refractus	Barbed Wire Grass		X							

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Cynodon dactylon	Common Couch	X			X	X	X	X	X	
Cyperus gracilis	Slender Flat-sedge						X			
Cyperus spp.	sedge					X		X		
Dactyloctenium radulans	Button Grass									X
Dianella	Blueberry Lily		X				X			
Dichanthium sericeum subsp. sericeum	Queensland Blue Grass		X			X	X			
Dichondra repens s.lat.	Kidney weed								X	
Digitaria brownii	Cotton Panic Grass		X							
Digitaria divaricatissima	Umbrella Grass				X		X			
Dodonaea viscosa subsp. angustifolia	Hop Bush		X							
Dysphania pumilio	Small Crumbweed								X	
Einadia nutans subsp. linifolia	Climbing Saltbush					X	X			
Einadia trigonos subsp. stellulata	Fishweed		X						X	
Elymus scaber	Common Wheat grass							X		
Eragrostis leptostachya	Paddock lovegrass									X
Eragrostis parviflora	Weeping Lovegrass	X	X							X
Eriochloa pseudoacrotricha	Early Spring Grass		X				X			
Erodium crinitum					X					
Eucalyptus albens	White Box						X			
Eucalyptus blackelyi	Blakely's Red Gum		X							
Euphorbia drummondii	Caustic Weed						X			
Geranium solanderi	Native Geranium			X				X	X	
Glycine spp.	Twining glycine		X				X			
Juncus spp.	a rush			X				X	X	
Landoltia punctata	Dotted Duckweed									X
Lomandra longifolia	Spiny-headed Mat-rush	X								
Microlaena stipoides var. stipoides	Weeping Grass								X	
Notelaea microcarpa var. microcarpa	Native Olive		X			X				
Oxalis exilis	Shade Wood-sorrel									
Oxalis perennans	Grassland Wood-sorrel		X	X		X			X	X
Pandorea pandorana subsp. pandorana	Wonga Wonga Vine		X				X			
Panicum buncei	Native Panic grass						X			
Panicum effusum	Hairy Panic grass		X							
Paspalidium gracile	Slender Panic grass						X			
Paspalum distichum	Water Couch									X
Persicaria prostrata	Creeping Knotweed					X		X	X	X
Phragmites australis	Phragmites									X
Pimelea neo-anglica	Poison Pimelea		X							

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Pseudognaphalium luteoalbum	Jersey Cudweed							X	X	X
Psydrax odorata	Iamboto		X							
Rorippa laciniata	Jagged Bitter-cress								X	
Rumex brownii	Swamp Dock						X			
Rytidosperma	Wallaby Grass		X							
Salsola australis	Roly Poly						X			
Senecio diaschides	Mountain Groundsel	X								
Sida cunninghamii	Ridge Sida						X			
Sida trichopoda	High Sida		X							
Solanum esuriale	Quena						X			
Sorghum leiocladum	Native Sorghum						X			
Sporobolus creber	Slender Rats tail Grass		X							X
Themeda triandra	Kangaroo Grass					X				
Tragus australianus	Small Burrgrass		X				X			
Tripogon loliiformis	Fiveminute Grass									X
Urtica incisa	Stinging Nettle							X		
Viola (vegetative)	Sweet Violet	X								
Wahlenbergia	Blue bell		X		X		X		X	X
		9	29	4	5	11	28	12	16	14

Eighty Two Exotic Plant Species Recorded At The Bridge Locations

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Acetosella vulgaris	Sheep Sorrel								W	W
Aloe maculata	Soap Aloe						W			
Alternanthera pungens	Khaki Weed				W					
Amaranthus retroflexus	Red-root Amaranth					W				
Ammi majus	Bishop's Weed					W				
Anchusa arvensis	Wild Bugloss			W						
Argemone ochroleuca subsp. ochroleuca	Mexican Poppy		W							
Avena	Wild Oats				W					
Bidens bipinnata	Beggar's Ticks	W	W		W				W	
Bidens pilosa var. pilosa	Cobbler's Pegs		W							
Bromus catharticus	Praire Grass							W	W	
Bromus diandrus	Great Brome			W						
Bromus molliformis	Soft Brome							W		
Carthamus lanatus	Saffron Thistle				W	W				
Centaurea solstitialis	St Barnabys Thistle					W	W			
Chloris virgata	Feathertop Rhodes Grass				W				W	W
Chondrilla juncea	Skeleton Weed					W			W	W
Cichorium intybus	Chickory					W				
Cirsium vulgare	Spear Thistle			W		W				
Conyza bonariensis	Flaxleaf Fleabane					W	W	W		W
Conyza sumatrensis	Tall Fleabane	W		W	W			W	W	W
Cuscuta species	Dodder					W				
Cyclospermum leptophyllum	Slender Celery						W			
Cyperus eragrostis	Umbrella Sedge	W					W		W	
Digitaria eriantha	grass						W			
Echium plantagineum	Patterson's Curse					W				
Eleusine tristachya	Goose Grass								W	W
Eragrostis cilianensis	Stinkgrass		W							
Eragrostis curvula	African Lovegrass	W		W					W	
Glandularia aristigera	Mayne's Pest						W			
Gomphrena celosioides	Gomphrena Weed		W							
Heliotropium amplexicaule	Blue Heliotrope		W		W				W	
Hirschfeldia incana	Buchan Weed				W				W	W
Holcus lanatus	Yorkshire Fog			W						
Hyparrhenia hirta	Coolatai Grass		W				W			
Hypericum perforatum	St John's Wort					W				
Hypochaeris radicata	Catsear	W							W	W

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Lactuca saligna	Willow-leaved Lettuce	W								
Lactuca serriola	Prickly Lettuce	W				W				W
Lepidium africanum	Common Peppercress	W							W	W
Ligustrum lucidum	Broad-leaved Privet					W				
Melia azedarach var. australasica	White Cedar					W	W			
Modiola caroliniana	Red-flowered Mallow									W
Oenothera indecora subsp. bonariensis	Small-flowered Evening-primrose			W						
Olea europaea subsp. cuspidata	Olive						W			
Paronychia brasiliana	Chilean Whitlow Wort,								W	
Paspalum dilatatum	Paspalum grass			W		W		W		W
Paspalum notatum	Bahia Grass								W	
Pavonia hastata	Pink Pavonia								W	
Petrorhagia nanteuilii	Proliferous Pink		W							W
Phalaris aquatica	Phalaris					W				
Plantago lanceolata	Lambs Tongue	W				W	W	W	W	W
Polygonum arenastrum	Wireweed							W		
Populus nigra	Poplar tree			W						
Prunus species	Stone fruit tree					W				
Pyracantha angustifolia	Orange Firethorn					W				
Rapistrum rugosum	Turnip					W				
Ricinus communis	Castor Oil Plant					W				
Rorippa palustris	Yellow Cress	W								
Rosa rubiginosa	Sweet Briar			W						
Rubus anglocandicans	Blackberry	W		W		W			W	
Rumex crispus	Curled Dock			W		W				
Salix spp.	Willow	W								
Salvia verbenaca	Wild sage							W		
Schkuhria pinnata var. abrotanoides	Dwarf Marigold		W							
Setaria parviflora	Slender Pigeon Grass	W	W	W			W		W	W
Sida rhombifolia	Paddy's Lucerne		W							
Sida spinosa	Spiny Sida						W			
Silybum marianum	Variegated Thistle					W				
Solanum chenopodioides	Whitetip Nightshade			W						
Solanum nigrum	Black-berry Nightshade				W	W	W			W
Sonchus oleraceus	Common Sowthistle								W	
Sorghum halepense	Johnson Grass				W	W	W			
Trifolium arvense	Haresfoot Clover					W		W		
Urochloa panicoides	Urochloa Grass						W			
Verbascum thapsus subsp.	Great Mullein			W	W			W	W	W

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9
Thapsus										
Verbena bonariensis	Purple top		W			W		W		W
Verbena caracasana	Shore Verbain	W								W
Verbena incompta	Purple top	W		W		W	W			
Vicia sativa	Vetch					W				
Vulpia sp	Fescue							W		
Xanthium occidentale	Noogoora Burr					W				
Zinnia peruviana	Peruvian zinnia		W							
		15	13	16	11	31	17	12	21	19

Appendix 3 Threatened Species Bionet Database Search

Threatened species considered in the bridge assessment listed in the *Biodiversity Conservation Act 2016*, *Environment Protection & Biodiversity Conservation Act 1999, and Fisheries Management Act 1994,* known to occur in the Tamworth Regional Council area

Common Name	Scientific Name	NSW status	Comm. status
Booroolong Frog	*Litoria booroolongensis*	E1,P	E
Davies' Tree Frog	*Litoria daviesae*	V,P	
Bell's Turtle or Western Saw-shelled Turtle	*Myucheles belli*	V,P	V
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	V,P	V
Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions	*Alectura lathami*	E2,P	
Spotted Harrier	*Circus assimilis*	V,P	
Little Eagle	*Hieraaetus morphnoides*	V,P	
Square-tailed Kite	*Lophoictinia isura*	V,P,3	
Eastern Osprey	*Pandion cristatus*	V,P,3	
Black Falcon	*Falco subniger*	V,P	
Bush Stone-curlew	*Burhinus grallarius*	E1,P	
Australian Painted Snipe	*Rostratula australis*	E1,P	E
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V,P,2	
Little Lorikeet	*Glossopsitta pusilla*	V,P	
Swift Parrot	*Lathamus discolor*	E1,P,3	CE
Turquoise Parrot	*Neophema pulchella*	V,P,3	
Barking Owl	*Ninox connivens*	V,P,3	
Powerful Owl	*Ninox strenua*	V,P,3	
Masked Owl	*Tyto novaehollandiae*	V,P,3	
Sooty Owl	*Tyto tenebricosa*	V,P,3	
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V,P	
Speckled Warbler	*Chthonicola sagittata*	V,P	
Regent Honeyeater	*Anthochaera phrygia*	E4A,P	CE
Painted Honeyeater	*Grantiella picta*	V,P	V
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	V,P	

Common Name	Scientific Name	NSW status	Comm. status
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	V,P	
Varied Sittella	*Daphoenositta chrysoptera*	V,P	
Olive Whistler	*Pachycephala olivacea*	V,P	
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V,P	
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	V,P	
Scarlet Robin	*Petroica boodang*	V,P	
Flame Robin	*Petroica phoenicea*	V,P	
Diamond Firetail	*Stagonopleura guttata*	V,P	
Spotted-tailed Quoll	*Dasyurus maculatus*	V,P	E
Koala	*Phascolarctos cinereus*	V,P	V
Yellow-bellied Glider	*Petaurus australis*	V,P	
Squirrel Glider	*Petaurus norfolcensis*	V,P	
Greater Glider	*Petauroides volans*	P	V
Brush-tailed Rock-wallaby	*Petrogale penicillata*	E1,P	V
Grey-headed Flying-fox	*Pteropus poliocephalus*	V,P	V
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V,P	
Large-eared Pied Bat	*Chalinolobus dwyeri*	V,P	V
Little Pied Bat	*Chalinolobus picatus*	V,P	
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V,P	
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V,P	
Corben's Long-eared Bat	*Nyctophilus corbeni*	V,P	V
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V,P	
Eastern Cave Bat	*Vespadelus troughtoni*	V,P	
Murray Cod	*Maccullochella peelii*		V
Purple-spotted Gudgeon	*Mogurnda adspersa*	End FM Act	
Silver Perch	*Bidyanus bidyanus*	V	
Olive Perchlet	*Ambassis agassizii*	EPop FM Act	
Freshwater Catfish	*Tandanus tandanus*	EPop FM Act	
Blue grass	*Dichanthium setosum*	V	
Austral Toadflax	*Thesium australe*	V	

Threatened Plants recorded in the Tamworth Council Region surveyed for at the nine bridge locations

Scientific Name	Common Name	NSW status	Comm. status	Records	Likely at bridges
Tylophora linearis		V	E	1	No
Stenopetalum velutinum	Velvet Thread-petal	E4		1	No
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	1	No
Prasophyllum petilum	Tarengo Leek Orchid	E1,P,2	E	1	No
Prasophyllum sp. Wybong		P	CE	1	No
Homopholis belsonii	Belson's Panic	E1	V	1	No
Polygala linariifolia	Native Milkwort	E1		1	No
Hakea pulvinifera	Lake Keepit Hakea	E1,2	E	1	No
Cadellia pentastylis	Ooline	V	V	1	No
Tasmannia glaucifolia	Fragrant Pepperbush	V	V	1	No
Cynanchum elegans	White-flowered Wax Plant	E1	E	2	No
Eucalyptus rubida subsp. barbigerorum	Blackbutt Candlebark	V	V	2	No
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V	3	No
Diuris pedunculata	Small Snake Orchid	E1,P,2	E	3	No
Swainsona sericea	Silky Swainson-pea	V		5	No
Chiloglottis platyptera	Barrington Tops Ant Orchid	V,P,2		6	No
Euphrasia ciliolata	Polblue Eyebright	V		6	No
Digitaria porrecta	Finger Panic Grass	E1		7	No
Euphrasia arguta		E4A	CE	8	No
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	10	No
Acacia pubifolia	Velvet Wattle	E1	V	12	No
Tasmannia purpurascens	Broad-leaved Pepperbush	V		12	No
Eucalyptus mckieana	McKie's Stringybark	V	V	13	No
Asterolasia beckersii	Dungowan Starbush	E1		14	No
Callistemon pungens			V	28	No
Homoranthus prolixus	Granite Homoranthus	V	V	28	No
Eucalyptus oresbia	Small-fruited Mountain Gum	V		33	No
Dichanthium setosum	Bluegrass	V	V	37	Possible
Zieria odorifera subsp. warrabahensis		E4A		40	Possible
Thesium australe	Austral Toadflax	V	V	86	Possible
Boronia ruppii	Rupp's Boronia	E1,P		495	No

Commonwealth status

C	Listed on China Australia Migratory Bird Agreement
CD	Conservation Dependent (Commonwealth EPBC Act 1999)
CE	Critically Endangered (Commonwealth EPBC Act 1999)
E	Endangered (Commonwealth EPBC Act 1999)
J	Listed on Japan Australia Migratory Bird Agreement
K	Listed on Republic of Korea Australia Migratory Bird Agreement
V	Vulnerable (Commonwealth EPBC Act 1999)
X	Extinct (Commonwealth EPBC Act 1999)
XW	Extinct in the Wild (Commonwealth EPBC Act 1999

Appendix 4 EPBC Act Database Search Report

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

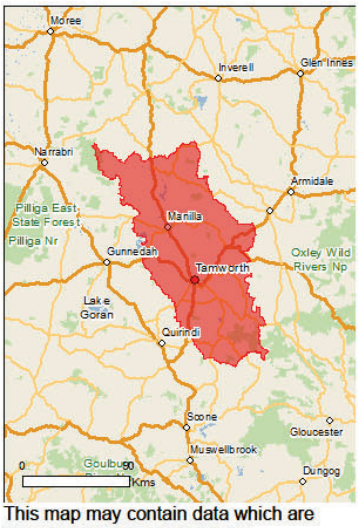
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

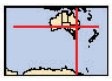
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

LGA TAMWORTH REGIONAL COUNCIL, NSW

Report created: 14/01/21 20:14:32



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://environment.gov.au/protection/environment-assessments

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance:	5
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Threatened Ecological Communities:	6
Threatened Species:	56
Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits-and-application-forms

Commonwealth Lands:	11
Commonwealth Heritage Places:	1
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	22
Regional Forest Agreements:	1
Invasive Species:	43
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	1000 - 1100km
Gwydir wetlands: gingham and lower gwydir (big leather) watercourses	100 - 150km upstream
Hunter estuary wetlands	100 - 150km upstream
Riverland	900 - 1000km upstream
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km

Threatened Ecological Communities		[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.		
Name	Status	Type of Presence
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Threatened Species		[Resource Information]
Name	Status	Type of Presence
BIRDS		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Breeding known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
FISH		
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
FROGS		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area
MAMMALS		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys oralis Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANTS		

Name	Status	Type of Presence
Acacia pubifolia Velvet Wattle [19799]	Vulnerable	Species or species habitat known to occur within area
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat known to occur within area
Callistemon pungens [55581]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Diuris pedunculata Small Snake Orchid, Two-leaved Golden Moths, Golden Moths, Cowslip Orchid, Snake Orchid [18325]	Endangered	Species or species habitat known to occur within area
Eucalyptus caleyi subsp. ovendenii Ovenden's Ironbark [56193]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus mckieana McKie's Stringybark [20199]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus nicholii Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus rubida subsp. barbigerorum Blackbutt Candlebark [64618]	Vulnerable	Species or species habitat may occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat known to occur within area
Hakea pulvinifera Lake Keepit Hakea [14228]	Endangered	Species or species habitat known to occur within area
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat known to occur within area
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area
Homoranthus prolixus [55198]	Vulnerable	Species or species habitat known to occur within area
Picris evae Hawkweed [10839]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Tasmannia glaucifolia Fragrant Pepperbush [21975]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat known to occur within area
Zieria odorifera subsp. warrabahensis [90008]	Critically Endangered	Species or species habitat known to occur within area
REPTILES		
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat known to occur within area
Wollumbinia belli Bell's Turtle, Western Sawshelled Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle [86071]	Vulnerable	Species or species habitat known to occur within area

Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of Defence Service Homes
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - TAMWORTH GRES DEPOT ; BEERSHEBA BARRACKS-TAMWORTH

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Tamworth Post Office	NSW	Listed place

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Back River	NSW
Ben Halls Gap	NSW
Crawney Pass	NSW
Curracabundi	NSW
Dowe	NSW
Forestry Management Areas in Walcha-Nundle (FMZ2)	NSW
Hobden Hill	NSW
Horton Falls	NSW
Ironbark	NSW
LNE Special Management Zone No1	NSW
Linton	NSW
Mount Kaputar	NSW
Rockview	NSW
Somerton	NSW
Tomalla	NSW
UNE_LNE_OldGrowth	NSW
Wallabadah	NSW
Warrabah	NSW
Watsons Creek	NSW
Watsons Creek	NSW
Watsons Creek	NSW
Woodsreef	NSW

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,	

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area

Name	Status	Type of Presence
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining oigations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Appendix 5. Definitions of the Endangered Ecological Communities

Definition of the aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River.

Description

The Darling River endangered ecological community includes all native fish and aquatic invertebrates within all natural creeks, rivers, streams and associated lagoons, billabongs, lakes, flow diversions to anabranches, the anabranches, and the floodplains of the Darling River within the State of New South Wales, and including Menindee Lakes and the Barwon River. This area includes:

The north-western slope rivers including the following: the Gwydir River from Copeton Dam (29°55'S; 150°55'E) downstream; the Namoi River from the junction of the Manilla River at Manilla (including Mehi River channel west of Moree) (30°46'S; 150°44'E) downstream; the Manilla River from Split Rock Dam (30°35'S; 150°42'E) downstream; the Peel River from Chaffey Dam (31°31'S; 151°08'E) downstream.

Excluded from this recommendation are the manmade/artificial canals, water distribution and drainage works, farm dams and off-stream reservoirs, and also the Paroo River and Bulloo River Overflow with their associated lakes and tributaries. Other watercourses above 500m not specifically named in this recommendation are excluded.

Definition of the Grassy White Box-Yellow Box-Blakely's Red Gum Woodland

What is Box-Gum Woodland?

Box-Gum Woodland is an open grassy woodland characterised by the presence or prior occurrence of White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*) or Blakely's Red Gum (*Eucalyptus blakelyi*). It has a ground layer of native tussock grasses and herbs, and a sparse, scattered shrub layer. In some locations however, these characteristic tree species may now be absent from the tree layer as a result of recent clearing or thinning and, at these locations, only other tree species may be present. These locations are still considered Box-Gum Woodland EEC as long as the area has the natural soil layer and seedbank intact, and therefore may recovery with appropriate management.

The community is important habitat for a diverse range of threatened animals, particularly where there are large, older trees with hollows. Examples include the Squirrel Glider, Barking Owl, Superb and Swift Parrots and the Regent Honeyeater.

Where is Box-Gum Woodland found?

Box-Gum Woodland is found on relatively fertile soils on the tablelands and western slopes of NSW, extending from an altitude of approximately 170m on the lower slopes up to 1200m on the northern tablelands. The community occurs within the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands and South Western Slopes Bioregions. Box-Gum Woodland containing White Box trees are most common on undulating areas of the western slopes while woodland containing Blakely's Red Gum and Yellow Box trees are more common in the grassy woodlands on the tablelands.

Why is it important?

Areas of Box-Gum Woodland have been drastically reduced since European settlement and what remains is often degraded and highly fragmented. For example, in some areas the community has been reduced to less than 1% of its original extent, while in other areas it is estimated that only between 4% and 7% of the original extent remains. Many remnants of the community are degraded as a consequence of past disturbance.

Identification of Box-Gum Woodland

The following is a list of key characteristics to help identify an area of Box-Gum Woodland.
Is the site on the tablelands or western slopes of NSW?

- Does the site contain, or would the site have recently been likely to contain, White Box, Yellow Box or Blakely's Red Gum?
- Is the ground layer mainly grassy?
- If the site has been degraded, is there potential for assisted natural regeneration of the tree layer or the understorey (e.g. by removing grazing, weeds, etc.)?

If you answer yes to the above questions, the area is likely to be Box-Gum Woodland.

The tree layer

The characteristic trees include White Box, Yellow Box and/or Blakely's Red Gum. There can be one or more of these trees in varying densities and combinations present at any site. Other eucalypts that may occur include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candle bark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*).

The shrub layer

Shrubs are generally sparse or absent, but may be common in some sites. Examples of shrubs that may be present include various Wattles, Black Cypress Pine (*Callitris endlicheri*), White Cypress Pine, Blackthorn (*Bursaria spinosa*), Dogwood (*Cassinia quinquefaria*), Cherry Ballart (*Exocarpos cupressiformis*), Wilga (*Geijera parviflora*), and Native Olive (*Notelaea microcarpa*).

The ground layer

The ground layer may be highly modified by grazing or other disturbances. In more natural sites, a diversity of native grasses and herbs occurs, including Kangaroo Grass (T*hemeda australis*), Poa Tussock (*Poa sieberiana*), Wallaby grasses (*Austrodanthonia spp.*), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*) and Small St John's Wort (*Hypericum gramineum*).

Characteristic species

A list of canopy trees and understorey plants that characterise a patch of Box-Gum Woodland is provided in the Table below. Not all the species listed need to occur at any one site for it to be considered Box-Gum Woodland.

Variation in the community

At heavily disturbed sites only some of the species which characterise the community may be present. In addition, above ground plants of some species may not be present, but may be represented below ground in the soil seed banks or as bulbs, corms, rhizomes or rootstocks. As such, disturbed remnants may still be considered to form part of the community. This includes sites where either the shrub layer and/or tree layer would respond, under appropriate management, to natural regeneration (i.e. where the natural soil and associated seed bank are still mostly intact) many of the canopy trees removed, and conversely, others which still retain the original trees mostly intact, have had the shrub or ground layers degraded or removed by grazing or pasture modification. Box-Gum Woodland remnants continue to be threatened by clearing, timber harvesting, firewood cutting, grazing, weed invasion, fire, soil disturbance and increased nutrient loads, soil acidification, salinity, and loss of connectivity with other vegetated areas. Box-Gum Woodland is poorly represented in conservation reserves within the State.

Department of Primary Industries (DPI NSW). 2012a. Olive Perchlet Fact Sheet. Available from: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/426594/Western-population-olive-perchlet-ambassis-agassizii.pdf.

Department of Primary Industries (DPI NSW). 2012b. Eel tailed cat fish. *Endangered Populations.* Available from: http://www.dpi.nsw.gov.au/fisheries/species-protection/conservation/what-current/endangered-populations/eel-tailed-catfish.

Cann, J. 1998. *Australian Freshwater Turtles*. Singapore: Beaumont Publishing Pty Ltd.

Cogger, H.G. 2000. *Reptiles and Amphibians of Australia - 6th edition*. Sydney, NSW: Reed New Holland.

Cogger, H.G., E.E. Cameron, R.A. Sadlier & P. Eggler..1993. *The Action Plan for Australian Reptiles*. [Online]. Canberra, ACT: Australian Nature Conservation Agency. Available from: http://www.environment.gov.au/biodiversity/threatened/action/reptiles/index.html.

Georges, A. & M. Adams 1992. A phylogeny for Australian chelid turtles based on allozyme electrophoresis. *Australian Journal of Zoology*. **40**:453-476.

Murray Darling Basin Authority (MBDA). 2009a. Purple Spotted Gudgeon Fact Sheet. *Native Fish Strategy*. Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-32-Southern-purple-spotted-gudgeon.pdf.

Murray Darling Basin Authority (MDBA). 2009b. Silver Perch Fact Sheet. *Native Fish Strategy.* Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-30-Silver-perch.pdf.

Murray Darling Basin Authority (MDBA). 2009c. Murray Cod Fact Sheet. *Native Fish Strategy.* Available from: http://www.mdba.gov.au/files/publications/Fact-sheets/MDBA-A4-Fact-Sheet-21-Murray-cod.pdf.

Appendix E

Biodiversity Desktop Searches

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Animals in selected area [North: -30.91 West: 150.97 East: 151.17 South: -31.11] returned a total of 132 records of 24 species.
Report generated on 14/11/2023 1:29 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Hylidae	3168	*Litoria booroolongensis*		Booroolong Frog	E1,P	E	70	
Animalia	Reptilia	Carphodactylidae	2139	*Uvidicolus sphyrurus*		Border Thick-tailed Gecko	V,P	V	1	
Animalia	Aves	Megapodiidae	0008	*Alectura lathami*		Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions	E2,P		1	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		1	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		1	
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*		Swift Parrot	E1,P	CE	4	
Animalia	Aves	Psittacidae	0302	^^*Neophema pulchella*		Turquoise Parrot	V,P,3		4	
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*		Brown Treecreeper (eastern subspecies)	V,P		2	
Animalia	Aves	Acanthizidae	0504	*Chthonicola sagittata*		Speckled Warbler	V,P		1	
Animalia	Aves	Meliphagidae	0603	^*Anthochaera phrygia*		Regent Honeyeater	E4A,P,2	CE	3	

Animalia	Aves	Meliphagidae	8303	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		2	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	Varied Sittella	V,P		2	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		1	
Animalia	Aves	Petroicidae	8367	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		1	
Animalia	Aves	Estrildidae	0652	*Stagonopleura guttata*	Diamond Firetail	V,P		5	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	5	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	E1,P	E	7	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		3	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	10	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		2	
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	1	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		1	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		3	

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment.
Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Plants in selected area [North: -30.91 West: 150.97 East: 151.17 South: -31.11] returned a total of 4 records of 1 species.
Report generated on 14/11/2023 1:34 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Poaceae	4895	*Dichanthium setosum*		Bluegrass	V	V	4	

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Communities in selected area [North: -30.91 West: 150.97 East: 151.17 South: -31.11] returned 0 records for 14 entities.
Report generated on 14/11/2023 1:37 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				*Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions*		Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	E3		K	
Community				*Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions*		Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions	E3		K	
Community				*Howell Shrublands in the New England Tableland and Nandewar Bioregions*		Howell Shrublands in the New England Tableland and Nandewar Bioregions	E3		K	
Community				*Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*		Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3		K	
Community				*McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions*		McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions	E3		P	

Community	*Mount Kaputar high elevation and dry rainforest land snail and slug community in the Nandewar and Brigalow Belt South Bioregions*	Mount Kaputar high elevation and dry rainforest land snail and slug community in the Nandewar and Brigalow Belt South Bioregions	E3		K	
Community	*Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland*	Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland		CE	K	
Community	*New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands*	New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands		CE	K	
Community	*New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion*	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	E4B		K	
Community	*Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion*	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	E3		P	
Community	*Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions*	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	E3		K	
Community	*Weeping Myall Woodlands*	Weeping Myall Woodlands		E	K	

Community	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and*	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	E4B	K	
Community	*White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	K	

Appendix F

Protected Matters Search

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Nov-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	42
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1000 - 1100km upstream from Ramsar site	In feature area
Riverland	900 - 1000km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community may occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FROG			
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Arthraxon hispidus			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cadellia pentastylis			
Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Callistemon pungens			
[55581]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dichanthium setosum			
bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus mckieana			
McKie's Stringybark [20199]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus nicholii			
Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Euphrasia arguta			
[4325]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Homoranthus prolixus			
[55198]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium aschersonii			
Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prasophyllum sp. Wybong (C.Phelps ORG 5269)			
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Thesium australe			
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis			
[92384]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi			
Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In feature area
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Myuchelys belli			
Western Sawshelled Turtle [86075]	Endangered	Species or species habitat may occur within area	In feature area
Uvidicolus sphyrurus			
Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [13313]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12982]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Residential Development & Assoc Infrastructure 31 & 41 Panorama Road	2005/2115	Not Controlled Action	Completed	In buffer area only
Residential Subdivision, Warramunga Avenue	2005/2201	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix G

AHIMS Search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Mick Maher's Bridge

Client Service ID : 870722

GeoLINK Consulting Pty Ltd

PO Box 1446

Coffs Harbour New South Wales 2450

Attention: Michelle Campione-Van Zetten

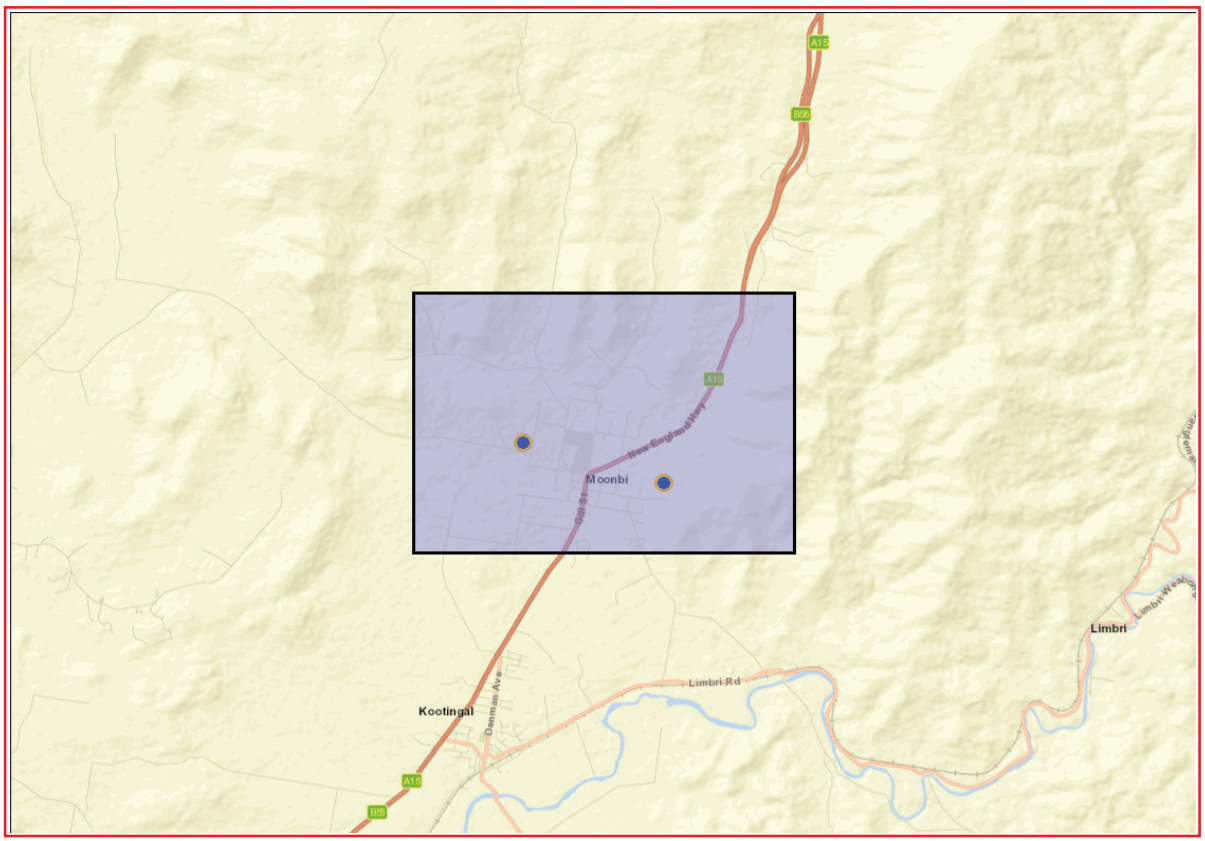
Email: mcampione-vanzetten@geolink.net.au

Date: 06 March 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -31.029, 151.0423 - Lat, Long To : -30.9922, 151.104, conducted by Michelle Campione-Van Zetten on 06 March 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix H

Due Diligence Advice

Michelle Campione-van Zetten

From: timhill.heritage@gmail.com
Sent: Tuesday, 5 December 2023 11:38 AM
To: Michelle Campione-van Zetten
Subject: RE: 4740 Timber bridge replacements - site information

Hi Michelle
That will be fine- the creek bank will have been subject to a degree of change/ modification from flooding and it is a low risk for sites right on the creek bank. Typically sites are back off the floodplain/bank.

Ta

Tim Hill
Heritage Management & Planning
0473033615

From: Michelle Campione-van Zetten <mcampione-vanzetten@geolink.net.au>
Sent: Tuesday, December 5, 2023 11:34 AM
To: Tim Hill <timhill.heritage@gmail.com>
Subject: 4740 Timber bridge replacements - site information

Hello Tim,

Thank you for answering my questions yesterday.

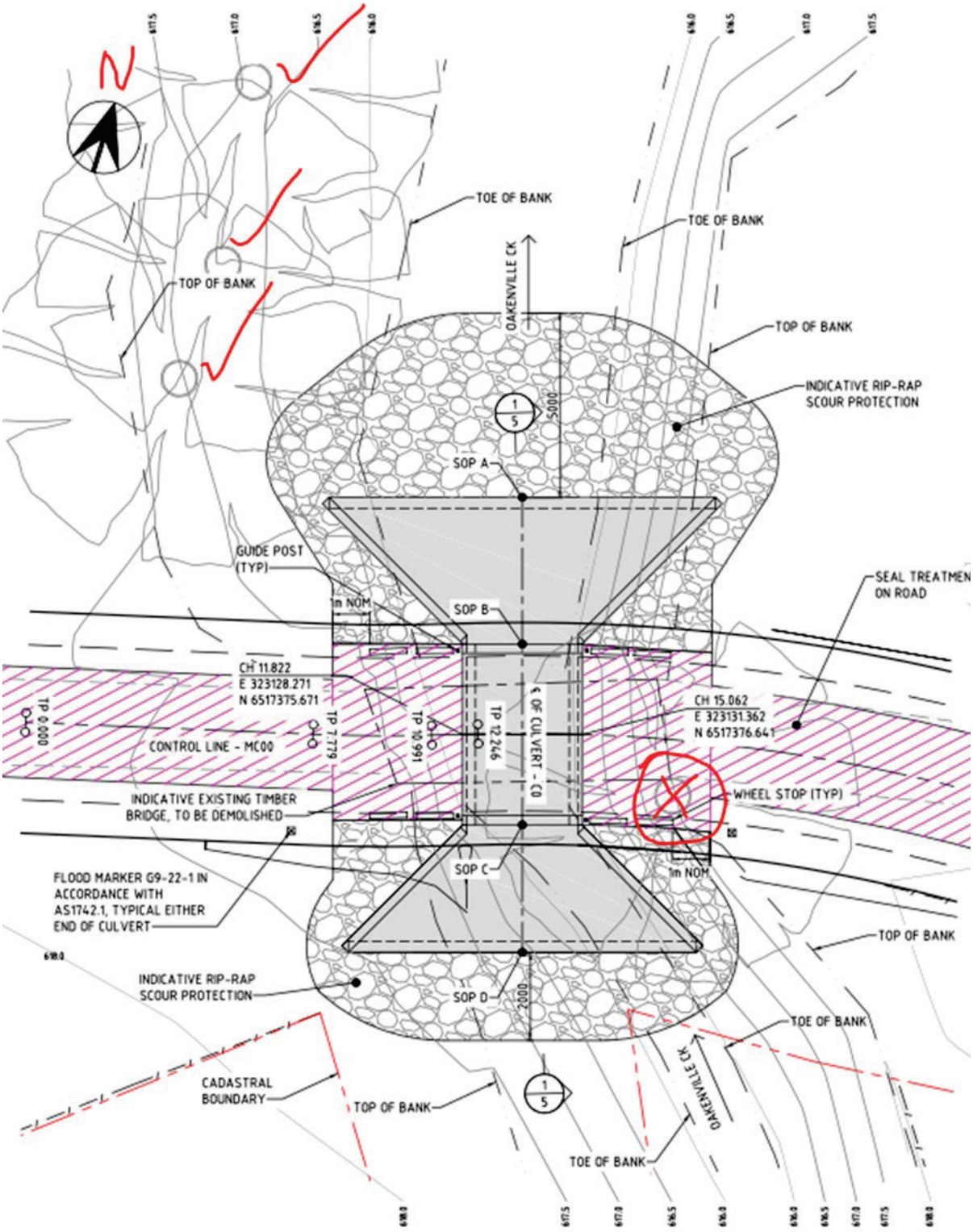
Following up on our conversation, the ecologists have been out to all the timber bridge sites and the following has been found:

- Mick Mahers
    - Both the bridge site and the compound site are disturbed areas
    - The compound area, which you mentioned you were not sure about, is a mowed area full of weeds being used for horse riding
    - Conclusion is that the areas are all disturbed and therefore the desktop Due Diligence will be sufficient

- Durbin Street Bridge
    - The northern side of the existing bridge is disturbed
    - The southern side is less disturbed with a large tree immediately adjacent to the bridge that will be removed for the works (see first photo – right side; second photo – bridge facing south; third photo – facing north)
    - The works are mostly within the creek bed and the road reserve (see construction figure)
    - Is tree removal enough to have to say that the south side of the bridge is non-disturbed area?

- 

- 



I am waiting on some information for the last bridge, Kia Ora Number 1, and will send a separate email about that one later. The additional information provided thus far states there will be minor channel realignment as part of the works.

Thank you,

Michelle Campione-van Zetten
Environmental Planner

GeoLINK
Quality solutions. Sustainable future.
P 02 6772 0454
W www.geolink.net.au

Appendix I

Construction Noise Estimator

Transport for NSW

Distanced Based Assessment (Construction Scenario)

Please pick from drop-down list in orange cells

Noise area category		R0
RBL or L_{A90} Background level (dB(A))	Day	30
	Evening	30
	Night	30
$L_{Aeq(15minute)}$ Noise Mangement Level (dB(A))	Day	40
	Day (OOHW)	35
	Evening	35
	Night	35
Scenario		Bridge works
Is there line of sight to receiver?		Yes

Steps for Screening Assessment:

1. Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
2. Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
3. Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
4. Is there line of sight to receiver? Select the appropriate scenario from the drop down list .

Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier and any gaps would compromise the acoustic integrity of the solid barrier.

6. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period . Consider background noise measurements to check assumption in Step #2 if:

(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver
8. Where night works are involved, identify sleep disturbance affected distance.
9. Document the outcomes of these steps.

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver

			$L_{Aeq(15minute)}$ noise level above background (L_{A90})											$L_{Aeq(15minute)}$ 75 dB(A) or greater (Highly affected)			Sleep disutrbance L_{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)					
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive					
		Affected distance (m)	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Affected distance (m)
Undeveloped green fields, rural areas with isolated dwellings	Day	815							N	390	50	N	185	60	N, PC, RO	40	75	
	Day (OOHW)	1165				N, R1, DR	815	40	N, R1, DR	390	50	N, R1, DR, PC, SN	185	60	N, PC, RO	40	75	
	Evening	1165				N, R1, DR	815	40	N, R1, DR	390	50	N, R1, DR, PC, SN	185	60	N, PC, RO	40	75	
	Night	1165	N	1165	35	N, R2, DR	815	40	N, PC, SN, R2, DR	390	50	AA, N, PC, SN, R2, DR	185	60	N, PC, RO	40	75	170
	Highly Affected	40													N, PC, RO	40	75	
Developed settlements (urban and suburban)	Day	1085							N	500	50	N	215	60	N, PC, RO	45	75	
	Day (OOHW)	1560				N, R1, DR	1085	40	N, R1, DR	500	50	N, R1, DR, PC, SN	215	60	N, PC, RO	40	75	
	Evening	1560				N, R1, DR	1085	40	N, R1, DR	500	50	N, R1, DR, PC, SN	215	60	N, PC, RO	45	75	
	Night	1560	N	1560	35	N, R2, DR	1085	40	N, PC, SN, R2, DR	500	50	AA, N, PC, SN, R2, DR	215	60	N, PC, RO	45	75	200
	Highly Affected	45													N, PC, RO	45	75	
Propagation across a valley / over water	Day	1525							N	685	50	N	280	60	N, PC, RO	45	75	
	Day (OOHW)	2005				N, R1, DR	1525	40	N, R1, DR	685	50	N, R1, DR, PC, SN	280	60	N, PC, RO	45	75	
	Evening	2005				N, R1, DR	1525	40	N, R1, DR	685	50	N, R1, DR, PC, SN	280	60	N, PC, RO	45	75	
	Night	2005	N	2005	35	N, R2, DR	1525	40	N, PC, SN, R2, DR	685	50	AA, N, PC, SN, R2, DR	280	60	N, PC, RO	45	75	250
	Highly Affected	45													N, PC, RO	45	75	

Non-residential receiver
Undeveloped green fields, rural areas with isolated dwellings

				$L_{Aeq(15minute)}$ noise level above NML						LAeq(15minute) 75 dB(A) or greater (Highly affected)		
	Standard hours			<10 dB(A)			10 to 20 dB(A)					
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Classroom at schools and other educational institutions	Day	55	265				N	125	65	N, PC, RO	40	75
Hospital wards and operating theatres	Day	65	125							N, PC, RO	40	75
Place of worship	Day	55	265				N	125	65	N, PC, RO	40	75
Active recreation	Day	65	125							N, PC, RO	40	75
Passive recreation	Day	60	185				N	75	70	N, PC, RO	40	75
Industrial premise	Day	75	40							N, PC, RO	40	75
Offices, retail outlets	Day	70	75							N, PC, RO	40	75

				$L_{Aeq(15minute)}$ noise level above NML											
	OOHW			< 5 dB(A)			5 to 15 dB(A)			15 to 25 dB(A)			> 25 dB(A)		
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Hospital wards and operating theatres	Evening	65	125				N, R1, DR	75	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
	Night	65	125	N	125	65	N, R2, NR	75	70	N, PC, SN, R2, DR	22	80	AA, N, PC, SN, R2, DR	7	90
Place of worship	Evening	55	265				N, R1, DR	185	60	N, R1, DR	75	70	N, R1, DR, PC, SN	22	80
	Night	55	265	N	265	55	N, R2, NR	185	60	N, PC, SN, R2, DR	75	70	AA, N, PC, SN, R2, DR	22	80
Active recreation	Evening	65	125				N, R1, DR	75	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
Passive recreation	Evening	60	185				N, R1, DR	125	65	N, R1, DR	40	75	N, R1, DR, PC, SN	13	85
Industrial premise	Evening	75	40				N, R1, DR	22	80	N, R1, DR	7	90	N, R1, DR, PC, SN	2	100
	Night	75	40	N	40	75	N, R2, NR	22	80	N, PC, SN, R2, DR	7	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	Evening	70	75				N, R1, DR	40	75	N, R1, DR	13	85	N, R1, DR, PC, SN	4	95
	Night	70	75	N	75	70	N, R2, NR	40	75	N, PC, SN, R2, DR	13	85	AA, N, PC, SN, R2, DR	4	95