Removal of Sportsmans Creek Bridge

Review of environmental factors

July 2016

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Roads and Maritime

Removal of Sportsmans Creek Bridge

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Prepared by Kellogg Brown & Root Pty Ltd

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Revision	Date	Comment	Signatures		
			Originated by	Checked by	Authorised by
A	23/03/16	Draft Issue	L. Mottee	S. Fox	W. Zborowski
B	06/05/16	Final Draft Issue	L. Mottee	S. Fox	W. Zborowski
C	01/06/16	Final Review	L. Mottee	S. Fox	W. Zborowski

Executive summary

The proposal

Roads and Maritime Services (Roads and Maritime) propose to replace the existing Sportsmans Creek Bridge at Lawrence, by building a new bridge and removing the existing bridge due to high and unsustainable maintenance costs.

The 'proposal' as assessed in this Review of Environmental Factors (REF) involves the removal of the existing Sportsmans Creek Bridge. As part of the proposal to remove the bridge, Roads and Maritime also propose to build a new cul-de-sac at the location of its northern abutment on Bridge Street in Lawrence, and consolidate Sportsmans Park and Flo Clark Park on the southern abutment, where it joins to Ensbey Road.

Roads and Maritime prepared and determined a REF in February 2015 to build the Sportsmans Creek new bridge. The REF included associated road upgrades to be built before the replacement of the existing bridge (KBR 2015).

The separation of the environmental assessments to build a new bridge and to remove the existing bridge allows for an accelerated bridge building program, which would otherwise be delayed by the assessment of the removal of the existing bridge.

Need for the proposal

The Sportsmans Creek Bridge is to be replaced under the *Roads and Maritime Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a) which has been endorsed by the Heritage Council of NSW. The strategy explains timber truss bridges are expensive to maintain in terms of planning, approvals, materials, maintenance frequency and skilled resources.

The Sportsmans Creek Bridge comprises three timber beam approach spans and two timber Dare truss spans, which were built in 1911. The approaches are part of the original bridge which was built in 1895. Replacement of this bridge is required due to significant costs associated with ongoing asset management, poor sight distance, poor alignment and no pedestrian access. The geometry and design limitations of the existing bridge mean that it is unable to be safely upgraded to cater for future haulage requirements of local surrounding agricultural industries, two-way traffic and pedestrian access. Seasonal sugarcane haulage activities rely on this bridge for access between July and December. There is no reasonable alternative route should the existing bridge be load limited to maintain the safety of the asset.

The maintenance cost of the existing timber truss bridge is high, with an estimated annual average maintenance cost of around $0.5 million. Further, an additional $10 million worth of restoration works would be required over the next year in order for the bridge to remain in operation safely. The ongoing annual maintenance cost of retaining the existing bridge would be significant and unsustainable for Roads and Maritime and/or for Council, should the asset be retained.

Retaining the bridge was determined to be of little benefit to retain the heritage value of truss bridges in NSW, as the bridge does not have high visibility to a large number of people, compared to the twelve other high-visibility bridges identified in the *Roads and Maritime Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a).

As such, Roads and Maritime has identified the existing bridge is not viable to maintain and cannot be upgraded to meet future operational requirements. Thus the existing bridge is to be removed and replaced with a new bridge.

The existing Sportsmans Creek Bridge would be removed after the new bridge is built.

Proposal objectives

The key objectives for the Sportsmans Creek Bridge replacement have been established by Roads and Maritime in collaboration with key stakeholders.

They are to:

- Build a new bridge over Sportsmans Creek, Lawrence
- Enhance road safety for motorists, residents, cyclists and pedestrians
- Improve traffic efficiency within Lawrence
- Improve road transport productivity, efficiency, maintainability and reliability
- Support local and regional economic development
- Remove the existing Sportsmans Creek Bridge
- Allow for safe removal of the existing bridge, in support of the *Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a)
- Minimise the impact on the natural, cultural, social and built environment
- Consider community views
- Deliver value for money
- Facilitate handover of the new bridge and associated road works to Council.

The key objectives for the proposal to remove the existing bridge are:

- Remove the existing Sportsmans Creek Bridge
- Allow for safe removal of the existing bridge, in support of the *Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a)
- Minimise the impact on the natural, cultural, social and built environment
- Consider community views
- Deliver value for money
- Facilitate handover of the new bridge and associated road works to Council.

A summary of the key features of the proposal include:

- Removal of the existing bridge and central piers within the waterway
- Earthworks to remove the existing southern bridge approach modifying Flo Clark Park and Sportsmans Park and to join both areas
- Building a new cul-de-sac at the existing road level at the end of Bridge Street
- Retention of the existing northern bridge approach, including the dry stone walls for flood protection and landscaping.

Alternatives and options considered

The alternatives and options for the Sportsmans Creek Bridge proposal were considered in parallel with the concept option development for the Sportsmans Creek new bridge and in consultation with the community.

The options considered as part of this REF include:

- Removal by dismantling using cranes
- Removal by collapse
- Maintain the existing bridge
- Maintain the existing bridge for pedestrian access
- Do nothing.

The analysis of options determined that any proposal to maintain the bridge or to ‘do nothing’ was considered economically unviable, unsafe and would not address future requirements. It was concluded that the option to dismantle the bridge using cranes and barges is the preferred option. This was on the basis that it minimises impact to the surrounding environment, has the lowest safety risk, is the most cost-effective and meets the proposal objective to safely remove the bridge.

Statutory and planning framework

This REF has reviewed the relevant legislation and determined the proposal is subject to assessment under Part 5 of the NSW *Environmental Planning and Assessment Act 1979.* The proposal would not require development consent as per the provisions of the *State Environmental Planning Policy (Infrastructure) 2007*. As such, Roads and Maritime is the proponent and determining authority for this proposal.

This REF found the proposal has potential to have a significant impact upon the Large-footed Myotis (*Myotis macropus*) as the existing bridge is inhabited by a large breeding colony of this microbat species. Large-footed Myotis is listed as vulnerable under the NSW *Threatened Species Conservation Act 1995*. Concurrence is also required with the Office of the Environment and Heritage (OEH) due to the potential for a significant impact upon the Large-footed Myotis. Given this, a Species Impact Statement (SIS) and supporting management documents have been prepared for approval.

The proposal has been assessed against relevant NSW legislation and other environmental planning instruments and no further statutory approvals are required.

The matters of National Environmental Significance (NES), protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999,* were considered for the proposal and it was found a referral to the Department of the Environment would not be required.

Community and stakeholder consultation

Community consultation was carried out with Clarence Valley Council (Council) and the residents and business owners of Lawrence through the options development process for the entire proposal, including the removal of the existing Sportsmans Creek Bridge. Both Council and residents were supportive of the proposal and comments provided have been incorporated into the design and addressed in this REF.

Consultation with NSW Maritime, OEH and Department of Primary Industries (DPI) (Fishing and Aquaculture) was also carried out with relevant requirements identified during this consultation addressed in the assessments and safeguards proposed.

Roads and Maritime would continue to liaise with the local community and key stakeholders as the project progresses.

Environmental impacts

Overall, the proposal would not have a significant adverse environmental or social impact. The following describes the key results of the environmental investigations.

Biodiversity

The findings of the Biodiversity Assessment identified the Sportsmans Creek Bridge supports a large (about 300 individuals) and important Large-footed Myotis breeding colony. Large breeding colonies are uncommon in the lower Clarence area and none are located in close proximity (ie within 10 kilometres along waterways) to the Sportsmans Creek Bridge. Surveys of drainage structures in the locality found that potential unoccupied alternative breeding roost drainage structures are uncommon and likely to have a lower roost carrying capacity than the currently occupied sites.

The seven-part test of significance prepared for the Large-footed Myotis concluded that although it is likely the local population would relocate to the habitat to be provided on the Sportsmans Creek new bridge, the removal of the existing timber truss Sportsmans Creek Bridge has the potential to significantly affect the local population. A SIS has been prepared with safeguards including a

Microbat Management Plan detailing mitigation measures to minimise impact to the population. These include the staged exclusion of the species from the bridge before removal and the provision of compensatory habitat in the Sportsmans Creek new bridge.

One threatened flora species, Durobby (*Syzygium moorei*), is located in the south-western corner of Flo Clark Park. The tree is a planted specimen of low conservation significance due to it occurring outside its natural range.

No other threatened flora or fauna species listed under the *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999* are considered likely to be significantly impacted by the proposal.

No Endangered or Threatened Ecological Communities (EECs) listed under the *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999* are considered likely to be significantly impacted by the proposal.

Soils, Flooding and Water Quality

An assessment of soils, flooding and water quality impacts was carried out to determine the potential impact on Sportsmans Creek. The assessment concluded that, in the absence of appropriate mitigation measures, high-risk impacts to the waterway health may include:

- Erosion and sedimentation during works in the riparian zone
- Acid Sulfate Soils (ASS) and bottom sediments disturbance during works in the waterway
- A large flood event during removal works
- Accidental spillages and surface-water run-off affecting water quality and aquatic habitats.

With the successful implementation of standard mitigation measures, there is a low risk the proposal would cause any significant impact upon Sportsmans Creek relating to soils, flooding or water quality.

Noise and vibration

A specialist noise and vibration assessment was carried out which included noise modelling. This assessment determined exceedances of noise and vibration criteria at the nearest sensitive residential receivers are predicted during short-term day-time removal works scenarios, including during potential rock breaking and impact piling works. Out of hours works required for the installation of microbat exclusion devices are also predicted to exceed noise and vibration criteria.

Reasonable and feasible mitigation measures have been considered and would be employed to minimise noise during the proposed works.

Non-Aboriginal heritage

The Sportsmans Creek Bridge was built in 1885 and rebuilt in 1911 and is:

- Listed on the Clarence Valley Local Environmental Plan (LEP) 2011
- Listed on the Roads and Maritime section 170 Heritage Register
- Forms part of the Lawrence heritage conservation area.

A Statement of Heritage Impact (SOHI) has been prepared as part of this REF and found the impact of the bridge's removal to be 'moderate'. The SOHI also determined the potential landscape and amenity benefits of removing the bridge to the Lawrence heritage conservation area outweigh the ongoing operating costs of retaining the structure. Safeguards and mitigation measures have been identified which would maintain the bridge's legacy for future generations.

Landscape and visual

The works would be visible along Weir Road, Ensbey Road, and Grafton-Lawrence Road and to users travelling across the Sportsmans Creek new bridge. Minor short-term amenity disturbances

would be experienced by the public and residents on Bridge Street during the removal works and the presence of the site compound in Flo Clark Park and Sportsmans Park, as well as work equipment along the banks of Sportsmans Creek.

The landscape character assessment post-removal showed the majority of landscape impacts are anticipated to be negligible or moderate to low as a result of the removal of the bridge.

Impacts would result from:

- The redirection of pedestrian and vehicle traffic movement along Grafton Street, slightly increasing the urbanity of the setting
- The removal of the existing Sportsmans Creek Bridge and the individual identity it provides in the local setting.

These impacts would be offset by the introduction of new open space with the consolidation of Sportsmans Park and Flo Clark Park. Permanent impacts upon the visual landscape as a result of the removal of the bridge are considered moderate and have little effect on the long-term visual quality of the setting (KI Studio 2014). Safeguards and mitigation measures for landscape and visual character are proposed to minimise long-term impacts of the proposal.

Traffic and access

The staging of the building of the new bridge before the removal of the existing bridge would minimise traffic impacts during the proposed works, removing the requirement of detours for through traffic. Private property and business access would be temporarily disturbed on Bridge Street while the cul-de-sac is built. Minor traffic disturbance would be experienced on local roads due to the presence of work vehicles. A Traffic Management Plan would be developed to manage traffic issues during the proposed works.

There would be potential for disruption to waterway users, as the Sportsmans Creek channel would be partly obstructed during the works. However, safe boat passage would be maintained and NSW Maritime would be consulted before any work with the potential to cause disruption to waterway access.

Justification and conclusion

Maintaining an unrestricted transport link through Lawrence is an important issue for the prosperity of the local community and sugar cane industry. As discussed in KBR (2015), the Sportsmans Creek new bridge would address the needs of the local community and industry well into the future. The removal of the existing Sportsmans Creek Bridge would provide significant savings in maintenance costs.

Key environmental impacts are identified in Chapter 6 of this REF. Key impacts include loss of habitat for the Large-footed Myotis, soils and waterway disturbance, noise and vibration, disturbance to visual and landscape character, traffic and access. It is considered the safeguards and mitigation measures identified in this REF, including those identified in the SIS, would minimise adverse impacts of the proposal during the bridge removal and in the long-term.

The proposal would provide the following benefits to the community:

- Removal of significant ongoing maintenance costs associated with the upkeep of the existing bridge
- Improved local amenity for Bridge Street residences
- Improved access to the Flo Clark Park boat ramp for sail boats
- Increased availability of open space in Flo Clark Park and Sportsmans Park
- Reinforcement of the original town plan and reduction in fragmentation of the Lawrence heritage conservation area.

On balance the proposal to remove the Sportsmans Creek Bridge as described in the REF is considered justified and the following conclusions are made:

1. The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the *Environmental Planning and Assessment Act 1979.*
2. The proposal is likely to significantly affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is required and has been prepared.
3. The proposal is not likely to significantly impact nationally listed biodiversity matters, commonwealth land and/or other matters of national environmental significance within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* and a referral to the Federal Department of the Environment is not required.

Display of the review of environmental factors

This review of environmental factors is on display for comment between 29 July 2016 and 28 August 2016. You can access the documents in the following ways:

Internet

The documents will be available as pdf files on the Roads and Maritime website at http://www.rms.nsw.gov.au/projects/northern-nsw/sportsmans-creek/

Display

The review documents can be viewed at the following locations:

- Lawrence Public Hall, Bridge Street, Lawrence, Thursday 11 August 2016, 3pm-7pm.

How can I make a submission?

To make a submission on the proposal, please send your written comments to:

Roads and Maritime Project Development Manager:
David Andrews
Sportsmans Creek bridge removal
Reply Paid 633,
Brisbane QLD 4001
SportsmansCreekNewBridge@kbr.com

Submissions must be received by 28 August 2016.

Privacy information

All information included in submissions is collected for the sole purpose of helping in the assessment of this proposal. The information may be used during the environmental impact assessment process by relevant Roads and Maritime staff and its contractors.

Where the respondent indicates at the time of supply of information that their submission should be kept confidential, Roads and Maritime will attempt to keep it confidential. However there may be legislative or legal justification for the release of the information, for example under the *Government Information (Public Access) Act 2009* or under subpoena or statutory instrument.

The supply of this information is voluntary. Each respondent has free access at all times to the information provided by that respondent but not to any identifying information provided by other respondents if a respondent has indicated that the representation should be kept confidential.

Any respondent may make a correction to the information that they have provided by writing to the same address the submission was sent.

The information will be held by Roads and Maritime, Northern Regional Office, 76 Victoria Street, Grafton NSW 2460.

What happens next?

After the submissions period, Roads and Maritime Services will collate submissions. Acknowledgement letters will be sent to each respondent. The details of submission authors will be retained and authors will be subsequently advised when project information is released.

After consideration of community comments Roads and Maritime Services will determine whether the proposal should proceed as proposed, or whether any alterations to the proposal are necessary. The community will be kept informed about this Roads and Maritime Services determination.

If the proposal goes ahead, Roads and Maritime Services will proceed with final design and tenders will be called for completing the project.

If you have any queries, please contact the Roads and Maritime Services project manager on (02) 6640 1073.

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1 Introduction

1.1 Proposal identification

Roads and Maritime Services (Roads and Maritime) propose to replace the existing Sportsmans Creek Bridge at Lawrence, by building a new bridge and removing the existing bridge due to high and unsustainable maintenance costs.

The 'proposal' as assessed in this Review of Environmental Factors (REF) involves the removal of the existing Sportsmans Creek Bridge. As part of the proposal to remove the bridge, Roads and Maritime also propose to build a new cul-de-sac at the location of its northern abutment on Bridge Street in Lawrence, and consolidate Sportsmans Park and Flo Clark Park on the southern abutment, where it joins to Ensbey Road.

The existing bridge is to be replaced under the *Roads and Maritime Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a) which has been endorsed by the NSW Heritage Office. Replacement of this bridge relates to issues of significant and unsustainable costs associated with ongoing asset management, poor sight distance, poor alignment and no pedestrian access. The new bridge and associated road works would be handed over to Clarence Valley Council (Council) for its ongoing ownership, control and maintenance.

A REF was prepared and determined in February 2015 for the building of the Sportsmans Creek new bridge and associated road upgrades, which would be built before the removal of the existing bridge (KBR 2015).

As shown on Figure 1.1, the Sportsmans Creek Bridge is located in Lawrence within the Council Local Government Area (LGA). Lawrence is located 25 kilometres north of Grafton on the Grafton-Lawrence Road (MR152) which is managed and maintained by Council.

Roads and Maritime is responsible for the management of the existing bridge as an 'ex-national' bridge and in accordance with the NSW Government Gazette No 83, 1928. The existing bridge was built in 1885 and reconstructed in 1911. It is 91.7 m long, consisting of three timber beam approach spans and two timber Dare truss spans. The bridge has a 5.5 m wide carriageway. Replacement of this bridge is required due to significant costs associated with ongoing asset management, poor sight distance, poor alignment and no pedestrian access. The geometry and design limitations of the existing bridge mean it is unable to be safely upgraded to cater for future haulage requirements of local surrounding agricultural industries, two-way traffic and pedestrian access.

Seasonal sugarcane haulage activities rely on this bridge for access between July and December. There is no reasonable alternative route should the existing bridge be load limited to maintain the safety of the asset.

The maintenance cost of the existing timber truss bridge is high, with an estimated annual average maintenance cost of around $0.5 million. Further, an additional $10 million worth of restoration works would be required over the next year in order for the bridge to remain in operation safely. The ongoing annual maintenance cost of retaining the existing bridge would be significant and unsustainable for Roads and Maritime and/or for Council, should the asset be retained.

Furthermore, retaining the bridge was determined to be of little benefit to retain the heritage value of truss bridges in NSW, as the bridge does not have high visibility to a large number of people, compared to the twelve other high-visibility bridges identified in the *Roads and Maritime Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a).

The removal of the existing bridge would occur after the building of the new bridge which would connect along the existing alignment of Grafton-Lawrence Road from the south and Grafton Street in the north, 100 metres upstream of the existing bridge.

A summary of the key features of the proposal include (refer to Figure 1.2):

- Removal of the existing bridge and central piers within the waterway
- Earthworks to remove the existing southern bridge approach, modifying Flo Clark Park and Sportsmans Park to join both areas
- Building a new cul-de-sac at the existing road level at the end of Bridge Street
- Retention of the existing northern bridge approach, including the dry stone walls for flood protection and landscaping.

The proposal is expected to start early to mid-2018 and to be completed by December 2018, weather permitting. The proposal (including both the removal of the existing bridge and building of the new bridge) is estimated to cost $26.2 million and would be funded by Roads and Maritime.

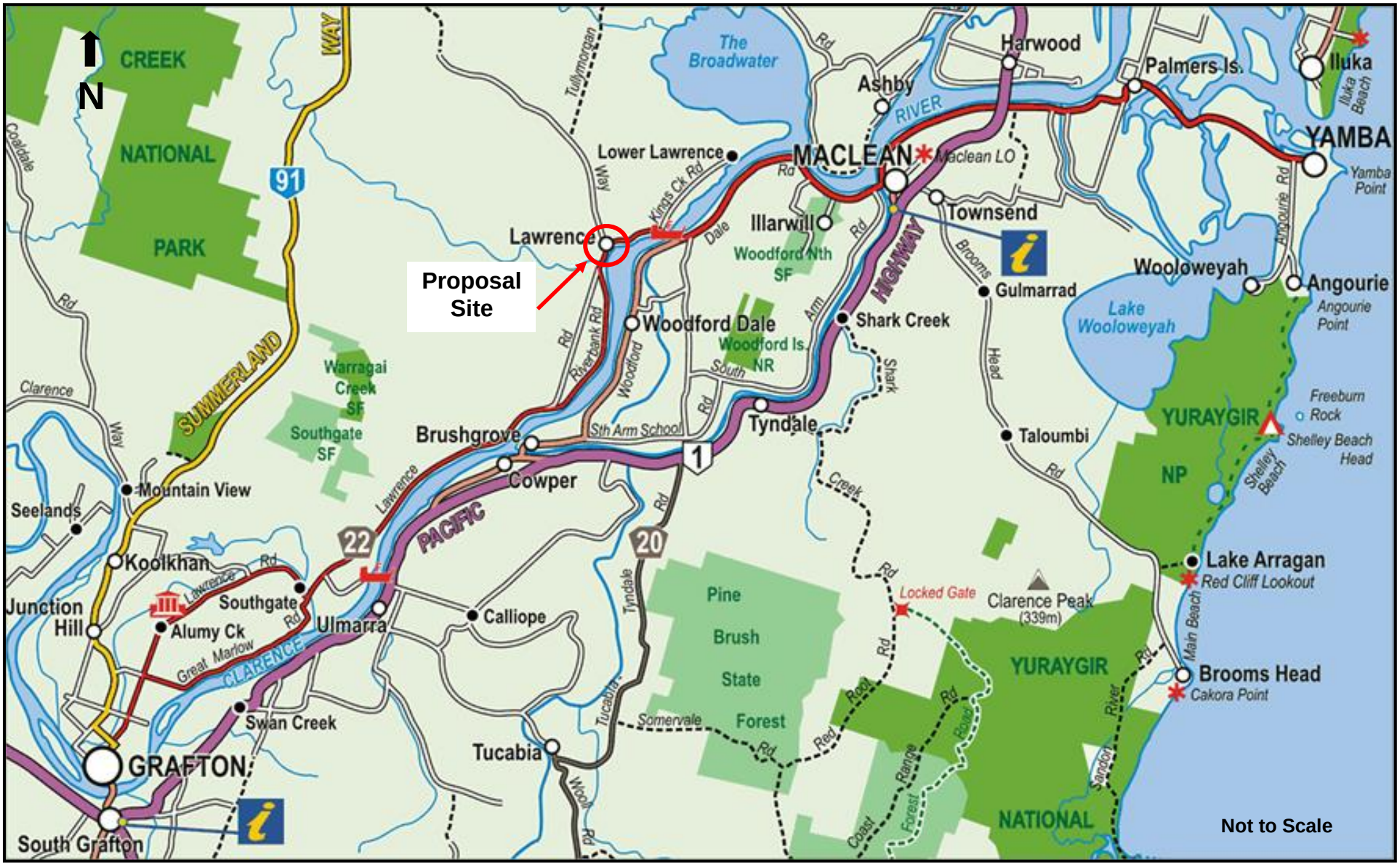

Figure 1.1: Road network (Source: Clarence Valley Tourism)

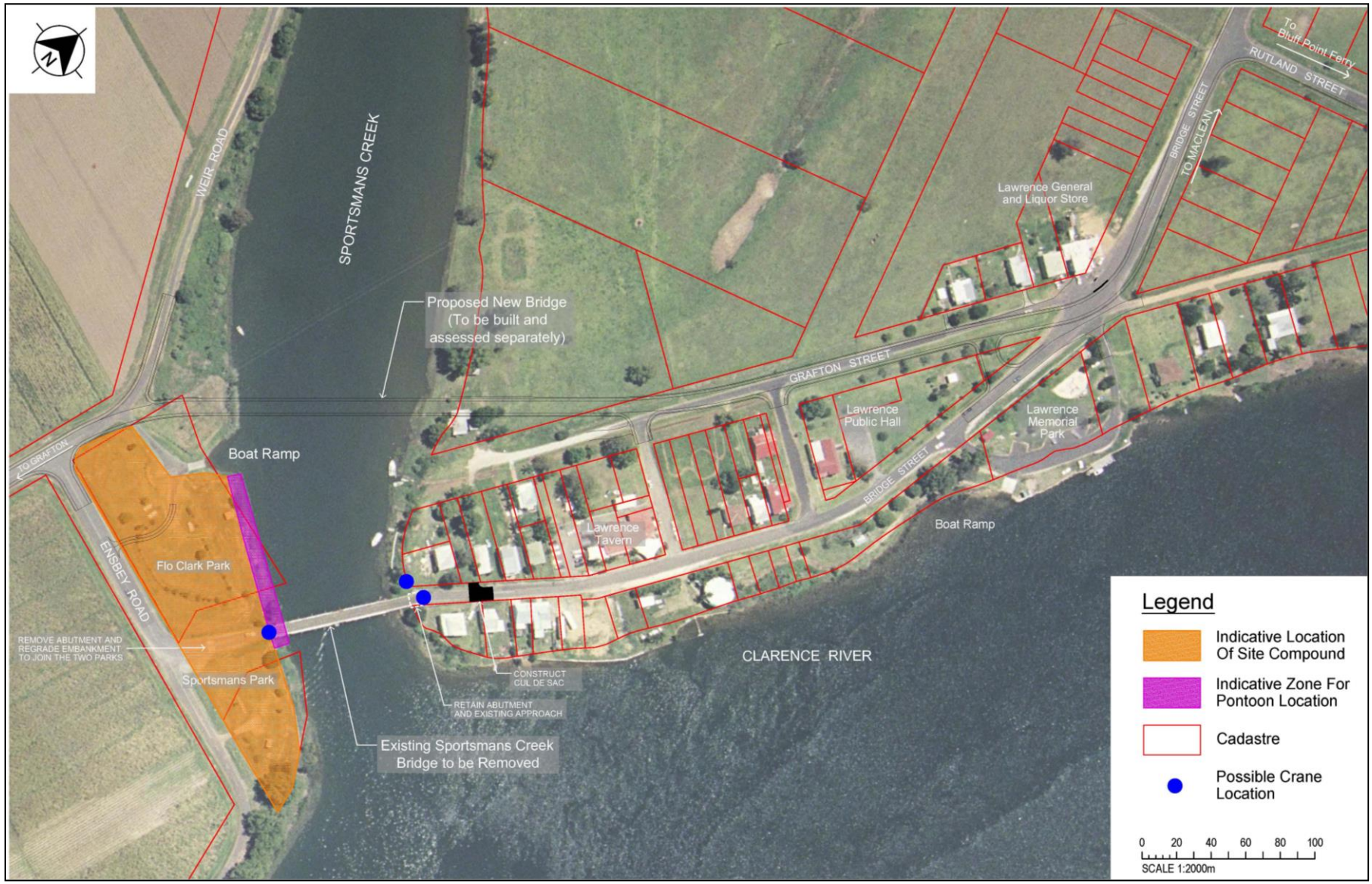

Figure 1.2: Removal of the Sportsmans Creek Bridge proposal

The Sportsmans Creek new bridge

As noted above, the REF for building the Sportsmans Creek new bridge was determined in February 2015 (KBR 2015). The separation of this assessment is to allow for an accelerated program for building the new bridge, which would otherwise be delayed by the assessment of the removal of the existing bridge. This is due to the requirement to assess the impact upon the threatened Large-footed Myotis (*Myotis macropus*) microbat population. The building of the new bridge would also facilitate the relocation of the threatened Large-footed Myotis microbat population from the existing bridge into the habitat provided in the new bridge.

The two proposals are considered independent of each other as they would result in different impacts on the community and use different work methods. The new bridge can be built without the need to remove the existing bridge, which would be closed to traffic after the completion of building works. The activities have been assessed separately under the *Environmental Planning and Assessment Act 1979*.

1.2 Purpose of the REF

This REF has been prepared by KBR on behalf of Roads and Maritime Services Northern Region. For the purposes of this work, Roads and Maritime Services are the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979*.

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been carried out in context of clause 228 of the Environmental Planning and Assessment Regulation 2000, the *Threatened Species Conservation Act 1995*, the *Fisheries Management Act 1994*, and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999.* In doing so, the REF helps to fulfil the requirements of:

- Section 111 of the *Environmental Planning and Assessment Act 1979* that Roads and Maritime Services examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity
- The strategic assessment approval granted by the Federal Government under the *Environment Protection and Biodiversity Conservation Act 1999* in September 2015, with respect to the impacts of Roads and Maritime activities on nationally listed threatened species, ecological communities and migratory species.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the *Environmental Planning and Assessment Act 1979*
- The significance of any impact on threatened species as defined by the *Threatened Species Conservation Act 1995* and/or *Fisheries Management Act 1994,* in Section 5A of the *Environmental Planning and Assessment Act 1979* and the requirement for a Species Impact Statement
- The significance of any impact on nationally listed biodiversity matters under the *Environment Protection and Biodiversity Conservation Act 1999*, including whether there is a real possibility that the activity may threaten long term survival of these matters, and whether offsets are required and able to be secured
- The potential for the proposal to significantly impact other matters of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the *Environment Protection and Biodiversity Conservation Act 1999*.

2 Need and options considered

2.1 Strategic need for the proposal

Five key documents identify the strategic need for the proposal:

- The Bridges for the Bush Initiative
- Timber Truss Bridge Conservation Strategy
- NSW Long Term Transport Master Plan
- NSW 2021: A Plan to Make NSW Number One
- NSW Government State Infrastructure Strategy.

2.1.1 Bridges for the Bush initiative

The 'Bridges for the Bush' initiative is a commitment from NSW Government to improve road freight productivity by replacing or upgrading bridges over a five year period at 17 key locations in regional NSW.

This program includes replacing or upgrading five key priority Higher Mass Limit (HML) deficient bridges on State managed roads and 12 timber truss bridges on State, regional and local roads.

The Sportsmans Creek new bridge project is directly referenced as a project within the 'Bridges for the Bush' initiative. The project would replace the timber truss bridge and negate the requirement for ongoing costly repairs of the existing bridge.

2.1.2 Roads and Maritime Timber Truss Bridge Conservation Strategy

The Timber Truss Bridge Conservation Strategy (Roads and Maritime 2012a) was completed and endorsed by the Heritage Council of NSW in July 2012. The strategy was developed to address the long term management of timber truss bridges in NSW. The strategy, carried out in consultation with the Heritage Council of NSW aims to establish a balance between infrastructure provision and heritage conservation.

The strategy explains timber truss bridges are expensive to maintain in terms of planning, approvals, materials, maintenance frequency and skilled resources. The strategy also recognises the road network plays a key role in the efficient transport of freight. The strategy proposed that 26 timber truss bridges should remain and the remainder of timber truss bridges within its control be removed or replaced.

The Sportsmans Creek Bridge at Lawrence was assessed as part of the strategy. The bridge comprises three timber beam approach spans and two timber Dare truss spans, which were built in 1911. The approaches are part of the original bridge which was built in 1895.

Due to geometry and design limitations of the existing bridge, it is unable to be safely upgraded to cater for future haulage requirements of local surrounding agricultural industries, two-way traffic and pedestrian access.

Seasonal sugarcane haulage activities rely on this bridge for access between July and December. As there is no reasonable alternative route should the existing bridge be load limited to maintain the safety of the asset, there is a need for a new bridge to be built to ensure the ongoing viability of this industry.

Furthermore, retaining the bridge was determined to be of little benefit to retain the heritage value of truss bridges in NSW, as the bridge does not have high visibility to a large number of people, compared to the twelve other high-visibility bridges identified in the strategy.

Roads and Maritime has identified the existing bridge cannot be upgraded to meet future operational requirements thus the existing bridge is to be removed and replaced with a new bridge.

The proposal to replace the existing Sportsmans Creek Bridge with a new bridge is listed in the Timber Truss Bridge Conservation Strategy.

2.1.3 NSW Long Term Transport Master Plan

The NSW Long Term Transport Master Plan (NSW Government 2012, p. 156) was released in December 2012 to address key transport challenges facing the State over the next 20 years and 'put the customer at the centre' of everything NSW does in transport.

The Master Plan is principally focused on six key transport challenges. These six challenges have been identified by looking at the transport system from the perspective of the customer and the multi-modal journeys made. They are:

- Integrating modes to meet customer needs
- Getting Sydney moving again
- Sustaining growth in Greater Sydney
- Providing essential access to regional NSW
- Supporting efficient and productive freight
- State-wide actions.

The proposal provides essential access to regional NSW and supports efficient and productive freight.

2.1.4 NSW 2021: A Plan to Make NSW Number One

NSW 2021: A Plan to Make NSW Number One (NSW Government 2011) presents the NSW Government's strategy to move the State forward over the next 10 years. It is based on five principal strategies with underlying goals.

The five strategies are to:

- Rebuild the economy – restore economic growth and establish NSW as the first place in Australia to do business
- Return quality services – provide the best transport, health, education, policing, justice and family services, with a focus on the customer
- Renovate infrastructure – build the infrastructure that makes a difference to both our economy and people's lives
- Strengthen our local environment and communities – improve people's lives by protecting natural environments and building a strong sense of community
- Restore accountability to Government – talk honestly with the community, return planning powers to the community and give people a say on decisions that affect them.

The plan refers to the 'Bridges for the Bush' initiative (as described in Section 2.1.1) and recognises the replacement of heritage timber truss bridges as an improvement in regional connectivity.

2.1.5 NSW Government State Infrastructure Strategy

The *NSW Government State Infrastructure Strategy* (December 2012) presents the Department of Premier and Cabinet's strategy for NSW infrastructure. It identifies the key drivers for understanding infrastructure needs and focuses on the improvements required for major arterial roads across the NSW network to improve regional connectivity and freight efficiency. The strategy also references the 'Bridges for the Bush' initiative (refer Section 2.1.1).

2.2 Existing road and infrastructure

2.2.1 Regional context

Figure 1.1 illustrates the road network between Grafton, Maclean and the proposal site.

The Pacific Highway (Route A1) forms the key regional route in the Clarence Valley, and provides a high-capacity road link between Grafton and Maclean and further north to Brisbane.

The Summerland Way (Route B91) forms an inland route linking Grafton with Casino and Kyogle.

Between Grafton and Maclean, the Grafton-Lawrence Road (MR152) runs west of the Clarence River through Lawrence. A large section of this road has a 100 kilometres per hour speed limit, including on the southern approach into Lawrence.

Part of the MR152 route between Grafton and Maclean is a ferry crossing of the Clarence River between Bluff Point in Lawrence and Woodford Dale Road on Woodford Island, linking Lawrence to Maclean and beyond to Yamba. The Sportsmans Creek Bridge at Lawrence forms part of the MR152 route.

2.2.2 Local network and carriageway configuration

Key local roads in Lawrence include Bridge Street, Grafton Street and Rutland Street as shown on Figure 1.2. Bridge Street runs in a north-south manner with the existing Sportsmans Creek Bridge at the south end. Its northern end intersects with Rutland Street and Grafton Street, where the Lawrence General and Liquor Store is located.

Bridge Street provides property access in the Lawrence village centre and carries a relatively high volume of through traffic, via Rutland Street to the Bluff Point Ferry. It consists of a 10 metre wide road reserve.

Grafton Street runs parallel and to the west of Bridge Street, with the southern end terminating at Sportsmans Creek. It consists of a 20 metres wide road reserve and functions as rear access to properties fronting Bridge Street on the eastern side of Grafton Street.

2.2.3 Speed limits and alignment

Speed limits within the Lawrence area are generally 50 kilometres per hour, with the Sportsmans Creek Bridge limited to 20 kilometres per hour per hour for trucks and buses. A safety advisory sign is situated at both approaches advising ‘Caution Vehicles over 15 t proceed down centre of bridge one at a time’.

A significant section of the Grafton-Lawrence Road south of Sportsmans Creek has a speed limit of 100 kilometres per hour. A ‘Reduce Speed’ advisory sign is provided on the northbound approach to the bridge. Access to the bridge from south of Sportsmans Creek is via a ‘dog-leg’ manoeuvre of a 90-degree right turn followed by a 90-degree left turn. There is no provision on the bridge for pedestrians and Bridge Street has a narrow road reserve.

2.3 Proposal objectives

The key objectives for the Sportsmans Creek Bridge replacement have been established by Roads and Maritime in collaboration with key stakeholders.

They are to:

- Build a new bridge over Sportsmans Creek, Lawrence
- Enhance road safety for motorists, residents, cyclists and pedestrians
- Improve traffic efficiency within Lawrence

- Improve road transport productivity, efficiency, maintainability and reliability
- Support local and regional economic development
- Remove the existing Sportsmans Creek Bridge
- Allow for safe removal of the existing bridge, in support of the *Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a)
- Minimise the impact on the natural, cultural, social and built environment
- Consider community views
- Deliver value for money
- Facilitate handover of the new bridge and associated road works to Council.

The key objectives for the proposal to remove the existing bridge are:

- Remove the existing Sportsmans Creek Bridge
- Allow for safe removal of the existing bridge, in support of the *Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a)
- Minimise the impact on the natural, cultural, social and built environment
- Consider community views
- Deliver value for money
- Facilitate handover of the new bridge and associated road works to Council.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

This section of the REF describes the alternatives and options considered for the Sportsmans Creek Bridge proposal. The options for the proposal were considered in parallel with the concept option development for the Sportsmans Creek new bridge and in consultation with the community (refer to chapter 5 of this REF). Further information about the route development options can be found in the *Sportsmans Creek new bridge Preferred Option Report* (Roads and Maritime 2014a).

The subject of this REF is the removal of the existing Sportsmans Creek Bridge.

2.4.2 Identified options

The options considered as part of this REF include:

- Maintain the existing bridge
- Maintain the existing bridge for pedestrian access
- Removal by dismantling using cranes
- Removal by collapse
- Do nothing.

Maintain the existing bridge

An option was considered to maintain the existing bridge after its closure conserving its heritage value and as habitat for the Large-footed Myotis. This option would require Roads and Maritime to retain ownership of the bridge or Council to agree to maintain, control and manage the structure for heritage and biodiversity purposes after the Sportsmans Creek new bridge is built.

Maintain the existing bridge for pedestrian access

An option suggested from the community consultation is to maintain the existing bridge as a pedestrian bridge after its closure to traffic, which would also conserve the heritage value of the bridge and habitat for the Large-footed Myotis. This option would require Roads and Maritime to retain ownership of the bridge or Council to agree to maintain, control and manage the structure and require an upgrade to make it safe for pedestrians after the Sportsmans Creek new bridge is built.

Removal by dismantling using cranes

This option involves the removal of the bridge in a staged manner, by dismantling the bridge in sections. A combination of cranes, barges and pontoons located within and on the banks of Sportsmans Creek would be used to dismantle each of the bridge components in a safe manner. In-stream works such as the removal of the bridge piers to the bed-level would be carried out in a manner to reduce sediment through the use of cofferdams or similar.

Removal by collapse

A staged collapse of the bridge using wrecking equipment or explosives was considered as an alternative technique. This would result in collapsing the bridge into Sportsmans Creek.

Do nothing

A fourth option was considered to leave the bridge in its current state and cease all maintenance activities after the Sportsmans Creek new bridge is built.

2.4.3 Analysis of options

As part of the proposal development, an internal technical workshop was held in August 2013 to assess the short-listed route options for the building of the new bridge and the removal of the existing bridge against the proposal objectives as described in the *Sportsmans Creek new bridge Preferred Option Report* (Roads and Maritime 2014a).

An assessment of the options relating to the existing bridge against the proposal supporting objectives is provided in Table 2.1. The following constraints to the proposal were also considered in the analysis of options:

- Flooding - removal in the river may be affected by flooding
- Removed materials would be recycled
- A high likelihood of hazardous substances occurring on the bridge, such as lead paint
- The possibility of uncontrolled fill requiring additional work before disposal.

Table 2.1: Analysis of options

Option	Assessment
Maintain the existing bridge	While this option would maintain heritage and ecological values of the bridge, this option has significant and unsustainable costs associated with maintaining timber truss bridges in terms of planning, approvals, materials and maintenance frequency and skilled resources. The maintenance cost of the existing timber truss bridge is high, with an average cost of more than $0.5 million per annum. Further, an additional $10 million worth of restoration works would be required over the next year, in order for the bridge to remain in operation safely. The maintenance cost of retaining the existing bridge would be a significant draw on the entire bridge maintenance budget for the State. Currently it is proposed that Bridge Street would be returned to a local road after building the new bridge. If Roads and Maritime were to transfer ownership of the asset, Council would need to agree to maintain, control and manage the structure for heritage and biodiversity purposes after the Sportsmans Creek new bridge is built. In regards to this, Council has indicated their unwillingness to take on the maintenance responsibility of the existing timber truss bridge due to funding and a lack of available in-house expertise. Overall this option would not deliver value for money nor meet the proposal objective to remove the bridge.

Option	Assessment
Maintain the existing bridge for pedestrian access	This option would maintain the bridge for pedestrian access, however, has significant and unsustainable costs associated with retention as outlined in the 'Bridges for the Bush' initiative and the Roads and Maritime *Timber Truss Bridge Conservation Strategy* (Roads and Maritime 2012a). These documents explain that timber truss bridges are expensive to maintain in terms of planning, approvals, materials, maintenance frequency and skilled resources. The maintenance cost of the existing timber truss bridge is high, with an average cost of more than $0.5 million per annum. Further, an additional $10 million worth of restoration works are required over the next year, in order for the bridge to remain in operation safely. The ongoing maintenance cost of retaining the existing bridge would be significant draw on the entire bridge maintenance budget for the State. Overall this option would not deliver value for money nor meet the proposal objective to remove the bridge. This option would continue with the sub-standard and potentially unsafe bridge crossing as it is not designed for pedestrian traffic. Deck modifications may be required to remove hazards. Currently it is proposed that Bridge Street would be returned to a local road after building the new bridge. If Roads and Maritime were to transfer ownership of the asset, Council would need to agree to maintain, control and manage the structure and require an upgrade to make it safe for pedestrians after the Sportsmans Creek new bridge is built. Council has indicated their unwillingness to take on the maintenance responsibility of the existing timber truss bridge due to funding and a lack of available in-house expertise.
Removal by dismantling using cranes	This option would minimise impact upon the banks and bed of Sportsmans Creek and reduce the risk of pollution affecting the water quality of the Creek. It would also ensure the northern abutment remains intact for heritage value and flood protection.
Removal by collapse	This option presents a high safety and environmental risk associated with the collapse of the bridge into Sportsmans Creek. The requirement to retain the northern abutment for heritage value and flood protection contributes to the high constructability risk of this option. Due to the proximity of the township of Lawrence this option presents potential human health risks.
Do nothing	The 'Do nothing' option, comprising of halting the existing maintenance program associated with the existing bridge, was considered by workshop participants during the route options assessment for the new bridge (Roads and Maritime 2014). This option would potentially be cheaper in the short-term, however, would be a greater cost to the environment in the long-term. It was concluded this option would not meet proposal objectives, would be inconsistent with heritage requirements, and the eventual decay of the structure would likely result in adverse impacts to the environment and pose an ongoing safety risk. This option would not meet the proposal objective to remove the bridge.

2.5 Preferred option

The analysis of options presented in Section 2.4.3 concluded the option to dismantle the bridge using cranes and barges was the preferred option. This was on the basis it would minimises impact to the surrounding environment, has the lowest safety risk, is the most cost-effective and meets the proposal objective to remove the bridge.

3 Description of the proposal

3.1 The proposal

The proposal is located in Lawrence, near the junction of Sportsmans Creek and the Clarence River. The proposal involves the removal of the timber truss bridge shown in Figure 1.2.

The removal of the bridge is expected to start in mid-2018 and to be completed in early 2019, weather permitting. This is scheduled to follow the building of the Sportsmans Creek new bridge, which is anticipated to start in 2016.

As part of the removal process, all timber and steel elements including steel central piers would be removed. The northern (dry stone walled) abutment and approach would be retained and the southern (timber and steel sheet piling) abutment and approach would be removed. The southern approach (Bridge Street) road surface would be removed and the approach lowered to the level of nearby parkland. Figure 1.2 shows the location of the Sportsmans Creek Bridge relative to the new bridge. More detailed drawings of the existing bridge are provided in Appendix A and photographs are shown in Plates 3.1 to 3.3.

The key details of the proposal are:

- Establishment of a site compound on the southern side of the bridge
- Establishment of environmental controls to mitigate impacts potentially resulting from the proposal, including the implementation of the Microbat Management Plan and an Erosion and Sedimentation Control Plan
- Building of temporary pads for crane support (if required) on either side of the bridge (refer to Figure 1.2)
- Establishment of temporary barge access (pontoon/jetty/wharf/ramp) on the southern bank of Sportsmans Creek
- Sequential disassembly and removal of the Sportsmans Creek Bridge
- Stockpiling of the bridge components in the site compound (if required)
- Work on Bridge Street to establish a cul-de-sac
- Landscaping the northern approach on the southern section of Bridge Street
- Removal of all waste in accordance with NSW guidelines
- Removal of the southern abutment and approach
- Levelling and reinstatement of disturbed areas in Flo Clark Park and Sportsmans Park in the vicinity of the southern abutment to a suitable state enabling Council to landscape the park area
- Demobilisation of equipment and machinery
- Removal of environmental controls.

Plate 3.1: Sportsmans Creek Bridge facing east looking towards the Clarence River

Plate 3.2: Sportsmans Creek Bridge looking towards the northern abutment

Plate 3.3: Sportsmans Creek Bridge looking towards the southern abutment

3.2 Removal activities

3.2.1 Works methodology

The indicative proposed works methodology is presented below. The final works methodology would be determined with the selected removal contractor and the sequencing of activities may change.

The Microbat Impact Management Plan proposed in the SIS (refer Section 6.1.5) would be implemented as part of the proposal. This would include staged exclusion of the threatened Large-footed Myotis population from the existing bridge before removal to avoid any potential impacts upon the resident population.

The proposal would involve four key activities:

- Site establishment
- Removal of the bridge
- Road treatments
- Site restoration and disestablishment.

1. Site Establishment

Site establishment activities for the proposal would include the following:

- Consult with Clarence Valley Council and other agencies after the new bridge is built and removal works start
- Establish environmental controls as recommended in this REF to mitigate environmental impacts including an Erosion and Sedimentation Control Plan and controls to prevent the dispersal of material into the local waterways
- Install site perimeter fencing
- Obtain approval from Council for and establish temporary traffic management

arrangements
- Establish a site compound including laydown area in Flo Clark Park/Sportsmans Park
- Clear vegetation as required (minimising impacts on riparian vegetation on the banks of Sportsmans Creek)
- Establish temporary access tracks
- Establish spoil and waste material stockpile sites and access tracks within the site compound
- Carry out additional site investigations and inspections to verify the presence of hazardous substances (such as lead paint and asbestos), the location of services and to confirm the bridge is consistent with the plans provided
- Implement traffic control arrangements as required
- Isolate/protect or temporarily relocate the 11 kV power pole/overhead line.

2. Removal of the existing bridge

The removal of the bridge would include the following:

- Exclusion of microbats in accordance with the Microbat Management Plan. Activities to be conducted include:
  - modify and cut bridge elements for exclusion attachments (proposed to be done during daytime) and install exclusion devices where microbats are not roosting (proposed to be done after dusk)
  - carry out an inspection by a qualified ecologist in accordance with the safeguards for microbat management provided in this REF (refer to Section 6.1.5) to ensure all microbats have been successfully excluded. Daily inspections for microbats would be continued during the removal of the bridge.
- Build temporary crane pads as required. The crane pads would be about 10 m by 10 m square and 0.5 m thick gravel pads on a geotextile layer over existing ground. Driven piles or concrete pads may also be required.
- Establish a gravel track about 4 m wide and 0.3 m thick to access the crane pads.
- Establish temporary barge access to the creek via a pontoon secured to the southern bank of Sportsmans Creek using driven piles in the Creek bed, or other suitable access arrangements. The pontoon would be accessed by gravel tracks and hardstand areas in the site compound. The barge would carry scaffolding, a boom lift and/or a small excavator, which would be lifted onto the barge by a site crane.

Once these activities are completed, the removal of the bridge may be carried out in the general sequence as shown in Table 3.1.

The final works methodology and equipment would be determined with the selected removal contractor.

The spans and piers are numbered as per Figure 3.1.

Table 3.1: Bridge removal sequence

Order	Component	Removal Method
1	Span 3 (truss span)	• Removal of timber bridge handrails by hand and small plant • Removal of decking planks by hand and small plant • Removal of deck beams and individual trusses by crane and barges.
2	Span 2 (approach span)	• Removal of timber bridge decking boards by hand and small plant • Removal the entire span by crane and barges.
3	Span 1 (approach span)	• Removal of timber bridge decking boards by hand and small plant • Removal of the entire span by crane and barges.
4	Span 4 (truss span)	• Removal of timber bridge handrails by hand and small plant • Removal of decking planks by hand and small plant • Removal of deck beams and individual trusses by crane and barges.

Order	Component	Removal Method
5	Span 5 (approach span)	• Removal of timber bridge decking boards by hand and small plant • Removal of the entire span by crane.
6	Pier 3	• Establish a floating boom/curtain around pier work area • Removal of the piers to 0.5 m below the existing Sportsmans Creek bed level using a saw from within the waterway with the help of divers • Support of each pile and removal by crane and barges.
7	Piers 1 and 2	• Establishment of a floating boom/curtain or cofferdam around pier work area • Support of piers using a crane and cut using axes/saws above the water line • Removal onto barges • Excavation and removal of concrete spreader footings to 0.5 m below the existing Sportsmans Creek bed or rock level.
8	Pier 4	• Establishment of a floating boom/curtain or cofferdam around pier work area • Removal of the piers using a saw from within the Sportsmans Creek with the help of divers • Localised displacement of the existing Sportsmans Creek bed material around the base of the pile to 0.5 m below the existing Creek bed level • Support of each pile for lifting and removal by crane.
9	Pier sections below existing Sportsmans Creek bed (Sub Substructure)	• Establish a floating boom/curtain or cofferdam around each footing • Removal of piers to 0.5 m to below the existing bed levels in a dry environment.
10	Southern abutment (Abutment B)	• Earthworks to remove timber and steel sheeting and abutment to at least 0.5 m below the ground level using excavators.
11	Northern abutment (Abutment A)	• Removal of existing guard fence and barriers with a small excavator and installation of new fence system.

During the removal of the bridge, it is proposed all removed materials would be taken to the site compound on the southern bank of Sportsmans Creek for dismantling, salvage and/or off-site disposal in accordance with Roads and Maritime Policy and the NSW Environment Protection Authority (EPA)'s Waste Classification guidelines as discussed in Section 6.12.5 of this REF.

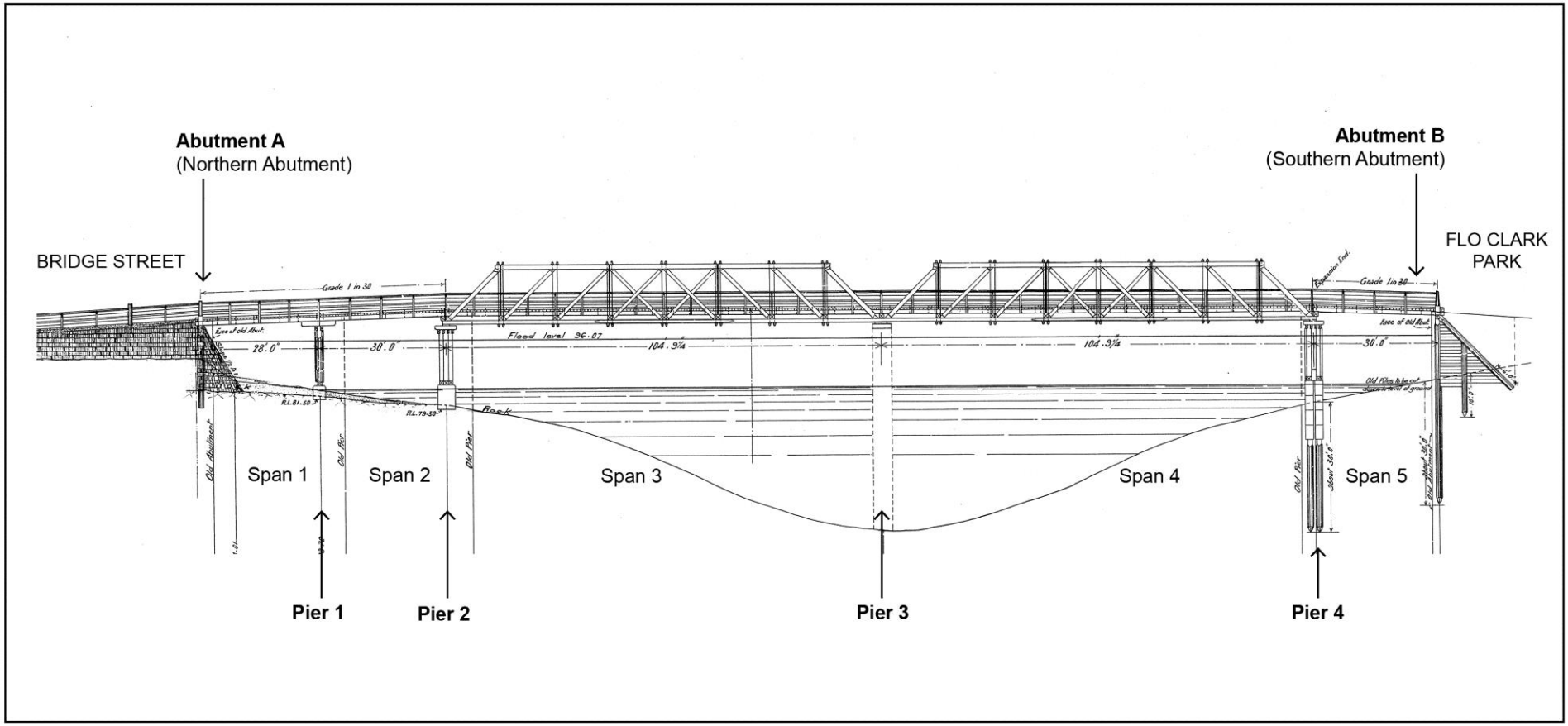

Figure 3.1: Existing Sportsmans Creek piers and span numbering

3. Road Treatments

The building of the road treatments would include the following initial activities:

- Inform Council and local residents of proposed works
- Obtain approvals from Council
- Install works signage
- Implement traffic control arrangements
- Install environmental controls including temporary or permanent fencing and erosion, sediment and drainage control measures.

Activities for the removal of the southern abutment would include:

- Remove the existing (timber and steel sheet piling) abutment and approaches
- Level and reinstate disturbed areas in Flo Clark Park and Sportsmans Park in the vicinity of the southern abutment to a suitable state enabling Council to landscape the park area
- Recycle suitable excavated material and incorporate suitable material in earthworks
- Truck any unsuitable/excess materials off-site
- Install line marking, signs and guide posts as required
- Install heritage commemorative plaque on either the southern or northern abutment in consultation with Council.

Activities for the removal of the northern abutment would include:

- Leave road in-situ and install pedestrian fence along both sides in the bitumen, minimising disturbance to the stone wall
- Install safety fence/pedestrian fence across the abutment one metre from the edge of the remaining bridge approach
- Reinstate any disturbed vegetation during the installation of the fencing
- Install heritage commemorative plaque on either the southern or northern abutment in consultation with Council.

Activities for the installation of the cul-de-sac would include:

- Excavate existing surface using small size machinery and equipment to avoid any damage to the stone wall
- Place new road material/build cul-de-sac
- Compact the road surface material using compaction equipment, avoiding vibratory machines to prevent any damage to the stone wall
- Seal surface using roadwork machinery and equipment
- Restore private access driveways and disturbed vegetation
- Install line marking, signs and guide posts as required.

4. Site restoration and disestablishment

Site restoration would include the following:

- Remove all dismantled materials from the site compound laydown area using an excavator and/or cranes
- Remove temporary barge access on the southern bank of Sportsmans Creek
- Remove temporary access tracks
- Remove site compound
- Grade work areas to a suitable level, replace top soil if required and progressively reinstate Flo Clark Park and Sportsmans Park to a suitable state to enable Council to landscape the park area upon the completion of the proposal
- Reshape Ensbey Road at the entry to the bridge and restore road
- Remove traffic controls and signage
- Remove environmental controls.

3.2.2 Hours and duration

Removal of the bridge is anticipated to take about 4 to 6 months, weather permitting, and is expected to start in mid-2018. Note the start date of the works would be dependent on the opening of the new bridge, the microbat breeding season and migration of the population as discussed in Section 6.1. An indicative staging plan is shown below in Figure 3.2.

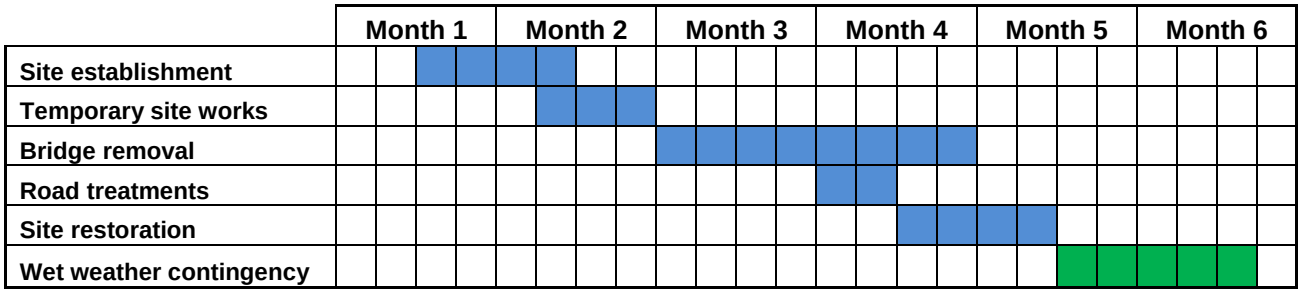

Figure 3.2: Indicative staging plan

It is proposed that the majority of removal works would only be carried out during daylight hours, as per standard work hours stipulated in the Interim *Construction Noise Guideline* (DECC 2009). The hours proposed are:

- Monday-Friday: 7.00am to 6.00pm
- Saturday: 8.00am to 1.00pm.

No work is proposed on Sundays or on public holidays.

Work would be conducted outside of standard hours to complete activities for the exclusion of the microbats from the bridge, which needs to occur after the microbats have left the roost in the evening.

With the exception of emergencies removal activities would not take place outside standard hours without prior notification to local residents, businesses and Council.

3.2.3 Plant and equipment

The following plant and equipment may be required as part of the proposal activities:

- Mini excavators (3 t)
- Trucks (for equipment and material transportation)
- Excavators (30 t)
- Bulldozers, graders, loaders, backhoes
- Compactors, multi-tyred and drum rollers
- Cranes (150 t and 250 t)
- Boom lifts
- Compressors
- Generators
- Hand tools (non-powered equipment such as hammers, hand-saws, etc)
- Power tools (such as jack hammers, grinding power tools, chainsaws, etc)
- Shoring
- Scaffolding
- Traffic control equipment
- Cement
- Concrete trucks and concrete pumps
- Site compound equipment (portable toilets, crib room, lockup container)
- Environmental controls (sediment fences, turbidity curtain/floating boom, sandbags)

- Chain saws/Oxy acetylene cutting kits
- Barges and punts to access Sportsmans Creek (about 12 m by 3 m wide with 25 t capacity)
- Water cart
- Bitumen sprayer and ancillary equipment.

3.2.4 Earthworks

Some earthworks would be required during the proposal, including:

- Preparation of Bridge Street as a cul-de-sac
- Creating temporary pads for the cranes and support props
- Excavating and levelling the southern abutment area in Flo Clark Park/Sportsmans Park after the bridge is removed
- Localised displacement of the existing Sportsmans Creek bed material around the base of the piers to facilitate the cutting and removal of the piers within the bed of Sportsmans Creek
- Reinstating the abutment and site compound on the south side of the existing bridge.

All material would be temporarily stockpiled and reused as far as practicable. If not practicable to reuse on site, it would be removed from site. It is not anticipated any additional fill, with the exception of material needed to establish crane pads, would be required for the removal of the bridge.

3.2.5 Source and quantity of materials

It is anticipated the proposal would not generate significant amounts of spoil. Some building materials would need to be imported for the establishment of temporary crane platforms, access tracks, pontoon and the re-configuring of Bridge Street to form a cul-de-sac.

These would include:

- Spoil/gravel for temporary access tracks and crane pads
- Materials for the establishment of a temporary barge access
- Road surface for the closure of Bridge Street to form the cul-de-sac
- Concrete for kerb, road surfaces and miscellaneous works
- Bitumen and aggregate for spray seals.

A local water source would also be required for the water supply in the compound.

The sources and precise quantities of materials are yet to be determined but they would be locally sourced where possible and consist of relatively minor quantities. In general, materials and equipment would be brought to the site via road.

3.2.6 Traffic management and access

Access to the proposal would be via Grafton-Lawrence Road or Ensbey Road from the south and Bridge Street and Grafton Road from the north, with the exception of access to crane pads.

Properties with access on Bridge Street would also need to be consulted during road works. The works would be short-term and access would be maintained to these properties throughout the removal and building works.

All traffic management required would be managed in accordance with a Traffic Management Plan (TMP) in the Construction Environmental Management Plan (CEMP) and the *Traffic Control at Work Sites Manual V4* (RTA 2010). The TMP is to be prepared in accordance with the requirements specified in Section 6.9.6 of this REF.

Sportsmans Creek would be accessed during bridge removal via barge and/or small boat. Barges would most likely be initially launched from the boat ramp at Lawrence Memorial Park. Smaller

boats could reach the waterway via the temporary pontoon to be established on the southern bank or, alternatively, the boat ramp in Lawrence Memorial Park.

The boat ramp in Flo Clark Park may be temporarily closed to the public during bridge removal. The Sportsmans Creek channel may be partially obstructed for maritime navigation, with short term closures during crane lifts (refer to Plate 3.4).

Consultation has been carried out with NSW Maritime (Roads and Maritime) in accordance with clause 16(2)e of the *State Environmental Planning Policy (Infrastructure) 2007* (refer to Section 4.1). The community and NSW Maritime would be consulted before work starts due to the requirement to temporarily close the Flo Clark Park public boat ramp during the removal activities.

Maritime traffic generated during the removal works would be limited to barges and vessels used for installing and decommissioning the sediment control devices and vessels moving people, plant and equipment.

Plate 3.4: Boat ramp access via Flo Clark Park (looking north)

3.3 Ancillary facilities

A site compound including removal material laydown would be required in Flo Clark Park and/or Sportsmans Park, next to the southern bridge approach (refer to Plate 3.5).

Plate 3.5: Location of southern site compound in Flo Clark Park and/or Sportsmans Park

The site compound would be used for the storage of machinery, site sheds (including site office and portable toilets), fuels and chemicals, waste storage, temporary stockpiles and laydown areas. All structures, storage and stockpiles in this area would need to ensure appropriate distances from the banks of Sportsmans Creek and safeguards would be implemented to secure the site and remove equipment and dispersible material in flood events. Parking would also be provided at the site compound for the small number of workers on site.

All fuels and chemicals would be stored in a double bunded area. It is likely temporary stockpiles of soil which may be required to be stored at the site compound would contain Acid Sulfate Soils (ASS) after the earthworks required for the southern abutment removal and within the bed of Sportsmans Creek. All stockpiles would be managed in accordance with Roads and Maritime *Stockpile Site Management Procedures* and the *QA Specification R44 – Earthworks*.

The site compound would be securely fenced and signage would be erected to indicate the presence of removal works. Signage would also be placed to inform the public that the Flo Clark Park boat ramp is closed for public access and to utilise the boat ramp at the Lawrence Memorial Park on the Clarence River as an alternative.

3.4 Public utility adjustment

Public utility adjustments are required and have been proposed as part of the building of the Sportsmans Creek new bridge (KBR 2015). No permanent public utility adjustments are required as part of the bridge removal works. However, isolation, protection or temporary relocation of the 11 kV power pole/overhead line would be required.

It is anticipated, if required, the temporary relocation of the pole would have a negligible impact on the surrounding environment.

A standard Dial-before-you-dig check for the presence of utilities before the start of cul-de-sac works on Bridge Street would also be conducted to ensure the safety of work.

3.5 Property acquisition

No private property acquisition would be required for the proposal. The land required for temporary use at the location of the southern abutment in Flo Clark Park (Lot 338, DP 751386) (refer to Figure 1.2) is owned by Council. A temporary lease arrangement would also be entered into for the use of Flo Clark Park/Sportsmans Park for the compound.

Consultation and consent would be required with the landowner at Lot 102 DP 1199150 and Lot 101 DP 11999150 about access and establishment of a crane pad at this location (refer to Figure 1.2) due the proximity of the proposed crane location on the northern bank to private property.

All other work is located in the existing road easements on classified roads as defined under the *Roads Act 1993*.

4 Statutory and planning framework

The next section provides the statutory and planning framework for the proposal and determines whether the assessment is subject to an environmental impact assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*.

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of ISEPP 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 for road infrastructure facilities and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent from Council is not required.

The Sportsmans Creek Bridge proposal consists of two parts, the first to build the Sportsmans Creek new bridge and the second to remove the existing Sportsmans Creek Bridge. While both parts are linked, this REF assesses only the removal of the existing bridge with a separate assessment determined in February 2015 for the building of the new bridge (KBR 2015).

Both parts are able to be assessed separately under the *Environmental Planning and Assessment Act 1979* as a lack of interdependence between both activities has been established. The new bridge structure including all approaches could be built without the need to remove the existing bridge. Once the new bridge is completed, the existing Sportsmans Creek Bridge would be closed to traffic before removal. Both activities are not reliant upon each other and would involve differing work methodologies and contractor engagements.

The separation of the proposal into two environmental impact assessments facilitates the timing of the building of the new bridge. It also helps in providing alternative habitat to relocate the threatened roosting population of Large-footed Myotis from the existing bridge before removal. As the removal of the bridge requires the preparation of a SIS, this has delayed the assessment of the removal of the existing bridge, allowing time for building activities on the new bridge. The removal works would not start until the contractors completing the works for the new bridge have finished, minimising impacts on the microbats and the community. Further information about the potential impacts during the removal of the bridge on the microbat population is provided in Section 6.1.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by *State Environmental Planning Policy No. 14 - Coastal Wetlands*, *State Environmental Planning Policy No. 26 - Littoral Rainforests, State Environmental Planning Policy (State and Regional Development) 2011* or *State Environmental Planning Policy (Major Development) 2005*.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities before the start of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in Chapter 5 of this REF.

4.1.2 State Environmental Planning Policy 71 – Coastal Protection

The purpose of *State Environmental Planning Policy (SEPP) 71 – Coastal Protection* is to help in regulating planning and development in the coastal zone of NSW. The policy stipulates significant development in sensitive coastal areas must be referred to the Director-General for comment with development in the coastal zone taking into consideration the NSW Government's *Coastal Policy*

(1997). Section 8 of the SEPP also lists a number of matters for consideration which councils must consider when assessing development applications, such as access to coastal foreshore, scenic values, measures to conserve animals, fish and wildlife corridors, cultural places and items of heritage and water quality.

State Environmental Planning Policy 71 – Coastal Protection applies to all land within the coastal zone, which is shown on the coastal zone mapping provided by the Department of Planning and Environment. The Coastal Zone includes a one kilometre stretch of Sportsmans Creek covered by the proposal. However, as the proposal is not considered a significant coastal development (as defined under Part 3 clause 9 and Schedule 3 of SEPP71), a referral and an additional development approval is not required.

Although *State Environmental Planning Policy 71 – Coastal Protection* does not apply to a project of this scale (insofar as significant coastal development provisions under the Policy), mitigation measures relating to the key coastal themes for this proposal were considered. This included acid sulfate soils, protection of foreshores, public access, water quality and heritage which have been incorporated into the REF to ensure the protection of land and waterways in the coastal zone and consistency with this SEPP.

4.2 Local Environmental Plans

4.2.1 Clarence Valley Local Environmental Plan 2011

The *Clarence Valley Local Environmental Plan 2011* (Clarence Valley LEP 2011) is the relevant planning scheme for the proposal. The land use zoning and relevant local policies are of interest to development principles. However, the proposal would not to be determined by Council under the LEP.

A review of Council's Geographic Information System (GIS) data for land use zoning is illustrated in Figure 4.1.

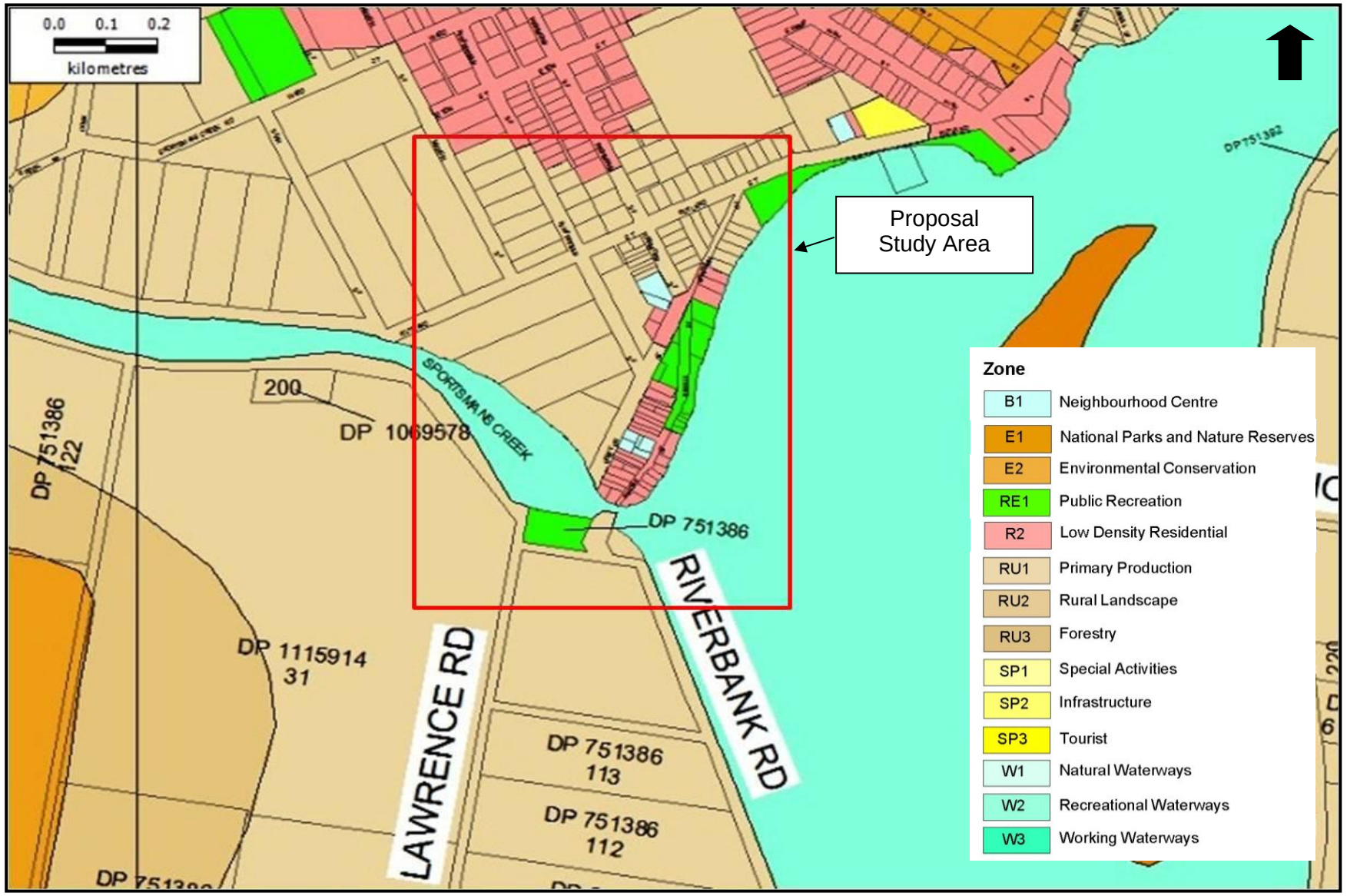

Figure 4.1: Clarence Valley LEP Zoning (Source: Clarence Valley LEP 2011, Land Zoning Map)

Land use zoning and development

The land use zoning at the bridge removal location is comprised of the following land use zonings; RU1 – Primary Production, RE1 – Public Recreation and R2 – Low Density Residential (pink). Table 4.1 details the objectives of the zones and the proposal's consistency with them.

Table 4.1: Applicable Clarence Valley LEP 2011 zoning

Zone	Objectives	Consistency with objectives and permissibility
RU1 – Primary Production (light brown)	a) To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. b) To encourage diversity in primary industry enterprises and systems appropriate for the area. c) To minimise the fragmentation and alienation of resource lands. d) To minimise conflict between land uses within the zone and land uses within adjoining zones. e) To prevent dispersed rural settlement. f) To ensure development does not unreasonably increase the demand for public services or public facilities. g) To ensure development is not adversely impacted by environmental hazards.	The proposal is consistent with the zone's objectives. In conjunction with the building of the new bridge, it would improve the flow of traffic through Lawrence as discussed in Section 6.9. The proposal would be of general benefit to primary production and the town's rural amenity (KBR 2015).
RE1 – Public Recreation (lime green)	a) To enable land to be used for public open space or recreational purposes. b) To provide a range of recreational settings and activities and compatible land uses. c) To protect and enhance the natural environment for recreational purposes.	The proposal is consistent with the objectives of this zone and aims to expand the amount of area available for recreational use in the community by joining Sportsmans Park and Flo Clark Park after the bridge is removed.
R2 – Low Density Residential (pink)	a) To provide for the housing needs of the community within a low density residential environment. b) To enable other land uses, which provide facilities or services to meet the day-to-day needs of residents.	The proposal is consistent with the objectives of the zone and does not modify the existing housing or land uses which provide facilities or services to meet the needs of residents.

Acid sulfate soils

The Clarence Valley LEP 2011 includes a mapping layer which indicates the potential for Acid Sulfate Soil (ASS) classes in the proposal area. The potential impacts and safeguards for ASS are discussed further in Section 6.2 of this REF.

Schedule 5 environmental heritage

A number of heritage items in Lawrence are listed in Schedule 5 of the Clarence Valley LEP 2011. These include the Lawrence heritage conservation area (shown in red hatching on Figure 4.2), which the Sportsmans Creek Bridge is a part of. Figure 4.2 shows the relationship of the bridge to Bridge Street and nearby heritage items in Lawrence.

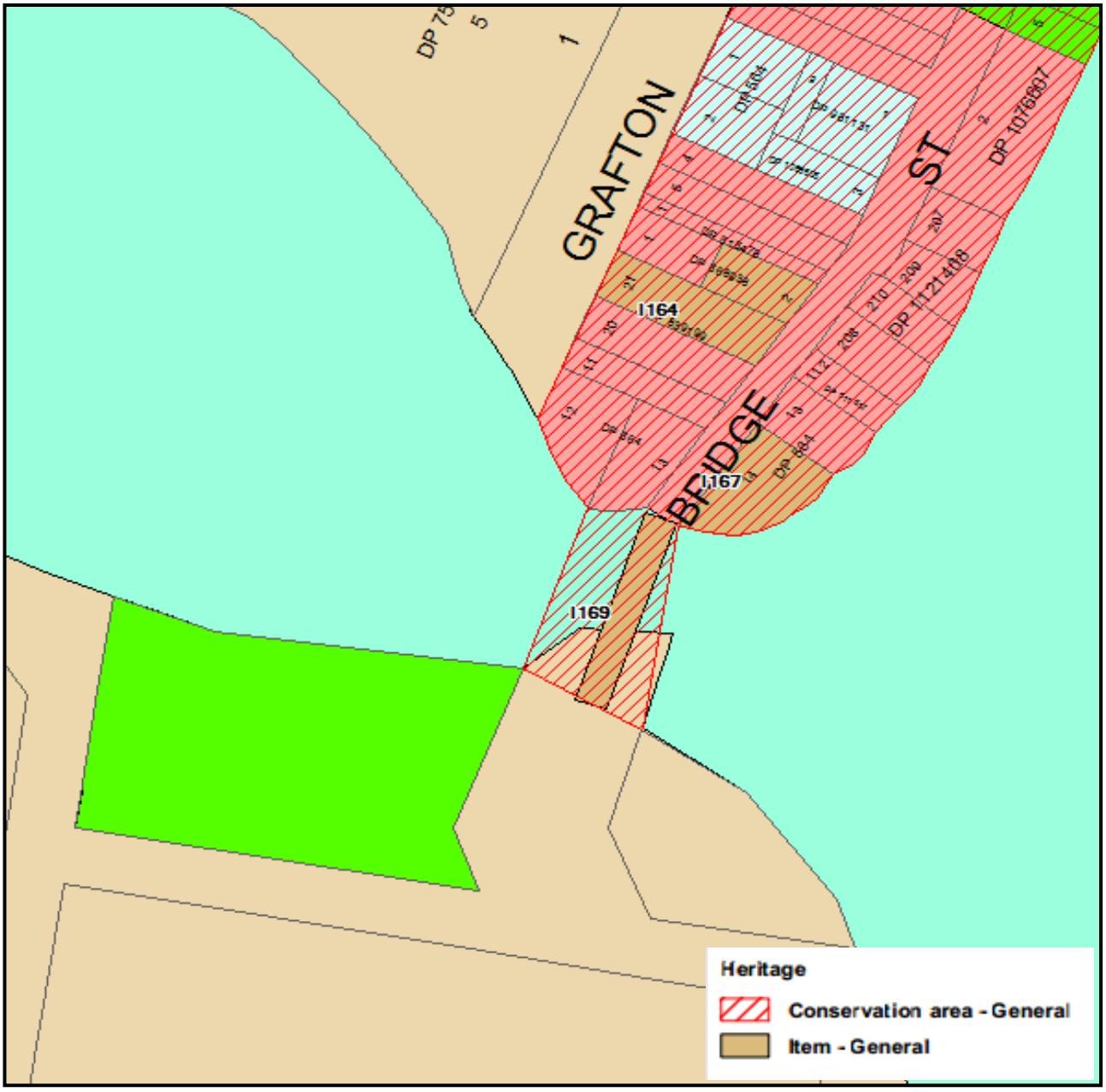

Figure 4.2: Heritage items within the vicinity of the Sportsmans Creek Bridge (Source: Clarence Valley LEP 2011)

Non-Aboriginal heritage is discussed further in Section 6.6 and as part of the *Historical Archaeology and Heritage Values of the Sportsmans Creek Bridge Precinct, near Lawrence, NSW: Recommended Option Report* (Maxim Archaeology & Heritage 2013) provided in Appendix B and the *Sportsmans Creek Bridge, Lawrence – Heritage Impact Statement June* (GAOHG 2014) in Appendix C.

4.3 Other relevant legislation

4.3.1 Crown Lands Act 1989

The *Crown Lands Act 1989* is administered by the NSW Department of Trade and Investment (Crown Lands Division). The broad purpose of the Act is to ensure Crown Land is managed for the benefit of the people of NSW and to provide for the assessment, management, development, reservation and conservation of Crown Land in accordance with the principles defined under Section 11 of the Act.

As work is planned in Sportsmans Creek, the proposal has the potential to impact upon Crown Land. Other public reserves (Flo Clark Park and Sportsmans Park) in the area are not considered Crown Land. This is discussed further in Section 6.10 of this REF. A Section 34 'authority to occupy crown land' would be required to be arranged by Roads and Maritime with the Crown Lands Division and the Minister for the purposes of the bridge removal within the crown reserve as per Part 4 of the *Crown Lands Act 1989*.

4.3.2 Fisheries Management Act 1994

The object of *Fisheries Management Act 1994* is to conserve biological diversity of fish and marine vegetation and promote ecologically sustainable development and activities.

Under Section 199 of the *Fisheries Management Act 1994*, a public authority (other than a local Government authority) is required to notify the Minister for Primary Industries (DPI) Fishing and Aquaculture if the proponent is to carry out any dredging or reclamation work.

The Act defines dredging as any work involving excavating water land or removing material from water land; and reclamation as using any material to fill in or reclaim water land, or depositing any such material on water land for the purposes of its reclamation. Water land is defined in the Act as land submerged by water permanently or intermittently and either an artificial or natural body of water, including wetlands.

Further, Section 218 of the *Fisheries Management Act 1994* requires the Minister be notified whenever a weir or barrier to fish movement is to be constructed, altered or modified. The *Fisheries Management Act 1994* also enables the Minister for Fisheries to make Habitat Protection Plans for the protection of any key fish habitat areas. Under Section 205 of the *Fisheries Management Act 1994*, notification and permit to harm any marine vegetation, protected species, or fish habitats may be required.

Sportsmans Creek is considered key fish habitat. However, as discussed in Section 6.1, threatened aquatic species and communities listed under Schedules 4, 4A, 5 and 6 of the *Fisheries Management Act 1994* are not present within the investigation area. The proposal does not constitute a listed Key Threatening Process.

The assessment of the removal of the Sportsmans Creek Bridge determined a notification would be required to the Minister of DPI (Fishing and Aquaculture) as per Section 199 of the *Fisheries Management Act 1994.* This is discussed in Chapter 5.

A permit would also be required under Section 219 of the *Fisheries Management Act 1994* for any work which may result in the temporary or permanent obstruction of fish passage within a waterway. Such obstructions can include silt fencing / curtains across waterways for sediment and erosion control and cofferdams.

As noted in Sections 3.2 and 6.2, the removal methodology is subject to confirmation by the selected removal contractor and may include a number of these obstructions requiring a permit to proceed. Mitigation measures have been provided in Section 6.2.5 to minimise this disturbance.

4.3.3 Coastal Protection Act 1979

The *Coastal Protection Act 1979* regulates development and other activities carried out by public authorities in the coastal zone of NSW. As defined in the Objects of the Act, the primary objective of the *Coastal Protection Act 1979* is to provide for the protection of the coastal environment of the State 'for the benefit of both present and future generations'. In particular the Act aims to protect, enhance, maintain and restore the environment of the coastal region and also to have regard for principles of Ecologically Sustainable Development (ESD). The *Coastal Protection Act 1979* defines the boundaries of the Coastal Zone, which are identified by the maps provided by the Department of Planning and Environment (DPE). The boundary is generally one kilometre

landward of coastal waters, bays, coastal rivers, mangroves, coastal lakes or lagoons as described in words in Section 4A of the *Coastal Protection Act 1979*.

The proposal is situated in the coastal zone as identified on the DPE mapping.

Section 38 of the *Coastal Protection Act 1979* requires a public authority to gain consent for carrying out developments in the coastal zone if the Minister is of the opinion that the development:

'…(b1) is inconsistent with principles of ESD;

'(c) adversely affects the behaviour of the sea or an arm of the sea or any bay, inlet, lagoon, lake, body of water, river, stream or watercourse; or

'(d) adversely affects any beach or dune, the bed, bank, shoreline, foreshore or flood plain of the sea or an arm of the sea or any bay, inlet, lagoon margin, lake, body of water, river, stream or watercourse...'

This concurrence requirement is only enacted if the Minister advises the public authority that the development triggers the criteria above (Section 38(1)) or issues a Gazette to public authorities (Section 39(1)) about prohibited developments in the coastal zone. The Minister has not advised Roads and Maritime in this regard.

The *Coastal Protection Act 1979* also states under Section 37B clause (c) that concurrence from the Minister is not required if the development is consistent with the relevant Coastal Zone Management Plan (CZMP) under Part 4A of the *Coastal Protection Act 1979*. The current CZMP is the 'Clarence Estuary Management Plan' (Umwelt 2003) and was adopted by the former Councils of the Clarence Valley in 2003. The main objectives relating to the Sportsmans Creek area are with regard to ASS management and the ecological values of the estuary, relating to connectivity of the river bank, wader habitats and riparian vegetation along the Creek. The Biodiversity Assessment (refer to Section 6.1) and visual and landscape assessment (refer to Section 6.8) carried out for the proposal in this REF determined that the proposal would modify the riparian vegetation along the waterway and has the potential to leave permanent effects along the Sportsmans Creek. However, provided the mitigation measures and future landscaping treatments proposed along the banks of Sportsmans Creek in Section 6.8 of this REF are implemented, the proposal would be consistent with the Clarence Estuary Management Plan (Umwelt 2003) and the objectives of the *Coastal Protection Act 1979*.

The safeguards and management measures proposed in Section 6.2.5 of this REF would minimise any potential impacts associated with the works. As such, the proposal is consistent with the principles of ESD and could be carried out in accordance with the relevant Council management plans and strategies, as well as with the NSW Coastal Policy (1997). Approval under the *Coastal Protection Act 1979* is not required.

4.3.4 Heritage Act 1977

Pursuant to Section 57 of the *Heritage Act 1977*, a proposed activity in relation to an item which is subject to an interim heritage order or is listed on the State Heritage Register requires approval of a relevant approval body (the Heritage Branch, DPE or Local Council). Under Sections 139 and 140 of the *Heritage Act 1977,* an excavation permit is required for the disturbance or excavation of any relic.

Any deposit, object or material evidence relating to the settlement of the area that comprised NSW, not being Aboriginal settlement, and which holds state or local significance, is defined as a relic under the Act. It should be noted the Act formerly protected any 'relic' more than 50 years old. The age determination has been removed from the Act and is now defined by the heritage significance assessment of the relic. An excavation permit is required for any works, excavation or activities, associated with an archaeological site.

A Non-Aboriginal heritage assessment has been prepared as part of this REF as detailed in Section 6.6 and Appendix B. The assessment has identified a number of heritage items within the vicinity of the proposed works, including the Lawrence Conservation Area on Bridge Street (listed on the Clarence Valley LEP 2011) and the existing Sportsmans Creek Bridge (listed on the Roads and Maritime's section 170 Heritage Register and the Clarence Valley LEP 2011).

A Statement of Heritage Impact (SOHI) has been prepared to address the removal of the Sportsmans Creek Bridge (refer to Appendix C). The removal of the bridge is not anticipated to have any permanent adverse impacts on the Lawrence Conservation Area and the items of local heritage significance within the Lawrence township. The SOHI prepared for the removal of the existing bridge concluded the impact of its removal would be moderate on the landscape and would be adequately mitigated through the safeguards proposed in Section 6.6.6 of this REF.

Furthermore, an endorsement was received in 2012 from the Heritage Branch of OEH of the Roads and Maritime Timber Truss Conservation Strategy including the removal of the Sportsmans Creek Bridge (refer to Appendix E). A 14-day notification to OEH in accordance with Section 170A of the *Heritage Act 1977* would be required with regard to the removal of the bridge from Roads and Maritime's section 170 register.

4.3.5 Contaminated Land Management Act 1997

The management of contaminated land is shared by the EPA, the DPE and local Government authorities.

Under the *Contaminated Land Management Act 1997*, the EPA regulates contaminated sites where the contamination is significant enough to warrant regulation. Contaminated sites which are not regulated by the EPA are managed by local councils through land use planning processes.

As discussed in Section 6.2, the geotechnical investigations identified there are no items listed on the Contaminated Lands Register. It was identified there is the low potential for uncontrolled or contaminated fill to be located within the southern abutment. Measures have been proposed in Section 6.2.5 to mitigate any potential impacts.

4.3.6 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* lists threatened species, populations and ecological communities in NSW. If a threatened species, population or ecological community or its habitat is likely to occur in any area which may be affected by a development proposal, then a 'seven part test – Assessment of Significance' in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* (as amended by the *Threatened Species Conservation Act 1995*) must be conducted to determine whether the proposal would have a significant impact.

If it is concluded there would be a significant impact, then a Species Impact Statement (SIS) must be prepared. The proposal would then be subject to approval from the Director-General of the Office of Environment and Heritage as per Section 112C of the *Environmental Planning and Assessment Act 1979*.

A biodiversity assessment has been completed for the proposal (refer to Section 6.1) and Appendix F has identified no threatened flora, fauna, endangered populations or Endangered Ecological Communities (EECs) would be adversely impacted by the proposal, with the exception of the Large-footed Myotis. As discussed in Section 6.1 and Appendix F, the ecological investigations carried out for the proposal identified the presence of an important population of the vulnerable microbat species within the existing Sportsmans Creek Bridge. The seven-part test of the microbat species included in the investigation identified there is likely to be a significant impact upon the species as a result of the bridge removal.

As a significant impact is likely a request for Director-General requirements from OEH would be required. A SIS has been prepared in accordance with Section 110 of *Threatened Species Conservation Act 1995* to obtain concurrence from the OEH for the proposal (refer to Appendix G).

4.3.7 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* is administered by OEH. The purpose of the *National Parks and Wildlife Act 1974* is the conservation of:

- Nature, including habitat, ecosystems, biological diversity, landscapes and landforms
- Objects, places or features of cultural value within the landscape including:
    - Places, objects and features of significance to Aboriginal people
    - Places of social value to the people of NSW
    - Places of historic, architectural or scientific significance.

The *National Parks and Wildlife Act 1974* sets outs the responsibilities for the management of NSW National Parks. As discussed in Section 6.1 and Appendix F (Biodiversity Assessment Report), there are no National Parks near the proposal and as such the provisions of the *National Parks and Wildlife Act 1974* relating to National Parks do not apply.

Threatened species, endangered populations, ecological communities and their habitats

Part 8A of the Act lists the offences in NSW relating to the harm or picking of threatened species, endangered populations or endangered ecological communities and buying, selling or possessing threatened species or endangered population, damage to critical habitat and habitat of threatened species, endangered populations or endangered ecological communities. Unlike other parts of the *National Parks and Wildlife Act 1974*, this part applies to any land in NSW. Clause 118A(3)(b) notes that it is a defence to prosecution for an offence against this section if the act constituting the alleged offence was essential for the carrying out of:

'(ii) an activity by a determining authority within the meaning of Part 5 of that Act if the determining authority has complied with that Part'.

As noted in Section 4.3.6, with the exception of the habitat of the Large-footed Myotis, no known threatened species, endangered ecological communities or endangered populations would be impacted by the proposal. Similar defence clauses apply under 118C(5)(b) and 118D(2)(b) for damage to critical habitat and habitat of threatened species. A SIS has been prepared to assess the impacts to the microbat species with a concurrent approval for the proposal from the Director-General of OEH for the removal of the bridge (refer to Section 4.3.6).

Aboriginal heritage

Under Section 86(4) of the *National Parks and Wildlife Act 1974*, it is an offence to harm or desecrate a declared Aboriginal Place. Many thousands of other Aboriginal heritage sites also receive protection under the Act. Harm includes destroying, defacing or damaging an Aboriginal Place. If a development is to take place near an Aboriginal Place, the potential impact of the development on an Aboriginal Place must be assessed.

An Archaeological Due Diligence (Aboriginal) assessment has been carried out as part of the new bridge REF (KBR 2015) (refer Section 6.7 and Appendix D) and identified no Declared Aboriginal Place(s) or items of Aboriginal heritage significance within the proposal footprint. It is noted there is a low potential to find any items previously unidentified, however, an unexpected finds procedure is proposed as a mitigation measure as discussed in Section 6.6.6.

4.3.8 Noxious Weeds Act 1993

The administration of noxious weed control is the responsibility of the Minister for Primary Industries. The purpose of the *Noxious Weeds Act 1993* is to identify noxious weeds in respect of which particular control measures need to be taken, to specify those control measures, and to

specify the duties of both public and private landholders with respect to the control of noxious weeds. In this regard, the *Noxious Weeds Act 1993* categorises noxious weeds into four divisions according to the requirements for their control.

Section 13 of the Act states:

'13 Public authorities' obligations to control noxious weeds on own land

'(1) A public authority that is an occupier of land to which a weed control order applies must control noxious weeds on the land as required under the order, to the extent necessary to prevent the weeds from spreading to adjoining land.'

Two listed 'noxious weeds' were detected within the survey area; Lantana (*Lantana camara*) and Camphor Laurel (*Cinnamomum camphora*) (refer Appendix F for details). Lantana is also listed as a Weed of National Significance (WoNS). The invasion, establishment and spread of Lantana is also listed as a Key Threatening Process under the *Threatened Species Conservation Act 1995*.

Control measures for the management of weeds have been recommended in Section 6.1.6.

4.3.9 Water Management Act 2000 and Regulation 2011

The *Water Management Act 2000* addresses the management of surface and ground water in NSW and is administered by the NSW Office of Water. Under the Act, approvals are required for controlled activities. The *Water Management Act 2000* provides for the protection of waterfront land, including on the banks of rivers, creeks and lakeside land. In addition to protecting this land, the *Water Management Act 2000* aims to ensure the integrated and sustainable management of water resources for NSW. For certain activities, known as 'controlled activities' and 'aquifer interferences' as per Section 91 of the *Water Management Act 2000* an additional approval may be required from the NSW Office of Water.

Exemptions exist under *Water Management (General) Regulation 2011* relating to controlled activities for public authorities. Clause 38 states *inter alia* public authorities are exempt from the requirement for obtaining controlled activity approvals under Section 91E of the *Water Management Act 2000*. This exemption also extends to third parties who are acting under contract on behalf of Roads and Maritime to carry out the building works, where Roads and Maritime retains control over works during and after building works. Nevertheless, Roads and Maritime has a duty of care to ensure work would not result in unnecessary harm to waterfront land and waterways under the *Water Management Act 2000*, *Fisheries Management Act 1994* and the *Protection of the Environment Operations Act 1997.* Control measures for the management of unnecessary harm to waterfront land have been recommended in the safeguards of this REF as discussed in Sections 6.2 and 6.3.

4.3.10 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* is administered by the EPA and by the Environment Minister. It is the main law in NSW regulating water, air and noise pollution. Provisions for waste are also included.

The Act:

- Empowers regulatory authorities to issue pollution licenses for scheduled activities (such as Environmental Protection Licences)
- Creates a range of pollution offences and penalties
- Allows regulatory authorities to enforce the *Protection of the Environment Operations Act 1997*
- Allows the public to take legal action to enforce the *Protection of the Environment Operations Act 1997*.

Section 6 of the Act indicates the EPA is the appropriate regulatory authority for development by public authorities, which would be Roads and Maritime for the proposal.

Offence to pollute waters

Section 120 of the *Protection of the Environment Operations Act 1997* applies a general prohibition to water pollution and all water pollution is prohibited unless it is authorised in some way.

Air pollution

Air pollution is defined as the emission into the air of any impurity, including dust, smoke, cinders, solid particles, gases, fumes, odours and radioactive substances. Unlike water pollution, there is no general prohibition on causing air pollution. However, the *Protection of the Environment Operations Act 1997* contains a number of specific offences which regulate certain activities which result in air pollution.

Noise pollution

Unlike water pollution, there is no general prohibition on causing noise pollution. However, the *Protection of the Environment Operations Act 1997* contains a number of specific offences which regulate certain activities which result in noise pollution. Appropriate noise criteria to be applied to avoid disturbance upon the surrounding environment are specified within the policies adopted by the EPA as discussed in Section 6.4.3 of this REF.

Waste management

Section 142A of the *Protection of the Environment Operations Act 1997* applies a general prohibition to the pollution of land and Section 145 of the Act defines the offence of littering in a public place.

The Act also contains a number of specific offences which regulate certain activities relating to waste management including transport and disposal which results in environmental harm.

Mitigation measures have been proposed in this REF to ensure the potential risk of pollution of waters, foreign particle emissions and increases in noise and off-site waste impacts resulting from the removal works are minimised. In the event an incident occurs, Roads and Maritime would be required to notify the EPA immediately of any 'pollution incident' likely to have an impact on the environment.

4.3.11 Protection of the Environment Operations (Waste) Regulation 2014

The Protection of the Environment Operations (Waste) Regulation 2014 regulates the management of waste facilities, the transportation of waste within, out of and into NSW, recycling of consumer packaging as well as a number of other miscellaneous provisions relating to waste in NSW. The contractor would be required to ensure the transportation and reporting requirements of this regulation were complied with in the removal of waste components after the bridge is removed in addition to the requirements of the *Waste Avoidance and Resource Recovery Act 2001* as discussed in Section 4.3.12.

4.3.12 Waste Avoidance and Resource Recovery Act 2001

The waste hierarchy, established under the *Waste Avoidance and Resource Recovery Act 2001*, ensures resource management options are considered against the following priorities:

- **Avoidance** including action to reduce the amount of waste generated by households, industry and all levels of Government
- **Resource** recovery including reuse, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources
- **Disposal** including management of all disposal options in the most environmentally responsible manner.

The proposal would need to consider these principles when preparing any waste management plans for inclusion in any environmental management planning and reporting during the removal works. Where possible, dismantled bridge components would be reused or recycled.
Section 6.12.5 discusses mitigation measures to ensure waste is appropriately managed.

4.4 Commonwealth legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* a referral is required to the Australian Government for proposed 'actions which have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Chapter 6 and Appendix H of the REF.

A referral is **not** required for proposed actions which may affect nationally listed threatened species, ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the *Environment Protection and Biodiversity Conservation Act 1999* by the Australian Government in September 2015. Potential impacts to these biodiversity matters are considered as part of Chapter 6 of the REF, Appendix F and Appendix G.

Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance.

Findings – nationally listed biodiversity matters

The assessment of the proposal's impact on nationally listed threatened species, ecological communities and migratory species found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Chapter 6 of the REF describes the safeguards and management measures to be applied. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

4.4.2 Native Title Act 1993

The *Native Title Act 1993* acknowledges native title rights and provides principles in relation to the management of native title in Australia.

A search of the federal Native Title Claims Search was carried out on 9 February 2016 and identified Native Title is registered (Determination Date: 25/06/2015) for the Yaegl People (Tribunal File no. NC2015/003) which covers a large area, including the nearby towns of Maclean and Harwood and continues beyond the coastline from Iluka to just beyond Wooli in the south. The boundary of the claim follows the Sportsmans Creek Bridge alignment up Grafton–Lawrence Road from north of Ulmarra through Lawrence along Bridge Street and Richmond Street.

Section 227 of the *Native Title Act 1993 inter alia* states that development affects native title:

'…if it extinguishes the native title rights and interests or if it is otherwise wholly or partly inconsistent with their continued existence, enjoyment or exercise.'

Roads and Maritime address the legal obligations of native title through their property division during the acquisition process. Although the bridge is located within the area covered by the claim, property acquisition is not required for the removal works. The proposal would not alter native title rights or interest and would return the land on which the southern abutment lies to public open space.

4.4.3 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The purpose of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is to preserve and protect areas and objects in Australia and Australian waters which are of significance to the Aboriginal community.

Under part II of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984,* the federal Minister of Indigenous Affairs has powers to protect items by means of ministerial declaration. The Act must be invoked by or on behalf of an Aboriginal or Torres Strait Islander or organisation.

A significant area or object is defined as one that is of particular importance to Aboriginal people according to Aboriginal tradition. The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* can, in certain circumstances override state and territory provisions, or it can be implemented in circumstances where state or territory provisions are lacking or are not enforced.

The Aboriginal due diligence assessment carried out for the building of the new Sportsmans Creek bridge proposal (refer to Appendix D, KBR 2015) did not identify any items or areas of Aboriginal heritage significance within the vicinity of the proposal and there is no requirement for this Act to be triggered.

4.5 Confirmation of statutory position

This REF has reviewed the relevant legislation and determined the proposal would not require development consent from local government as per the provisions of the ISEPP and is subject to assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*. As such, Roads and Maritime are the proponent and determining authority for this proposal.

The review of legislation determined a concurrent approval is required from the OEH and a SIS has been prepared to address impacts on the habitat of the Large-footed Myotis microbat population in the existing Sportsmans Creek Bridge.

5 Stakeholder and community consultation

5.1 Consultation strategy

Roads and Maritime is committed to informing and consulting stakeholders in relation to the removal of the Sportsmans Creek Bridge. A Public Participation Plan was created for the proposal. The purpose of the plan was to inform and consult with stakeholders in accordance with the Roads and Maritime *Community Participation and Communications: A resource manual for staff* (Roads and Maritime 2012b).

The Sportsmans Creek new bridge project started in June 2013 clarifying the proposal involved both the building of a new bridge and the removal of the existing timber truss bridge.

Thus consultation on the bridge removal began in mid-2013 and has continued throughout the project to the current day, including the public display period about the bridge removal REF.

5.1.1 Public Participation Plan

The objectives of the Public Participation Plan are to:

- Inform stakeholders of the proposal scope and timeframes
- Manage stakeholder expectations in relation to delivery timeframes and their level of influence on the proposal
- Provide stakeholders with appropriate opportunities to provide input.

The Plan was implemented between mid-2013 and mid-2016, over six main stages:

- Stage 1: Study area announcement
- Stage 2: Recommended Option Report display
- Stage 3: Announcement of preferred option
- Stage 4: Review of environmental factors for the building of the new bridge
- Stage 5: Detailed design
- Stage 6: Review of environmental factors for the removal of the existing bridge.

A desktop analysis, as part of the development of the Public Participation Plan, was carried out to identify potential stakeholders affected by or interested in the proposal. This was carried out with close coordination between Roads and Maritime and Council.

Stakeholders considered under the Public Participation Plan were:

- Clarence Valley Council
- State and Federal Government (Roads and Maritime NSW, State Member for Clarence and Federal Member for Page)
- Businesses within the study area
- Residents and/or property owners within the study area
- Emergency services
- Lawrence Public School
- Traditional owners (in accordance with the Cultural Heritage Management Plan)
- Road users
- Environmental groups (Clarence Valley Conservation in Action, Clarence Valley Wires)
- Other interest groups (Lawrence Historical Society, Lawrence Fishing Club, Clarence Cane Growers, Clarence River Fisherman's Co-operative Ltd.)
- Local media.

Throughout the proposal stakeholder feedback channels were maintained by phone (toll free), email and mail, with information continually updated on the Roads and Maritime website.

5.1.2 Steering Committee

A Steering Committee was also established for the proposal. It comprised of key executive representatives of Roads and Maritime and Council. Through their appointment to the Committee, members agreed to be available for the term of the proposal and contribute by:

- Providing governance for the overall proposal. This includes considering and making recommendations on matters as and when required
- Attending meetings to review the proposal status, forecasts, risks and monitor the proposal implementation to ensure it is properly carried out in accordance with agreed plans
- Overcoming any internal Roads and Maritime or Council barriers to success, through negotiation and discussion with colleagues at various levels
- Providing leadership to the team in implementing all proposal outcomes
- Promoting the benefits of the proposal throughout the wider community and stakeholders
- Acting as informed proposal advocates, who speak on behalf of the proposal without personal opinion or motivation
- Providing encouragement and celebrating success
- Overseeing the preparation of the proposal's various implementation phases.

The Committee did not have specific decision-making responsibilities, but provided a formal mechanism for communication.

5.2 Community involvement

5.2.1 Stage 1: Study area announcement (mid-2013)

In June 2013 the study area and proposal for a new bridge and removal of the existing bridge was publicly announced, with Lawrence residents advised of the proposal by letter. During this stage technical studies were completed with a wide range of bridge options considered. One option was identified during this stage as delivering far greater benefits than the other options. Opportunities to provide input were communicated through:

- Direct meeting requests
- Newspaper advertisement of community drop-in sessions held on Thursday 18 July 2013 (11.00am to 2.00pm and 4.00pm to 7.00pm) at the Lawrence Public Hall
- Distribution of a letter to the household (direct mail and letter box drop)
- Content on the Roads and Maritime website
- Media releases
- Holding two staffed community drop-in sessions (mentioned above) where posters were displayed and the letter to the householder and feedback forms were available.

Thirty-eight community members signed in at the two drop-in sessions. Project team members were present to help community members to better understand the proposal, answer questions and give feedback.

Individual meetings were held with the owners of the Lawrence General and Liquor Store (General Store) and Lawrence Tavern (Tavern) to discuss potential impacts on their businesses. The proposal team also presented to members of the Lawrence Historical Society on the proposal's objectives, including the removal of the existing bridge.

Twenty-two formal feedback forms were returned.

The feedback received was compiled and presented in the *Sportsmans Creek new bridge Early Feedback Summary, August* (Roads and Maritime 2013b).

The future of the existing bridge was among the top 10 subjects raised by consultation participants. Table 5.1 summarises the community suggestions with relevant responses.

Table 5.1: Stage 1 feedback about bridge removal

Bridge removal comments	Roads and Maritime responses and reference to relevant chapter of REF
Concerns were expressed about the structural integrity of the existing bridge.	Routine maintenance would continue on the bridge until it was safely removed.
People asked what would happen to the existing bridge and whether any parts would be reused or commemorated.	Section 6.12 notes the materials used in the bridge would be assessed by the removal contractor before removal and a suitable disposal method would be determined. As noted in Section 6.6, Roads and Maritime would consider how best to commemorate the bridge and recognise its history.
Several people commented they would be sad to see the existing bridge go, but were accepting of the logic behind the decision to do so.	As noted in the Section 6. 6 (refer Appendix C), Roads and Maritime would consider how best to commemorate the bridge and recognise its history.
The existing bridge should be retained for pedestrians and cyclists.	The high cost of bridge maintenance means this suggestion cannot be pursued. This is discussed further in Chapter 2 of this REF.
The existing bridge is a draw-card for tourists who are regularly seen taking pictures or painting it.	The high cost of bridge maintenance means this suggestion cannot be pursued (refer to Chapter 2 about maintenance costs). Roads and Maritime would consider how best to commemorate the bridge and recognise its history. Roads and Maritime has identified a number of other timber truss bridges within the State for preservation.
Maintain access to existing bridge while new bridge is being built.	The existing bridge would remain in use until the new bridge is built and available for use by road traffic. This is discussed in Section 6.9.

5.2.2 Stage 2: Recommended Option Report display (November 2013)

Public participation during Stage 2 of the proposal focused on gathering stakeholder and community feedback on the recommended route option, with information provided in the community update outlining the six options considered and why various options were not progressed.

As well as being invited to comment on the recommended option, residents were asked to comment on the proposed intersection treatments for:

- Grafton/Bridge Street connection (option A and option B)
- Ensbey and Weir Roads connection
- Southern end of Bridge Street.

During Stage 2 opportunities to provide input were communicated through:

- Direct meeting requests
- Newspaper advertisement of community drop-in sessions held on Monday 9 December 2013 (4.00pm to 7.00pm) and Wednesday 11 December 2013 (11.00am to 2.00pm) in Lawrence at the Public Hall
- Distribution of a community update (direct mail and letter box drop)
- Email to the proposal distribution list (stakeholder's invited to register during Stage 1 and new members added by request throughout project)
- Content on the Roads and Maritime website
- Display of the Sportsmans Creek new bridge Recommended Option Report, Roads and Maritime (November 2013) (Roads and Maritime 2013a) along with posters and the community update including feedback form at Lawrence General and Liquor Store, Roads and Maritime office (Grafton) and Council offices (Grafton and Maclean)
- Media releases
- Holding two community drop-in sessions (mentioned above) where posters were displayed and community updates and feedback forms were available.

Nineteen community members signed in at the drop-in sessions. Attendees spoke with members of the proposal team either one-on-one or in small groups to better understand the proposal, ask questions and give feedback.

Individual meetings outside the community drop-in session times were offered to property owners and businesses within the study area to discuss the recommended option and any potential impacts on their properties/businesses. Forty formal feedback forms were returned.

Generally, the recommended option announced in November 2013 was well received by those who attended the drop-in sessions and submitted feedback forms. Of the 40 feedback forms received:

- Twenty-three expressly preferred the recommended option
- Four preferred other options but were happy with the reasoning behind the selection of the recommended option
- Two preferred another option.

Community feedback specifically relating to the existing bridge's removal is outlined in Table 5.2 below. The future of the existing bridge continued to be one of the top 10 topics raised by community participants in the consultation. More information on community input at this project stage is available in the Community Feedback Report, February 2014.

Table 5.2: Stage 2 feedback about bridge removal

Bridge removal comments	Roads and Maritime responses and reference to relevant chapter of REF
The process has been too long and drawn out, and meanwhile money has been wasted on maintaining the existing bridge.	Roads and Maritime would continue to maintain the existing bridge to a safe standard until the new bridge is completed, and advance the project as quickly as is practicable.
One or both of the ends of the existing bridge should be retained as jetties for fishing and recreational use.	It is proposed the northern abutment of the bridge be retained as part of the project (refer to Section 3.1). The southern abutment is to be removed to provide a new larger recreational area combining Sportsmans Park and Flo Clark Park (refer Section 3.1).
The existing bridge is in terrible condition and despite historical significance needs to be replaced; it does not make sense to keep it.	This view supports the overall project intent to remove the existing bridge while seeking ways to commemorate its history. This is discussed further in Section 2.4 and 6.6).
The existing Sportsmans Creek Bridge abutments protect some houses in Bridge Street during flood events – if possible can the abutments to the existing bridge on the southern end of Bridge Street be maintained to ensure this protection continues?	It is proposed the northern abutment of the bridge is retained in response to this comment raised by the community for flood protection (refer to Section 6.3).
The abutment on the southern end of the bridge should be removed and levelled so the park can be all the same height. Improved facilities could include local flora, barbeques, seats and tables.	It is proposed the southern abutment be removed to provide a new larger recreational area combining Sportsmans Park and Flo Clark Park for public use (refer to Section 6.8, 6.10). The final landscape design would be determined by Council in accordance with their landscape master plan.

5.2.3 Stage 3: Announcement of preferred option (August 2014)

In August 2014, the preferred option for the new bridge was announced along with an explanation of the next steps for the proposal.

At Stage 3, the preferred option was communicated via:

- On site media event attended by Roads and Maritime representatives, State Member for Clarence Mr Chris Gulaptis and Mayor Richie Williamson on 28 July 2014
- Distribution of a community update (direct mail and letter box drop)
- Email to the proposal distribution list
- Content on the Roads and Maritime website
- Display of the *Sportsmans Creek new bridge Preferred Option Report* (Roads and Maritime 2014a) along with the community update at Lawrence General and Liquor Store, Roads and Maritime office (Grafton), Council offices (Grafton and Maclean) and Lawrence Post Office
- Media releases.

5.2.4 Stage 4: Review of environmental factors for new bridge (March 2015)

The REF for the new bridge was made available online for public information from March 2015.

Community members were advised the REF was available online for information via:

- Distribution of a community update in March 2015 (direct mail and letter box drop)
- Email to the proposal distribution list
- Content on the Roads and Maritime website
- Media releases were issued during this stage, for example about the REF online and early works commencing.

Project contact details were provided on the community update including phone, email and post but no questions or comments were received about the REF.

5.2.5 Stage 5: Detailed design (July-December 2015)

During the detailed design stage the community was kept informed about the project's progress, including topics such as:

- Start of geotechnical investigation to inform detailed design
- Call for tenders for the building phase of the project
- Detailed design now completed.

The communication methods used included:

- Updates to the Roads and Maritime website's project page
- Several media releases for example about detailed design, geotechnical investigations and a call for building tenders
- Distribution of further community updates in September and December 2015.

The communication channels for the project remained open, so community members could ask questions. No incoming communication was received during this time.

5.2.6 Stage 6: Review of environmental factors for removal of the existing Sportsmans Creek Bridge (March 2015-present)

The proposal is currently within this stage; refer to Section 5.6 of this REF.

5.3 Aboriginal community involvement

An investigation using *Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (Roads and Maritime 2011a) into the potential for Aboriginal Heritage items to occur in the proposal site was conducted by the Roads and Maritime Cultural Heritage Officer and McCardle Cultural Heritage (refer Appendix D).

The assessment concluded no further investigation or any Aboriginal Heritage Impact Permits would be required to carry out the works due to the low probability of discovery of items of Aboriginal significance. The Roads and Maritime Cultural Heritage Officer confirmed acceptance of the Archaeological Due Diligence Assessment report as fulfilling the Roads and Maritime PACHCI requirements and no further consultation would be required with the Aboriginal community (G. Purcell 2014, pers. comm., November).

5.4 ISEPP consultation

The ISEPP contains provisions for public authorities such as Roads and Maritime to consult with local councils and other public authorities before starting certain types of development. Consultation has been carried out throughout the design development with Council. Additional consultation was carried out with Council and a number of agencies about the REF process for the Sportsmans Creek new bridge (KBR 2015) and follow-up consultation was conducted in September 2015 with Maritime NSW.

A summary of the consultation carried out with Council and agencies, with the relevant applicable ISEPP clauses is shown in Table 5.3.

Table 5.3: ISEPP consultation summary

Infrastructure SEPP Clause	Assessment	REF Section
13 Consultation with councils—development with impacts on council-related infrastructure or services (1) This clause applies to development carried out by or on behalf of a public authority that this Policy provides may be carried out without consent if, in the opinion of the public authority, the development:		
(a) will have a substantial impact on stormwater management services provided by a council, or	Not Applicable	Not Applicable
(b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or	The proposal has the potential impact upon traffic in the LGA.	Section 6.9 and Appendix I
(c) involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council, or	Not Applicable	Not applicable
(d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or	Not Applicable	Not applicable
(e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or	The proposal would require the temporary closure of Flo Clark Park during removal and alterations to Flo Clark Park and Sportsmans Park once work is completed.	Section 6.8
(f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the *Roads Act 1993* (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).	The proposal would involve work on local roads.	Section 6.9
(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies unless the authority or the person has: (a) given written notice of the intention to carry out the development to the council for the area in which the land is located, and (b) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.	Correspondence was issued to Council on 17 July 2014 notifying of the REF assessment, the intention to carry out development and requesting any comment for inclusion. A response was received 21 October 2014 indicating Council has no further comment for inclusion in the REF or	Section 5. Appendix J

Infrastructure SEPP Clause	Assessment	REF Section
	with the proposal.	
14 Consultation with councils-development with impacts on local heritage (1) This clause applies to development carried out by or on behalf of a public authority if the development: (a) is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area, and (b) is development that this Policy provides may be carried out without consent. (2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies unless the authority or the person has: (a) had an assessment of the impact prepared, and (b) given written notice of the intention to carry out the development, with a copy of the assessment, to the council for the area in which the heritage item or heritage conservation area (or the relevant part of such an area) is located, and (c) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given	The proposal would require the removal of an item of local heritage significance listed on the Clarence Valley LEP, the Sportsmans Creek Bridge. Additionally, the work would be carried out within the Lawrence Conservation Area. Correspondence has been issued to Council as noted above, including the provision of the Statement of Heritage Impact (SOHI). A response was received from Council on 8 March 2016 raising matters relevant to the building of the new bridge, and accepting the bridge removal as part of the agreed Roads and Maritime Timber Truss Bridge Conservation Strategy.	Section 6.6 Appendix B, C, J
15 Consultation with councils-development with impacts on flood liable land (1) In this clause, 'flood liable land' means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Floodplain Development Manual: the management of flood liable land published by the New South Wales Government and as in force from time to time. (2) A public authority, or a person acting on behalf of a public authority, must not carry out, on flood liable land, development that this Policy provides may be carried out without consent and that will change flood patterns other than to a minor extent unless the authority or person has: (a) given written notice of the intention to carry out the development to the council for the area in which the land is located, and (b) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.	The proposal is located within Flood liable land in accordance with Council flood mapping documents. Consultation has been carried out by Roads and Maritime with Council about the flood modelling. The outcome of the flood study prepared in KBR (2015) determined the removal of the bridge would not adversely affect the flood patterns within the floodplain. The northern abutment and dry stone wall which presently provides flood protection for houses on Bridge Street would also remain.	Section 6.3
16 Consultation with public authorities other than councils (1) A public authority, or a person acting on behalf of a public authority, must not carry out specified development that this Policy provides may be carried out without consent unless the authority or person has: (a) given written notice of the intention to carry out the development to the specified authority in relation to the development, and (b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given. (2) For the purposes of subclause (1), the following development is 'specified development' and the following authorities are	Clauses (a) - (d) and (f) do not apply to the proposal development. Consultation with NSW Maritime was carried out on 17 July 2014 and 25 August 2014 as part of the Sportsmans Creek new bridge REF (KBR 2015). Comments were addressed as part of the earlier REF assessment process. Follow up consultation on 7 September 2015. A response received 30 September 2015 confirmed no changes to the previously provided comments in 2014.	Section 5, 6.9 Appendix J

Infrastructure SEPP Clause	Assessment	REF Section
'specified authorities' in relation to that development: (a) development adjacent to land reserved under the *National Parks and Wildlife Act 1974* -the Department of Environment and Climate Change, (b) development adjacent to a marine park declared under the *Marine Parks Act 1997* -the Marine Parks Authority, (c) development adjacent to an aquatic reserve declared under the *Fisheries Management Act 1994* -the Department of Environment and Climate Change, (d) development in the foreshore area within the meaning of the *Sydney Harbour Foreshore Authority Act 1998* -the Sydney Harbour Foreshore Authority, (e) development comprising a fixed or floating structure in or over navigable waters-the Maritime Authority of NSW, (f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)-the NSW Rural Fire Service.		

5.5 Government agency and stakeholder involvement

5.5.1 Department of Primary Industries (DPI) - Fishing and Aquaculture

In addition to the ISEPP consultation, Roads and Maritime consulted with DPI (Fishing and Aquaculture) under Section 199 of the *Fisheries Management Act 1994* to obtain advice on requirements for both bridge construction and removal. Follow-up consultation was carried out in September 2015 to confirm whether there were any additional requirements, after the decision to separate the REF assessments. A response was received on 9 September 2015 confirming the previous requirements still apply, and has been included in Appendix J.

A summary of the requirements which have been incorporated into Sections 6.1.6, 6.2.5 and 6.3.6 includes:

- Use of the 'Blue Book' Managing Urban Stormwater: Soils and Construction fourth edition (Landcom 2004)
- Referral of a late draft of the REF to Fisheries NSW and consideration of the matters raised
- Address the REF requirements in Section 3.3 of Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update) (DPI 2013).

An additional recommendation was made by the department to consider facilitating the establishment of River Mangroves near the upstream and downstream abutments on either side of the Creek. This comment was discussed with Council and it was determined it was unable to be carried out as part of the proposal.

5.5.2 Office of Environment and Heritage (OEH)

OEH was consulted in regard to the proposal and a response was received on 27 August 2014. The letter is contained in Appendix J and Attachment 1 of the correspondence lists the requirements for the REF. Table 5.4 shows the sections in which requirement are addressed.

Table 5.4: OEH requirements

Issue	REF Section
General information – including proposal objectives	2.3
The proposal – description	3
The proposal area – all processes and activities relating to the site	3 and 6
Aboriginal Cultural Heritage – assessment	6.7 and Appendix D
Biodiversity – flora and fauna characteristics, field survey, impacts and mitigations	6.1 and Appendix F
Historic Heritage	6.6 and Appendix B, C
Coast, Estuaries and Floodplains	6.3
National Parks and Wildlife Estate	6.1 and Appendix F

A 14-day notification is required to OEH for the removal of the Sportsmans Creek Bridge from the Roads and Maritime section 170 register.

Further consultation was also carried out with OEH about the threatened microbat species as part of the SIS process. Consultation would continue with OEH as part of obtaining the concurrence approval. This is discussed further in Appendix G.

5.5.3 Office of Water

The Office of Water was consulted during the building REF process about potential requirements for permits for the extraction of groundwater during excavation.

As excavation work required for the removal of the bridge would not intercept groundwater, the Office of Water were not consulted further during this REF and best practice management measures have been incorporated into this REF to ensure the protection of riparian land as discussed in Sections 6.1 and 6.3.

5.6 Ongoing or future consultation

The bridge removal REF addresses the key issues raised during consultation carried out to date with the community and stakeholders, namely:

- Continuity of access across Sportsmans Creek during building and removal, Section 6.3
- Flood mitigation consideration to homes on Bridge Street, Section 6.3
- Acknowledgement of history of the bridge and appropriate commemoration, Section 6.6
- Treatment of abutments of the existing bridge and potential for recreational use, Sections 6.3 and 6.8
- Integration of Sportsmans Park with Flo Clark Park on southern side of the bridge, Sections 6.8, 6.10.

Roads and Maritime also notes the public expectation of expedient project delivery and will continue to strive to deliver the new bridge quickly with due consideration to the interim upkeep cost of the existing bridge.

The bridge removal REF will go on public display and all submissions will be formally considered, with responses provided in a submissions report to be made available to the public.

Ongoing or future consultation activities would be as stipulated by the safeguards and management measures in this REF and would likely involve:

- Affected residents and landholders
- Businesses and service providers (such as the Lawrence bus service and Lawrence Tavern)

- Utility owners about temporary service relocations
- NSW Maritime
- Council
- DPI (Fishing and Aquaculture)
- OEH as part of the SIS process.

6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of:

- The factors specified in the guidelines *Is an EIS required?* (DUAP 1999) and *Roads and Related Facilities* (DUAP 1996) as required under clause 228(1)(b) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix H.
- Potential impacts on matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999*.

Site-specific safeguards are provided to ameliorate the identified potential impacts.

6.1 Biodiversity

A biodiversity assessment was completed by GeoLINK (2016) and is provided in Appendix F. The biodiversity assessment addressed the removal of the bridge and associated work. This section summarises the desktop and field investigations carried out as part of the biodiversity assessment. The full report should be referred to for detailed records of flora and fauna survey methodologies and results.

For the purposes of the Biodiversity Assessment, the following definitions apply:

- 'The site' refers to the area which is subject to direct impacts inclusive of permanent and temporary works and includes the existing Sportsmans Creek Bridge and its approaches, Sportsmans Park and Flo Clark Park
- 'The investigation area' refers to the site plus a 100 metre buffer which includes areas that may be affected by the proposal, either directly or indirectly
- 'The locality' refers to the area within a 10 kilometre radius of the site.

Figure 6.1 shows the subject site and investigation area.

The Biodiversity Assessment identified a potential significant impact upon the Large-footed Myotis microbat species and a SIS has been prepared (refer to Appendix G). Specific mitigation measures have been proposed as part of a Microbat Management Plan within the SIS to address potential impacts. No other threatened species would be impacted by the proposal.

6.1.1 Existing environment

Desktop assessment method

A desktop assessment of the following databases was carried out to identify potential biodiversity constraints associated with the site:

- The BioNet Atlas of NSW Wildlife (OEH) to identify threatened flora/fauna species and EECs known to occur within the 10 kilometre radius search area on 19 August 2015
- The *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool (PMST) for federally listed threatened flora/fauna species and ecological communities predicted to occur within a 10 kilometre radius search area on 8 December 2015
- The Fisheries Records Viewer for threatened aquatic fauna occurring within the Clarence Valley LGA (DPI (Fishing and Aquaculture) on 8 December 2015

- Current noxious weed declarations for the Clarence Valley Local Control Authority (LCA) area (DPI) on 8 December 2015.

An assessment of the likely occurrence of these species within the investigation area is provided in the Biodiversity Assessment (Appendix F).

Field survey method

Flora assessment

A flora assessment of the investigation area was conducted on 8 July 2014 to enable vegetation to be described and to provide an indicative list of flora species occurring at the site (refer to Figure 6.1). The survey method included targeted searches in areas of preferred habitat for threatened flora species identified in desktop database searches as having potential to occur in the investigation area.

Plant species were identified and recorded in the field with the aid of identification keys as required. Vegetation types recorded were compared with Endangered Ecological Community (EEC) descriptions under the NSW *Threatened Species Conservation Act 1995*, and Threatened Ecological Communities (TECs) listed by the Commonwealth Threatened Species Scientific Committee under the Federal *Environment Protection and Biodiversity Conservation Act 1999*.

Fauna assessment

A fauna habitat assessment of the site was carried out on 8 July 2014 in addition to previous survey work carried out (refer KBR 2015) to identify threatened microbats on the Sportsmans Creek Bridge.

Fauna habitat features were observed and the suitability for threatened species recorded in the locality. Habitat surveys targeted threatened species and their habitat requirements.

Bird surveys were carried out during afternoon/dusk on 3 and 26 August 2015. They involved recording all bird species observed, or heard calling within the investigation area.

Microbat surveys

Direct inspections of the bridge for roosting microbats were carried out on 16 December 2013 and 3 February 2014. The two inspection periods were proposed to coincide with the two Large-footed Myotis breeding events in the north coast of NSW (October to mid-April inclusive).

Surveys for other Large-footed Myotis breeding colonies were carried out on 3 and 4 February 2014. They were carried out within a 10 kilometre radius of Sportsmans Creek Bridge and involved direct inspection of other accessible road drainage structures on public land.

Figure 6.1: Subject site and investigation (study) area

Flora

The BioNet Atlas of NSW Wildlife (OEH) and PMST identified records of 18 threatened flora species listed under the *Threatened Species Conservation Act 1995* and/or *Environment Protection and Biodiversity Conservation Act 1999* previously recorded or having habitat within the search area (10 kilometre radius around the site).

Of these records, one specimen of the threatened flora species, Durobby (*Syzygium moorei*) is located in the south-western corner of Flo Clark Park (refer to Figure 6.2). The tree is a planted specimen and is of low conservation significance due to it occurring outside its natural range. No other threatened flora species were recorded.

One vegetation community within Sportsmans Park on the edge of the Clarence River represents a low condition form of *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EEC listed under the *Threatened Species Conservation Act 1995* (refer to Figure 6.2). This community is highly degraded and has an open canopy with vine weeds smothering mature Swamp Oak. No other *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999* listed EECs occur within the investigation area.

An assessment of the likely occurrence of these species within the investigation area is provided in Appendix F.

Vegetation communities

Vegetation within the investigation area comprises:

- Managed parkland (Flo Clark Park and Sportsmans Park) containing:
  - Planted exotic and native trees including Bottlebrush (*Callistemon sp.*), Cadagi (*Corymbia torreliana*), Jacaranda (*Jacaranda mimosifolia*), African Tulip Tree (*Spathodea companulata*) and Water Gum (*Tristaniopsis laurina*) (refer to Plate 6.1 and Plate 6.2).
  - Highly modified/disturbed vegetation considered to be of low conservation value
- Riparian zones (cleared and Swamp Oak forest)
  - Dominated by exotic grasses and weeds, including Para Grass (*Urochloa mutica*) and Coastal Morning Glory (*Ipomoea cairica*) (refer to Plate 6.3).
  - The southern bank of Sportsmans Creek contains Common Reed (*Phragmites australis)* and exotic Para Grass (refer to Plate 6.4)
  - Cleared of aquatic vegetation
  - Seagrass and saltmarsh in the Clarence River to the east of the site
  - Highly degraded Swamp Oak forest within Sportsmans Park on the Clarence River
- Sugar cane (south of Ensbey Road)
- Cleared pasture land (western side of Grafton Street) containing:
  - Grass species dominated by Kikuyu (*Pennisetum clandestinum*), Common Couch (*Cynodon dactylon*) and *Paspalum* spp.

These areas are shown on Figure 6.2. Flora species within the investigation area are listed in Appendix F.

Noxious weeds

Two listed 'Noxious weeds' declared for the Clarence Valley LCA were detected within the riparian zone during the survey (refer Table 6.1). The invasion, establishment and spread of Lantana are listed as a Key Threatening Process (KTP) to the habitat of threatened species listed under the *Threatened Species Conservation Act 1995 Act*.

Table 6.1: Listed noxious weeds identified within the site

Scientific name	*Common name*	*Listing*	*Extent/location*
Cinnamomum camphora	Camphor Laurel	N4	A number of Camphor Laurels were recorded on the site in the riparian zone.
Lantana camara	Lantana	N4, Weed of National Significance (WoNS)	A small number of occurrences occur in the riparian zone.

Figure 6.2: Biodiversity features

Plate 6.1: View north-east towards Sportsmans Creek Bridge showing isolated trees within Flo Clark Park

Plate 6.2: View south over Sportsmans Park

Plate 6.3: View east showing un-mown riparian vegetation

Plate 6.4: Exotic Para Grass on the steep southern bank

Microbats

Potential microbat roosting habitat occurs throughout Sportsmans Creek Bridge (refer to Plate 6.5) and includes:

- Split (two piece) stringers (refer to Plate 6.6)
- Decking gaps (below longitudinal decking, between transverse decking and most above or directly beside the middle three stringers) (refer to Plate 6.7). These features are common across the bridge
- Rotted timber features (primarily girder) (refer to Plate 6.8). Uncommon feature and generally in exposed locations or not well formed.

Bird nests Welcome Swallow (*Hirundo neoxena)* and Fairy Martin *(H. ariel*) and mud dauber wasp nest would also be expected to occur at least periodically and provide mostly non-breeding roosting opportunities.

No hollow-bearing trees, caves or mines occur within the investigation area. While local buildings may provide roosting opportunities for microbat species, previous inspection of the residential dwellings along Sportsmans Creek near the existing bridge (KBR 2015) failed to record any microbats (including the Large-footed Myotis found elsewhere in the investigation area). The potential for the dwellings in the vicinity of the proposal to provide significant microbat roosting habitat is low.

Plate 6.5: View north showing underside of Sportsmans Creek Bridge

Plate 6.6: Two piece (split) stringer

Plate 6.7: Large-footed Myotis in bridge decking

Plate 6.8: Cavity at the end of a rotted girder

Potential microbat foraging habitat

The investigation area comprises a mostly cleared floodplain landscape. It offers potential aerial foraging habitat for microbat species capable of foraging in modified or non-forested coastal landscapes. Aquatic foraging habitat for the Large-footed Myotis is present locally, including Sportsmans Creek and the Clarence River. Aerial and aquatic microbat foraging habitat of similar value occurs throughout the locality.

Microbats at Sportsmans Creek Bridge

About 300 Large-footed Myotis (adults and juveniles) were recorded roosting at Sportsmans Creek Bridge during both the December 2013 and February 2014 surveys. No other microbat species were recorded. Twenty-one roost sites within the bridge were recorded (19 in December 2013 and nine in February 2014); all located above the water in spans 2 and 3. Occupied roosting habitat features included:

- Split (two piece) stringers: Six in total
- Decking gaps: 20 in total.

Other sections of the bridge supported similar structures, providing potential non-breeding bat roosting habitat for other threatened species listed as vulnerable on the *Threatened Species Conservation Act 1995*; the Little Bent-winged Bat (*Miniopterus australis*) and Eastern Bent-winged Bat (*Miniopterus orianae oceanensis*). Signs of previous usage in the bridge were visible, however, were not occupied at the time of the survey.

Surveys for other Large-footed Myotis breeding colonies

The results of the surveys for other Large-footed Myotis breeding colonies within a 10 kilometre radius of the site are provided in the Biodiversity Assessment (Appendix F). Site visits were carried out at 66 drainage structures (five bridges and 61 culverts), of which 55 were able to be inspected for microbats. Microbats or evidence of microbat occurrence was recorded in 10 drainage structures including; Large-footed Myotis, Chocolate Wattled bat (*Chalinolbus gouldii*) and the vulnerable Little Bent-winged Bat.

Only three of the drainage structures inspected were considered to provide potentially suitable Large-footed Myotis breeding habitat, though these were not occupied by this species during the survey and offer potential habitat only for small colonies (less than 30 bats).

Other local Large-footed Myotis breeding colonies

Sportsmans Creek Bridge supports a large breeding colony of Large-footed Myotis. Large breeding colonies are uncommon in the lower Clarence and are not in close proximity to the Sportsmans Creek Bridge (greater than 10 kilometres along waterways which are how Large-footed Myotis would be expected to disperse).

In addition to Sportsmans Creek Bridge, three other Large-footed Myotis breeding colonies were recorded or are known to occur within a 10 kilometre radius of Sportsmans Creek Bridge. Populations are located at the Coldstream Bridge (Pacific Highway), Shark Creek Bridge (Pacific Highway) and a pipe culvert at Pringles Way (refer to Table 3.2, Appendix F).

A review of Large-footed Myotis records from the OEH Wildlife Atlas shows six records of this species have been lodged within 10 kilometres of Sportsmans Creek Bridge. These records include the subject site.

There are no known caves or other subterranean roosting opportunities within the locality for the Large-footed Myotis and the other microbat species. Hollow-bearing trees are uncommon as the local landscape is largely cleared. While Large-footed Myotis hollow-bearing tree breeding roosts may occur within the locality, they are unlikely to support large populations (greater than 30 bats).

Fauna (excluding Large-footed Myotis)

No other threatened fauna species were recorded in the investigation area during the fauna habitat assessments and bird survey. It is considered unlikely the investigation area represents a significant area of habitat for any threatened fauna species (refer to Appendix F).

While the timber truss bridge represents potential non-breeding roosting habitat for the Eastern Osprey (*Pandion cristatus*), there are no known records of Eastern Osprey using the Sportsmans Creek Bridge as a nesting site and the bridge offers low suitability as nesting habitat due to the low truss height.

A list of birds observed is provided within Appendix F. No threatened bird species were recorded or are considered likely to be significantly affected by the proposal.

Wildlife corridors and key habitats

A review of OEH wildlife corridor and key habitat mapping and field survey showed no wildlife corridors or areas of nominated key habitats are associated with the investigation area.

Sportsmans Creek would however act as a local corridor for bird species moving between habitats associated with the upstream reaches of Sportsmans Creek and the Everlasting Swamps and habitats associated with the lower Clarence River.

Fisheries

A search of the NSW DPI (Fishing and Aquaculture) Records Viewer for threatened aquatic fauna did not find any records of threatened aquatic fauna within the locality. The local section of Sportsmans Creek does not provide potential habitat for any *Fisheries Management Act 1994* listed threatened species.

Sportsmans Creek is part of mapped Key Fish habitat within the Clarence Valley LGA. It is likely to provide habitat for a number of fish species, including the Australian Bass (*Macquaria novemaculeata*) which would likely spawn within this estuary. The Creek is a known breeding ground for crustaceans which were observed during the fauna habitat assessment.

Wetlands

Four nationally important wetlands listed in the NSW Directory of important wetlands in NSW Spatial Database were identified in the *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool (PMST) as occurring within a 10 kilometre radius of the site. These are:

1. Clarence River Estuary
2. Everlasting Swamp
3. The Broadwater
4. Upper Coldstream.

Two of these wetlands occur in proximity to the investigation area; Everlasting Swamp which occurs about 500 metres west of the investigation area and the Clarence River Estuary which occurs within the Clarence River immediately east of the existing Sportsmans Creek Bridge.

6.1.2 Policy setting

A number of key acts relate to the protection of biodiversity and management of ecological impacts, including the federal *Environment Protection and Biodiversity Conservation Act 1999* and NSW *National Parks and Wildlife Act 1995*, *Fisheries Management Act 1994*, *Threatened Species Conservation Act 1995*, *Noxious Weeds Act 1993* and Section 5A of the *Environmental Planning and Assessment Act 1979*. These are discussed in Chapter 4 of this REF.

Public authorities are required to consider the impact of their activities upon the local environment under clause 228 of the Environmental Planning and Assessment Regulation 2000. More specifically, authorities must address any impacts on the habitat of protected fauna and whether the proposal is likely to endanger any species of animal, plant or other form of life, whether living on land in water or in the air, as per clause 228(2)(f) and (g).

As the proposal would require earthworks and disturbance to the bed and banks of Sportsmans Creek, notification is required to the Department of Primary Industries (Fishing and Aquaculture) as per Section 199 of the *Fisheries Management Act 1994*.

6.1.3 Criteria

The criteria adopted for assessing the impact of the proposal would be to minimise impacts upon potential habitats of identified threatened species and minimise disturbance to native vegetation and the local terrestrial and aquatic environment as result of the proposal. The mitigation measures have been prepared in accordance with the *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA 2011a).

6.1.4 Potential impacts

Biodiversity impacts (excluding Large-footed Myotis)

The investigation area comprises managed parkland, predominantly cleared of native vegetation. Remnant vegetation along the Clarence River and Sportsmans Creek is highly degraded and has low diversity with significant weed cover. Terrestrial fauna habitat values are low as the site is modified, however, Sportsmans Creek provides suitable habitat for aquatic fauna.

The likely key biodiversity impacts include:

- Disturbance to/removal of planted parkland vegetation within Flo Clark Park and Sportsmans Park as required, retaining riparian vegetation on the banks of Sportsmans Creek
- Disturbance to/removal of riparian vegetation on the southern bank of Sportsmans Creek during the establishment of the temporary 5 metre long pontoon to provide waterway access for barge transport to the bridge
- Potential disturbance to aquatic habitat/vegetation downstream within Sportsmans Creek/ Clarence River during in-stream removal works and the pontoon establishment, depending on the selected removal methodology.

Provided the safeguards in Section 6.1.6 are implemented the potential biodiversity impacts are likely to be minimal. Potential indirect impacts to local habitats through water quality and sedimentation impacts would be managed through implementation of the safeguards discussed in Section 6.2.5.

Statutory Assessments

The *Threatened species assessment guidelines: the assessment of significance* (DECC 2007) was reviewed when determining if a significant impact is likely on state-listed threatened species, populations or ecological communities.

Seven-part tests of significance prepared in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* for three state-listed threatened species; Large-footed Myotis, Little Bent-winged Bat and Eastern Bent-winged Bat were conducted (refer to Appendix F). These assessments concluded:

- **Large-footed Myotis**: The removal of the timber truss bridge has the potential to significantly affect the local Large-footed Myotis population. A SIS has been prepared for the species and the potential impacts are discussed further below.
- **Little and Eastern Bent-winged Bats**: A significant impact on these species is unlikely.

One vegetation community, within the far eastern portion of Sportsmans Park on the edge of the Clarence River, represents a highly degraded/disturbed low condition form of *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EEC. A seven-part test of significance concluded the proposed removal of the existing timber truss Sportsmans Creek Bridge is unlikely to significantly impact upon this community.

Large-footed Myotis

Potential impacts and associated risk of the proposal on Large-footed Myotis are listed in Table 6.2. They are divided into ‘direct impacts’ (those that directly affect habitat and individuals) and ‘indirect impacts’ (occur when removal activities affect habitat and individuals other than direct loss).

Key potential impacts include habitat removal and disruption to the breeding cycles which have the potential to significantly impact on the microbat population and potential mortality/ injury during the bridge removal. The statutory assessments identified further assessment would be required in the form of a SIS as a precautionary approach, as the impact of the bridge removal may be significant on the species. The SIS has been prepared and is included in Appendix G. Safeguards for the

protection of the Large-footed Myotis have been proposed in Section 6.1.6, with further information provided in Table 5.1 of Appendix F and as part of the Microbat Management Plan in the SIS (Appendix J of Appendix G). The final safeguards for the management of impacts to the microbat species are subject to approval by OEH as part of seeking their concurrence.

Key mitigation strategies for the local Large-footed Myotis population include:

1. Provision of compensatory microbat roosting habitat on the new concrete Super-T bridge before removal of the existing bridge
    - Compensatory breeding roosting habitat for the Large-footed Myotis would be incorporated into the new concrete bridge and available for microbat usage before the exclusion and removal of the existing bridge. Compensatory roosting habitat is discussed further in the SIS (refer Appendix G).

2. Staged microbat exclusion outside the Large-footed Myotis breeding season from the existing Sportsmans Creek Bridge before removal
    - Staged microbat exclusion from the timber truss bridge would be carried out after building the new bridge to ensure no microbats are able to gain access to the underside of the timber truss bridge
    - Details of staged microbat exclusion methodology and timing is provided in the Microbat Management Plan as part of the SIS (refer Appendix J of Appendix G).

The exclusion methods proposed have been effective on other similar bridge and culvert works projects involving breeding Large-footed Myotis colonies. Monitoring pre-, during and post-exclusion is also proposed to ensure any issues can be identified and addressed at the earliest possibility.

Table 6.2: Potential impacts of the proposal on Large-footed Myotis

Potential impact (risk)	Impact	Safeguards and Management Measures
Direct impacts		
Habitat removal (definite): The proposal would result in the removal of the existing timber truss Sportsmans Creek Bridge and replacement with a new concrete bridge about 100 m upstream. The removal is proposed to start at least three months after completion of the concrete structure for the new bridge.	Significant – the proposal would remove habitat occupied by a large Large-footed Myotis breeding colony. The colony's response is unknown but may include adoption of alternative roosting habitat within the locality, either as a single unit or fragmented into smaller groups. Alternative roosting habitat locally is mainly provided by culverts, most of which are susceptible to flooding which poses a risk to the future breeding success of the population. The colony or part of the colony may also disperse and join part of other colonies in the broader region (eg McFarlane Bridge). The species' ability to do this is unknown.	• Build compensatory breeding roosting habitat on the new bridge based on known Large-footed Myotis breeding habitat structures in the region. Three different types of compensatory breeding roosting habitat would be provided on the new bridge: – Microbat habitat 1: Walkway Super-T join void. – Microbat habitat 2: Walkway void. – Microbat habitat 3: Pre-cast parapet. • One opportunistic alternative microbat roosting habitat feature would be provided on the new bridge: – Microbat habitat 4: Super-T girder joins. • Staged microbat exclusion from the timber truss bridge would be carried out following building of the new bridge and before removal of the timber truss bridge. This will ensure no microbats are able to gain access to the underside of the timber truss bridge. The aim is to have the existing timber truss bridge completely free of roosting microbats before bridge removal. • Monitoring as per Table 5.1. Appendix F.
Disruption to breeding (mating or birthing) cycle (high): The proposal poses a high risk of disruption to the breeding cycle of Large-footed Myotis through removal of the location within which this currently occurs being Sportsmans Creek Bridge.	Potentially significant – the timber truss Sportsmans Creek Bridge supports a large breeding colony of Large-footed Myotis. Depending on the response to habitat removal and building of the new roosting habitat, breeding may not occur within the local area.	• Provide compensatory breeding roosting habitat on the new bridge. • Bridge removal is proposed to start at least three months after completion of the concrete structure for the new bridge to allow microbats to become accustomed to new available habitat. • Carry out staged exclusion of microbats from the timber truss bridge before bridge removal and outside the Large-footed Myotis breeding period, when juveniles are flightless and dependent. • May to September is the optimal time to exclude microbats to avoid impacts on the Myotis breeding population. • Monitoring as per Table 5.1. Appendix F.

Potential impact (risk)	Impact	Safeguards and Management Measures
Mortality or injury during bridge removal (high): The proposal poses a high risk of mortality and injury to microbats roosting at the bridge during removal. There is a risk to juvenile microbats if the removal or exclusion works were scheduled during the Large-footed Myotis breeding period or when juveniles are flightless and dependent.	Potentially significant – Sportsmans Creek Bridge supports a large breeding colony of Large-footed Myotis.	• Provide compensatory breeding roosting habitat on the new bridge • Carry out staged exclusion of microbats from the timber truss bridge before bridge removal and outside the Large-footed Myotis breeding period, when juveniles are flightless and dependent. • May to September is the optimal time to exclude microbats to avoid impacts on the Myotis breeding population. • Exclusion installation programming would allow for flexibility to avoid torpor periods (during significant cold and/or wet weather). • Where > 20 microbats are present at the time of exclusion installation, install exclusion at nights after fly-out. • Check exclusion devices to avoid microbat entrapment or breaches. • Ecologist to be present during exclusion installation to ensure the welfare of animals is maintained; and available for call-outs during bridge removal.
Fly-way impacts (unlikely): The new bridge would be of a similar height above the water as the existing bridge, with similar distances between piers for the main structure.	Unlikely – No fly-way impacts is considered likely.	N/A
Indirect impacts		
Foraging habitat degradation (low): The removal of the bridge poses a risk of water quality/flow impacts which could reduce the foraging habitat values of local waterways.	Low – After the removal of the bridge, it is unlikely the flow of Sportsmans Creek would be modified such that foraging habitat values of Sportsmans Creek would be significantly impacted.	• Removal of the bridge would be carried out in accordance with *Roads and Maritime QA Specification G36 Environmental Protection and Specification G38 Soil and Water Management* ensuring the risk and the magnitude of potential indirect impacts which may affect the foraging carrying capacity of the investigation area is low.
Reduction in habitat connectivity: Removal of Sportsmans Creek Bridge may result in a break to the linkage of the network of roost sites.	Low – No direct habitat fragmentation/impacts to corridors would occur as a result of the proposal and barriers to fly-ways for microbats moving along Sportsmans Creek are unlikely to be created. Medium – Removal of Sportsmans Creek Bridge would remove a roosting site within the lower Clarence located in nightly movement distance of other local roosts. The relationship between roost sites in the locality is unknown.	• Provide compensatory breeding roosting habitat on the new bridge. • Monitoring as per Table 5.1. Appendix F.

6.1.5 Safeguards and management measures

The mitigation measures to manage potential impacts upon biodiversity would be in accordance with Section 4.8 of the Roads and Maritime QA Specification G36 with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Disturbance to biodiversity values within the investigation area	• Tree protection zones will be implemented around trees to be retained in proximity to the proposed works in accordance with the *Australian Standard 4970-2009 Protection of trees* on development sites to prevent machinery impacts to trees. • If unexpected threatened fauna or flora species are discovered, works will cease immediately and the Roads and Maritime Unexpected Threatened Species Find Procedure in the Roads and Maritime Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process) is to be followed. • Should injured fauna be found on the site, local wildlife care groups and/ or local veterinarians are to be contacted immediately and arrangements made for the immediate welfare of the animal. The phone number of the local WIRES group (ph: 1800 094 737) or Northern Rivers Wildlife Carers (ph: 6643 4055) is to be provided to the site personnel. • Environmental safeguards will be communicated to all personnel as part of an environmental site induction, and repeated where appropriate at Toolbox Sessions before starting relevant work components. • To minimise sedimentation and water quality impacts to waterways and wetlands, the safeguards listed in Section 6.2.5 of this REF will be implemented.	Contractor	Pre-removal and during works
Aquatic biodiversity/ protection of fish habitat	• Direct disturbance of aquatic fauna, habitat and riparian zones will be minimised in accordance with Roads and Maritime *Biodiversity Guidelines - Guide 10 Aquatic habitat and riparian zones (2011).* • Riparian vegetation (such as near the Clarence River within Sportsmans Park) in areas other than in the vicinity of the work area, are to be designated as 'no-go zones'. • To minimise in-stream works impacting aquatic fauna movement, the safeguards listed in Section 6.3.6 of this REF will be implemented.	Contractor	Pre-removal and during works

Impact	Environmental safeguards	Responsibility	Timing
Spread of weeds	• Weed and pathogen hygiene protocols will be implemented in accordance with *Guide 6 (Weed Management) and Guide 7 (Pathogen) of the Roads and Maritime Biodiversity Guidelines 2011* to avoid introduction and spread of weeds and pathogens to and from the site. • The Noxious weeds identified will be managed in accordance with the Council control requirements and for noxious weed classes as follows: ○ N4 (Camphor Laurel, Lantana): The growth and spread of these plants must be controlled according to the measures specified in a management plan published by the local control authority, titled Class 4 Weed Control Management Plan (Clarence Valley Council 2012).	Contractor	During removal works
Microbat habitat removal / Reduction in habitat connectivity	• Staged exclusion of the microbat species from the timber truss bridge in accordance with the safeguards proposed in this REF and the Microbat Management Plan in Appendix J of Appendix G. • Compensatory breeding roosting habitat is to be provided on the new bridge based on known Large-footed Myotis breeding habitat structures in the region. Three different types of compensatory breeding roosting habitat will be provided on the new bridge as described in Appendix F and Appendix G. • Monitoring as per Table 5.1 of Appendix F	Contractor / Roads and Maritime	Pre-removal works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F
Disruption to microbat breeding (mating or birthing) cycle / Mortality or injury during bridge removal:	• Compensatory breeding habitat in the new bridge is to be provided. • Staged microbat exclusion from the timber truss bridge will be carried out after finishing the concrete structure for the new bridge containing the new bat habitat and before removal of the timber truss bridge. • The aim is to have the timber truss bridge completely free of roosting microbats before bridge removal. Additional safeguards apply as follows: ○ Bridge removal is to start at least three months after finishing the concrete structure for the new bridge containing the new bat habitat to allow microbats to become accustomed to new available habitat. ○ Carry out staged exclusion of microbats from the timber truss bridge before bridge removal and outside the Large-footed Myotis breeding period, when juveniles are flightless and dependent. ○ May to September is the optimal time to exclude microbats to avoid impacts on the Myotis breeding population.	Contractor / Roads and Maritime	Pre-removal and during works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F.

Impact	Environmental safeguards	Responsibility	Timing
	○ The scheduling of the exclusion installation shall allow for flexibility to avoid torpor periods (during significant cold and/ or wet weather). ○ Where greater than 20 microbats are present at the time of exclusion installation, install exclusion at nights after fly-out. ○ Check exclusion devices to avoid microbat entrapment or breaches. ○ Ecologist to be present during exclusion installation to ensure the welfare of animals is maintained; and available for call-outs during bridge removal. • Monitoring as per Table 5.1 of Appendix F. • All personnel involved with bridge exclusion of microbats and removal are to be trained in their responsibilities, signs of and how to search for microbats, what to do if microbats are encountered, personal safety practices and the requirements of the Microbat Management Plan (Appendix J of Appendix G).		
Microbat Foraging habitat degradation	• To minimise sedimentation and water quality impacts to waterways and wetlands, the safeguards listed in Section 6.2.5 of this REF will be implemented.	Contractor	During removal works
Monitor Large-footed Myotis numbers	• Direct inspection of the new bridge (targeting compensatory roosting habitat). Methodology as for Pre-exclusion Monitoring as per Table 5.1 of Appendix F and the Microbat Management Plan (Appendix J of Appendix G).	Roads and Maritime	Post-removal works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F.

6.2 Soils, contamination and water quality

A geotechnical investigation report was completed for the proposal area by Golder Associates in March 2014 (Golder Associates 2014). The report is provided in Appendix K and provides the basis for this section of the REF. The full report should be referred to for detailed descriptions of survey methodologies, laboratory testing results and subsurface conditions.

The geotechnical investigation area referred to in this section of the REF is shown on Figure 1 of Appendix K. The assessment identified potential contaminated fill within the southern abutment and potential Acid Sulfate Soils within the banks and bed of Sportsmans Creek. Mitigation measures have been proposed to address potential impacts on water quality and soils.

6.2.1 Existing environment

Topography

The topography of the investigation area is characterised by typically low elevation flood plain terrain associated with the Clarence River and Sportsmans Creek systems. The typical site elevation within the investigation area on the southern bank of Sportsmans Creek ranges between three metres to five metres Australian Height Datum (AHD). Elevations on the northern bank vary ranging from one metre to five metres AHD.

Geology and soils

A review of the 1:250,000 scale NSW Department of Mineral Resources 1970 Geological Map 'Maclean' shows the investigation area is underlain by the geological rock units of the Bundamba Group. The majority of the area is underlain by rocks of the Late Jurassic Grafton Formation, consisting of interbedded, clayey siltstone, claystone, sandstone and minor coal seams.

The rock units shown on the 1:100,000 Grafton Area Coastal Quaternary Geology Map indicate the majority of the Lawrence area are overlain by Holocene Alluvial Deposits, including levee and floodplain deposits of silts, clays, sands, organic mud and minor gravels. There is a small area of in-channel bar deposits near the mouth of Sportsmans Creek, consisting of fluvial sand, clay, gravel and silt.

A number of geotechnical investigations were carried out at the locations as shown on Figure 1, Appendix K. The results of the testing showed the subsurface conditions consist of fill/topsoil to a depth of 0.3 metres comprising variable clayey sand to silty clay. Beneath this, a layer of low strength alluvial deposits of silty to sandy clay, soft to firm on the south bank to depths of 31 metres and depths of four metres on the north bank. A sand, medium grained, loose to very loose, saturated layer was also interbedded with the above layer. Beneath these layers, fine grained sandstone and siltstone was encountered at depths greater than 30 metres on the southern bank and greater than four metres on the northern bank. These results are consistent with the mapping reviewed.

Acid Sulfate Soils (ASS)

A search of the Australian Soil Resource Information System (ASRIS) indicates the investigation area has a high probability of the presence of potential acid sulfate soils (PASS). This is shown on Figure 6.3. A review of the Clarence Valley LEP mapping showed the proposal area is located in soils mapped as either Class 2 or Class 3 ASS (high risk at greater than one to two metres depth), with the sediments in Sportsmans Creek mapped as Class 1 ASS, meaning the sediments are high risk.

Laboratory testing was carried out of samples taken during geotechnical work to assess the presence of potential or actual ASS. The results showed all samples exhibited some or all of characteristics of Potential Acid Sulfate Soils (PASS) to a depth from near the surface at 0.3 metres to 5.95 metres. Three samples which showed a high reaction rate were tested further. The results of this testing showed two samples indicated exceedance of Acid Sulfate Soils Management Advisory Committee (ASSMAC) Guidelines.

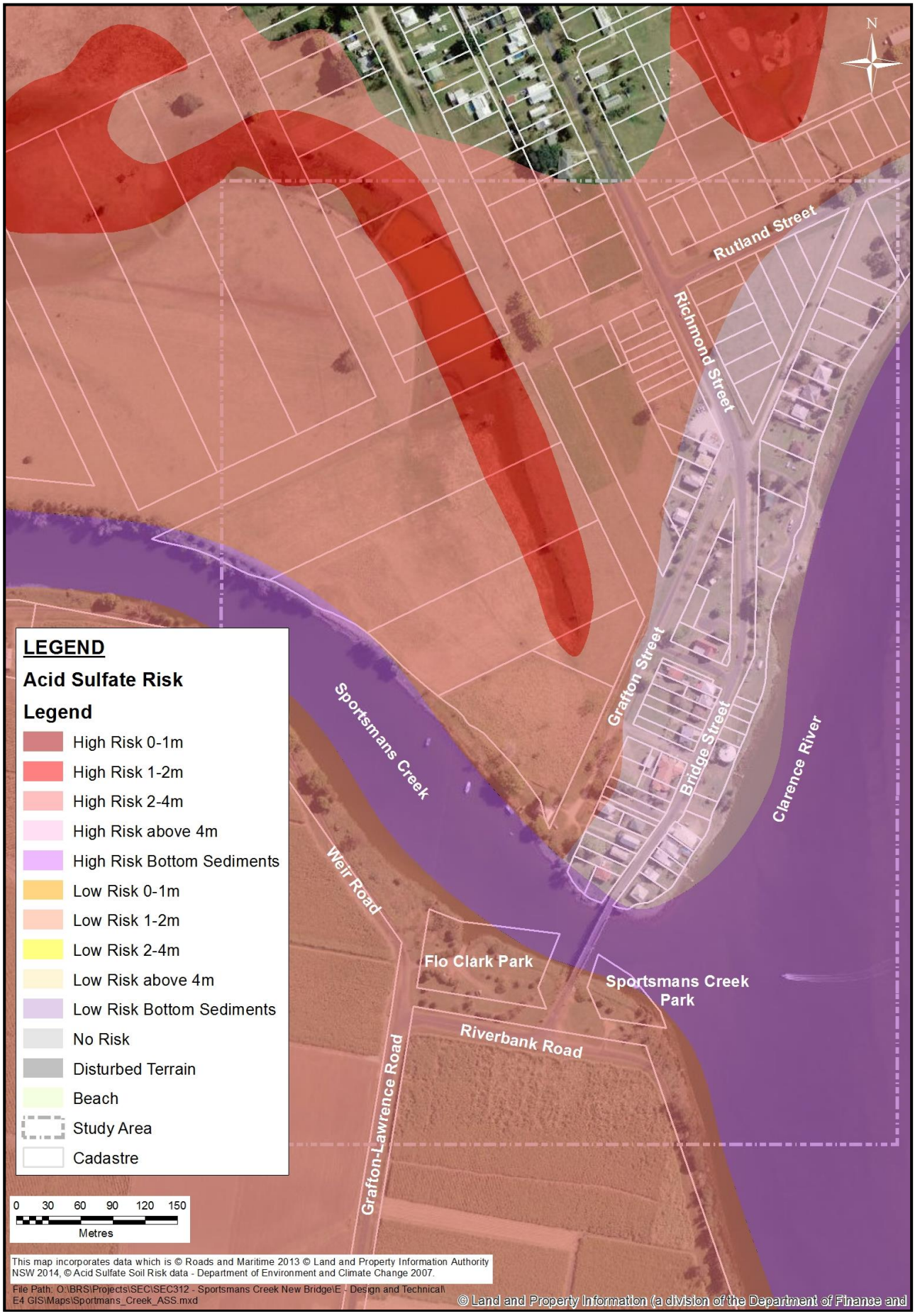

Figure 6.3: ASS mapping

Contamination

A desktop review was carried out by Golder Associates (2013) to identify any potential sources of contamination, including reviews of:

- Publically available historical information, including aerial photography
- Regulatory databases and notices, including the EPA registers
- Publically available hydrological, geological and soils information relevant in the investigation area.

Potential sources included agricultural land use impacts, namely pesticides or herbicides and local fill materials in the bridge abutments.

A search of the DPI cattle dip site locator completed on 18 March 2016 returned 11 sites located within the town of Lawrence. No records were located within the investigation area. No records were identified on the EPA Register of Contaminated Sites and one record on the *Protection of the Environment Operations Act 1997* Public Register showed a private property issued a clean-up notice 1.3 kilometres north of the existing bridge next to the Lawrence water reservoir.

Contamination testing was carried out and showed contaminants were not present in the majority of testing locations. One sample in the investigation area contained benzo(a) pyrene which exceeded the trigger values set in the DECC (2009) guidelines for disposal as general solid waste and the National Environment Protection Council (NEPC 2013) Ecological Screening Level (ESL) for coarse soils. The assessment concluded that this was attributed to shallow fill and this exceedance was considered minor. Laboratory test certifications and summary tables of these results are presented in Appendix F of Appendix K.

It is also assumed the Sportsmans Creek Bridge structure is likely to contain lead paint due to its age. Lead paint may be present on steel items and on timber items on the truss span. Any flaking which has occurred may have the potential for contamination of soils and Sportsmans Creek.

Water quality and stormwater management

The nearest Water Quality station managed by the Office of Water is located at the Gurranang siding several kilometres upstream of the proposal. At this location flow and velocities are monitored, however, no other parameters are monitored.

The major influences to water quality generally within the Clarence River catchment are sediment transport, including acid sulfate soils and discharges from licensed industries, agricultural uses and wastewater and may be influenced from time to time by recreational uses (Umwelt 2003).

At present there are no kerbs or gutters on local roads on the northern or southern approaches to the existing bridge and stormwater flows overland into drainage depressions alongside the road.

6.2.2 Policy setting

The proposal would be required to ensure best practice soil and water quality management practices would be implemented as contained within the *Roads and Maritime QA Specifications G36 Environmental Protection* and *G38 Soil and Water Management* and in accordance with the Landcom (2004) *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book) to minimise impacts upon aquatic life, riparian vegetation, recreational use, food supply and environmental values of waterways.

Furthermore, public authorities are required to consider the impact of their activities on the environment in a number of subclauses of clause 228 of the *Environmental Protection and Assessment Regulation 2000,* including the potential for pollution of the environment.

6.2.3 Criteria

There is an absence of baseline water quality information to set criteria against the ANZECC Water Quality Guidelines. Given this, minimising impacts upon aquatic life, riparian vegetation, recreational use, food supply and environmental values of waterways has been adopted as the criteria for the proposal to achieve through the implementation of best practice measures. This criterion would be achieved by adhering to best practice management with regards to implementing the proposal.

Contamination laboratory testing was carried out by Envirolab Services as part of the Golder Associates investigation in accordance with the contaminant threshold values in the *Waste Classification Guidelines Part 1: Classifying Waste* (DECCW 2009) and the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013).

6.2.4 Potential impacts

Topography, erosion and sedimentation

The topography of the proposal site is generally flat on the northern bank, however, is steeply elevated on the northern approach of the Sportsmans Creek Bridge at Bridge Street. There is a gentle slope towards the boat ramp on the southern banks of Sportsmans Creek and the southern approach is a moderately elevated earth embankment. Removal activities which have the potential to impact upon soils in the local environment include:

- Earthworks required removing the southern abutment and levelling the land in Flo Clark Park/Sportsmans Park
- Building temporary access tracks and crane working pads
- Building a temporary pontoon for barge access on the southern bank, using driven piles
- Vegetation clearing and grubbing
- Excavation within the bed of Sportsmans Creek disturbing ASS and clay sediments for the removal of the substructure
- Road upgrade works
- General vehicle movements on unsealed surfaces resulting in transporting sediment and compacting damp soils
- Stockpiling of soils
- Landscaping treatments.

Initial clearing work required for site establishment and removal of the southern abutment would result in the exposure of topsoils to erosive forces from water and wind. The movement of vehicles and equipment along banks of Sportsmans Creek and temporary stockpiling work have the potential to erode and cause sedimentation of eroded topsoils into the waterway. Damp soils within these areas may also be impacted by soil compaction from heavy machinery. These short-term impacts upon soils are considered to be moderate to high. Provided best practice erosion and sediment controls as per Section 6.2.5 are implemented, these impacts would be mitigated and short-term only.

The removal of the bridge substructure would require excavation within the bed of Sportsmans Creek to remove the bridge piers, most likely using a cofferdam. The establishment of the barge pontoon and temporary crane platforms using driven piles would also require disturbance to the bed and banks of Sportsmans Creek. These activities have the potential to erode soils and cause sedimentation and disturb sediments within Sportsmans Creek. This work is not anticipated to have long-term effects upon soils, however, would have a moderate disturbance in the short-term, which could be managed using the safeguards proposed in Section 6.2.5.

There is also the potential for slope failure due to the instability of the banks of Sportsmans Creek if heavy machinery operates too close to the edge of the waterway. Slope failure poses a safety risk to heavy machinery and operators and may result in environmental impacts in the event of bank erosion and sedimentation into the waterway. Safeguards proposed in Section 6.2.5 should

be implemented to manage risks to heavy machinery during work on the banks of Sportsmans Creek.

Acid sulfate soils

Excavation and piling work have the potential to expose or disturb ASS. Figure 6.3 shows high risk potential for PASS within the bottom sediments of Sportsmans Creek, which are likely to be disturbed during piling activities. Exposure of ASS may result in soil acidification and acid and dissolved metal discharge into nearby surface water bodies via surface water runoff, drainage and groundwater flows.

The results of the laboratory testing indicate a high potential to encounter soils which exceed the trigger limits documented in the ASSMAC Guidelines (ASSMAC 1998). This triggers the requirement to prepare an ASS management plan. The temporary stockpiling of PASS materials must be managed in accordance with Roads and Maritime's guidelines (RTA 2005) to minimise the potential for oxidisation and off-site impacts upon the environment.

Safeguards and management measures as per Section 6.2.5 should be implemented to mitigate the potential for adverse environmental impacts.

Contamination

Potential sources of contamination have been identified within the investigation area. The removal works and road upgrades avoid the majority of these potential sources. There is a residual risk of exposing contaminated imported fill when removing the southern abutment. The exposure of contaminated soils is considered low risk and could be managed with the implementation of safeguards and management measures as shown in Section 6.2.5.

The potential presence of lead paint and/or other contaminates within the bridge structure would need to be managed during the removal process to avoid any flaking into Sportsmans Creek and contamination of land used to store bridge materials. This could be managed with the implementation of safeguards and management measures as shown in Sections 6.5.5 and 6.12.5.

Water quality

The methodology for the removal of the Sportsmans Creek Bridge has the potential to introduce pollutants into the surrounding environment. If uncontrolled, these contaminates may result in adverse impacts upon the water quality of Sportsmans Creek. Works associated with the removal of the bridge may have the following potential impacts:

- Activities carried out within the bed or on the banks of Sportsmans Creek resulting in sedimentation into waterways, increased sediment load and organic matter resulting in impacts upon aquatic flora and fauna found in the bed of creeks or within the riparian zone. This includes any activities which involve the generation of sediment, such as earthworks, building temporary access tracks, crane pads and pontoon.
- Reduction in channel habitat due to sediment deposition and reduction in photosynthesis due to turbidity from works in the Creek.
- Accidental releases of contaminated materials, such as concrete residues, from the removal process and road upgrades.
- Accidental spills of waste material (possibly containing contaminants such as wood preservatives or lead paint) entering the waterway from sawdust, metal, asphalt or cement.
- Contaminated stormwater runoff from the site compound and removal laydown areas, equipment and plant.
- Spills of chemicals or other liquid waste (such as from the ablutions blocks) due to the proximity of chemical storage in the site compound.
- Flooding in the area transporting chemicals (such as stored fuels and oils), waste, materials and equipment into the Clarence River floodplain.
- The disturbance of ASS has the potential to result in water quality impacts including acidification of waterways, fish kills and aquatic habitat loss.

The removal of the bridge, including the removal of the various bridge components using saws and removing of bolts and other methods to dismantle the bridge have the potential to drop contaminates such as lead paint and fibres into Sportsmans Creek below. The movement and temporary storage of bridge components which would become waste material after the bridge removal, also have the potential to enter Sportsmans Creek if the appropriate management measures are not implemented.

Provided the safeguards and management measures discussed in Sections 6.2.5 and 6.3.6 are implemented, the potential for impacts upon water quality in Sportsmans Creek overall would be of low to moderate risk.

6.2.5 Safeguards and management measures

The mitigation measures to prevent adverse impacts on Soils, Contamination and Water Quality would be in accordance with Sections 4.1, 4.2, 4.3, 4.13 and 4.16 of the Roads and Maritime QA Specification G36, Roads and Maritime QA Specification G38 with the following additions/ amendments.

Impact	Environmental safeguards	Responsibility	Timing
Water Quality and surface water run-off	• Where practicable, stockpiles will be located away from areas subject to concentrated overland flow. Stockpiles located on a floodplain would be managed so as to minimise loss of material in flood or rainfall events. All stockpiles shall be stabilised at the end of each work day, during wet weather and covered with geotextile or vegetative cover and managed in accordance with the Roads and Maritime procedure for *Stockpile Site Management Guideline* (RMS 2015). • Topsoil, earthworks and other excess spoil material will be stockpiled in accordance with the principles outlined in *Stockpile Site Management Guidelines* (RMS 2015). • Stockpiles containing potential ASS will be managed in accordance with the ASS Management Plan. • All wastewater shall be treated to prevent the release of dirty water into the river or any waterways. • Vehicle wash down and/or cement truck washout if required will be carried out off-site or in a designated bunded area lined with an impervious surface. • No work will be permitted if flooding is predicted and all excavations should be filled in and stockpiles removed or secured before enacting evacuation protocols.	Contractor	During removal works

Impact	Environmental safeguards	Responsibility	Timing
Water quality and the storage of chemicals	• All fuels, chemicals and liquids will be stored in an impervious bunded area (preferably at least 50 metres) away from any waterways or drainage lines. For storage within 50 metres, these will be double-bunded or stored as approved by the Roads and Maritime Environment Officer. A Safety Data Sheet (SDS) for each item stored will be kept. • Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways. Refuelling of plant and equipment on barges is to occur within a double-bunded area. • Daily checks of machinery and equipment for liquid leaks of any substance will be carried out. • All staff will be trained in incident and emergency response procedures. • Emergency dry and wet weather spill kits are to be kept on site at all times and staff made aware of their location and trained in their use. • The Roads and Maritime Environmental Incident Classification and Management Procedure is to be followed in the event of an incident and the Roads and Maritime Contract Manager notified as soon as practicable. • The EPA shall be notified in the event of a significant spill in accordance with Part 5.7 of the *Protection of the Environment Operations Act 1997*.	Contractor	During removal planning and removal
Water Quality - Work in Sportsmans Creek	• No equipment cleaning will be carried out within the waterway. • All workers will remain vigilant to monitor for any signs of impacts to water quality (such as hydrocarbons spills, turbidity, discoloured water or unusual smells) on a daily basis.	Contractor	Removal planning During removal works
Erosion and Sedimentation	• An Erosion and Sedimentation Control Plan (ESCP) will be prepared in accordance with the Roads and Maritime Specification *G38 - Soil and Water Management (Soil and Water Management Plan)* for inclusion in the SWMP. The ESCP will include: ○ Management measures for erosion and sedimentation controls in accordance with the 'blue book', *Managing Urban Stormwater - Soils and Construction Volumes 1 and 2 (Landcom 2004, DECC 2008).*	Contractor	Before, during and post removal

Impact	Environmental safeguards	Responsibility	Timing
	○ Specific details of controls required for excavation activities, in-stream works (such as piling, temporary waterway access, pier removal and earthworks for the removal of the southern approach). • The plan will include measures to: ○ Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets ○ Reduce water velocity and capture sediment on-site ○ Minimise the amount of material transported from site to surrounding road surfaces ○ Divert clean water around the site ○ Erosion and sedimentation controls will be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request. • Water from site will be used for building purposes, such as dust suppression, where feasible and reasonable. • The CEMP will include specific measures to minimise tracking of material onto sealed areas and offsite and potential reuse of material on site or disposal in accordance with the mitigation measures in Section 6.12.5. • All erosion and sediment controls are to be installed before the start of works which are likely to disturb soil and will be maintained until the work has been completed and areas are stabilised. • Topsoil will be stored separately for possible reuse. • The CEMP will include specific measures to restore the site including: ○ Removal of environmental controls ○ Progressive stabilisation and restoration in accordance with the restoration plan for the proposal (refer to Section 6.8).		

Impact	Environmental safeguards	Responsibility	Timing
PASS/ASS Excavation/ Disturbance	• For areas identified as PASS where excavation is required (including for piling), an ASS management plan shall be prepared in accordance with the Roads and Maritime's *Guidance for the Management of Acid Sulfate Materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfidic Black Ooze* (RTA 2005) and the soils and water management plan (acid sulfate soils section). The ASS management plan should be accepted by Roads and Maritime before the start of any earthworks and at a minimum, the plan shall include: ○ Management measures for the safe excavation, isolation and disposal of neutralisation of soils ○ Requirements for additional testing to determine predicted liming rates of excavated spoil once quantities are determined. • Specific controls to be implemented include: ○ Capping exposed surfaces with clean fill to prevent oxidation ○ Placing excavated ASS separately in a lined, bunded and covered area ○ Neutralising ASS for reuse (where appropriate) by using additives such as lime.	Contractor	Removal planning During removal works
Contaminated soil	• A contingency plan for the management of contaminated soils shall be developed. • Visual/olfactory assessment of excavated materials shall be carried out immediately after exposure.	Contractor	Removal planning During removal works
Trafficability	• Access tracks will be stabilised from gravel sourced locally, which is certified as pathogen-free.	Contractor	During removal works
Slope failure	• A risk assessment will be carried out before works with heavy machinery to determine the risk potential of slope failure near Sportsmans Creek. ○ The risk assessment will identify a safe working distance for the operation of machinery near the banks of Sportsmans Creek ○ Heavy machinery will only operate within the safe working distance as determined by risk assessment.	Contractor	Pre-removal and during works

6.3 Hydrology and flooding

A flooding assessment of the combined impact of the removal of the Sportsmans Creek Bridge and the new bridge, once operational, was carried out by BMT WBM (2014) and included in the REF assessment of the new bridge (KBR 2015). The flooding assessment is provided in Appendix L. A brief summary of the assessment of relevance to the removal works is included in this section.

6.3.1 Existing environment

Hydrology and drainage

The proposal is located about four kilometres downstream of the Sportsmans Creek Weir. Sportsmans Creek is the dominant feature on the alluvial floodplain in which the lower parts of the township of Lawrence are located. The broader Clarence River, its estuary and the coastal floodplain which Sportsmans Creek forms part of, is the largest coastal river system in NSW (Umwelt 2003). The Clarence River Floodplain is also significant as it supports a commercial estuary fishing industry.

Sportsmans Creek is about 100 metres wide and drains in a south-east direction under the existing bridge towards the Clarence River. During low flow conditions, Sportsmans Creek may be influenced by afflux from the Clarence River, whereby the water from the Clarence flows upstream into Sportsmans Creek. Both the Clarence River and Sportsmans Creek are tidal. The weir is installed to prevent the incursion of saltwater into the wetlands further upstream (Golder Associates 2014). The weir also provides a freshwater pool for agricultural purposes for stock (Clarence Valley Council 2008).

Flooding

The Lower Clarence River Flood Study Review (WBM 2004) shows Sportsmans Creek and the approach roads to Sportsmans Creek Bridge are impacted by flooding. An update of the 2004 study was completed by BMT WBM (2013) and provides an assessment of the flood behaviour within the Lower Clarence Valley and the flood flow within Grafton and Maclean when the levee systems are overtopped.

A flooding assessment of the Sportsmans Creek new bridge proposal was completed by BMT WBM (2014) and is included in the REF assessment for the new bridge (KBR 2015). The primary objective of the study was to determine the impact of the proposed bridge scenario on flood behaviour in the vicinity of Lawrence and carry out an assessment of potential scour at the abutments and piers of the proposed bridge. The study assessed the combined impact of the bridge removal (including retaining the northern abutment) and the building of the new bridge.

Flooding behaviour

Flooding behaviour of the Lower Clarence River floodplain is dominated by the river flow originating upstream of Grafton in terms of both peak flood levels (that is, the maximum level the flood waters reach during a flood event) and duration of inundation of the floodplain.

The flow typically contributes 80 to 90 per cent of the total volume of floodwaters entering the lower floodplains, and flow can be sustained for several days to weeks as shown in Plates 6.1 and 6.2. Clarence River floods typically occur from rainfall events lasting several days to weeks. On the Clarence River floodplain, the flows from other smaller catchments downstream play only a minor role in flood behaviour.

Flood behaviour downstream of Grafton is quite complex. For Sportsmans Creek, river flows and elevated river levels in the Clarence River result in flow back up Sportsmans Creek. As the Clarence River floodplain flows drop, the flows travel in a reverse direction with flows discharging from Sportsmans Creek back into the Clarence River. Plate 6.9 and Plate 6.10 show the extent of the February 2013 flood event and the subsequent remaining impact after one week. The bridge can be seen in both photos and was not overtopped, although the approaches were inundated.

Plate 6.9 February 2013 flood event

Plate 6.10: One week after February 2013 flood event

Figures A.1 and A.3 in BMT WBM (2014) (refer Appendix L) show the extent of flooding in the investigation area for a 20 per cent and 1 per cent Annual Exceedance Probability (AEP) event. The map shows much of the Clarence River flood plain is inundated during both the 20 per cent AEP and 1 per cent AEP flood events.

6.3.2 History

The area has a history of flooding with major flood events occurring regularly.

The Sportsmans Creek Weir was installed in 1927 to prevent tidal flow upstream. Sportsmans Creek once formed part of diverse floodplain habitats, freshwater and estuarine wetlands, which have been removed and drained for agricultural lands (Umwelt 2003). This activity has resulted in the introduction of major challenges for sustainable management of water quality and water use in the catchment.

6.3.3 Policy setting

The *Clarence Estuary Management Plan* (Umwelt 2003) is the Council Coastal Management Plan which applies to Sportsmans Creek for the purposes of the *Coastal Protection Act 1979*.

The Office of Water issues a number of guidelines for the management of work on waterfront land. Although Roads and Maritime are subject to exemptions from 'controlled activity approvals' under the *Water Management Act 2000*, the guidelines are still relevant to work carried out within the riparian zone.

In addition to the guidelines and legislation listed above, public authorities are required to consider the impact upon coastal processes and hazards under *Environmental Planning and Assessment Regulation 2000*, clause 228 (2)(p) and on the environment more broadly in a number of subclauses of clause 228.

6.3.4 Criteria

The criteria for assessing the impact of the proposal would be set as minimising impacts upon groundwater, flooding and hydrology of the local environment to ensure it remains as similar as possible to the existing condition.

6.3.5 Potential impacts

Removal

Flooding

The existing Sportsmans Creek Bridge, its approaches and site compound in Flo Clark Park are located within the 1 in 5 year ARI (or 20 per cent AEP). Although the bridge is located within the 20 per cent AEP, it sits above the flood level, as shown in the most recent flood in 2013 (refer Plate 6.9 and 6.10). The 2013 flood demonstrated once the area becomes inundated, it is likely it would take several days for the flood waters to recede. As such, the proposed removal works and local access roads to the proposal site are likely to be impacted by flood in the event of a significant rain event in the wettest summer months of the year.

Large buoyant items, such as temporary pontoons and barges, would pose a safety risk during a flood event and need to be secured. Removal planning would need to consider the potential impacts of flooding upon work areas and a contingency plan developed, in accordance with the safeguards and management measures provided in Section 6.3.6.

Hydrology

Depending on the removal method, the presence of the temporary pontoon has the potential to have a minor influence the local hydrology of Sportsmans Creek. The design of work platforms would need to consider the local hydrological conditions to ensure this impact would be minimal.

Post-removal

The BMT WBM (2014) study demonstrated once the new bridge is built and the existing bridge is removed (excluding the northern abutment), there would be negligible impact on peak water levels, minor increases in average velocities not requiring mitigation and minimal scouring. The retention of the northern abutment of the bridge provides flood protection for the houses located along Bridge Street.

Overall, as demonstrated by the BMT WBM (2014) study the removal of the existing bridge and operation of the new bridge is not anticipated to have any permanent long term flood-related impact upon the environment, property or community and would have a negligible effect upon the existing floodplain.

6.3.6 Safeguards and management measures

The mitigation measures to prevent adverse impacts on water quality would be in accordance with the Roads and Maritime QA Specification G36 *Environmental Protection* and *G38 Soil and Water Management* and in accordance with the Landcom (2004) *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book) with the following additions/amendments.

Impact	Environmental safeguards	Responsibility	Timing

Flooding during removal works	• A Flood Management Plan will be prepared as part of the CEMP and implemented during removal works. At minimum this plan shall include:
	  ○ Consideration of evacuation protocols from the *Clarence Valley Local Flood Plan* (SES 2012) for the Lawrence Sector
	  ○ Project-specific emergency response and evacuation controls during flooding
	  ○ Measures to ensure equipment, site-offices, ablution facilities, vehicles, materials, buoyant items (including barges) and machinery are secured against flood or able to be removed off-site when a flood warning is issued.
	  ○ Reporting requirements
	  ○ A regular weather monitoring regime.
	• The installation of temporary pontoons and barge access will include measures to ensure they can be secured during a flood event.
	• The State Emergency Service (SES) will be informed of the works, if they are occurring during flood season (November to March).
	• The SES will also be informed of any partial or full road closures during removal works.
		Contractor	During removal Planning
			
			During removal works

Impact	Environmental safeguards	Responsibility	Timing
	• No work will be carried out during or immediately after periods of flood unless it is deemed safe to return to the area by the SES and the Roads and Maritime Project Manager.		
Hydrological impacts	• Any temporary structures such as silt curtains placed in-stream shall be installed so as to not impact flows and cause erosion.	Contractor	During removal works
Hydrological changes impacting Sportsmans Creek during the temporary removal works and for waterway access	• As per the correspondence in Appendix J, the proposal design shall consider the *NSW DPI (Fisheries) guidelines Policy and guidelines for fish habitat conservation and management* (DPI 2013) and mitigation measures to minimise potential impacts upon Sportsmans Creek.	Roads and Maritime	Removal planning

6.4 Noise and vibration

A noise and vibration impact assessment of building and operation of the new bridge was completed by SLR Consulting Australia in May 2014 (SLR 2014). An updated Noise and Vibration Assessment was completed in May 2016 to address the changes in the methodology proposed for the removal of the Sportsmans Creek Bridge (SLR 2016, refer to Appendix M). This section of the REF summarises the findings of the noise and vibration assessment.

The noise and vibration assessment included a desktop review of the proposal area as shown in Figure 6.4 below to identify sensitive receivers, followed by noise monitoring at three locations (refer Figure 6.4) during 9 December 2013 to 15 December 2013.

The assessment identified that during the removal and building works, the proposal is predicted to exceed the noise goals at sensitive receivers during standard daytime construction hours. The proposed removal works are also planned to occur within the recommended safe working distances for human comfort with regards to vibration. Specific mitigation measures have been proposed to address potential impacts.

6.4.1 Existing environment

A desktop review of the proposal area identified residential, commercial, and other noise and vibration sensitive receivers within the proposal area. The assessment divided the surrounding area into Noise Catchment Areas (NCAs) which represent the various areas of sensitive receivers in the vicinity of the proposal. The NCAs are shown in Figure 6.4 below.

Figure 6.4: Proposal area and noise catchment areas

A description of the NCA's is shown in Table 6.3.

Table 6.3: NCA and nearest sensitive receiver details

NCA	Nearest Receiver Type	Nearest Receiver Address	Approximate Distance to Receiver (m)
NCA0_PAS	Passive recreation area	Flo Clark Park	10 m
NCA1_RES	Residential	4 Grafton Street, Lawrence	60 m
NCA2_COM	Commercial	19 Bridge Street, Lawrence	90 m
NCA3_RES	Residential	1-3 Bridge Street, Lawrence	10 m
NCA4_SPC	Community Hall	33 Bridge Street. Lawrence	220 m
NCA5_PAS	Passive recreation area	Lawrence Memorial Park	250 m
NCA6_RES	Residential	10 Grafton Street, Lawrence	420 m

In order to characterise the noise environment across the proposal area and to establish existing ambient noise levels upon which to base the noise emission targets, environmental noise monitoring was performed at the representative locations shown in Figure 6.4. Although NCA0_PAS, Flo Clark Park, is listed as a sensitive receiver, noise monitoring was not carried out at this location as the park would be utilised as the site compound during the removal works and would be closed to public use.

A summary of the unattended continuous noise monitoring (carried at the noise monitoring locations listed in Table 6.3) during Industrial Noise Policy (INP) defined time periods is contained in Table 6.4.

Table 6.4: Unattended noise logger results

Location	Period[1]	Noise Parameter (dBA)			
		LA90	LAeq	LA10	LA1
NM1	Daytime	33	47	47	55
	Evening	36	46	46	51
	Night	35	44	45	46
NM2	Daytime	31	56	58	67
	Evening	32	52	49	63
	Night	30	48	40	52

Location	Period[1]	Noise Parameter (dBA)			
		LA90	LAeq	LA10	LA1
NM3	Daytime	32	51	53	60
	Evening	32	48	48	57
	Night	29	47	45	53

Note 1: INP Governing Periods - Day: 7.00am to 6.00pm Monday-Saturday, 8.00am to 6.00pm Sundays, Evening: 6.00pm to 10.00pm, Night: 10.00pm to 7.00am Monday to Saturday, 10.00pm to 8.00am Sunday.

Daily noise monitoring graphs showing the measured noise levels at all monitoring locations are provided in Appendix B of Appendix M.

6.4.2 Policy setting

The following noise and vibration guidelines for building and operations are based on the publications managed by the EPA. The guidelines applicable to this REF assessment and noise and vibration assessment in NSW include:

- Construction Noise – Interim Construction Noise Guideline (ICNG) (DECC 2009)
- Construction Vibration (human comfort) – Assessing Vibration – a technical guideline (DEC 2006)
- AS 2107 Acoustics – Recommended design sound levels and reverberations times for building interiors.

Roads and Maritime have also prepared a number of guidelines which set the policy framework and assessment for the noise and vibration associated with Roads and Maritime developments. These include:

- Roads and Maritime assessment requirements – Preparing an Operational Noise and Vibration Assessment, Roads and Maritime July 2011 (Roads and Maritime 2011c)
- Roads and Maritime noise management response – Environmental Noise Management Manual (ENMM), (RTA 2001).

Public authorities are required to consider the impact of their activities upon the local environment under clause 228 of the Environmental Planning and Assessment Regulation 2000.

6.4.3 Criteria

Noise

The criteria adopted for assessing the impact of removal works are the goals set in the *Interim Construction Noise Guideline (ICNG)* (DECC 2009) as shown in Table 6.5. AS 2107 provides the recommended maximum internal noise levels for other sensitive land use with no ICNG classification as shown in Table 6.6.

In order to minimise the potential noise impacts upon nearby sensitive receivers, the majority of removal work is proposed to be carried out during standard daytime periods (7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm on Saturdays). The installation of exclusion devices is required after dusk when microbats have vacated the area. This work is anticipated to conclude at or before 11.00pm.

With the exception of emergencies, removal activities would not take place outside standard hours without prior notification to local residents, businesses and Council in accordance with the *Roads and Maritime Noise Management Manual Practice Note VII* (RTA 2001).

Table 6.5: ICNG Noise Management Levels (NML)

Receiver	Representative Noise Monitoring Location	Receiver Types	Management Level $L_{Aeq(15\ min)}$ (dBA) (applies when in use)			
			Day[1]	Day OOH[2]	Eve[3]	Night[4]
NCA0_PAS	n/a	Passive Recreation (Sportsmans Park Flo Clark Park)	60	60	n/a	n/a
NCA1_RES	NM1	Residential	43	38	41	40
NCA2_COM	n/a	Commercial	70	70	n/a	n/a
NCA3_RES	NM2	Residential	41	36	37	35
NCA4_SPC	n/a	Other Sensitive: Community Hall	60	60	n/a	n/a
NCA5_PAS	n/a	Passive Recreation (Lawrence Memorial Park)	60	60	n/a	n/a
NCA6_RES	NM3	Residential Commercial[5]	42 70	37 70	37 n/a	34 n/a

Note 1: Standard daytime construction period: 7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturday.
Note 2: Daytime out-of-hours (OOH) construction 7 am to 8 am and 1 pm to 6 pm Saturday.
Note 3: Evening period: 6 pm to 10 pm.
Note 4: Night-time period: 10 pm to 7 am except on a Sunday/Public Holiday when night-time is extended to 8 am.
Note 5: One commercial receiver in NCA. Commercial receiver assessed against commercial NMLs.

Table 6.6: AS 2107 recommended maximum internal noise levels

Receiver		Description	Time Period	AS 2107	
				Classification	Recommended /Maximum/ Internal LAeq (dBA)
NCA4_SPC	Lawrence Public Hall	Public Space	Daytime and evening	Municipal Buildings - *Public Spaces*	50

Vibration

Vibration noise goals have been set in accordance with the EPA's *Assessing Vibration: A Technical Guideline and Australian Standard AS 2187: Part 2-2006 Explosives – Storage and Use – Part 2: Use of Explosives and British Standard BS 7385 Part 2-1993 Evaluation and Measurement for Vibration in Buildings Part 2.*

The acceptable vibration dose values (VDVs) in human comfort from vibration of an intermittent nature are set between 0.10 metres per second (m/s) $^{1.75}$ and 0.80 m/s$^{1.75}$ during both daytime and night-time (refer to Table 5, Appendix M).

The transient vibration guide values for minimal risk of cosmetic damage to buildings (BS 7385) for residential or light commercial type buildings is 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above (refer to Table 6, Appendix M).

The German Standard DIN 4150-3 Effects of Vibration on Structures identifies more stringent vibration levels for building damage than BS 7385 (effectively, no risk of damage), and includes a category specifically for heritage buildings. The DIN 4150-3 recommended guide values for peak velocity in frequency range for heritage buildings are shown in Table 6.7.

Table 6.7: DIN 4150-3 recommended guide values for peak velocity for heritage buildings

Type of Building	Foundation peak particle velocity in frequency range			Vibration at the horizontal plane of highest floor (all frequencies)
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	
Heritage buildings	3 mm/s	3 mm/s at 10 Hz increasing to 8 mm/s at 50 Hz	8 mm/s at 50 Hz increasing to 10 mm/s at 100 Hz	8 mm/s

6.4.4 Potential impacts

Noise

The noise impact assessment is based on a scope of work for the removal scenarios and the worst-case sound power levels for equipment as discussed in Section 5.3, Appendix M. The $L_{Aeq(15\ minute)}$ Noise Management Levels (NMLs) have been determined in accordance with the ICNG. The noise monitoring locations, which are relevant to the NCAs (refer to Table 6.5) for the proposed works, are shown in Figure 6.4 and detailed in Table 6.8.

The worst-case $L_{Aeq(15\ minute)}$ predicted noise levels for the proposed works are presented in Table 6.8 for the various scenarios along with the relevant Noise Management Levels at the most potentially affected receiver. A complete list of results is provided in Appendix M.

The noise predictions indicate exceedances of the NMLs are likely during the worst-case scenarios as assessed. It is noted the worst-case scenarios assume work is being carried out in the closest possible location to each receiver, with actual noise levels likely to be lower. Noise levels would also depend on the number of plant items and equipment operating at any one time and their precise location relative to the sensitive receiver. In some cases, reductions in noise levels would occur when plant is screened from view behind buildings or other items of equipment.

Highly noise affected receivers

Residential receivers are considered to be highly noise affected if noise levels exceed 75 dBA during standard working hours. The worst-case predicted levels indicate there is the potential for this to occur during scenarios 15a through 16b and 17e through 19a as indicated in Table 6.8, for residential receivers in Noise Catchment Area, NCA3_RES for the closest residential receivers during the following proposed works:

- Installation of environmental controls
- Vegetation clearing
- Building of crane pads
- Building of the northern abutment crane pad
- Northern abutment work
- Road treatment earthworks
- Road paving
- Road line marking
- Site compound de-commissioning.

A worst-case exceedance of the daytime (standard construction hours) $L_{Aeq\ (15\ minute)}$ NML of up to 52 dB is predicted at the most affected sensitive receiver location at 1–3 Bridge Street, Lawrence. This would occur during site work for the building of the temporary northern abutment crane pad.

Out-of-hours work

A worst-case exceedance of the out-of-hours $L_{Aeq(15minute)}$ noise goal of up to 32 dB is predicted during the night-time microbat exclusion work at the most affected sensitive receiver location (2 Bridge Street, Lawrence) within the proposal area. Out-of-hours work would be limited to only a few nights. Noise-intensive work required for the preparation of the microbat exclusion work would be carried out during standard daytime working hours.

Table 6.8: Noise predictions

Scenario		Works Ref	Most Affected Receiver NCA	Address	Type	Worst-case Predicted $L_{Aeq(15min)}$ (dBA)[5]	NML (dBA)				NML Exceedance (dB)			
							Day[1]	Day OOH[2]	Eve[3]	Night[4]	Day[1]	Day OOH[2]	Eve[3]	Night[4]
Site Establishment	Installation of environmental controls	15a	NCA3_RES	2 Bridge	Residential	**86**	41	n/a	n/a	n/a	45	n/a	n/a	n/a
	Vegetation clearing	15b	NCA3_RES	1-3 Bridge	Residential	**88**	41	n/a	n/a	n/a	47	n/a	n/a	n/a
	Noise-intensive microbat exclusion work (eg using chainsaws)	20a	NCA3_RES	2 Bridge	Residential	70	41	36	37	35	29	n/a	n/a	n/a
	Out of hours exclusion work	20b	NCA3_RES	2 Bridge	Residential	67	41	36	37	35	n/a	n/a	30	32
Temporary site works	Construct crane pads	16a	NCA3_RES	1-3 Bridge	Residential	**78**	41	n/a	n/a	n/a	37	n/a	n/a	n/a
	Construct northern abutment crane pad	16b	NCA3_RES	1-3 Bridge	Residential	**93**	41	n/a	n/a	n/a	52	n/a	n/a	n/a
	Construction of pontoon	16c	NCA3_RES	1-3 Bridge	Residential	72	41	n/a	n/a	n/a	31	n/a	n/a	n/a
	Construct gravel track to pontoon	16d	NCA3_RES	1-3 Bridge	Residential	57	41	n/a	n/a	n/a	16	n/a	n/a	n/a
Bridge Removal	Removal of bridge elements by hand and small plant	17a	NCA3_RES	2 Bridge	Residential	72	41	n/a	n/a	n/a	31	n/a	n/a	n/a
	Removal of bridge	17b	NCA3_RES	2 Bridge	Residential	74	41	n/a	n/a	n/a	33	n/a	n/a	n/a

Scenario		Works Ref	Most Affected Receiver NCA	Address	Type	Worst-case Predicted $L_{Aeq(15min)}$ (dBA)[5]	NML (dBA)				NML Exceedance (dB)			
							Day[1]	Day OOH[2]	Eve[3]	Night[4]	Day[1]	Day OOH[2]	Eve[3]	Night[4]
	elements with crane and barges													
	Pier removal	17c	NCA3_RES	1-3 Bridge	Residential	74	41	n/a	n/a	n/a	33	n/a	n/a	n/a
	Southern abutment removal	17d	NCA3_RES	1-3 Bridge	Residential	64	41	n/a	n/a	n/a	23	n/a	n/a	n/a
	Northern abutment work	17e	NCA3_RES	2 Bridge	Residential	**76**	41	n/a	n/a	n/a	35	n/a	n/a	n/a
Road Treatments	Earthworks	18a	NCA3_RES	2 Bridge	Residential	**85**	41	n/a	n/a	n/a	44	n/a	n/a	n/a
	New road surface	18b	NCA3_RES	2 Bridge	Residential	**88**	41	n/a	n/a	n/a	47	n/a	n/a	n/a
	Line marking	18c	NCA3_RES	2 Bridge	Residential	**76**	41	n/a	n/a	n/a	35	n/a	n/a	n/a
Site restoration	Site compound de-commissioning	19a	NCA3_RES	2 Bridge	Residential	**80**	41	n/a	n/a	n/a	39	n/a	n/a	n/a
	Grade Flo Clark Park	19b	NCA3_RES	1-3 Bridge	Residential	59	41	n/a	n/a	n/a	18	n/a	n/a	n/a
	Landscaping	19c	NCA3_RES	2 Bridge	Residential	59	41	n/a	n/a	n/a	18	n/a	n/a	n/a

Note 1: Standard daytime construction hours: 7.00 am to 6.00 pm Monday to Friday, 8.00 am to 1.00 pm on Saturdays and no work on Sundays or Public Holidays.
Note 2: Daytime out-of-hours (OOH) construction 7 am to 8 am and 1 pm to 6 pm Saturday
Note 3: Evening period: 6 pm to 10 pm.
Note 4: Night-time period: 10 pm to 7 am except on a Sunday/Public Holiday when night-time is extended to 8 am.
Note 5: Worst-case predicted noise levels greater than 75dBA (highly noise affected) are indicated in **red bold** text for residential receivers

Significant NML exceedances are predicted for the proposal where noisy plant items (such as impact piling rigs and chainsaws) are proposed to be used near sensitive receivers. For some scenarios, noise intensive plant may be located as close as 10 metres from the nearest residential receivers.

It should be noted that some of these works are scheduled to be of short duration. Provided the safeguards and mitigation measures detailed in Section 6.4.5 are implemented, this impact would be minimised.

Vibration

The vibration impact assessment identified the major potential source of vibration from the proposed works as rock breaking, impact piling and use of vibratory rollers. Table 6.9 identifies the recommended safe working distances for vibration intensive plant for the proposal.

Table 6.9: Recommended safe working distances for vibration intensive plant

Plant Item	Rating/Description	Compliant Setback Working Distances	
		Cosmetic Damage[1]	Human Response[2]
Vibratory Roller	< 50 kN (Typically 1-2 t)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 t)	6 m	20 m
	< 200 kN (Typically 4-6 t)	12 m	40 m
	< 300 kN (Typically 7-13 t)	15 m	100 m
	> 300 kN (Typically 13-18 t)	20 m	100 m
	> 300 kN (> 18 t)	25 m	100 m
Small Hydraulic Hammer	(300 kg – 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	N/A
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure
Impact Pilling	< 10,000 kg/m	15 m	70 m

Note: More stringent conditions may apply to heritage or other vibration sensitive structures.
Note 1: Referenced from British Standard BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2
Note 2: Referenced from *EPA's Assessing Vibration: a technical guideline* (DEC 2006)

During vibration-intensive activities, sensitive receivers would be within the safe working distances for human comfort. Several buildings located within 100 metres of the proposed removal works are listed as heritage buildings on the Clarence Valley LEP as identified in Table 6.10.

Table 6.10: Summary of identified listed Heritage buildings with the proposal area

LEP Item Number	Address	Description
I169	Bridge Street	Sportsmans Creek Bridge[1]
I167	2 Bridge Street	Former Baptist Manse
I164	9 Bridge Street	Baptist Church
I168	11 Bridge Street	Residence
I165	33 Bridge Street	School of Arts Building
I166	Bridge Street	War Memorial

Note 1: Entry denotes bridge to be removed

Building surveys would be required before and after vibration intensive activities. Should heritage buildings be identified as more susceptible during surveys before commencing work, reduced vibration levels may be applicable and modified building practices may be required.

Provided the safeguards proposed in Section 6.4.5 are implemented, the proposed removal works would not result in adverse vibration impacts upon buildings within the proposal area.

6.4.5 Safeguards and management measures

The mitigation measures to manage potential impacts upon noise and vibration within the locality would be in accordance with Section 4.6 of the Roads and Maritime QA Specification G36 with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Noise and vibration disturbance during works	• During the removal planning stage, when more specific information is available in relation to the proposed works, a Site Specific Construction Noise and Vibration Management Plan (CNVMP) as part of the CEMP documents shall be prepared, consistent with the requirements of the ICNG. The objectives of the CNVMP are as follows: • Minimise exceedances of the Noise Management Levels and goals nominated in Section 6.4.3 and 6.4.4 • Determine noise and vibration monitoring, reporting and response procedures • Describe specific mitigation treatments, management methods and procedures to be implemented to control noise and vibration during the proposed works • Describe work timetabling to minimise noise impacts including time and duration restrictions, respite periods and frequency • Describe procedures for notifying residents of noise and vibration generating work activities likely to affect their amenity. • Define contingency plans to be implemented in the event of non-compliances and/or noise complaints • Ensure the management measures detailed in this REF are documented • Specify the removal work is to be carried out during normal work hours (ie 7.00am to 6.00pm Monday to Friday; 8.00am to 1.00pm Saturdays). Any emergency or microbat exclusion work performed outside normal work hours or on Sundays or public holidays is to minimise noise impacts.	Contractor	Removal planning and during works
Noise disturbance during works	• Noise impacts will be minimised in accordance with Practice Note 7 in the *Roads and Maritime Environmental Noise Management Manual (RTA 2011b).* As a minimum, the following mitigation	Contractor	Removal planning and during works

Impact	Environmental safeguards	Responsibility	Timing

	measures shall be included in the CNVMP and all feasible and reasonable mitigation considered:
	• Use of localised acoustic hoarding around particularly intensive noise generating items of plant (eg rock breakers, chainsaws, hammer drills and pilling rigs), where practicable
	  ○ Air gaps shall be minimised far as practicable and hoarding placed as close as possible to the work
	• Implementation of work equipment and tools with lower noise emission levels
	• Planning of the higher NML exceedance activities/locations to be carried out predominantly during less noise-sensitive periods, where available and possible. Nearby residents shall be consulted to help identify less noise time sensitive periods
	• Utilising respite periods where noise intensive plant items are required.
	  ○ This may include limiting work to non-consecutive nights.
	• Briefing of the work team in order to create awareness of the location of sensitive receivers and the importance of minimising noise emissions
	• Spoil, off-cuts and rubbish shall be placed and not dropped into awaiting trucks to minimise noise
	• Locating noisy items of plant away from receivers, where possible
	• Turning off noisy plant when not in use
	• Ensuring plant is regularly maintained and equipment repaired/replaced when it becomes noisier
	• Establishing load points as far as practicable from sensitive receivers
	• Utilising silenced or less noise-intensive equipment, where reasonable and feasible
	• Reversing of equipment shall be minimised so as to prevent nuisance caused by reversing alarms (ie a unidirectional flow of work vehicles should be established through the work site)
	• Non-tonal reversing alarms shall be fitted to minimise nuisance caused by reversing alarms.		

Vibration disturbance during works	• Potential vibration impacts shall be addressed in the CNVMP as part of the CEMP documents. • Before and after building condition surveys will be conducted before and after the works for all potentially affected properties.	Contractor	During removal planning

Impact	Environmental safeguards	Responsibility	Timing
	• Attended vibration monitoring should be carried out in the event that vibration intensive work is required within the cosmetic damage safe working distances, for example if rock breaking is required within 7 metres of a receiver (medium rock breaker), or if impact piling is required within 15 metres of a receiver. • Vibration levels will remain below the criteria for cosmetic damage at all receivers (heritage or otherwise) as listed in Section 6.4.3 and Table 6.9 • Measures for vibration management to be included in the CNVMP as part of the CEMP documents include: ○ Utilising dampened rock breakers and/or 'city' rock breakers to minimise the impacts associated with rock breaking work; and the use of smaller capacity rock breakers where feasible ○ Utilising bored or rotary pilling in lieu of impact pilling, where feasible ○ Utilising non-vibratory rolling equipment ○ Minimising consecutive work in the same locality. This may potentially be implemented by rotating work between areas within the site on a daily basis ○ Sequencing of rock breaking operations so vibration intensive operations do not occur concurrently ○ Scheduling of rock breaking work during the less sensitive times of the day. The most noise and vibration sensitive times of day shall be determined through consultation with the affected community ○ Providing respite periods. Daytime noise and vibration respite periods are typically provided during lunch-time periods and the most appropriate periods shall be determined through consultation with the affected community ○ Utilising a hydraulic rock splitter or saw rather than a rock breaker (if applicable).	Contractor	During works
Vibration impacts to heritage buildings during works	• Building surveys of all nearby heritage structures as defined in Table 6.10 of this REF shall be carried out in order to assess the potential for increased susceptibility to building damage from vibration • In the event these buildings are considered more susceptible to vibration than regular buildings, reduced vibration criteria levels may	Roads and Maritime	Before removal works

Impact	Environmental safeguards	Responsibility	Timing
	be applicable and subsequently adopted for the assessment process. These reduced criteria may influence the selection of appropriate processes and equipment to be used in the vicinity of these buildings.		

6.5 Air quality and climate

6.5.1 Existing environment

Air quality

The air quality in the area surrounding the proposal site is typically that of a rural locality and as such is generally good. The state of air quality in the Clarence Valley LGA area is not monitored and the nearest OEH Air Quality monitoring station is located in Tamworth, a significant distance away. However, air quality is generally influenced by point sources of pollution, such as bush fires, controlled burns, licenced and unlicensed industrial sites and transport pollution (Clarence Valley Council (CVC) 2009a).

Search results from National Pollution Inventory for Lawrence show records from two industrial sources located in Grafton. The commonly reported emissions are Arsenic and compounds, copper and compounds, chromium (VI) compounds, Ethylbenzene, Cyclohexane and total nitrogen and phosphorus. However, given Grafton is 25 kilometres away, it is unlikely these industries impact air quality at the proposal site.

Climate

The historical rainfall records for the nearby Bureau of Meteorology (BOM) station at the Lawrence Post office (Station Reference 058 033) were reviewed. The Lawrence climate is typically cool dry winters and warm wet summers.

The average monthly rainfall for the past century at the Lawrence Post office is shown in Figure 6.5. December to April are generally the wettest months, with the highest rainfall received in February (historical mean >140 mm). During the February 2013 floods, the Lawrence Post Office station recorded 323.4 mm (following 242 mm in January), more than double the historical mean for the same months. The historical mean annual rainfall for the Lawrence area is 1070 mm. The driest months are generally August and September (historical mean of around 40 mm).

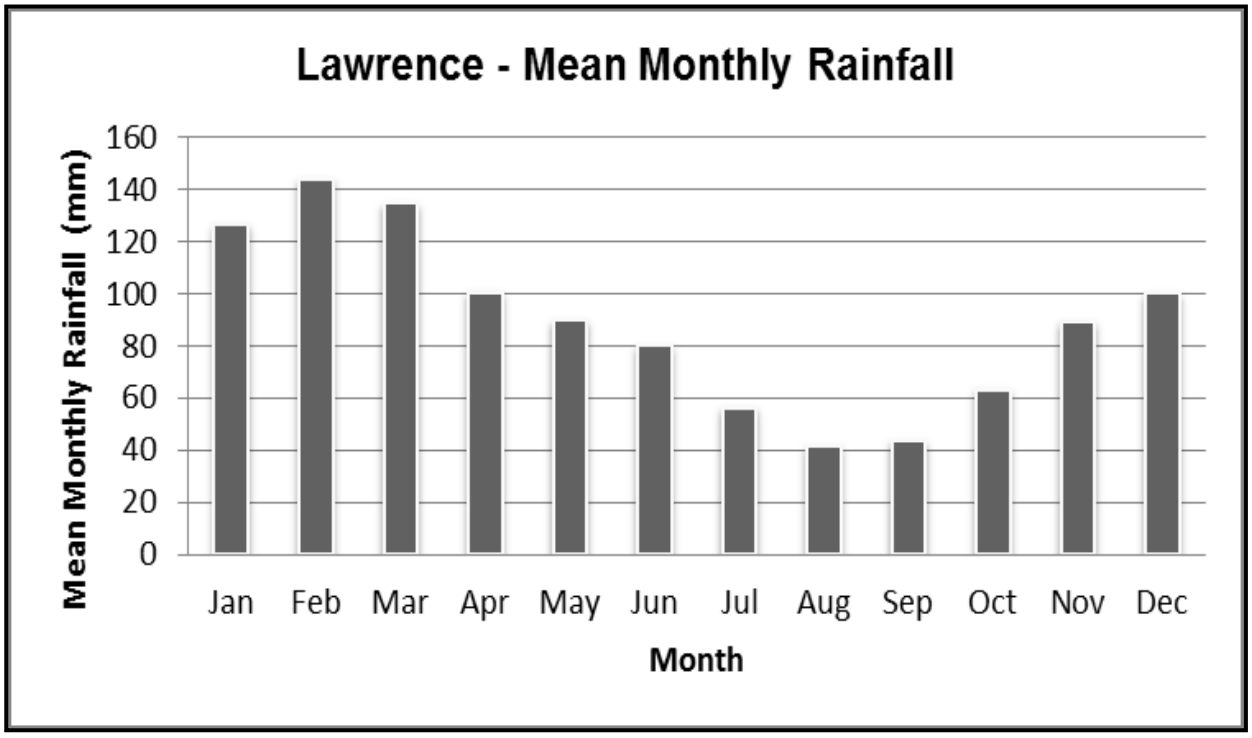

Figure 6.5: Historical mean rainfall at Lawrence Post Office

The nearest Bureau of Meteorology weather station which monitors temperature is located at the Harwood Sugar Mill, Harwood Island (Station Number 058027) 17 kilometres away to the north of the proposal site. The historical mean monthly minimum temperature ranges between 7.8 degrees in July to 19.0 degrees in February. The historical mean monthly maximum temperature ranges between 20.8 degrees in July and 29.0 degrees in January. Wind records and directions are not recorded at this location.

6.5.2 Policy setting

Air quality in NSW is regulated by the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations Act (Clean Air Regulation) 2010*. Both Acts are administered by the EPA and regulated by the EPA and local councils.

Public authorities are required to consider the impact of their activities upon the local environment under clause 228 of the *Environmental Planning and Assessment Regulation 2000.*

6.5.3 Criteria

The criteria adopted for assessing the impact of the proposal would be to minimise air emissions in the local environment resulting from the proposal.

6.5.4 Potential impacts

Air quality impacts may occur throughout all phases of removal from the following activities:

- Earthworks to remove the southern abutment and general building activities on unsealed surfaces
- Vegetation clearing and stripping
- Stockpiling of soil
- Grading and surface levelling work for road preparation at Bridge Street
- Any transport movements of soils and materials containing sediment
- Emissions generated by vehicle and plant movements from exhaust
- Removal of the bridge structure.

Adverse impacts on the air quality of the local environment are most likely to be from:

- The generation of dust on unsealed surfaces post clearing
- Dust generated during minor topography reshaping earthworks
- Air-borne particulates from the bridge removal.

Dust generation and air-borne particulates within the vicinity of residential receivers has the potential to cause health impacts and be a nuisance to residents. Dust generated may have an impact upon native vegetation with the area. However, due to the small proposal footprint, dust emissions are anticipated to be minor and could be controlled through best practice safeguards and management measures.

The removal of the bridge structure has the potential to generate dust and expose fibres/other materials that are potentially hazardous due to the age of the structure, such as lead paint. Before the removal of the structure, an inspection would be required to determine if any additional measures would be required to prevent human health impacts. Surfaces with lead paint would be managed with contaminate measures in accordance with AS 4361.1.

Vehicles, plant and equipment associated with the removal and building works would generate exhaust emissions. The emissions would be considered short term and minimal, with heavy equipment only required for minor earthworks after the removal of the bridge. The temporary presence of machinery would not have an adverse long-term negative impact upon residential receivers or the local environment.

6.5.5 Safeguards and management measures

The mitigation measures to prevent adverse impacts on air quality would be in accordance with Section 4.4 of the Roads and Maritime QA Specification G36, and safeguards specified in Section 6.13.5, with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Dust generation	• All vehicles will adhere to speed limits, particularly on unsealed surfaces. • Vehicles transporting waste or other materials that may produce odours or dust shall be covered during transportation. • Areas that may generate dust shall be managed to suppress dust emissions in accordance with the Roads and Maritime's *Stockpile Site Management Guideline* (RMS 2015). • Visual monitoring of air quality will be carried out on a daily basis to verify the effectiveness of dust controls. • Measures (including watering or covering exposed areas) shall be used if required to minimise or prevent air pollution and dust. • Work (including the spraying of paint and other materials) shall not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.	Contractor	Removal planning During removal works

Impact	Environmental safeguards	Responsibility	Timing
Emissions to air	• Vegetation or other materials are not to be burnt on site. • Plant and vehicles must not be left idling when not in use for extended periods. • Regular maintenance of vehicles, plant and equipment should be carried out and vehicles fitted with emission control devices in accordance with Australian Design Standards. • Visual monitoring of air quality would be carried out on a daily basis to verify the effectiveness of emissions controls.	Contractor	During removal
Removal of bridge	• A full inspection should be carried out of the bridge to determine the presence of any hazardous components. • The removal of the bridge and lead contaminated material would be carried out in accordance with AS 4361.1.	Contractor	Before and during Removal

6.6 Non-Aboriginal heritage

An assessment of the historical archaeology and heritage values of Sportsmans Creek Bridge precinct was completed by Maxim Archaeology and Heritage Pty Ltd in August 2013 (Maxim 2013) and is provided in Appendix B. The assessment discussed both the building of the new bridge and the removal of the existing Sportsmans Creek Bridge. A further Statement of Heritage Impact (SOHI) of Sportsmans Creek Bridge was prepared by the NSW Government Architect's Office Heritage Group (GAOHP2014) and is provided in Appendix C.

This section summarises the desktop and field investigations and assessment of potential items of non-Aboriginal heritage significance in the investigation area. The investigation (study) area referred to in this section is shown on Figure 1.1 of Appendix B.

The Maxim (2013) assessment identified a number of heritage items within the heritage investigation area through a desktop investigation. It was concluded these items did not present a constraint to the building of the new bridge or the removal of the existing bridge and no further field inspection was carried out.

The potential impact upon non-Aboriginal heritage and the Lawrence Conservation Area of the bridge removal was assessed by the Government Architect's Office (GAOHP2014) in the SOHI (refer to Appendix C). The report determined the overall heritage impact of removal of the Sportsmans Creek Bridge at Lawrence would be moderate and the resulting impact upon the Lawrence Conservation area would be moderate to minor.

6.6.1 Existing environment

A desktop assessment using heritage databases and available hard and soft copy resources was carried out to identify any items or places of potential historical heritage significance within the investigation area, as shown in Table 6.11. Further detail of the recorded items is provided in Appendix B.

Table 6.11: Results of the heritage database searches

Database Name	Search Date	Search Target	Outcome
Australian Heritage Database environment.gov.au/heritage/ahdb/	13.07.2013	The townships of Lawrence, Maclean and Copmanhurst in the Clarence Valley LGA, NSW	One resource was listed in the Lawrence town precinct
NSW Heritage Office State Heritage Register and State Heritage Inventory heritage.nsw.gov.au/	13.07.2013	The townships of Lawrence, Maclean and Copmanhurst in the Clarence Valley LGA, NSW	Five listings within the Lawrence town precinct, of which three fell within the investigation area
The Clarence Valley Local Environmental Plan 2011 legislation.nsw.gov.au	13.07.2013	The localities of Lawrence, Maclean and Copmanhurst	15 listings within the Lawrence town precinct, of which six fell within the investigation area
Local Heritage Studies: The Maclean Community Based Heritage Study, 2006 clarence.nsw.gov.au	14.07.2013	The area of the former Maclean Shire LGA	15 listings within the Lawrence town precinct, of which five fell within the investigation area
The Copmanhurst Community Based Heritage Study, 2005 clarence.nsw.gov.au/	14.07.2013	The area of the former Copmanhurst Shire LGA	One listing within Lawrence town precinct, which fell within the investigation area

Database Name	Search Date	Search Target	Outcome
The Maclean Shire (former) Community Based Thematic History, 2006 clarence.nsw.gov.au/	14.07.2013	The area of the former Copmanhurst Shire LGA	One listing within Lawrence town precinct, which fell within the investigation area
Roads and Maritime Heritage and Conservation Register, under s170 *Heritage Act 1977* rta.nsw.gov.au	13.07.2013	The Northern Region	The detailed listing for the present Sportsmans Creek Bridge

Review of databases and information supplied in Table 6.11 shows the primary items of historical heritage significance relevant to the proposal investigation area as follows:

- The search of the Australian Heritage Database and Roads and Maritime s.170 Heritage and Conservation Register revealed only the listing Sportsmans Creek Bridge within the Lawrence area
- The search of the State Heritage Inventory revealed the following three sites within the investigation area
    - Former Lawrence Baptist Church
    - Lawrence School of Arts
    - Sportsmans Creek Bridge.
- The Clarence Valley LEP 2011 lists 15 resources in the Lawrence precinct, six of which fall within the investigation area:
    - Former Lawrence Baptist Church
    - Lawrence School of Arts Building
    - Lawrence War Memorial and Park
    - Former Baptist Manse, Lawrence
    - Residence, 11 Bridge Street, Lawrence
    - Sportsmans Creek Bridge.

The Lawrence Conservation Area is listed on the Clarence Valley LEP 2011 and also falls within the investigation area. Figure 6.6 shows the location of the Lawrence Conservation Area and individual items of non-Aboriginal heritage significance within proximity to the proposal site.

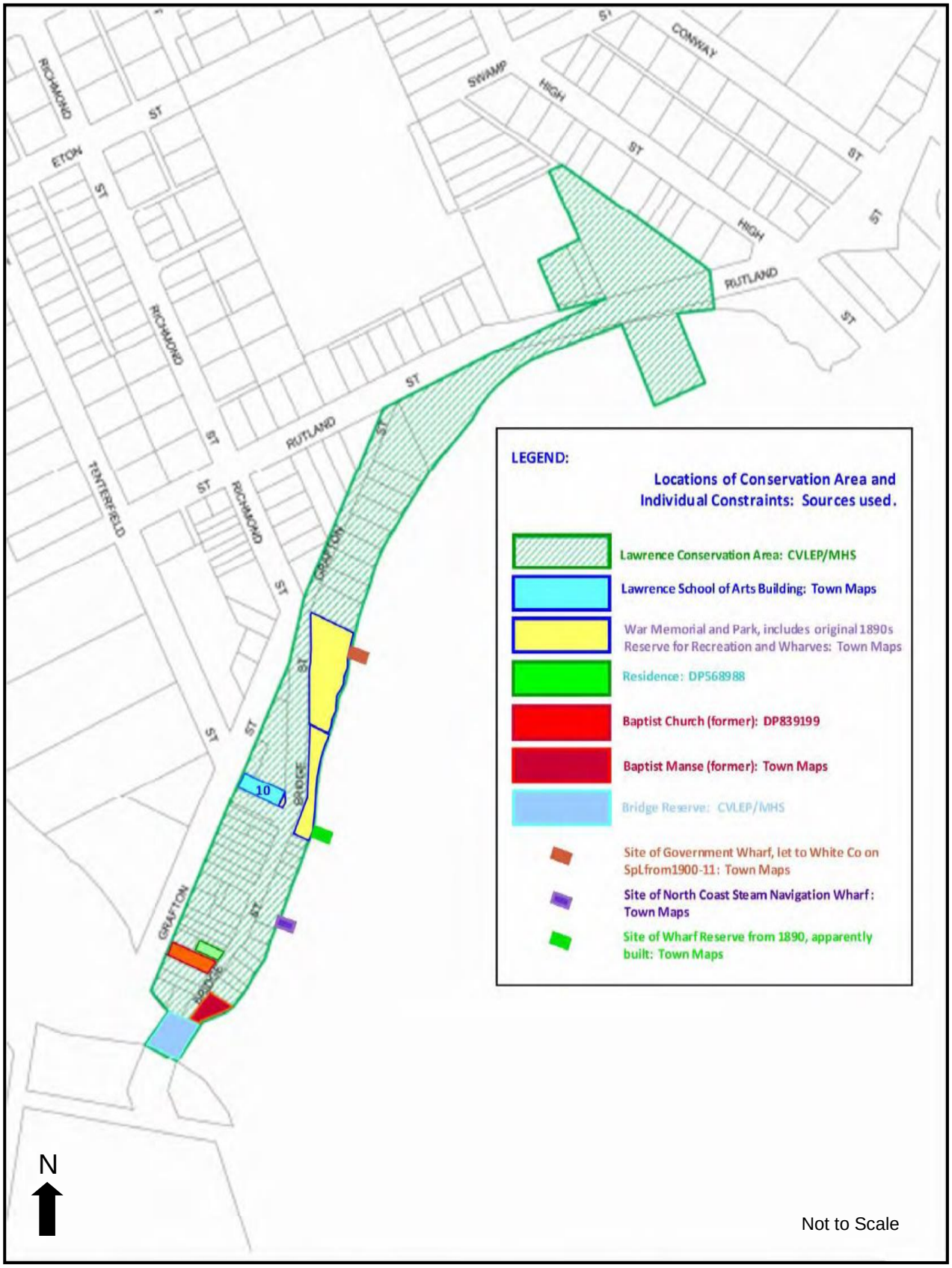

Figure 6.6: Lawrence heritage conservation area and non-Aboriginal items of heritage significance

Lawrence heritage conservation area

The Lawrence heritage conservation area was identified in the *Maclean Shire (former) Community Based Heritage Study, report to Clarence Valley Council* (Maclean Shire 2006) and has a formal listing on the Clarence Valley LEP 2011. The significance of the conservation area arises from its history in the 1870s and 1880s, when Lawrence was a busy town because of its involvement with the tablelands trade.

The town consisted of Upper and Lower Lawrence, with the former centred on Bridge Street. In the 1970s the area contained the post office, the Lawrence hotel and Stewart's wharf. The present Post Office constructed in 1894 marks the centre of Lawrence. The majority of other buildings have gone, with the exception of a few remaining buildings on Bridge Street and Rutland Street which form part of the conservation area as shown on Figure 6.6.

State Heritage Register (s.170) Listing

Roads and Maritime lists the Sportsmans Creek Bridge in its Heritage and Conservation Register, maintained pursuant to Section 170 of the *Heritage Act 1977* (refer to Section 4.3.4).

The following is the statement of significance for the bridge:

'The Sportsmans Creek Bridge is a Dare type timber truss bridge, and was built in 1911. In 1998 it was in good condition.'

As a timber truss road bridge, it has strong associations with the expansion of the road network and economic activity throughout NSW, and Harvey Dare, the designer of this type of truss.

Dare trusses were fifth in the five stage design evolution of NSW timber truss road bridges. They were similar to Allan trusses, but contain improvements which make them stronger and easier to maintain. This engineering enhancement represents a significant evolution of the design of timber truss bridges, and gives Dare trusses some technical significance.

The Sportsmans Creek Bridge is particularly technically significant because it has very large span trusses.

In 1998 there were 27 surviving Dare trusses in NSW of the 40 built, and 82 timber truss road bridges survive from the more than 400 built.*

The Sportsmans Creek Bridge is a representative example of Dare timber truss road bridges, and is assessed as being State significant, primarily on the basis of its technical and historical significance.'

* *In 2011 there were 18 surviving Dare trusses in NSW of the 44 built and 62 timber truss road bridges survive from the more than 400 built (Roads and Maritime 2012a), indicating that they are considered rare in NSW.*

A full statement of significance of the bridge against the Heritage Office NSW Criteria is provided in Appendix C (refer to Section 6.6.4 for the criteria).

Sportsmans Creek Bridge condition

A condition assessment was carried out of the bridge as part of the heritage assessment for this REF. The following was noted:

- Though the bridge decks are generally sound and the bridge is in use for road traffic, the ironbark timber trusses, railings and fixings are in fairly poor condition
- The queen post braces and exposed cross-girder ends are badly decayed along the upper face
- Junctions of guardrail posts and stringers are also decayed
- Sheltered parts of the bridge, including main structural piers and footings, lower chord of

the trusses, hanger rods and stays appear slightly better preserved although there appear to have been some structural reinforcements added
- The stone abutment to the northern approach is in good condition along the lower section of the gradient but masonry riprap appears unstable just below the bridge deck level, especially on the downstream side.

Numerous repairs of the bridge were noted.

6.6.2 History

William Robertson established his Lanark Lodge run of 15,000 acres in 1838. This run was bounded on the east by the western bank of the Clarence River, on the south by Sportsmans Creek and north by The Broadwater and Broadwater Creek.

The station homestead was established in the area that would eventually become the heart of Lawrence, the house, home farm and services in the Richmond-Eton-Tenterfield Streets enclave, with an orchard and gardens fenced off between the home farm and the river bank. In due course, a population area was resumed from Lanark Lodge station to provide for the establishment of Lawrence and the final footprint of the property.

The layout of the town had been well and truly established by 1889, when the Third Edition of the Town Map was prepared (refer to Appendix B). Also notable on this plan are the annotated locations of the Government wharf and of the North Coast Steam Navigation Company. A further wharf was located next to the third lot north of the termination of High Street at the river bank. Subsequent town plans indicate the continuity of these wharves until 1942, although by that time another wharf was in operation next to the High Street wharf.

In general, the activity along the river bank gives emphasis to the history of the town of Lawrence as a long-standing transport hub, receiving and dispatching freight for the local district and from the New England Tableland. Lawrence played its part in the distribution process, in the first instance by fulfilling the role of principal port ('rather than a town' says the history), and as the terminal for bullock trains to and from the Tableland along 'the Old Line' connecting Tabulam. The population remained small because the town catered for itinerant teamsters rather than resident farmers, although it had a Post Office after 1859, Court House and Police Station since the 1860s, and as a tribute to the potential for interstate trade, a Customs House after 1861.

The growth of Grafton as a transport hub regionally, resulted in the decline of Lawrence as a port. As such, much of what made Lawrence an important feature of Lower Clarence Valley life in the last half of the 19th Century, and, to a declining degree, in the first half of the 20th Century, is represented in surviving buildings and known locations of archaeological sites.

Timber Truss Bridges in NSW

Timber truss bridges were used extensively throughout the state from 1860 through to 1936 and five different truss types were developed during this period. Of the 407 timber truss road bridges originally constructed, most have been replaced with new structures on the same or similar alignments. The remaining bridges are heavily affected by modern road and traffic requirements which, in the longer term, would necessitate the substantial upgrading of these bridges or their replacement with a new bridge.

Timber truss bridges were preferred by the Public Works Department from the mid-19th to the early 20th century because they were relatively cheap to construct, and used mostly local materials. This condition effectively prohibited the use of iron and steel, as these, before the building of the steel works at Newcastle in the early 20th century, had to be imported from England.

In 1903 engineer Harvey Dare was in charge of highway bridge design. The Dare truss bridges proved to have the highest survival rate of timber truss bridges in NSW. The first Dare truss bridge, completed in 1905, spanned the MacDonald River at Bendemeer and is still used as a footbridge.

Sportsmans Creek Bridge

The plan for a bridge over Sportsmans Creek to replace the Sportsmans Creek Ferry met with a series of delays through the 1880s (GAOHG 2014). A timber bridge was opened finally in 1885. However, the structure soon showed signs of deterioration.

The condition worsened rapidly, possibly due to white ants. In 1904 the bridge was re-decked (Clarence and Richmond Examiner 17 May 1904, p. 5), but condition had deteriorated to the point of danger by 1909 (Examiner 16 February 1909, p. 4). Traffic appears to have been increasing and the condition of the approaches was regarded as poor. Tenders for the replacement 'composite truss' bridge were let in August 1909 (Northern Star, 24 August 1909, p. 3) and the winning bid (by Oxenford Bros, $3480) was accepted the next month. In 1911 the Examiner described the bridge as follows:

'The present bridge has served for close on a quarter of a century, and it is proposed to supersede it with a new structure, which will consist of two composite truss spans of 104ft. 9in. each, and three approach spans, one of 28ft. and two of 30ft., truss of spans to be 21ft. 8in. apart, truss to be 13ft. deep, and to have eight panels of 13ft., the- carriage way to be 18ft. in the clear.' (Examiner 19 August 1909).

The new Sportsmans Creek Bridge was built on the same alignment as the original, which allowed the re-use of the two central piers from the first bridge and remains the same bridge to the present.

Plate 6.11 to Plate 6.13 show historical photographs of the Sportsmans Creek Bridge.

Plate 6.11: Dare truss bridge at Sportsmans Creek, 1911 (undated image) Source: Colin O'Connor *Spanning Two Centuries, historic bridges of Australia,* Queensland University Press, 1985)

Plate 6.12: Sportsmans Creek bridge, 1949 (Source: Roads and Maritime archives)

Plate 6.13: Sportsmans Creek Bridge in May 1996 (Source: Department of the Environment)

6.6.3 Policy setting

Public authorities are required to consider the impact of their activities on locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations under clause 228(2)(e) of the *Environmental Planning and Assessment Regulation 2000.*

Heritage items in NSW are protected under the *Heritage Act 1977* and the relevant LEP as discussed in Sections 4.3.4 and 4.2.1.

The Roads and Maritime *Timber Truss Bridge Conservation Strategy 2012* (as discussed in Section 2.1.2) also provides the context for the proposal and the justification for the removal of the bridge.

6.6.4 Criteria

The assessment of significance of removal of the bridge adopted the Heritage Council of NSW significance criteria. These criteria help in achieving consistency in the assessment process and provide a basis for comparison. The criteria broadly are as follows:

- Criterion (a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)
- Criterion (b) an item has strong or special association with the life or work of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)
- Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)
- Criterion (d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons
- Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)
- Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)
- Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's:
  - Cultural or natural places
  - Cultural or natural environments
- A class of the local area's:
  - Cultural or natural places
  - Cultural or natural environments.

More broadly, the criteria adopted for assessing the impact upon non-Aboriginal heritage in the locality, would be to ensure the proposal avoids impact upon known or unidentified items of non-Aboriginal heritage significance.

6.6.5 Potential impacts

The proposal has the potential to impact upon non-Aboriginal heritage through the following activities:

- Removal of the Sportsmans Creek Bridge (listed on the s. 170 heritage register), including the southern abutment
- Road surface and intersection works at the location of the northern abutment of the bridge to close Bridge Street.

The SOHI prepared by the NSW GAOHG (2014) for the proposal assessed the potential impacts upon both the Lawrence heritage conservation area and the removal of the bridge as discussed below.

The proposal is unlikely to impact upon the heritage value of any other items of non-Aboriginal heritage significance identified in the investigation area of the Maxim (2013) study due to sufficient distance. Potential impacts upon heritage structures due to the proximity of vibration-intensive works are discussed further in Section 6.4.4. Nevertheless, during on-site work, all staff, contractors and others involved in removal related activities would be made aware of the statutory legislation protecting sites and places of significance. Safeguards and mitigation measures proposed in Section 6.6.6 and Section 6.4.5 would ensure that potential impacts are avoided.

Removal of the Sportsmans Creek Bridge

The SOHI prepared for the proposal assessed the removal of the bridge against the State Heritage Criteria in NSW (refer to Section 6.6.4) and is summarised in Table 6.12.

Table 6.12: Heritage impact assessment

Aspect of Significance	Level of Significance	Heritage Impact of Proposal	Mitigation Factors
Association with the expansion of the NSW road network Historically important acceptance of American bridge design ideas (Criterion A)	Local	Adverse impact loss of the bridge Diminishing of historical role of the Maclean-Grafton road in NSW transport development	6 other Roads and Maritime Dare truss bridges in NSW to be retained (and 5 non-Roads and Maritime) including nearby Briner bridge (to be upgraded to State Heritage Register) Interpretation (Timber Truss Bridges book; local signboards and heritage markers)
Association with Harvey Dare (Criterion B)	Local/State	Adverse impact	Interpretation (Timber Truss Bridges book; local signboards and heritage markers) Photographic archival recording and measured drawings
Technical quality of design Landscape significance as visual 'gateway' to road travellers Ranked 19th out of 82 timber bridges in NSW by McMillan Britton & Kell, 1998 (Criterion C)	Local, moderate	Adverse impact Irreparable loss of the bridge	Photographic archival recording and measured drawings Interpretation (Timber Truss Bridges book; local signboards and heritage markers) Landscape enhancement and added amenity values as per Section 6.8 of this REF.
Social visibility Contribution to group value (Criterion D)	Local	Adverse impact Irreparable loss of the bridge	Offset by the existence of other Dare Truss bridges in the State Environmental/amenity benefits to heritage values of the Lawrence Conservation Area
Representative of major technical developments in timber truss design Large span bridge (Criterion E)	Local	Moderate impact Offset by Roads and Maritime retention strategy	Photographic archival recording and measured drawings 6 other Roads and Maritime Dare truss bridges (and 5 non-Roads and Maritime) in the State to be retained including the nearby Briner bridge (to be upgraded to State Heritage Register)
Rarity - in 2011 there were 18 surviving Dare trusses in NSW of the 44 built (Criterion F)	Local/State	Adverse	Updating of the Roads and Maritime s.170 Register Bi-annual reporting to the Heritage Council of NSW.
Significance in demonstrating the principal characteristics of a class of NSW's cultural or natural places (Representativeness)	Local	Adverse Offset by Roads and Maritime retention strategy	Photographic archival recording and measured drawings 6 other Roads and Maritime Dare truss bridges (and 5 non-Roads and Maritime) in the State to be retained including the nearby Briner bridge (to be upgraded to State Heritage Register)

The removal of the existing timber truss bridge has potential significant, permanent implications for the heritage item. The heritage impact assessment as noted in Table 6.12, showed the loss of the

bridge and associated work would be mitigated by the safeguards as proposed in Section 6.6.6 for the following key reasons:

- The Roads and Maritime Timber Truss Bridge Conservation Strategy has charted positive long-term strategic goals for timber truss bridges in NSW and is being followed through in accordance with commitments made to the Heritage Council
- Long-term operability of the bridge for modern road infrastructure and regional development has been shown to be untenable
- All options for retention and re-use have been explored and none are able to guarantee adequate conservation
- Postponement of removal affords no advantages as the bridge would rapidly fall into disrepair
- The landscape character benefits to the Lawrence heritage conservation area outweigh the loss of the bridge (refer to Section 6.8.5)
- The stone piers on the northern abutment would be retained and consolidated to provide a vestige of continuity with the streetscape and could serve as a reference point of heritage interpretation.

The assessment concluded the overall heritage impact of removal of the Sportsmans Creek Bridge at Lawrence would be moderate. A copy of the SOHI has been issued to the Council Heritage Officer for comment (refer Section 4.2.1).

Although the proposal is to remove the bridge, the northern abutment would be retained. The bridge removal planning would also need to consider the impact upon the structures to be retained before the start of work to ensure their structural integrity is retained in accordance with the safeguards proposed Section 6.6.6.

Lawrence conservation area

The heritage impact of the proposal on the character and amenity of the Lawrence conservation area, 'the Heritage Village' is included in KI Studio (2014) and discussed in Section 6.8. The report considered both the building of the new bridge and the sensitivity of the preferred option against the character of the village and the management of the loss of the existing bridge upon the landscape and visual character of the environment.

The assessment demonstrated there are a range of amenity benefits to the heritage conservation area, including the removal of through traffic, environmental and amenity improvements, landscape consolidation and streetscape and heritage interpretation and enhancement, which outweigh the loss of the bridge itself. GOAHP (2014 concurred with this finding. The safeguards listed in Section 6.8.6 would ensure the loss of the bridge would be appropriately mitigated during the detailed design phase.

Based on the evidence supplied in KI Studio (2014) and the field inspection by GAOHG (2014), it was concluded the heritage impact of removal of the existing bridge would have moderate or minor heritage impact on the heritage conservation area provided the safeguards proposed in Section 6.8.6 are implemented.

As minor road work is required within the heritage conservation area and the wharf within Lawrence War Memorial and Park may be utilised to move materials and equipment, the Council Heritage Officer would be consulted in accordance with the ISEPP (refer to Section 5.4) before the start of work within this area to determine any requirements for inclusion in the CEMP for the works.

6.6.6 Safeguards and management measures

The mitigation measures to manage potential impacts upon non-Aboriginal heritage would be in accordance with Section 4.10 of the Roads and Maritime QA Specification G36 and the Roads and Maritime standard safeguards, with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Removal of an item listed on the Roads and Maritime s.170 register and Clarence Valley LEP 2011	• Roads and Maritime shall update its s.170 Register to reflect the removal of the Sportsmans Creek Bridge. • As per Section 14 of the SEPP (Infrastructure) Roads and Maritime will provide written notice of the intention to carry out the proposed works to Council.	Roads and Maritime	Before the start of works
Removal of the Sportsmans Creek Bridge	• Urban and landscape design shall acknowledge the missing bridge as a central feature in the historic urban form of Lawrence. Redevelopment shall make reference to the original road corridor (eg in considering the design of viewing points, plantings, parkland, the siting of waterside amenities) in order to preserve the historical linkage across the creek at this location, which began with the ferry and was continued in the 1885 and 1909 Lawrence bridges.	Council	Removal planning
	• A design-based approach to restoration of the creek banks after the removal of the bridge will be carried out in accordance with the safeguards proposed in Section 6.8.6. • The content, scope and interpretive value of local signboards, markers and other on-site interpretation materials will be determined at an early stage	Roads and Maritime	
	• All useful parts of the bridge shall be salvaged and stockpiled for future re-use in line with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction* and *Technical Guide: Management of Road Construction and Maintenance Wastes*.	Contractor	During removal works
Protection of the Dry Stone Wall Northern Abutment	• Consolidation work to stabilise the loose masonry of the dry stone northern abutment, if required, will be carried out in a manner which safeguards the values and integrity of this element as a surviving remnant of the historical landscape. • Specific measures will be included in the CEMP to minimise impact on the stone abutment during removal works. Should accidental damage to the stone wall occur, any required restoration of the abutment shall be carried out to ensure the retention of historical values.	Contractor	During removal works

Impact	Environmental safeguards	Responsibility	Timing
Damage to items of non-Aboriginal heritage significance to be retained	• The dismantling process in terms of heavy plant, access, excavation, etc shall consider any potential impact on the structural soundness and historical value of the stonework or other retained elements, and appropriate measures will be implemented to ensure the remains are protected. • Any accidental damage to items of non-Aboriginal heritage significance to be retained will be reported to the Roads and Maritime Environmental Officer and restored to ensure the retention of historical values.	Contractor	Removal planning, During removal works
Damage to items of non-Aboriginal heritage significance	• All staff, contractors and others involved in building and maintenance related activities will be made aware of statutory legislation protecting sites and places of significance. Of particular importance are the *Heritage Act 1977*, the Clarence Valley LEP 2011 and items shown on Figure 6.6. • If unexpected archaeological remains are uncovered during the works, all work must cease in the vicinity of the material/find and the steps in the Roads and Maritime (2012c) *Standard Management Procedure: Unexpected Archaeological Finds* must be followed. Roads and Maritime Environmental Officer must be contacted immediately. • If any items defined as relics under the *NSW Heritage Act 1977* are uncovered during the works, all work must cease in the vicinity of the find and the Roads and Maritime Environmental Officer contacted immediately.	Contractor	During removal
Work in proximity to the Lawrence Conservation Area.	• A notification shall be issued to Council about the works. • Consultation will be carried out with the Council Heritage Officer before the start of works which will involve disturbance to any heritage structures located within the Lawrence heritage conservation area. In addition the following applies: ○ In the event alternate access to Sportsmans Creek is unavailable, the boat ramp and wharf could be utilised subject to the approval of the Roads and Maritime Project Manager and Environment Officer in consultation with Council.	Contractor	During removal works

6.7 Aboriginal heritage

An archaeological due diligence assessment was completed for the proposal by McCardle Cultural Heritage (McCardle Cultural Heritage 2014) (refer Appendix D). This section of the REF summarises the investigations and assessment of potential items of Aboriginal heritage in relation to the proposal area.

A desktop assessment including a literature review was carried out to identify any potential items of Aboriginal heritage significance, followed by a field investigation on 14 February 2014. The assessment concluded there were no sites of Aboriginal heritage significance or Potential Archaeological Deposits (PADs) identified and the investigation area is highly disturbed with low to no potential for in situ archaeological evidence of past occupation. Standard best practice measures for the management of Aboriginal heritage during removal would be applied.

6.7.1 Existing environment

Desktop assessment

Initially, a desktop assessment was carried out of the relevant literature and heritage databases covering the area of investigation in order to identify any potential issues which may be relevant to the assessment of the proposal options.

A search of the Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) register identified six known Aboriginal sites are within five kilometres of the investigation area and include three modified trees, two artefacts and one burial site as shown in Table 6.13.

Table 6.13: Results of Aboriginal heritage database searches

Database Name	Search Date	Search Type	Comment
OEH Aboriginal Heritage Information Management System (AHIMS)	02.07.2013	AGD, Zone : 56, Eastings: 504000 - 514000, Northings : 6731000 - 6741000 with a Buffer of 50 metres,	Six AHIMS sites within the search area.

Austral Archaeology (2002) undertook a Heritage Assessment and Statement of Heritage Impact (SOHI) for a new bridge route of the replacement of Sportsmans Creek Bridge in the vicinity of the current proposal as part of a previous investigation by Council. The survey carried out was for a new concrete bridge on Grafton Street by Austral Archaeology and the Yaegl Local Aboriginal Land Council.

The survey did not identify any Aboriginal archaeological or cultural sites. However, two Potential Archaeological Deposits (PADs), one on each side of Sportsmans Creek, were identified. PAD1 and PAD2 were both subject to past land use practices such as vegetation clearing and landscaping activities. It was argued although this sort of activity is likely to have caused some disturbance to any sub surface archaeological remains, such remains, even though possibly disturbed, can still contribute information to the past Aboriginal occupation of the investigation area.

Predictive Model and Archaeological Model for the investigation area

Previous archaeological studies carried out throughout the Clarence Valley are limited and provide limited information about site types, context, extents, locations and proximity to water. Research has shown scarred trees and artefact sites are the most predominant site types likely in the area. The most common site locations are along watercourses and on elevated landforms, with artefact density being greatest in close proximity to water sources.

Within the specific investigation area, a low potential for evidence of past occupation is predicted due to the landform being an alluvial floodplain. Sites are expected to be located on elevated land, which the investigation area is lacking. Based on archaeological sites registered in the region, the results of past archaeological studies, and the location within low lying flood plains, no sites are likely to occur.

Field investigations

Methodology

A field investigation was carried out on 14 February 2014 with the Roads and Maritime Aboriginal Cultural Heritage Officer as part of the McCardle Cultural Heritage (2014) Aboriginal due diligence assessment provided in Appendix D. The investigation was proposed to provide an assessment of the proposal (including both the building of the new bridge and removal of the old) upon Aboriginal heritage as well as investigate the presence of the PADs identified in the Austral Archaeology (2002) report.

The investigation area was divided into four Survey Units (SUs) which were based on the proposed development impact areas (refer to Figure 6.7). The survey units were surveyed on foot by the archaeologist and included transects about four metres apart. Transects focused on areas of high ground surface visibility and exposures such as erosional features, creek bank, tracks, and cleared areas.

Consideration was given to the effective coverage, which is comprised of two components: the visibility of the bare ground and exposure, which is the likelihood of revealing subsurface cultural materials. The overall effective coverage of the investigation area was determined as 15.64 per cent, with grass being identified as the limiting factor, and erosion across the investigation area identified as minimal.

Results

The results of the Aboriginal Heritage field investigation by McCardle Cultural Heritage (2014) concluded:

- No archaeological sites were identified as:
  - The investigation area is situated on Sportsmans Creek alluvial plains and is subject to regular flooding
  - The high level of land uses and impacts as well as natural factors (such as erosion and flooding) would have destroyed any evidence of past occupation.
- No PADs were identified due to the following reasons:
  - The investigation area is situated on Sportsmans Creek alluvial plains and is subject to regular flooding
  - The high level of land uses and impacts as well as natural factors (such as erosion and flooding) would have destroyed any evidence of past occupation
  - The revised potential for artefacts to occur within the investigation is assessed as very low or negligible after field investigations
  - There remains a low to no potential for evidence to occur in the areas currently obscured by vegetation
  - The investigation area is highly disturbed and is considered to have low to no potential for not to have been suitable for past occupation as the surrounding area contains no raw materials typically used in the manufacture of stone tools, no exposed sandstone is evident and no elevated landform is present within close proximity.

Figure 6.7: Aboriginal Heritage Survey units

6.7.2 History

The Clarence Valley area is dominated by lower valleys and rich coastal plains fed by the Clarence River and the Nymboida River. The Clarence River flows into the sea between Iluka and Yamba and was originally called Breimba or Berrinbah by the Aboriginal people indigenous to the area, who were traditionally part of the Gumbainggir language group. The full extent of Gumbainggir country stretched from Nambucca Heads in the south, to Yamba in the north and out to Glenn Innes in the west.

The Clarence River was located along the northern border of the Gumbainggir territory, with the traditional country of the Bundjalong language group located to the north of this.

6.7.3 Policy setting

The proposed works would be required to be consistent with the *Roads and Maritime Service Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) and the NSW Due Diligence Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. The Roads and Maritime Cultural Heritage Officer has confirmed acceptance of the Archaeological Due Diligence Assessment report fulfils the Roads and Maritime PACHCI requirements (G. Purcell 2014, pers. comm., November).

Public authorities are required to consider the impact of their activities locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations under clause 228(2)(e) of the *Environmental Planning and Assessment Regulation 2000.*

6.7.4 Criteria

The criteria adopted for assessing the impact upon Aboriginal heritage in the locality, would be to ensure the proposal avoids impact upon known or unidentified items of Aboriginal heritage significance.

6.7.5 Potential impacts

The archaeological due diligence assessment prepared by McCardle Cultural Heritage (2014) (refer to Appendix D) concluded no sites or PADs were identified or likely to occur within the area of investigation, the proposal would be unlikely to result in adverse impacts upon the archaeological record and that no further investigations are required.

Minor earthworks required for the removal of the bridge would require disturbance to the ground subsurface and have the potential to uncover previously undiscovered items of Aboriginal heritage significance. The assessment concluded that the potential to uncover undiscovered items is low to zero risk potential as the Sportsmans Creek low lying alluvial plains area is highly disturbed and the surrounding landform and environs are considered not to have been suitable for past occupation.

Nevertheless, during on-site works, all staff, contractors and others involved in removal activities would be made aware of the statutory legislation protecting sites and places of significance. Safeguards and mitigation measures proposed in Section 6.7.6 would ensure that any potential impacts to unidentified objects could be avoided.

6.7.6 Safeguards and management measures

The mitigation measures to manage potential impacts upon Aboriginal heritage would be in accordance with Section 4.9 of the Roads and Maritime QA Specification G36 and the Roads and Maritime standard safeguards, with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Damage to items of Aboriginal heritage significance	• The following measures should be included within the CEMP for the Proposal and implemented during removal works: ○ All staff, contractors and others involved in removal activities should be made aware of statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010, under the *National Parks and Wildlife Act 1974* ○ If Aboriginal heritage items are uncovered during the works, all work in the vicinity of the find must cease and Roads and Maritime's Aboriginal cultural heritage advisor and the environmental officer contacted immediately. Steps in the Roads and Maritime (2012c) *Standard Management Procedure: Unexpected Archaeological Finds* must be followed.	Contractor	Pre-Removal During removal works

6.8 Landscape character and visual impacts

A landscape character and visual impact assessment was completed by KI Studio in March 2014 (KI Studio 2014) (refer to Appendix N). This section draws on the main findings of the report.

The assessment concluded that the proposal is of a limited scale considering the overall context and expanse of the setting. The proposal (combined with the building of the new bridge) has little effect on the longer term visual quality of the setting and provides future opportunities to enhance the urban structure and the use of the heritage village and improvements to accessibility of Flo Clark Park.

6.8.1 Existing environment

Landscape character zones

In order to determine the sensitivity of the landscape, the assessment identified eight landscape character zones in the general vicinity of the investigation area. These are shown on Figure 6.8 and form the basis of the assessment.

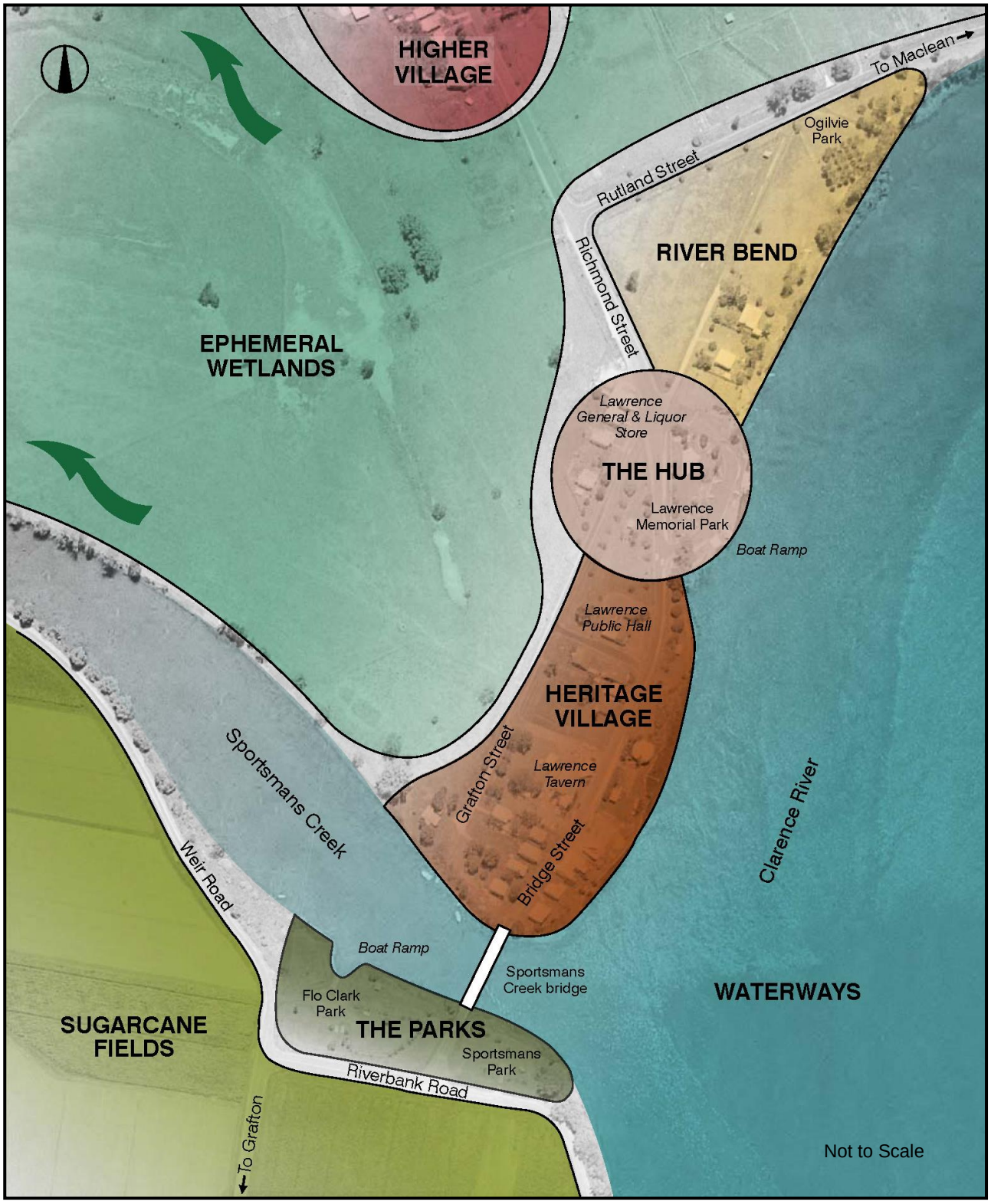

Figure 6.8: Landscape character zones map

Higher village

This zone occupies the upper grounds of the township and comprises predominantly residential properties on an elevated position with views towards the floodplain below and beyond. This zone is considered high in sensitivity due to its general land use and contextual views from many residences.

Ephemeral wetlands

Comprising of the low-lying land directly south and east of the Higher Village, this zone is characterised by pasture land and wetlands. Within this zone there are a few stands of trees. However, its character is generally open with extensive views. Its sensitivity is considered moderate.

River bend

This area includes a combination of open pasture land and two residences flanking the Clarence River and Ogilvie Park. Due to the extensiveness of open space, this zone has a rural character. Due to its mixed use, it is considered to have a moderate sensitivity.

The Hub

The Hub is defined by the intersection of Richmond, Grafton and Bridge Streets.

Lawrence General and Liquor Store strongly marks the intersection from where views towards the Clarence River are attainable.

This zone marks the northern entry point into the Heritage Village and provides a strong sense of context through the visual interrelationship between the waterways, the Heritage Village, the floodplains and the Higher Village. Hence, the Hub strongly contributes to the orientation of the traveller/viewer.

The Hub also includes Lawrence Memorial Park from which a boat ramp provides recreational access to the Clarence River. It also includes a playground, picnic facilities and a memorial in memory of local servicemen who served in both world wars, Borneo, Korea, Malaya and Vietnam. A high sensitivity level has been determined for this zone due to its strategic location and its interface of parks and water.

Heritage Village

The Heritage Village is an ensemble of residences with a number of them under heritage protection. This ensemble, including the former Baptist Church has a strong visual inter-relationship with the waterways of the Clarence River and creates a picturesque setting that defines its identity. Considering its significance to the township's identity and heritage value, a high sensitivity rating is considered appropriate.

The Heritage Village hugs the western bank of the Clarence River at this location and is focused on Bridge Street. This area with a number of heritage properties, combined with the bridge structure, creates a memorable gateway setting as the entry point into town from the south. This entry point is defined by the bridge, historic buildings as well as open space/parks that provide a strong visual and spatial relationship with the Clarence River.

This visual relationship is considered significant as it strongly contributes to the sense of place and character and provides a strong sense of arrival that partly defines the impression of the town.

Considering its significance to the township's identity and heritage value, it is considered to have a high sensitivity.

The parks

This zone comprises Flo Clark Park and Sportsmans Park. These two parks provide direct views towards the existing bridge and the Heritage Village beyond. Flo Clark Park has picnic facilities and a boat ramp, and Sportsmans Park has a picnic shelter and dilapidated BBQ. These parks consist of mown grass with stands of trees. Panoramic views are attainable from these parks towards the Clarence River and Sportsmans Creek, as well as direct views across to the Heritage Village. This recreational area with contextual views is considered to have a high sensitivity.

Sugarcane fields

This zone, located to the south, is dominated by the green and homogeneous character of the sugarcane fields. Depending on the harvest time, these fields would either provide open views to the landscape beyond or create an enclosed feeling along the road. This zone strongly contributes to the general character of the landscape and is one of the most southern sugarcane production areas in NSW. A low sensitivity level has been assessed due to its land use.

Waterways

Comprised of Sportsmans Creek and the Clarence River, this zone with its strong green demarcation in the form of a floodway, is visually of high significance and defines the eastern edge of the central part of town. This area is in the vicinity of seagrass beds, wetlands of national significance and saltmarsh areas.

The *Clarence River Way Masterplan* highlights the need to improve public accessibility to waterfront road reserves, and to provide bird habitat/interpretation of wetlands from road reserves (CVC 2009b).

This zone is considered high in sensitivity due to its strategic position within Lawrence, its environmental values and aesthetic appeal. The recreational value of the waterways and visual appeal in context to its transient nature limits this zone sensitivity; however, it is considered to have an overall high sensitivity.

6.8.2 History

Lawrence flourished in the 1870s and 1880s through the trade from the tablelands and developed as a port facility along the Clarence River. Over time much of the historic fabric of the town centre has vanished, however a number of old buildings along Bridge Street and Rutland Street still provide evidence of the ‘old days’.

The Heritage Village of Lawrence hugs the western bank of the Clarence River at this location and is focused on Bridge Street. This area with a number of heritage properties, combined with the bridge structure, creates a memorable gateway setting as the entry point into town from the south. This entry point is defined by the bridge, historic buildings as well as open space and parks that provide a strong visual and spatial relationship with the Clarence River.

This visual relationship is considered significant as it strongly contributes to the sense of place and character and provides a strong sense of arrival that partly defines the impression of the town.

6.8.3 Policy setting

Public authorities are required to consider the impact of their activities on *locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations, transformation of a locality and any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality* under clause 228(2)(b, d and e) of the Environmental Planning and Assessment Regulation 2000.

The visual assessment was prepared in accordance with Roads and Maritime guidelines as follows:

- *Guidelines for landscape character and visual impact assessment EIA-N04, Version 2.0* (Roads and Maritime 2013c); and consideration of the Roads and Maritime latest revision to this document
- *Beyond the Pavement - RMS urban design policy, procedures and design principles* (Roads and Maritime 2014c)
- Bridge Aesthetic Guidelines (Roads and Maritime 2012d)
- Landscape Guidelines (RTA 2008).

The management measures proposed in Section 6.8.6 are also consistent with Council plans, namely the *Clarence River Way Masterplan* (CVC 2009b). Key priority recommendations of the Clarence River Way Master Plan are:

- The focus on sustainability to increase water based access as a priority
- The need to provide a range of land/water interfaces access points along the river allied to the townships and tourist nodes.

6.8.4 Criteria

The criteria adopted for assessing the impact of the proposal are to minimise adverse impacts upon the visual amenity of the local environment as a result of the proposal. The criteria utilised to assess the magnitude and sensitivity of impacts is derived from the landscape visual impacts rating table in the Roads and Maritime *Guidelines for landscape character and visual impact assessment EIA-N04, Version 2.0* as shown in Table 6.14.

Table 6.14: Landscape visual impacts rating table (Roads and Maritime EIA-N04)

Magnitude

Sensitivity		**High**	**Moderate**	**Low**	**Negligible**
	High	High impact	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

6.8.5 Potential impacts

Removal

The proposal is anticipated to generate a temporary visual impact upon the locality, through the presence of work vehicles and equipment and the site compound and temporary laydown for dismantled materials in Flo Clark Park and along the banks of Sportsmans Creek.

The works would be visible along Weir Road, Ensbey Road, and Grafton-Lawrence Road and to users travelling across the Sportsmans Creek new bridge. The residential properties situated on the northern banks of Sportsmans Creek and along Bridge Street would be impacted by the temporary visual obstructions, particularly those nearby to temporary crane platforms. Minor short-term disturbances would be experienced by the public and residents on Bridge Street during the works.

Provided the safeguards and management measures in Section 6.8.6 are implemented, it anticipated that the impacts would be of low to moderate risk.

Post-removal

The landscape character assessment carried out is based upon the cumulative impact from the removal of the old bridge as well as the building of the new bridge. A summary of the overall impact assessment ratings is provided in Table 6.15 and a full description of the impact upon each zone is discussed in Appendix N. A photomontage of the area after the bridge is removed – looking from the Flo Clark Park boat ramp – is provided in Plate 6.14.

Plate 6.14: Photomontage of the proposal area after the Sportsmans Creek Bridge removal

Table 6.15: Landscape character impact - summary table

Character Zones	Sensitivity	Magnitude	Impact
Higher Village	High	Negligible	Negligible
Ephemeral Wetlands	Moderate	Low	Moderate-low
River Bend	Moderate	Negligible	Negligible
The Hub	High	Low	Moderate
Heritage Village	High	High	High
The Parks	High	Moderate	Moderate-high
Sugarcane Fields	Low	Negligible	Negligible
Waterways	High	Moderate	Moderate-high

The majority of impacts are anticipated to be negligible or moderate to low landscape impact as a result of the removal of the bridge. The following conclusions can be made from Table 6.15:

- The 'Ephemeral Wetlands' zone rating is due to the redirection of movement along the floodplain's verge (Grafton Street), which would slightly increase the urbanity of the setting
- 'Parks and the Waterways' zone rating is directly related to:
  - The removal of the old bridge and the individual identity it provides in the local setting
  - This would be offset by the introduction of new open space, consolidating Sportsmans Park and Flo Clark Park (refer to Section 6.1)
- The 'Heritage village' zone rating is a high positive landscape character impact due to the increase in heritage value of the historic area (that is rated as of 'moderate' heritage impact, refer to Appendix C and Section 6.6) combined with the environmental quality through the removal of traffic on Bridge Street (resulting in improvements to amenity and safety within the local area) and the retention of the dry stone wall on the northern abutment.

In order to minimise the potential impacts upon the landscape character, safeguards and mitigation measures would be implemented. The proposal to combine Flo Clark Park and Sportsmans Creek would be implemented once the existing bridge is removed. After the proposal, the area would be levelled and revegetated with grasses, such that the area may be landscaped by Council. The remaining safeguards and mitigation measures are described in Section 6.8.6.

KI Studio (2014) found that, 'Although the town would lose a unique heritage bridge that contributes to the identity and character of the town, and in particular of the Heritage Village by complementing its setting, the proposal provides a multitude of benefits that off-set the loss of the historic structure.'

Visual impact analysis

To determine the visual impact, sensitivity values were assigned to the various viewpoints. Figure 6.9 shows the chosen viewpoints.

Only one viewpoint is considered to have a high impact as a consequence of the combined proposal. This was relating to the impact of the new bridge only. The only views considered to be impacted by the removal of the bridge are at 2 and 4 as shown in Table 6.16.

Table 6.16: Visual impact - viewpoint assessment summary

Viewpoint	Sensitivity	Magnitude	Impact
2	Low	Moderate	Moderate-low
4	High	Low	Moderate

Figure 6.9: Visual Impact Assessment – Selected viewpoints

Viewpoint 2 is rated moderate to low impact as the proposal would remove the existing embankment of the bridge approach and would consolidate open space, creating a flowing space. Viewpoint 4 is rated moderate impact as the removal of the bridge would visually and spatially reconnect some private properties more towards the Clarence River the relocation of traffic away from these sensitive viewers is considered positive.

KI Studio (2014) found that 'the general impact of the proposal has little effect on the long term visual quality of the setting and provides future opportunities to further enhance the urban structure and use of the Heritage Village.'

Provided the safeguards and mitigation measures proposed in Section 6.8.6, visual impact is anticipated to be low risk.

6.8.6 Safeguards and management measures

The mitigation measures to manage landscape character and visual impacts would be in accordance with the Roads and Maritime *QA Specification G36* with the following additions/ amendments:

Impact	Environmental safeguards	Responsibility	Timing
Minimise long-term impacts upon the landscape character	• The following opportunities to minimise impacts upon the landscape character will be considered during detailed design in consultation with Council: ○ The recommendations in the Landscape Character and Visual Assessment (Appendix N) in consultation with Council.	Roads and Maritime/ Council	During removal planning
Minimise short-term impacts upon the landscape character and visual amenity	• The location of the compound and general site layout shall be placed to minimise the visual impact on surrounding residences, including the siting of stockpiles, buildings, plant and equipment. • Work to be carried out in accordance with *EIA-N04 Guidelines for visual impact assessment and landscape character assessment*.	Contractor	During removal planning During removal works

6.9 Traffic and access

A transport and traffic assessment was carried out by GTA Consultants in March 2014 for the proposal (GTA 2014). The report is provided in Appendix I and a summary is provided in this section.

The assessment included a desktop review of existing data and traffic volume counts which were carried out in a two-week period in February 2013 and a one-week period in December 2013. It was concluded that there would be a number of impacts, both positive and negative as a result of the operation of the proposal as result of the removal of the existing bridge and the building of the new bridge, including safety considerations, intersection changes and access to bus services.

During removal works it is anticipated that there would be a minor increase in vehicle movements and temporary property and access disturbances. Mitigation measures have been proposed to address these issues.

6.9.1 Existing environment

Regional Road Network

The regional road context for the proposal is described in Section 2.2.

Local Roads

Key local roads in Lawrence include Bridge Street, Grafton Street and Rutland Street as shown on Figure 1.2. The speed limits on local roads are generally 50 kilometres per hour, with the exception of the existing bridge which is set at 20 kilometres per hour. Bridge Street is a regional road which passes through the centre of Lawrence and also provides property access. It carries a high volume of through traffic, via Rutland Street to the Bluff Point Ferry.

Grafton Street runs parallel and to the west of Bridge Street. Grafton Street provides access to properties fronting Grafton Street and rear access to properties with frontage to Bridge Street. Plate 6.15 shows a view of Grafton Street looking north towards the Lawrence General and Liquor Store.

Rutland Street provides the link to Bluff Point Ferry about 1 kilometre north-east of the Lawrence village centre.

Traffic Counts

Traffic counts carried out by Roads and Maritime in February 2013 indicate that the Annual Average Daily Traffic (AADT) across Sportsmans Creek Bridge is 1,032 vehicles per day, of which about 7.4 per cent are heavy vehicles. The AM peak hour occurs between 8:00am and 9:00am, with an average of 96 vehicles recorded over the survey period. The weekday AM peak volume was 116 vehicles for both directions. The recorded PM peak hour was between 4.00pm and 5.00pm, with an average of 91 vehicles.

Significant seasonal sugarcane haulage activities rely on this bridge for access between July and December each year. A total of 300 hectares of cane exists to the south of Sportsmans Creek with approximately 47,086 t (4,379 trips) of harvested cane transported across the bridge within the 2015 season.

Plate 6.15: Street views

Recent traffic counts carried out in 2002 and 2013 indicated that traffic volume over the bridge is expected to increase at an annual growth rate of 2.5 per cent per annum for the next 25 years.

Bluff Point Ferry

The Bluff Point Ferry is a cable ferry linking Rutland Street and Bluff Point on the Lawrence side and the Woodford Dale Road – Grafton-Lawrence Road junction on Woodford Island. It is part of the transport link between Lawrence and Maclean and is used by more than 800 vehicles daily which accounts for between 70 and 80 per cent of the volume on Sportsmans Creek Bridge.

The ferry operates 24 hours a day, seven days a week. There is no interruption to service due to maintenance as an alternative ferry is available at the crossing. The capacity of the Bluff Point Ferry has recently been upgraded from 35,000 to 46,800 vehicles a month.

Public transport

Lawrence Bus Service operates two routes in Lawrence.

Route 384: Lawrence to Grafton:

- Two daily weekday services to Grafton; one in the morning and one in the afternoon for school days and additional services Tuesday and Fridays
- No services operate on public holidays.

Route 385: Lawrence to Maclean:

- Two daily weekday services to Maclean; one in the morning and one in the afternoon and an additional service to Maclean on Thursdays
- No services operate on public holidays.

Site observations indicate that the main bus stop in Lawrence is outside the Lawrence General and Liquor Store, although no formal bus passenger facilities are provided.

Level of service

The operational assessment demonstrated that the operation of Bridge Street during the peak periods is considered within the acceptable levels of service, given that traffic volumes are well below the Austroads and Highway Capacity Manual (HCM) capacity limit, and that no significant platooning could be observed.

The other road sections in the investigation area experience lower volumes of traffic compared with Bridge Street, and by association, could be considered operating within acceptable levels as well.

Walking and cycling

There are no designated cycleways or footpaths in the vicinity of the proposal. Pedestrians crossing the existing Sportsmans Creek Bridge must cross with caution, sharing the road with vehicles.

Waterway usage

Sportsmans Creek has limited maritime traffic due to the obstruction of the weir upstream and the height restriction of the existing bridge. A small number of fishing boats utilise the waterway infrequently, however, the boat ramp at Flo Clark Park is frequently in use on weekends, particularly by small boats accessing the Clarence River.

Property access

Aside from being the main through route in the township of Lawrence, Bridge Street also provides local property access to residential dwellings and commercial establishments. Two lateral local roads link Bridge Street with Grafton Street, ie the road immediately south of the Lawrence Public

Hall, and the road to the north of Lawrence Tavern. The northern section of Grafton Street also provides access to properties north of the Grafton Street and Bridge Street intersection (north of the Lawrence General and Liquor Store).

6.9.2 History

Based on a review of previous traffic counts in Lawrence, traffic growth over the period 1970 to 1990 was at an average of 1.1 per cent per annum. More recent traffic counts carried out in 2002 indicated that traffic volume over the bridge is expected to increase at an annual growth rate of up to 2.5 per cent per annum for the next 25 years.

Historical crash statistics collated by Roads and Maritime indicate that during the five-year period 1 July 2008 to 30 June 2013, there was a total of six crashes in the Lawrence area and vicinity, three of which are in the 50 kilometre per hour zones north of Sportsmans Creek, and another three in the 100 kilometre per hour section along the Grafton-Lawrence Road south of Sportsmans Creek.

The anticipated increase in traffic and history of incidents within the locality places emphasis on ensuring the ongoing safety and reliability of the bridge crossing in Lawrence is relevant into the future.

6.9.3 Policy setting

The proposal forms part of the NSW Long Term Transport Master Plan (NSW Government 2012) and the 'Bridges for the Bush Initiative' as discussed in Section 2.1.1. The proposal is also part of a commitment from the NSW Government to improve road freight productivity.

Roads and Maritime are required to assess the impact upon traffic when assessing their impact of their activities as per clause 228 of the Environmental Planning and Assessment Regulation 2000.

6.9.4 Criteria

The criteria adopted for assessing the impact upon traffic and access in the locality, would be to ensure the proposal addresses the key traffic issues of road safety, traffic capacity and integration with user and community needs while maintaining constructability and achieves the objectives set in Section 2.3 of this REF.

6.9.5 Potential impacts

The removal of the bridge is proposed to occur after the building of the new Sportsmans Creek Bridge. This would help minimise the impacts associated with its removal. During the removal, the following traffic and access impact is anticipated:

- Increased heavy vehicle movements for hauling of dismantled parts, focusing on Grafton Street, Bridge Street, the Grafton-Lawrence Road and Pringles Way
- Heavy vehicle movements associated with building and removal equipment
- Potential barge movements for removal of larger structures
- Vehicle movements from staff and service vehicles
- Access restrictions to the existing Sportsmans Creek boat ramp and Flo Clark Park
- Temporary partial closure of roads and altered property and business accesses along Bridge Street south of the Lawrence Tavern.

These impacts have the potential to result in short-term increases in travel times and potential safety issues relating to the increased heavy vehicle movements. The building of the Sportsmans Creek new bridge as the permanent waterway crossing to accommodate larger vehicles would minimise potential impacts on the local road network as through traffic is not affected. The proposed works would not require any detours as the existing bridge would be closed after the new bridge is built. Vehicle movements would also be minimised by utilising barges to transport

dismantled parts and stockpiling parts temporarily in Flo Clark Park to maximise truck loads to be removed.

Property and business access may be affected to those properties with driveway access on Bridge Street during the road surfacing works to finalise the closure of Bridge Street at the location of the northern abutment. Access requirements to the work site are discussed in Section 3.2.6. Residents, property owners and business owners (including the Lawrence Tavern) would need to be consulted about any altered access arrangements before such changes which may be required in the short-term to complete the cul-de-sac works at the northern abutment can occur.

As discussed in Section 5.4, NSW Maritime was consulted in regards to the proposal. NSW Maritime has indicated that they would prefer to see that Sportsmans Creek remains navigable during the proposed works. Any waterway closures would need to be discussed prior with NSW Maritime, as well as with any residents with access to Sportsmans Creek before obstructing the waterway and moorings. Navigational marks and signage would need to be implemented to inform boat users of any changes resulting from the proposal works. The navigation aids plan and on-water traffic management is to be development in consultation with and approved by NSW Maritime.

The boat ramp within Flo Clark Park may require temporary closure during the proposed works. This would be dependent upon the sequencing of removal works and the available navigable area at the time.

The closure of Bridge Street and the existing Sportsmans Creek Bridge to through traffic would occur after the opening of the Sportsmans Creek new bridge. As such, the potential impacts to public transport routes, walking and cycling routes and permanent changes to local traffic routes and property access has been assessed as part of the Sportsmans Creek new bridge REF (KBR 2015). Adverse impacts upon traffic and access would not result from the removal of the existing bridge.

6.9.6 Safeguards and management measures

The mitigation measures to manage potential impacts upon traffic and access would be in accordance with Section 3.7 of the Roads and Maritime QA Specification G36 and the Roads and Maritime standard safeguards, with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Traffic and access	• A detailed Traffic Management Plan would be prepared in accordance with the RTA (2010) *Traffic Control and Work sites Manual* and Roads and Maritime Specification G10-Control of Traffic. The plan must be approved by Roads and Maritime and reviewed by Council before implementation. • Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays. • The Traffic Management Plan will include such measures to provide safe access points to work areas from the nearby road network, safety barriers where necessary, temporary speed restrictions when necessary, adequate sight distances and prominent warning signage.	Contractor	Removal planning

Impact	Environmental safeguards	Responsibility	Timing
	• Consultation will be carried out with local residents and the Lawrence Tavern on Bridge Street about any temporary access requirements to property to ensure access is maintained at all times. • Residents, businesses and Council shall be notified of the proposed works and any changes in traffic arrangements in accordance with Roads and Maritime procedures before the work commences. • Work areas will be bounded by fencing or barriers to prevent pedestrian access. Safe, alternative access should be provided for pedestrians where required.		
	• Removal traffic will access the site via designated access points to be defined in the Traffic Management Plan.	Contractor	During removal works
Waterway access	• Removal vehicles will be parked off-road as far as practicable or in a manner that minimises disruption to other road users, businesses and the public.	Contractor	During removal works
	• Signage shall be placed at Flo Clark Park and Sportsmans Park to indicate the temporary closure of the boat ramp and the park if required, and the location of alternative ramp and facilities on the Clarence River near Lawrence Memorial Park.	Contractor	Before the removal works
On-water traffic and access	• NSW Maritime will be consulted with as required in regard to the closure of the boat ramp, relocation of moorings and obstructions to the Sportsmans Creek channel - during removal works and before the start of works. • Consultation with NSW Maritime shall be carried out throughout the duration of the works to develop forward plans for the on-water traffic management while the work is carried out and as plant and structures are deployed in different locations. • Appropriate navigational marks and signage will be implemented. A Navigational Aids plan is to be prepared and approved by NSW Maritime. • Exclusion zones around critical areas of removal activities and floating removal equipment shall be clearly marked in accordance with Roads and Maritime advice and requirements.	Contractor	Before removal works and during removal works

6.10 Land use, property and utilities

6.10.1 Existing environment

The land use in the area surrounding the proposal site is predominately rural cane fields, open space and rural residential properties. A summary of the land zonings present and map is provided in Section 4.2 of this REF.

On the northern side of Sportsmans Creek there are a small cluster of residences in the lower Lawrence village. There are two commercial uses within the locality. On Grafton Street, there is the Lawrence General and Liquor Store and on Bridge Street is the Lawrence Tavern. A community hall is also situated on an unnamed laneway between Bridge and Grafton Streets, about 250 m north of the new bridge. To the north of this hall is a landscaped area of crown reserve (Lot 7014 DP 1126811 and Lot 280 DP751377) which is maintained by Council.

On the southern side of Sportsmans Creek, the land use is open space, with Flo Clark Park to the west of the existing bridge abutment and Sportsmans Park on the east of the abutment. Flo Clark Park also provides boat ramp access into Sportsmans Creek and a grassed area for parking next to the waterway. The Weir Road reserve follows generally alongside the bank of Sportsmans Creek from the intersection of Grafton-Lawrence Road and Ensbey Road. The reserve is zoned as rural residential land on the Clarence Valley LEP 2011.

As discussed in Section 3.4, two electrical overhead lines traverse the proposal site, a 66 kV near Weir Road and 11 kV near the northern abutment. Both lines are managed by Essential Energy and the 66 kV is significant regionally as it supplies the Maclean Zone substation from Koolkhan.

6.10.2 Policy setting

Although development approval and assessment against the Clarence Valley LEP 2011 is not required, Roads and Maritime are required to consider the land zonings present as discussed in Section 4.2.

The policy setting which applies for works on Crown lands is discussed in Section 4.3.1.

6.10.3 Potential impacts

The proposal is anticipated to cause minor temporary impacts upon land use during bridge removal works.

As discussed in Section 6.9.5, accesses to private property and the Lawrence Tavern may be temporarily disturbed during works for the cul-de-sac intersection on Bridge Street. However, once the intersection is completed, local access to Bridge Street would be reinstated to an appropriate standard.

An area within Flo Clark Park would be required for the site compound and laydown area during removal works. The site compound would be securely fenced and likely to be occupied for a period of at least six months. Once works are completed, access to the boat ramp and park for recreation would be returned.

Consent would be required with the landowner at Lot 102 DP 1199150 and Lot 101 DP 1199150 about access and establishment of a temporary crane pad at this location (refer to Figure 1.2) due the proximity of private property.

The bridge removal would require the isolation, protection or temporary relocation of an 11 kV power pole. The requirements are yet to be determined. It is anticipated that the alignment would remain in the same location and the existing power pole upgraded and placed in the same position. The utility adjustment work would be of low environmental impact due to the small footprint

required to install the poles and could be managed utilising the standard mitigation measures and safeguards proposed in this REF for the broader proposal.

After removal of the bridge, the Bridge Street approach road from the Ensbey Road intersection would be removed. It is proposed as part of the restoration plan that the topography of the land would be levelled and both Park areas would be combined into a new recreational area for public use. The works would improve the topography within Flo Clark Park and Sportsmans Park, resulting in a permanent positive benefit to land use in this area.

6.10.4 Safeguards and management measures

The mitigation measures to manage land use would be in accordance with those proposed in Section 6.11.6 and the Roads and Maritime QA Specification G36 with the following additions/amendments.

Impact	Environmental safeguards	Responsibility	Timing
Utility relocation	• Consultation will be continued with Essential Energy about the isolation or protection of services impacted.	Roads and Maritime	During removal planning
Disturbance to available open space	• Council will be consulted about use of Flo Clark Park and Sportsmans Park. • Restoration and landscaping shall ensure that Flo Clark Park and Sportsmans Park are restored to as previous or better condition.	Roads and Maritime	Pre-removal

6.11 Socio-economic

The investigation area referred to in this section is adopted from the initial options assessment as shown in KBR (2015).

The information presented and issues discussed in this section of the REF discuss the Australian Bureau of Statistics (ABS) postcode suburb of Lawrence and the Clarence Valley Council and the potential impact of the proposal site more broadly.

6.11.1 Existing environment

Social

The profile of the existing social environment in Lawrence and the Clarence Valley is based on review and assessment of several data sources, including the following:

- Publically available Council reports and website information
- Desktop study of aerial photography, maps and other sources using a GIS
- Demographic data from the Australian Bureau of Statistics (ABS) 2011 Census
- Feedback from the consultation with community and businesses
- Field investigations.

Population characteristics

The following key elements of Lawrence's demographic profile are summarised below.

At the 2011 ABS Census, the Urban Centre and Locality (UCL) of Lawrence had a total population of 740 with the following age breakdown:

- 3.7 per cent aged less than 14 years
- 29.2 per cent aged over 65 years

- Median age of the population is 55 years
- Aboriginal population is 5.7 per cent.

Compared with the Clarence Valley LGA which has the following features:

- 18.7 per cent aged less than 14 years
- 21.2 per cent aged over 65 years
- Median age of the population 46 in the Clarence Valley LGA
- Aboriginal population of 2.6 per cent.

Population growth

According to the Social Plan, the Clarence Valley LGA population is growing, with the population reported at 48,425 at the 2006 census, which was an increase of 1026 (2.17 per cent) during 2001–2006 (CVC 2010). This growth is attributed to an increase in retirees and those looking for a sea change and/or tree change and moving to the area. At the 2011 census, the population of the LGA was reported as 49,665 and is projected to grow to 54,500 by 2021 and further to reach 57,300 by 2036 (CVC 2010, ABS 2011a).

Public transport usage

Public transport usage rates are low in Lawrence. This is likely due to the limited public transport options (one bus company offers services between Lawrence and Grafton and Lawrence and Maclean).

The local school bus service utilises the Lawrence Memorial Park turning bay as a pick up and drop off point for school children.

Housing

Lawrence is generally characterised by low density, detached housing, which makes up 96.9 per cent of the total dwellings in the village (ABS 2011a). A very low portion of the population of Lawrence live in Group households (2.5 per cent) and the greatest portion live in family households (73.6 per cent). These figures are similar to Clarence Valley (2.7 per cent in group households, 69.6 per cent in family households) and NSW (3.8 per cent in group households and 71.9 per cent in family households).

In the Lawrence village, 56.7 per cent of homes are fully owned, with only 10.9 per cent rented. This is significantly higher than the Clarence Valley LGA (37.5 per cent) and NSW (33.2 per cent).

Key community facilities, services and events

Few services and retail opportunities exist for the Lawrence community. Residents travel to Grafton or Maclean to access health, education and other related services, retail and employment. Services and businesses in the village are the Post Office, Lawrence Primary School, Lawrence Tavern (accommodation and restaurant/bar), Lawrence Nursery, Lawrence General and Liquor Store and Lawrence Museum. Figure 1.2 shows the location of key features in the area proximate to the proposal.

The investigation area contains about 21 houses, two businesses and one cane farm, located in the south. Two houses were noted for sale during the field investigations and one has been acquired by Roads and Maritime and the other by a local resident.

There are also two reserves in the investigation area; Flo Clark Park, located on the southern side of Sportsmans Creek and the Lawrence Memorial Park on the banks of the Clarence River. Both of these parks have boat ramps which are frequently used. Two other recreation reserves exist in the village; Ogilvie Park (near the Lawrence Post Office) and Sportsmans Park (on the opposite bank to the village at the mouth of Sportsmans Creek).

The Lawrence Public Hall is also popular for hosting community events and clubs such as the over 50s Club and the Community Musical Fellowship. The Lawrence Memorial Park and War memorial is also utilised on Anzac Day (25 April) annually for a memorial service.

Community values

The following key community values have been identified as part of previous consultation by Council:

- Scenic views, rural activities, community interactions with their surroundings
- Natural environment and flora and fauna within it and the recreational opportunities it provides
- Protection of natural environment in developing future economic benefits
- Healthy waterways and clean water
- Sense of place, cultural heritage, relationship to surrounding landscapes and human scale
- Community size is such that members can build relationships with others, feel connected and supported. The ability to 'pull together' in times of tragedy and natural disaster
- Safe and respectful communities (both safety and property security).

Economic

Business activity

The local economy of Lawrence is very small and is best viewed through an analysis of statistical data for the Clarence Valley LGA. Local economy is identified as a growth area with the Clarence River Way Masterplan, particularly in relation to encouraging investment from the tourism industry and improving infrastructure to facilitate industry transport (CVC 2010).

According to the Interim Valley Vision, there were about 4,090 businesses in the Clarence Valley in 2011, which has been in steady decline since 2007 (ABS 2011b, CVC 2013). Of the total businesses registered, the Agriculture, Forestry and Fishing industry has the highest number (26.3 per cent), followed by Construction (16.6 per cent), Rental, Hiring and Real Estate Services (7.8 per cent) and Retail Trade (7.6 per cent).

The estimated turnover for industry in the Clarence Valley was $1.3 billion in 2010/2011, which has also decreased by 0.4 per cent annually. However, the average turnover of all businesses has increased by 0.2 per cent. Overall the Gross Domestic Product (GDP) is growing for the Clarence Valley at around 8 per cent per annum and is presently worth about $1,703.9 million (CVC 2013).

The core economic base is comprised of industries such as fishing, timber, agriculture and sugar, with emerging economics in tourism, regional food, arts and design, education, boat building and timber value adding (CVC 2013).

Investment within the region is increasing, in particular in aged care, tourism, timber and core infrastructure, encouraged by sea-change immigration, growing population, more affordable land and lower operational costs (CVC 2013).

Employment, labour force and income

Unemployment rates within Lawrence and Clarence Valley LGA are higher than those rates in NSW, with 13.4 per cent of the population in Lawrence unemployed and 8.9 per cent in the Clarence Valley compared with 5.9 per cent in NSW.

Economic values and trends

Key economic trends are identified at both the local and regional economy scale can be derived from the *Clarence River Way Masterplan, Clarence Valley Council Valley Vision 2024* and the *Mid North Coast Regional Strategy 2006–2031*.

The following trends and strategic directions are of note for the region in general (CVC 2009b, CVC 2013 and Department of Planning 2009):

- Encourage capital expenditure to improve infrastructure such as: recreational areas, site and landscaping improvements, road upgrades and environmental improvements
- Foster economic prosperity through environmentally sustainable activities
- Encourage economic growth and investment utilising federal funding support (through the Masterplan) to promote the rural coast area as a touring region
- Protection of high value natural environments to ensure that new urban development avoids key habitat corridors, threatened species, vegetation communities, coastal lakes, estuaries and aquifers
- Ensure development and growth does not impact upon the coast and character of local villages
- Increase housing stock to meet the demand of 59,600 by 2031 to meet the population growth, however, also ensure this meets the needs of smaller households and the elderly population
- Ensure the demand for land supports economic growth and capacity of the additional employment opportunities
- Support and value voluntary work and build opportunities for training and mentoring to retain expertise in communities (in particular for disadvantaged, youth and less skilled community members).

6.11.2 History

Sportsmans Creek was named in 1839 when the ship 'King William' ran aground near Lawrence and encountered an abundance of wildlife. Lanark Lodge was the first settlement in the investigation area and the homestead was established in Lawrence was up on the high point above the Lawrence General and Liquor Store in 1842 (McSwan and Switzer 2006).

The existing Sportsmans Creek Bridge was built in 1911 and formed part of the original village gateway entry proposed by Council.

6.11.3 Policy setting

Roads and Maritime are required to assess the social, economic and environmental impacts, including any environmental impact on a community of their activities as per clause 228 of the Environmental Planning and Assessment Regulation 2000.

Roads and Maritime are also required to consider the principles of Ecologically Sustainable Development (ESD) under the objects of the EP&A Act, which require an assessment of inter and intra-generational equity and social impacts.

6.11.4 Criteria

The criteria for assessing the impact of the proposal would be set as minimising impacts upon the local socio-economic environment, addressing community concern and ensuring potential impacts upon the locality are effectively managed.

6.11.5 Potential impacts

Community consultation

As discussed in Chapter 5, the local residents of the Lawrence village were engaged during the development of the Sportsmans Creek project. Issues raised by the community during consultation relating to the design included; road safety, traffic flow and travel times, business/service patronage, flooding and drainage and community facilities and services. The majority of issues raised were in relation to the building of the new bridge and have been addressed by KBR (2015). Residual concerns relating to traffic flow and travel times, heritage values, flooding and drainage,

recreational amenity and waste have been discussed and addressed through safeguards proposed in this REF in Sections 6.3, 6.6, 6.8, 6.9 and 6.12.

Some residences in the Lawrence area are occupied by shift workers. As such, during removal works there is potential to cause sleep disturbance during particular noise and vibration-generating work scenarios (refer to Section 6.4.4). Residents who are shift workers should be identified within the community during the community consultation process and consulted in regards to reasonable feasible measures to avoid disturbance to daytime sleep.

Removal

The removal of the bridge and associated works on Bridge Street are anticipated to generate the following impacts:

- Local amenity impacts relating to dust and air quality, noise and vibration, visual amenity
- Temporary property access changes, including access to businesses in the local area, namely the Lawrence Tavern and properties located on Bridge Street
- Property disturbance during the establishment of temporary crane pads for the northern abutment
- Reduction in available open space for recreation in Flo Clark Park/Sportsmans Park and access to the boat ramp in Flo Clark Park
- Restrictions on waterway access during key work requiring in-stream removal works.

As discussed in Section 6.9, temporary impacts upon property access would be generated during the removal works, particularly to properties accessed in Bridge Street. After the completion of cul-de-sac works on Bridge Street, local access would be restored. Provided the safeguards and management measures in Section 6.9.6 are implemented these impacts are anticipated to be low risk.

Emissions to air and noise and vibration impacts from removal and building activities is anticipated to be low to moderate risk and safeguards and management measures have been proposed in Sections 6.4.5 and 6.5.5 to minimise these.

The temporary influences upon visual amenity and land use are considered low and management measures are discussed in Sections 6.8.6 and 6.10.4. Consultation with the community during various stages of the work would be required to inform them of potential disturbances. The property owners at Lot 102 DP 1199150 and Lot 101 DP 1199150 would need to be consulted directly during the establishment of crane pads and operation of the cranes. The temporary compound located in Flo Clark Park would be securely fenced and signage would be erected to indicate the presence of removal works.

The proposal to join Sportsmans Park and Flo Clark Park after the bridge removal would result in an improved larger permanent recreational area. This landscaping would enhance the original plan for the town entrance and allow Council to implement their own landscape plan (refer to Section 6.8).

During consultation Maritime NSW stipulated that notices would be required in the local press and on the Maritime NSW website to inform residents and recreational boat users should the Flo Clark Park Boat Ramp be temporarily closed due to the removal works. It is proposed that while the boat ramp in Flo Clark Park is closed signage would be erected to direct recreational users the ramp in Lawrence Memorial Park. The Lawrence Fishing Club would also need to be informed of the changes in access to Sportsmans Creek. Any residents located further upstream with moorings would need to be consulted to minimise disruption. During in-stream works and removal works it is also anticipated that for periods of time access to the Clarence River via Sportsmans Creek would be restricted for safety reasons.

The proposal is not anticipated to generate any impacts upon the local economy during the removal works, due to the small number of workers and materials/resource use required to carry out the works. The local businesses in the area may experience increased patronage; however, this increase is anticipated to be a negligible impact.

Post-removal

Once the bridge has been removed there would be a positive contribution long-term to the locality and would have flow-on effects to the local economy with the building of the new bridge as discussed in KBR (2015).

The removal of the bridge would also result in a reduction of noise and air quality emissions to the residents on Bridge Street and a reduction in noise overall (KBR 2015).

Although there would be temporary disturbance to the recreational use and visual amenity of Flo Clark Park and Sportsmans Park while the existing bridge is removed, the proposal to join Sportsmans Park and Flo Clark Park would result in an improved larger recreational area. The retention of the northern abutment would also have a social benefit, through providing a reminder of the existing bridge after it is removed and maintaining any existing flood protection for nearby houses. Retaining part of the old bridge would help ensure its legacy is retained within the community and could be appreciated by future generations within the Lawrence area.

6.11.6 Safeguards and management measures

The mitigation measures to manage socio-economic impacts would be in accordance with those proposed in Sections 6.4.5, 6.5.5, 6.8.6, 6.9.6, 6.10.4 and the Roads and Maritime QA Specification G36 with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Disturbance to recreational users of Flo Clark Park / Sportsmans Park	• Fencing and signage will be placed at the site compound location at Flo Clark Park. Signage will be placed to inform boat ramp users of the temporary closure of the boat ramp and the alternate waterway access in Lawrence Memorial Park.	Contractor	Pre-removal and during removal works
Accessibility to Sportsmans Creek	• Notices will be placed in the local press and NSW Maritime website as per NSW Maritime requirements and further consultation should be carried out with NSW Maritime with regards to timing of removal works. • The Lawrence Fishing Club will also be consulted about the boat ramp closure. • Residents with moorings on Sportsmans Creek will be consulted before building in the waterway with regards to any obstructions of the waterway which may impact upon their access to the waterway downstream of the proposal.	Contractor and Roads and Maritime	Pre-removal

Impact	Environmental safeguards	Responsibility	Timing
Local amenity disturbances	• Residents and businesses within the locality must be contacted at least five days before the start of works, in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Community consultation shall be carried out in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Complaints received shall be recorded and attended to promptly in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Residents within the locality who are shift workers will be identified and consulted with in regards to noise and vibration-generating work which may result in sleep disturbance.	Roads and Maritime/ Contractor	Pre-removal

6.12 Resource use and waste

6.12.1 History

The proposal site contains imported fill of an unknown source which was brought on site for the building of the existing bridge (refer to Section 6.2).

6.12.2 Policy setting

Under clause 228 of the Environmental Planning and Assessment Regulation 2000, social, economic and environmental impacts (including the degradation and or pollution of the environment) must be taken into account when assessing the impact of an activity for the purposes of Part 5 of the *Environmental Planning and Assessment Act 1979*.

The state's primary environment protection legislation, the *Protection of the Environment Operations Act 1997*, together with the *Waste Avoidance and Resource Recovery Act 2001* and the Protection of the Environment Operations (Waste) Regulation 2005 contain the requirements for managing, storing, transporting, processing, recovering and disposing of waste.

The management and disposal of potentially hazardous waste, in particular Asbestos, must address the NSW WorkCover codes of practice and regulations *Protection of the Environment Operations Act 1997*, Work Health and Safety Regulation 2011 and the *National Occupational Health and Safety Commission (2002) Code of Practice for Safe Removal of Asbestos (NOSHC 2005)*.

Roads and Maritime is committed to the principles embodied in the *Waste Avoidance and Resource Recovery Act 2001.* Roads and Maritime is also committed to ensuring responsible environmental management of waste that cannot be avoided and to providing opportunities for promoting the re-use of waste products as discussed in Section 4.3.11 of this REF.

6.12.3 Criteria

The criteria for assessing the impact of the proposal would be set as minimising waste to landfill and resource use and ensuring reuse and recycling opportunities are maximised in accordance with Roads and maritime policy and NSW legislation.

6.12.4 Potential impacts

Removing the Sportsmans Creek Bridge and building the cul-de-sac would generate the following forms of waste:

- Packaging and other materials associated with building work
- Sediment captured in erosion and sediment controls installed
- Surplus excavated spoil and fill
- Vegetative matter from clearing work required for the establishment of site compounds, including noxious weeds
- General refuse from workers
- Wastewater from toilets and compound facilities
- Surplus materials, such as cement
- Potentially contaminated or hazardous soils, including ASS and any other unknown contaminates
    - Waste from the removal of the bridge structure including
    - Steel and timber components
    - Rock
    - Road surface (concrete/asphalt)
    - Potentially contaminated materials.

All disused bridge components would be temporarily stored on site, classified and removed off-site by a licenced contractor to an EPA licenced facility. Due to its age, the bridge components may contain lead paint or wood preservation chemicals contaminates that would require testing before determining the appropriate disposal method or suitability for reuse. Where practicable, the removal contractor would stockpile all bridge components for reuse or recycling in accordance with Roads and Maritime *(*2016a, 2016b) guidelines *Technical Guide: Sustainability in Infrastructure Design and Construction* and *Technical Guide: Management of Road Construction and Maintenance Wastes* and waste management procedures as noted in Section 6.12.5.

Surplus excavated spoil or surplus fill and cleared weed free vegetation could be reused on site to facilitate landscaping and site restoration. Any packaging materials could be separated for recycling, as well as general refuse which is collected by the workers. Liquid waste would be removed by tanker and disposed off-site by a licenced contractor.

As discussed in Section 6.2, it is unlikely that contamination is present within soils to be disturbed, however, PASS are known to be situated close to the ground surface. Any soil which would be identified as potentially contaminated, would be classified as hazardous and require testing before removal.

Resource use

The resource requirements for the proposal are anticipated to be minimal, limited to:

- Building materials such as concrete, rock and bitumen for the establishment of temporary crane platforms, access tracks, pontoon and cul-de-sac works
- Water for the site compound, dust suppression and concreting
- Energy (primarily diesel) to operate equipment, plant and machinery.

The above resources are readily available and can be sourced locally or cast in-situ. At present, the source or requirements for water is unknown. The requirement is anticipated to be minimal for compound use only and likely to be sourced locally. Overall the proposal would generate a minor demand on resources.

6.12.5 Safeguards and management measures

The mitigation measures for waste management and the management of the demand on resources would be in accordance with Section 4.11 of the Roads and Maritime *QA Specification G36* with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing

Waste management	• Resource management hierarchy principles will be followed:
	  ○ Avoid unnecessary resource consumption as a priority.
	  ○ Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery).
	  ○ Disposal is carried out as a last resort (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).
	• All waste will be managed in accordance with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction and Technical Guide: Management of Road Construction and Maintenance Wastes*.
	• Waste materials should be removed off-site by a licenced contractor in accordance with the EPA's Waste Classification guidelines and Roads and Maritime (2016a, 2016b) guidelines to a facility authorised to take such waste.
	  ○ There is to be no disposal or re-use of building waste on to other land.
	  ○ Waste is not to be burnt on site.
	  ○ Waste material, other than vegetation and tree mulch, is not to be left on site once the work has been completed.
	• Appropriate receptacles for the collection of waste with separated bins for waste streams will be provided to encourage the recycling of materials
	• Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
		Contractor	During removal works

Wastewater disposal	• All liquid waste should be disposed off-site by tanker using a licenced contractor and disposed of a facility authorised to take such waste.	Contractor	During removal
Noxious weeds disposal	• All noxious weeds cleared should be disposed of in accordance with the requirements of Council as stipulated in Section 6.1.6 of this REF.	Contractor	During removal

Impact	Environmental safeguards	Responsibility	Timing

Removal bridge components (Contaminated materials)	• Lead paint materials are to be managed in accordance with the *Australian Standard AS4361.1 'Guide to Lead Paint Management – Part 1 Industrial Applications 1995'*.
	• Licenced landfill operators would be notified of the presence of lead paint on any timbers/metals before delivery
	• Any hazardous waste material stockpiles are to be fenced and signed for public safety.
	• Redundant materials from the removal of the bridge must be disposed as follows:
	  ○ All bridge timbers are to be assessed in accordance with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction and Technical Guide: Management of Road Construction and Maintenance Wastes*
	  ○ As otherwise provided for by the relevant waste legislation and Roads and Maritime (2016a, 2016b) guidelines.
		Roads and Maritime/ Contractor	Pre-removal and during removal

6.13 Greenhouse gas and climate change

6.13.1 Existing environment

According to the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5) prepared in 2013, human interference to the climate system is occurring which is resulting in changes in the state of the climate. These changes would have ongoing effects on natural and human systems, through extreme weather events and climate events and increases in temperature. The report noted that increases in temperature globally have occurred since the preparation of the AR4 report in 2007 and that further measures are required.

Existing sources of greenhouse gas emissions within proximity to the proposal site are from vehicles utilising the road (in particular large cane trucks), maritime traffic and the equipment utilised within the surrounding agricultural land.

6.13.2 Policy setting

In NSW the Policy framework sits under the *NSW 2021: A Plan to Make NSW Number One* plan (NSW Government 2014) which includes goals and targets supplemented by practical action to minimise impacts upon local communities.

The NSW Climate Impact Profile prepared by OEH assesses the potential impacts projected for NSW as a result of climate change. It outlines the risks NSW faces in terms of climate change and helps decision makers in developing planning and response strategies under the NSW Policy.

Public authorities are required to consider the impact of coastal processes and coastal hazards, including those under projected climate change conditions under clause 228(p) of the Environmental Planning and Assessment Regulation 2000.

6.13.3 Criteria

The criteria for assessing the impact of the proposal relate to minimising greenhouse gas emissions during removal works and ensuring the proposal has considered increases in temperature and extreme weather events in design.

6.13.4 Potential impacts

The proposal may generate emissions through:

- The use of fuels in equipment and vehicles
- Disposal of materials
- Transport and production of building materials for the cul-de-sac
- Emissions associated with energy use.

However, the overall amounts generated would not be a significant contributor to the atmosphere and would be considered minor and short-term.

6.13.5 Safeguards and management measures

The mitigation measures to minimise greenhouse gas emissions and account for climate change would be in accordance with Section 4.4 of the Roads and Maritime QA Specification G36, the safeguards specified in Section 6.5.5 with the following additions/amendments:

Impact	Environmental safeguards	Responsibility	Timing
Vulnerability to effects of climate change	• Further opportunities will be considered for reducing greenhouse gas emission during the removal works.	Roads and Maritime	Before bridge removal
Greenhouse gas emissions	• Alternative fuels and power sources for equipment will be considered, such as biodiesel generators.	Contractor	During removal

6.14 Cumulative impacts

6.14.1 Existing environment

A search of the Council register for development applications lodged recently and/or determined within the LGA was carried out in January 2016. The vast majority of these applications were applications for the sub-division of lots and minor structure modifications, located in Lawrence. No proposals were located nearby to the bridge.

A search of the NSW DPE major projects register was carried out in January 2016. The search did not return any results within close proximity to the site, with the nearest projects located in Maclean/Grafton (Pacific Highway Upgrade Woolgoolga to Ballina and Grafton Bridge) and Yamba (Tourist and Residential Developments).

Roads and Maritime's proposal to remove the existing bridge, which is planned to occur once the new bridge is operational, is the only significant proposal to be completed within close proximity to the proposal.

6.14.2 Policy setting

Public authorities are required to consider the cumulative effect of their activities under clause 228(o) of the Environmental Planning and Assessment Regulation 2000.

6.14.3 Potential impacts

During the removal works, the proposal is anticipated to generate a number of cumulative impacts from combined impacts within other activities in the local area, such as upon the local amenity (such as noise and air quality), visual amenity, recreational land use, waterway use and traffic and access. Continued consultation with the community, businesses and Council, combined with the safeguards proposed in Chapter 6 of this REF would ensure that the proposal minimises any potential for cumulative impacts upon the local environment.

The proposal is also anticipated to generate positive cumulative impacts after the new bridge is built. In particular, land reclaimed in Flo Clark Park would be regained through the amalgamation of Sportsmans Park and Flo Clark Park. The building of the new bridge and removal of the bridge would also have positive cumulative effects on local amenity upon the residences in Bridge Street, the Lawrence Tavern and the Lawrence heritage conservation area.

6.15 Summary of beneficial effects

The potential beneficial effects of the proposal are discussed in Table 6.17.

Table 6.17: Summary of beneficial effects

Effect	Significance Rating
Improves local amenity for the Lawrence Tavern and homes located on Bridge Street.	High
Connects Flo Clark Park and Sportsmans Park and provides improved recreational opportunities.	Moderate
Facilitates new access for sail boats to the boat ramp in Flo Clark Park.	Moderate
Reinforces original town plan.	High
Reduces fragmentation of the heritage conservation area of Lawrence by removing thru-traffic.	High
Improves traffic efficiency, road safety and pedestrian access (combined with the building of the Sportsmans Creek new bridge).	Moderate
Results in a reduction of noise and air quality emissions to the residents on Bridge Street and a reduction in noise overall.	High
Maintains existing flood protection for nearby houses through the retention of the northern abutment.	Moderate
Removes significant ongoing maintenance costs associated with the upkeep of the existing bridge.	High

6.16 Summary of adverse effects

While the proposal is anticipated to have a number of beneficial effects, potential adverse effects are discussed in Table 6.18. Many of these effects relate to the removal works and are short-term.

Table 6.18: Summary of adverse effects

Effect	Significance Rating
Removes habitat for the threatened population of Large-footed Myotis present in the Sportsmans Creek Bridge.	Very High
Removes the Sportsmans Creek Bridge, listed as a heritage item on the Clarence Valley LEP 2011 and Roads and Maritime s. 170 register and involves work within the Lawrence heritage conservation area.	Moderate
Temporarily restricts access to properties on Bridge Street during building works for the cul-de-sac.	Low
Potentially disturbs aquatic habitat / vegetation downstream within Sportsmans	Moderate

Effect	Significance Rating
Creek / Clarence River during in-stream removal works and pontoon establishment, depending on the selected removal methodology.	
Temporarily disturbs aquatic habitat due to activities carried out within the bed of Sportsmans Creek resulting in sedimentation of waterways, disturbance of ASS bottom sediments, increased sediment load and organic matter.	Moderate
Temporarily creates erosion and sedimentation impacts on the banks of Sportsmans Creek and subsequent water quality impacts due to exposure and disturbance of soils through clearing and general removal activities, such as the removal of the southern abutment.	Moderate
Temporarily reduces available open space, visual amenity within the locality and results in aesthetic impacts in Flo Clark Park due to the presence of the site compound.	Low
Temporarily generates noise, vibration and air quality disturbances during removal works.	Low

7 Environmental management

7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the proposal.

A Project Environmental Management Plan (PEMP) (if required) and a Contractors Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. These plans will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The plans will be prepared before the proposal and must be reviewed and certified by the Roads and Maritime Environment Officer before the start of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan) and the QA Specification G40 – Clearing and Grubbing.

7.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 7.1.

Table 7.1: Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing

1	General	• All environmental safeguards must be incorporated within the following:
		  • Project Environmental Management Plan (if required)
		  • Detailed design stage
		  • Contract specifications for the proposal
		  • Contractor's Environmental Management Plan
			Project manager	Pre-removal

2	General	• A risk assessment must be carried out on the proposal in accordance with the Roads and Maritime Project Pack and PMS risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented. • A review of the risk assessment must be carried out after the initial audit or inspection to evaluate is the level of risk chosen for the project is appropriate. • Any works resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration.	Project manager and regional environmental staff	Pre-removal After first audit
3	General	• The environmental contract specification must be forwarded to the Roads and Maritime Environmental Officer for review at least 10 working days before the tender stage. • A contractual hold point must be maintained until the CEMP is reviewed by the Roads and Maritime Environment Officer.	Project manager	Pre-removal
4	General	• The Roads and Maritime Project Manager must notify the Roads and Maritime Environmental Officer at least five working days before works commencing.	Project manager	Pre-removal
5	General	• All businesses and residences likely to be affected by the proposed works must be notified at least five working days before the start of the proposed activities.	Project manager	Pre-removal
6	General	• Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors.	Contractor	Pre-removal and during removal as required.

No.	Impact	Environmental safeguards	Responsibility	Timing
7	Disturbance to biodiversity values within the investigation area	• Tree protection zones will be implemented around trees to be retained in proximity to the proposed works in accordance with the *Australian Standard 4970-2009 Protection of trees* on development sites to prevent machinery impacts to trees. • If unexpected threatened fauna or flora species are discovered, work will cease immediately and the *Roads and Maritime Unexpected Threatened Species Find Procedure in the Roads and Maritime Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process*) is to be followed. • Should injured fauna be found on the site, local wildlife care groups and/ or local veterinarians are to be contacted immediately and arrangements made for the immediate welfare of the animal. The phone number of the local WIRES group (ph: 1800 094 737) or Northern Rivers Wildlife Carers (ph: 6643 4055) is to be provided to the site personnel. • Environmental safeguards will be communicated to all personnel as part of an environmental site induction, and repeated where appropriate at Toolbox Sessions before starting relevant work components. • To minimise sedimentation and water quality impacts to waterways and wetlands, the safeguards listed in Section 6.2.5 of this REF will be implemented.	Contractor	Pre-removal and during works
8	Aquatic biodiversity/ protection of fish habitat	• Direct disturbance of aquatic fauna, habitat and riparian zones will be minimised in accordance with Roads and Maritime *Biodiversity Guidelines - Guide 10 Aquatic habitat and riparian zones (2011).* • Riparian vegetation (such as near the Clarence River within Sportsmans Park) in areas other than in the vicinity of the work area, are to be designated as 'no-go zones'. • To minimise in-stream works impacting aquatic fauna movement, the safeguards listed in Section 6.3.6 of this REF will be implemented.	Contractor	Pre-removal and during works
9	Spread of weeds	• Weed and pathogen hygiene protocols will be implemented in accordance with *Guide 6 (Weed Management) and Guide 7 (Pathogen) of the Roads and Maritime Biodiversity Guidelines 2011* to avoid introduction and spread of weeds and pathogens to and from the site. • The Noxious weeds identified will be managed in accordance with the Council control requirements and for noxious weed classes as follows: ○ N4 (Camphor Laurel, Lantana): The growth and spread of these plants must be controlled according to the measures specified in a management plan published by the local control authority, titled Class 4 Weed Control Management Plan (Clarence Valley Council 2012).	Contractor	During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
10	Microbat habitat removal/Reduction in habitat connectivity	• Staged exclusion of the microbat species from the timber truss bridge in accordance with the safeguards proposed in this REF and the Microbat Management Plan in Appendix J of Appendix G. • Compensatory breeding roosting habitat is to be provided on new bridge based on known Large-footed Myotis breeding habitat structures in the region. Three different types of compensatory breeding roosting habitat will be provided on the new bridge as described in Appendix F and Appendix G. • Monitoring as per Table 5.1 of Appendix F	Contractor / Roads and Maritime	Pre-removal works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F
11	Disruption to microbat breeding (mating or birthing) cycle/ Mortality or injury during Bridge removal:	• Compensatory breeding habitat in the new bridge is to be provided. • Staged microbat exclusion from the timber truss bridge will be carried out after completion of the concrete structure for the new bridge containing the new bat habitat and before removal of the timber truss bridge. The aim is to have the timber truss bridge completely free of roosting microbats before bridge removal. Additional safeguards apply as follows: ○ Bridge removal is to start at least three months after completion of the concrete structure for the new bridge containing the new bat habitat to allow microbats to become accustomed to new available habitat ○ Carry out staged exclusion of microbats from the timber truss bridge before bridge removal and outside the Large-footed Myotis breeding period, when juveniles are flightless and dependent ○ May to September is the optimal time to exclude microbats to avoid impacts on the Myotis breeding population ○ The scheduling of the exclusion installation shall allow for flexibility to avoid torpor periods (during significant cold and/ or wet weather) ○ Where greater than 20 microbats are present at the time of exclusion installation, install exclusion at nights after fly-out ○ Check exclusion devices to avoid microbat entrapment or breaches ○ Ecologist to be present during exclusion installation to ensure the welfare of animals is maintained; and available for call-outs during bridge removal. • Monitoring as per Table 5.1 of Appendix F. • All personnel involved with bridge exclusion of microbats and removal are to be trained in their responsibilities, signs of and how to search for microbats, what to do if microbats are encountered, personal safety practices and the requirements of the Microbat Management Plan (Appendix J of Appendix G).	Contractor / Roads and Maritime	Pre-removal works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F
12	Microbat Foraging habitat degradation	• To minimise sedimentation and water quality impacts to waterways and wetlands, the safeguards listed in Section 6.2.5 of this REF will be implemented.	Contractor	During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
13	Monitor Large-footed Myotis numbers	• Direct inspection of the new bridge (targeting compensatory roosting habitat). Methodology as for Pre-exclusion Monitoring as per Table 5.1 of Appendix F.	Roads and Maritime	Post-removal works, monitoring in accordance with the timing specified in Table 5.1 of Appendix F.
14	Water Quality and surface water run-off	• Where practicable, stockpiles will be located away from areas subject to concentrated overland flow. Stockpiles located on a floodplain would be managed so as to minimise loss of material in flood or rainfall events. All stockpiles shall be stabilised at the end of each work day, during wet weather and covered with geotextile or vegetative cover and managed in accordance with the Roads and Maritime procedure for *Stockpile Site Management Guideline* (RMS 2015). • Topsoil, earthwork and other excess spoil material will be stockpiled in accordance with the principles outlined in *Stockpile Site Management Guideline* (RMS 2015). • Stockpiles containing PASS will be managed in accordance with the ASS Management Plan. • All wastewater shall be treated to prevent the release of dirty water into the river or any waterways. • Vehicle wash down and/or cement truck washout if required will be carried out off-site or in a designated bunded area lined with an impervious surface. • No work would be permitted if flooding is predicted and all excavations should be filled in and stockpiles removed or secured before enacting evacuation protocols.	Contractor	During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
15	Water quality and the storage of chemicals	• All fuels, chemicals and liquids will be stored in an impervious bunded area (preferably at least 50 metres) away from any waterways or drainage lines. For storage within 50 metres, these will be, double-bunded or stored as approved by the Roads and Maritime Environment Officer. A Safety Data Sheet (SDS) for each item stored will be kept. • Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways. Refuelling of plant and equipment on barges is to occur within a double-bunded area. • Daily checks of machinery and equipment for liquid leaks of any substance will be carried out. • All staff will be trained in incident and emergency response procedures. • Emergency dry and wet weather spill kits are to be kept on site at all times and staff made aware of their location and trained in their use. • The Roads and Maritime Environmental Incident Classification and Management Procedure are to be followed in the event of an incident and the Roads and Maritime Contract Manager notified as soon as practicable. • The EPA shall be notified in the event of a significant spill in accordance with Part 5.7 of the *Protection of the Environment Operations Act 1997*.	Contractor	During removal planning and removal
16	Water Quality – Work in Sportsmans Creek	• No equipment cleaning will be carried out within the waterway. • All workers will remain vigilant to monitor for any signs of impacts to water quality (such as hydrocarbons spills, turbidity, discoloured water or unusual smells) on a daily basis.	Contractor	Removal planning During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing

17	Erosion and Sedimentation	• An Erosion and Sedimentation Control Plan (ESCP) will be prepared in accordance with the Roads and Maritime Specification *G38 - Soil and Water Management (Soil and Water Management Plan)* for inclusion in the SWMP. The ESCP will include:
		  ○ Management measures for erosion and sedimentation controls in accordance with the 'blue book', *Managing Urban Stormwater - Soils and Construction Volumes 1 and 2 (Landcom 2004, DECC 2008).*
		  ○ Specific details of controls required for excavation activities, in-stream works (such as piling, temporary waterway access, pier removal and earthwork for the removal of the southern approach.)
		• The plan will include measures to :
		  ○ Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets
		  ○ Reduce water velocity and capture sediment on-site
		  ○ Minimise the amount of material transported from site to surrounding road surfaces
		  ○ Divert clean water around the site.
		  ○ Erosion and sedimentation controls will be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
		• Water from site will be used for building purposes, such as dust suppression, where feasible and reasonable.
		• The CEMP will include specific measures to minimise tracking of material onto sealed areas and offsite and potential reuse of material on site or disposal in accordance with the mitigation measures in Section 6.12.5.
		• All erosion and sediment controls are to be installed before the start of works which are likely to disturb soil and will be maintained until the works have been completed and areas are stabilised.
		• Topsoil will be stored separately for possible reuse.
		• The CEMP will include specific measures for restoration of the site including:
		  ○ Removal of environmental controls
		  ○ Progressive stabilisation and restoration in accordance with the restoration plan for the proposal (refer to Section 6.8).
			Contractor	Before, during and post removal

No.	Impact	Environmental safeguards	Responsibility	Timing
18	PASS/ASS Excavation/ Disturbance	• For areas identified as PASS where excavation is required (including for piling), an ASS management plan shall be prepared in accordance with the Roads and Maritime's *Guidance for the Management of Acid Sulfate Materials: Acid sulfate Soils, Acid Sulfate Rock and Monosulfidic Black Ooze* (RTA 2005) and the soils and water management plan (acid sulfate soils section). The ASS management plan should be accepted by Roads and Maritime before the start of any earthwork and at a minimum, the plan shall include: ○ Management measures for the safe excavation, isolation and disposal of neutralisation of soils ○ Requirements for additional testing to determine predicted liming rates of excavated spoil once quantities are determined. • Specific controls to be implemented include: ○ Capping exposed surfaces with clean fill to prevent oxidation ○ Placing excavated ASS separately in a lined, bunded and covered area ○ Neutralising ASS for reuse (where appropriate) by using additives such as lime.	Contractor	Removal planning During removal works
19	Contaminated soil	• A contingency plan for the management of contaminated soils shall be developed. • Visual/olfactory assessment of excavated materials shall be carried out immediately after exposure.	Contractor	Removal planning During removal works
20	Trafficability	• Access tracks will be stabilised from gravel sourced locally, which is certified as pathogen-free.	Contractor	During removal works
21	Slope failure	• A risk assessment will be carried out before work with heavy machinery to determine the risk potential of slope failure near Sportsmans Creek. ○ The risk assessment will identify a safe working distance for the operation of machinery near the banks of Sportsmans Creek. • Heavy machinery will only operate within the safe working distance as determined by risk assessment.	Contractor	Pre-removal and during works

No.	Impact	Environmental safeguards	Responsibility	Timing

22	Flooding during removal works	• A Flood Management Plan will be prepared as part of the CEMP and implemented during removal works. At minimum this plan shall include:
		  ○ Consideration of evacuation protocols from the *Clarence Valley Local Flood Plan* (SES 2012) for the Lawrence Sector
		  ○ Project-specific emergency response and evacuation controls during flooding.
		  ○ Measures to ensure that equipment, site-offices, ablution facilities, vehicles, materials, buoyant items (including barges) and machinery are secured against flood or able to be removed off-site when a flood warning is issued.
		  ○ Reporting requirements
		  ○ A regular weather monitoring regime.
		• The installation of temporary pontoon and barge access will include measures to ensure that they can be secured during a flood event.
		• The State Emergency Service (SES) will be informed of the work, if they are occurring during flood season (November to March).
		• The SES will also be informed of any partial or full road closures during removal works.
		• No work would be carried out during or immediately after periods of flood unless it is deemed safe to return to the area by the SES and the Roads and Maritime Project Manager.
			Contractor	During removal planning
				
				During removal works

23	Hydrological impacts	• Any temporary structures such as silt curtains placed in-stream shall be installed such that they will not impact flows and cause erosion.	Contractor	During removal works
24	Hydrological changes impacting Sportsmans Creek during the temporary removal works and for waterway access	• As per the correspondence in Appendix J, the proposal design shall consider the *NSW DPI (Fisheries) guidelines Policy and guidelines for fish habitat conservation and management* (DPI 2013) and mitigation measures to minimise potential impacts upon Sportsmans Creek.	Roads and Maritime	Removal planning

No.	Impact	Environmental safeguards	Responsibility	Timing
25	Noise and vibration disturbance during works	• During the removal planning stage, when more specific information is available in relation to the proposed works, a Site Specific Construction Noise and Vibration Management Plan (CNVMP) as part of the CEMP documents shall be prepared, consistent with the requirements of the ICNG. The objectives of the CNVMP are as follows: • Minimise exceedances of the Noise Management Levels and goals nominated in Section 6.4.3 and 6.4.4 • Determine noise and vibration monitoring, reporting and response procedures • Describe specific mitigation treatments, management methods and procedures to be implemented to control noise and vibration during the proposed works. • Describe work timetabling to minimise noise impacts including time and duration restrictions, respite periods and frequency • Describe procedures for notifying residents of noise and vibration generating work activities likely to affect their amenity • Define contingency plans to be implemented in the event of non-compliances and/or noise complaints • Ensure the management measures detailed in this REF are documented • Specify the removal work is to be carried out during normal work hours (ie 7.00am to 6.00pm Monday to Friday; 8.00am to 1.00pm Saturdays). Any emergency or microbat exclusion work that is performed outside normal work hours or on Sundays or public holidays is to minimise noise impacts.	Contractor	Removal planning and during works

No.	Impact	Environmental safeguards	Responsibility	Timing

26	Noise disturbance during works	• Noise impact will be minimised in accordance with Practice Note 7 in the *Roads and Maritime Environmental Noise Management Manual (RTA 2011b).*
		As a minimum, the following mitigation measures shall be included in the CNVMP and all feasible and reasonable mitigation considered:
		• Use of localised acoustic hoarding around particularly intensive noise generating items of plant (eg rock breakers, chainsaws, hammer drills and pilling rigs), where practicable
		  ○ Air gaps shall be minimised far as practicable and hoarding placed as close as possible to the work
		• Implementation of work equipment and tools with lower noise emission levels
		• Planning of the higher NML exceedance activities/locations to be carried out predominantly during less noise-sensitive periods, where available and possible. Nearby residents shall be consulted to help identify less noise time sensitive periods
		• Utilising respite periods where noise intensive plant items are required.
		  ○ This may include limiting work to non-consecutive nights.
		• Briefing of the work team in order to create awareness of the location of sensitive receivers and the importance of minimising noise emissions
		• Spoil, off-cuts and rubbish shall be placed and not dropped into awaiting trucks to minimise noise
		• Locating noisy items of plant away from receivers, where possible
		• Turning off noisy plant when not in use
		• Ensuring plant is regularly maintained and equipment repaired / replaced when it becomes noisier
		• Establishing load points as far as practicable from sensitive receivers
		• Utilising silenced or less noise-intensive equipment, where reasonable and feasible
		• Reversing of equipment shall be minimised so as to prevent nuisance caused by reversing alarms (ie a unidirectional flow of work vehicles should be established through the work site)
		  • Non-tonal reversing alarms shall be fitted to minimise nuisance caused by reversing alarms.
			Contractor	Removal planning and during works

27	Vibration disturbance during works	• Potential vibration impacts shall be addressed in the CNVMP as part of the CEMP documents. • Before and after building condition surveys will be conducted before and after the works for all potentially affected properties.	Contractor	During removal planning

No.	Impact	Environmental safeguards	Responsibility	Timing
28	Vibration disturbance during works	• Attended vibration monitoring should be carried out in the event vibration intensive work is required within the cosmetic damage safe working distances, for example if rock breaking is required within 7 metres of a receiver (medium rock breaker), or if impact piling is required within 15 metres of a receiver. • Vibration levels will remain below the criteria for cosmetic damage at all receivers (heritage or otherwise) as listed in Section 6.4.3 and Table 6.9 • Measures for vibration management to be included in the CNVMP as part of the CEMP documents include: ○ Utilising dampened rock breakers and/or 'city' rock breakers to minimise the impact associated with rock breaking work; and the use of smaller capacity rock breakers where feasible ○ Utilising bored or rotary pilling in lieu of impact pilling, where feasible ○ Utilising non-vibratory rolling equipment ○ Minimising consecutive work in the same locality. This may potentially be implemented by rotating work between areas within the site on a daily basis ○ Sequencing of rock breaking operations so vibration intensive operations do not occur concurrently ○ Scheduling of rock breaking work during the less sensitive times of the day. The most noise and vibration sensitive times of day shall be determined through consultation with the affected community ○ Providing respite periods. Daytime noise and vibration respite periods are typically provided during lunch-time periods and the most appropriate periods shall be determined through consultation with the affected community ○ Utilising a hydraulic rock splitter or saw rather than a rock breaker (if applicable).	Contractor	During removal works
29	Vibration impacts to heritage buildings during works	• Building surveys of all nearby heritage structures as defined in Table 6.10 of this REF shall be carried out in order to assess the potential for increased susceptibility to building damage from vibration. • In the event that these buildings are considered more susceptible to vibration than regular buildings, reduced vibration criteria levels may be applicable and subsequently adopted for the assessment process. These reduced criteria may influence the selection of appropriate processes and equipment to be used in the vicinity of these buildings.	Roads and Maritime	Before removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
30	Dust generation	• All vehicles will adhere to speed limits, particularly on unsealed surfaces. • Vehicles transporting waste or other materials that may produce odours or dust shall be covered during transportation. • Areas that may generate dust shall be managed to suppress dust emissions in accordance with the Roads and Maritime's *Stockpile Site Management Guideline* (RMS 2015). • Visual monitoring of air quality will be carried out on a daily basis to verify the effectiveness of dust controls. • Measures (including watering or covering exposed areas) shall be used if required to minimise or prevent air pollution and dust. • Work (including the spraying of paint and other materials) shall not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.	Contractor	Removal planning During removal works
31	Emissions to air	• Vegetation or other materials are not to be burnt on site. • Plant and vehicles must not be left idling when not in use for extended periods. • Regular maintenance of vehicles, plant and equipment should be carried out and vehicles fitted with emission control devices in accordance with Australian Design Standards. • Visual monitoring of air quality would be carried out on a daily basis to verify the effectiveness of emissions controls.	Contractor	During removal
32	Removal bridge components (Contaminated materials)	• A full inspection should be carried out of the bridge to determine the presence of any hazardous components. • The removal of the bridge and lead contaminated material would be carried out in accordance with AS 4361.1.	Contractor	Before and during Removal
33	Removal of an item listed on the Roads and Maritime s.170 register and Clarence Valley LEP 2011	• Roads and Maritime shall update its s.170 Register to reflect the removal of the Sportsmans Creek Bridge. • As per Section 14 of the SEPP (Infrastructure) Roads and Maritime will provide written notice of the intention to carry out the proposed works to Council.	Roads and Maritime	Before the start of works
34	Removal of the Sportsmans Creek Bridge	• Urban and landscape design shall acknowledge the missing bridge as a central feature in the historic urban form of Lawrence. Redevelopment shall make reference to the original road corridor (eg in considering the design of viewing points, plantings, parkland, the siting of waterside amenities) in order to preserve the historical linkage across the creek at this location that began with the ferry and was continued in the 1885 and 1909 Lawrence bridges.	Council	Removal planning works

No.	Impact	Environmental safeguards	Responsibility	Timing
35		• A design-based approach to restoration of the creek banks after the removal of the Bridge will be carried out in accordance with the safeguards proposed in Section 6.8.6. • The content, scope and interpretive value of local signboards, markers and other on-site interpretation materials will be determined at an early stage for incorporation into forthcoming design briefs and consultations with Council, community stakeholders and other public agencies.	Roads and Maritime	
36		• All useful parts of the bridge shall be salvaged and stockpiled for future re-use in line with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction* and *Technical Guide: Management of Road Construction and Maintenance Wastes*.	Contractor	During removal works
37	Protection of the Dry Stone Wall Northern Abutment	• Consolidation work to stabilise the loose masonry of the dry stone northern abutment, if required, will be carried out in a manner that, while safeguarding the values and integrity of this element as a surviving remnant of the historical landscape. • Specific measures will be included in the CEMP to minimise impact on the stone abutment during removal works. Should accidental damage to the stone wall occur, any required restoration of the abutment shall be carried out to ensure the retention of historical values.	Contractor	During removal works
38	Damage to items of non-Aboriginal heritage significance to be retained	• The dismantling process in terms of heavy plant, access, excavation, etc shall consider any potential impact on the structural soundness and historical value of the stonework or other retained elements, and appropriate measures will be implemented to ensure the remains are protected. • Any accidental damage to items of non-Aboriginal heritage significance to be retained will be reported to the Roads and Maritime Environmental Officer and restored to ensure the retention of historical values.	Contractor	Removal planning, During removal works
39	Damage to items of Non-Aboriginal heritage significance	• All staff, contractors and others involved in building and maintenance related activities will be made aware of statutory legislation protecting sites and places of significance. Of particular importance are the *Heritage Act 1977*, the Clarence Valley LEP 2011 and items shown on Figure 6.6. • If unexpected archaeological remains are uncovered during the works, all work must cease in the vicinity of the material/find and the steps in the Roads and Maritime (2012c) *Standard Management Procedure: Unexpected Archaeological Finds* must be followed. Roads and Maritime Environmental Officer must be contacted immediately. • If any items defined as relics under the NSW *Heritage Act 1977* are uncovered during the works, all work must cease in the vicinity of the find and the Roads and Maritime Environmental Officer contacted immediately.	Contractor	During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
40	Work in proximity to the Lawrence Conservation Area.	• A notification shall be issued to Council about the works. • Consultation will be carried out with the Council Heritage Officer before the start of works which will involve disturbance to any heritage structures located within the Lawrence heritage conservation area. In addition the following applies: ○ In the event that alternative access to Sportsmans Creek is unavailable, the boat ramp and wharf could be utilised subject to the approval of the Roads and Maritime Project Manager and Environment Officer in consultation with Council.	Contractor	During removal works
41	Damage to items of Aboriginal heritage significance	• The following measures should be included within the CEMP for the Proposal and implemented during removal works: ○ All staff, contractors and others involved in removal activities should be made aware of statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010, under the *National Parks and Wildlife Act 1974* ○ If Aboriginal heritage items are uncovered during the works, all work in the vicinity of the find must cease and Roads and Maritime's Aboriginal cultural heritage advisor and the environmental officer contacted immediately. Steps in the Roads and Maritime (2012c) *Standard Management Procedure: Unexpected Archaeological Finds* must be followed.	Contractor	Pre-Removal During removal works
42	Minimise long-term impacts upon the landscape character.	• The following opportunities to minimise impacts upon the landscape character will be considered during detailed design in consultation with Council: ○ The recommendations in the Landscape Character and Visual Assessment (Appendix N) in consultation with Council.	Roads and Maritime / Council	During removal planning
43	Minimise short-term impacts upon the landscape character and visual amenity	• The location of the compound and general site layout shall be placed to minimise the visual impact on surrounding residences, including the siting of stockpiles, buildings, plant and equipment. • Work to be carried out in accordance with *EIA-N04 Guidelines for visual impact assessment and landscape character assessment*.	Contractor	During removal planning During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
44	Traffic and access	• A detailed Traffic Management Plan would be prepared in accordance with the RTA (2010) *Traffic Control and Work sites Manual* and Roads and Maritime Specification G10-Control of Traffic. The plan must be accepted by Roads and Maritime and reviewed by Council before implementation. • Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays. • The Traffic Management Plan will include such measures to provide safe access points to work areas from the road network, safety barriers where necessary, temporary speed restrictions when necessary, adequate sight distances and prominent warning signage. • Consultation will be carried out with local residents and the Lawrence Tavern on Bridge Street about any temporary access requirements to property to ensure access is maintained at all times. • Residents, businesses and Council shall be notified of the proposed works and any changes in traffic arrangements in accordance with Roads and Maritime procedures before the work starts. • Work areas will be bounded by fencing or barriers to prevent pedestrian access. Safe, alternative access should be provided for pedestrians where required.	Contractor	Removal planning
45		• Removal traffic will access the site via designated access points to be defined in the Traffic Management Plan.	Contractor	During removal works
46	Waterway access	• Removal vehicles will be parked off-road as far as practicable or in a manner that minimises disruption to other road users, businesses and the public.	Contractor	During removal works
47		• Signage shall be placed at Flo Clark Park and Sportsmans Park to indicate the temporary closure of the boat ramp and the park if required, and the location of alternative ramp and facilities on the Clarence River near Lawrence Memorial Park.	Contractor	Before the removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
48	On-water traffic and access	• NSW Maritime will be consulted with as required in regard to the closure of the boat ramp, relocation of moorings and obstructions to the Sportsmans Creek channel during removal works and before the start of works. • Consultation with NSW Maritime shall be carried out throughout the duration of the works to develop forward plans for the on-water traffic management while the work is carried out and as plant and structures are deployed in different locations. • Appropriate navigational marks and signage will be implemented. A Navigational Aids plan is to be prepared and approved by NSW Maritime. • Exclusion zones around critical areas of removal activities and floating removal equipment shall be clearly marked in accordance with Roads and Maritime advice and requirements.	Contractor	Before removal work sand during removal works
49	Utility relocation	• Consultation will be continued with Essential Energy about the isolation or protection of services impacted.	Roads and Maritime	During removal planning
50	Disturbance to available open space	• Council will be consulted about the use of Flo Clark Park and Sportsmans Park. • Restoration and landscaping shall ensure that Flo Clark Park and Sportsmans Park are restored to as previous or better condition.	Roads and Maritime	Pre-removal
51	Disturbance to recreational users of Flo Clark Park / Sportsmans Park	• Fencing and signage will be placed at the site compound location at Flo Clark Park. Signage will be placed to inform boat ramp users of the temporary closure of the boat ramp and the alternate waterway access in Lawrence Memorial Park.	Contractor	Pre-removal and during removal works
52	Accessibility to Sportsmans Creek	• Notices will be placed in the local press and NSW Maritime website as per NSW Maritime requirements and further consultation should be carried out with NSW Maritime with regards to timing of removal works. The Lawrence Fishing club will also be consulted about the boat ramp closure. • Residents with moorings on Sportsmans Creek will be consulted before building in the waterway with regards to any obstructions of the waterway which may impact upon their access to the waterway downstream of the proposal.	Contractor and Roads/ Maritime	Pre-removal

No.	Impact	Environmental safeguards	Responsibility	Timing
53	Local amenity disturbances	• Residents and businesses within the locality must be contacted at least five days before the start of works, in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Community consultation shall be carried out in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Complaints received shall be recorded and attended to promptly in accordance with the Roads and Maritime *(2012b) Community Engagement and Communications Manual*. • Residents within the locality who are shift workers will be identified and consulted about noise and vibration-generating work which may result in sleep disturbance.	Roads and Maritime/ Contractor	Pre-removal

54	Waste Management	• Resource management hierarchy principles will be followed:
		  ○ Avoid unnecessary resource consumption as a priority
		  ○ Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery)
		  ○ Disposal is carried out as a last resort (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).
		• All waste will be managed in accordance with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction and Technical Guide: Management of Road Construction and Maintenance Wastes*.
		• Waste materials should be removed off-site by a licenced contractor in accordance with the EPA's Waste Classification guidelines and Roads and Maritime (2016a, 2016b) guidelines to a facility authorised to take such waste.
		  ○ There is to be no disposal or re-use of building waste on to other land.
		  ○ Waste is not to be burnt on site.
		  ○ Waste material, other than vegetation and tree mulch, is not to be left on site once the work has been completed.
		• Appropriate receptacles for the collection of waste with separated bins for waste streams will be provided to encourage the recycling of materials
		• Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
			Contractor	During removal works

55	Wastewater disposal	• All liquid waste should be disposed off-site by tanker using a licenced contractor and disposed of a facility authorised to take such waste.	Contractor	During removal works
56	Noxious weeds disposal	• All noxious weeds cleared should be disposed of in accordance with the requirements of Council as stipulated in Section 6.1.6 of this REF.	Contractor	During removal works

No.	Impact	Environmental safeguards	Responsibility	Timing
57	Removal bridge components (Contaminated materials)	• Lead paint materials are to be managed in accordance with the *Australian Standard AS4361.1 'Guide to Lead Paint Management – Part 1 Industrial Applications 1995'*. • Licenced landfill operators would be notified of the presence of lead paint on any timbers/metals before delivery • Any hazardous waste material stockpiles are to be fenced and signed for public safety. • Redundant materials from the removal of the bridge must be disposed as follows: ○ All bridge timbers are to be assessed in accordance with the Roads and Maritime (2016a, 2016b) guidelines: *Technical Guide: Sustainability in Infrastructure Design and Construction and Technical Guide: Management of Road Construction and Maintenance Wastes* ○ As otherwise provided for by the relevant waste legislation and Roads and Maritime (2016a, 2016b) guidelines.	Roads and Maritime/ Contractor	Pre-removal and during removal
58	Vulnerability to effects of climate change	• Further opportunities will be considered for reducing greenhouse gas emission during the removal works.	Roads and Maritime	Before bridge removal
59	Greenhouse gas emissions	• Alternative fuels and power sources for equipment will be considered, such as biodiesel generators.	Contractor	During removal works

7.3 Licensing and approvals

As discussed in Chapter 4, various approvals and permits are likely to be required for the Proposal, as summarised in Table 7.2.

Table 7.2: Summary of licensing and approval required

Requirement	Timing
A late draft copy of the REF is required to be issued to DPI (Fishing and Aquaculture) for review and consideration.	After review of a late Draft of the REF and a minimum of 28 days before the start of dredging or reclamation work. Outcomes of this consultation must be addressed in the CEMP and relevant Environmental Work method Statement (EWMS).
A commence work notification form as per the notification requirements under Section 199 of the *Fisheries Management Act 1994* is required.	A minimum of three days before the start of works.
A permit to block fish passages is required under Section 219 of the Fisheries Management Act 1994. This applies to any temporary or permanent blockages that occur as a result of bridge or side track work.	Before the start of removal works.
Council are to be notified of any road closures if required.	A Traffic Management Plan and notification is to be issued to Council about the closure.
Documented approval about access from the landholders of properties that would be obstructed or impacted by the proposal.	Consultation before removal commences and then notification at least five days before the obstruction.
A notification is to be issued to Clarence Valley Council about any work which would impact the Lawrence Memorial Park or the Lawrence Conservation area as the bridge is listed on the Clarence Valley LEP 2011 and the northern part of the work on Bridge Street are located within the Lawrence Conservation Area.	Consultation with the Council Heritage Officer before removal.
According to Maritime requirements, Marine Notices are to be placed in the local Press and on the NSW Maritime website.	During works and updated throughout the different removal phases.
An 'authority to occupy crown land' is required in the form of a lease from the Crown Lands Division for the Sportsmans Creek waterway.	Before the start of works.
A concurrence approval from OEH under Section 112C of the *EP&A Act*. A SIS has been prepared in accordance with Section 110 of the *Threatened Species Conservation Act 1995* due to the potential significant impact upon the Large-footed Myotis.	Before the determination of the REF by Roads and Maritime, a concurrence approval must be obtained from OEH. Feedback from OEH on the SIS mitigation measures must be addressed in the CEMP and relevant EWMS.
A notice of removal as per Section 170A of the *Heritage Act 1977* to the NSW Heritage Office is required to remove the existing Sportsmans Creek Bridge.	A notification is required at least 14 days before the removal of the bridge.

8 Conclusion

8.1 Justification

This REF has been prepared to assess the proposal to remove the Sportsmans Creek Bridge. The bridge is proposed to be removed after the building of the Sportsmans Creek new bridge. The bridge is to be removed as it cannot be safely upgraded to meet future requirements and requires ongoing significant and unsustainable maintenance and repairs.

8.2 Objects of the Environmental Planning and Assessment Act 1979

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The proposal addresses costs associated with the maintenance requirements of the Sportsmans Creek Bridge and facilitates the future strategic need for the movement of agricultural product through the region. The proposal encourages the proper management, development and conservation of natural and artificial resources. Once the proposal is complete, it would provide the community an improved area for recreation and remove the need for large trucks to move through the Lawrence heritage conservation area along Bridge Street.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	The proposal would promote the appropriate economic use and development of land by returning the land to public use / Council control after the removal of the bridge in accordance with *Roads and Maritime's Timber Truss Bridge Strategy* (Roads and Maritime 2012a).
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	The proposal would not have any permanent impact upon communication and utility services as services temporarily relocated would be returned after the removal of the bridge.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal would temporarily result in a reduction of beneficial use of land for public purposes in Flo Clark Park and Sportsmans Park. Once restoration work is completed combining Flo Clark Park and Sportsmans Park, the land where the Sportsmans Creek Bridge abutment is located would be improved for public purposes.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	Not relevant to the proposal.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	A biodiversity assessment has been carried out for the proposal and is provided in Appendix F. A SIS has also been prepared and is included in Appendix G. The removal of the bridge would result in the permanent loss of habitat for the Large-footed Myotis. A concurrence approval from the OEH for the proposal is required. The protection and conservation of the environment would be assured through the implementation of the safeguards presented in this REF and in the CEMP to be prepared for the removal works. A SIS has been prepared to address the potential significant impacts upon the Large-footed Myotis and incorporate safeguards as part of Microbat Management Plan to mitigate these impacts.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.

Object	Comment
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	As discussed in Section 5.2, the community has been engaged throughout previous phases of the proposal and would be continued to be consulted throughout the bridge removal.

8.2.1 The precautionary principle

To satisfy the principles of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. The precautionary principle dictates that lack of scientific certainty should not be used as a reason for postponing measures to avoid environmental degradation, where there is a risk of 'serious or irreversible damage'.

The proposal would lie largely within land which has been previously disturbed by the building of the existing Sportsmans Creek Bridge (see KBR 2015). The removal of the bridge is considered of low risk to the environment as it would only require a minor amount of clearing of vegetation and disturbance to open space within Flo Clark Park and Sportsmans Park. The Biodiversity Assessment, however, identified potential significant risk to Large-footed Myotis and the potential habitat for other threatened microbat species. The precautionary principle was applied by preparing the seven-part test of significance assessments, and in carrying out the SIS for the Large-footed Myotis. The safeguards and management measures proposed in the prepared SIS (refer Appendix G) would minimise the impacts of the proposal on microbat species.

Works within Sportsmans Creek could have the potential for serious or irreversible damage to the natural environment and although field investigations have been carried out, there remains still the potential to discover unidentified species or items of heritage significance. Nevertheless, the safeguards and management measures proposed in this REF would minimise the impacts of the proposal. The proposal is considered to be consistent with the precautionary principle.

8.2.2 Intergenerational equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The principle includes both intra-generational equity (within generations) and intergenerational equity (between generations).

The environmental impacts identified for the proposal, such as noise, disruptions to traffic and access, and loss of open space, would disadvantage current generations to a degree over a relatively short time frame.

The SOHI has assessed the permanent loss of heritage in the removal of the bridge and concluded that the collective benefits to the heritage conservation area (through the removal of through traffic, environmental and amenity improvements, landscape consolidation, streetscape and heritage interpretation) would outweigh the loss of the individual item. The retention of the northern abutment would also ensure that its legacy is retained for future generations.

The benefits of the broader proposal as outlined in Section 6.15 of this REF would be available to current and future generations. Moreover, there are no significant or important local natural resources that would be permanently removed, such that their loss would disadvantage future generations. The proposal is consistent with the principle of inter- and intra-generational equity.

8.2.3 Conservation of biological diversity and ecological integrity

Biological diversity (biodiversity) is defined as the variety of life forms, and is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity. Ecosystem diversity describes the condition of an ecosystem that is relatively unaltered from its natural state.

The proposal has avoided, where possible, disturbance to the local environment. However, the removal of the bridge would result in the removal of habitat for the Large-footed Myotis. A biodiversity assessment has been carried out which proposes safeguards and mitigation measures to mitigate potential impacts. A SIS has been prepared to further assess the significance of impacts and determine mitigation measures to minimise risks to the population (refer to Appendix G). Mitigation measures include providing new habitat for the population residing in the existing bridge and a Microbat Management Plan is proposed to facilitate the successful relocation of species.

The proposal would have only minor effects on other flora and fauna, as minimal clearing of vegetation would be required and appropriate safeguards and mitigation measures have been proposed in this REF.

8.2.4 Improved valuation, pricing and incentive mechanisms

Improved valuation and pricing of environment resources is a component of the concept of inter-generational equity. The need to determine proper values for services provided by the natural environment, including waste assimilation, aesthetic and cultural values, and provision of materials, water, air and energy is central to ESD. Traditionally, pricing of resources has not reflected their true scarcity, replacement costs in the long-term nor future costs of irreversible and cumulative damage to natural systems.

The proposal would result in short-term increases in resource use and in emissions of air pollutants and operation of plant and machinery. It would also require removal of a small area of vegetation, with an associated short-term decrease in the local aesthetic value and visual quality. The economic and environmental value of these resources is difficult to quantify.

Although the cost of electricity, fuel, other utilities, raw materials and waste removal and management can be estimated, these prices would not fully reflect the true environmental cost of their extraction, processing and ultimately, disposal of their waste bi-products. While no detailed valuation or pricing of these environmental resources has been carried out, the resources to be expended or utilised during the proposal would be minor within the context of the local economy, and negligible within the context of the regional or State economies. Moreover, the long-term social and environmental benefits that would result from the Proposal would outweigh the relatively minor short-term negative impacts. Safeguards are provided in this REF to minimise risks to biological diversity, ecological integrity and protect the value of the local environmental resources.

8.3 Conclusion

The proposed removal of the Sportsmans Creek Bridge at Lawrence is subject to assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*. The 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. This has included consideration of conservation agreements and plans of management under the *National Parks and Wildlife Act 1993*, joint management and biobanking agreements under the *Threatened Species Conservation Act 1995*, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal *Environment Protection and Biodiversity Conservation Act 1999.*

A number of areas of potential environmental impacts from the proposal have been avoided or reduced during the options assessment. The proposal as described in the REF best meets the project objectives but would still result in impacts on:

- Soils and ASS within the bed and on the banks of Sportsmans Creek
- The Sportsmans Creek Bridge, listed on both the Clarence Valley LEP 2011 and the Roads and Maritime s. 170 register and the Lawrence heritage conservation area

- Local amenity due to visual amenity, noise and vibration and air quality disturbance during earthworks and removal
- Recreational areas and visual amenity within Flo Clark Park and Sportsmans Park
- Local traffic and access to private property and in Lawrence village, and waterway access to Sportsmans Creek during removal
- Aquatic and terrestrial vegetation through clearing for site establishment, bridge removal, pontoon establishment and in-stream works
- Habitat for a known breeding colony of the threatened species listed as vulnerable on the *Threatened Species Conservation Act 1995*, the Large-footed Myotis, for which a SIS has been prepared.

Mitigation measures as detailed in this REF and the prepared SIS (refer Appendix G) would ameliorate or minimise the expected impacts. The proposal would also provide opportunity for improvements to recreational accessibility in Flo Clark Park through the connection with Sportsmans Park after the removal of the southern abutment, and negate significant and unsustainable maintenance costs. On balance the proposal is considered justified and the following conclusions are made:

1. Significant impact to the environment

The environmental impact of the proposal is not likely to be significant and it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the *Environmental Planning and Assessment Act 1979*.

2. Significant impact to NSW listed biodiversity matters

The proposal has the potential to significantly affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994,* and a Species Impact Statement has been prepared (refer Appendix G).

3. Significant impact to nationally listed biodiversity matters

The proposal is not likely to significantly affect threatened species, ecological communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999.*

4. Commonwealth land and other matters of national environmental significance

The proposal does not significantly affect Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* and a referral to the Federal Department of the Environment is not required.

The proposal is not likely to significantly affect other matters of national environmental significance, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* and a referral to the Federal Department of the Environment is not required.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Lara Mottee

Senior Environmental Scientist

Kellogg, Brown & Root Pty Ltd

Date: 5/7/2016

I have examined this review of environmental factors and the certification by Lara Mottee from Kellogg Brown & Root Pty Ltd and accept the review of environmental factors on behalf of Roads and Maritime Services.

David Andrews 11 July 2016

Senior Project Development Manager

Freight and Regional Program Office

Infrastructure Development Division

Date:

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Terms and acronyms used in this REF

AADT	Annual Average Daily Traffic (AADT)
ABS	Australian Bureau of Statistics
AEP	Annual Exceedance Probability. The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year. It is utilised to measure the rarity of a rainfall event.
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ALS	Airborne Laser Survey
AADT	Annual Average Daily Traffic
ARI	Average Recurrence Interval. The average, or expected, value of the periods between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random. The term utilised to measure the rarity of a rainfall event before the use of the current term AEP.
ASS	Acid Sulfate Soils
ASRIS	Australian Soil Resource Information System
ASSMAC	Acid Sulfate Soils Management Advisory Committee
BOM	Bureau of Meteorology
CEMP	Construction environmental management plan
CLD	Crown Lands Division
CNVMP	Construction Noise and Vibration Management Plan
CPT	Cone Penetration Testing. A type of geotechnical investigation technique.
Council	Clarence Valley Council
Clarence Valley LEP 2011	Clarence Valley Local Environmental Plan 2011
CVC	Clarence Valley Council
CZMP	Coastal Zone Management Plan
DEC	Department of Environment and Conservation
DECCW	Department of Environment, Climate Change and Water
DEM	Digital Elevation Model
Db	Decibel
DIWA	Directory of Important Wetlands
DPE	Department of Planning and Environment
DP	Deposited Plan
DPI (Fishing and Aquaculture)	Department of Primary Industries - Fishing and Aquaculture
EEC	Endangered Ecological Community
EIA	Environmental impact assessment
ENMM	Environmental Noise Management Manual
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW). Provides the legislative framework for land use planning and development assessment in NSW

EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
ESL	Ecological Screening Level
EWMS	Environmental Work Method Statement
GDP	Gross Domestic Product
GIS	Geographic Information System
HCM	Highway Capacity Manual
HML	Higher Mass Limit
ICNG	Interim Construction Noise Guideline
INP	Industrial Noise Policy
IPCC	Intergovernmental Panel on Climate Change
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
Kg	kilogram
kg/m	Kilograms per metre
km	Kilometre
km/hr	Kilometres per hour
kN	Kilo-newton
kV	kilovolts
LALC	Local Aboriginal Land Council
LAeq	Equivalent continuous level. A term utilised to define the period of measurement of continuous noise or energy average noise level.
LCA	Local Control Authority
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local Government Area
MCA	Multi-Criteria Analysis
mg/kg	Milligrams per kilogram
mm	millimetre
m	metre
$m/s^{1.75}$	Unit of measurement for a Vibration Dose Value
NCA	Noise Catchment Area
NEPC	National Environment Protection Council
NES	Matters of national environmental significance under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
NM	Noise Monitoring location
NML	Noise Management Level
NSW	New South Wales
OEH	Office of Environment and Heritage
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PAD	The term 'Potential Archaeological Deposit (PAD)' is used to describe areas that are likely to contain sub-surface cultural deposits

PASS	Potential Acid Sulfate Soils
PEMP	Project Environmental Management Plan
PMST	Protected Matters Search Tool
QA Specifications	Specifications developed by Roads and Maritime for use with roadwork and bridgework contracts let by Roads and Maritime
RBL	Rated Background Level
REF	Review of Environmental Factors
RNE	Register of National Estate
RNP	Road Noise Policy
Roads and Maritime	Roads and Maritime Service
RTA	Roads and Traffic Authority
SDS	Safety Data Sheet
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SEPP 14	State Environmental Planning Policy No.14 – Coastal Wetlands
SEPP 71	State Environmental Planning Policy No.71 – Coastal Protection
SES	State Emergency Services
SIS	Species Impact Statement
SOHI	Statement of Heritage Impact
SPT	Standard Penetration Testing
SU	Survey Units
SWMP	Soil and Water Management Plan
TEC	Threatened Ecological Community
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
UCL	Urban Centre and Locality
VDV	Vibration Dose Values
WHS	Work Health Safety
WoNS	Weed of National Significance

Appendix A

Design drawings

Appendix B

Historical archaeology and heritage values of Sportsmans Creek Bridge precinct, near Lawrence NSW

Appendix C

Sportsmans Creek Bridge, Lawrence - Heritage Impact Statement

Appendix D

Archaeological Due Diligence Assessment

Appendix E

Heritage Council Endorsement Letter

Appendix F

Biodiversity Assessment

Appendix G

Species Impact Statement

Appendix H

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Impact
a. Any environmental impact on a community? There would be temporary impacts on the local community during the bridge removal. Safeguards and management measures provided in Chapter 6 have proposed to minimise environmental impacts upon the community. There are long-term benefits of an improved open space area in Flo Clark Park and Sportsmans Park.	Minor negative short-term removal work impacts
b. Any transformation of a locality? The proposal would temporarily transform the locality during establishment of the temporary site compound in Flo Clark Park and the cranes required for the removal work. The removal of the bridge would have some permanent transformation, which is considered to be of minor or moderate impact. However, overall no significant transformation of the locality would occur as the bridge would be replaced in the locality.	Minor negative short-term impacts. Long-term minor/moderate impacts.
c. Any environmental impact on the ecosystems of the locality? The proposal involves clearing vegetation including habitat for flora and fauna within Flo Clark Park. This clearing would not result in a long-term impact upon any EECs or threatened species of the local ecosystems of the locality, provided the safeguards and mitigation measures proposed in this REF are implemented. However, the proposal would require the removal of habitat for a threatened breeding colony of Large-footed Myotis (*Myotis macropus*) that resides in the existing Sportsmans Creek Bridge. It is proposed that the species would be excluded from the bridge before removal and the new Sportsmans Creek Bridge would provide compensatory habitat for the species. A SIS has been prepared to further investigate impact and a Microbat Management Plan is proposed to manage potential impacts to the species.	Potential long-term significant impact if mitigation measures are not implemented.
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? A short-term temporary reduction in recreational value of Flo Clark Park would be generated during the removal work due to the presence of the site compound and removal work obstructing the boat ramp and Sportsmans Creek. Overall, the proposal would not have any significant impact on the environmental, scientific or recreational values of the area.	Minor short-term negative impact
e. Any effect 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 proposal would result in the removal of an item of local and state heritage significance. The SOHI prepared for the proposal concluded that impact of the removal of the bridge upon the heritage and aesthetic values of the local area and Lawrence Conservation Area would be considered minor or moderate. The assessment concluded there would be a positive effect on the landscape character of the locality through the reinforcement of the original town plan and reduction in fragmentation of the heritage conservation area of Lawrence. Overall the proposal would not have any significant effect on any place, structure or artefact of significance to either Non-Aboriginal or Aboriginal cultural heritage.	Long-term moderate negative impact, partially offset by a long-term positive impact.

Factor	Impact
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* 1974)? A biodiversity assessment was carried out which determined that the proposal would not have a significant impact on the habitat of any protected Fauna within the meaning of the *National Parks and Wildlife Act* 1974 (with the exception of the Large-footed Myotis (*Myotis macropus*). The proposal would remove the habitat for the threatened breeding colony of Large-footed Myotis (*Myotis macropus*) that inhabits the existing bridge. It is proposed that the Large-footed Myotis (*Myotis macropus*) population which would be trans-located into the new bridge in compensatory habitat, before the removal of the existing bridge. A SIS has been prepared to further investigate impacts and a Microbat Management Plan is proposed to manage potential impacts on the species.	Potential long-term significant impact if mitigation measures are not implemented.
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Provided the safeguards and mitigation measures presented in this REF are effectively implemented the proposal would not endanger any species of plant or animal. A Microbat Management Plan is proposed to manage potential impacts on the microbat species to be relocated.	Minor negative short-term impacts, potential long-term significant impact if mitigation measures are not implemented..
h. Any long-term effects on the environment? No significant long-term effects on the environment would result from the proposal. A SIS has been prepared the impact upon the Large-footed Myotis (*Myotis macropus*) population further and appropriate safeguards have been proposed a Microbat Management Plan.	Minor negative short-term impacts, potential long-term significant impact if mitigation measures are not implemented..
i. Any degradation of the quality of the environment? Provided the safeguards and mitigation measures presented in this REF are effectively implemented there would be no significant degradation of the environment.	Minor negative short-term impacts. Long-term positive impacts through the improvement of the Sportsmans Creek and Flo Clark Park.
j. Any risk to the safety of the environment? During the removal work, there would be a low risk that hazardous substances, such as fuels or oils could be accidentally spilled and enter Sportsmans Creek. This risk would be minimised by storing and handling these substances within double-bunded areas.	Minor negative short-term impacts.
k. Any reduction in the range of beneficial uses of the environment? There would be no reduction in beneficial uses of the environment.	Nil.
l. Any pollution of the environment? Issues associated with the potential for pollution of the environment are discussed in (j) above. Provided that the proposed safeguards and mitigation measures in this REF are effectively implemented, it is unlikely that there would be any significant pollution of the environment.	Potential minor negative impacts may result if safeguards are not implemented.
m. Any environmental problems associated with the disposal of waste? No environmental problems associated with the disposal of wastes are expected, provided that the management measures described in this REF are effectively implemented.	Nil.

Factor	Impact
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? No demand would be placed on resources which are in short supply nor does the proposal require the use of resources (natural or otherwise) that are likely to be come in short-supply.	Nil.
o. Any cumulative environmental effect with other existing or likely future activities? Cumulative environmental effects have been discussed in Section 6.14. No cumulative effects are expected which would have any significant adverse effect on the environmental values of existing or future activities.	Nil.
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The proposal would be carried out within the coastal zone, however, would not have any impact on coastal processes or coastal hazards.	Nil.

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to help in determining whether the proposal should be referred to the Australian Government Department of the Environment.

A referral is **not** required for proposed actions that may affect nationally listed threatened species, ecological communities and migratory species. Impacts on these matters are assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
a. Any impact on a World Heritage property? The proposal would not impact upon any World Heritage properties.	Nil.
b. Any impact on a National Heritage place? The proposal would not impact upon any National Heritage place.	Nil.
c. Any impact on a wetland of international importance? Although wetlands are present in the investigation area (refer to Section 6.1), the proposal would not impact upon any wetlands of international importance.	Nil.
d. Any impact on a listed threatened species or communities? As noted in Section 6.1 and Appendix F, Commonwealth-listed threatened species and communities have the potential to occur in the proposal investigation area. However, none have been identified and adverse impacts upon them are not anticipated.	Nil.
e. Any impacts on listed migratory species? As noted in Section 6.1 and Appendix F, Commonwealth-listed migratory species are likely to occur with the proposal area. However, the proposal is unlikely to have any adverse impacts upon migratory species.	Nil.
f. Any impact on a Commonwealth marine area? There are no commonwealth marine areas located in proximity to the proposal.	Nil.
g. Does the proposal involve a nuclear action (including uranium mining)? The proposal does not involve any nuclear action.	Nil.
Additionally, any impact (direct or indirect) on Commonwealth land? The proposal does not involve work on Commonwealth land nor would indirectly affect Commonwealth land.	Nil.

Appendix I

Transport and Traffic Impact Assessment

Appendix J

Consultation with agencies and stakeholders

Appendix K

Geotechnical Investigation Report

Appendix L

Flood Study

Appendix M

Noise and Vibration Impact Assessment

Appendix N

Landscape Character and Visual Assessment

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