



Transport
Roads & Maritime
Services



New Tabulam bridge for Bruxner Highway

Route Options Development Report

NOVEMBER 2013



Roads and Maritime Services

Tabulam New Bridge

Bruxner Highway

Route Options Development Report

Executive summary

Introduction

Tabulam is in the Northern Rivers region of New South Wales and is situated on the Bruxner Highway (HW16), between Tenterfield and Casino, and located on the Clarence River.

The existing Bruxner Highway bridge over the Clarence River at Tabulam, which is a State heritage listed structure, is primarily a timber structure and has an overall length of about 300 metres, comprising 13 timber approach spans and five composite timber/steel de Burgh truss central spans. The overall width between kerbs is only 4.6 metres, accommodating only single lane traffic. The main spans are supported by concrete piers located in the river, whilst the approaches are supported by timber trestles.

Extensive maintenance works have been conducted over recent years to ensure the bridge remains safe for legally loaded vehicles. However, the bridge presents significant transport limitations both now and into the future and also requires a disproportionate share of NSW Roads and Maritime Services (Roads and Maritime) bridge maintenance funding.

Roads and Maritime is currently undertaking investigations for a new bridge over the Clarence River and to remove the existing structure. The study area for the project is located on the Bruxner Highway incorporating the village of Tabulam and the Clarence River.

The process to identify a preferred route for the new Tabulam bridge project involves:

- The development and assessment of the route options.
- Community and stakeholder consultation.
- Investigations of the study area.
- The identification and display of the preliminary route options for community comment.
- Field investigations and technical studies.
- A value management workshop.
- The identification and display of a preferred route option.

Following the display of the preferred option, Roads and Maritime will prepare a concept design and an environmental impact assessment (EIA) for further community input. Issues raised by the community will be considered before project approval is sought.

This report focuses on the development and display of the short listed route options.

Project objectives

The project objectives are as follows:

- Enhance road safety for all road users over the length of the project, including improving safety for pedestrians and cyclists. Investigate and determine the appropriate treatment for pedestrians and cyclists on the new structure.
- Remove the existing bridge.
- Improve traffic efficiency.
- Improve road transport productivity and reliability.
- Support regional and local economic development including improved opportunity for economic and tourist development for Tabulam.
- Provide a value for money solution.
- Minimise impacts on the natural, social and built environment.
- Coordinate construction traffic to minimise its impact and damage to the existing structure and to make allowance for potential maintenance works that may need to be conducted during the course of this project.
- Involve all stakeholders and consider their interests.
- Consider constructability impacts.
- Consider Work Health and Safety impacts of the project options.

Strategic transport and planning context

A number of plans and strategies are referenced in this report that provide an overview of the transport planning context for NSW and more locally the Bruxner Highway. These are:

- NSW Long Term Transport Master Plan.
- State Plan - NSW 2021.
- State Infrastructure Strategy.
- Ballina to Tenterfield Corridor Strategy.

Furthermore, two additional studies relate directly to the strategy of providing a new bridge at Tabulam and demolishing the existing bridge. These are:

- Timber Truss Bridge Conservation Strategy.
- Bridges for the Bush.

Timber Truss Bridge Conservation Strategy

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

The strategy identified the existing bridge over the Clarence River at Tabulam as requiring replacement and for the existing structure to be removed. It found that the existing bridge could not be upgraded to meet current or future transport needs. Furthermore, the strategy found that any form of retention of the bridge would present continuing conservation, operational and financial challenges. The report noted that conservation of the bridge would not substantially strengthen the representative sample and would come at a high cost to government.

Bridges for the Bush

In October 2012 the NSW Government committed to improving road freight productivity by replacing or upgrading bridges over the next five years at 17 key locations in regional NSW.

One of the priority programs to help manage ageing assets and provide a benefit to freight productivity includes the replacement of six heritage timber truss bridges to modern standards, including the existing bridge over the Clarence River at Tabulam.

Community involvement

A community and stakeholder consultation process has been implemented since the project began in May 2013. The local community has important information on issues and constraints in the study area that can assist with identifying a preferred route for the new bridge.

A community information drop-in session was held on Thursday 15 August 2013 at the Tabulam Community Hall where over 60 people attended. The top four issues identified as most important to respondents included:

- Road safety.
- Impact on community.
- Pedestrian safety.
- Heritage, including retention of the existing bridge.

Roads and Maritime will continue to work closely with the community throughout the project.

Community feedback and retention of the existing bridge

Roads and Maritime acknowledges there is some community opposition to the removal of the existing bridge over the Clarence River at Tabulam. Roads and Maritime has received this feedback verbally, in written form and via two community petitions.

This feedback has been carefully considered. However, due to ongoing conservation, operational and financial challenges presented by retaining the existing bridge, Roads and Maritime is proceeding with the current project. This includes identifying a replacement bridge location and removal of the existing bridge.

Options that were considered for retaining the existing bridge included:

- Retain the existing bridge for pedestrian access only.
- Retain the bridge for visual aesthetics only until the bridge collapses into the river.
- Retain the existing bridge for its current use.

Roads and Maritime is investigating ways to recognise the heritage significance of the existing bridge. Roads and Maritime will work with the community to determine the most appropriate ways the bridge could be remembered. The community is encouraged to provide feedback and ideas.

Study area characteristics

To assist in the development of the preliminary route options a number of preliminary desktop studies were undertaken to understand the key characteristics within the study area.

Findings from the studies were used to build constraint mapping across areas such as socio-economic, environmental and engineering, which were used to assess the potential impacts for each of the preliminary route options developed within the study area.

Route options development

The route option development process includes several steps:

- Review of existing data including reports, maps and other information available.
- Site familiarisation and site visits including inspections of road, bridge and study area.
- Preliminary investigations and assessments to determine the opportunities and constraints for route options.
- Development of preliminary route options.
- Shortlisting workshop to review and assess preliminary route options and establish a shortlist of route options worthy of further development and investigation.
- Route options development report and display – where we are now.

A total of eleven preliminary route options were developed for further consideration.

Selection of the shortlisted route options

A shortlisting workshop was held in August 2013 to evaluate the eleven preliminary route options against the project objectives.

The purpose of this workshop was to review and assess the eleven preliminary route options and establish a shortlist of route options for further development and investigation.

The workshop was attended by representatives from Roads and Maritime Services, Transport for NSW, GHD (Roads and Maritime Contractor) and Australian Centre for Value Management (workshop facilitator).

At the conclusion of the preliminary route option assessment process the following route options were shortlisted for further development and investigation:

- Option 2 (now called Option A) - starts at the existing highway on the western approach, crossing the river upstream and parallel to the existing bridge, then converges and re-joins the highway at the Clarence Street intersection. This option uses only one of the existing overflow bridges on the western side of the river.

- Option 3 (now called Option B) - starts at the highway on the western approach, crossing the river upstream and parallel (curved alignment) to the existing bridge, connecting to the existing highway at the Clarence Street intersection. This option utilises both overflow bridges on the western side of the river.
- Option 6 (now called Option C) - starts at the existing highway on the western approach, crossing the river downstream and parallel to the existing bridge, then converges and re-joins the highway at the Clarence Street intersection. This option uses only one of the existing overflow bridges on the western side of the river.
- Option 7 (now called Option D) – starts at the existing highway at the most western overflow structure, crossing the river downstream on a slight angle to the existing bridge, then converges and re-joins the highway at the Clarence Street intersection. This option uses only one of the existing overflow bridges on the western side of the river.

The shortlisted route options are illustrated on the figure overleaf.

Next steps

Following the display of the shortlisted route options, Roads and Maritime will review the public submissions received during the display period and undertake field investigations. This information and the outcomes of the value management workshop will inform the selection of a preferred route.

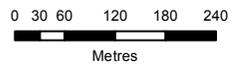
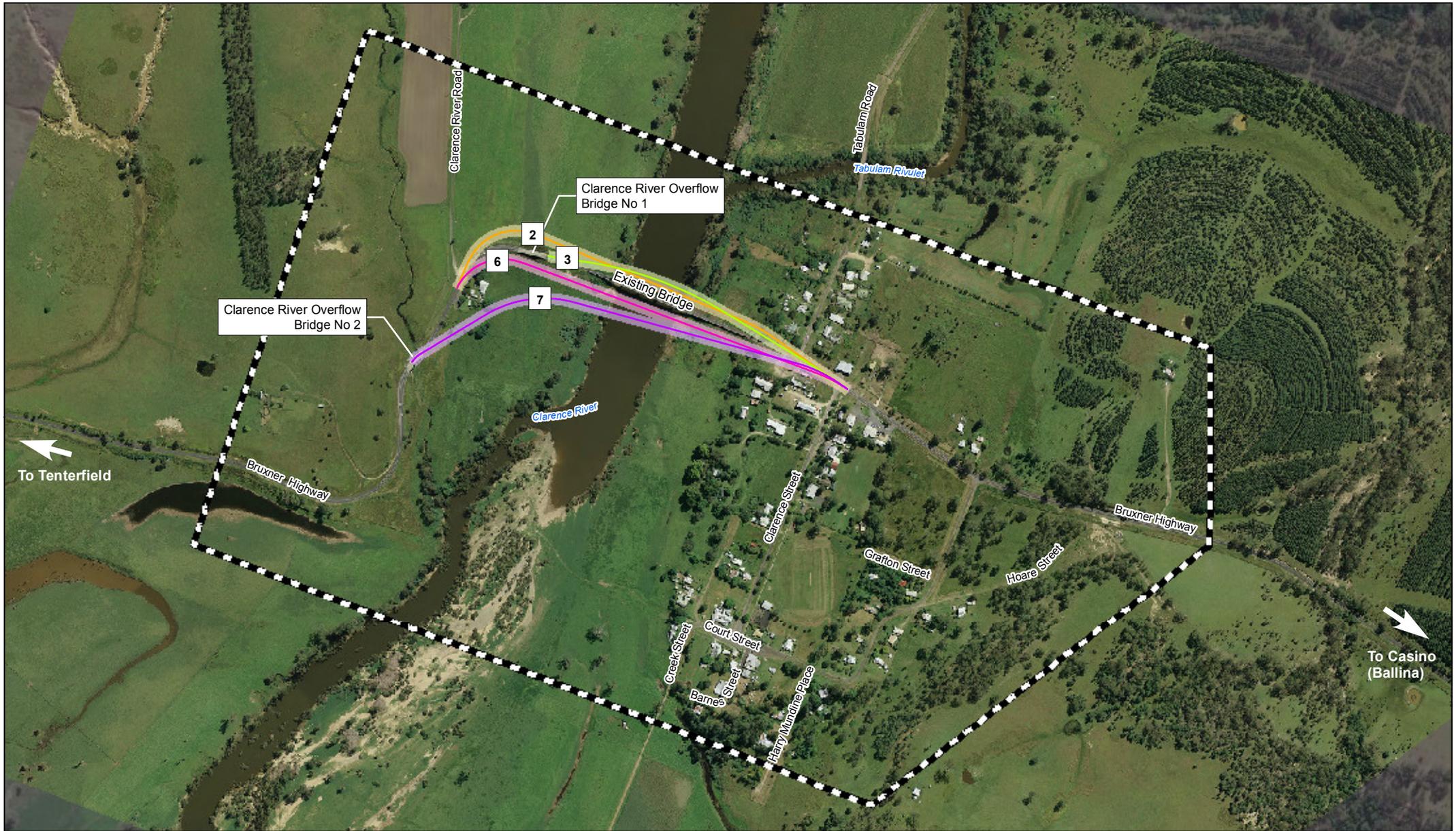
A value management workshop will be held with participants from the community, government and technical areas of expertise following the route options display.

The workshop will assess the performance of each of the route options against a range of criteria that relate to the project objectives.

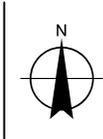
A recommendation will be made to the Minister for Roads and Ports. The preferred route will then be displayed for community comment.

Following the display of a preferred route a concept design and an environmental impact assessment (EIA) will be prepared.

The concept design and EIA will also be displayed for community comment.



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND



Study area

Option 2 (A)

Option 3 (B)

Option 6 (C)

Option 7 (D)

Shortlisted Route Options

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1 Introduction

1.1 Project overview

Tabulam is in the Northern Rivers region of New South Wales and is situated on the Bruxner Highway (HW16), between Tenterfield and Casino. Located on the Clarence River, its position on the northern catchment of one of Australia's most voluminous rivers affords it geographical and environmental significance.

Originally occupied by the Bundjalung people, Tabulam and surrounding land was first settled by Europeans in 1839. A postal service from Grafton was established in 1848 and eventually a courthouse and post office opened in 1849. The river crossing remained a problem with many sheep-droving teams stranded when the river flooded. The existing bridge was first built in 1903, though a punt had aided river crossings as early as 1863. As such the heritage of the town is an important consideration when planning for a new bridge over the Clarence River.

A map of Tabulam and its location in northern NSW is provided as Figure 1-1.

The existing Bruxner Highway bridge over the Clarence River at Tabulam, which is a State heritage listed structure, is primarily a timber structure and has an overall length of about 300 metres, comprising 13 timber approach spans and five composite timber/steel de Burgh truss central spans. The overall width between kerbs is 4.6 metres, accommodating single lane traffic only. The main spans are supported by concrete piers located in the river, whilst the approaches are supported by timber trestles.

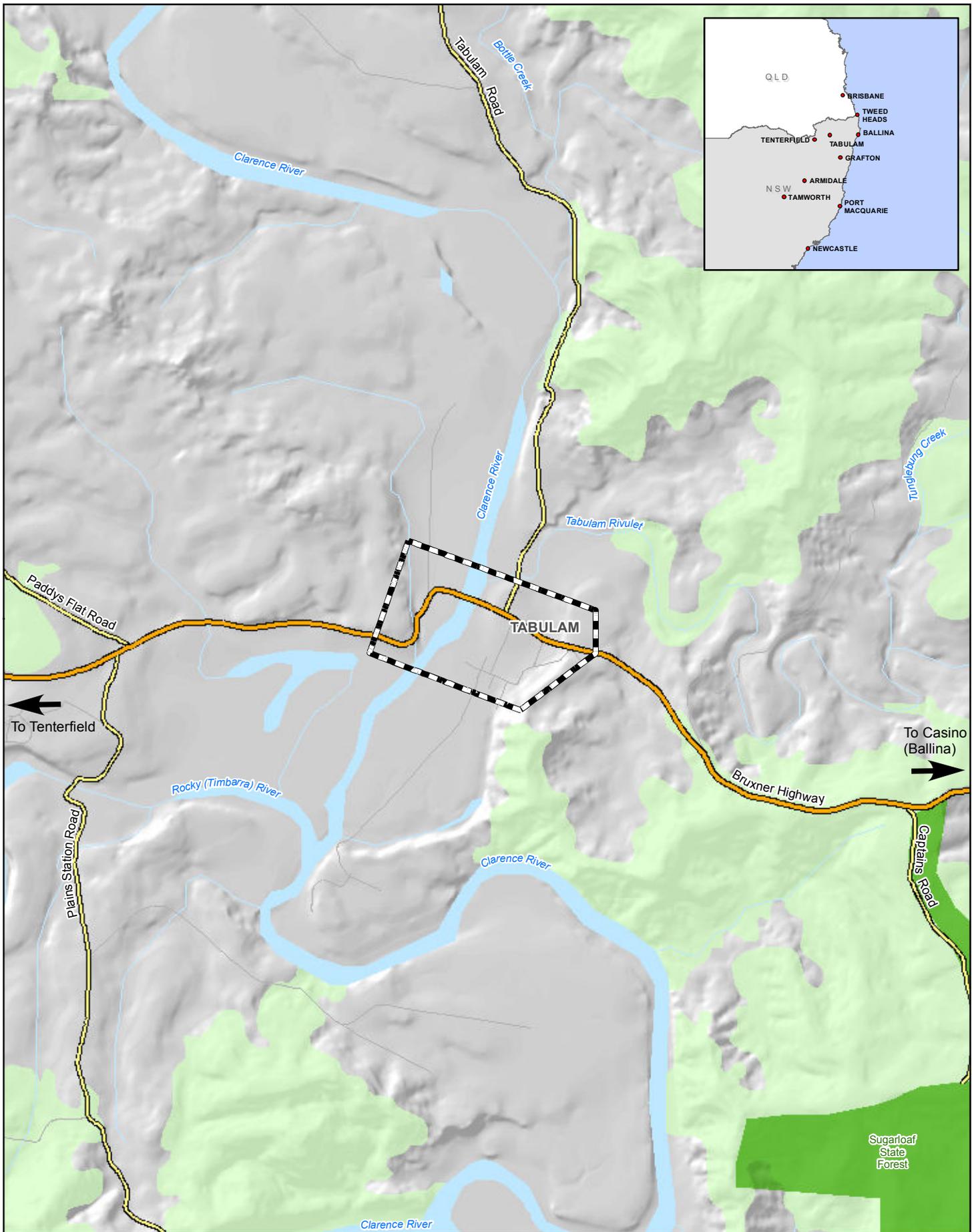
Extensive maintenance works have been conducted over recent years to ensure the bridge remains safe for legally loaded vehicles. However, the bridge presents significant transport limitations both now and into the future and also requires a disproportionate share of NSW Roads and Maritime Services (Roads and Maritime) bridge maintenance funding.

Roads and Maritime is currently undertaking investigations to replace the existing Bruxner Highway bridge over the Clarence River at Tabulam with a modern structure and to remove the existing structure.

Planning activities include:

- Desktop studies for the study area focusing on environmental, physical, socio-economic and existing infrastructure constraints in and around the town.
- Development of feasible route options.
- Selection of shortlisted route options for further assessment and site investigations.
- Selection of a preferred route.
- Concept design for the preferred route.
- Environmental impact assessment (EIA).

Roads and Maritime will conduct public displays for the shortlisted route options, the preferred route and at the completion of the concept design and EIA, at which time the community will be invited and encouraged to provide feedback.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | |
|---------------|---------------|-----------------------------|
| Site location | Local Road | Nature Conservation Reserve |
| Watercourse | Arterial Road | State Forest |
| Waterbody | Highway | Forest Or Shrub |

Locality

Figure 1-1

1.2 Report purpose and structure

This report describes the investigations that have led to the identification of feasible route options, their characteristics and their potential impacts. This report includes the following information:

- Section 1 – Provides introductory information.
- Section 2 – Summarises the strategic transport and planning context.
- Section 3 – Presents the project objectives and design principles.
- Section 4 – Describes the community consultation objectives, consultation activities and issues raised by the community to date.
- Section 5 – Describes the characteristics of the study area, including the main features of the existing environment and the key issues and constraints.
- Section 6 – Describes the feasible route options, the development process and the characteristics of each route option.
- Section 7 – Describes the process for selection of shortlisted route options, assessment criteria and the workshop outcomes.
- Section 8 – Assesses the impacts of the shortlisted route options.
- Section 9 – Describes the next steps in the process to select a preferred route and complete a concept design and EIA.
- Section 10 – Provides the sources of material referenced within this report.

1.3 Overview of study process

The study process for the new Tabulam bridge project involves two stages and numerous tasks as follows:

- Stage 1: Development and assessment of route options:
 - A program of community and stakeholder consultation.
 - Development of project criteria which are based on the project objectives.
 - Development of a long list of route options using a geographic information system, investigations of the study area, other project requirements such as design standards and input from the community.
 - Assessment of the long list of route options against the project objectives and criteria to identify a short list of feasible options.
 - Development and display of a short list of route options.
 - Development of a preferred option based on information collected during targeted fieldwork, issues raised by the community and stakeholders in relation to the options and a value management workshop.
- Stage 2: Assessment and approval of the preferred route:
 - Refinement and display of the preferred option.
 - Concept design and environmental impact assessment of the preferred option.
 - Determination of the project.

This report focuses on Stage 1, up to the development and display of the short listed route options.

1.4 Project details

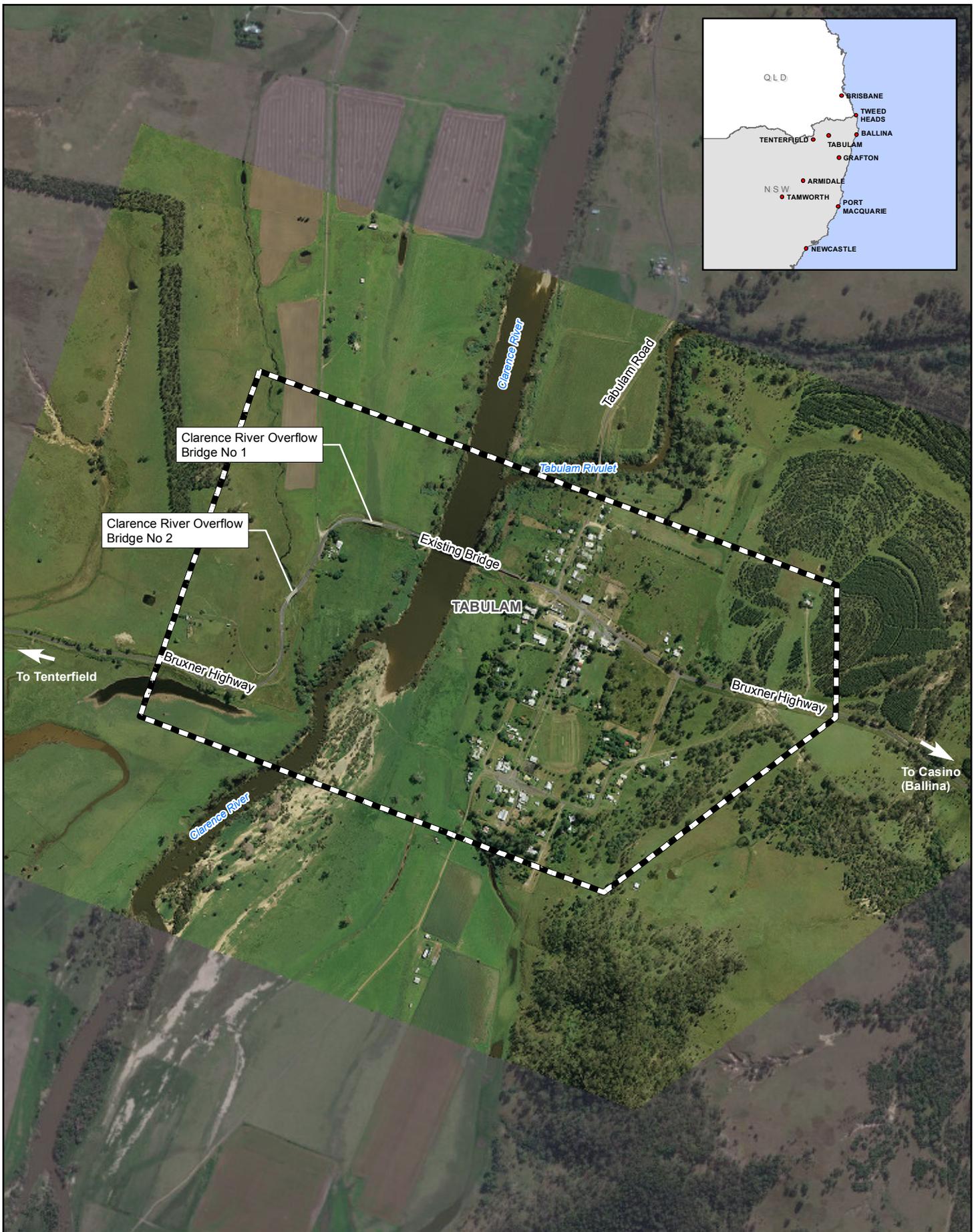
Table 1-1 Project details

Project:	Tabulam New Bridge
Region:	NSW Roads and Maritime Services, Northern Region
Road Name:	Bruxner Highway
Road Number:	HW16
Project Location:	Tabulam NSW
Project Length:	Variable
Council Area(s):	Kyogle Council Tenterfield Shire Council

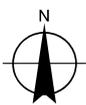
1.5 Study area for the project

The study area for the project is located on the Bruxner Highway incorporating the village of Tabulam and the Clarence River.

A map of the study area for the project is provided as Figure 1-2 below.



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

 Study area

Study Area

Figure 1-2

2 Strategic transport and planning context

This chapter describes the context of the project upgrade in terms of the strategic planning framework. It also identifies the need for the project.

2.1 Strategic transport and planning

2.1.1 NSW Long Term Transport Master Plan

The *Long Term Transport Master Plan* was released by Transport for NSW in December 2012. It identifies the key transport challenges for NSW over the next 20 years to support NSW's development and outlines specific actions to address these challenges. Though not addressed specifically, the proposal to replace the Tabulam Bridge supports targeted measures to reduce stoppages, better use existing road capacity and improve road safety.

The plan makes reference to the Bridges for the Bush program which aims to improve regional connectivity and freight efficiency through the replacement of heritage timber truss bridges with modern structures allowing for Higher Mass Limits (HML) vehicles. The plan recognises the replacement of the bridge over the Clarence River at Tabulam as an important activity for realising its objectives. Further detail on the Bridges for the Bush program is outlined in Section 2.1.6.

2.1.2 State Plan - NSW 2021

NSW 2021: A plan to make NSW number one (NSW Government, 2011) is a 10 year plan with goals and targets to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen the local environment and communities. It replaces the State Plan as the NSW Government's strategic business plan, setting priorities for action and guiding resource allocation. NSW 2021 lists a number of actions to achieve these goals and targets including:

- Reduce travel time.
- Improve road safety.
- Protect our natural environment.

The proposal would assist in achieving the goal of reducing travel times by increasing the capacity of the bridge thereby improving safety and reducing stoppages. Easing transport congestion and reducing travel times is also one of the priority actions in NSW 2021 for improving the efficiency of the State's road network.

The NSW 2021 strategy includes the *Northern Rivers Regional Action Plan (NRRAP)* that aims to deliver the growth of a strong and diversified regional economy, which is carefully managed to ensure the protection of the region's natural features. The NSW Government in partnership with the community has a vision for the region that is:

- Sustainably managed, through the protection of natural resources and the local environment, and recognised for biodiversity, tourism and recreation.
- Socially inclusive, providing appropriate support for all community members by investing in quality health and community services.
- Economically strong, by investing in infrastructure, education and training to drive job growth supporting knowledge-based and clean, green industries.

NRRAP acknowledges the Bridges for the Bush program and the need for the replacement of the bridge over the Clarence River at Tabulam to provide for Higher Mass Limits (HML) semi-trailers.

The proposal to replace the Tabulam Bridge is therefore consistent with NSW 2021.

2.1.3 NSW State Infrastructure Strategy

The *NSW Government State Infrastructure Strategy*, released by the NSW Department of Premier and Cabinet in December 2012, assists in understanding NSW infrastructure needs for the next 20 years, particularly in light of key drivers for infrastructure demand in NSW. The strategy recognises that major arterial roads across the State road network will require improvement and that there will be value in addressing regional connectivity and freight efficiency in the short term.

In this regard, the strategy references the Bridges for the Bush program which aims to improve regional connectivity and freight efficiency through the replacement of heritage timber truss bridges with modern structures allowing for HML vehicles. Though the proposal is not specifically listed in the strategy, it is considered to be consistent with this goal.

2.1.4 Ballina to Tenterfield Corridor Strategy

The *Ballina to Tenterfield Corridor Strategy* provides an overall view of the road transport system from Ballina on the NSW Far North Coast to Tenterfield in the Northern Tablelands. The Bruxner Highway dominates this corridor with the strategy focusing on the 183 kilometre section of this road which carries the majority of traffic, between the Pacific Highway and Tenterfield.

The strategy nominates, whilst recognising its heritage importance, the existing bridge over the Clarence River at Tabulam is a major constraint on the western section of the route and presents very challenging environmental, structural and maintenance issues for Roads and Maritime.

The strategy states that the existing bridge is a physical restriction on access for higher productivity vehicles and acknowledges that managing the heritage of the bridge while catering for any growing and changing traffic demands is a challenge.

Short and long term priorities for the bridge include enhanced road safety, increased freight efficiency, maintenance and improvement of existing road asset and management of the impacts of road traffic in the local environment.

2.1.5 Timber Truss Bridge Conservation Strategy

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

The strategy explains that timber truss bridges are expensive to maintain in terms of planning, approvals, materials, maintenance frequency and skilled resources. The timber truss bridge stock comprise one per cent of Roads and Maritime's bridge inventory but require around 20 per cent of the bridge maintenance budget. This current level of expenditure in timber truss bridges is compromising bridge maintenance and replacement needs across the remainder of the State's bridge stock.

The strategy also recognises the road network plays a key role in the efficient transport of freight. Timber truss bridges are a major limitation in allowing for more efficient road freight vehicles such as those carrying HML. Furthermore is the risk of these bridges to damage due to their intrinsic design which features a structural support frame above the bridge deck. They are generally narrow single lane bridges making their trusses even more vulnerable to damage from trucks.

The bridge over the Clarence River at Tabulam was assessed as part of the strategy. The strategy found that the existing bridge is on a major State highway and cannot be upgraded to meet future operational requirements such as providing for HML vehicles. The existing structure is currently the only impediment to opening the Bruxner Highway to HML semi-trailers between Casino and Tenterfield.

The strategy also found that any form of retention of the bridge would present continuing conservation, operational and financial challenges. The report noted that its conservation would not substantially strengthen the representative sample and would come at a high cost to government.

2.1.6 Bridges for the Bush

In October 2012 the NSW Government committed to improving road freight productivity by replacing or upgrading bridges over the next five years at 17 key locations in regional NSW.

The NSW Government has made a commitment of \$145 million. In August 2012 the NSW Government made a submission to the Australian Government seeking half the funding of the approximately \$290 million program.

One of the priority programs to help manage ageing assets and provide the biggest benefit to freight productivity includes the replacement of six heritage timber truss bridges to modern standards.

The existing bridge over the Clarence River at Tabulam was identified to be replaced with a new structure and the existing structure removed.



Figure 2-1 View to the west of traffic crossing the Tabulam Bridge

2.2 Higher Mass Limits (HML) vehicles

In 2006 the Council of Australian Governments agreed to implement higher mass limits for heavy vehicles with road friendly suspension. A commitment was also made to examine and, if necessary, upgrade sections of highway, bridges and appropriate arterial and local roads. Different levels of HML access are permitted on the road network in NSW according to vehicle type. It is expected that upon completion of the new bridge the Bruxner Highway between Casino and Tenterfield would be open to HML semi-trailers.

Higher mass limits allow semi-trailer operators to increase their total mass from 42.5 tonnes to 45.5 tonnes. In order to operate a HML vehicle in NSW the operator of the vehicle must follow strict management measures. Operators must enrol in the Intelligent Access Program which enables Roads and Maritime to track the locations and speeds of these vehicles to ensure compliance and trucks must have road friendly suspension which reduces damage to the road pavement.

2.3 Need for the project

The existing bridge over the Clarence River at Tabulam is costly to maintain and is considered a major capacity constraint on the Bruxner Highway. The length and width of the bridge allows only a single lane of traffic and thus requires traffic to stop and give way to oncoming vehicles. Additionally the bridge does not have any dedicated pedestrian or cyclist facilities forcing vulnerable road users to share the road with heavy vehicles.

The annual average maintenance expenditure for the bridge over the last 10 years is in the order of \$700,000. Future maintenance costs are likely to increase significantly as the existing critical timber elements, such as trestles, approach the end of their life.

2.4 Implications of doing nothing

The implications of not constructing a new bridge are three fold – reduced safety and transport productivity as well as ongoing maintenance costs.

2.4.1 Safety

The existing bridge is a single lane structure with a width of 4.6 metres between kerbs. The existing trusses show signs of being struck by heavy vehicles and crash data also indicates crashes on the bridge in recent years between vehicles attempting to cross in opposite directions at the same time.

In addition, the bridge does not provide a dedicated and safe provision for pedestrians or cyclists who cross the 300 metre long bridge.

2.4.2 Bridge maintenance

The annual average maintenance expenditure for the bridge over the last 10 years is in the order of \$700,000. Future maintenance costs are forecast to be higher due to critical elements which will need replacement. If funding were reduced there could be the need to place load limits on the bridge, therefore further impacting east-west freight movement through this region.

2.4.3 Transport efficiency

The existing bridge is the only limitation to allowing more efficient semi-trailers to use the Bruxner Highway between Casino and Tenterfield. This has a long term impact on transport productivity and efficiency through this region.

Carrying out bridge maintenance often results in the bridge being closed during the day for extended periods, inconveniencing local and through traffic, in particular heavy vehicles. Figure 2-2 shows a bridge closure notice on the bridge regarding ongoing maintenance. Repeated disruptions can cause a significant reduction in transport efficiency.



Figure 2-2 Periodic maintenance requires closure of the Tabulam Bridge

3 Project objectives and design principles

3.1 Project objectives

The objectives for the project are:

- Enhance road safety for all road users over the length of the project including improving safety for pedestrians and cyclists. Investigate and determine the appropriate treatment for pedestrians and cyclists on the new structure.
- Remove the existing bridge.
- Improve traffic efficiency.
- Improve road transport productivity and reliability.
- Support regional and local economic development including improved opportunity for economic and tourist development for Tabulam.
- Provide a value for money solution.
- Minimise impacts on the natural, social and built environment.
- Coordinate construction traffic to minimise its impact and damage to the existing structure and to make allowance for potential maintenance works that may need to be conducted during the course of this project.
- Involve all stakeholders and consider their interests.
- Consider constructability impacts.
- Consider Work Health and Safety impacts of the project options.

3.2 Design requirements

3.2.1 Design standards

The proposed bridge over the Clarence River, minor bridges, and any approach roads must be designed to comply with the design requirements of the Austroads Standards, Roads and Maritime supplement(s) and AS 5100 for bridge design. An outline of these is as follows.

Table 3-1 Geometric performance and design requirements

Design criteria	Minimum design requirement
Horizontal and vertical alignment	
Design speed	60 km/h
Maximum grade	10%
Road cross section	
Number of travel lanes	2
Travel lane width	3.5 metres
Shoulder width	1.0 metre

Design criteria	Minimum design requirement
Bridges	
Width between kerbs	9.0 metres
Length of bridge (between abutments)	300 - 320 metres
Lane numbers per carriageway and widths	3.5 metre wide lanes with one in each direction

3.2.2 Travel lane configuration

The travel lane configurations used for route option development are based on the design standards and performance requirements described in the section above.

3.2.3 Urban design principles and strategy

As part of the development of the preferred route, urban design themes will be developed and incorporated into the bridge design and road approaches. Local heritage would be referenced and used to inspire character in the new bridge design and create harmony with the local environment and heritage.

Roads and Maritime will investigate, in particular, how an ongoing legacy for the existing heritage bridge can be incorporated into the bridge design or bridge approaches.

Landscaping themes will be examined and incorporated into the available areas on the bridge approaches where possible.

Urban design principles will be guided by the Roads and Maritime, Beyond the Pavement - RMS urban design policy, procedures and design principles, while bridge aesthetics will be guided by Roads and Maritime, Bridge Aesthetics Guidelines.

3.2.4 Option development and assessment process

The route option development process includes several steps:

- Review of existing data including reports, maps and other information available.
- Site familiarisation and site visit including road, bridge and inspections of the study area.
- Preliminary investigations and assessments - to determine the opportunities and constraints for route options.
- Development of preliminary feasible route options and optimisation of route options using road geometry and consideration of constraints and opportunities.
- Shortlisting workshop to review and assess preliminary feasible route options and establish a shortlist of route options worthy of further development and investigation.
- Route options development report and display – where we are now.

4 Community involvement

4.1 Consultation objectives

A community and stakeholder consultation process has been implemented since the project began. The local community has important information on issues and constraints in the study area that can assist with identifying a preferred route for the new bridge.

Stakeholders may also be affected, directly and/or indirectly, by the route options.

The objectives of the community and stakeholder consultation are to:

- Proactively engage with the community and stakeholders as well as local interest groups to ensure concerns and aspirations are considered and directly reflected in the assessment of options for a new bridge.
- Provide feedback to the community about how their input was considered in project decision making processes.
- Build relationships with the community and stakeholders.
- Provide clarity about aspects of the project that are negotiable and non-negotiable.
- Demonstrate an understanding of community and stakeholder concerns and values.
- Provide the community and stakeholders with an opportunity to meet the project team and ask questions to identify issues surrounding the project, and provide feedback.
- Seek ideas, knowledge and encourage attendance at community information sessions and public displays.
- Manage community and stakeholder feedback and complaints in a timely, respectful way.
- Monitor and evaluate stakeholder feedback to measure the appropriateness of consultation methods and review planning and activities as necessary.
- Be transparent in communication, making available to the community and all stakeholders, clear, accurate and up to date information on the planning of a new bridge for Tabulam from the beginning of planning to the end.

4.2 Consultation activities

Activities to date have included:

- A letter to The Householder informing each resident of the project and study area.
- A staffed drop-in session in Tabulam.
- Advertising and media coverage (print and electronic) informing the community of key aspects of the project and opportunities for involvement.
- Provision of a free call community information line (1800 810 680) and e-mail for project inquiries - community.input@ghd.com.
- Meetings/briefings to local councils, Tabulam Chamber of Commerce and special interest groups.

- A Preliminary Feedback Summary report following the initial drop-in session at Tabulam available on the Roads and Maritime project website.
- A dedicated project website.

The route options, along with this report, will be placed on public display for a period of four weeks, and public comment invited. Consultation activities during the display will include distribution of a community update, static displays, a staffed drop-in session in Tabulam and meetings as required with individual property owners potentially affected by the route options.

A selection of community and stakeholder members will be invited to participate in the value management workshop, providing input to a recommendation of a preferred route for the project.

4.3 Issues raised by the community

To supplement the study area announcement and project commencement a community information drop-in session was held on Thursday 15 August 2013 between 3 pm–7 pm at the Tabulam Community Hall. It is estimated that over 60 people attended the session with 59 registered attendees as well as others who did not sign the register. Thirty six feedback forms were returned, with some submitted on the day of the drop-in session and others sent by email or post following the session.

A Preliminary Feedback Summary Report has been prepared and made available on the project website. The report summarises the community feedback received during the initial stages of the project. This feedback has been integrated into the development of and selection of route options, and is summarised below.

4.3.1 Key stakeholders

The following eight groups/organisations were represented by individuals who completed feedback forms:

- Upper Clarence High Country Tourism Association.
- Tabulam State Emergency Service (SES).
- Tabulam & District Chamber of Commerce.
- Tenterfield Shire Council.
- Motorcyclists Australia (MA).
- NSW Farmers Association.
- Bonalbo Show Society.
- West of the Range Historical Society.

4.3.2 Preliminary feedback

The feedback forms circulated at the community information session asked two questions of the community regarding issues for the project team to consider and aspects of the project that were most important to them.

Respondents most frequently identified the following four considerations for the project team to consider when planning for a new bridge:

- Road/pedestrian safety.
- The historical nature of the existing bridge.

- Local flooding issues.
- The location and design of the proposed new bridge.

Respondents most frequently identified the following four aspects of the project that were most important to them:

- Road safety.
- Impact on community.
- Pedestrian safety.
- Heritage.

4.3.3 Petitions

The project team also received two petitions opposing the removal of the existing bridge. The first was received with 162 signatures, and the second as an online petition with 197 comments as of October 2013.

Roads and Maritime acknowledges the heritage significance of the existing bridge and the opposition to its removal by the signatories of these petitions.

All feedback received from the stakeholders and the community, including these petitions, is being considered as planning progresses.

4.3.4 Community feedback and retention of the existing bridge

Roads and Maritime acknowledges there is some community opposition to the removal of the existing bridge over the Clarence River at Tabulam. Roads and Maritime has received this feedback verbally and via two community petitions as outlined above.

This feedback has been carefully considered however due to the ongoing conservation, operational and financial challenges presented by retaining the existing bridge, Roads and Maritime is proceeding with the current project. This includes identifying a replacement bridge location and removal of the existing bridge. Options that were considered for retaining the existing bridge included:

- Retain the existing bridge for pedestrian access only - retaining a pedestrian access bridge would continue to require significant maintenance costs as a footway bridge would still need to be maintained for vehicular traffic to allow for safety inspections and maintenance work. As such, it is considered too costly.
- Retain the bridge for visual aesthetics only until the bridge collapses into the river - retaining the bridge without ongoing maintenance costs would pose significant safety risks to the Tabulam community and river users and is not considered a viable option.
- Retain the existing bridge for its current use - as identified in the *Timber Truss Bridge Conservation Strategy* the existing bridge is expensive to maintain and cannot be upgraded to meet future operational requirements. A new bridge would substantially reduce maintenance costs and provide a new bridge suitable for future needs.

4.3.5 Recognition of the existing bridge

Roads and Maritime is investigating ways to recognise the heritage significance of the existing bridge. Roads and Maritime would like to work with the community to determine the most appropriate ways the bridge could be remembered. An example of how this could be provided is given in Figure 4-1 and Figure 4-2 below in a sketch form. The community is encouraged to provide feedback and ideas.

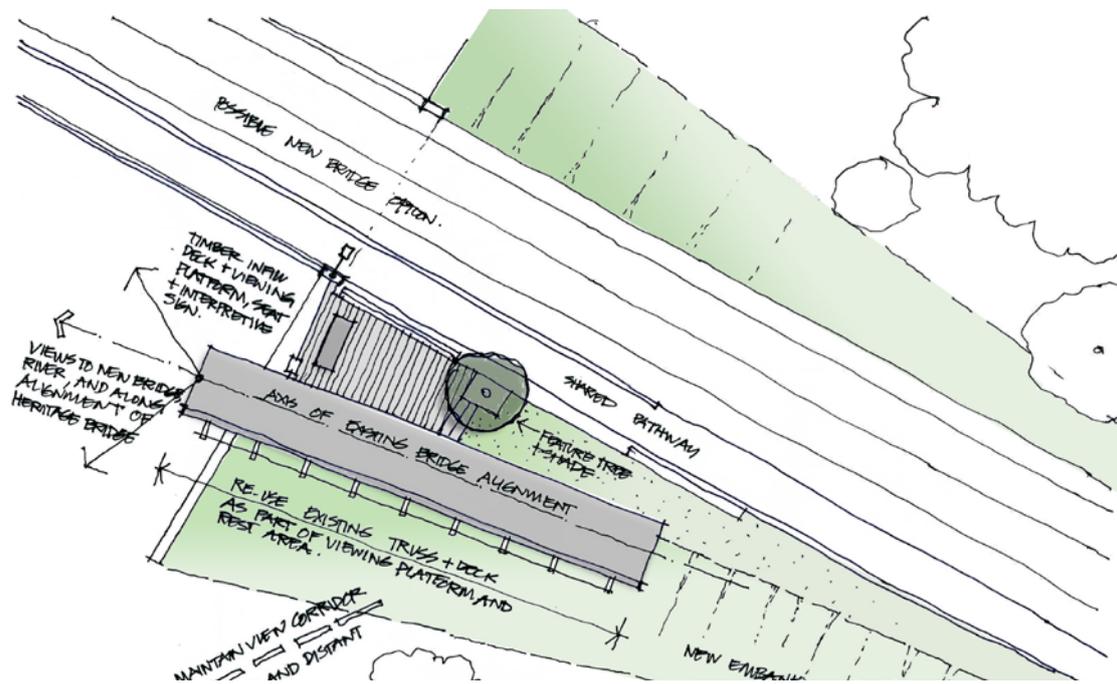


Figure 4-1 Plan view of possible bridge approach treatment

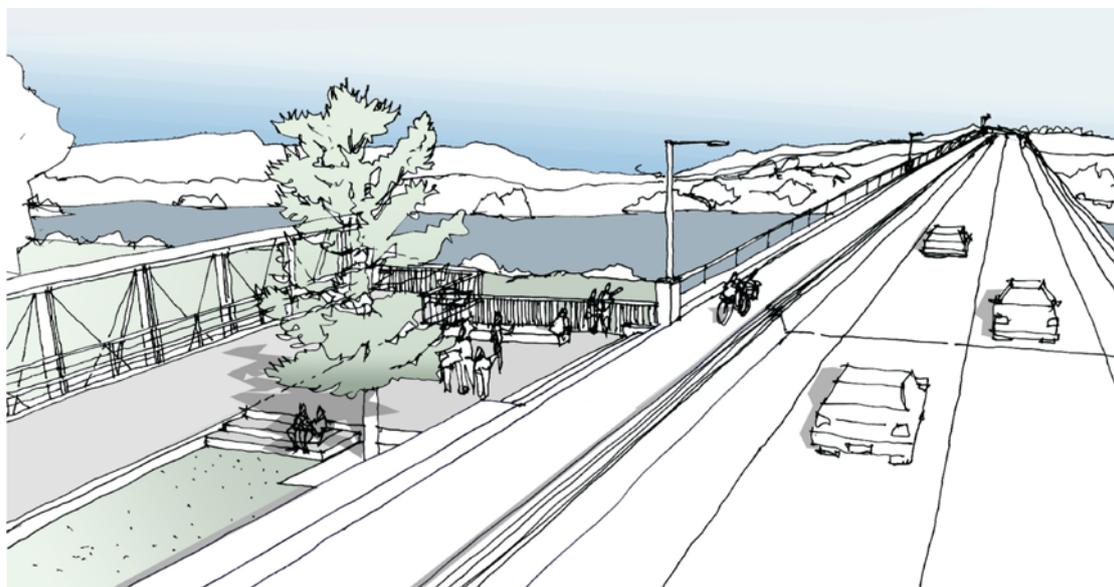


Figure 4-2 Perspective view of possible bridge approach treatment

4.4 Where to from here

The public display of the route options and invitation for comment is an important part of the consultation process. A community update will be sent to the project mailing list and property owners within or near the corridors for each of the shortlisted route options. The update includes a description of the shortlisted route options, details about the displays and explains how to make a submission.

A staffed drop-in session will be held during the display period to enable the community to ask questions about the route options and provide feedback.

Advertising will be used to assist in raising public awareness of the route options displays, where and how people can make a submission on the route options and to provide information regarding the project's contact details.

Following exhibition of the route options, submissions will be reviewed and these will feed into the route selection process.

A further display will publicise the announcement of the preferred route after community, environmental and engineering aspects have been considered. Similar activities to the route options displays will take place during the display of the preferred option.

Consultation activities will continue throughout the process to identify a preferred route, develop a concept design and the preparation of an EIA for project approval.

5 Study area characteristics

5.1 Constraints mapping

Route options were developed and evaluated using a multi-criteria approach. This allows a systematic comparison of a range of options against a set of different parameters that may be quantitative or qualitative. These parameters reflect the project objectives, and encompass social, environmental, engineering/functional and cost issues. Ultimately, this approach assists with the selection of a preferred route.

As part of this multi-criteria, approach information was gathered across environmental, physical and socio-economic fields. Each data set (or layer) was combined into a Geographical Information System to develop the constraints map in a manner as portrayed in Figure 5-1 below. The map is used to identify constraints and opportunities available for the feasible route options. The bridge and road engineering teams utilised the data and the constraints map to develop the initial feasible route options in consultation with the broader project team.

Constraints mapping will be further progressed at the conclusion of detailed field investigations in preparation for the selection of the preferred route.

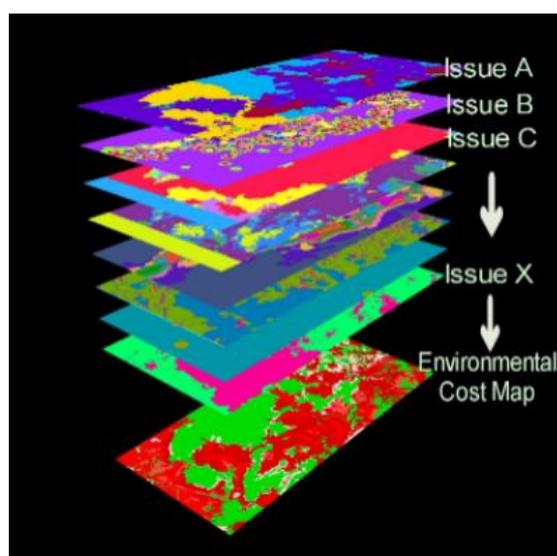


Figure 5-1 Constraints mapping

5.2 Local community

5.2.1 Overview

Tabulam is a rural village in the Northern Rivers region of NSW, where the Bruxner Highway crosses the Clarence River between Casino and Tenterfield. The Clarence River forms the boundary between Kyogle and Tenterfield Shire local government areas (LGA). The town of Tabulam is located to the east of the river, within the Kyogle LGA, whilst other areas which are considered to be part of Tabulam lie to the west of the river within the Tenterfield Shire LGA.

The preliminary socio-economic study has involved a desktop review of available data and information from a number of sources including Australian Bureau of Statistics (ABS) Census 2011 and 2006, documents from Kyogle Council and Tenterfield Shire Council, and information available online.

5.2.2 Socio-economic characteristics

The total population of the Tabulam area was 644 people living in 241 dwellings in 2011. More than a third of the population (224 people) live within Tabulam village statistical area, within the Kyogle LGA according to the ABS 2011 Census. Of the 224 just over 20 per cent of the population live in the nearby Jubullum Village, a local Aboriginal community. Anecdotally the population of Tabulam village is believed to be approximately 110 people.

The Jubullum Village has a much younger population than other parts of Tabulam. With a median age of only 28 years, more than one third of the population (34.5 per cent) is under the age of 18. Single parent families are also common, representing almost three quarters (74.2 per cent) of all families.

Figure 5-2 displays the age profiles for each of the statistical areas that make up Tabulam together with the Kyogle and Tenterfield LGA's. Small areas are defined statistically based on population and geographic locations.

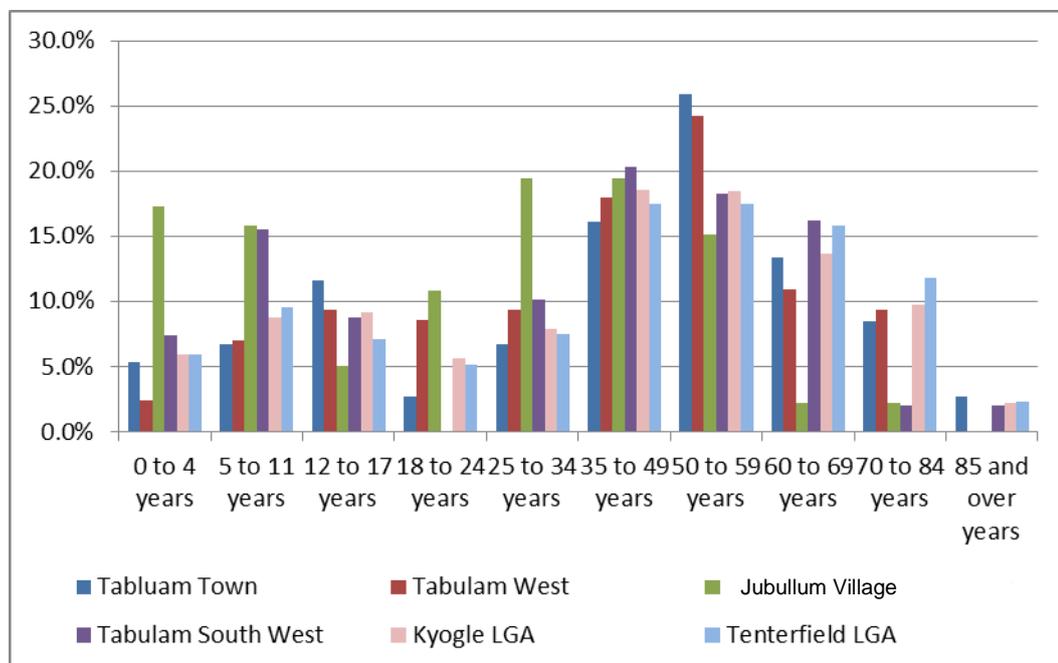


Figure 5-2 Age profile for Tabulam small areas, Kyogle LGA and Tenterfield LGA, 2011 (Source - ABS 2006 and 2011)

The Socio-Economic Indexes for Areas (SEIFA) number shows how disadvantaged or advantaged an area is compared with other areas in Australia. SEIFA are summary measures from 2011 Census information which can be used to explore different aspects of socio-economic conditions by geographic areas. SEIFA draws on both social and economic information, applying a broad definition of relative socio-economic disadvantage in terms people's access to material and social resources, and their ability to participate in society, rather than simple measures of socio-economic status such as income or unemployment alone.

SEIFA scores for Tabulam indicate that all small areas have higher levels of disadvantage than both Kyogle and Tenterfield LGA's. This excludes the Jubullum Village, as SEIFA scores are not available for this locality. In particular, Tabulam West displays a higher level of disadvantage.

Local economy

The main employment categories for residents of Tabulam are agricultural and forestry based industries, representing between 30 and 50 per cent of workers, compared with closer to 20 per cent for both Kyogle and Tenterfield LGA's. The next most common industries are accommodation and food services, public administration and safety, retail trade and construction.

Unemployment levels vary across Tabulam. Tabulam village and Tabulam South West display unemployment rates in 2011 that are comparable to the averages for the LGA's, with rates between six and nine per cent. The unemployment rates for Tabulam West are higher than average for Tenterfield LGA, at 15 per cent compared to 6.8 per cent. Labour force participation is also lower across Tabulam small areas (from 40.1 to 44.4 per cent) than the LGA averages (50 per cent). The Jubullum Village has a labour force participation rate of 16.3 per cent, and unemployment of 35.7 per cent.

Social infrastructure

Limited social infrastructure is available in Tabulam. The town supports a public primary school and playground, pre-school, church, SES and fire facility and a licensed post office. Retail outlets include a newsagent which provides local tourist information, petrol station, general store, café and a hotel. A number of commercial/agricultural services are also located in Tabulam.

The nearest hospital and high school are at Bonalbo, approximately 27 kilometres from Tabulam. Tertiary technical studies are available through TAFE campuses at Casino and Tenterfield.

5.3 Existing highway

5.3.1 Road reserve

The existing road reserve width along the length of the Bruxner Highway within the study area varies in width. Typically the road reserve width between property boundaries is in the order of 30 metres west of the Clarence River, approximately 60 metres immediately east of Clarence River and approximately 40 metres through the Tabulam village.

Preliminary route options in close proximity to the existing bridge would be able to occupy parts of the existing road reserve, limiting the area of property acquisition required.

5.3.2 Carriageway configuration

Existing travel lanes on the Bruxner Highway consist of two 3.5 metre wide sealed lanes with little or no sealed shoulder provided. At the approaches to the existing Tabulam Bridge the carriageway tapers to a narrower width of 4.6 metres, this being the width between kerbs on the bridge.

Due to the existing bridge being only a single lane configuration, the flow of traffic on the bridge is give way controlled at the western end.

5.3.3 Horizontal and vertical alignment

The horizontal alignment west of the Clarence River is a combination of tight bends and lower standard reverse curves. The alignment east of the Clarence River comprises large radius bends and straights. At the western end of the bridge the grade of the existing road drops down to Clarence River Overflow Bridge No 1.

The sign posted speed limit through Tabulam village is 50 km/h.

5.3.4 Intersections and private accesses

Since the existing Bruxner Highway travels through Tabulam village there are a number of private properties fronting the highway. These properties have direct access to the highway.

The major intersections east to west are Lawrence Street, Clarence Street and Tabulam Road east of the bridge, and Clarence River Road west of the bridge.

5.3.5 Structures

Bridge over Clarence River at Tabulam

The existing bridge over Clarence River at Tabulam is primarily a timber structure and has an overall length of about 300 metres, comprising 13 timber approach spans and five composite timber/steel de Burgh truss central spans. The overall width between kerbs is 4.6 metres, accommodating single lane traffic only. The main spans are supported by concrete piers located in the river, whilst the approaches are supported by timber trestles. The bridge is shown in Figure 5-3 below.

The existing bridge deck is above the approximate 1 in 100 year flood level.



Figure 5-3 Existing bridge over the Clarence River at Tabulam – view east

Clarence River Overflow Bridges No.1 and No.2

On the western side of the bridge over the Clarence River at Tabulam there are two concrete overflow bridges. These bridges span the overflow channels of the greater Clarence River flood plain. The lane configuration of the two bridges consists of two 3.5 metre lanes and one metre shoulders. The bridges were open to traffic in the year 2001.

The bridge deck and approach levels for both overflow bridges are below the 1 in 100 year flood level and thus provide a lower flood immunity to the existing bridge over the Clarence River. These bridges are shown in Figure 5-4 below.



Clarence River Overflow Bridge No.1 –
view west



Clarence River Overflow Bridge No.2 –
view west

Figure 5-4 Existing Clarence River Overflow bridges

5.3.6 Road safety audit

This existing conditions (Stage 5) road safety audit was undertaken to identify any safety issues with the existing Bruxner Highway. This audit followed a standard practice structured around the standard safety inspection checklist provided in Austroads' *“Guide to Road Safety, Part 6: Road Safety Audit”* and Roads and Maritime *“Accident Reduction Guide – Part 2: Road Safety Audits”*. The audit was carried out onsite during both day and night and identified a number of minor road safety issues.

5.4 Traffic and transport characteristics

5.4.1 Existing road network and performance

Bruxner Highway

The Bruxner Highway extends from the Pacific Highway near Ballina to the northwest town of Tenterfield. The role of the Bruxner Highway is to provide an important link for the rural communities of the upper northwest of NSW to travel and to transport their products to the wider markets of Casino, Lismore and Ballina.

Tabulam Road

Tabulam Road is a rural local road that provides access to several residential properties in Tabulam and services the localities of Jacksons Flat and Lower Bottle Creek to the north of Tabulam and beyond to Bonalbo, which provides access to a hospital and high school. The road extends to the north from the intersection of Bruxner Highway and generally follows the alignment of Bottle Creek, joins Woodenbong Road which leads to Bonalbo and beyond to Woodenbong. The daily traffic volume provided by Kyogle Council for Tabulam Road is 137 vehicles per day.

Lawrence Street / Court Street / Clarence Street

This combination of local streets are the main local streets in the southern area of the Tabulam village. The roads are all sealed and provide local access to residences and businesses in the town. No traffic count data is available for these local roads. Based on the number of properties serviced, the roads are estimated to carry less than 500 vehicles per day.

Clarence River Road

Clarence River Road is a local road with a narrow sealed surface in poor condition. It intersects the Bruxner Highway approximately midway between the bridge over the Clarence River and the Clarence River Overflow No 2 Bridge and provides access for approximately seven rural properties. Clarence River Road meets the highway at an acute angle, forming a large poorly delineated and partially sealed intersection. No traffic count data is available for Clarence River Road and based on the number of properties serviced, it is estimated to carry less than 50 vehicles per day.

5.4.2 Traffic data

The historical records for two sites on the Bruxner Highway, one approximately 9 km to the west of Tabulam and the other approximately 20 km to the east of Tabulam, show that traffic volumes at each of the stations on the Bruxner Highway are tending to trend slightly upwards. These counts indicate a growth rate at each site of approximately 0.2 per cent per annum.

A traffic count survey was undertaken between August 2013 and October 2013 on the Bruxner Highway at the eastern approach to the existing bridge. The collection of daily traffic volume data was by way of 7 day/24 hour continuous data collection of vehicles passing over automatic traffic counters. The traffic counter device has the capacity to record axle configurations and as such the data collected provides a classification profile of heavy vehicle usage as well as cars.

Table 5-1 presents the average daily traffic volumes for both light and heavy vehicles for a five day week (Monday to Friday only) and for a seven day week (Monday to Sunday).

Table 5-1 Average daily traffic volumes for Tabulam Bridge

Survey Period	Light	Heavy
5 day week (M to F)	1121	148
7 day week (M to S)	1076	128

Points to note from the traffic surveys conducted at Tabulam on the Bruxner Highway in August 2013 are:

- Two way peak volumes for light vehicles are generally between 90 and 100 vehicles per hour over a sustained period from 9 am to 4 pm. Heavy vehicle numbers are also relatively consistent over this time at between 10 and 15 vehicles per hour. The total two way traffic volume over this period ranges from 100 to 115 vehicles per hour.
- Night time (11 pm to 4 am) volumes drop to 10 vehicles per hour or less for both light and heavy vehicles.

- The proportion of heavy vehicles is approximately 12 per cent for the seven day week count.
- The average 85th percentile travel speed is 58 km/hr.

5.4.3 Public transport

The local Tabulam Bus Service operates a local school bus service which picks up children from local homes to be transported to Tabulam Public Schools and Bonalbo Central School. Northern Rivers Bus Lines provide two services daily during week days, from Tabulam to Tenterfield and Casino/Lismore, and a school bus service linking Tabulam with surrounding areas. Northern Rivers Community Transport provides transport for Home and Community Care patients, a regular bus service two days a week to Lismore/Casino, and a service for young people to access recreational activities.

5.4.4 Pedestrians and cyclists

There are no dedicated pedestrian or cyclist facilities on the Bruxner Highway in the study area. Large sections of the Bruxner Highway have no shoulders often with steep drop offs making walking difficult. While considered a rural area there are pedestrian trip generators on the western side of the bridge. A pre-school is sited around 300 metres west of the existing bridge and the Jubullum Aboriginal community village around 3.5 kilometres west of the bridge. Both these sites generate pedestrian trips with previous discussions with Jubullum residents highlighting this issue.

5.4.5 Crash history

In the 5 year period to the end of 2012 there were a total of 2 crashes within the study area. Both crashes occurred on the existing bridge.

5.5 Land use and planning

Land use

The village of Tabulam supports a range of land uses typical of most rural villages of similar size. Refer Figure 5-5 below. Beside residential dwellings, the town supports a public primary school and playground, pre-school, church, SES and fire facility and a licensed post office. Retail outlets include a newsagent which provides local tourist information, petrol station, general store, café and a hotel. A number of commercial/agricultural services are also located in Tabulam.

Surrounding land use is predominately agricultural and forestry. Agricultural pursuits are identified as sheep, cattle and grain farming in the ABS statistics for Tabulam. There is a sand and gravel quarry across the river approximately five kilometres to the southwest of Tabulam.

Planning

Tabulam village has been zoned RU5 Village under the Kyogle Local Environmental Plan (LEP) 2012. The village zone allows for a range of land uses including residential, commercial, industrial, infrastructure and tourism related development. Development must reflect or enhance the local character and identity of the village and should not adversely affect the amenity of the village.

Beyond the village zone, the surrounding land has been zoned RU1 Primary Production under the Kyogle LEP and Tenterfield LEP 2013 respectively. The RU1 zone allows for a range of rural and agricultural development provided it leads to sustainable primary industry production by maintaining and enhancing the natural resource base. Refer Figure 5-5 below.

As the proposal involves road infrastructure facilities and is to be carried out by Roads and Maritime, it can be assessed pursuant to Clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP). Development consent from council is not required.

Relevant environmental planning instruments

Environmental planning instruments relevant to the proposal and study area include:

- State Environmental Planning Policy (Infrastructure) 2007.
- Kyogle Local Environmental Plan 2012 (Kyogle LEP).
- Tenterfield Local Environmental Plan 2013 (Tenterfield LEP).

Local Environmental Plans

The study area encompasses the following zones under each Local Environmental Plan (LEP):

- Kyogle LEP– RU5 Village, RU1 Primary Production.
- Tenterfield LEP– RU1 Primary Production.

Permissibility of proposal against Kyogle LEP 2012 and Tenterfield LEP 2013

The relevant zone objectives and provisions of the LEPs are addressed below.

Table 5-2 LEP zone objectives and provisions

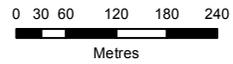
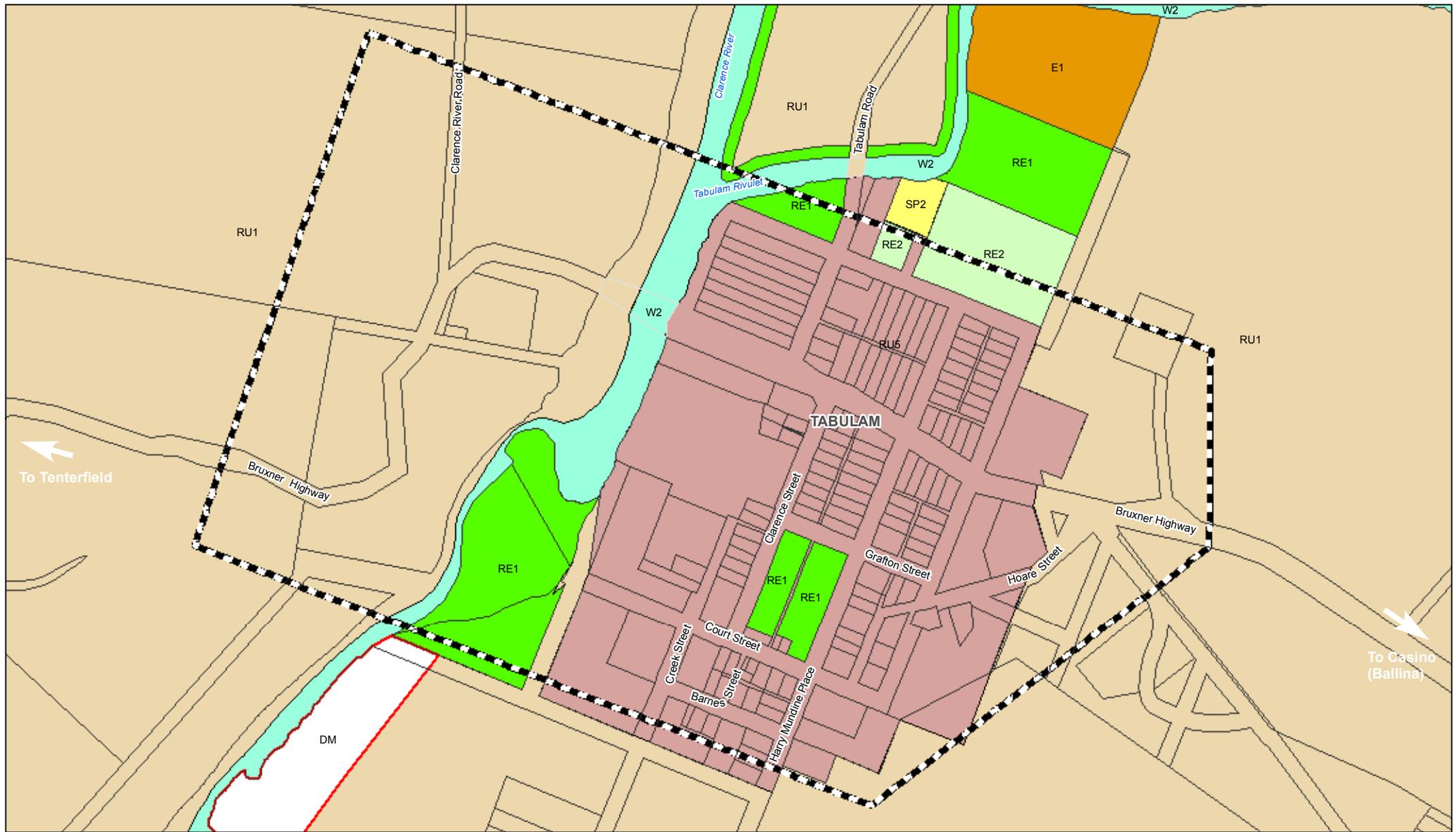
LEP/Zone	Objectives/ requirements	Permissibility/ comments
Kyogle LEP		
RU5	<p>To provide for a range of land uses, services and facilities that are associated with a rural village.</p> <p>To promote development in existing villages that reflects or enhances their local character and identity.</p> <p>To ensure that the amenity of existing developments is not adversely affected by new development.</p>	'Roads' permitted with consent

LEP/Zone	Objectives/ requirements	Permissibility/ comments
RU1	<p>To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.</p> <p>To encourage diversity in primary industry enterprises and systems appropriate for the area.</p> <p>To minimise the fragmentation and alienation of resource lands.</p> <p>To minimise conflict between land uses within this zone and land uses within adjoining zones.</p> <p>To ensure that the productive capacity of agricultural land is appropriately recognised and managed.</p>	'Roads' permitted with consent
Clause 5.10 - Heritage conservation	<p>Development consent is required for any of the following:</p> <p>(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):</p> <p>(i) a heritage item,</p> <p>(ii) an Aboriginal object,</p> <p>(iii) a building, work, relic or tree within a heritage conservation area,</p> <p>(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,</p> <p>(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,</p> <p>(d) disturbing or excavating an Aboriginal place of heritage significance,</p> <p>(e) erecting a building on land:</p> <p>(i) on which a heritage item is located or that is within a heritage conservation area, or</p>	<p>Tabulam bridge is listed under Schedule 5 - Environmental Heritage of the LEP.</p> <p>Consent would be required to demolish the bridge.</p>

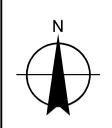
LEP/Zone	Objectives/ requirements	Permissibility/ comments
	(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance, (f) subdividing land: (i) on which a heritage item is located or that is within a heritage conservation area, or (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.	
Tenterfield LEP		
RU1	To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. To encourage diversity in primary industry enterprises and systems appropriate for the area. To minimise the fragmentation and alienation of resource lands. To minimise conflict between land uses within this zone and land uses within adjoining zones.	'Roads' permitted without consent

Approval pathway

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 involves road infrastructure facilities and is to be carried out by the Roads and Maritime, it can be assessed under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). Development consent from council is not required.



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|------------------------|---------------------------------------|------------------------|---------------------------|
| Study area | E1 National Parks and Nature Reserves | RU1 Primary Production | W2 Recreational Waterways |
| Cadastral | RE1 Public Recreation | RU5 Village | DM Deferred matters |
| RE2 Private Recreation | SP2 Infrastructure | | |

Legislation

A preliminary review of relevant legislation is as follows:

NSW Heritage Act 1977

The Heritage Act 1977 is administered by the NSW Heritage Council and its purpose is to ensure that the heritage of NSW is adequately identified and conserved. The Heritage Act 1977 is concerned with all aspects of conservation ranging from the most basic protection against damage and demolition, to restoration and enhancement.

Under Section 57 of the Heritage Act 1977, a permit must be obtained for works, which have the potential to interfere with a heritage item or place, which is either listed on the State Heritage Register or the subject of an interim heritage order. The existing Bridge over the Clarence River at Tabulam is listed on the State Heritage Register.

As previously detailed in Section 2.1.5 of this report, the existing bridge over the Clarence River at Tabulam was identified to be replaced with a new structure as part of the Timber Truss Bridge Conservation Strategy and the existing structure demolished.

Pursuant to Section 38 of the Heritage Act, the Minister may, after considering the recommendation of the Heritage Council on the matter, direct the removal of a listing from the State Heritage Register. The existing bridge will therefore require delisting from the State Heritage Register in accordance with Section 38 in order for the proposal to proceed.

NSW Threatened Species Conservation Act 1995 (TSC Act)

The TSC Act lists a number of threatened species, populations or ecological communities to be considered in deciding whether an activity is likely to have a significant impact on threatened biota, or their habitats. If an impact is considered likely, an assessment of significance that addresses the requirements of Section 5A of the EP&A Act must be completed to determine the significance of the impact. If the impact is significant, a species impact statement (SIS) would be required. The requirements to be addressed in the SIS are described in section 110 of the TSC Act.

NSW Fisheries Management Act 1994 (FM Act)

The FM Act requires a permit is sought for certain works including dredging or reclamation works that block fish passage or harm marine vegetation.

Pursuant to section 199 of the FM Act, a public authority (other than a local government authority) must, before it carries out or authorises the carrying out of dredging or reclamation work, give the Minister written notice of the proposed work, and consider any matters concerning the proposed work that are raised by the Minister within 28 days after the giving of the notice (or such other period as is agreed between the Minister and the public authority).

National Parks and Wildlife Service Act 1974 (NPW Act)

Aboriginal cultural heritage in NSW is protected under the NPW Act. An assessment of the presence and potential impact on sites or items of Aboriginal cultural heritage will be undertaken. If a site or object will be impacted by the proposal, an Aboriginal heritage impact permit (AHIP) will be required to be sought under Section 90A of the NPW Act.

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land.' If the Australian Government deems the proposal a 'controlled action' approval would be required under this Act.

Commonwealth Native Title Act 1993

If native title has been granted over the study area under the Native Title Act, consultation with the native title holder or claimants must be undertaken. A search of the National Native Title Tribunal has found that there is a pending application for native title over the study area. This claim is under further investigation by the heritage sub-consultants.

Relevant determining authorities

Determining authorities for approval under the Acts described above are as follows:

- NSW Heritage Act 1977 – NSW Heritage Branch, Office of Environment and Heritage.
- TSC Act – Office of Environment and Heritage.
- FM Act – Department of Primary Industries, Fishing and Aquaculture.
- NPW Act – Office of Environment and Heritage.
- EPBC Act - Australian Government Department of Sustainability, Environment, Water, Population and Communities.
- Native Title Act 1993 – National Native Title Tribunal.

5.6 Heritage

5.6.1 Aboriginal heritage overview

Traditionally, the Tabulam region is a land of the Bundjalung people and is culturally significant, with the Koori place name of Tabulam meaning "the originals".

European settlement of Tabulam resulted in the forced relocation of many of the Bundjalung people from areas in and around Tabulam to a nearby Aboriginal reserve, which later became a mission. This area is now known as the Jubullum Village, located approximately 3.5 kilometres west of the Tabulam Township (DECC 2007).

The Jubullum Flat Camp Aboriginal Area (managed by NSW National Parks, approximately 0.5km north of Tabulam village) is also a culturally significant site for the Bundjalung people.

5.6.2 Aboriginal Heritage Information Management System search

Aboriginal Heritage Information Management System (AHIMS) data indicates one Aboriginal site in the study area. This is a burial site, reference number AHIMS #03-06-0009.

The burial site named Tabulam 1 was registered with NSW NPWS in 1967. The site is 'place marked' as being located in Lawrence Street at the base of the ridge slope at the eastern end of the study area and the Tabulam village. The ridge slope containing the burial location comprises the eastern sector of the study area bounded by the Bruxner Highway, Lawrence Street and the ridge crest.

Predictive archaeological modelling of Aboriginal cultural heritage was undertaken to assist in the assessment of preliminary route options. The predictive mapping utilised AHIMS search results, a literature review, topographic features and land use history to classify areas of Aboriginal heritage importance. Figure 5-6 shows areas of Aboriginal archaeological sensitivity.

5.6.1 Non-Aboriginal heritage

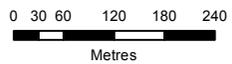
Searches of non-Aboriginal heritage registers identified nine heritage listings for the Tabulam area, all of which are located within a 1.8 km radius of the study area. Tabulam Racecourse, Tabulam Cemetery and Tabulam Old Cemetery are located outside of the study area with the remaining 6 items located within Tabulam village. The existing bridge over the Clarence River at Tabulam is listed on the State Heritage Register. The remaining five heritage items are locally significant and listed in the Kyogle LEP 2012. They include Chauvel Park, St Johns Church, Hotel, Post Office and the Police Station.

Figure 5-7 below indicates the various locations for non-Aboriginal heritage.

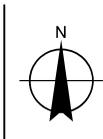
In addition to the items listed above the preliminary inspection noted two stone and plaque memorials at Harry Mundine Place and Chauvel Park installed by the West of the Range Historical Society.

Literary research found that a large boulder and burial was placed on the bank of the Clarence River to commemorate the death of William May and William Sloman, drowned in the 1863 flood (Wilkinson n.d.: 36-37). The location of the memorial is south of the Tabulam village and outside the study area.

On the western side of the Clarence River south of the Pre-School, adjacent to the Bruxner Highway, there is a boulder with a plaque noting the now demolished house for Harry Lasseter, of Lasseter's Lost Reef fame. This memorial is in the study area.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56

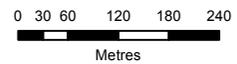
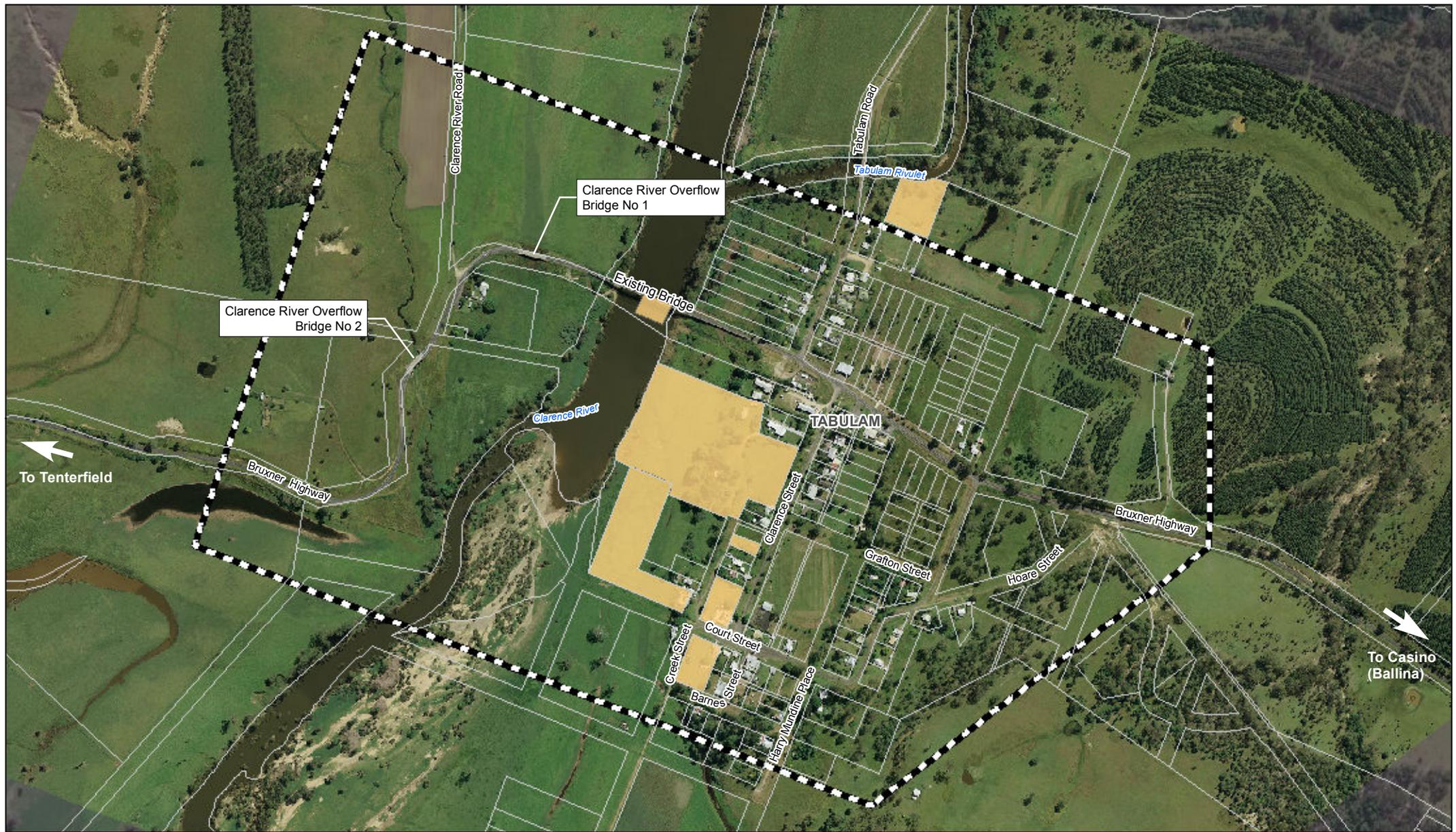


LEGEND

- Study area
- Aboriginal Site
- Burial
- Predicted Risk High
- Predicted Risk Moderate
- Predicted Risk Low - Moderate

Aboriginal Sites and Predictive Mapping

Figure 5-6



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND

-  Study area
-  Cadastre
-  Non-Aboriginal Heritage

Non-Aboriginal Heritage

Figure 5-7

5.7 Visual amenity

5.7.1 Local context and setting

Tabulam is a rural village with the main part of the village located east of the Clarence River and located within the Kyogle Council LGA. Tabulam has a range of services including a public school, post office, grocery store, police station and community facilities. There are also a number of recreation/open space areas within the village and adjoining the Clarence River.

Tabulam village is generally bordered by the Clarence River to the west, the south eastern extent of the Tabulam Rivulet to the north and gentle rolling hills to the south east. Tabulam is also located to the west of the Clarence River in the Tenterfield LGA. This area mainly includes rural properties with the exception of the Tabulam and District Community Preschool.

Tabulam lies on a large floodplain associated with the Clarence River, which generally flows in a southerly direction in the vicinity of the study area. Part of the village is subject to inundation from the Clarence River.

5.7.2 Landscape character zones

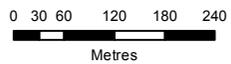
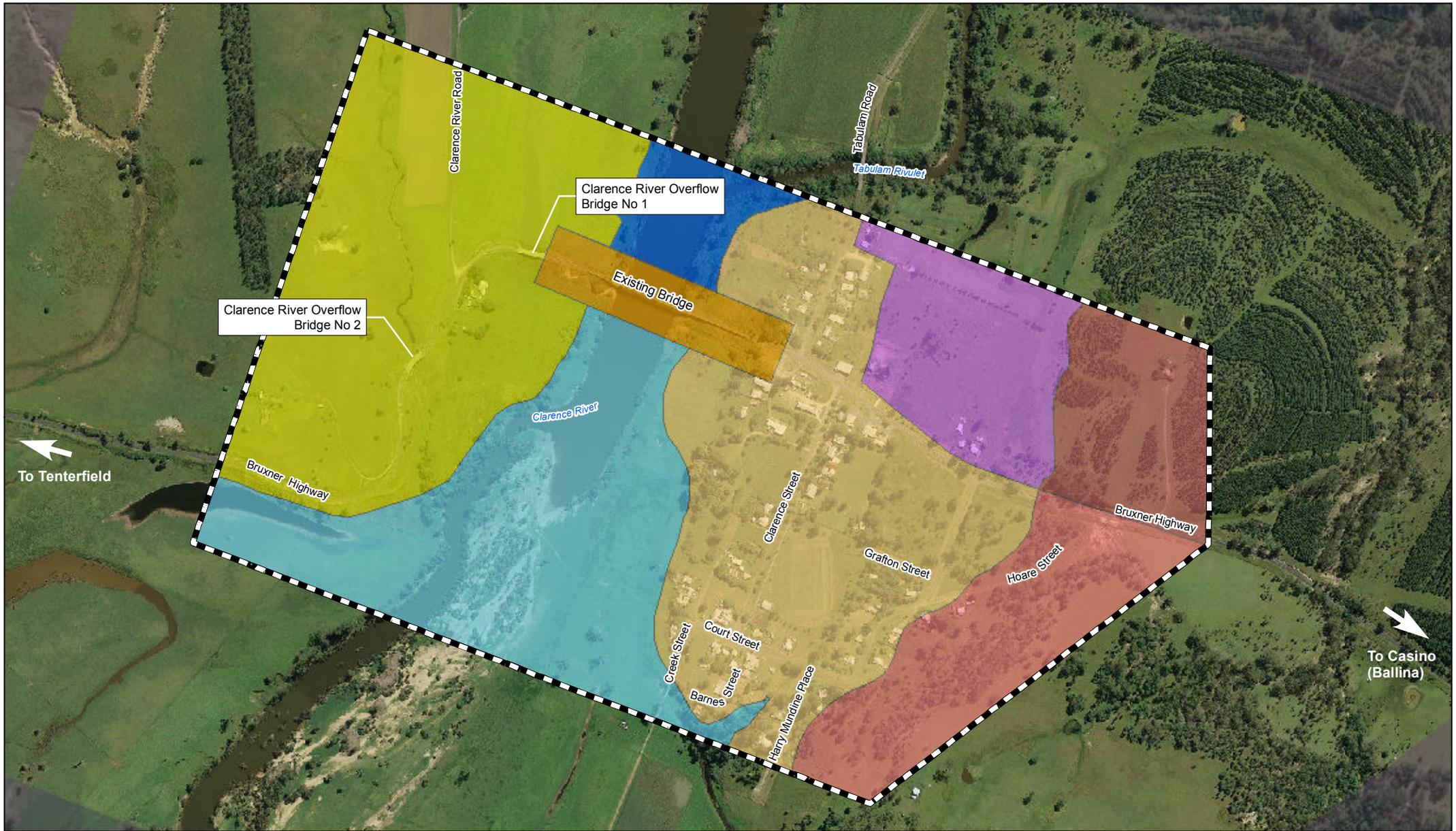
A series of landscape character zones (LCZ) were identified that have a distinct character resulting from a similar combination of urban and landscape features that include landform, built form, vegetation and land use for the study area.

The landscape character zones include:

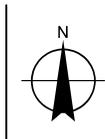
- LCZ 1 - Existing bridge and curtilage.
- LCZ 2 - Tabulam village.
- LCZ 3 - Lower river flood plain.
- LCZ 4 - Upper river reach.
- LCZ 5 - Saleyards/rural west.
- LCZ 6 - Golf course/rural transition.
- LCZ 7 - Rural east.
- LCZ 8 - Currabubula Hill/rural lands.

A preliminary assessment has been undertaken to measure the impact of the proposal on the landscape character zones with these incorporated into the preliminary route option evaluation process. LCZ1 and LCZ2 are assessed as having a high impact with the effect of LCZ2 based on a variance in new bridge alignment. LCZ3 to LCZ8 are assessed as a high to moderate impact due to the viewpoints downstream of the existing bridge.

Refer to Figure 5-8 for landscape character zones.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND



Study area

Visual Landscape Zones

- LCZ 1 - Existing bridge and curtilage
- LCZ 2 - Tabulam Village

LCZ 3 - Lower River Flood Plain

LCZ 4 - Upper River Reach

LCZ 5 - Saleyards / Rural West

LCZ 6 - Golf course / Rural transition

LCZ 7 - Rural East

LCZ 8 - Currabubula Hill / Rural

Visual Landscape Zones

Figure 5-8

5.8 Noise, vibration and air quality

5.8.1 Noise and vibration

The study area comprises residential dwellings and other sensitive receivers such as a school and pre-school. The majority of the study area is already subject to some noise from the Bruxner Highway with little other noise generating sources located within the area.

Noise from road related activities includes construction of new highways, noise from heavy vehicles and from individual vehicles fitted with modified exhaust systems.

Further noise assessment will be undertaken when a preferred route is chosen and as part of the EIA. Construction noise will be assessed in accordance with the Interim Noise Construction Guideline (DECCW 2009). Noise from the operation of the proposal would be assessed using the NSW Road Noise Policy (DECCW 2011). The NSW Road Noise Policy sets noise assessment criteria for road traffic noise based on protecting amenity and wellbeing.

Impacts due to vibration would be managed in accordance with *Assessing Vibration – Technical Guide* (DEC 2006).

5.8.2 Air quality

A review of the National Pollutant Inventory revealed that there are no scheduled industries operating within the study area. The nearest scheduled industries are approximately 55 kilometres east in Casino. Since the study area is remote from any major 'airshed'-sized sources of air pollution, ambient air quality pollution levels can safely be assumed to be low (zero at below detection limits or negligible).

The transport and dispersion of air emissions from the proposal will be influenced by the rain and wind climate experienced within the study area. Vehicle emissions should be considered the same for all options.

Construction activities have the potential to result in dust emissions which may impact on nearby sensitive receivers, in particular residences. Wherever ground is disturbed, or spoil is handled, there is the potential for the generation of dust.

Individual assessment of the air quality impacts of each of the route options has not been undertaken at this stage.

5.9 Biodiversity

The majority of the study area has either been urbanised in the Tabulam village or disturbed by agriculture. However the options cross the banks of the Clarence River which has a potential for impacts on either flora or fauna in this area.

Desktop investigations and assessment have been undertaken for the study area. The following data sources were reviewed:

- Atlas of NSW Wildlife for species listed under the NSW Threatened Species Conservation Act, 1995 (TSC Act).
- Protected Matters Search Tool for matters of national environmental significance listed under the Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act).
- NSW Department of Primary Industries for records of threatened species listed under the Fisheries Management Act, 1994 (FM Act).

The desktop review indicates that a number of TSC Act and EPBC Act listed species have either been recorded or are predicted to occur within a 10 kilometres search area. Based on the desktop assessment and previous records, it is possible that a number of these species could occur on (or utilise) the site, at least on a temporary, seasonal or transient basis. In particular, it is possible that individuals of threatened microbat species utilise the space underneath the existing bridge for roosting and the riparian vegetation and open water of the Clarence River for foraging.

Both the Eastern Freshwater Cod (FM Act) and Black-necked Stork (TSC Act) have been recorded previously in this section of the Clarence River, and are likely to occur in the study area. The Brush Tailed Phascogale is also likely to occur within the study area. Several threatened flora species also have the potential to occur within the study area including the Creek Triplarina which is endangered and only found in a few locations such as watercourses near Tabulam.

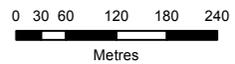
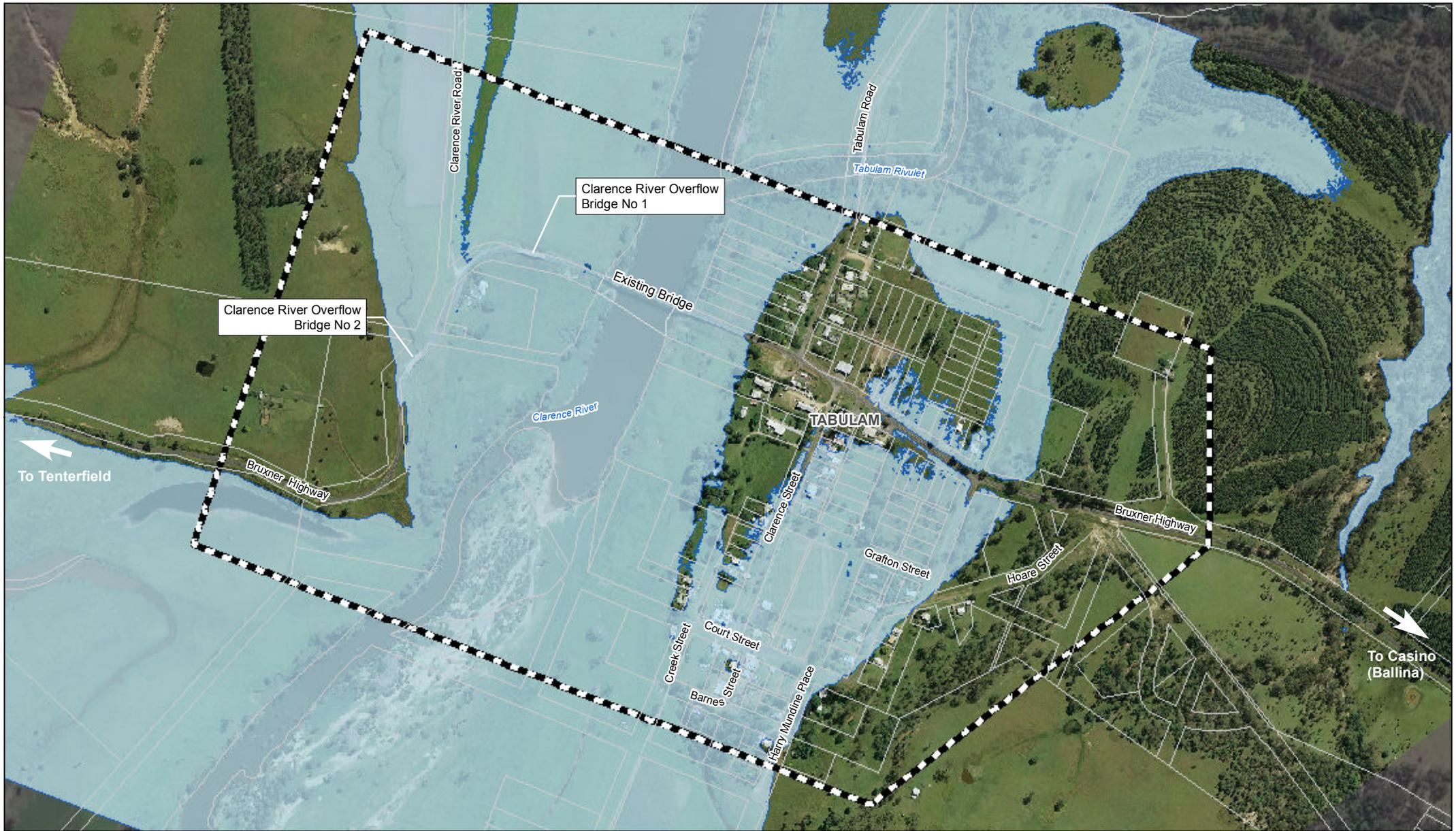
5.10 Hydrology and hydraulics

A flood level frequency analysis utilising historical rainfall and flood level data indicates that the 100 year Average Recurrence Interval (ARI) flood level of 128.2 metres Australian Height Datum (AHD) should be adopted at the alignment of the existing bridge. The ARI is a statistical estimate of the average period of time (in years) between the occurrences of a specified flood. For example, a 100 year ARI flood is a flood that occurs (or is exceeded) on average once every 100 years.

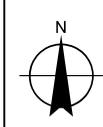
The existing bridge over the Clarence River at Tabulam has a deck level of approximately 129.0 metres AHD which corresponds to an immunity of approximately 130 year ARI.

The approximate flood immunities of Clarence River Overflow Bridges No 1 and 2 is 33 years and 40 years ARI respectively.

A more detailed hydraulic model will be prepared as the bridge design assessment is advanced. Refer to Figure 5-9 for the extent of the 100 year ARI flooding around the Tabulam village.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND

- Study area
- 100 year Flood Level (Approximate)
- Cadastre

Flooding 100yr ARI

Figure 5-9

5.11 Water quality

The NSW Government conducts discreet and continuous water quality monitoring throughout NSW with the nearest data for the Clarence River collected around Grafton. These sites are approximately 90 kilometres to the southeast of the study area, therefore are of limited value.

Review of aerial photography for Tabulam did not identify any potential point sources of water pollution, such as effluent pipelines draining into the river or riverbank developments, within the study area. There is an auto repair workshop close to the river within the township.

Tenterfield Shire Council and Kyogle Council were not aware of any sites of potential groundwater pollution.

Further water quality assessment will be undertaken as part of the EIA process.

5.12 Geotechnical

Tabulam lies within the geological setting of the Clarence-Moreton basin. Metallogenic resources indicate that the Tabulam area is underlain by Quaternary alluvium along the Clarence River, and the Gatton Sandstone unit of the Marburg Subgroup. Details of these units are as follows.

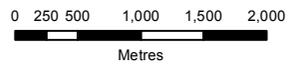
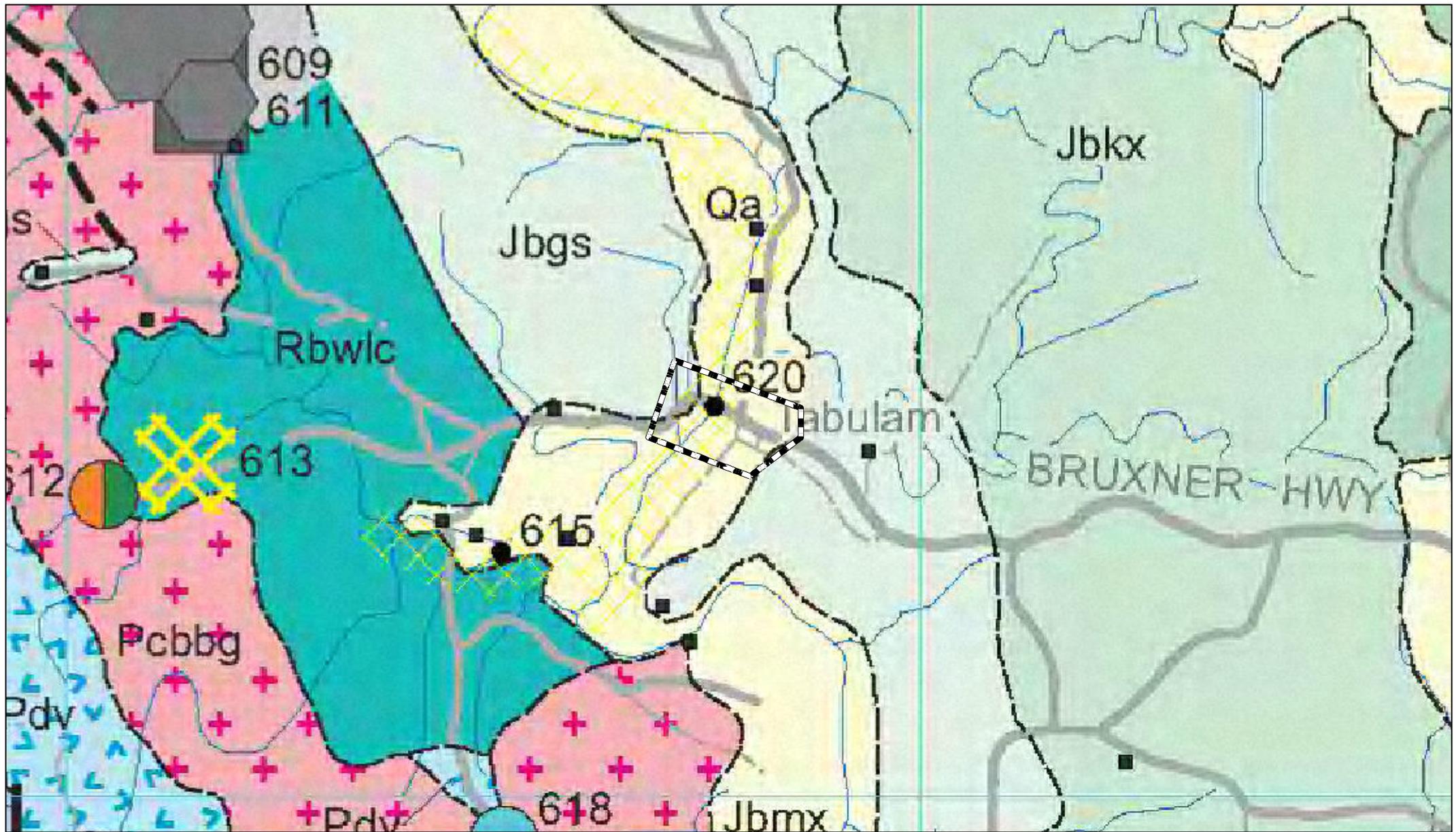
- Quaternary alluvium (Qa), dominates the study area featuring “undifferentiated alluvial deposits of sand, silt, clay, gravel and some residual colluvial deposits”.
- Gatton Sandstone (Jbgs), may be present within the eastern side of the study area, featuring “thin to thick bedded, coarse to medium grained feldspathic to lithic feldspathic sandstone with clay matrix, subordinate intervals of granule, pebble and minor cobble polymictic conglomerate with abundant ferruginised fossil wood logs and fragments”.

Limited existing hydrological information is available for the study area with alluvial soils observed at variable depths, underlain by sandstone bedrock.

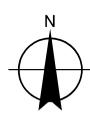
No acid sulphate soil risk maps are available of the study area. The potential for acid sulphate soils (ASS) is considered low, considering that the elevation of the study area is in the order of 130 metres AHD and ASS are usually located in coastal areas at an elevation of less than 10 metres AHD.

Being on an alluvial plain, potential construction material sources in the immediate vicinity of the town are limited, with the majority of historical and current extractive industries focused on gold and silver production. Topographical maps identify a small number of potential material sources in the area with the closest identifiable commercial sources for construction material predominantly centred on Casino, 55 kilometres to the east.

Refer to Figure 5-10 for geotechnical characteristics for the Tabulam area.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND



Study area



Qa Alluvial plain



Rbwlc Laytons Range Conglomerate



Pcbbg Bruxner Monzogranite



Jbgs Gatton Sandstone



Jbkx Koukandowie Formation



Pdv Drake Volcanics

5.13 Public utilities

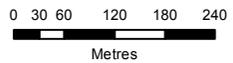
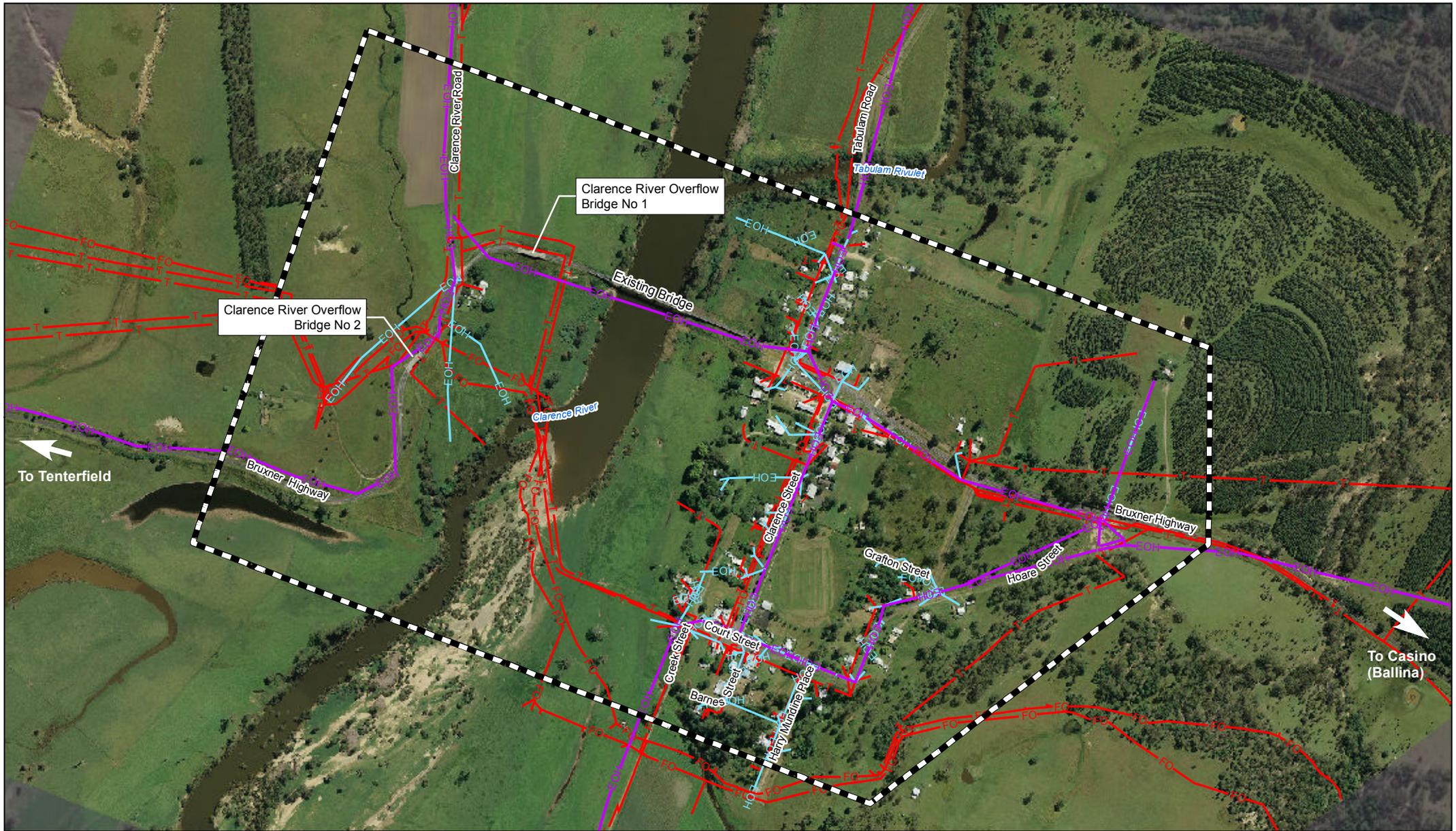
The preliminary public utilities assessment indicates that there are Essential Energy and Telstra assets within the study area.

Essential Energy assets were identified as being dispersed through the study area. The assets are generally confined to the township extents and road reserves. An overhead 11kV transmission line crosses the Clarence River just south of the existing bridge.

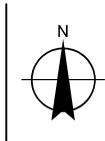
Telstra plans indicate underground utilities dispersed throughout the study area. In general, the utilities follow the alignment of roads within the immediate township area and are confined to the road reserve. Major optic fibre cables are present within the study area crossing the Clarence River cross section. The alignment extends from the south of the village to near the Pre-school on the western bridge abutment, before continuing further west beyond the study area.

It is understood that an unincorporated body, the Tabulam Water Board, operates a pump supplying water to an unknown number of properties. This pump is located on the Clarence River with access to the pump from Court Street. The details for this pump, the associated pipe work and network are unknown at this stage.

Tenterfield Shire Council and Kyogle Council indicated that there are no reticulated water or sewer assets at Tabulam. Refer to Figure 5-11 below.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND



Study area

EOH 11kV Electricity

Telstra

EOH Low Voltage Electricity

FO Optic Fibre

Utilities

Figure 5-11

6 Route options development

6.1 Process for development of the route options

The route option development process includes several steps.

- Review of existing data including reports, maps and other available information.
- Site familiarisation and site visits including road, bridge and study area inspection.
- Preliminary investigations and assessments to determine the opportunities and constraints for route options.
- Development of preliminary route options and optimisation of route options using road geometry and consideration of constraints and opportunities. Once route corridor options were developed, preliminary engineering alignments were fitted to these corridors based on design standards and performance requirements.
- Shortlisting workshop to review and assess preliminary route options and establish a shortlist of route options worthy of further development and investigation.
- Route options development report and display – where we are now.

6.2 Long list of potential route options

A wide range of preliminary route options have been developed within the study area and are shown in Figure 6-1. The preliminary route options have been numbered from north (upstream) to south (downstream) from Option 1 to Option 11. For the purposes of comparing the options a 20 metre wide road corridor has been assumed for each option.

With the exception of Option 4, all options would require the existing bridge over the Clarence River to be kept in service until the new bridge is constructed and commissioned for traffic. Once the new bridge is completed and traffic has been switched over the existing bridge would be demolished and the site remediated.

Option 4 proposes the replacement of the existing bridge on the same alignment and requires the construction of an all-weather side track and installation of a temporary low-level crossing before the existing bridge can be demolished and new bridge construction can commence.

Each of the preliminary route options is described as follows.

Option 1

Option 1 traverses around the northern edges of the Tabulam village. It starts on the Bruxner Highway on the western side at the intersection with Clarence River Road and extends to the north of existing Clarence River Overflow Bridge No 1 before turning and crossing the Clarence River at an angle. Option 1 uses a small section of Charles Street road corridor before re-joining the Bruxner Highway east of town at the Hoare Street intersection. A new intersection where it crosses Tabulam Road would be required. This option uses only one of the existing overflow bridges (No 2) on the western approach and will require construction of a new overflow bridge No 1. Property acquisition is required on both sides of the river and there is the possible acquisition of one residence.

Option 2

Option 2 starts on the Bruxner Highway on the western side at the intersection with Clarence River Road, crossing the Clarence River to the north and parallel to the existing bridge. The alignment then converges and re-joins the existing Bruxner Highway at the Clarence Street intersection. Reconstruction of the Tabulam Road intersection is required. This option uses only one of the existing overflow bridges (No 2) on the western approach and would require construction of a new overflow bridge No 1. Property acquisition is required on both sides of the river.

Option 3

Option 3 utilises both overflow bridges on the western side of the river and crosses the Clarence River to the north of the existing bridge before connecting into the existing Bruxner Highway at the Clarence Street intersection. The bridge alignment is curved to allow it to connect to the highway either side of river whilst providing a sufficient lateral clearance to the existing bridge. Reconstruction of the Tabulam Road intersection is required. This option requires a short connection on the western side to join into the existing No 1 overflow bridge. Minor property acquisition is required for this option on both sides of the river.

Option 4

Option 4 utilises the existing bridge alignment and highway approaches. As this option is in the same location as the existing bridge it would require the removal of the existing bridge before construction of the new bridge could commence. To allow traffic to continue to use the Bruxner Highway a detour or all-weather side track, including a temporary low level bridge over the Clarence River would be required to be constructed prior to removing the existing bridge. The location of the detour could impact on local streets on the eastern side of the river through Tabulam. No property acquisition is required for this option, but leasing of land for the detour may be required.

Option 5

Option 5 is a mirrored version of Option 3, crossing the Clarence River to the south of the existing bridge. This option is also a curved bridge structure to utilise the most eastern overflow bridge and connects into the existing Bruxner Highway on the eastern side at the Clarence Street intersection. Reconstruction of the Tabulam Road intersection is required. Minor property acquisition is required on the western side of the river.

Option 6

Option 6 starts on the Bruxner Highway on the western side at the intersection with Clarence River Road, crossing the Clarence River on the southern side and parallel to the existing bridge and connects into existing alignment at the Clarence Street intersection. Reconstruction of the Tabulam Road intersection is required. This option uses only one of the existing overflow bridges (No 2) on the western approach and will require construction of a new overflow bridge No 1. Property acquisition is required on the western side of the river.

Option 7

Option 7 starts on the Bruxner Highway on the western side at the eastern abutment of the Clarence River Overflow Bridge No 2 and traverses the land to the south of the preschool before crossing the Clarence River at an angle, connecting back to the existing Bruxner Highway at the Clarence Street intersection. A new overflow bridge No 1 is required on the downstream side of the existing overflow bridge. Reconstruction of the Tabulam Road intersection is required along with a new intersection to provide connection to Clarence River Road and the preschool. Property acquisition is required on the western side of the river.

Option 8

Option 8 starts on the Bruxner Highway on the western side at a bend west of the Clarence River Overflow Bridge No 2 and traverses the land to the south of the preschool before crossing the Clarence River at an angle, connecting back to the existing Bruxner Highway at the Clarence Street intersection. Reconstruction of the Tabulam Road intersection is required along with a new intersection to provide connection to Clarence River Road and the preschool. This option is the most direct of the southern options but would require a longer length of new road construction and two new Clarence River overflow bridges. Property acquisition is required on both sides of the river

Option 9

Option 9 starts on the Bruxner Highway further west than Option 8 and crosses the Clarence River at an angle at a wider river cross section, aligning with an extension of Grafton Street that separates the school and football field before converging and re-joining the Bruxner Highway east of the town limits and Hoare Street. New intersections would be required at Clarence and Lawrence Streets and on the western side to provide connection to Clarence River Road and the preschool. One long bridge would be required to replace the overflow bridges and the existing bridge. Property acquisition is required on both sides of the river and there is the possible acquisition of one residence.

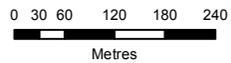
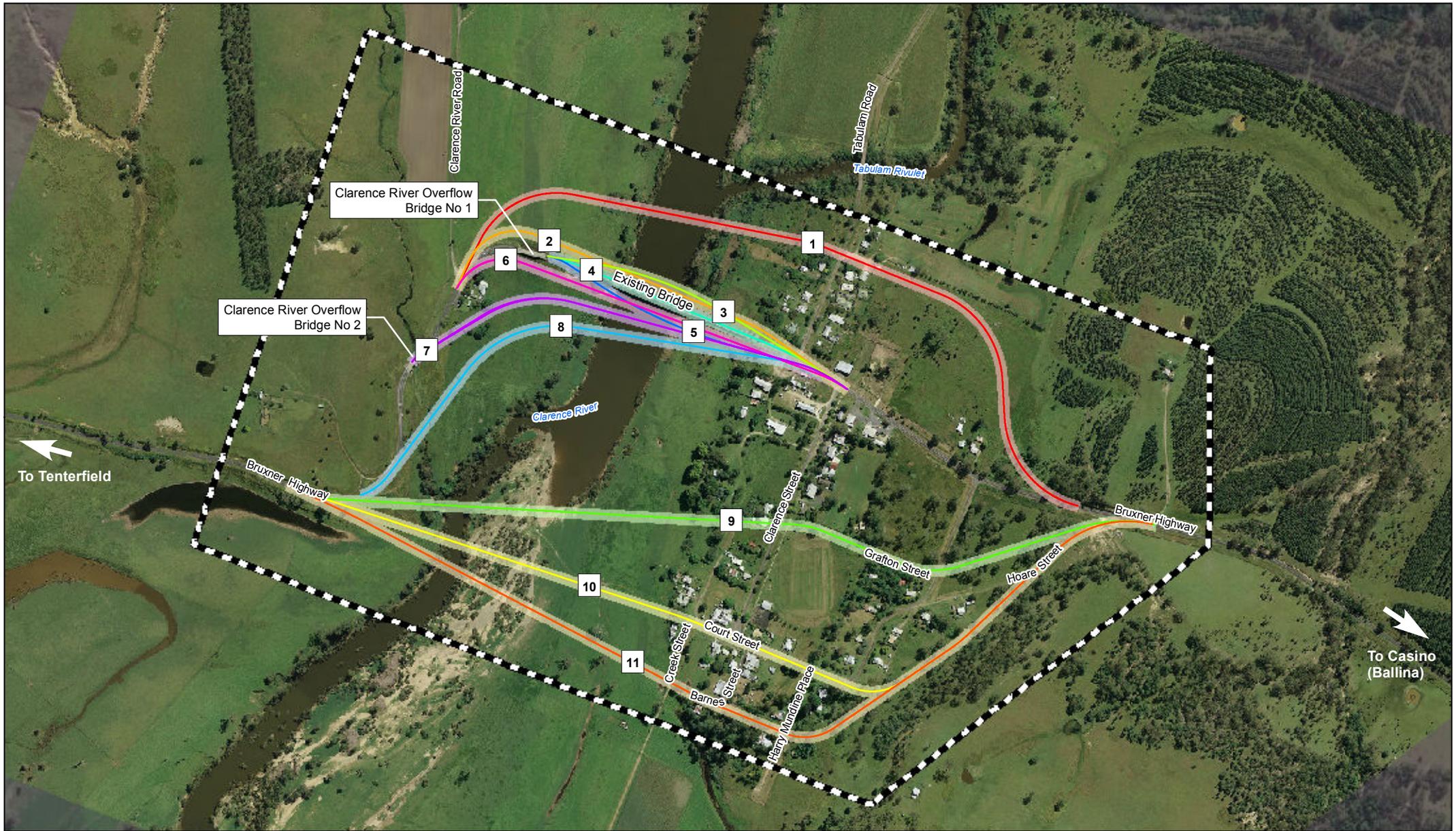
Option 10

Option 10 starts on the Bruxner Highway at the same location as Option 9 and crosses the Clarence River at a wider river cross section, aligning with Court Street before sweeping the south east boundary of the village, cutting into Currabubula Hill and re-joining the Bruxner Highway at the same location as Option 9. Intersection upgrades would be required along Court Street and a new intersection on the western side to provide connection to Clarence River Road and the preschool. One long bridge would be required to replace the overflow bridges and the existing bridge. Property acquisition is required on both sides of the river.

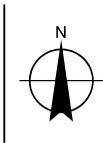
Option 11

Option 11 starts on the Bruxner Highway at the same location as options 9 and 10 and crosses the Clarence River at a much wider river cross section aligning with a road corridor south and parallel to Court Street before sweeping the south east boundary of the village and re-joining the Bruxner Highway at the same location as options 9 and 10. One long bridge would be required to replace the overflow bridges and the Tabulam Bridge and requires the longest bridge of all the options. Property acquisition is required on both sides of the river.

A comparative summary of each route option is shown in Table 6-1. This table comparatively presents the engineering attributes along with the environmental and social issues of each route option.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND



Study area

- | | | | |
|---|--|---|---|
| — Option 1 | — Option 4 | — Option 7 | — Option 10 |
| — Option 2 | — Option 5 | — Option 8 | — Option 11 |
| — Option 3 | — Option 6 | — Option 9 | |

All Route Options

Figure 6-1

Table 6-1 Key attributes of the long list of preliminary route options

	Route Option										
	1	2	3	4	5	6	7	8	9	10	11
Total Length (m)	1,430	790	590	400	580	745	820	1,000	1,510	1,650	1,745
Length of new road (m)	1,085	455	290	100	280	405	475	585	1,060	1,230	1,250
Length of major bridging (m)	300	300	300	300	300	300	300	300	450	420	500
Length of minor bridging (m)	45	45	0	0	0	45	45	115	0	0	0
No. of existing flood relief bridges utilised	1	1	2	2	2	1	1	0	0	0	0
Area of vegetation cleared (m ²)	4,747	1,384	1,147	115	929	1,102	1,493	1,564	7,352	10,052	13,709
No. of new noise receivers, with 50m buffer either side	6	0	0	0	1	2	1	1	6	16	6
Properties impacted – No. of lots	14	29	23	6	11	11	12	13	20	13	18
Properties impacted – Area (m ²)	13,226	8,589	4,930	1,076	509	3,009	6,143	9,160	17,053	12,984	19,622
Properties impacted – No. of houses	1	0	0	0	0	0	0	0	1	0	0

7 Selection of the shortlisted route options

7.1 Selection process

A shortlisting workshop was held in August 2013 to evaluate the eleven preliminary route options based on the project objectives. The purpose of this workshop was to review and assess the eleven preliminary route options and establish a shortlist of route options for further development and investigation.

The workshop was attended by representatives from Roads and Maritime Services, Transport for NSW, GHD (Roads and Maritime Contractor) and Australian Centre for Value Management (workshop facilitator).

The following process was followed:

- Brief discussion on the background to the project.
- Overview and confirmation of project purpose and project objectives.
- A series of discussions and presentations were undertaken to identify and describe the key constraints within the study area to ensure all workshop participants were familiar with the potential impacts of each preliminary route option.
- Confirmation of assessment criteria and methodology to evaluate preliminary route options. The workshop group determined whether the assessment criteria were discrete, and could be used to differentiate between route options. The opportunity to add additional criteria was provided. The assessment criteria were then confirmed to allow evaluation of route options.
- Establishment of weightings of assessment criteria using a perceived level of importance determined by general consensus of the workshop attendees. The weight comprised a numerical score between one and five where a numerical score of five was perceived to be very important ranging to a numeric score of one which is less important.
- Overview of the preliminary route options.
- First pass elimination of the preliminary route options.
- Evaluation of the remaining preliminary route options against the assessment criteria.
- Presentation of strategic high level cost estimates.
- Confirmation of shortlisted route options.

7.2 Assessment criteria

The assessment criteria were formulated and developed to enable each route option to be evaluated in relation to the project objectives. Workshop participants agreed to the assessment criteria and their relative weightings.

The weight comprised a numerical score between one and five where a numerical score of five was perceived to be very important ranging to a numeric score of one which is less important.

Table 7-1 details the assessment criteria agreed upon and their relative weightings.

Table 7-1 Assessment criteria and weightings

Objective	Criteria	Criteria Weight (5 -1)
Enhance road safety for all road users over the length of the project including improving safety for pedestrians and cyclists. Investigate and determine the appropriate treatment for pedestrians and cyclists on the new structure.	<ul style="list-style-type: none"> Number of casualty crash sites treated. 	4
	<ul style="list-style-type: none"> Optimise the geometry standards (network targets). 	4
	<ul style="list-style-type: none"> Minimise conflict points on the highway. 	4
	<ul style="list-style-type: none"> Control operating speed through town. 	5
	<ul style="list-style-type: none"> Improve pedestrian and cyclists connectivity. 	5
Improve road transport productivity and reliability.	<ul style="list-style-type: none"> Improved flood immunity of the highway. 	2
Support regional and local economic development including improved opportunity for economic and tourist development for Tabulam.	<ul style="list-style-type: none"> Minimise adverse impact on business/ service patronage. 	4
Minimise impacts on the natural, cultural, social and built environment.	<ul style="list-style-type: none"> Minimise area of native vegetation impacted. 	3
	<ul style="list-style-type: none"> Minimise area of fauna habitat impacted. 	4
	<ul style="list-style-type: none"> Number of new noise receivers with 50m buffer either side of route option. 	4
	<ul style="list-style-type: none"> Minimise impact on Aboriginal heritage. 	5
	<ul style="list-style-type: none"> Minimise the number of property lots impacted / farm land. 	3
	<ul style="list-style-type: none"> Minimise the number of houses impacted. 	4
	<ul style="list-style-type: none"> Minimise visual impact. 	2
	<ul style="list-style-type: none"> Landscape character – sensitivity. 	3
	<ul style="list-style-type: none"> Maintain community connectivity and limit severance of township. 	5
	<ul style="list-style-type: none"> Minimise the impact on flooding regime within town. 	4
	<ul style="list-style-type: none"> Minimise impact on major public utilities. 	2
<ul style="list-style-type: none"> Minimise impact on non-Aboriginal heritage (excluding the existing bridge). 	5	
Consider constructability impacts.	<ul style="list-style-type: none"> Access for construction traffic and impacts on local roads. 	2
Consider WHS impacts of the project options	<ul style="list-style-type: none"> Length of road constructed under traffic. 	3

7.3 Assessment of route options

7.3.1 First pass evaluation of the preliminary route options

Following the overview of each preliminary route option a first pass evaluation of the route options was undertaken to identify options that did not merit further consideration.

The three options ruled out for further investigation are summarised in Table 7-2 below.

Table 7-2 First pass evaluation results

Option	Why rejected
4	<ul style="list-style-type: none">• Poses a high risk of severance if any minor floods occur during the bridge construction period, either damaging or washing away the side track – highway cut whilst side track is reconstructed.• Unacceptable community severance while bridge was being constructed.• There would be significant construction difficulties and risks associated with Option 4.• Eliminates some bridge construction methodologies.
9	<ul style="list-style-type: none">• Would result in unacceptable community severance.• Potential for unacceptable impacts on non-Aboriginal heritage.• Significant adverse impacts on some local businesses.• Unacceptable severance of primary school and oval.
10	<ul style="list-style-type: none">• Unacceptable community severance.• Potential for unacceptable impacts on Aboriginal and non-Aboriginal heritage.• Potential road safety issues due to difficulty in controlling speed through town.• Any advantage associated with Option 10 is seen as being less than for Option 11.• Potential road safety issues due to mixing of local and through traffic.

7.3.2 Assessment of the preliminary route options

Following the initial evaluation, the eight remaining preliminary route options were assessed on a qualitative basis against the assessment criteria. Each option was assessed on a scale of one to five, where five was assigned when the performance of the option was considered to be excellent ranging down to a score of one where the performance against the criterion was considered to be relatively poor.

Once the qualitative evaluation was completed, the options were scored using the agreed weightings. The options were then rated as shown in Table 7-3.

Table 7-3 Preliminary route options evaluation scores

Objective	Criteria	Weighting	Option 1		Option 2		Option 3		Option 5		Option 6		Option 7		Option 8		Option 11	
			Score	Weighted Score	Score	Weighted Score												
Enhance road safety for all road users over the length of the project including improving safety for pedestrians and cyclists. Investigate and determine the appropriate treatment for pedestrians and cyclists on the new structure	Number of casualty crash sites treated	4	3	12	2	8	1	4	1	4	2	8	2	8	4	16	5	20
	Optimise the geometry standards (network targets)	4	5	20	3	12	2	8	1	4	2	8	4	16	5	20	4	16
	Minimise conflict points on the highway	4	4	16	3	12	3	12	3	12	3	12	3	12	3	12	4	16
	Control operating speed through town	5	1	5	3	15	3	15	3	15	3	15	2	10	2	10	1	5
	Improve pedestrian and cyclists connectivity	5	1	5	4	20	3	15	3	15	4	20	4	20	3	15	2	10
Improve road transport productivity and reliability	Improved flood immunity of the highway	2	3	6	3	6	1	2	1	2	3	6	3	6	5	10	5	10

Objective	Criteria	Weighting	Option 1		Option 2		Option 3		Option 5		Option 6		Option 7		Option 8		Option 11	
			Score	Weighted Score	Score	Weighted Score												
Support regional and local economic development including improved opportunity for economic and tourist development for Tabulam	Minimise adverse impact on business/ service patronage	4	1	4	5	20	5	20	5	20	5	20	5	20	5	20	3	12
Minimise impacts on the natural, social, cultural and built environment,	Minimise area of native vegetation impacted	3	1	3	4	12	4	12	4	12	4	12	3	9	3	9	1	3
	Minimise area of fauna habitat impacted	4	1	4	4	16	4	16	4	16	4	16	3	12	3	12	1	4
	Number of new noise receivers with 50m buffer either side of route option	4	2	8	5	20	5	20	3	12	3	12	3	12	3	12	2	8
	Minimise impact on	5	2	10	3	15	4	20	4	20	3	15	3	15	3	15	1	5

Objective	Criteria	Weighting	Option 1		Option 2		Option 3		Option 5		Option 6		Option 7		Option 8		Option 11	
			Score	Weighted Score	Score	Weighted Score												
	Aboriginal heritage																	
	Minimise the number of property lots impacted / farm land	3	1	3	2	6	3	9	4	12	3	9	3	9	2	6	1	3
	Minimise the number of houses impacted	4	3	12	5	20	5	20	5	20	5	20	5	20	5	20	3	12
	Minimise visual impact	2	1	2	2	4	4	8	3	6	2	4	2	4	2	4	2	4
	Landscape character – sensitivity	3	3	9	5	15	5	15	4	12	4	12	4	12	4	12	2	6
	Maintain community connectivity and limit severance of township	5	4	20	3	15	3	15	3	15	3	15	3	15	3	15	4	20
	Minimise the impact on flooding regime within town	4	5	20	4	16	3	12	3	12	4	16	4	16	4	16	1	4

Objective	Criteria	Weighting	Option 1		Option 2		Option 3		Option 5		Option 6		Option 7		Option 8		Option 11	
			Score	Weighted Score	Score	Weighted Score												
	Minimise impact on major public utilities	2	4	8	4	8	4	8	2	4	2	4	4	8	3	6	3	6
	Minimise impact on non-Aboriginal heritage (excluding the existing bridge)	5	5	25	5	25	5	25	5	25	5	25	5	25	5	25	5	25
Consider constructability impacts.	Access for construction traffic and impacts on local roads	2	2	4	4	8	4	8	4	8	3	6	3	6	3	6	1	2
Provide a value for money solution	Maximise use of existing infrastructure	4	2	8	3	12	4	16	4	16	3	12	2	8	1	4	1	4
Consider WHS impacts of the options	Length of road constructed under traffic	3	4	12	2	6	1	3	1	3	2	6	3	9	3	9	4	12
Total Weighted Score				216		291		283		265		273		272		274		207
Rank				7		1		2		6		3		3		3		8

7.4 Selection of shortlisted route options

Following the scoring process workshop participants acknowledged that there was not a significant material difference between the total weighted scores for many of the options and indicative cost estimates needed to be considered.

Indicative capital cost estimates for the infrastructure elements such as the bridges and road work were produced for each route option in advance of the technical workshop. A contingency of about 50 per cent was applied to each route option cost estimate as per standard practice for this stage in the process. The cost of removal of the existing bridge was omitted for all options given the cost would be applied equally to all options. More detailed estimates have been subsequently prepared and are provided in Section 8.5 of this report.

In order to obtain a shortlist of route options worthy of further development and investigation, the total weighted score, the order of capital cost and comparative value for money assessment for each route option were compared. Value for money was determined by dividing the total weighted score by the indicative capital cost.

A shortlist of route options was obtained through this comparison with reasons for and against shortlisting were detailed as shown in Table 7-4 below.

Table 7-4 Preliminary route option evaluation results

Option	Total weighted score	Indicative Capital Cost (\$ M)	Value For Money (score/capital cost)	Short List Yes/no	Reasons
1	216	42.4	5.1	No	Relatively low value for money option Poor performance against some safety criteria and adverse, pedestrian and cyclist and vehicle connectivity Potential adverse impact on business and high property impact
2	291	37.2	7.8	Yes	Represents the highest value for money option Provides an effective 'on balance' response to all criteria
3	283	37.5	7.5	Yes	Provides a relatively high value for money option Provides an effective 'on balance' response to all criteria
5	265	38.9	6.8	No	Poor relative performance compared to other retained options and no material advantages over Option 3
6	273	37.6	7.3	Yes	Provides a relatively high value for money option Provides an effective 'on balance' response to all criteria
7	272	47.4	7.3	Yes	Provides a relatively high value for money option Provides an effective 'on balance' response to all criteria
8	274	43.7	6.3	No	Similar score compared to Option 7 but slightly lower value for money option compared to Option 7
11	207	63.8	3.2	No	Relatively low value for money option Poor performance against some safety criteria and adverse , pedestrian and cyclist and vehicle connectivity Potential adverse impact on business and high property impact Potential adverse impact on flooding and Aboriginal heritage

7.5 Selected shortlisted route options

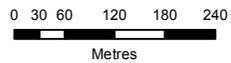
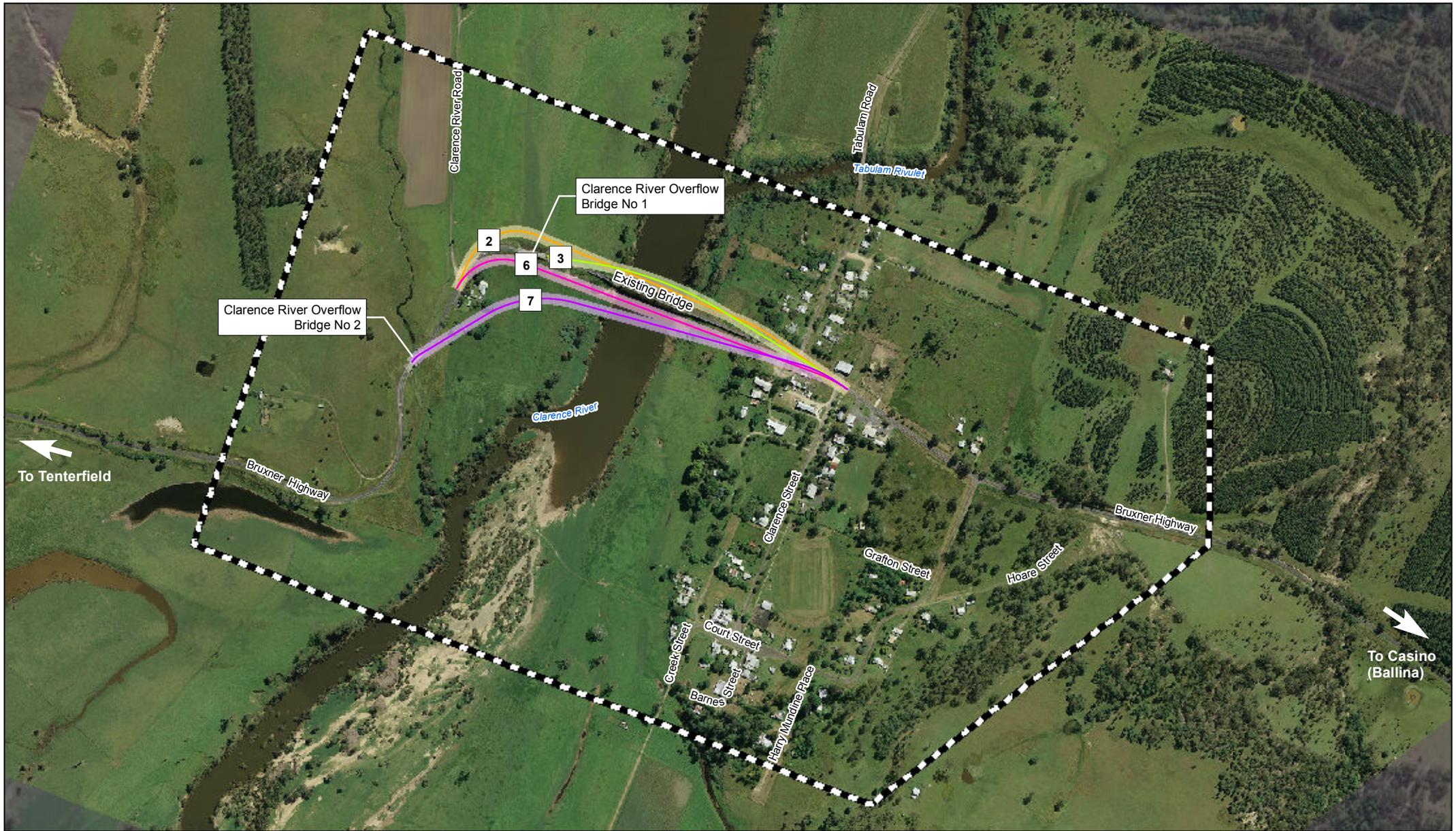
At the conclusion of the route option assessment process the following route options were shortlisted for further development and investigation.

Following the selection process the selected options have been renamed as follows:

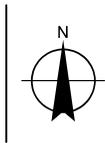
- **Option 2** - now called Option A.
- **Option 3** - now called Option B.
- **Option 6** - now called Option C.
- **Option 7** - now called Option D.

The shortlisted route options are illustrated in Figure 7-1 below.

These options will be displayed for community comment.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



LEGEND

- Study area
- Option 2 (A)
- Option 6 (C)
- Option 3 (B)
- Option 7 (D)

Shortlisted Route Options

Figure 7-1

8 Assessment of shortlisted route options

This section provides an assessment of the selected shortlisted route options. As all the shortlisted options are in close proximity to each other, at and around the existing bridge, potential impacts will be similar.

A brief description of proposed work and associated key impacts for each option is as follows.

8.1 Option A (formerly option 2)

Description of proposed work

As well as a new straight bridge over the Clarence River at a similar length to the existing, this option also requires a new curved bridge on the western side to replace the existing Clarence River Overflow Bridge No 1. In addition to the new bridge and approaches, an intersection upgrade is required at the intersection with Tabulam Road.

Impacts

Potential impacts for this option include:

- Aboriginal heritage – crosses low-moderate, moderate and high risk zones.
- Clearing of vegetation for bridge and approach works.
- Property acquisition – required west and east of the river for most of the new option alignment.
- Noise and vibration – possibly new receivers on Tabulam Road.
- Public utilities – minor Telstra underground cables and above ground power.

8.2 Option B (formerly option 3)

Description of proposed work

With this option the new bridge over the Clarence River will be on a curved alignment at a similar length to the existing. In addition to the new bridge and approaches, an intersection upgrade is required at the intersection with Tabulam Road. This option requires the shortest length of work. Connection between the new bridge and the existing overflow structure could be problematic due to road alignment and level differences.

Impacts

Potential impacts for this option include:

- Aboriginal heritage – crosses low-moderate, moderate and high risk zones.
- Clearing of vegetation, particularly at the banks of the river and at the eastern end.
- Property acquisition – required west and east of the river for most of the new option alignment.
- Noise and vibration – possibly new receivers on Tabulam Road.
- Public utilities – minor Telstra underground cables and above ground power.

8.3 Option C (formerly option 6)

Description of proposed work

This option is similar to option 2 but is located on the southern side of the existing bridge. This option proposes to have both the new bridge over the Clarence River and the new bridge over the overflow channel on a straight alignment. New approach work will require an intersection upgrade at Tabulam Road and possibly at Clarence River Road.

Impacts

Potential impacts for this option include:

- Aboriginal heritage – crosses low-moderate and moderate risk zones.
- Clearing of vegetation for bridge and approach works.
- Property acquisition – required on the western side only.
- Noise and vibration – possibly new receivers on the southern side of the highway in the vicinity of Clarence Street and the preschool.
- Public utilities – major Telstra underground cables and major high voltage power.

8.4 Option D (formerly option 7)

Description of proposed work

This option requires a longer straight bridge over the Clarence River at a slightly different angle to the existing. As with option 2, a curved bridge is required to replace the existing Clarence River Overflow Bridge No 1. In addition to the new bridge and approaches work, an intersection upgrade is required at the intersection with Tabulam Road and a new intersection to provide access to Clarence River Road and the preschool.

Impacts

Potential impacts for this option include:

- Aboriginal heritage – crosses low-moderate, moderate and high risk zones.
- Clearing of vegetation for bridge and approach works.
- Property acquisition – required on the western side only.
- Noise and vibration – possibly new receivers on the southern side of the highway in the vicinity of Clarence Street and the preschool.
- Public utilities – major Telstra underground cable and major high voltage power.

Following the display of the shortlisted route options, further onsite investigations and studies will be undertaken in the vicinity of the route alignments. These investigations may establish additional impacts that will be considered when undertaking the selection of the preferred route.

8.5 Project cost estimates

High level strategic cost estimates, including contingency, have been prepared for the shortlisted options and are provided in Table 8-1.

Table 8-1 Strategic cost estimates for shortlisted route options

Option	Strategic cost estimate amount
Option A (2)	\$49.0m
Option B (3)	\$40.9m
Option C (6)	\$48.7m
Option D (7)	\$48.5m

Following the selection of a preferred route a concept design will be prepared for the preferred route alignment, providing a higher level of detail for that option. At this stage of the project the strategic cost estimate will be refined.

9 Next steps

9.1 Selection of the preferred route

Following the display of the shortlisted route options, Roads and Maritime will review the public submissions received during the display period and undertake field investigations. This information and the outcomes of a value management workshop will inform the selection of a preferred route.

The value management workshop will be held with participants from the community, government and technical areas of expertise following the route options display.

The workshop will assess the performance of each of the route options against a range of criteria that relate to the project objectives.

A recommendation will be made to the Minister for Roads and Ports. The preferred route will then be displayed for public comment.

9.2 Development of the concept design and EIA

Following the display of the preferred route a concept design and EIA will be prepared. Further field investigations would be undertaken to gather information to enable this work to be completed. A single public display will be held for the concept design and EIA.

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