

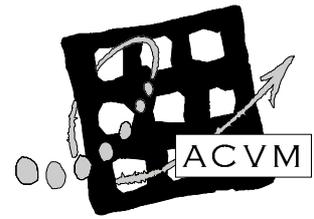


**Roads and Traffic Authority  
New South Wales**

# **ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON**

## **CORRIDOR EVALUATION WORKSHOP**

Workshop Report  
April 2004



ABN 36 082 506 171

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# Report

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The section summarises the outcomes of the Corridor Evaluation Workshop. The Appendices provide the detail and perceptions by the workshop group regarding the additional crossing of the Clarence River at Grafton.

## Background

The existing vehicular bridge over the Clarence River was completed in 1932 and since that time has served as the major link across the river between Grafton and South Grafton on the Summerland Way which leads from the Pacific Highway to Casino.

Traffic volumes including heavy vehicles using the bridge have increased over the years which has led to congestion, delays and conflicts. Also there are "kinks" on the existing bridge which is seen as a safety concern and a significant cause of delays.

In 2001 a community campaign for an additional crossing of the Clarence River at Grafton commenced. A public meeting in May 2002 led the State Government to commission the Roads and Traffic Authority (RTA) to undertake a Feasibility Study and determine strategic locations for an additional crossing to service Grafton and the surrounding communities.

As a result of the Feasibility Study, and a commitment by the State Government to proceed with the next stage of planning, the RTA formed a project team to build on the work undertaken in the Feasibility Study. Investigations were undertaken and feasible localities were developed within the study area that would improve road safety, reduce traffic delays and provide improved access for the local and statewide road network.

Broad localities were developed between Susan Island and Elizabeth Island for further investigation and then a Shortlisting Workshop (November 2003) determined that two localities were most worthy to proceed to more detailed investigations.

As a result, three crossing options have now been developed from the two localities for analysis and evaluation. The crossing options for evaluation (as shown in **Figure 1**) are:

- **Option 1 – Villiers Street/Abbott Street.** The limits of this option are from the Gwydir Highway (Ryan Street) at the southern approach to Victoria Street at the northern approach. The crossing would be 2 lanes, with 2 way flow. Traffic facilities such as roundabouts would need to be provided at Ryan Street and Victoria Street connections (subject to concept design and community consultation)

- **Option 2a – At the Existing Bridge (directly upstream).** This option is directly upstream of the existing bridge. The level of the bridge would be at (or just below) the roadway of the existing bridge. The new crossing would be 2 lanes, with one way flow and the existing crossing would change to one way flow. This would require modification to the 'kinks' on the existing crossing. The limits of this option are from Bent Street at the southern approach to the existing bridge (opposite the Nursing Home), to the northern approach at Craig Street (opposite KFC). On the southern approach, an additional southbound lane would be provided to allow four lanes (two lanes each way) on this approach
- **Option 2b – At the Existing Bridge (directly downstream).** This option is directly downstream of the existing bridge. The level of the bridge would be at (or just above) the roadway of the existing bridge. The new crossing would be 2 lanes, with one way flow and the existing crossing would change to one way flow. This would require modification to the 'kinks' on the existing crossing. The limits of this option are from Bent Street at the southern approach to the existing bridge (opposite the Nursing Home), to the northern approach at Craig Street (opposite KFC). On the southern approach, an additional southbound lane would be provided to allow four lanes (two lanes each way) on this approach.

It should be noted that the shortlisting of localities from which the options were developed had been undertaken after an investigation process involving the RTA project team and local government input. As a result no further options were considered in the workshop. However, it was acknowledged that whichever preferred option moved forward for further development, there would be a level of fine tuning and improvement undertaken with mitigation measures employed to address any adverse impacts.

A Corridor Evaluation Workshop using a value management approach focussing on evaluating the shortlisted options, was seen as an appropriate tool to bring together a wide range of stakeholder interests and expertise to review the investigations undertaken to date, and on the balance of issues, to assess the options against agreed assessment criteria and determine a preferred direction to progress the project development.

The Corridor Evaluation Workshop was seen as one of the major inputs into the process for determining the preferred corridor for the project.

The Australian Centre for Value Management (ACVM) was commissioned to facilitate and report on the workshop which was attended by a range of stakeholders on **28<sup>th</sup> and 29<sup>th</sup> April 2004**. A list of participants who attended the workshop can be found in **Appendix 1**.

## Workshop Objectives

The objective of the workshop, as presented to the participants, was to:

***“Obtain a common understanding of the project and its objectives, review the work undertaken to date to ensure it meets the project objectives, and to recommend a preferred direction, if appropriate, to progress the project to the next stage of development”***

Specifically the participants were to:

- *Clarify the objectives of the project*
- *Review the planning parameters for the project*
- *Examine the shortlisted options developed and identify potential value improvements to meet the project objectives*
- *Recommend a preferred option(s) to the RTA to progress the project*
- *Develop an action plan to progress the project*

This report has been compiled by ACVM and seeks to provide an objective overview of the project aspects discussed and the outcomes formulated by the end of the workshop.

## Workshop Activities

The workshop process builds on the perspectives as well as the detailed and specialist knowledge which resides with the workshop participants then structures the review and option evaluation from a functional base (ie. what are the problems that the project must address and what must the project achieve to be successful).

During the workshop, background material was presented (**Appendices 2 and 3**). What was important about the project from various stakeholder perspectives was identified. The problem situation and the project purpose and objectives were reviewed. Assumptions being made about the project were also identified and challenged from various perspectives (**Appendix 2**).

Assessment criteria were developed and weighted within the “triple bottom line” categories (being functional performance, social impacts and environmental impacts) for later evaluation of the options (**Appendix 2**).

Using this information, the shortlisted options to meet the project objectives and address the problems identified were reviewed by the group (**Appendix 3**).

The group evaluated the crossing options using the assessment criteria. The result of the evaluation indicated that **Option 2b** performed, on balance, better than the other options against the functional, social impact and environmental criteria. It also had (on the information presented) the second lowest capital cost estimate and benefit cost ratio (BCR). However it was acknowledged that Option 2b needed to satisfactorily address and mitigate issues raised during the workshop in the next stage of development (**Appendix 3**).

The workshop discussions led the group to conclusions as outlined below.

## Workshop Outcomes

By the end of the workshop, the participants had:

- **Identified** the problems causing the need for the project being a mix of:
  - *Reducing delays on the existing bridge and approaches*
  - *Significantly reducing road accidents and injuries*
  - *The need to improve economic development in Grafton*
  - *The need to improve access for the local and State Road network*
- **Confirmed** the project purpose and objectives which reflect what the project must do to be successful and address the problems identified  
*The project purpose is to provide an additional crossing of the Clarence River at Grafton in order to improve road safety, reduce traffic delays and provide improved access for the local and State road network between north and south of the Clarence River*  
The **broad project objectives** are to:
  - *Significantly improve traffic efficiency*
  - *Significantly reduce the potential for road accidents and injuries*
  - *Be socially acceptable to the regional and local community*
  - *Support economic development*
  - *Be managed in accordance with Ecologically Sustainable Development Principles (minimise the impact on the environment)*
  - *Achieve maximum effectiveness of expenditure (value for money)*
- **Identified and challenged** assumptions being made about the project from a range of perspectives (see **Appendix 2**)

- **Developed** and weighted qualitative assessment criteria within the three categories of functional performance, social impact and environmental impact. These would be used to evaluate the shortlisted options. The assessment criteria identified were:

#### **Functional Performance**

- Reduce delays at existing bridge in peak hour (Level C in 30years)
- Provide adequate vertical clearance for heavy transport on the Summerland Way
- Reduce through traffic from CBD (including heavy vehicles)
- Reduce potential road accidents and injuries (bridge, approaches and connecting intersections)
- Provision of emergency access

#### **Social Impact**

- Minimise impacts on the social environment
- Minimise the impacts on access for the community
- Improve opportunity for economic and tourist development
- Usage of river
- Minimise impact on properties affected (built environment)
- Minimise negative visual impact

#### **Environmental Impact**

- Minimise impacts on the natural environment
- Minimise impacts on non-indigenous heritage (including values)
- Minimise impacts of traffic noise on existing noise sensitive developments
- Minimise flooding impacts/river hydrology impacts
- Minimise impacts on indigenous heritage (including values)
- Minimise impacts on air quality

- **Reviewed** the shortlisted options tabled for the project and obtained an understanding of their relative advantages and disadvantages (see **Appendix 3**).
- **Evaluated** the shortlisted options against the three categories of assessment criteria and ranked the performance of each option. The options were also ranked in terms of the estimated cost and their benefit cost ratio (BCR) (see **Appendix 3**)

- **Recommended** that as Option 2b performed, on balance, better than the other options it should be considered the preferred option for further investigation in the next stage of project development because:

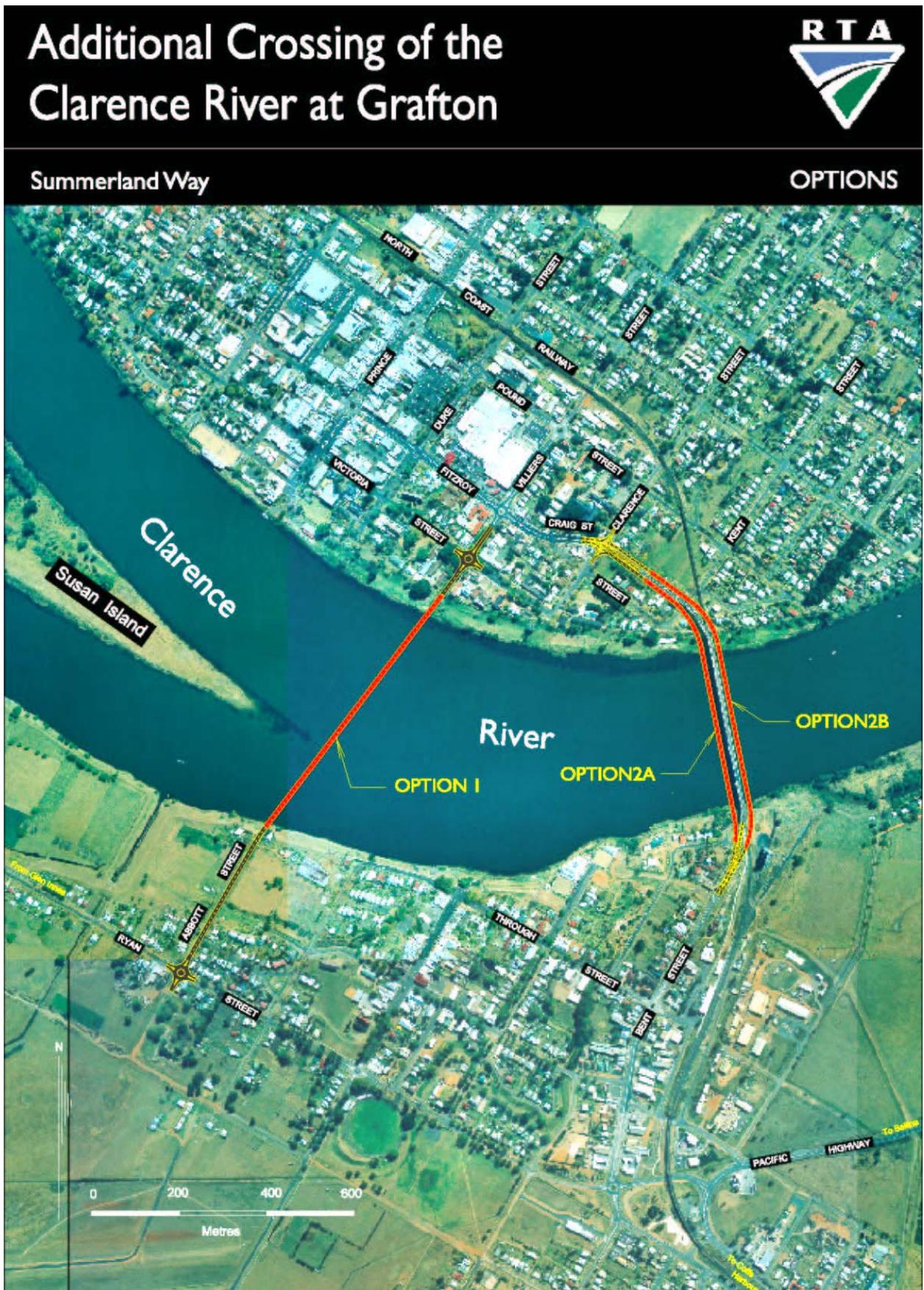
- *It is the highest ranked option for all three categories of qualitative criteria (functional, social, environmental)*
- *Capital costs are similar for all three options*
- *The BCR supports its selection*
- *It retains the iconic vista and role of the existing bridge towards the majority/larger community focus/activities*
- *The riverscape upstream is maintained*
- *It can be built with a minimum clearance to the existing bridge*
- *Least effect on the fabric of Grafton*
- *Best meets the purpose and project objectives*

However this is subject to the following issues being addressed:

- *Approval by the Heritage Council to remove the “kinks” on the existing heritage bridge or the development of contingency plan if Heritage Council is non-compliant. Heritage Council needs to consider Option 2b has the least heritage impacts overall*
- *The new bridge does not dominate the existing bridge in height (ie. minimise noise and visual impact)*
- *Siting and alignment being as close as possible to the existing bridge*
- *Design development complying with heritage requirements for proximity/empathy*
- *Assessment of noise implications to the neighbourhood for the elevated structure is appropriate*
- *Indigenous consultation is undertaken*
- *Clearance over the railway is appropriate*
- *Constructability and pier matching are appropriately addressed*
- **Agreed** to a fallback option should the recommended option prove unsuitable after further investigation. In most events the participants favoured Option 2a as the fallback option.

- **Drew** the following conclusions:
  - There was unanimous support within the workshop for Option 2b to proceed to the next stage of development as the preferred direction subject to:
    - The design complying with Heritage Council approval to remove the “kinks” on the existing bridge
    - Development of a contingency plan if the heritage Council is non compliant
    - Siting and alignment being as appropriately close as possible to the existing bridge to minimise noise and visual impacts
    - Constructability and pier matching are appropriately addressed
    - Clearance over the railway is appropriate
  - There is a need to make Heritage Council aware that Option 2b has the least impact of the options
  - There was a genuine disappointment that a Heritage Council representative did not attend the workshop. It was seen to be a wasted opportunity
  - The group worked well together to reach consensus conclusions
  - The participants obtained a better understanding of the wider dimensions to the project
  - The process undertaken to reach these conclusions was robust and allowed consideration of the various perspectives represented in the workshop
- **Were presented** at the conclusion of the workshop with an outline of the next steps to progress the project planning from here. These were listed as:
  - A media announcement will be released to inform the community about the workshop and its findings
  - Finalise the workshop report outlining the findings and conclusions of the group. This will be undertaken by ACVM. A copy of the workshop report will be sent to each participant
  - The Project Team will undertake the additional investigations to address the “subject to” statements listed in the workshop for the preferred direction
  - Finalise the Preferred Option Report which will incorporate the workshop conclusions
  - Obtain the internal RTA client approvals to proceed
  - Provide information to the Minister of Roads for the announcement of the preferred route for the crossing

Figure 1 – Options for Evaluation



## **Appendix 1. List of Participants**

# ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON OPTION EVALUATION WORKSHOP

## Participants List

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### Community Stakeholders

Shirley Adams	Community Focus Group
Ron Bell	Community Focus Group
Robert Blanchard	Community Focus Group
Greg Hayes	Community Focus Group

Kel Kearns	Community Focus Group
Laurie Marchant	Community Focus Group
Peter Morgan	Community Focus Group
Bill Noonan	Community Focus Group

Gordon Poynter	Community Focus Group
Heather Roland	Community Focus Group
Amanda Steiner	Community Focus Group
Karen Thompson	Community Focus Group

### Government Agencies

Col Harbidge	Engineering, Clarence Valley Council
Bob Pavitt	Planning, Clarence Valley Council
David Andrews	Summerland Way Promotional Committee

Graeme Budd	Environment Protection Authority
David Thompson	Department of Infrastructure, Planning and Natural Resources
John Rowe	NSW Waterways Authority
Jeff Madden	Rail Infrastructure Corporation

### Project Team

Peter Black	Project Manager, RTA
Peter Collins	Regional Manager, RTA
Joe Canceri	Bridge Design, RTA
Sonia Williamson	Communications, RTA
Simone Garwood	Environment, RTA
Greg Collins	Environment, RTA
Peter Mahar	Bridge Maintenance, RTA
Trevor Smith	Road Design, RTA
Bruce Parks	Client Representative, RTA
Stephen Summerell (Day 1 only)	Client Representative, RTA

# ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON OPTION EVALUATION WORKSHOP

## Participants List (cont)

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### Project Team (cont)

Bill Paterson	Hydrology Consultant, Paterson Consultants
Brian Kerwick	Traffic Consultant, RoadNet Pty Ltd
Darren Jurevicious	Air Noise Water Consultant, ERM Pty Ltd
Vicki St Lawrence	Community Participation Consultant, St Lawrence & Associates
Kerry Power	Planning and Social Consultants, Smythe Maher & Associates

### Workshop Facilitation Team

Ross Prestipino	Facilitator, ACVM
Mark Neasbey	Co-facilitator and reporter

## **Appendix 2. Project Information and Analysis**

## Project Information and Analysis

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The information presented in this Appendix is a consolidation of the general outputs and perceptions by the workshop group as they shared information about the additional crossing of the Clarence River at Grafton which allowed them to later make comparisons of options based on the analysis of what the project was required to achieve.

### The Strategic Context of the Project

In order to allow the participants to obtain an understanding of the project's context, Peter Collins, Northern Regional Manager, RTA outlined the "Big Picture" for the project including the role of RTA and its expectations.

Key points raised in his presentation included:

- Why are we looking at an additional crossing of the Clarence River?
  - Community concern about delays and emergency access as well as the future development of Grafton and the Clarence Valley
  - Another crossing of the Clarence River has been discussed since the 1960s. The crossing is not just for Grafton but for the Clarence River Valley as part of the Summerland Way and the State Road Network
  - The existing bridge has served us well but the time is right to plan and determine the best site for an additional crossing because of:
    - Increasing delays, queuing is getting longer in the peaks
    - Level of service of the existing bridge is diminishing
    - Expansion of settlement and growth either side of the Clarence River
  - NSW State Government is committed to build the crossing
- The State Government allocated \$100,000 to enable a Feasibility Study to be undertaken for the project specifically to confirm its need and to clarify the 'no-go' zones. This then generated seven broad localities for a second crossing. These were subject to more detailed analyses as a result of which two localities were shortlisted and three options within those localities are the subject of this workshop. This workshop's task is to recommend which location, on balance, should be recommended as best meeting the objectives of the project. The State Government has confirmed a commitment to the project and will be making an announcement of a preferred crossing taking into account the findings of the workshop

### Clarence Valley Council Perspective

A Clarence Valley Council perspective of the project was presented by Col Harbidge, Engineer, Clarence Valley Council on behalf of Neil Payne, General Manager Clarence Valley Council who was unable to attend. His presentation is recorded below.

- This project is of paramount importance to the City of Grafton and to the Clarence Valley. The impacts of any decision coming out of this process will be felt by almost the whole community. There will be positive and negative impacts, no matter what decision is made
- I look forward to everybody's keen participation and I hope that we are all able to leave tomorrow afternoon knowing that we have all had ample opportunity to put forward our points of view and to test the points of view of others. The former Grafton City Council had a long history of pursuing a second bridge over the Clarence River in Grafton. The background papers distributed for the workshop briefly outlines some of that history
- In more recent times, a sub-committee of Grafton City Chamber of Commerce and Industry was appointed to actively pursue a second bridge at Grafton. In May 2002, some 600 people attended a public meeting at Grafton High School Multi-purpose Centre. There appeared to be a high level of public support for the proposal although I note that some reservations were expressed
- Around June and July 2002, the RTA commenced work on the Feasibility Study. In September 2002 the former Grafton City Council was addressed by Mr Peter Collins and Mr Peter Black, RTA. Council also considered a staff report. Council subsequently resolved:- *"that it supports a second crossing of the Clarence River at Grafton with the main objective of relieving traffic congestion"* and further that on completion of the feasibility study *"that Council would also be urging the Feasibility Study progress to the Development Phase"*

- In January 2003 Council considered the draft Feasibility Study prepared by the RTA and was again addressed by the RTA. The key outcome of the draft Feasibility Study is described in the following extract from its Executive Summary:
  - *"The most feasible location appears to be in the vicinity of the existing bridge. However, although this location is feasible an additional crossing would still have significant impacts on the community such as traffic, noise, social and aesthetics. If the project were to proceed to the Development Phase, i.e. selection of a preferred location, more detailed studies would be required. This would include more specific traffic analysis and noise monitoring in the locality. It would also require continuation of close consultation with the community to determine the social impact of an additional crossing"*
  - *"The locations upstream and downstream of the existing bridge also appear feasible as they meet all the objectives of the project with the exception of economic comparisons of the benefits to cost. These options have a number of adverse impacts particularly social and environmental impacts and traffic noise. However, they do have a number of benefits as detailed in this report. If the project were to proceed to the Development Phase these locations would need to be considered as part of the selection of a preferred location to validate the findings of the Feasibility Study. Further detailed traffic analysis, noise monitoring, environmental investigations and community consultation would be required to determine the viability of an additional crossing in these locations"*
  - *"The locations at Ulmarra, Cowper and Lawrence do not meet a number of objectives of the project and would not contribute greatly to reducing congestion or providing a significant improvement to safety at the existing Grafton Bridge. Therefore, an additional crossing at these locations does not appear feasible as it does not meet the objectives of this project."*
- In consideration of the Draft Feasibility Study, the former Grafton City Council resolved:
  1. That Council recognise and support the findings of the Feasibility Study Report
  2. That the RTA be requested to include additional information in the Feasibility Study Report dealing with the structural adequacy of the existing bridge and an assessment of the "do-nothing" option
  3. That the RTA be requested to finalise a feasibility study report as soon as possible
  4. That subject to the finalisation of the Feasibility Study Report in accordance with the above, that the RTA be requested to proceed to the development phase of the project, based on strategic locations 1, 2 and 3."
- For your information in the Feasibility Study Report, Location 1 covered the strategic location for a crossing between the existing Grafton Bridge up to and including Susan Island; Location 2 covered the strategic location for crossing in the vicinity of the existing bridge; Location 3 covered the strategic location for a crossing from the existing Grafton Bridge and downstream to and including Elizabeth Island
- The final Feasibility Study was issued in February 2003. Of particular interest is Section 3.3.6 of the report entitled "Road Capacity". This section provides information on the existing traffic delays in destinations of traffic delays in 2011 and 2021. These delays are such that they would have extreme negative impacts on the Grafton community if not addressed
- The Study states that by the year 2011, the morning and afternoon peak period may extend to 3 hours/day and the intensity currently experienced in the morning peak between 8:15am and 9am may be common for the 3 hour morning and afternoon period. By the year 2021, the morning and afternoon peak period may extend to 4.5 hours and up to nine hours by the year 2031
- In September 2003, the former Grafton City Council appointed Councillors Mrs Shirley Adams and Mr Max Murray to represent the Council at community focus group meetings
- In November 2003, a Shortlisting of Localities Workshop was held. I understand from the background papers that the outcome of this workshop has been presented to community focus group meetings and workshops although no final report has been presented to Council
- The decision to be made in the second crossing of the Clarence River will shape the future of Grafton in many ways. It will impact significantly on the City's physical appearance, its operation and amenity. It will impact on its growth potential and its actual growth, it will have social and environmental effects, it will impact on the Grafton community and the community of the Clarence Valley in many ways. No doubt these, and other impacts, will be identified at this workshop.

## **Project Overview Presentation**

An overview of the work undertaken to date was presented by Peter Black, Project Manager, RTA. Key points made in his presentation which supplements the background papers distributed to participants prior to the workshop are outlined below.

### ***Purpose of the Project***

The purpose of the project is to provide an additional crossing of the Clarence River at Grafton in order to improve road safety, reduce traffic delays and provide improved access for the local and State road network between north and south of the Clarence River

### ***Project Objectives***

The broad project objectives are to:

- Significantly improve traffic efficiency
- Significantly reduce the potential for road accidents and injuries
- Be socially acceptable to the regional and local community
- Support economic development
- Be managed in accordance with Ecologically Sustainable Development Principles (minimise the impact on the environment)
- Achieve maximum effectiveness of expenditure (value for money)

Under the broad objectives, there are a range of secondary objectives which assist in determining criteria that options can be evaluated against

### ***Background***

- Approval was given in 1915 for the design and construction of a bridge over the Clarence River, at Grafton (with a moveable span for river navigation clearance) to carry a railway and a footway. In 1922, when design was well advanced, the Minister for Works requested that the design include vehicular traffic in addition to the railway and pedestrian traffic. The new bridge was opened to traffic in 1932
- Grafton City Council initiated correspondence to the Department of Main Roads (DMR) regarding a second bridge in 1960 with investigations commencing in the early 1970's. In 1977, the DMR advised that a new bridge location had been adopted linking Fitzroy Street, Grafton, to Bent Street, South Grafton. Survey and geotechnical investigations were then undertaken. In 1985, the DMR advised that the new bridge was a long-range Proposal
- In 2001, a group of business people formed a committee to campaign for a new bridge at Grafton. In May 2002, the community campaign for an additional crossing of the Clarence River at Grafton commenced. A public meeting held in May 2002 lead the State Government to commission the RTA to undertake a Feasibility Study and determine strategic options for the location of an additional crossing to service Grafton and the surrounding communities. Following the completion of the Feasibility Study in February 2003, a project team was formed to proceed with a Route Selection Study
- The Route Selection Study would identify crossing options and assess the best value for money alignment for the additional crossing to improve road safety, reduce traffic delays and provide improved access for the local and state road network between the north and south of the Clarence River.

### ***Project Issues to be Addressed***

The following specific issues that need to be addressed by the project include:

- Reduce delays at the existing bridge
- Significantly reduce road accidents and injuries
- Improve economic development for Grafton
- Improve access for the local and State Road network

### **Development of Crossing Options**

The activities to progress the development of options and the timeframe to date are shown in the table below and included:

<b>Date</b>	<b>Activity</b>
July to November 2003	Detailed investigations
November 2003	Short Listing of Localities
November 2003 to February 2004	Community input to Short Listed Localities
April 2004	Public display of crossing options

### **Localities Short Listing Workshop**

- The initial step in the process of selecting a preferred crossing was to identify localities that most likely met the project objectives to move forward for further detailed investigations. The information gathered from the specialist studies was used as a basis for decision making on which crossing localities should be further investigated in the route selection stage. As a result, seven localities were identified between Susan Island and Elizabeth Island
- In order to shortlist those localities worthy of further investigation a Localities Shortlisting Workshop was held on 28 November 2003. The Australian Centre for Value Management (ACVM) was commissioned to facilitate and report on the shortlisting workshop
- The shortlisting of localities workshop was a technical workshop seen as the appropriate strategic tool to bring together some of the key stakeholders involved in the project and to review and assess the localities developed in order to discard those that did not (on balance) sufficiently/effectively meet the project objectives and to shortlist those that did, so they could proceed to more detailed investigation. The participants included the RTA project team and representatives from the former Grafton City Council, Copmanhurst Council and Pristine Waters Council. The outcomes of the workshop were that Localities 2 and 3 should proceed to the next stage of development and that the other localities should not proceed (details were shown in the background paper for this workshop)
- Following the presentation of the shortlisted localities to the community in December 2003, it was raised that a Turf Street option (upstream of Locality 1) should also be considered. This was further investigated. The project team analysed the project information for this crossing locality against the project criteria, and using the methodology of the Shortlisting Workshop, determined that this locality did not sufficiently meet the project objectives (on balance) and should not proceed further (reasons stated in the background paper for this workshop)
- As a result, three options were developed within Localities 2 and 3 being Option 1 (Villiers Street/Abbott Street), Option 2 (Directly upstream of the existing bridge) and Option 3 (Directly downstream of the existing bridge) as shown in **Figure 1**

### **Involving the Community**

Community participation and issue identification has been encouraged through a number of activities (as described in the background paper). In summary, these include:

- Community focus group meetings (to convey information to and from community interest groups)
- Agency briefings
- Media releases to local newspapers
- Community workshops
- Letters to residents
- Newsletters (community updates)
- Free call hotline
- Meetings with residents
- Consultation with Aboriginal Community
- Information Display

## What's Important about the additional crossing and its associated road works

The group identified from their various perspectives (individually, then within focus groups and finally collectively) what was important about the additional crossing and its associated road works. The group recorded what was important (shown below) and then reflected on the collated list (in five focus groups). Although acknowledging that all items are important, the group indicated which items were considered more critical by marking them with an asterisk (\*) as shown below. (More than one asterisk indicates an allocation by more than one focus group. Also some items were considered linked leading to more than one asterisk being allocated by a focus group).

No.	What's Important	Rating
1.	Avoiding adverse changing fabric (enhance fabric) and structure of Grafton	**
2.	Avoiding congestion at peak times/better dispersal	*
3.	Maintaining heritage values of the existing bridge ( <i>link to Item 34</i> )	***
4.	Keeping noise and pollution of a new bridge where they already are	*
5.	Improving traffic efficiency including approaches ( <i>link to Item 2</i> )	***
6.	Enhancing the future growth of Grafton	**
7.	Feeling/being safe and comfortable when crossing the bridge and approaches as well as the surrounding road and viaducts	
8.	Recognising the need for emergency access	
9.	Recognising the need for emergency access during construction phase	
10.	Minimising visual impact (new and old bridge) ( <i>link to Item 34</i> )	*
11.	Incorporating indigenous values	
12.	Mitigating impact on local roads	
13.	Keeping heavy vehicles out of the main street	
14.	Maintaining aesthetics and user values of the existing bridge from the river	
15.	Maintaining access to the river above Grafton	
16.	Keeping noise impacts to a minimum	*
17.	Meeting heavy vehicle requirements through Grafton	**
18.	Providing an alternative route (Summerland Way-Gwydir Highway, Summerland Way-Pacific Highway, Armidale-Grafton) ( <i>link to Item 33</i> )	*
19.	Maintaining safety for vessels using the river	
20.	Improving the economic and social requirements of the city (long term) – increasing the volume of consumers in the city ( <i>link to Item 39</i> )	**
21.	Avoiding environmental impact on residential areas	
22.	Not increasing flooding impacts	
23.	Providing a ring road scenario	
24.	Ensuring a robust process is followed (not having emotion rule)	
25.	Meeting broad project objectives	**
26.	Meeting future traffic needs	
27.	Avoiding islands and minimising environmental impacts	*
28.	Removing /minimising pollution and the nuisance from heavy vehicles	*
29.	Ensuring the balance between local/wider issues	
30.	Minimising indigenous impacts	
31.	Minimising impacts on the river/maintaining the aquatic venue for activities	*
32.	The use of new infrastructure	
33.	Providing an alternative crossing	
34.	Maintaining heritage streetscapes and properties	

## What's Important (Cont.)

No.	What's Important	Rating
35.	Maintaining existing bridge as an icon	
36.	Ensuring least number of residents' properties are disrupted	
37.	Providing a vision for the future (long term)	
38.	Achieving best economic outcome/value for money	
39.	Reducing unnecessary traffic in CBD	
40.	Improving accessibility for residents and businesses	
41.	Minimising impact of bridge on river hydrology	
42.	Maintaining a reasonable level of access to properties	

Upon reflection, the workshop group concurred that there was overlap in the list. However, the list reflected the items considered important that the project needs to address as planning proceeds. This "What's Important" list (as well as other information such as the project objectives) would later be used in the workshop to develop and fine tune assessment criteria to evaluate the options for consideration.

## The Problem Situation

The group reflected on the background paper material as well as from their own perspectives and identified the problems causing the need for a project (ie. the "Problem Situation"). These were recorded as a mix of the following:

- Reducing delays on the existing bridge and approaches
- Significantly reducing road accidents and injuries
- The need to improve economic development in Grafton
- The need to improve access for the local and State Road network

## Project Purpose and Objectives

Having discussed the problems causing the need to consider a project, the group reviewed the project purpose and objectives (ie. what must the project achieve to be successful) as stated in the presentations and in the background papers distributed prior to the workshop. The group agreed with the purpose and objectives of the project which are restated below.

### *Purpose of the Project*

The purpose of the project is to provide an additional crossing of the Clarence River at Grafton in order to improve road safety, reduce traffic delays and provide improved access for the local and State road network between north and south of the Clarence River

### *Project Objectives*

The group agreed that the project should:

- Significantly improve traffic efficiency
- Significantly reduce the potential for road accidents and injuries
- Be socially acceptable to the regional and local community
- Support economic development
- Be managed in accordance with Ecologically Sustainable Development Principles (minimise the impact on the environment)
- Achieve maximum effectiveness of expenditure (value for money)

## Givens and Constraints

The group reflected on the Givens and Constraints that the project was being developed within as stated in the background paper for the workshop. The group discussed and amended these as appropriate. The givens and constraints agreed to were recorded as:

- Funding is available for the selection of a preferred crossing
- The project was initially driven by the community to reduce delays at the existing bridge and this is a key driver of the project
- The existing bridge will be retained
- Three options are being considered for selection of a preferred option
- The existing “kinks” will need to be modified for Options 2a and 2b (*subject to approval from Heritage Council*)
- Option 1 will be two lanes (one lane in each direction)
- Options 2a and 2b will be two lanes on a new bridge in one direction and two lanes on the old bridge in the other direction. (*This was not agreed to as a given at this stage of the workshop and needs to be resolved as planning proceeds*)
- Start and end points for Option 1 are from Ryan Street on the southern side to Victoria Street on the northern side
- Start and end points for Options 2a and 2b are from the southern approach on Bent Street, adjacent to KFC (*This could be extended if it is the preferred option – needs to be resolved as planning proceeds*)
- The objective of the workshop is to provide a recommendation for a preferred crossing
- The Minister for Roads will announce the preferred crossing
- The project objectives cannot be achieved without an additional crossing

## Assumptions

The group (in focus groups) identified assumptions being made about the project from various perspectives. The recorded assumptions of each focus group were assessed by the whole group using the assessment table below. This allowed participants to further share information about the project and find out about the various views being held within the group.

### Assessment Table

Key	Assessment Explanation
✓	It is safe to proceed with planning on the basis of this assumption
✱	There is some doubt or uncertainty about this assumption and it needs to be resolved as the project planning proceeds

Topics for each group gave focus to the assumptions identified. The topic for each focus group is listed below:

- **Focus group 1: Key Planning/Design Parameters**
- **Focus group 2: Local Traffic, Safety and Access Assumptions**
- **Focus group 3: Environmental, Heritage and Social Assumptions**
- **Focus group 4: Through Traffic, Business and Urban Planning Assumptions**

Each focus group's assumptions and the whole group's assessment are listed below.

### Focus group 1: Key Planning/Design Parameters

No.	Assumptions	Category
1.	Built to Australian Standards/best practice both construction and design	✓
2.	There are RailCorp height restrictions to comply with for bridge and approaches (on Option 2b) – to be resolved as planning proceeds	✱
3.	Maintain existing heights restriction for Waterway requirements	✓
4.	Comply with environmental legislation (Federal, State and Local Government)	✓
5.	The bridge design will be aesthetic, pleasing, compliments the area	✓
6.	Comply with heritage requirements (Federal and State)	✓
7.	Use appropriate pavement standards – surface, widths, minimise noise	✓
8.	Design life of materials will consider future maintenance needs	✓
9.	Will cope with projected future traffic needs	✓
10.	Will undertake works on local road system (ie. road approaches, additional local roads require upgrading to be effective with the new bridge, redirection of traffic/remove load from existing roads)	✱
11.	Planning for mitigation measures (ie. noise, other treatments, etc)	✓
12.	Comply with RTA policies and procedures	✓
13.	Comply with State and local government policies and guidelines (ie. LEP, Heritage requirements, EPA, NSW Fisheries, DIPNR requirements, etc)	✓
14.	Design will consider constructability issues but still needs to be resolved as planning proceeds	✓

### Focus group 2: Local Traffic, Safety and Access Assumptions

No.	Assumptions	Category
1.	The existing bridge will be structurally adequate for next 30 years	✓
2.	Villiers Street roundabout will be adequate for next 30 years	✓
3.	U-turn bay on southern side would be eliminated (Option 2a and 2b)	✱
4.	Villiers Street roundabout will require modification after 30 years	✱
5.	Left-turn movement from Clarence Street onto the bridge to be retained	✱
6.	For Option 1, more traffic will use Victoria Street	✓
7.	It will be possible to meet existing ground levels at Victoria Street for Option 1	✓
8.	Villiers Street viaduct vertical clearance can be increased	✓
9.	1% pa growth in traffic (using existing bridge) for our 30 year horizon (includes all traffic)	✓
10.	Duke Street viaduct is still available for traffic	✓
11.	Heritage Council will approve modifications to existing bridge	✱
12.	Should trees be removed on any option, the approval authority is Council	✓
13.	Safety will be improved and accidents decreased by undertaking the project	✓
14.	Pedestrian movements across the approach roads will be more difficult and appropriate arrangements will be required	✓
15.	B-doubles will remain on restricted time access	✱
16.	For Option 2, left-turn into Riverside Drive (northbound traffic) will be possible	✱
17.	B-triples will not access either bridge on any option	✓
18.	KFC access is available via Fitzroy Street	✓
19.	Bent Street residents/business will continue to have access	✓

### Focus group 3: Environmental and Heritage Assumptions

No.	Assumptions	Category
1.	Environmental impact will be minimised – at least meet environmental legislation (better if possible) eg. noise, air, water, fauna, floral	✓
2.	Impact on indigenous cultural heritage and site/place heritage will be minimised	✓
3.	Impact on non-indigenous cultural heritage will be minimised (ie. existing bridge, streetscapes, heritage houses/buildings, LEP heritage items/areas, etc)	✓
4.	Impacts on passive/active use of river and river foreshores will be minimised	✓
5.	Adverse hydrological and geometric impacts will be minimised	✓
6.	Bridge design will be compatible with heritage/environment	✓
7.	Minimise impacts on property and residents	✓
8.	Visual/aesthetic impacts on landscape will be minimised	✓
9.	Traffic flows will improve	✓
10.	The fabric of Grafton will be maintained	✓
11.	Amenity and safety in crossing the bridge will be improved	✓
12.	The iconic value of existing Grafton Bridge will be maintained	✓
13.	Social impact on residents and community (ie. noise; property; access; pollution; neighbourhood precincts; open space, etc) will be minimised	✓

### Focus group 4: Through Traffic, Business and Urban Planning Assumptions

No.	Assumptions	Category
1.	Surveys reflect normal traffic conditions (ie. 12 hour count with number plates. 24 hour data for all traffic)	✓
2.	Lowering of road at Villiers Street is feasible	✓
3.	The local businesses rely on the existing bridge for access	✓
4.	Future urban development will be at Junction Hill, Clarenza, Waterview Heights	✓
5.	Clarence regional strategy information used for traffic growth projections	✓
6.	There is a strong pull between Grafton and South Grafton	✓
7.	Shopping Centre developments will remain	✓
8.	Sub-divisions in South Grafton will occur as planned	✓

## Developing the Assessment Criteria

Before reviewing the crossing options, the group established assessment criteria with which to evaluate the options. Firstly as a starting point, the draft assessment criteria as outlined in the background papers were presented to the group and their alignment with the project objectives explained.

The draft assessment criteria were categorised under the streams of Functional Performance, Social Impacts and Environmental Impacts (ie. an examination of a “triple bottom line” approach). The criteria as listed in the background papers are listed below:

#### **Functional Criteria**

- Reduce delays at existing bridge in peak hour (Level C in 30years)
- Provide adequate vertical clearance for heavy transport on the Summerland Way
- Reduce through traffic from CBD (including heavy vehicles)
- Reduce potential road accidents and injuries (bridge, approaches and connecting intersections)

### ***Social Impact Criteria***

- Minimise flooding impacts
- Minimise impacts on the social environment
- Minimise the impacts on access for the community
- Improve opportunity for economic and tourist development

### ***Environmental Impact Criteria***

- Minimise impacts on the natural environment
- Minimise impacts on heritage
- Minimise impacts of traffic noise on existing noise sensitive developments

Secondly, a focus group examined the “What’s Important” statements identified earlier including those considered collectively by the whole group as more important. The focus group added to the criteria under the various categories, the relevant “What’s Important” statements which had not been already covered, for consideration by the whole group. Other criteria were also raised but were considered needed to be met by all options and would not be useful as a criteria to differentiate between options

There findings are presented below:

### ***Functional Criteria***

All “What’s Important” statements were covered except for:

- Accessibility for emergency services
- Access to and from river and up and down river

### ***Social Impact Criteria***

All “What’s Important” statements were covered except for:

- Feelings of safety and comfort when using the crossing
- Inclusion of indigenous values
- Iconic value of the existing bridge
- The footprint required/No. properties affected

### ***Environmental Impact Criteria***

All “What’s Important” statements were covered except for:

- Sustainability and accommodating future growth
- Controlling pollution
- River hydrology
- Visual impact/aesthetics of the crossing

### ***Other Criteria***

- Road network integration/efficiency/linkages
- Robustness of process
- Balancing local and regional needs
- Contributing to the city’s/region’s vision for the future

The group was now in a position to consider the draft assessment criteria and other criteria developed from the “What’s Important” statements to determine which criteria were most appropriate to be used to evaluate the crossing options.

After discussing the criteria and their categorisation, the assessment criteria identified under each of the “triple bottom line” categories accepted by the whole group to evaluate the crossing options were:

**Functional Criteria**

- Reduce delays at existing bridge in peak hour (Level C in 30years)
- Provide adequate vertical clearance for heavy transport on the Summerland Way
- Reduce through traffic from CBD (including heavy vehicles)
- Reduce potential road accidents and injuries (bridge, approaches and connecting intersections)
- Provision of emergency access

**Social Impact Criteria**

- Minimise impacts on the social environment
- Minimise the impacts on access for the community
- Improve opportunity for economic and tourist development
- Usage of river
- Minimise impact on properties affected (built environment)
- Minimise negative visual impact

**Environmental Impact Criteria**

- Minimise impacts on the natural environment
- Minimise impacts on non-indigenous heritage (including values)
- Minimise impacts of traffic noise on existing noise sensitive developments
- Minimise flooding impacts/river hydrology impacts
- Minimise impacts on indigenous heritage (including values)
- Minimise impacts on air quality

**Weighting of Assessment Criteria**

Relative weightings for the assessment criteria in each stream of the triple bottom line categories were undertaken qualitatively by the whole group using a paired comparison technique. The discussion in undertaking this task was extensive and allowed the group to understand and appreciate the various perspectives represented within the group. The final weightings were reached on a consensus basis. The group’s workings and their weightings of the assessment criteria for each category are shown below:

**Functional Assessment Criteria**

No.	Criteria	Raw Score	Relative Weightings
A.	Reduce delays at existing bridge in peak hour	4	50
B.	Provide adequate vertical clearance for heavy transport on Summerland Way	0	0
C.	Reduce through traffic from CBD (including heavy vehicles)	0	0
D.	Reduce potential road accidents and injuries	3	38
E.	Provide for emergency access	1	12
	<b>Total</b>	<b>8</b>	<b>100%</b>

## Scoring Matrix

The workings for the relative assessment are shown below.

	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>A</b>	N/A	2A	1A	1A
	<b>B</b>	N/A	N/A	N/A
		<b>C</b>	1D	1E
			<b>D</b>	2D
				<b>E</b>

The extent one criteria was preferred by the group over another was indicated by using the scoring system below:

3. Major Preference
2. Medium Preference
1. Minor Preference

## Summary

The weighting of the assessment criteria for Functional Performance using the paired comparison methodology indicated that the **“Reducing delays at the existing bridge in peak hour”** was the most important criteria followed by the **“Reducing potential road accidents and injuries”** on the next level of importance. This was followed by **“Provision of emergency access”** in importance. **“Reducing through traffic from the CBD”** although important was not considered as important as the other criteria when compared in pairs and scored zero. Also the criteria, **“Providing adequate clearance for heavy vehicles on the Summerland Way”** was not compared by the group as they believed although it was required, it could not be used to differentiate between the options.

## Social Impact Criteria

No.	Criteria	Raw Score	Relative Weightings
A.	Minimise impacts on social environment	7	23
B.	Minimise impacts on access for the community	1	3
C.	Improve opportunity for economic and tourist development	9	29
D.	Usage of river	0	0
E.	Minimise impact on properties affected (built environment)	3	10
F.	Minimise negative visual impact	11	35
	<b>Total</b>	<b>31</b>	<b>100%</b>

## Scoring Matrix

The workings for the relative assessment are shown below.

	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>A</b>	3A	1C	3A	1A	1F
	<b>B</b>	3C	1B	1E	3F
		<b>C</b>	3C	2C	1F
			<b>D</b>	2E	3F
				<b>E</b>	3F
					<b>F</b>

The extent one criteria was preferred by the group over another was indicated by using the scoring system below:

3. Major Preference
2. Medium Preference
1. Minor Preference

### Summary

The weighting of the assessment criteria for Social Impacts using the paired comparison methodology indicated that the **“Minimising negative visual impacts”** was the most important criteria followed by the **“Minimising impacts on the social environment”** and **“Improving opportunity for economic and tourist development”** on the next level of importance, then **“Minimising impact on properties affected (built environment)”** on the next level of importance followed by **“Minimising impacts on access for the community”** in importance. **“Usage of the river”** although important was not considered as important as the other criteria when compared in pairs and scored zero.

### Environmental Impact Criteria

No.	Criteria	Raw Score	Relative Weightings
A.	Minimise impacts on natural environment	0.5	2
B	Minimise impacts on non-indigenous heritage (including values)	5.5	18
C.	Minimise impacts of traffic noise on existing noise sensitive developments	10.5	35
D.	Minimise flooding impacts/river hydrology impacts	8	27
E.	Minimise impacts on indigenous heritage (including values)	0.5	2
F.	Minimise impacts on air quality	5	16
<b>Total</b>		<b>30</b>	<b>100%</b>

### Scoring Matrix

The workings for the relative assessment are shown below.

	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>A</b>	2B	3C	3D	A/E	2F
	<b>B</b>	B/C	3D	1B	2B
		<b>C</b>	1C	3C	3C
			<b>D</b>	2D	1F
				<b>E</b>	2F
					<b>F</b>

The extent one criteria was preferred by the group over another was indicated by using the scoring system below:

3. Major Preference
2. Medium Preference
1. Minor Preference

### Summary

The weighting of the assessment criteria for Environmental Impacts using the paired comparison methodology indicated that the **“Minimising impacts on traffic noise on existing noise sensitive developments”** was the most important criteria followed by **“Minimising flooding impacts/river hydrology impacts”** on the next level of importance, then the **“Minimising impacts on non-indigenous heritage (including values)”** and **“Minimising impacts on air quality”** on the next level of importance followed by **“Minimising impacts on natural environment”** and **“Minimising impacts on indigenous heritage (including values)”**.

A summary of the weightings of the assessment criteria within the triple bottom line categories as determined by the group appears below.

<b>Assessment Criteria</b>					
<b>Functional</b>		<b>Social Impacts</b>		<b>Environmental Impacts</b>	
<b>Criteria</b>	<b>Wt</b>	<b>Criteria</b>	<b>Wt</b>	<b>Criteria</b>	<b>Wt</b>
Reduce delays at existing bridge in peak hour (Level C in 30yrs)	50%	Minimise impacts on the social environment	23%	Minimise impacts on the natural environment	2%
Provide adequate vertical clearance for heavy transport on Summerland Way	Not Used	Minimise the impacts on access for the community	3%	Minimise impacts on non-indigenous heritage (including values)	18%
Reduce through traffic from CBD (including heavy vehicles)	0%	Improve opportunity for economic and tourist development	29%	Minimise impacts of traffic noise on existing noise sensitive developments	35%
Reduce potential road accidents and injuries (bridge, approaches and connecting intersections)	38%	Usage of river	0%	Minimise flooding impact/river hydrology	27%
Provision of emergency access	12%	Minimise impact on properties affected (built environment)	10%	Minimise impact on indigenous heritage (including values)	2%
		Minimise negative visual impact	35%	Minimise impact on air quality	16%

These weighted assessment criteria would later be used to evaluate the various crossing options for the project.

Having built a foundation and common understanding of the problems and issues, the objectives (what the project is to achieve), assumptions and the assessment criteria for option evaluation, the group was now in a position to broadly review the crossing options shortlisted for the project.

### **Appendix 3. Crossing Option Review, Evaluation and Recommendation**

# Crossing Option Review, Evaluation and Recommendation

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## Crossing Option Presentations

The Project Team led by Peter Black, Project Team Manager, RTA presented key investigations to the group of the options being considered. The crossing options as well as their advantages and disadvantages are described in the background paper distributed prior to the workshop. In short, the crossing options (as shown in **Figure 1**) consist of:

- **Option 1 – Villiers Street/Abbott Street.** The limits of this option are from the Gwydir Highway (Ryan Street) at the southern approach to Victoria Street at the northern approach. The crossing would be 2 lanes, with 2 way flow. Traffic facilities such as roundabouts would need to be provided at Ryan Street and Victoria Street connections but this would be subject to concept design and community consultation
- **Option 2a – At the Existing Bridge (directly upstream).** This option is directly upstream of the existing bridge. The level of the bridge would be at, or just below, the roadway on the existing bridge. The new crossing would be 2 lanes, with one way flow and the existing crossing would change to one way flow. This would require modification to the 'kinks' on the existing crossing. The limits of this option are from Bent Street at the southern approach to the existing bridge (opposite the Nursing Home), to the northern approach at Craig Street (opposite KFC). On the southern approach, an additional southbound lane would be provided to allow four lanes (two lanes each way) on this approach
- **Option 2b – At the Existing Bridge (directly downstream).** This option is directly downstream of the existing bridge. The level of the bridge would be at, or just above, the roadway on the existing bridge. The new crossing would be 2 lanes, with one way flow and the existing crossing would change to one way flow. This would require modification to the 'kinks' on the existing crossing. The limits of this option are from Bent Street at the southern approach to the existing bridge (opposite the Nursing Home), to the northern approach at Craig Street (opposite KFC). On the southern approach, an additional southbound lane would be provided to allow four lanes (two lanes each way) on this approach.

It should be noted that the shortlisting of localities from which the options were developed had been undertaken after an investigation process involving the project team and local government input. As a result no further options were considered in the workshop. However, it was acknowledged that whichever preferred option moved forward for further development, there would be a level of fine tuning and improvement undertaken with mitigation measures employed to address any adverse impacts.

Key points made in the presentation and background papers are outlined below.

### Video Presentation

A brief video presentation indicating traffic queuing and roundabout functionality at Villiers Street intersection was shown. It was noted that the maximum capacity during the peak across the bridge was 2,400 vehicles/hour (ie. approx. 1,200 vehicles/hour in each direction). Due to the narrow lanes and the 'kinks' in the bridge, traffic slows when opposing flows are quite close under these circumstances. This is exacerbated in the morning peak (usually between 8:20 am and 9:00am) when school buses are also accessing the bridge.

The queuing from the bridge quickly builds back to and across the roundabouts on both sides of the bridge. The functionality and capacity of the roundabouts are in themselves more than adequate to meet projected traffic demand.

### Construction Form

There are several forms that the bridge construction could take and whilst each would perform well technically, the urban design aspect will be a critically important issue. A particularly important aspect of the design is the piers in the river and how they will generally align and impact visually (particularly in relation to the existing bridge). There is a design challenge with the irregular span widths of the existing bridge and the minimum span width to comply with river navigation requirements. This will be the subject of investigation in the next stage of development depending on the preferred option recommended.

## **Traffic and Safety**

The traffic investigations considered:

- Urban growth in the Grafton area and in nearby centres 30 years into the future
- Traffic issues raised by the community during the consultation process
- Future traffic growth and needs up to 30 years
- A review of existing data and collection of additional traffic data
- Traffic modeling and analysis
- A benefit cost analysis based on traffic modeling outputs and project cost estimates.

The results of the traffic investigations are detailed below.

### ***Vehicle Classification Counts***

Vehicle classification counts determine the types of light and heavy vehicles that use the road. Vehicle classification counts were conducted for the week ending Sunday 21 September 2003 in various locations on the Summerland Way and residential streets in Grafton.

Daily volumes during the survey week progressively increased from 24,000 on Monday to 28,000 on Friday whilst weekend volumes were considerably lower. The figure of 26,000 vehicles per day on the bridge was used for analysis purposes as it reflects typical weekday traffic flows.

The traffic volumes recorded for Junction Hill are considerably lower than those at the Clarence River Bridge and give an initial indication that the majority of traffic that use the existing bridge is local traffic rather than through traffic using the Summerland Way.

### ***Origin and Destination Survey***

To determine where traffic was traveling to and from, an Origin and Destination Survey was conducted over a 12 hour period between 7am and 7pm during Thursday 18 September 2003. During the survey, vehicle classification counters were installed at eight specified locations. The number plates of all heavy commercial vehicles (i.e., articulated vehicles Austroads Class 6 and above), and all "red" cars were recorded to track heavy commercial vehicles and the proportion of cars that turned off the Pacific Highway and traveled north through Grafton to the Summerland Way.

The daily volumes recorded on that day at the Clarence River Bridge were 13, 440 northbound and 13,335 southbound, totaling 26, 775. Of the 26,775 vehicles that used the bridge on the survey day, less than 1000 (3.7%) of those vehicles also traveled through Junction Hill. Only 70 of the 400 heavy commercial vehicles using the bridge on the survey day were 'through traffic'. Further investigations were undertaken to determine the number of log trucks that turned off the Summerland Way at Junction Hill to access the timber mills. These were not counted in the original origin and destination survey and there would be another 22 log trucks per day that would be classified as through vehicles bringing the total to 92 out of 400 were 'through traffic'.

Results of the origin and destination survey therefore indicate that the main traffic flows across the Clarence River Bridge are to and from Grafton. A very small percentage is through, or bypass, traffic.

### ***Heavy Vehicles***

The 2003 survey showed that total heavy vehicles accounted for 5% of total traffic during peak hour traffic.

### ***Road Capacity***

Previous traffic counts indicate that during 2001 the peak traffic period is 2.5 hours per day, typically comprising 45 minutes in the morning (8:15–9:00 am) and 1 hour 45 minutes in the afternoon (3:30–5:15 pm). Recent traffic counts indicate that afternoon peak hour traffic is busier than the morning peak hour traffic. However, the traffic during the morning peak hour is more concentrated. Similar, pm-peak hour traffic occurs on the bridge between 4:30-5:30 pm but is less intense and queuing is not as extensive as the morning period.

It is anticipated, the peak period would extend to 3 hours by 2011 and the delays currently experienced in the morning peak leading up to 9:00am would be common for the whole period, morning and afternoon. This would mean longer traffic delays.

### ***Intersection Capacity***

Previous traffic investigations conducted indicate that the Villiers Street/Fitzroy Street and Through Street/Bent Street roundabouts would continue to operate satisfactorily if the existing bridge were to be duplicated. Traffic modeling indicated that these intersections would be able to accommodate an increase in traffic of up to 30%, which is the predicted growth (1%) for the next 30 years.

The Villiers and Fitzroy Street roundabout would reach practical capacity in about 30 years for Options 2a and 2b. The two roundabouts in Bent Street (Options 2a and 2b) on the southern side of the river would function satisfactorily for the 30 year period but may require traffic management for other reasons, eg, pedestrians, turning paths for trucks, and unexpected increased turning volumes for certain movements.

### ***Pedestrians***

Pedestrians are well catered for on the existing bridge with a footpath on both sides at rail level. No additional pedestrian facilities would be provided for Options 2a and 2b. A pedestrian/cycleway would be considered for Option 1.

### ***Future Traffic Volumes and Associated Impacts***

Traffic data collected from the vehicle classification counts and the origin and destination survey has been used to predict future volumes on the three options being considered.

**Option 1:** Would attract considerable traffic (11,000 vpd) off the existing bridge, due to its proximity to the existing bridge and the Pacific Highway. Much of the South Grafton traffic and the majority of the Gwydir Highway traffic would be attracted to this Option. Some traffic would use Victoria Street to disperse prior to entering the Villiers Street / Fitzroy Street roundabout. This would have some benefits for the intersection but the additional traffic in Victoria Street would have impacts on parking and safety.

Traffic volumes in Villiers Street to the north of Fitzroy Street would not necessarily increase to any significant degree. Option 1 would need the Villiers Street southern approach widened to 2 entry lanes into the roundabout at Fitzroy Street. There would be less traffic entering the Fitzroy St roundabout compared to Options 2a and 2b because some traffic would use Victoria Street. This would mean slightly less congestion at the roundabout in the long term.

Option 1 would reduce the delays on the existing bridge in the short term but the existing bridge would reach current volumes in the 30 year analysis period.

**Option 2a and 2b:** Both options would have the same traffic benefits. A second bridge located adjacent to the existing bridge, either directly upstream or directly downstream, provides the highest traffic benefits of the crossings considered due to two travel lanes being available in one direction on the existing and additional crossing. This would require modification of the 'kinks'. A 2 lane, one way facility provides better travel conditions – freedom to maneuver, ability to pass slower vehicles, extra capacity. However, the impact on existing intersections is greater because Options 2a and 2b centralises traffic flows. Option 1 distributes traffic more widely.

Traffic modeling shows that the Villiers Street / Fitzroy Street intersection would operate satisfactorily under its current configuration within the 30 year period. The intersection on the southern approach at Bent Street/Through Street is shown to function satisfactorily but may require traffic management within 30 years.

Option 2a and 2b would reduce the delays on the existing bridge in the long term by eliminating the peak hour delays for the 30 year analysis period.

## **Environment**

### ***Ecology***

Potential impacts as a result of an additional crossing in the study area would include the removal of native vegetation, loss of vegetation structure and riparian vegetation, the spread of noxious weeds and new weed propagules to the area. It is anticipated that the level of impact would be minimal in Options 1, 2a and 2b that have previously been disturbed and cleared and consist mainly of rural agricultural pastures or built environments. Option 1 would require the removal of a large fig tree in Villiers Street which is part of the Grafton Conservation Area (National Estate Register). Options 1, 2a and 2b would impact on riverweed bed habitat.

The southern approach to Option 2a would impact on a revegetated area on the southern bank of the Clarence River. In addition the Options also have the potential to impact upon landscape trees located within each of the localities, through widening potential works associated with the Proposal. These trees mainly include species within the genera of *Brachychiton*, *Ficus* or *Jacaranda* that are located throughout the streets of the City of Grafton and are of local heritage significance.

It is anticipated that Options 2a and 2b would have the least impact as these Options do not lie close to any remnant vegetation and would be confined to an existing area of wildlife movement obstruction and potential road strike. However, there is the potential that the existing bridge may provide habitat and shelter for micro-chiropteran bat species and some bird species.

Option 1 has the potential to affect a large fig tree that is likely habitat for bat species, and may cause a barrier to fauna movement, particularly bat species, due to its closer proximity to Susan Island.

During construction, the Options may cause primary impacts such as loss of riparian and sub tidal fish habitat due to disturbance of the foreshore, shading, bed scouring, and accelerated sedimentation. The operation of the Options may result in secondary impacts such as long term barriers to fish movements, changes to habitat in particular aquatic plant communities, increased pollution, and alter the frequency of flooding by altering bank heights. Floodplains provide important food sources and spawning grounds for fish during floods and allow fish to move between rivers, creeks and wetlands (NSW Fisheries, 1999).

Option 1 would have a greater impact upon fish habitat than Options 2a and 2b due to the potential disturbance to existing weed beds. It is considered that Options 2a and 2b would have the least potential impact due to the lack of existing habitat. The positioning of bridge piers for Options 2a and 2b is likely to be similar to the existing bridge and require less number of piers than Option 1 due to bridge length.

### ***Air Quality***

The operation of the Options has the potential to alter existing air quality through changes in traffic volumes and travel behaviour. Emissions to the atmosphere during the operational phase would predominantly be emitted from the combustion of fuel used in vehicles. Typical emissions for both phases would include carbon monoxide, nitrogen dioxide, hydrocarbons, particulate matter and carbon dioxide.

Option 1 is likely to have the greater increase in emissions due to the increase in traffic volumes (up to 11,000 vpd in Abbott Street), while Options 2a and 2b would have a slight decrease in emissions due to the improvement of traffic flow, including reduction of stoppages at the 'kinks'.

### **Cultural**

#### ***Indigenous Heritage***

The potential for Indigenous heritage within and surrounding Options 1 and Option 2a is generally low as much of the riverbank and floodplain in these areas has been disturbed from flooding, levee construction, agricultural practices and landscaping works associated urban development. However, some sub surface material of disturbed nature may still be present in these areas.

The potential for Indigenous heritage within and surrounding Option 2b is relatively high. A place of Aboriginal ceremony and dreaming has been identified downstream of the existing bridge, along the southern bank of the river. The potential for further presence of dreaming and ceremonial sites associated with the Clarence River is also likely.

In general, the Indigenous community has recorded all of the study area as a significant Indigenous area for a variety of reasons.

#### ***Non-Indigenous Heritage***

Non-Indigenous Heritage items are located within the vicinity of all three Options. Heritage items within the vicinity of Option 1 include items within the Conservation Area of the North Coast REP, Grafton LEP and register of National Estate, and heritage trees as defined by the LEP. Such trees have the potential to be impacted by road widening works associated with the Proposal. Impacts upon items within the Conservations areas would be dependant upon the local significance of such items, such as the local schools and churches.

Option 2a would avoid the remains of the S.S Induna located 200m west of the existing bridge on the south bank of the river and the Bow Memorial within Earle Page Park, although may affect a small portion of the Park land. Option 2a also has the potential to impact upon the heritage listed rail viaducts with the modification of the 'kinks', State Heritage listed Clarence River Bridge and heritage trees defined by the Grafton LEP. This Option also falls within the Conservation Area of the North Coast REP.

Option 2b is likely to have the least impacts in comparison to Options 1 and 2a, however Option 2b still has the potential to impact upon the rail viaducts with the modification of the 'kinks' and the State Heritage listed Clarence River Bridge. Option 2b would have the least visual impacts upon the existing Bridge.

Note that any modifications to the existing bridge would require approval from NSW State Heritage Office. In addition, approval from the Minister for the Environment and Heritage would be required for any action that takes place, which has, or is likely to have, a significant impact on national heritage values within the Grafton Conservation Area.

### **Hydrology**

The Clarence River is the largest New South Wales coastal river with a catchment of some 19,820 sq km. The river system has a long history of flooding. The river is essentially confined at Mountain View, 14 km upstream of Grafton, but gradually spreads to an expansive floodplain downstream of Grafton. In response to the disruption of flooding, major levees have been constructed at North Grafton, South Grafton, and along the river banks in the downstream rural areas. The levees at North Grafton notionally provide protection to the one percent AEP flood, but with no freeboard. However, recent floods in 1996 and May 2001 have shown that the grade of the levee crest downstream of the existing bridge may not provide the expected level of protection. A levee failure in Grafton would create a major "disaster" situation within Grafton, with substantial damage to public and private property and an attendant risk of loss of life.

The proposed design standards for the assessment were:

- Afflux (increase in flood levels upstream) in the 1% AEP flood should not exceed 100 mm upstream of the existing bridge and 50 mm downstream of the existing bridge
- Afflux created at the road design level should not exceed 200 mm
- Road shoulder level to be set at the design flood level plus allowance for 200 mm afflux

The above design considerations are based on maintaining the flood protection provided. Preliminary assessment of affluxes created by the bridges on the three options is shown below (**Table 1**).

**Table 1: Afflux Comparison of Options**

<b>Option</b>	<b>Afflux</b>
1	0.05m
2a	0.075m
2b	0.075m

The Clarence River County Council commissioned an extensive flood study of the Clarence River in 1999. The draft report was publicly released in December 2003 and after the Hydrology Report for the project was completed.

The CRCC report has been examined to identify differences that might affect the route and bridge evaluation process. In the evaluation process, the major items of concern are peak flood discharge and peak flood level for the 100 year Average Recurrence Interval (ARI) (1 percent Annual Exceedence Probability, AEP) flood.

The design 100 year ARI flood is an important sized flood, given:

- It represents the normal "flood" used for bridge design
- The levee system at Grafton was notionally designed to protect against this flood

A comparison of critical items for the design 100 year ARI flood as used in the Hydrology Report for the project and in the CRCC report appears below (**Table 2**).

**Table 2 Comparison of Design Parameters**

<b>Design Parameter</b>	<b>Hydrology Report</b>	<b>CRCC Report</b>
Peak Flow (cu m/sec)	20,600	19,060
Peak level, Prince Street (m AHD)	8.27	8.36

It is also noted that the 1985 report "South Grafton Levee Augmentation Study" used a peak flow of 20,600 cu m/sec and a predicted level of 8.15 m AHD. Comparison of the information in **Table 1** above shows little difference between the information used in the Hydrology Report and that shown in the CRCC Report. It is concluded there is not a need to modify the recommendations of the Hydrology Report. Comparison of the underwater bed profiles is being undertaken for:

- 1910 as per Bridge Design Drawing
- 1983 PWD hydro survey
- 2001 RTA survey
- 2004 RTA survey

Comparison of the surveys shows up to five metres of erosion is evident between the 1910 profile and 2001 profile. Inspection and bed sampling on 1 April 2004 showed that the bed at Piers 2 and 3 scoured to the bedrock with no signs of undercutting and that the bed material generally consisted of fine sand.

The proposed bridge is envisaged as using piles socketed into the underlying rock. This construction thus can be designed such that the erodible bed material is not required for structural strength. In terms of restricting the changes to sediment movement that occurs during floods and the impact on the existing bridge, the ranking of the route options would be:

- Rank 1: Option 1 as this structure is the most upstream and furthest from the existing bridge
- Rank 2: Option 2b as at this location, the new structure will cause less turbulence and hence erosion against the existing structure
- Rank 3: Option 2a

**Noise**

Further investigations have been conducted into operational noise issues associated with Options 1, 2a and 2b. This included further noise monitoring to determine existing background noise levels and noise predictions for each of the Options.

**Noise Monitoring**

Existing background noise levels were measured using two noise data loggers from 15th to 23rd September 2003 and six data loggers from 17th to 30th March 2004 at the closest residences on the northern and southern sides of the Clarence River, upstream and downstream of the existing bridge.

**Table 3 represents a summary of the measured assessment background noise levels (ABL) and ambient noise levels for Daytime (LAeq, 15hr) and Nighttime (LAeq, 9hr)**

Receptor	Measured Daytime dB(A) (7am to 10pm)	DEC Criteria for Daytime dB(A)	DEC Criteria Exceedance dB	Measured Nighttime dB(A) (10pm to 7am)	DEC Criteria for Nighttime dB(A)	Criteria Exceedance dB
North	57.0	60.0	-3.0	51.5	55.0	-3.5
South	57.4	60.0	-2.6	53.3	55.0	-1.7
1	52.5	55.0	-2.5	48.9	50.0	-1.1
2	58.1	60.0	-1.9	47.7	50.0	-2.3
3	61.7	N/a	-	51.6	N/a	-
4	51.5	50.0	1.5	39.4	50.0	-10.6
5	58.4	N/a	-	51.1	N/a	-
6	56.3	60.0	-3.7	49.5	55.0	-5.5

Note: Receptor locations include:

- 1: End of Abbot Street
- 2: Outside 43 Abbot Street
- 3: Outside music conservatorium
- 4: Convent facing Villiers Street
- 5 End of Catherine McAuley school oval
- 6: No. 4 McClymont Place

**Table 3** shows the measured daytime and nighttime traffic noise levels at residences North and South to be within the relevant DEC criteria by approximately 2 to 3 dB. All other locations also fall within the relevant DEC criteria except for location No. 4 located at the Convent facing Villiers Street.

## Noise Modelling

Table 4 provides a summary of the noise predictions including existing noise levels.

**Table 4 Summary of future noise levels modelled using traffic noise contours for (LAeq 15) Day time 7am – 10pm.**

Predicted Noise Levels	Southern approach	At the Crossing	Northern approach	DEC Noise Criteria - Daytime
Option 1	50 – 60dB(A)	55dB(A)	55 – 65dB(A)	40 – 55dB(A)
Option 2a	50 – 65dB(A)	50 – 60dB(A)	50 – 60dB(A)	60dB(A)
Option 2b	60 – 65dB(A)	55 – 60dB(A)	55 – 60dB(A)	60dB(A)

**Table 5 Summary of future noise levels modelled using traffic noise contours for (LAeq 9) night-time 10pm-7am.**

Predicted Noise Levels	Southern approach	At the Crossing	Northern approach	Dec Criteria Night-time
Option 1	45 – 55dB(A)	50dB(A)	50 – 60dB(A)	50dB(A)
Option 2a	40 – 55dB(A)	40 – 50dB(A)	40 – 50dB(A)	55dB(A)
Option 2b	50 – 55dB(A)	50dB(A)	45 – 50dB(A)	55dB(A)

Results of the noise modelling conclude that either Option 2a or 2b provide negligible impact when operated in conjunction with the existing bridge as a split two-lane configuration. This is primarily because the existing traffic volume would be split equally over two bridges combined with the increased noise shielding of both bridges being side by side. Most residents affected by traffic noise from the existing bridge are not likely to perceive a noticeable change in received noise levels from either Options 2a or 2b operating as a split two-lane configuration.

Option 1 significantly impacts sensitive land use, ie, a school and a place of worship, located either side of Villiers Street as well as residents on Abbot Street, all of which are not currently affected by significant traffic noise. Stringent DEC criteria for sensitive land use may significantly increase the difficulty for compliance with the implementation of feasible, cost effective noise mitigation measures.

In comparison of all three options against relevant DEC criteria including criteria for sensitive land use, Option 1 would generate noise levels that would exceed the recommended noise criteria, in some cases by 5-10dB(A). However, the implementation of this Option would marginally decrease existing noise levels at the existing bridge by attracting traffic away from that location.

The level of noise exceedence for both Options 2a and 2b are very similar with noise levels likely to be greater on the southern approach rather than the northern approach, although the exceedence is not as significant as noise levels associated with Option 1. Similar to Option 1, receptors on the opposing side of the existing bridge and preferred alignment may experience a slight decrease in noise. Option 2b may generally generate greater noise levels than Option 2a, as noise levels predicted tend to be a slightly greater.

## Social and Economic Impacts

### Social Impacts

Recent investigations undertaken have revealed that there are a number of concerns in the general community about the existing bridge. The community seems generally in agreement that a new crossing is necessary. Key reasons cited are the traffic delays currently experienced at peak hours on weekdays, the need for emergency services to be able to cross the bridge at all times without delays, and safety issues associated with trucks and buses using the existing bridge.

## Option 1

Positive social impacts with Option 1 include:

- Would alleviate the use of the existing bridge and Bent Street by heavy vehicles
- Improved access to city centre for residents of Waterview Heights, Coutts Crossing and South Grafton (particularly those on western side of Bent Street)
- Alternative access for emergency vehicles
- Land along Gwydir Highway and in this western section of South Grafton generally likely to become more attractive for commercial development
- Likely increase of traffic into the South Grafton business area generally improving business for proprietors in this location
- Is a direct route to the Summerland Way heavy vehicle detour along Villiers Street
- Reduced traffic in Bent Street would provide increased amenity to Bent and Fitzroy Street residents

Negative social impacts with Option 1 include:

- Impact on safety and amenity issues for children attending schools and conservatorium on the northern approach
- Potential noise impacts for conservatorium
- Potential access problems at Victoria Street
- Increased traffic could result in increased pollution into businesses in this location
- Increased traffic using Ryan Street to access this Option
- Loss of parking in the section of Villiers Street from the river to Fitzroy Street
- Loss of amenity to residences in Abbott Street
- Access concerns at intersection of Abbott Street with Kennedy Street
- Acquisition of one house may be required
- Impact on river users particularly sailing
- Loss of visual amenity for residents and businesses in Grafton and South Grafton with views over the river

## Option 2a and 2b

Positive social impacts with option 2a and 2b include:

- Better access into the city centre, with likely flow-on effects of increased spending by tourists and passing trade
- Improved access for emergency vehicles
- Continued high traffic flows along Bent Street and of benefit to proprietors in this location
- Retains existing traffic on Fitzroy and Bent Streets, and will result in little adverse strategic impacts on land uses
- Retains existing bridge approaches in Bent and Fitzroy Streets

Negative social impacts with Option 2a and 2b include:

- Uncertainty about impacts and development possibilities, which may manifest in individual community members through increased stress, anxiety or apathy about the future
- Changes to personal economic situations through changes to property values
- Land acquisition, including houses, would be affected. Refer to **Table 6** showing acquisition impacts for Option 2a and 2b
- Perceptions that individual property owners and residents will suffer because of decisions made for the benefit of the wider community
- Concerns over reduction in amenity values for residential areas likely to be affected
- Impact on recreation areas on the northern approach particularly the Sailing Club (Option 2a)
- Potential minor impact on Earle Page Park on the southern approach (Option 2a)
- Perception of changes in existing levels of community cohesion and integration
- Concerns over the heritage value of the existing bridge, and how any additional crossing may affect its amenity

### ***Economic Impact***

Results of discussions held to date with members of the business community in the study area conclude that the business and employment sector of the community seems generally in agreement that a new crossing is necessary. Businesses in Grafton cite difficulties of deliveries into the city centre and the fact that the perceived problems with the existing bridge may alter shopping preferences for customers. Many businesses appear to alter their business operations (in terms of trips and/or timing) because of the present level of congestion associated with the existing bridge.

#### **Option 1**

Positive economic impacts for Option 1 include:

- A potential increase in the number of customers and tourists into the city centre because of perceived increase in travel safety over bridge
- Quicker travel times for trips to work and making deliveries
- Increased access to regional areas, with flow-on economic benefits
- Ease of access for delivery trucks
- Buses would better able to meet timetables
- Flow on effects of reduced congestion, reduced emissions and noise at existing bridge
- Facilitation of urban growth and economic development within Grafton City

Negative economic impacts for Option 1 include:

- Disruption to businesses located at or near the additional crossing
- Changes to economic situations and business profitability through changes to traffic volumes past existing business in Bent Street
- The potential creation of business and industry development nodes

#### **Option 2a and 2b**

Positive economic impacts for Option 2a and 2b include:

- A potential increase in the number of customers and tourists into the city centre because of perceived increase in travel safety over bridge
- Quicker travel times for trips to work and making deliveries
- Increased access to regional areas, with flow-on economic benefits
- Ease of access for delivery trucks
- Buses would better able to meet timetables
- Flow on effects of reduced congestion and reduced emissions at the existing bridge
- Reduced braking noise at the 'kinks'
- Facilitation of urban growth and economic development within Grafton City

Negative economic impacts for Option 2a and 2b include:

- Disruption to businesses located at or near the proposed additional crossing

**Table 6 Land Use and Costs**

Item	Option		
	Option 1	Option 2a	Option 2b
<b>Bridge Length</b>	730m	665m	725m
<b>Properties affected</b>			
<b>2 a) Residential</b>	2,400 m <sup>2</sup>	3,300 m <sup>2</sup>	2,300 m <sup>2</sup>
<b>4 a) Industrial</b>	2,100 m <sup>2</sup>	-	-
<b>6 a) Recreation</b>	300 m <sup>2</sup>	800 m <sup>2</sup>	-
<b>6 b) Recreation - Special Purposes</b>	-	200 m <sup>2</sup>	800 m <sup>2</sup>
<b>No of buildings fronting the Options</b>	13	12	3
<b>No of houses potentially directly impacted</b>	1	4	2
<b>Cost (\$m)</b>	\$46	\$40	\$45
<b>BCR</b>	1.5	2.0	1.8

**Planning and Zoning**

All of the options proposed pass through various different zonings under the Grafton LEP, 1988. **Table 7** below provides a summary of the relevant zonings applicable to Options 1, 2a, and 2b.

**Table 7 Zonings applicable to Options 1, 2a and 2b**

Zonings	Option 1	Option 2a	Option 2b
Zone No 2(a) (Living Area)	x	x	x
Zone No 4(a) (Industrial)	x		
Zone No 5(b) (Special Uses (Railway))			x
Zone No 6(a) (Public Recreation)	x	x	x
Zone No 6(b) (Recreation (Special Purposes))		x	
Unzoned (Clarence River)	x	x	x

Roadworks within all zones are permissible with Council consent. However, in general the application of the EP&A Model Provisions and State Environmental Planning Policy No. 4 to the Proposal, may remove the need for consent. Except where:

- The Proposal would be located over the Clarence River (Clause 20 of the LEP);
- Where works may affect heritage items, places, or conservations areas as described in the LEP and REP; and
- On land, which is reserved under and environmental, planning instrument for use exclusively for a purpose referred to in Section 26(c) of the *Environmental Planning and Assessment Act, 1979* (i.e. potentially zones 5a, 6a and 6b)

Therefore, the proposal for Options 1, 2a and 2b has the potential to proceed under Part 5 of the EP&A Act but a development application may be required where the Proposal triggers the above points.

In comparison between the three Options, Options 2b has the least statutory planning constraints, as it is located outside of any conservation areas listed in Schedules of the LEP and REP and would partially pass through Zones 5b and 6a. Option 1 passes through conservation areas on both sides of the river and a small area of Zone 6a on the northern bank. Option 2a also partially passes through the Grafton Conservation Area and Zones 6a, and 6b, partially affecting Crown Land reserved for public recreation.

## Comparison Table

The following updated summary table of comparative parameters was handed out during the workshop:

Criteria	Option 1	Option 2	Option 3
Traffic:			
2003 Volumes:			
New Bridge	11,000	13,000	13,000
Existing Bridge	<u>15,000</u>	<u>13,000</u>	<u>13,000</u>
Total	26,000	26,000	26,000
2033 Volumes:			
New Bridge	13,000	17,000	17,000
Existing Bridge	<u>21,000</u>	<u>17,000</u>	<u>17,000</u>
Total	34,000	34,000	34,000
2033 Peak Hour LOS:			
New bridge	D	C	C
Existing Bridge	E	C	C
(LOS A=very good, F=very poor)			
Ecology	Minimal	Minimal	Minimal
Air Quality	Increase	Slight Decrease	Slight Decrease
Noise	+5-10dBa	Minimal	Minimal
Bridge Length	730m	665m	725m
Properties Affected			
2 a) Residential	2,400m <sup>2</sup>	3,300m <sup>2</sup>	2,300m <sup>2</sup>
4 a) Industrial	2,100m <sup>2</sup>	-	-
6 a) Recreational	300m <sup>2</sup>	300m <sup>2</sup>	800m <sup>2</sup>
6 b) Recreation	-	2,000m <sup>2</sup>	-
Number of Buildings fronting the option	13	12	3
Number of houses potentially affected (i.e. to be acquired by RTA)	1	4	2
Capital Cost	\$46M	\$40M	\$45M
BCR (Benefit Cost Ratio)	1.5	2.0	1.8

## Advantages and Disadvantages of the Options

At the conclusion of the presentation of the options, the group summarised the advantages and disadvantages of each which are recorded below:

### Option 1

#### Advantages:

- Improves access to the CBD for South Grafton and areas to the west
- Reduces volumes of vehicles on the existing bridge in the short-term
- Direct connection to Villiers Street for heavy vehicles. Provides an opportunity to direct traffic away from CBD
- Southern connection would become more attractive for commercial development
- Provides value for money
- Provides alternative access for emergency vehicles
- Provides an additional cycleway/pedestrian way
- Removes necessity to take "kinks" out of existing bridge
- No visual change at existing bridge

**Disadvantages:**

- Substantial increase in road traffic noise on adjacent schools, businesses and residences (including Victoria Street) causing reduction in amenity
- Other adverse impacts to Victoria Street (ie. potential widening required, etc)
- Does not reduce through traffic from the CBD
- Height restrictions at the railway viaducts
- Safety issues with schools and local streets
- Loss of amenity/character of residential streets
- Impact on recreational use of the river
- Non-indigenous heritage impact on the fig tree located in Villiers Street
- Property access issues and land acquisition
- Visual impact of noise mitigation walls
- Visual impact of view of river looking upstream
- Increase traffic in Ryan Street
- Impact on river weed beds
- Impact on fauna habitat
- Impacts on two separate conservation areas
- Will not take as much traffic load off existing bridge than Option 2a or 2b

**Option 2a****Advantages:**

- Significantly reduces delays at the existing bridge in the long-term
- Reduces potential for crashes on the existing bridge
- Minimises the potential for increased road traffic noise in comparison to the other localities
- Benefits businesses on the existing approaches
- Minimises flooding impacts
- Minimises natural environment impacts
- Provides value for money
- Does not change existing traffic patterns or footprint
- Preserves visual amenity of existing bridge downstream
- Preserves view of river upstream of bridge
- Improves access for emergency services
- Preserves character of Victoria Street
- Provides a greater option of bridge design than Option 2b
- Less visual impact of noise mitigation measures than Option 1

**Disadvantages:**

- Height restrictions for heavy vehicles at the railway viaducts
- Does not reduce through traffic from the CBD
- Impact on Heritage Conservation Area (removal of some trees and houses)
- Requires upgrade of Fitzroy/Villiers Street and Bent/Through Street intersections in the long term (20-30 years)
- Continued high traffic flow for existing residences
- Property/business access issues
- Social impacts including land acquisition
- Greater impact on recreational areas
- Not an alternative route but duplication of existing route
- Impacts on riparian vegetation and weed beds (However, less than Option 1)
- Visual impact upstream (where there is more populated)
- Requires removal of "kinks" on existing bridge
- Greater impact on scouring on existing bridge than Option 1 or Option 2b

## Option 2b

### **Advantages:**

- Significantly reduces delays at the existing bridge in the long-term
- Reduces potential for crashes on the existing bridge
- Minimises the potential for increased road traffic noise in comparison to the other localities
- Benefits businesses on the existing approaches
- Minimises flooding impacts
- Minimises natural environment impacts
- Provides value for money
- Retains visual amenity upstream
- Lesser heritage impact than Option 2a
- Retains left turn to Riverside Drive
- Lesser visual impact of "kink" removal than Option 2a
- Lesser impact on open space and other property acquisition than Option 2a
- Does not change existing traffic patterns or footprint
- Less visual impact of noise mitigation measures than Option 1
- Preserves visual amenity of existing bridge upstream
- Preserves view of river downstream of bridge
- Improves access for emergency services
- Preserves character of Victoria Street

### **Disadvantages:**

- Height restrictions for heavy vehicles at the railway viaducts
- Does not reduce through traffic from the CBD
- Requires upgrade of Fitzroy/Villiers Street and Bent/Through Street intersections in the long term (20-30 years)
- Continued high traffic flow for existing residences
- Property access issues
- Social impacts including land acquisition
- Less number of bridge options available than Option 2a
- Not an alternative route but duplication of existing route
- Requires removal of "kinks" on existing bridge
- Larger structures required for this option which could have height and shade impacts
- Reduces one of sailing club access sites to river
- Visual impact downstream

## Assessment of Corridor Options

Having reviewed the options and discussed their advantages and disadvantages in relation to the various studies outlined in the presentations as well as the investigations outlined in the background paper, the group was now in a position to evaluate the options against the weighted assessment criteria developed earlier in the workshop.

The group (in three focus groups) evaluated the options using the weighted assessment criteria in each of the three categories, separately. One focus group evaluated the options against the functional assessment criteria, whilst a second focus group evaluated the options against the social impact assessment criteria and the third focus group evaluated the options against the environmental impact assessment criteria.

The options were judged on a qualitative basis of how well each option met each category's assessment criteria relatively on a scale of Excellent (**E**), Very Good (**VG**), Good (**G**), Fair (**F**) or Poor (**P**).

Once the qualitative evaluation was completed, the evaluation was scored using the weightings of the criteria and establishing a ranking for each option within that category. Each focus group discussed their findings and recorded their observations as a result of their deliberations.

The findings of each focus group was presented to the whole group for discussion, amendment (if necessary) and finally endorsement (if appropriate) as to an agreed assessment to assist the group move forward. Their findings as presented (together with amendments, if required) and agreed by the whole group are listed below.

## Evaluation of Corridor Options against Functional Assessment Criteria

Functional Criteria												
OPTIONS	WT	Assessment Criteria	Reduced delays at existing bridge	Reduce potential road accidents & injuries	Provide for emergency access							
		ASSIGNED WEIGHT										
<b>1</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 3</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		<b>100</b>	<b>76</b>	<b>48</b>							
<b>2a</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 1</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		<b>200</b>	<b>152</b>	<b>36</b>							
<b>2b</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 1</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		<b>200</b>	<b>152</b>	<b>36</b>							

### Key Observations

- Constructability issues need to be resolved
- Level of service confidence is assumed
- Growth assumption could exceed 1%
- Emergency management needs to be considered
- Pacific Highway traffic detour strategy will be required
- Summerland Way route needs resolution and marking

## Evaluation of Corridor Options against Social Impact Assessment Criteria

Social Impact Criteria												
Assessment Criteria	Minimise impacts on social environment	Minimise impacts on access for community	Improve opportunity for economic & tourist dev.	Minimise impact on properties affected	Minimise negative visual impact							
												ASSIGNED WEIGHT
OPTIONS	WT	23	3	29	10	35						
<b>1</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 2</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		46	3	87	30	105					
<b>2a</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 2</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		69	9	87	10	70					
<b>2b</b>	5	E	E	E	E	E	E	E	E	E	E	<b>RANK 1</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	P	
	Sub Total		69	9	87	20	140					

### Key Observations

- Visual impact definition for the exercise:
  - On existing bridge – Option 2b has least impact
  - On riverscape – Option 2b has least impact
  - On built environment – Option 2a has the most impact
  - On streetscape – Option 2a has most impact
- There is a problem with defining the economic impacts for South Grafton (ie. land use implications)
- Access issues – Option 1 had major impacts and issues on Victoria Street and Ryan Street
- Social environment – Option 1 had major issues (ie. Victoria Street)

## Evaluation of Corridor Options against Environmental Impact Assessment Criteria

Environmental Impact Criteria											
OPTIONS	Assessment Criteria	Minimise impacts on natural environment	Minimise impacts on non-indigenous heritage	Minimise impacts of traffic noise on existing noise sensitive dev.	Minimise flooding/river hydrology impacts	Minimise impacts on indigenous heritage	Minimise impacts on air quality				
	ASSIGNED WEIGHT										
	WT	2	18	35	27	2	16				
<b>1</b>	5	E	E	E	E	E	E	E	E	E	<b>RANK 3</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	
	Sub Total		2	18	35	54	2	16			
<b>2a</b>	5	E	E	E	E	E	E	E	E	E	<b>RANK 2</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	
	Sub Total		6	18	105	81	6	48			
<b>2b</b>	5	E	E	E	E	E	E	E	E	E	<b>RANK 1</b>
	4	VG	VG	VG	VG	VG	VG	VG	VG	VG	
	3	G	G	G	G	G	G	G	G	G	
	2	F	F	F	F	F	F	F	F	F	
	1	P	P	P	P	P	P	P	P	P	
	Sub Total		8	54	175	108	6	48			

### Key Observations

- Ryan Street - Abbott Street to the river is within the Heritage Conservation Zone in LEP
- Villiers Street side/area is also within the Heritage Conservation Zone in LEP
- The residence at No. 2 Fitzroy Street is National Trust listed heritage which would need to be acquired for Option 2a and there are impacts on other conservation items
- Noise sensitive developments impacted (ie. nursing home (hospital), church, school rooms and playgrounds)
- Option 2b has less houses, etc close to the noise source
- Flood mitigation (ie. topping up the levee upstream will be slightly easier/less costly). Option 2a and Option 2b better than Option 1
- Known indigenous heritage outside of impacts but there would be cultural/visual implications for a bridge built closer to Susan Island
- Possible impact on significant fig tree(s). Action required to investigate and assess - RTA to consult with Council

## Summary of Crossing Option Evaluation

A summary of the rankings of the options against the various assessment categories together with the cost estimates and benefit cost ratios (BCR) presented earlier appears below. It should be noted where the difference in score between options was not greater than the highest weighted criteria within that category, the options were equally ranked as the difference in score was not considered significant.

Rank	Assessment Category				
	Functional	Social Impact	Environmental Impact	Cost (\$M)	BCR
1	2a, 2b	2b	2b	2a (\$40M)	2a (2.0)
2		2a, 1	2a	2b (\$45M) 1 (\$46M)	2b (1.8)
3	1		1		1 (1.5)

## Recommending A Preferred Direction

As a result of the work undertaken above, the group (in five focus groups) was asked “Which corridor option would you recommend as the preferred direction to move forward and the reasons why”. However, the preference is “subject to” the issues identified below being addressed. Also a fallback option was to be nominated by each focus group should their recommendation be found to be unsuitable upon further investigation.

The focus group conclusions are recorded below.

### Focus group 1

***We recommend Option 2b as the preferred direction to be progressed.***

***Because:***

- It generally performs better across the qualitative criteria
- It retains the iconic vista and role of the existing bridge towards the majority/larger community focus/activities
- Riverscape upstream is maintained
- It can be built with a minimum clearance to the existing bridge

***Subject to:***

- Design development complies with heritage requirements for proximity/empathy
- Assessment of noise implications to the neighbourhood for the elevated structure is appropriate
- The ability to remove the “kinks” to the heritage structure
- Siting and alignment being as close as possible to the existing bridge

***Fallback position:***

- Option 2a

### Focus group 2

***We recommend Option 2b as the preferred direction to be progressed.***

***Because:***

- Ranks the best option against functional, environmental and social criteria
- Least effect on the fabric of Grafton
- Best meets the purpose and project objectives

**Subject to:**

- The “kinks” on existing bridge being able to be modified (or Option 1 as fallback)
- Similar road levels being matched to existing bridge (or Option 2a as fallback)

**Fallback position:**

- Option 2a or Option 1 as stated above

**Focus group 3**

***We recommend Option 2b as the preferred direction to be progressed.***

**Because:**

- It possesses the highest ranking in each qualitative criteria
- The differences between the BCRs is minimal

**Subject to:**

- Heritage Council approval to modify the bridge
- Confirmation of clearances over the railway
- Indigenous consultation
- Matching of piers of new and old bridge
- Development of contingency plan if Heritage Council is non-compliant

**Fallback position:**

- Option 2a

**Focus group 4**

***We recommend Option 2b as the preferred direction to be progressed.***

**Because:**

- It has the least heritage impacts
- It has the least (iconic) visual impacts
- It has the least environmental impacts
- It has the least noise impacts
- It has the least social impacts
- It has the least impact on property
- The BCR supports its selection

**Subject to:**

- Modification of “kinks” is allowed by the Heritage Council
- Clearance over railway is appropriate
- Heritage Council needs to consider Option 2b has the least heritage impacts overall

**Fallback position:**

- Option 2a

**Focus group 5**

***We recommend Option 2b as the preferred direction to be progressed.***

**Because:**

- It is the highest ranked option for all three categories of qualitative criteria (functional, social, environmental)
- Capital costs are similar for all three options and BCR is similar for Options 2a and 2b

**Subject to:**

- Heritage approval to remove the “kinks” from the existing bridge
- The new bridge not dominating the existing bridge in height (minimise noise and visual impact)
- Constructability and pier matching are appropriately addressed

**Fallback position:**

- Option 2a
- Move to three lanes if no heritage approval

## Conclusions Drawn from the Workshop

As a result of the discussions over the two days of the workshop, the group agreed to the following conclusions:

- There was unanimous support within the workshop for Option 2b to proceed to the next stage of development as the preferred direction subject to:
  - The design complying with Heritage Council approval to remove the “kinks” on the existing bridge
  - Development of a contingency plan if Heritage Council is non compliant
  - Siting and alignment being as appropriately close as possible to the existing bridge to minimise noise and visual impacts
  - Constructability and pier matching are appropriately addressed
  - Clearance over the railway is appropriate
- There is a need to make Heritage Council aware that Option 2b has the least impact of the options
- There was a genuine disappointment that a Heritage Council representative did not attend the workshop. It was seen to be a wasted opportunity
- The group worked well together to reach consensus conclusions
- The participants obtained a better understanding of the wider dimensions to the project
- The process undertaken to reach these conclusions was robust and allowed consideration of the various perspectives represented in the workshop

## Where to From Here?

At the conclusion of the workshop, Peter Black, Project Manager outlined the next steps in the process to progress the project planning from here. These were listed as:

- A media announcement will be released to inform the community about the workshop and its findings
- Finalise the workshop report outlining the findings and conclusions of the group. This will be undertaken by ACVM. A copy of the workshop report will be sent to each participant
- The Project Team will undertake the additional investigations to address the “subject to” statements listed in the workshop for the preferred direction
- Finalise the Preferred Option Report which will incorporate the workshop conclusions
- Obtain the internal RTA client approvals to proceed
- Provide information to the Minister of Roads for the announcement of the preferred route for the crossing