Transport Roads & Maritime Services

ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON

Value management option selection workshop

DECEMBER 2012

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Summary

Background

Planning for an additional crossing of the Clarence River at Grafton was initially funded by the NSW Government, starting from 2002. Investigations were deferred in September 2005 and restarted in 2009.

In December 2010 RMS (formerly Roads and Traffic Authority (RTA) announced a revised approach to engage more effectively with the community and stakeholders in identifying a preferred route for an additional crossing. A community update issued in December 2010 identified 13 preliminary route options and invited community comment via a postal survey. Subsequent phone and business surveys were also carried out.

In June 2011, RMS published the Feasibility Assessment Report which describes the assessment undertaken on the 41 suggestions identified following the December 2010 to March 2011 community consultation period. Twenty-five preliminary route options in five corridors were identified for engineering and environmental investigation.

In January 2012, six route options were announced for further investigation. The short-listed options and short-listing process are documented in the Preliminary Route Options Report – Final (RMS, January 2012). Since the announcement of the six short-listed options in January 2012, design refinements have been undertaken on the route options and further field and technical investigations undertaken. The six short-listed options are referred to as the route options throughout this report.

The six route options are:-

Option E. The additional crossing would be located west (upstream) of the existing bridge and southeast (downstream) of Susan Island and connect Cowan St South Grafton to Villiers St, Grafton

Option A. The additional crossing would be located parallel to and immediately west (upstream) of the existing bridge and connect Bent St, South Grafton and Fitzroy St, Grafton

Option C. The additional crossing would be located about 70 metres east (downstream) of the existing bridge and connect the Junction of Pacific Hwy and Gwydir Hwy, South Grafton to Pound St, Grafton

Option 11. The additional crossing would be located northeast (downstream) of the existing bridge and connect the existing Pacific Hwy north of South Grafton to Fry St, Grafton

Option 14. The additional crossing would be located northeast (downstream) of the existing bridge and connect the existing Pacific Hwy north of South Grafton to North St Grafton via Kirchner St

Option 15. The additional crossing would be located northeast (downstream) of the existing bridge and connect the existing Pacific Hwy north of South Grafton to Summerland Way north of Grafton, via Kirchner St

The six short-listed route options are presented in ***Figure 1(Appendix 3).***

Now that the shortlist of options have been developed and displayed for comment, a Value Management Workshop (VMW) was seen as the appropriate tool to bring together a wide range of stakeholder interests and expertise to review the investigations undertaken to date and assess the options against agreed assessment criteria with a view of determining a recommended option for further investigation.

The outcome of the VMW is one input into the process for determining the preferred route for the project.

The Australian Centre for Value Management (ACVM) was commissioned to facilitate and report on the workshop which was held on the **23 & 24 October 2012**.

A list of participants who attended the workshop is included in **Appendix 1**.

General Workshop Purpose

In broad terms, the objective of this workshop is to obtain a common understanding of the project and its objectives, to review the work undertaken to date and to recommend a preferred option, if appropriate, so as to progress the project to the next stage of development.

Specific Workshop Activities

- *Clarify the objectives of the project;*
- *Examine the route options;*
- *Recommend a preferred option to the RMS for consideration;*

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 commenced with the participants identifying what was important about the project from various stakeholder perspectives. The problem situation and the project objectives were reviewed. Assumptions being made about the project were identified and challenged from various perspectives.

Assessment criteria were developed and weighted under three key categories (Functional, Socio Economic as well as Natural and Built Environment) based on what participants considered important (ie. of value) for later evaluation of the corridor options (**Appendix 2**).

Relative weighting of the assessment criteria was undertaken by the whole group based on a paired comparison assessment process. (**Appendix 2**).

The short-listed options considered and assessed to date were presented and questions clarified. A map of the short-listed options and a summary table comparing the options is provided in **Appendix 3**

The participants then evaluated the performance of the options against the weighted criteria. The process involved the determination of the relative performance of the option against the respective criterion on a 1 (poor) to 5 (excellent) basis. The assessment is then converted to a numerical score and compared to the capital cost and benefit cost ratio (BCR) of the route options as a basis for assessment. (**Appendix 4**).

Recommendations and conclusions were then drawn based on the assessment.

Detailed comments from the evaluation tables are provided in **Appendix 5**, and presentations given at the workshop have been reproduced in **Appendix 6**

Workshop Outcomes

By the end of the workshop, the participants had:

- **Confirmed** the objectives for the project were
  - Enhance road safety for all road users over the length of the project

- Improve traffic efficiency between and within Grafton and South Grafton
- Support regional and local economic development
- Involve all stakeholders and consider their interests
- Provide value for money
- Minimise impact on the environment

- **Identified** assumptions being made about the project from various perspectives and assessed whether it was appropriate to proceed with planning based on these assumptions or whether they needed to be resolved as planning proceeded (see **Appendix 2**)
- **Identified** assessment criteria under three key categories (Functional, Socio Economic and Natural and Built Environment) based on the "What's Important" Statements. The assessment criteria to assess the route options were agreed as:

  Functional

  - Improve the overall efficiency of the road network including am and pm peaks
  - Enhance safety for all road users
  - Optimise the efficiency of freight movement
  - Improve bicycle and pedestrian linkages
  - Provide an effective alternate route during incidents
  - Maintain navigable bridge clearances for river uses

  Socio Economic

  - Minimise the impact on the operation of the existing businesses and provide for economic growth
  - Promote better connectivity between Grafton and South Grafton for social, commercial and industrial users
  - Minimise amenity impacts of traffic (including heavy vehicles) on residential areas, noise, air quality
  - Minimise acquisition of properties – rural, residential, business & community
  - Maintain the relationship of the town to the river eg views and river users

  Natural and Built Environment

  - Minimise Non Aboriginal heritage impacts
  - Maintain the material fabric and character of Grafton (Urban landscape)
  - Maintain the visual experience of the existing bridge
  - Minimise impact on Aboriginal cultural heritage
  - Minimise ecological impacts – (EEC, Fauna, Flora, Aquatic, etc)
  - Minimise the surface/ground water impacts

- **Reviewed** the route options tabled for the project (see **Appendix 3**).
- **Assessed** the route options in each category against the assessment criteria and ranked the performance of each option. The relative project cost estimates and BCR for each option was also discussed (see **Appendix 4**)
- **Unanimously** expressed preference for either Option C or Option E or were unable to decide between Option C or E.

  Supporting arguments for ***Option C*** included:-

- Option C offers an alternative road transport corridor and does not concentrate traffic at the one point as is the case with Option E which focuses traffic at Fitzroy/ Villiers intersections
- Option C works well from a functional perspective and on balance Option C offers a better functional outcome than Option E and the general view being a down river option would provide a better transport outcome for Grafton
- Option C links to the industrial area in South Grafton.
- Option C uses space that wouldn't be otherwise be used.
- Option C keeps infrastructure in a similar "corridor" to the current bridge, notwithstanding Option C still provides alternative access and egress points to crossing the river.

Supporting arguments for ***Option E*** included

- Option E is the most direct link between Grafton and South Grafton CBDs.
- Option E provides good connectivity between CBDs and has the potential to promote economic growth in the South Grafton area.
- Option E has less environmental impacts than Option C.
- Option E is considered more pedestrian/cyclist friendly than Option C and provides a good loop between the two bridges and the river precinct.
- Option E has minimal property acquisition when compared to Option C.
- Option E was ranked in top two for each of the categories of functional, socio economic, and natural and built environmental, capital cost and BCR (including ranked 1 twice) used for assessing the options.
- Option E satisfies each of the project objectives.
- Under Option E existing businesses will continue to secure existing trade.

Conclusions

Conclusions identified by participants at the completion of the workshop are listed below:-

- Four focus groups were formed from the workshop participants to recommend a preferred option. All four focus groups expressed preferences for either Option C or Option E or were unable to decide between Option E or Option C
- All four focus groups considered that Options A, 11, 14 & 15 are the least preferred options because they do not perform as well as the Options E & C when assessed against the option assessment criteria and the project objectives
- It was difficult to decide between Options E & C because
  - Option C is the best performing option assessed against function criteria
  - Option E is the best performing option assessed against natural and built environment criteria
  - Options E & C performed equally well against Socio Economic criteria
  - The capital cost and cost benefit ratios for E & C were similar
- If Option C is to be adopted then additional consideration needs to be given to mitigating the adverse environmental impacts associated with Aboriginal heritage during construction, the impact on the material fabric of the town, visual experience of the bridge and the ecological impacts
- If Option E is adopted then additional consideration needs to be given to mitigating the adverse functional impacts associated with the pinch point at Villiers Street (freight movement in the town and the alternative route in emergencies), transport efficiency across the network and safety aspects.

Appendix 1. List of Participants

RMS	Representing
Chris Clark	RMS
Bob Higgins	RMS
Alison Nash	RMS
Craig Leckie	RMS
James Green	RMS
Arup	
Ben Schnitzerling	Arup
Stakeholders	
Robert Blanchard	Blanchards Transport (Haulage)
Des Harvey	Grafton Chamber of Commerce
Jenny Johnson	Department of Planning
David Morrison	Clarence Valley Council
Brett Tibbett	Grafton-Ngerrie Local Aboriginal Land Council
Dallas Leven	NSW Police and Emergency Services
Community Participants	
Alan Scofield	Option E
Mark Burridge	Option A
Alex Purvis	Option C
Joe Forwood	Option 11
Richard Green	Option 14
John Sheraton	Option 15
Andrew Robinson	Regular Bridge Users
Assistance	
Rachel Sadler	RMS – support
Vicky Sisson	RMS – support
Technical Advisors	
Kathryn Nation	Arup – Technical Support
John Hamilton	Arup – Technical Support
Gerard Cavanagh	Arup – Technical Support
Mitchell Allen	Arup – Technical Support
Nicola Fleury	Arup – Technical Support
Gina Newling	ID Planning – Community consultation
ACVM	
Alan Butler	Facilitator
Chris Laird	Facilitator

Appendix 2. Project Information and Analysis

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 Clarence River Crossing which allowed them to later make comparisons of corridor options based on the analysis of what the project was required to achieve.

Background to the project and an overview of the journey so far and a brief overview of the route options

In order to allow the participants to obtain an understanding of the project's context, Chris Clark, Senior Project Development Manager, RMS outlined the strategic context of the project and provided a summary of the work undertaken to date. A copy of the presentation is provided in **Appendix 6**.

Feedback on the Community Consultation Process

Gina Newling from ID Planning provided a summary of the preliminary outcomes of the community consultation process for the display of the Route Options Development Report in September and October 2012. A copy of the presentation is provided in **Appendix 6**.

What's important to you

The group identified from their various perspectives (individually, then within focus groups and finally collectively) *those features or characteristics that are **most important*** about the additional crossing and its associated road works.

The consolidated list, which is in no order of priority, is reproduced below

#	***Important Feature or Characteristic***
1	Improve the am and pm crossing times for the network
2	Link Grafton and south Grafton by the most efficient route
3	Achieve the best outcome for the town in terns of liveability and amenity (including noise and air quality)
4	Maximise safety for all road users
5	Improve the overall traffic efficiency of the road network
6	Minimise heritage and ecological impacts
7	Maintain major transport links
8	Optimise the efficiency of freight movement
9	Provide an effective alternate route between Grafton and South Grafton during emergencies
10	The crossing adds value to the businesses in town
11	Promote better social connectivity between Grafton and South Grafton
12	Enhance the fabric and character of Grafton
13	Minimise heavy vehicle access to residential areas
14	Minimise the noise impact on the community for any chosen option
15	Maintain the visual experience of the existing bridge
16	Prevent any restrictions for heavy vehicles on the new crossing and any further implications to the existing road network

17	Minimise the impact on existing businesses and provide for economic growth
18	Maintain or improve clearances for river users
19	Improve bicycle and pedestrian crossing
20	Integrate the commercial, industrial and residential areas of Grafton and South Grafton
21	Maintain the relationship of the township to the river including views and river use
22	Recommend an option that will stand the test of Treasury provide value for money and get built
23	Build resilience to enable coping against emergencies and during disasters
24	Ensure the existing bridge is retained and maintained to an appropriate standard
25	Ensure the project does not increase flooding impacts
26	Ensure the option chosen is compatible with the future plans for the Grafton area
27	Build the most appropriate option ASAP
28	Minimise impact on Aboriginal cultural heritage

Upon reflection, the workshop group concurred that there was overlap in the list. However, the list reflected the features and important characteristics that the project needs to address as planning proceeds.

The "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 material as well as from their own perspectives and identified the problems causing the need for a project that is the "Problem Situation".

These were recorded, in no order of priority, as the following:

#	***The Problem Situation***
1	Traffic congestion on the current bridge during peaks and at school times
2	Physical constraints on the existing bridge such as the kinks impact on safety
3	Four lanes of traffic converging into two lanes traversing the bridge
4	The existing bridge adversely impacts on the perception of Grafton's efficiency
5	There is no alternative crossing
6	The existing bridge impacts on tourism ie tourists are apprehensive about towing a caravan across the bridge
7	Social disconnect between Grafton and South Grafton
8	There is a "fear" amongst drivers, pedestrians and cyclists in regard to using the bridge
9	The bridge is perceived as being poorly maintained
10	Heavy vehicles sometimes need to cross the centre line which impacts on traffic efficiency and safety
11	The traffic congestion Impacts on usage with people deferring travelling across the bridge between Grafton and South Grafton
12	General risk and safety concerns to unfamiliar cars and pedestrians users
13	Potential severance of the town caused by a major accident on the bridge

Primary purpose and objectives of the project

The focus groups reflected on the problems listed and identified what they believed to be the primary purpose of the additional crossing of the Clarence River.

The focus groups responses are reproduced below:-

Group 1
To provide an alternative river crossing which reduces traffic congestion on the existing bridge and improves efficiency of the road network in the short and long term

Group 2
Facilitate the future proofing of Grafton and South Grafton as a regional centre and community

Group 3
Efficiently connect Grafton and South Grafton with another road bridge

Group 4
To improve the efficiency of the traffic network to cater for current and future needs

The participants agreed that there was common agreement within the group as to the primary purpose of the additional crossing of the Clarence River.

The project objectives as identified in the technical documentation are:-

- Enhance road safety for all road users over the length of the project
- Improve traffic efficiency between and within Grafton and South Grafton
- Support regional and local economic development
- Involve all stakeholders and consider their interests
- Provide value for money
- Minimise impact on the environment

Key features common to all options

The participants considered the key features common to all the route options.

The exercise enabled participants the opportunity to question and understand key engineering design features of the crossing and the associated road works.

The identified features and any subsequent group commentary are reproduced below:

#	***Feature***
1	Posted speed limit of 60 kilometres per hour for approach roads within urban areas and 80 kilometres per hour for approach roads outside urban areas ***Note*** Check posted speed limit details for approach roads
2	Minimum traffic lane widths of 3.5 metres
3	Pedestrian/cyclist shared path width of 3.1 metres clear on structures, continuing as a 2.5 metre wide shared path alongside the main approach roads
4	Bridge structural elements designed and detailed for a design life of at least 100 years
5	Waterway structures to be of sufficient height to maintain acceptable freeboard during a 100- year ARI design flood event
6	Bridge approach embankments and viaducts to be flood immune during a 100-

year ARI design flood event

7 Main roads accessing the bridge approaches (as part of this project) to be flood immune during a 20-year ARI design flood event

8 Route options should not adversely impact the flood immunity in Grafton and South Grafton. Where impacts are identified, design mitigation measures would be implemented to maintain the current level of flood immunity

9 To reasonably cater for expected demand in 2019 for the “do minimum" scenario, it is likely that some roadworks would be necessary to address localised congestion and capacity constraints as they arise. Localised network upgrades found necessary for the model to operate reasonably in 2019 include:

- Upgrading Pound Street to two traffic lanes in each direction between Villiers Street and Prince Street

  Note:- Item not shown for Options 11, 14 & 15
- Upgrading of Gwydir Highway to two traffic lanes in each direction between the Pacific Highway and Bent Street
- Upgrading of the Villiers Street and Dobie Street roundabout to improve turning movements for heavy vehicles
- Upgrading of the Gwydir Highway and Skinner Street roundabout from a single lane roundabout to a two-lane roundabout.

10 Drainage infrastructure must meet appropriate design criteria

11 The additional crossing over the Clarence River at Grafton requires the minimum clearances shown below

- Options E, A and C Vertical clearance 9.1 m and Horizontal clearance 2 x 35 m
- Options 11, 14 and 15 Vertical clearance 17 m and Horizontal clearance 2 x 35 m

Assumptions

The group (in focus groups) identified what assumptions they believed were 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.

Key	Assessment Explanation
Valid	It is appropriate to proceed with planning on the basis of this assumption
Challengeable	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 and Flooding
- 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 and Flooding Assumptions

#	Assumption	Assessment
	Planning	
1	Landuse and population growth will occur as indicated in the Mid North Coast Regional Strategy and CVC's landuse strategy	Valid
2	Grafton and South Grafton CBDs will continue to develop and there will be no new major CBDs established in the Grafton / South Grafton areas for the foreseeable future	Valid
3	Upgrade of Pacific Highway between Glenugie and Tyndale will be opened to traffic before the new crossing of the Clarence River is completed	Valid
4	Except for Option A, semi-trailers and B-doubles will not use the existing bridge	Valid
5	Rigid heavy vehicles, including buses, will be able to continue to use the existing bridge	Valid
6	A shared path facility will be provided for all options	Valid
7	For the purposes of the assessment, the additional crossing is assumed to be opened to traffic by 2019	Valid
8	The Pacific Highway will remain the priority designated freight route for the North Coast	Valid
	Flooding	
9	The existing flood immunity will be retained for all options by raising the flood levees.	Valid
10	The piers for the options close to the existing bridge (Options A & C) line-up with those of the existing bridge to minimise flooding impacts and improve navigability.	Challenged for southern piers

	Design	
11	The design for each option provides for predicted traffic volumes 30 years after the assumed date of opening of the additional crossing, ie in 2049	Valid
12	Construction of the options will be staged with required upgrades to the road network and intersections implemented when required to cater for traffic volumes	Valid
13	Option A includes provision to upgrade the safety barriers on the existing bridge as it will continue to be used by semi-trailers and B-doubles. There in no provision to upgrade the safety barriers on the existing bridge for the other options as it will not be used by semi-trailers and B-doubles with these options.	Valid

Focus group 2: Local Traffic, Safety and Access Assumptions

#	Assumption	Assessment
1	Local Driver's will respond to delays and queues by using the alternative route	Valid
2	Key activity centres are assumed to remain the key activity centres into the future	Valid
3	The constraints on the existing bridge have the potential to inhibit growth in Grafton and South Grafton	Valid
4	Reduce road safety risk by reducing hazards including road geometry and roadside furniture	Valid
5	Reduce road safety risk by reducing stop / start traffic operations	Valid
6	The new bridge will be designed to current standards	Valid
7	Personal travel will continue to be predominantly private vehicle based	Valid
8	A new crossing should be designed to improve the opportunity for increased public transport usage	Valid
9	Bridge should contribute to intuitive wayfinding – making simple route choice decision and is inherently safer	Valid
10	Road network should be accessible for all vehicles entitled to use the road network without restrictions and impediments	Valid except in regard to the use of the existing bridge
11	Options will not reduce the level of access to individual properties or businesses below current levels	Challengeable

Focus group 3: Environmental and Heritage

#	Assumption	Assessment
1	Acid sulphate soils (ASS) can be managed but there is a cost to do so	Valid
2	The cost of managing ASS has not been included in the option estimates Note:- RMS advised that the contingency sum provided in the	Check

	Strategic Cost estimates would cover the cost of managing ASS	
3	The relative increase in traffic noise has been equitably assessed across all options.	Valid
4	EECs will be impacted for all options.	Valid
5	Debris against the floodplain viaducts has not been considered as to whether it will cause increased flood levels.	Issue has been considered
6	Aesthetic Aboriginal impact on Susan Island and Elizabeth Island has been considered.	Valid
7	Impact on existing non-Aboriginal heritage items and areas in Grafton will be minimised.	Valid
8	Property impacts will be reduced as the design progresses.	Design Objective
9	The full impact on businesses has not been considered eg. access, parking and loss of passing trade.	Check
10	Degradation of ground water causing impacts on the river and potentially having impacts on aquatic ecosystems.	Refer to item 1
11	Environmental impacts can be minimised and will continue to be minimised at the next design stage.	Valid
12	Any environmentally impact will be adequately managed and minimised where possible	Valid

Focus group 4: Through Traffic, Business and Urban Planning

#	Assumption	Assessment
1	The additional crossing will assist local business rather than hamper it through access to passing / destination trade	Valid
2	Volume of through traffic should not increase with new bridge crossing	Valid
3	Current bridge constrains growth in business	Valid
4	Whichever option is chosen has to be compatible and/or drive Council's urban planning vision for Grafton and surrounds	Valid
5	A new river crossing should build on business viability	Valid
6	Assumption that through traffic comes from or is going to the Summerland Way – connecting to Pacific Highway or Gwydir Highway	Valid
7	A new crossing could bring growth to areas which benefit from new connections. Particularly so for South Grafton	Valid

Developing the Assessment Criteria

Using the information shared in the workshop to date (in particular, the "What's Important" statements and the project objectives), a focus group consisting of a representative cross section of the workshop participants clustered statements within a set of themes or perspectives in order to present to the whole group for comment, amendment and, if acceptable, endorsement as a basis to assess the various options.

The approach adopted was to:

(1) Take the list of "What's Important" statements and separate those which would not assist in differentiating between the route options. Some statements were expressed as objectives and some statements were a common requirement for all options.

(2) Cluster the remaining "What's Important" statements under three key categories being: ***Functional; Socio Economic; and Natural and Built Environment***

(3) Develop summary statements from the consolidated "What's Important" list within each category which could be used as assessment criteria to meaningfully compare and differentiate the route options

(4) Present the approach and the outputs to the workshop group for consideration, discussion, adjustment and endorsement

Agreeing to the "Non-Differentiators"

The focus group agreed the following "What's Important" statements would not help to differentiate between the route options or were duplicates.

#	**What's Important – *but not assist in differentiating between Route Options***
26	Ensure the option chosen is compatible with the future plans for the Grafton area (risky - picked up in many of technical studies)
3	Achieve the best outcome for the town in terms of liveability and amenity eg noise and air quality (subset of #13 & #14)
7	Maintain major transport links (Subset #5)
16	Prevent any restrictions for heavy vehicles on the new crossing and any further implications to the existing road network (Subset #8)
22	Recommend an option that will stand the test of Treasury and get built (value for money)
23	Build resilience against emergencies and disasters (dealt with in Functional criteria #9)
24	Ensure the existing bridge is retained and maintained to an appropriate standard
25	Ensure the project does not increase flooding (given)
27	Build the most appropriate option ASAP

The remaining statements were considered as having the capacity to differentiate between options. They were clustered under the three categories below and rephrased as assessment criteria for consideration by the whole workshop group.

After review, comment and amendment by the whole workshop group, the assessment criteria within each of the three categories to evaluate the options later in the workshop were agreed as:

1. Functional Criteria

#	*Criteria*	*What's important reference*
A.	Improve the overall efficiency of the road network including am and pm peaks	(1, 2 & 5)
B.	Enhance safety for all road users	4
C.	Optimise the efficiency of freight movement	8
D.	Improve bicycle and pedestrian linkages	19
E.	Provide an effective alternate route during incidents	9 & 23
F	Maintain navigable bridge clearances for river uses	18

2. Socio Economic Criteria

#	*Criteria*	*What's important reference*
A.	Minimise the impact on the operation of the existing businesses and provide for economic growth	10 &17
B.	Promote better connectivity between Grafton and South Grafton for social, commercial and industrial users	11 & 20
C.	Minimise amenity impacts of traffic (including heavy vehicles) on residential areas, noise, air quality	13, 14 & 30
D.	Minimise acquisition of properties – rural, residential, business & community	32
E.	Maintain the relationship of the town to the river eg views and river users	21 (F)

3. Natural and Built Environment Criteria

#	*Criteria*	*What's important reference*
A.	Minimise Non Aboriginal heritage impacts	6
B.	Maintain the material fabric and character of Grafton (Urban landscape)	12
C.	Maintain the visual experience of the existing bridge	15
D.	Minimise impact on Aboriginal cultural heritage	28
E.	Minimise ecological impacts – (EEC, Fauna, Flora, Aquatic, etc)	29
F.	Minimise the surface/ground water impacts	31

Weighting of Assessment Criteria

Relative weightings for the assessment criteria in each of the three 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 generally reached on a consensus basis. Comparative pairs where there was a strong minority counter view are noted with a footnote.

The group's workings and their weightings of the assessment criteria for each category are shown below:

Functional Impact Criteria

No.	Criteria	Raw Score	Relative Weight
A.	Improve the overall efficiency of the road network including am and pm peaks	11	33%
B	Enhance safety for all road users	6	18%
C.	Optimise the efficiency of freight movement	5	15%
D.	Improve bicycle and pedestrian linkages	6	18%
E.	Provide an effective alternate route during incidents	5	15%
F.	Maintain navigable bridge clearances for river uses	0	-
	Total	**33**	**99**

Scoring Matrix

The workings for the relative assessment are shown below.

	B	C	D	E	F
A	**2A**	**3A**	**2A**	**1A**	**3A**
	B	**2B**	**1B**	**B/E**	**2B**
		C	**C/D**	**C/E**	**3C**
			D	**2D**	**3D**
				E	**3E**
					F

How Important

3 Major Preference
2 Medium Preference
1 Minor Preference

Socio Economic Criteria

No.	Criteria	Raw Score	Relative Weight
A.	Minimise the impact on the operation of the existing businesses and provide for economic growth	3	17%
B	Promote better connectivity between Grafton and South Grafton for social, commercial and industrial users	8	44%
C.	Minimise adverse amenity impacts of traffic (including heavy vehicles) on residential areas, noise, air quality	5	28%
D.	Minimise acquisition of properties – rural, residential, business & community	2	11%
E.	Maintain the relationship of the town to the river eg views and river users	-	-
	Total	18	100

Scoring Matrix

The workings for the relative assessment are shown below.

	B	**C**	**D**	**E**
A	**2B**	**A/C[1]**	**1A**	**1A[2]**
	B	**2B**	**2B**	**2B**
		C	**2C**	**2C**
			D	**2D**
				E

How Important

3 Major Preference
2 Medium Preference
1 Minor Preference

Notes:-

There was general agreement to the criteria weighting except for the items noted.

[1] The majority view is reflected in the weighting noted. There was a strong alternative minority view was that the impact on residents resulting from an option (Criteria C) was more important than minimising the impact on business and providing for economic growth (Criteria A). There was another strong alternative minority view that Criteria A was more important than Criteria C

[2] There was a minority view that the Criteria E warranted equal weighting with Criteria A

Natural and Built Environmental Criteria

No.	Criteria	Raw Score	Relative Weight
A.	Minimise Non Aboriginal heritage impacts	6	20%
B	Maintain the material fabric and character of Grafton (Urban landscape)	9	30%
C.	Maintain the visual experience of the existing bridge	2	7%
D.	Minimise impact on Aboriginal cultural heritage	7	23%
E.	Minimise ecological impacts – (EEC, Fauna, Flora, Aquatic, etc)	6	20%
F.	Minimise the surface/ground water impacts	-	-
	Total	**30**	**100**

Scoring Matrix

The workings for the relative assessment are shown below.

	B	**C**	**D**	**E**	**F**
A	**2B**	**2A**	**A/D**	**A/E**	**2A[3]**
	B	**2B**	**D/B**	**2B**	**2B[3]**
		C	**2D**	**2E**	**2C[3]**
			D	**D/E**	**2D[3]**
				E	**2E[3]**
					F

Note:-

[3] There was general agreement to the criteria weighting except for the items noted. The majority view is reflected in the weighting as recorded. The alternative minority view was that Criteria F - Minimise the surface/ground water impacts [from acid sulphate soils] was significant and warranted at least equal weight when compared to the other criteria.

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

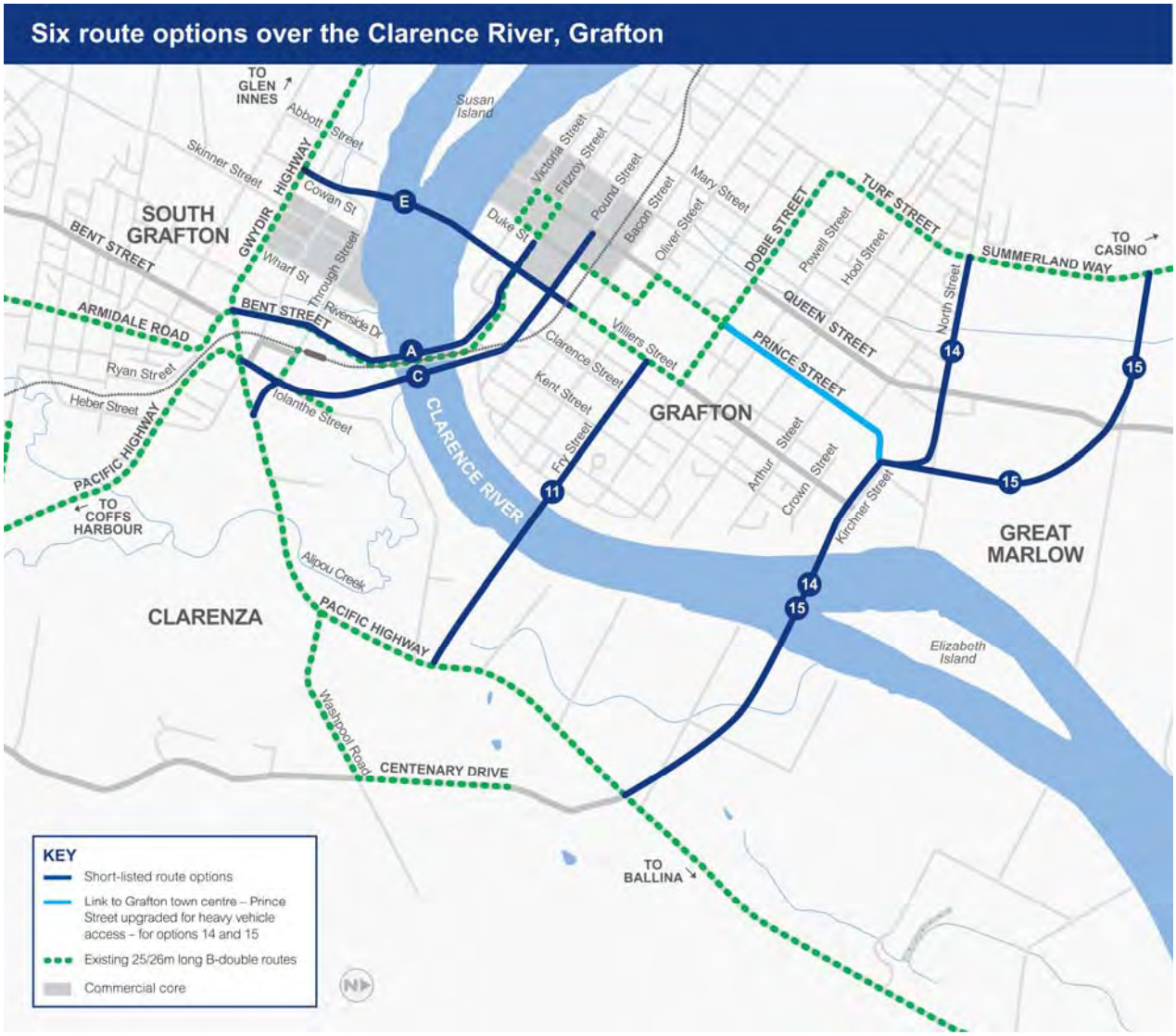
Assessment Criteria					
Functional		**Socio Economic**		**Natural and Built Environmental**	
Criteria	**Wt**	**Criteria**	**Wt**	**Criteria**	**Wt**
Improve the overall efficiency of the road network including am and pm peaks	33%	Minimise the impact on the operation of the existing businesses and provide for economic growth	17%	Minimise Non Aboriginal heritage impacts	20%
Enhance safety for all road users	18%	Promote better connectivity between Grafton and South Grafton for social, commercial and industrial users	44%	Maintain the material fabric and character of Grafton (Urban landscape)	30%
Optimise the efficiency of freight movement	15%	Minimise adverse amenity impacts of traffic (including heavy vehicles) on residential areas, noise, air quality	28%	Maintain the visual experience of the existing bridge	7%
Improve bicycle and pedestrian linkages	18%	Minimise acquisition of properties – rural, residential, business & community	11%	Minimise impact on Aboriginal cultural heritage	23%
Provide an effective alternate route during incidents	15%	Maintain the relationship of the town to the river eg views and river users	0	Minimise ecological impacts – (EEC, Fauna, Flora, Aquatic, etc)	20%
Maintain navigable bridge clearances for river uses	0			Minimise the surface/ground water impacts	0

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

Appendix 3. Map of Short-Listed Options and Comparison Table

Six Short-Listed Route Options

The Arup Project Team presented key comparisons to the group of the route options being considered. A copy of the presentation is attached at the end of this Appendix.



A summary table comparing the details for each option as contained in the Community Newsletter is reproduced below.

Comparing the Options						
	Option E	Option A	Option C	Option 11	Option 14	Option 15
Traffic – Bridge utilisation Traffic volumes for 2 hour AM peak period (7am-9am) (both ways): Number of vehicles using the additional crossing (approximate % of total vehicles crossing the river)[1] • 2019 • 2049	 2697 (66%) 5231 (65%)	 3188 (78%) 5919 (74%)	 2808 (67%) 5431 (68%)	 1296 (32%) 3515 (45%)	 936 (23%) 2673 (36%)	 921 (22%) 2578 (35%)
Traffic – Reducing delays Average travel time between the Bent Street/Gwydir Highway intersection, South Grafton and Prince Street/Pound Street intersection, Grafton using the existing bridge,30 years after opening (2049) in morning (AM) peak period (minutes)[2]	7	8	7	8	14	14
Heavy vehicles Travel between the Pacific Highway/Tyson Street intersection, South Grafton and Summerland Way/Butterfactory Lane intersection, Grafton using the additional crossing: •Travel distance(km). •Travel time 30 years after opening (2049) in morning (AM) peak period (minutes).	 9.1 15	 8.7 14	 8.4 13	 10 11	 10.5 10	 10.3 10
Road Safety Number of issues identified in road safety audit: • High priority. • Medium priority. • Low priority.	 2 9 7	 3 13 7	 1 10 4	 3 8 4	 2 7 5	 2 7 5
Property impacts Number of potentially directly affected properties: • Residential • Businesses • Rural • Community • Total	 16 7 0 8 31	 21 21 0 15 57	 24 4 2 12 42	 22 1 2 5 30	 6 2 7 5 20	 1 1 14 6 22

Noise impacts 10 years after opening (2029) (without mitigation measures). Number of residential properties where noise levels [3]: •Are more than 50dBA at night[4] •Increase by 12dB or more at night	461 11	448 0	462 1	505 51	477 30	415 21
Aboriginal cultural heritage Impact on areas of Aboriginal cultural heritage.	None	None	Impact on the aesthetic value of 1 site – Golden Eel	None	Direct impact on 1 site – Great Marlow	Direct impact on 1 site – Great Marlow
Non-Aboriginal heritage Direct impact on non-Aboriginal heritage items and archaeological sites: • Items of State heritage significance (No.). • Other items (No.).	0 21	2 25	0 24	0 12	0 10	0 10
Environmental Potential direct impact on identified Endangered Ecological Communities (EEC) m2	100	550	1,450	14,250	22,000	37,500
Landscape and urban character	Maintains visual integrity of existing bridge. Would not fragment existing urban settlement patterns.	Impacts on views to, and visual character of, existing bridge. Would fragment existing urban settlement patterns.	Impacts on views to, and visual character of, existing bridge. Would significantly fragment existing urban settlement patterns.	Maintains visual integrity of existing bridge. Would significantly fragment existing urban settlement patterns.	Maintains visual integrity of existing bridge. Would fragment existing urban settlement patterns.	Maintains visual integrity of existing bridge. Would fragment existing urban settlement patterns.
Flooding Length of levees upstream of additional crossing that will need to be raised to retain existing flood protection (km) [5] .	11.75	16.70	18.10	19.50	16.50	16.50
Cost • Route option strategic cost estimates ($M) (all upgrades at 2012) • Benefit cost ratio over 30 years from 2019 based on strategic cost estimates [6]	215 1.6 1.6	231 1.3 1.3	231 1.6 1.6	210 1.7 1.7	304 1.0 1.0	340 0.9 0.9

1. For Option A the new bridge would be two lanes northbound and one lane southbound, and the existing bridge would become one lane southbound only. For the other five options, the new bridge would be one lane northbound and one lane southbound, and the existing bridge would remain as one lane northbound and one lane southbound.
2. Typical recorded travel times between the Bent Street/Gwydir Highway intersection South Grafton and Prince Street/Pound Street intersection Grafton in the morning (AM) peak earlier in 2012 were between 8 and 10 minutes.
3. Only includes receivers identified in the Noise Assessment technical paper (September 2012).
4. Includes 468 properties that would exceed 50 dBA at night if no additional crossing was built.
5. Maximum height of increase for all options is less than or equal to 0.1 metre. For Option C, drainage mitigation measures would be required to provide the required flood immunity for the underpass of the railway viaduct between Kent and Clarence streets.
6. A benefit cost ration (BCR) that is greater than one indicates that the road user benefits exceed the cost.

Appendix 4. Assessment of the Options

Assessment of the 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)** with a corresponding numerical value of 5, Very Good **(VG)** with a corresponding numerical value of 4, Good **(G)** with a corresponding numerical value of 3, Fair **(F)** with a corresponding numerical value of 2 or Poor **(P)** with a corresponding numerical value of 1**.**

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.

Evaluation of Options against Functional Assessment Criteria

Options	***Wt***	***Option E***		***Option A***		***Option C***		***Option 11***		***Option 14***		***Option 15***	
		Rate	∑	*Rate*		*Rate*	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑
Improve the overall efficiency of the road network including am and pm peaks	33%	G	99	G	99	VG	132	F	66	P	33	P	33
Enhance safety for all road users	18%	G	54	F	36	VG	72	VG	72	VG	72	VG	72
Optimise the efficiency of freight movement	15%	G	45	F	30	VG	60	VG	60	F	30	F	30
Improve bicycle and pedestrian linkages	18%	VG	72	G	54	G	54	F	36	P	18	P	18
Provide an effective alternate route during incidents	15%	F	30	P	15	VG	60	VG	60	G	45	G	45
Maintain navigable bridge clearances for river uses	-	E	0	E	0	E	0	F	0	P	0	P	0

Total Weighted Score		***300***		***234***		***378***		***294***		***198***		***198***

General Observations

Criteria:- Improve the overall efficiency of the road network including am and pm peaks

- General agreement reached relatively easily around the table on the assessment of all options based on traffic performance and the studies undertaken.

Criteria:- Enhance safety for all road users

- There was considerable discussion on understanding what the safety issues were for the options.
- The group relied on the raw numbers from road safety audit (after understanding each of the numbers better) as a reasonable guide to relative safety.
- General agreement reached around the table on the assessment of all options based on the available information.

Criteria:- Optimise efficiency of freight movement

- The more in town options are considered better for servicing the town (freight coming into and out of town), while the out of town options are better for through freight. It was acknowledged that fewer heavy vehicles were making this through movement.
- General agreement reached around the table following discussion.

Criteria: - Improve bicycle and pedestrian linkages

- Group discussion around which of these options may perform better depending on the benefit.
- Option E rated highest, followed by A and C (rated the same) – taking into account the proposed cyclelink by Council for Clarenza.
- General agreement that Option 11 rated higher than Options 14 and 15.
- Options 14 and 15 rated as poor because it was considered that they would be used less due to their distances from the CBD and residential areas.
- General agreement reached around the table following discussion.

Criteria:- Provide an effective alternate route during incidents

- Options C and 11 were considered good alternatives in that they were separated but not too far apart from the existing crossing. Options rated as very good. Agreement easily reached.
- Discussion around Option E (rated second worse). Rating changed from fair to good to fair. Issue identified that Victoria Street was an issue for trucks as there is no alternate route and trucks can't use Victoria Street. Group differentiated between the minor and major incidents. Option E decided to be worse than Options 14 and 15. Discussion required to reach consensus on rating for Option E.
- Options 14 and 15 rated good because they remain independent routes altogether however have additional travel distances in the event of an incident.
- General agreement reached around the table following discussion

Criteria:- Maintain navigational clearances

- All options would be built to minimum standard. Harwood Bridge is higher than all options.
- Options E, A and C ranked highest as they don't effect the existing situation.

- General agreement reached around the table following discussion.

More detailed comments and observations are included in ***Appendix 5.***

Evaluation of Options against Socio Economic Assessment Criteria

Options	***Wt***	***Option E***		***Option A***		***Option C***		***Option 11***		***Option 14***		***Option 15***	
		Rate	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑
Minimise the impact on the operation of the existing businesses and provide for economic growth	17	G	51	F	34	VG	68	F	34	P	17	P	17
Promote better connectivity between Grafton and South Grafton for social, commercial and industrial users	44	E	220	VG	176	VG	176	F	88	P	44	P	44
Minimise adverse amenity impacts of traffic (including heavy vehicles) on residential areas, noise, air quality	28	F	56	G	84	G	84	P	28	P	28	F	56
Minimise acquisition of properties – rural, residential, business & community	11	G	33	P	11	F	22	G	33	VG	44	VG	44
Maintain the relationship of the town to the river eg views and river users	-	F	0	F	0	F	0	F	0	P	0	P	0
Total Weighted Score			***360***		***305***		***350***		***183***		***133***		***161***

General Observations

- It was difficult for some group participants to dissociate themselves with personal impacts as opposed to looking at the bigger picture.
- There was some difficulty in agreeing on consensus around what the criteria was actually describing eg river uses vs river views, acquisition of residential property vs business vs rural and what should be ranked higher.
- The group was good at acknowledging that some people were directly impacted, and it was difficult to rank options knowing that there was a personal issue at stake as well.
- Some concern was expressed in relation to how impacts were calculated / assessed (eg with regards to noise… perception by some group members that the report suggested greatest impacts related to the largest increase in noise levels as opposed to absolute level).

More detailed comments and observations are included in ***Appendix 5.***

Evaluation of Options against Natural and Built Environment Criteria

Options	*Wt*	*Option E*		*Option A*		*Option C*		*Option 11*		*Option 14*		*Option 15*	
		Rate	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑	*Rate*	∑
Minimise Non Aboriginal heritage impacts	20	P	20	F	40	F	40	E	100	G	60	VG	80
Maintain the material fabric and character of Grafton (Urban landscape)	30	E	150	VG	120	F	60	F	60	P	30	P	30
Maintain the visual experience of the existing bridge	7	G	21	P	7	P	7	G	21	E	35	E	35
Minimise impact on Aboriginal cultural heritage	23	E	115	E	115	P	23	G	69	G	69	F	46
Minimise ecological impacts – (EEC, Fauna, Flora, Aquatic, etc)	20	E	100	VG	80	G	60	F	40	P	20	P	20
Minimise the surface/ground water impacts	-	VG	0	E	0	VG	0	G	0	F	0	P	0
Total Weighted Score			***406***		***362***		***190***		***290***		***214***		***211***

General Observations

Minimise non-Aboriginal heritage impacts

- Trees are listed in terms of heritage value not in terms ecological value.
- Impacts on State listed items were not considered direct impacts. The direct impacts on Option A were not considered to be substantial by the group.
- The group agreed that Option 11 has the least impact; Option E has the greatest impact, followed by Options A and C.
- Option 14 was considered worse than Option 15 due to the greater impact on the trees.

Maintain the material fabric and character of Grafton

- Options E and A provide good connectivity between Grafton and South Grafton.
- Option 11 affects the rural land south of the river and the residential areas in Grafton.
- Option 14 and 15 are considered as bypasses.

Aboriginal heritage

- Option C is the worst, followed by Option 15 and then Option 14, followed by Option 11. Option E and A rate equally.
- Significant emphasis was placed on the series of meetings between GNLALC and RMS

Water quality

- The impact on water quality was based on the potential acid sulphate soils map and the length of the options through high risk areas. Option 15 rated the worst as it has the greatest length through the acid sulphate soils.

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) appears below.

It should be noted where the difference in score between options were similar the options were equally ranked as the difference in score was not considered significant.

Rank	*Functional*	*Socio Economic*	*Environmental*	*Capital Cost*	*BCR*
1	***Option C*** (378)	***Option E & C*** (360, 350)	***Option E*** (406)	***Option 11*** ($210 M)	***Option 11*** (1.7)
2	***Options E & 11*** (300, 294)		***Option A*** (362)	***Option E*** ($215 M)	***Options E & C*** (1.6)
3		***Option A*** (305)	***Option 11*** (290)	***Options A & C*** ($231 M)	
4	***Option A*** (234)	***Option 11 & 15*** (183, 161)	***Option 14 & 15*** (214, 211)		***Option A*** (1.3)
5	***Options 14 & 15*** (198)			***Option 14*** ($304 M)	***Option 14*** (1.0)
6		***Option 14*** (133)	***Option C*** (190)	***Option 15*** ($340 M)	***Option 15*** (0.9)

Recommending a Preferred Direction

As a result of the work undertaken above, the group (in four focus groups) was asked "Which 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 C*** as the preferred option to be progressed.

Because:

- Option 14/ 15 ranked low on functional, socio economic, cost and environment ranks
- Option 11 average performer not standing out with any significant advantages or disadvantages from a criteria perspective, cost was seen as similar as other options
- Option A average performer but has other issues such as no effective alternative route and the focus on the one corridor, better to have an alternative corridor
- Option E focuses traffic at Fitzroy/ Villiers intersections and Option C offers an alternative corridor and does not concentrate traffic at the one point
- On balance Option C offers a better functional outcome than Option E and the general view being a down river option would provide a better transport outcome for Grafton

Subject to:

- Option C – further design work is required and a management plan to address the concerns of the aboriginal community

- We recognise personal opinions on visual aspects are very subjective and there will be a variety of opinions

Fallback position:

- Option E

Focus group 2

We recommend ***Option E*** and ***Option C*** as the preferred options to be progressed***.***

It was unanimous that Options E and C were either the first or second choice for the group.

Option E was supported as one of the two preferred options ***because:-***

- Option E is the most direct link between Grafton and South Grafton CBD.
- Provides good connectivity between CBDs.
- Has less environmental impacts than Option C.
- More pedestrian/cyclist friendly.
- Works as well as Options A and C in terms of traffic modelling.
- Has minimal property acquisition.
- Provides a good loop between the two bridges and the waterfront – river precinct.

Subject to:

- The development along both sides of the river to create the loop between the two bridges.

Option C was supported as one of the two preferred options ***because***:-

- Option C links to the industrial area in South Grafton.
- Option C works well from a functional perspective.
- Option C uses space that wouldn't otherwise be used.
- Keeps infrastructure in a similar corridor to the current bridge.
- Approach from the south. Option E had congestion along Gwydir Hwy in the traffic visualisations.
- Prefer to keep bridges together.

Subject to:

- Suggested adding single lane on east side of railway to connect to Villiers St.
- A concern is the flooding under the viaduct on Pound St.

Focus group 3

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

Because:

- On balance Option E was considered to perform best based on the process we have undertaken in the workshop and the overall project objectives.
- Ranked in top two for each of the areas of functional, socio economic, environmental, capital cost and BCR (including ranked 1 twice) used for assessing the options.
- Satisfies each of the project objectives.

Additional reasons

- Some members of the group also believed that with option E it is achievable to manage any identified impacts at a reasonable cost relative to the other options.
- Option E appeared to provide good connectivity between Grafton and South Grafton, which has the potential to promote economic growth in South Grafton area.
- Existing businesses will still get existing trade.

Subject to:

- Minimising noise impacts from traffic where possible (considering in particular the convent).
- Good urban design as there is an opportunity to build a second iconic bridge and entrance for the town.

Fallback position:

- Option C if something could be done to reduce the environmental impacts, particularly the Aboriginal impacts and views

Other notes:

- Rule out Options 14, 15 because on balance they did not perform well. Option 11 also not considered as a recommendation due to socio economic impacts.
- Option A also not recommended due to its functional rating, particularly as it does not provide a good alternative if an incident occurs.

Focus group 4

We recommend ***Options E or C*** as the preferred directions to be progressed***.***

Because:

- The group couldn't split between E and C
- While Option C was the best performing option functionally, it was the worst performing option environmentally across the environmental criteria
- The group couldn't split Options E and C on socio economic, cost or value for money considerations.

The group agreed that:

- Options 14 and 15 were the worst performing options.
- Option A was the next worst performing option.
- On balance Option 11 does not perform as well as Options E or C, does not have any major strength and has high impacts on residential areas in Grafton.

Conclusions

- All four focus groups expressed preferences for either Option C or Option E or were unable to decide between Option E or Option C
- All four focus groups suggested that Options A, 11, 14 & 15 are the least preferred options because they do not perform as well as the Options E & C when assessed against the option selection criteria and the project objectives
- It was difficult to decide between Options E & C because
    - Option C is the best performing option assessed against function criteria
    - Option E is the best performing option assessed against natural and built environment criteria
    - Options E & C performed equally well against socio economic criteria
    - The capital cost and cost benefit ratios for E & C were similar
- If Option C is to be adopted then additional consideration needs to be given to mitigating the adverse environmental impacts associated with Aboriginal heritage during construction, the impact on the material fabric of the town, visual experience of the bridge and the ecological impacts
- If Option E is adopted then additional consideration needs to be given to mitigating the adverse functional impacts associated with the pinch point at Villiers Street (freight vehicles servicing the town and the alternative route in emergencies), transport efficiency across the network and safety aspects.

Appendix 5. Comments from the Option Evaluation Process

Each sub group kept a log of the points raised in discussion during the option evaluation process.

The comments are reproduced below.

Functional Criteria Assessment

Criteria:- Improve the overall efficiency of the road network including am and pm peaks

- Option E - General consensus that it was good (initially identified as potentially excellent).
- Option A – Considered fair or good. Considered queuing in 2049, and the fact that traffic remains in one corridor. Assessment considered efficiency of the whole network. Consideration of traffic lights. Signalised intersections only included where volumes too high to cope. Consensus reached on good. Will come back and sanity check against other options.
- Option C - Performs very well in PM peak. Consensus reached very good overall.
- Option 11 - Travelling time queuing times in peaks. Option 11 does not perform as well as Option C.
- Options 14 and 15 – Considered poor.

Summary
General agreement reached around the table on the assessment of all options based on traffic performance and the studies undertaken.

Criteria:- Enhance safety for all road users

- The group reviewed the outcomes in the CU/report summary table.
- There was discussion on understanding what the safety issues were for the options.
- The group relied on the raw numbers from road safety audit (after understanding each of the numbers better) as a reasonable guide to relative safety.
- General agreement reached around the table on the assessment of all options based on the available information.

Criteria:- Optimise efficiency of freight movement

- From a heavy vehicle perspective the group rated Option C as the best followed by 11, E then A, 14 and 15.
- Vehicles travelling from Casino and then accessing the Pacific Highway as through traffic, Options 14 and 15 very good.
- About 780 heavy vehicles were counted in surveys to be travelling along Villiers Street, north of Oliver Street (total for both directions in peak hours) which seems fairly reasonable (however these count all heavy vehicles including through trips, trips still servicing CBD area, and trips starting or ending in Grafton/South Grafton).
- Need to remember that when the highway opens this vehicle count should also go down (not up).
- For the vehicles travelling in and out of town preference switches over to Options A and C
- Discussion centred around where trucks are travelling to and from, and the reasons why this changes
- Note: The more in town options are better for servicing the town (freight coming into and out of town), while the out of town options are better for through freight. It was acknowledged that fewer heavy vehicles were making this through movement.

- About 40% of vehicles crossing the bridge are travelling external to internal or vice versa. Based on this would give a greater preference to the in-town options
- Options 14 and 15 are considered fair as they only provide one aspect of vehicles improvements
- Going out of town increases costs on goods and services (as they will no longer have a choice of using the existing bridge).
- General agreement reached around the table following discussion

Criteria: - Improve bicycle and pedestrian linkages

- Options E, A and C considered fairly similar. Most pedestrian traffic going into CBD or residential areas. E rated best because it provided a good link between the two town centres.
- A good cycleway could encourage cycling to schools in Clarenza.
- Options E and C are considered very good.
- Group discussion around which of these options may perform better depending on the benefit.
- Note – Option E rated the highest, followed by A and C when considering the proposed cyclelink by Council for Clarenza.
- Options 14 and 15 rated as poor because it was considered that they would be less used due to their distances from the CBD and residential areas.
- General agreement reached around the table following discussion.

Criteria:- Provide an effective alternate route during incidents

- Group identified issues associated with Option A sharing linkages subsequently rated as poor.
- Option E – issue relates to the location of the junction point. Option E considered good compared to Option A where there is no alternative.
- Options C and 11 were considered good alternatives in that they were separated but not too far apart from the existing crossing. Options rated as very good. Agreement easily reached.
- Option A clearly considered the worse.
- Option E rated fair and Option A rated poor.
- Discussion around Option E (rated second worse). Rating changed from fair to good to fair. Identified that Victoria Street was an issue for trucks as there is no alternate route and trucks can't use Victoria Street. Group differentiated between the minor and major incidents. Option E considered to be worse than Options 14 and 15. Discussion required to reach consensus on rating for Option E.
- 14 and 15 good because they remain independent routes altogether however have additional travel distances in the event of an incident.
- General agreement reached around the table following discussion.

Criteria F:- Maintain navigational clearances

- All bridges would be built to minimum standard. Harwood Bridge is much higher than all options so doesn't come into equation.
- High voltage cable connections could be raised in the future.
- Options E, A and C ranked highest as they don't effect existing situation – all ranked excellent.
- Options A, C and E rated higher than other options. Could get 70-80% of boats further up near the bridge.
- 11 slightly better than 14 and 15 (poor) because higher boats can go further upstream (however groups noted this was a very small number of boats that actually go up the Clarence River as far as Grafton with masts higher than 17 metres).
- Note: decision based on current designs.

Socio Economic Criteria

Criteria: Minimise impact on existing businesses and economic growth

- Group agreed that Option C should be rated as very good followed by Option E rated as good.
- The group discussed if Option C should be rated as excellent, but others questioned whether this was too high as an excellent score would indicate there were no problems.
- The group agreed to rate Option C as very good and Option E as good.
- Option A considered to fragment and impact on businesses. This issue was discussed in the context including the impact on economic growth (as opposed to just impacting on businesses).
- The group discussed whether businesses will still be able to trade, or whether they will be lost. The group discussed the impact of acquisition.
- After discussion group consensus was reached for 14 and 15 being rated as Poor.

Criteria: Better connectivity between Grafton and South Grafton

- Group noted that commercial activity was occurring around southern end of Option C now
- Based on discussion the group believed that Option E sits a little above Option C.
- The issue of the rail line still creating severance through the town was discussed
- Options 14/15 were considered the worst.

Criteria: Amenity

- The group talked about around noise modelling as there was perception that it only considers changes in noise levels rather than absolute level. There are however absolute levels also presented in report and Community Update
- Discussion centred on areas becoming a traffic environment that previously weren't.
- Residential sites were classified higher for noise impacts.
- The group acknowledge there are impacts with all options. No option was necessarily good, but the group did acknowledge the scoring system.

Criteria: Minimise acquisition of property

- Discussion around impact of rural properties and severance issue. Should rural properties be considered as a business?
- The group decided to consider residential acquisition first. Option 15 was rated the best followed by Option 14, then Option E, then Options A, 11 and C were all fairly similar. So best to worse with residential properties are 15 – 14 – E – 11 then A & C are same.
- Options 14 and 15 have huge impacts on farmland. Option 11 also has significant impact on farmland. Option C is confined to edges of property. Option A also has minimal impact. With regards to impact on Option E – vacant land is actually zoned industrial. Options 15 is rated worse, then Option 14, then Option 11 then Option C, with Options A and E the same.
- Businesses considered due to viability resulting from acquisition. This was discussed as an indicator where viability was impacted. Worse is Option A, then Option E then Option C. Best performing is Options 14 and 15.
- In terms of overall acquisition Options 14 and 15 were rated the best followed by Option E, then Option 11. Options A and C are about the same. This was determined by adding ranking scores.
- The group were very conscious of the impact on rural viability; however Options 14 and 15 came out as best with acquisition on balance of all components.
- One participant expressed concern with the assessment. The participant acknowledged he was the only person at the table who stands to lose his house and was concerned that residential loss were not ranked higher. Rest of table acknowledged this as valid concern. After discussion Option A rated as poor, then Option C rated as fair.

- The group acknowledge some people may lose properties, so for these people the loss of property was seen as very important.

Criteria: Maintain relationship of town to the river (views and river users)
- The group discussed how each option impacts on river uses, including where the rowing club and sailing club is now.
- Highest activity, and where Council is promoting more use is between existing bridge and Prince Street. In this regard Option E has greatest impact.
- There was an impression that Option A would adversely impact on the sailing club – however there will be no direct impact on the actual sailing club, with the potential for a small amount of surrounding council land potentially directly impacted by Option A
- Aspect of views came up as balancing point.
- The group had some difficulty to make a decision, as very diverse views for how to consider at the last point.

Observations:
- It was difficult for some group participants to dissociate themselves with personal impacts as opposed to looking at the bigger picture.
- There was some difficulty in agreeing on consensus around what the criteria was actually describing eg river uses vs river views, acquisition of residential property vs business vs rural and what should be ranked higher.
- The group was good at acknowledging that some people were directly impacted, and it was difficult to rank options knowing that there was a personal issue at stake as well.
- Some concern was expressed in relation to how things were calculated / assessed (eg with regards to noise… greatest impacts were about biggest increase in noise levels as opposed to absolute level).

Natural and Built Environment

Criteria: Minimise non-Aboriginal heritage impacts
- Trees are listed in terms of heritage value not in terms ecological value.
- State listed items considered to not have direct impacts.
- Option 11 has the least impact.
- Option E has the greatest impact. Followed by Options A and C.
- Option 14 is worse than Option 15 due to the greater impact on the trees.

Criteria: Maintain the material fabric and character of Grafton
- Option E and A provide good connectivity between Grafton and South Grafton.
- Option 11 affects rural areas south of the river and the residential areas north of the river
- Option 14 and 15 are bypasses.

Criteria: Aboriginal heritage
- Option C is the worst, followed by Option 15 and then Option 14, followed by Option 11.
- Option E and A rate equally.
- Deferred to Brett's input, based on the series of meetings that GNLALC and RMS have had.

Criteria: Ecological
- Although Option 15 was perceived to be slightly worse than Option 14, they have been put in the same category.

Criteria: Water quality

- The impact on water quality was based on the potential acid sulphate soils map and the length of the options through high risk. Option 15 is the worst as it has the greatest length through the acid sulphate soils.

Appendix 6. Presentations

Project purpose and objectives

➢**Project purpose** - To identify an additional crossing of the Clarence River at Grafton to address short-term and long-term transport needs.

➢**Project objectives:**

- Enhance road safety for all road users over the length of the project
- Improve traffic efficiency between and within Grafton and South Grafton
- Support regional and local economic development
- Involve all stakeholders and consider their interests
- Provide value for money
- Minimise impact on the environment

Route options

E Cowan St South Grafton to Villiers St, Grafton.

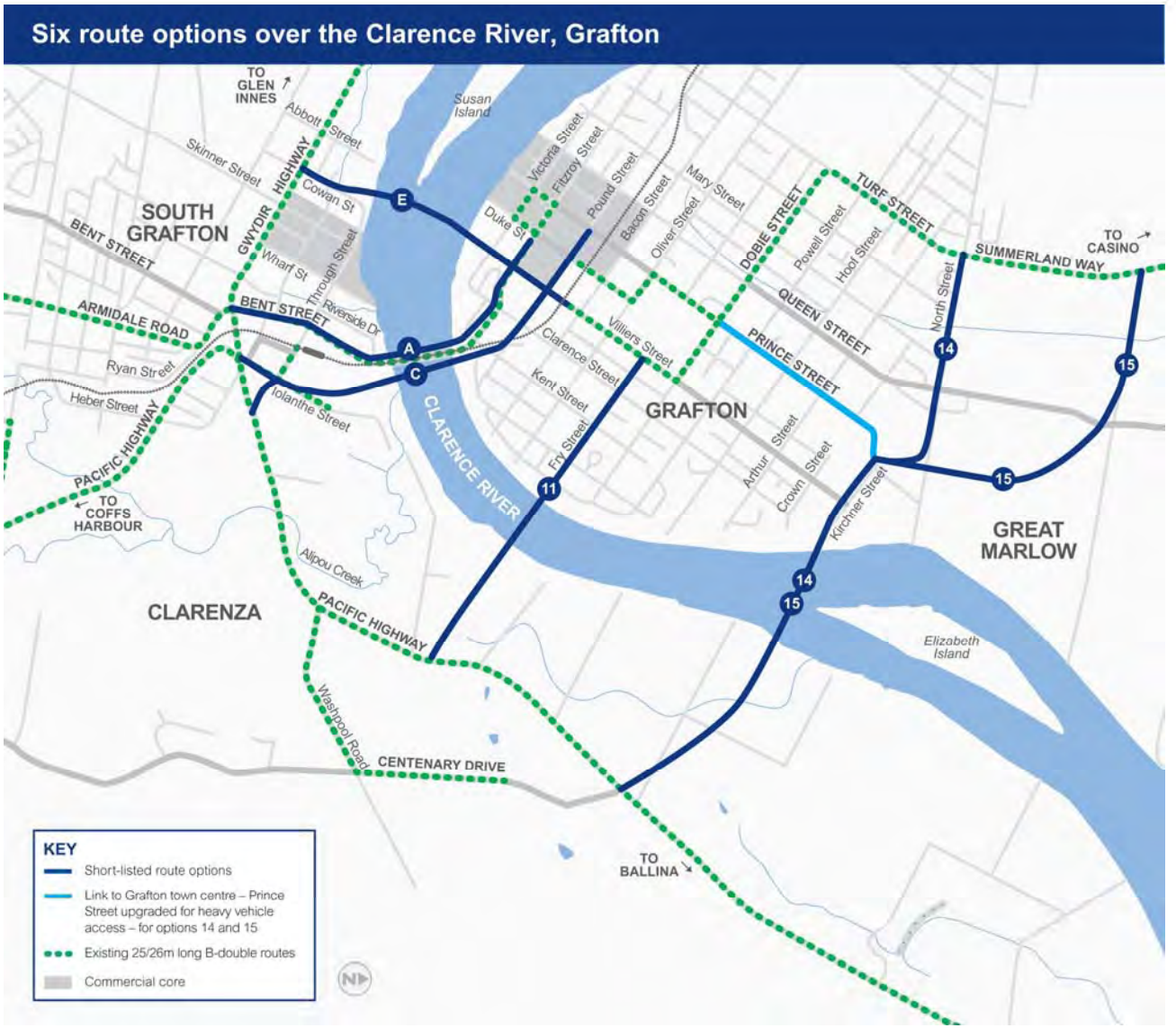
A New bridge parallel to and immediately upstream of the existing bridge connecting Bent St, South Grafton and Fitzroy St, Grafton.

C Junction of Pacific Hwy and Gwydir Hwy, South Grafton to Pound St, Grafton.

11 Existing Pacific Hwy north of South Grafton to Fry St, Grafton.

14 Existing Pacific Hwy north of South Grafton to North St Grafton via Kirchner St.

15 Existing Pacific Hwy north of South Grafton to Summerland Way north of Grafton, via Kirchner St.



Route Options Development Report

January 2012 - six short-listed route options announced for further investigation

The Route Options Development Report (RODR) provides the outcome of the technical and environmental investigations on the six options. Split into:

- Volume 1: Main Report
- Volumes 2 and 3: Technical Papers

RODR on display for community comment between 10 September and 12 October 2012

Short-listed options

Refinement of concept designs for short-listed options:

- Horizontal and vertical alignments
- Intersection upgrades
- Indicative road boundaries

Investigations into:

- Traffic
- Flooding
- Noise and amenity
- Geotechnical
- Landscape and urban character
- Social and economic
- Heritage – Aboriginal and non-Aboriginal
- Flora and fauna
- Cost estimates and value for money

FUNCTIONAL

Key features

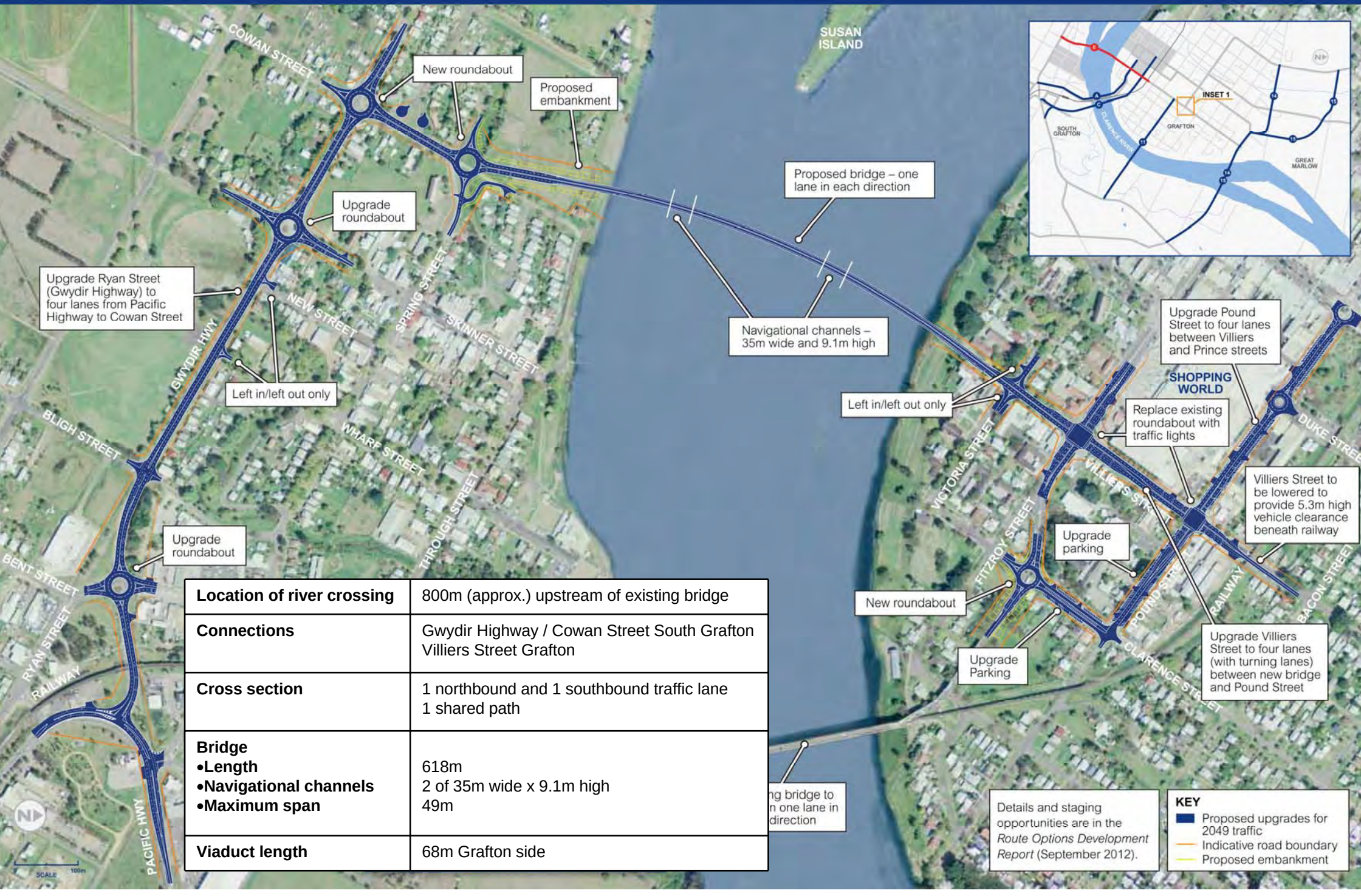
- Assumed date of opening to traffic – 2019

- Upgrade of the Pacific Highway between Glenugie and Tyndale (which bypasses South Grafton) assumed to be open to traffic before the new bridge is open to traffic (ie by 2019)

- Options designed to cater for predicted traffic 30 years after assumed date of opening (ie 2049)

- Construction of preferred option likely to be staged. Indicative Stage 1 construction included in report

OPTION E



Location of river crossing	800m (approx.) upstream of existing bridge
Connections	Gwydir Highway / Cowan Street South Grafton Villiers Street Grafton
Cross section	1 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 618m 2 of 35m wide x 9.1m high 49m
Viaduct length	68m Grafton side

Details and staging opportunities are in the *Route Options Development Report* (September 2012).

KEY

- Proposed upgrades for 2049 traffic
- Indicative road boundary
- Proposed embankment

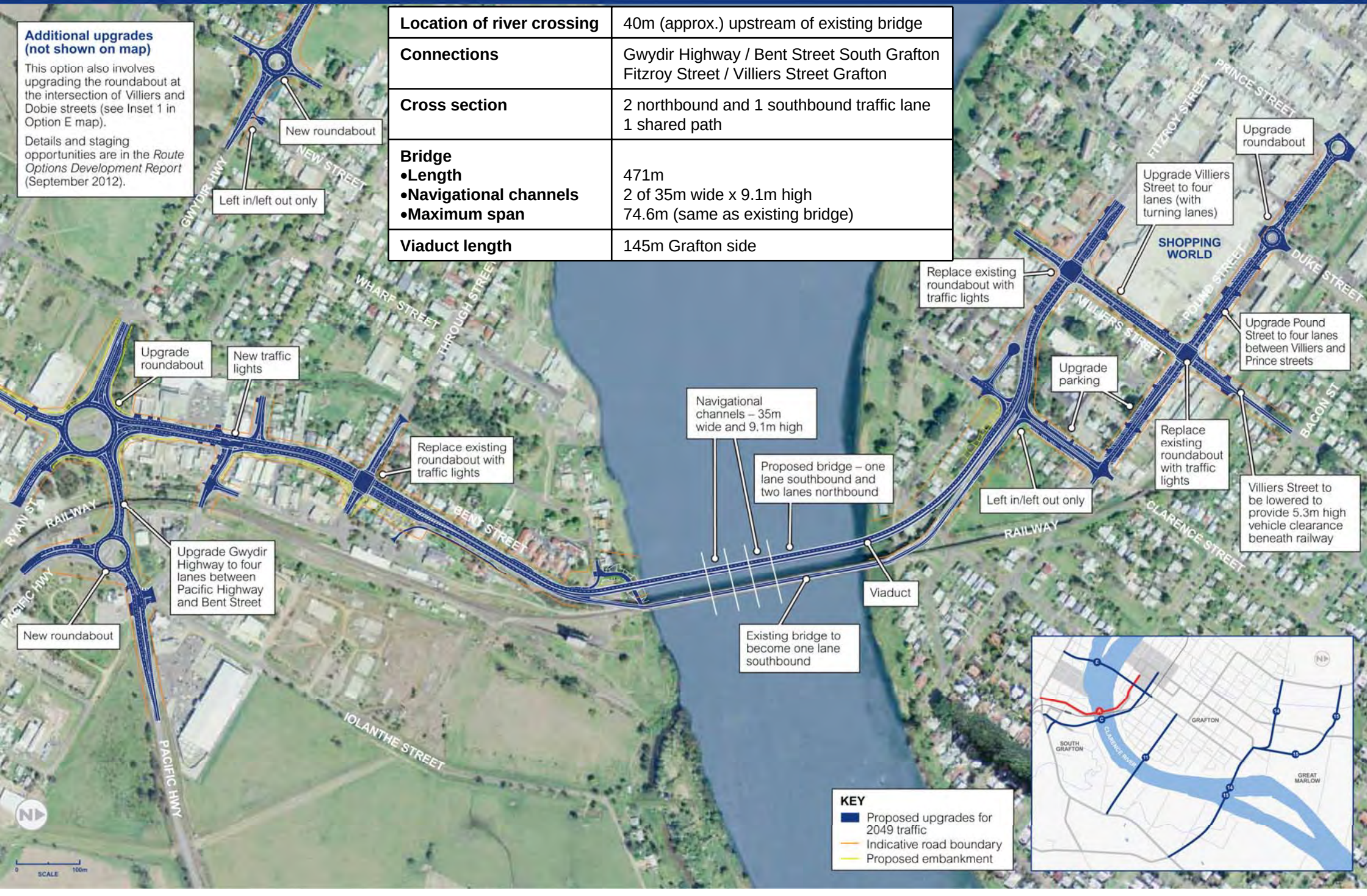
OPTION A

Location of river crossing	40m (approx.) upstream of existing bridge
Connections	Gwydir Highway / Bent Street South Grafton Fitzroy Street / Villiers Street Grafton
Cross section	2 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 471m 2 of 35m wide x 9.1m high 74.6m (same as existing bridge)
Viaduct length	145m Grafton side

Additional upgrades (not shown on map)

This option also involves upgrading the roundabout at the intersection of Villiers and Dobie streets (see Inset 1 in Option E map).

Details and staging opportunities are in the *Route Options Development Report* (September 2012).



OPTION C

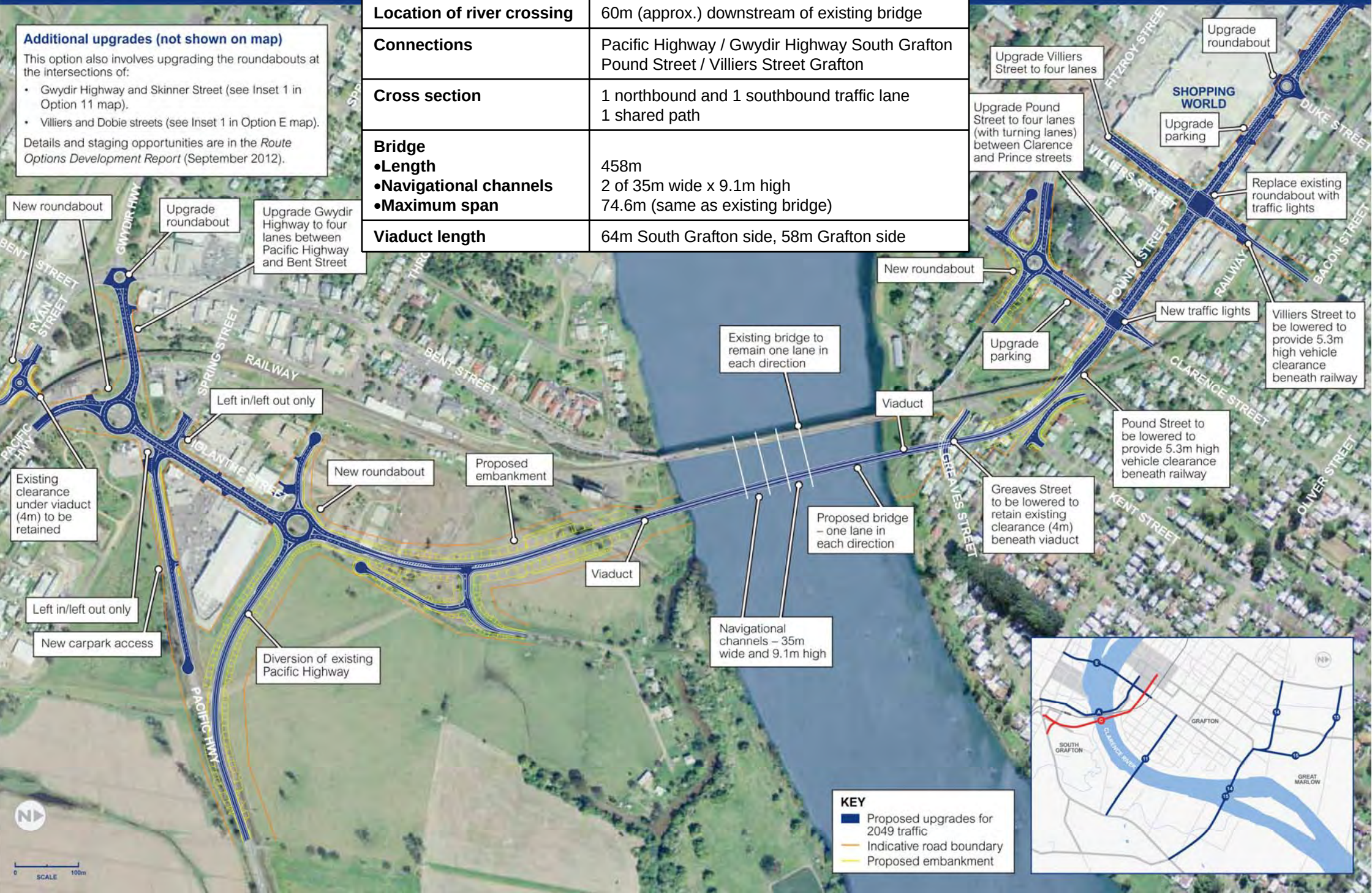
Location of river crossing	60m (approx.) downstream of existing bridge
Connections	Pacific Highway / Gwydir Highway South Grafton Pound Street / Villiers Street Grafton
Cross section	1 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 458m 2 of 35m wide x 9.1m high 74.6m (same as existing bridge)
Viaduct length	64m South Grafton side, 58m Grafton side

Additional upgrades (not shown on map)

This option also involves upgrading the roundabouts at the intersections of:

- Gwydir Highway and Skinner Street (see Inset 1 in Option 11 map).
- Villiers and Dobie streets (see Inset 1 in Option E map).

Details and staging opportunities are in the *Route Options Development Report* (September 2012).

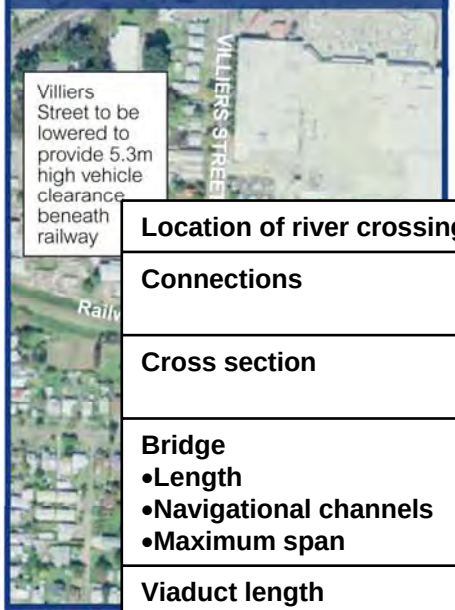


OPTION 11

INSET 1 – Gwydir Highway / Skinner Street Intersection

INSET 2 – Pacific Highway / Gwydir Highway

INSET 3 – Villiers Street underpass

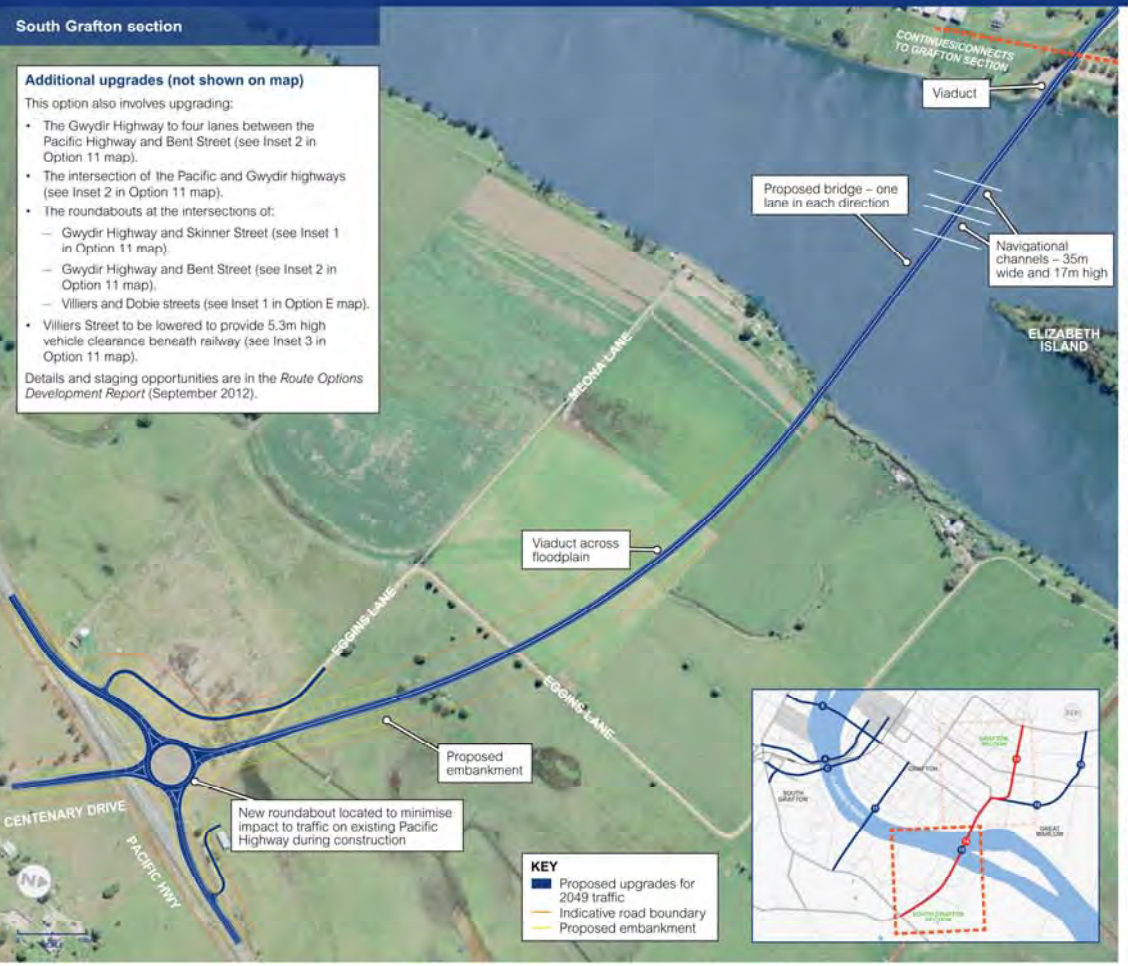


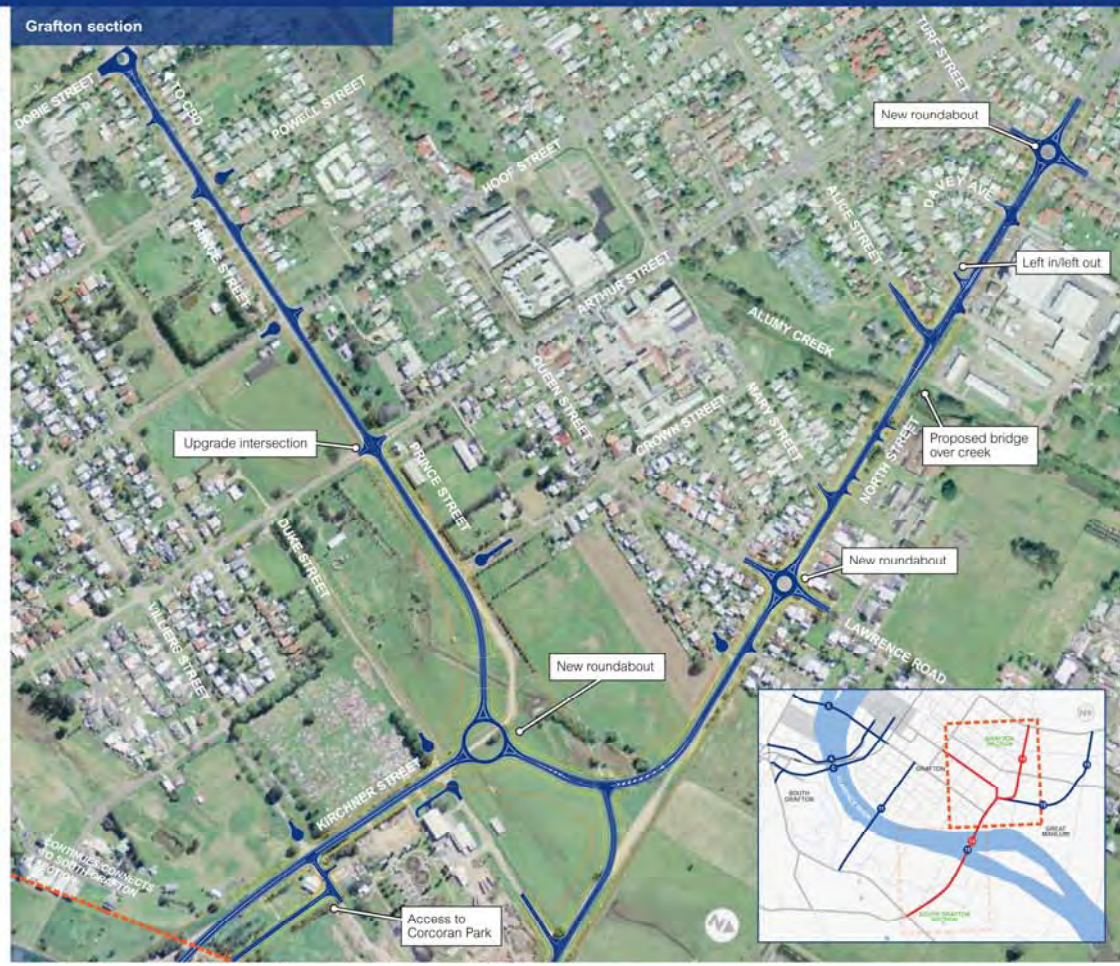
Location of river crossing	1,100m (approx.) downstream of existing bridge
Connections	Pacific Highway South Grafton Fry Street / Villiers Street Grafton
Cross section	1 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 387m 2 of 35m wide x 17m high 48.4m
Viaduct length	450m South Grafton side

Option 14

Location of river crossing	2,700m (approx.) downstream of existing bridge
Connections	Pacific Highway / Centenary Drive South Grafton North Street / Turf Street Grafton
Cross section	1 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 617m 2 of 35m wide x 17m high 53m
Viaduct length	782m South Grafton side, 136m Grafton side

OPTION 14

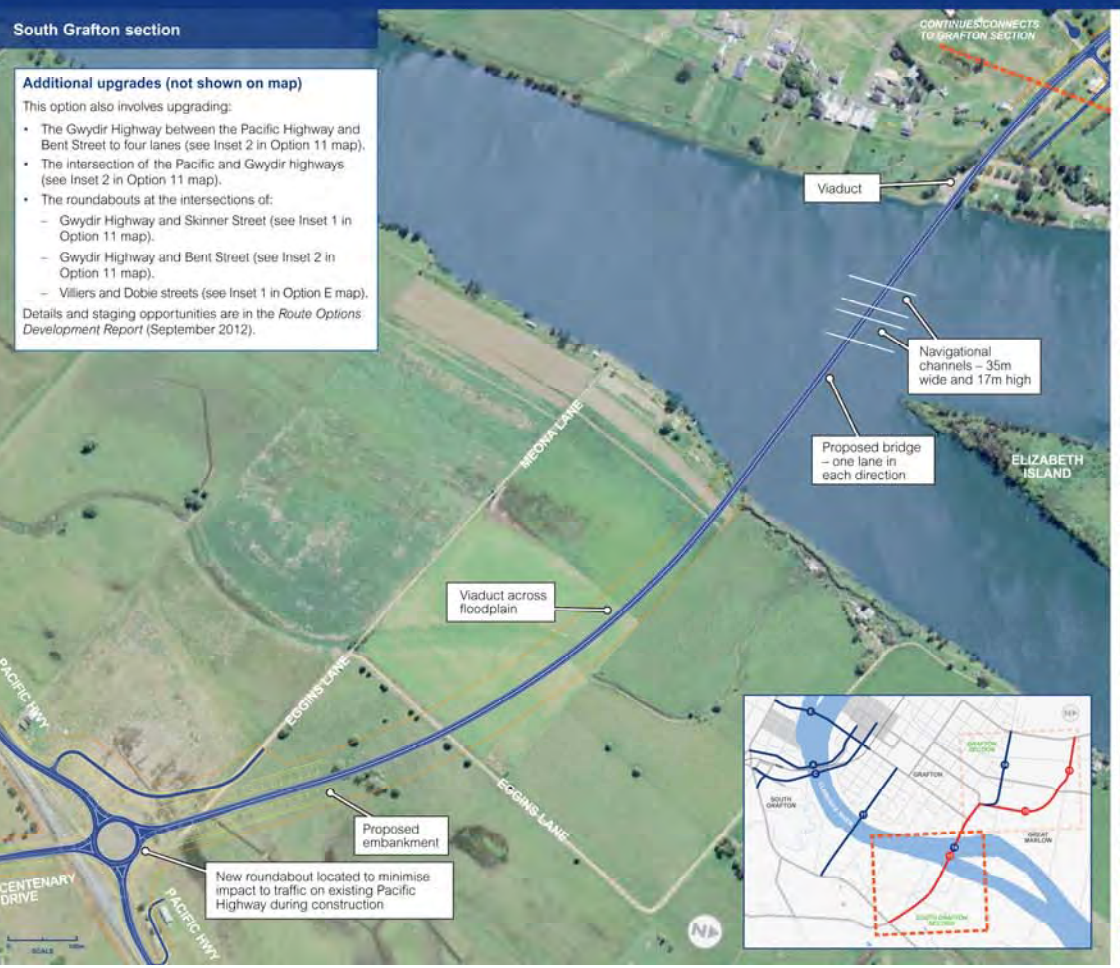


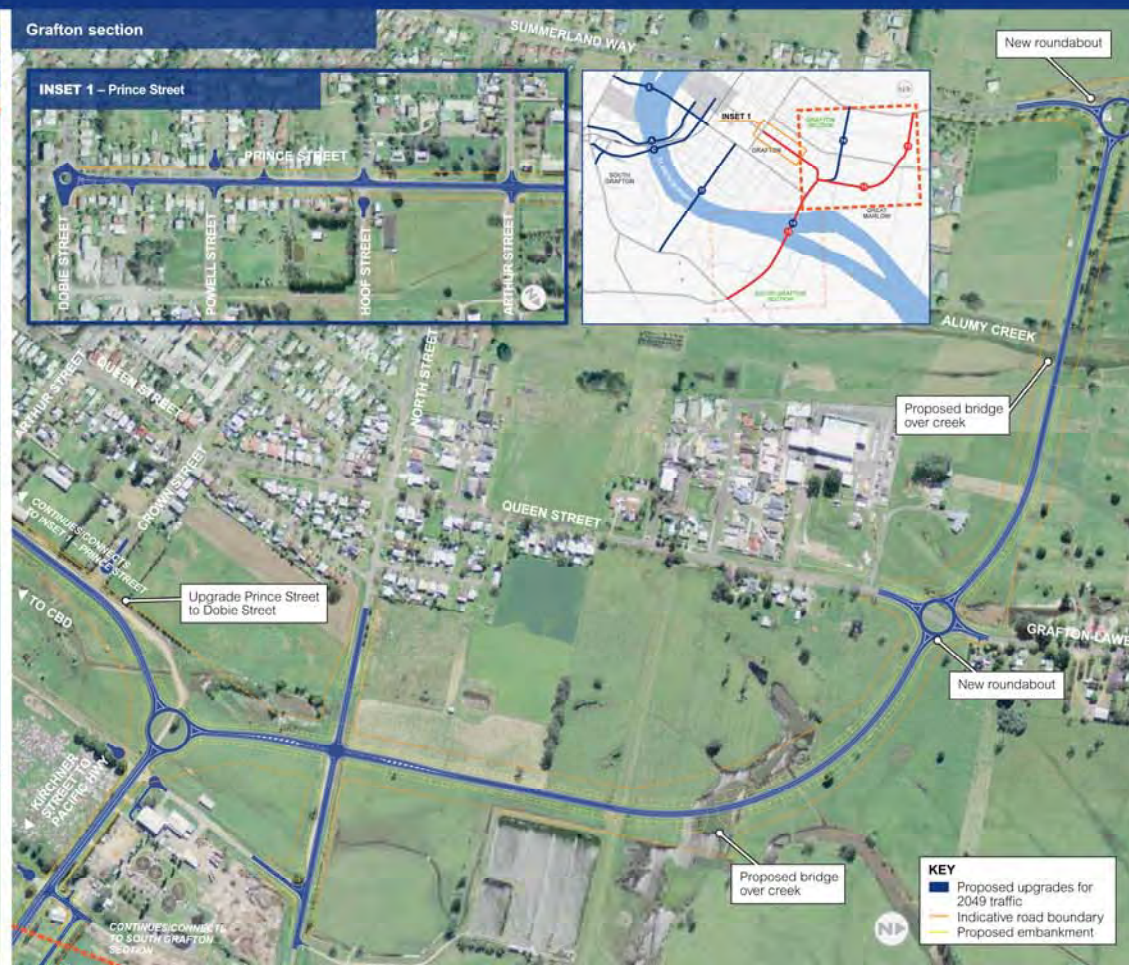


Option 15

Location of river crossing	2,700m (approx.) downstream of existing bridge
Connections	Pacific Highway / Centenary Drive South Grafton Summerland Way Grafton
Cross section	1 northbound and 1 southbound traffic lane 1 shared path
Bridge **•Length** **•Navigational channels** **•Maximum span**	 617m 2 of 35m wide x 17m high 53m
Viaduct length	782m South Grafton side, 136m Grafton side

OPTION 15





Functional - Road safety

Project objective: Enhance road safety for all road users over the length of the project

Supporting objective: Reduce the potential for road crashes and injuries on the bridge and approaches including any intersections and connecting roads.

Road safety was addressed by undertaking an independent road safety audit for each option.

- Options A and E have the highest number of safety issues in total. Generally this is because these two options direct traffic through the centre of Grafton, and are more constrained by existing developments and infrastructure.
- Options C, 11, 14 and 15 remove some traffic from central Grafton and therefore are less constrained by existing developments and infrastructure.

Supporting objective: Provide safe facilities for pedestrians and cyclists.

- Option A has the most safety issues for pedestrians and cyclists related to higher exposure to traffic volumes and heavy vehicles.
- Options E, C, 11, 14 and 15 had fewer issues, mainly related to roundabouts.

Functional - Road safety

Project objective: Enhance road safety for all road users over the length of the project

Supporting objective: Reduce the potential for road crashes and injuries on the bridge and approaches including any intersections and connecting roads.

Road safety was addressed by undertaking an independent road safety audit for each option.

- Options A and E have the highest number of safety issues in total. Generally this is because these two options direct traffic through the centre of Grafton, and are more constrained by existing developments and infrastructure.
- Options C, 11, 14 and 15 remove some traffic from central Grafton and therefore are less constrained by existing developments and infrastructure.

Supporting objective: Provide safe facilities for pedestrians and cyclists.

- Option A has the most potential to compromise road safety for pedestrians and cyclists.

Functional - Traffic Assessment Background

- Traffic investigation have involved strategic and micro-simulation traffic modelling
- Traffic modelling has been informed by
  - Origin/ destination surveys in 2009 and 2010
  - A combination of tube, video and intersection counts at approximately 68 sites
  - Travel time surveys
  - Observation of queuing traffic
- Micro-simulation modelling used to assess the 6 shortlisted options

Functional - Future Population Growth

- Mid North Coast Strategy – identified Grafton as a key regional centre

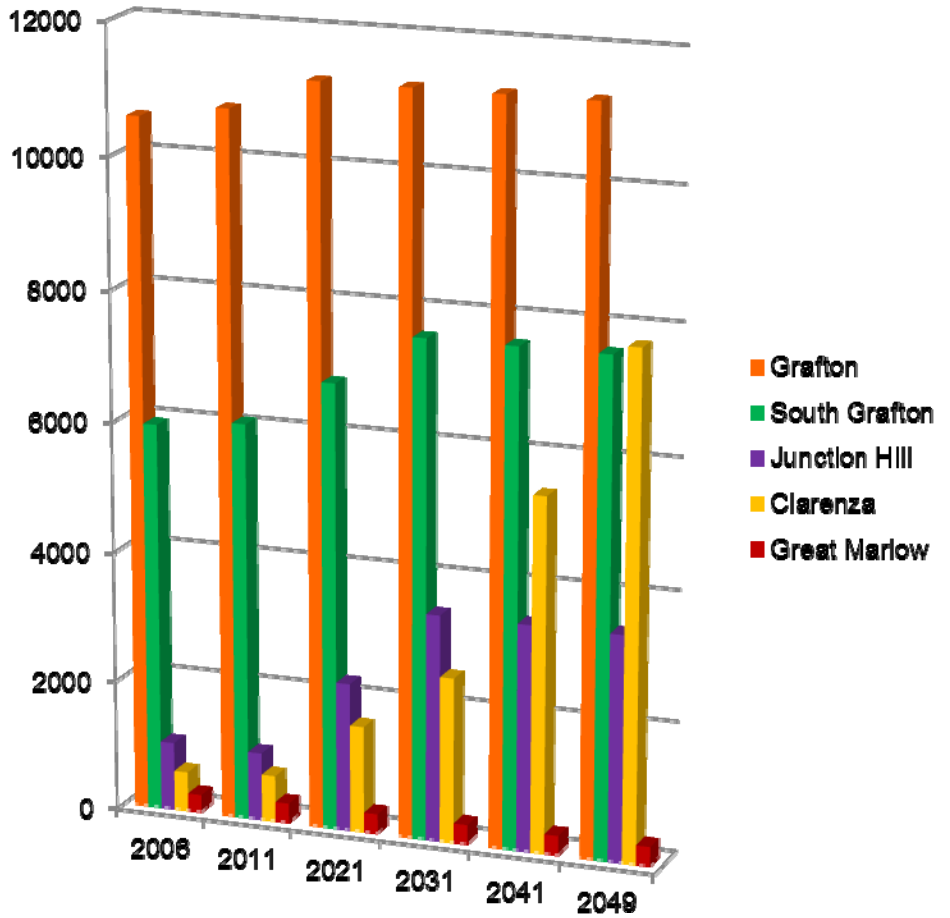
- Clarence Valley Council – available land, sequencing, focused on development in Junction Hill, Clarenza, Waterview Heights

- Population increases from 18,803 (2011) to 30,330 (2049)

- As capacity reached development accelerates in areas with spare capacity

- Population allocated to each zone in the model

- Trips estimated based on the change in population within each zone



Functional -Traffic

Project objective: Improve traffic efficiency between and within Grafton and South Grafton

Supporting objective: Provide efficient access for a second crossing of the Clarence River and for the State road network.

Supporting objective: Provide a traffic management network which reduces delays between Grafton and South Grafton in peak periods to an acceptable level of service for 30 years after opening.

Functional –
Key Outcomes Bridge Volumes 2hr AM Peak

- Cross river traffic in AM peak
  - 2019 – 4,086 trips
  - 2049 – 8,048 trips

- Options E,A and C capture similar proportion of cross-river traffic in 2019 and 2049

- Dominant travel into the existing Grafton central area

- Option 11 increases to 45% of cross river traffic at 2049 as the Clarenza development approaches capacity

- Options 14 and 15 lower proportion of travel in 2019 as OD's of demand & distance to the bridge

- Options 14 and 15 at 2049 attracts greater proportion of cross – river trips due to change in OD's and delays elsewhere

	Forecast Year	
Option	**2019**	**2049**
E	2,697 (66%)	5,231 (65%)
A	3,188 (78%)	5,919 (74%)
C	2,808 (67%)	5,431 (68%)
11	1,296 (32%)	3,515 (45%)
14	936 (23%)	2,673 (36%)
15	921 (22%)	2,578 (35%)

Functional –
Key Outcomes Reducing Delay (2049 AM Peak)

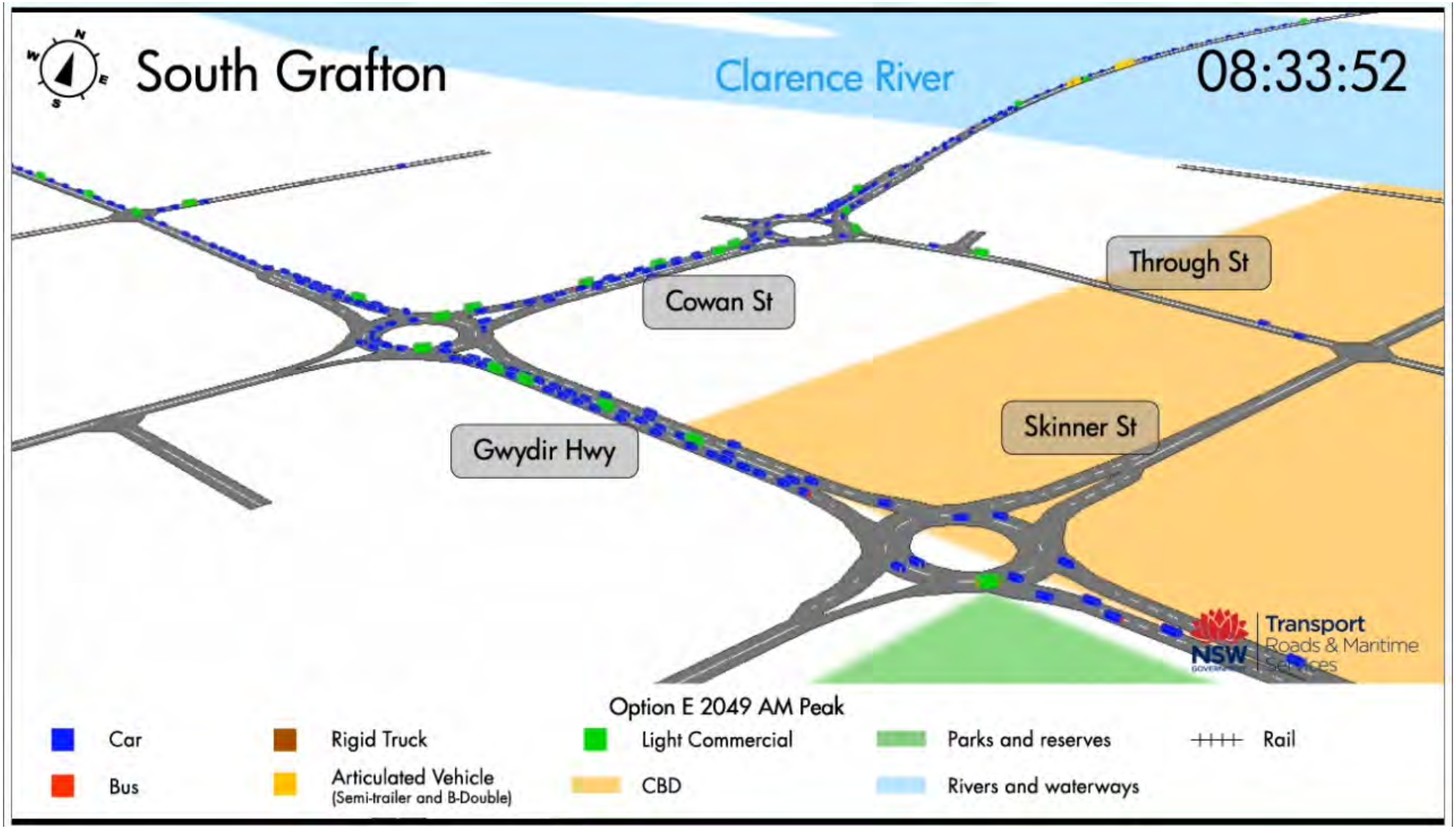
Option	Travel Time
E	7 min
A	8 min
C	7 min
11	8 min
14	14 min
15	14 min

- Option E, A, C and 11 similar effect
- Option 14 and 15 are similar but do not reduce travel time on the existing bridge

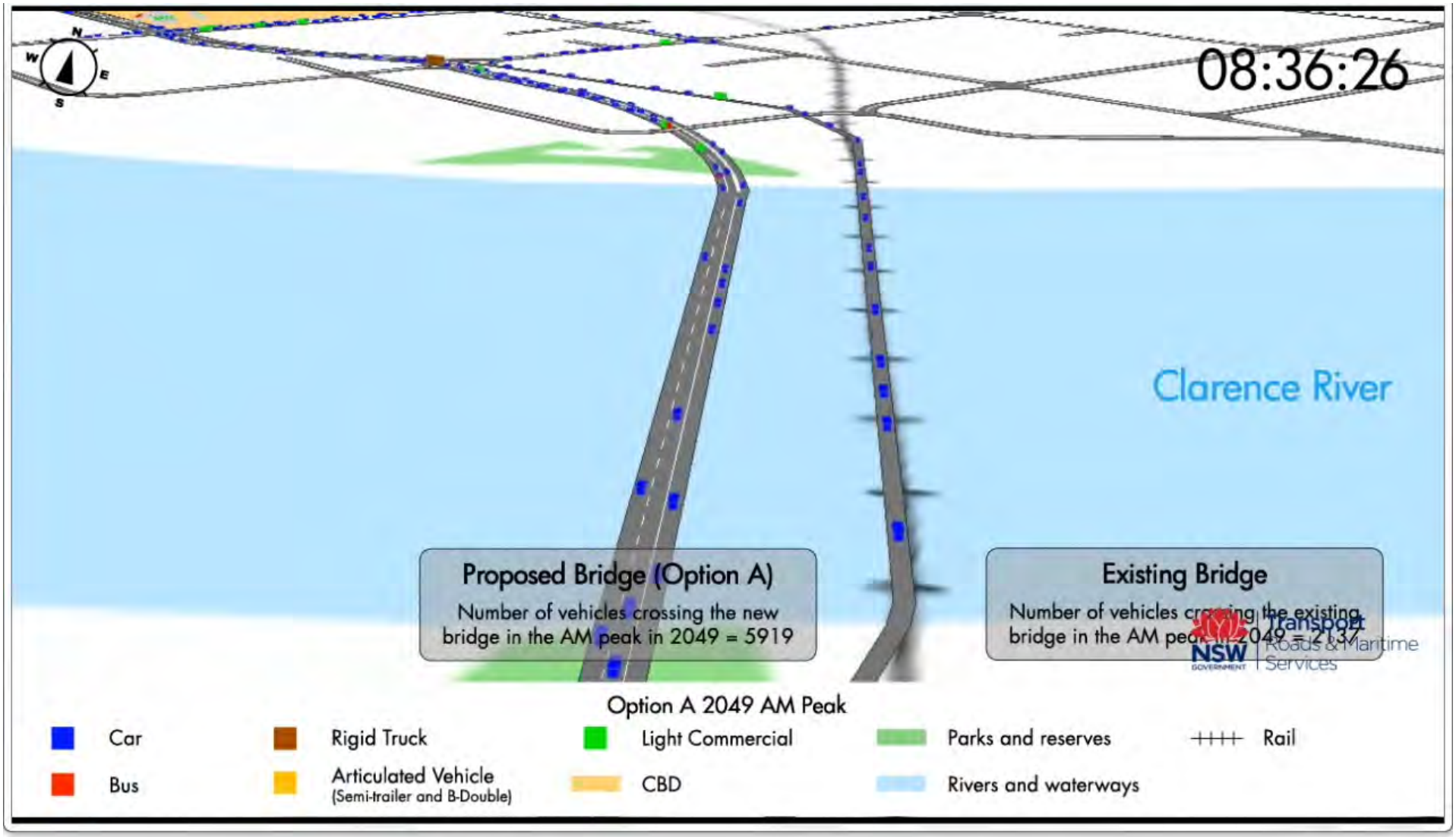
Transport
Roads & Maritime
Services

2049 AM PEAK TRAFFIC SIMULATIONS

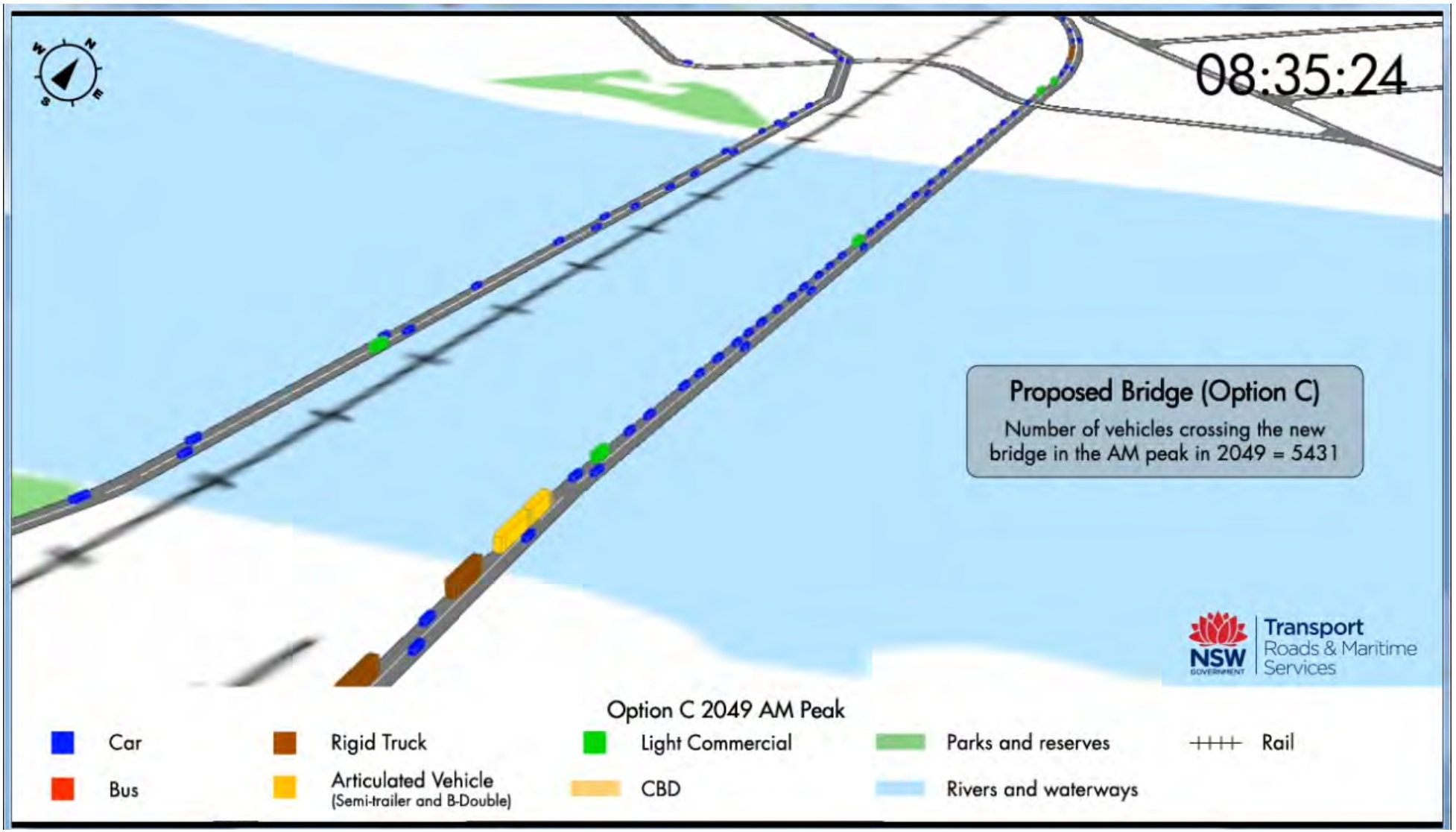
Option E - 2049



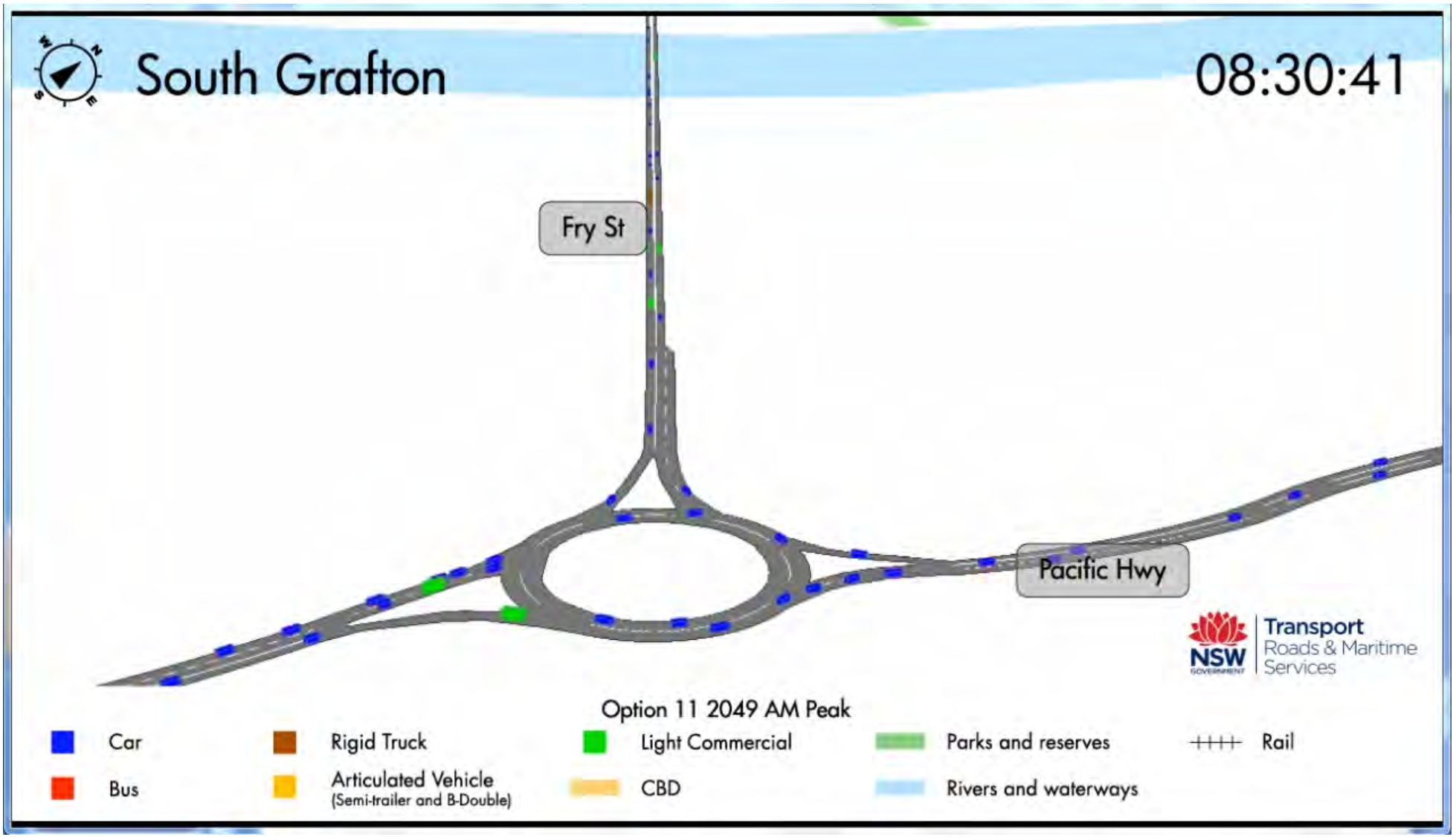
Option A - 2049



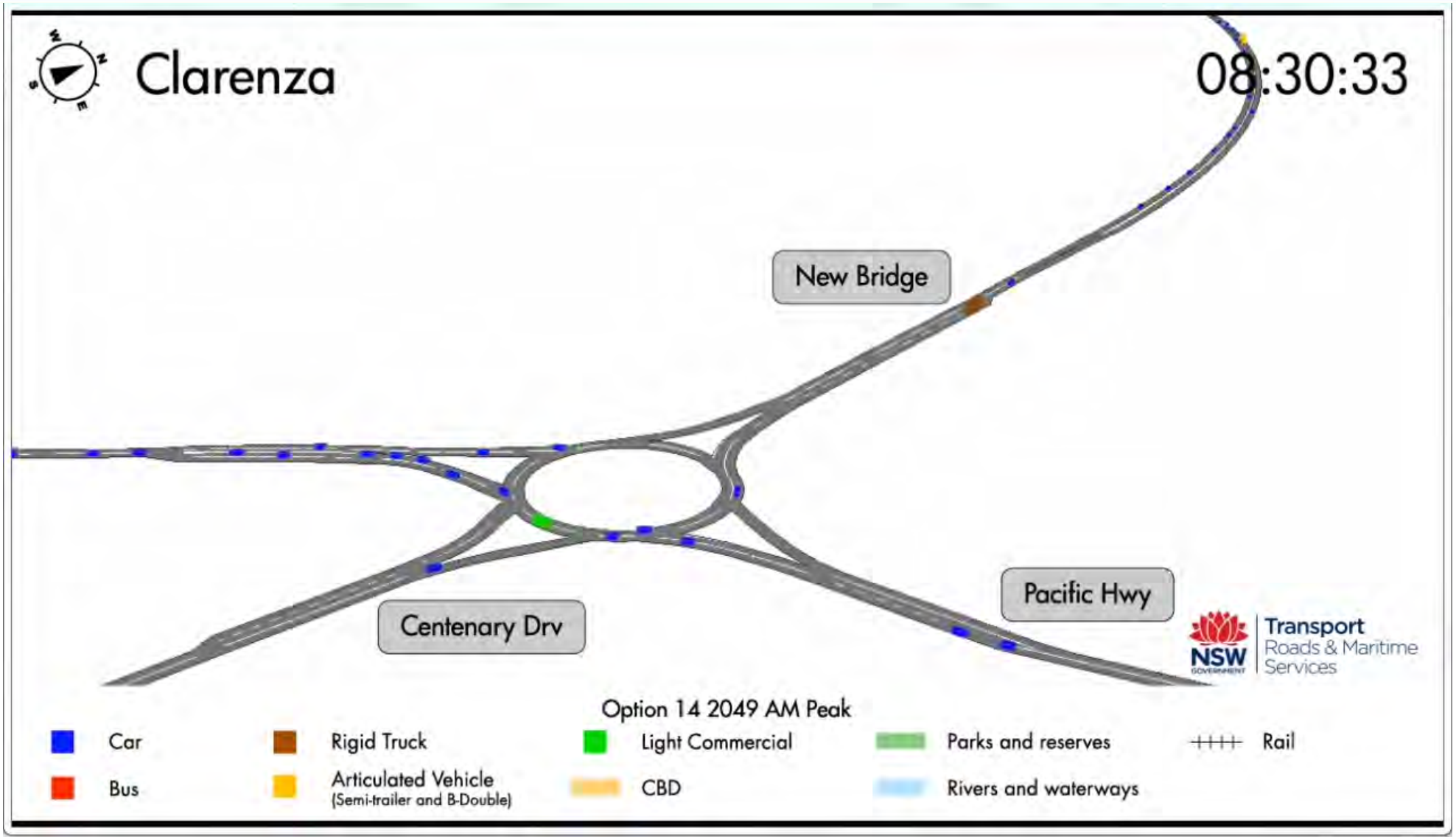
Option C - 2049



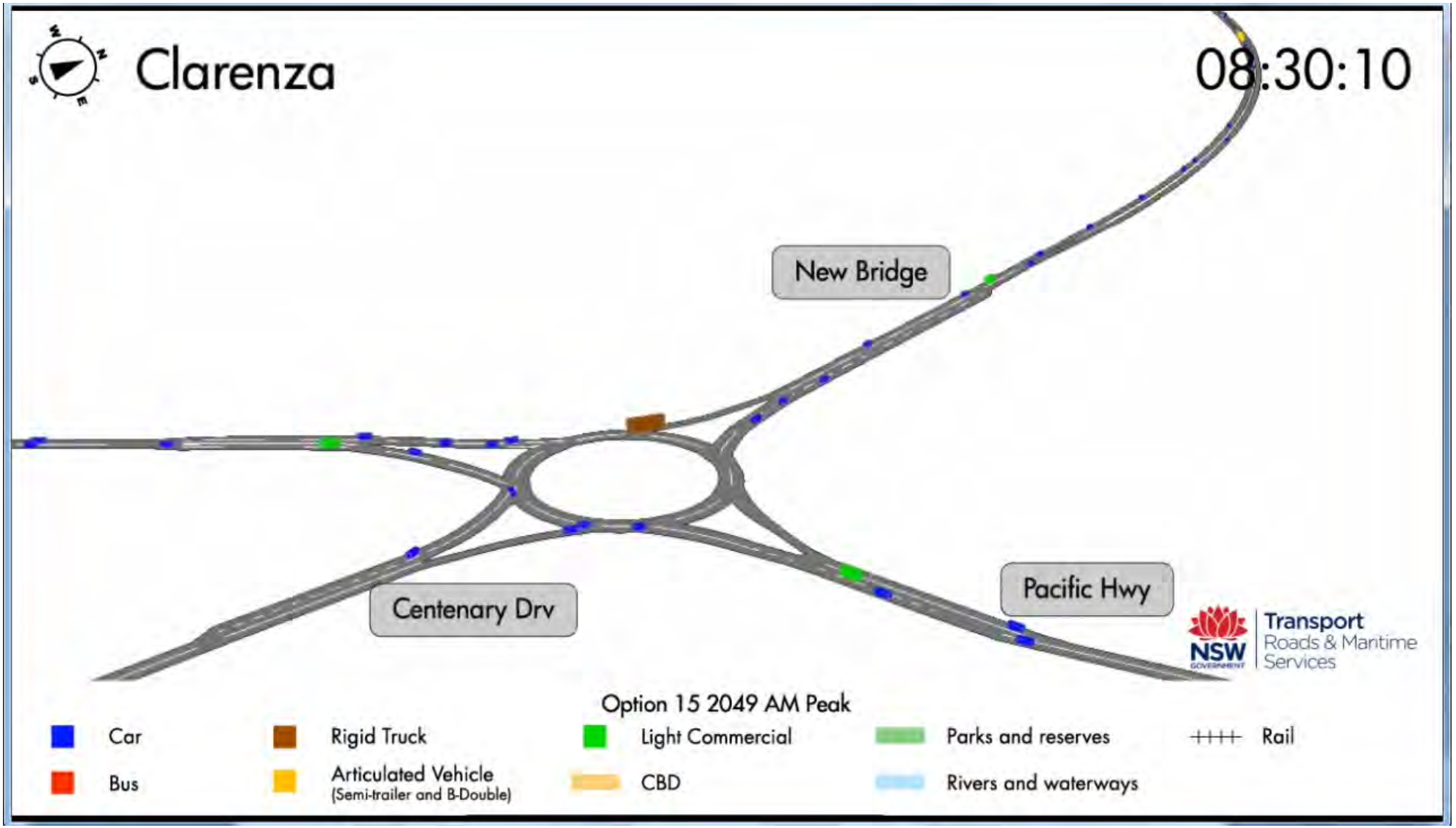
Option 11 - 2049



Option 14 - 2049



Option 15 - 2049



Functional - Urban Character and Landscape

Project objective: Minimise impact on the environment

Supporting objective: Provide a project that fits sensitively into the built, natural and community context

- Investigations considered:
  - Visual integrity of the existing bridge
  - Urban context and connections with the surrounding built environment
  - Integrity of existing landscape and street pattern

Functional - Urban Character and Landscape

Option E	Option A	Option C	Option 11	Option 14	Option 15
• Maintains visual integrity of existing bridge. • Would not fragment existing urban settlement patterns. • Direct connections between town centres.	• Impacts on views to, and visual character of, existing bridge. • Would fragment existing urban settlement patterns. • Maintain existing connectivity between town centres but no improvement.	• Impacts on views to, and visual character of, existing bridge. • Would significantly fragment existing urban settlement patterns. • Maintain existing connectivity between town centres but no improvement.	• Maintains visual integrity of existing bridge. • Would significantly fragment exiting urban settlement patterns. • Reduce connectivity between town centres.	• Maintains visual integrity of existing bridge. • Would fragment existing urban settlement patterns. • Reduce connectivity between town centres.	• Maintains visual integrity of existing bridge. • Would fragment existing urban settlement patterns. • Reduce connectivity between town centres.

Functional - Flooding

Project objective: Minimise impact on the environment

Supporting objective: Minimise flooding impact caused by the project

- All options hydraulically modelled
- Flood mitigation measures identified for each option
- Designed to maintain current flood immunity in Grafton and South Grafton
- Evacuation and emergency response also considered

Functional - Flooding

- Minor levee raising proposed for all options
- Increase in levee height:
  - Option 11: 0.1m
  - Options E, A, C, 14 & 15: 0.03m to 0.05m
- Length of levee:
  - Option E: 11.75 km
  - Options A, 14 & 15: 16.50 km to 16.70 km
  - Option C: 18.10 km
  - Option 11: 19.50 km
- Bridge / viaduct lengths between 500 and 1600 metres, depending on option
- Option C requires additional local drainage infrastructure

Functional - Flooding

- None of the mitigated designs impact on flood levels behind the levees, or downstream from Grafton
- Minor upstream river level increase ≤ 10 centimetres, no increase in floodplain
- All options increase efficiency of major flood evacuation
- Options A, E, C concentrate evacuation through business district / reduce contingency
- Options 11, 14, 15 provide route out of Grafton, reducing congestion / increase contingency

ENVIRONMENTAL

Environmental - Natural environment (ecology)

Project objective: Minimise impact on the environment

Supporting objective: Minimise impact on the natural environment

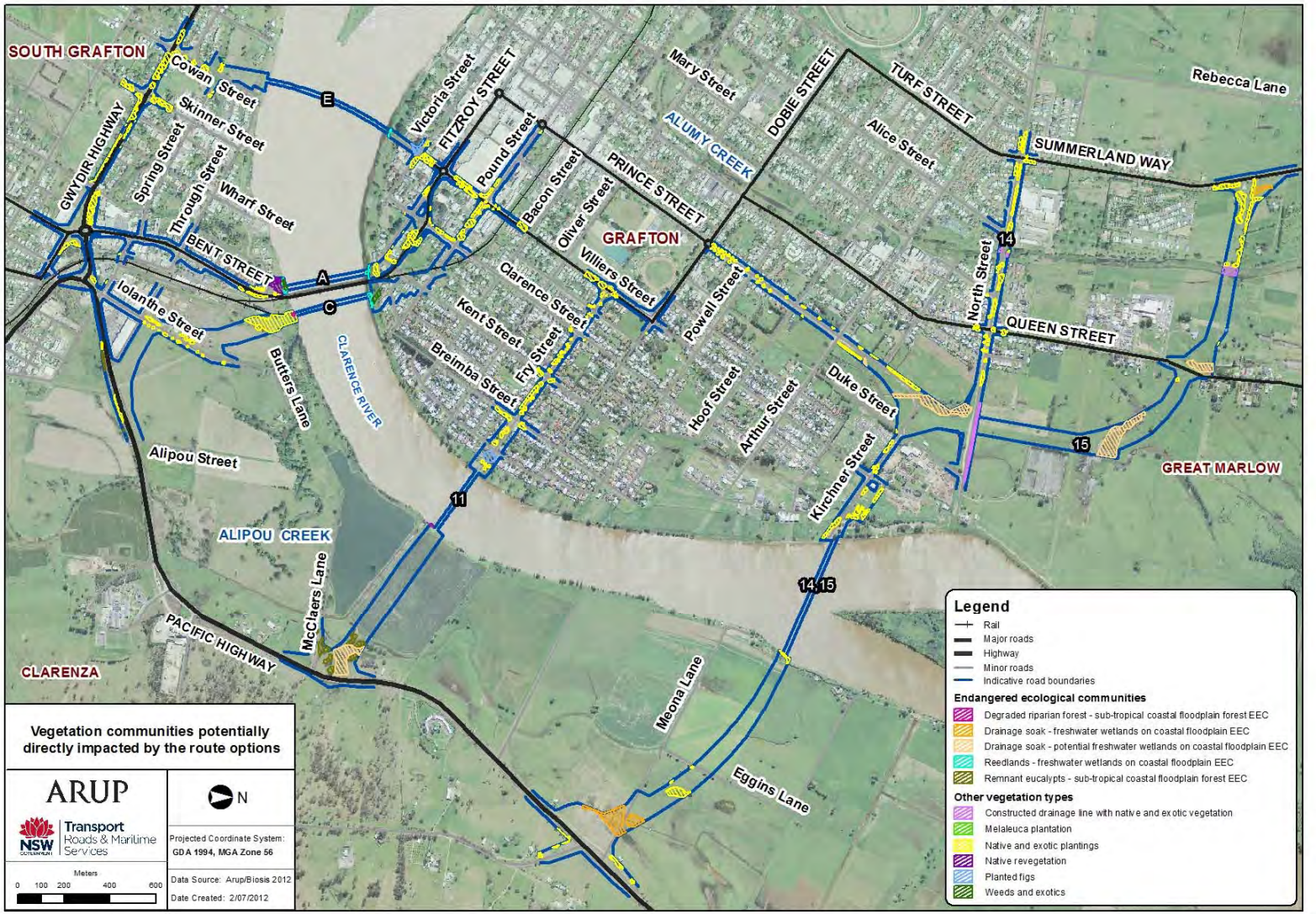
- Potential ecological constraints
  - Type of plant community, both endangered ecological communities and other vegetation and habitat
  - Threatened species flora
  - Threatened species fauna habitat

Environmental - Natural environment (ecology)

➢Options 14 and 15 have the greatest potential direct impacts on ecological communities
- drainage areas on freshwater wetlands on coastal floodplains
- native and exotic plantings

➢Options E, A, C and 11 affect lower areas of communities
- reedlands
- native and exotic plantings
- eucalypts
- riparian forest

➢Known habitat for threatened listed species
- Option E – flying foxes (fig trees and flight path to Susan Island)
- Options A and C - bats (bridge and riparian zone)
- Option 14 and 15 – egret (wetland)



Environmental - Non-Aboriginal heritage

Project objective: Minimise impact on the environment

Supporting objective: Minimise impact on heritage

➢ Report includes information on:

- Heritage items
- Archaeological items
- Trees as heritage items and effect on streetscape and setting
- Heritage conservation areas

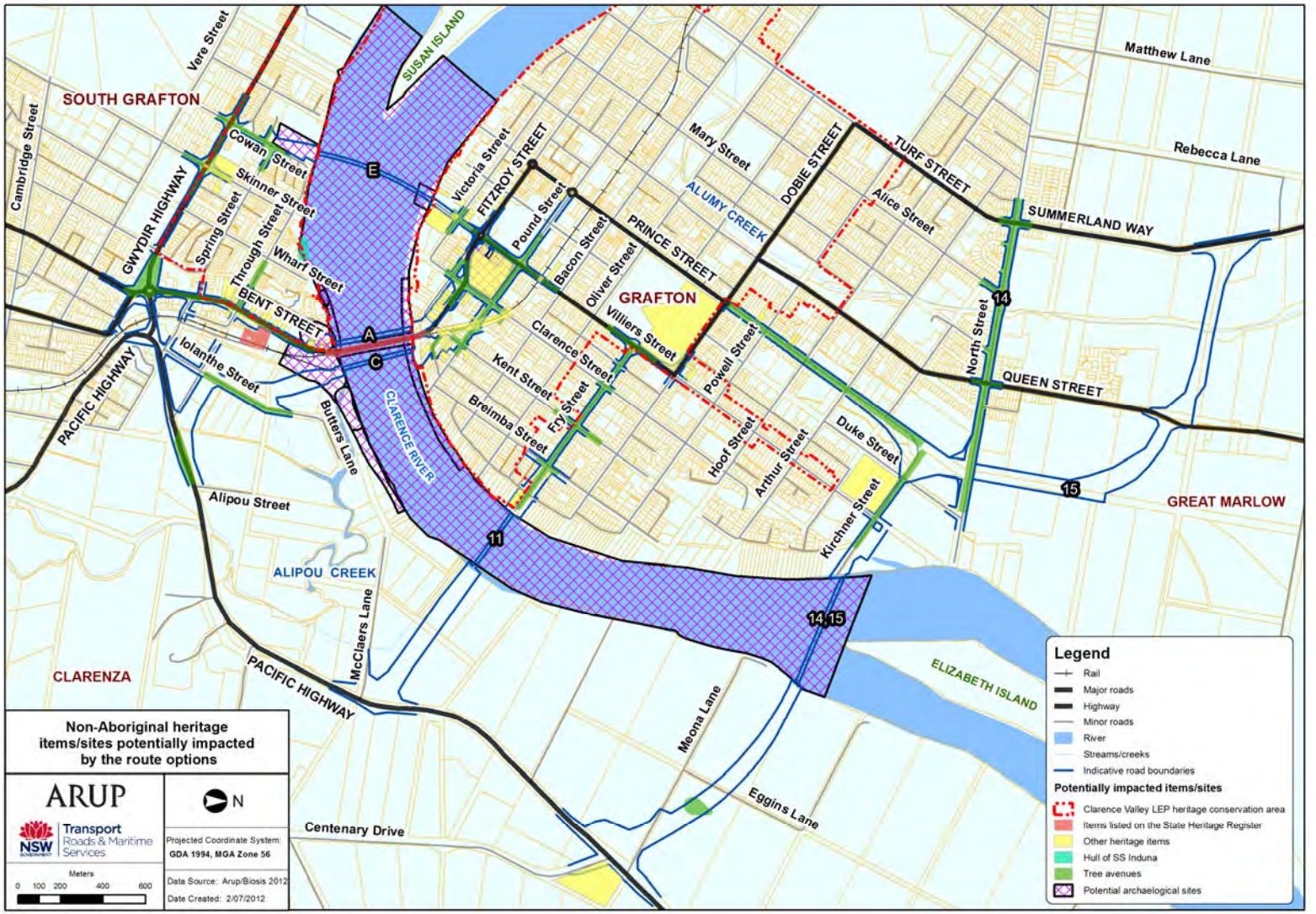
➢Report updated to correct errors in legislation tables and listing details in option results.
Note: These do not affect summary tables or indicator numbers.

Environmental - Non-Aboriginal heritage

- Options E, A and C greatest potential impact on items of non-Aboriginal heritage due to urban location.

- Option A potential direct impact on two items on state heritage register.
  - Grafton Road and Rail Bridge
  - Railway Station Group

- Options E and C will also have visual impacts on the existing state heritage listed bridge.



Environmental - Non-Aboriginal heritage

Direct impact on non-Aboriginal heritage items and archaeological sites	Option E	Option A	Option C	Option 11	Option 14	Option 15
Items of State heritage significance (No.)	0	2	0	0	0	0
Other items (No.)	21	25	24	12	10	10

- All options impact on listed trees such as figs, jacaranda and flame trees and other significant plantings. Option 14 affecting the most trees (140).

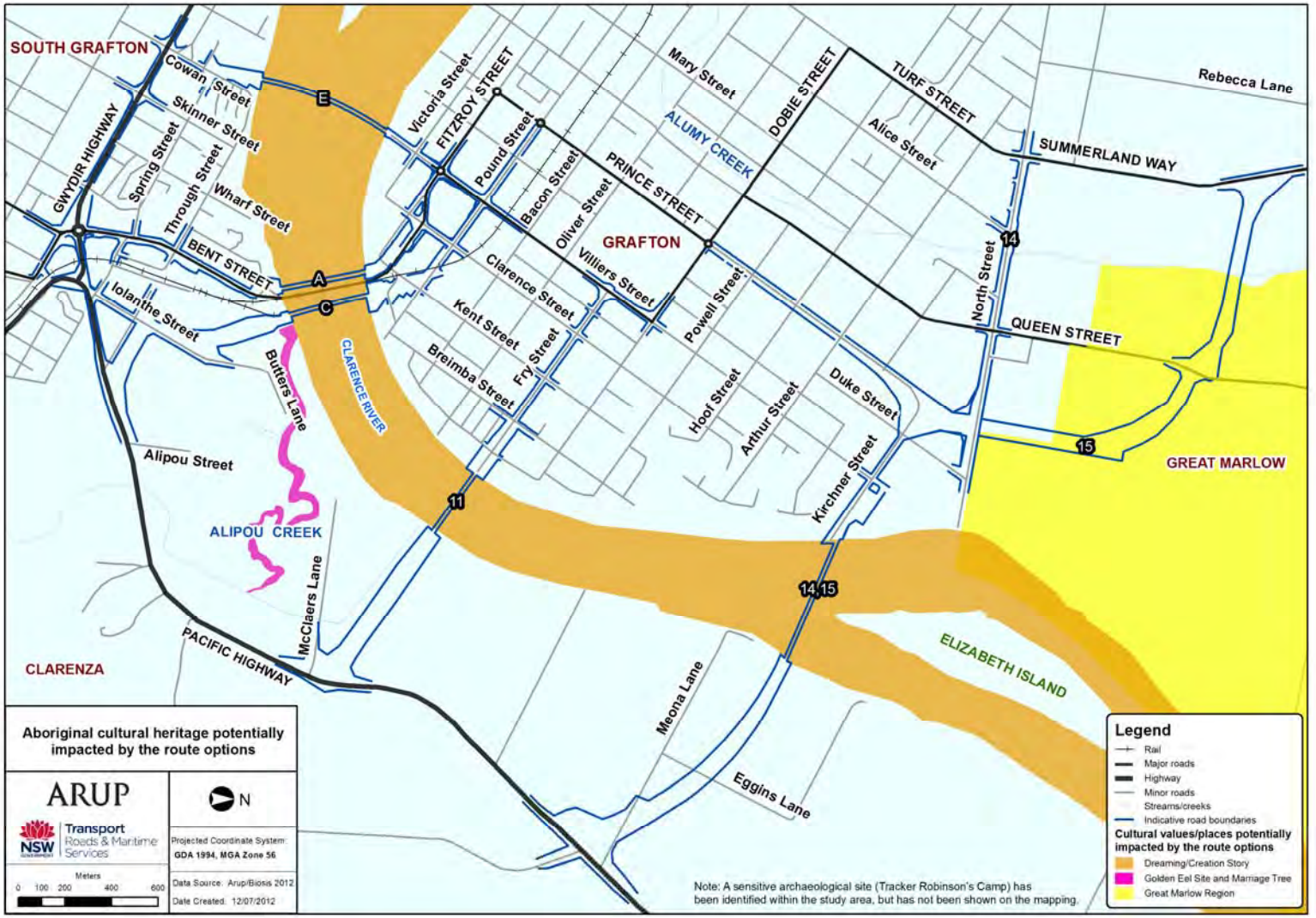
- Potential Archaeological Sites (PAS) have also been considered and these include potential maritime sites.

Environmental - Aboriginal heritage

- Aboriginal Cultural Heritage
- Aboriginal Archaeological Heritage

Environmental - Aboriginal cultural heritage

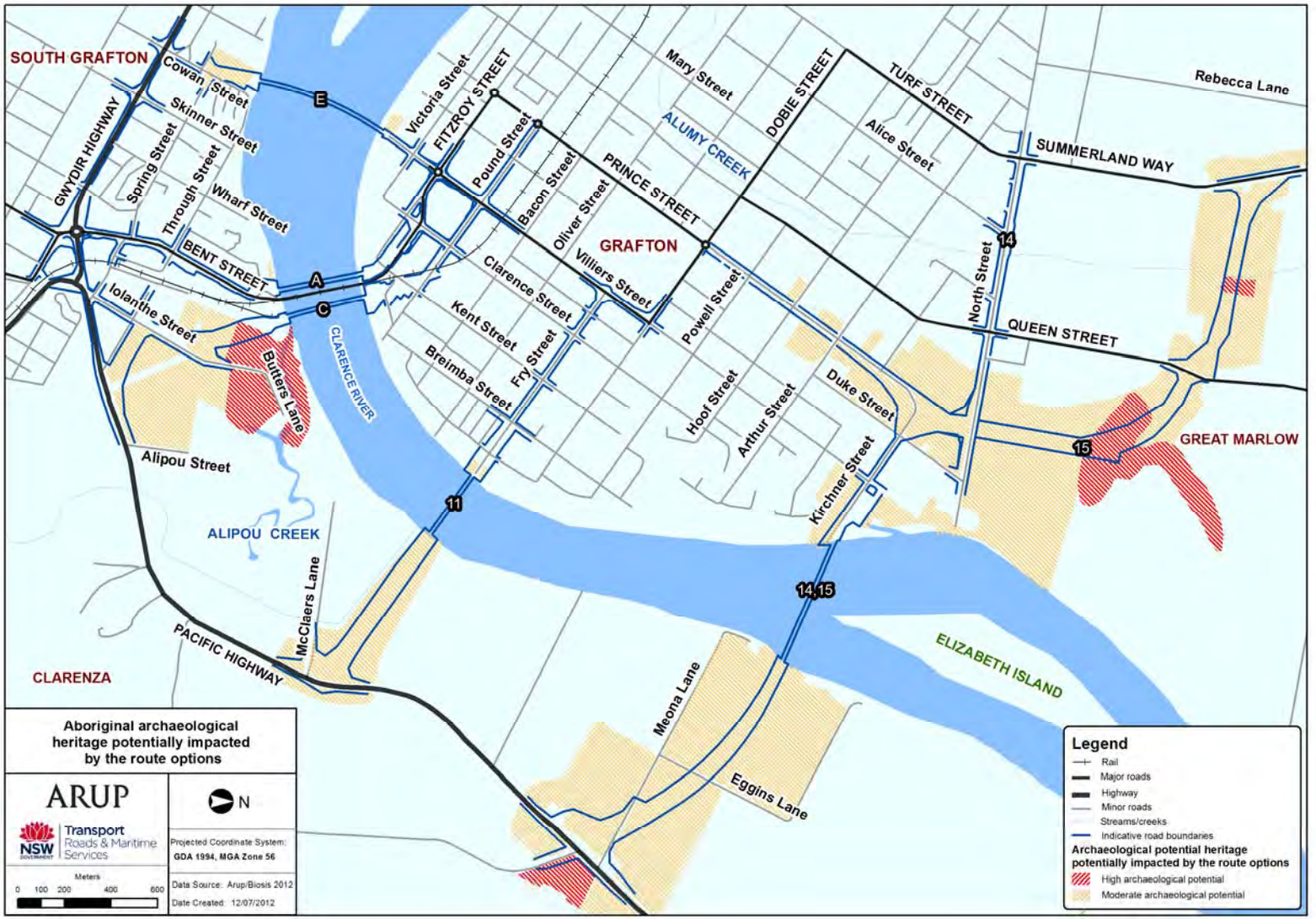
- Options 14 and 15 direct impact Great Marlow cultural site.
- Option C could potentially affect the aesthetic value of the Golden Eel cultural site. Protection measures to be put into place during construction.
- Option 15 is in close proximity to the Tracker Robinson camp site. Protection measures to be put into place during construction.



Environmental - Aboriginal archaeological heritage

Length through areas of high Aboriginal archaeological potential:

- Option 15 affects the greatest length
- Option C and 14 affect shorter lengths
- Options E, A and 11 would not affect



SOCIO-ECONOMIC

Socio-economic - Noise

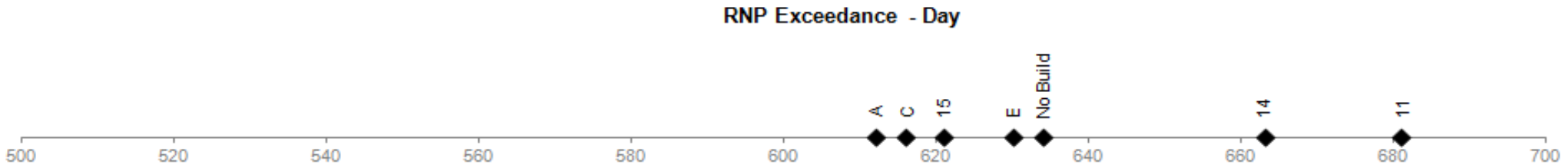
Project objective: Minimise impact on the environment

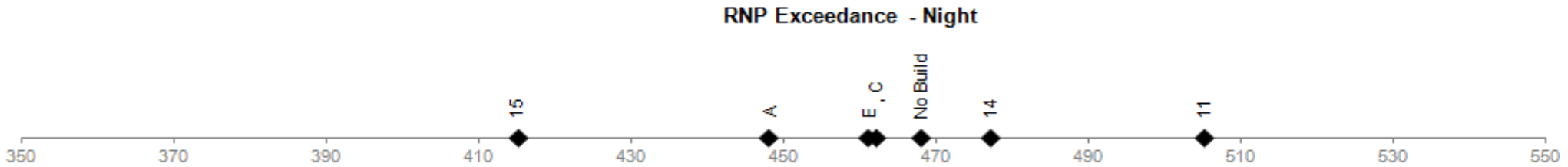
Supporting objective: Minimise the impact on residential amenity, including noise, vibration, air quality etc.

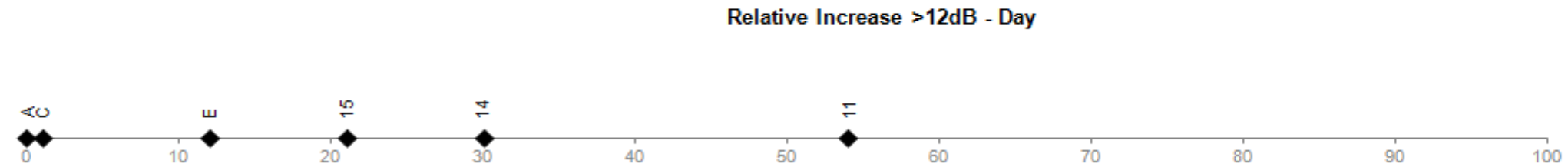
- Options A, C & E similar to each other and least change to existing noise impacts
- Option 11 clear outlier due to Fry Street
- Option 14 has significant impact on North Street
- Option 15 redirects traffic to greenfield area

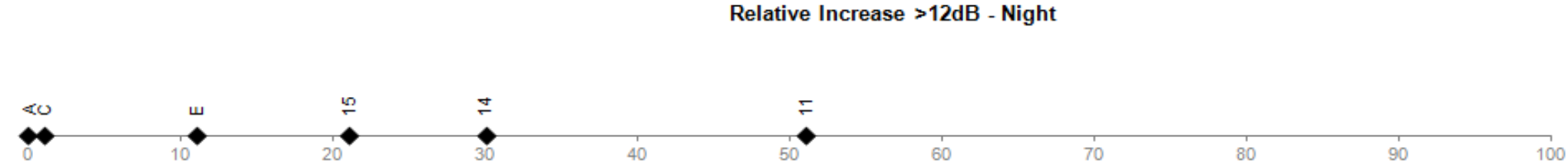
Report updated to correct errors in noise logger reference locations.
Note: These do not affect summary tables or indicator numbers.

Socio-economic - Noise

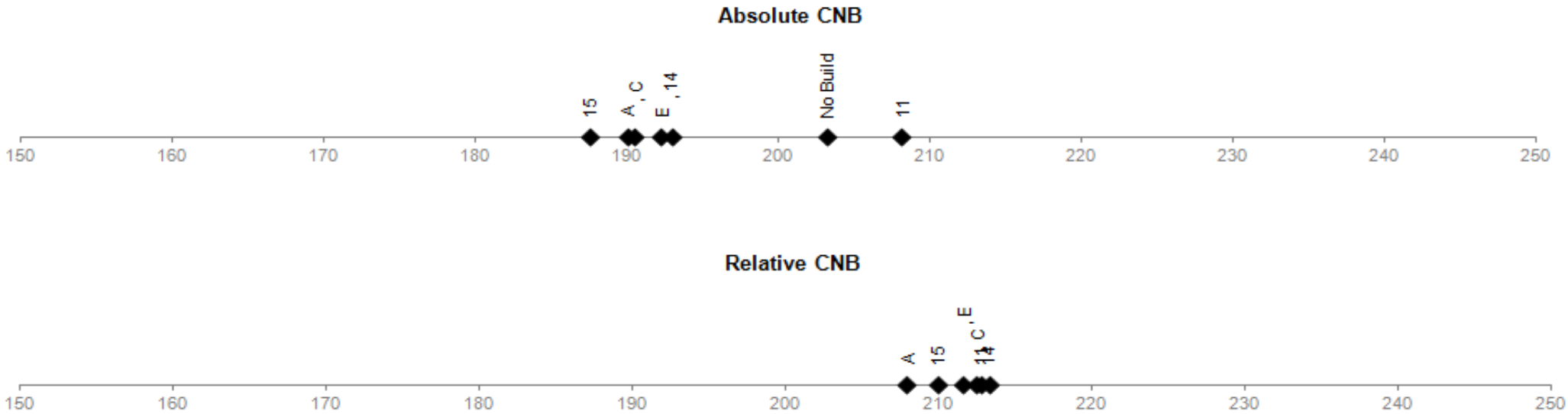








Socio-economic – Noise Analysis

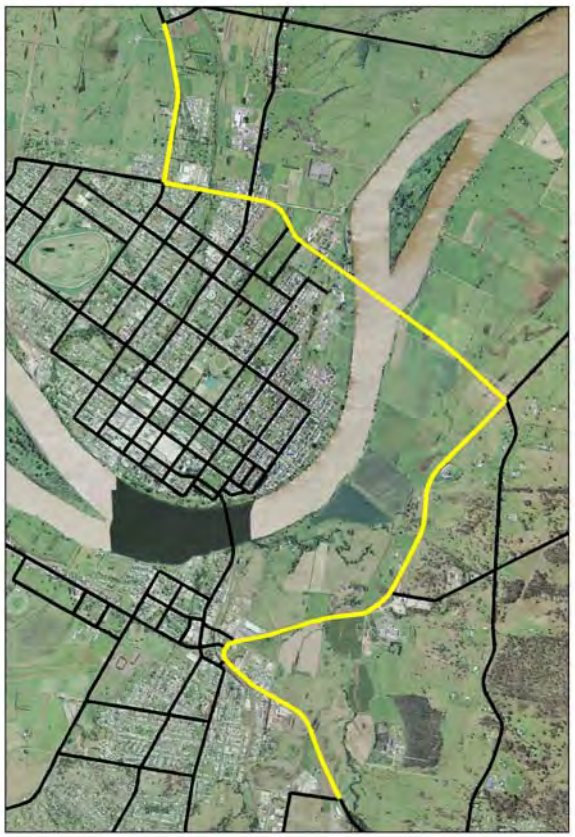


- Community Noise Burden approach shows even closer spacing between options

Socio-economic - Traffic

Project objective: Support regional and local economic development

Supporting objective: Provide for commercial transport including B-doubles where required.



Study Outcomes – Heavy Vehicles 2049 AM Peak

Option	Distance	Time
E	9.1 km	15 min
A	8.7 km	14 min
C	8.4 km	13 min
11	10.0 km	11 min
14	10.5 km	10 min
15	10.3 km	10 min

- Option 11, 14, 15 provide the lowest travel time for HV
- Option A, C similar and slower than 11, 14, 15
- Option E has the highest trave time

Social and Economic

Project objective: Support regional and local economic development

Supporting objective: Provide transport solutions that complement existing and future land uses and support development opportunities

- All options would provide some improvement to the level of connectivity.
  - Option E provides a strong link between the Grafton & South Grafton CBD
  - Options E, A and C improve connectivity between existing residential areas and CBDs
  - Option 11 provides improved connectivity to Clarenza residential growth area
  - Options 14 and 15 provide improved connectivity between the two separate growth and employment areas of Junction Hill and Clarenza

Supporting objective: Provide improved opportunities economic and tourist development for Grafton

- Option E provides strong potential to integrate with several local strategies and provides stronger link with waterfront
- Options A and C have a stronger potential to contribute to tourism development than Options 11, 14 and 15 as they enter Grafton at some distance from the CBD

Social and Economic

- Benefits of second crossing include reduced traffic congestion and travel times; improved road safety and access for service delivery, emergency services, pedestrians and cyclists; as well as a greater integration between Grafton and South Grafton

- Report updated to include the results of additional business surveys. Note: These surveys update the full-time equivalent numbers in the *Social and Economic Technical Paper*. This assessment is not included in the main report of the *RODR*.

Social and Economic Issues

Project objective: Minimise impact on the environment

Supporting objective: Minimise the impact on the social and economic environment, including property impacts

- Options are likely to affect access to community activities such as:

  - Option E – disruption to movement to facilities in Villiers and Victoria St
  - Options A and C – relatively little impact, localised disruption
  - Option 11 – significant disruption to ease of north-south movement across Fry St
  - Options 14 and 15 – increased traffic along Prince St may disrupt ease of east-west movement

Social and Economic Issues

- Land use impacts, including property acquisitions – as per table below

	Option E	Option A	Option C	Option 11	Option 14	Option 15
Residential	16	21	24	22	6	1
Businesses	7	21	4	1	2	1
Rural	0	0	2	2	7	14
Community	8	15	12	5	5	6

- Option A, C and 11 have largest impact on residential properties
- Options 14 and 15 have largest impact on rural properties and regionally significant farmland
- Option A has the greatest impact on businesses, mostly located along Bent St
- Option C is the only option which may potentially require demolition of a community facility

Draft Route Options Community Feedback Report

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Community Facilitation • Mediation • Architectural Design • Communication

What is valued?

Important considerations

The options

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What is valued?

- Heritage items (Convent, bridge, dwellings)
- Sites of Aboriginal heritage significance
- Avenues and individual trees
- Community connectivity
- Affordable housing
- Agricultural properties
- Views

What is valued?

- Relationship of the town to the river
- Local amenities including Corcoran Park
- Flora and fauna, especially water birds
- Quiet residential streets
- Community facilities

  (pre-schools, nursing home, schools)

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Important considerations

Protect the valued areas of Grafton

- Transport needs for growth and freight
- Relieve traffic congestion
- Minimise heavy traffic in CBD and quiet areas
- Access for emergency vehicles
- Address traffic study concerns

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Community Facilitation • Mediation • Architectural Design • Communication

Important considerations

- Plan in regional and national context
- Enhance public transport and manage demand
- Protect against flooding
- Avoid damage to heritage items
- Reach a decision and minimise cost

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The Options

Agree the need to relieve traffic congestion
Disagree about how to do it

- Accept RMS project goal and traffic study – support in town options (E, A, C, 11)
- Question RMS project goal and traffic study – support out of town options (14 and 15)

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The Options

Like about E,A, C, 11	Like about 14 and 15
Likely to be used	Heavy vehicle bypass of CBD
Cost effective	Avoids fragmenting Grafton
Maintains bus viability (A or E)	Less noise impact
Provides emergency access	Less non-Aboriginal heritage impact
Various benefits of different options	Cater for growth and freight
	Alternative flood free access

The Options

Do not like about E,A, C, 11	Do not like about 14 and 15
Significant heritage impact	Poor cost benefit
Separate or isolate areas	Affects farmland
Noise impacts	Affects fauna
Safety – traffic in quiet streets	Affects recreation area
Disrupt community facilities	Would not relieve congestion
Remove views to and of bridge	Potential flooding impacts
Potential flooding impacts	Less effective in emergencies

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The Options

Option	Number of submissions supporting option(s)
Single option supported	
E	12
A	9
C	8
11	8
14	3
15	18
More than one option supported	
E and C	1
E and 11	1
E, 11 and 15	1
E and 15	1
A modified	1
A and C	2
C modified	1
C, 11, 14 and 15	1
11, 14 and 15	2
14 and 15	24
14, 15 modified	1
15 modified	3
TOTAL	97

Additional crossing of the Clarence River at Grafton

Transport Roads & Maritime Services

NSW GOVERNMENT

Presentation for Value Management Workshop Background Information

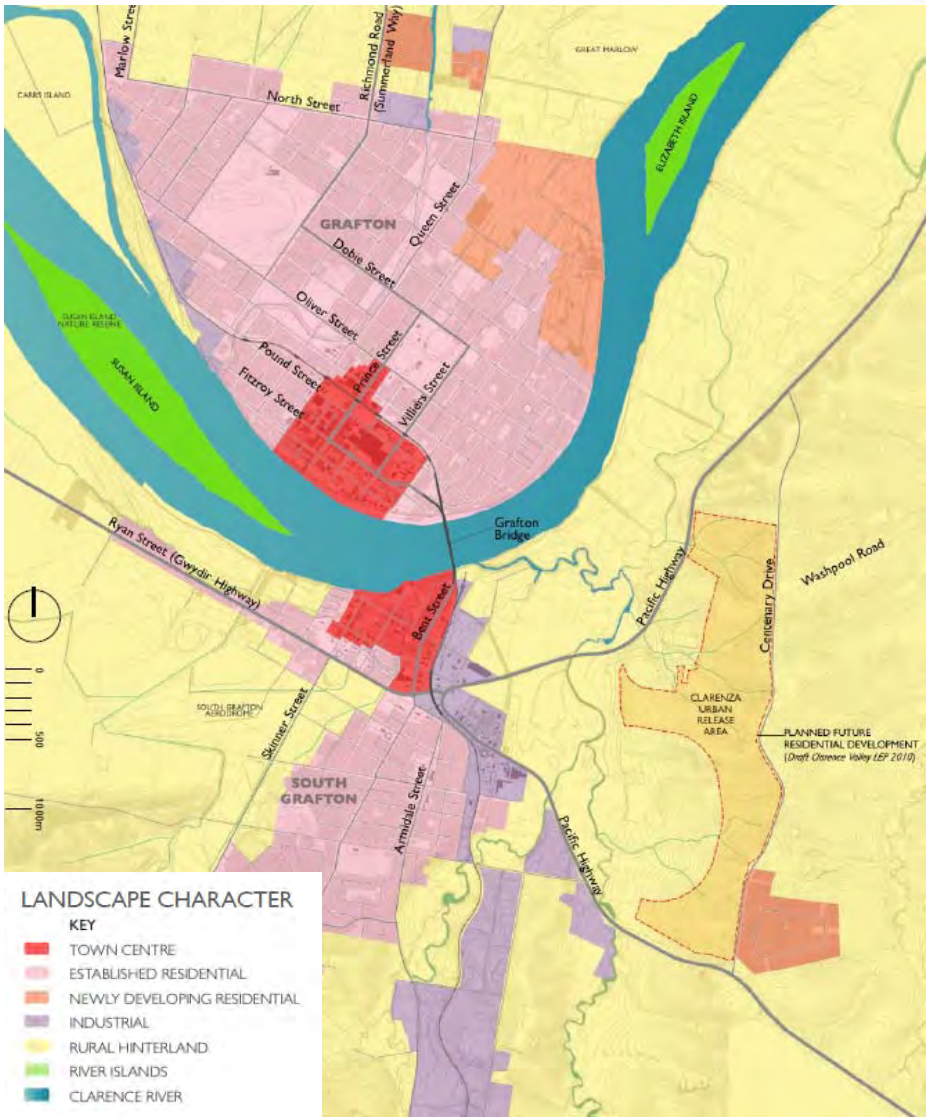
23 October 2012

Grafton location and topography

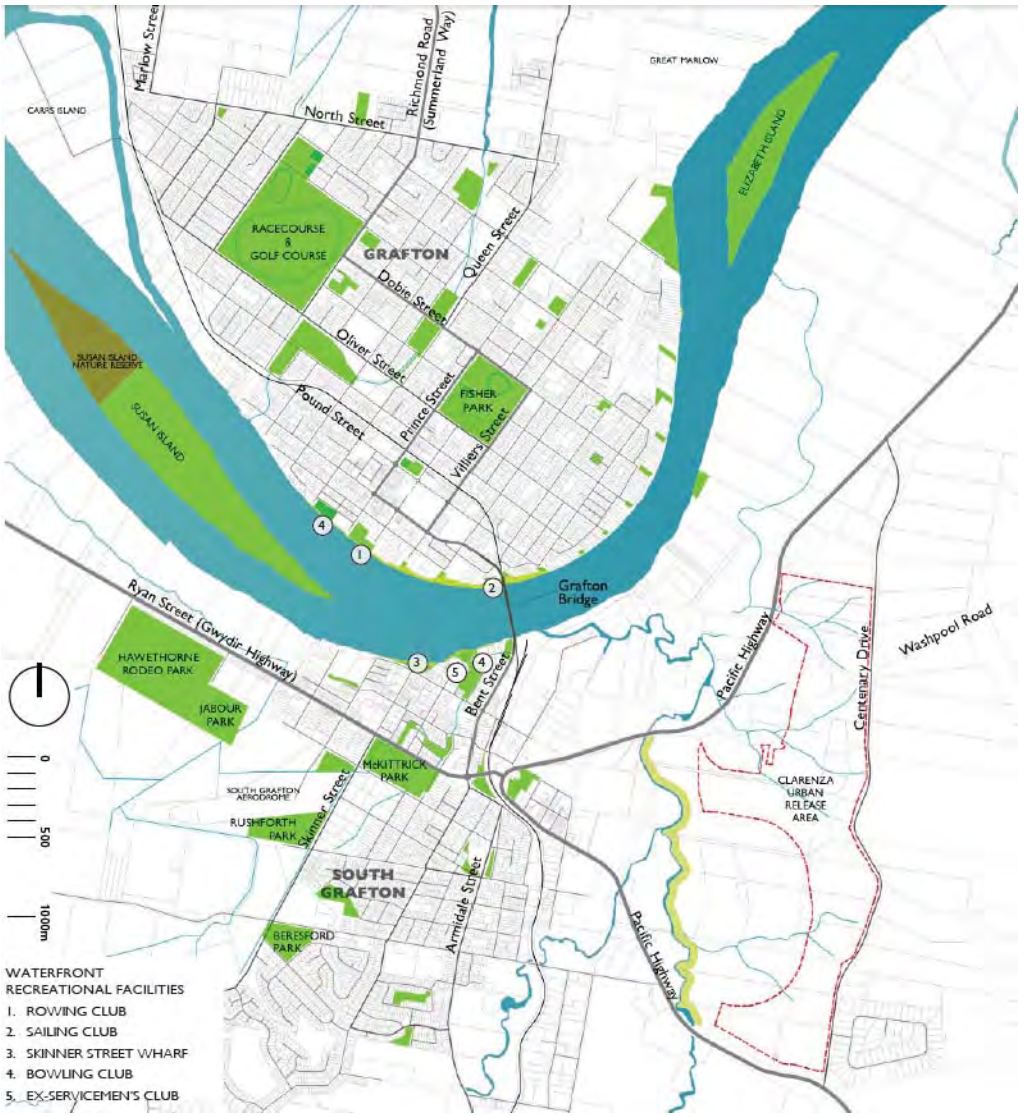
- Major regional centre in the Clarence Valley - includes commercial, industrial, institutional and administrative activities
- Located on a bend of the Clarence River
- Grafton and substantial parts of South Grafton located on the floodplain and therefore subject to frequent and extensive flooding
- Grafton and south Grafton currently protected by a series of levees that provide flood immunity approx. equivalent to a 1 in 20 year flood event

Grafton urban areas

- Clarence River divides Grafton into two separate urban areas:
  - Grafton (north of the river) – has primary commercial activity along Prince St
  - South Grafton (south of the river) – has primary commercial activity along Skinner St
- Industrial areas, generally situated along primary regional transport routes and on the outskirts of town, particularly in South Grafton
- Established residential areas connected to the town centres, with housing stock of varying ages
- Newly developing residential areas on the outskirts of town, including the Clarenza Urban Release Area
- Rural hinterland, consisting of low-lying river floodplain and rolling hills, with intermittent buildings in the landscape



Grafton recreation



- Range of recreation spaces including public parks and recreation facilities such as the Fisher Park and also a large number of water-based activities (eg. water skiing, fishing and sailing)

- Two large undeveloped islands of cultural significance to the Aboriginal community:
  - Susan Island
  - Elizabeth Island

Non-Aboriginal heritage

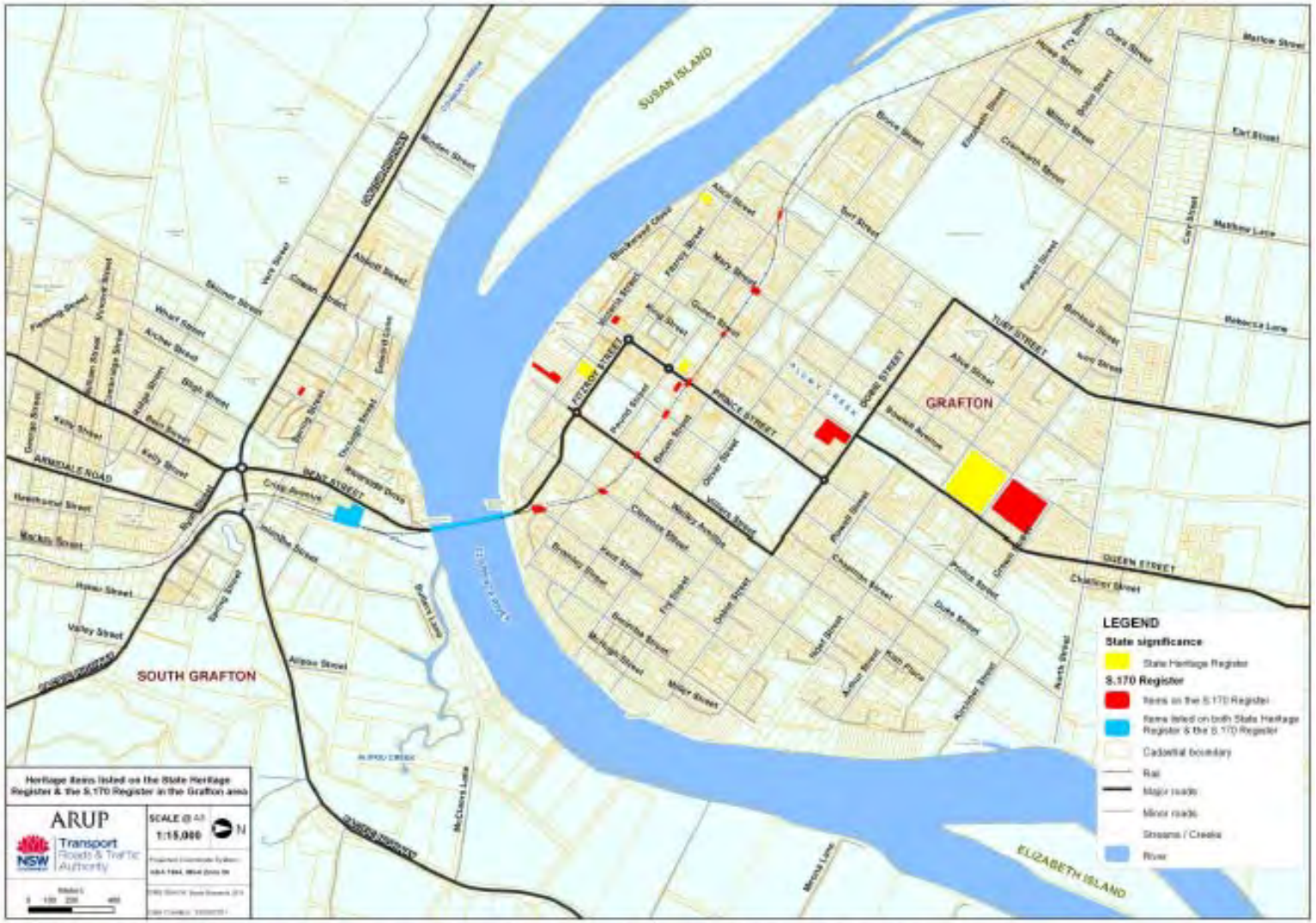


Figure 31: Items in the Grafton area listed on the State Heritage Register and the Section 170 Register.

Grafton Road Network

- State controlled roads in the Grafton area include:
  - Pacific Highway
  - Gwydir Highway
  - Summerland Way
- Junction of Pacific Hwy and Gwydir Hwy located in South Grafton
- The current Pacific Hwy passes through the edge of South Grafton
- The route for the Pacific Hwy upgrade is from Glenugie to Tyndale
- Summerland Way runs from the Gwydir Highway over the existing bridge to Casino and southern Queensland

Existing Grafton Bridge

- Metal truss span bridge with a bascule span opened to traffic in 1932
- North Coast Railway line and utility services situated on the lower deck, the Summerland Way road is situated on the upper deck
- Only crossing of the Clarence River in the Grafton area
- Safety implications, traffic delays and congestion due to the shape of the existing bridge (the “kinks”)
- Freight movement is restricted by B-Double/articulated vehicle ban in peak periods

Existing Bridge – current traffic situation

Congestion and traffic delays over the existing bridge and approach roads, particularly during morning and afternoon peak hours.

- 1360 vehicles per hour in the northbound direction for the AM peak
- 1330 vehicles per hour in the southbound direction for the PM peak
- Theoretical capacity of the bridge in the range of 900-1400 vehicles per lane per hour

Therefore the peak hour traffic flows across the bridge are at, or very close to, the practical capacity of the bridge.

It is likely that future traffic growth will add to the existing congestion in peak hours, which in turn will decrease the average travel speed and increase travel times. This scenario will result in a reduced level of service on the existing bridge.

Traffic data

All trips between Grafton and South Grafton including local and through trips use the existing bridge as there is no practical alternative.

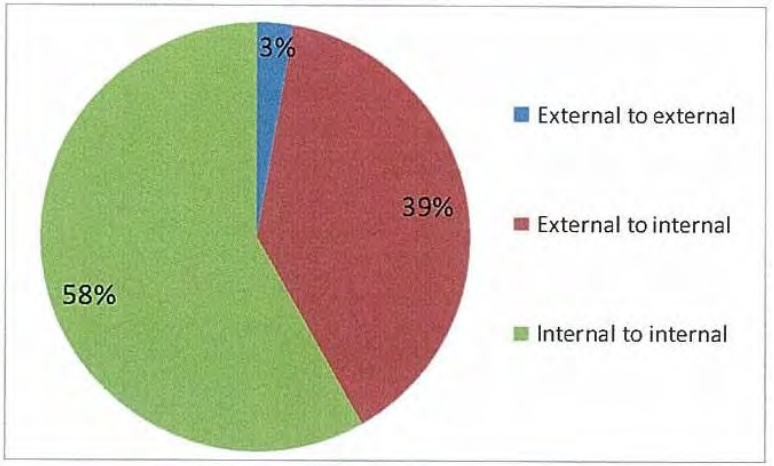
Traffic studies show that the majority of traffic that uses the existing bridge is traffic with an origin and/or destination in Grafton or South Grafton.

Definitions

- Internal to Internal trips - Trips between Grafton and South Grafton
- External to Internal trips - Trips crossing the Grafton Bridge that have an origin and/or destination in Grafton or South Grafton
- External to External trips - Trips crossing the Grafton Bridge that do not have an origin and/or destination in Grafton or South Grafton

Traffic data – Grafton Bridge

All vehicles

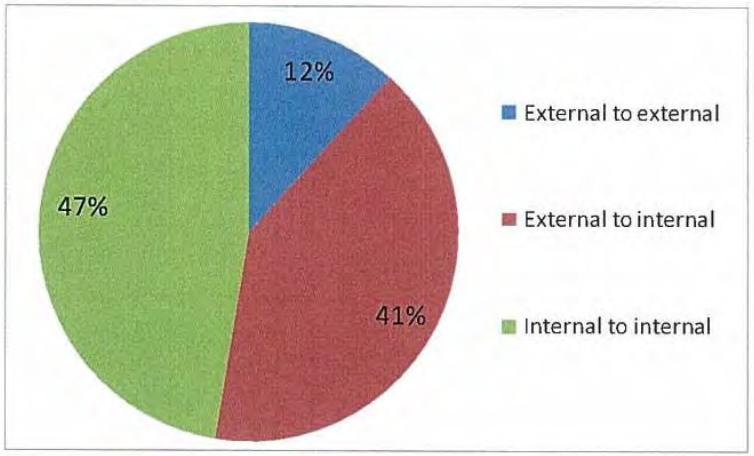


Vehicle trip types crossing Grafton Bridge on 19 August 2010 (5 am - 7 pm).

Trip type	No. of vehicles	% of vehicles
Internal to internal	15,466	58
External to internal	10,360	39
External to external	728	3
Total	26,554	100

Traffic data – Grafton Bridge

Heavy vehicles (5% of all vehicles)



Vehicle trip types crossing Grafton Bridge on 19 August 2010 (5 am - 7 pm).

Trip type	No. of vehicles	% of vehicles
Internal to internal	658	47
External to internal	567	41
External to external	163	12
Total	1,388	100

Traffic data – Villiers Street Grafton and Pacific Highway

Villiers Street between Fitzroy and Pound Streets, Grafton (June 2011)

Vehicle type	No. of vehicles	% of total vehicles
Light vehicles	10,730	92
Heavy vehicles		
•Rigid heavy vehicles	750	6
•Articulated heavy vehicles	240	2
Total	11,720	100

Pacific Highway north of Centenary Drive, South Grafton (August 2010)

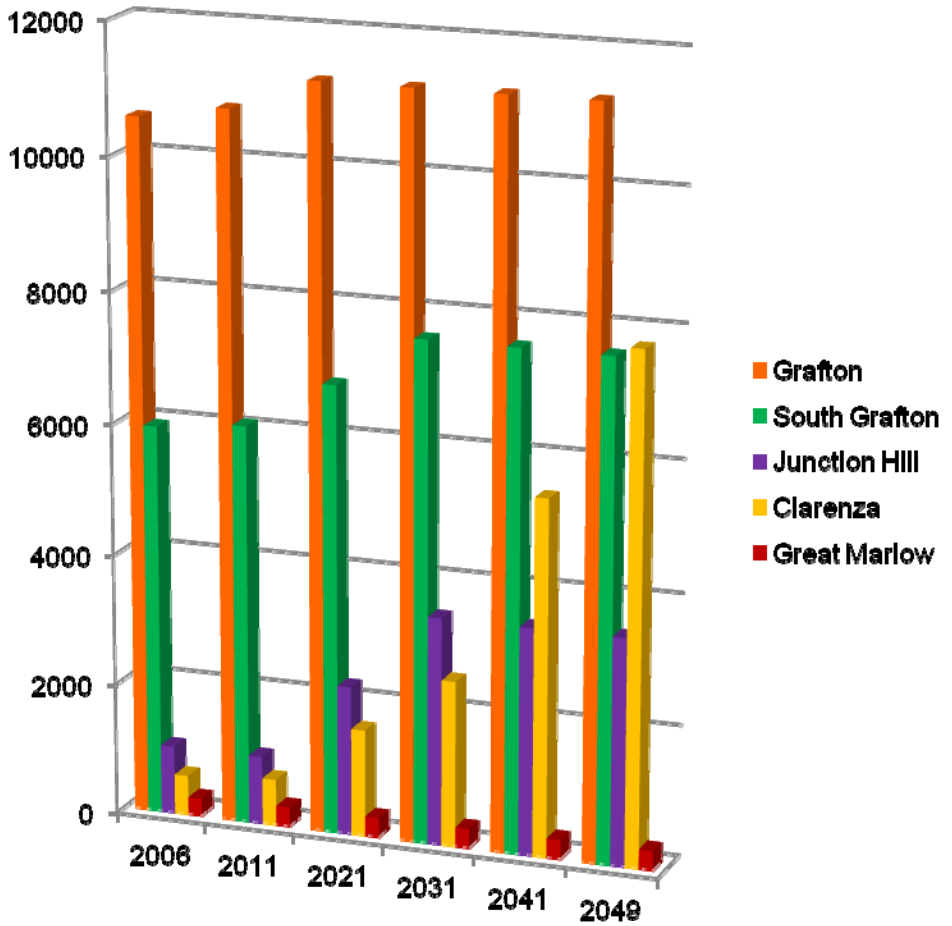
Vehicle type	No. of vehicles	% of total vehicles
Light vehicles	8,025	78
Heavy vehicles		
•Rigid heavy vehicles	730	7
•Articulated heavy vehicles	1,520	15
Total	10,275	100

Transport
Roads & Maritime
Services

2011 AM & PM PEAK TRAFFIC SIMULATIONS

Future Population Growth

- **Mid North Coast Strategy – identified Grafton as a key centre**
- **Clarence Valley Council – available land, sequencing, focused on development in Junction Hill, Clarenza, Waterview Heights**
- **Population increases from 18,803 (2011) to 30,330 (2049)**
- **As capacity reached development accelerates in areas with spare capacity**
- **Population allocated to each zone in the model**
- **Trips estimated based on the change in population within each zone**



Project purpose and objectives

➢**Project purpose** - To identify an additional crossing of the Clarence River at Grafton to address short-term and long-term transport needs.

➢**Project objectives:**

- Enhance road safety for all road users over the length of the project
- Improve traffic efficiency between and within Grafton and South Grafton
- Support regional and local economic development
- Involve all stakeholders and consider their interests
- Provide value for money
- Minimise impact on the environment

Project purpose

- Planning for the additional crossing provides for semi-trailers and B-doubles to use the new crossing in preference to the existing bridge.

- It is not the intention of the new crossing to provide an additional freight corridor or to attract more heavy vehicles onto the Summerland Way.

- The Pacific Highway will continue to be the priority designated freight route for heavy vehicles travelling between Sydney and Brisbane.

Key assumptions

- Assumed date of opening to traffic – 2019

- Upgrade of the Pacific Highway between Glenugie and Tyndale (which bypasses South Grafton) assumed to be open to traffic before the new bridge is open to traffic (ie by 2019)

- Options designed to cater for predicted traffic 30 years after assumed date of opening (ie 2049)

- Construction of preferred option likely to be staged. Indicative Stage 1 construction included in report

Appendix 3 – Option Assessment Workshop Report