



**Transport**  
Roads & Maritime  
Services

# **APPENDIX B1**

## **Construction Traffic and Access Management Plan**

### **Additional Crossing of the Clarence River at Grafton Project**

**SEPTEMBER 2016**



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[signed]  
BRENDAN JOHNSON  
~~Mark Stevenson~~  
15/9/2016

Contractor PM



[signed]  
SAM LEIGH  
Sam Leigh  
15-9-2016

Contractor EM



[signed]  
Brendan Johnson  
Name  
15.9.2016

Contractor TM

[signed]

Name  
Greg Nash 15/9/16

RMS representative

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## Glossary / Abbreviations

AADT	Annual average daily traffic
ARTC	Australian Rail Track Corporation
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CTAMP	Construction Traffic and Access Management Plan
D&C	Design and Construct
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
ITS	Intelligent Transport System
LoS	Level of Service
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage
CRB	Additional Crossing of the Clarence River at Grafton
RASS	Radar Activated Speed Signs
RMS	Roads and Maritime Services of New South Wales
ROL	Road Occupancy Licence
SSI	The state significant infrastructure as generally described in Schedule 1 (SSI-6103) of the Infrastructure Approval.
SWTC	Schedule of Works and Technical Criteria
SZA	Speed Zone Authorisation
TCaWS	Traffic Control and Work Sites Manual
TCP	Traffic Control Plan
TMS	Traffic Management Centre
VMP	Vehicle Movement Plan
VMS	Variable Message Sign
VSLs	Variable Speed Limit Signs
WHS	Work Health and Safety

# 1 Introduction

## 1.1 Context

This Construction Traffic and Access Management Plan (CTAMP or Plan) describes how Fulton Hogan proposes to safely manage vehicular, cyclists and pedestrian traffic during the design and construction phase of the Additional Crossing of the Clarence River at Grafton Project (the Project), so that project objectives are fully realised.

Fulton Hogan acknowledges the safety of road users and the effective management of traffic is paramount to the successful day-to-day activities during the construction phase of this Project. This CTAMP seeks to ensure the certainty of the delivery of the prescribed road user requirements including: provision of a safe environment for workers and the travelling public, and minimising impacts on the road network.

This Plan forms part of the Construction Environmental Management Plan (CEMP) for the Additional Crossing of the Clarence River at Grafton Project (the Project).

This CTAMP has been prepared to address the requirements of:

- the Infrastructure Approval (19 December 2014);
- the environmental management measures listed in the Additional Crossing of the Clarence River at Grafton Environmental Impact Statement (EIS) (ARUP, 2014) and Submissions Report (RMS, 2014); and
- all applicable legislation.
- The Schedule of Works and Technical Criteria (SWTC) requirement, in particular to:
  - SWTC, Appendix 6 – General Specification type G10 – Traffic Management
  - SWTC, Appendix 27 – Road Occupancy

This Plan operates as the master document to a set of site or zone specific Traffic Management Plans (TMP) and their associated Traffic Control Plans (TCP) and Temporary Works Drawings. Together they deal with the safe and effective management of traffic during the design and construction phase of the Project.

This Plan applies to all parts of the construction of the Works. It does not apply to the maintenance of the road after opening to traffic.

This Plan is applicable to all staff, employees, subcontractors, and any statutory Service Authorities undertaking service relocations throughout the duration of the contract until project completion and its implementation and on-going development will be managed by the senior project team.

## 1.2 Background

Section 8 of the Additional Crossing of the Clarence River at Grafton EIS (ARUP, 2014) considered the potential traffic impacts during the construction of the Project. As part of the development of the EIS, a detailed traffic and transport assessment was prepared to address the Director-General's requirements for the Project. The traffic and transport assessments were included in the EIS as Appendix D: Technical Paper: Traffic and transport.

## 1.3 Environmental management document system

The Project Environmental Management document system is described in the CEMP.

The CTAMP is part of Fulton Hogan's environmental management framework for the Project, as described in Section 4.1 of the CEMP. In accordance with the requirements of CoA D46

(b), this Plan has been developed in consultation with Clarence Valley Council (for details refer Section 4).

Management measures identified in this CTAMP will be incorporated into Fulton Hogan's site or activity specific Environmental Work Method Statements (EWMS).

EWMSs will be developed and signed off by Fulton Hogan's environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified safeguards.

Used together, the CEMP, issue-specific plans, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by Fulton Hogan's personnel and contractors.

The review and document control processes for this CTAMP are described in Section 10 of the CEMP.

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this CTAMP is to describe how Fulton Hogan proposes to manage traffic during construction of the Project, but not to the extent to those SWTC requirements under the Contract.

### 2.2 Objectives

The key objective of the CTAMP is to ensure that traffic impacts during construction are minimised and are within the scope permitted by the Planning Approval. This includes minimising delays, ensuring consideration is given to the needs of all road users and maintaining safety for both workers and the general public.

To achieve these objectives, Fulton Hogan will undertake the following:

- ensure appropriate controls and procedures are implemented during construction activities to address potential traffic impacts along the Project corridor;
- ensure appropriate measures are implemented to address the relevant CoAs outlined in Table 3.1 and the safeguards detailed in the EIS; and
- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this CTAMP.

Progress against the nominated objectives will be continually assessed during the course of the project.

The delivery of the objectives for this project is the responsibility of the Project Director or nominee, as detailed in the Duties and Responsibilities section of this Plan.

### 2.3 Targets

The following targets have been established for the management of traffic impacts during the construction of the Project:

Table 2-1: Key Performance Areas

Objective	Target	KPI / month
▪ Provide a safe environment for road users and workers	▪ No unplanned impact on traffic flow due to works	▪ No of unplanned impact on traffic flow due to works
▪ Ensure impacts on road users are kept to a minimum	▪ No traffic incidents caused by the construction activities	▪ N <sup>o</sup> of incidents
▪ Ensure road users and the community are regularly informed about traffic changes	▪ No traffic related complaints	▪ N <sup>o</sup> of traffic related complaints



## 3 Environmental requirements

### 3.1 Relevant legislation and guidelines

#### 3.1.1 Legislation and regulatory requirements

Legislation relevant to traffic management includes the *Environmental Planning and Assessment Act 1979* (EP&A Act), under which the Infrastructure Approval was granted. Relevant provisions of the EP&A Act are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

Identified regulatory requirements relevant to traffic management include:

- an approved and valid Road Occupancy Licence (ROL);
- an approved relevant Speed Zone Authorisation (SZA); and
- Australian Road Rules.

#### 3.1.2 Guidelines

The main guidelines, specifications and policy documents relevant to this CTAMP include:

- RMS QA Specification G10 – Traffic Management;
- RMS Traffic Control at Worksites Manual (TCaWS), 2010;
- Austroads Road Safety Audit Second Edition 2002: Checklist 4. Pre-opening scheme audit;
- Austroads Road Safety Audit Second Edition 2002: Checklist 5: Roadwork traffic scheme audit;
- Austroads Road Safety Audit Second Edition 2002: Checklist 6: Existing roads: road safety audit,
- RMS Road Design Guide;
- RMS NSW Bicycle Guidelines;
- Austroads Traffic Engineering Practice – Part 14;
- Austroads Guide to Road Design Part 3 – Geometric Design;
- Austroads Guide to Road Design Part 4B – Roundabouts (2009);
- Guide: Signposting (RTA, July 2007); and
- Tourist Signposting guide (RMS and Destination NSW, 2012).

## 3.2 Minister's Conditions of Approval

The CoAs relevant to this CTAMP are listed in Table 3-1 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

**Table 3-1: Conditions of Approval relevant to the CTAMP**

CoA No.	Condition Requirements	Document Reference
B24	In relation to new or modified local road, parking, pedestrian and cycle infrastructure, the SSI shall, where feasible and reasonable, be designed: <ul style="list-style-type: none"> <li>a) in consultation with the Council;</li> <li>b) to take into consideration existing and future demand, road safety and traffic network impacts;</li> <li>c) to meet relevant design, engineering and safety guidelines, including <i>Austroads Guide to Traffic Engineering Practice</i>; and</li> <li>d) be certified by an appropriately qualified person that has considered the above matters.</li> </ul>	<i>Detailed design</i>
<b>Access</b>		
D13	Access to all properties shall be maintained during construction, where feasible and reasonable, unless otherwise agreed by the relevant property owner or occupier. Any access physically affected by the SSI shall be reinstated to at least an equivalent standard, unless agreed with by the property owner.	<i>Section 7.9</i>
D14	Safe pedestrian and cyclist access through or around worksites shall be maintained during construction. In circumstances where pedestrian and cyclist access is restricted due to construction activities, a satisfactory alternate route shall be provided and signposted.	<i>Section 7.7, Section 7.9 Annexure C- Pedestrian and Cyclist Management Plans</i>
D15	Construction vehicles (including staff vehicles) associated with the SSI shall be managed to: <ul style="list-style-type: none"> <li>a) minimise parking or queuing on public roads;</li> <li>b) minimise idling and queuing in local residential streets where practicable;</li> <li>c) minimise the use of local roads (through residential streets and town centres) to gain access to construction sites and compounds; and</li> <li>d) adhere to the nominated haulage routes identified in the Construction Traffic and Access Management Plan required under condition D46(b).</li> </ul>	<i>Section 7.2 Annexure A -Traffic Control Plans Annexure B -Vehicle Management Plans Annexure E - Queue Length Management Strategy</i>
<b>Parking</b>		
D16	Where feasible and reasonable, the Proponent shall provide alternative temporary parking spaces for formal on-street parking spaces removed and/or impacted by the construction of the SSI. The location and number of temporary or relocated parking spaces shall be determined in consultation with Council and affected businesses. The alternative parking spaces shall be provided prior to commencement of construction activities that impact on parking spaces within the SSI footprint.	<i>Detailed design , Community Communication Strategy and through development of specific TCPs prepared during the staging of the Works.</i>

CoA No.	Condition Requirements	Document Reference
	<b>Road Dilapidation</b>	
D17	<p>Upon determining the haulage route(s) for construction vehicles associated with the SSI, and prior to construction, an independent and qualified expert shall prepare a <b>Road Dilapidation Report</b> for local roads outside the SSI boundary. The Report shall assess the current condition of the road and describe mechanisms to restore any damage that may result due to their use by traffic and transport related to the construction of the SSI. The Report shall be submitted to Council for review prior to the commencement of haulage.</p> <p>Following completion of construction, a subsequent Report shall be prepared to assess any damage that may have resulted from the construction of the SSI. Measures undertaken to restore or reinstate local roads affected by the SSI shall be undertaken in a timely manner, in accordance with the reasonable requirements of Council, and at the full expense of the Proponent.</p> <p><i>Note: Nothing in this condition restricts the Proponent commencing adjustments and minor upgrades to the existing road network to cater for construction traffic and installation of temporary Project signage prior to the commencement of construction.</i></p>	<i>Road Dilapidation Report – Local Roads (provided separately)</i>
D46(b)	<p>As part of the CEMP for the SSI, the Applicant shall prepare and implement:</p> <p>(b) <b>a Construction Traffic and Access Management Plan</b> to manage construction traffic and access impacts of the SSI. The Plan shall be developed in consultation with Council and shall include, but not necessarily be limited to:</p>	<i>This CTAMP</i>
	(i) identification of construction traffic routes and construction traffic volumes (including heavy vehicle/spoil haulage) on these routes;	<i>Section 7.2</i>
	(ii) details of vehicle movements for construction sites, levee stockpile sites and site compounds, including parking, dedicated vehicle turning areas, and ingress and egress points;	<i>Section 7.2</i>
	(iii) identification of construction impacts that could result in disruption of traffic, public transport, pedestrian and cycle access, property access, and parking including details of oversize load movements;	<i>Section 6</i>
	(iv) details of management measures to minimise traffic impacts, including temporary road work traffic control measures, onsite vehicle queuing and parking areas, and management measures to minimise peak time congestion and measures to ensure safe pedestrian and cycle access;	<i>Section 7</i>
	(v) details of measures to manage traffic movements, parking, loading and unloading at ancillary facilities during out-of-hours work;	<i>Section 7.2.4</i>
	(vi) a response plan which sets out a proposed response to any traffic, construction or other incident;	<i>Section 7.12, Annexure A Traffic Incident Procedure</i>
	(vii) details on any access and speed restrictions to be imposed along the Clarence River, including timing and duration;	<i>Section 7.14, Annexure F Construction Navigation Management Plan</i>

CoA No.	Condition Requirements	Document Reference
	(viii) information on the number of moorings to be relocated, their current location, proposed location, whether the relocation would be permanent and if not, the duration of relocation; and	<i>Section 7.14, Annexure F Construction Navigation Management Plan</i>
	(ix) mechanisms for the monitoring, review and amendment of this plan.	<i>Chapter 8, Chapter 9</i>

## 4 Consultation

### 4.1 Consultation requirements under the Infrastructure Approval

- **CoA D46(b)**, the CTAMP is to be developed in consultation with the Clarence Valley Council;
- **CoA B24**, in relation to new or modified local road, parking, pedestrian and cycle infrastructure, the Project will be designed in consultation with the Clarence Valley Council;
- **CoA D16**, the location and number of temporary or relocated parking spaces will be determined in consultation with the Clarence Valley Council and affected businesses.

### 4.2 Consultation requirements under the EIS

- **CO1** Consultation will be carried out with:
  - Clarence Valley Council on the potential staging of local road network upgrades in Grafton and South Grafton;
  - ARTC on the design, construction and ownership transfer of the railway bridge on Pound Street.
- **TT4** Consultation will be undertaken with bus operators during construction to maintain access to bus stops where feasible and reasonable or identify suitable alternatives.
- **TT5** The CTAMP will:
  - include requirements and methods to consult and inform the local community of impacts on the local road network and traffic
  - describe impacts on all transport modes, identifying appropriate mitigation measures in accordance with the relevant guidelines and in consultation with relevant parties (ie bus and rail operators).
- **TT6** Consultation will be undertaken with the appropriate rail operators / owners to explore the possibility of transporting machinery and materials over long distances to Grafton by rail and then haulage to site using road transport. Emergency services will be notified in advance of changes to traffic conditions (e.g. partial or total road closures).
- **TT10** Commercial fishing licence holders on the Clarence River at Grafton will be consulted during construction to minimise impacts and address any access issues in and around the construction site.
- **TT15** Opportunities to provide a comparable level of parking on Clarence Street between Pound Street and the railway viaduct will be investigated in consultation with local business owners.
- **SE3** Consultation with the owners of the moorings will be carried out during the detailed design stage and before construction.
- **SE8** Consultation will be carried out with the Clarence River Sailing Club and other Clarence River event organisers regarding the need to make alternative access arrangements during construction.

A summary of consultation undertaken during the preparation of this CTAMP is provided in Appendix A2 of the CEMP.

# 5 Existing environment

## 5.1 Existing road network

The existing road network in the vicinity of the Project area is shown in Figure 5-1 and described below.

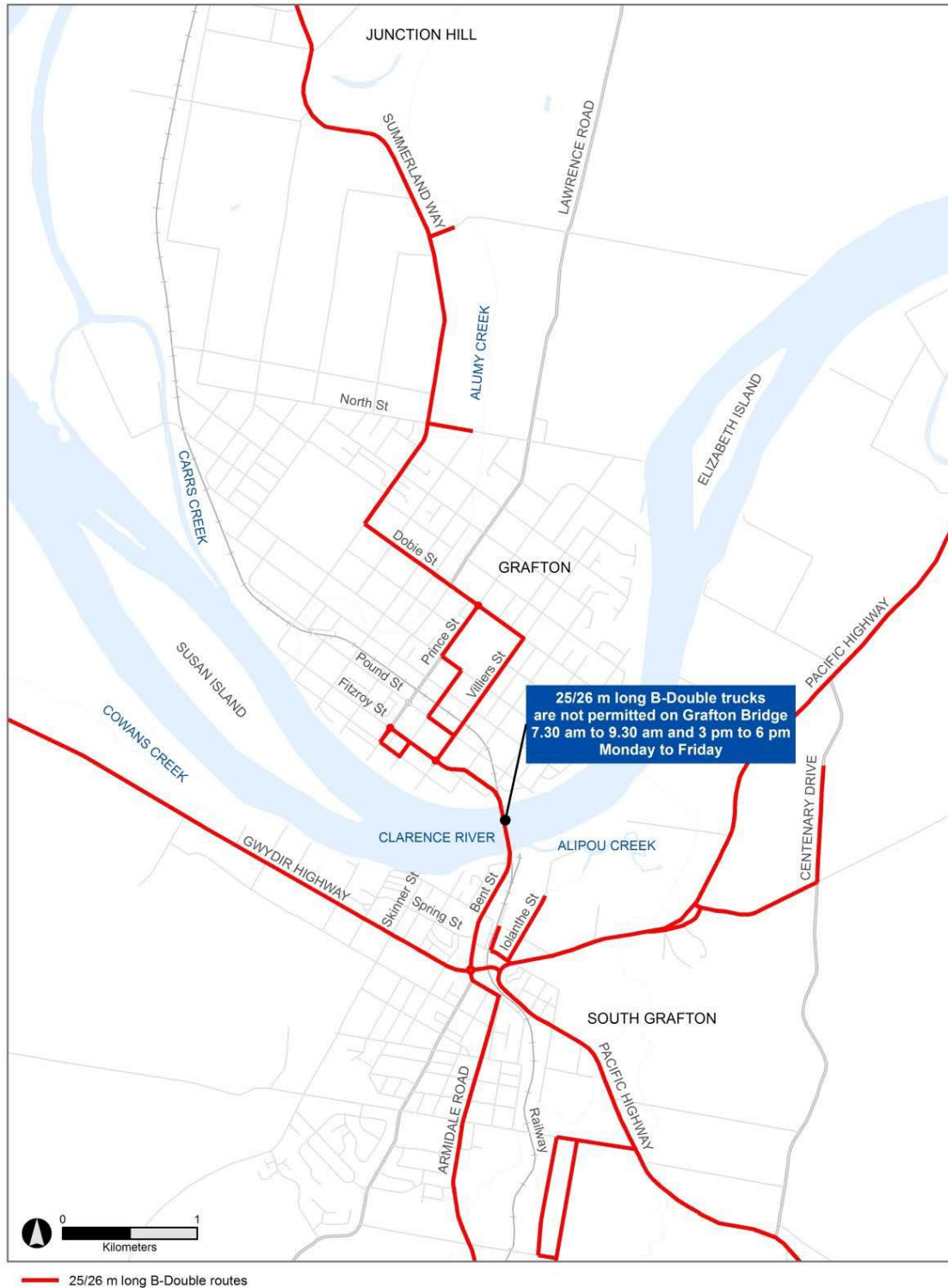


Figure 5-1: Road network in the Project area

### **5.1.1 State Roads**

#### ***Pacific Highway***

The Pacific Highway (Highway No 10) is the major coastal road transport route between Sydney and Brisbane. At a regional level, the Pacific Highway connects South Grafton with Coffs Harbour and Woolgoolga to the south, and Woodburn and Ballina to the north. The Pacific Highway enters the Grafton city area from the south at South Grafton, connecting to various local streets and the Gwydir Highway on the east side of South Grafton. From this intersection (Pacific Highway/Gwydir Highway) the highway leaves South Grafton in a north-east direction following the Clarence River to the town of Maclean.

#### ***Gwydir Highway***

The Gwydir Highway (Highway No 12) is 567 km long and traverses the New England region from South Grafton to the inland areas of Glen Innes, Inverell, Wialda, Moree and Walgett. It crosses the New England tablelands and western plains and connects four interstate highways (Pacific, New England, Newell and Castlereagh). It is the only east-west B-Double truck route in the NSW northern region.

### **5.1.2 Summerland Way**

The Summerland Way (Route No 83) is a north-south 199 km road which runs from the Mount Lindesay Highway near Woodenbong in the vicinity of the Queensland border to Grafton. The Summerland Way passes through the towns of Casino and Kyogle and connects South Grafton and Grafton via the existing bridge. Within Grafton, the Summerland Way links the CBD with South Grafton via the existing bridge. Most local businesses in central Grafton and South Grafton are located on Summerland Way. It is a 50 km/h street with no traffic signals, and two lanes in each direction between Clarence Street and Duke Street. It has conventional roundabouts at the main intersections and designated pedestrian crossings at selected locations.

Although the route is designated for 25/26 m long B-Double trucks, the Summerland Way does not currently comply with Roads and Maritime requirements for vertical clearance in Grafton. Headroom restrictions resulting from the existing elevated railway line through the centre of Grafton means that there are only nine locations where traffic can pass between central Grafton and the areas to the north. Access for 25/26 m long B-Double trucks at the existing bridge is restricted during peak traffic periods.

### **5.1.3 Regional roads**

Regional roads that connect Grafton and South Grafton with other towns and villages within the region are:

- Lawrence Road, connecting Grafton with Lawrence and Maclean (to the north-east).
- Armidale Road, connecting South Grafton with the villages of Coutts Crossing and Ebor (to the south) and the Northern Tablelands at Armidale.

### **5.1.4 Local road network**

The key local roads within Grafton are:

- Villiers Street – connects the Grafton centre and residential areas to the northeast, as well as accommodating high vehicles using route MR83
- Pound Street – provides access to Shopping World and other small businesses. Also acts as a secondary access road (rat-run) to the existing bridge

The key local roads within South Grafton are:

- Skinner Street – provides access to the small urban hub at its northern end, and connection to regional centres to further southwest of Grafton via Rushforth Road at its southern end; and
- Spring Street – acts as a secondary route (rat-run) between Bent Street and the Pacific Highway at its eastern end, and provides access to a number of small businesses along its entire length.

## 5.2 Heavy vehicles and freight

The existing freight network passes through the Grafton area via the Pacific Highway, Gwydir Highway and Summerland Way, and crossing the existing Grafton Bridge (refer Figure 5-1). The main freight routes in the Grafton area are the designated 25/26 m long B-Double truck routes which are used to transport goods within the Grafton area, as well as through to other major centres.

## 5.3 Crashes

There have been 76 crashes recorded in the Project area over a five year period ending on 30 June 2013. In total, 34 crashes resulted in injuries and 42 crashes resulted in the vehicle(s) involved needing to be towed away. No fatal crashes were recorded.

The crash data indicates that crashes were largely clustered along the alignment of higher order roads which carry higher traffic volumes including:

- **Pacific Highway near intersections with Spring Street and Gwydir Highway**  
Characterised by closely spaced priority-controlled intersections with poor geometry.
- **Bent Street near its intersections with the Gwydir Highway and Through Street**  
Characterised by roundabout intersections that experience a significant volume of daily traffic (most crossing the river).
- **Grafton Bridge**  
Most crashes occurred near the “kinks” in the existing bridge alignment which are the direct cause of congestion on a daily basis during peak periods, and pose issues to the safe movement of vehicles.
- **Fitzroy Street near its intersections with Pound Street and Clarence Street**  
Characterised by intersections that experience congestion particularly along the southbound carriageway in the evening peak period.

## 5.4 Existing road network performance

### 5.4.1 Network traffic demands

The primary roads and observed traffic volumes in the Grafton and South Grafton road network, based on the 2011 Base Case traffic model (refer *Strategic Traffic Assessment* (GTA, 2011)), are summarised below.

#### **Grafton**

- Fitzroy Street (9,000 to 24,000 vehicles per day)
- Villiers Street, north of Fitzroy Street (9,000 to 16,000 vehicles per day)
- Pound Street (8,000 to 11,000 vehicles per day).



## **South Grafton**

- Bent Street (21,000 to 23,000 vehicles per day)
- Pacific Highway (10,000 to 12,000 vehicles per day)
- Gwydir Highway (8,000 to 11,000 vehicles per day).

### **5.4.2 Existing bridge traffic demands**

The weekday average traffic volume (including heavy vehicles) observed across the existing road and rail bridge over the Clarence River during 19 August 2010 to 26 August 2010 was approximately 27,578 vehicles per day. Other key findings from the traffic survey were:

- The majority of vehicles (both light and heavy) use the bridge during the day;
- Friday provides the highest daily traffic volumes for all trips across the bridge;
- Sunday traffic volumes are the lowest;
- In the AM peak period (between 7 am and 10 am) most traffic is northbound into Grafton;
- In the PM peak period (between 4 pm and 7 pm), the traffic flow is more even in both directions but the predominant traffic flow is southbound; and
- The number of heavy vehicles crossing the bridge during peak hours is influenced by the ban on B-Double trucks greater than 25 m length using the Grafton Bridge between 7.30 am and 9.30 am and between 3 pm and 6 pm.

### **5.4.3 Capacity of the existing bridge**

The *Guide to Traffic Management Part 3: Traffic studies and analysis* (Austroads, 2009) indicates that the theoretical capacity of the existing road and rail bridge over Clarence River is in the range of 900 to 1400 vehicles per lane per hour.

Traffic counts carried out in August 2010 indicate that the bridge was carrying 1360 vehicles per hour in the northbound direction for the AM peak and 1330 vehicles per hour in the southbound direction for the PM peak. Furthermore, congestion and traffic delays are observed at the bridge approaches during peak periods, indicating that the bridge is at capacity during peak periods.

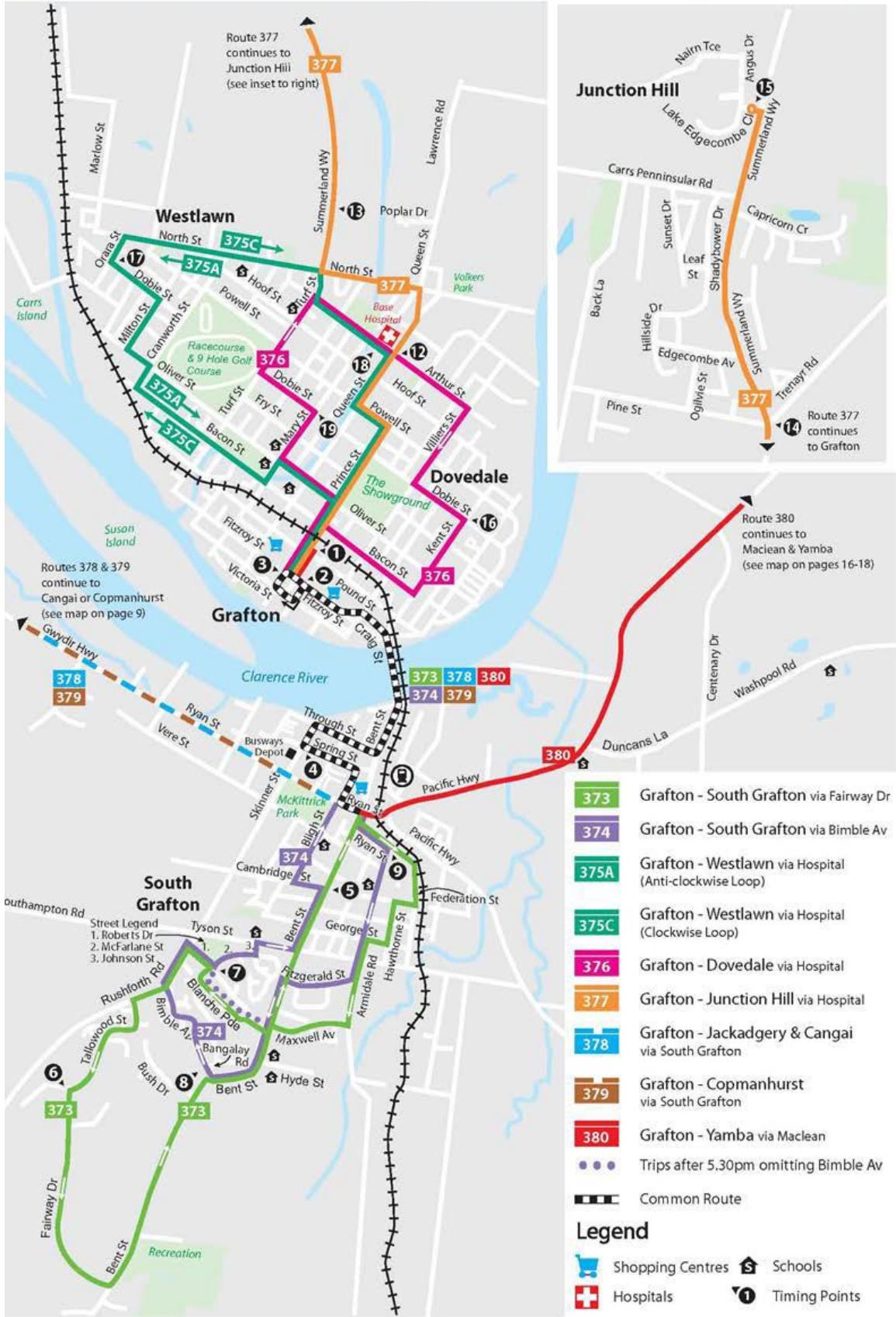
## **5.5 Public transport network**

### **5.5.1 Bus**

Busways is the main public bus operator in Grafton providing regular services to Grafton and South Grafton and the towns and villages of Ulmarra, Maclean, Yamba, Iluka, Copmanhurst and Jackadgery. Routes covering Grafton and South Grafton are presented in Figure 5-2. The figure illustrates that several routes converge at the Summerland Way corridor through the centre of Grafton and at the existing bridge crossing, whilst deviating to Through Street and Spring Street in South Grafton.

Coach companies also provide services to/from Grafton and towns / regional centres such as Lismore, Yamba, Maclean, Lawrence, Corindi Beach, Woolgoolga, Byron Bay, Moree, Copmanhurst, Cangai as well as long distance services to Brisbane and Sydney.

Based on a survey undertaken for the *Heavy Vehicle Traffic Study (Roads and Maritime, 2011)*, buses within the Project area typically operate from 5.30 am to 8.30 pm Monday to Friday and from 7.30 am to 3.30 pm on Saturdays.



**Figure 5-2: Public Bus Network in the Grafton Area**

### **5.5.2 Rail**

Grafton City railway station operates out of South Grafton (near the corner of Bent Street and Through Street) and is on the North Coast Line. The line is the primary rail route in the Mid North Coast and Northern Rivers regions and forms part of the rail corridor between Sydney and Brisbane. The line begins at Maitland and ends at the Roma Street railway station in Brisbane passing through towns such as Taree, Wauchope, Macksville, Nambucca Heads, Coffs Harbour, Casino and Kyogle. The line is utilised by both passenger and freight operators. The Grafton, Casino and Brisbane express passenger trains (XPT) each run daily from Sydney and stop at Grafton.

## **5.6 Pedestrian and cyclist infrastructure**

An overview of the current cycle network within Grafton is shown in Figure 5-3.

### **5.6.1 Existing bridge**

A dedicated shared bicycle and pedestrian path is provided along both sides of the existing bridge at the rail line level (lower deck). These two-way paths are provided with railings for pedestrian and cyclist safety. At an approximate width of 1.5 m between handrails, the paths on the existing bridge are considered to be narrow.

### **5.6.2 South Grafton**

On the southern side of Clarence River, the dedicated shared bicycle and pedestrian path extends from the bridge to the Grafton Rail Station parking area, and is discontinued at the southern end of Crisp Avenue. From here, users are required to share the road with general traffic for a brief section before connecting with the shared path running from Spring Street to Armidale Road, across the Gwydir Highway. This route requires crossing of Spring Street, Gwydir Highway and Armidale Road, all of which are heavily trafficked roads. There are no formal arrangements for cyclists or pedestrians to cross these roads.

Currently there are no specific facilities for pedestrians and cyclists to get from the end of the shared path at Crisp Avenue eastbound to or across the Pacific Highway. The current route uses unformed road verges or the existing road formation to get to the Pacific Highway. For students trying to access McAuley Catholic College to the north, pedestrians and cyclists need to cross the Pacific Highway to get to Hennessey Drive and the college. The Pacific Highway in South Grafton currently carries approx. 12,000 vehicles per day (depending on section) and represents a significant hazard to pedestrians and cyclists.

Aside from a short, disconnected footpath on Iolanthe Street at the frontage to the Supercheap Auto site, there are no other formal paths along the Pacific Highway, Gwydir Highway or Spring Street within the Project boundary.

### **5.6.3 Grafton**

On the northern side of the river, the shared pathway extends from the bridge crossing to Greaves Street where it meets with the local road network which generally has no dedicated facilities for cyclists. Grafton's current city cycle routes guide cyclists to use minor streets to the west to access areas closer to the Clarence River, and Kent Street and Oliver Street to access areas to the north. Pedestrian footpaths are generally provided on at least one side of the roadway in central Grafton, however less connectivity is provided on streets further away from the centre.

In terms of other links or paths within the Project boundary, a footpath exists along the southwest side Pound Street which serves as a pedestrian connection between the Grafton centre and residential areas to the southeast.

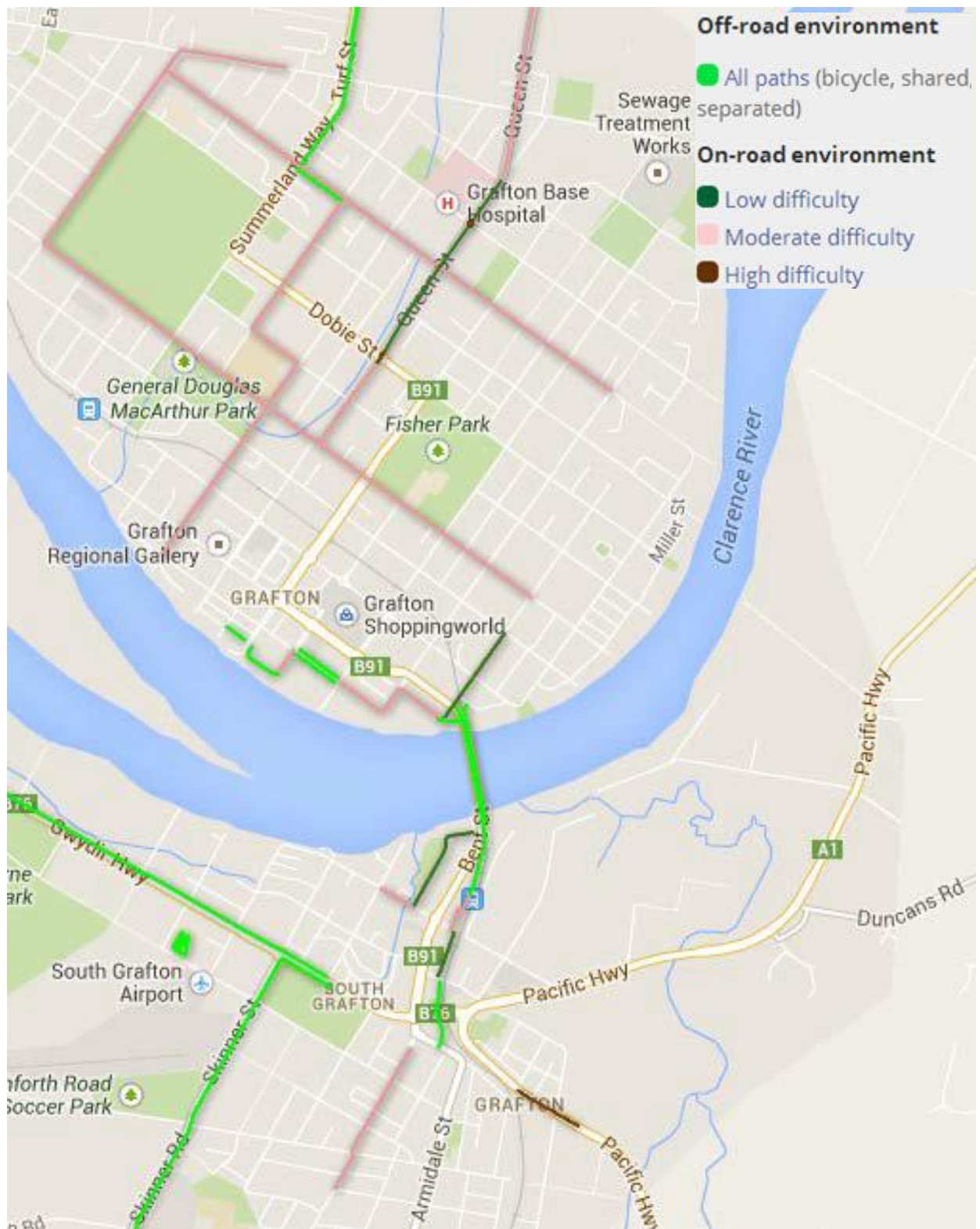


Figure 5-3: Grafton Cycle Links



## 6 Construction traffic impacts

### 6.1 Traffic generating activities

The main traffic generating construction activities comprise:

- materials (including spoil) haulage by heavy vehicles;
- delivery of civil, concrete and paving materials;
- movements of construction equipment; and
- light vehicle movements (vans, utility pick-ups) associated with construction staff and contractors.

In addition, bridge construction works will require deliveries of large pre-cast structures such as those required for structural installation works, which may involve oversize and/or slow moving vehicles.

The following will be required to support these construction activities:

- temporary road closures;
- traffic diversions for general traffic and for buses;
- footpath and shared path diversions; and
- temporary restrictions to property access.

River traffic on the Clarence River is discussed in Section 6.7.

### 6.2 Construction traffic impacts

A small temporary increase in traffic volumes is expected during the construction period as a result of commuting workers and management staff to site, deliveries of equipment and the haulage of materials to and from the work sites.

Construction activities may result in the following impacts:

- increased travel times due to road works restrictions and reduced speed limits around construction sites;
- increased travel times due to increased truck and construction machinery movements;
- increased travel times due to potential rerouting/diversion to alternative routes;
- temporary partial or complete closure of roads and altered property access during construction;
- temporary changes to bus access arrangements, including stop relocation, resulting in increased walk distance for certain customers;
- temporary or permanent reductions in on-street parking access or pedestrian / cyclist path access; and
- potential safety issues relating to increased heavy vehicle movements, as well as to higher traffic flows temporarily traversing lower-capacity road sections.

The following streets may be directly impacted by road works construction zones:

- Grafton
  - Clarence Street, between Fitzroy Street and Bacon Street;
  - Kent Street, between Fitzroy Street and Bacon Street;
  - Pound Street, between Villiers Street and Bromley Street.
- South Grafton

- Butters Lane;
- Through Street, between the rail corridor and Iolanthe Street;
- Iolanthe Street;
- Spring Street;
- Pacific Highway; and
- Gwydir Highway.

The following road closures are expected to occur in Grafton during construction:

- **Greaves Street**, in the vicinity of the northern approach to the new bridge crossing. This street carries very low traffic volumes. Residents to the north will be required to detour via Bacon Street. Those to the south of the closure would be required to detour via Fitzroy Street.
- **Pound Street, between Kent and Clarence**. This section will be temporarily closed while the structure that will replace the Pound Street viaduct is lifted into place. This street section carries a relatively low volume of traffic at approximately 1,500 vehicles per weekday, and approximately 160 vehicles per hour during peak periods. During closure, a detour will be in place via the existing parallel road at Bacon Street.

## 6.3 Construction routes

### 6.3.1 Site compound access

The main site compound will be located in South Grafton, with a smaller site compound located in Grafton for the construction of the northern bridge abutment, the Pound Street railway viaduct replacement and road upgrades in Grafton.

The ancillary sites in Grafton and South Grafton and stockpile areas along the levee will be accessed via existing roads. The two adjoining sites that form the South Grafton site compound will be accessed via Iolanthe Street. The site located at the eastern side of Iolanthe Street will also have an access point at the Pacific Highway. The two adjoining sites at the Pound Street viaduct ancillary facility will be accessed via Pound Street.

Levee stockpile areas located along the banks of the Clarence River to the west of the bridge crossings will utilise existing roads to access the trunk road network as depicted on Figure 7-3.

### 6.3.2 Haulage routes

The roads within the vicinity of the Project to be used as haulage routes are:

- Summerland Way, Villiers Street and Pound Street in Grafton; and
- Bent Street, Pacific Highway, Gwydir Highway and Iolanthe Street in South Grafton.

The timing of vehicle activity on these haulage routes will take account of bridge access restrictions and avoid vehicle movements in the peak traffic periods to minimise impacts on traffic operations.

Where possible and feasible, machinery and materials required to be delivered over long distances will be transported to Grafton by rail and hauled to site by road transport. All other goods will be transported by road at times that will minimise impact on peak period traffic operations.

## 6.4 Pedestrian and cyclist access

Construction of the Project may have temporary impacts on access to pedestrian and cycle paths. In Grafton, construction work at the rail viaduct and road upgrades at Pound Street may require closure of the route from the existing bridge to residential areas in the north

along Kent Street. Cyclists and pedestrians may be detoured through Villiers Street, or another temporary alternative route.

In South Grafton, work associated with the Gwydir Highway widening may impede crossing of the Pacific Highway between Derek Palmer Place and Silver Jubilee Park. This may require cyclists to detour along Bent Street.

## **6.5 Public transport**

### **6.5.1 Bus**

The construction work and traffic management measures are not expected to directly impact bus services, as road closures are not proposed on bus routes in the Project area. The level of disruption on bus services would be low, similar to the disruption experienced by general traffic.

The one exception is the school bus route that picks up and drops off students in Pound Street near Clarence Street. The bus operator will be contacted before construction starts to identify an alternative pickup up and drop-off location.

### **6.5.2 Rail**

Construction of the Project will have short-term impacts on the North Coast Line rail services, which will not be able to run during possessions (closures of the rail line). Possessions are likely to occur over a long weekend and/or during scheduled rail network outages, usually in off-peak periods of the year in terms of patronage and freight movements, to minimise impact on rail operations.

During the rail possession, alternative passenger transport services will be provided where possible. Coach services will be provided for regional trips to other communities in the area.

Freight trains will not be able to operate during the closure period. The Contractor will consult with freight operators to minimise impact on freight movement.

## **6.6 Clarence River traffic impacts**

Construction of the Project will generate additional river traffic, including piling barges and general work boats such as vessels used for installing and decommissioning sediment control devices. A temporary jetty for barge launching is proposed off the South Grafton foreshore to facilitate these river-based construction activities.

Impacts on river traffic may potentially occur during installation of the new bridge piles and piers, wholly or partially restricting transit through the main navigable spans and presenting a physical safety hazard. Construction and support barges used during piling and pier construction may also obstruct vessels while in use.

Maritime access to the Clarence River will be maintained throughout construction, excluding the areas of construction. For the majority of users it is expected that this will not restrict maritime access. The main impact would be on the sailing course and mooring areas, which may need to be permanently relocated.

## **6.7 Impacts to freight services**

Access across the existing bridge would be maintained during construction, however surrounding road network upgrades as part of the Project may cause delays which would have a minor impact on the freight services travelling through, to or from the Grafton area during construction.

## **6.8 Impacts to kerbside parking**

Road network upgrades in South Grafton and Grafton may require temporary alterations to on-street parking access. Mitigation measures are addressed under section 7.13.6 of this Plan.

## **6.9 Property access**

Access to residential, commercial, TAFE and the Gummyaney Aboriginal preschool properties will be maintained during construction at all times, unless otherwise agreed with property owners and businesses to limit the duration of any impacts. Property access around the northern bridge approach will be maintained for all properties that are not proposed to be acquired for the Project.

Pedestrian and cycle access will be prohibited from foreshore areas within the construction work zone as well as some sections of the road reserve.

## **6.10 Impacts to flood evacuation routes**

Construction of the Project will not impact on flood evacuation routes.

## **6.11 Emergency services**

There is potential for delays to response times for emergency services due to construction of the Project. Delays due to construction activities, queuing traffic and reduced speed limits may disrupt emergency services. Emergency services will be notified regarding any traffic conditions changes (eg. partial or total road closures) during the construction phase.

## **6.12 Cumulative construction traffic**

Potential cumulative construction impacts may occur from the aggregated effect of other developments preparing for or starting construction, including cumulative traffic disruptions to road users travelling to and from Grafton along the Pacific Highway and cumulative traffic disruptions to road users travelling between Grafton and South Grafton across the existing bridge.

Projects that may contribute to cumulative traffic impacts due to location, timeframe and project size include:

- Pacific Highway Upgrade – Woolgoolga to Ballina;
- Lapsed Homemaker Centre development approval at the intersection of Through Street and Iolanthe Street, South Grafton; and
- Future urban development projects instigated by the construction of the new bridge and associated road upgrades.

This is further detailed under section 7.13 of this Plan.



# 7 Traffic and transport management

## 7.1 Traffic and transport management measures

A range of environmental requirements and control measures are identified in the EIS, Submissions Report, Infrastructure Approval and other RMS documents. Mitigation and management measures will be implemented to comply with these requirements and to avoid, minimise or manage impacts to traffic and transport, including river navigation and access.

These measures will be prepared in accordance with RMS *QA Specification G10 - Traffic Management and Traffic Control at Work Sites Manual (2003)*. General traffic management measures include:

- Construction activities will be staged to allow traffic movements along alternative roads where possible. Where road closures are required, construction activities will be undertaken in a manner that minimises reduction in traffic capacity, particularly by limiting peak periods.
- Road closures will be staged to allow priority for traffic movements in the peak direction, and alternative diversion routes provided. These diversions may include roads in the wider area beyond the immediate Project area.
- Property access will be maintained throughout construction of the Project, unless otherwise agreed with property owners and businesses to limit the duration of any impacts.

Specific measures and requirements to address the construction impacts of the Project on traffic and transport are provided in Table 7-1.

### Time Management

Fulton Hogan aims to meet its time related obligations. Among them are:

- Submitting CTMP 60 days from date of the Project Deed or 4 weeks prior to the proposed commencement date for construction which affects traffic conditions;
- Submitting TCPs and VMPs at least 10 business days prior to its proposed use;
- Submitting ROLs at least 10 business days prior to its proposed use;
- Notifying a day prior to opening temporary roadways and detours to traffic;
- Allowing 2 days after opening a temporary roadways or detour to traffic prior to disturbing sections of the existing roadway being placed to provide for the event where failure of the temporary roadway or detour occurs and there is a need to direct traffic back onto the existing roadway;
- Conduct a Road Safety Audit within 24 hours of opening temporary roadways or detours.
- Submitting Road Safety Audit Reports within 7 days of implementation of the TCPs;
- Notifying emergency services and relevant sections of the community and transport industry of work which results in significant traffic disruption. Provide to the RMS a draft of an appropriate advertisement 3 weeks before the proposed placement of the advertisement;
- Notifying residents and businesses affected by disruption to property access or by night works in built-up areas. A letter will:
  - be "letter-box-dropped" at least three Business Days before the proposed date
  - detail the dates and times of the proposed access restrictions and contact details
- Performing work and Services only in the times permitted; and

- Lodging early as possible (at worst no less than 10 Business Days before the work) a road occupancy application. Noting, however, the exemptions for emergencies and hazards;

The above mentioned community notification is required to be done in accordance to the Community Communications Strategy (CCS).

### **7.1.1 Detailed design development**

Operational impacts on river navigation and access will be assessed during detailed design, including investigation into the provision of permanent aids to navigation on the bridge.

Roads and Maritime will conduct a Project road safety audit as part of detailed design to identify and address potential safety issues associated with the operation of the Project  
Future traffic demand

If more detailed information regarding future demand becomes available during detailed design of the Project, Roads and Maritime will assess the suitability of incorporating the revised Projections.

**Table 7-1: Traffic and transport management measures**

<b>ID</b>	<b>Measure / Requirement</b>	<b>When to implement</b>	<b>Responsibility</b>	<b>Further Detail</b>
<b>Construction Traffic Impacts</b>				
<b>Operational impacts on river navigation and access</b>				
TT1	The provision of permanent aids to navigation on the bridge will be investigated as part of detailed design.	Pre-construction	Fulton Hogan	Section 7.1
<b>Road safety audit</b>				
TT2	Roads and Maritime will conduct a Project road safety audit as part of detailed design to identify and address potential safety issues associated with the operation of the Project	Pre-construction	Fulton Hogan	Section 7.1
<b>Future traffic demand</b>				
TT3	If more detailed information regarding future demand becomes available during detailed design of the Project, Roads and Maritime will assess the suitability of incorporating the revised Projections.	Pre-construction	RMS	Section 7.1
<b>Construction impacts on public transport</b>				
TT4	Access to bus stops will be maintained during construction or suitable alternatives will be identified in consultation with the bus operators where feasible and reasonable.	Pre-construction, Construction	Fulton Hogan	Section 7.9
<b>Construction traffic impacts</b>				
TT5	Construction traffic management measures will be developed and identified as part of the CEMP (CTAMP). The plan will: <ul style="list-style-type: none"> <li>Detail how the traffic associated with construction activities will be managed in accordance with the relevant standards, including <i>Traffic Control at Work Sites</i> (Roads and Maritime, 2010), AS1742 and Roads and Maritime Specification G10</li> <li>Confirm haulage routes between material source sites and ancillary site / flood levee stockpile access locations</li> <li>Quantify the impacts on level of service during critical construction periods and demonstrate how the mitigation measures proposed will enable acceptable traffic operations and level of service on the road network during construction</li> </ul>	Pre-construction	Fulton Hogan	This Plan Section 7.2.2, Section 7.2.3, Section 7.5 & Section 7.6

ID	Measure / Requirement	When to implement	Responsibility	Further Detail
	<ul style="list-style-type: none"> <li>Identify how the continuous, safe and efficient movement of traffic for both the public and construction workers will be maintained</li> </ul>			
	<ul style="list-style-type: none"> <li>Identify site-specific traffic control measures (including signage) to be provided to manage and regulate traffic movements at relevant locations during construction</li> <li>Identify access arrangements at both construction sites and quarry sites, detailing vehicle ingress / egress movements</li> <li>Include requirements and methods to consult and inform the local community of impacts on the local road network and traffic</li> <li>Describe impacts on all transport modes, identifying appropriate mitigation measures in accordance with the relevant guidelines and in consultation with relevant parties (ie bus and rail operators).</li> <li>Consider other developments and projects that may also be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic.</li> </ul>			
TT6	<p>Construction deliveries will be timed to occur outside peak traffic periods when feasible and reasonable, to minimise impacts on road network.</p> <p>Where feasible and reasonable, machinery and materials to be delivered over long distances will be transported to Grafton by rail and hauled to site by road transport. Consultation will be initiated with the appropriate rail operators / owners to explore this opportunity at the appropriate design stage.</p> <p>Emergency services will be notified in advance of changes to traffic conditions (e.g. partial or total road closures).</p>	Construction	Fulton Hogan	Section 7.2 Section 7.3 Section 7.10
	<b>Construction impacts on the road network</b>			
TT7	Local roads used for construction access will be repaired where required and maintained in serviceable condition.	Pre-construction, Construction	Fulton Hogan	Section 7.2
	<b>Construction impacts on public transport</b>			
TT8	Roads and Maritime will coordinate the placement of the new Pound Street bridge with ARTC to ensure the North Coast Line possession coincides with other works required along the line. In addition, North Coast Line users (passengers and freight operators) will be notified of impending changes to minimise impacts on them.	Pre-construction, Construction	Fulton Hogan and RMS	Section 7.8

ID	Measure / Requirement	When to implement	Responsibility	Further Detail
<b>Construction impacts on river navigation and access</b>				
TT9	Exclusion zones around critical areas of construction activities and floating construction plant will be clearly marked in accordance with Roads and Maritime advice and requirements.	Construction	Fulton Hogan	Section 7.14
TT10	Commercial fishing licence holders on the Clarence River at Grafton will be consulted during construction to minimise impacts and address any access issues in and around the construction site.	Construction	Fulton Hogan	Section 7.9 & 7.14
TT11	A proclaimed Marine Notice will be issued through Roads and Maritime alerting river users of ongoing construction activities.	Construction	Fulton Hogan and RMS	Section 7.14
TT12	Temporary aids to navigation will be provided where feasible and reasonable and in accordance with Roads and Maritime advice and requirements (such as lighted buoys to mark exclusion zones).	Construction	Fulton Hogan	Section 7.14
TT13	Early and ongoing liaison with local marine events organisers (including Grafton Rowing Club, Grafton River Sailing Club and the Grafton Bridge to Bridge Waterski Race organiser) will be carried out to ensure the viability of these annual events and general activities organised by the clubs.	Pre-construction, Construction	Fulton Hogan	Section 7.14
TT14	A construction navigation management plan will be prepared and implemented to set out river procedures and impact reduction measures to be adopted during construction.	Pre-construction	Fulton Hogan	Annexure F – Construction Navigation Management Plan
<b>Impacts on Parking</b>				
TT15	Roads and Maritime will investigate opportunities to provide a comparable level of parking on Clarence Street between Pound Street and the railway viaduct in consultation with local business owners.	Construction	Fulton Hogan	Section 7.2
<b>Socio-Economic, Property and Land Use (relevant to traffic and transport)</b>				
<b>Impacted moorings</b>				
SE3	Roads and Maritime will consult with the owners of the moorings during the detailed design stage and before construction.	Pre-construction	Fulton Hogan	Section 7.14
<b>Social infrastructure – Grafton TAFE Campus and Gummyaney Aboriginal preschool</b>				
SE7	Roads and Maritime and the construction contractor will continue to liaise with Grafton TAFE Campus and the Gummyaney Aboriginal preschool to minimise impacts on access and operations.	Pre-construction, Construction	Fulton Hogan	Section 7.9

ID	Measure / Requirement	When to implement	Responsibility	Further Detail
	<b>Social infrastructure – Clarence River Sailing Club and other Clarence River event organisers</b>			
SE8	Roads and Maritime will consult with Clarence River Sailing Club and other Clarence River event organisers regarding the need to make alternative access arrangements during construction.	Construction	Fulton Hogan	Section 7.9
	<b>Local amenity – residents and business</b>			
SE9	Roads and Maritime and the construction contractor will maintain ongoing and timely communication with nearby residents regarding construction work. This will include notice on timing and duration of activities and potential localised impacts.  The community and business will be notified of any construction activities outside standard construction working hours.  Management measures to reduce construction noise impacts would be required and would be implemented as identified in Section 8.4 of the EIS.	Pre-construction, Construction	Fulton Hogan and RMS	Section 7.9
	<b>Local business – residents and tourism</b>			
SE10	Roads and Maritime and the construction contractor will maintain ongoing timely communication with affected businesses on Project timing, changes to traffic conditions and access arrangements.	Construction	Fulton Hogan and RMS	Section 7.9
	<b>Social infrastructure – general</b>			
SE11	The construction contractor will: <ul style="list-style-type: none"> <li>Maintain access to existing bridge pedestrian links</li> <li>Maintain access for river users, including the Clarence River Sailing Club, and provide appropriate safety and maritime directional and safety signage on structures in the river</li> </ul> Maintain communications with police and emergency services in relation to changed access arrangements and traffic management plans.	Construction, Pre-construction	Fulton Hogan	Section 7.9
	<b>Local business and tourism</b>			
SE12	The construction contractor will maintain access to affected businesses at South Grafton and Grafton and provide directional signage.	Construction, Pre-construction	Fulton Hogan	Section 7.9

ID	Measure / Requirement	When to implement	Responsibility	Further Detail
<b>Local amenity – construction traffic</b>				
SE13	<p>Roads and Maritime will develop construction traffic management measures as part of the CEMP. The measures will detail access arrangements for residents close to the ancillary sites and construction work zones including residents along Greaves Street and Bridge Street.</p> <p>Mitigation measures are outlined in Section 8.1 of the EIS to enable acceptable traffic operations and level of service on the road network during construction.</p>	Pre-construction	Fulton Hogan	Section 7.9
<b>Social infrastructure – Clarence River Visitor Information Centre and other businesses</b>				
SE14	<p>Roads and Maritime will maintain access to the Clarence River Visitor Information Centre and other businesses along Spring and Charles streets in South Grafton by providing directional signage in accordance with relevant Roads and Maritime and Government guidelines.</p>	Construction	Fulton Hogan	Section 7.9

## 7.2 Construction traffic management

Managing traffic around a construction area is important to ensure minimal to no risks to health and safety. This is in regards to both the public and workers on site. The traffic includes cars, trucks and plant like forklifts, as well as pedestrians (workers and visitors).

The most effective way to protect pedestrians is by removing the potential for conflicts between pedestrians and vehicles. This can be undertaken by prohibiting vehicles from pedestrian spaces, or conversely implementing pedestrian routes that prevent access to areas where vehicles are used. In the event that this is not achievable or reasonable, the risks must be minimised as much as practically possible.

The key issues to be considered for construction traffic management include:

- Separating pedestrians and vehicles, including at entrance and egress points;
- Minimising vehicle movements;
- Eliminating the need for any reversing vehicle movements (or alternatively reducing related risks if this is impractical);
- Ensuring high visibility between pedestrians and vehicles;
- Implementing traffic signals; and
- Traffic management plan.

### 7.2.1 Construction staging

#### Grafton (North)

- A. *All work north of Clarence Street including Pound / Clarence Street intersection and Clarence Street*

To minimise the construction impact to local businesses, TAFE and local traffic as well as to provide a cost effective earthworks management strategy, the Grafton (North) section of work will be prioritised and completed early as a separate portion. Upon completion of this section, Pound / Clarence Street intersection will operate as T-junction.

For the initial five to six months of services relocation work, no changes will occur to the traffic arrangement. This will be followed by the construction of temporary widening on the eastern side of Pound Street in two stages (between Villers and Clarence) to reduce the impact to businesses due to parking and to enable construction of the main carriageway in two halves, with traffic restricted to the southbound direction. A similar arrangement will be implemented for Clarence Street (west of Pound Street) to enable the upgrade of the roadway and car parking bays in an efficient manner.

It is envisaged that this section of the works will be completed by end of 2017 and ready for final switch upon completion of the main bridge. This is comprised of approximately six months of services relocation work and six to seven months of proper construction work.

- B. *Clarence Street to Abutment B*

The short length of Pound Street will be closed for the construction of major transverse drainage and sediment basin at the vicinity of Bridge Street. Traffic for Bridge Street will be maintained through Pound Street heading towards Clarence Street. Upon completion of the transverse drainage and connecting roadwork to Bridge Street, Pound Street will be closed to traffic from Bridge Street to Clarence Street. This will enable construction of the full carriageway from Abutment B to Clarence Street. Access to Bridge Street will be via Kent Street.



The replacement of the rail overpass is scheduled during the June 2018 shut down. All preparation work, assembly of the steel structure and piling work will occur during the Pound Street closure.

Temporary road closure with proper detour will be implemented at Greave Street for girders and parapets installation. Other major activities may require partial road closure or can be managed using contra flow arrangements (such as major concrete pours, piling operation and major delivery). Kent Street (between Greave and Pound Street) will be closed permanently for the construction of roadwork, pipeline for pump station and used as the main access point in this zone.

A temporary fence will be erected to delineate the construction zone between Clarence and northern riverbank, with gated entry points at the vicinity of Kent and Greave Street (Abutment B area).

### **Grafton Bridge**

Prior to the completion of levee work, some preparation work will occur for the construction of landside bridge structure and investigation works. The main construction works and activities for river work including temporary jetty located at the southern riverbank, are scheduled to commence in May 2017 upon the completion of the levee upgrade.

A precast yard for the bridge segments will be established at the allocated ancillary site at the southern side. All deliveries (including concrete supply) will initially use Iolanthe Street and later, the new constructed connecting road to Through Street and right turn facility approximately 350m north of Spring Street. A left turn deceleration lane may be required for north-bound traffic. A gated entry point with traffic controller will be established at the northern side of the Through Street roundabout, to management traffic flow and construction activities in this area.

### **Grafton South**

#### *A. Iolanthe / Spring Street*

To minimise construction impact to major businesses including Bunnings, McDonalds and the Service Station, the proposed construction staging initiatives include accelerated construction of Iolanthe Street in two halves by converting Iolanthe Street onto one-way southbound traffic for short term (Stage 1 B only) with the provision of an alternative right turn onto Spring Street for southbound Pacific Highway traffic, 350m north of current location.

Two-way traffic will be maintained for Spring Street (except for a short duration during Stage 3) including provision of right turn into Pacific Highway at all times.

The major transverse drainage across Spring / Iolanthe intersection will be constructed during night work (not staged) to maintain drainage provision in this area.

As part of the strategy to minimise the impact to McDonalds, Spring Street pavement upgrade will occur towards the end of the project when traffic will be limited to one-way (westbound for short duration) with the pavement upgrade carried out in two halves, in an accelerated manner.

#### *B. Gwydir / Pacific Highway Roundabout and Adjoining Roadwork*

The construction of the roundabout concrete pavement will be carried out in three large sections after diversion of traffic onto the temporary pavement constructed (on the eastern side and southwest corner).

The first section comprises the pavement at the south west corner including part of the PCP pavement adjoining existing Gwydir Hwy.

The second section comprising of northwest area, will be constructed together with the pavement between Spring Street and Gwydir Highway and the PCP pavement adjoining Gwydir Highway, after traffic is diverted onto the newly constructed pavement.

The third section comprises the balance of pavement on the eastern side of the roundabout.

The adjoining pavement on the southern side of the roundabout will be constructed in two halves during night works, with full depth asphalt pavement proposed in this area.

### **Levee works**

As a number of existing properties will be impacted by the new infrastructure during floods, mitigation measures will be put in place to adjust the levee levels. These works will be done prior to the commencement of construction of the main infrastructure on the project.

AS there will be a number of levee works, the levee stockpile areas will be located along the banks of the Clarence River to the west of the bridge crossings. The construction will utilise existing roads to access the trunk road network as depicted on Figure 7-3.

Details of vehicle movements for levee stockpile sites including parking, dedicated vehicle turning areas, and ingress and egress points will be determined in the detailed design. Measures to manage traffic movements, parking, loading and unloading at these sites during out-of-hours' work will be developed after such sites have been confirmed in the detailed design.

The volume of vehicular movements comprising utility vehicles, floats and trucks for levee stockpile sites is anticipated to be around 50 trucks a day or larger number, if smaller trucks/floats are used. This will be confirmed as and when the volume of levee works is known after investigation and consultation with properties affected by the works.

## **7.2.2 Construction traffic routes**

### **Planning vehicle movements**

Fulton Hogan acknowledges that attention must be given to the safe movement of construction vehicles when planning construction activities.

When planning construction vehicle movements, the Project Team will be required to:

- Limit heavy vehicle movements from ancillary facilities as far as practicable at night in residential areas;
- Comply with all relevant environmental approvals;
- Minimise the number of vehicle movements by balancing earthworks and recycling excavated materials;
- Set up depots and stockpiles at locations that minimise travel distances and limit the number of movements (conflicts) with the motorway traffic;
- Conduct a risk assessment to identify specific hazards and apply mitigation measures;
- Promote safe driving principles;
- Develop on-road haulage routes that not only provide an efficient operation but also minimises the impact on the road network and local community;
- Where feasible, maximise haulage operations within the construction corridor;
- Analyse, assess and mitigate the impacts of the traffic generated by the construction works;
- Limit the number of access points and haul road crossings;

- Evaluate the need for temporary traffic control;
- Implement appropriate environmental controls;
- Plan on-site vehicle movements;
- Design and implement safe access points;
- Provide an efficient and well maintained vehicle fleet;
- Prepare VMPs for all construction vehicle movements;
- Determine the most appropriate hours of operation that will minimise the impact on the road network and local communities;
- Minimise stopping and laying over of construction vehicles beside or on the roadway; and
- Avoid or minimise truck reversing and three-point turns on site.

Guidance on planning for works traffic is provided in Section 7 of RMS' TCaWS Manual.

The Vehicle Movement Plans (VMP)s will be required to show travel paths for trucks at key points on routes remote from the work site such as places to turn around, accesses, ramps and side roads. A VMP may be combined with or superimposed on a Traffic Control Plan (TCP) which can be either a written document or drawing.

The hours of operation for the movement of construction vehicles is required to be in accordance with the approved operating hours stipulated under MCoA as detailed in the CEMP.

### **Haulage Routes**

The Project Team will be required to plan all vehicle movements to minimise the impact on the road network. Where possible, movements will be limited to the construction site, by fine tuning the alignment to achieve an earthworks balance and reusing materials generated by excavations to reduce the need for off-site transportation.

When on-road haulage operations are required, the Project Team will be required to:

- Conduct traffic analysis to determine the number of vehicle movements and assess the potential impact on the road network;
- Develop a route that maximises the use of the arterial roads and minimises the use of local roads;
- Assess the route and determine the potential impacts on existing developments/traffic facilities (such as schools and intersections);
- Select a route that has a minimal impact, and/or where the potential impacts can be effectively managed;
- As required, consult with local councils, RMS vehicle regulations, other road authorities and key stakeholders;
- Select haulage vehicles that can negotiate the route or can handle the nominated haulage vehicle;
- Where possible, avoid movements during peak periods;
- Develop a detailed VMP, and then induct and Toolbox all drivers into the VMP;
- Ensure the fleet is regularly maintained;
- Operate a works crew to assist with vehicle breakdowns and to clean up spills (only applicable to spills within the works areas or ones caused by construction-related traffic. The spills that occur in the public space come under the RMS Incident Manager's jurisdiction as an unplanned incident);
- Develop contact lists for heavy tow operators; and
- For major operations engage a haulage coordinator.

The roads within the vicinity of the Project to be used as haulage routes are:

- Summerland Way, Villiers Street and Pound Street in Grafton; and
- Bent Street, Pacific Highway, Gwydir Highway and Iolanthe Street in South Grafton.

The haulage and access routes to be utilised throughout the length of the project are highlighted in Figure 7-1. The bridge construction staging is not shown, rather the entirety of works to be completed are enclosed within the construction zone. The river access routes are proposed at this stage and are subject to change. Figure 7-2 also shows typical construction access routes.

The haulage routes are proposed at this stage and subject to alteration. The haulage routes between material source sites and ancillary sites will be confirmed during the detailed design.

The timing of vehicle activity on haulage routes will take account of bridge access restrictions and avoid vehicle movements in the peak traffic periods to minimise impacts on traffic operations.

Where possible and feasible, machinery and materials required to be delivered over long distances will be transported to Grafton by rail and hauled to site by road transport. All other goods will be transported by road at times that will minimise impact on peak period traffic operations.

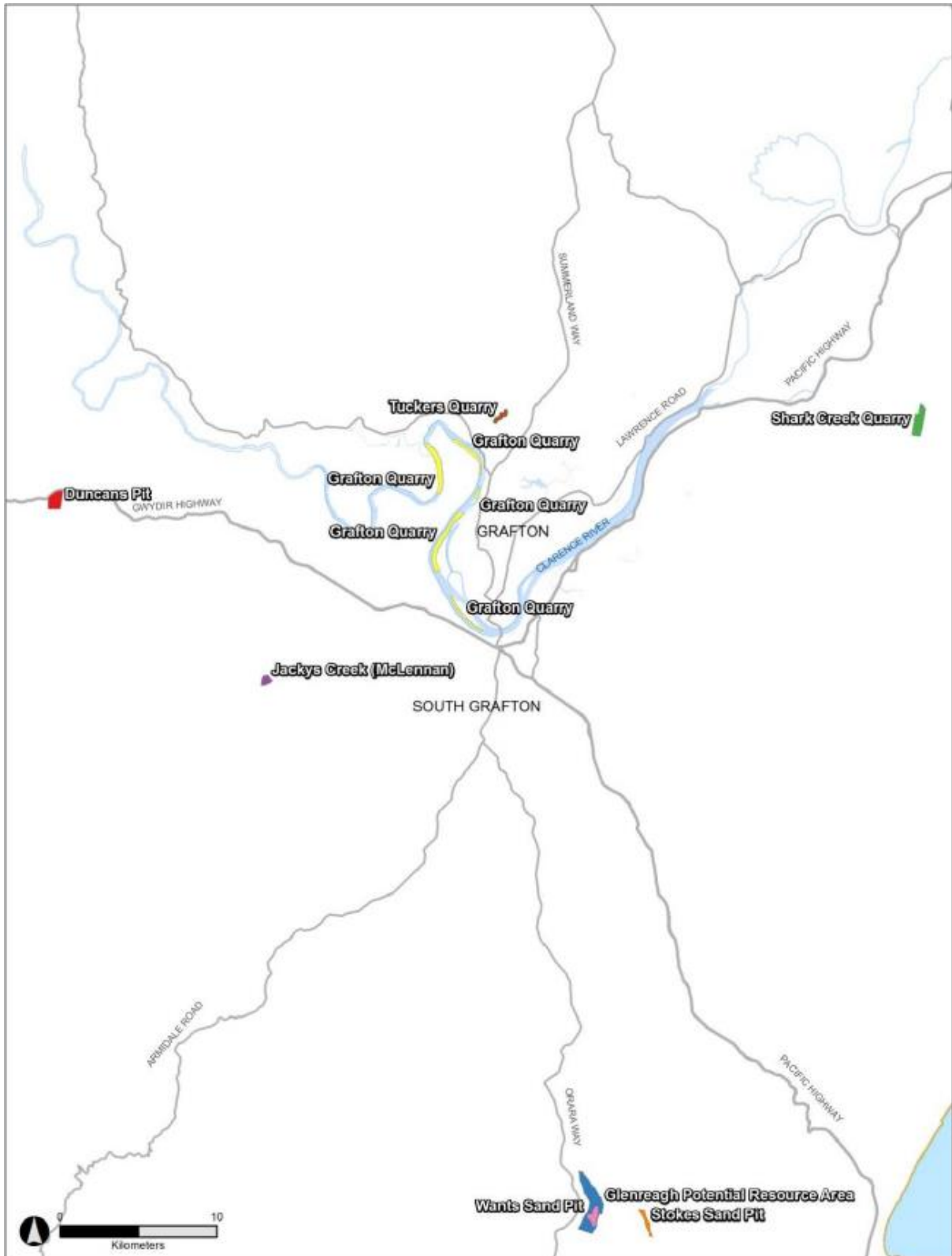
Multiple access points from the selected roads to the construction site have truck acceleration and deceleration lanes and this will adversely impact the flow of traffic. To minimise this impact, Fulton Hogan will construct haul roads within the construction site and maintain all construction traffic movements within the site wherever possible.

The haul road will be constructed in accordance with the requirements of the SWTC and removed on completion. Temporary pipework installed in any waterways will be designed for low flows only, with all flood events overtopping the haul road.

Potential sources of construction materials in Figure 7-2 Potential Material Sources and Haulage Routes detail possible highway and arterial routes into Grafton for haulage.



**Figure 7-1 Proposed Haulage and Access Routes**



**Figure 7-2 Potential Material Sources and Haulage Routes**



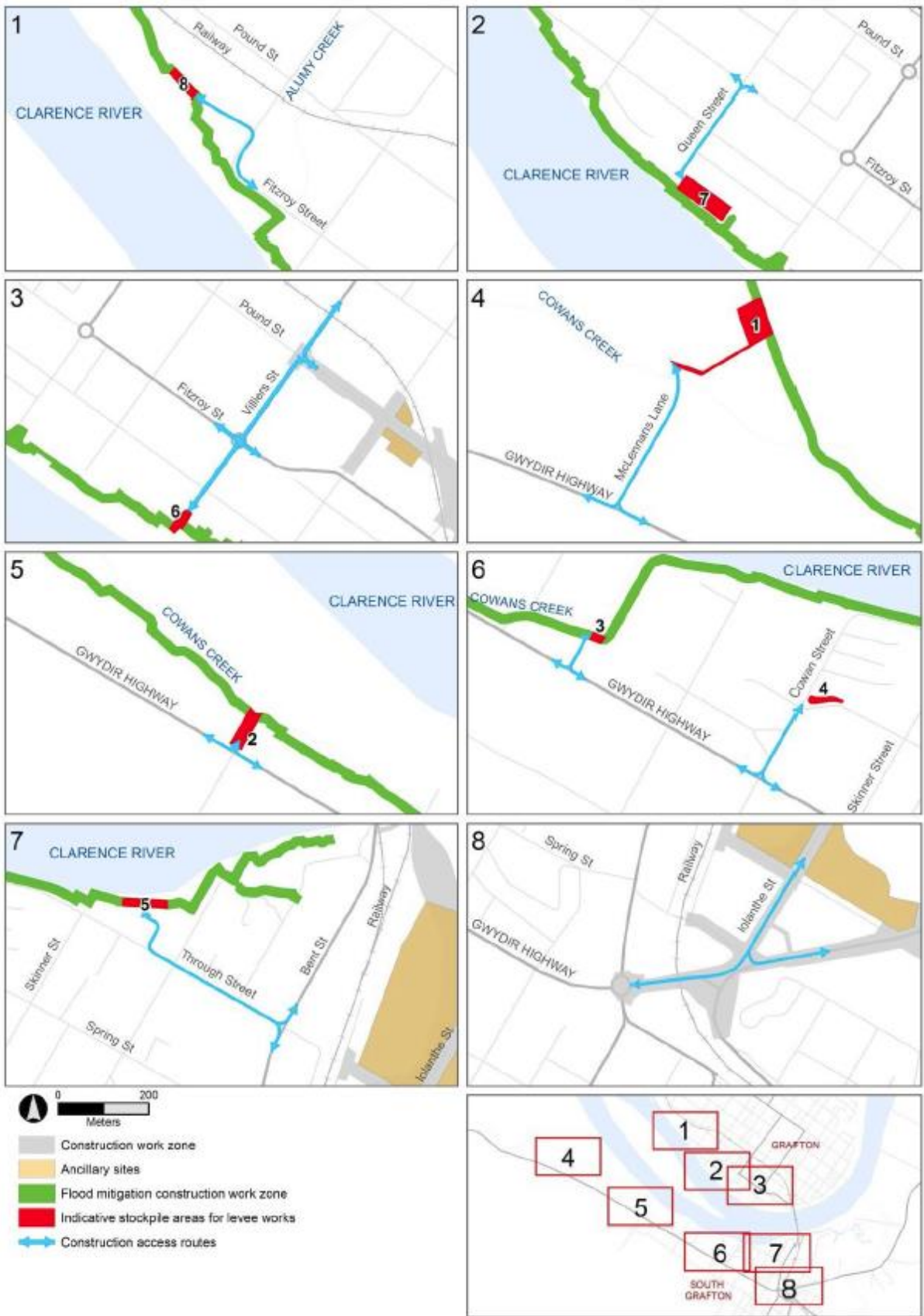


Figure 7-3 Typical construction access routes

### 7.2.3 Construction traffic volumes

The average size of the construction workforce on site would be about 55 people including management staff, contractors and subcontractors. It is anticipated that the work force would generate about 60 trips (30 in, 30 out) on an average work day. This takes into account carpooling behaviours typically observed among workers on similar projects.

Based on the standard construction work hours recommended by the *Interim Construction Noise Guidelines* (DECC, 2009), it is considered that the work-based trips generated by the workforce would occur before 7am and after 6pm. The traffic generated by the workforce for trips to and from site would not coincide with general peak period traffic. As a result, workforce traffic would have minimal impact on peak period traffic operations.

It is estimated that a total of 18,700 truck trips would be required during construction of the project. These trips would be distributed over approximately a three-year construction period. Although the number of trips would vary day to day, this implies an indicative average rate of about 20 materials truckloads per working day, for a total average generation of 40 trips per working day, throughout these three years.

In addition to trips generated by the workforce and materials haulage, there would also be trips generated by deliveries to site. These deliveries to site are expected to involve around 20 trips per day. The deliveries where feasible, should be timed to occur outside of peak traffic periods, in order to minimise the impact on road network operations.

### 7.2.4 Construction site traffic management

The effective management of construction vehicle movements on site and throughout the road network is essential to the success of all projects. The Project Team will plan all construction vehicle movements with the aim of minimising the risk to other road users and keep the traffic generated by the project to minimum.

Typical construction vehicle movements may include:

- Deliveries of materials, supplies, plant or equipment to site;
- Transportation of over-sized loads;
- Haulage of materials on and off site associated with earthworks operations;
- Deliveries of ready mixed concrete, hot mix asphalt and liquid bitumen from batching plants to work areas; and
- Regular trips by construction personnel in work trucks and utility vehicles.

The types of vehicles used on the Project will vary depending on the type and location of the works. Off road plant/vehicles may include: dump trucks and all-wheel drive tippers. Road registered vehicles may include: 4wd utilities, single unit trucks (with or without trailers), semi-trailers, B-Doubles, and over-sized floats/platforms.

The Project Team will minimise traffic and transport impacts on local roads by:

- Using smaller construction vehicles during the initial excavation of spoil material and transporting it to stockpile at the main compound;
- Reloading from main compound on to larger construction vehicles that will access directly on to construction sites;
- Minimising parking or queuing on public roads using traffic controllers;
- Minimising idling and queuing in local residential streets using traffic controllers where practicable; and
- Adhering to the nominated haulage routes identified in this Plan.



The strategy is to only use local roads during the early stages of work, to enable safe access and egress for larger construction vehicles.

### **7.2.5 Hazardous movements**

When planning construction vehicle movements, the following movements are considered hazardous:

- Entering and exiting work sites to and from adjacent travel lanes;
- U-turn movements across travel lanes and at median crossover points between dual carriageways;
- Reversing manoeuvres in the work area and in the adjacent travel lane;
- Travelling through the work area between construction personnel and hazards;
- Construction vehicles stopping within adjacent travel lanes;
- Transit of trucks through school zones when the school zone periods are in effect;
- Three-point turns for construction vehicles whilst on public roads;
- All entry and egress to construction sites or gates that cannot be approached in a forward direction (i.e. require vehicles reversing);
- Over-sized vehicle movements;
- Hazardous goods vehicles using unapproved routes; and
- Vehicles entering or existing high speed motorway environment.

The Project Team will be required to apply controls and measures to mitigate the risk of hazardous movements including, but not limited to:

- Restricting the practice of specific movements (e.g. turning bans);
- Installing temporary traffic control measures;
- Installing deceleration, acceleration and turning lanes outside of the through lanes;
- Educating drivers; and
- Installing warning devices on vehicles; and
- Developing and implementing VMPs.

### **7.2.6 Driver responsibilities**

The Project Team will be required to ensure that drivers employed on the Project, whether direct employees or subcontractors, understand that they have a responsibility to drive safely. They must drive in accordance with the NSW road rules and any other directives issued on the project and the company, in particular Fulton Hogan's [Safe Operation of Light Vehicle Standard](#).

Drivers must comply with the VMPs developed for the Project and special care must be taken when exiting and entering traffic flows.

### **7.2.7 Main construction access**

Refer to Figure 7 1 for access points to the works. A description of these accesses is indicated below:

#### *Grafton*

- Greaves Street (Abutment B area) for land bridge construction;
- Kent Street (Greaves Street end); and
- Clarence and Pound Street Junction.

#### *Grafton Bridge*

- Initial, via Iolanthe Street; and

- Later, through new connecting road from Pacific Highway to Through Street, new right turn facility 350m north of Spring Street.

#### *Grafton South*

- The works will be accessed from Spring Street and along Iolanthe Street. An access from Pacific Highway to the North of Bunnings Hardware Store will be closed as the new Pacific Highway embankment is constructed.

### **7.2.8 Access to work sites**

Access to work sites will be constructed and maintained to ensure minimal impact on adjacent traffic on the Project. Accesses typically allow for acceleration (180 to 235 m long) and deceleration lanes for construction vehicles and will be located in areas along the Upgrade alignment that provide sufficient sight distance.

All vehicle turning areas will be within the limit of the works, and will be identified in the traffic flow plans which are Toolboxed weekly.

Most hazardous movements for construction vehicles occur when the vehicle is entering or exiting the construction site/ancillary facilities to and from the adjacent travel lane. The risk is increased on high speed high volume roads where existing access points are limited because drivers do not expect vehicles to be turning from or entering the traffic flows.

When planning construction access points the Project Team will be required to ensure:

- Where feasible, to utilise local road junctions to access construction work areas;
- The number of access points are kept to an absolute minimum;
- The new construction access points do not adversely impact on any existing intersections, traffic facilities or traffic generating developments;
- Only access points that have adequate sight distance are installed (example Safe Intersection Site Distance);
- All access points are designed in accordance with Austroads Guide to Road Design Part 5A and relevant state design standards;
- The access junction configuration has sufficient capacity to accommodate the traffic generated by the construction site;
- The access is designed to accommodate the turning movements of the largest vehicles that will be accessing the site;
- On high speed roads appropriate acceleration and deceleration lanes are provided;
- Where installed, security fences and gates are indented to enable vehicles to park clear of the adjacent travel lanes;
- Access junctions are constructed of a suitable all weather surface that prevents debris from being tracked on to the adjacent travel lanes;
- All access points are clearly visible to approaching traffic and signposted accordingly;
- Signposting is implemented in accordance with the standard TCP 195 from the TCaWS Manual; and
- Accesses are free of obstructions to flow, such as security gates and parking areas (this is to prevent any queues spilling back onto the highway).

Austroads Design Guide Part 4 – Intersections and Crossings - General and Section 4 of RMS' Road Design Guide provide guidance on the design of junctions and access points.

Temporary traffic controls may be required from time to time to facilitate short-term major haulage operations and the movement of over-sized vehicles (regardless of the type of junction configuration implemented).

### 7.2.9 Traffic queues

For the purposes of this plan, a traffic queue means the situation where the traffic is backed up on a roadway either stationary or moving at a rate much slower than the designated posted traffic speed limit signage.

The management of traffic queues is addressed under annexure E of this Plan, the Traffic Queue Management Strategy.

### 7.2.10 Site compound traffic management

Site compounds will be located within ancillary sites and include offices, workforce facilities (such as parking, lunchrooms and toilets), workshops and storage areas for plant and construction materials. A main ancillary site is likely to be located in South Grafton (approximately 9 hectares in size) and a smaller compound is likely to be required in Grafton for the construction of the northern abutment, the Pound Street railway viaduct replacement and road upgrades in Grafton (approximately 0.5 hectares in size). Indicative locations of ancillary facilities and the access routes to and from the ancillary facilities are detailed in the Figure 7-1.

Routes providing connection between ancillary sites, levee stockpile areas and their respective materials sources will be confirmed during detailed design. However, it is anticipated that the road most likely to be used as haulage routes within the vicinity of the project are:

- Summerland Way, Villers Street and Pound Street in Grafton
- Bent Street, Pacific Highway, Gwydir Highway, Iolanthe Street in South Grafton and Spring Street.

The timing of vehicle activity associated with the above would take into account bridge access restrictions and avoid vehicle movements in the peak traffic periods to minimise impacts on traffic operations.

Appropriate car parking will be provided within the main site compound, ancillary compounds and dedicated parking areas within the limit of works.

Details of vehicle movements for levee stockpile sites and site compounds including parking, dedicated vehicle turning areas, and ingress and egress points will be determined in the detailed design. Measures to manage traffic movements, parking, loading and unloading at ancillary facilities during out-of-hours work will be developed after such sites have been confirmed in the detailed design.

These site compounds may be co-located with batch plants and are likely to be sited near major construction activities to minimise construction traffic. All site compounds will be fenced for security and safety purposes.

The site compound(s) will:

- Be located more than 50 metres from a waterway;
- Be located within or next to land where the State significant infrastructure is being carried out;
- Have ready access to the road network;
- Be located to minimise the need for heavy vehicles to travel through residential areas;
- Be sited on relatively level land;
- Be separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant);
- Not require vegetation clearing beyond that already required by the State significant infrastructure;

- Not impact on heritage items (including areas of archaeological sensitivity) beyond those already impacted by the State significant infrastructure;
- Not unreasonably affect the land use of nearby properties;
- Be above the 20-year average recurrence interval flood level unless a contingency plan to manage flooding is prepared and implemented; and
- Provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

### **7.2.11 Lighting**

Lighting along live road alignments, affected by the Project works, will be maintained in its existing or final design arrangement at all times during the Project. Any changes to lighting resulting from works on the Project will be identified within the relevant TCP along with mitigation and contingency measures for maintaining sufficient lighting as required. Contingency for lighting of roadways may be provided through use of daymakers a temporary generator on existing lighting arrangements or through provision of daymakers where applicable.

### **7.2.12 Site Security**

Site security, site access and signage will be managed through the implementation of this plan, WHS Management Plan and the VMPs covering the area in and around the work-site access points.

The location of rumble grids, wheel washes and other environmental protection measures shall be included in the VMPs and will be as determined by the requirements of the CEMP.

The VMPs will also provide details of the layout within the worksites and the site compound area including:

- The movement of construction and other vehicles within the work site and site compound area and the associated signage including off-road plant movements;
- Movement of vehicles on adjacent publically accessible roads e-g haulage of spoil from and excavation site, across the highway to a stockpile site;
- The location of and access to parking areas and the associated signage;
- Visitor parking areas;
- Pedestrian routes;
- Access paths to crib sheds, offices and the like;
- All associated signage; and
- Security point locations including boom-gates if required.

VMPs will be developed and updated throughout the Project to direct the construction personnel on how to safely manoeuvre around the site.

## **7.3 Road occupancy**

A number of diversions will require the shoulders and lanes on several local and surrounding roadways to be closed for construction. All roads that are affected by construction works will require a Road Occupancy Licence ROL from.

These sections of the work adjacent to and nearby the additional crossing at Clarence River will need to be carried out under land occupancies, including the installation of safety barriers, setting up ingress and egress points, mill and re-sheet, tie-in work and major deliveries.

Where any work by the Project will or is likely to obstruct or have the effect of restricting, closing, interfering with or obstructing the free flow of traffic on any lane or shoulder of the highway or local road (i.e. each activity that will occupy the road), the Project Team will be required with a minimum ten business days to lodge with Traffic Management Centre (TMC):

- An application on a standard ROL Application Form, available on RMS website in the form set out in Appendix 27 of the SWTC for a ROL, providing all relevant details of the proposed Work; and
- A TCP as required by RMS.

Any impacts to ROL conditions is to be liaised with:

- NSW TMS on 1800 679 7812; or with
- RMS Traffic Manager (Pacific Highway only) – Mr Andy Gaudiosi on (02) 6640 1077
- RMS Traffic Operations Manager – Northern (other states roads) – Mr Neil Gendle on either (02) 6640 1368 or 0418 201 747.

Note that consent under Section 138 of the Roads Act will need to be obtained from Clarence Valley Council for any work proposed to be undertaken within the following road reserve of local roads for which the council is the road authority for.

- Spring Street
- Iolanthe Street
- Through Street
- Butters Lane
- Greaves Street
- Bridge Street
- Pound Street
- Clarence Street; and
- Villiers Street

If acceptable with Clarence Valley Council, a single application detailing all affected roads will be sufficient. This includes a permit from Council to undertake works on a council road (**Council Permit**) by completing and submitting to the council 'Carry out Works or Erect a Structure on or Over a Public Road Application form' which is included as an attachment to Appendix 27 of SWTC.

ROLs will be planned with the aim of:

- Minimising the actual work area;
- Limiting obstructions and restrictions;
- Maximising road capacity;
- Avoiding peak traffic periods;
- Minimising safety risks; and
- Ensuring cost-effectiveness.

An application and TCP will be required to be lodged no less than ten business days prior to the date when the Project Team intends to undertake the work. This allows RMS and Council to review the application and TCP, issue a ROL and, where appropriate, make arrangements for implementing the TCP.

The application can be submitted by either Fulton Hogan's Traffic Manager or by the Traffic Control Subcontractor in consultation with Fulton Hogan's Traffic Manager.

The application to RMS or Council will include:

- Submission of a completed road occupancy application form;
- Brief details of the works to be conducted;
- Any relevant design drawings of the works;
- Program of the works;
- Copies of TCPs;
- If applicable, details of the speed limit authorisation submission; and
- Contact details of a construction site representative.

The Project Team will consider traffic volumes during the period of the ROL that are likely to exceed the capacity of the affected road such as during holiday periods, a special event or during other periods of, or other circumstances which give rise to, increased traffic volumes, reduced traffic speeds or lowered capacity of the road.

Work will not begin until RMS/Council, as required, has approved and issued the ROL/Council Permit.

A copy of any ROLs issued are required to be available at:

- The location of the relevant road occupancy; and
- All times during construction activities associated with the ROL are taking place.

When any unplanned closure of a lane or a restriction in the flow of traffic occurs on the Highway or on specified local roads, the Project will immediately advise RMS and Council of the nature relating to the closure or restriction and of the timeframe for reopening of the lanes.

The Project Team will take all required measures to open the lane as quickly as possible. If required, an Incident Report in accordance with the WHS Management Plan will be forwarded to RMS.

### **Periods for Implementation of Road Occupancies**

Road occupancies consisting of traffic lane closures will not be implemented on existing Highway, or temporary works being used by existing Highway, or any part of the new Works opened to traffic during the following periods unless approved by RMS:

Whether or not specifically stated in a relevant ROL, as a minimum Road occupancies must not be implemented during the following periods associated with school and public holidays:

- from 6.00am on the Friday prior to the commencement of a NSW Government School holiday period until 6.00am on the first Monday of the NSW Government School holiday period;
- from 6.00am on the last Friday of a NSW Government School holiday period until 6.00am on the first day of the new NSW Government School term;
- from 6.00am on the day prior to a public holiday to 6.00pm on the day following the NSW public holiday;
- from 6.00am on the Friday prior to a NSW public holiday Monday, to 6.00pm on the Tuesday following the NSW public holiday; and
- from 6.00am on the Thursday prior to a NSW public holiday Friday to 6.00am on the Monday following the NSW public holiday.

For the section of the Pacific Highway between Centenary Drive South Grafton and Centenary Drive Clarenza, no through travel lane closures or stoppages are permitted from:

- 7.00am to 9.30am Monday to Friday;
- 3.00pm to 6.00pm Monday to Friday; and
- 7.00am to 2.00pm Saturday.

For the section of the Gwydir Highway from the Pacific Highway to Bent Street, no through travel lane closures or stoppages are permitted from:

- 7.30am to 9.30am Monday to Friday;
- 3.00pm to 5.00pm Monday to Friday; and
- 8:15am to 10:00pm Saturday.

For the section of Villiers Street from Fitzroy Street to Dobie Street, Grafton, no through travel lane closures or stoppages are permitted from:

- 7.30am to 9.30am Monday to Friday;
- 3.00pm to 5.00pm Monday to Friday; and
- 8:15am to 10:00pm Saturday.

Notwithstanding above, work may be undertaken outside these hours where:

- The delivery of materials is required outside these hours by the Police or other authorities for safety reasons;
- It is required in an emergency to avoid the loss of lives, property and /or prevent environmental harm;
- The work can be undertaken in such a way that would be inaudible at sensitive receivers;
- If a temporary additional lane is provided in such a way that there is no net loss of capacity and the ROL is submitted and approved by RMS; and
- Restrictions stipulated by other authorities in road/rail corridors such as track procession allowances by rail asset owner/manager.

### **Closure of shoulders**

Road occupancies involving closure of any shoulder is to provide a minimum of one travel lane in each direction at all times through the road occupancy.

### **Passage of over-dimension heavy vehicles**

Road occupancies are to be designed and implemented to allow for and accommodate the same passage of over-dimension heavy vehicles through all the road occupancies as permitted prior to implementation of the road occupancy. The Project team is to liaise with RMS Representative to establish communication protocols for the passage of over-dimension heavy vehicles through all road occupancies.

## **7.4 Speed management**

### **7.4.1 Temporary speed zones**

Roadwork speed zones in road occupancies will be required to comply with:

- Section 8.2 of "Traffic Control at Work Sites Manual, ver 4.0 – RTA, June 2010"; and
- Section 5.6 of the "RTA's NSW Speed Zoning Guidelines – RTA Version 3 April 2009"

The road speed limit must not be less than 60km/hour, or the existing speed limit whichever is lesser, at all times except where approved by an ROL.

Throughout the offline haulage roads, a speed zone of 40 km/hr for all construction vehicles is to be applied at all times. Consideration will be given to the variable speed limit signs when reducing the roadwork speed zone.

Whenever work is being undertaken within five metres of vehicles associated with construction such as trucks, works supervisor's vehicles traffic, speed zones of 20 km/hr may be applied at the haulage roads. The exact locations of the restrictions are to be included in

TCPs. A Speed Zoning Authorisation (SZA) will be required prior to the reduction of speed on all public roads. Copies of SZAs applicable to any road occupancies will be required to be available at the road occupancy locations for the duration of the road occupancies.

Roadwork speed limit signs must be a minimum Type 'B' size sign duplicated on both sides of the carriageway at any changes in posted speed limits.

#### **7.4.2 Varying the speed limit**

Where a TCP, either short term / long term or major / minor, requires a change in the posted speed limit, a formal direction from RMS will be required (including restoring the existing speed limit on completion). This will be requested as part of the SZA application submitted to RMS, which is an extension to ROL.

This issue requires the Project Team to manage the speed of traffic approaching and passing through a work site and address the varying of speed limit signage through construction speed limit signs.

Existing speed limits can be varied through the authorisation of an SZA by RMS.

The issue of speed limit signage will be managed through the implementation of the Traffic Staging Plans and their associated TCPs.

Operation of all existing Intelligent Transport System (ITS) devices including the variable Speed Limit Signs (VSLs) would not be interrupted during construction.

#### **Requirements to implement a roadwork speed zone**

A reduced roadwork network speed zone is not always required for construction work around road networks. They should only be implemented when warranted depending on the site conditions.

The Traffic Manager will assess whether roadwork speed zones are necessary to assist in controlling vehicle speeds in circumstances that may include:

- Traffic travelling through a work site;
- Workers being endangered by high speed traffic;
- Dust or smoke reducing visibility;
- Loose material or stones on the road surface;
- A reduction at the work site in the road surface condition or vertical or horizontal alignment which is inconsistent with the adjacent length of the road;
- Excavations adjacent to the travel path of vehicles;
- Bridges, which for reasons of structural safety, require a reduction in the impact loading caused by traffic; and
- Traffic being diverted onto the opposing travel lanes or carriageway.

The Project Team will be required to address RMS' TCaWS Manual, NSW Speed Zoning Guidelines and Australian Standards 1742.3 to provide guidance with the selection and installation of roadwork speed zones. Specifically, Section 8.2 of RMS' TCaWS Manual outlines the general principles, what to consider when selecting the speed limit (40, 60 or 80 km/h), installation guidelines and regulatory issues.

#### **Submission of SZA procedure**

The Project Team will be required to apply for an SZA as described in RMS' Road Occupancy Manual. The manual contains a number of explanatory notes, checklists, and application forms. The documents applicable to this project include:

- SZA Application Explanatory Notes Form R; and
- SZA Application Form R which is attached as a knowledge resource to this topic.



When deemed necessary, the Traffic Manager will process a submission to RMS in accordance with the ROL/SZA requirements. The SZA application shall be forwarded to RMS' TMC for processing and approving the SZA within a period of up to ten working days.

An approved copy of the SZA shall be forwarded to the local NSW Police Highway Patrol Office, and if necessary, to the local council. The Project Team will manage the records associated with the speed zone in accordance with Section 8.2.6 of RMS' TCaWS Manual.

### **Extensions to SZA period of operation**

RMS limits the period of operation of an SZA from one month to six months. To obtain extensions, the Traffic Manager will be required to resubmit an SZA submission.

If there are no amendments, other than dates, to the original submission, the Traffic Manager will be required to submit a completed SZA Application Form R with a copy of original TCP, quoting the previous SZA number, otherwise a new SZA submission will need to be prepared and submitted.

It is the responsibility of the Traffic Manager or delegate to ensure the validity of each approved SZA, thus regular monitoring of SZA expiry dates is essential. The Traffic Manager will be required to maintain an ROL database, which will contain details of SZA, including daily records of signs that were in place each day and the condition of the signs.

## **7.5 Signposting and delineation**

### **7.5.1 Traffic controls**

The risk assessment, and/or VMP will identify specific locations where temporary traffic controls will be required to mitigate a particular hazardous movement.

The type of temporary traffic controls to be installed by the Project Team may include:

- Truck turning ahead signs in advance of access points must be in accordance with standard TCP195 from the TCaWS Manual;
- Reduce speed zones on the approaches to access points and turning locations must be in accordance with standard TCP 57 from the TCaWS Manual;
- Traffic Controllers positioned at access points to facilitate entry and exit movements;
- Road shoulder closures to provide deceleration and acceleration (180m long) lanes;
- Closure of slow and fast lanes on dual carriageways to provide deceleration;
- Acceleration lanes; and
- Traffic Controller with radio will be at the motorway entry points for radioing on approach for approval to enter.
- For spacing of traffic controllers, they are to be located on each of the approaches to the closest road occupancy, and within the road occupancy itself and are to be positioned no greater than 400 metres apart.

### **7.5.2 Site specific control measures**

#### ***Safety barriers***

Where identified in TCPs, safety barriers are required to be from the list of safety barrier products accepted by RMS. This list can be obtained from RMS' website at:

<http://www.rms.nsw.gov.au/business-industry/partners-suppliers/design-documents/safety-barrier-products/index.html>

The safety barriers are to be erected in accordance with Contract Specification D&C R132 and the acceptance conditions for that safety barrier product.

The Project Team is required to provide the manufacturer's recommended buffer zones (exclusion zones) on the approach side of the water filler barriers and behind barriers, as required. Construction work, cyclist or pedestrian movement is not to be permitted within the deflection or working width zone of safety barriers.

### ***Temporary traffic signals***

If required, portable traffic signals are to be installed at the locations shown on TCP. The portable traffic signals are required to comply with section 10 of TCaWS Manual and the requirements of contract specification D&C G10.

Portable traffic signals should be covered or turned away from traffic when not in use. This is to avoid driver confusion associated with the blackout of permanent signals in which case the intersection/ control point becomes STOP controlled under the default road rule.

### ***Pavement marking and signage***

Signage will be used as required by this CTAMP and health and safety regulations to ensure that traffic and site staff are aware of all restrictions and hazards along the alignment. Gate access signage will be provided for advanced warning and at the gate position. This approach has been successfully implemented on a number of Fulton Hogan projects.

Existing information signage, distance information, street name signage for local roads and advance warning signage will be managed through the implementation of the Traffic Staging Plans and their associated TCP/VMPs.

These plans will allow for the temporary relocation of the existing signs and any roadside tributes located on or adjacent to local roads in consultation with RMS and the authorities including Clarence Valley Council.

Signage adjustments include all street name signage for local roads.

All pavement marking, retro-reflective raised pavement markers and signposting for use in temporary works are required to be appropriate to the climate, lighting and traffic conditions reasonably expected along the project works, all areas accessible by the public, which are affected by the Project Works.

They are also required to be in accordance with Contract Specifications: D&C R141, D&C R142 and D&C R143 and several RMS policies for use, such as VMS / portable VMS, to the same standards as for permanent work. Unless otherwise specified, waterborne paint is to be used for pavement markings of temporary works.

Temporary speed zoning signs are to be supplied and erected by the Project Team at the locations indicated in relevant TCP.

The signs are to be kept covered when the speed zone is not in use. Temporary Speed Zoning signs are to be removed when they are no longer in force.

### **7.5.3 Project identification, including signage to acknowledge government funding and management**

All temporary signs within the project boundary are required to be maintained in good condition for the full period of display and are required to be removed no later than the Date of Construction Completion or when directed by RMS.

#### ***Information, distance information and advance warning signage***

This issue requires the Project Team to address the location of the existing:

- Information Signs;

- Distance Information Signs; and
- Advanced Warning Signs.

The issue of information signage, distance information and advance warning signage will be managed through the implementation of the Traffic Staging Plans and their associated TCPs or VMPs.

These plans will allow for the temporary relocation of the existing signs and any roadside tributes located on or adjacent to local roads in consultation with RMS and authorities including Clarence Valley Council.

### ***Regulatory signage***

Where a TCP, either short-term or long-term, major or minor, requires a change in the posted speed limit, a formal direction from RMS will be required (including restoring the existing speed limit on completion). This will be requested as part of the SZA application submitted to RMS, which is an extension to ROL.

This issue requires the Project Team to manage the speed of traffic approaching and passing through a work site and to address the varying of speed limit signage through construction speed limit signs.

Existing speed limits can be varied through the authorisation of a Speed Zone Authorisation (SZA) by RMS. This is detailed under Speed Limits section of this Plan.

The issue of speed limit signage will be managed through the implementation of the Traffic Staging Plans and their associated TCPs.

### ***Directional signage***

Changes to directional signage will be required to be shown on each TCP.

In addition, the information signage will be required to be consistent with the Guide: Signposting (RTA July 2007).

### ***Advanced warning and notification signage***

Advanced signage will be installed by Fulton Hogan during the Works to:

- Provide warning and notification of upcoming works;
- Provide distance information, particularly before and during any adjustments to the traffic flow; and
- Inform of any upcoming traffic management adjustments as required.

Fulton Hogan will provide portable VMS on each approach (outside the exclusion zone or protected from passing traffic).

The issue of information signage, distance information and advance warning signage will be managed through the implementation of the Traffic Staging Plans and their associated TCP/VMPs.

These plans will allow for the temporary relocation of the existing signs and any roadside tributes located on or adjacent to local roads in consultation with RMS and authorities including the Clarence Valley Council.

### ***Portable variable message signs***

Variable Message Signs (VMS) are to be placed in strategic locations as agreed on with RMS and TMC to keep road users informed of changes to road conditions and if there are possible delays as a result of construction work.

A minimum of one additional VMS is to be provided and installed on each approach to each occupancy on the Pacific Highway and/or Gwydir Highway which involves approved traffic stoppages.

VMS' must:

- Be trailer mounted;
- Be type C size;
- Be solar powered;
- Comply with AS 4852.2;
- Comply with RMS D&C No. P3074A; and
- Be operated continuously
- Have a 24 hour remote message change facility to allow the Project Team to make immediate changes to the messages.

The messages will be determined by the Traffic Manager in consultation with the Community Relations Manager and the RMS as detailed in the TCPs.

The VMSs will be required to operate continuously to notify all road users of the road occupancy by displaying appropriate messages to this effect.

The messages displayed on the VMS are required to remain current over the duration of the works. The location of the VMS is to be moved, as needed, during the progress of the works. The location of the signs and the messages displayed must be approved by RMS.

VMS' are also to be used for publicising any pending changes in traffic arrangement for seven days prior to those changes, and for changed traffic arrangements for seven days after marking those changes.

The VMSs are required to be secured and regularly maintained, this includes cleaning the VMS perspex and solar panels and checking the batteries.

The VMSs will be required to be installed at least one week prior to the day of the implementation of the road occupancy to provide advance notification to all road users of the future road occupancy.

### ***Radar activated speed signs***

A minimum of one trailer mounted Radar Activated Speed Signs (RASS) with variable message signs are to be provided for use during the construction period.

The RASS is to be located in a position(s) suitable for influencing the speed of motorists entering the reduced speed zone. The location of RASS and the messages displayed must be agreed with the RMS and will be indicated on the VMP and any applicable TCPs.

RASS calibration details are required to be obtained from the supplier prior to mounting. The calibration records are to be kept by the Traffic Manager.

The effectiveness of the speed limit reductions is to be monitored and a report will be submitted to the RMS, if requested.

### **7.5.4 Advertising**

Advertising is not permitted on the highway.

Fulton Hogan will not erect any advertising on or near the Construction Site without prior approval of RMS. RMS may install signage on or near the construction site at its own discretion. Should any advertising placed along the construction site by external parties, without prior approval by RMS, Fulton Hogan will ensure that these are removed during routine site safety inspections.

### **7.5.5 Temporary traffic signals**

If required, portable traffic signals are to be installed at the locations shown on TCPs. The portable traffic signals are required to comply with section 10 of TCaWS Manual and the requirements of Contract Specification D&C G10.

Portable traffic signals should be covered or turned away from traffic when not in use. This is to avoid driver confusion associated with the blackout of permanent signals in which case the intersection or control point becomes STOP controlled under the default road rule.

### **7.5.6 Anti-gawking screens**

In order to ensure that drivers' attention is not diverted by construction activities, suitable anti-gawking screens will be supplied and erected as per project requirements. The type and location of the temporary construction fencing is to be detailed in TCPs.

The anti-gawking screens will be removed when they are no longer required.

### **7.5.7 Lighting Towers**

Lighting Towers used to facilitate night works or otherwise where there is insufficient light are to have a noise rating of more than:

- 83dB(a) at operators ear,
- 81dB(A) at 1 metre, and
- 70 dB(A) at 7 metres.

The specification for the location of lighting towers should be in compliance with Construction Noise and Vibration Management Plan.

### **7.5.8 Auditing temporary roadways or detours**

A Road Safety Audit is required to be carried out within 24 hours of opening temporary roadways or detours to traffic in order to inspect the traffic control measures during both day and night times.

The Road Safety Auditor must be independent and be certified to level 3 in RMS' Road Safety Auditor Register, as a minimum.

The road safety audit team should also include an orange card accredited TCP designer.

If the original measures prove not to be fully effective, then the TCPs are required to be revised without delay and appropriate measures are to be implemented in consultation with the Road Safety Auditor and RMS.

A copy of the report from the Road Safety Auditor is required to be addressed to whichever party commissions it and be submitted to RMS within seven days of implementing the TCPs.

## **7.6 Intersection level of service**

Fulton Hogan acknowledges that maintaining the Level of Service (LoS) of the road network and minimising the delays experienced by road users during the construction of any project is important.

The impacts of the proposed upgrades on existing intersections is detailed in Table 7-2.

**Table 7-2 General Intersection Impact**

<b>Intersection</b>	<b>Upgrade Proposed</b>	<b>Impact</b>
<b>Intersections proposed as part of the project</b>		
Pound Street / Villiers Street	This intersection would be widened to a four-leg roundabout at the south-east Pound Street leg to accommodate increases in traffic from the proposed bridge.	The form of this intersection is not proposed to change significantly. The increased traffic along Pound Street attracted by the new bridge is anticipated to be accommodated by the proposed adjustments at the south-eastern leg, as such impacts on performance and safety are anticipated to be minor.
Pound Street / Clarence Street	Traffic lights would be installed, and Pound Street widened to four lanes to accommodate increased traffic from the bridge and safely accommodate pedestrians crossing Pound Street and/or accessing the TAFE.	The role of this intersection will change significantly from the existing situation whereby its main function is facilitating a rat-run to the existing bridge. The analysis indicates the proposed intersection will perform at an acceptable level of service, whilst safety of the intersection will be upheld through the provision of traffic signals.
Iolanthe Street / Pacific Highway / Through Street	This intersection would be upgraded to a four-leg roundabout, and Pacific Highway realigned to provide additional capacity for traffic accessing the proposed bridge, and to improve traffic flow at the highway's intersection with Spring Street.	The role of this intersection will change significantly from the existing situation whereby its main function is facilitating the small volume of traffic accessing local business and residences. Although traffic volumes are anticipated to increase, the analysis indicates the proposed intersection will perform at an acceptable level of service, whilst safety of the intersection should be upheld through the provision of a large roundabout with sufficiently spaced conflict zones.
Gwydir Highway / Pacific Highway	This intersection would be upgraded to a three-leg roundabout, and Gwydir Highway widened to four lanes to increase traffic capacity of the intersection.	Preliminary analysis of the existing intersection has demonstrated that without an upgrade, the right turn movement from the Gwydir Highway would perform at a level of service F by year of opening. At priority controlled intersections, this can lead to increased chances of aggressive / forceful driver behaviour. Provision of the roundabout upgrade will help ensure adequate intersection performance (LOS A in 2039) and safe operation.
Gwydir Highway / Bent Street / Ryan Street	Retained as all movements, four-leg roundabout	The form of this intersection is not proposed to change significantly. The intersection analysis indicates that the intersection will perform with an acceptable level of service in 2039. In light of the above, safety implications at this location are anticipated to be minor.
<b>Possible initial upgrades</b>		
Gwydir Highway / Pacific Highway	As described above.	As described above.
Iolanthe Street / Pacific Highway / Spring Street	The Pacific Highway would remain on its current alignment and connect with Iolanthe Street at a new roundabout at the Iolanthe Street/Spring Street intersection. A pedestrian crossing with traffic lights would be provided on the Pacific Highway about 100 m east of the Iolanthe Street intersection.	In the existing situation, this intersection configuration includes two closely-spaced priority controlled intersections, with recorded crashes in the last five years. It is anticipated that the proposed roundabout will improve the road geometry and hence safety and traffic operations in the area.
Iolanthe Street / Through Street / Butters Lane	This intersection would be upgraded by realigning Butters Lane, which would become the fourth leg of the roundabout, instead of the Pacific Highway.	As per the Iolanthe Street / Pacific Highway / Through Street upgrade discussed above, however performance of the intersection is anticipated to be even higher in light of the eastern approach servicing residents of Butters Lane only (instead of the realigned Pacific Highway).

Analysis indicates that the intersections proposed as part of the project would perform within acceptable limits of operation. All movements at these intersections are anticipated to operate within capacity.

Fulton Hogan acknowledges that maintaining the Level of Service (LoS) of the road network and minimising the delays experienced by road users during the construction of any project is important. The strategies and measures that can be applied to minimise road user delays is addressed in annexure E of this Plan.

## **7.7 Pedestrians and cyclists**

Safe pedestrian and cyclist access through and/or around worksites is to be maintained during the construction of the project. Before altering pedestrian and cyclist paths relevant stakeholders will be consulted by the Project Team to ensure that appropriate measures are taken to ensure proper implementation.

### **7.7.1 Pedestrians**

#### ***Identifying pedestrian needs***

When planning construction activities, the Project Team will be required to give consideration to the following:

- Volume of pedestrians;
- Type of pedestrian activity (e.g. office, retail, residential or recreational);
- Origin and destination points of the pedestrians and their desired travel path;
- Needs of vulnerable pedestrians, such as young children, the elderly, vision impaired, disabled people, people with prams and trolleys;
- Proximity of pedestrian generating developments, such as schools, shopping centres, railway stations and bus terminals;
- Restriction of pedestrians onto the highway; and
- Pedestrians from broken down vehicles on the highway.

The Project Team will be required to adhere to the guidelines in the Austroads Guide to Road Design 'Part 6A Pedestrian and cyclist paths'.

To provide a safe environment for pedestrians, a safety audit will be conducted and then any measures necessary to ensure the safety of pedestrian is not compromised will be implemented. The Traffic Manager or nominee will clearly define the boundaries of all work areas, and provide defined walking paths, where required.

#### ***Defining work area***

To provide a safe environment for pedestrians, the Traffic Manager or nominee will clearly define the boundaries of all work areas. Defined walking will also be provided, where required.

Fencing will be installed to restrict physical access to hazardous areas and for site security, which will be appropriately signposted. Types of temporary and semi-permanent fencing may be installed including plastic mesh, water filled plastic delineators, weldmesh pool fencing and chain wire mesh. All physical barriers must be maintained during the Project and be appropriately secured to prevent injury to the public.

#### ***Providing temporary footpaths and crossings***

Where work areas restrict access to existing footpaths or crossings, alternative routes will be developed and implemented after recommendations from the safety audit. The Project will

engage with the community to understand any specific requirements or suggestions that they may have regarding any changes.

Alternative routes may include using the opposite footpath or setting up detours via other streets. Alternative facilities may include footpath protection such as barriers or a speed reduction to ensure adherence to minimum lateral clearances to traffic or provision of temporary footpaths through the work area.

Temporary pedestrian walkways with the appropriate delineation from the work site will be implemented along Pound Street during construction. This will be done for both sides of the street at varying times in the construction phase. Three temporary pavements will be constructed at the new roundabout connecting Gwydir Highway and Iolanthe Street as per the Southern Zone Construction Staging Plan.

The works have been programmed to maintain safe access to the shared paths for as long as possible throughout construction.

All temporary pedestrian /shared paths will be:

- Clearly defined;
- Signposted appropriately to indicate the direction of the cycle path;
- Constructed of an asphalt or concrete smooth surface equivalent to the section of path on each approach to the temporary path, free of loose materials and obstacles;
- Designed to accommodate the type of cyclists to be encountered along the route;
- Provided with ramps, holding rails and street lighting where required; and
- Kept well maintained while in operation.

In locations where pedestrians are diverted onto the existing roadways adjacent to traffic flows, additional treatments will be required to be implemented by the Traffic Manager to ensure adequate safety separation is provided and that it is clearly delineated.

Where possible, the VMPs are to allow for safe management of pedestrians, including the workforce via means of separation and segregation in particular in the areas where heavy vehicles operate as depicted in the WHS Management Plan.

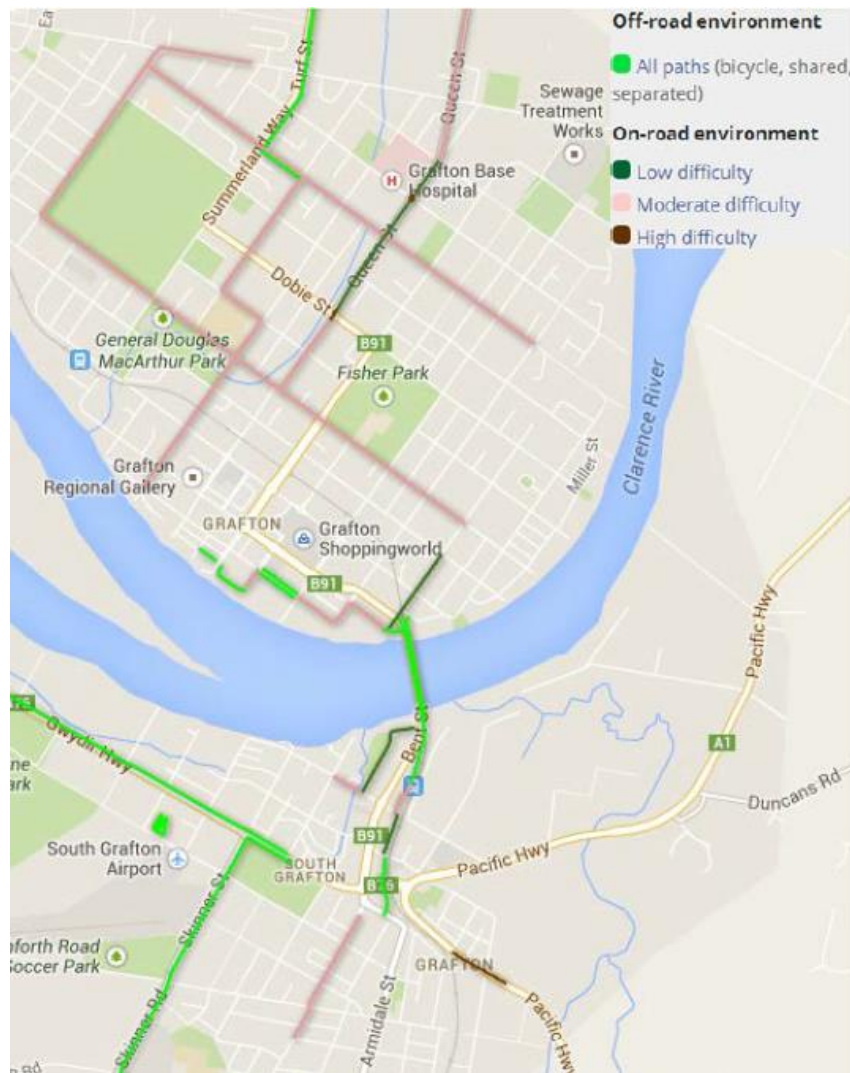
The Austroads Guide to Road Design 'Part 6A Pedestrian and cyclist paths' provides guidance on the design parameters of on-road facilities.

A TCP/VMP is to be developed by the Project Team for all alterations to existing pedestrian and cycle paths.

### **Considering cyclists needs**

An overview of the current facilities for pedestrians and cyclists within the Grafton area is given in Figure 7-4 Grafton Cycle Links





**Figure 7-4 Grafton Cycle Links**

It is expected that the impact to cyclist is minimal and equivalent to pedestrians and road vehicles as well. Cyclist considerations still need to be made to ensure their safety around and near construction zones.

All local road cycle detours will be fully signposted. In addition, the changes will be communicated by letterbox drop, cycling forums and drop at a location to be advised.

All shared paths will be:

- Clearly defined;
- Signposted appropriately to indicate the direction of the cycle path; and
- Kept well maintained while in operation.

When planning construction activities, the Project Team will give consideration to the following, where applicable:

- Number of cyclists;
- Type of cycling activity (e.g. school children's, recreational, commuter, utility, touring or sport training);
- Origin and destination points of the cyclists, and the connectivity of their routes;
- Needs of vulnerable cyclists, such as young children under 12 years;

- Travel speed of cyclists; and
- Redirection of cyclists to alternative and separate routes.

There is minimal expected interference to the RMS regional coastline cycle routes through Grafton, and a temporary route for cyclists will not be required at this stage. There are procedures in place in the event that this does need to be addressed as the project progresses.

### ***Defining work areas and hazards***

To provide a safe environment for cyclists, the Project team will be required to clearly define the boundaries of all work areas, and implement measures to mitigate any hazards.

Prior to implementation of any changes to the current cyclist and pedestrian access, Fulton Hogan will consult with all relevant stakeholders and implement all necessary measures as agreed including the safety audits and implement its findings as stipulated in the Deed.

Where possible, the Project team will be required to avoid introducing hazards into the travel path of cyclists. Where this is not feasible, appropriate physical barriers, treatments and or warning signs will be required to be implemented.

Fencing maybe required to be installed by the Project team to restrict physical access to hazardous areas and for site security, which will be appropriately sign posted. Various types of temporary and semi-permanent fencing may be installed including plastic mesh, acceptable temporary barriers, chain wire mesh, and the like. All physical barriers must be maintained during the Project and appropriately secured to prevent injury to the public.

### ***Providing temporary cycle paths***

Where work areas restrict access to cycle paths, the Project team may be required to implement alternative routes and facilities. Alternatives may include using, detours via other streets/cycle routes, or the provision of temporary cycle paths through the work area.

A risk assessment is required to be conducted if alternative routes direct cyclists to the opposite side of the road and introduce the need for bicycle crossovers. This is because an increased safety risk may be introduced compared to keeping them on the same side of the road with less ideal facilities.

All temporary cycle paths will be required to be:

- Clearly defined;
- Signposted appropriately to indicate the direction of the cycle path;
- Designed to accommodate the type of cyclists to be encountered along the route;
- Provided with bollards and barriers wherever necessary; and
- Kept well maintained while in operation.

The design parameters for off-road cycle paths are specified in AUSTRROADS Guide to Road Design – Part 6A Pedestrian and cycle paths and in NSW Bicycle Guidelines.

A TCP/VMP is to be developed by the Project team for all alterations to existing cycle paths.

The Project will prepare the necessary cyclist detour drawings and notes within TCP/VMP, and submit the design drawings and documents to RMS for review and approval at least 14 days prior to commencement of construction of the cyclist detour works. An approval in writing from RMS is required to be obtained before commencing any cyclist detour work.

### ***Providing cycle crossings***

Where feasible, the Project team will aim to maintain all existing cycle crossing facilities. Where this cannot be achieved, alternative facilities that are a similar standard to the present facility might be required. Should alternative facilities be required, the local community will be consulted to discuss the type and location of crossings to ensure it is fit for purpose. Following consultation, the wider community and local cycling clubs/groups in the area through Traffic Liaison Group would be notified of any significant changes that may affect their routes.

Typical temporary crossing facilities may include general crossing treatments (Figure 6-29 AUSTRROADS), refuge islands, controlled traffic signals and the like.

The AUSTRROADS Guide to Road Design – Part 6A Pedestrian and cyclist paths and NSW Bicycle Guidelines provide guidance on the design parameters of cycle crossing facilities.

A TCP/VMP is to be developed by the Project team for all alterations to existing cycle crossing facilities.

The project team might also be required to obtain approval from the relevant authority prior to adjusting any existing cycle facilities, or the implementation of any new temporary facilities.

## **7.8 Public transport**

The construction work and traffic management measures are not expected to directly impact bus services, as road closures are not proposed on bus routes in the Project area. The level of disruption on bus services would be low, similar to the disruption experienced by general traffic.

The one exception is the school bus route that picks up and drops off students in Pound Street near Clarence Street. The bus operator will be contacted before construction starts to identify an alternative pickup up and drop-off location.

Construction of the Project will have short-term impacts on the North Coast Line rail services, which will not be able to run during possessions (closures of the rail line). Possessions are likely to occur over a long weekend and/or during scheduled rail network outages, usually in off-peak periods of the year in terms of patronage and freight movements, to minimise impact on rail operations. During the rail possession, alternative passenger transport services will be provided where possible. Coach services will be provided for regional trips to other communities in the area. These arrangements will be made with North Coast Line rail services to minimise disruption to passengers on this line.

The new Pound Street bridge will be coordinated with ARTC to ensure the North Coast Line possession coincides with other works required along the line. In addition, Fulton Hogan will ensure North Line Coast users (passengers and freight operators) will be notified of impending changes to minimise impacts on them

Freight trains will not be able to operate during the closure period. The Contractor will consult with freight operators to minimise impact on freight movement, and determine alternate freight routes where possible.

Management of other potential impacts will be assessed on an ongoing basis in conjunction with affected stakeholders. Key consideration will be given to the effects of traffic switches as a result of the staging required for the Project.

## 7.9 Property access

Access to all properties will be maintained during construction, where feasible and reasonable, unless otherwise agreed by the relevant property owner or occupier. Any access physically affected by the SSI are to be reinstated to at least an equivalent standard, unless agreed with by the property owner. While access disruptions or restrictions to affected properties are likely to occur at various times throughout the Project, Fulton Hogan, with RMS approval, will minimise any disruption or restriction of property access by:

- Maintaining suitable access at all times to all properties and between severed portions of properties, if this is not possible, then suitable alternative access will be provided as agreed with the property owners/users;
- Locating entries to properties as close as practicable to the existing entrance and in a location where minimal disruptions will occur;
- Planning and forecasting disruptions or restrictions well in advance, wherever possible, so that adequate notice can be given and early discussions can be held with property owners/users;
- Minimising the frequency and duration of any unplanned disruptions or restrictions to access (Fulton Hogan will maintain a strong focus on minimising unplanned disruptions or restrictions by monitoring and recording their frequency and impact, and reporting them in each monthly report);
- Implementing traffic management measures as part of the Works, including the installation of temporary signage that does not have any adverse impacts on property access;
- In circumstances where pedestrian and cyclist access is restricted due to construction activities, a satisfactory alternate route shall be provided and signposted; and
- Where feasible and reasonable, unless otherwise agreed by the relevant property owner or occupier, any access physically affected by the Project shall be reinstated to at least an equivalent standard.

It is not anticipated that any business access will be affected by the works, however if access restrictions apply to a local business, the Project Team will minimise disruption as described above. In the event of access restrictions, RMS and Fulton Hogan will maintain timely communication on project timing, changes to traffic conditions and access arrangements.

Where access is needed for Dilapidation Surveys, inspections will be conducted by agreement with the property owners. A detailed record (including dated photographs) of the preconstruction condition of the property will be documented and a copy will be provided to the property owners. The management of Dilapidation Surveys is further addressed under the PMP.

The Project Team will comply with these requirements unless an approval otherwise is obtained from all persons having legal access to the affected property.

The Project Team will make all arrangements with all affected persons in relation to the impacts and consequences of the interruption of any services.

All properties that are not proposed to be acquired for the project will retain access. Access to residential, commercial, TAFE and the Gummyaney Aboriginal preschool properties will be maintained during construction at all times, unless otherwise agreed with property owners and businesses to limit the duration of any impacts. RMS and Fulton Hogan will consult with the Grafton TAFE Campus and Gummyaney Aboriginal pre-school throughout the project to ensure minimal impacts to access and operations.

Access to bus stops will be maintained during construction or suitable alternatives will be identified in consultation with the bus operators where feasible and reasonable (however, it is

not anticipated that there will be an impact on existing bus stops). Temporary notices and signposting will be provided at bus stops detailing any changes to bus, routes, bus stops, timetables and services at least 10 days prior to a change to any bus service.

Commercial fishing licence holders on the Clarence River at Grafton will be consulted during construction to minimise impacts and address any access issues in and around the construction site. Fulton Hogan will minimise any impact to holders of a commercial fishing licence on the Clarence River at Grafton.

Fulton Hogan will consult with Clarence River Sailing Club and other Clarence River event organisers throughout the life of the construction works. Alternative arrangements will potentially need to be made in regards to river access during construction. In the event that access arrangements are made, Fulton Hogan will implement appropriate safety signage on structures in the river.

In the unlikely event of disruptions to the public, Fulton Hogan will notify residents and businesses affected by disruption to property access or by night works in built-up areas. A letter will be 'letterbox-dropped' at least three business days before the proposed date.

## **7.10 Detail the dates and times of the proposed access restrictions and contact details.**

### **Emergency services**

During design development, feedback was sought through consultation from the following authorities:

- Ambulance Service of NSW
- Fire and Rescue NSW
- NSW State Emergency Service

Overall it is considered that the project would enable enhanced access and efficiency of emergency services. Ongoing consultation with emergency providers during detailed design should be carried out to ensure that potential impacts of the project on emergency service operations are avoided.

The inevitable nature of emergencies and their potentially significant social, economic and environmental consequences is acknowledged and relevant State acts and legislation have been enacted to controlling these situations.

The relevant acts identify agencies primarily responsible for controlling particular hazards/emergencies. Such agencies are detailed in Table 7-2.

**Table 7-2: Emergency Services Agencies**

<b>Event</b>	<b>Agency</b>
Law enforcement/emergencies	Police
Fire	Fire and Rescue NSW NSW Rural Fire Services
Hazardous Materials	Fire and Rescue NSW NSW Rural Fire Services
Flood	State Emergency Service NSW Rural Fire Services
Storm and Tempest	State Emergency Service NSW Rural Fire Services

The Community Relations Manager and the WHS Manager will be responsible for providing up to date information to the respective emergency services regarding any changes or restrictions to traffic flows during the project. The wider project team will be responsible for adhering to these requirements and notifying the Community Relations Manager and WHS Manager of any restrictions or changes as required.

Arrangements to manage impacts on emergency services include:

- Notification and communication with affected emergency services in accordance with the Community Communication Strategy;
- Updating the Project Team and work crews of any requirements or measures to be undertaken to enable access through site in conjunction with emergency services;
- Notification of out of hours works or works that may restrict access including suggested detour routes;
- Provision for emergency service access through construction zones and subsequent notification to emergency services of any changes to these conditions;
- Communication with the project workforce to ensure understanding of emergency access and response requirements; and
- Training of staff to ensure understanding of expectation and requirements.

### **Evacuation routes**

Construction will not impede on any of the Grafton evacuation routes. The flood evacuation plan is documented in the Clarence Valley Council Local Flood Plan (SES, 2012). There are three main evacuation routes out of Grafton:

- Two routes north, to Junction Hill; and
- One route across the existing Grafton bridge to South Grafton

## **7.11 Special events**

A special event in traffic management terms is defined as any planned activity that is wholly or partially conducted on a road, requires multiple agency involvement, requires special traffic management arrangements and may involve large numbers of participants and/or spectators. Major events may attract crowds in excess of 30,000 people.

Seasonal variations in traffic volumes, daylight savings changes and NSW holiday periods are also events that will require attention by the Project Team due to the effects on traffic flows.

### ***Special event responsibility***

The Event Organiser has the responsibility for the assessment and coordination of special events using Special Events Guide, which is conducted in consultation with relevant stakeholders, Police, TMC, Local Councils and may include Fulton Hogan.

In consultation with relevant stakeholders which may include Fulton Hogan, the event organiser will be required to develop a specific TCP for the special events in accordance with NSW Government 'The Guide to Traffic and Transport Management for Special Events'.

### ***Role of the project team***

A major event requires planning to successfully cater for the movement of large volumes of people in an efficient manner to minimise disruption to normal transport patterns.

The Project Team is required to participate in regular forums, communicate, and cooperate in the management process with the road authority, event organisers and relevant project members and clients.

## **7.12 Incident Management and response**

RMS and emergency services are responsible for responding to incidents.

For the purpose of this plan, this is addressed under annexure D of this Plan.

## **7.13 Cumulative traffic impacts**

Potential cumulative construction impacts may occur from the aggregated effect of other developments preparing for or starting construction, including cumulative traffic disruptions to road users travelling to and from Grafton along the Pacific Highway and cumulative traffic disruptions to road users travelling between Grafton and South Grafton across the existing bridge.

Projects that may contribute to cumulative traffic impacts due to location, timeframe and project size include:

- Pacific Highway Upgrade – Woolgoolga to Ballina;
- Proposed service station, fast food restaurant and café at the intersection of Spring Street and Iolanthe Street, South Grafton;
- Lapsed Homemaker Centre development approval at the intersection of Through Street and Iolanthe Street, South Grafton; and
- Future urban development projects instigated by the construction of the new bridge and associated road upgrades.

### **7.13.1 Impacts on the road network**

It is anticipated that the cumulative impact of changes may have some temporary impact on the level of service of the road network during peak periods. Mitigation measures are required to ensure the safety and efficiency of the road network is not compromised.

To address these issues, traffic analysis would be carried out to quantify the impact on level of service during critical construction periods once the haulage routes and construction sequence are confirmed by the construction contractor. Based on the analysis, traffic management measures would be included in the construction environmental management plan. These are developed to enable acceptable traffic operations and level of service on the road network during construction to be maintained.

Appropriate traffic control measures will be determined on a site-by-site basis and would include a combination of temporary lane closures, realignments, or detours, along with temporary fencing, visual barriers, traffic controllers and signage.

### **7.13.2 Impacts to freight services**

Access across the existing Grafton Bridge would be maintained during construction, however surrounding road network upgrades as part of the project may cause delays which would have a minor impact on the freight services travelling through, to or from the Grafton area during construction.

### **7.13.3 Impacts on access to properties**

Access to residential, commercial, TAFE and the Gummyaney Aboriginal preschool properties would be maintained during construction at all times.

Pedestrian and cycle access would be prohibited from foreshore areas within the construction work zone as well as some sections of the road reserve.

#### **7.13.4 Impacts on public transport**

The proposed construction work and traffic management measures are not expected to directly impact bus services as the proposed road closures would not occur on bus routes in the project area. Therefore, the level of disruption on bus services would be low, and would be similar to the disruption experienced by general traffic.

The one exception would be a school bus route that picks up and drops off students in Pound Street near Clarence Street. The bus operator would be contacted before construction starts to find an alternative pickup up and drop-off location.

Construction of the project would have short-term impacts on the North Coast Line rail services, which would not be able to run during possession (closure of the rail line). The duration of the possession would be confirmed during detailed design but it could potentially occur over a long weekend and in line with scheduled rail network outages. This is usually done in off-peak periods of the year in terms of patronage and freight movements, to minimise impact on rail operations.

During this period, alternative passenger transport services will be provided where possible. For regional trips to other communities in the area, coach services would be provided.

Freight trains would not be able to operate during the closure period. RMS will consult with freight operators to minimise impact on freight.

#### **7.13.5 Impacts on pedestrian and cyclist access**

Construction of the project may have temporary impacts on access to pedestrian and cycle paths, as follows:

- Grafton, work at the rail viaduct and road upgrades at Pound Street may require closure of the route from the existing bridge to residential areas in the north along Kent Street. Cyclists and pedestrians may need to detour through Villiers Street, or another temporary alternative route
- South Grafton, work associated with the Gwydir Highway widening may impede crossing of the highway between Derek Palmer Place and Silver Jubilee Park. This may require cyclists to detour along Bent Street.

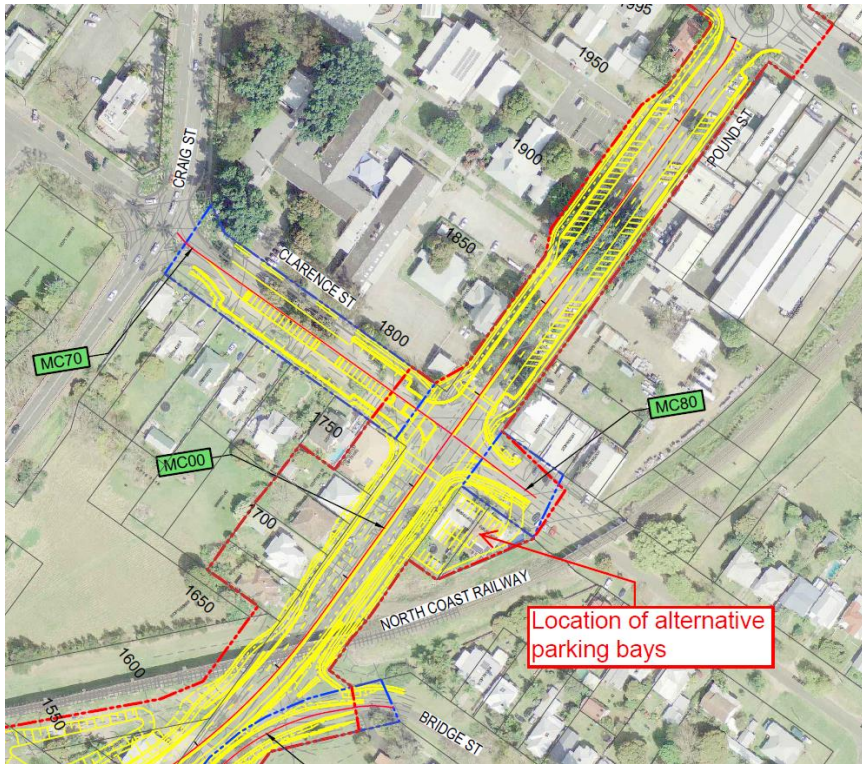
#### **7.13.6 Impacts on parking**

As a number of on-street parking will be impacted and/or removed by the construction activities on the project, the following provisions, in consultation with Clarence Valley Council and affected businesses, will be made prior to the commencement with construction activities that impacts those parking spaces.

##### **Corner Pound and Clarence Street**

Alternative parking, accommodating 26 parking spaces as shown in Figure 7-5 , will be required to be made available prior to the commencement with the working impacting parking spaces within the area.

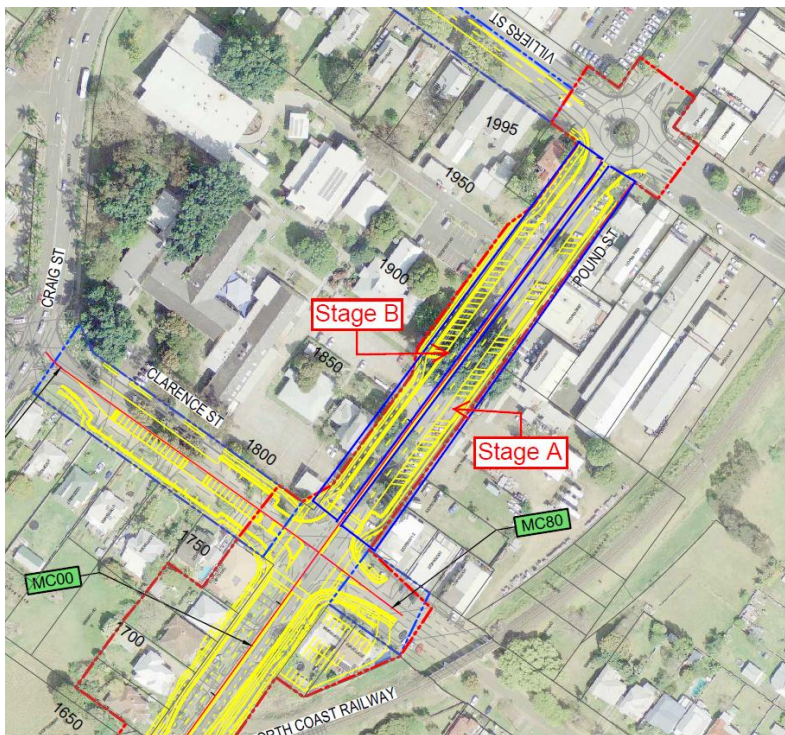




**Figure 7-5 Alternative parking on Pound and Clarence Street**

**Pound Street**

Works on the pound street will be delivered in two stages in order to reduce the impact of existing parking between Clarence and Villiers Street as depicted in Figure 7.6 below.



**Figure 7-6 Alternative parking on Pound and Clarence Street**

## 7.14 River Navigation and Access

The management of navigation and access to the Clarence River is addressed under Annexure F of this Plan.

## 7.15 Traffic Switching Arrangements and Procedure

### 7.15.1 General

Traffic switches will be required to be carried out during the staged delivery of the project and local road upgrade components of the Project. Multiple traffic switches will be required across the Project with varying impacts on the through traffic, local traffic, public transport, school buses, bicyclists and pedestrians.

The Project team will develop and implement a procedure for managing traffic switches in compliance with the Project Deed and the local authority requirements (i.e. Local Council, The Clarence valley Council).

Specific Traffic Staging Plans and accompanying TCPs will be required to be developed for each traffic switch. In doing so, the Project team will:

- Comply with RMS Specification D&C G10 and the SWTC to ensure that the design of any temporary works associated with the traffic switch provides a satisfactory:
  - Temporary pavement design;
  - Vertical profile;
  - Horizontal alignment;
  - Sight distances;
  - Lane and shoulder widths.
  - Minimum qualification of the designer, and
- Comply with the Australian Standard 1742 and AUSTRROADS Guide to Traffic Engineering Practice to ensure the temporary traffic control devices used are appropriate for the traffic switch;
- Ensure the road lane capacity is not impacted where-ever practicable;
- Obtain all necessary RMS and local council approvals;
- Inform the public through the processes described in the Community Communications Strategy;
- Program and resource the traffic switch event to the satisfaction of the RMS and local authorities ensuring adequate:
  - Labour;
  - Plant;
  - Traffic control devices;
  - Traffic barriers;
  - Asphalt milling and re-sheeting resources; and
  - Traffic controllers;
- Tool-box the traffic switch with all staff, labour and subcontract resources to ensure a clear understanding of individual and team responsibilities during the day/night of the traffic switch;
- Brief the emergency services agencies about the proposed traffic switch, including the police, ambulance, fire brigade, rural fire brigade, bus operators and any affected service authorities;
- Make due allowance for the impact of holidays and other peak traffic events;

- Inspecting all pavement markings, signposting and safety barriers that they have been installed before opening temporary roadways to traffic by an Orange Card holder.
- Carry out an independent safety audit on the proposed traffic switch noting that all signposting, pavement marking, safety barriers and portable or temporary traffic signals must be completed before the opening of temporary roadways to traffic or after opening temporary roadway to traffic providing that its done within 24 hours after opening, the latter will benefit the auditor from seeing the switch in operation with traffic using it;
- Ensure sufficient resources are available to monitor the traffic after the traffic switch and to carry out minor adjustments;
- Inform the RMS of any circumstances that require modifications to the approved temporary traffic arrangement;
- Continue monitoring the new temporary traffic arrangement on a regular basis; and
- Unless otherwise approved by RMS, traffic shall be switched to a temporary roadway or detour only where the usual workforce will be on site for a minimum of two days thereafter.

## **7.15.2 Temporary Roadways and Detours**

### **Designing Temporary Roadways and Detours**

Where temporary roadways and detours, or adjustments to existing lane configuration and geometry, are required as part of the traffic staging, they will be designed in accordance with the relevant design standards and in accordance to clause 2.7 of project specific RMS Specification D&C G10 and Traffic Control at Worksites Manual.

The road designer will be required to have at least 5 years' experience designing roads to RMS standards and must be engaged to prepare traffic staging road design drawings.

The road designer is to provide a certificate that the traffic staging road designs comply with the relevant standards as depicted under relevant schedules under the Project Deed.

These design standards also apply where existing or unused roadways, including road shoulders, are proposed as temporary roadway.

### **Constructing Temporary Roadways and Detours**

The construction of the temporary roadways and detours will be required to comply with the relevant RMS specification for the particular roadwork element.

### **Opening Temporary Roadways and Detours to Traffic**

All works must be completed before opening the temporary roadways to traffic.

In addition, an inspection by a qualified Orange Card holder is required to be conducted to verify that regulatory signs, warning signs and traffic control devices have been suitably located to be visible and effective under the site conditions and expected traffic speeds before opening the temporary roadways to traffic.

Opening a temporary roadways and detours to traffic is subjected to a hold point release from the RMS in accordance with Clause 3.3 of project specific D&C G10.

Unless otherwise approved by RMS, the project team will comply with the following:

- Traffic may only be switched to a temporary roadways or detour where the project team's usual workforce will be performing the works on site for a minimum of two successive days thereafter, and

- Sections of the existing roadway being placed is not disturbed for at least two days after opening a temporary roadways or detour to traffic, to provide for the event where failure of the temporary roadway or detour occurs and there is a need to direct traffic back onto the existing roadway.

### **Auditing Temporary Roadways or Detours**

A Road Safety Audit (RSA) is required to be carried out, within 24 hours of opening temporary roadways or detours to traffic in order to inspect the traffic control measures during both day and night times.

However, this audit is to be based on the perceived risk of each side track/intersection.

As an audit by a level 3 RSA has been completed on the Traffic Staging Plans, a separate Level 3 RSA on the TCPs is not required unless there have been changes to the site layout which could affect the findings. Instead, an audit by a level 4 RSA auditor is required to be carried out progressively.

In addition, Fulton Hogan is required to conduct a full project wide audit by a level 4 RSA auditor at the completion of Stage 1A to identify any issues that have not been picked up in the individual RSA.

The Road Safety Auditor must be independent and have as a minimum be certified to level 3 in the RMS Road Safety Auditor Register.

The road safety audit team should also include an orange card accredited TCP designer.

If the original measures prove not to be fully effective, then in consultations with the Road Safety Auditor and RMS the TCPs are required to be revised without delay and appropriate measures are to be implemented.

A copy of the report from the Road Safety Auditor is required to be addressed to whichever party commissions it and submitted to the RMS within 7 days of implementation of the TCPs.

### **Removing Temporary Roadways or Detours**

Temporary traffic control arrangements will implemented with regard to:

- Suitability for purpose and compliance;
- The required duration for the use of temporary arrangements; and
- Removal methodology.

Upon completion of the Works, remove the temporary roadways and / or detour arrangements and restore the area to a condition equivalent to that which existed prior to the commencement of the work.

Where removal of pavement markings is required, the Traffic Staging Plans will provide details of the proposed methods for removal, the estimated durations to carry out the removal, and if necessary any proposed measures to restore the road surface.

The method of removal of redundant pavement markings from wearing surfaces, other than final wearing surfaces, will comply with the requirements of the TCaWS and the requirements of contract specification D&C R141. Removal of redundant linemarking within traffic lanes by covering with paint is not to be acceptable.

### 7.15.3 Opening to Traffic upon Completion

All relevant permanent sign posting pavement markings, safety barriers and traffic signals required under the Project Deed is required to be in place prior to opening of any part of the Project Works to traffic.

All temporary traffic control devices no longer required for the safety of traffic, when any part of the Project Works is opened to traffic are also required to be removed or covered.

At least 14 business day's written notice is to be given to RMS of the date of opening any part of the Works to traffic.

Consultations for opening traffic are to be carried out with RMS and the Police.

## 8 Compliance management

### 8.1 Roles and responsibilities

The project team is responsible for all construction activities, including the implementation and maintenance of the various temporary traffic management arrangements and have the qualifications depicted under 'Traffic Controllers' of this Plan.

Fulton Hogan's initial Project Team organisational structure is appended to the Project Management Plan (PMP) and overall roles and responsibilities are outlined in both PMP and the CEMP. Specific responsibilities for the implementation of construction traffic management are detailed below.

#### Project Director

- Ensures the Project's road safety and traffic management objectives are achieved;
- Ensures that all the incidents caused by site activity, and incidents on public roadway that are unrelated to the construction activity are reported to RMS; and
- Co-ordinating incidents to RMS Incident Manager for Grafton Region and Police.

#### Project/Construction/Engineering Managers

The Project Managers are responsible for ensuring traffic management:

- Is properly planned, organised, directed and controlled;
- Is properly resourced with people, equipment, facilities and systems;
- Meets the requirements of the contract including the Project Deed, SWTC and RMS Specifications D&C G10;
- Complies with all other legislation; and
- Is achieving its objectives.

#### Project Superintendent

- Co-ordinates the field resources;
- Supports the delivery of the road safety and traffic management objectives;
- Assists with the implementation of the CTMP
- Provides direction and support to enable effective planning of temporary traffic management arrangements;
- Ensures all field team members receive the appropriate training; and
- Managing all Emergency Controls as depicted in Incidents and Emergency Response Plan.

## **Traffic Manager**

The nominated Traffic Manager will be required to have, as a minimum, RMS' Select/Modify Traffic Control Plan (Red Card) qualifications and will be required to have the delegated authority from, and responsibility to, the Project Managers for continuously monitoring the implementation and operation of all road occupancies to ensure that they are compliant with the ROLs, TCPs, VMPs, etc., including, but not limited to:

- Monitoring and quantifying the durations of delays to the free flow of traffic;
- Monitoring, measuring and recording traffic queue lengths, including the maximum 10 minutes or 1000m traffic queue lengths in each direction and the total occupancy or stoppage time;
- Maintaining and adjusting traffic control measures and devices to assist prevailing traffic flows, minimise lane and shoulder occupancies and any lost traffic flow capacity and minimise traffic flow delay durations and queuing;
- Monitoring of over-dimension heavy vehicle movements;
- Prepare and keep records of all road occupancies and records of all traffic flow delays and durations, traffic queue lengths and other ROL related matters and submit a report including copies of those records to RMS by 9.00am on the Thursday following the week being recorded;
- The selection of any Traffic Control subcontractors;
- Ensuring that processes and control systems needed are established, implemented and maintained;
- Approving TCPs (where required) for individual tasks including those of subcontractors;
- Arranging and approving training;
- Ensuring that the requirements of all the plans are properly implemented;
- Regularly reviewing the continuing suitability, adequacy, and effectiveness, of all the plans;
- Preparing and submitting Hold Point Forms, SZAs, applications and Directions to Restrict applications 10 working days before the works are scheduled to begin;
- Allocation of all resources required for the implementation of all the plans;
- Ensuring that control measures are maintained and that work-in-progress is inspected
- Identifying training needs and arranging for employees and subcontractors to attend the training;
- Ensuring subcontractors/suppliers have suitable qualifications and experience;
- Carrying out and recording weekly inspections and verifications to demonstrate compliance;
- Facilitating traffic awareness and giving toolbox talks to the site; and
- Reporting traffic incidents to the Project Director.

The Traffic Manager (or the delegates in his absence) will be contactable at all times (7 days per week and 24 hrs. per day) during the construction phase of the works to receive and answer traffic/incident related inquiries from RMS and the Police. Site Emergency contact list shall be located in the Fulton Hogan Incident and Emergency Response Plan that will be displayed in the site office and the crib room. Refer to the Incident and Emergency Response Plan for details concerning the managing of incidents and emergencies on the project.

The Traffic manager will have the authority to stop work on any activity if it is considered to be necessary to prevent traffic incidents, or to comply with the directions of RMS or Police.

## **Traffic Coordinator**



The Traffic Engineer will be required to be qualified to the “Traffic Control Worksite Manual” course (i.e. holds a current Select /Modify Traffic Control Plans) and will have delegated authority from, and responsibility to, the Traffic Manager for:

- Implementing the Traffic Management Plan and the TCPs on site
- Maintaining the TCPs
- Assessing and monitoring subcontractor’s capabilities and performance in respect of site activities
- Ensuring the safe passage of traffic at all times
- Ensuring everyone on site is inducted and wears the appropriate approved clothing
- Driving through the site to inspect the traffic control layout, recording any deficiencies and the action taken to rectify them
- Report incident including public roadway that are unrelated to the construction activity, near misses to Traffic Manager/ WHS Manager.

### **Engineers Responsible for the Work Activity**

- Assist in the delivery of the road safety and traffic management objectives outlined in the Plan;
- Plan all work activities and identify the required traffic management arrangements to facilitate the works;
- Liaise with the Traffic Crews in the planning and implementation of the required traffic management arrangements;
- Prepare TCPs to facilitate the works and obtains approval from the Traffic Manager;
- Conduct regular inspections (including pre-starts) of traffic controls and VMPs and, where necessary, instruct the rectification of deficiencies;
- Allocate plant, equipment and human resources for the works including the provision of the temporary traffic control arrangements; and
- Conduct and keep records of daily and weekly (day and night) inspections of the traffic control arrangements, assist audits and, where necessary, rectify deficiencies.

### **Foreman**

- Ensure compliance to the approved TCPs;
- Issues the required TCPs and, where relevant, road occupancy approvals and speed zone authorisations to the traffic control crew / or subcontractor;
- Ensures adequate plant, equipment and human resources are made available for the installation and maintenance of temporary control devices;
- Conducts pre-start inspections and regular night / weekly inspections of traffic control arrangements, and ensure all deficiencies are rectified;
- Assist with the implementation of mitigation measures to address unsafe road conditions, and unusual traffic congestion;
- Assist with the management of unplanned incidents, providing initial response to make the site safe; and
- Records unplanned incident details, and when traffic controls are in operation, including the installation and removal of regulatory signage.

### **Functional Personnel**

- Functional personnel provide support for all construction activities and their traffic management related responsibilities are described above; and
- WHS team is responsible for managing haulage routes in compliance with WHS Management Plan.

## **Community Relations Manager**

- Liaises with the community for all aspects of community and stakeholder issues;
- Represents the Project for all community and stakeholders issues;
- Conducts consultation with stakeholders for traffic planning, and provides an on-going liaison role;
- Prepares and distributes changed traffic condition information to the community; and
- Community relations including addressing complaints.

## **8.2 Training**

All employees, contractors and utility staff working on site will undergo site induction training relating to traffic and transport management issues. This induction training will address elements related to traffic management including:

- existence and requirements of this CTAMP;
- relevant legislation;
- roles and responsibilities for traffic management;
- temporary and interim traffic arrangements;
- response procedure for dealing with traffic incidents.

For the purpose of this Plan, training is further detailed under Training Management Plan for the Project.

## **8.3 Communication**

Traffic and transport management information will be communicated to the community as detailed in the Community Communications Strategy (CCS), this includes local and regional communications.

The Community Relations Manager on behalf of the Project and in consultation with RMS will provide timely, accurate, relevant and accessible information about changed traffic arrangements and potential delays to road users and local communities with provision for feedback through a complaints line during construction.

Consultation requirements will be updated by E&P/RMS on receipt of responses to consultation letters.

A consultation with respect to a signage policy which addresses the project is required to be done with the Clarence Valley council.

This Plan and subsequent revisions will send to the representatives of Clarence Valley council and their comments will be sent to RMS for concurrence.

In addition to the requirements of the CCS, the project team will be required to meet the reasonable needs and desires of the community for information on changed traffic conditions including property access provisions, bicyclist impacts, pedestrian impacts and heavy haulage transport impacts.

The following stakeholders will be consulted when preparing long term TCPs, as required:

- RMS;
- Clarence Valley Council;
- NSW Police;
- NSW Rural Fire Services; and



- Affected Adjacent Land Owners

### **Altered Traffic Arrangements**

The project team will be required to:

- Be available at all reasonable times to address any community questions concerning planned traffic arrangements including any temporary traffic switches;
- Establish stakeholder or Issues Groups to inform the community on:
  - Traffic management (including property access); and
  - Cyclist needs.

### **Project Display Material**

The project team will be required to provide project display material when key project milestones are reached. The display material must include, as a minimum:

- Access information for temporary and permanent works, including pedestrian/cyclist access and temporary traffic arrangements;
- Any traffic disruptions and restrictions; and
- The construction of temporary detours.

### **Notifications and Advertising**

The project team will be required to:

- Notify local residents and businesses about construction activities which will affect access to their properties or otherwise significantly disrupt use of their premises. Such notification shall be made at least five working days before commencing work affecting the premises and shall advise the nature of the work, why it is necessary, indicate the expected duration plus any changes to arrangements for traffic or property access. Contact details for the Project team shall also be provided;
- Advertise significant traffic management changes, detours, traffic disruptions and work outside the working hours contained in the environmental assessment documents. Newspapers are to be identified that are read/used by the driving community on the Project; and
- Advise RMS if any part of the Temporary Works that is the subject of an advertisement is to be changed or varied so as to make the advertisement substantially incorrect

### **Media and Community Events**

The project team will be required to:

- Hold on-going discussions with RMS regarding dates, commencing at least 3 months prior to the anticipated occurrence of the event, for major milestones / traffic switches and the opening of the Works or any stage of the Works and Local Road Works to traffic;
- Give RMS at least 8 weeks' written notice of the date for commencement of construction and at least 8 weeks' written notice of the date of opening of the works or any stage of the works and Local Road Works to traffic, to enable RMS to organise any associated official media / community events;
- Plan for an event of some form to mark the opening of the works to traffic; and
- Not announce the proposed opening of the Works and / or any stage of the works or Local Road Works to traffic without the approval of RMS.

### **24 Hour Emergency Contacts and Public Complaints**

The 24 Hour Emergency Contact List is located within the Incidents and Emergency Response Plan.

The 24 Hour Emergency Contact List along with the Variable Message Sign (VMS) supplier contact details are to be provided to the TMC so that the TMC can arrange for message displays to be changed in the event of a traffic emergency.

The RMS 1800 633 332 hotline number will be used for capturing complaints; this is further addressed under the Community Involvement Plan.

## **8.4 Monitoring and inspections**

Requirements and responsibilities in relation to monitoring and inspections are documented in Sections 8.1 and 8.2 of the CEMP.

In addition to the inspections conducted by the RMS, a nominated member of the project team, holding appropriate Traffic Control tickets (Yellow, Red or Orange Card), is required to inspect the temporary traffic controls during the construction phase, focusing on monitoring compliance against the TCP/VMP and identifying safety hazards, to enable implementation of corrective solutions.

The Traffic Manager, or delegate, will be required to conduct four main types of inspections:

- Daily pre-start and pre-close down inspections of short-term traffic control;
- Weekly inspections of long-term traffic control;
- Night inspections of long-term traffic control; and
- Pre-opening inspections of minor temporary traffic switches.

Requirements and responsibilities in relation to monitoring and inspections are also documented in CEMP.

These inspections will be required to be carried out in accordance with RMS TCaWS Manual, That is:

### **Daily Inspections:**

1. "TCP" – Traffic Team Leader (holding a Yellow Card – as required in G10) will tick that all Traffic Control devices have been implemented and sign off/date, the record of these inspections will be done on the actual TCP by ticking each sign, safety barrier...etc. to verify that the inspections are done. This will also be inspected by Traffic Subcontractor's supervisor and co-signed on the TCP for acceptance after review.

2. "Daily Traffic Management Risk Assessment Checklist"– This identifies information regarding "Checks", Start/Finish Times, etc. using subcontractor's checklist. The Traffic Team Leader (holding a Yellow Card – as required in G10) will fill in information as per checklist and sign off/date. This will also be inspected by Traffic Subcontractor's supervisor and co-signed on the checklist for acceptance after review.

In addition, Fulton Hogan team will inspect relevant TCPs and note any actions on Traffic Management Monitoring Checklist.

### **Weekly Inspections (Random TCP setup)**

"Traffic Control at Work Sites Safety Inspection Checklist" Appendix E – Will be utilised by Fulton Hogan's Traffic Manager and Traffic Subcontractor's Supervisor and both sign off/date.

The Traffic Manager, or delegate, will also be required to monitor traffic management and traffic controls to assess compliance with the conditions of ROLs, including:

- As-built layouts for compliance with approved traffic control plans, including sign maintenance and delineation; (Daily)

- Provisions for cyclists, pedestrians, disabled persons and buses; (Weekly)
- Timing and duration of road occupancies; (Weekly)
- Qualifications of traffic control personnel; (Weekly)
- Assist WHS team in monitoring Haulage routes off the Construction Site; (Weekly)
- Night inspections of roadworks. (After each traffic switch)

Other inspection checklists contained in Appendix C of TCaWS Manual, or equivalent will be utilised (or modified to suite local requirements) for recoding the inspections.

Records of inspections of road conditions and traffic control measures will be maintained by Fulton Hogan's Traffic Manager.

### **Special Monitoring Requirements**

The Traffic Manager will be required to monitor the performance of the southern interchange roundabouts within the first four weeks after opening and develop any remedial actions necessary to ensure continued safe access for pedestrians and cyclists.

The Traffic Manager will also be required to monitor traffic on the highway and key local roads in Grafton, particularly during peak periods, six months and 12 months after opening the project to monitor the performance of the network and ensure it is performing as expected. The results would also be used to inform the operational noise monitoring for the project. The Project Team will then investigate and implement any remedial action, if required.

## **8.5 Auditing**

Audits (both internal and external) will be undertaken to assess the effectiveness of traffic and transport management measures, compliance with this CTAMP, CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.4 of the CEMP.

In addition, Road Safety Audits will be conducted throughout the duration of the project, that's in addition to Road Safety Audit for temporary roadways and detours.

This Road Safety Audit will be conducted by an independent road safety audit is also required to be conducted in accordance to Guide to Road Safety Audit Practices (2011) at the:

- Development of Concept Design stage; and
- Substantial Detailed Design stage.

The Road Safety Auditor must be independent and have as a minimum be certified to level 3 in the RMS Road Safety (RSA) Auditor Register.

The audit findings are to be actioned as per the risks levels stipulated in the audit report which is usually immediately if there is a high risk to public or construction safety.

### **Audit Frequency and Responsibility**

The Traffic Manager is responsible for managing the Project's road safety audit program in coordination with the Design Manager and the Project Managers. One of the team members must be orange card accredited TCP designer.

The responsibility and frequency of audits is summarised in the Table below.

Table 3: Audit frequency and responsibility

<b>Audit type</b>	<b>Responsibility</b>	<b>Frequency</b>
Internal audit of temporary traffic arrangements.	To be conducted by the Traffic Manager.	At least once per month.
External audit of temporary traffic arrangements.	Traffic Manager to engage a pre-qualified auditor who is external to the Project.	At least every 6 months.
Pre-opening audit of new roads and or major temporary traffic switches.	Traffic Manager to engage a pre-qualified auditor who is external to the Project.	Prior to the opening of all new roads and major temporary traffic switches.

To enable RMS to observe all road safety audits undertaken, RMS will be invited to attend. Issues identified in the road safety audits will be dealt with in accordance with the Project's Quality Management Plan under managing non-conformances.

Copies of the road safety audits are required to be issued promptly to the commissioning party and copied to RMS and the Project Verifier (PV).

## 8.6 Reporting

Reporting requirements and responsibilities are documented in Section 8.5 of the CEMP.

## 8.7 Traffic Management Risk Assessment Workshop

Further to the above mentioned compliance management requirements, a Traffic Management Risk Assessment Workshop will be conducted prior to the commencement of any traffic management works in accordance with Contract Specification RMS D&C G10. This will identify and address the risks associated with the road safety, traffic management and local network issues specific to the site.

All workshops will be organised and championed by the Traffic Management Steering Group to incorporate all relevant parties to determine best for project outcomes. Additional workshops and trainings will be undertaken to train the Project team regarding the implementation of this plan, TCPs and when traffic arrangement issues need to be reinforced or reviewed.

The outcomes of the workshop will be documented in the Project Risk Register that is appended to the Risk Management Plan.

## 8.8 Maintenance of Roadways

The existing roadways, temporary roadways and detours are required to be maintained in accordance to the requirements of appendix 25 of SWTC.

This includes:

- sections of newly completed roadways after opening until the date of construction completion; and
- Local Roads used by construction traffic.

Fulton Hogan will co-operate with the RMS, local council or their agents in carrying out these maintenance activities in order to provide a safe, trafficable condition road for all class of vehicles that may use them.

The work includes:

- Maintenance of existing pavements, linemarking, kerb and gutter, road shoulders and verges, ancillary devices, roadside environment, drainage, signage, trimming of vegetation and housekeeping;
- Repairing any potholes, surface drainage blockages or other failures;
- Removing any debris of any type, including animal carcasses; and
- Re-applying linemarking or temporary delineation devices as needed to clearly delineate traffic lanes for the duration of temporary traffic arrangements;
- Conducting pavement quality checks and a road safety audits prior to use of temporary roadways. and
- Installing, maintaining and utilising wheel wash facilities or other devices to ensure that no mud, dirt or other material is deposited onto any road which is open to the public.

If the Roadways are to be maintained by RMS and/or local council at any stage of the Project, RMS/local Council will provide reasonable notice to the project team of any impending landscape maintenance works and similar lawful obligations required to be carried out in areas that may impact the construction activities of the Works.

The project team will be required to alter its construction activities to accommodate the lawful maintenance activities of the RMS/local Council.

## **9 Review and improvement**

### **9.1 Continuous improvement**

Continuous improvement of this plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- identify areas of opportunity for improvement of traffic management;
- determine the cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- verify the effectiveness of the corrective and preventative actions;
- document any changes in procedures resulting from process improvement; and
- make comparisons with objectives and targets.

### **9.2 CTAMP update and amendment**

The processes described in Chapters 8 and 9 of the CEMP may result in the need to update or revise this CTAMP. This will occur as needed.

Only the Traffic Manager (in consultation with the Environment Manager and the Quality Manager) can amend this CTAMP.

Proposed changes are to be done in consultation with RMS, ER and CVC.

A copy of the updated CTAMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

## **Annexure A: Traffic Control Plans**

*[Will be prepared progressively and submitted to RMS as part of relevant hold points specified under contract specification – type G10 Traffic Management]*

## **Annexure B: Vehicle Management Plan**

*[Will be prepared progressively and submitted to RMS as part of relevant hold points specified under contract specification – type G10 Traffic Management]*



## **Annexure C: Pedestrian and Cyclist Management Plan**

*[Will be prepared progressively upon completion of design and submitted to RMS as part of relevant hold points specified under contract specification – type G10 Traffic Management]*

# Annexure D

## Traffic Incident Procedure

*[CoA D46(b)(vi) – a response plan which sets out a proposed response to any traffic, construction or other incident ]*

## **Procedure**

RMS and emergency services are responsible for responding to incidents.

If required, Fulton Hogan will provide traffic control by qualified traffic controllers for emergencies such as crashes and spillages along the work corridor. Traffic management for these events will not require a Hold Point release to be submitted to RMS.

Where the Police, Emergency Services, RMS, TMC are controlling an incident, the Project Team:

- Shall comply with any instruction or direction by the Police, Emergency Services, RMS and TMC in relation to any proposed closure to a lane or shoulder;
- Shall not restrict, close, interfere with or obstruct the free flow of traffic on any lane or shoulder of the existing Highway, the works or a Local Road contrary to the instructions of the Police, Emergency Services, RMS and TMC; and
- If permitted to restrict, close, interfere with or obstruct the free flow of traffic on any lane or shoulder of the existing motorway, the works or a Local Road, shall act in accordance with any instructions of the Police, Emergency Services, RMS and TMC including to suspend any of the contractor's work and to re-open the lane or shoulder.

The types of emergencies or unplanned incidents that may occur include, but are not limited to motor vehicle crashes, bush fires, environmental spills, terrorist attacks, bomb threats, construction type incidents, structural catastrophic failures, inclement weather conditions, flooding and anti-social behaviour.

The Project Team will adopt the operating procedures for managing emergencies and unplanned incidents that are addressed in the WHS Management Plan.

In the event of a traffic incident occurring within the Site of work or at other locations affected by your work, the Project team is to immediately notify the RMS Representative of the occurrence of the incident, record the knowledge of the facts and video or photograph the road approaches at 10m intervals starting from at least 100m each side of the incident site, including videoing or photographing the location of all relevant safety devices and signs (whether in the above 100m limit or not), as soon as possible after the incident. The Traffic Manager, or delegate, is then required to forward a report with this information to the RMS Representative within 2 days of the occurrence of the incident.

In addition, the Project Team will use an appropriate standard plan from TCaWS Manual, adjusting it as needed to suit the site conditions.

### **Emergencies in close proximity to the Project (not within Project boundary)**

The Traffic Manager will be required to notify relevant key stakeholders including traffic or incident controllers such as the Police, TMC and local councils for traffic incidents that occur in close proximity to but not within the Project Boundary. For example, if a major crash occurred just outside the project boundary and was due to issues unrelated to the construction site, the construction personnel may be the first 'eyes and ears' to detect the incident. If so, notification is required immediately in order to mitigate traffic delays caused by these incidents.

The Traffic Manager or the delegates will then be required to contact the relevant incident controller in accordance with the project's Incident and Emergency Response Plan for the Project.

## Notification Requirements to Authorities

Fulton Hogan acknowledges the importance of keeping RMS and all stakeholders regularly informed. Therefore, during the Project, the Project team will report to RMS, community consultative committees and other relevant stakeholders on all road safety and traffic management issues that may impact on the road network.

When any unplanned closure of a lane or a restriction in the flow of traffic occurs on the existing Highway or on local roads, the project team is required to immediately advise RMS of the nature of the closure or restriction and of the schedule for reopening of the lanes. The project team will take all required measures to open the lane as quickly as possible.

### Information to be Reported

- The traffic management information to be provided by the Project team will include:
- Reports on recent traffic, pedestrian and cyclist incidents;
- Community and media feedback as they relate to road safety and traffic management issues;
- Current and upcoming critical issues, (including those identified by the client, and other stakeholders and the proposed measures to address these issues as required);
- Construction activities and scheduling;
- Recent and proposed changed traffic conditions and the impacts on the operation of the road network;
- Traffic analysis and modelling results, and the current performance of the road network and traffic systems;
- The current status of CTMP, TCP, VMP, development, approvals and implementation;
- Status of approved and anticipated ROL/SZA applications;
- Media and community information released and proposed to be released;
- Results and feedback from recent inspections and road safety audits; and
- Performance results and trends of traffic KRA/KPI and targets

### Frequency

The frequency of reports provided by the Project team to RMS will be in four categories:

- Immediate - reporting of major incidents and critical issues;
- Within 1 working day - formal reports of major incidents;
- Weekly reports - on forecast road occupancies and performance results of recently implemented changed traffic conditions/operations; and
- Monthly reports - summarising: construction activities; proposed major traffic changes; upcoming media releases; incidents and issues; road network performance etc.

### Methods of Reporting

The methods of reporting to be applied by the project team will be as follows:

- Verbal reports - on issues of an urgent nature, (e.g. initial reporting of major unplanned incidents, adverse community/political feedback) which will be followed up with a formal written report;

- Formal written reports - in a format subject to client and stakeholder needs;
- Presentations - to consultative forums such as community consultative committees, and or traffic and transport liaison groups etc.

#### Presentations

Presentations to consultative forums such as community consultative committees, and or traffic and transport liaison groups etc.



# **Annexure E**

## **Queue Length Management Strategy**

## Strategy

A traffic queue means the situation where the traffic is backed up on a roadway either stationary or moving at a rate much slower than the designated posted traffic speed limit signage.

Fulton Hogan acknowledges that maintaining the Level of Service (LoS) of the road network and minimising the delays experienced by road users during the construction of any project is important. The strategies and measures that can be applied to minimise road user delays are as follows:

- The existing bridge and local roads operate with peak periods of 7am to 10am and 4pm to 7pm;
- The average volume of traffic using the existing bridge each day has been recorded as 27,578 in 2010;
- The traffic count of local roads in Grafton and Grafton South is between 8,000 and 24,000 vehicles per day; and
- These roads are at capacity particularly in the morning and evening peak periods, and as such any works on these roadways will be done at specified times outside of the peak periods with RMS approval.

## Delay Minimisation Strategies

The delay minimisation strategies to be applied by the Project Team will include:

- Minimising the impacts of each work area;
- Maximising the operating performance of the individual routes;
- Aiming to maintain access; and
- Coordinating works at each work area to ensure road users do not encounter several delays in quick succession;
- No Stop/Go permitted on highway during daylight hours or at night without an appropriate ROL;
- VMS are placed in strategic locations as agreed on with RMS and TMC to keep road users informed of changes to road conditions and if there are possible delays as a result of construction work.
- Free flow of traffic to local roadways in any direction is not delayed more than:
  - Five minutes for any single road occupancy; and
  - Seven minutes cumulatively due to all road occupancies.

## Implementing Measures

Measures to minimise road user delays for the development of any major infrastructure project starts during the concept design phase and continues through to the opening and operation phase.

Fulton Hogan acknowledges there are measures that can be applied to minimise road user delays, which are generally divided into the following categories:

- Isolation of work areas;
- Work methods; and
- Planning of lane closure or road occupancies.

Where practical, the Traffic Manager will be required to apply the following measures:

- Isolate work areas from traffic flows (e.g. using alternative routes, and temporary safety barriers);
- Develop alternative work methods to minimise impacts (e.g. use more efficient plant and equipment, apply different design solutions, enclosed work platforms, time of day applications);



- Plan all lane closures and road occupancies with the aim to minimise the size of the work area, limit obstructions and restrictions, maximise road capacity, and avoid peak traffic flow periods;
- Analyse traffic volume data to establish the capacity of the road, assess the potential impact on traffic flows and identify the best time to apply temporary traffic arrangements, to minimise the inconvenience to road users; or
- Provide road users with changed traffic condition information to enable them to plan their journey and avoid the roadwork.

Traffic queues caused by road occupancies, measured visually along a single lane in any direction (by Fulton Hogan or reported by RMS) are required not to exceed 1000m in length or 10 minutes. If traffic queues reach these limits, the responsible traffic controller will be required to remove the cause of the delay until the flow of traffic returns to free flow conditions.

The traffic Manager is required to monitor, measure and record traffic queue lengths, including the maximum 10 minutes or 1000m traffic queue lengths in each direction and the total occupancy or stoppage time.

# Annexure F

## Construction Navigation Management Plan

*TT14 A construction navigation management plan setting out river procedures and impact reduction measures to be adopted during construction.*

## Current Clarence River maritime traffic

River traffic on the Clarence River at Grafton includes the following recreational craft:

- Sailing dinghies
- Sailing and motor yachts
- Power boats (including water-ski and wakeboard tows)
- Small unpowered craft (including rowing boats, canoes and paddle boards).

As well as normal river traffic, a number of recurrent events on the river result in additional vessels transiting the proposed bridge alignment. These events include the Clarence River Rowathon, Grafton Rowing Club Regatta, Grafton Bridge to Bridge Water-ski Race and sailing races.

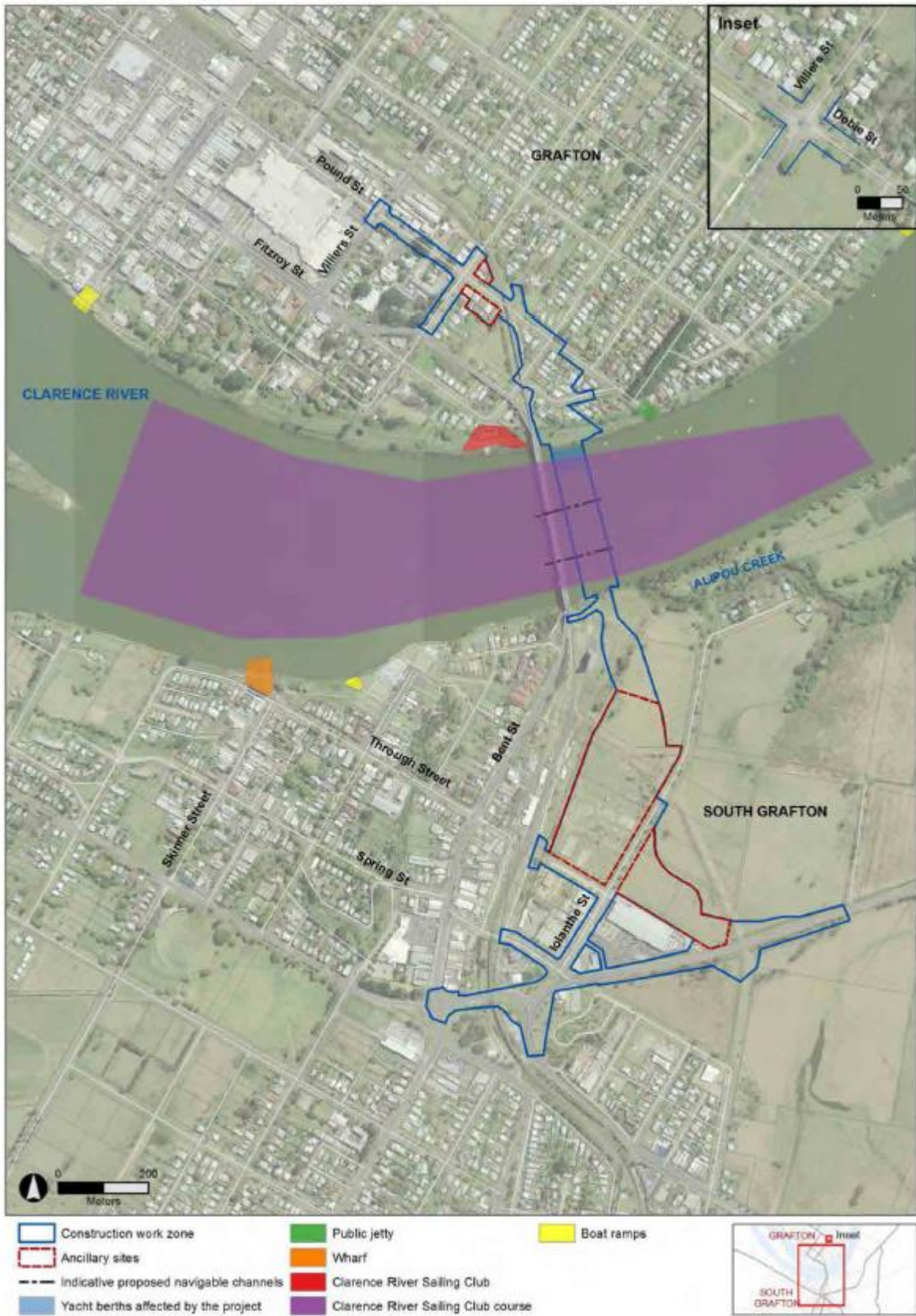
The following commercial vessels also operate near the proposed bridge alignment:

- Commercial fishing vessels that operate between Susan Island downstream to the bridge, and from the bridge downstream to Elizabeth Island
- A 35 metre barge owned by Boral, which mainly operates upstream of the existing bridge. For repairs or other exceptional operations it may travel downstream past the proposed bridge alignment.

The Clarence River at Grafton can be accessed through a number of boat ramps, wharfs and jetties on both sides of the river as shown in **Error! Reference source not found..**

Fulton Hogan acknowledges that maintaining the Level of Service (LoS) of the road network and minimising the delays experienced by road users during the construction of any project is important. The strategies and measures that can be applied to minimise road user delays are as follows:

- The existing bridge and local roads operate with peak periods of 7am to 10am and 4pm to 7pm;
- The average volume of traffic using the existing bridge each day has been recorded as 27,578 in 2010;
- The traffic count of local roads in Grafton and Grafton South is between 8,000 and 24,000 vehicles per day; and
- These roads are at capacity particularly in the morning and evening peak periods, and as such any works on these roadways will be done at specified times outside of the peak periods with RMS approval.



**Figure Annex.F-1: Aerial photograph summarising Clarence River maritime use areas**

## Construction impacts on Clarence River maritime traffic

Construction of the project will generate additional river traffic, which will likely be limited to piling barges and general work boats such as the vessels used for installing and decommissioning the sediment control devices. The project includes the construction of a temporary jetty immediately downstream from the new bridge. The jetty will be used to launch construction barges and for the delivery of materials.

A temporary jetty for barge launching is proposed off the South Grafton foreshore to facilitate these river-based construction activities. Impacts on river traffic may potentially occur during installation of the new bridge piles and piers, wholly or partially restricting transit through the main navigable spans and presenting a physical safety hazard. Construction and support barges used during piling and pier construction will also obstruct vessels while in use.

Maritime access to the Clarence River will typically be maintained throughout construction. For the majority of users it is expected that this would not restrict maritime access. The main impact would be on the sailing course and mooring areas, which may need to be permanently relocated. Access to existing boat launching facilities close to the bridge approaches may need to be restricted during construction but will be reopened once the bridge is operational. Existing boat launching facilities will not be affected by the operational stage of the project, but some mooring licences close to the new bridge may be moved further downstream.

The project will provide sufficient horizontal and vertical clearance over the navigable channel of the Clarence River to maintain existing maritime traffic movements.

There will be two clear navigable channels beneath the proposed bridge each with:

- A minimum horizontal clearance of 35 metres
- A minimum vertical clearance of 9.1 metres above mean high water spring.

In addition to the two clear navigable channels, there will be two additional channels, each about 67 metres wide, consistent with the existing bridge clearance.

Subject to the construction methodology chosen and construction contractor program or works, temporary working platforms may also be constructed. These platforms will be located within the construction work zone and will extend from the existing banks into the river to enable stable and safe access to construction barges, and piling areas as required. Any temporary working platforms will be designed in accordance with the following principles:

- Be constructed of hard, sound, durable rock free of fine particles and not contaminated with foreign materials;
- Be designed to allow for effective and regular clean-up of sediment and spill management;
- Be designed to prevent small rock or fine capping materials from being washed out of the platform;
- Be designed and operated in a manner that minimises the re-suspension of sediments or substrates;
- Remain in the waterway for the minimum time possible;
- Be protected with large rock armouring as required to ensure durability during a 1:10 year average rainfall interval flood event as a minimum;
- Be protected by anti-pollution booms and heavy duty silt curtains which are designed, installed/anchored and maintained specific to the waterway. Anti-pollution booms and heavy duty silt curtains will be installed before the commencement of any work that may generate sedimentation;
- Facilitate appropriate water flow to safely convey water and reduce impacts in high flow events, including but not limited to downstream bank and bed scouring and associated deposition; and
- Include appropriate fish passage treatments.

Construction will require some restrictions on navigation around the work areas, which will include the placement of barges and sediment control structures, thus restricting speed and navigation similar to roadworks zones. These would potentially affect the use of the river for:

- Rowing, sailing and special events; and
- The Boral barge, which uses the river for transporting sand and gravel. The bridge has been designed with sufficient draft and separation between supports to enable the barge to continue operating during construction.

Roads and Maritime would consult with these river users to mitigate impacts by providing alternative arrangements as required.

### **River operational requirements**

Considerations that will be taken into account when planning operations in the river include environmental/weather effects, potential for flooding and navigational channels.

Some environmental restrictions include:

- Operation wind speed limits and operation lifting reduction factors;
- Wind generated waves on the river;
- Flow velocities during tidal movements;
- Flow velocities during flood events; and
- Personnel working near the water must wear life vests at all times.

In order to keep the navigational channels open the following controls will be implemented:

- Additional anchor blocks for barge movements to be setup in positions which allow the navigational channels to remain open;
- Temporary signage, navigation lights and buoys will be erected, maintained and moved as required to keep navigational channels open and safe for the public; and
- Permanent signage, navigation lights and buoys will be erected at the earliest allowable time when safe to do so.

Any constructed temporary work platforms will have an effect on river operations. Consideration will be given to the following factors:

- Tidal range, variation and flow velocity;
- River flow velocity during non-flood events;
- Flooding characteristics including but not limited to afflux constraints (eg proximity of sensitive receivers), catchment size, flow velocity during a 2-year, 10-year and 20-year average recurrence interval flood events, associated potential scour impacts and flood evacuation procedures;
- River morphology including but not limited to bed shape, depth, major flow channels and substrate type;
- Navigational requirements including but not limited to visibility, speeds and navigational channels;
- Commercial and recreational uses of the waterway including but not limited to fishing, water skiing or other leisure activities;
- Procurement and delivery of working platform materials and components including but not limited to mobilisation, proximity to existing river structures, transportation/access for barges, access to clean rock (ie hard, sound, durable rock free of fine particles and not contaminated with foreign materials);
- Maintenance works and associated management (eg refuelling, routine maintenance and spill management);
- Rehabilitation requirements associated with decommissioning; and
- Applicability of industry innovations and/or sustainability initiatives (eg reuse of materials).

Any temporary working platforms will be developed and designed in consultation with the appropriate regulatory agencies to ensure that potential impacts from the installation,

operation and decommissioning of the working platforms are managed to minimise impacts on the surrounding waterways.

Maritime traffic generated during construction of the platforms will be limited to construction barges, vessels used for installing and decommissioning the sediment control devices and vessels delivering materials.

The proposed bridge will pass close to the existing boat moorings immediately downstream of the existing Grafton Bridge. These moorings will need to be relocated during construction. RMS will consult with the owners of the moorings during the detailed design stage and before construction. Moorings will be reopened after completion of the bridge, although some may be relocated away from the bridge.

Maritime access along the Clarence River at Grafton will be maintained throughout construction. However, the placement of the new bridge piles and piers will temporarily restrict transit route options. Also, construction barges used during piling will temporarily obstruct vessels.

### **Exclusion zones / marine notices**

Exclusion zones around critical areas of construction activities and floating construction plant will be clearly marked in accordance with Roads and Maritime advice and requirements. A proclaimed Marine Notice will be issued through Roads and Maritime alerting river users of ongoing construction activities. In addition, temporary aids to navigation will be provided where feasible and reasonable and in accordance with Roads and Maritime advice and requirements (such as lighted buoys to mark exclusion zones).

Commercial fishing licence holders on the Clarence River at Grafton will be consulted during construction to minimise impacts and address any access issues in and around the construction site. Early and ongoing liaison with local marine events organisers (including Grafton Rowing Club, Grafton River Sailing Club and the Grafton Bridge to Bridge Waterski Race organiser) will be carried out to ensure the viability of these annual events and general activities organised by the clubs.

A construction navigation management plan will be prepared and implemented to set out river procedures and impact reduction measures to be adopted during construction.

A loading jetty will be constructed on the southern bank of the river to allow delivery of material and movement of work force from the river bank to work face in the river.

Roads and Maritime Services issues safety advice to vessel operators via Marine Notices. Both the Project Team as well as the wider community (i.e. operators of marine vessels) will be encouraged to check Marine Notices to identify any hazards or special events in the area.

There are two main types of Marine Notices:

- Navigation Warnings
- Aquatic Licence or Special Event 'exclusive use' conditions.

Navigation Warnings will be published from time to time to advise of hazardous conditions on waterways. These warnings have no legal status, however RMS issue Navigation Warnings in an advisory capacity as the safety regulator for waterways and boating. Roads and Maritime makes every effort to warn vessel operators if physical circumstances change which may present a danger that was previously unknown, and which vessel operators may not be aware of.

FH will work with RMS to ensure Marine Notices are issued both to provide safety advice to vessel operators and in accordance with certain statutory requirements. They will be published by RMS in newspapers, placed on the RMS website and distributed to relevant maritime related organisations such as the volunteer marine rescue organisation.

Vessel operators will be advised to exercise **extreme caution** when navigating in the vicinity of the works area. Operators must reduce speed to 4 knots when within 100 metres of the construction equipment and minimise wash.

The floating plant will display appropriate lighting and advisory day shapes. Any floating lines will be marked with yellow floats and yellow flashing lights at night.

Minor vessel traffic delays may be experienced whilst operating within the dredging area. Communication with the dredge operator will be by Marine Radio or line of sight.

Aquatic Licences and Special Events will be requested for certain areas of works. Exclusive use Aquatic Licence or Special Event Marine Notices are authorised by Statute, and relate to the granting of an Aquatic Licence by Roads and Maritime to allow a particular body to have 'exclusive use' of waters for the purposes of a race, regatta etc. (Clause 73 of the Marine Safety (General) Regulation 2009).

From time to time, a Special Event may be required and require the following to be undertaken:

- A notice must be published when a Special Event is declared (Section 12 of the Marine Safety Act 1998).
- These notices advise the public that certain areas of water are closed to recreational navigation. Notices generally describe the parameters of the area which is set aside for exclusive use, the time and date, and the means by which the area is to be marked off.
- Notices are required under the Act so that the public is aware of exclusive use events, so that they don't accidentally move into construction work zones.
- Once a notice is published, it is an offence to breach it. You can be fined for failing to leave an area that has been set aside as an exclusive use/special event area.

## **Aids to navigation**

The detailed design stage of the project will consider the provision of permanent aids to navigation on the proposed bridge in accordance with the International Association of Marine Aids to Navigation and Lighting Authorities, which provides recommendations for the specification of aids to navigation of bridges within inland waterways.

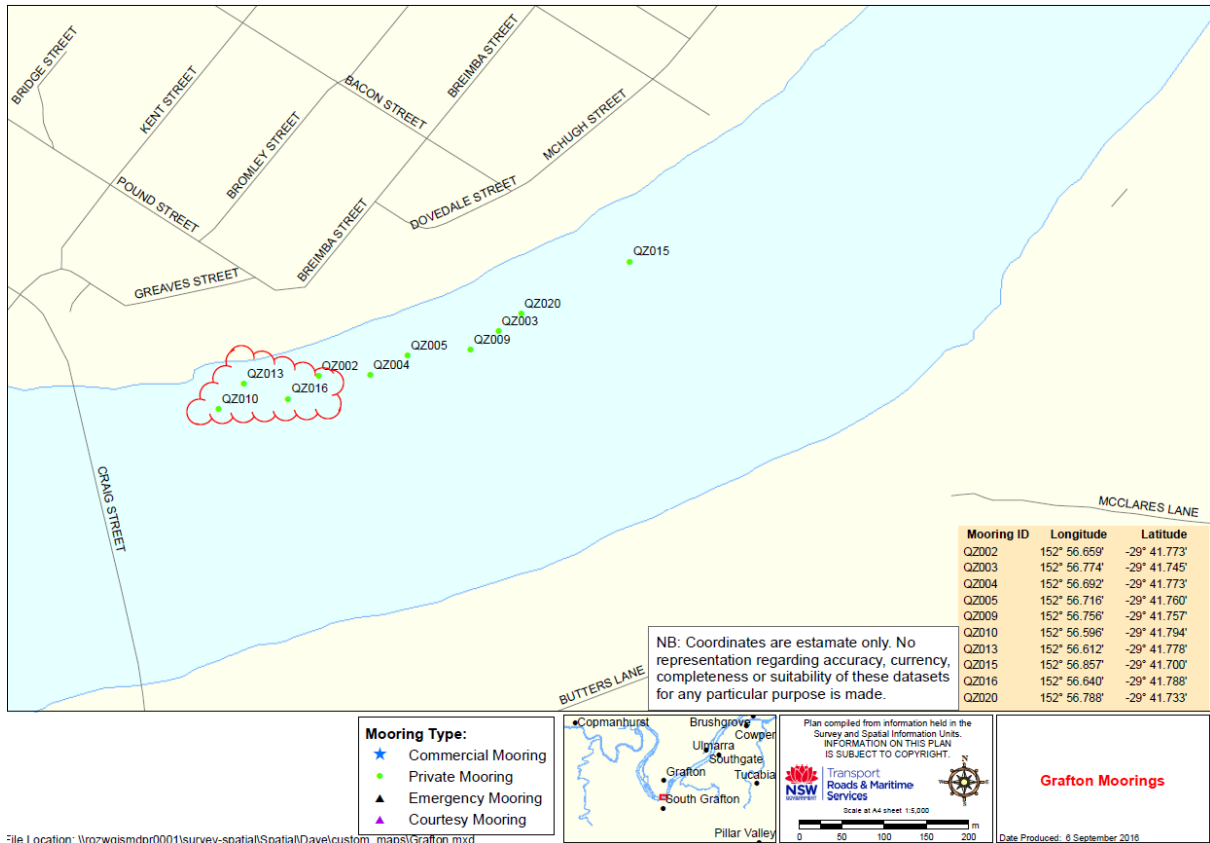
It is proposed that green and red navigation lights marking the deep-water navigation channel extents, and a cardinal white light in the centre of the span at deck level, be provided on the bridge to aid boat operators at night. Complementary day markings may also be provided. The final arrangement of the aids to navigation, including lighting flashing sequences, will be confirmed by RMS during the detailed design stage.

Temporary aids to navigation will be provided where feasible and reasonable contractor and in accordance with Roads and Maritime advice and requirements (such as lighted Roads and buoys to mark exclusion zones).

## **Relocation of moorings**

From the GPS coordinates provided by RMS Maritime and after consultation with RMS Maritime on the potential requirement to temporarily relocate moorings that are in close proximity to construction activities; up to 3 No of moorings (license numbers QZ010, QZ013 and QZ016) as shown in Figure Annex.F.2 below are potentially affected by the works. From the aerial photography and inspections on site, it has been observed that not all of these moorings are present. Therefore the number of relocations required may be reduced.





**Figure Annex.F-2: Clarence river private moorings**

With reference to Figure Annex.F.3 below, the closest mooring coordinate is 60m from the new bridge alignment; this exceeds the RMS guideline of 30m from a structure. Therefore permanent relocations will not be required.



**Figure Annex.F-3: Impact on Clarence river private moorings**

If the relocation of any moorings is required, the project team will be required to:

- Carry out a survey to confirm mooring locations;
- Consult with license holders that have apparatus in close proximity to the works (through RMS Maritime); and
- Relocate the apparatus as agreed with license holders using a licensed contractor.

### **Construction barges, pontoons and vessels**

Prior to commencement of bringing in construction barges, pontoons and vessels, an approval and acceptance of the Notice to Mariners is required for the overwater work. This approval from Mariners takes five day turnaround, so advance planning is required.

All barges will need to have channel markers on them that comply with RMS standards for commercial vessels

The drilling barge is expected to be launched from about 2km downriver from the bridge (Fry Street Boat Ramp – to be confirmed) and it will be appropriately anchored/winched until the completion of drilling works.

The main barge for the works will also be permanently winched until completion of the works.

The smaller vessels will be moored at the construction jetty. This jetty will be constructed around the southern abutment of the new Clarence River Bridge.

All barges, pontoons and vessels will have allowance for river flooding periods so that river floods do not significantly impact the works.

The barge, pontoon and vessel operators will be required have the relevant experience and provide details of mooring and berthing of construction barges, pontoons and vessels prior to commencement with the works, in compliance with RMS Maritime requirements.

### **Navigation restriction notice**

Prior to commencement with the works impacting the navigation on Clarence River, a notice in compliance with Marine Safety Act 1998 s.12, to the Mariners will be required to be distributed, detailing the works, duration, restrictions and directions. In addition, a press release similar to the following will be required to be published in coordination with the Community Relations Manager and in compliance with Community Communications Strategy.



Transport  
Roads & Maritime  
Services

## Navigation Restriction

### **GEOTECHNICAL DRILLING Grafton Bridge, Clarence River**

September 2016 to approximately October 2016

#### **NAVIGATION RESTRICTION**

The works will commence on the **southern side** and continue in a **northerly direction** along the Eastern alignment of the existing Grafton Bridge on the Clarence River. Temporary navigational restrictions will be in place for the duration of the works, which will be marked with lighting and navigational markers.

Vessel operators should navigate this area with extreme caution.

**Penalties apply.**

**Marine Notice NH1686**

For more information [rms.nsw.gov.au](http://rms.nsw.gov.au)

**Figure Annex.F-4: Sample notice for navigation restriction**

### **RMS Maritime Contacts**

The RMS Maritime contacts for the Clarence River Bridge Project are;

- Rod McDonagh – Manager Operations North (RMS) – 0418 494 153
- Mike Baldwin – Senior Boating Safety Officer Far North Coast (RMS) - 0419 751 853
- Brett Ryan – 0419 982 127, will act in Rod McDonagh's position from 24/9/2016