Coffs Harbour City Centre Masterplan 2031 Supporting Transport Report

transportation planning, design and delivery

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GTAconsultants

Coffs Harbour

City Centre Masterplan 2031

Supporting Transport Report

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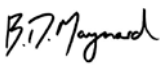
A	30/04/13	Final	Ashish Modessa Chris Slenders Matthew Houlden	Brett Maynard	

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1. Introduction

1.1 Background and Purpose of this Report

GTA Consultants was commissioned as part of a multi-disciplinary team by Coffs Harbour City Council in September 2012 to undertake a transport assessment to inform the development of the Coffs Harbour City Centre Masterplan.

This report sets out an assessment of and provides more detail surrounding the recommendations proposed within City Centre Masterplan 2031. This report should be read in conjunction with the Existing Conditions Transport Report prepared by GTA Consultants dated 10 December 2012.

2. Streetscape

The existing road cross-sections in the Coffs Harbour CBD provide an oversupply of vehicle capacity to the detriment of pedestrians. The Masterplan proposes to reduce the width of the road carriageways and free up space for pedestrians, cyclists and street planting. The following sections set out a summary of the proposed changes to the existing road cross-sections within the Coffs Harbour CBD.

2.1 Road Cross-sections

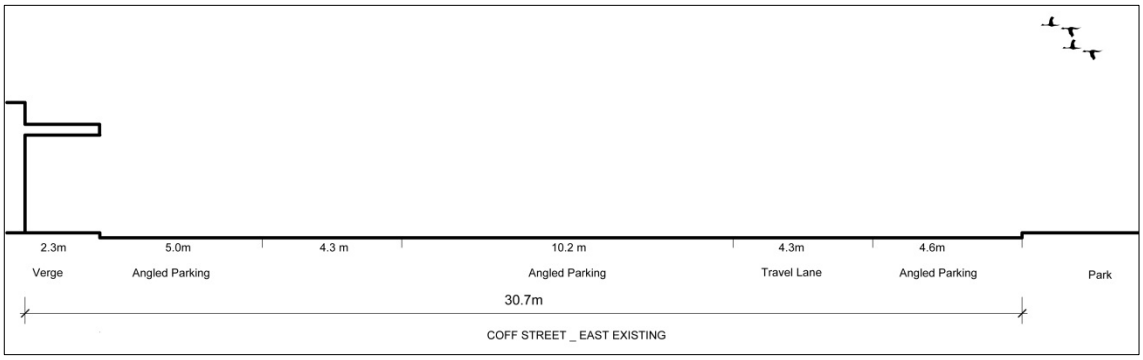
The existing and proposed road cross-sections are provided in the following sections. All proposed cross-sections have been reviewed against Australian Standard Parking Facilities Part 5: On-street parking (AS 2890.5-1993) and meet the requirements.

2.1.1 Coff Street

Existing (East)

The section of Coff Street between Gordon Street and Duke Street is generally configured as two 4.3 metre lanes with angled parking on both sides of each lane. The cross-section of the typical layout is shown in Figure 2.1.

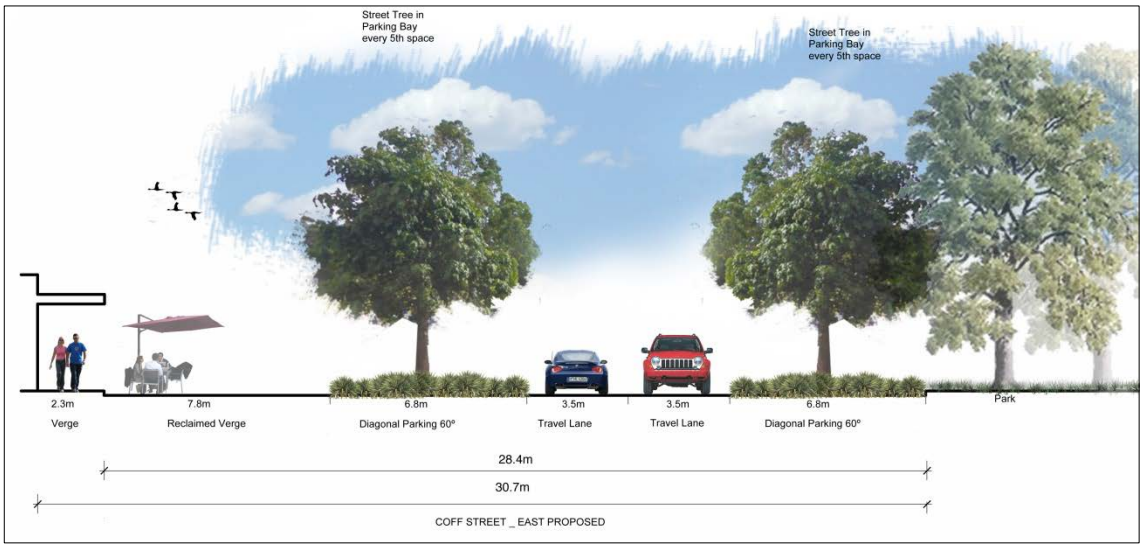
Figure 2.1: Coff Street (East) Existing Cross-Section



Proposed (East)

On Coff Street between Gordon Street and Duke Street, it is proposed to remove the central diagonal parking to create a single, two-lane two-way carriageway with 60 degree diagonal parking on each side of the carriageway. The parking bays will be provided with wheel stops to prevent overhang on the adjacent verge. The reclaimed area is proposed to provide a 7.8 metre wide area with tree planting and outdoor dining. A cross-section of the proposed layout is shown in Figure 2.2.

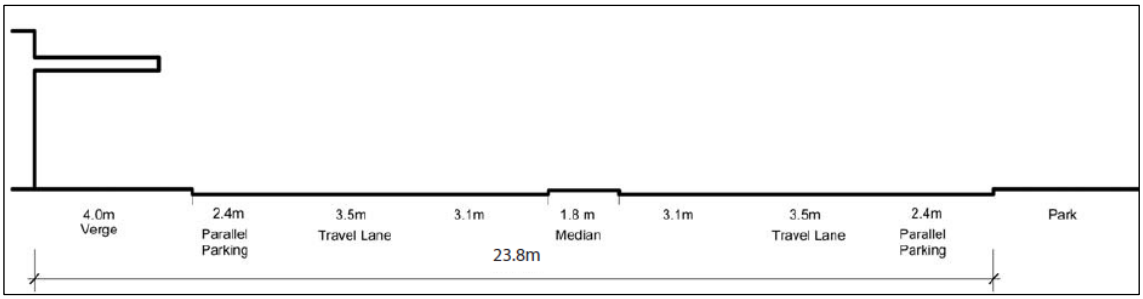
Figure 2.2: Coff Street (East) Proposed Cross-Section



Existing (West)

The section of Coff Street between Gordon Street and Castle Street is generally configured as two 3.5 metre lanes with parallel parking on both sides of the divided road. The cross-section of the typical layout is shown in Figure 2.3.

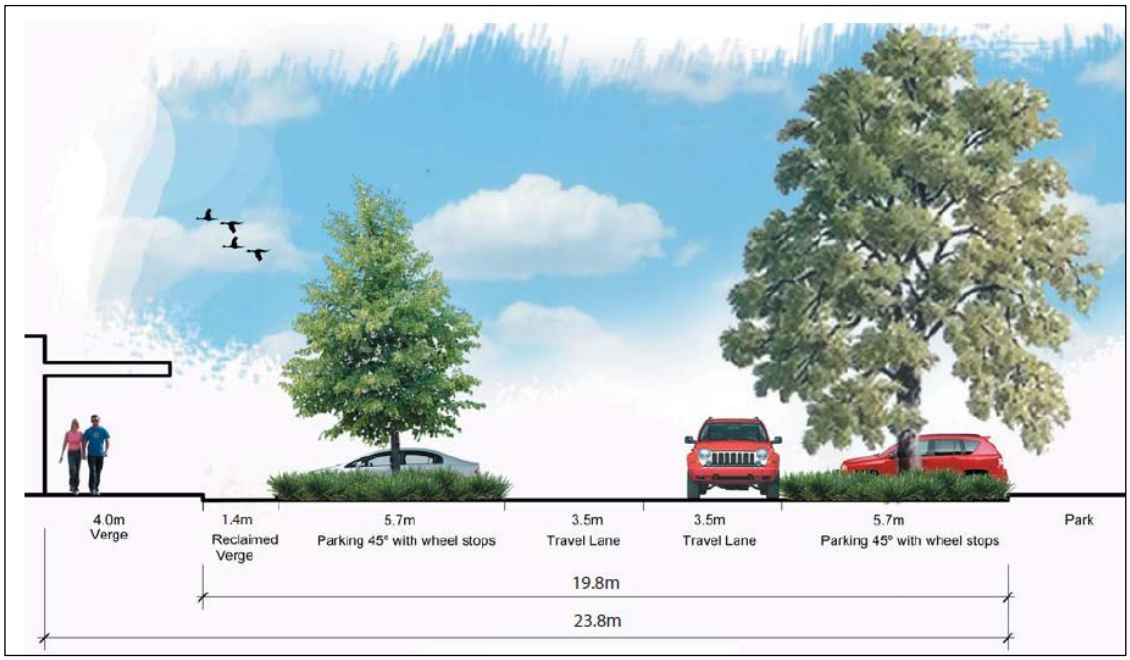
Figure 2.3: Coff Street (West) Existing Cross-Section



Proposed (West)

On Coff Street between Gordon Street and Castle Street, it is proposed to create a single, two-lane two-way carriageway with 45 degree parking on each side of the carriageway. The parking bays will be provided with wheel stops to prevent overhang on the adjacent verge. The reclaimed area is proposed to provide a 2.25 metre wide area. A cross-section of the proposed layout is shown in Figure 2.4. Tree planting is provided in regular intervals in the 45 degree parking spaces which would result in the loss of some car parking spaces which would have to be replaced.

Figure 2.4: Coff Street (West) Proposed Cross-Section

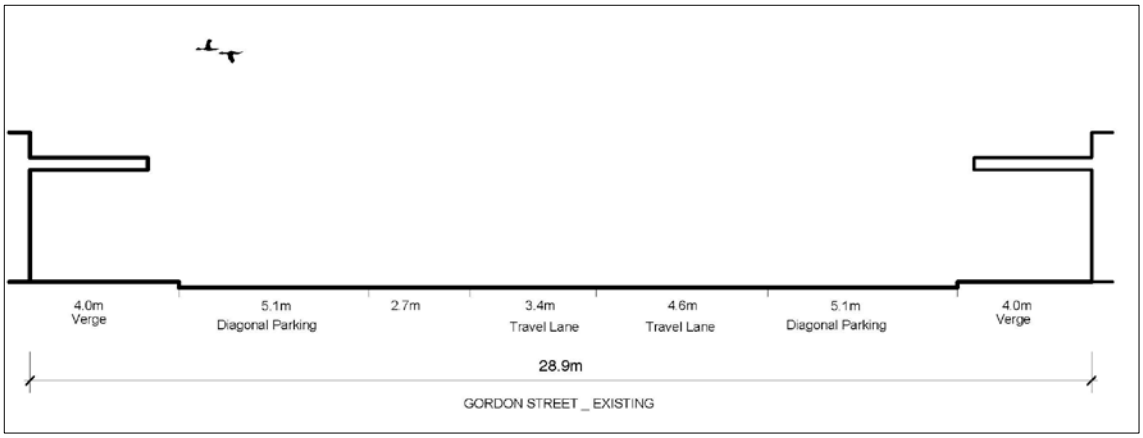


2.1.2 Gordon Street

Existing

Gordon Street is generally configured as a two-way, two-lane street with diagonal parking on each side of the carriageway. The northeast-bound lane has an adjacent 2.7 metre parking manoeuvre lane. The southwest-bound lane does not have any adjacent parking manoeuvre lane however it is wider than the northeast-bound lane. The typical cross-section of Gordon Street between Coff Street and Vernon Street is shown in Figure 2.5.

Figure 2.5: Gordon Street Existing Cross-section

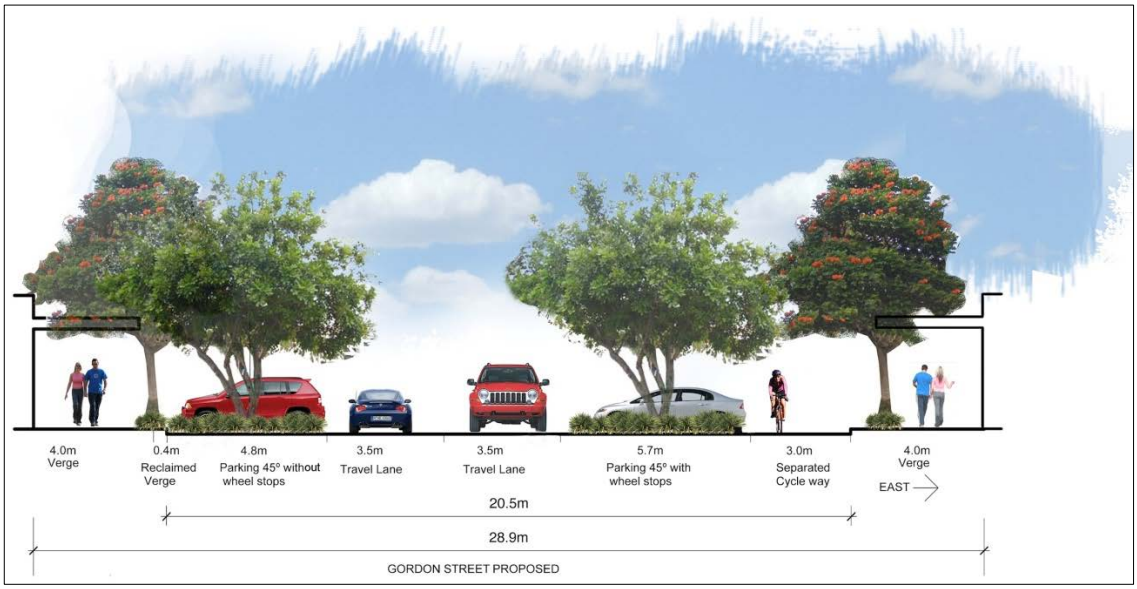


Proposed

It is proposed to reduce the through lanes to provide a 3.0 metre wide cycle path on the north-west side of the carriageway between the verge and the parking lane. The NSW Bicycle Guidelines (RMS, 2005) recommend that two-way off-road bicycle lanes within the road reserve are between 2.0 and 3.5 metres wide. It is also recommended to provide a 1.0 metre wide dividing strip between the bicycle path and

parallel parked vehicles. Given that diagonal parking is proposed with wheel stops, a much smaller or no dividing strip would be acceptable.

Figure 2.6: Gordon Street Proposed Cross-Section

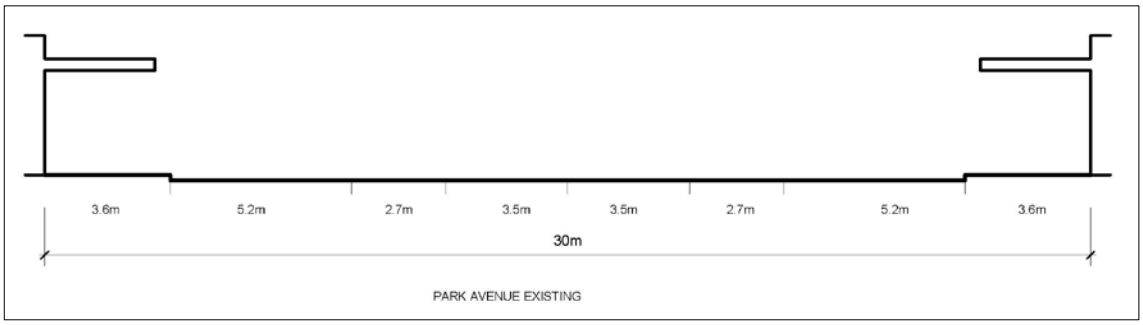


2.1.3 Park Avenue

Existing

Park Avenue is generally configured as a two-way, two-lane carriageway. Each side has a 2.7 metre parking manoeuvre lane and 45 degree angled parking spaces. The typical cross-section is shown in Figure 2.7.

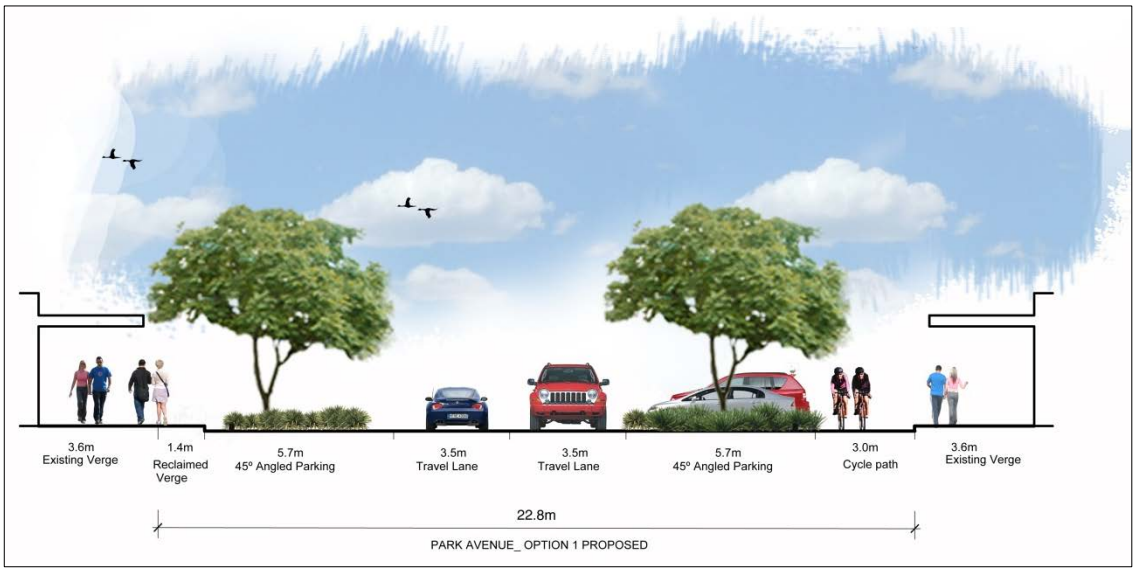
Figure 2.7: Park Avenue Existing Cross-section



Proposed Option 1

It is proposed to provide a 3.0 metre two-way bicycle path on the northern side of the road reserve and a 1.4m reclaimed verge on the southern side of the road reserve. To facilitate this, it is proposed to remove the parking manoeuvre lanes and provide two 3.5 metre wide lanes with 45 degree parking on both sides of the carriageway. The proposed typical cross-section is shown in Figure 2.8.

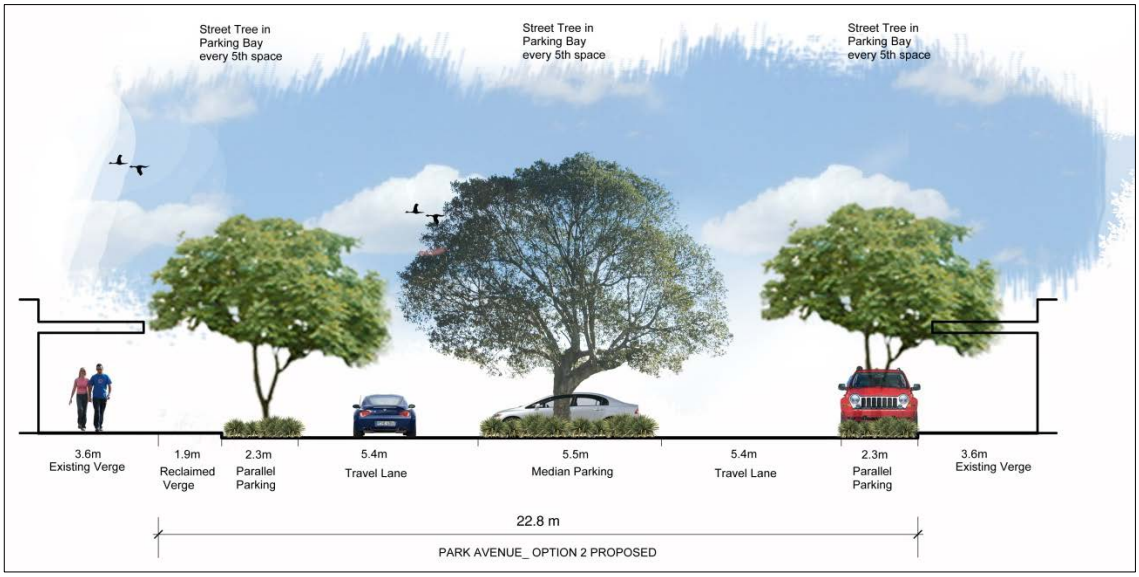
Figure 2.8: Park Avenue Proposed Cross-section Option 1



Proposed Option 2

It is proposed to provide parallel parking and landscaping on both sides of the road as well as centre-of-the-road parking. A 1.9m reclaimed verge is achieved on the southern side of the road. Every 5th space will also include a tree. The proposed typical cross-section is shown in Figure 2.9.

Figure 2.9: Park Avenue Proposed Cross-section Option 2

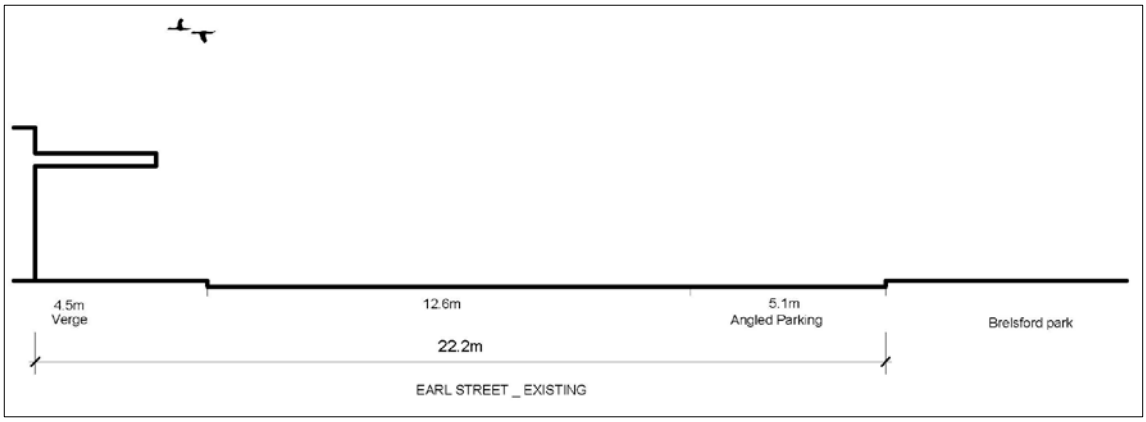


2.1.4 Earl Street

Existing

Earl Street between Harbour Drive and Park Avenue is generally configured as a two-way, two-lane carriageway. Parallel parking is provided on the western side of the carriageway with angle parking provided adjacent to Brelsford Park. The cross-section is shown in Figure 2.10.

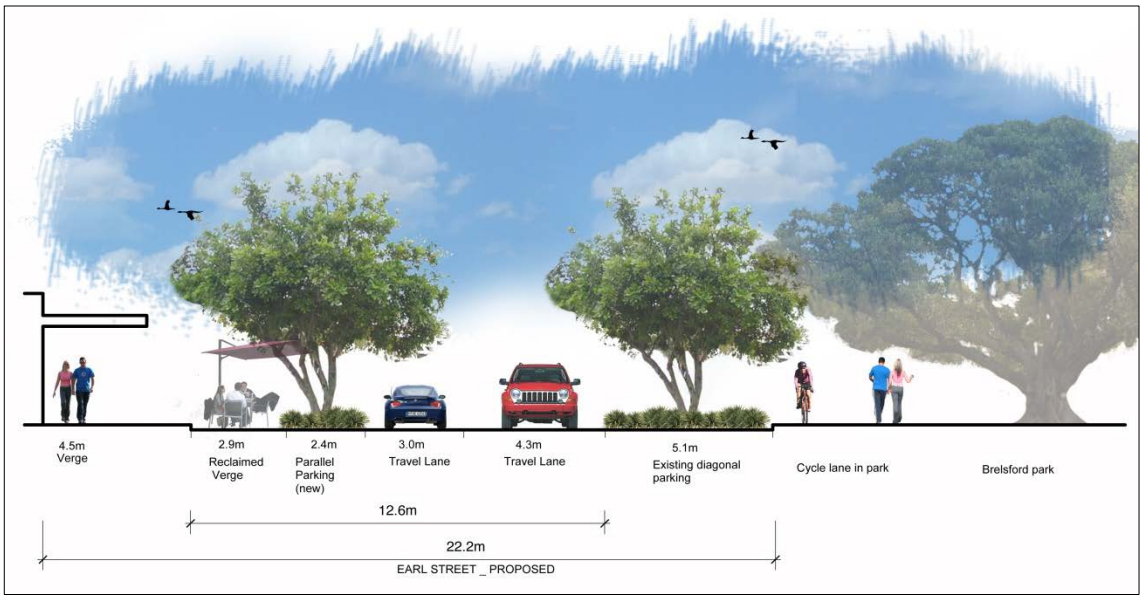
Figure 2.10: Earl Street Existing Cross-Section



Proposed

It is proposed to reduce the carriageway by 2.9 metres western side of the street and add this to the verge. This could be used for planting or outdoor dining. Parallel parking would be retained on the western side adjacent to a 3.0 metre traffic lane. It is proposed to retain the existing diagonal parking on the eastern side of the carriageway; however the adjacent carriageway will be reduced to 4.3 metres. The proposed cross-section is provided in Figure 2.11.

Figure 2.11: Earl Street Proposed Cross-Section

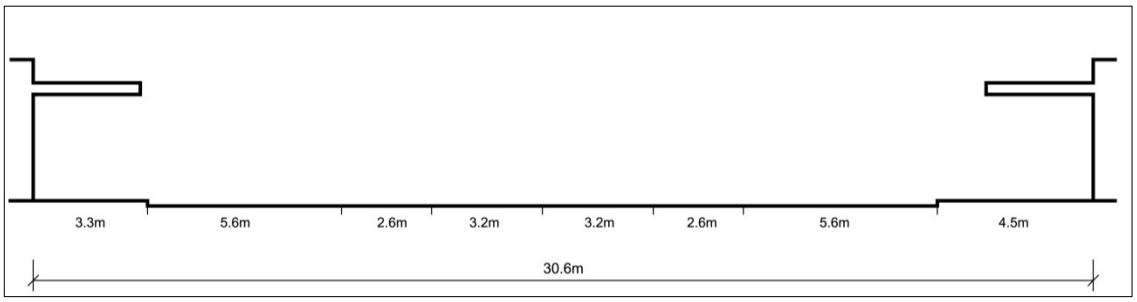


2.1.5 Moonee Street

Existing

Moonee Street is generally configured as a two-way, two-lane carriageway. Each side has a 2.6 metre parking manoeuvre lane and parking spaces. The typical cross-section is shown in Figure 2.12.

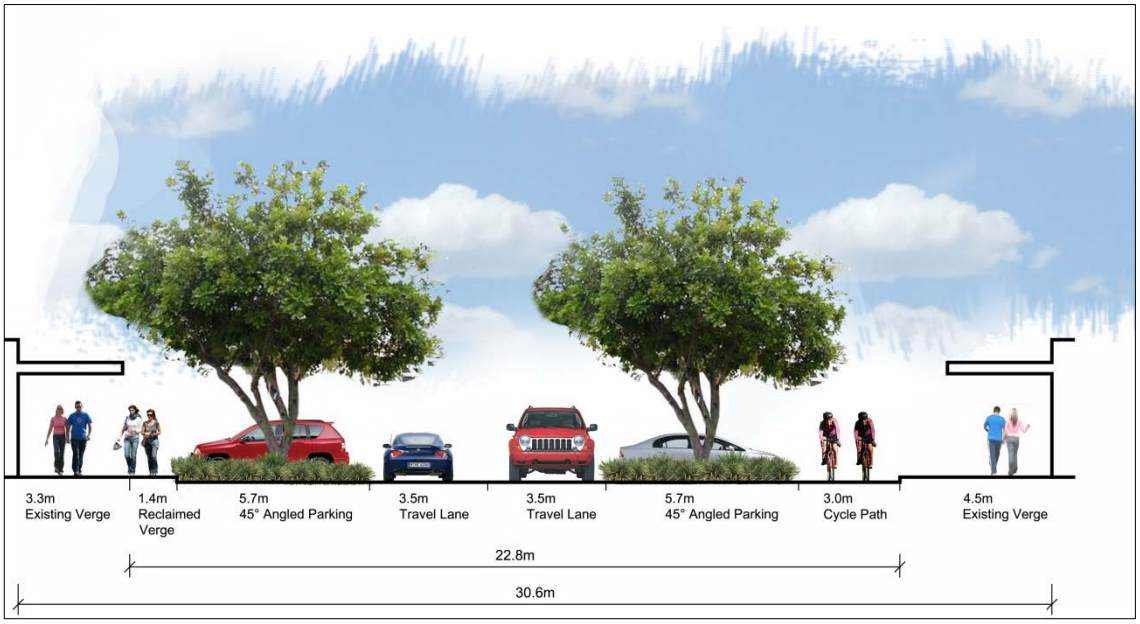
Figure 2.12: Moonee Street Existing Cross-section



Proposed

It is proposed to provide a 3.0 metre two-way bicycle path on the eastern side of the road reserve and a 1.4m reclaimed verge on the western side of the road reserve. To facilitate this, it is proposed to remove the parking manoeuvre lanes and provide two 3.5 metre wide lanes with 45 degree parking on both sides of the carriageway. The proposed typical cross-section is shown in Figure 2.13.

Figure 2.13: Moonee Street Proposed Cross-section



2.2 Loss of Parking Spaces

The proposed changes to the street configuration are expected to result in the loss of approximately 140 short-term car parking spaces from the City Centre. It is recommended that these spaces are replaced by reducing the amount of long-term spaces within the City Centre by a similar amount. The recommended locations for removing long-term parking include:

- Duke Street car park
- Duke Street
- Palms Centre car park (Castle Street)
- Moonee Street car park
- Albany Street car park.

It is recommended that where a street cross-section changes reducing the amount of parking, the spaces are replaced in the closest available car park or by extending the short-term parking where on-street unrestricted parking exists.

3. Pedestrian Infrastructure

3.1 Proposed Improvements

A number of existing pedestrian zebra crossings which are located mid-block are proposed to be relocated to the nearest intersection. More information is provided in Section 7 in relation to the impact on vehicular traffic. The proposed change is expected to improve the walkability of the City Centre which is expected to encourage people to walk further within the City Centre and to also more seriously consider walking as an option rather than driving short distances to visit the City Centre (or parts thereof).

To improve the connection to the proposed Justice Centre on Pacific Highway north of Beryl Street, a marked foot crossing will be included at the signalised intersection of Pacific Highway and Beryl Street.

3.2 Proposed Strategies to Increase Walking

To improve the percentage of City Centre employees that walk to work and those that walk within the City Centre at lunchtimes and for short trips (rather than drive), a number of strategies have been identified. It is expected that these strategies could form part of a workplace travel plan for each business in the City Centre. Some strategies would require assistance and input from Council.

- Produce a map showing safe walking routes to and from each the City Centre with times (not distances) to local facilities, such as shops and public transport stops.
- For individual sites, identify employees living near work that may be interested in walking to work.
- Provide lockers for keeping a change of clothes.
- Provide showers and change room facilities.
- Encourage walking meetings to get the brain going, for those times when people don't need to take notes.
- For offices, have a few umbrellas handy at reception for rainy days – perhaps bearing the company logo.
- Council to regularly review the quality of the footpath and pram ramps within the City Centre
- Take part in 'National Walk to Work Day'.
- Have some TravelSmart 'Get to Work' days encouraging staff to come by alternative modes of transport.

3.2.1 Workplace Travel Plan

Businesses within the Coffs Harbour City Centre should be encouraged to prepare Workplace Travel Plans for their business to reduce single-occupant car transport by staff to and from the workplace. Generally this involves increasing travel mode by public transport such as buses, carpooling or car-sharing as well as 'active travel', which includes walking and cycling.

The workplace travel plans would identify where public transport to the study area exists, where cycle facilities exist and to identify ways that more people could switch their current mode of travel away from the private vehicle.

A Council Sustainable Transport Officer (existing or potential new role/ responsibility) could work with businesses in the City Centre to create personalised Travel Plans and/ or prepare a template or sample plan which businesses could base their personalised travel plans on.

4. Cycle Infrastructure

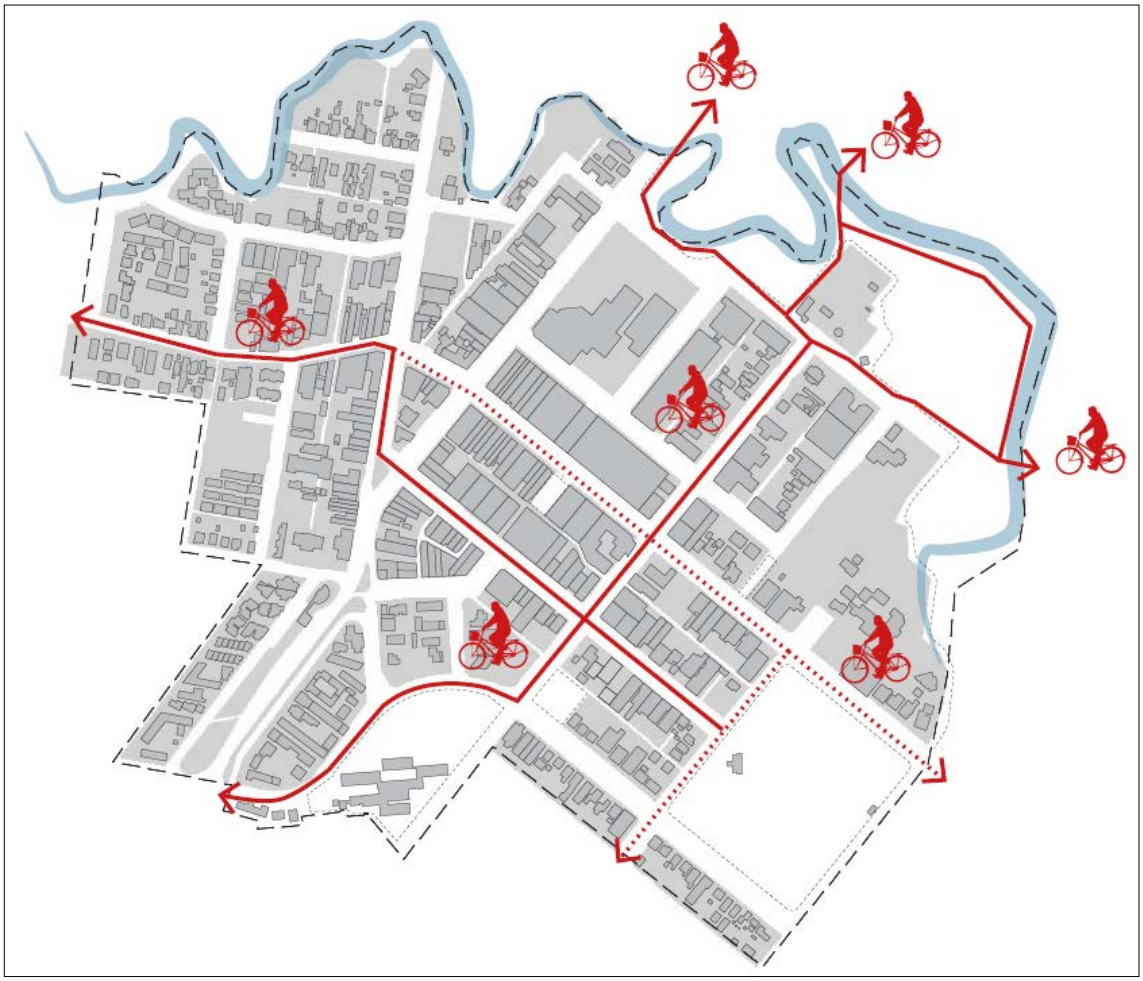
4.1 Proposed Improvements

As part of the road network improvements, it is proposed to provide cycle links within the City Centre to connect with existing bicycle infrastructure outside the City Centre. Bicycle lanes within the road reserve are planned along Gordon Street and Park Avenue.

The Gordon Street path would connect Fitzroy Park to Albany Street (where St. Augustine's Primary School is located) and the Park Avenue path would connect Moonee Street to Brelsford Park.

Marked on-road paths are proposed along Harbour Drive, connecting from West High Street/ Moonee Street to the south-east. A proposal of the bicycle linkages is shown in Figure 4.1.

Figure 4.1: Coffs Harbour City Centre Proposed Cycle ways



Detailed investigation would be required as part of the design stage to determine the intersection control for the separated cycleways and the impact on the operation of the road network.

4.2 Proposed Strategy to Increase Cycling to and from the City Centre

To improve the percentage of City Centre employees that ride a bicycle to work and those that ride within the City Centre at lunchtimes (rather than drive), a number of strategies have been identified. It is expected that these strategies could form part of a workplace travel plan for each business in the City Centre. Some strategies would require assistance and input from Council (see also Section 3.2.1).

- Assist the Coffs Harbour Bicycle Users Group by providing advertising and exposure to increase awareness.
- Develop a central bicycle hub for the City Centre which could include secure parking, showers and change room facilities.
- Ensure directional signage is clear and consistent across the LGA.
- Develop a 'bike buddy' scheme for inexperienced cyclists.
- Organise a cyclists breakfast.
- Organise an after-work ride. It doesn't have to be long or strenuous, and could end somewhere for dinner or drinks. The idea is to encourage people who might be reluctant to cycle to 'give it a go!'
- Provide sufficient bicycle parking to meet peak needs.
- Have good, secure bicycle parking in an easily accessible location. It is not recommended that bicycle parking be provided within public car parks.
- Provide bicycle parking for visitors to major uses.
- Ensure bicycle parking is clearly visible or provide signage to direct people to cycle bays
- Provide showers and changing rooms.
- Negotiate with a local gym or sports centre for staff to use showers where not otherwise available.
- Provide lockers for a change of clothes.
- Supply a workplace toolkit consisting of puncture repair equipment, a bike pump, a spare lock and lights.
- Provide a pool bicycle for staff to use when making short work trips during the day.
- Come to an arrangement with a local bicycle retailer for cheap servicing of staff bikes and other incentives.
- Provide interest free loans for staff to buy a bicycle which they then pay back from their wages.
- Provide an on-site bicycle maintenance service (either as a special one day event or on a regular basis).
- Provide insurance cover for those cycling on work business.
- Produce a map showing more leisurely bicycle routes to the City Centre.
- Use bicycle couriers for local deliveries.
- Participate in annual events such as 'Ride to Work Day'.

In terms of end of trip facilities such as showers and lockers, it is recommended that they be provided on an as-needs basis in consultation with bicycle user groups. We cannot advise how many end-of-trip facilities are required at this stage. It is not recommended that a large facility be provided unless extensive planning is undertaken to determine the potential need and likely usage.

It is recommended that facilities are provided at or as close to key trip attractors as possible. Where new developments are to be constructed, it is recommended that they also provide adequate facilities for bicycle riders.

It is recommended that Council monitor the areas where bicycles are parked informally and provide formal bicycle parking spaces in these locations. This could include the parking as noted in Figure 4.2 which makes use of existing street poles.

Figure 4.2: Example Bicycle Parking Treatment

5. Public Transport

5.1 Existing Facilities

The two main facilities for buses servicing the Coffs Harbour City Centre are the coach terminal located adjacent to the tourist information centre, bound by Elizabeth Street and Pacific Hwy, south of McLean Street and the 6 bus bays located along Park Avenue near Little Street.

The coach terminal consists of a covered area with seating, public telephone and vending machine facilities and is near to public toilets.

As previously identified, Park Avenue consists of bench seating located adjacent to the pedestrian paths, with shelter above the seating only. The north side shelter is provided by the car parking structure of the street, whereas stand-alone bus shelters are provided on the south side of the street.

5.2 Existing Bus Services

A review of the Bus services (Local, Regional and Interstate) that utilise either the existing coach terminal near the tourist information centre or the bus bays along Park Avenue was undertaken by GTA Consultants.

Predominately, Busways operate inter-town services through Coffs Harbour, whereas Sawtell Coaches provide inter-town services to the south of Coffs Harbour. Several other operators have regional and interstate services operating either from Park Avenue or the coach terminal.

During a typical weekday, it was noted that up to 11 services that utilise either Park Avenue bus stops or the coach terminal can occur in any half hour period. During a peak period, up to 5 services could arrive in a 5 minute period. Depending on service type, dwell time is expected to be minimal for through services.

5.3 Proposed Vernon Street Bus Hub

As part of the long-term street amenity improvements and changes to Park Avenue, one potential location for the existing bus stop on Park Avenue to move is Vernon Street underneath the connection between the Palms Shopping Centre and the Palms Centre car park. The area is currently not considered adequate in terms of amenity and would require a significant upgrade. There are also a number of space constraints in that area which would need to be considered before relocation of the existing bus stop.

Some key criteria for inclusion/ as part of a new bus interchange to service the Coffs Harbour City Centre would be:

- a minimum of 6 bus bays (operating independently)
- minimal diversion route for interstate bus services (close to Pacific Highway)
- convenient to the shopping facilities
- adequate weather protection for waiting passengers
- adequate seating for waiting patrons
- toilet facilities, potentially including showers and change rooms

- passive security controls, sufficient night lighting, near an active area
- active security controls, surveillance cameras, emergency assist intercom
- public telephone
- vending machine facilities.

An initial concept layout for a bus hub on Vernon Street has been prepared by GTA Consultants and is provided in Figure 5.1.

Figure 5.1: Concept Sketch of a Bus Hub in Vernon Street

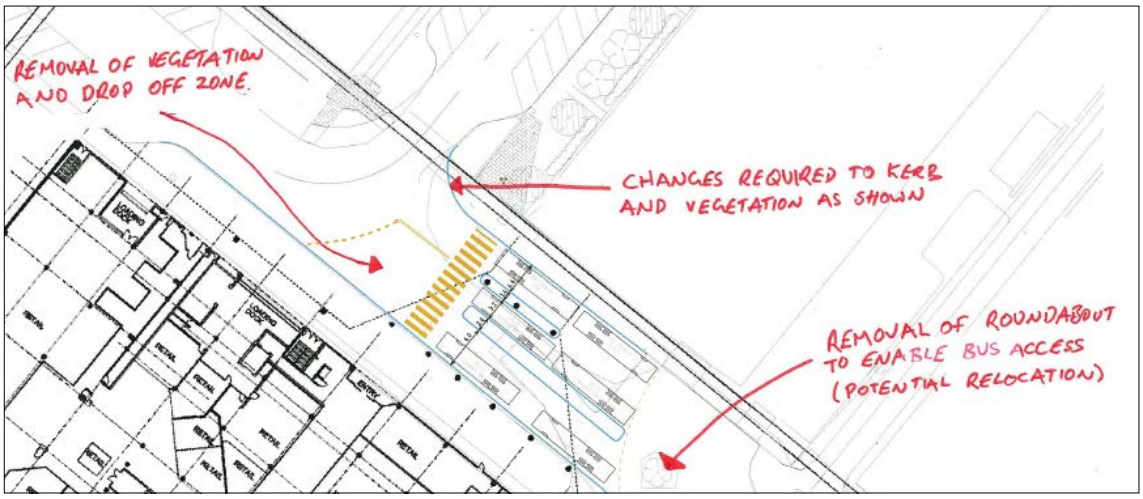


Figure 5.1 indicates that 6 bus bays can be achieved however there are limitations to how they can function. There is insufficient width to allow independent operation for 4 of the bus bays (2 eastbound and 2 westbound). In addition, there is limited room to expand in the future should this be required.

The area is not currently activated which could pose safety issues for waiting customers. However, if this location is chosen as the bus hub then a significant investment could make the area safe, attractive and a positive customer experience.

The following changes to Vernon Street would be required to provide a bus hub in this location:

- Changes to kerb and removal of vegetation to allow access to buses from Castle Street. Alternatively, bus access could be provided from the Pacific Highway via Vernon Street.
- Kerb and vegetation reconfiguration on the southern side of Vernon Street to enable bus egress.
- The bus hub would become 'bus only'. At least during the day time and all vehicles that currently exit the Castle Street via Vernon Street would have to continue to Gordon Street.

It is recommended that a more detailed study be undertaken to consider the design, access for buses and the required changes to the road network in that area. Based on the initial investigations, there are a number of issues at this location with respect to size of the area and lack of independent operation of bus bays. Given the width of Vernon Street there is the potential for a bus hub to work in this location, however more detailed investigation is required.

5.4 Short-term Improvements to Park Avenue

In the short-term it is recommended that the following improvements be made to the Park Avenue bus stops:

- improved weather protection
- improved customer information such as maps of bus routes and walking directions maps
- increased seating, particularly on the northern side of Park Avenue.

6. Car Parking

6.1 Expected Future Additional Short-Term Parking Requirements

The following sections set out an assessment of the anticipated future short-term parking spaces the Coffs Harbour City Centre requires to satisfy the future anticipated Gross Floor Area (GFA). The assessment also considers where and how additional car parking demands could be provided.

Based on information provided in *Business Lands Component Local Growth Management Strategy, Coffs Harbour City Council August* 2010 and the 2012 Coffs Harbour LEP, GTA Consultants undertook an assessment to determine approximately how much additional short-term parking would be required by the year 2031.

The *Business Lands Component Local Growth Management Strategy* reviewed a range of background documents and took into account expected population growth in the region to identify the expected future land use.

The study area in the document closely aligned with the Coffs Harbour City Centre Masterplan study area and is shown in Figure 6.1.

Figure 6.1: Study Area (Business Land Component Local Growth Management Strategy, Coffs Harbour City Council 2010)

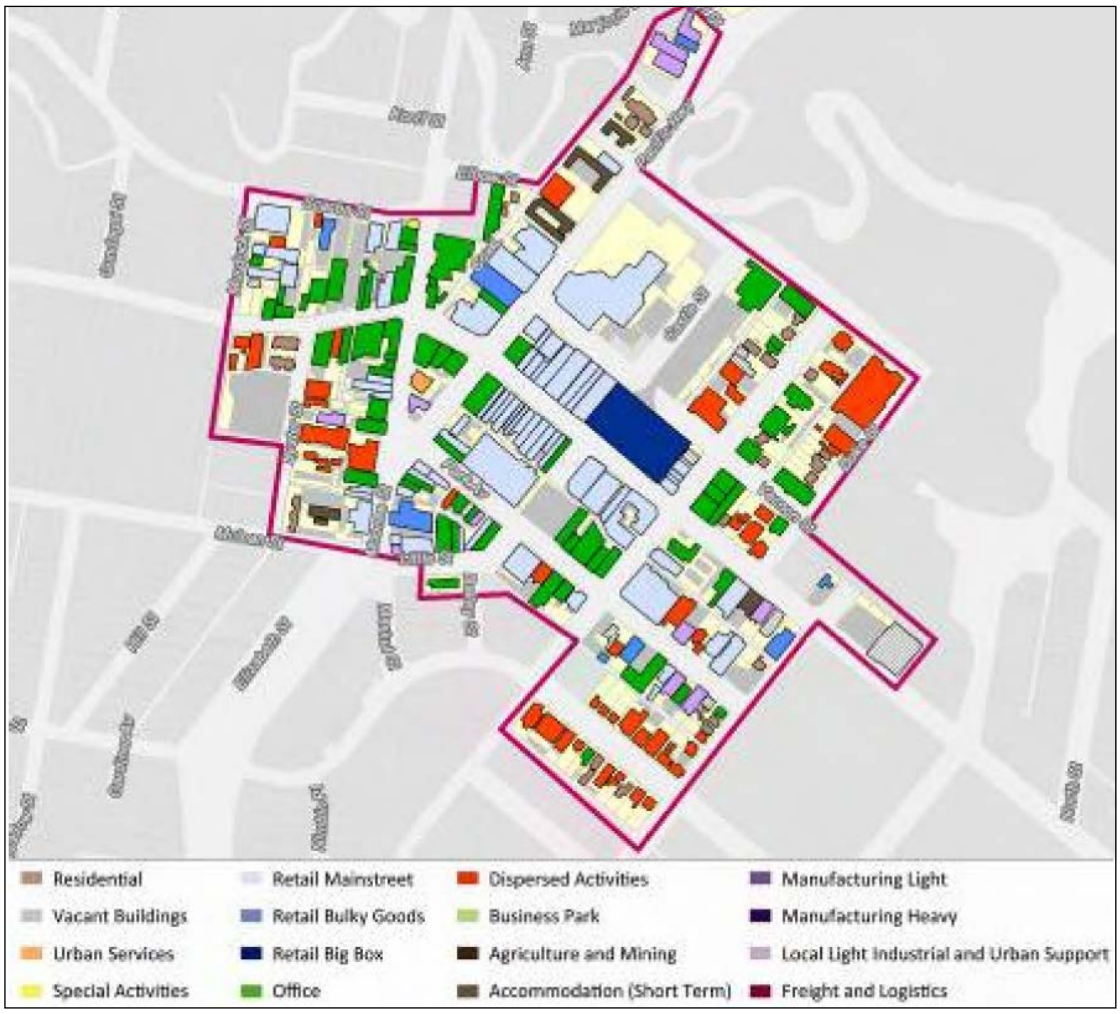


Figure 6.1 indicates that the City Centre approximately correlates with the Coffs Harbour City Centre Masterplan study area. The only exception is that some land north of Coff Street is included in this study area which is not included in the Masterplan study area. For the purposes of this assessment, no change has been made to the study area.

There are three scenarios provided in the Business Lands Component Local Growth Management Strategy. In consultation with Roberts Day, GTA Consultants have used Scenario 2.

Table 6.1 sets out the expected additional GFA and short-term parking spaces required between the base 2006 scenario and the 2031 scenario.

In addition, Table 6.1 also makes an assessment of the land use demand at the peak time and the proportion of total parking demand that is short-term.

Table 6.1: Summary of Expected Future GFA and Short-Term Parking Requirements

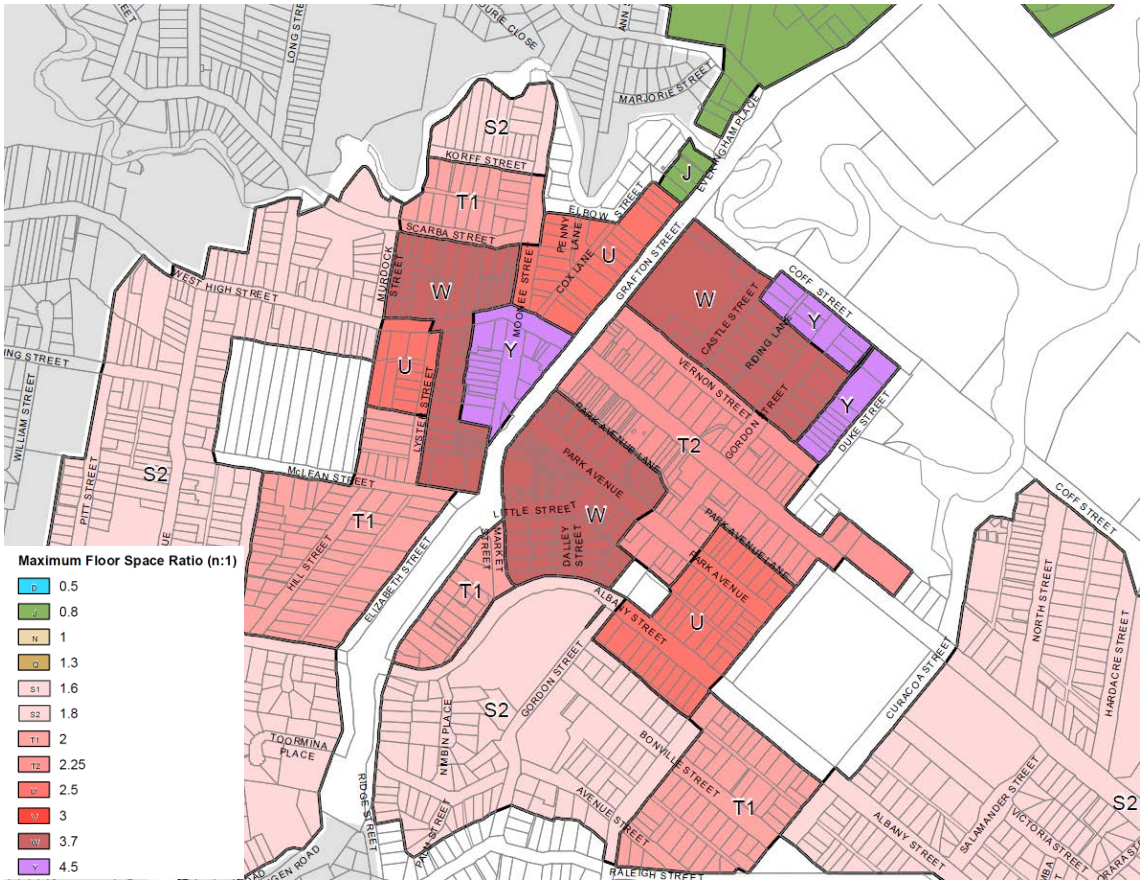
Land Use	Expected Future Growth (GFA)	Selected Rate		Total Requirement	Demand at Peak Hour	Proportion of Short Term Spaces	Short Term spaces required
Accommodation Short Term	173	1	space / apartment	6	100%	0%	0
Dispersed Activities [4]	5,881	4	spaces / 100sqm [1]	147	100%	80%	118
Light Industrial	218	1	space / 100sqm [2]	2	100%	10%	0
Office	24,094	2.5	spaces / 100sqm [2]	602	100%	10%	60
Retail Big Box	6,939	2	spaces / 100sqm [2]	139	100%	80%	111
Retail Bulky Goods	1,064	2	spaces / 100sqm [2]	21	100%	80%	17
Retail Main Street	10,165	4	spaces / 100sqm [2]	407	100%	80%	326
Special Activities [5]	5	0	spaces / 100sqm	0	0	0%	0
Urban services [6]	159	2.5	spaces / 100sqm [3]	0	100%	10%	0
Total	**48,698**			**1,324**			**632**

[1] Assumed based on a medical centre rate using rates from the GTA Consultants database
[2] Coffs Harbour City Centre DCP 2011
[3] Based on a rate for Light Industrial from the Coffs Harbour DCP 2011
[4] "Primary and secondary education, lower level health, social and community services, trades construction, other 'nomads'. *Business Lands Component Local Growth Management Strategy 2010*
[5] "Tertiary level education, health, and community services. Typically require strategic locations and needed in each sub-region". *Business Lands Component Local Growth Management Strategy 2010*
[6] "Concrete batching, waste recycling and transfer, construction and local and state government depots, sewerage, water supply, electricity construction yards". *Business Lands Component Local Growth Management Strategy 2010*

Table 6.1 indicates that by 2031 during the peak hour, an additional 632 short-term parking spaces are expected to be required within the study area.

To determine the proportion of future parking required east and west of the Pacific Highway, GTA Consultants used the proposed floor to space ratio (FSR) in Coffs Harbour City Centre LEP 2011 (see Figure 6.2) and existing lot sizes.

Figure 6.2: Coffs Harbour City Centre LEP 2011 – Maximum Floor Space Ratio



Based on a total short-term requirement of 632 additional parking spaces in 2031, Figure 6.2 was used to determine the expected proportion of additional short-term parking to the east and west of Pacific Highway. The results of this assessment is summarised in Table 6.2.

Table 6.2: Short-Term Parking Requirements

Area	Total Floor Area (Approx.)	% of Total Floor Area	Short-Term Parking Requirement
East	630,000	68%	429
West	300,000	32%	203
Total	930,000	100%	632

Table 6.2 indicates that of the estimated 632 additional short-term parking spaces required by 2031, 429 and 203 spaces are required east and west of Pacific Highway respectively.

6.2 How Can Future Parking be Provided?

Additional car parking supply could be provided in a number of ways to satisfy the future anticipated car parking demands including:

- utilising existing car parking vacancies
- create additional public car parking facilities
- provide car parking on-site as part of any new development.

Each of these options is discussed in the following sections.

Before exploring each of these options, some consideration should be given to the preferred type of parking to accommodate the different parking users.

Long term parking for retail and commercial/ office staff can, beyond some convenient minimum amount, be located in public car parks if these exist. Otherwise these need to be accommodated on-site. In general, long term parking should not be accommodated on-street.

Visitor (short-term) parking can either be accommodated on-site, on-street or in car parking facilities. Visitor parking is by its nature, short term and characteristically occurs at different times for different uses. In these circumstances, a clear opportunity exists to share the same spaces for visitors of different uses which implies that it is inefficient to provide visitor spaces on-site. In summary, visitor parking is best provided either on-street or in a public car parking facility.

Given the above, it is convenient to assess the car parking supply options by reference to the capacity and suitability of accommodating car parking on-street first, opportunities for car parking stations secondly and then directing the remainder of the demand to be accommodated on site.

6.2.1 Utilising Existing Car Parking Vacancies

Given the cost of providing additional car parking, it is important to maximise the use of the existing car parking supply within the City Centre. In particular, on-street car parking represents a parking resource which should not be ignored when designing a car parking system. This parking often represents the most proximate and attractive parking for visitors to developments and can effectively and efficiently be shared between multiple land uses, particularly if land uses have peak parking requirements occurring at different times of the day.

The use of on-street car parking acts to calm traffic speeds and adds to the vitality of the area and to not allow the use of this car parking in satisfying a development's car parking generation calculation, will often result in an underutilisation of the car parking provision which is provided on-site.

As such, in establishing the most appropriate way to cater for the future car parking demands some reliance on on-street and public off-street parking should be considered. It is clear from the car parking surveys however that there are not enough on-street vacancies to cater for the expected future requirements.

6.2.2 Providing New Public Car Park Facilities

To understand the potential cost of car parking facilities, GTA Consultants has prepared a summary based *Rawlinsons Australian Construction Handbook 2012*. The summary is provided in Table 6.3.

Table 6.3: Indicative cost for new public car parks

Type of Facility	Indicative Size	$ per space [1]	Total Cost
At-grade car park	100 spaces	$3,150 to $3,675 [2]	$315,000 to $367,500
Above ground 2 levels	100 spaces	$16,800 to $17,850 [3]	$1,608,000 to $1,785,000
Above ground 3 levels	100 spaces	$19,425 to $20,475 [3]	$1,942,500 to $2,047,500
Below ground 2 levels	100 spaces	$55,125 to $59,325 [4]	$5,512,500 to $5,932,500

[1] Does not include any land acquisition costs. Includes a 5% allowance for Coffs Harbour.
[2] Including bitumen paving, stormwater drainage, minimal lighting and some landscaping
[3] Ground + 2 or 3 levels – including reinforced concrete construction, open sides, minimal toilet facilities, and no lifts ventilation or fire sprinklers.
[4] Reinforced concrete including deck over, mechanical ventilation, fire sprinklers, landscaping to top of deck; minimal facilities and no lifts.

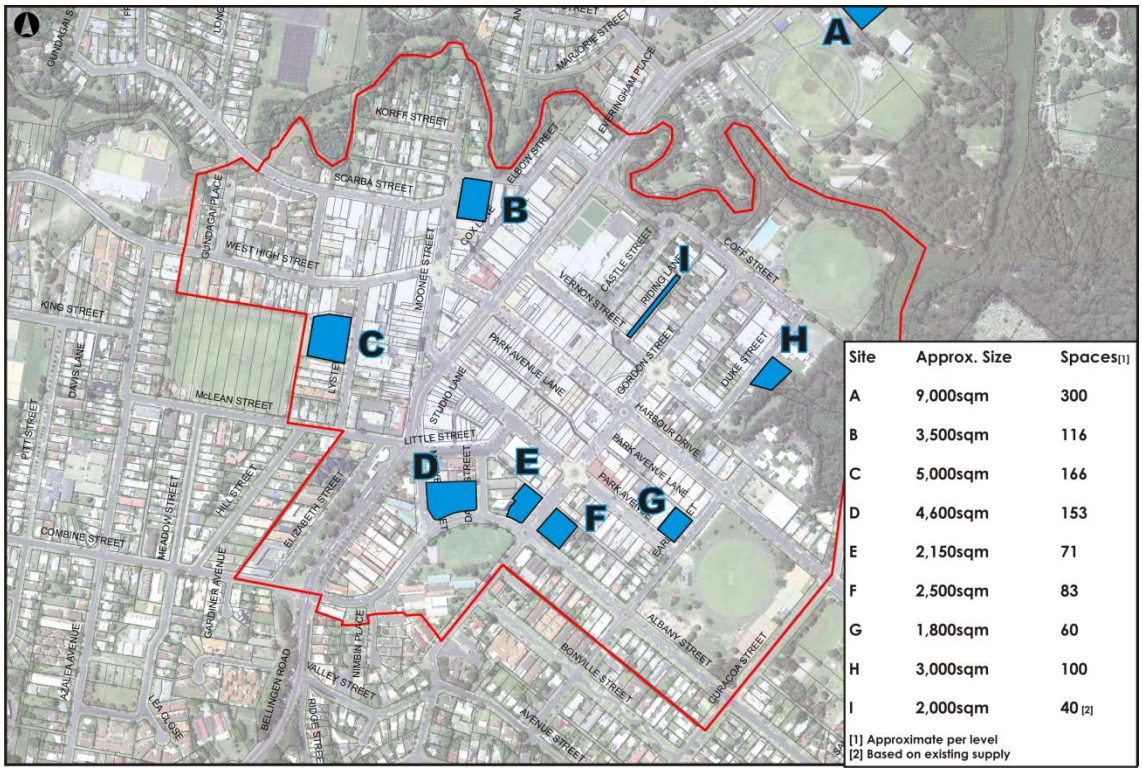
Table 6.3 indicates that to construct a car park for 100 spaces would cost in the order of $315,000 to $5.9M depending on the configuration and design of the car park. As identified, this does not include land acquisition costs, planning and other associated costs. Based on an average of 30sqm GFA per car parking space (which accounts for access locations, ramps, columns and dead space), approximately 3,000sqm would be required to cater for a 100 space car park.

Possible Public Car Parking Facility Locations

Based on the above and the requirement for 632 short-term car parking spaces (429 and 203 spaces required east and west of Pacific Highway respectively), GTA Consultants have identified a number of possible locations where additional car parking could be provided.

Figure 6.3 presents possible locations for additional off-street car parking, the size of the sites and an estimate of the number of spaces per level each can accommodate.

Figure 6.3: Possible Additional Car Parking Locations



The indicative costs associated with the construction of these potential car parks are presented in Table 6.4.

Table 6.4: Indicative Costs for Potential Car Park Locations

Site	Existing Spaces	Potential Type	Potential Additional Spaces	Indicative Cost Range*
A	Informal parking	At-Grade	300	$945,000 to $1,102,500
B	130	2 storey	102	$1,713,600 to $1,820,700
C	176	2 storey	156	$2,620,800 to $2,784,600
D	0 (currently private land)	2 storey	306	$5,140,800 to $5,462,100
E	82	2 storey	60	$1,008,000 to $1,071,000
F	0 (currently a park)	2 storey	166	$2,788,800 to $2,963,100
G	54	2 storey	66	$1,108,800 to $1,178,100
H	52	2 storey	148	$2,486,400 to $2,641,800
I	38	3 Storey	120	$2,331,000 to $2,457,000

* These costs do not include associated demolition or land acquisition costs.

Site A (the showgrounds), approximately 10 minute walk from the City Square, is considered suitable for staff/ all day parking (unrestricted) allowing a proportion or all existing unrestricted off-street parking (approximately 1,000 spaces) in the City Centre to be used for time-restricted/ short-term parking, potentially reducing the need for further car parks.

It is recommended that car parking be generally considered separately for the east and western sides of the City Centre. It would also be preferable to spread out the car parking demand throughout the City Centre rather than concentrating it in one central location. If all new car parking was to be concentrated into one central location traffic congestion would significantly increase in that area, potentially requiring intersection upgrades. In addition, consideration should also be given to appropriate walking time and distance set out in the next section.

It is noted that there is an existing car park accessible from Scarba Street. The car park is considered too narrow to redevelop as a stand-alone site however it could be developed in the future incorporating adjoining properties. This could be part of a joint-venture or as a stand-alone development.

Appropriate Walking Time and Distance

Acknowledgement must be given to appropriate walking time and distances between car parking locations and a user's intended destination. Generally, the time and distance which drivers are prepared to walk depends on the length of time which will be spent at their destination.

For people with disabilities, deliveries and convenience trips, approximately 1 minute (50m) is considered a reasonable walking time.

For longer visits such as those to supermarkets, medical centres and residents, approximately 3 minutes (250m) is considered a reasonable walking time.

For general retail, restaurant and entertainment uses, approximately 5 minutes (400m) is considered a reasonable walking time.

For employees and overflow parking, approximately 5 to 10 minutes (400m to 800m) is considered a reasonable walking time. As previously identified, showgrounds is accessible from the City Square within a 10 minute walk.

This assessment considers the relative topography and climate of Coffs Harbour.

6.2.3 Providing Car Parking On-Site

It is not always appropriate to allow a development to utilise on-street car parking to cater for its car parking demands or a development may want to provide all of its car parking on-site for economic purposes. In such cases, on-site car parking can be provided to cater for some or all site users.

If on-site parking is to be for private use only, it may not always represent the most efficient provision of car parking, i.e. does not allow for the sharing of short term parking between multiple users, however barring urban design and access constraints, on-site parking is suitable to cater for all demands.

On-site parking is mainly applicable for medium-large multi-purpose developments where underground or podium parking is an option. For such developments, appropriate levels of on-site parking should be provided for commercial uses within the building for all user types to reduce the reliance on off-site parking which is required to cater for smaller commercial developments.

Where a developer is proposing additional public car parking to cater for a use such as a supermarket and additional public car parking is expected to be required in the future, Council should consider working with the developer to increase the size of the car park to cater for the development requirements as well as the anticipated future public car parking requirements.

6.3 Recommended Approach

It is recommended that as much parking as possible (beyond some convenient minimum for each development) be provided within public car parks in the City Centre to minimise the overall parking requirement. As discussed in Section 2.2, it is recommended that the following unrestricted car parks be converted to short-term progressively over time to cater for additional short-term parking demand:

- Moonee Street
- Duke Street
- Palms Centre (Castle Street)
- Albany Street
- Scarba Street
- Lyster Street.

It is noted that additional pedestrian connections would be required to ensure appropriate walking distance for the Lyster Street car park.

If new public car parking facilities are to be provided, it is recommended that these be funded either fully or party via Section 94 developer contributions. A more detailed car parking study would be required to determine the size of the facility and appropriate cost per space.

For additional long-term parking it is recommended that parking in public car parks should be provided on the periphery of the City Centre. For example, if the Moonee Street car park was to be expanded then the top level (for example) could be used for unrestricted parking with the lower level used for short-term parking.

6.4 Future Mode Share Target

GTA Consultants undertook a review of 2006 and 2011 journey to work data available of Coffs Harbour City Council's 'Profile.ID' website. Data presented on the website is based on the place of residence therefore analysis of travel mode is presented by origin. Analysis of origin and destination of workers in the Coffs Harbour Local Government Area (LGA) indicates that 90.6% of workers work and live in the LGA and 68.7% live and work in the same Statistical Local Area (SLA). This indicates that an assessment of travel mode would provide an adequate understanding of Coffs Harbour City Centre staff journey to work mode share.

Journey to Work mode share was reviewed for the Coffs Harbour Central and Central North districts. The results of the journey to work mode share is summarised in Table 6.5.

Table 6.5: Mode of Travel

Mode of Travel	2011		2006	
	Number [1]	%	Number [1]	%
Bus	24	0.6	50	1.4
Taxi	0	0.0	15	0.4
Car - as driver	**2,928**	**77.4**	**2,541**	**72.8**
Car - as passenger	325	8.6	379	10.9
Truck	89	2.4	104	3.0
Motorbike	38	1.0	40	1.1
Bicycle	74	2.0	66	1.9
Walked only	267	7.1	261	7.5
Other	38	1.0	36	1.0
Total	3,783	100	3,492	100

[1] Employed persons aged 15+

Table 6.5 indicates that residents of Coffs Harbour Central and Central North predominantly travelled to work by car as a driver (77.4%) in 2011. Travel to work by car (as driver) increased by 4.6% between 2006 and 2011. There has been a 0.1% increase in travel by bicycle with all other modes reducing in the timeframe. Car as passenger has decreased from 10.9% to 8.6% across the same time period.

Compared to the Coffs Harbour LGA and Regional NSW, the study area has 2.6% less people travelling to work by car at 81% and 80% respectively.

GTA Consultants recommend that a target of 70% be set for travel to work by car (as driver), a reduction of roughly 10%. If a reduction of 7.4% can be achieved, this would result in a theoretical reduction in car parking demand in the CBD of 182 vehicles during the peak hour[1].

The cost of providing an additional 100 car parking spaces can range from $315,000 to $367,500 for an at-grade car park or $1,942,500 to $2,047,500 for an above ground car park. The saving for reducing parking demand by 182 vehicles and delaying the need for additional future parking would be approximately $600,000 for at-grade parking and approximately $3,700,000 for an above-ground car park.

[1] Based on the peak overall demand for GTA Consultants survey on 4 October 2012.

6.5 Redevelopment of the Park Avenue Car Park

In the long-term, the site of the Park Avenue car park is proposed to be redeveloped to a cultural building which, depending on the final development configuration, could result in a loss of car parking on the site. It is expected that this development would act as a catalyst for the redevelopment of the area to the south the existing City Square and Park Avenue.

The Park Avenue car park (P2), located in the heart of the City Centre adjacent to the Harbour Drive Mall area, has a total supply of 248 short-stay spaces, including 9 disabled spaces and 3 motorcycle parking spaces over 3 car parking levels.

Parking occupancy for the Park Avenue location was noted to peak at 12pm, with 246 vehicles parked. The day-time space occupancy surveyed for this location is shown in Figure 6.4.

Figure 6.4: Park Avenue Car Park Occupancy

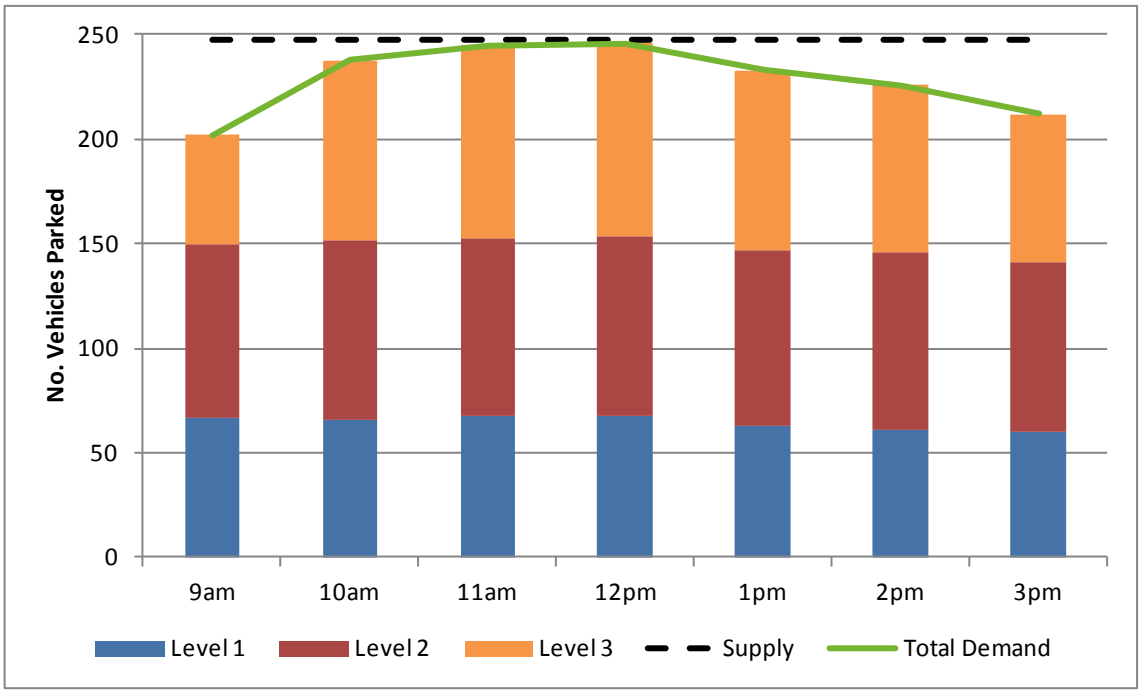


Figure 6.4 indicates that the Park Avenue car park reaches capacity during peak times.

If the Park Avenue car park were to be removed, the 248 car parking spaces would need to be accommodated within the surrounding City Centre area. Figure 6.5 shows the overall and short-term existing supply and demand within the surrounding south-eastern parking precinct (south of Harbour Drive). The total demand for the Park Avenue car park has also been shown in addition to existing short-term demand.

Figure 6.5: South-eastern car parking precinct day-time occupancy

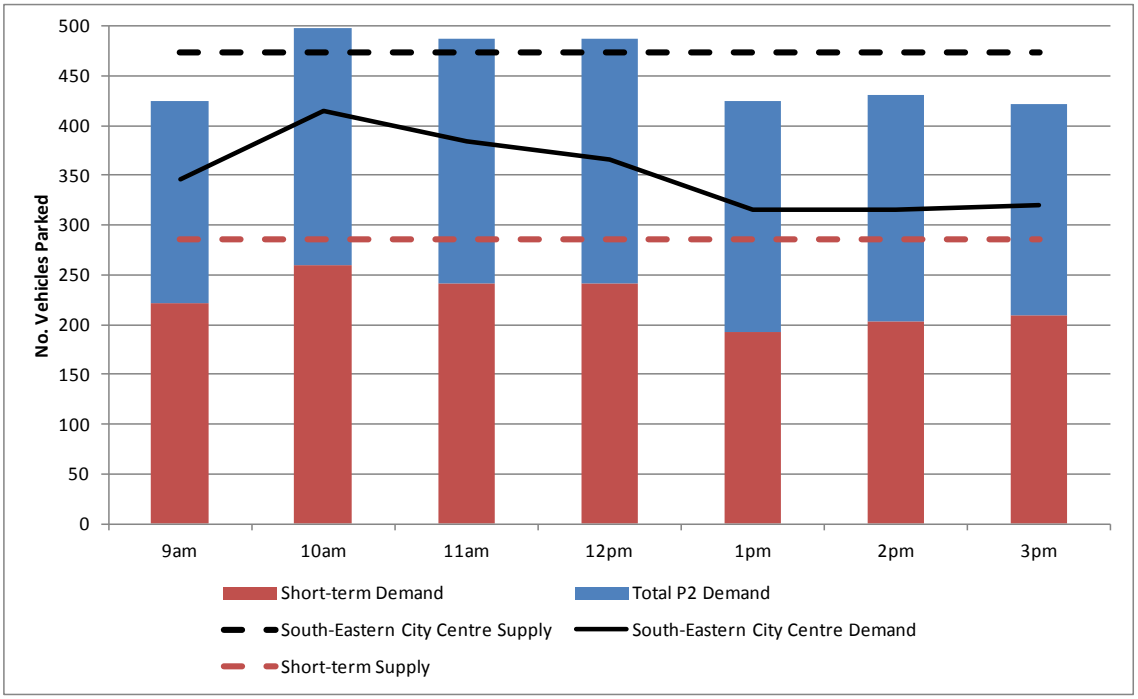


Figure 6.5 indicates that in the case of the current demand for the Park Avenue car park being relocated to the surrounding road network, the total demand would exceed both the existing short-term supply and overall car parking supply of on-street parking.

The occupancy analysis shows that in order to cater for the existing car parking demand, the Park Avenue car park would need to be relocated to a nearby location rather than be removed with all spaces retained for the nearby retail uses.

Alternatively, the site could contain the same number of spaces on-site for public use which would be incorporated as part of the design. This would need to be investigated in more detail at a later stage.

6.6 Should Parking Charges be introduced within the City Centre?

The existing conditions car parking surveys show that parking demand is at capacity within the core zone for the majority of the day and unrestricted public car parks are also at capacity for the majority of the day, associated with employee parking. These spaces are in highest demand and are currently provided free of charge to motorists with all Coffs Harbour residents paying for these assets through rates.

Duration of stay surveys indicate that while the majority of vehicles are complying with the restrictions, there is a level of non-compliance which reduces turnover and in turn, affects the viability of the City Centre.

Pay Parking prepared by RMS (previously RTA), version 3.1 June 2009 states that for a pay parking system, "*one of the objectives of pay parking is to enhance available parking spaces by increasing parking turnover. In addition there may also be other higher transport objectives such as management of travel*

demand or changing travel mode through pricing mechanisms. In this regard it is important that pay parking schemes implemented by declared organisations support and complement these objectives.

From a declared organisation's perspective, the objectives if implementing pay parking schemes within its area of operations may also include:

- *Improved parking control*
- *Improved customer / public access*
- *Improved safety / traffic efficiency"*

GTA Consultants clearly understands the current retail situation within the City Centre with regard to vacancy rates and subsidised rents. In this regard, the introduction of paid parking initially is not supported in the short-term. It is recommended however, that Council consider introducing pay in the medium to long-term across the areas of highest demand to ensure the viability of the operation of the City Centre and to assist in promoting a mode shift away from the private vehicle.

The introduction of a pay parking system would require a separate report to be prepared. The details are set out in the RMS *Pay Parking* document.

6.7 Parking Demand Management, Technologies and Innovations

The following section sets out a summary of the parking demand management techniques, technologies and recent innovations which could assist Council in enforcing the existing parking restrictions. This is only provided for information purposes at this stage to give Council an understanding of what is available. As identified above, compliance with restrictions is generally good but there is still a level of non-compliance. This should be monitored over time to ensure continued turnover of valuable customer spaces.

6.7.1 Dynamic Car Parking Signage

Dynamic car parking signage allows the number of vacant car parking spaces in a given area to be continuously displayed and updated on electronic signs located at key driver decision points. The system operates through the detection of a vehicle parked in a space or entering and exiting a car parking area. This information is fed to a controlling computer system operated by Council and then relayed to the associated electronic signage. Signs are located such that users have sufficient time to decide whether they enter the associated car parking area or not.

Such technology can assist in reducing road network congestion as vehicle circulation and time spent in search of a vacant space is reduced. Signage can also improve utilisation of car parking areas, particularly as they reach capacity and it becomes more difficult to identify where vacant spaces exist.

Dynamic Parking Signage is usually implemented within large off-street car parking facilities where the car park is not visible from the street and drivers have no idea of whether they will find a space until they get there.

6.7.2 Pay Parking Technology

There are a number of pay parking technologies which can be used in both on-street and off-street functions. A number of options are summarised in Table 6.6. As identified above, although it is not a

short-term recommendation, it is recommended that Council consider introducing pay parking in the medium to long-term.

Table 6.6: Pay Parking Technology

System Type	Use / Methodology	Advantages	Disadvantages
Multi-bay metres	Generally serves up to 10 spaces with one unit. Generally used only for on-street spaces	No consumables. Can be run via solar cells integrated on top of unit.	Can be confusing to some users, with each parking bay needing to be clearly numbered. One machine generally serves no more than 10 spaces.
Pay and Display ticket	One machine can serve all car parking spaces in close proximity to it. Can be used in both on-street and off-street areas.	Fewer units required compared to multi-bay meters. Can be run via integrated solar cells.	Requires consumables (paper).
Fixed price entry stations	Pay as vehicle enters a controlled parking zone. Used only for off-street parking areas.	Simple system suited to long term parkers depending on entry price.	Uniform rate parking, does not encourage high turnover of vehicles. Only applicable to off street parking. Requires entry gates and exit gates or directional spikes for exiting vehicles.
Automatic fee collection system	Ticket issued by dispenser upon entry to parking zone. Ticket paid at station before exiting parking zone, grace period typically provided. Used only for off-street parking areas.	Simple system suited to long term parkers depending on entry price.	Only applicable for off-street parking. Requires most expensive exit control system compared to other options.

Current technology for on street parking revenue collection systems include, single bay meters, multi-bay meters and pay and display meters.

These pay parking technologies all have the capability of accepting payment options including coin, notes, credit card and mobile phone. The use of mobile phone payment is the most recent technology innovation and is used in only limited areas at this stage however is becoming more accepted as a payment alternative. Mobile phone technology can also allow for the alerting of drivers when their meter is due to expire and also allow for the remote payment and top up of parking fees.

The real-time wireless communication capabilities of parking meters also allow for the transmission of alarms and data to central servers, facilitating the effective deployment of parking enforcement officers and the collection of parking information for councils.

Pay parking systems also provide a level of natural enforcement and an easy detection method of over-stay parking which usually leads to a higher level of driver compliance than in unpaid parking areas.

6.7.3 Pricing of Parking

Given a choice, motorists prefer unpriced parking, however the pricing of parking can assist in providing:

- A level of natural enforcement of restrictions (drivers are less willing to risk overstaying as an overstay event in a paid parking area is easier for enforcement officers to detect than in a simple time restricted area).
- Greater time efficiency in the enforcement task for officers monitoring parking spaces allowing a greater catchment of spaces to be captured.

As a result, a pay parking system assists to increase turnover of parking spaces. In addition, pay parking can act as a demand management tool, which reflects the priority order of spaces and emphasises the convenience of most important central parking areas. This assists, while not physically increasing the supply of parking, to increase the opportunity for more drivers to use the same parking space.

Furthermore the pricing of parking encourages more efficient (lower) use of parking facilities which in turn reduces parking facility costs and land requirements, reduces vehicle traffic and circulation and can provide revenue which can be used to enhance other elements of the transport system.

The success of how pay parking can assist to alter parking demands is uncertain, because it is difficult to quantify the level of such reduction. Research exists which has attempted to establish the elasticity of parking pricing on the demand for parking indicating an elasticity range of between -0.10 to -0.60 with an average of -0.30[2]. This means that a 100% increase in parking charges is likely to reduce demand by about 30%. The ability to establish this exact elasticity is however limited as different areas are afforded different levels of access to transport alternatives.

It must also be noted that this research is related to a change in parking price rather than the introduction of a parking price.

6.7.4 In-Ground Vehicle Detection Systems

In-ground vehicle detection systems can be used both in conjunction with pay parking operations or separately. These devices are placed in the ground and are individually programmed with information such as the location of the bay, its number and the time restrictions that apply to the bay.

The sensors use a magnetic field to detect the arrival and departure of vehicles in each individual bay and determine when a vehicle exceeds the time restriction.

The information gathered by the sensors can be then relayed via wireless technology to a handheld device carried by a patrolling Parking Officer, to indicate which vehicles are overstaying the posted time limit.

While this technology can be used to assist with parking enforcement it can be more broadly used to assist the overall operation of the parking system including being linked to website or mobile phone applications to alert drivers to the location of vacant parking spaces. In addition sensors can provide detailed information to Councils in respect of parking occupancies and durations.

The detectors in car parking bays contain an induction loop, radio transmitter and long life battery.

6.7.5 Enforcement Technology

It is possible to introduce a high level of technology for the surveillance, ticketing and processing of parking offences. While such technology may have a high implementation cost it can reduce operational costs, especially the number of parking enforcement officers, improve the coverage of officers and improve the responsiveness to illegal parking. A sample of a number of the most commonly adopted technologies is presented below.

[2] Source: Exploring travel and parking impacts of the Melbourne CBD parking levy, Paul Hamer, Graham Currie, William Young

Handheld Ticketing Machines

A majority of municipalities (as established through case studies) are utilising hand held ticketing machines as they reduce the required time an enforcement officer is required to prepare a ticket and any double-handing as far as recording the issued offence, as any ticket printed by the machine can be simply uploaded to a computer.

Fixed Cameras

The use of fixed camera technology for the surveillance of safety related parking locations (i.e. no standing, clearway and double parking) is relatively new and has experienced some resistance from local communities however has been shown to be very effective. The fixed camera records images every second which are reviewed to establish where illegal car parking activity has been observed to allow parking infringement notices along with photographic evidence to be issued.

Mobile Cameras

Mobile cameras are generally used to determine vehicle over-stay infringements. Mobile cameras perform the enforcement task similar to an enforcement officer walking a street route and marking tyres. However in this instance, vehicles are fitted with mobile camera technology and rather than marking tyres, photograph vehicles and number plates.

Recorded number plates of each parked vehicle are compared for each circuit driven by the vehicle to establish if vehicles have overstayed the posted time limits.

This technology allows a greater and more frequent coverage of key areas to maintain effective turnover and operations of parking.

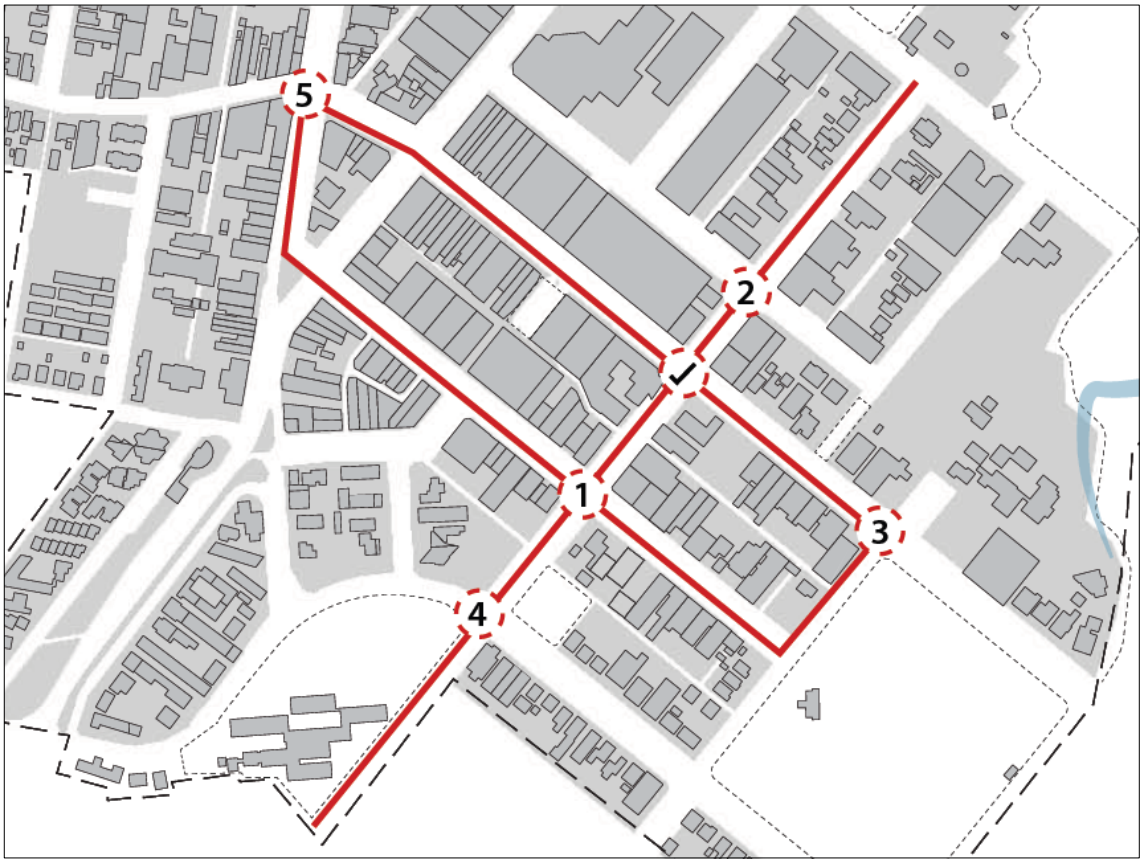
7. Traffic

7.1 Proposed Roundabout Removal Strategy

The objective of the City Centre Masterplan is to revitalise the City Centre and plan for what the City Centre should be in 2031. In order to achieve this, the City Centre will need to consider a sustainable transport strategy that balances the pedestrian, cyclist and vehicles. The existing roundabouts are difficult to cross for pedestrians and in some cases where pedestrian fencing is in place, this leads to extended walking distance and reduced walkability within the City Centre.

As part of this strategy, it is proposed to reconfigure and then ultimately remove a number of the roundabouts within the City Centre. These are shown in Figure 7.1.

Figure 7.1: Proposed Roundabout Removal Strategy



The roundabouts identified in Figure 7.1 include:

1 – Park Avenue / Gordon Street
2 – Vernon Street / Gordon Street
3 – Earl Street / Harbour Drive
4 – Albany Street / Gordon Street
5 – Moonee Street / West High Street.

Generally, the existing intersections are four leg roundabouts with two entry, circulating and exit lanes on each leg as shown in Figure 7.2. In some cases, pedestrian fences have been erected to prevent

pedestrian movements at the intersections. Pedestrian crossing points are generally located away from the intersection in mid-block sections. This arrangement results in poor pedestrian connectivity, particularly along Gordon Street, at the respective intersecting streets, to the benefit vehicular traffic and intersection operation.

Figure 7.2: Typical Existing Roundabout Layout (showing two circulating lanes and pedestrian fencing)

The proposed removal strategy involves two stages as follows:

- **Stage 1:** Add a pedestrian zebra crossing to each leg of the intersections and reconfigure the roundabouts to have one entry and exit lane to each leg. An example of this is shown in Figure 7.3.
- **Stage 2:** Remove the roundabout and provide a signalised intersection. It is noted that not all intersections currently meet the warrants for signalisation but it is expected that with increased growth in the City Centre that the warrants could be met.

Figure 7.3: Stage 1 Example Intersection Configuration

Expected Benefits

The removal of the existing two-lane roundabouts is part of the objective of reducing the car dominance of the City Centre and improving the priority for pedestrians and cyclists. The Masterplan does not seek to remove cars and car parking from the City Centre; instead, it proposes to make walking and cycling easier than it currently is. The improved priority for pedestrians and cyclists is an important step in reducing the amount future traffic and car parking within the Ctiy Centre which would be required if the existing travel patterns remained the same. Without a change in the percentage of employees and visitors that drive to the City Centre, in the future, intersection works and amount of car parking required would be very costly and a small reduction in car parking and traffic can have a significant cost saving.

Stage 1

Pedestrian connectivity would significantly improve with the pedestrian zebra crossings providing minimal diversion from pedestrian desire lines. There would also be no delays to pedestrians assuming the crossing was not blocked by a vehicle and walking distances would be reduced. Local traffic speeds would be reduced, further increasing the safety and amenity for pedestrians.

Stage 2

Providing a signalised crossing provides more surety in comparison to zebra crossings for pedestrians, particularly for children and elderly pedestrians. Gaps created in the traffic stream can assist nearby side streets and parking manoeuvres.

Expected Impacts

Stage 1

The reduction of one lane to the entry and exit of each leg will reduce the vehicle capacity of each intersection and that will result in increased travel times for vehicles driving within the City Centre. The addition of pedestrian zebra crossings on each leg is expected to further reduce the vehicular capacity of each intersection and therefore limit the ability to accommodate additional volumes during peak periods. A significant increase in pedestrian volumes could also affect the capacity of the intersection as well as the resultant queuing through the intersection. This option also presents a number of sight line issues which would need to be considered by Council and the local traffic committee as this is not a standard intersection treatment. There are however a number of examples of this intersection treatment which should provide adequate reference.

Based on the current operation and volumes, the following intersections are expected to operate satisfactorily:

1 – Park Avenue / Gordon Street
2 – Vernon Street / Gordon Street
4 – Albany Street / Gordon Street.

No information was available for the other intersections proposed to change and as a result they have not been assessed. It is recommended that the all intersections are assessed in detail prior to implementation.

Stage 2

Converting each roundabout to a signalised intersection is expected to further increase average delay and queuing. The modelling suggests however that all converted intersections could function satisfactorily in the future. The modelling methodology, limitations and results are summarised later in this report.

It is noted that the introduction of signals represents a significant change for the Coffs Harbour City Centre as signals have not previously been present. As development proceeds within the City Centre, however, it is expected that the increase in traffic and pedestrians could cause volumes to increase to a point where traffic signals would be the only efficient method of control.

Timing of Roundabout Removal and Streetscape Changes

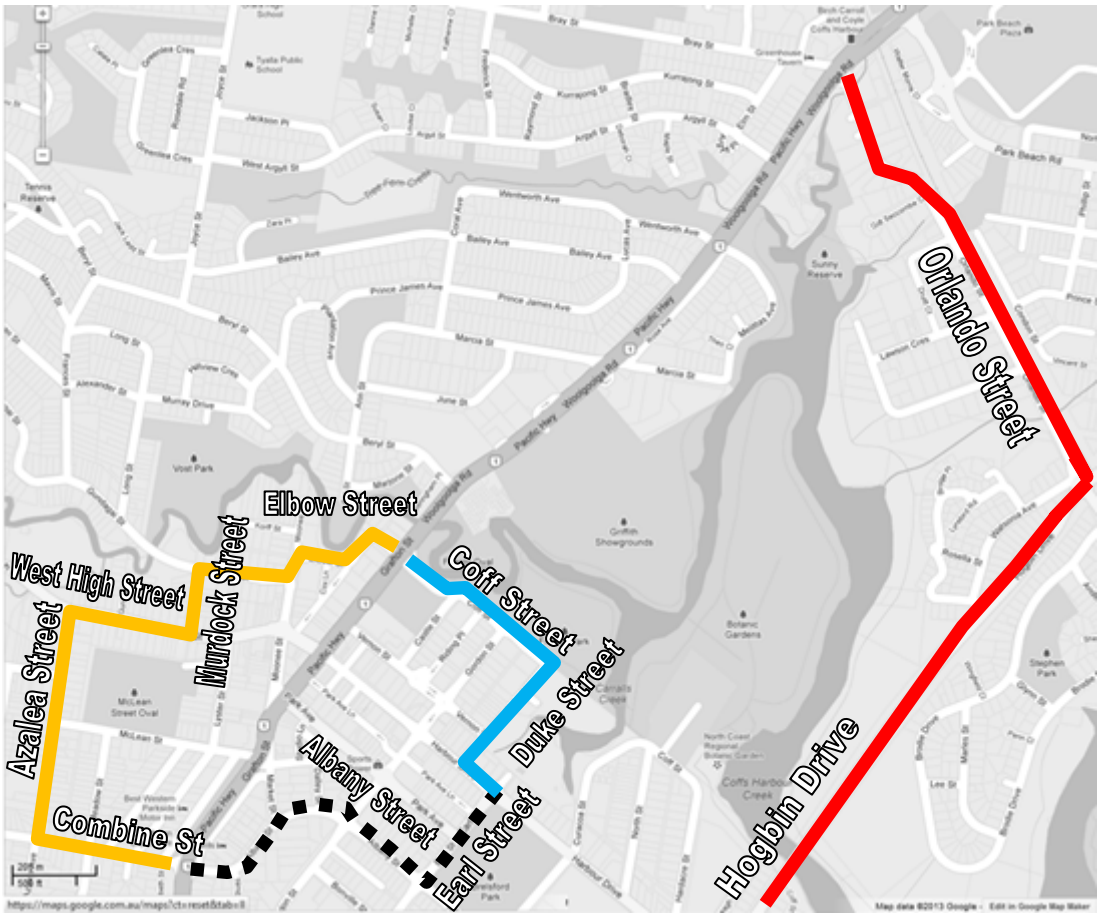
Ideally the roundabout and street reconfigurations would occur at the same time. However, if this is not possible, a staging plan would need to be developed to identify how pedestrian connectivity and walkability of the City Centre would be maintained through the construction period and how the street reconfiguration would be matched into the existing roundabout design.

7.2 Town Centre Bypass Options

A total of three City Centre bypass options are proposed for traffic to avoid the use of Harbour Drive. These include:

i Orlando Street / Hogbin Drive
ii Coff Street / Duke – While Duke Street is a designated bypass route for the City Centre, it will be narrowed in the future and primarily used for access to the adjoining properties.
iii Albany Street / Earl Street
iv Elbow Street / Murdock Street / West High Street / Azalea Street / Combine Street.

Figure 7.4: Proposed City Centre Bypass Routes



7.2.1 Proposed Duke Street Bypass

As part of the traffic signal installation at the intersection of Harbour Drive and Gordon Street, a temporary connection is proposed to be constructed from Duke Street to Harbour Drive. During construction the intersection will be closed at times and the bypass will provide an additional route through the City Centre from Harbour Drive.

Bitzios Consulting Pty Ltd prepared a report for Council regarding the proposed temporary connection and also assessed whether the connection was required in 2022 and 2032. The report concluded that the road network could function in 2022 without the connection although the introduction of the connection did improve the operation of the network. The report stated that in 2032 the road network

did not function without the proposed Duke Street connection. On traffic grounds there in accordance with the report from Bitzios Consulting Pty Ltd, is no short-term need for the proposed connection however in the long-term the connection should be introduced.

It is understood that priority would be provided to Duke Street in the future. It is recommended that in the future, Duke Street and Coff Street be narrow, low speed roads to discourage high volumes of City Centre bypass trips. A low speed 'loop road' would encourage the use of Orlando Street for such a purpose.

7.2.2 Orlando Street Bypass

The future use of Orlando Street is considered an important route to reduce traffic travelling through the City Centre. Without the use of Orlando Street, streets such as Duke Street and Coff Street would have to be wider and have more traffic capacity. The use of Orlando Street provides the ability to have a narrower street network which would improve the pedestrian environment and public domain.

Tube count data provided by Council along Orlando Street suggests that there is spare capacity however it is recommended that turning movement counts and intersection analysis be undertaken at the following intersections to determine how much capacity is available:

- Orlando Street / Pacific Highway
- Orlando Street / Hogbin Drive / Hogbin Drive North.

7.3 Intersection Modelling Methodology

The following sections set out a summary of the modelilng undertaken to support the proposed Stage 1 and Stage 2 changes to the road network.

7.3.1 Limitation of Modelling

The intersection modelling was undertaken using SIDRA Intersection which is an isolated (single) intersection modelling program. The parameter options can be set to approximate environmental factors such as the impact of pedestrians on vehicles; however, more detailed modelling of road networks with other software packages such as COMMUTER would provide more accurate estimates of road network benefits and impacts to vehicles and pedestrians. More detailed modelling however requires further data collection and has a more intensive preparation process and cost.

7.3.2 Stage 1 – Roundabout Modelling Methodology

As previously mentioned, SIDRA Intersection is a single intersection modelling program that has limitations modelling conditions away from the intersection. For unsignalised intersections, SIDRA assumes pedestrians give way to vehicles and this parameter cannot be changed.

To model existing conditions, observed queues and delays, an environmental factor was added to the relevant leg to produce the observed conditions. This is not easily repeatable for the proposed Stage 1 roundabouts as the downstream pedestrian zebra crossing would be placed at the intersection.

As the proposed roundabout intersection layout includes pedestrian crossings at the vehicle give way point a methodology was sought to account for the delay caused by pedestrians.

In determining the delay to vehicles by pedestrians, the following factors were considered:

- volume of pedestrians
- number of crossing events (reducing volumes for group crossings)
- approach distance to the crossing where a vehicle will give way to a pedestrian
- the effective crossing length where a vehicle will wait
- the average walking speed of a pedestrian.

In considering the above factors, a reduction time for each leg and therefore reduced roadway capacity was determined. Even using this method, it is difficult to account for blockages to the exit movement which have the potential to stop all vehicle movements at the intersection.

Using previous pedestrian volume count data collected in May 2012, expected volumes were determined at each relevant leg during each AM and PM peak hour and reduction of capacity was applied at each leg. Given that for each direction, only one lane of traffic would be crossed, a reduced delay by pedestrians is likely to result in comparison to the existing mid-block crossings where four lanes of traffic are crossed between pedestrian refuge points.

7.3.3 Stage 2 – Signalised Intersection Modelling City Centre

It has been assumed that if all the aforementioned intersections along Gordon Street were signalised, they would run to a 60 cycle time, or half the cycle time of the signalised intersections along Pacific Highway. This would reduce the delay and increase the connectivity for pedestrians along the Gordon Street corridor than having a cycle time that matches the Pacific Highway cycle times.

Vehicle movements along Gordon Street were also given a more desirable arrival rate to take into account the potential signal co-ordination.

The proposed intersection layouts considered the existing lane configuration and model results that resulted in acceptable delays and intersection saturation. It is noted there is already a proposal for the intersection of Gordon Street/ Harbour Drive which has been approved as per Figure 7.7. The proposed layouts are shown in Figure 7.5 to Figure 7.8.

Figure 7.5: Proposed Gordon Street – Albany Street Layout

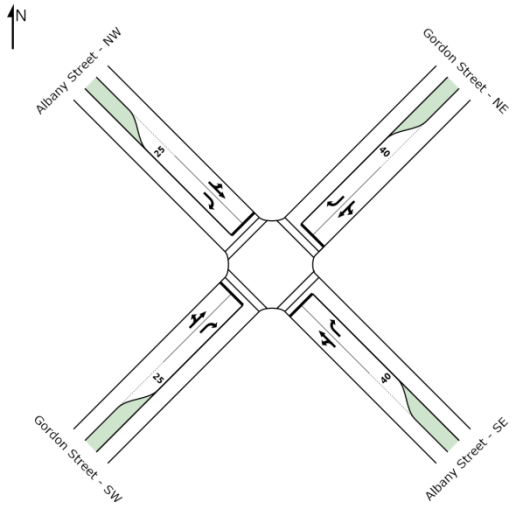


Figure 7.6: Proposed Gordon Street – Park Avenue Layout

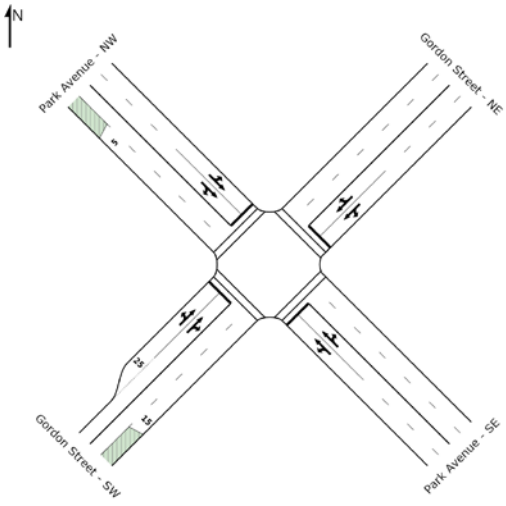


Figure 7.7: Proposed Gordon Street – Harbour Drive Layout

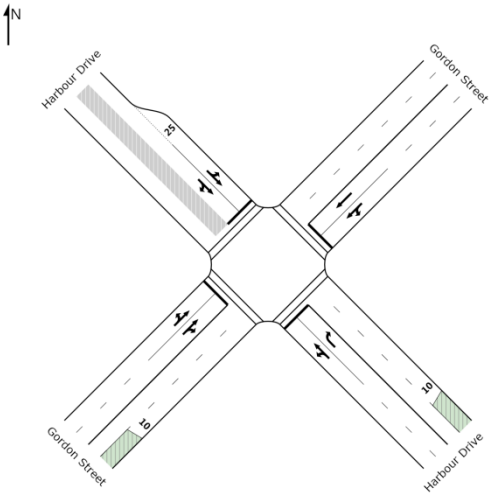
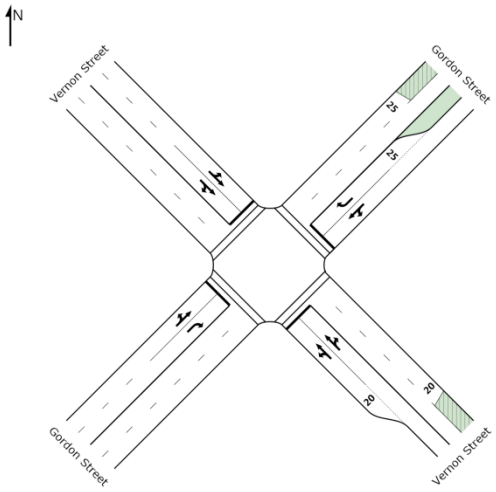


Figure 7.8: Proposed Gordon Street – Vernon Street Layout



7.4 2031 Future Volumes

The future traffic volumes within the City Centre have been calculated based on the forecast percentage increase in floor area up to 2031. An increase in floor area of 48,700sqm or approximately 27% is expected.

The RTA (now RMS) *Guide to Traffic Generating Developments* 2002, Section 3 indicates discounts in traffic generation apply where development occurs within existing developed areas. Under this guide, it suggests a traffic discount of 15% could be assumed for an increase over 30,000sqm GLFA. Therefore the total additional volumes to network volumes within the Coffs Harbour City Centre have been increased by 22.9% (based on a total increase of 27% with a 15% reduction).

The increase percentage has also been applied to the non-through Pacific Highway movements at signalised intersections along Pacific Hwy. It is expected that a town bypass will have been constructed by 2031 and as a result, through traffic volumes would be similar to existing through volumes.

The future volumes have only been applied to the signalised intersection models as the roundabout models (Stage 1) is proposed as a short to medium term option only.

7.5 Existing Intersection Operation

The existing intersection operation is summarised in Figure 7.9 and Figure 7.10.

Figure 7.9: Existing AM Peak Hour Intersection Operation

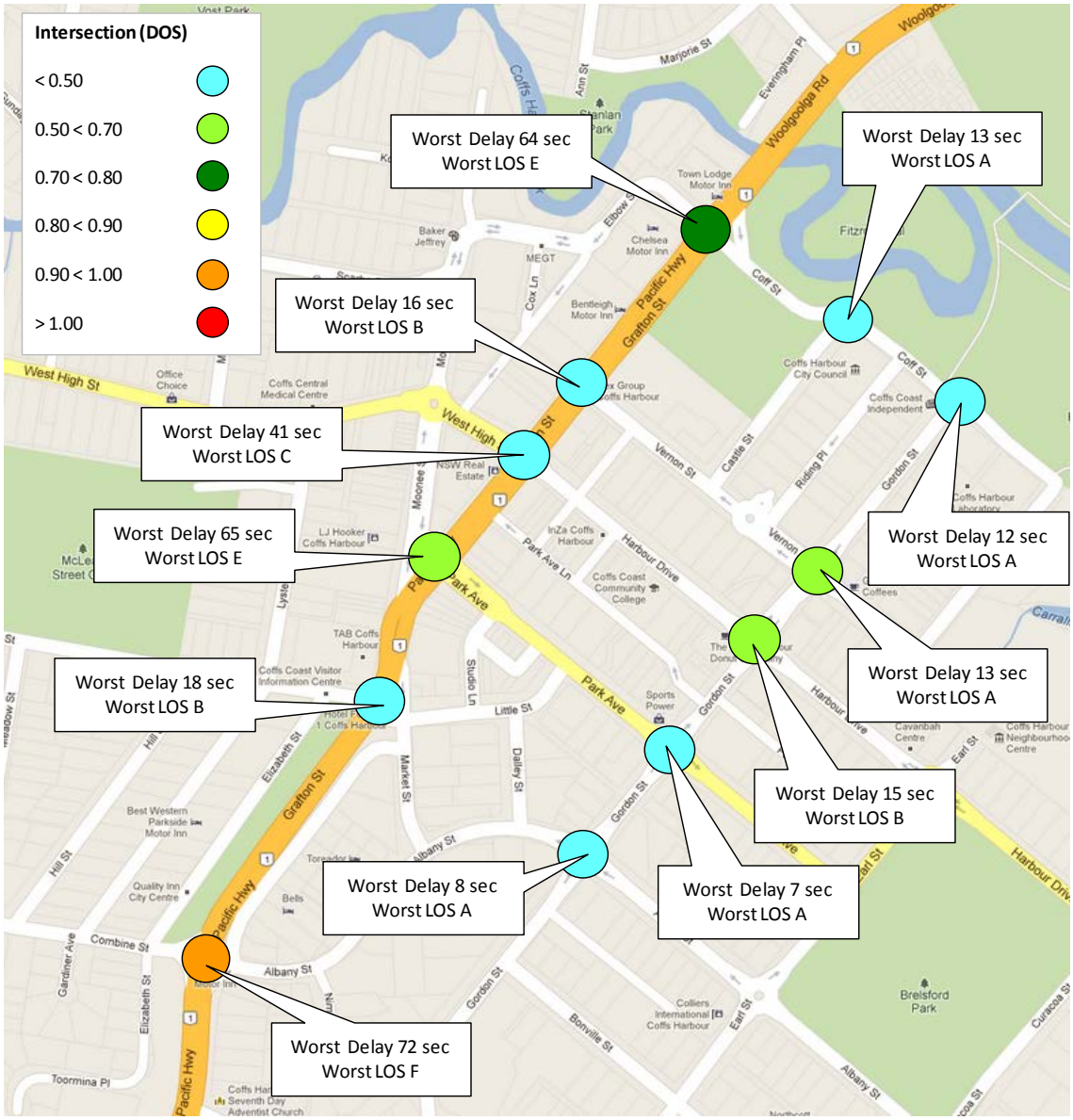
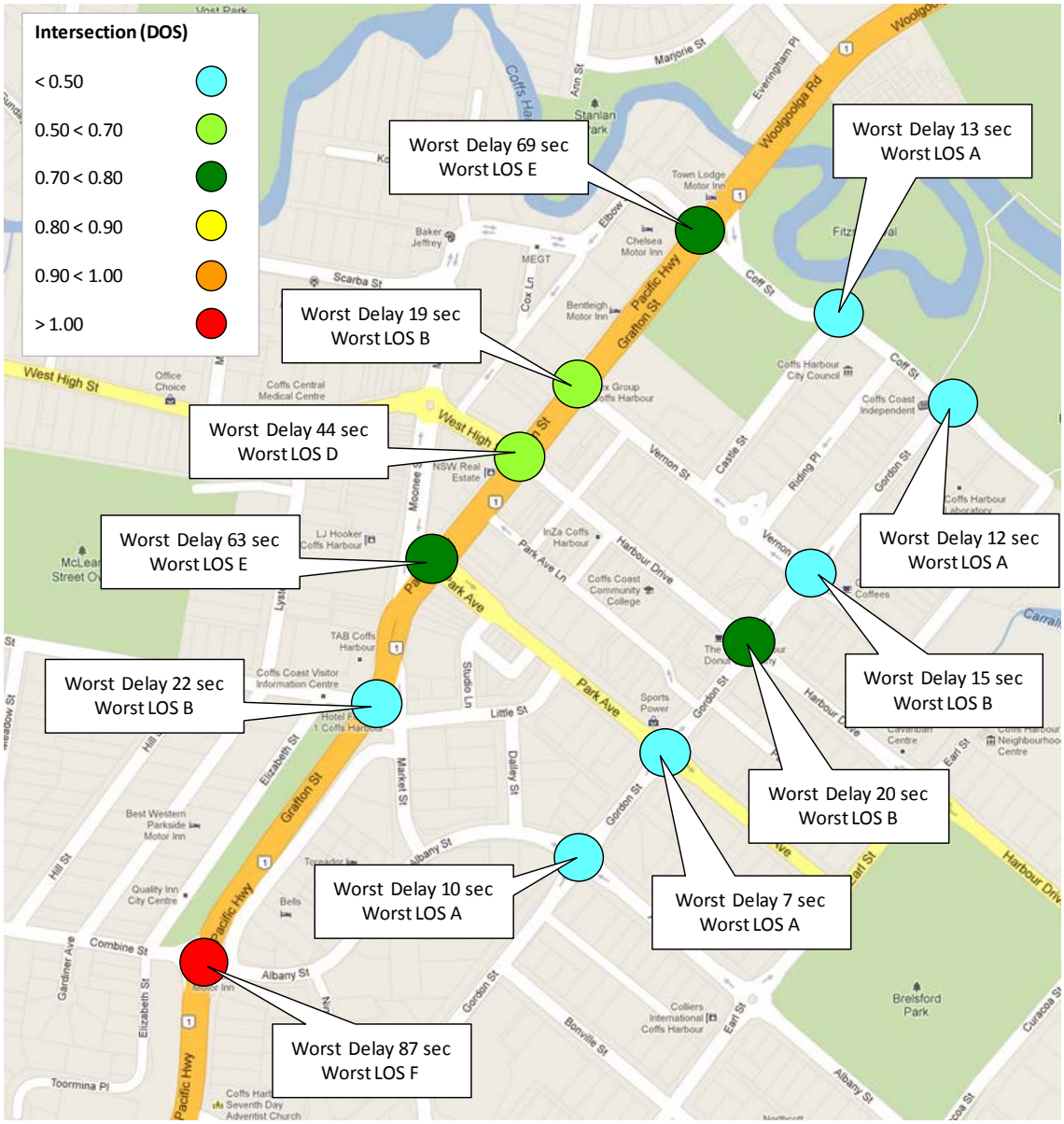


Figure 7.10: Existing PM Peak Hour Intersection Operation



7.6 Stage 1 Roundabout Modelling Results

Gordon Street – Albany Street

It has been assumed that the intersection of Gordon Street and Albany Street will remain consistent with current conditions as the intersection already operates as a single lane roundabout. Pedestrian effects are expected to be negligible.

Gordon Street – Park Avenue

During the AM and PM peak hour modelled, the worst delay was noted to increase by 1 second. It is noted that the reduction to a single lane roundabout increased the overall average delay and the degree of saturation increased. The modelling shows that expected the capacity of the roundabout

would be reduced with this layout. The existing and proposed layout is shown in Figure 7.11 and Figure 7.12.

Figure 7.11: Gordon Street – Park Avenue Existing Layout

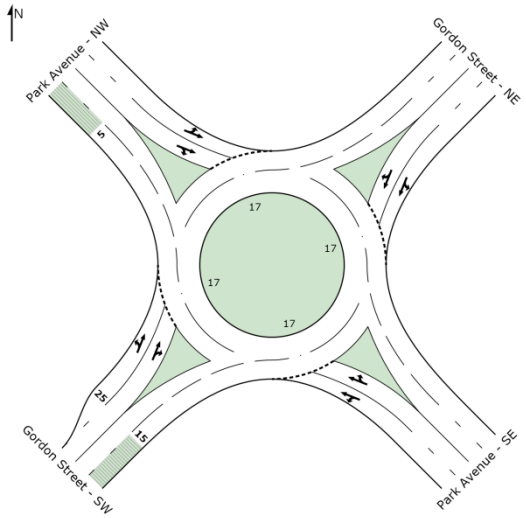
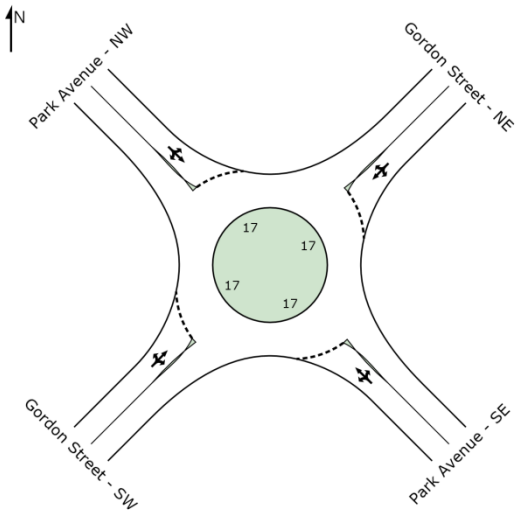


Figure 7.12: Gordon Street – Park Avenue Proposed Layout



Gordon Street – Harbour Drive

The intersection of Gordon Street and Harbour Drive was not modelled as a single lane roundabout as it is already proposed to construct a signalised intersection in this location.

Gordon Street – Vernon Street

Modelling yielded mixed results with the AM model indicating reduced delay with a single lane roundabout and the PM model indicating an increase of 1 second to the average maximum delay. In both AM and PM cases under a single lane model, the vehicle queue along the south-west approach (Gordon Street) would extend beyond Harbour Drive. Longer queues would be expected from the north-east leg (Gordon Street).

Figure 7.13: Gordon Street – Vernon Street Existing Layout

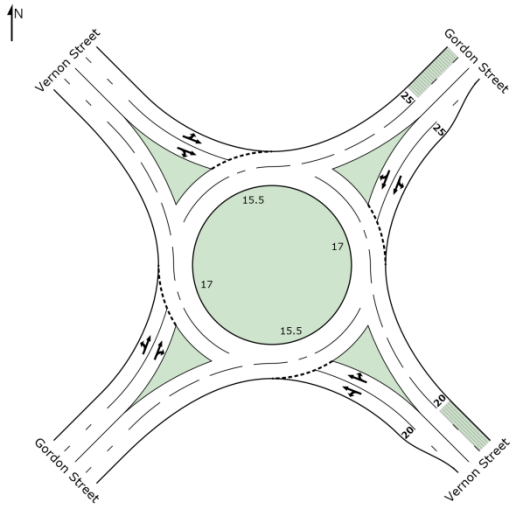
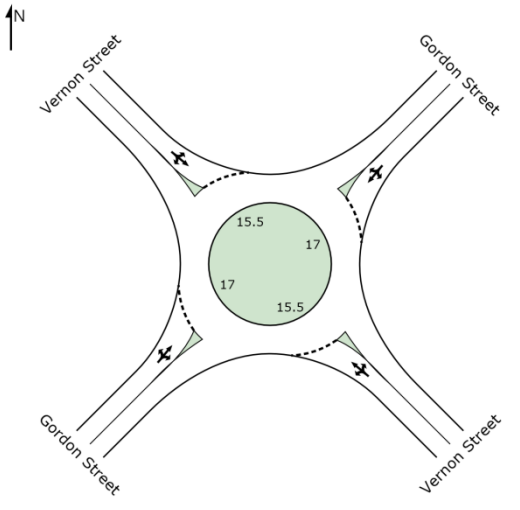


Figure 7.14: Gordon Street – Vernon Street Proposed Layout



The interim operation of the roundabouts with revised layouts to single lane operation during the AM and PM network peak is shown in Figure 7.15 and Figure 7.16 respectively.

Figure 7.15: AM Operation – Single Lane Roundabout

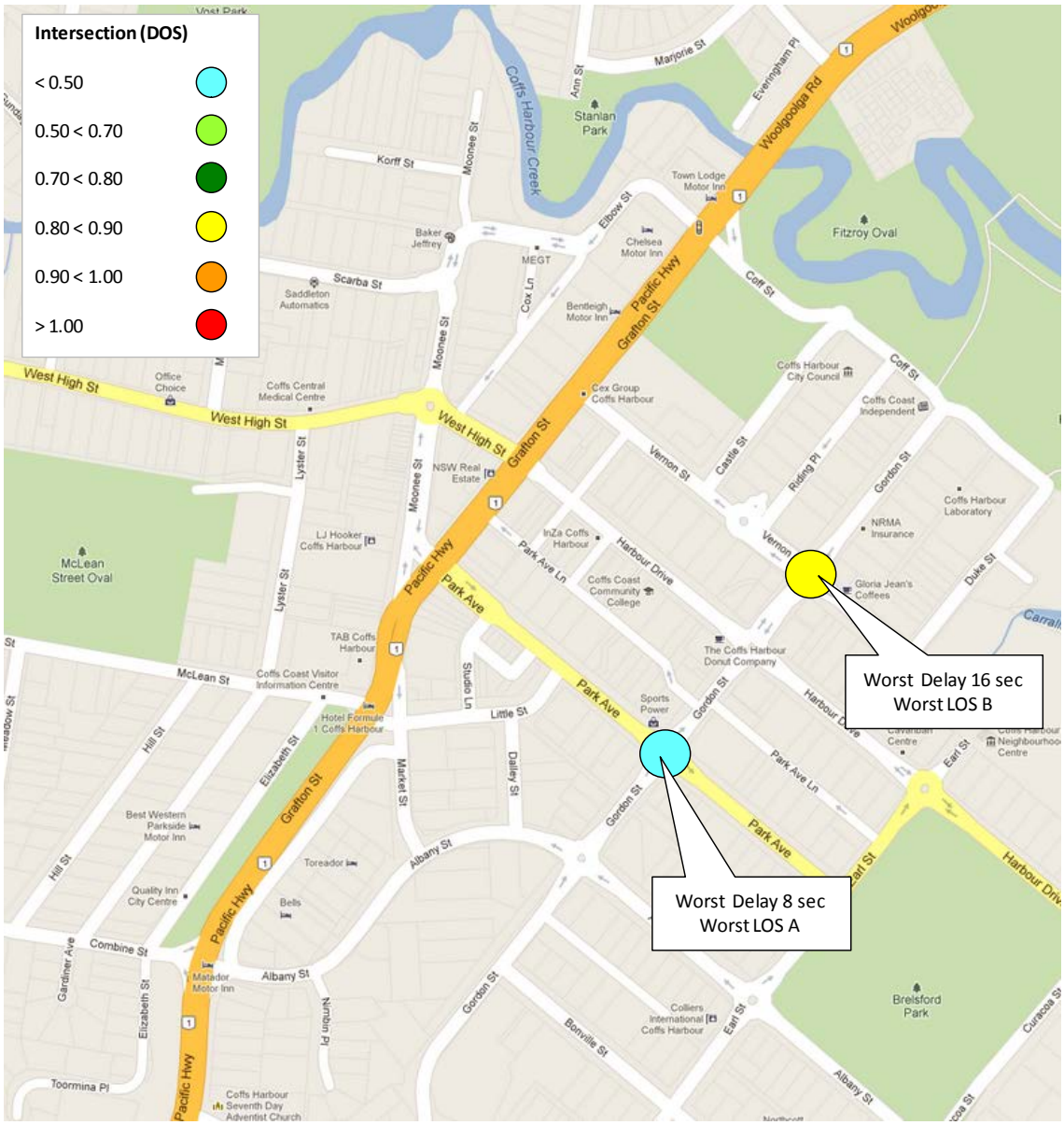
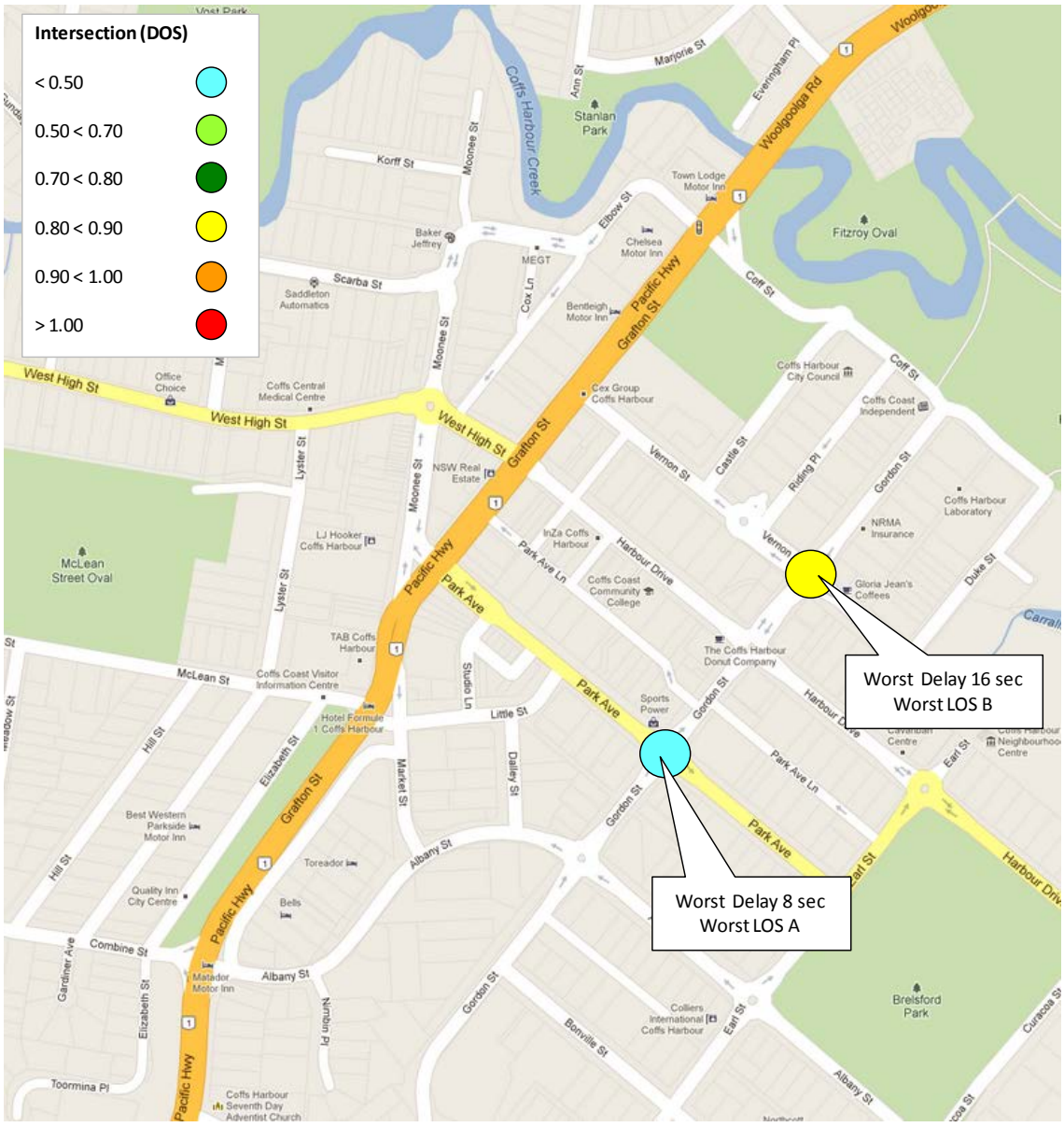


Figure 7.16: PM Operation – Single Lane Roundabout



7.7 Stage 2 Signalised Intersection Results

Gordon Street Network

Due to the operational nature of signalised intersections, the signalisation of intersections in general will increase delay. The operation of the signalised intersections along the south-east of the City Centre generally is acceptable except for the intersection of Gordon Street and Harbour Drive. As previously explained, the signalisation of this intersection is already proposed and it not part of the Masterplan. It has been included to illustrate that this will be the constraint point in the network of signalised intersections proposed along Gordon Street.

The Gordon Street – Harbour Drive model assumes no link road between Harbour Drive and Duke Street. With its construction, it would be expected to redistribute right turn movements from Harbour Drive south-east to Gordon Street and therefore ease conditions at this intersection. This has not been

tested as this work has previously been undertaken by Council by Bitzios as documented in their report *Coffs harbour CBD Traffic Study Stage 2 Traffic Modelling Report* dated 28 August 2012.

Pacific Highway Network

It is expected that the network along Pacific Highway will remain largely consistent with the present layout. Some option testing was carried out to determine possible improvements, these include:

- extending south leg, right turn lane from Pacific Highway onto Albany Street
- reconfiguring the through lane from Moonee Street to Park Street at to a shared through/ right turn lane
- banning right turn movements from West High Street to Pacific Highway
- right turn from Pacific Highway to Harbour Drive.

The above options are discussed in the following sections and have all been included in the future modelling.

Pacific Highway – Albany Street – Combine Street

The future model of Pacific Highway/ Combine Street/ Albany Street assumes a right turn lane extension on the south leg from the current 45 metres to 80 metres. The existing and proposed layouts are shown in Figure 7.17 and Figure 7.18 respectively.

Figure 7.17: Pacific Highway – Albany Street – Combine Street Existing Layout

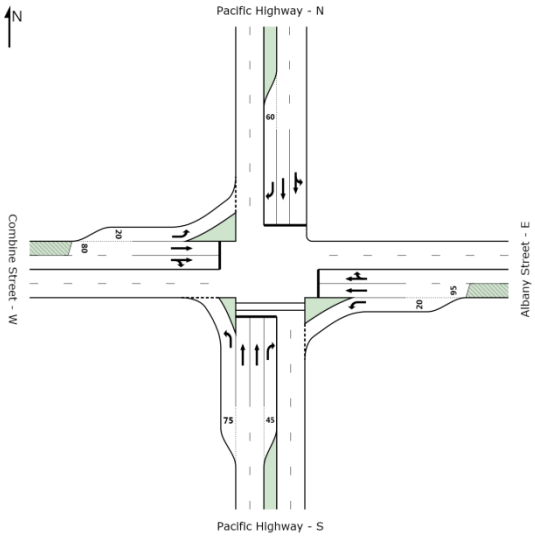
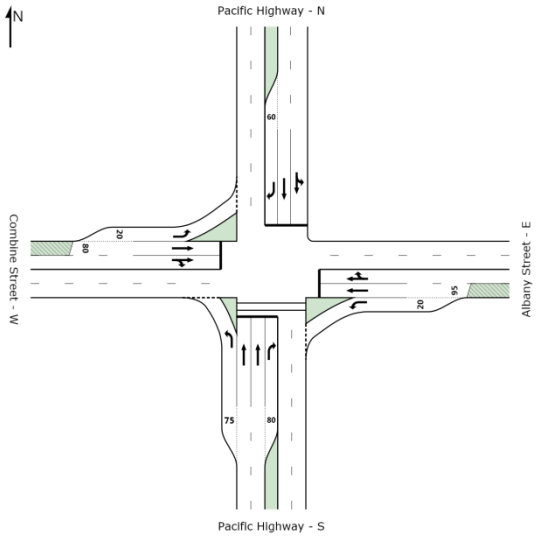


Figure 7.18: Pacific Highway – Albany Street – Combine Street Proposed Layout



Without this improvement, the future operation of the intersection would be considerably worse as right turning traffic from the south leg would consistently reduce the through capacity during peak periods and as such, it is recommended that this treatment be planned included in the Masterplan in the short to medium term.

Pacific Highway – Moonee Street – Park Avenue

Queues, particularly in the AM peak hour along Moonee Street can currently extend back to the intersection of West High Street. The Moonee Street intersection with Pacific Highway was remodelled with a shared through right centre lane in lieu of the existing through only lane.

Figure 7.19: Pacific Highway – Moonee Street – Park Avenue Existing Layout

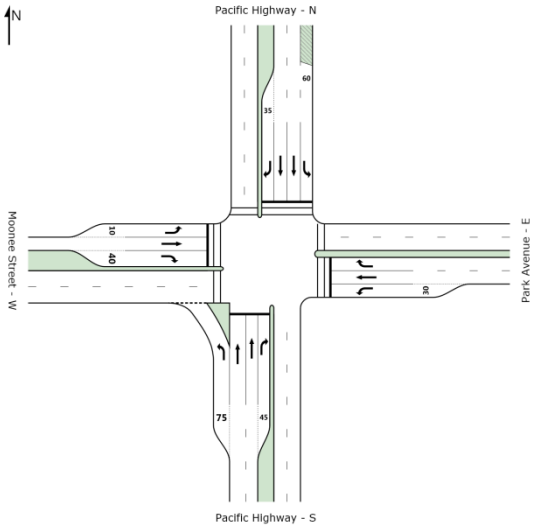
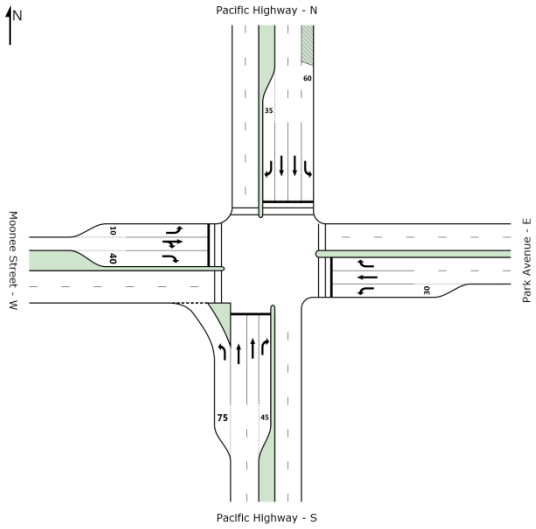


Figure 7.20: Pacific Highway – Moonee Street – Park Avenue Tested Layout



It was found that while this configuration reduced delays and saturation for the Moonee Street leg, queue distance increased. This is best explained by the dynamics of right turn movements and the centre lane being modelled to carry a portion of right turning vehicles and therefore more vehicles overall. Modelling suggests it is best maintain a dedicated through lane to minimise queues along Moonee Street.

Pacific Highway – West High Street – Harbour Drive

Queues along West High Street, particularly in the AM peak hour can extend to Moonee Street. The option to ban right turns form West High Street to Pacific Highway was tested. There was a negligible impact on vehicle queues as a result of the low vehicle volumes turning right from this approach (24 vehicles in the AM peak hour and 36 vehicles in the PM peak hour).

A right turn lane from Pacific Highway into Harbour Drive is proposed and was modelled with the assumption there would be the same volume of right turners as at Park Avenue currently, one street before Harbour Drive. As a right turn lane already exists on the north leg from Pacific Highway to West High Street, the addition of a right turn lane on the south leg was found to have a negligible impact as a right turn phase occurs at present.

Providing a right turn lane at this location would likely re-distribute and reduce right turning movements in the near vicinity. The existing and proposed intersection model is shown in Figure 7.21 and Figure 7.22 respectively.

Figure 7.21: Pacific Highway – West High Street – Harbour Drive Existing Layout

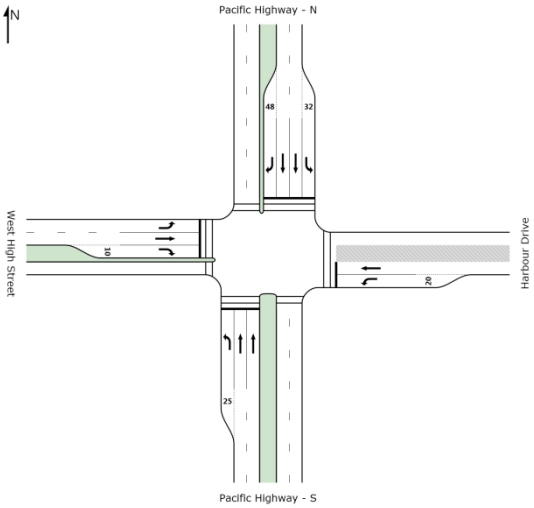
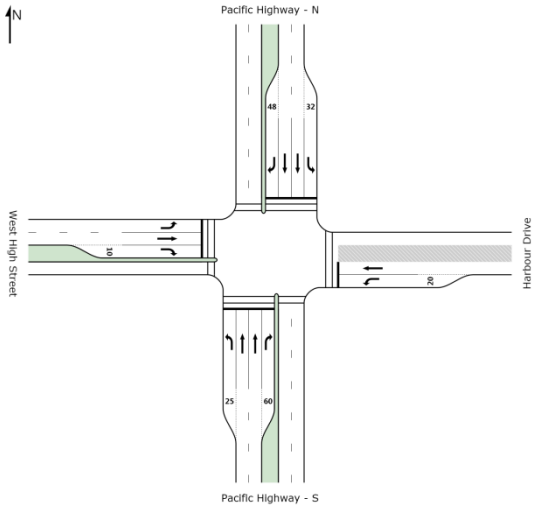


Figure 7.22: Pacific Highway – West High Street – Harbour Drive Proposed Layout



While the West High Street layout has a shared through right turn lane, it was observed on-site that one to two vehicles could queue within the intersection without blocking the passage of through traffic on West High Street.

The 2031 modelled operation of signalised intersections along Pacific Highway and Gordon Street during the AM and PM peak periods are shown in Figure 7.23 and Figure 7.24 respectively.

Pacific Highway – Coff Street – Elbow Street

The results of the analysis at the intersection of Pacific Highway / Coff Street show that the intersection is expected to operate with increased queues and delays in the future. Our analysis has not considered the possible redistribution of traffic, for example to Orlando Street to avoid the potential increased queues and delays, and as a result, could be considered a worst case scenario. The resulting queue is expected to extend back on Coff Street to affect the intersection of Coff Street / Castle Street in the future. Although the PM peak 95th percentile queue expected to reach beyond Castle Street, the average queue is approximately 100m and is not expected to reach the intersection with Castle Street.

Potential options for upgrading the intersection of Pacific Highway/ Coff Street include a triple right turn from Coff Street to Pacific Highway and an additional through lane on Pacific Highway. Both options are not considered feasible and it is expected that traffic delays will naturally balance by using another route through the study area or bypass it altogether. As such, upgrading of the intersection of Pacific Highway/ Coff Street is not recommended at this stage.

Figure 7.23: Anticipated 2031 Operation – AM Peak Hour

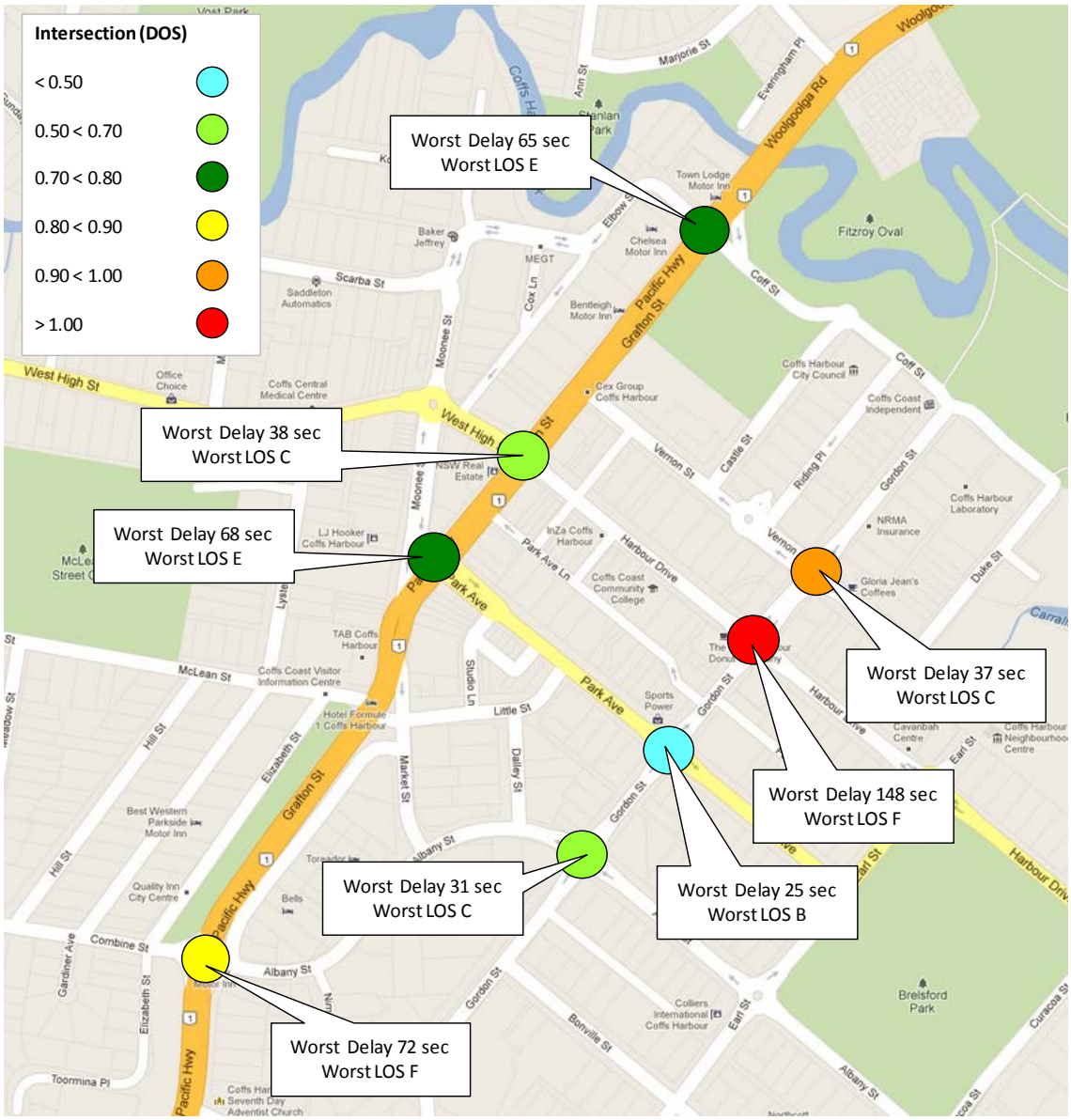
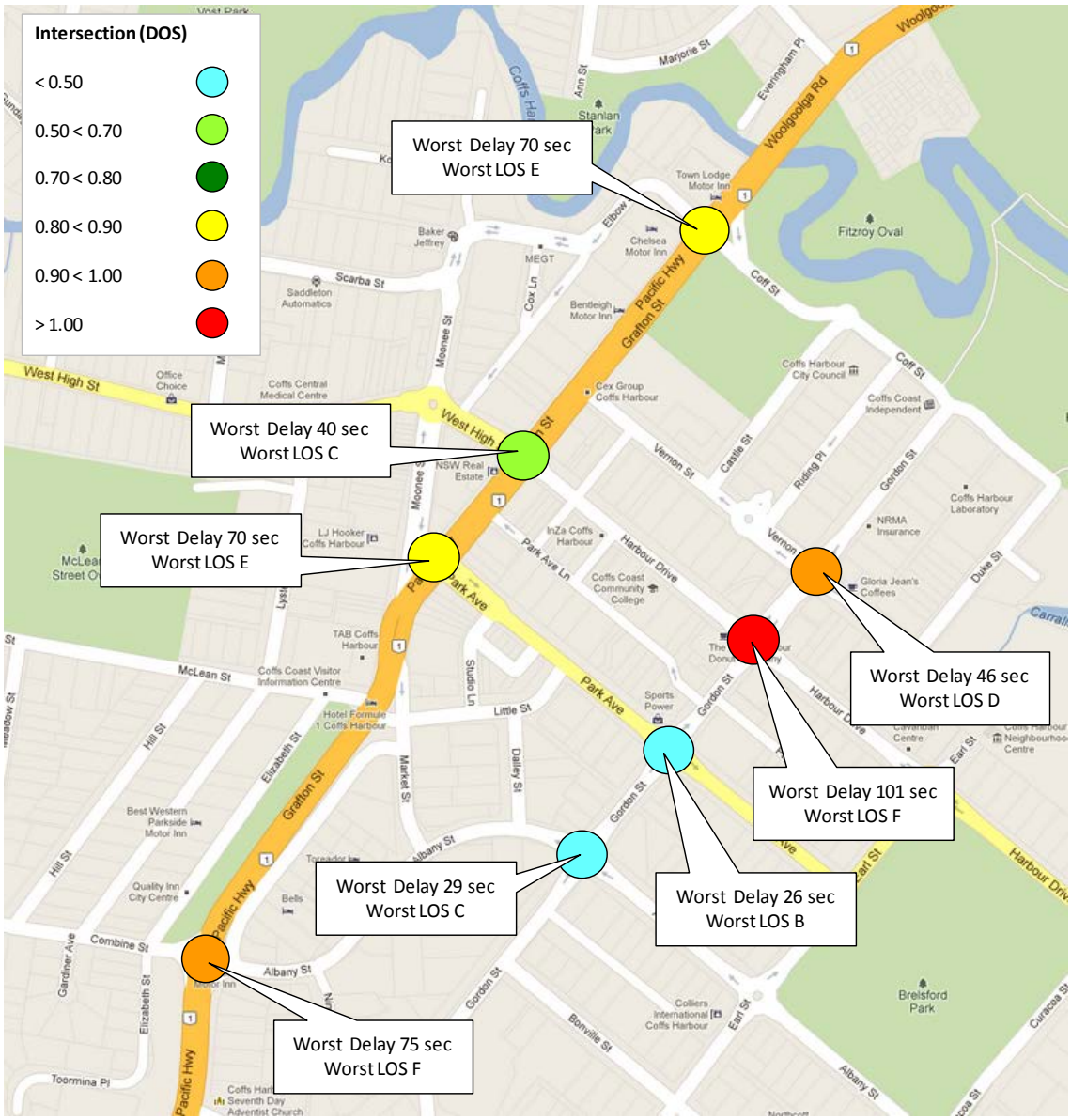


Figure 7.24: Anticipated 2031 Operation – PM Peak Hour



8. Recommendations

Based on the analysis and discussions presented within this report, the following recommendations are made:

i That a more detailed study be undertaken to consider the design, access for buses and the required changes to the road network to determine the exact operation of the proposed Vernon Street bus hub.

ii That as much parking as possible (beyond some convenient minimum for each development) be provided within public car parks in the City Centre to minimise the overall parking requirement.

iii That the following unrestricted car parks be converted to short-term progressively over time to cater for additional short-term parking demand:

- Moonee Street
- Duke Street
- Palms Centre (Castle Street)
- Albany Street
- Scarba Street
- Lyster Street.

iv That any future public car park facilities be funded fully or partly by Section 94 developer contributions.

v That additional funding arrangements be further investigated by Council.

vi That all long-term public parking be provided on the periphery on the City Centre.

vii That pay parking not be introduced in the short-term but Council consider the introduction in the medium to long-term.

viii That the intersections of West High Street/ Moonee Street and Harbour Drive/ Earl Street be assessed in more detail to understand the expected impact of removing the roundabouts.

ix The intersections of Orlando Street/ Pacific Highway and Orlando Street/ Hogbin Drive/ Hogbin Drive North should be assessed in more detail to understand the available capacity for City Centre bypass traffic.

x The roundabout removal strategy should be adopted by Council and the Duke Street bypass should be maintained permanently following construction of the intersection of Harbour Drive / Gordon Street.

xi The following changes to the road network should be adopted by Council and the committee:

- Changes to the road carriageways as identified in Section 2 of this report.
- New right turn lane for vehicles to turn right from Pacific Highway onto Harbour Drive.
- Extension of the right turn lane at the intersection of Pacific Highway / Albany Street
- No change to the existing configuration of Moonee Street at the intersection with Pacific Highway.
- No change to the existing configuration of Pacific Highway / Coff Street.

xii The proposed bicycle network should be adopted by Council and the Committee.

xiii That Council monitor the areas where bicycles are parked informally and provide formal bicycle parking spaces in these locations

xiv The target mode split of 70% car driver should be adopted by Council and the Committee, a 10% reduction to the current mode split to car driver.

Appendix A

Modelling Results

MOVEMENT SUMMARY

Site: Gordon St/Albany St (Ex AM)

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Albany Street Intersection
Existing AM 0800 - 0900
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Albany Street - SE											
21	L	17	2.0	0.258	4.0	LOS A	1.2	8.3	0.40	0.51	36.5
22	T	160	2.0	0.258	2.9	LOS A	1.2	8.3	0.40	0.38	36.7
23	R	122	2.0	0.258	7.5	LOS A	1.2	8.3	0.40	0.75	35.1
Approach		299	2.0	0.258	4.8	LOS A	1.2	8.3	0.40	0.54	36.0
North East: Gordon Street - NE											
24	L	194	2.0	0.381	3.8	LOS A	1.9	13.3	0.36	0.47	36.4
25	T	51	2.0	0.381	2.6	LOS A	1.9	13.3	0.36	0.35	36.7
26	R	236	2.0	0.381	7.3	LOS A	1.9	13.3	0.36	0.68	35.0
Approach		480	2.0	0.381	5.4	LOS A	1.9	13.3	0.36	0.56	35.7
North West: Albany Street - NW											
27	L	139	2.0	0.273	3.5	LOS A	1.2	8.4	0.28	0.45	36.9
28	T	185	2.0	0.273	2.3	LOS A	1.2	8.4	0.28	0.31	37.3
29	R	29	2.0	0.273	7.0	LOS A	1.2	8.4	0.28	0.76	35.4
Approach		354	2.0	0.273	3.2	LOS A	1.2	8.4	0.28	0.40	37.0
South West: Gordon Street - SW											
30	L	13	2.0	0.057	4.5	LOS A	0.2	1.7	0.44	0.54	36.4
31	T	38	2.0	0.057	3.4	LOS A	0.2	1.7	0.44	0.44	36.6
32	R	8	2.0	0.057	8.1	LOS A	0.2	1.7	0.44	0.78	35.1
Approach		59	2.0	0.057	4.3	LOS A	0.2	1.7	0.44	0.51	36.3
All Vehicles		1192	2.0	0.381	4.5	LOS A	1.9	13.3	0.35	0.50	36.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Albany St (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Albany Street Intersection
Existing PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Albany Street - SE											
21	L	8	2.0	0.186	5.1	LOS A	0.7	5.0	0.13	0.48	44.1
22	T	126	2.0	0.186	4.1	LOS A	0.7	5.0	0.13	0.37	44.9
23	R	135	2.0	0.186	9.1	LOS A	0.7	5.0	0.13	0.74	41.3
Approach		269	2.0	0.186	6.6	LOS A	0.7	5.0	0.13	0.55	42.9
North East: Gordon Street - NE											
24	L	80	2.0	0.103	5.2	LOS A	0.4	2.6	0.19	0.49	43.8
25	T	17	2.0	0.103	4.2	LOS A	0.4	2.6	0.19	0.38	44.5
26	R	38	2.0	0.103	9.2	LOS A	0.4	2.6	0.19	0.71	41.1
Approach		135	2.0	0.103	6.2	LOS A	0.4	2.6	0.19	0.54	43.1
North West: Albany Street - NW											
27	L	109	2.0	0.168	5.5	LOS A	0.6	4.4	0.25	0.54	43.7
28	T	101	2.0	0.168	4.4	LOS A	0.6	4.4	0.25	0.43	44.2
29	R	1	2.0	0.168	9.4	LOS A	0.6	4.4	0.25	0.79	41.2
Approach		212	2.0	0.168	5.0	LOS A	0.6	4.4	0.25	0.49	43.9
South West: Gordon Street - SW											
30	L	1	2.0	0.040	5.7	LOS A	0.1	1.0	0.30	0.55	43.5
31	T	38	2.0	0.040	4.7	LOS A	0.1	1.0	0.30	0.45	43.9
32	R	8	2.0	0.040	9.7	LOS A	0.1	1.0	0.30	0.79	41.2
Approach		47	2.0	0.040	5.6	LOS A	0.1	1.0	0.30	0.51	43.4
All Vehicles		663	2.0	0.186	5.9	LOS A	0.7	5.0	0.19	0.53	43.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Existing AM 0800 - 0900
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	42	2.0	0.049	4.7	LOS A	0.1	1.0	0.33	0.52	36.4
22	T	88	2.0	0.099	2.6	LOS A	0.3	2.4	0.33	0.34	37.2
23	R	29	2.0	0.099	7.3	LOS A	0.3	2.4	0.33	0.79	35.4
Approach		160	2.0	0.099	4.0	LOS A	0.3	2.4	0.33	0.47	36.6
North East: Gordon Street - NE											
24	L	93	2.0	0.101	4.1	LOS A	0.3	1.8	0.23	0.48	36.7
25	T	257	2.0	0.223	2.1	LOS A	0.7	4.8	0.23	0.28	37.7
26	R	34	2.0	0.223	6.9	LOS A	0.7	4.8	0.23	0.84	35.5
Approach		383	2.0	0.223	3.0	LOS A	0.7	4.8	0.23	0.38	37.2
North West: Park Avenue - NW											
27	L	168	2.0	0.135	3.7	LOS A	0.3	2.5	0.19	0.46	36.8
28	T	72	2.0	0.135	2.0	LOS A	0.3	2.5	0.19	0.25	37.7
29	R	109	2.0	0.135	6.8	LOS A	0.3	2.5	0.19	0.68	35.3
Approach		349	2.0	0.135	4.3	LOS A	0.3	2.5	0.19	0.49	36.5
South West: Gordon Street - SW											
30	L	38	2.0	0.090	3.7	LOS A	0.2	1.4	0.17	0.49	37.0
31	T	131	2.0	0.090	2.0	LOS A	0.2	1.7	0.17	0.25	37.9
32	R	42	2.0	0.090	6.7	LOS A	0.2	1.7	0.17	0.75	35.5
Approach		211	2.0	0.090	3.2	LOS A	0.2	1.7	0.17	0.39	37.2
All Vehicles		1103	2.0	0.223	3.6	LOS A	0.7	4.8	0.22	0.43	36.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Park Av (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Existing PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	21	2.0	0.026	4.4	LOS A	0.1	0.5	0.26	0.48	36.6
22	T	84	2.0	0.076	2.2	LOS A	0.2	1.6	0.24	0.29	37.6
23	R	13	2.0	0.076	7.0	LOS A	0.2	1.6	0.24	0.82	35.5
Approach		118	2.0	0.076	3.1	LOS A	0.2	1.6	0.24	0.38	37.2
North East: Gordon Street - NE											
24	L	29	2.0	0.036	4.2	LOS A	0.1	0.6	0.24	0.48	36.7
25	T	109	2.0	0.124	2.1	LOS A	0.3	2.4	0.22	0.27	37.7
26	R	51	2.0	0.124	6.8	LOS A	0.3	2.4	0.22	0.77	35.4
Approach		189	2.0	0.124	3.7	LOS A	0.3	2.4	0.22	0.44	36.9
North West: Park Avenue - NW											
27	L	105	2.0	0.129	4.0	LOS A	0.4	2.6	0.26	0.51	36.7
28	T	93	2.0	0.129	2.3	LOS A	0.4	2.6	0.26	0.29	37.4
29	R	118	2.0	0.129	7.0	LOS A	0.4	2.6	0.26	0.67	35.1
Approach		316	2.0	0.129	4.6	LOS A	0.4	2.6	0.26	0.51	36.3
South West: Gordon Street - SW											
30	L	135	2.0	0.186	3.7	LOS A	0.4	3.1	0.17	0.47	36.9
31	T	282	2.0	0.186	2.0	LOS A	0.5	3.8	0.17	0.26	37.9
32	R	29	2.0	0.186	6.7	LOS A	0.5	3.8	0.17	0.83	35.6
Approach		446	2.0	0.186	2.8	LOS A	0.5	3.8	0.17	0.36	37.4
All Vehicles		1069	2.0	0.186	3.5	LOS A	0.5	3.8	0.21	0.42	37.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Ex AM)

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
Existing AM 0800 - 0900
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	32	2.0	0.060	7.0	LOS A	0.2	1.6	0.54	0.67	35.1
22	T	6	2.0	0.035	7.8	LOS A	0.1	0.9	0.57	0.61	34.2
23	R	6	2.0	0.035	12.7	LOS A	0.1	0.9	0.57	0.85	32.5
Approach		44	2.0	0.060	7.9	LOS A	0.2	1.6	0.55	0.68	34.5
North East: Gordon Street											
24	L	27	2.0	0.389	5.0	LOS A	1.6	11.3	0.44	0.59	36.5
25	T	460	2.0	0.389	3.8	LOS A	2.0	14.5	0.46	0.47	36.7
26	R	53	2.0	0.389	8.7	LOS A	2.0	14.5	0.47	0.83	34.8
Approach		540	2.0	0.389	4.3	LOS A	2.0	14.5	0.46	0.51	36.4
North West: Vernon Street											
27	L	22	2.0	0.063	10.0	LOS A	0.2	1.7	0.59	0.71	33.3
28	T	7	2.0	0.133	5.9	LOS A	0.6	4.1	0.57	0.59	35.1
29	R	66	2.0	0.133	10.6	LOS A	0.6	4.1	0.57	0.78	33.3
Approach		96	2.0	0.133	10.1	LOS A	0.6	4.1	0.57	0.75	33.4
South West: Gordon Street											
30	L	357	2.0	0.355	3.6	LOS A	2.0	14.1	0.26	0.41	36.8
31	T	359	2.0	0.472	2.4	LOS A	3.1	22.2	0.30	0.30	37.2
32	R	132	2.0	0.472	7.1	LOS A	3.1	22.2	0.30	0.73	35.3
Approach		847	2.0	0.472	3.6	LOS A	3.1	22.2	0.28	0.42	36.7
All Vehicles		1527	2.0	0.472	4.4	LOS A	3.1	22.2	0.37	0.48	36.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
Existing PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	81	2.0	0.152	7.2	LOS A	0.6	4.0	0.58	0.74	34.9
22	T	11	2.0	0.083	10.1	LOS A	0.3	1.9	0.62	0.69	32.8
23	R	13	2.0	0.083	14.9	LOS B	0.3	1.9	0.62	0.90	31.4
Approach		104	2.0	0.152	8.4	LOS A	0.6	4.0	0.59	0.75	34.2
North East: Gordon Street											
24	L	23	2.0	0.361	4.9	LOS A	1.5	10.6	0.45	0.59	36.5
25	T	426	2.0	0.361	3.6	LOS A	1.8	12.8	0.46	0.47	36.6
26	R	60	2.0	0.361	8.5	LOS A	1.8	12.8	0.47	0.81	34.9
Approach		509	2.0	0.361	4.2	LOS A	1.8	12.8	0.46	0.52	36.4
North West: Vernon Street											
27	L	88	2.0	0.172	7.4	LOS A	0.7	5.0	0.57	0.69	34.8
28	T	2	2.0	0.279	5.5	LOS A	1.3	8.9	0.59	0.62	35.2
29	R	165	2.0	0.279	10.2	LOS A	1.3	8.9	0.59	0.79	33.5
Approach		256	2.0	0.279	9.2	LOS A	1.3	8.9	0.58	0.76	33.9
South West: Gordon Street											
30	L	359	2.0	0.369	3.7	LOS A	1.9	13.7	0.29	0.43	36.7
31	T	396	2.0	0.452	2.5	LOS A	2.6	18.6	0.32	0.33	37.2
32	R	54	2.0	0.452	7.4	LOS A	2.6	18.6	0.32	0.79	35.4
Approach		808	2.0	0.452	3.4	LOS A	2.6	18.6	0.31	0.40	36.9
All Vehicles		1678	2.0	0.452	4.8	LOS A	2.6	18.6	0.41	0.51	36.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Park Av AM
Proposed 1 lane

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Existing AM 0800 - 0900
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	42	2.0	0.146	4.0	LOS A	0.6	4.2	0.40	0.52	36.6
22	T	88	2.0	0.146	2.9	LOS A	0.6	4.2	0.40	0.39	36.8
23	R	29	2.0	0.146	7.7	LOS A	0.6	4.2	0.40	0.78	35.2
Approach		160	2.0	0.146	4.1	LOS A	0.6	4.2	0.40	0.50	36.4
North East: Gordon Street - NE											
24	L	93	2.0	0.311	3.6	LOS A	1.4	9.7	0.33	0.46	36.8
25	T	257	2.0	0.311	2.4	LOS A	1.4	9.7	0.33	0.32	37.2
26	R	34	2.0	0.311	7.2	LOS A	1.4	9.7	0.33	0.79	35.4
Approach		383	2.0	0.311	3.1	LOS A	1.4	9.7	0.33	0.40	36.9
North West: Park Avenue - NW											
27	L	168	2.0	0.280	3.5	LOS A	1.2	8.4	0.30	0.44	36.8
28	T	72	2.0	0.280	2.3	LOS A	1.2	8.4	0.30	0.31	37.2
29	R	109	2.0	0.280	7.1	LOS A	1.2	8.4	0.30	0.70	35.2
Approach		349	2.0	0.280	4.4	LOS A	1.2	8.4	0.30	0.49	36.3
South West: Gordon Street - SW											
30	L	38	2.0	0.167	3.2	LOS A	0.6	4.5	0.24	0.42	37.1
31	T	131	2.0	0.167	2.1	LOS A	0.6	4.5	0.24	0.28	37.6
32	R	42	2.0	0.167	6.9	LOS A	0.6	4.5	0.24	0.75	35.4
Approach		211	2.0	0.167	3.3	LOS A	0.6	4.5	0.24	0.40	37.0
All Vehicles		1103	2.0	0.311	3.7	LOS A	1.4	9.7	0.32	0.44	36.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Park Av PM
Proposed 1 lane

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Proposed PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	21	2.0	0.102	3.6	LOS A	0.4	2.6	0.31	0.47	36.9
22	T	84	2.0	0.102	2.4	LOS A	0.4	2.6	0.31	0.32	37.3
23	R	13	2.0	0.102	7.2	LOS A	0.4	2.6	0.31	0.79	35.4
Approach		118	2.0	0.102	3.2	LOS A	0.4	2.6	0.31	0.40	37.0
North East: Gordon Street - NE											
24	L	29	2.0	0.163	3.5	LOS A	0.6	4.5	0.31	0.45	36.8
25	T	109	2.0	0.163	2.4	LOS A	0.6	4.5	0.31	0.32	37.2
26	R	51	2.0	0.163	7.1	LOS A	0.6	4.5	0.31	0.75	35.3
Approach		189	2.0	0.163	3.8	LOS A	0.6	4.5	0.31	0.45	36.6
North West: Park Avenue - NW											
27	L	105	2.0	0.282	3.9	LOS A	1.2	8.6	0.40	0.50	36.4
28	T	93	2.0	0.282	2.8	LOS A	1.2	8.6	0.40	0.37	36.7
29	R	118	2.0	0.282	7.5	LOS A	1.2	8.6	0.40	0.73	35.1
Approach		316	2.0	0.282	4.9	LOS A	1.2	8.6	0.40	0.55	36.0
South West: Gordon Street - SW											
30	L	135	2.0	0.345	3.3	LOS A	1.5	10.6	0.27	0.43	37.0
31	T	282	2.0	0.345	2.2	LOS A	1.5	10.6	0.27	0.29	37.5
32	R	29	2.0	0.345	6.9	LOS A	1.5	10.6	0.27	0.78	35.5
Approach		446	2.0	0.345	2.8	LOS A	1.5	10.6	0.27	0.36	37.2
All Vehicles		1069	2.0	0.345	3.7	LOS A	1.5	10.6	0.32	0.44	36.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Pr AM) 1 lane

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
Existing AM 0800 - 0900
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	32	2.0	0.083	6.9	LOS A	0.4	2.6	0.60	0.67	35.1
22	T	6	2.0	0.083	5.8	LOS A	0.4	2.6	0.60	0.60	35.4
23	R	6	2.0	0.083	10.8	LOS A	0.4	2.6	0.60	0.83	33.5
Approach		44	2.0	0.083	7.3	LOS A	0.4	2.6	0.60	0.68	34.9
North East: Gordon Street											
24	L	27	2.0	0.663	5.7	LOS A	5.2	37.2	0.61	0.67	36.1
25	T	460	2.0	0.663	4.8	LOS A	5.2	37.2	0.61	0.61	36.1
26	R	53	2.0	0.663	9.7	LOS A	5.2	37.2	0.61	0.88	34.4
Approach		540	2.0	0.663	5.3	LOS A	5.2	37.2	0.61	0.64	35.9
North West: Vernon Street											
27	L	22	2.0	0.167	6.3	LOS A	0.8	5.5	0.60	0.67	35.2
28	T	7	2.0	0.167	5.3	LOS A	0.8	5.5	0.60	0.62	35.5
29	R	66	2.0	0.167	10.0	LOS A	0.8	5.5	0.60	0.80	33.7
Approach		96	2.0	0.167	8.8	LOS A	0.8	5.5	0.60	0.76	34.2
South West: Gordon Street											
30	L	357	2.0	0.902	4.5	LOS A	14.9	105.9	0.80	0.51	35.3
31	T	359	2.0	0.902	3.6	LOS A	14.9	105.9	0.80	0.49	35.1
32	R	132	2.0	0.902	8.3	LOS A	14.9	105.9	0.80	0.61	34.9
Approach		847	2.0	0.902	4.7	LOS A	14.9	105.9	0.80	0.52	35.1
All Vehicles		1527	2.0	0.902	5.2	LOS A	14.9	105.9	0.71	0.58	35.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Pr PM) 1 lane

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
Existing PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	81	2.0	0.280	11.2	LOS A	1.4	10.3	0.78	0.86	32.6
22	T	11	2.0	0.280	10.1	LOS A	1.4	10.3	0.78	0.82	32.8
23	R	13	2.0	0.280	14.9	LOS B	1.4	10.3	0.78	0.94	31.5
Approach		104	2.0	0.280	11.5	LOS A	1.4	10.3	0.78	0.86	32.5
North East: Gordon Street											
24	L	23	2.0	0.728	9.7	LOS A	8.3	59.2	0.82	0.86	33.7
25	T	426	2.0	0.728	8.8	LOS A	8.3	59.2	0.82	0.84	33.8
26	R	60	2.0	0.728	13.6	LOS A	8.3	59.2	0.82	0.95	32.5
Approach		509	2.0	0.728	9.4	LOS A	8.3	59.2	0.82	0.85	33.6
North West: Vernon Street											
27	L	88	2.0	0.542	12.1	LOS A	4.0	28.4	0.82	0.98	31.9
28	T	2	2.0	0.542	11.0	LOS A	4.0	28.4	0.82	0.95	32.0
29	R	165	2.0	0.542	15.8	LOS B	4.0	28.4	0.82	1.03	30.9
Approach		256	2.0	0.542	14.5	LOS A	4.0	28.4	0.82	1.01	31.2
South West: Gordon Street											
30	L	359	2.0	0.834	4.8	LOS A	12.0	85.7	0.78	0.53	35.4
31	T	396	2.0	0.834	3.9	LOS A	12.0	85.7	0.78	0.50	35.2
32	R	54	2.0	0.834	8.8	LOS A	12.0	85.7	0.78	0.64	35.0
Approach		808	2.0	0.834	4.6	LOS A	12.0	85.7	0.78	0.53	35.3
All Vehicles		1678	2.0	0.834	8.0	LOS A	12.0	85.7	0.80	0.72	33.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Albany St (Ex AM) – Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Albany Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Albany Street - SE											
21	L	21	2.0	0.306	21.3	LOS B	4.6	32.8	0.75	0.84	34.3
22	T	197	2.0	0.306	14.8	LOS B	4.6	32.8	0.75	0.63	35.2
23	R	150	2.0	0.554	30.8	LOS C	4.2	29.9	0.94	0.81	28.7
Approach		367	2.0	0.554	21.7	LOS B	4.6	32.8	0.83	0.71	32.2
North East: Gordon Street - NE											
24	L	238	2.0	0.371	19.0	LOS B	6.0	42.8	0.72	0.79	34.6
25	T	62	2.0	0.371	12.5	LOS A	6.0	42.8	0.72	0.61	35.7
26	R	290	2.0	0.587	21.0	LOS B	6.2	44.5	0.86	0.81	33.2
Approach		590	2.0	0.587	19.3	LOS B	6.2	44.5	0.79	0.78	34.0
North West: Albany Street - NW											
27	L	171	2.0	0.537	21.6	LOS B	9.1	64.7	0.81	0.84	33.7
28	T	228	2.0	0.537	15.1	LOS B	9.1	64.7	0.81	0.70	34.4
29	R	36	2.0	0.161	23.3	LOS B	0.8	5.6	0.75	0.71	32.0
Approach		435	2.0	0.537	18.3	LOS B	9.1	64.7	0.81	0.76	33.9
South West: Gordon Street - SW											
30	L	16	2.0	0.139	26.6	LOS B	1.5	10.5	0.83	0.77	31.4
31	T	47	2.0	0.139	20.1	LOS B	1.5	10.5	0.83	0.63	32.0
32	R	10	2.0	0.049	26.2	LOS B	0.2	1.7	0.80	0.68	30.6
Approach		72	2.0	0.139	22.4	LOS B	1.5	10.5	0.82	0.67	31.6
All Vehicles		1464	2.0	0.587	19.8	LOS B	9.1	64.7	0.81	0.75	33.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Albany St (Ex PM) – Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Albany Street Intersection
Existing PM
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Albany Street - SE											
21	L	10	2.0	0.151	13.1	LOS A	2.3	16.3	0.50	0.86	39.1
22	T	155	2.0	0.151	6.6	LOS A	2.3	16.3	0.50	0.41	41.7
23	R	166	2.0	0.406	16.1	LOS B	2.9	20.4	0.61	0.75	36.0
Approach		331	2.0	0.406	11.6	LOS A	2.9	20.4	0.56	0.59	38.6
North East: Gordon Street - NE											
24	L	98	2.0	0.273	27.4	LOS B	2.9	21.0	0.86	0.77	30.3
25	T	21	2.0	0.273	21.0	LOS B	2.9	21.0	0.86	0.68	30.8
26	R	47	2.0	0.150	27.7	LOS B	1.1	8.1	0.84	0.73	30.0
Approach		166	2.0	0.273	26.7	LOS B	2.9	21.0	0.85	0.75	30.3
North West: Albany Street - NW											
27	L	135	2.0	0.241	13.5	LOS A	3.8	27.1	0.53	0.79	38.3
28	T	124	2.0	0.241	7.0	LOS A	3.8	27.1	0.53	0.45	40.6
29	R	1	2.0	0.004	13.4	LOS A	0.0	0.1	0.48	0.62	37.7
Approach		260	2.0	0.241	10.4	LOS A	3.8	27.1	0.53	0.63	39.4
South West: Gordon Street - SW											
30	L	1	2.0	0.106	26.3	LOS B	1.1	8.0	0.82	0.78	31.8
31	T	47	2.0	0.106	19.9	LOS B	1.1	8.0	0.82	0.61	32.4
32	R	10	2.0	0.051	28.9	LOS C	0.3	1.8	0.85	0.67	29.5
Approach		58	2.0	0.106	21.6	LOS B	1.1	8.0	0.82	0.63	31.8
All Vehicles		815	2.0	0.406	15.0	LOS B	3.8	27.1	0.63	0.64	36.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Park Av (Ex AM) – Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	52	2.0	0.084	21.4	LOS B	1.0	7.5	0.72	0.72	33.0
22	T	109	2.0	0.293	17.9	LOS B	3.4	23.9	0.81	0.66	33.2
23	R	36	2.0	0.293	24.3	LOS B	3.4	23.9	0.81	0.81	32.5
Approach		197	2.0	0.293	20.0	LOS B	3.4	23.9	0.78	0.70	33.0
North East: Gordon Street - NE											
24	L	114	2.0	0.132	16.3	LOS B	1.9	13.5	0.60	0.73	35.9
25	T	316	2.0	0.433	9.8	LOS A	5.7	40.4	0.57	0.49	39.0
26	R	41	2.0	0.433	16.2	LOS B	5.7	40.4	0.57	0.86	37.0
Approach		471	2.0	0.433	11.9	LOS A	5.7	40.4	0.58	0.58	38.0
North West: Park Avenue - NW											
27	L	207	2.0	0.408	23.5	LOS B	5.9	41.9	0.82	0.80	32.2
28	T	88	2.0	0.408	17.8	LOS B	5.9	41.9	0.83	0.69	32.4
29	R	135	2.0	0.408	25.2	LOS B	4.3	30.4	0.84	0.80	31.4
Approach		430	2.0	0.408	22.9	LOS B	5.9	41.9	0.83	0.78	32.0
South West: Gordon Street - SW											
30	L	47	2.0	0.263	15.2	LOS B	1.3	9.2	0.51	0.75	37.1
31	T	160	2.0	0.263	10.2	LOS A	2.7	19.3	0.55	0.45	38.4
32	R	52	2.0	0.263	17.2	LOS B	2.7	19.3	0.57	0.81	36.1
Approach		259	2.0	0.263	12.5	LOS A	2.7	19.3	0.55	0.58	37.7
All Vehicles		1356	2.0	0.433	16.7	LOS B	5.9	41.9	0.68	0.66	35.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Park Av (Ex PM) - Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Park Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Park Avenue - SE											
21	L	26	2.0	0.050	23.5	LOS B	0.6	4.0	0.75	0.70	32.0
22	T	103	2.0	0.249	19.1	LOS B	2.8	20.0	0.82	0.66	32.6
23	R	16	2.0	0.249	25.6	LOS B	2.8	20.0	0.82	0.81	32.0
Approach		145	2.0	0.249	20.6	LOS B	2.8	20.0	0.81	0.68	32.4
North East: Gordon Street - NE											
24	L	36	2.0	0.056	13.5	LOS A	0.7	4.9	0.46	0.72	38.1
25	T	135	2.0	0.272	8.0	LOS A	2.5	17.8	0.49	0.41	40.2
26	R	62	2.0	0.272	14.5	LOS B	2.5	17.8	0.49	0.80	37.8
Approach		233	2.0	0.272	10.6	LOS A	2.5	17.8	0.49	0.56	39.2
North West: Park Avenue - NW											
27	L	129	2.0	0.432	25.9	LOS B	5.7	40.5	0.86	0.81	31.3
28	T	114	2.0	0.432	19.6	LOS B	5.7	40.5	0.86	0.72	31.7
29	R	145	2.0	0.432	27.0	LOS B	4.0	28.5	0.87	0.79	30.4
Approach		388	2.0	0.432	24.5	LOS B	5.7	40.5	0.87	0.78	31.1
South West: Gordon Street - SW											
30	L	166	2.0	0.499	14.8	LOS B	2.6	18.4	0.56	0.72	36.9
31	T	347	2.0	0.409	7.4	LOS A	5.1	36.3	0.48	0.42	41.1
32	R	36	2.0	0.409	13.8	LOS A	5.1	36.3	0.48	0.87	38.5
Approach		549	2.0	0.499	10.0	LOS A	5.1	36.3	0.50	0.54	39.5
All Vehicles		1314	2.0	0.499	15.6	LOS B	5.7	40.5	0.64	0.63	35.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Pr AM) – Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	39	2.0	0.196	24.6	LOS B	0.8	5.8	0.74	0.71	35.8
22	T	8	2.0	0.032	16.1	LOS B	0.3	2.3	0.73	0.52	38.4
23	R	8	2.0	0.032	24.5	LOS B	0.3	2.3	0.73	0.74	36.8
Approach		54	2.0	0.196	23.4	LOS B	0.8	5.8	0.74	0.69	36.3
North East: Gordon Street											
24	L	34	2.0	0.602	19.9	LOS B	12.7	90.2	0.77	0.93	41.1
25	T	565	2.0	0.602	11.7	LOS A	12.7	90.2	0.77	0.68	42.8
26	R	65	2.0	0.444	36.9	LOS C	1.9	13.8	0.96	0.77	29.8
Approach		664	2.0	0.602	14.5	LOS B	12.7	90.2	0.79	0.70	41.0
North West: Vernon Street											
27	L	27	2.0	0.048	24.4	LOS B	0.6	4.1	0.74	0.71	35.9
28	T	9	2.0	0.201	17.4	LOS B	2.0	14.5	0.78	0.62	36.7
29	R	82	2.0	0.201	25.5	LOS B	2.0	14.5	0.78	0.77	35.5
Approach		118	2.0	0.201	24.7	LOS B	2.0	14.5	0.77	0.74	35.7
South West: Gordon Street											
30	L	439	2.0	0.904	30.4	LOS C	28.8	204.8	0.91	1.06	33.6
31	T	441	2.0	0.904	22.2	LOS B	28.8	204.8	0.91	0.98	34.2
32	R	162	2.0	0.550	28.2	LOS B	3.9	27.7	0.81	0.80	33.8
Approach		1041	2.0	0.904	26.6	LOS B	28.8	204.8	0.89	0.98	33.9
All Vehicles		1877	2.0	0.904	22.1	LOS B	28.8	204.8	0.84	0.86	36.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gordon St/Vernon St (Pr PM) - Signalised Conversion

13S1032000 Coffs Harbour CBD Masterplan
Gordon Street/Vernon Street Intersection
PM
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Vernon Street											
21	L	100	2.0	0.506	25.3	LOS B	2.2	15.6	0.77	0.75	35.4
22	T	13	2.0	0.063	17.2	LOS B	0.6	4.4	0.76	0.56	37.5
23	R	16	2.0	0.063	25.5	LOS B	0.6	4.4	0.76	0.75	36.1
Approach		128	2.0	0.506	24.5	LOS B	2.2	15.6	0.77	0.73	35.7
North East: Gordon Street											
24	L	28	2.0	0.555	19.5	LOS B	11.3	80.4	0.74	0.93	41.3
25	T	524	2.0	0.555	11.3	LOS A	11.3	80.4	0.74	0.65	43.2
26	R	74	2.0	0.559	41.6	LOS C	2.3	16.7	1.00	0.76	28.0
Approach		626	2.0	0.559	15.2	LOS B	11.3	80.4	0.77	0.68	40.6
North West: Vernon Street											
27	L	109	2.0	0.191	25.4	LOS B	2.4	17.2	0.78	0.77	35.3
28	T	3	2.0	0.518	20.4	LOS B	5.3	37.8	0.89	0.74	34.3
29	R	203	2.0	0.518	28.5	LOS C	5.3	37.8	0.89	0.81	33.7
Approach		314	2.0	0.518	27.4	LOS B	5.3	37.8	0.85	0.80	34.2
South West: Gordon Street											
30	L	441	2.0	0.953	45.5	LOS D	39.7	282.9	1.00	1.22	27.4
31	T	486	2.0	0.953	37.2	LOS C	39.7	282.9	1.00	1.22	27.5
32	R	66	2.0	0.205	25.4	LOS B	1.5	10.6	0.77	0.76	35.4
Approach		994	2.0	0.953	40.1	LOS C	39.7	282.9	0.98	1.19	27.8
All Vehicles		2062	2.0	0.953	29.6	LOS C	39.7	282.9	0.89	0.95	32.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Combine St/Albany St (Ex AM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Combine Street/Albany Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	181	2.0	0.175	7.7	LOS A	1.2	8.7	0.18	0.62	48.3
2	T	841	5.0	0.524	27.2	LOS B	18.0	131.7	0.79	0.70	32.9
3	R	191	2.0	0.932	56.3	LOS D	10.3	73.4	0.90	0.85	22.7
Approach		1213	4.1	0.932	28.9	LOS C	18.0	131.7	0.72	0.71	32.2
East: Albany Street - E											
4	L	72	2.0	0.419	17.5	LOS B	1.8	12.8	0.48	0.66	36.5
5	T	101	2.0	0.294	49.6	LOS D	4.5	32.0	0.93	0.73	21.9
6	R	65	2.0	0.294	56.8	LOS E	4.3	30.8	0.93	0.77	22.1
Approach		238	2.0	0.419	42.0	LOS C	4.5	32.0	0.80	0.72	25.1
North: Pacific Highway - N											
7	L	21	2.0	0.900	53.9	LOS D	25.1	182.6	1.00	0.98	24.5
8	T	780	5.0	0.900	46.2	LOS D	25.1	182.6	1.00	0.98	25.3
9	R	42	2.0	0.467	71.6	LOS F	2.6	18.4	1.00	0.73	19.5
Approach		843	4.8	0.900	47.7	LOS D	25.1	182.6	1.00	0.96	24.9
West: Combine Street - W											
10	L	34	2.0	0.126	10.3	LOS A	0.5	3.3	0.30	0.62	41.4
11	T	286	2.0	0.850	59.5	LOS E	18.1	128.6	1.00	1.00	19.9
12	R	285	2.0	0.890	71.8	LOS F	19.0	135.3	1.00	1.00	19.1
Approach		605	2.0	0.890	62.6	LOS E	19.0	135.3	0.96	0.98	20.1
All Vehicles		2899	3.7	0.932	42.4	LOS C	25.1	182.6	0.86	0.84	26.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Combine St/Albany St (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Combine Street/Albany Street Intersection
Existing PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	156	2.0	0.155	7.9	LOS A	1.2	8.5	0.19	0.62	48.0
2	T	1016	5.0	0.621	28.1	LOS B	22.9	167.0	0.83	0.74	32.3
3	R	214	2.0	1.000 [3]	50.9	LOS D	10.3	73.4	0.98	0.82	24.1
Approach		1385	4.2	1.000	29.4	LOS C	22.9	167.0	0.78	0.74	31.9
East: Albany Street - E											
4	L	109	2.0	0.687	25.1	LOS B	3.6	25.8	0.51	0.74	32.5
5	T	88	2.0	0.207	48.8	LOS D	3.1	22.1	0.92	0.70	22.1
6	R	29	2.0	0.207	56.0	LOS D	3.0	21.6	0.92	0.76	22.4
Approach		227	2.0	0.687	38.3	LOS C	3.6	25.8	0.72	0.73	26.3
North: Pacific Highway - N											
7	L	38	2.0	0.964	68.1	LOS E	29.7	216.3	1.00	1.09	21.0
8	T	788	5.0	0.964	59.8	LOS E	29.7	216.3	1.00	1.09	21.8
9	R	78	2.0	0.648	70.7	LOS F	4.8	34.1	1.00	0.81	19.6
Approach		904	4.6	0.964	61.1	LOS E	29.7	216.3	1.00	1.06	21.6
West: Combine Street - W											
10	L	51	2.0	0.209	11.4	LOS A	0.8	5.8	0.35	0.63	40.5
11	T	147	2.0	0.510	51.6	LOS D	8.1	57.8	0.97	0.78	21.6
12	R	261	2.0	0.950	86.5	LOS F	19.3	137.6	1.00	1.10	17.0
Approach		459	2.0	0.950	67.0	LOS E	19.3	137.6	0.92	0.95	19.5
All Vehicles		2976	3.8	1.000	45.5	LOS D	29.7	216.3	0.87	0.87	25.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Moonee St/Park Ave (Ex AM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Moonee Street/Park Avenue Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	139	2.0	0.121	7.5	LOS A	1.1	7.6	0.19	0.60	48.1
2	T	766	5.0	0.803	49.4	LOS D	22.9	167.2	1.00	0.93	24.4
3	R	109	2.0	0.810	73.2	LOS F	7.0	49.8	1.00	0.91	18.6
Approach		1015	4.3	0.810	46.2	LOS D	22.9	167.2	0.89	0.89	25.3
East: Park Avenue - E											
4	L	54	2.0	0.388	46.7	LOS D	2.5	18.1	0.84	0.72	22.1
5	T	135	2.0	0.764	62.4	LOS E	8.3	59.2	1.00	0.91	17.3
6	R	72	2.0	0.426	63.3	LOS E	4.1	29.4	0.99	0.76	19.0
Approach		260	2.0	0.764	59.4	LOS E	8.3	59.2	0.96	0.83	18.6
North: Pacific Highway - N											
7	L	120	2.0	0.273	26.3	LOS B	3.8	27.2	0.74	0.75	33.2
8	T	697	5.0	0.738	45.9	LOS D	19.2	140.5	0.98	0.87	25.4
9	R	7	2.0	0.055	64.0	LOS E	0.4	2.9	0.95	0.66	20.4
Approach		824	4.5	0.738	43.2	LOS D	19.2	140.5	0.94	0.85	26.2
West: Moonee Street - W											
10	L	12	2.0	0.107	16.0	LOS B	0.2	1.7	0.56	0.63	32.0
11	T	294	2.0	0.398	28.7	LOS C	12.4	88.3	0.78	0.67	24.7
12	R	187	2.0	0.828	48.2	LOS D	9.2	65.3	0.81	0.92	21.9
Approach		493	2.0	0.828	35.8	LOS C	12.4	88.3	0.78	0.76	23.6
All Vehicles		2592	3.7	0.828	44.6	LOS D	22.9	167.2	0.89	0.84	24.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Moonee St/Park Ave (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Moonee Street/Park Avenue Intersection
Existing PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	84	2.0	0.095	8.4	LOS A	0.9	6.3	0.24	0.61	47.1
2	T	872	5.0	0.806	46.6	LOS D	25.7	187.3	0.99	0.93	25.2
3	R	129	2.0	0.784	70.4	LOS E	8.1	57.6	1.00	0.89	19.1
Approach		1085	4.4	0.806	46.5	LOS D	25.7	187.3	0.94	0.90	25.2
East: Park Avenue - E											
4	L	88	2.0	0.565	38.2	LOS C	3.7	26.7	0.76	0.73	24.1
5	T	249	2.0	0.778	55.5	LOS D	14.9	105.9	1.00	0.93	18.4
6	R	106	2.0	0.348	53.9	LOS D	5.6	39.9	0.93	0.78	20.7
Approach		444	2.0	0.778	51.7	LOS D	14.9	105.9	0.94	0.85	19.9
North: Pacific Highway - N											
7	L	140	2.0	0.296	19.0	LOS B	3.2	23.1	0.63	0.74	37.8
8	T	679	5.0	0.634	40.6	LOS C	17.4	127.2	0.93	0.80	27.2
9	R	7	2.0	0.054	61.5	LOS E	0.4	2.9	0.94	0.66	21.0
Approach		826	4.5	0.634	37.1	LOS C	17.4	127.2	0.88	0.79	28.4
West: Moonee Street - W											
10	L	15	2.0	0.150	20.0	LOS B	0.3	2.3	0.68	0.65	30.2
11	T	173	2.0	0.347	39.1	LOS C	8.2	58.7	0.86	0.71	21.8
12	R	153	2.0	0.804	53.4	LOS D	8.3	58.8	0.85	0.93	20.8
Approach		340	2.0	0.804	44.7	LOS D	8.3	58.8	0.85	0.81	21.6
All Vehicles		2696	3.7	0.806	44.2	LOS D	25.7	187.3	0.91	0.85	24.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/West High St/Harbour St (Ex AM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/West High Street/Harbour Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	16	2.0	0.100	29.9	LOS C	0.5	3.8	0.61	0.69	32.9
2	T	740	5.0	0.470	27.1	LOS B	15.6	113.7	0.78	0.68	33.0
Approach		756	4.9	0.470	27.1	LOS B	15.6	113.7	0.77	0.68	33.0
East: Harbour Drive											
4	L	32	2.0	0.268	34.1	LOS C	1.2	8.3	0.67	0.71	30.9
5	T	188	2.0	0.267	28.4	LOS B	7.7	54.6	0.74	0.62	32.4
Approach		220	2.0	0.268	29.2	LOS C	7.7	54.6	0.73	0.63	32.2
North: Pacific Highway - N											
7	L	64	2.0	0.268	22.5	LOS B	1.8	12.6	0.51	0.72	37.1
8	T	756	5.0	0.375	22.2	LOS B	16.2	118.1	0.80	0.70	35.5
9	R	149	2.0	0.467	27.5	LOS B	4.8	34.0	0.78	0.78	34.2
Approach		969	4.3	0.467	23.0	LOS B	16.2	118.1	0.78	0.71	35.4
West: West High Street											
10	L	67	2.0	0.079	26.9	LOS B	2.1	15.2	0.58	0.74	34.5
11	T	274	2.0	0.388	30.0	LOS C	11.7	83.6	0.79	0.67	31.6
12	R	25	2.0	0.472	40.7	LOS C	1.1	7.6	0.74	0.71	28.4
Approach		366	2.0	0.472	30.1	LOS C	11.7	83.6	0.75	0.69	31.8
All Vehicles		2312	3.9	0.472	26.1	LOS B	16.2	118.1	0.77	0.69	33.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/West High St/Harbour St (Ex PM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/West High Street/Harbour Street Intersection
Existing PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	40	2.0	0.280	35.0	LOS C	1.5	10.8	0.69	0.72	30.6
2	T	893	5.0	0.659	21.8	LOS B	17.3	126.3	0.71	0.63	36.0
Approach		933	4.9	0.659	22.3	LOS B	17.3	126.3	0.71	0.63	35.7
East: Harbour Drive											
4	L	32	2.0	0.237	28.3	LOS B	1.0	7.3	0.59	0.70	33.8
5	T	287	2.0	0.338	23.4	LOS B	10.9	77.6	0.70	0.60	35.1
Approach		319	2.0	0.338	23.8	LOS B	10.9	77.6	0.69	0.61	34.9
North: Pacific Highway - N											
7	L	53	2.0	0.251	27.3	LOS B	1.7	12.0	0.58	0.72	34.2
8	T	737	5.0	0.426	23.3	LOS B	14.3	104.7	0.72	0.63	35.1
9	R	115	2.0	0.580	33.8	LOS C	4.2	30.1	0.88	0.78	31.2
Approach		904	4.4	0.580	24.8	LOS B	14.3	104.7	0.73	0.65	34.5
West: West High Street											
10	L	129	2.0	0.135	23.6	LOS B	3.8	27.0	0.54	0.75	36.4
11	T	165	2.0	0.194	21.7	LOS B	5.8	41.4	0.65	0.54	36.2
12	R	38	2.0	0.665	44.4	LOS D	1.7	12.3	0.70	0.81	27.1
Approach		333	2.0	0.665	25.0	LOS B	5.8	41.4	0.61	0.65	34.9
All Vehicles		2488	4.0	0.665	23.8	LOS B	17.3	126.3	0.70	0.64	35.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Combine St/Albany St AM 2031

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Combine Street/Albany Street Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	223	2.0	0.211	8.0	LOS A	1.8	12.8	0.20	0.63	48.0
2	T	841	5.0	0.652	35.9	LOS C	20.8	151.9	0.91	0.79	28.9
3	R	234	2.0	0.866	71.1	LOS F	15.2	108.3	1.00	0.95	19.6
Approach		1298	3.9	0.866	37.5	LOS C	20.8	151.9	0.80	0.79	28.4
East: Albany Street - E											
4	L	88	2.0	0.549	19.1	LOS B	2.4	16.9	0.52	0.68	35.6
5	T	124	2.0	0.361	50.3	LOS D	5.6	39.8	0.94	0.75	21.8
6	R	80	2.0	0.361	57.5	LOS E	5.4	38.3	0.94	0.78	21.9
Approach		292	2.0	0.549	42.9	LOS D	5.6	39.8	0.82	0.74	24.8
North: Pacific Highway - N											
7	L	26	2.0	0.875	50.7	LOS D	24.2	176.3	0.99	0.96	25.5
8	T	780	5.0	0.875	42.9	LOS D	24.2	176.3	0.99	0.94	26.3
9	R	52	2.0	0.574	72.4	LOS F	3.2	22.9	1.00	0.76	19.3
Approach		858	4.7	0.875	44.9	LOS D	24.2	176.3	0.99	0.93	25.8
West: Combine Street - W											
10	L	41	2.0	0.169	11.4	LOS A	0.7	4.7	0.34	0.63	40.6
11	T	352	2.0	0.855	52.7	LOS D	25.4	180.5	0.94	0.96	21.3
12	R	351	2.0	0.855	60.6	LOS E	25.4	180.5	1.00	0.96	21.3
Approach		744	2.0	0.855	54.1	LOS D	25.4	180.5	0.94	0.94	21.9
All Vehicles		3192	3.5	0.875	43.8	LOS D	25.4	180.5	0.88	0.86	25.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Combine St/Albany St PM 2031

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Combine Street/Albany Street Intersection
Existing PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	156	2.0	0.159	8.0	LOS A	1.3	9.1	0.20	0.62	47.9
2	T	1002	5.0	0.677	32.4	LOS C	24.2	176.4	0.89	0.79	30.4
3	R	227	2.0	0.702	54.4	LOS D	12.3	87.7	0.95	0.84	23.2
Approach		1385	4.2	0.702	33.2	LOS C	24.2	176.4	0.82	0.78	30.1
East: Albany Street - E											
4	L	135	2.0	0.834	28.6	LOS C	4.6	32.6	0.54	0.74	30.9
5	T	109	2.0	0.254	49.3	LOS D	3.9	27.4	0.92	0.72	22.0
6	R	36	2.0	0.254	56.4	LOS D	3.8	26.8	0.92	0.77	22.3
Approach		279	2.0	0.834	40.2	LOS C	4.6	32.6	0.74	0.74	25.7
North: Pacific Highway - N											
7	L	38	2.0	0.897	53.3	LOS D	25.7	187.3	1.00	0.98	24.7
8	T	788	5.0	0.897	45.2	LOS D	25.7	187.3	1.00	0.98	25.6
9	R	78	2.0	0.648	70.7	LOS F	4.8	34.1	1.00	0.81	19.6
Approach		904	4.6	0.897	47.7	LOS D	25.7	187.3	1.00	0.96	24.9
West: Combine Street - W											
10	L	62	2.0	0.267	12.1	LOS A	1.1	7.6	0.37	0.64	40.1
11	T	181	2.0	0.568	47.2	LOS D	9.6	68.2	0.94	0.77	22.6
12	R	321	2.0	0.914	74.9	LOS F	22.2	158.1	1.00	1.03	18.6
Approach		564	2.0	0.914	59.1	LOS E	22.2	158.1	0.91	0.91	21.0
All Vehicles		3133	3.7	0.914	42.7	LOS D	25.7	187.3	0.88	0.85	26.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Moonee St/Park Ave AM 2031 - w/out left slip

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Moonee Street/Park Avenue Intersection
Existing AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	171	2.0	0.731	43.8	LOS D	24.7	178.8	0.94	0.89	26.7
2	T	766	5.0	0.731	37.4	LOS C	24.7	178.8	0.94	0.83	28.1
3	R	135	2.0	0.746	68.2	LOS E	8.2	58.7	1.00	0.86	19.6
Approach		1072	4.1	0.746	42.3	LOS C	24.7	178.8	0.95	0.84	26.5
East: Park Avenue - E											
4	L	66	2.0	0.446	41.7	LOS C	2.9	20.8	0.80	0.73	23.2
5	T	166	2.0	0.737	58.9	LOS E	9.9	70.8	1.00	0.89	17.8
6	R	88	2.0	0.412	60.1	LOS E	4.9	35.1	0.97	0.77	19.5
Approach		320	2.0	0.737	55.7	LOS D	9.9	70.8	0.95	0.83	19.3
North: Pacific Highway - N											
7	L	147	2.0	0.272	19.0	LOS B	3.4	24.3	0.63	0.75	37.8
8	T	697	5.0	0.553	35.1	LOS C	16.6	121.4	0.87	0.75	29.3
9	R	9	2.0	0.066	60.4	LOS E	0.5	3.5	0.93	0.67	21.2
Approach		853	4.4	0.553	32.6	LOS C	16.6	121.4	0.83	0.75	30.2
West: Moonee Street - W											
10	L	14	2.0	0.163	21.0	LOS B	0.4	2.6	0.68	0.65	29.8
11	T	361	2.0	0.750	46.4	LOS D	20.1	143.0	0.98	0.88	20.1
12	R	230	2.0	0.485	47.1	LOS D	11.6	82.3	0.91	0.81	22.1
Approach		605	2.0	0.750	46.0	LOS D	20.1	143.0	0.95	0.85	21.0
All Vehicles		2850	3.5	0.750	41.7	LOS C	24.7	178.8	0.91	0.81	25.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/Moonee St/Park Ave PM 2031 - w/out left slip

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/Moonee Street/Park Avenue Intersection
Existing PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	103	2.0	0.873	59.3	LOS E	31.5	228.8	1.00	1.00	22.4
2	T	872	5.0	0.873	52.6	LOS D	31.5	228.8	1.00	1.01	23.5
3	R	159	2.0	0.866	69.8	LOS E	10.0	71.4	0.97	0.97	19.3
Approach		1134	4.3	0.873	55.7	LOS D	31.5	228.8	1.00	1.00	22.7
East: Park Avenue - E											
4	L	109	2.0	0.615	32.0	LOS C	4.2	29.8	0.68	0.75	25.9
5	T	307	2.0	0.869	60.8	LOS E	19.7	140.4	1.00	1.04	17.5
6	R	131	2.0	0.389	52.5	LOS D	6.8	48.6	0.93	0.79	20.9
Approach		546	2.0	0.869	53.1	LOS D	19.7	140.4	0.92	0.92	19.7
North: Pacific Highway - N											
7	L	172	2.0	0.294	17.2	LOS B	3.0	21.5	0.61	0.75	39.2
8	T	679	5.0	0.616	39.6	LOS C	17.2	125.6	0.92	0.79	27.6
9	R	9	2.0	0.061	52.9	LOS D	0.4	3.2	0.87	0.67	23.0
Approach		860	4.4	0.616	35.2	LOS C	17.2	125.6	0.86	0.78	29.1
West: Moonee Street - W											
10	L	18	2.0	0.192	21.1	LOS B	0.4	3.0	0.71	0.66	29.8
11	T	212	2.0	0.661	51.6	LOS D	11.9	84.8	0.99	0.83	19.1
12	R	188	2.0	0.593	56.3	LOS D	10.4	73.8	0.98	0.81	20.2
Approach		418	2.0	0.661	52.4	LOS D	11.9	84.8	0.97	0.81	19.9
All Vehicles		2958	3.6	0.873	48.8	LOS D	31.5	228.8	0.94	0.90	23.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/West High St/Harbour St (Prop 3 AM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/West High Street/Harbour Street Intersection
Proposed right-turn bay controlled AM 0800 - 0900
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	19	2.0	0.127	31.2	LOS C	0.7	4.8	0.63	0.69	32.3
2	T	740	5.0	0.490	28.7	LOS C	16.0	117.1	0.80	0.69	32.2
3	R	135	1.0	0.328	25.9	LOS B	4.0	28.2	0.78	0.77	34.0
Approach		894	4.3	0.490	28.3	LOS B	16.0	117.1	0.79	0.71	32.4
East: Harbour Drive											
4	L	39	2.0	0.338	35.7	LOS C	1.5	10.6	0.69	0.71	30.3
5	T	232	2.0	0.344	30.8	LOS C	9.9	70.8	0.79	0.66	31.2
Approach		270	2.0	0.344	31.5	LOS C	9.9	70.8	0.77	0.67	31.1
North: Pacific Highway - N											
7	L	79	2.0	0.415	32.2	LOS C	2.9	20.3	0.66	0.74	31.8
8	T	756	5.0	0.500	32.8	LOS C	18.6	135.6	0.91	0.79	30.2
9	R	184	2.0	0.500	26.6	LOS B	5.6	40.2	0.79	0.79	34.6
Approach		1018	4.2	0.500	31.6	LOS C	18.6	135.6	0.87	0.79	31.0
West: West High Street											
10	L	83	2.0	0.136	38.0	LOS C	3.3	23.8	0.73	0.76	29.3
11	T	336	2.0	0.499	32.9	LOS C	15.4	109.9	0.84	0.73	30.2
Approach		419	2.0	0.499	33.9	LOS C	15.4	109.9	0.82	0.73	30.0
All Vehicles		2602	3.7	0.500	30.8	LOS C	18.6	135.6	0.82	0.74	31.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Pacific Hwy/West High St/Harbour St (Prop 3 PM)

13S1032000 Coffs Harbour CBD Masterplan
Pacific Highway/West High Street/Harbour Street Intersection
Proposed right-turn bay controlled PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pacific Highway - S											
1	L	49	2.0	0.306	29.1	LOS C	1.6	11.7	0.61	0.72	33.3
2	T	893	5.0	0.545	13.2	LOS A	11.9	86.6	0.49	0.43	42.5
3	R	159	2.0	0.433	25.0	LOS B	4.8	34.2	0.75	0.78	34.4
Approach		1101	4.4	0.545	15.6	LOS B	11.9	86.6	0.53	0.50	40.7
East: Harbour Drive											
4	L	39	2.0	0.342	36.4	LOS C	1.5	10.7	0.70	0.71	30.0
5	T	353	2.0	0.537	34.1	LOS C	16.6	118.2	0.86	0.74	29.7
Approach		392	2.0	0.537	34.4	LOS C	16.6	118.2	0.85	0.74	29.7
North: Pacific Highway - N											
7	L	65	2.0	0.322	29.3	LOS C	2.2	15.5	0.62	0.73	33.2
8	T	737	5.0	0.450	25.5	LOS B	15.0	109.7	0.75	0.66	33.8
9	R	141	2.0	0.520	25.1	LOS B	4.2	29.9	0.75	0.78	35.5
Approach		943	4.3	0.520	25.7	LOS B	15.0	109.7	0.74	0.68	34.0
West: West High Street											
10	L	159	2.0	0.267	40.3	LOS C	6.8	48.8	0.78	0.79	28.4
11	T	203	2.0	0.309	31.1	LOS C	8.7	61.8	0.78	0.65	31.1
Approach		362	2.0	0.309	35.1	LOS C	8.7	61.8	0.78	0.71	29.9
All Vehicles		2798	3.7	0.545	24.2	LOS B	16.6	118.2	0.68	0.62	34.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Melbourne

A 87 High Street South
PO Box 684
KEW VIC 3101
P +613 9851 9600
F +613 9851 9610
E melbourne@gta.com.au

Canberra

A Unit 4, Level 1, Sparta Building, 55 Woolley Street
PO Box 62
DICKSON ACT 2602
P +612 6263 9400
F +612 6263 9410
E canberra@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
F +617 4722 2761
E townsville@gta.com.au

Sydney

A Level 2, 815 Pacific Highway
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
F +612 8448 1810
E sydney@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
F +618 8334 3610
E adelaide@gta.com.au

Brisbane

A Level 3, 527 Gregory Terrace
BOWEN HILLS QLD 4006
PO Box 555
FORTITUDE VALLEY QLD 4006
P +617 3113 5000
F +617 3113 5010
E brisbane@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37
1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

www.gta.com.au

GTAconsultants