Zoe Holdings Rockdale Pty Ltd

75-81 Railway Street, Rockdale

Traffic impact assessment

Issue | 24 March 2015

Job number 240297

Arup
Arup Pty Ltd ABN 18 000 966 165

Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Document Verification

ARUP

Job title		75-81 Railway Street, Rockdale			**Job number** 240297
Document title		Traffic impact assessment			**File reference**
Document ref					
Revision	**Date**	**Filename**	Draft Report.docx		
Draft 1	12 Mar 2015	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	Daniel Kwon	James Turner	Andrew Hulse
		Signature			
Draft 2	23 Mar 2015	**Filename**	23032015 Draft Report.docx		
		Description	Updated for commercial use		
			Prepared by	Checked by	Approved by
		Name	Daniel Kwon	James Turner	Andrew Hulse
		Signature			
Issue	24 Mar 2015	**Filename**	24032015 Traffic Report .docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	Daniel Kwon	James Turner	Andrew Hulse
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document ✓

Contents

1 Introduction

1.1 Project background

Arup was engaged by Candalepas Associates on behalf of Zoe Holdings Pty Ltd to provide traffic engineering services for the proposed mixed use residential development site located at 75-81 Railway Street, Rockdale. The proposal is for a nine storey mixed use development containing residential apartments and ground floor retail frontages on Railway Street.

1.2 Scope of work

This traffic impact assessment supports the planning proposal application for the proposed development at 75-81 Railway Street, Rockdale, and will outline the following:

- Existing traffic conditions review and intersection performance analysis for the AM and PM peak hour.
- Establishment of trip generation and distribution based on the site uses, including time and origin of arrival of customers / visitors.
- Traffic impact assessment of the proposed development on the local road network for one future year determined by the proposed development timeline. Key outputs from intersection modelling will establish whether any mitigation measures will be required to accommodate the traffic generation of the proposed development.
- Design advice for proposed car park design and garbage collection through swept path analysis.
- Advice on parking requirements at the proposed development.

2 Existing conditions

2.1 Site description

The proposed development site is located at 75-81 Railway Street, Rockdale which is shown in Figure 1. The site is located within the Rockdale Local Government Area (LGA) and is currently zoned as B2 Local Centre. The site is located near Rockdale Station and is currently occupied by two commercial buildings. The area surrounding the site consists of retail stores and high density residential developments along Railway Street and low density residential developments to the west.

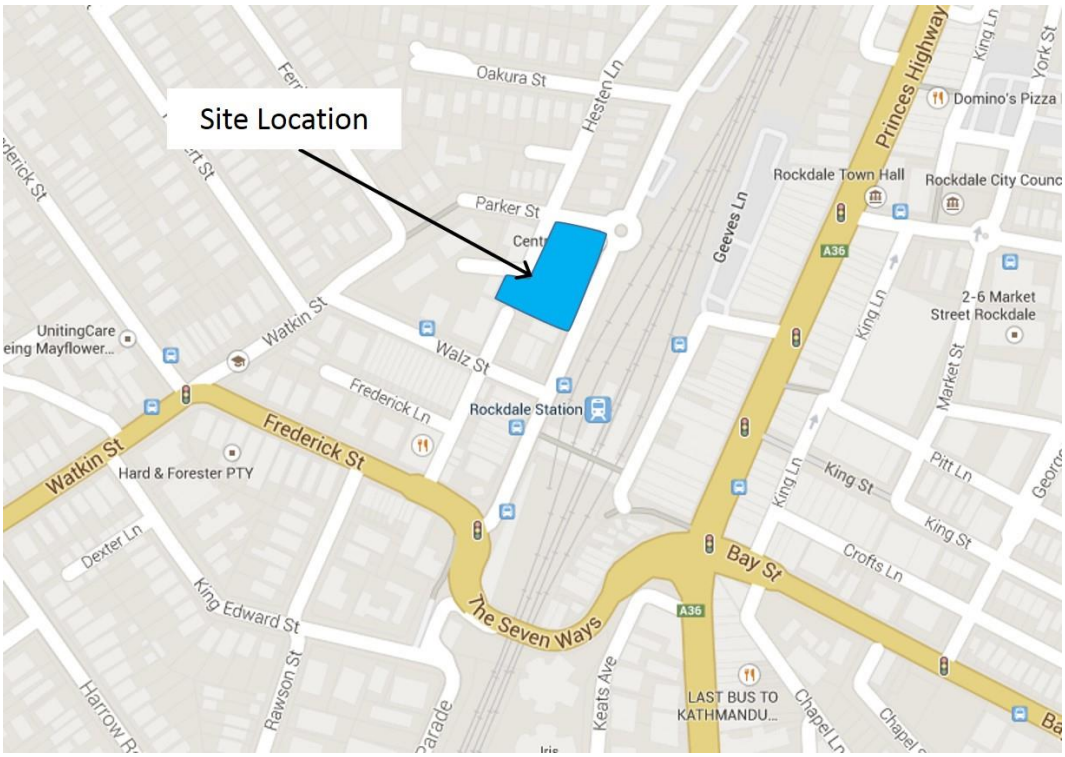

Figure 1: Site location

2.2 Road network

The site is bound by Railway Street to the east, Hesten Lane to the west and Parker Street to the north.

The section of Railway Street surrounding the site is a local two-way collector road connecting local roads to The Seven Ways. Kerbside parking is permitted on the western side of the road, whilst bus zone restrictions apply on the eastern side (where a bus interchange is located). One of the existing site driveways (to the basement) is located on Railway Street. The road has high pedestrian activity due to close proximity of schools, public transport and shops and subsequently has 40 km/h posted speeds.

Frederick Street (located south of the site) is an RMS state controlled road. Frederick Street is a sub-arterial road and continues over the south coast railway line as The Seven Ways, providing a connection between local traffic and the Princes Highway. There are 60 km/h speed restrictions on all sections of the road.

Hesten Lane is a local laneway that runs parallel to Railway Street. The laneway is a narrow 4.5 m wide two-way with no kerbside parking. The southern interface of Hesten Lane forms one of the driveways of the existing commercial building at the site location. There are 40 km/h speed restrictions on all sections of the road.

Parker Street is a two-way local road with kerbside parking permitted on either side of the road. It forms an intersection with Railway Street as a roundabout. Observations made by Arup during a typical weekday morning peak showed a high level of pick-up and drop-off activity along the kerbside parking spaces during the AM peak hour. There are 40 km/h speed restrictions on all sections of the road.

Figure 2: Pick-up activity on Parker Street

2.3 Existing traffic volumes

Traffic count surveys were undertaken in the AM (8:00am-9:00am) and PM (4:30pm-5:30pm) peak periods on two intersections surrounding the site on Tuesday 17 February 2015. The intersections surveyed were Parker Street / Railway Street and Railway Street / Walz Street. Analysis of the traffic survey data revealed that the AM peak hour occurs between 8:00am-9:00am and the PM peak hour occurs between 5:00pm-6:00pm. The existing traffic volumes during the AM and PM peak hours are shown in Figure 3.

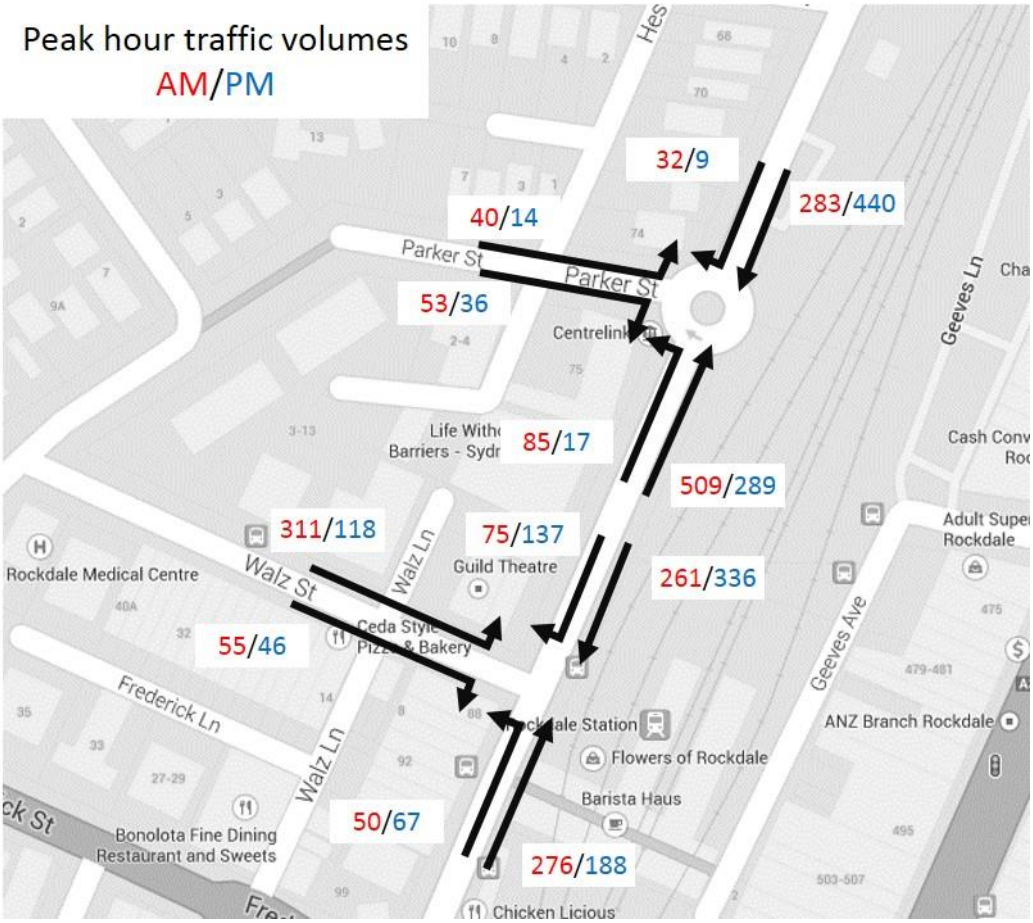

Figure 3: Traffic survey counts

2.4 Existing trip generation

Arup surveyed the three driveways of the existing development (Figure 4) to assess the level of activity during the AM (8:00 am-9:00 am) and PM (4:30 pm-5:30 pm) peak hours on a typical working day. The in/out movements from the driveways that service the two commercial buildings were surveyed and the results are described in Table 1.

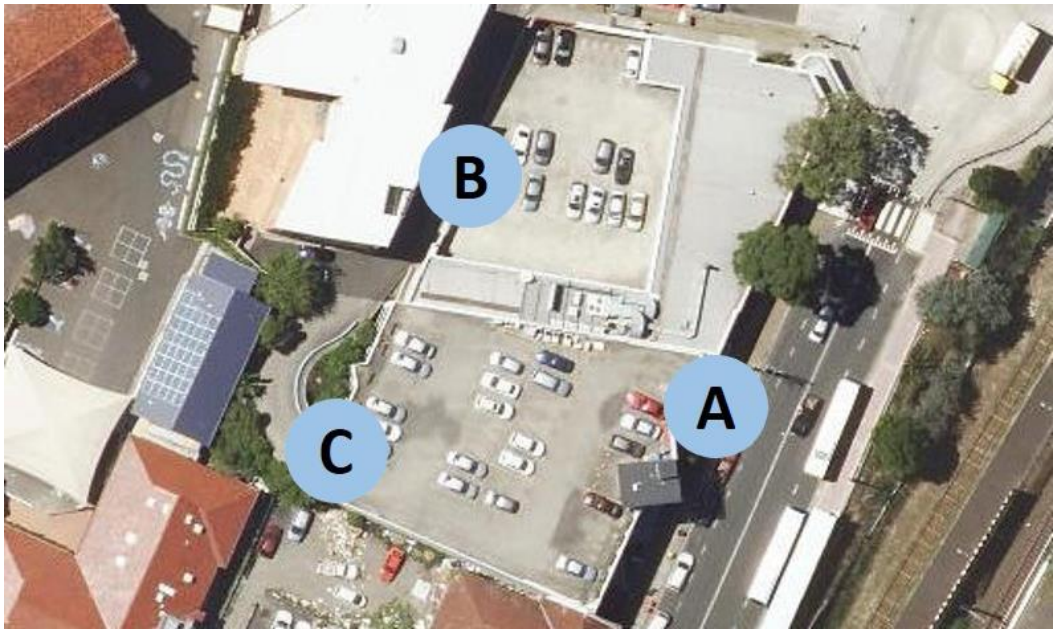

Figure 4: Driveway survey locations

Table 1: Driveway survey counts

Driveway	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
A	21	1	22	0	18	18
B	6	0	6	0	8	8
C	10	0	10	1	15	16
Total	**37**	**1**	**38**	**1**	**41**	**42**

The existing commercial buildings generate a total of 38 trips during the AM peak hour and 42 trips during the PM peak hour on a typical weekday. The majority of AM peak hour trips are inbound and outbound in the PM peak hour, which is typical for a commercial building.

2.5 Public transport

The site has good access to public transport and is located within 200m walking distance from Rockdale Station. A bus interchange is also located on Railway Street, within 100m walking distance.

Rockdale Station is serviced by the T4 Eastern Suburbs & Illawarra Line, which provides all stop train services to the Sydney CBD, Cronulla and the South Coast via Sutherland. The station is well served by trains with services every 10 minutes during the peak periods in both direction of travel.

Bus stops located on Railway Street connect the local area to the Sydney CBD, Burwood, Beverley Hills, Bexley, Drummoyne and Kingsgrove. Bus routes servicing the site are summarised in Table 2.

Table 2: Bus services

Bus Route	Service description
Route 400, Burwood to Bondi Junction	Services every 20 minutes throughout the day in each direction.
Route 410, Rockdale to Bondi Junction	Services every 30 minutes during peak periods in each direction. Services only operate during peak periods.
Route 452, Beverly Hills to Rockdale	Services every 20 minutes throughout the day in each direction.
Route 473, Rockdale to Campsie	Services every 30 minutes during peak periods in both directions of travel Services every hour during non-peak periods in both directions of travel
Route 492, Rockdale to Drummoyne	Services every 15 minutes during peak periods in both directions of travel Services every 30 minutes during non-peak periods in both directions of travel
Route 493, Rockdale to Roselands	Services every hour throughout the day in each direction.

2.6 Pedestrian and cycling facilities

The site is located in Rockdale Town Centre and is well served by a good network of local footpaths. Paved footpaths and kerb ramps are provided on both sides of Railway Street, Walz Street and Parker Street. All roads on the walking route from the proposed development site to Rockdale transport interchange possess paved footpaths and kerb ramps on both sides of the road with sections of Railway Street providing covered footpaths. There are pedestrian zebra crossing opportunities across Railway Street and Walz Street connecting to the shops and transport nodes.

The site is well connected to a number of cycling routes which consist of both off-road cycling paths as well as on-road marked paths. The on-road bike path on Railway Street connects to the Cooks River Cycleway which provides a safe and efficient connection to the Sydney Airport and the Sydney CBD (see Figure 5).

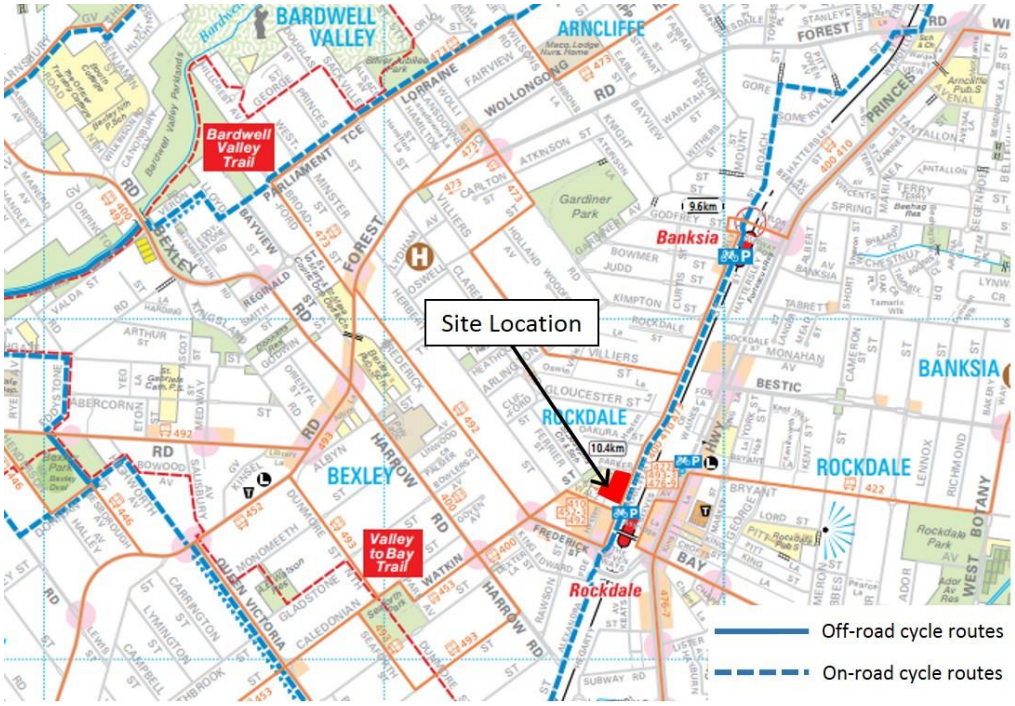

Figure 5: Cycle routes surrounding the site

2.7 Parking

The site is located within the Rockdale town centre which mostly has restricted parking on surrounding streets. Parker Street has a number of restrictions including:

- two hour restrictions between 9:30am-2:30pm and 3:30pm-6:00pm Monday to Friday and
- 15 minute restrictions on the northern side and
- no parking restrictions on the southern side between 8:30am-9:30am and 2:30pm-3:30pm during school days.

Railway Street has short-stay 15 minute parking restrictions on the western side and bus zones on the eastern side due to the bus interchange. There are unrestricted parking opportunities on local streets further north of the site which are generally occupied by commuters.

2.8 Travel characteristics

Mode share patterns at the site were analysed using 2011 Journey to Work (JTW) Census data from the Bureau of Transport Statistics. The JTW data for travel zone 2764 was used to assess the likely mode of peak hour trips to and from the site. The location and the coverage of travel zone 2764 is shown in Figure 6. The results of the analysis are shown in Table 3.

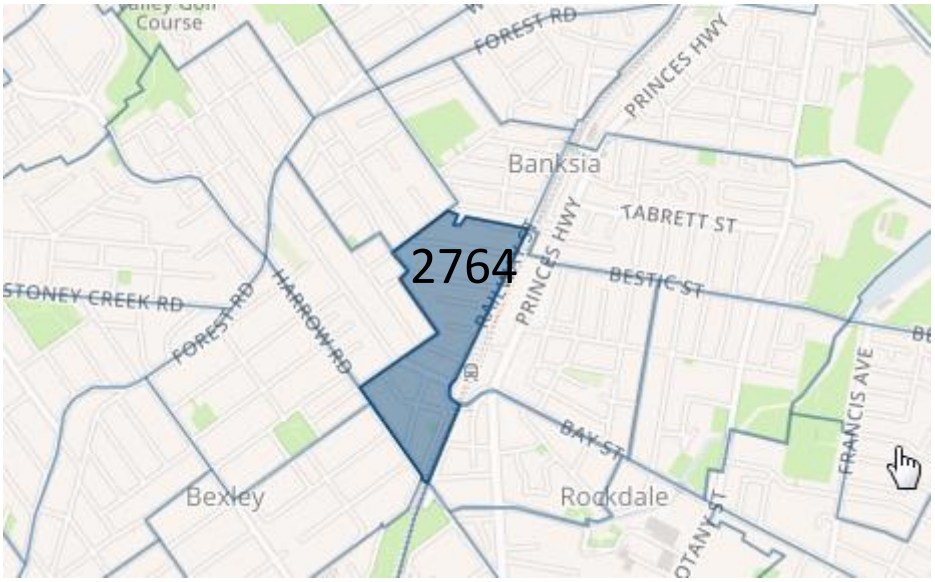

Figure 6: Travel zone 2764
Source: BTS, 2011

Table 3: Journey to Work travel patterns

Mode	Inbound trips to work	Outbound trips to work
Train	14%	43%
Bus	3%	5%
Car	74%	44%
Walk	7%	5%
Other	1%	1%
Mode not stated	1%	3%
Total trips	534	903

Source: BTS, 2011

The JTW data shows that residents of travel zone 2764 rely primarily on public transport to commute to work. The data reveals 43% of residents travel to work via train and 5% travel to work via bus. This can be attributed to the close proximity of Rockdale Station and the frequency of public transport services to the Sydney CBD.

The JTW data reveals that commuters travelling to travel zone 2764 rely more heavily on car trip modes which makes up 74% of inbound trips. Commuters travelling to Rockdale by train make up 14% of inbound trips and trips made by bus make up 3%.

3 Planning proposal

3.1 Proposed development

The proposed concept development is for a nine storey mixed use development which will include eight levels of residential apartments, ground floor retail and commercial uses and three levels of basement car parking.

The residential component of the development comprises of 1-bedroom, 2-bedroom and 3-bedroom apartments. The total number of each type of apartment is summarised in Table 4.

Table 4: Residential apartment schedule

Adaptable	1-bedroom	2-bedroom	3-bedroom	Total
13	26	69	13	121

In addition, the development will provide approximately 374m^2 of retail and 459m2 of commercial space.

3.2 Car parking

The proposed development will provide a number of basement parking levels. Vehicular access to the basement level car park will be via ramps down from Parker Street.

3.3 Site access

Vehicle access to the site will be provided on Parker Street via a new driveway that leads down to the basement level car parks. Ramps are proposed in the north-east section of the site to provide access between the car parking levels. All other existing driveways to the site will be removed.

Pedestrian access to the site will be provided on Railway Street for residents and on Parker Street for customers using the retail shops and child care centre.

3.4 Service vehicle access

Garbage collection will occur from a bin room to be located on the corner of Hesten Lane and Parker Street frontage. There are 4 bin rooms in the basement and bins will be brought to the street level bin room on collection days.

Deliveries will occur on-street.

4 Parking assessment

4.1 Off street parking

The proposed car parking rates for the development site will be calculated based on the Rockdale Council DCP.

The required parking provisions are outlined in the existing Rockdale City Council Development Control Plan 2011 (DCP 2011), Section 4.6: Car Parking, Access and Movement. The relevant proposed and required parking rates for this development have been summarised in Table 5.

Table 5: Car parking rates as per Rockdale DCP

Development type		**DCP requirement**
Residential	Adaptable	1 accessible space per apartment
	1 bedroom	1 space per apartment
	2 bedrooms	1 space per apartment
	3+ bedrooms	2 spaces per apartment
	Visitor parking	1 space per 5 units
Commercial	Office or businesses premises	1 space per 40m^2 of GFA
Shops, restaurants or cafes	Shop	1 space per 40m^2 of GFA

The Rockdale Council DCP also states that:

"Council's on-site car parking requirements aim to satisfy the parking demand likely to be generated by the development while discouraging unnecessary car use and encouraging other modes of transport. Developments are to facilitate and encourage greater pedestrian, bicycle and public transport usage to improve local amenity and to minimise pollution and the use of non-renewable resources."

Given that the development is adjacent to a Railway Station and there is good access to a bus interchange with 6 routes serviced, consideration should be given to reducing the provision of car parking which will reduce car dependence.

If the full Rockdale DCP parking rates are used, car parking for 194 vehicles is required as shown in Table 6. This will require three levels of car parking. However, given that there are parking restrictions on surrounding streets and a nearby railway station, it is unlikely that this level of parking will be required. It is expected that many residents of the development will use public transport as their primary mode of transport and that the shops will generate minimal need for parking within the development with the availability of on-street.

Table 6: Car parking to be provided

Development type		Number of units / GFA	Car parking requirements (Rockdale DCP)
Residential	Adaptable	13	13
	1 bedroom	26	26
	2 bedrooms	69	82
	3+ bedrooms	13	26
	Visitor parking	121	25
Commercial		459m^2	12
Shops, Cafes, Restaurants		374m^2	10
Total Parking Spaces			194 parking spaces

4.2 Bicycle parking

The bicycle parking rates for the development have been taken from the Rockdale DCP and used here in Table 7

Table 7: Rockdale City Council bicycle parking rates

Development type	**DCP requirement**	**Number of apartments / GFA / children**	**DCP required parking**
Residential	1 space per 10 dwellings	121	13
Shops, restaurants or cafes	1 space per 200m^2	374m^2	2
Commercial	1 space per 200m^2	459m^2	3
Total			18

Bicycle parking and end of trip facilities will be provided with the development in accordance with Rockdale DCP requirements.

4.3 Motorcycle parking

The motorcycle parking rates for the development have been taken from the Rockdale DCP and used here in Table 8.

Table 8: Rockdale City Council motorcycle parking rates

Development type	DCP requirement	Number of apartments / spaces	DCP required parking
Residential	1 space per 15 dwellings	121	10
Shops, restaurants or cafes	1 space per 20 car spaces	2	1
Commercial	1 space per 20 car spaces	2	1
Total			12

Motorcycle parking will be provided with the development in accordance with Rockdale DCP requirements.

5 Transport assessment

5.1 Traffic generation

Traffic generation rates were adopted from the RMS Technical Direction (TDT 2013/4a) Guide to Traffic Generating Developments Updated Traffic Surveys. Trips generated. These rates were used for the residential component of the development which have been calculated based on Rockdale specific rates for vehicle trips per unit. The site surveyed at Rockdale as part of the RMS TDT 2013/4a was a 234 unit apartment with a 1.11:1 parking ratio. The proposed site will have 121 apartments and 194 parking spaces as shown in Table 6. This represents a parking ratio of 1.60:1. The RMS traffic generation rate is therefore appropriate.

Trips for the proposed retail have been assumed as 50% of the averaged Sydney Metropolitan rate, given the site is located within the Rockdale Town Centre. The retail will not be a key generator of both vehicle and pedestrian trips, but will likely serve as an ancillary function for the residents and workers of the proposed development.

Trips for the proposed commercial have been calculated based on the Sydney Metropolitan rate for office blocks.

Based on the development schedule and rates outlined above, Table 9 and

Table 10 detail the expected trip generation for the site.

Table 9: AM peak hour trip generation

Land use	Size of proposed development	AM peak hour trip generation rate	AM peak hour trips generated
Residential	121 units	0.32 per unit	39
Retail	374m^2 GFA	n/a	0
Commercial	300m^2	1.6 per 100m^2	5
Total trips			**44**

Table 10: PM peak hour trip generation

Land use	Number of units / GFA	PM peak hour trip generation rate	PM peak hour trips generated
Residential	121	0.18 per unit	22
Retail	374m^2	6.15 per 100m2	23
Commercial	300m^2	1.2 per 100m^2	4
Total trips			**49**

The site is currently occupied by two commercial office blocks which currently generate trips during the AM and PM peak hours. Survey results outlined in Table 1 reveal that the existing site generates 38 trips in the AM peak of which 37 were incoming trips to the site and 42 trips in the PM peak of which 41 were outgoing trips leaving the site. The proposed development will predominately generate outgoing trips in the AM peak and incoming trips in the PM peak as it is

residential in nature. Therefore the development is expected to generate the trips outlined Table 11.

Table 11: Additional trips generated

Peak hour	Trips inbound	Trips outbound	Total trips in hour
AM	-35	+40	+5
PM	+34	-28	+6

Note: Negative trips indicate trips that are expected to be removed from the road network due to the change of development type.

5.2 Traffic distribution

The existing turning proportions of vehicles at Parker Street / Railway Street intersection have been assumed as the turning distribution of the additional trips. Traffic surveys were conducted at the Parker Street / Railway Street to observe the movement of vehicles entering and leaving Parker Street. The proportions in Figure 7 have been assigned.

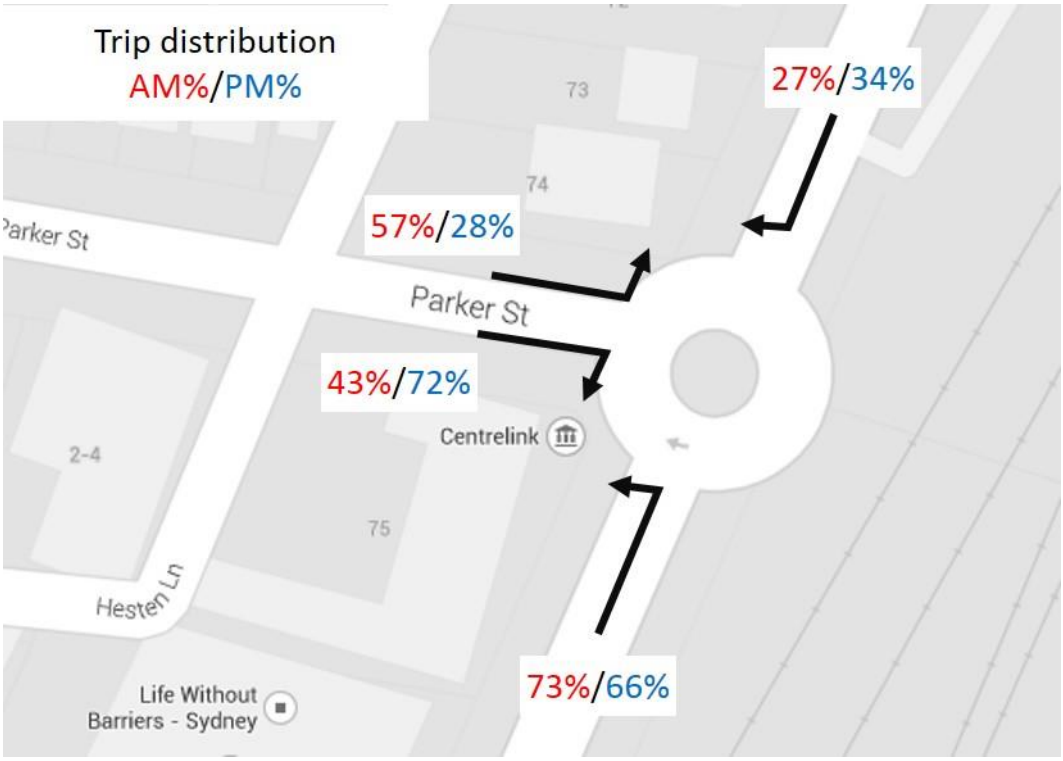

Figure 7: Trip distribution

5.3 Road network impacts

The development will have a net increase in 6 trips in the AM and 7 trips in the PM peak hours which accounts for approximately 1% of existing traffic volumes at the Parker Street / Railway Street intersection. As such, the proposed development is expected to have minimal impacts to the local road network when distributed over the network and accesses to the site.

Table 12: Development traffic compared to existing traffic volumes

Peak	Existing traffic volumes	Development traffic volumes	Percentage (%)
AM	1,002	+5	0.5%
PM	802	+6	0.8%

5.3.1 Traffic modelling

The Parker Street / Railway Street intersection has been assessed using RMS approved software SIDRA software. In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LoS), is based on the average delay per vehicle. LoS ranges from A = very good to F = unsatisfactory.

Table 13: Level of service criteria for intersections

Level of Service	Average delay (seconds per vehicle)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At Capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

Another common measure of intersection performance is the degree of saturation (DoS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection is 0.9.

The existing intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (Seconds per vehicle)
- Level of Service

5.3.2 Results and analysis

Results of the analysis of the roundabout at Parker Street / Railway Street are summarised in Table 14.

Table 14: SIDRA results - Parker Street / Railway Street

Peak period	Scenario	LoS	Average delay (s)	DoS
AM	Existing	A	6	0.41
	Development	A	6	0.39
PM	Existing	A	5	0.32
	Development	A	5	0.32

Results from the SIDRA analysis summarised in Table 14 reveals that the development will have minimal impacts on the operation of the intersection.

6 Conclusion

This review has described the potential traffic and transport impacts of the proposed conceptual mixed use development at 75-81 Railway Street, Rockdale. Key findings of the review are as follows:

- The site is located within Rockdale Town Centre, parking in this area is restricted discouraging residents from parking on-street;
- The development is located within 200m of various modes of public transport. Rockdale Station and bus stops are located adjacent to the site on Railway Street and thus the development is expected to not generate a large parking demand;
- The development would be responsible for a small increase (1%) in peak hour traffic flows along surrounding key roads. Due to the small increase in development traffic, it is expected that surrounding key roads will continue to operate in the same way;
- Results of SIDRA analysis indicate that the Parker Street / Railway Street intersection continues to operate at a LoS A with adequate DoS in both peak periods;
- Secure bicycle parking is to be provided as a component of the proposed development; and
- The proposed increase in height for the site will have minimal impacts on the existing road network.