CLIENTS | PEOPLE | PERFORMANCE

Thakral Holdings Limited

Pacific Bay Western Lands

Traffic and Transport Assessment

March 2009

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Introduction and Background

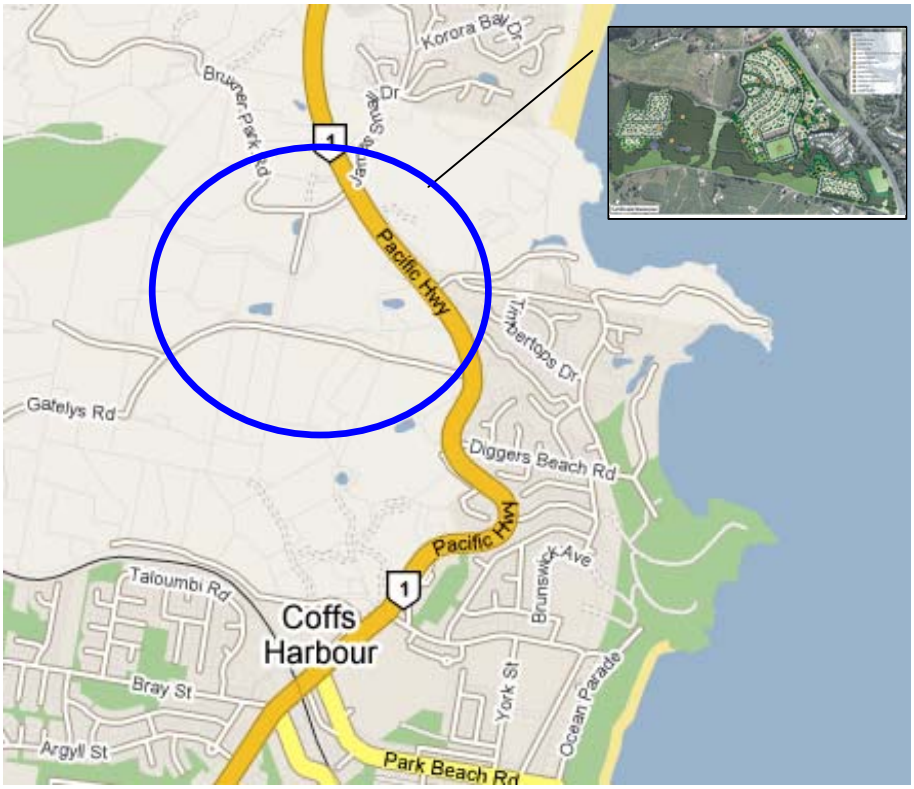
Thakral Holdings Pty Limited is proposing to develop a site located on the western side of the Pacific Highway at Korora, around three kilometres north of the Coffs Harbour CBD.

The development site (herein referred to as “the Site”) is bounded by the Pacific Highway on the east, Bruxner Park Road on the north, and West Korora Road on the south. The Site consists of 28.51 hectares of undeveloped rural land and is to be developed into a 132-lot residential community

GHD Pty Ltd (GHD) was engaged by the Thakral Limited to undertake a traffic assessment associated with the proposed rezoning of the area to develop the Site as a residential community along the Pacific Highway.

The location of the site in relation to Coffs Harbour CBD and the Pacific Highway is shown in Figure 1.

Figure 1 Location of the Site



1.2 Zoning

The Site is currently zoned rural agriculture with patches of environmental protection habitat and environmental protection scenic buffer.

1.3 Proposed Land Use

The proposal comprises of 132 residential lots.

1.4 Phasing and Timing

It is assumed that the Site will be developed in a single phase and construction will take around two years. Hence, it is anticipated that the Site will be opened in mid 2010.

1.5 Report Format

The report is set out in the following format:

- Section 2 – Existing Conditions
- Section 3 – Traffic Generation
- Section 4 – Impact Assessment
- Section 5 – Conclusions

2. Existing Conditions

2.1 Existing Road Conditions

2.1.1 Pacific Highway

The Pacific Highway is a main arterial road which constitutes the north-south connection between Sydney and the Queensland border and is one of the most heavily used interstate road corridors.

The nature and condition of the Pacific Highway between Newcastle and the Queensland border varies greatly from divided carriageways to stretches of narrow two-lane road. In the vicinity of the Site, the Pacific Highway is predominantly dual carriageway and has a posted speed of 80 km/h.

Figure 2 Pacific Highway Northbound approach to Bruxner Park Road intersection

2.1.2 Bruxner Park Road

Bruxner Park Road serves as the north boundary of the Site and provides the main connection to the Pacific Highway from the proposed development. It forms a cross-junction with the Pacific Highway and James Small Drive.

In the vicinity of Bruxner Park Road, the Pacific Highway consists of two lanes in each direction, with a separate left turn bay from the northbound approach and a separate right turn bay from the southbound approach for vehicles wishing to enter Bruxner Park Road. Turning traffic to and from Bruxner Park Road at the intersection give way or yield to traffic on the Pacific Highway. Bruxner Park Road is roughly 8.7 metres in width at the intersection approach and has a posted speed of 50 km/h.

Figure 3 Bruxner Park Road from Pacific Highway looking west

2.1.3 West Korora Road

West Korora Road runs parallel to the southern boundary of the Site and provides the connection to the Pacific Highway for the southern portion of the proposed development. It is a sealed narrow (6.3 metres wide) rural road with posted speed of 50 km/h. West Korora Road forms a T-junction with the Pacific Highway.

Along the approach to the intersection on the Pacific Highway, a slip lane is provided on the northbound approach for vehicles turning left into West Korora Road and a turn slot is provided on the southbound approach for vehicles wishing to turn right into West Korora Road. U-turn manoeuvres are also permitted on the southbound direction of the Pacific Highway.

Figure 4 West Korora Road from Pacific Highway looking west

2.2 Site Accessibility

The Site is mainly accessible from the Pacific Highway via Bruxner Park Road and West Korora Road. No new connections to the Pacific Highway will be developed and it is envisioned that Bruxner Park Road will provide the main access.

2.3 Historical Traffic Data

The RTA has a combination of permanent and temporary counting stations along the entire section of the Pacific highway from Newcastle to the Queensland border. Traffic data from two permanent count stations located along the Pacific Highway between Coffs Harbour and Woolgoolga were analysed. The following table provides an understanding of historical daily traffic volumes along the Pacific Highway for this section.

Table 1 Average Annual Daily Traffic (AADT) Volumes, vehicles

Station	Location	1990	1992	1995	1998	2001	2004
04.250	Coffs Harbour – N of MR151, High Street	21,221	Nda	25,170	25,275	27,394	39,287
04.150	1 Km south of Moonee Beach Road	12,314	Nda	16,332	16,156	20,171	20,868

Source: Roads and Traffic Authority, Traffic Volumes Data for Hunter and Northern Regions (2004)

(Nda – no data available)

The observed traffic volumes near the town centre of Coffs Harbour at High Street manifested an increase in traffic growth of around 5% per annum over a ten year period from 1995 to 2004 with a sharp increase of 12.8% per annum over a three year period from 2001 to 2004.

Further north to Coffs Harbour towards Woolgoolga, traffic volumes recorded were relatively lower by roughly half of that recorded near the centre. The observed traffic volumes south of Moonee Beach Road manifested a lower traffic growth rate of 2.8% per annum for the period from 1995 to 2004 and with only 1.1% per annum in the period from 2001 to 2004.

2.4 Existing Traffic Volumes – Intersection Turning Movement Counts

As part of this study, peak hour traffic volume count surveys were undertaken at the two key intersections with the Pacific Highway relevant to the Site. A morning and afternoon peak hour turning movement survey was undertaken at the two main intersections in the vicinity of the Site. The intersections are: Pacific Highway/Bruxner Park Road and Pacific Highway/West Korora Road. The survey was conducted on Wednesday (27 February 2008) and Thursday (28 February 2008) between 8:00 – 9:00 a.m. and 4:00 – 5:00 pm. The surveys showed the following peak hour volumes on the Pacific Highway:

Table 2 Peak Hour Through Traffic Volumes on the Pacific Highway at the intersection with Bruxner Park Road

	Direction		
	Northbound	Southbound	Both Directions
AM Peak	651	1695	2346
PM Peak	1256	762	2018

Table 3 Peak Hour Through Traffic Volumes on the Pacific Highway at the intersection with West Korora Road

	Direction		
	Northbound	Southbound	Both Directions
AM Peak	701	1930	2631
PM Peak	1423	793	2216

The 4-lane section of the highway has a nominal capacity of 2,420 vehicles per hour per direction or 4,850 vehicles (2-way).[1] While the above volumes are within this capacity, the highway is already operating at a Level of Service C and D. Level of Service C is the zone of stable flow and most drivers are restricted to some extent to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort declines noticeably at this level. Level of Service D occurs when traffic flow is close to the limit of stable flow and is approaching unstable flow. At this level, drivers are restricted in their freedom to select desired speed and to manoeuvre within the traffic stream. Level of convenience is poor and small increases in traffic will create operational problems.

2.5 Intersection Operation

The turning movement volumes recorded for the intersections of Bruxner Park Road and West Korora Road with the Pacific Highway were assessed for existing operational performance using SIDRA Intersection software Version 3.2.

SIDRA Intersection calculates the amount of delay experienced by vehicles using an intersection, and gives a Level of Service rating which indicates the relative performance of that intersection with regard to the average delay (in seconds per vehicle) experienced by vehicles at the intersection.

The 'Level of Service' is the standard used to measure the performance of the intersection operation. This is defined as the qualitative assessment of the quantitative effect of factors such as speed, traffic volume, geometric features, delays and freedom of movement. The Level of Service criteria set by the RTA[2] is outlined in Table 4**.** In analysing existing intersection performance, the level of Service "D" is generally acceptable to the RTA.

[1] Austroads Guide to Traffic Engineering Practice Part 2, Uninterrupted Multi Lane Roads

[2] RTA Guide to Traffic Generating Developments, NSW 2002

Table 4 Level of Service Criteria

Level of Service	Average Delay (sec/vehicle)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity, requires other control mode
F	More than 70	Roundabouts require other control mode	

The existing volumes are shown in Figure 5 and Figure 6.

Figure 5 Bruxner Park Road / Pacific Highway Intersection Turning Volumes

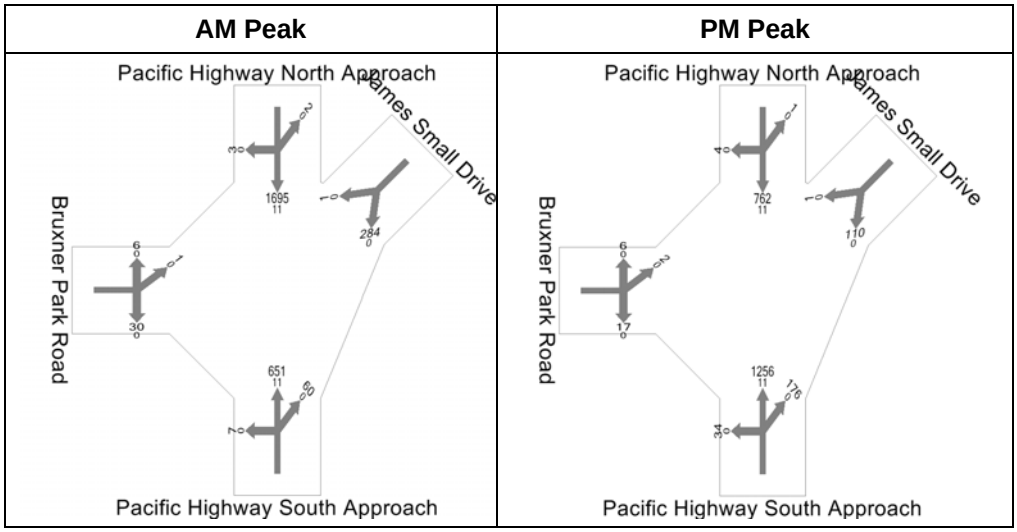
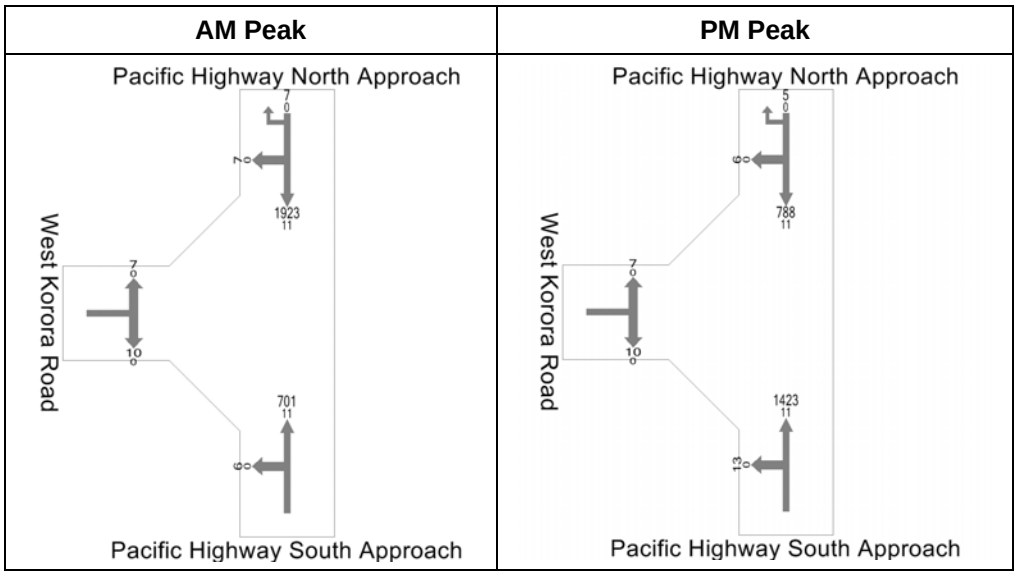


Figure 6 West Korora Road / Pacific Highway Intersection Turning Volumes



The results of the SIDRA analysis of the intersections under existing traffic volumes are shown in Table 5.

Table 5 Intersection Analysis – 2008 Base Case

Intersection	AM Peak		PM Peak	
	LoS	Average Delay (Seconds)	LoS	Average Delay (Seconds)
Bruxner Park Road / Pacific Highway				
- Pacific Highway North	A	0.0	A	0.1
- Pacific Highway South	A	0.8	A	1.3
- Bruxner Park Road	F	131.3	E	59.1
- James Small Drive	F	>200	B	19.1
West Korora Road / Pacific Highway				
- Pacific Highway North	A	0.1	A	0.4
- Pacific Highway South	A	0.1	A	0.1
- West Korora Road	F	>200	F	>200

The above results indicate that due to the high volume of traffic along Pacific Highway, vehicles exiting Bruxner Road, James Small Drive and West Korora Road experience lengthy delays as the Yield/Give way control at the intersections give priority to traffic along the Pacific Highway.

2.6 Public Transport

There are no existing public transport services to the Site. There are existing bus and coach services that travel along the Pacific Highway linking Coffs Harbour and Woolgoolga but no bus stops are located along that stretch of the Pacific Highway.

2.7 Key findings from Crash Analysis

Crash statistics from the RTA's crash record database were analysed. The analysis covers a four-year period between October 2002 and September 2007 to understand road safety characteristics along the Pacific Highway corridor in the vicinity of the Site. The section of the Pacific Highway analysed is from 500m north of Bruxner Park Road to 500m south of West Korora Road.

The key findings from the analysis of crash data is summarised below. The length of the road analysed is approximately 1.9 km.

- A total of 18 crashes were recorded in this section of the Pacific Highway over a 5 year period;
- Crashes consist of 5 serious injuries (28%) and 13 non-casualties (72%). No fatal injuries (0%) were recorded;
- Only 1 (5.6%) crash involved a heavy vehicle;
- 9 (50%) crashes were recorded as intersection;
- In the vicinity of Bruxner Park Road, 2 (33%) crashes were recorded as non-intersection crashes and 4 (67%) were recorded as intersection crashes;
- In the vicinity of West Korora Road, 2 (100%) crashes were recorded as non-intersection crashes;
- 15 (83.3%) crashes occurred during weekdays; and
- 3 (16.7%) crashes occurred during the night.

Under the RTA's urban road network classification hierarchy, the Pacific Highway Road is classified as a "5u" road or a significant State road with a corresponding Class average of 5.8 casualty crashes per kilometre. The crash analysis above indicates that this section of Pacific Highway has a casualty crash rate of 2.6 which is less than the class average.

3. Traffic Generation

3.1 Traffic Generation

Traffic generation for the Site was estimated on the basis of the RTA's *Guide to Traffic Generating Developments*.[3] The Guide provides trip generation rates to estimate peak hour vehicle traffic to and from specific land use developments. The traffic generation for residential uses is further differentiated by type of dwelling. The Guide specifies a range of traffic generation rates for private housing depending on the density. For the purpose of this assessment, it is assumed that the proposed residential development will mainly comprise single detached dwelling houses with a corresponding peak hour traffic generation rate of 0.85 vehicle trips per dwelling and a daily traffic generation rate of 9.0 vehicle trips per dwelling.

Although the Guide suggests that about 25% of trips are 'internal' to the subdivision involving local shopping, schools and local social visits, it is assumed that all trips for this development should be considered external since the location of shops, schools and facilities are all external to the Site. As public transport to the Site is also considered to be very limited, no reduction is applied in the generation rate.

The Site which will contain 132 residences is expected to generate a total of 113 vehicle trips during the peak hour. Note, however, that the peak hour volume for residential traffic tends to be representative of the morning peak hour while in the evening peak, the residential traffic generation is more spread out over a wider period.

3.2 Distribution of Traffic

In terms of directional split of residential traffic generation, outbound traffic is expected to be higher than inbound traffic in the morning peak period while in the evening peak period, inbound traffic will be higher than outbound traffic. The RTA Guide suggests that 80% of the traffic generated by residential developments account for outbound traffic in the morning peak while 20% account for inbound traffic. For the evening peak, it is expected to be the opposite.

Table 6 Directional Split of Peak Hour trips

	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Percent of trips	20%	80%	80%	20%
Vehicle trips per hours	23	90	90	23

[3] RTA Guide to Traffic Generating Developments, 2002