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TRAFFIC ASSESSMENT REPORT

Preparation of Traffic Assessment Report for the Proposed Fixed / Wet Berth Marina at The Boathouse Restaurant on Brisbane Water Drive, Koolewong

SEPTEMBER 2010

LOCALITY SKETCH

TABLE OF CONTENTS

1. INTRODUCTION

1.1 The Project

TPK & Associates were invited by ADW Johnson to undertake the preparation of a Traffic Assessment Report to fully assess and report on the proposed Marina to be constructed at the existing The Boathouse Restaurant, Koolewong.

The Boathouse Restaurant, Koolewong is located along Brisbane Water Drive and currently used as a restaurant and function centre.

It is proposed to construct a 50 wet berth marina, and adjust the existing car park to include provision for the additional parking spaces required.

The Marina *will not* provide pump out services or refueling facilities. It will be protected by a security gate allowing access to select personnel. Management of the Marina will be located off site.

A primary consideration would relate to the relationship between the existing restaurant use and the proposed marina, in terms of conflicts of parking requirement.

Traffic counts have been undertaken to determine existing usage and form part of this report.

1.2 Task Description

This assessment and report focuses on the following objectives:

- To ensure that the proposed development complies with the specific requirements of the referenced documents with respect to traffic and parking requirement specifically.

- Assessment of the likely additional vehicle movements arising from the proposed development and the effect on the road network.

- Establish that appropriate road safety and traffic management guidelines and standards have been addressed by the proposal.

1.3 Project Representative

Mr T Keating, Director TPK & Associates undertook the evaluation and preparation of the report. He has extensive experience in the assessment of traffic generating developments, road safety and traffic management issues.

1.4 References

Roads and Traffic Authority – Guide to Traffic Generating Developments.

Austroads Guide to Engineering Practice - Part 5: Intersections at Grade.

Austroads Design Vehicles and Turning Path Templates

Australian Standard 2890.1: 2004 Off – street car parking

Australian Standard 2890.2: 2002 Off – street commercial vehicle facilities

Australian Standard 3962 – 2001 Guidelines for design of Marinas

Gosford Council Development Control Plan No. 111 – Car Parking

Christopher Hallam & Associates Pty Ltd "Car Parking Implications of Marina Developments" - Prepared for the Boating Industry Association of New South Wales

2. ROAD NETWORK AND EXISTING TRAFFIC CONDITIONS

2.1 Surrounding Road Network

Brisbane Water Drive - Main Road (M.R.) 349

Brisbane Water Drive (M.R. 349) is a main road under the care and control of the Roads and Traffic Authority of NSW.
Within the broader road network it provides a link between Umina and Narara.
In the vicinity of the proposed development Brisbane Water Drive is of level grade and constructed as a two lane two way road with sealed road shoulder.

Roadmarking and street lighting to the required standard has been provided.

No Stopping signposting is provided in Brisbane Water Drive across the frontage of the Boathouse Restaurant.

At its entry into the Boathouse Restaurant a fully chanellised intersection has been constructed to provide a separate left turn deceleration lane together with a painted right turn sea – gull treatment. (see Figure 1)

The route currently has a 70-kph speed limit at this point in the road network.

Brisbane Water Drive looking south

Figure 1

Sight distance from the driveway access to both the north and south along Brisbane Water Drive satisfies the requirements of Australian Standard 2890.1: 2004 Off – street car parking (see Figures 2 & 3 respectively)

Sight distance from access driveway to the north

Figure 2

Sight distance from access driveway to the south

Figure 3

2.2 Observed Traffic Conditions.

An indicative traffic count was also undertaken between the hours of 1100hrs – 1230hrs on a typical Sunday to assess the volume of traffic on Brisbane Water Drive during the "lunch" sitting at The Boathouse Restaurant.
As will be shown later in the report these times shown in Table 1 are consistent with most activity from the proposed Marina.

Time / Movement	Brisbane Water Drive North/Bound	Brisbane Water Drive South/Bound.	Numbers into Access Driveway
1100 – 1115hrs	144	107	0
1115 – 1130hrs	158	147	0
Total	302	254	0
1130 – 1145hrs	188	148	2
1145 – 1200hrs	200	169	1
1200 – 1215hrs	206	173	5
1215 – 1230hrs	218	183	5
Total	812	673	13

Typical Sunday (21/06/09)

Table 1

Traffic volumes in Brisbane Water Drive (M.R. 349) were observed to be moderate (see Table1)
When assessing a development application to determine whether traffic calming measures or roadworks is required on strategic mid block links or intersections, traffic flow limits for different Levels of Service (LoS) are of value for strategic planning purposes only. – Roads and Traffic Authority – Guide to Traffic Generating Developments.
These key indicators are in the range LoS A to LoS F where A indicates good operating conditions reducing to F where other forms of control should be considered.
Table 2 below defines the limits of hourly flow required to maintain a desired LoS.

Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Table 2

The indicative peak hourly volumes on Brisbane Water Drive are shown in Table 1 where a maximum hourly volume for a typical Sunday of 812 for northbound vehicles was measured.
These figures indicate that a LoS C presently operates for the westbound traffic flow in Brisbane Water Drive (M.R. 349) in the vicinity of the proposed development. (see Table 2)

The definition of:

LoS C

- This level is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.

3. PROPOSED TRAFFIC CONDITIONS

3.1 Car Parking Requirements

3.1.1 Existing Parking Requirement and Operation

The Boathouse Restaurant operates as follows:

- Wednesday to Saturday – Lunch and Dinner
- Sunday – Lunch only

The Restaurant uses a “staggered” booking system. This provides a larger spread of arrival and departure times therefore reducing the use on the parking provision e.g. for dinner the bookings commence at 1800hrs to 2130hrs with customers staying for approximately 1.5hrs average. This allows bookings at 1800hrs,1945hrs and 2130hrs.

As well the use of courtesy cars, mini buses and local ferries are encouraged to also minimise the use of the parking provision.

In order to keep parking available for customers staff are requested to car pool and make use of car parking available at Woy Woy. The staff are then transported to their cars at the end of their shift.

No Stopping signposting in Brisbane Water Drive across the frontage of The Boathouse Restaurant is provided to ensure that parking is restricted to on site only.

The parking requirement is 18 spaces when the Gosford Council Development Control Plan No. 111 – Car Parking is applied to the existing development. The calculation is detailed in Table 3 under.

Traffic counts shown in Attachment “A” detail the numbers and type of vehicles entering the site over a period of one week.

SUMMARY

Overall the present parking provision is managed in an effective and efficient manner.

At no time were all vehicles spaces occupied within a 1.5 hr period. (see Attachment “A”)

Use	GFA / m2	Requirement	No. Car Spaces
Restaurant	114.2	1 space per 16m2 of GFA	7.1
Kitchen	41.5	1 space per 16m2 of GFA	2.5
Verandah	66.4	1 space per 16m2 of GFA	4.1
Office	181.1	1 space per 40m2 of GFA	4.5
			Total 18 car spaces

Existing parking requirement for The Boathouse Restaurant - 18 car spaces.

Table 3

3.1.2 Parking Requirement for Proposed Fixed / Wet Berth Marina Development

The existing carpark area is marked to provide a total of 33 spaces.

A revised carparking layout is shown in Attachment “B” and now provides for 44 car spaces; the layout includes provision of spaces in accordance with AS2890.1. Figure 2.1, Type C2 for 90^{o} parking.

Marked entry / exit walkways areas have also been provided.

The existing development requires 18 spaces to comply with Gosford Council requirements for this particular development and 33 spaces are available (see Table 3).
This provides an excess of 15 car spaces.

With respect to the Marina development the Australian Standard 3962 – 2001 Guidelines for design of Marinas and the Roads and Traffic Authority – Guide to Traffic Generating Developments require a similar maximum provision.
In a review of previous marina proposals and NSW coastal council standards, a rate of between 0.3 and 0.6 per wet berth has been applied.

Parking – Marinas

0.3 – 0.6 spaces per wet berth.

50 x 0.6 = 30 spaces required
50 x 0.3 = 15 spaces required

The management of the Marina will be off site therefore no provision need be been made for employee parking.

SUMMARY
A total of 15 car spaces and no more than 30 car spaces being required for a 50 fixed / wet berth Marina. A total of 26 car spaces are provided.
No Stopping signposting in Brisbane Water Drive across the frontage of The Boathouse Restaurant is provided to ensure that parking is restricted to on site only.
On road parking for 4-6 vehicles is available on Brisbane Water Drive in a layback situated approximately 300metres north of The Boathouse Restaurant.

3.2 Predicted Traffic Generation Rates

In 2000 / 01 the Boating Industry Association of NSW (BIA) commissioned a study to review available data on Marina Traffic and Parking. This data is useful in assessing likely traffic generation associated with Marina developments.
Table 4 provides a summary of cars recorded per swing mooring and fixed / wet berth, on weekends, during the Marina surveys undertaken in 2000 / 01

Survey Location	Swing Mooring	Fixed/Wet Berth
Rose Bay Marina	0.362	0.238
Point Piper	0.121	0.114
Gladesville Bridge / Westport Marina	0.106	0.138
Dolans Bay Marina	0.197	0.188

Weekend Surveys of Cars Per Swing Mooring and Fixed / Wet Berth 2000 / 01

Table 4

The BIA study also noted that typically, only some 15% of boat owners use their boats at any one time

The trip rates specified in the Roads and Traffic Authority – Guide to Traffic Generating Developments are significantly higher at 2.7 Daily Vehicle Trips per Fixed/ Wet Berth.
The rates provided in the guide are based on a mix of boat types (both power boat and yachts) and on movements on a summer weekend day.
Most significantly these rates also include an allowance for shore based facilities such as boat sales and repairs.
As previously mentioned the proposed Marina *will not* provide pump out services or refueling facilities. It will also be protected by a security gate allowing access to select personnel.
This Study will use the RTA trip rates and apply the survey figures shown in Table 4 to provide a range of traffic generation rates.
This development proposal would provide a mix of boat types with most activity occurring on weekends.

Land Use Traffic Generation – Marinas (RTA trip rates)

Daily Vehicle Trips (DVP) = 2.7 per fixed berth

For the 50 wet berth proposal
50 x 2.7 = 136 Daily Vehicle Trips

Land Use Traffic Generation – Marinas (Table 4 Weekend Survey trip rates)

The highest trip generation rate (Rose Bay Marina) from the samples in Table 4 was applied to the subject Marina.
A 50 fixed / wet berths facility would generate weekend traffic activity of less than 18 movements per day (i.e. 9 trips inbound + 9 trips outbound)

SUMMARY

Based on the rates shown in Table 4 and the RTA trip rates the estimated peak summer weekend traffic generation for the proposed Marina is as follows:

The proposed 50 wet berth Marina is estimated to generate between 18 movements per day (i.e. 9 trips inbound + 9 trips outbound) and 136 movements per day (i.e. 68 trips inbound + 68 trips outbound) respectively on a typical peak summer weekend.

3.3 Effect on the Road Network and Car Park Operation

Brisbane Water Drive

The indicative peak hourly volumes on Brisbane Water Drive are shown in Table 1 where a maximum hourly volume for a typical Sunday of 812 for northbound vehicles was measured.

These figures indicate that a LoS C presently operates for the northbound traffic flow in Brisbane Water Drive (M.R. 349) in the vicinity of the proposed development. (see Table 2)

It was predicted that the proposed development would generate 68 trips inbound + 68 trips outbound on a typical peak summer weekend.

If it were to be assumed that at least the outbound trips were to occur during the measured peak hour in Table 1 the following conclusion could be drawn:

Of the 68 outbound trips predicted 50% would travel to Gosford and 50% to Woy Woy.

A total of 34 vehicles would be added to the 812 northbound vehicles counted in Table 1 giving a total of 846 vehicles.

This total does not affect its present LoS C route capacity level. Furthermore it is contended that the existing sea-gull intersection layout of the access will manage this minimal increase in traffic; it was concluded that SIDRA modelling was not required to support this position for this project.

Shared Pedestrian / Cycleway

Special note was made that during the period of the traffic survey shown in Table 1 only 8 cyclists and 7 pedestrians were seen on the designated Pedestrian / Cycleway in the vicinity of The Boathouse Restaurant.

Professional / Training cyclists of which 3 were noted rode on the Brisbane Water Drive and not the designated Pedestrian / Cycleway.

This observed minor movement on the designated Pedestrian / Cycleway did not at any time conflict with the motor traffic vehicles accessing The Boathouse Restaurant car park. The predicted traffic generation for the proposed Marina development shown in section 3.2 together with that of the existing development would not be expected to cause any undue safety concerns with cyclists or pedestrians.

Car Park Operation

The present parking requirement at The Boathouse Restaurant is 18 spaces when the Gosford Council Development Control Plan No. 111 – Car Parking is applied to the existing development. The weekly trading traffic survey undertaken of traffic movements into the existing site shown in Attachment "A" indicated that at no time were all vehicles spaces occupied at the one time.
It was also observed that 63% of car parking spaces were available during this observation period 1100hrs – 1230hrs Sunday.
The traffic generation for the proposed Marina development shown in section 3.2 together with that of the existing development would not be expected to cause either delay or safety issues given that the parking requirement for both the proposed Marina and The Boathouse Restaurant satisfy the referenced standards.
To further support this conclusion the Boating Industry Association of NSW (BIA) commissioned a study to review available data on Marina Traffic and Parking (see referenced document). *The BIA study noted that typically, only some 15% of boat owners use their boats at any one time*

4. RECOMMENDATIONS AND CONCLUSIONS

The proposed development complies with the specific requirements of all referenced documents with respect to traffic issues.

The appropriate road safety and traffic management guidelines and standards have been addressed by the proposal.

The traffic generation for the proposed Marina development together with that of the existing development would not be expected to cause either delay or safety issues in the car park area given that the parking requirement for both the proposed Marina and The Boathouse Restaurant satisfy the referenced standards.

The predicted traffic generation for the proposed Marina development together with that of the existing development would not be expected to cause any undue safety concerns with cyclists or pedestrians on the designated Pedestrian / Cycleway.

With respect to the proposed Marina development the Australian Standard 3962 – 2001 Guidelines for design of Marinas required that a total of 5 car spaces and no more than 9 car spaces were required for a 14 fixed / wet berth Marina. A total of 9 car spaces are provided.

The present LoS “C” measured on the road network is not affected by the inclusion of the predicted traffic generated by this development.

The revised carparking layout now provides for 44 car spaces (33 car spaces total existing). Additional to the 44 car spaces, a loading dock, waste bin, bicycle area and a disabled space have been provided. Marked entry / exit walkways areas have also been provided.

T Keating

Terry Keating, Director
TPK & Associates

5. ATTACHMENT “A”

Car Park - Weekly Inbound Traffic Survey

*** Friday, 15 May 2009**

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13
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1700	3	3	0	0	0	0	0	0	0	0	0	0	0	0
1800	3	2	0	0	0	0	0	0	0	0	0	0	0	1
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ATTACHMENT "A" (Cont'd)

*** Saturday, 16 May 2009**

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1700	2	1	0	0	0	0	0	0	0	0	0	0	0	1
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*** Sunday, 17 May 2009**

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*** Monday, 18 May 2009**

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ATTACHMENT "A" (Cont'd)

*** Tuesday, 19 May 2009**

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1300	2	2	0	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1600	2	2	0	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1800	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1900	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[24]	**5**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

ATTACHMENT "A" (Cont'd)

*** Wednesday, 20 May 2009**

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13
0000	1	1	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0500	1	0	0	0	1	0	0	0	0	0	0	0	0	0
0600	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0700	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800	1	1	0	0	0	0	0	0	0	0	0	0	0	0
0900	3	2	0	0	1	0	0	0	0	0	0	0	0	0
1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1100	2	1	0	0	0	0	0	0	0	0	0	0	0	1
1200	1	0	0	0	0	0	0	0	0	0	0	0	0	1
1300	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	2	1	0	0	0	0	0	0	0	0	0	0	0	1
2000	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[24]	**14**	**9**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**

ATTACHMENT "A" (Cont'd)

*** Thursday, 21 May 2009**

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13
0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0600	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0700	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800	2	1	0	1	0	0	0	0	0	0	0	0	0	0
0900	2	2	0	0	0	0	0	0	0	0	0	0	0	0
1000	6	5	0	1	0	0	0	0	0	0	0	0	0	0
1100	1	0	0	0	0	0	0	0	0	0	0	0	0	1
1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1300	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1400	4	4	0	0	0	0	0	0	0	0	0	0	0	0
1500	2	2	0	0	0	0	0	0	0	0	0	0	0	0
1600	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1700	3	2	0	0	0	0	0	0	0	0	0	0	0	1
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	2	2	0	0	0	0	0	0	0	0	0	0	0	0
2000	5	4	0	0	0	0	0	0	0	0	0	0	0	1
2100	2	2	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
[24]	**31**	**26**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**

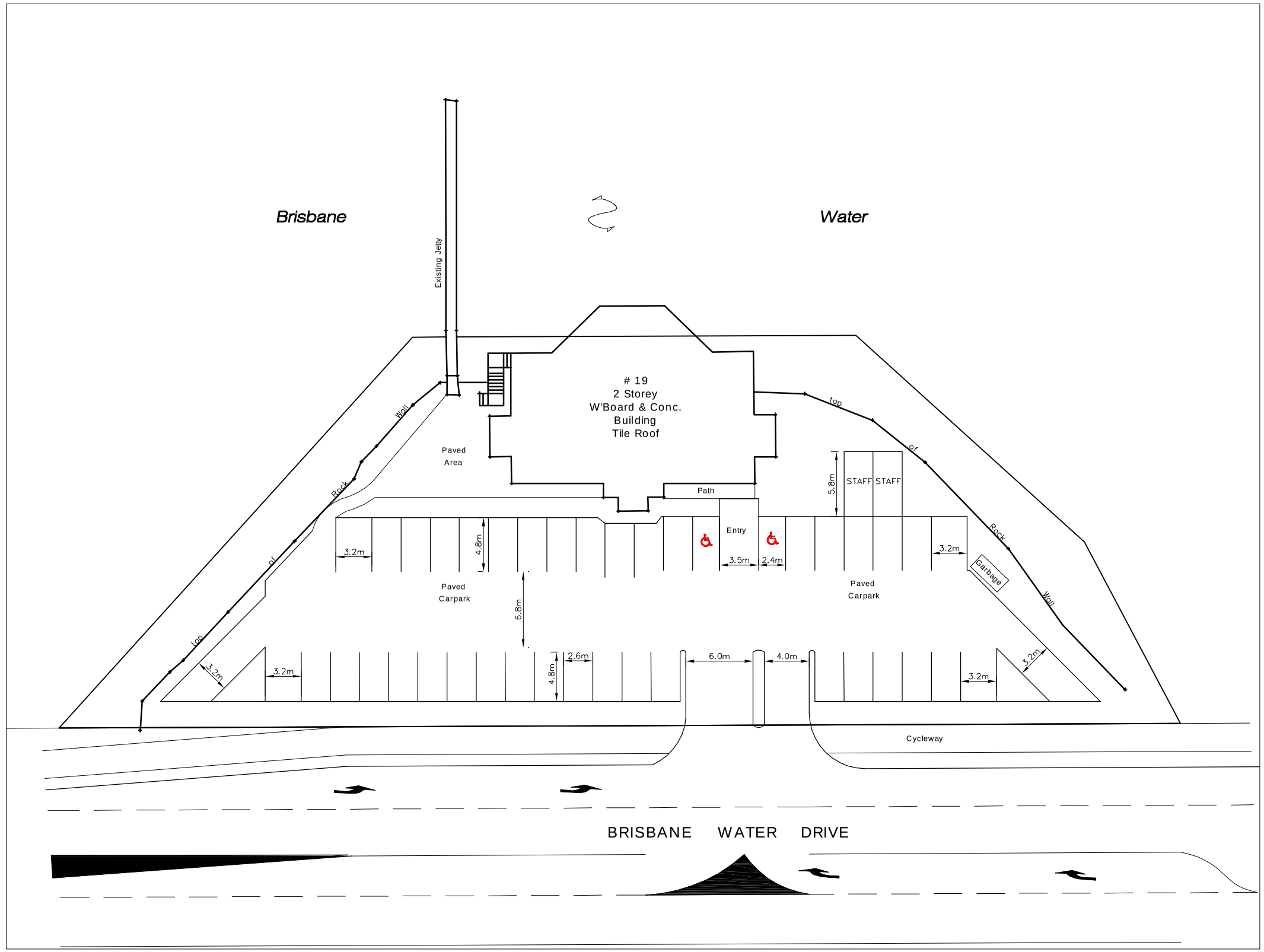
ATTACHMENT "A" (Cont'd)

*** Friday, 22 May 2009**

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13
0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0600	1	0	0	0	1	0	0	0	0	0	0	0	0	0
0700	1	1	0	0	0	0	0	0	0	0	0	0	0	0
0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0900	4	3	0	0	0	0	0	0	0	0	0	0	0	1
1000	1	0	0	0	0	0	0	0	0	0	0	0	0	1
1100	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1200	2	1	0	0	0	0	0	0	0	0	0	0	0	1
[24]	**10**	**6**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**

ATTACHMENT"B"

Layout for DA (Option Six)_001



DETAIL PLAN
SCALE 1:200

NOTE: EXISTING CARPARK LAYOUT AND
SERVICES ARE NOT SHOWN IN THIS DRAWING

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV.	DATE	AMENDMENT	DRAWN	CHECK	DESIGN	VERIFY
A	20/07/10	Preliminary Issue	K.B.	A.C.	K.B.	A.C.

DESIGN FILE S:\

SCALES
0 5 10 A1 / A3
1:200 / 1:400
ALL DIMENSIONS ARE IN METRES. DO NOT SCALE

adw johnson
Central Coast
2 Bounty Close,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email: coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

CLIENT
GEMSTED PTY LTD

PROPERTY DESCRIPTION
LOT 510 D.P. 729020
BRISBANE WATER DRIVE
KOOLEWONG

SURVEYED: OTHERS
DATUM: A.H.D.

PROJECT
PROPOSED CARPARK

PLAN TITLE
PROPOSED CARPARK LAYOUT (44 SPACES)
TYPICAL SERVICE VEHICLE AND STANDARD
CAR TURNING TEMPLATES

PROJECT No.		DISCIPLINE		NUMBER	REV.
150134	–	DA	–	001	A

100mm AT FULL SIZE

Plotted By: kurtb Plot Date: 20/07/10 – 14:48 Cad File: S:\150134 – Koolewong Marina\Drawings\ENG\Layout for DA (Option Six)_001.dwg

TPK & Associates Pty. Ltd.
TRAFFIC MANAGEMENT & SAFETY CONSULTANTS

10 Haig Street Belmont NSW 2280
PH. (02) 4945 5688
Fax (02) 4945 5686
Mob. 0418 419 190
E-mail: tp.keating@hunterlink.net.au

SIDRA SUPPLEMENT TO SEPT 2010 REPORT

Supplementary Analysis for Traffic Assessment Report on the Proposed Fixed / Wet Berth Marina at The Boathouse Restaurant (Report prepared 2010) Brisbane Water Drive, Koolewong

AUGUST 2011

LOCALITY SKETCH

TPK & Associates (TPK) provided the Traffic Report to support the subject development when the DA was submitted. TPK submitted that the traffic conditions, as assessed did not require proof through SIDRA modeling; RTA Central Coast has requested modeling of the access intersection for proof in terms of potential queue lengths.

TPK's representative Mr. T Keating has completed the SIDRA modeling; background to the analysis includes:

- Figure 1 of this report is the geometric layout utilized by SIDRA; it reflects existing site conditions for Brisbane Water Drive.
- Default SIDRA setting were retained.
- Traffic flows from the tables and text of the 2010 Traffic Report were used; they were the Sunday lunch time peak hour volumes for through traffic whilst for the turn movements volumes of 12vph for the restaurant and 68vph for the marina were adopted. The inward and outward turn movements were spread 50% over each inward or outward approach or departure direction.

The scenarios modelled are presented in this report as tables:

- MS1 – Marina & Restaurant traffic arrival, Restaurant traffic exit.
- MS2 – Marina & Restaurant traffic arrival, Restaurant traffic exit with 2% growth over 10years.
- MS3 – Restaurant traffic arrival, Marina & Restaurant traffic exit.
- MS4 – Restaurant traffic arrival, Marina & Restaurant traffic exit with 2% growth over 10years.

Discussion is provided after each table.

Please Note

The analysis on the following pages confirms that the intersection will maintain acceptable intersection performance on all measures including queues.

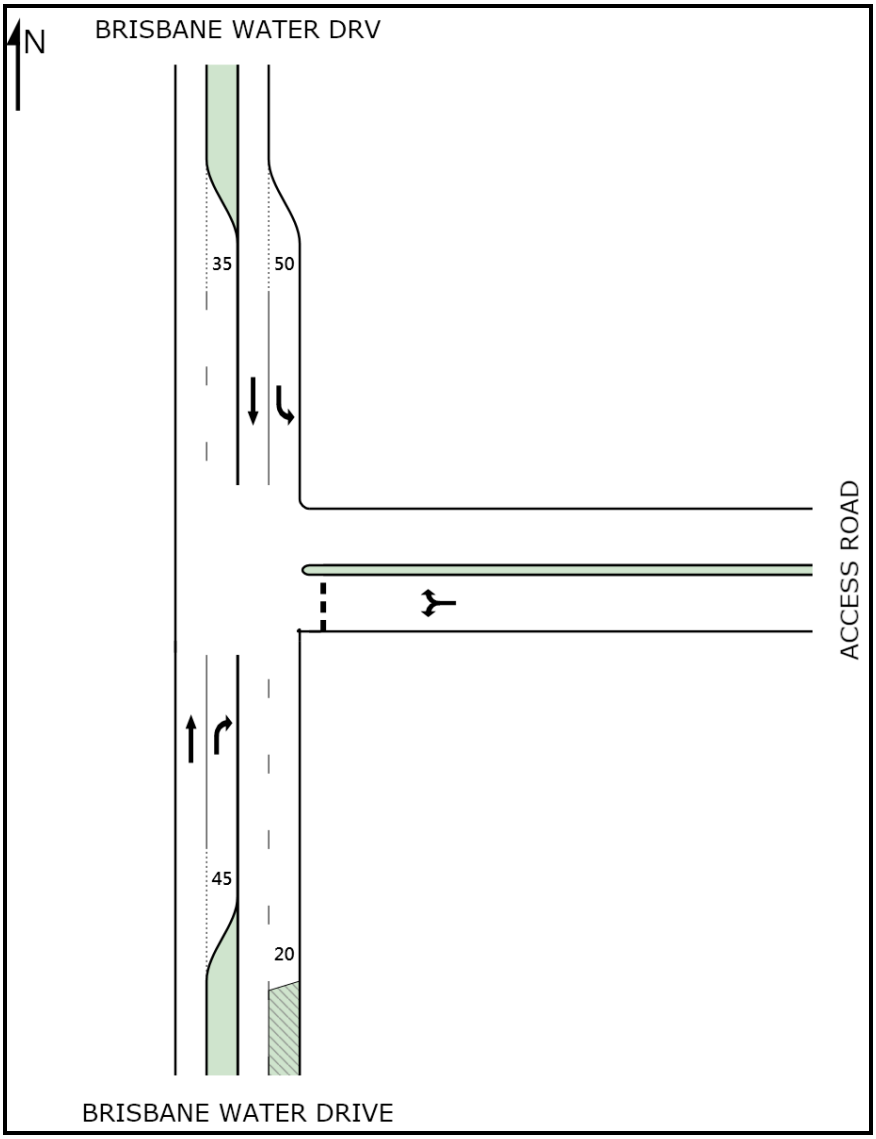


FIGURE 1 – SIDRA LAYOUT ADOPTED FOR ANALYSIS

MS1 – MOVEMENT SUMMARY

Site: BW DRV & ACCESS

BRISBANE WATER DRIVE & MARINA/RESTAURANT ACCESS, KOOLEWONG
Giveway / Yield (Two-Way)

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: BRISBANE WATER DRIVE											
2	T	855	1.0	0.441	0.1	X	X	X	X	0.00	59.9
3	R	42	1.0	0.067	12.4	LOS B	0.2	1.7	0.58	0.82	44.8
Approach		897	1.0	0.441	0.7	NA	0.2	1.7	0.03	0.04	58.9
East: ACCESS ROAD											
4	L	6	1.0	0.037	16.9	LOS C	0.1	0.9	0.67	0.84	41.0
6	R	6	1.0	0.037	16.8	LOS C	0.1	0.9	0.67	0.88	41.0
Approach		13	1.0	0.037	16.8	LOS C	0.1	0.9	0.67	0.86	41.0
North: BRISBANE WATER DRV											
7	L	42	1.0	0.023	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	708	1.0	0.366	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		751	1.0	0.366	0.5	NA	0.0	0.0	0.00	0.04	59.3
All Vehicles		1660	1.0	0.441	0.7	NA	0.2	1.7	0.02	0.04	58.9

Movement Summary MS1 shows that the combined Marina and Restaurant traffic inward peak does not cause unacceptable queues for turn movements and performance is acceptable.

MS2 – MOVEMENT SUMMARY

Site: BW DRV & ACCESS

BRISBANE WATER DRIVE & MARINA/RESTAURANT ACCESS, KOOLEWONG
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

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: BRISBANE WATER DRIVE											
2	T	1026	1.0	0.529	0.1	X	X	X	X	0.00	59.8
3	R	51	1.0	0.098	14.0	LOS B	0.4	2.5	0.67	0.88	43.3
Approach		1076	1.0	0.529	0.8	NA	0.4	2.5	0.03	0.04	58.8
East: ACCESS ROAD											
4	L	8	1.0	0.059	20.6	LOS C	0.2	1.4	0.76	0.92	38.3
6	R	8	1.0	0.059	20.5	LOS C	0.2	1.4	0.76	0.91	38.3
Approach		15	1.0	0.059	20.6	LOS C	0.2	1.4	0.76	0.92	38.3
North: BRISBANE WATER DRV											
7	L	51	1.0	0.027	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	850	1.0	0.439	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		901	1.0	0.439	0.5	NA	0.0	0.0	0.00	0.04	59.3
All Vehicles		1992	1.0	0.529	0.8	NA	0.4	2.5	0.02	0.05	58.7

Movement Summary MS2 shows that the combined Marina and Restaurant traffic inward peak at 2% growth over 10 years does not cause unacceptable queues for turn movements and performance remained acceptable.

MS3 – MOVEMENT SUMMARY

Site: BW DRV & ACCESS

BRISBANE WATER DRIVE & MARINA/RESTAURANT ACCESS, KOOLEWONG
Giveway / Yield (Two-Way)

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: BRISBANE WATER DRIVE											
2	T	855	1.0	0.441	0.1	X	X	X	X	0.00	59.9
3	R	6	1.0	0.010	11.8	LOS B	0.0	0.2	0.56	0.71	45.3
Approach		861	1.0	0.441	0.2	NA	0.0	0.2	0.00	0.01	59.7
East: ACCESS ROAD											
4	L	42	1.0	0.231	17.4	LOS C	0.9	6.2	0.70	0.92	40.6
6	R	42	1.0	0.231	17.3	LOS C	0.9	6.2	0.70	0.91	40.6
Approach		84	1.0	0.231	17.3	LOS C	0.9	6.2	0.70	0.91	40.6
North: BRISBANE WATER DRV											
7	L	6	1.0	0.003	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	708	1.0	0.366	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		715	1.0	0.366	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		1660	1.0	0.441	1.0	NA	0.9	6.2	0.04	0.05	58.4

Movement Summary MS3 shows that the combined Marina and Restaurant traffic outward peak does not cause unacceptable queues for turn movements and performance is acceptable.

MS4 – MOVEMENT SUMMARY

Site: BW DRV & ACCESS

BRISBANE WATER DRIVE & MARINA/RESTAURANT ACCESS, KOOLEWONG
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

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: BRISBANE WATER DRIVE											
2	T	1026	1.0	0.529	0.1	X	X	X	X	0.00	59.8
3	R	8	1.0	0.014	13.1	LOS B	0.0	0.3	0.62	0.77	44.1
Approach		1033	1.0	0.529	0.2	NA	0.0	0.3	0.00	0.01	59.7
East: ACCESS ROAD											
4	L	51	1.0	0.356	23.0	LOS C	1.5	10.4	0.80	1.00	36.8
6	R	51	1.0	0.356	22.9	LOS C	1.5	10.4	0.80	0.99	36.8
Approach		101	1.0	0.356	22.9	LOS C	1.5	10.4	0.80	0.99	36.8
North: BRISBANE WATER DRV											
7	L	8	1.0	0.004	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	850	1.0	0.439	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		858	1.0	0.439	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		1992	1.0	0.529	1.3	NA	1.5	10.4	0.04	0.06	57.9

Movement Summary MS4 shows that the combined Marina and Restaurant traffic outward peak at 2% growth over 10 years does not cause unacceptable queues for turn movements and performance remained acceptable

T Keating – 1st August 2011