Blue Dolphin
Development Joint
Venture

Dolphin Blue Project

Transport and Traffic
Impact Study

Blue Dolphin Development Joint Venture

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Transport and Traffic Impact Study

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1 Introduction

1.1 Introduction

Dolphin Blue is a proposed residential and holiday accommodation development in Yamba, Northern NSW. Arup was appointed by the Blue Dolphin Development Joint Venture to undertake sustainable transportation planning and traffic engineering analysis.

This report outlines the background to the site, traffic generation, transport and traffic analysis, parking requirements, impact on the road network and conclusions.

1.2 Study Process

This Transport Study comprised the following key activities:

- Briefing and site inspection and traffic counts
- Preliminary discussions and site inspection with officers of Clarence Valley Council (Council) and the Road and Traffic Authority of NSW (RTA)
- Design development, option assessment and identification of constraints and opportunities.
- Traffic Engineering and Transport Planning Analysis
- Definition of Environmental issues and ESD matrix
- Preparation of Draft Transport Study report April 2006
- Classified automatic traffic counts of Yamba Road during Easter 2006
- On-site meeting with Council and RTA Officers to discuss traffic and access issues
- Design revision and refinement to preferred Master plan for Development Assessment (DA)
- Preparation of this Transport Study Report to accompany the DA submission.

1.3 References

This study and report was prepared with reference to and compliance with documents including the following – details of the references are shown in Appendix C, Glossary.

- RTA Guidelines (esp. Table 2.1)
- AUSTROADS Guidelines (esp Part 5)
- Australian Standard AS 2890 for car parking
- Clarence Valley Council DCP No 1

2 Subject Site and Existing Development

2.1 Site and Existing Development

The proposed development is on a 5.7 hectare site with an approximate 300metre frontage to Yamba Road and Yamba Bay of the Clarence River, approximately 2km west of the Yamba town centre. (see Figure 1 and site photographs following).

The subject site is currently:

- the Blue Dolphin caravan park, with on-site cabins and
- a general store,
- café,
- a petrol station,
- and supporting recreational facilities.

The site has vehicle access via:

- a wide four–lane driveway to Yamba Road with no major traffic intersection improvement, and
- a second driveway to the petrol station forecourt.

The foreshore has a footpath through a foreshore park, with small boat ramp and a jetty with a fishing pontoon.

There is a motel (Moby Dick Motel) adjoining to the east, and a large nature reserve adjoining to the west.

Existing land use opposite on Yamba Road is low density detached housing, with individual driveways to Yamba Road.

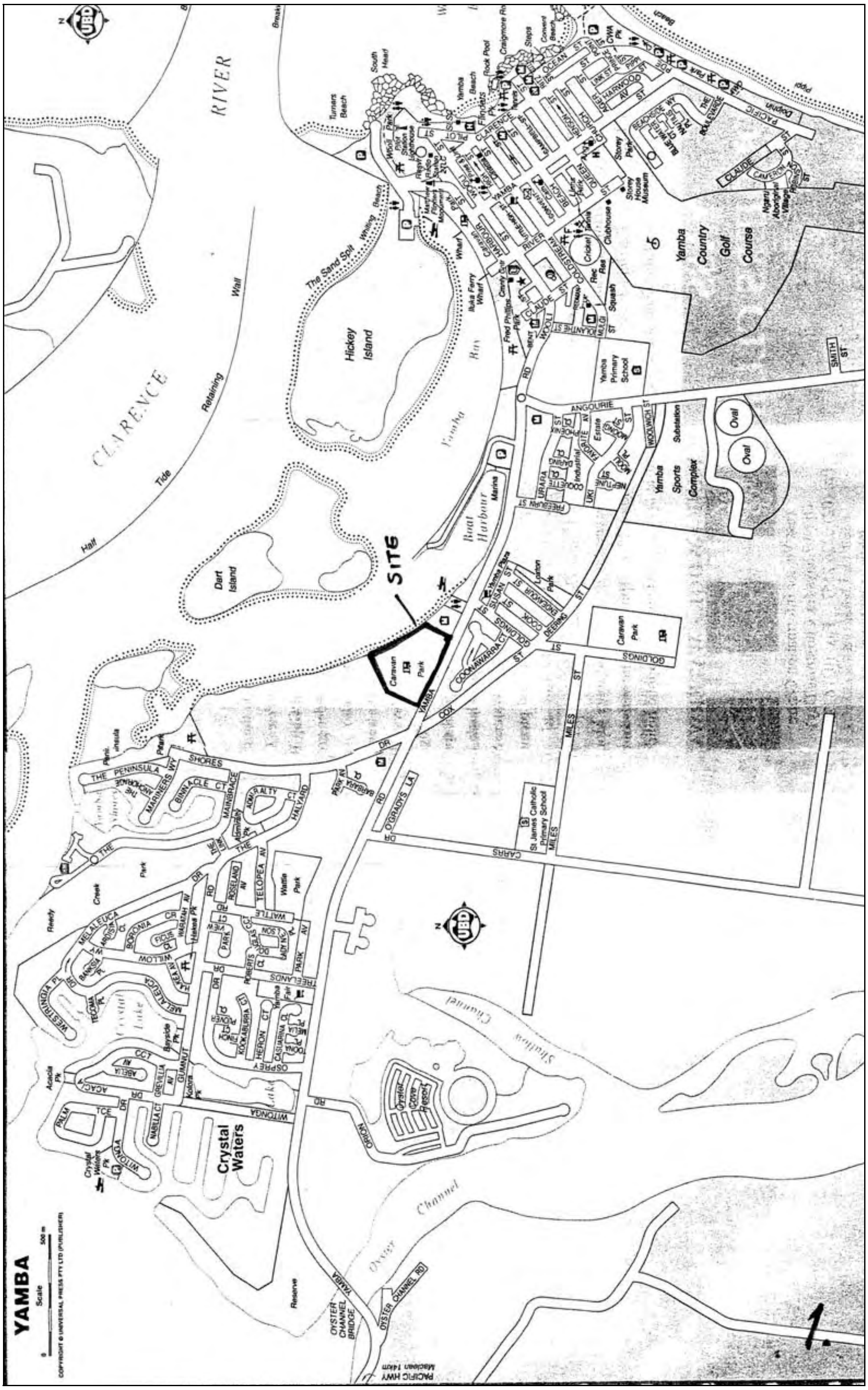
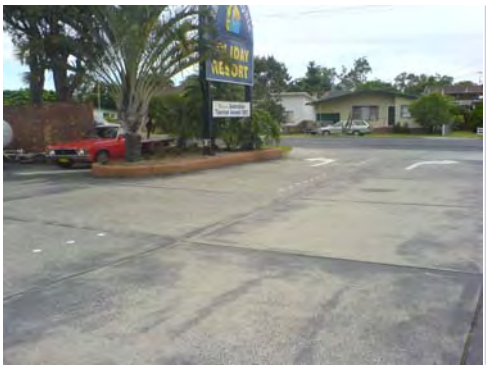


Figure 1 Site Location

Foreshore and Paths within Blue Dolphin

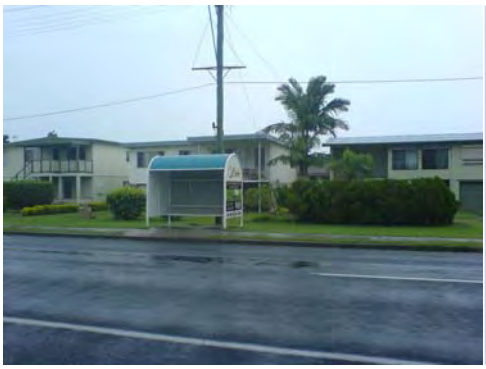


Main Driveway to/from Blue Dolphin

Main Driveway to/from Blue Dolphin

Service Station and General Store Forecourt to second driveway

Yamba Road view to the west, showing second service station driveway and bus shelters.



Bus shelter and dwellings on the south side of Yamba Road opposite the subject site

3 Existing Transport Network

3.1 Road Network

The Regional Overview(2) noted that the major local transport corridor is the Pacific Highway, carrying 13 488 annual average daily traffic in year 2004, 26.3% more than in year 2001 (RTA Station 04.001 north of Grafton). The study noted the major upgrades under consideration as a second river crossing at Grafton, and the Pacific Highway Upgrade Program managed by the RTA NSW.

Yamba Road is a "classified road" (MR 152) for the purposes of the Roads Act 1993 for which Clarence Valley Council is the roads authority, although the RTA's concurrence is required before the Council can consent to specified works. Yamba Road is a regional main road serving the township of Yamba, Crystal Waters, and Angourie. On the other side of the Clarence River, the smaller township of Iluka can be reached by passenger ferry or road. Yamba Road connects to the Pacific Highway about 15km to the west of the subject site.

In the vicinity of the site Yamba Road is a two-lane two-way single carriageway sealed road with a wide sealed shoulder marked in each direction for bicycles, but also used at peak times for vehicle parking. The subject site is well within the urban limits of Yamba, and has a 50km/h speed limit on surrounding roads.

Traffic volumes vary widely on Yamba Road according to the holiday industry activity in the town. It has an AADT[1] of 8000 vehicles per day. Key intersections are:

- Shores Drive/Cox Street to the west (priority junction)
- Goldings Street to the east
- Angourie Road to the east

There is an existing roundabout at Yamba Road/Angourie Road intersection, and an intersection under construction on the Yamba Road/Golding Street intersection expected to be completed by mid 2006.

Cox Street/Deering Street is not currently a through-traffic link but appears to have a reservation to construct a road link at some future time with Angourie Road, effectively creating a bypass of the subject site frontages for some traffic.(see below)

3.2 Public Transport

3.2.1 Buses

A local bus service is operated by Busways North of Yamba. Hail & Ride bus service No. 380 services the site at bus stops and shelters located on both sides of Yamba Road immediately west of the petrol station on this subject site. The No 380 service from Angourie – Yamba – Maclean – Grafton and return operates a service about every 2 hours, 6 times per weekday and 4 times on weekend days and public holidays, taking about 70 minutes from Yamba to Grafton.

3.3 Bicycles

Yamba has a relatively extensive bicycle route network. Along the site frontage, marked bike lanes are provided on the road shoulders. Elsewhere in Yamba, such as along parts of Angourie Road, separate off-road paths are provided for cycling.

[1] Annual Average Daily Traffic (AADT)
[2] DCP No.1, Engineering Standards, Clarence Valley Council, adopted 17 May 2005.
[3] Clarence Valley – Regional Economic Overview Final Report 14004.

3.3.1 Rail

There are three daily XPT passenger services between Sydney and Grafton (10 hours) and on to Brisbane (4 hours). The nearest major railway stations are Coffs Harbour to the south and Casino to the north.

The Regional Economic Overview[2] suggests there is a need to explore a Yamba link to the Pacific Highway and northern rail line for freight transport.

3.4 Pedestrians

There is a foreshore path within the subject site, but the path does not extend to the nature reserve west of the site or the Motel to the east. There are few local footpaths.

There are no formal pedestrian crossing points of Yamba Road in the vicinity of the site.

3.5 Air

Clarence Valley Regional Airport is located 17km south of Grafton, but most commercial services arrive via:

- Ballina Airport (1 hour north)
- Lismore Airport (1½ hours north)
- Coffs Harbour Airport (1½ hours south).

4 Traffic

4.1 Existing Traffic Generation

The existing Blue Dolphin park has total of approximately 254 sites and cabins, mostly powered. Information on existing characteristics and traffic is shown in the following tables

Table 1 Traffic Generation Data

Characteristics	Existing
Accommodation	
Cabins, Powered Sites, Unpowered Sites	254
Residences	0
Holiday Units	0
Population Estimate Peak	1200
Off Peak	4-500
Staff (included in above)	
Car parking estimate	508 plus informal parking to a total of say 600bays
Patron (@2 per site)	
Visitors and staff bays	120
Total bays	628
Peak Hour Site entry and exit Traffic estimate	Left in: 120 vehicles per hour Right in: 100 vehicles per hour Left out: 120: vehicles per hour Right out : 100 vehicles per hour (total :440 vehicles per hour)
Mode split estimate (%)	
Car/motorcycle etc	97%
Bus	1%
Walk	1%
Bicycle	1%

Source:

1) Blue Dolphin Management. Approximately half of the traffic would be reost at any one time and half service station. Base rate for holiday times as follows. Xmas x4, Easter x4, September School holidays x3, Weekends x2, Off Season x1.

2) RTA guide to Traffic Generating Development.

4.2 Existing Traffic – Yamba Road

The Yamba Strategic road Network Study detailed local traffic patterns including Yamba Road as summarised in Table 2. To further quantify the seasonal fluctuations in traffic volumes, Arup undertook detailed traffic counts on the site frontage west of the subject site driveway during Easter 2006. the date is summarised in Table 3 following and Appendix A.

Table 2 Yamba Road (MR152) – Daily Traffic Volumes 1996 and 2001/2002 Data Comparison[4]

	May/June 1996	May/June 2001-02	Summer 1996	Summer 2001-02	AADT 2001
Oyster Channel Bridge	4532	5158	6789	6830	
Bet. Marina and Angourie Road	7900	8144	11253	12100	
Yamba RTA Station 04436 (east of Angourie Road)					10016

Table 3 Yamba Road Traffic Volumes Summary, Easter Peak activity 2006[5]

SITE: Yamba Road, Between Shores Drive & Caravan Park Driveway

SURVEY DATES: Fri, 14 Apr 06 **Until**: Thu, 20 Apr 06

		DIRECTION OF TRAVEL		
		TWO-WAY	Eastbound	Westbound
TRAFFIC VOLUME:	Weeks Days Only	10,957	5,390	5,567
[VEH/DAY]	7 Days Average	11,099	5,534	5,565
PEAK HOUR **AM**	10:00	1038	515	523
VOLUME**:** **PM**	12:00	968	478	490
TOTAL SPEED:	85th Percentile	57.0	56.4	57.7
Km/Hr	Average	51.4	50.7	52.0
CLASSIFICATION%*	CLASS 1	97.4%	97.5%	97.3%

*CLASS 1 – Short Vehicles up to 5.5m

4.2.1 Accident History

In all there were 36 reported accidents in five years along Yamba Road, including Wooli Street (RTA Crash Statistical Data, 1996 to 2000).

[4] Yamba Strategic Road Network Study, URaP, 2001.
[5] Arup Traffic Surveys Easter 206. (See Appendix A)

5 Future Conditions

5.1 Yamba Strategic Road Network Study

In 1996, Maclean Shire Council (MSC) carried out a traffic study to identify future road network requirements for the town of Yamba and its surrounds. The report was subsequently updated in November 1999 to assist Council in preparing a Section 94 contribution plan for implementation of the Yamba Urban Road Bypass, which was identified as the preferred traffic management strategy. The report was finalised by ERM Mitchell McCotter in April 2000 and is entitled the "Yamba Traffic Study Update, 1999".

The Yamba Traffic Study Update 1999 did not examine a number of key elements, which are recommended in current standards and guidelines for assessment in traffic planning studies. Some of these included:

- Assessment of land use and strategic planning,
- Environmental issues and constraints,
- Cost-benefit analysis of options,
- The consequential impact of an urban road bypass on the social, visual amenity, and character of Yamba,
- Seeking alternative best practice traffic engineering methodology by way of "demand management", and
- Verification of the expenditure and investment to be justifiable on a needs basis and not resulting in unwarranted expenditure.

Accordingly, MSC commissioned Urban Research and Planning Pty Ltd (URaP) to undertake the Yamba Road Network Strategic Study[3], to enable a more informed decision to be made with respect to a preferred traffic management strategy for Yamba.

The assessment in the preceding Yamba Traffic Study Update 1999 was based on average summer weekday traffic conditions during the six-week Christmas school holidays, when traffic volumes are significantly greater than at other times of the year due to an influx of tourists. That study clearly indicates that Yamba Road has adequate capacity during the peak summer periods when compared to current industry standards and guidelines for traffic management. In addition, over a twenty year planning horizon and beyond, Yamba Road will continue to function at an acceptable "level of service" without the proposed urban road bypass.

The Strategic Study(3) examined six alternative road management strategies, and concluded that:

In summary, this study and the previous Yamba Traffic Study Update, 1999 indicate that future growth projections for Yamba will not require construction of an urban road bypass, as the existing Yamba Road will operate at a good level of service over the next 20 year planning horizon and beyond. However, it is recommended that capacity along Yamba Road be improved by implementing demand management measures combined with an upgrade of connecting road intersections. This process will make the urban road bypass, which has a high capital cost and low economic justification, unnecessary. In addition, use of demand management accords with best practice and current standards and guidelines in traffic management. Scenario 1, upgrading Yamba Road with demand management, is therefore recommended as the preferred traffic management strategy for Yamba.

Currently Yamba Road is operating at a very good level of service and will continue to operate at an equivalent level of service considering similar traffic growth in the future and the proposed upgrading of Yamba Road. If there is no upgrade or road demand management measures, its operational level of service would be decreased to LOS D which current traffic standards and guidelines indicate is acceptable.

[6] Yamba Road Network Strategic Study, , Urban Research and Planning Pty Ltd (URaP)

The report action plan included:

- Adopt the Recommended Management Strategy
- Investigate the feasibility of a link road between Angourie Road and Coldstream Street as part of the proposed strategy for Yamba Road.
- Consult RTA for input and possible accelerated financial assistance.
- Provide appropriate intersection control devices for safe and efficient operation of the road system (eg provision of a roundabout or equivalent device at the intersection of Treelands Drive and Yamba Road).
- Provide a cycleway within the appropriate corridors/road reservations.
- Provide pedestrian facilities to cater for pedestrian and school children's needs and their safe crossing of Yamba Road.

It is therefore assumed that roundabouts are existing or proposed at:

- Yamba Road/Shores Drive (proposed)
- Yamba Road/Golding Street (under construction)
- Yamba Road/Freeburn Street
- Yamba Road/Angourie Road (existing)

5.2 Community Responses

Community responses[4] to the publication of the Strategic Road Study were reviewed as part of this study. The responses were mixed on some issues, but included, in summary:

- Suitable land should be set aside for a bypass
- Yamba Road should not be widened, as it provides for cyclists and pedestrians
- Yamba Road should be a tourist drive
- Pedestrian crossings should be provided of Yamba Road
- At peak times, there are problems of noise and existing driveways on Yamba Road
- Continue footpaths both sides of Yamba Road full length
- Widespread concern about Yamba Road being upgraded to 4 lanes of traffic.

Community Workshops were also conducted in 2006 as part of the design of the subject development. The issues raised by attendees including residents and business people regarding traffic and transport were considered and included in this study.

[4] Copy of summary responses provided by Council in 2006

6 Proposed Development and Access

6.1 Proposed Subject Development

The proposed development (see Master Plan) consists of 117 holiday accommodation units on the western portion of the site, and 224 residential units on the eastern portion of the site, a total of 341 units.

Ancillary to these users are leisure activities such as swimming pools and tennis courts, day spa, and a boat launching ramp. A small retail component will serve the holiday accommodation. The retail components include gym, restaurants, bar, shops, day spa, kids club, and pool facilities. The holiday accommodation will be managed by an experienced operator from a reception located on a porte-cochere within the northern access road.

Two vehicular access points are proposed onto the frontage road, Yamba Road: one at the western end of the site frontage to service the holiday accommodation, and one near the existing Blue Dolphin access point to the residential access point.

DCP No.1[(1)] refers to design standards in the Northern Rivers Local Government Development and Design Manual.

6.2 Safety and Efficiency of Internal Road Layout

When designing a road network, the following key objectives are considered:

- Provide acceptable levels of accessibility, safety and convenience for all streets and road users in residential areas, while ensuring acceptable levels of amenity, and minimising the negative impact of through traffic.
- Provide a network of streets with clear physical distinctions between traffic routes and residential streets based on function, legibility, convenience, traffic volumes, vehicle speeds, public safety and amenity.
- To discourage residential streets from operating as through traffic routes for externally generated traffic, while limiting the length of time local drivers need to spend in a low speed environment.
- Provide a tributary network that supports maximum movement opportunities, allowing the efficient travel between origins and destinations by all modes

Some of the latest research from the UK, suggests residential developments which focus on the movement and parking of vehicles create places which badly relate to their locality. A better approach is thought to be the consideration of building and enclosure arrangements and then fit the roads around the buildings.

AMCORD recommends that no more than three turning movements at intersections should be required between a property and the nearest collector street. In addition, the driving distance from any dwelling to the nearest collector street or higher order road should be less than 700m. This is a useful parameter to measure the permeability of a road network.

The RTA Guide to Traffic Generating Developments recommends desirable environmental capacity performance goals. The recommendation is that streets are designed to meet the adopted functions and carry the volumes of traffic as indicated in Table 4.

Table 4 Environmental Capacity Performance Standards

Road Class	Road Type	Maximum Speed	Maximum Peak Hour Traffic Volume
Local	Access Way	25 km/hr	100
	Street	40 km/hr	200 Environmental Goals 300 Maximum
Collector	Street	50 km/hr	300 Environmental Goal 500 Maximum

Source: RTA Guide to Taffic Generating Developments

Note: Typically a peak hour traffic volume equates to approximately 10% of the total daily traffic flows.

The aim of the environmental capacities is to improve safety and amenity for residents in local streets. Residential streets typically have higher pedestrian activity and by reducing the speed and volume of traffic it minimises the potential conflict between vehicles and pedestrians. Reduced traffic volumes also have the advantage of reduced traffic noise in residential areas.

The internal road layout provides short sections to deter excessive speeds and to minimise through traffic volumes.

Internal service areas and parking areas are designed to accommodate the Australian Standard trucks and cars, and are located to minimise through traffic for patrons, residents, visitors and service operators. Garbage vehicles can be accommodated on the roads and service areas within the development

6.3 Number of access points

The RTA and Council officers emphasised during the site inspection that the RTA prefers a single access point from the road network to major new development sites, and prefer that access to be “left turn in/left turn out only”. They prefer right turns in and out to be prevented by a raised median along the frontage road, and to re-circulate traffic wanting to make a right turn via the nearest roundabout. The RTA are emphasising this style of treatment in various areas of northern NSW.

The design team considered a single access driveway but decided that two access points was significantly better for the subject development for the reasons outlined in the following table:

Table 5 Access Driveway Considerations

Issue	One Access Driveways	Two Access Driveways	More than two Access Driveways
Legal	Shared Access /Easement problems	The two entry points provide access to two separate lots.	More driveways than lots
RTA policy	Complies	Complies with the spirit of RTA policy, only one access to each Lot with a discrete land use	Does not comply
Road safety	Good	Good	Moderate
Precedent	Less driveways than currently exist.	There are currently two separate access points , one for the service station and one for the Blue Dolphin park.	More driveways than exist
Through Traffic	High.	Medium	Low
Pedestrian and bicycle access	Longer walking and cycling distances	Reduced walking and cycling distances	Reduced walking and cycling distances
Way finding and signs	Complex within site, with holidaymakers stopping/getting lost/"jack-knifing" reversing trailers in residential areas.	Simpler, with two separate functions of holidaymakers and residents	Multiple decision points along Yamba Road
Emergencies /Fire	Indirect access, No redundancy if blocked	Robust with redundancy	Robust with redundancy
Staging	Conflict of existing and Stage 1 operations and construction traffic	Allows staged development and opening of new units without conflict with existing Blue Dolphin or construction traffic	Allows staged development and opening

The roads within the site are to be private roads available and designated for public vehicular and pedestrian use (excluding boat and trailer) use.

The existing private jetty function is proposed to be retained. Public boat and trailer access to the private jetty is not proposed.

6.4 Visitors

Existing levels of public access will be maintained and enhanced for accessibility by foot. Visitors to the site will have similar levels of access to the public recreation area and open space on the foreshore as currently exist by walking, cycling, bus or vehicle.

In addition to the holiday and commercial and residential car parking spaces, the public visitors accessing the food and beverage facilities, day spa, conference facilities and foreshore public reserve component will have access to over 60 visitor car spaces.

6.5 Yamba Road Layout

The RTA's preferred traffic management system would be implemented. A raised concrete median would be constructed along the centreline of Yamba Road across the driveways to the subject site to prevent right turns. It is envisaged by the RTA that this continuous median would stretch from Goldings Street Roundabout to a new Shores Drive Roundabout.

This median would also prevent right turns to and from other properties on Yamba Road including the houses opposite. Whilst there is likely to be some initial concern from these other road users, many of them have already reported their concerns about delays and danger in making right turns too and from their properties as Yamba Road has become busier. It is likely that they will appreciate the improved safety and reliability of traffic flow once they become accustomed to the new median arrangement.

The median could be planted to provide an attractive landscape along Yamba Road.

RTA noted in consultation that they did not favour a marked pedestrian ("zebra") crossing where clear numerical warrants in terms of numbers of pedestrians were not met. Median breaks would provide improved safe staged pedestrian and cyclist crossing points of Yamba Road, which do not currently exist.

In the short term, Yamba Road would be lane marked in accordance with Austroads Guides to Traffic Engineering Practice, such as Part 14 Figure 4.15 Advisory Treatment using bike logos as follows:

- 2.8m acceleration/deceleration auxiliary lanes eastbound
- 5.5m bike/parking /traffic lane where occasional parking eastbound
- 1.2m raised median
- 5.5m bike/parking /traffic lane where occasional parking westbound
- Total width of roadway kerb to kerb: 12.8 -12.9m as existing, plus at the 2.8m auxiliary lanes to a total of 15.6m.

In the longer term, if the 4 traffic lanes sought by the RTA is approved and implemented, the lane layout would be as follows:

- 2.8m acceleration/deceleration auxiliary lanes eastbound
- 2.8m kerbside traffic lane eastbound
- 3.0m central traffic lane eastbound
- 1.2m raised median
- 3.0m central traffic lane westbound
- 2.8m kerbside traffic lane westbound
- Total width of roadway kerb to kerb: 12.8 -12.9m as existing, plus at the 2.8m auxiliary lanes to a total of 15.6m.

A 2.5m wide shared bicycle and pedestrian path is proposed across the site frontage.

7 Future Traffic Generation and Capacity

7.1 Future Traffic Generation

Future traffic generation of the proposed development was estimated using conservatively high traffic generation rates as follows. The future traffic generation will not be any more than existing.:

Table 6 Traffic Generation Data

Characteristics	Existing	Proposed Concept Plan
Accommodation		
Cabins, Powered Sites, Unpowered Sites	254	0
Residences	0	224
Holiday Units		117
Population Peak	1200	970
Off Peak	4-500	400
Staff (included in above)		
Car parking Patron (@2 per site)	508 plus informal parking to a total of say 600 bays	
Visitors and staff bays	120	
Total bays	628	714
Peak Hour Site entry and exit Traffic estimate		
Left in: vehicles per hour	120	
Right in: vehicles per hour	100	
Left out: vehicles per hour	120	
Right out : vehicles per hour	100	
(total : vehicles per hour)	(440)	(200-290)*
Mode split estimate (%)		
Car/motorcycle etc	97%	90%
Bus	1%	2%
Walk	1%	4%
Bicycle	1%	4%

Note: * As reviewed with K Dobinson of Dobinson & Associates Pty Ltd , in the range of 200 to 285 vehicles per hour +_ 20%, for details of Arup estimate see Table 7.

Staff will be encouraged to travel to the site by walking, cycling or bus. Those staff who do drive to the site can ride-share and can share parking bays with visitor parking on a reciprocal basis: staff parking during the day, visitor parking after hours.

Current traffic from the service station and general store will be removed. The deletion of the service station, fuel sales, and general store and roadside café will have a significant effect in reducing the numbers of vehicle movements in and out of the site.

In addition to the holiday and commercial car parking spaces, the public accessing the food and beverage facilities, day spa, conference facilities and foreshore public reserve component will have access to over 50 visitor car spaces. This visitor traffic generation component is included in the above traffic generation data.

Table 7 Traffic Generation and Distribution in Holiday Peak Hours (vehicles per hour)

	Access Traffic		Yamba Road	
	Western Access	**Eastern Access**	Eastbound	Westbound
Land Use	117 holiday units	224 residential units		
Traffic Generation[1] rate per unit	6.5 trips per day	6.5 trips/day		
Total trips/hour/unit	0.65 trips per hour approx.	0.65 trips/hour approx.		
AM			480	480
Left in[2] (55%)	8	14		
Right in (45%)	0	0		
Left out (55%)	70	128		
Right out (45%)	0	0		
PM			480	480
Left in	70	128		
Right in	0	0		
Left out	8	14		
Right out	0	0		

1) RTA (conservatively high because assumes mostly commuters and assumes full occupancy – most holiday units and many residential units in Yamba are unoccupied for many days of the year)
2) Existing Distribution
3) 12 000 vehicles per day in holiday peak, by 8% in peak hour (Pacific Hwy generally 6%, in towns 7-9%)
4) At worst, 10% in peak hour
5) 50/50 directional split along Yamba Road
6) 90/10 directional split out/in in the AM and 10/90 in the PM.

7.2 Intersection Capacity

The accesses of the site will form two intersections along Yamba Road. (see Figure in Appendix B)

The western access to the holiday units are designed to the standard and appearance of a public road. The eastern access to the residential units is designed to the standards and appearance of a residential driveway.

Both accesses are capable of accommodating Medium Rigid Vehicle (MRV) garbage trucks and occasional Large Rigid Vehicle (LRV) trucks and tourist buses. The accesses to the site are proposed to be controlled as priority junctions or driveways.

The capacity of driveways acting as priority intersections is determined by the through traffic headways along Yamba Road and the follow-up headways on the site access driveways.

Analysis using the SIDRA model indicates acceptable levels of service at both driveway intersections in the peak holiday hours traffic as estimated above and shown in the table below. The analysis indicates that the driveways will operate at a good level of service without the need to use the shoulder lane or separate left turn lanes, although these are proposed in accordance with AUSTROADS Part 5 standards.

Table 8 Future Intersection Operation Analysis [5] with proposed development: eastern driveway to Yamba Road

Eastern driveway Configuration	**Maximum Delay (on left turn out) (seconds)**	**Queue (metres)**	**Level of Service**
2 lane Yamba Road with no use of shoulder lanes	10.3	7	LOS B (good)
2 lane Yamba Road with occasional use of shoulder lanes as 50m short lanes on approach to the intersection.	9.9	7	LOS A (excellent)

The western driveway serves less traffic and would also operate at an acceptable level of service. Outside of holiday peaks, the traffic level of service operation would also be acceptable.

The RTA stated at the site meeting that RTA Northern Region were not designing based on traffic engineering design packages such as SIDRA but relied on the AUSTROADS guidelines, particularly the AUSTROADS Part 5- Intersections at Grade. Section 5.7 of that guide states: "Simple left turns: this treatment usually consists of a curve of appropriate radius …..and would generally be provided where the left run volume is low ,such as at residential street intersections…a 6 to 10m radius simple curve"

"Auxiliary left turn lanes should be considered at signalised intersections, high left turning volumes, or rural intersections". This is not considered applicable in this low speed urban area of Yamba with moderate left turning volumes. Furthermore, auxiliary left turn lanes may compromise pedestrian and bicycle safety as evidenced by recent experience outside the Bi Lo site in west Yamba, and would unnecessarily encroach into the bus stop, verge and shared path area.

However, left turning deceleration lanes of 30m length plus 8m radius taper and acceleration lanes of 105m length plus 8m radius taper have been proposed at both access points at the request of RTA officers.

[5] SIDRA Analysis

8 Parking Provision

8.1 Rate and provision of parking

The RTA Guide to Traffic Generating Development suggested the minimum parking provision for different type of development. The parking provision for dwelling house residential development is suggested at minimum one space per dwelling but preferably two spaces. **Table 9** below summarises the parking requirement for various scenarios.

The rate of visitor parking is based on the RTA Guide to Traffic Generating Developments 2002 rather than local ordinances which were intended for smaller individual development sites and small unit flat developments. The RTA recommends (Clause 5.4.2) a rate of one visitor car parking bay per 5 residential units or part thereof.

The proposed car parking exceeds the required car parking. This will balance the loss of on-street car parking on the Yamba Road frontage resulting from the acceleration and deceleration lanes.

Table 9 Parking Provision (car parking bays)

Parking	Western Site Holiday	Eastern Site Residential	Total Site
Proposed Dwelling units	117	224	341
Required Parking bays @ 50:50 split of 1and 2 bays per unit	179	336	515
Required Visitor parking bays @ 1 bay per 5 units	24	45	69
Required total car parking bays	203	381	584
Proposed car parking bays	212	400	612
Proposed on-grade visitor parking spaces	50	52	102
Total proposed car parking	262	452	714

8.2 Parking Layout and dimensions

Visitor Parking is conveniently located on-grade. Residential and holiday unit parking is conveniently located below the buildings.

It is understood that Council documents such as the local DCP have in the past required larger dimensions for car parking than the current Australian Standards AS 2890.1:2004 “Part 1: Off Street Car Parking”.

Most Local Government Authorities now refer to AS2890.1 as the design criterion for car parking, as the most comprehensive advice to planners, designers and regulatory bodies for design and layout of off-street parking facilities. The subject development has been designed in accordance with AS2890.1:2004.

Bike parking is provided in accordance with AUSTROADS guidelines.

8.3 Servicing

Adequate servicing, turning and parking for trucks and couriers is provided in accordance with AS 2890.2 Off Street Commercial Vehicle Facilities.

The parking provision is also adequate when assessed in the terms of the Clarence Valley Council Residential DCP Development in Residential Zones.

9 Public Transport, Pedestrian and Cyclist Provisions

9.1 Pedestrians and Cyclists

Currently, the subject site is used as a caravan park with basic pedestrian and cyclist infrastructures provided within the site. The subject development has created an opportunity to provide footpath and cycleway facilities to promote walking / cycling within the sites and travelling between the sites and the town centre etc .

Since the community facilities are proposed to be located on both the eastern and western sites, the two sites may have only small interactions in terms of pedestrian and cyclist movements. Crossing facilities like pedestrian refuge should be provided on Yamba Road at locations with good sight distance. Residents will be required to cross Yamba Road to access the bus stops or footpath.

Internal to the site, pedestrian paths are provided along the main routes, and the road environment is designed for low speed traffic movement to allowed shared use by motorists and cyclists and pedestrians.. Long straight road sections are avoided to prevent vehicles from travelling in high speed.

Recommended design aspects include:

- Routes are overlooked and have active street frontages, enabling visual surveillance by residents.
- Pram/ wheelchair crossing points are required at road intersections
- Safe crossing points should be provided for pedestrians at appropriate locations, particularly along collector roads
- Shared pathways should be between 2 – 2.5m wide, preferably 2.5m.
- Footways widths should be 2m, although they can be reduced to 1.2m for short distances to avoid obstructions. Footways serving non-residential uses may need to be widened within the immediate vicinity of developments to accommodate the increased pedestrian flow.
- Any landscaping should not reduce visibility along shared pathways
- Lighting levels along shared pathways should be adequate, in particular at intersections with roads and obstructions, such as street furniture
- Bicycle parking is provided in accordance with AUSTROADS guidelines.
- On shared pathways there should be adequate site distance to minimise conflict between users. The minimum stopping distance for cyclists, when there is no gradient is approximately 15m for cyclists travelling at 15 km/hr.

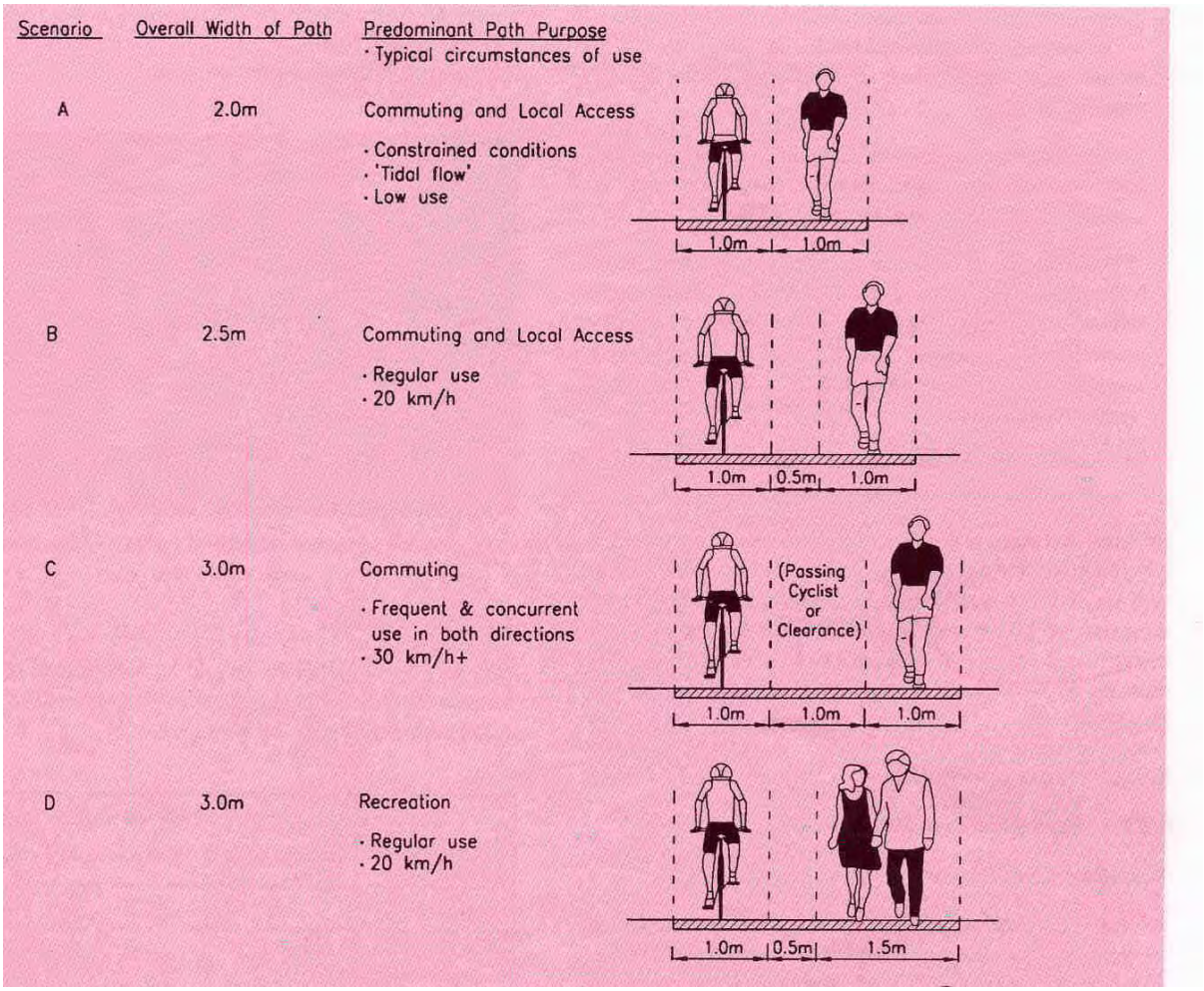


Figure 2 Path Layouts (Austroads)

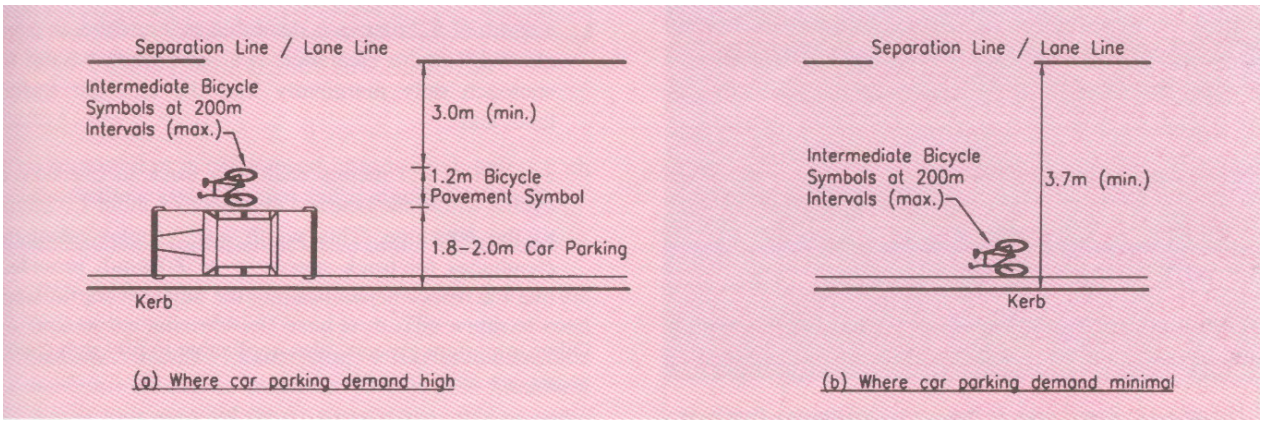


Figure 3 Advisory Treatment using Pavement Symbols - Layout

Figure 4 Advisory Treatment using Pavement Symbols

9.2 Public Transport

It is proposed that bus stops should be maintained on both sides of Yamba Road to encourage people to use public transport, particularly school students.

10 Road User Safety

The proposed development will improve safety by:

- Reduction of right turn conflict points along Yamba Road
- Low speed design environment
- Pedestrians/bicycle path along site frontage
- Pedestrian refuges on Yamba road
- Road network improvements including the Yamba Road median and roundabout at Shores Drive/Yamba Road.

11 Traffic Noise

Traffic generation will not be any more than existing. The generally reduced level of traffic proposed is likely to produce less traffic noise than existing. Detail is provided in the separate Acoustic/Noise Report.

12 Environmentally Sustainable Transport

12.1 ESD Transport (Appendix C)

Actions are suggested for addressing ESD/Green Transport objectives at a strategic level and at tactical and operational levels as part of a coordinated ESD Plan over the staged development of major sites. See Appendix B.

13 Conclusions

The existing Blue Dolphin Caravan Park operates as a significant tourist destination with 254 sites, café and general store and petrol station in Yamba.

The existing park has two driveways on its frontage to Yamba Road: a 4-lane wide driveway to the Caravan Park and a driveway to the petrol station approximately 20 metres to the west.

The proposed Dolphin Blue development consists of two distinct functions: 117 units of holiday accommodation and ancillary uses and 224 units of residential dwellings.

In order to support these distinct functions, two separate traffic access and circulation patterns are proposed: a driveway and road at the western end of the site frontage to serve the holiday accommodation, and retention of the existing caravan park driveway location on the eastern part of the frontage to serve the residential dwellings.

Two separate access points allow the turning volumes to be dispersed and allows a logical internal road hierarchy and circulation pattern. The petrol station will be removed and the existing driveway to the petrol station would be closed.

Traffic generation will not be any more than existing. The forecast traffic generation of the proposed development is significantly less than the traffic generation of the existing development during peak periods.

Despite this lower traffic generation and therefore positive traffic impact on the road network, and no consequential impact from the extent of traffic, the proposal recognises the need for the transport network to work as well as possible. Therefore a range of enhancements have been included in the proposals, for traffic and non-motorised transport.

A series of roundabouts exists or are proposed along Yamba Road at key intersections, including Shores Drive. Yamba Road has a 50km/h speed limit in this section. Daily traffic ranges from 6,000 vehicles per day to 12,000vpd in the holiday peak season.

As the Yamba Road along the frontage is a single traffic lane and a single bike /parking paved shoulder lane in each direction, analysis was undertaken for alternative options of simple driveways, auxiliary right turn lanes, or roundabouts.

Left-in/Left-out only traffic access is considered the best design for this layout. They avoid the immediate 4-lane road widening of Yamba Road which was rejected by community responses to the Strategic Road Study. They minimise the noise of speed changes and headlight beam deviation into residences which would occur with roundabouts.

The operation of the proposed accesses was tested using the SIDRA intersection program for the peak holiday mode i.e. Christmas and off peak. The access intersections with Yamba Road both operated at level of service LOS B (Good) or better.

The existing private jetty function is proposed to be retained. Public access to the private jetty is not required, and there is no proposal for access of trailers and boats to the foreshore. The jetty and the boat ramp are not part of this application and use of any road that will have access to the public will not be for trailers to the boat ramp.

Adequate car parking and access for service vehicles is provided for the residents, holiday accommodation, visitors to the public recreation area and other facilities on-site.

The overall transport environment has the opportunity to be improved by the adoption of a voluntary planning agreement including the following:

- Funding and construction of a raised central median on Yamba Road and a contribution to a roundabout at the intersection of Yamba Road and Shores Drive to create the left-in/left-out traffic flow with right turn recirculation via roundabouts. This traffic flow arrangement is considered safer and more efficient and is advocated by the RTA. Funding by the proponent should be commensurate with the need for changed local

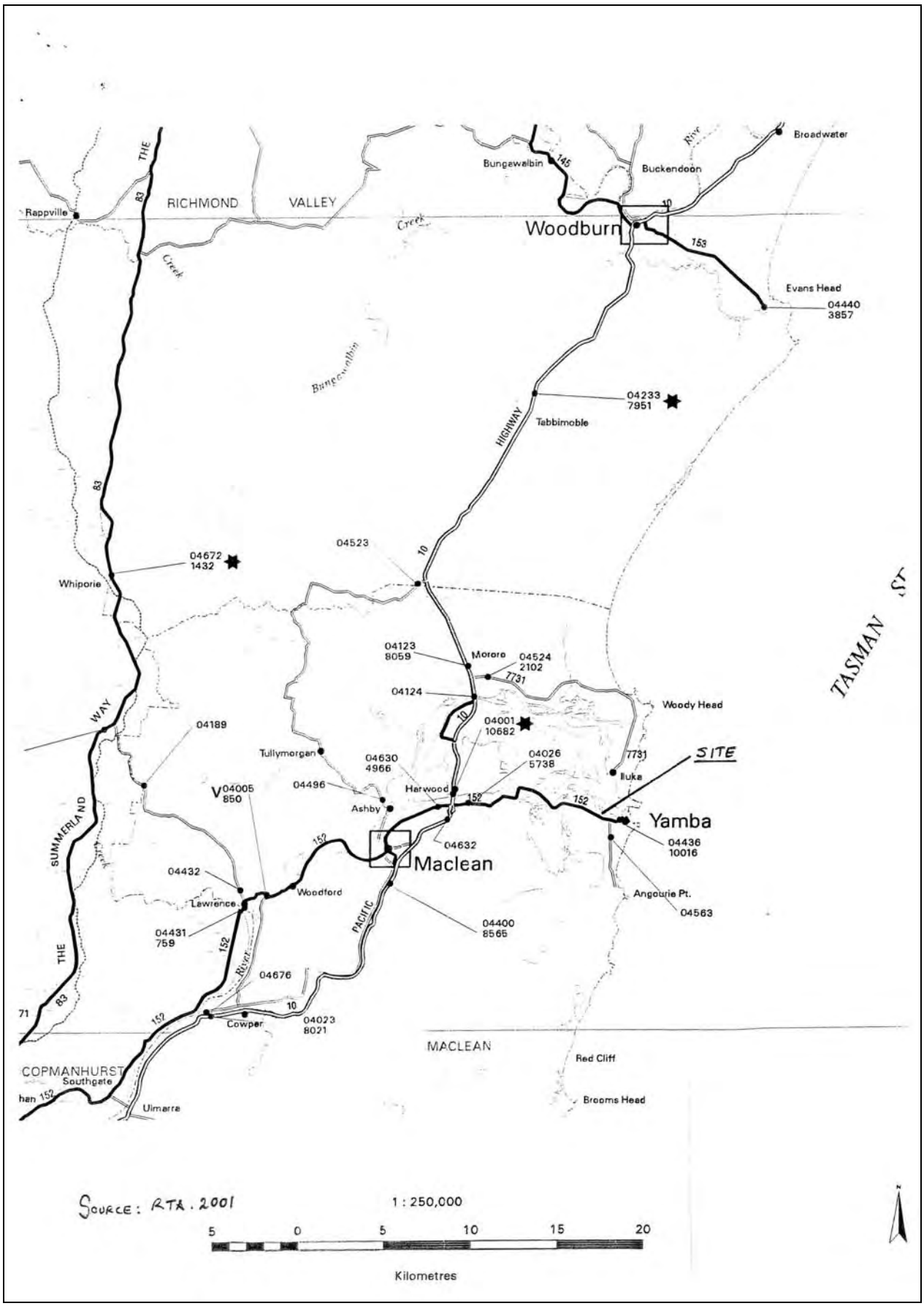
transport demand along the site frontage such as the concrete median and site access roads, and a partial contribution in proportion to the use towards the wider area improvements which benefit the whole network, such as the new roundabout. Traffic generation from the subject site will not be any more than existing.

- An off-road shared bike and pedestrian path along the Yamba Road frontage of the site to provide an additional choice for cyclists and walkers.
- Improvement of the existing bus stops and shelters on both sides of the Yamba Road frontage, with all –weather paving and inverted U rail bike parking to encourage use of public transport.
- Installation of pedestrian refuges in the proposed central median in Yamba Road including near the bus stops to improve the safety of the pedestrians, and bus travellers, and local residents wanting to cross Yamba Road.
- Establishment of a Dolphin Blue “Green Travel Plan” within the development to encourage residents, patrons and staff to make sustainable transport choices.

The study has concluded that the proposed development and access layout is appropriately designed and will have an acceptable traffic impact and provide benefits for sustainable transport.

Appendix A

Traffic Volumes and SIDRA Analysis


RICHMOND VALLEY
Rappville
Woodburn
Broadwater
Bungawalbin
Buckendoon
Evans Head
04440
3857
04233
7951
Tabbimoble
HIGHWAY
04523
04672
1432
Whiporie
04123
8059
Morore
04524
2102
7731
04124
Woody Head
04001
10682
04189
Tullymorgan
04630
4966
04026
5738
SITE
Iluka
V04005
850
04496
Harwood
Ashby
Yamba
04436
10016
04632
Maclean
04432
Lawrence
Woodford
Angourie Pt.
04563
04431
759
04400
8565
PACIFIC
04676
Cowper
04023
8021
MACLEAN
Red Cliff
COPMANHURST
Southgate
Ulmarra
Brooms Head
TASMAN SEA
SOURCE: RTA. 2001
1 : 250,000
5 0 5 10 15 20
Kilometres

MACLEAN COUNCIL TRAFFIC COUNTS - axle pairs = vpd x 1.07

as at 11/02/03

Road Name	Road No	Site No	Location	Description	Date Start	Date Finish	Total Count	Daily Count	Count Units	% HV (Class 3-12)	Mean Speed	85th% speed	Data File (public/englibra/traffic count data/
MR152 (Wooli St)	301	0301_10	Yamba	Between River St and Yamba St	29-May-01	3-Jun-01	23113	3,852	vpd	2.6%	45.2	51.5	0301_10a.rtc, 0301_10b.rtc
MR152 (Wooli St)	301	0301_10	Yamba	Between River St and Yamba St	20-Jan-01	27-Jan-01	50694	6,337	vpd	3.0%	43.3	49.0	0301_1030jan2001.ec0
MR152 (Wooli St)	301	0301_20	Yamba	Between Claude St & River St	4-Jun-01	14-Jun-01	52750	5,819	vpd	2.3%	44.0	50.0	0301_2014jun2001.ec0
MR152 (Wooli St)	301	0301_30	Yamba	West of Claude St	4-Jun-01	13-Jun-01	78919	8,769	axle pairs				
MR152 (Wooli St)	301	0301_40	Yamba	East of Angourie Rd	8-Jan-02	17-Jan-02	117072	13,008	axle pairs				
MR152 (Wooli St)	301	0301_40	Yamba	East of Angourie Rd	14-May-01	21-May-01	51849	7,943	vpd	3.1%	49.7	55.0	0301_4020may2001.ec0
MR152 (Wooli St) (RTA Site 4.63)	301	0301_40	Yamba	East of Angourie Rd	1-Jun-01	7-Jun-01	51977	7,425	vpd	5.3%			0301_40.xls (RTA Count)
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	8-Jan-02	17-Jan-02	84755	12,100	vpd	2.0%	48.7	54.0	0404_1010jan2002.ec0, 0404_1017jan2002.ec0
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	6-Oct-01	10-Oct-01	47396	7,899	vpd	3.3%	50.7	56.5	0404_10a.rtc, 0404_10b.rtc
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	14-May-01	21-May-01	53471	8,144	vpd	3.6%	50.0	56.0	0404_1020may2001.ec0
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	1-Jan-96	8-Jan-96	67517	11,253					
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	13-Oct-94	20-Oct-94	55925	7,989	axle pairs				
MR152 (Yamba Rd)	404	0404_10	Yamba	West of Angourie Rd	13-Oct-94	20-Oct-94	56904	8,129	axle pairs				
MR152 (Yamba Rd)	404	0404_20	Yamba	Between Shores Drive & Carrs Drive	8-May-01	13-May-01	37129	6,188	vpd	4.3%	60.7	66.5	0404_20b.rtc, 0404_20a.rtc
MR152 (Yamba Rd)	404	0404_30	Yamba	West of Carrs Drive	7-May-01	14-May-01	51315	7,331	axle pairs				
MR152 (Yamba Rd)	404	0404_40	Yamba	East of Oyster Channel bridge	2-Jan-02	17-Jan-02	103240	6,830	vpd	3.7%	74.8	81.0	0404_4010jan2002.ec0
MR152 (Yamba Rd)	404	0404_40	Yamba	East of Oyster Channel bridge	13-Dec-01	30-Dec-01	101527	6,345	vpd	3.7%	75.2	82.0	0404_4021dec2001.ec0, 0404_4001jan2002.ec0
MR152 (Yamba Rd)	404	0404_40	Yamba	East of Oyster Channel bridge	18-May-01	21-May-01	14902	4,967	axle pairs				
MR152 (Yamba Rd)	404	0404_40	Yamba	East of Oyster Channel bridge	14-May-01	16-May-01	10316	5,158	axle pairs				
MR152 (Yamba Rd)	404	0404_40	Yamba	Oyster Ch Bridge	1-Jan-96	8-Jan-96	44540	7,423					

Summary Statistics

AUSTRALASIAN TRAFFIC SURVEYS

JOB NUMBER 5859 - 1

Suburb Yamba

CLIENT Arup

SITE Yamba Road, between Shores Drive & Caravan Park Driveway

SURVEY DATE Fri, 14 Apr 06 Until Thu, 20 Apr 06

		DIRECTION OF TRAVEL		
		TWO-WAY	Eastbound	Westbound
TRAFFIC VOLUME:	Weeks Days Only	10,957	5,390	5,567
[VEH/DAY]	7 Days Average	11,099	5,534	5,565
PEAK HOUR **AM**	10:00	1038	515	523
VOLUME: **PM**	12:00	968	478	490
TOTAL SPEEDS:	85th Percentile	57.0	56.4	57.7
Km/Hr	Average	51.4	50.7	52.0
CLASSIFICATION % *:	CLASS 1 %	97.4%	97.5%	97.3%

NOTES : (OBSERVATIONS)

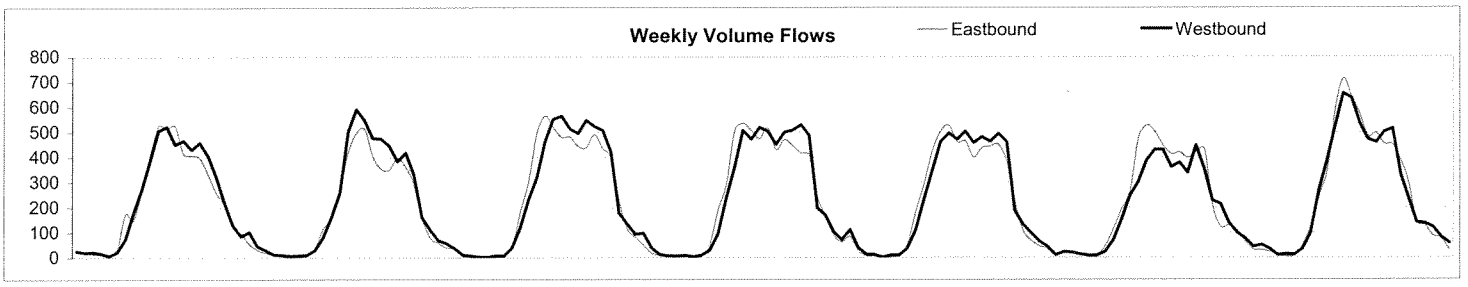
* CLASS 1 - Short Vehicles up to 5.5m

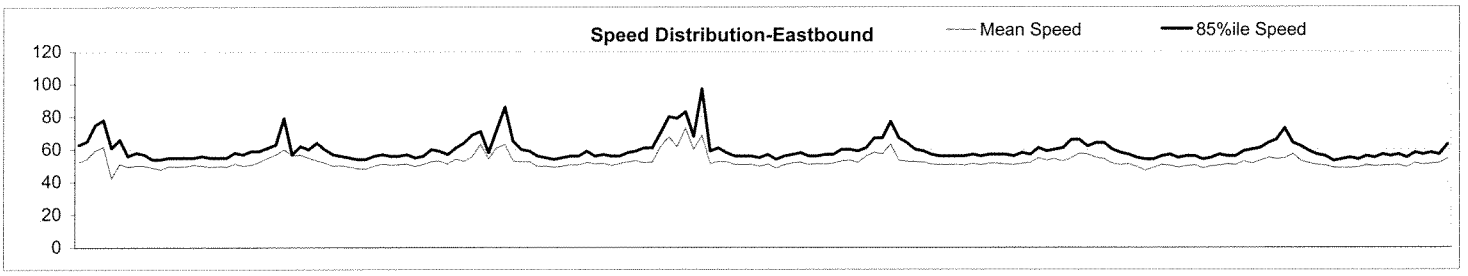
AUSTRALASIAN TRAFFIC SURVEYS

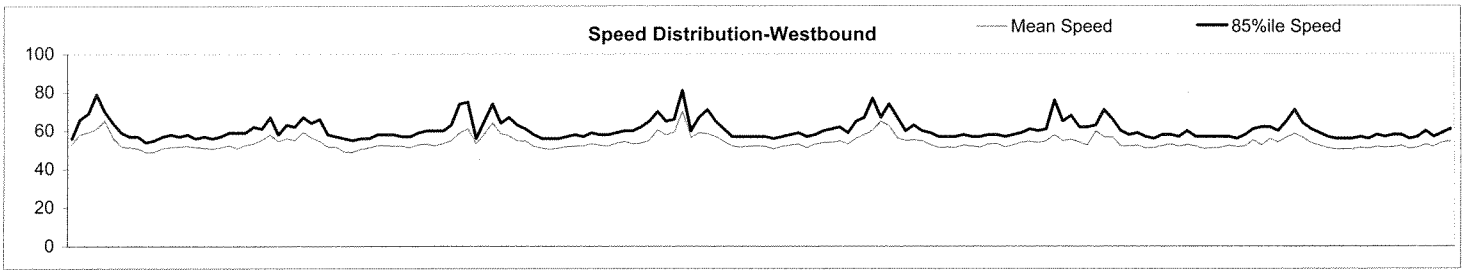
Automated vehicle Study Summary Report
Yamba Road, between Shores Drive & Caravan Park Drivewa

From: Friday, 14 Apr 06
Untill: Thursday, 20 Apr 06

Data Record Inerval = 1Hr	Monday, 17 Apr 06			Tuesday, 18 Apr 06			Wednesday, 19 Apr 06			Thursday, 20 Apr 06			Friday, 14 Apr 06			Saturday, 15 Apr 06			Sunday, 16 Apr 06		
	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way
Short Veh %	4934	5112	10001	4504	5081	9585	5657	5702	11359	5791	5735	11526	5398	5446	10822	5300	4730	10030	6283	6188	12471
Medium Veh %	89	97	183	72	102	174	143	155	298	152	179	331	132	145	277	80	72	152	94	122	216
Long Veh %	1	4	5	4	11	15	12	17	29	14	18	32	20	13	33	9	2	11	9	4	13
7am-7pm Vol	4391	4574	8965	4096	4700	8796	5097	5220	10317	5122	5207	10329	4830	4958	9788	4636	4118	8754	5571	5392	10963
24Hr Vol	**5029**	**5213**	**10242**	**4585**	**5198**	**9783**	**5817**	**5880**	**11697**	**5960**	**5936**	**11896**	**5561**	**5607**	**11168**	**5394**	**4805**	**10199**	**6390**	**6316**	**12706**
85%ile Speed	**56**	**57**	**56**	**56**	**57**	**57**	**57**	**58**	**57**	**57**	**58**	**57**	**57**	**58**	**57**	**56**	**58**	**57**	**56**	**57**	**56**
Mean Speed	**49.79**	**51.21**	**50.51**	**50.18**	**51.38**	**50.82**	**50.87**	**52.32**	**51.60**	**51.11**	**52.47**	**51.79**	**51.20**	**52.60**	**51.90**	**49.76**	**52.10**	**50.86**	**49.80**	**51.46**	**50.63**
AM Pk Hr Vol	525	522	1036	512	591	1087	564	564	1072	535	519	1042	527	496	1023	527	430	933	713	654	1367
AM Hr Factor	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09	0.09	0.11	0.10	0.11
AM Peak 85%	78	79	79	79	67	67	86	75	77	97	81	82	77	77	75	66	71	67	73	71	68
AM Peak Time	10:00	11:00	11:00	11:00	10:00	10:00	9:00	11:00	10:00	9:00	11:00	9:00	10:00	10:00	10:00	10:00	11:00	11:00	10:00	10:00	10:00
PM Pk Hr Vol	524	467	975	405	476	881	490	547	1013	517	529	1021	464	503	967	448	447	878	572	533	1105
PM Hr Factor	0.10	0.09	0.10	0.09	0.09	0.09	0.08	0.09	0.09	0.09	0.09	0.09	0.08	0.09	0.09	0.08	0.09	0.09	0.09	0.08	0.09
PM Peak 85%	61	62	61	64	74	70	70	70	70	60	65	63	61	76	68	60	61	61	63	61	62
PM Peak Time	12:00	13:00	12:00	12:00	12:00	12:00	15:00	14:00	15:00	12:00	16:00	12:00	12:00	12:00	12:00	12:00	16:00	12:00	12:00	12:00	12:00

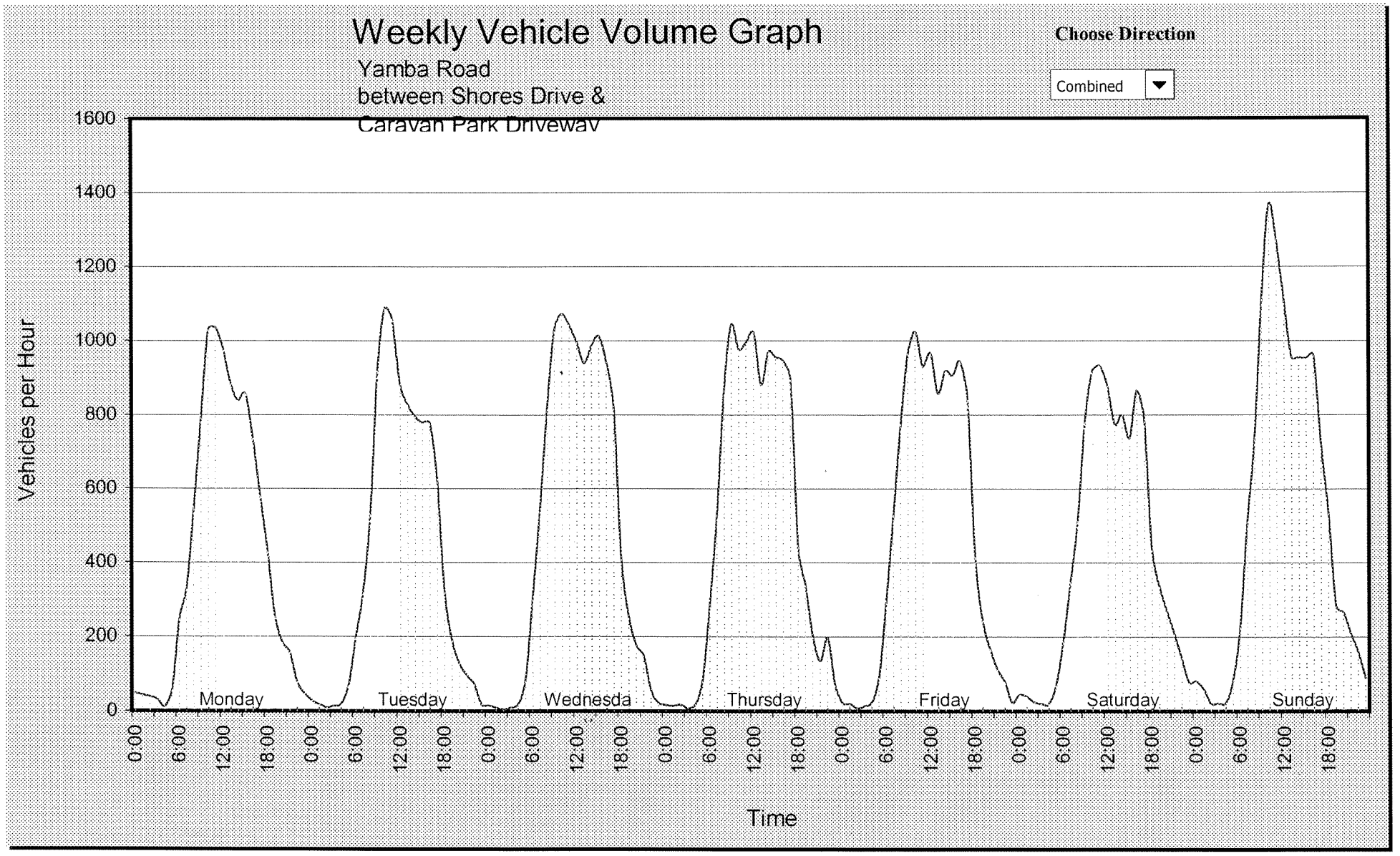






Classification Satistics 24Hr Vol	17-Apr-06			18-Apr-06			19-Apr-06			20-Apr-06			14-Apr-06			15-Apr-06			16-Apr-06		
	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way	Eastbound	Westbound	2 way
1 Car	4872	5037	9864	4389	4904	9293	5540	5565	11105	5681	5634	11315	5289	5339	10606	5153	4642	9795	6174	6083	12257
2 Car+Trailer	62	75	137	115	177	292	117	137	254	110	101	211	109	107	216	147	88	235	109	105	214
3 2 axle Truck	80	93	170	62	90	152	120	130	250	121	151	272	109	120	229	70	68	138	90	115	205
4 3 axle Truck	6	4	10	7	7	14	21	23	44	25	23	48	19	24	43	7	4	11	2	3	5
5 4 axle Truck	3	0	3	3	5	8	2	2	4	6	5	11	4	1	5	3	0	3	2	4	6
6 3 axle Semi	0	1	1	1	5	6	2	2	4	2	2	4	5	4	9	3	1	4	2	1	3
7 4 axle Semi	0	1	1	1	1	2	1	3	4	2	5	7	2	0	2	2	0	2	2	1	3
8 5 axle Semi	0	0	0	1	4	5	0	2	2	2	2	4	2	0	2	0	0	0	1	0	1
9 6 axle Semi	1	1	2	1	1	2	8	7	15	6	7	13	8	7	15	2	1	3	2	2	4
10 7/9axle Truck	0	0	0	0	0	0	1	3	4	1	2	3	2	2	4	0	0	0	1	0	1
11 B-Double	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	1
12 Road Train	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0
Class 13 Unknown	5	0	5	5	4	9	5	6	11	3	4	7	11	3	14	5	1	6	4	2	6

Definitions:
85th Percentile Speed = The speed at or below which 85% of volume is observed to travel
Short = 1-2, Medium = 3-5, Long = 6-12


Weekly Vehicle Volume Graph
Yamba Road
between Shores Drive &
Caravan Park Driveway
Choose Direction
Combined
Vehicles per Hour
1600
1400
1200
1000
800
600
400
200
0
Monday
Tuesday
Wednesda
Thursday
Friday
Saturday
Sunday
0:00
6:00
12:00
18:00
Time