TRAFFIC AND PARKING IMPACT ASSESSMENT OF WOOLOOWARE BAY TOWN CENTRE AT CAPTAIN COOK DRIVE, WOOLOOWARE

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Development Type: **Woolooware Bay Town Centre**

Site Address: **Captain Cook Drive, Woolooware**

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1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *Bluestone Property* Solutions to provide a Traffic and Parking Impact Assessment of the Woolooware Bay Town Centre at Captain Cook Drive, Woolooware.

This report supports the modification application for the town centre (eastern) precinct following the concept plan approval issued by the Planning Assessment Committee for the Woolooware Bay Town Centre (WBTC). The approval is sought for the revised development of the Eastern Precinct at WBTC as described in the Overview of Proposed Development section of this report.

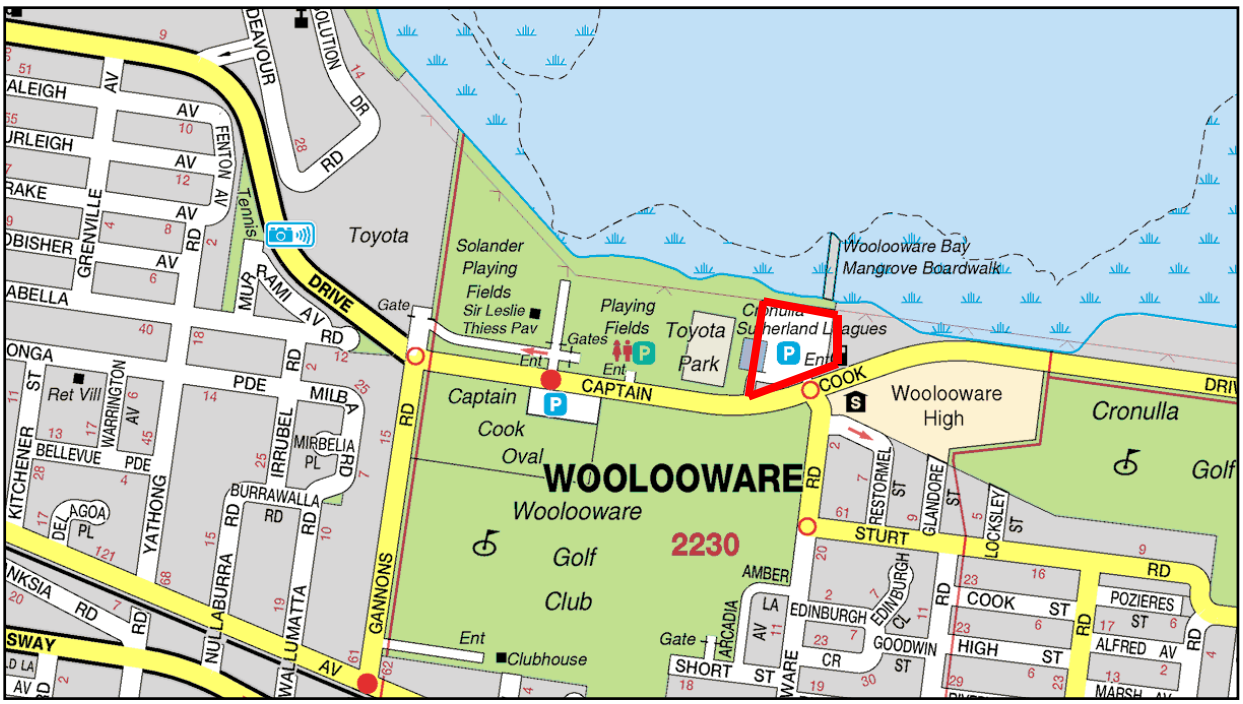
1.1 Site Location

The subject site is known as 455 Captain Cook Drive, Woolooware as shown in the context of the overall WBTC site in **Figure 1** and **Figure 2**. The site is formally described as part Lot1 DP1180482.

The WBTC is a master-planned town centre comprising three precincts, being the Town Centre Precinct, the Residential Precinct and the Stadium Precinct. This application relates to the Town Centre Precinct, generally comprising the land in the eastern portion of the WBTC site.

Site Location

FIGURE 1: SITE CONTEXT - AERIAL



Site Location

FIGURE 2: SITE CONTEXT - MAP

1.2 Existing Approval

The existing approved development was analysed in regards to traffic and parking in the "Cronulla Sharks Redevelopment – Mixed Used Masterplan - Traffic Management and Accessibility Plan" prepared by McLaren Traffic Engineering and dated May 2012.

Following the masterplan approval, a project application was lodged and approved with an updated traffic impact assessment report being the "*Cronulla Sharks Leagues Club – Retail Development – Traffic and Parking Impact Assessment*" prepared by *McLaren Traffic Engineering* and dated February 2013. An addendum to this report was issued by *McLaren Traffic Engineering* with title "*Woolooware Bay Town Centre, Transport and Parking Impact Assessment – Response to Department of Planning and Infrastructure*" and dated 24 May 2013. The approved project application scale, including parking allocation and traffic impact are reproduced in **Section 3** of this report. The parking clauses of the issued consent are reproduced in **Section 3.2** of this report.

1.3 State Environmental Planning Policy (Infrastructure) 2007 Requirements

The proposed development qualifies as a traffic generating development with relevant size or capacity under Clause 104 of State Environmental Planning Policy (Infrastructure) 2007 and has received support from the Road and Maritime Services (RMS). The Concept Approval for the Town Centre Precinct includes requirement for the upgrade of the Captain Cook Drive / Woolooware Road intersection plus new signalised access points to Captain Cook Drive for the Town Centre Precinct and the Residential Precinct.

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Site Location

Woolooware Bay Town Centre is located on Captain Cook Drive, Woolooware and includes Cronulla Sharks Leagues Club, existing car park areas associated with the club, Sharks Stadium and associated grandstands, and training fields. The location of the site is shown in **Figure 1 & 2.**

Opposite the site are Woolooware Golf Course and Captain Cook Oval, which is primarily used for softball and baseball. To the east of the site, on the south eastern corner of the new roundabout at Woolooware Road North is Woolooware High School. To the east of the Sharks car park is Fitness First and a petrol station. West of the site are the Solander Fields and Toyota Motor Corporation.

2.2 Surrounding Roads

The characteristics of the nearby traffic network are described below.

Captain Cook Drive

- Regional road east of Gannons Road, operating as a 4 lane divided carriageway immediately adjacent to the site;
- State Road west of Gannons Road, operating as a 6 lane divided carriageway;
- Operates as a 2 lane undivided carriageway east of the site during construction of an additional 2 lanes;
- Kerbside parking is generally not permitted along either side of the road adjacent to the site;
- Bicycle lanes are located on both sides of the road adjacent to the site;
- 70km/h speed limit outside of school zone times, 40km/h School Zones apply around Woolooware High School during school zone times.

Woolooware Road North

- Local Road classification;
- 2 lane undivided carriageway;
- Unrestricted kerbside parking generally permitted along both sides of the road;
- 50km/h speed limit, except during school zone times leading up to Captain Cook Drive intersection 40km/h.

Gannons Road

- Regional Road classification;
- 2 lane undivided carriageway;
- Unrestricted kerbside parking generally permitted along both sides;
- 60km/h speed limit.

2.3 Traffic Management

The following prevailing traffic management facilities exist within the immediate vicinity of the site:

- Roundabout at the intersection of Captain Cook Drive / Woolooware Road North / Car Park Access for Cronulla Sharks Club Building. This roundabout operates as a two lane circulating roundabout;
- Wombat crossing in Woolooware Road North immediately south of the new roundabout at the junction of Captain Cook Drive / Woolooware Road North;
- Bicycle lanes on both sides of Captain Cook Drive along the front of the property;
- 40km/h School Zones operate near Woolooware High School;
- Pedestrian actuated traffic signals across Captain Cook Drive, at the driveways serving Solander Field and Captain Cook Oval;
- Roundabout control at the junction of Captain Cook Drive with Gannons Rd;
- Modified vehicle entry and exit arrangements for the car park serving Captain Cook Oval;
- Indented bus bay on Captain Cook Drive out the front of Sharks Stadium;
- During peak events at Sharks Stadium, such as NRL Rugby League matches, a special event traffic management plan is used to manage the peak traffic & pedestrian activity. This plan was development in 1998 by *M^{C}Laren Traffic Engineering* in consultation with Council's traffic committee and the Sharks. Trial implementation of satellite parking and extended bus services for game day is ongoing.

2.4 Existing Intersection Performance

The following is an extract from the 2012 PPR for the Sharks Redevelopment which should be read in conjunction with the traffic analysis section of this report:

> *"During peak crowd conditions at Toyota Stadium (to be referred to as Sharks Stadium) difficulties were often experienced by vehicles leaving the driveways serving overflow parking areas as well from the accessway to the Club car park immediately east of Sharks Stadium. However, these difficulties have been addressed by the Peak Event Traffic Management Plan developed in 1998 by M^C^Laren Traffic Engineering in consultation with Sutherland Shire Council, the Cronulla Sharks, and local traffic committee (Refer to Figures 1 & 2 of that 1998 document). Council have also installed supplementary measures to assist pedestrian safety since that time.*
>
> *In addition, the roundabout constructed at the junction of Captain Cook Drive / Woolooware Road North / Club car park around 2002 has dramatically improved traffic conditions during typical demand periods and during peak game periods. The existing performance of the key intersections were analysed with the aid of SIDRA intersection Version 5.1 for the Friday evening and Saturday peak periods.*
>
> *It is evident from **Table 1** (See Below) that the intersections that currently operate poorly are the Gannons Road / Kingsway signalised intersection and the Captain Cook Drive / Gannons Road roundabout on the Friday evening peak."*

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA 5.1)

Intersection	*Peak Hour*	*Degree of Saturation(1)*	*Average Delay(2) (sec/vehicle)*	*Level of Service(3)*	*Control Type*
Captain Cook Drive / Gannons Road	*Friday PM*	*1.49*	*>70 (>70)*	*F Worst: F*	*Roundabout*
	Saturday NOON	*0.75*	*12.0 (17.7)*	*A Worst: B*	
Captain Cook Drive / Woolooware Road North	*Friday PM*	*0.77*	*8.3 (22.2)*	*A Worst: B*	*Roundabout*
	Saturday NOON	*0.53*	*8.2 (15.2)*	*A Worst: B*	
Captain Cook Drive / Elouera Road	*Friday PM*	*0.71*	*10.9 (13.6)*	*A Worst: A*	*Roundabout*
	Saturday NOON	*0.29*	*7.5 (11.1)*	*A Worst: A*	
Gannons Road / Kingsway	*Friday PM*	*1.00*	*54.4*	*D*	*Signals*
	Saturday NOON	*1.19*	*64.8*	*E*	
Gannons Road / Denman Avenue	*Friday PM*	*0.86*	*19.9*	*B*	*Signals*
	Saturday NOON	*1.05*	*32.9*	*C*	
Captain Cook Dr / Boulevard / Taren Pt Rd	*Friday PM*	*1.08*	*>70*	*F*	*Signals*
	Saturday NOON	*1.00*	***>70***	***F***	

NOTES :

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the average delay experience by all movements. The average delay for the worst movement is shown in brackets for Stop, Giveway and roundabout intersections.

(3) *Level of Service is a qualitative measure of performance describing operational conditions. The overall Level of Service is shown in bold, with the Level of Service for the most disadvantaged movement shown in brackets.*

2.5 Existing Public Transport

At present the site is not served by public transport with the nearest connection being Woolooware Railway Station which is 1.4km walking distance from the site. This represents an existing poor level of service.

3 APPROVED PROJECT APPLICATION

The Planning Assessment Commission approved a Part 3A Concept Plan for the Woolooware Bay Town Centre site in late-2012, comprising a master plan for the redevelopment of the site. This involved the construction of approximately 600 new apartments, upgrades to the Leagues Club, construction of a new Town Centre precinct with supermarkets, specialty retail, leisure uses and a medical centre. The master plan also includes the creation of a new foreshore parkland and upgrades to Remondis Stadium. Subsequently to this, a Project Application has been approved for the Town Centre Development and a Development Application has also been approved for Stages 1 and 2 of the residential component. The following section describes the approved Town Centre development approved under Project Application MP10_0230.

3.1 Scale

The approved project application had the following development scale:

- Major Retail 8500m^2
- Speciality Shops 4076m^2
- Restaurant 648m^2
- Medical 3012m^2
- Leisure 1340m^2
- Club 3450m^2
- Club Deck 941m^2
- Outdoor Retail Deck 820m^2
- Parking 770 spaces

3.2 Parking Volume and Allocation

The approved project application had the following parking volume and allocation:

• *Club*	*180 spaces per 8500* m^2	*73 spaces*
• *Supermarket*	*1 space per 23.8* m^2	*362 spaces*
• *Specialty Retail*	*1 space per 22.2* m^2	*184 spaces*
• *Restaurant*	*1 space per 30m^2*	*22 spaces*
• *Medical*	*1 space per 111.1* m^2	*27 spaces*
• *Leisure*	*nil parking demand*	*0 spaces*
• *Dual Use*	*10% of retail*	*55 spaces*
• *Parking Demand*		*613 spaces*
• *Parking Provided*		*770 spaces*

As noted in the February 2013 PPR, the following amount of parking will be available for Club members, guests and others authorised by the club exclusively and free of charge:

- *Monday to Sunday 9am-5pm, 143 car parking spaces*
- *Monday to Thursday 5pm to close of Club trading, 256 car parking spaces*
- *Friday, Saturday and Sunday 5pm to close of Club trading, 300 car parking spaces*

3.3 Traffic Volume and Impact

The approved project application had the following traffic generation and traffic impact:

Friday 4:45pm to 5:45pm Traffic Generation

Club	*168 trips per 8500 m^2*	*87 trips*
Supermarket	*14.1 trips per 100 m^2*	*1199 trips*
Specialty Retail	*5.7 trips per 100 m^2*	*269 trips*
Medical	*0.5 trips per 100 m^2*	*15 trips*
Leisure	*nil traffic generation*	*0 trips*
Dual Use	*10% of retail*	*147 trips*
Car Ownership	*2.5% higher than RMS*	*Included in rates*
Total Trips		*1423 trips*

Saturday 11:30am to 12:30pm Traffic Generation

Club	*100 per 8500 m^2*	*52 trips*
Supermarket	*105% of Friday*	*1258 trips*
Specialty Retail	*105% of Friday*	*283 trips*
Medical	*105% of Friday*	*16 trips*
Leisure	*nil traffic generation*	*0 trips*
Dual Use	*10% of retail*	*154 trips*
Car Ownership	*2.5% higher than RMS*	*Included in rates*
Total Trips		*1454 trips*

Table 2: *Traffic Impact for Friday PM and Saturday Midday based on 2012 PPR*

Intersection	*Peak Hour*	*Degree of Saturation[1]*	*Average Delay[2] (s/veh)*	*Level of Service[3]*	*Control Type*
EXISTING PERFORMANCE					
Captain Cook Drive / Gannons Road	*FRI PM*	*1.49*	***>70** (>70)*	***F** Worst: F*	*Roundabout*
	SAT NOON	*0.75*	***12.0** (17.7)*	***A** Worst: B*	
Captain Cook Drive / Woolooware Road North	*FRI PM*	*0.77*	***8.3** (22.2)*	***A** Worst: B*	*Roundabout*
	SAT NOON	*0.53*	***8.2** (15.2)*	***A** Worst: B*	
Captain Cook Drive / Elouera Road	*FRI PM*	*0.71*	***10.9** (13.6)*	***A** Worst: A*	*Roundabout*
	SAT NOON	*0.29*	***7.5** (11.1)*	***A** Worst: A*	
Gannons Road / Kingsway	*FRI PM*	*1.00*	***54.4***	***D***	*Signals*
	SAT NOON	*1.19*	***64.8***	***E***	
Gannons Road / Denman Avenue	*FRI PM*	*0.86*	***19.9***	***B***	*Signals*
	SAT NOON	*1.05*	***32.9***	***C***	
Captain Cook Dr / Boulevard / Taren Pt Rd	*FRI PM*	*1.08*	***>70***	***F***	*Signals*
	SAT NOON	*1.00*	***>70***	***F***	
FUTURE PERFORMANCE BASED ON CONCEPT APPROVAL INCLUDING STAGES 1-4					
Captain Cook Drive / Gannons Road	*FRI PM*	*1.88*	***>70** (>70)*	***F** Worst: F*	*Roundabout*
	SAT NOON	*0.94*	***21.5** (38.8)*	***B** Worst: C*	
Captain Cook Drive / Woolooware Road North	*FRI PM*	*0.78*	***16.1***	***B***	*Proposed Upgrade to Signals*
	SAT NOON	*0.51*	***16.2***	***B***	
Captain Cook Drive / Elouera Road	*FRI PM*	*0.81*	***11.7** (17.3)*	***A** Worst: B*	*Roundabout*
	SAT NOON	*0.42*	***7.7** (11.5)*	***A** Worst: A*	
Gannons Road / Kingsway	*FRI PM*	*1.00*	***57.8***	***E***	*Signals*
	SAT NOON	*1.23*	***>70***	***F***	
Gannons Road / Denman Avenue	*FRI PM*	*0.87*	***20.5***	***B***	*Signals*
	SAT NOON	*1.11*	***55.8***	***D***	
Captain Cook Dr / Boulevard / Taren Pt Rd	*FRI PM*	*1.23*	***>70***	***F***	*Signals*
	SAT NOON	*1.02*	***>70***	***F***	
Captain Cook Drive / New Residential Access	*FRI PM*	*0.75*	***2.5***	***A***	*Proposed New Signals*
	SAT NOON	*0.74*	***1.8***	***A***	
Captain Cook Dr / New Retail Access	*FRI PM*	*0.84*	***9.4***	***A***	*Proposed New Signals*
	SAT NOON	*0.84*	***11.2***	***A***	

3.4 Approved Public Transport

Public transport services will be provided in accordance with the approval received from Department of Planning & Infrastructure as detailed in the previous reports submitted including an interim shuttle bus service. As part of the consent conditions imposed by the PAC, a shuttle bus service provided by the Cronulla Sharks Leagues Club will operate immediately when the Town Centre development is open.

The proposed shuttle service will go well above the minimum service route of WBTC to Woolooware Railway Station. Instead, the shuttle bus will link WBTC to the public transport nodes of Cronulla, Woolooware and Caringbah Railway Stations up until such time when Transport for New South Wales (TfNSW) implements its own services (expected to be operated by Veolia) which was given support during PPR discussions.

A bus route has been settled between the bus operator (Veolia), Council and the proponent. The route is a clockwise loop, with estimated patronage numbers and times analysed previously and reproduced in the letter of **Annexure C**.

Indented bus bays will be provided on both sides of Captain Cook Drive with pedestrian access provided in the short term by the existing pedestrian traffic lights near the Solander Fields driveway and in the future by the approved three signalised intersections (one at the residential driveway and two at the Town Centre driveways).

In addition, a travel access guide will be made available for users of the site, reproduced in **Annexure D**.

4 PROPOSED DEVELOPMENT MODIFICATIONS

TABLE 3: WOOLOOWARE BAY TOWN CENTRE – STAGE 4 MODIFICATIONS

Land Use	WBTC Previously Proposed Scale	Modified Scale
Supermarket	8 500 m^2	8 548 m^2
Specialty Shops	4 076 m^2	4 146 m^2
Medical Centre	3 012 m^2	633 m^2
Club (including new deck)	4 391 m^2	4 640 m^2
Restaurant	648 m^2	1 065 m^2
Childcare Centre	0	75 Places
Parking (spaces)	770	770
Community Use	0	518 m^2
Leisure	2 801 m^2	908 m^2

The two sets of signals serving the development have existing approval by RMS and any revisions to turn bay lengths and signal phasing will require further approval by RMS.

5 PARKING ASSESSMENT

5.1 Car Parking

For submissions to the PAC, JRPP and DP&E the subject development was analysed generally in comparison to RMS and Sutherland Shire Council Development Control Plans (DCP) rates for parking demand and supply. The consent clauses relating to Town Centre parking are "*A minimum of 770 spaces for the Retail and Club Precinct*" and "*Retail and Club precinct parking and allocation to uses is to be determined following the submissions of a parking study*".

In line with Sutherland Shire Council DCP 2015 Chapter 12 Clause 10.9 regarding "*a proposed development comprises two or more land uses with different peak parking demands*", the peak parking per land use is summarised with sources of data in **Table 4**.

The new land use in this application, and the applicable parking rate, are:

- Community Use – Parking based on Office/medical rates contained in RMS 'Guide to Traffic Generation Developments' despite being predominantly ancillary.
- Childcare Centre – Parking based on the Sutherland Shire Draft DCP 2015, it should be noted that Childcare Centre parking demand is negligible other than in peak weekday morning and afternoon periods.

TABLE 4: PEAK PARKING DEMAND PER LAND USE

Land Use	Peak parking Rate	Derived From
Supermarket	4.2 spaces per 100m^2	Existing Town Centre Approval
Secondary Retail	4.5 spaces per 100m^2	Existing Town Centre Approval
Medical	0.9 spaces per 100m^2	Existing Town Centre Approval
Leisure	nil	Existing Town Centre Approval
Club	180 spaces per 8500 m^2	Site patronage Surveys
Restaurant / Cafe	3.3 spaces per 100m^2	DCP
Childcare Centre	1 space per 4 places	DCP
Community Facility	0.9 spaces per 100 m^2	RMS Guide to traffic generating Developments
Dual Use of Parking	10% retail discount	Existing Town Centre Approval

Three major parking periods are identified and analysed below regarding parking accumulation, being Friday before 5:30pm, Friday after 6:30pm and Saturday Midday. These scenarios each have the greatest anticipated overlaps of Town Centre parking. An operating factor has been applied as a comparison to the peak parking accumulation to recognise the changing parking demand of each land use with time. A simple example is the club which has low parking demand during 9am to 5pm with progressively higher parking demand in the PM and a peak at approximately 9pm.

TABLE 5: PARKING ACCUMULATION FRIDAY PRIOR TO 5:30PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday Prior to 5:30PM (spaces)
Supermarket	360	100%	360
Secondary Retail	187	100%	187
Medical Centre	6	100%	6
Club	99	30%	30
Restaurant	36	50%	18
Childcare Centre	19	100%	19
Leisure	0	100%	0
Community Facility	5	100%	5
Demand Sub-Total			**625 spaces**
Dual Use	360+187 = 547	- 10%	- 55
Total Demand	**570**		
Total Supplied	**770**		

TABLE 6: PARKING ACCUMULATION FRIDAY AFTER 6:30PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday After 6:30PM (spaces)
Supermarket	360	100%	360
Secondary Retail	187	25%	47
Medical Centre	6	50%	3
Club	99	100%	99
Restaurant	36	100%	36
Leisure	0	100%	0
Community Facility	5	50%	3
Demand Sub-Total			**548 spaces**
Dual Use	360+47 = 407	- 10%	- 41
Total Demand	**507**		
Total Supplied	**770**		

TABLE 7: PARKING ACCUMULATION SATURDAY MIDDAY

Land Use	Peak Parking Demand (spaces)	Operating Factor	Saturday Midday (spaces)
Supermarket	360	100%	360
Secondary Retail	187	100%	187
Medical Centre	6	50%	3
Club	99	75%	74
Restaurant	36	75%	27
Leisure	0	100%	0
Community Facility	5	100%	5
Demand Sub-Total			**656 spaces**
Dual Use	360+187 = 547	- 10%	- 55
Total Demand	**601**		
Total Supplied	**770**		

It is apparent then that due to the mix of land uses the town centre will operate effectively and with a maximum/peak weekly parking accumulation of 601 spaces on Saturday at midday. 770 spaces are provided which exceeds the estimate of demand by 169. It is desirable for shopping centres to have a small percentage of spaces spare to allow for turnover of customers and reduced searching times. The parking supply also allows the site to operate effectively as a town centre with a variety of complimentary land uses and a shared pool of parking to serve the needs of the community.

The quantum of parking is compliant with the minimum requirements set by the existing approval and in excess of the demand found by the parking study. The parking provision is therefore satisfactory and supported.

5.2 Parking Allocation

Existing approval required allocation of a minimum of fifty (50) spaces be allocated to club staff at all times, though not within the Town Centre precinct necessarily. Given that there is ample parking capacity above projected peak parking demand, it is considered that these can be accommodated without need for a dedicated staff parking area.

Based on the varying demand of the Town Centre precinct, the following approximate parking availability will occur for the use by club staff/visitors:

- Monday to Sunday 9am to 5pm – 235 Club spaces (including 50 for staff)
- Monday to Friday 5pm to close of Club Trading – 367 Club spaces (including 50 for staff)
- Saturday and Sunday – 5pm to close of Club Trading – 488 Club spaces (including 50 for staff and assuming retail is 50% of peak or less)

5.3 Car Park Guidance System

There should be a system in place to have higher turnover parking at the lower levels and long stay parking at the higher levels. Since generally the short stay parking will only be retail customers, it will be necessary to discourage the long stay users from the most convenient parking areas in an effort to minimise driver search times for available parking.

This can be done by introducing a scheme such as free untimed parking on levels 4 and 5, free 3 hour parking on levels 1 and 3 between 8am and 7pm and free parking on all levels between 7pm and 8am. This would effectively result in Town Centre staff parking on the upper levels which is only a minor inconvenience. It would however provide a very high increase to efficiency and attractiveness of the centre for club patrons and retail customers. The management of such an operation should be an automatic parking guidance system, based on the advice of an experienced installer and operator. The uncontrolled situation may result in higher turnover of spaces on the upper levels which is inefficient and undesirable.

It is recommended that an electronic dynamic parking guidance system be installed to direct traffic entering the Town Centre car park to available parking spaces. Such a system could also be used on game days to assist in directing cars to specially assigned internal game day parking spaces. The system could manage the location of time restricted parking in addition to directing drivers to appropriate levels for each land use.

5.4 Accessible Parking

The accessible parking rate is to be 1% as per BCA Table D3.5, as reviewed in the *Morris-Goding Accessibility Consulting 'Access Review'.* This requirement is met.

5.5 Motorcycle Parking

The approved parking supply of 770 spaces for the Town Centre precinct included nil motorcycle provision. As such the development with nil motorcycle parking is in line with existing approval.

5.6 Bicycle Parking

Council's DCP gives the following bicycle parking rates in relation to this proposed development:

- 1 per 10 car parking spaces for first 200 car spaces, then 1 space per 20 parking spaces thereafter and 1 unisex shower per 10 employees.

The proposal requires 770 car parking spaces within the precinct. As such forty-nine (49) bicycle spaces/racks are required for the visitors and staff to the Town Centre precinct. The development meets this requirement.

5.7 Car Parking Design Compliance

Referring to the indicative plans provided at **Annexure A**, the parking layout has been assessed in accordance with AS2890.1:2004, AS2890.2:2002, AS2890.3:2015 and AS2890.6:2009 where applicable. In summary, the following notable design details have been achieved:

- Minimum space widths of 2.6m
- Minimum space width of 2.3m for the designated small car bays
- Disabled parking spaces are 2.4m in width and 5.4m in length. Adjacent shared zones have been provided measuring 2.4m in width and 5.4m in length.
- Widths of circulation aisles and manoeuvring areas according to user class (6.2m or 6.6m for high turnover parking). Generally circular one-way system employed.

The layout of the car park will be subject to detailed design and review as part of future development applications though the current design is satisfactory and supported.

5.8 Servicing/Loading Dock Provision

No changes are proposed to the general loading dock locations or capacity as part of this modification application. Access and management of these docks has been assessed and approved as part of Project Application MP10-0230.

While all bays were previously overdesigned for 19.0m articulated vehicles, refinement of the intended operators has introduced more bays than previous, albeit with fewer dedicated semi-trailer bays. At least one articulated bay will be made available to each of the large retail tenancies with the smaller tenancies having shared use of an articulated bay and many other rigid vehicle bays. Swept path tests showing 19m semi-trailer access are provided in **Annexure B**.

5.9 Entry control device

If future applications are made to the local traffic committee for paid parking to be implemented on the site, the eastern entry shall not have a boom gate on entry and shall only employ a licence plate recognition or other system not requiring vehicles to stop. This is to prevent queuing upstream of the entry on Woolooware Road North. There is sufficient entry queue length on site for the western entry to be able to implement a boom gate if desired, though it remains the recommendation for a consistent system to be implemented, if any, such that the western entry would have licence plate recognition also. The entry queue lengths are therefore supported. Exit queue lengths would be managed within the site and except for game day would more likely be limited by the amount of green time at the two sets of traffic signals on Captain Cook Drive than by the exiting boom gate delay.

Game day management arrangements for the Town Centre parking allocation were assessed and approved as part of Project Application MP10-0230. Since game day traffic is largely tidal, inbound prior to the game and outbound following the game, any boom gates installed on exit should have a secondary lane also to allow the additional game day flows.

6 TRAFFIC ASSESSMENT

6.1 Traffic Generation

Previously the site was assessed using the most recent available data from the RMS, being the RMS *'Guide to Traffic Generating Developments'* dated October 2002. The modification will utilise the previously applied rates for traffic generation including 2.5% loading on RMS rates, 10% dual use of the retail component and the Saturday peak retail traffic being 105% of the Friday peak retail traffic.

Traffic generation for the proposed club, retail and residential precinct is described in **Table 8** and **Table 9** below:

TABLE 8: TRAFFIC GENERATION RATES PER LAND USE

Land Use	Traffic Generation Friday 5-6PM (per hour)	Traffic Generation Saturday Midday (per hour)	Derived From
Supermarket (or similar)	14.1 trips per 100m^2	14.8 trips per 100m^2	Approved Project Application
Secondary Retail	5.7 trips per 100m^2	6.0 trips per 100m^2	Approved Project Application
Office	0.5 trips per 100m^2	0.5 trips per 100m^2	Approved Project Application
Medical	0.5 trips per 100m^2	0.5 trips per 100m^2	Approved Project Application
Community Use	0.5 trips per 100m^2	0.5 trips per 100m^2	Office as in RMS Guide to Traffic Generating Developments
Club	168 trips per 8500m^2	100 trips per 8500m^2	Approved Project Application
Leisure	nil	nil	Approved Project Application
Restaurant	5.0 trips per 100m^2	5.0 trips per 100m^2	RMS Guide to Traffic Generating Developments
Child Care Centre	0.7 trips per place	Nil	RMS Guide to Traffic Generating Developments
Car ownership rates in Sutherland Shire	Included in above rates	Included in above rates	Approved Project Application
Dual Use	10% of Retail	10% of Retail	Approved Project Application

TABLE 9: TRAFFIC GENERATION TRIPS PER LAND USE

Land Use	Traffic Generation Friday 5-6PM (Trips per hour)	Traffic Generation Saturday Midday (Trips per hour)
Supermarket (or similar)	1205	1244
Secondary Retail	236	369
Office	1	1
Medical	3	9
Leisure	nil	nil
Club	92	60
Restaurant	53	43
Childcare Centre	53	0
10% Dual Use of Retail	-144	-151
TOTAL (2015 MOD)	**1500**	**1476**
TOTAL (2013 Approval)	**1423**	**1454**

The updated project application, will produce a slightly increased peak traffic generation of approximately 5% for the weekday peak and 2% for the weekend peak, though the updated application should still be analysed regarding external traffic impact.

6.2 Traffic Impact

Previous site analyses estimated the direction of traffic flows (traffic assignment) for the residential and non-residential components of the precinct and the same percentage assignments are utilised in this analysis of traffic impact. The traffic volumes modelled include the existing survey counts, RMS recommended 383 trips for Kurnell residential development, Residential Stages 1-3 and Town Centre Precinct.

SIDRA INTERSECTION 6.0 analysis software has been utilised to examine the traffic impact on the two co-ordinated retail signals agreed to by the RMS during previous approval processes. The previous results, found using SIDRA INTERSECTION 5.1, have been re-tested for comparison purposes using SIDRA 6.0.

During the process of conversion between the software versions, and as previously noted in another modification application traffic report, a previous error was observed and corrected. The lane disciplines for the roundabout at Gannons Road/Captain Cook Drive had been incorrectly assigned. On the eastern approach to the intersection the right hand lane was previously modelled as RIGHT though is supposed to be RIGHT & THRU, which correctly identifies the THRU capacity on this approach. The existing, approved and future performances of this roundabout will include this correction.

In the TMAP of the approved development it was ascertained that some intersections beyond the nearby Captain Cook Drive precinct, such as Taren Point Road/Captain Cook Drive, are under the control of the RMS and have an existing need for improvement without the subject development. The subject development was approved in light of this information. The critical intersections for the development are the two sets of retail signals serving the Town Centre precinct and the Gannons Road roundabout.

A summary of existing, approved and proposed performances of the intersections is provided below in **Table 10**:

TABLE 10: INTERSECTION PERFORMANCE SUMMARY

Intersection	Peak Hour	Degree of Saturation	Average Delay (s/veh)	Level of Service
Existing (SIDRA 5.1/6.0)				
Western Retail Signals	FRI PM	-	-	-
	SAT MID	-	-	-
Captain Cook Drive/Woolooware Road	FRI PM	0.77/0.78	8.3/6.6	A/A
	SAT MID	0.53/0.53	8.2/6.4	A/A
Captain Cook Drive/Gannons Road	FRI PM	/0.70	/8.2	/A
	SAT MID	/0.67	/8.8	/A
Approved Concept Plan/Project Application Scale (SIDRA 6.0)				
Western Retail Signals	FRI PM	0.84	8.7	A
	SAT MID	0.72	9.1	A
Captain Cook Drive/Woolooware Road	FRI PM	0.80	14.0	A
	SAT MID	0.62	17.7	B
Captain Cook Drive/Gannons Road	FRI PM	0.94	19.7	B
	SAT MID	0.96	22.7	B
Proposed Project Application Scale (SIDRA 6.0)				
Western Retail Signals	FRI PM	0.86	9.6	A
	SAT MID	0.71	9.5	A
Captain Cook Drive/Woolooware Road	FRI PM	0.78	14.0	A
	SAT MID	0.5	14.4	A
Captain Cook Drive/Gannons Road	FRI PM	0.96	23.2	B
	SAT MID	0.95	19.8	B

The two sets of signals serving the Town Centre precinct operate efficiently at Level of Service **A** in both critical time periods for the approved and proposed scales of development.

The Gannons Road roundabout operates at Level of Service **B** at the crucial time periods in the currently proposed scenario. Delays will be generally experienced by eastbound traffic due to volume in the evening peak hour and for westbound traffic in both time periods due to the number of vehicles turning right across the traffic stream from the eastbound approach. These turning volumes are not caused by the subject development and are in any case a supported and acceptable outcome.

The residential signals have also been tested separately and are operating at an acceptable level of service.

The proposed development modification is therefore supportable on traffic impact grounds.

7 CONCLUSIONS

The proposed modification application to the Town Centre Project Approval (MP10-0230) has been analysed in regards to projected parking demand and traffic generation. The parking provision will meet the expected peak demand and the traffic generation will be suitably distributed onto the local and wider traffic network with the works already approved under the concept plan.

- Peak parking demand rates and times have been estimated based on previous rates, the local DCP or the RMS guide and the supply of 770 shared parking spaces can accommodate the peak demand at any one time. The parking rate also complies with the concept approval of minimum 770 spaces. The parking and loading dock designs comply with the relevant standards including swept paths, bay sizes and ramp details.

- The updated application generates some 5% additional peak hour trips compared to the approved project application. The distributed external traffic has an acceptable traffic impact with Level of Service **B** which is an acceptable and compliant outcome.

- A revised intersection count was completed of the Elouera Road roundabout as a response to a submission in a modification application. Analysis shows that even without discounting the partially constructed Kurnell subdivisions, the roundabout will operate at a high level of service with minimal delays in the peak hour.

ANNEXURE A: SITE LAYOUT

(SHEET 1 OF 3)

ANNEXURE A: SITE LAYOUT

(SHEET 2 OF 3)

ANNEXURE A: SITE LAYOUT

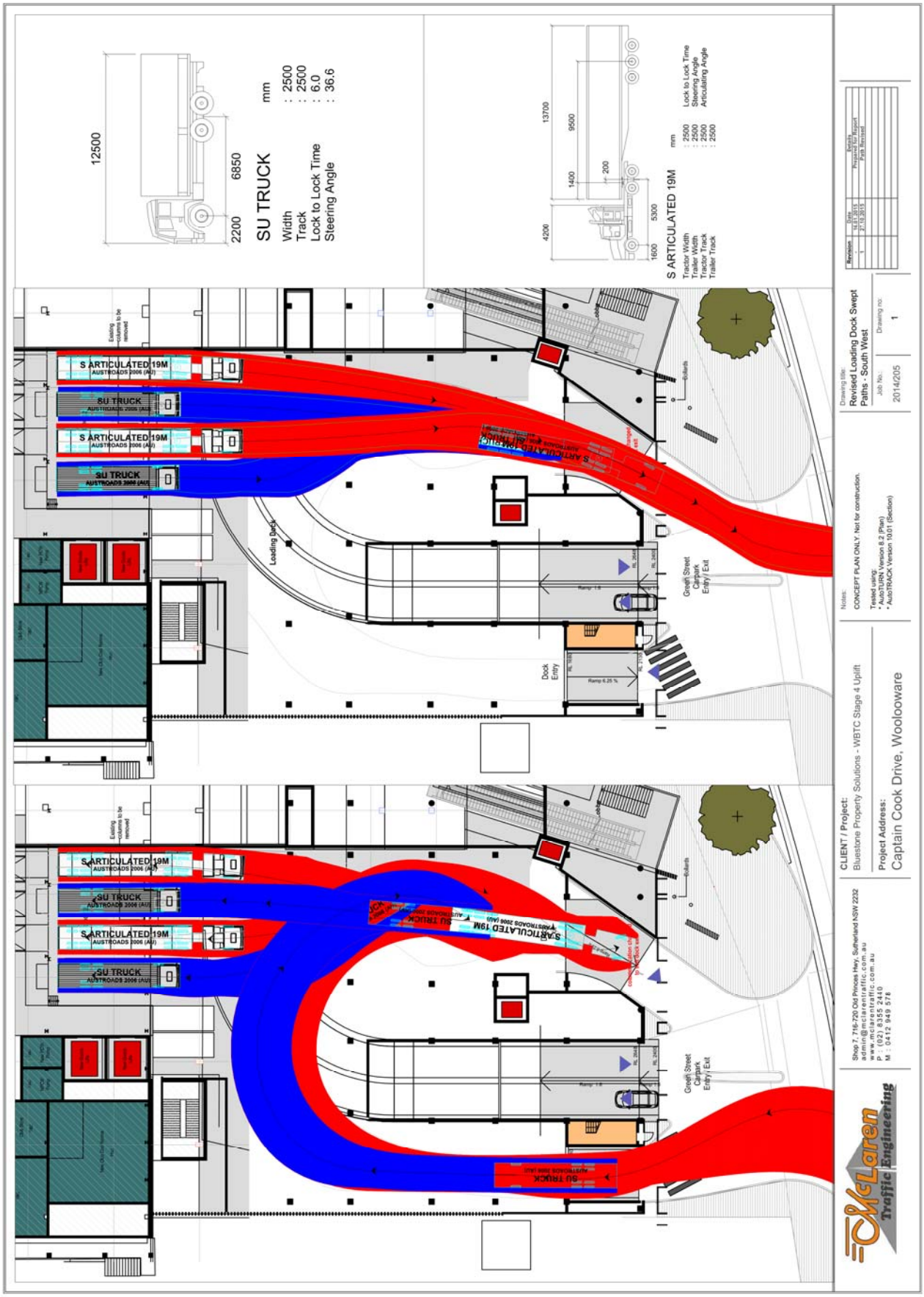
(SHEET 3 OF 3)

ANNEXURE B: LOADING DOCK SWEPT PATHS

SHEET 1 OF 2

ANNEXURE B: LOADING DOCK SWEPT PATHS

SHEET 2 OF 2



ANNEXURE C: LETTER REGARDING BUSES

SHEET 1 OF 7

24 February 2014

Julie Gilbert
Veolia Transport NSW
PO Box 209
Georges Hall, NSW 2198

Re: Estimation of Costs for Bus Service- Woolooware Bay Town Centre
471 Captain Cook Drive, Woolooware

Dear Julie

I refer to the above development and the minimum requirements set out in our Development Consent Condition 28A (as seen below) for the First Stage of Residential Development. Bluestone along with the Cronulla Sutherland Leagues Club are required to provide a regular bus for residents and visitors to Woolooware Bay Town Centre, which services local train stations and Cronulla Beach.

Condition 28

A. Before Occupation
A shuttle bus shall be provided to service the development 7 days a week from the issue of the first Occupation Certificate until the day of the first timetabled public bus service stopping at the new bus bays in Captain Cook Drive.

The bus shall operate as described below:

i. Minimum capacity: 22 seats

ii. Minimum hours & frequency as follows:

	Monday to Friday				Saturday	Sunday
Time	6am-9am	9am-4pm	4pm-7pm	7pm-9pm	8am-9pm	9am-2pm
Frequency	30min	30min	30min	60min	60min	60min

iii. Set down and pick up points: from the development to Woolooware, Caringbah and Cronulla Railway Stations

iv. Link with train timetable: bus services shall align with the train timetable between 6am-8pm Monday to Friday.

I have attached five appendices which give information on the predicted demand overtime of the development as determined by our Traffic Engineering Consultant Craig McLaren. I have also included a map which outlines a proposed shuttle route. Bus bays will be provided in front of both the residential and retail components on the northern side of Captain Cook Drive.

The details of the proposed shuttle bus services are as follows:

- Hours of operation: 6am-9pm Monday to Friday. 8am-9pm Saturday and 9am to 2pm Sunday.
- Service Frequency: In accordance with the McLaren Transport recommendations attached;

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- Set-down/pick up points: Woolooware Station, Caringbah Station, Woolooware Bay Town Centre Retail, Woolooware Bay Town Centre Residential, Cronulla Station, Cronulla Beach and a second stop on Kingsway Road to service Woolooware Station (refer to indicative map attached);
- Bus Capacity: Minimum 22 seats.

It is expected the service will be required for approximately two years, from the day the retail centre opens (early 2016) to the date of the first timetabled public bus service to Woolooware Bay Town Centre.

We would like to meet with you and Craig McLaren to discuss any options there may be for Veolia to provide the shuttle service to Woolooware Bay.

Should you require any additional information or wish to discuss this further, please do not hesitate to contact Emily McLaughlin on 02 9523 1622.

Yours sincerely,

General Manager- Development

Matt Crews
Bluestone Property Solutions Pty Limited

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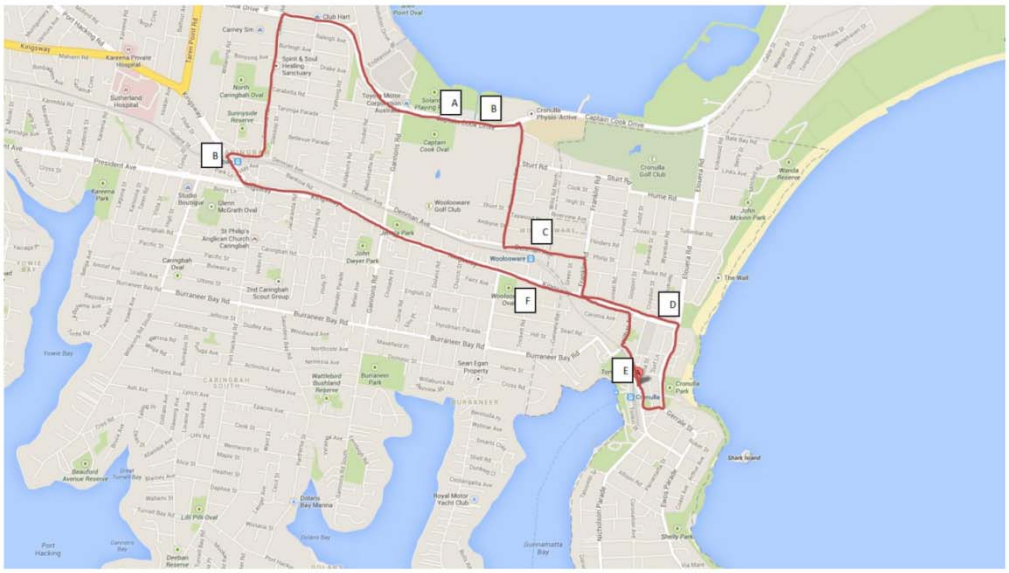
Appendix A: Proposed Shuttle Route



A- Woolooware Bay Town Centre Residential
B- Woolooware Bay Town Centre Retail
C- Woolooware Station
D- Cronulla Beach
E- Cronulla Station
F- Woolooware Bay Station (2)
G- Caringbah Station

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Appendix B: Proposed Bus Timetable (Extracted from McLaren Engineering Report Dated 10 May 2012)

TABLE 1: BUS TIMETABLE

Scale of Use	Monday to Friday								Saturday		Sunday	
	Bus	Frequency 6-9am	Bus	Frequency 9am-4pm[1]	Bus	Frequency 4-7pm	Bus	Frequency 7-9pm	Bus	Frequency 8am-9pm	Bus	Frequency 9am-2pm
<400 units	1	30min	1	30min	1	30min	1	60min	1	60min	1	60min
600 units	2	30min	1	30min	2	30min	1	60min	1	60min	1	60min

Notes:

[1] To align with train timetable

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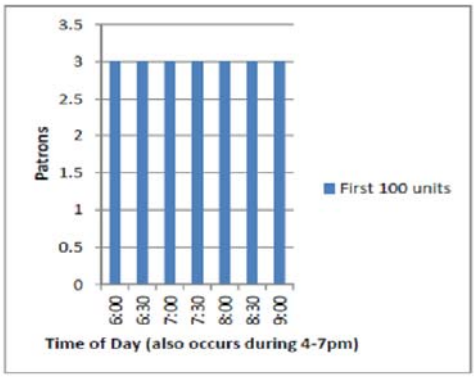
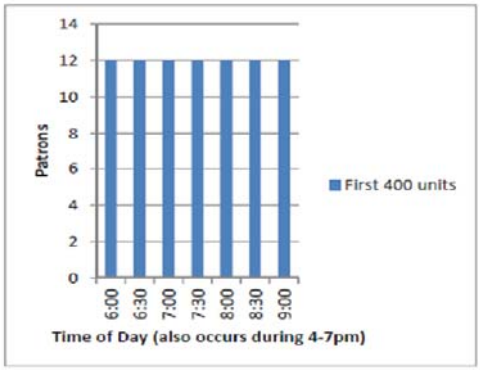
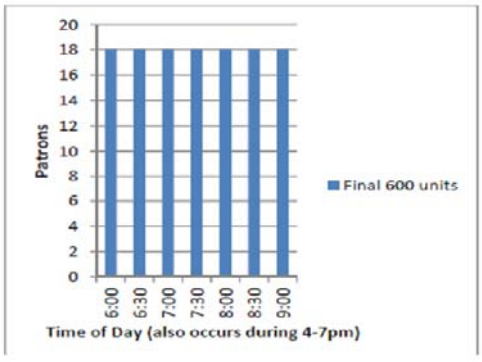
Appendix C: Residential Usage (Extracted from McLaren Engineering Report Dated 10 May 2012)







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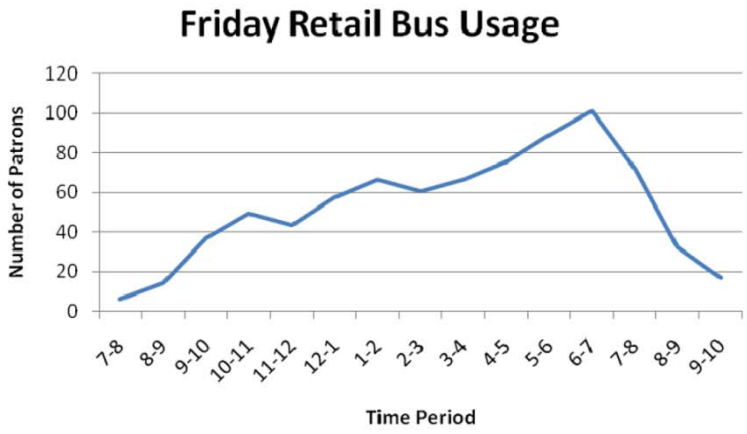
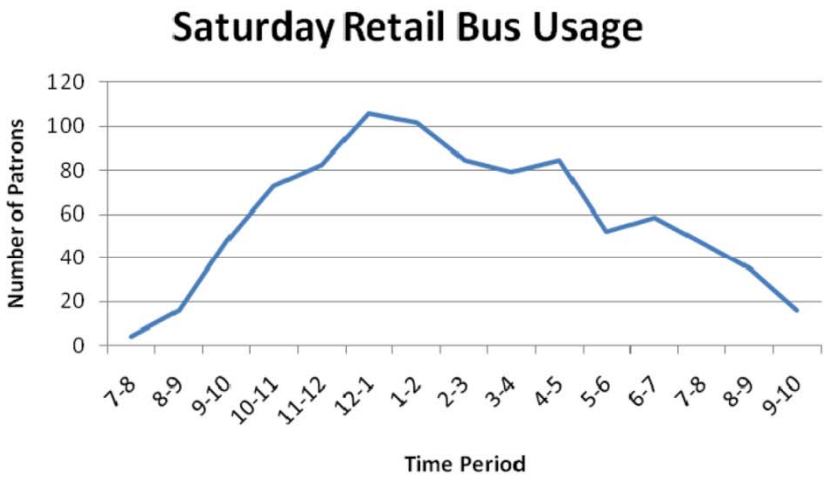
Appendix D: Proposed Retail Bus Usage Friday and Saturday (Extracted from McLaren Engineering Report Dated 10 May 2012)





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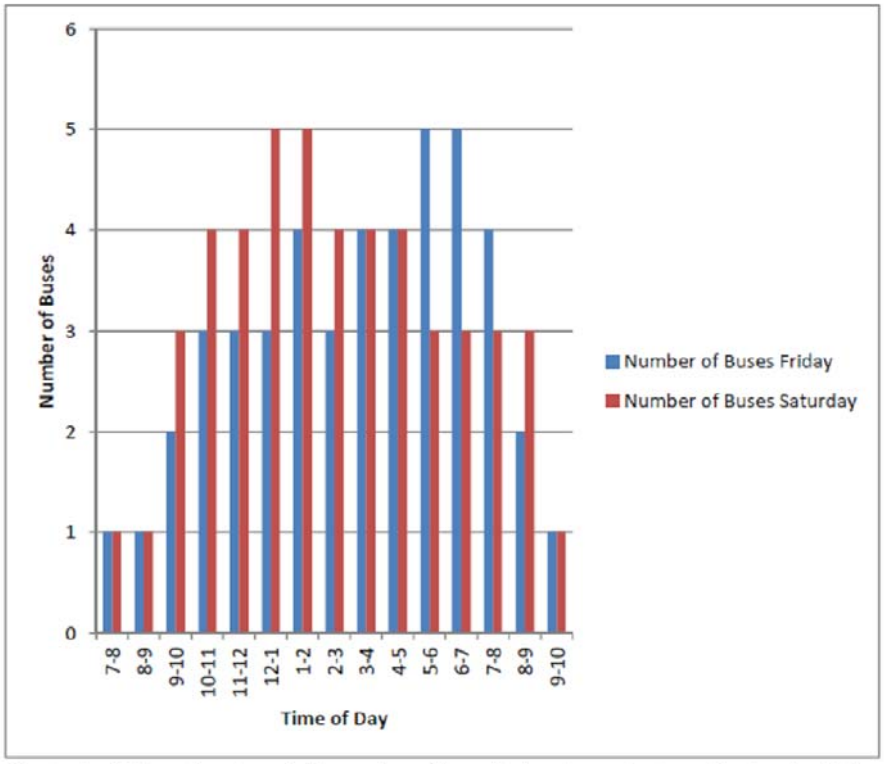
Appendix E: Retail Bussses(Extracted from McLaren Engineering Report Dated 10 May 2012)

ANNEXURE B: RETAIL BUSES*



Note: If a standard 50 seat bus is used, the number of buses in the above chart would reduce by 56%.

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ANNEXURE D: TRAVEL ACCESS GUIDE

SHEET 1 OF 3

Travelling to Woolooware Bay Town Centre

Woolooware Bay Town Centre (WBTC) is located on Captain Cook Drive, north or Woolooware Golf Club on the Woolooware Bay foreshore. The retail centre is well serviced by public transport with regular shuttle buses from Woolooware and Caringbah Railway Station.

The site also offers taxi pick up and drop off bays as well as pedestrian and cycle networks surrounding the centre offering a diverse travel options to WBTC. Numerous bicycle parking facilities are provided enabling secure lock-up and peace of mind while shopping

Travel by Public Transport

Future bus connections and interim shuttle bus services will set down at multiple locations along Captain Cook Drive. Bus stops designed with Department of Transport input are located at the residential and the retail, leisure and club precincts. The retail bus stop with covered entry is adjacent to the main entry of the centre with its direct links north through to the foreshore. Please visit http://www.131500.com.au/ or [Sharks Website] for more information

Cycling

If you wish to Cycle to WBTC, then a variety of off-road and on-road provisions may suit you travel path. A dedicated cycle lane is provided on Captain Cook Drive on both approaches provided.

If you wish to take a more scenic route, then why not travel along the existing cycleway on the foreshore. This connects to circulate around WBTC opening up parts of the foreshore never before experienced. If you're travelling from the south, safe crossing locations by means of controlled intersections allow you to cross Captain Cook Drive safely.

Walking

Walking is a healthy and free method of travel. If you live locally, why not consider walking to WBTC and explore the scenic surrounds while leaving you car at home. A series of shared and wide pedestrian paths allow you to approach WBTC from all directions. Pedestrian paths surrounding WBTC provide access to the main entry, bus and taxi bays as well as the foreshore.

Parking

Parking at WBTC is managed by integrated parking guidance systems to allow you easy and quick access to parking. Parking to WBTC is provided off Captain Cook Drive or Woolooware Road North. Three levels of parking are provided and ample parking for disabled across all levels.

Travel Access Guide

This travel access guide is available from all shops and outlets within WBTC as well as online at [Sharks Website]. This access guide is recommended for all visitors, customers and employees of WBTC. There are a range of benefits for choosing public transport, walking and cycling as your main method of travel which include:

- Walking and Cycling provides a level of exercise to assist in your overall health and wellbeing
- Reduce you carbon footprint as well as cost of travel by saving on public transport tickets or free methods of travel such as walking and cycling
- Avoid the stress of lengthy travel times and possible traffic jams or the time taken to find a park

ANNEXURE D: TRAVEL ACCESS GUIDE

SHEET 2 OF 3

Contact Information

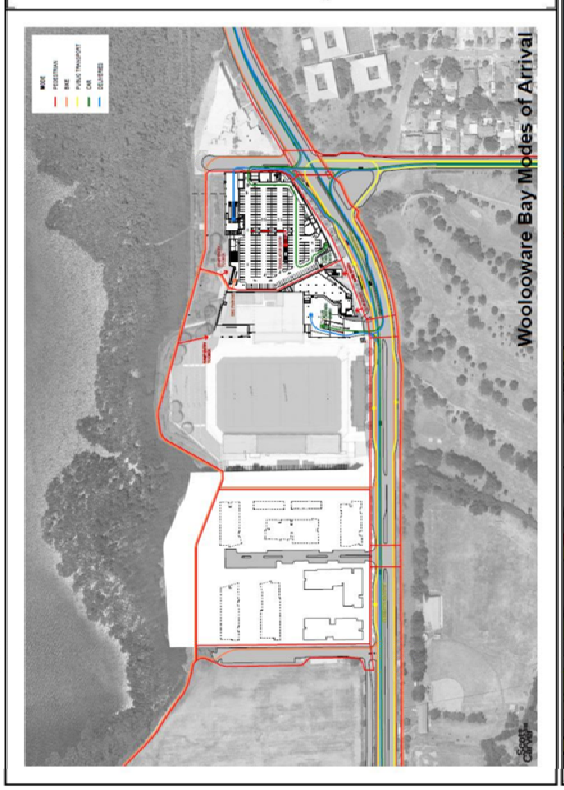
[Sharks Website]

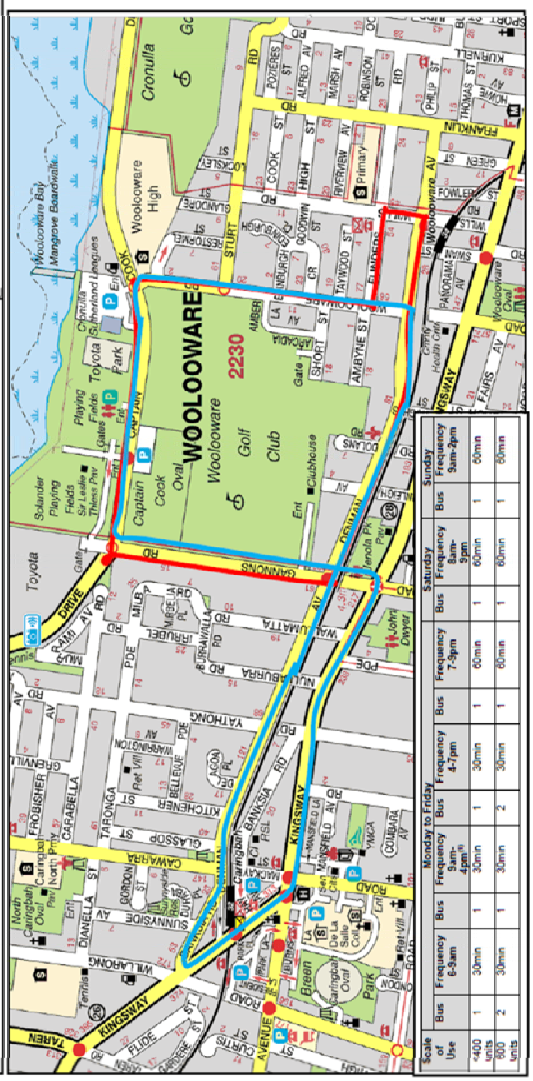
[Centre Management Phone Number]

[Centre email]

[http://www.131500.com.au/]

[Veolia Transport Website]





ANNEXURE D: TRAVEL ACCESS GUIDE

SHEET 3 OF 3