



**WOOLOOWARE BAY TOWN CENTRE
RESIDENTIAL PRECINCT GFA INCREASE
TRAFFIC IMPACT ASSESSMENT**

Captain Cook Drive, Woollooware

Report 2 - Final Issue B – 11th June 2015



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WOOLOOWARE BAY TOWN CENTRE
CAPTAIN COOK DRIVE, WOOLOOWARE
NSW 2230

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1 INTRODUCTION

This report supports a Section 75W Modification Application to the concept plan approval issued by the Planning Assessment Committee for the Woollooware Bay Town Centre (WBTC). The approval is sought for the revised development of the Western Precinct at WBTC in regards to Gross Floor Area, as described in the **Section 4** of this report.

One other S75 Modification Application is currently under assessment. This pertains to the parking rates for the residential precinct. This report will assume the approval of the other submission for purpose of consistency and any subsequent inconsistency would be due to proposed changes the development between submissions.

The concept approval proceeded a preferred project report including analysis in regards to traffic and parking from the “*Cronulla Sharks Redevelopment – Mixed Used Masterplan - Traffic Management and Accessibility Plan*” prepared by *McLaren Traffic Engineering* and dated May 2012.

1.1 Site Location

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



Western Precinct

FIGURE 1 - SITE CONTEXT (AERIAL PHOTO)



— Western Precinct

FIGURE 2 - SITE CONTEXT (MAP)

Woollooware Bay Town Centre (WBTC) is located on Captain Cook Drive, Woollooware and includes Cronulla Sharks Leagues Club, existing car park areas associated with the club, Sharks Stadium and associated grandstands, and training fields.

Opposite the site are Woollooware 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 Woollooware Road North is Woollooware 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.

1.2 State Environmental Planning Policy (Infrastructure) 2007 Requirements

The proposed development qualifies as a 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). A set of signals, bus stops and a bus service are the agreed approach to traffic management between the RMS and the applicant.

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Surrounding Road Network

Nearby roads are described in this section.

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 Woollooware High School during school zone times.

Woollooware 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

2.2 Traffic Management

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

- ❑ Roundabout at the intersection of Captain Cook Drive / Woollooware Road North / Car Park Access for Cronulla Sharks Club Building. This roundabout operates as a two lane circulating roundabout.
- ❑ Wombat crossing in Woollooware Road North immediately south of the new roundabout at the junction of Captain Cook Drive / Woollooware Road North.
- ❑ Bicycle lanes on both sides of Captain Cook Drive along the front of the property.
- ❑ 40km/h School Zones operate near Woollooware 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 developed in 1998 by *McLaren 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.

2.3 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 McLaren 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.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA 5.1)

<i>Intersection</i>	<i>Peak Hour</i>	<i>Degree of Saturation⁽¹⁾</i>	<i>Average Delay⁽²⁾ (sec/vehicle)</i>	<i>Level of Service⁽³⁾</i>	<i>Control Type</i>
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 / Woollooware 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, Giveaway 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.

*It is evident from **Table 1** 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."*

SIDRA INTERSECTION 6.1 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 6.1.

During the process of conversion between the software versions, a previous error was observed and corrected. The lane disciplines for the roundabout at Gannons Road/Captain Cook Drive have 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 increases capacity on this leg by

approximately 70%. The existing, approved and future performances of this roundabout will include this correction.

TABLE 2: EXISTING INTERSECTION PERFORMANCE AT SITE FRONTAGE

Intersection	Peak Hour	Degree of Saturation	Average Delay (s/veh)	Level of Service
Existing (SIDRA 5.1/6.1)				
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
Western Retail Signals	FRI PM	-	-	-
	SAT MID	-	-	-
Residential Signals	FRI PM	-	-	-
	SAT MID	-	-	-
Captain Cook Drive/Gannons Road	FRI PM	/0.70	/8.2	/A
	SAT MID	/0.67	/8.8	/A

2.4 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 PART 3A MASTERPLAN

The Planning Assessment Commission approved a Part 3A Concept Plan for the Woollooware 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 retail 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. The following section describes the western precinct comprising predominantly residential flat buildings with some portion of commercial/retail at the lower building levels.

3.1 Scale

The approved masterplan had the following development scale for the western precinct:

Gross Building Area
Residential Precinct - 104,419sqm

Gross Floor Area
Residential Precinct - 58,420sqm

3.2 Parking Volume and Allocation

The approved masterplan had the following parking volume and allocation:

1 Bedroom Apartment	- 1 space per apartment
2 Bedroom Apartment	- 1 space per apartment
3 Bedroom Apartment	- 2 spaces per apartment
Visitors	- 1 space per 5 dwellings
Commercial	- 1 space per 30sqm
Parking	- 883 spaces (maximum) excluding any on-street spaces within the newly created on-site streets

3.3 Traffic Volume and Impact

The concept approval was preceded by a traffic report which projected peak traffic volumes for the masterplan development of :

Western Precinct			
Residential	597 Units	0.29 trips per unit	173 trips
Commercial	740sqm	2 trips per 100sqm	15 trips
Total			188 trips

Entire Precinct	
Weekday PM	1432 trips
Weekend Noon	1305 trips

3.4 Public Transport

As part of the consent conditions imposed by the PAC, a shuttle bus service provided by the Cronulla Sharks Leagues Club will operate prior to issuing of an occupation certificate for the retail or residential components of the precinct.

4 PROPOSED DEVELOPMENT MODIFICATIONS

The proposed modifications to the concept approval are alteration of clause A3 (Maximum Gross Building Area/ Gross Floor Area) and the building envelopes. The building/floor area changes are quantified in **Table 3** and the envelope changes are listed below:

Adjustments to the maximum building envelopes, including:

- *Increase to the parapet and plant heights of Building B to allow for the provision of a rooftop communal open space and an apartment;*
- *Reduction in the height of the lower step on Building B, comprising a reduction of two levels from eight storeys to six storeys;*
- *Increase of the Building B envelope to the north to account for balconies;*
- *Merging of the Building C envelopes into a single continuous envelope;*
- *Increase to the height of Building C to account for skillion roofs; and*
- *Increase of the Building C envelope to the north, east, south and west.*

TABLE 3: PROPOSED CHANGE TO GBA/GFA FOR RESIDENTIAL PRECINCT

	Gross Building Area (sqm)	Gross Floor Area(sqm)
<i>Existing Approval for residential precinct</i>	104,419 of 155,410	58,420 of 84,915
<i>Proposed for residential precinct</i>	114,408 of 165,399	61,370 of 87,865
Nett change	+ 9989	+ 2950

While the parking demand consequentially is linearly increased according to new commercial and residential apartment quantum, it is assumed for the purpose of this report additional parking would be provided substantially in accordance with the concept plan approval as amended.

The traffic generation of the site will increase as a result of the proposed modification. While it can be simply said that a minor increase in residential units having the full benefit of a dedicated set of traffic signals will have little to no impact on the surrounding road network, a cumulative traffic impact assessment will nonetheless be required considering the sensitivity of the site's traffic impact at the concept plan approval stage.

5 PARKING ASSESSMENT

As part of the S75 Submission to modify the residential precinct parking rates, a full parking assessment has been completed. The assessment determined that shared availability of visitor spaces would improve the efficiency of the site. Parking for the approved scale and parking rates would be 810 spaces while the modified parking rates and proposed GFA would be 862 parking spaces. The total of 862 parking spaces consists of 734 tenant/staff spaces and a minimum of 128 visitor parking spaces.

5.1 Parking Compliance

The concept approval did not specify any requirements for parking design compliance contrary to the design principles of AS2890.1, AS2890.2, AS2890.6 and AS4299 where applicable. Deviation from these standards is not proposed. Refinement of the user class allocation of spaces will impose minimum space widths being 2.4m for staff or residential tenant (Class 1A), 2.5m for any visitor space (Class 2) and 3.5m for any loading bay (Class 2 + 1.0m Loading Clearance).

A 'best practice' design principle is recommended for the CCC such that the minimum number of CCC parent spaces (50% or 0.5 per 4 children) will be provided proximal to the CCC pedestrian entrance and with a minimum 1.0m unobstructed pedestrian path to the entrance from every parent space. This design initiative is based on the objective specified for CCC parking in the 'Guide to traffic generating developments' where parking "*...must be provided in a convenient location, allowing safe movement of children to and from the centre.*"

5.2 Other Parking Considerations

The remaining parking consideration are assessed in sufficient detail in the parking report which accompanies the other S75W submission, including bicycle parking, disabled parking, entry control devices and servicing.

6 TRAFFIC ASSESSMENT

6.1 Traffic Generation

The concept approval was based on a preferred project report, and TMAP, which projected traffic generation of the residential precinct to be 188 trips in the peak weekday PM hour, though did not provide any controls regarding traffic generation. The previous rates of traffic generation from the TMAP will hence be used and any new land uses to be projected according to the RMS guide.

Traffic generation for the residential precinct is described in **Table 4** and **Table 5** below:

TABLE 4: TRAFFIC GENERATION RATES PER LAND USE

Land Use	Traffic Generation Friday 5-6PM (per hour)	Traffic Generation Saturday Midday (per hour)	Derived From
1 Bed Unit	0.29 trips per unit	25% of Friday PM (Previous TMAP)	RMS Guide to traffic generating Developments
2 Bed Unit	0.29 trips per unit	25% of Friday PM (Previous TMAP)	RMS Guide to traffic generating Developments
3 Bed Unit	0.29 trips per unit	25% of Friday PM (Previous TMAP)	RMS Guide to traffic generating Developments
Commercial	2 trips per 100sqm	2 trips per 100sqm	Office rate in RMS Guide to traffic generating Developments
CCC	0.7 trips per child	nil	RMS Guide to traffic generating Developments
Menshed Facility	1 trip per space	1 trip per space	Reasonable Estimation
Community Leisure Area	nil	nil	Ancillary Leisure

TABLE 5: RESIDENTIAL PRECINCT TRAFFIC GENERATION

Land Use	Traffic Generation Friday 5-6PM (Trips per hour)	Traffic Generation Saturday Midday (Trips per hour)
1 Bed Unit	51	13
2 Bed Unit	108	27
3 Bed Unit	24	6
Commercial	18	0
CCC	32	0
Menshed Facility	1	1
Community Leisure Area	0	0
TOTAL (Concept Approval)	188	43
TOTAL (Proposed)	234	47
Nett Change	+ 46 (24%)	+ 3 (7%)

The total traffic generation of the site is hence changing by a maximum of 234 - 188 = 46 trips in the peak as part of this submission. The total development traffic generation will be changing from the most recent approvals according to **Table 5** below.

For the cumulative traffic impact assessment the surrounding land uses and their traffic generation must be considered. This assessment will include the approved traffic generation rates and scales of the TMAP for the PPR for the retail/club precinct and the Kurnell subdivision projections. Retail precinct traffic generation is hence 1244/1393 for the Weekday/Weekend peak. Kurnell subdivision expansion traffic was required to be assessed as a total of 383 trips on Captain Cook Drive, with a 50/50 split for eastbound/westbound.

6.2 Traffic Assignment

The traffic assignment will remain the same as that which was adopted for the TMAP for the PPR, which was approved by the concept approval.

The following traffic assignment has been applied on the basis of the economic impact assessment and journey to work data:

- *West of Boulevard / Taren Pt Rd: 40% of residential, 6% of retail*
- *North of Boulevard / Taren Pt Rd: 40% of residential, 6% of retail*
- *West of Gannons Rd Roundabout: 80% of residential, 12% of retail*
- *South of Gannons Rd Roundabout (along Gannons Rd): 10% of residential, 16% of retail*
- *Between Gannons Rd Roundabout & New Res. Signals: 95% of residential, 28% of retail*
- *Between New Res. Signals & New Retail Signals: 10% of residential, 28% of retail*
- *Between New Retail Signals & Woollooware Rd / Capt Cook Drive: 10% of residential, 0% of retail*
- *East of Woollooware Rd / Capt Cook Drive: 44% of retail*
- *East of Elouera Roundabout (Kurnell): 18% of retail*
- *South of Elouera Roundabout: 26% of retail*
- *South along Woollooware Road: 10% of residential, 30% of retail*

6.3 Traffic Impact

The generated traffic trips have hence been assigned onto the surrounding road network for assessment of changes in intersection performance. As mentioned in **Section 2.3**, the intersections were previously assessed using an *SIDRA INTERSECTION 5.1* and that the latest set of analyses have been completed using the most recent version of the software, *SIDRA INTERSECTION 6.1*.

Further, during the process of conversion between the software versions, 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 increases capacity on this leg by approximately 70%. The existing, approved and future performances of this roundabout will include this correction, though this intersection will only be modelled using the latest software.

Detailed SIDRA outputs can be provided on request though have been left out of this report due to volume. A summary of existing, approved and proposed performances of the intersections is provided below in **Table 6**:

TABLE 6: INTERSECTION PERFORMANCE SUMMARY

Intersection	Peak Hour	Degree of Saturation	Average Delay (s/veh)	Level of Service
Existing (SIDRA 5.1/6.1)				
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
Western Retail Signals	FRI PM	-	-	-
	SAT MID	-	-	-
Residential Signals	FRI PM	-	-	-
	SAT MID	-	-	-
Captain Cook Drive/Gannons Road	FRI PM	--/0.70	--/8.2	--/A
	SAT MID	--/0.67	--/8.8	--/A
Concept Approval Scale + Kurnell Subdivision (SIDRA 5.1/6.1)				
Captain Cook Drive/Woolooware Road	FRI PM	0.78/0.80	16.1/14.0	B/A
	SAT MID	0.51/0.62	16.2/17.7	B/B
Western Retail Signals	FRI PM	0.84/0.84	9.4/8.7	A/A
	SAT MID	0.84/0.72	11.2/9.1	A/A
Residential Signals	FRI PM	0.75/0.75	2.5/1.5	A/A
	SAT MID	0.74/0.74	1.8/0.9	A/A
Captain Cook Drive/Gannons Road	FRI PM	--/0.98	--/27.5	--/B
	SAT MID	--/0.94	--/18.2	--/B
Proposed Scale + Kurnell Subdivision (SIDRA 6.1)				
Captain Cook Drive/Woolooware Road	FRI PM	0.76	17.3	B
	SAT MID	0.74	23.7	B
Western Retail Signals	FRI PM	0.70	11.0	A
	SAT MID	0.69	10.8	A
Residential Signals	FRI PM	0.58	4.2	A
	SAT MID	0.41	2.5	A
Captain Cook Drive/Gannons Road	FRI PM	0.98	19.7	B
	SAT MID	0.97	24.6	B

The traffic assessments previously determined that Gannons Road/Captain Cook Drive was the worst performing intersection and it was incorrectly assessed as well above capacity (generally above Degree of Saturation 1.1 to 1.2). It is apparent now that the intersection is performing well with Degree of Saturation 0.98 / 0.97 in the weekday / weekend peak hour.

It is important to note that 383 trips (27% of approved traffic and 26% of the proposed traffic) have been added equally as through movements on Captain Cook Drive to accommodate the residential subdivisions on the Kurnell Peninsula, despite these subdivisions not completing works to improve capacity along this segment of the transport corridor. Hence, a portion of any additional delay or reduction in capacity is not the responsibility of the subject submission and development.

The intersections do not approach capacity due to the proposed development scale nor do any of the intersections have average delays greater than 70 seconds, or level of service F. It is determined then that the development, given the elsewhere proposed changes in scale of the retail/club precinct, and the subject changes to the residential precinct, are fully supportable on traffic grounds. The cumulative impact assessment shows that some minor changes in delays will occur though the local road network will function similar to that previously approved and any changes in delay are certainly acceptable.

7 CONCLUSIONS

In summary, the proposed modifications to the Part3A concept approval of the Woollooware Bay Town Centre, to provide additional GBA/GFA and altered building envelopes, has been assessed in regards to parking and traffic.

The number of parking spaces will be provided according to the previous approval as amended.

The traffic generation of the residential precinct is only likely to change by a total of 46 additional trips based on the changed and slightly increased uses of the residential precinct. A cumulative traffic impact assessment has been completed and results in some minor increase to delays at relevant intersections though an acceptable level of service will be experienced. The traffic impact of the proposed modified development is therefore supported.

In view of the foregoing, the proposed modifications to the GBA/GFA and building envelopes of the residential precinct are fully supported in terms of traffic and parking.