BARKER RYAN STEWART

Northern Beaches Council

Traffic and Parking Impact Assessment Report

North Narrabeen Surf Life Saving Club

2 Malcolm Street, Narrabeen

28 September 2023

ENGINEERING
PLANNING
SURVEYING
CERTIFICATION
PROJECT MANAGEMENT

Project No.	230478
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Checked	AN
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1	Draft	31/07/2023	

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1 Introduction

Barker Ryan Stewart have been engaged by Northern Beaches Council to prepare a Traffic and Parking Impact Assessment in accordance with the requirements of Warringah Development Control Plan 2011 and the NSW Government's '*Guide to Traffic Generating Developments*' to accompany a Development Application for an upgrade of the existing North Narrabeen Surf Lifesaving Club (SLSC).

The purpose of this report is to assess and address traffic, access, car parking and pedestrian impacts generated by the proposed development. This can be briefly outlined as follows:

- The expected traffic generation to/from the proposed development.
- The impact of the proposed development on the road network.
- Intersection analysis based on traffic counts.
- Vehicle parking provisions.
- Provision for pedestrians.
- Availability of public transport.

This Traffic and Parking Impact Assessment Report concludes that the subject site is suitable for the proposed development in relation to traffic impact, car parking provision, vehicle and pedestrian access and safety considerations.

2 Existing Conditions

2.1 Site Location

The North Narrabeen SLSC site is located at 225-229 Ocean Street, Narrabeen and 2 Malcolm Street, North Narrabeen and comprises of the following lots:

- Lot 1, DP122234
- Lot 3 and Lot 6, Section 63 DP5748
- Lot A and B, DP 376822
- Lot 1, DP178553
- Lot 1-2, DP339162
- Lot 4, DP331508

The site has existing vehicular access from Malcolm Street.

It is surrounded by the beach in the north and east and low-density residential developments in the south and west. An aerial of the site location is shown in Figure 2.1.

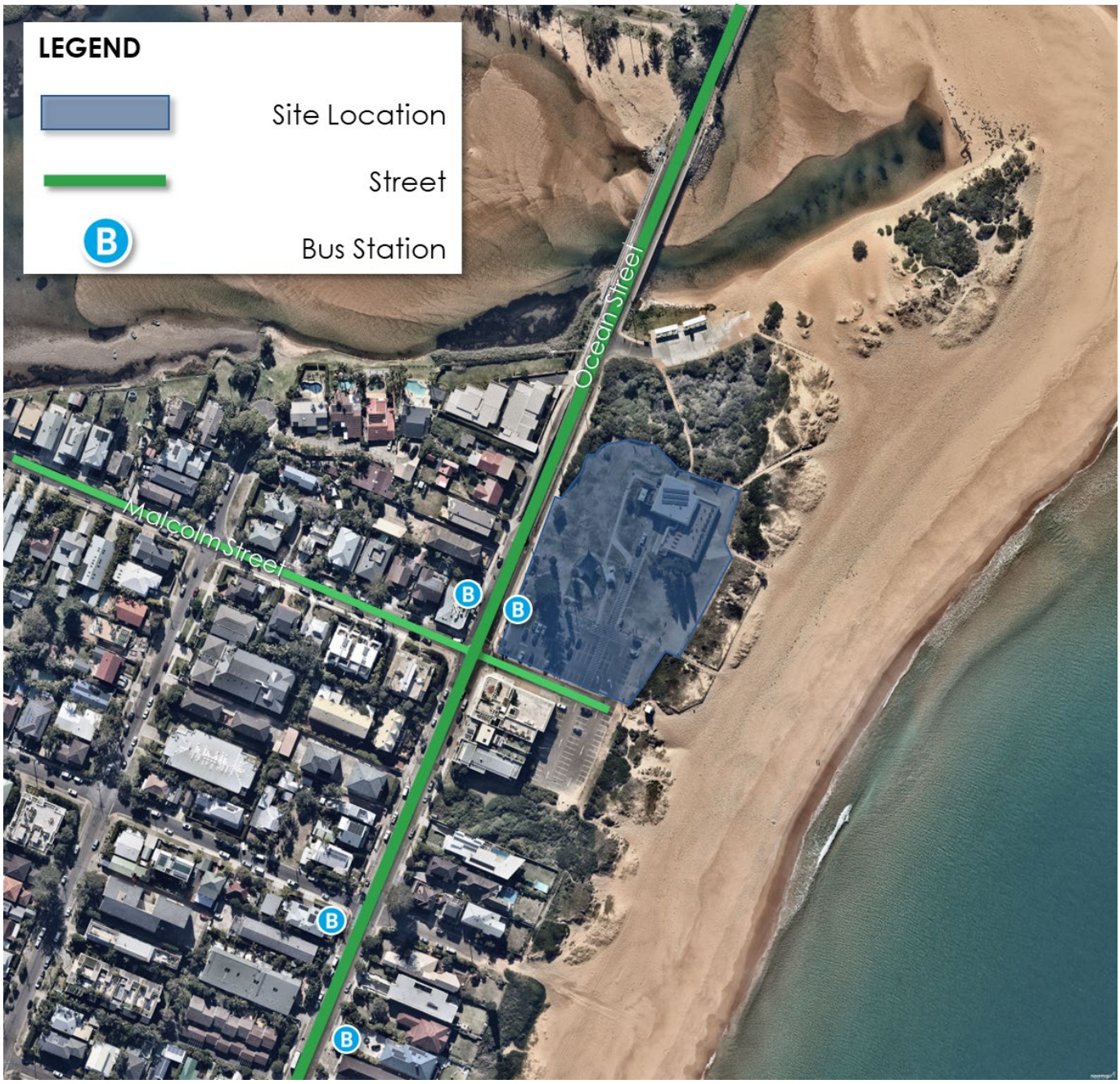


Figure 2.1: Site Location (Source: Nearmap, July 2023)

2.2 Existing Development

The existing development is the operational North Narrabeen SLSC. The existing development is described below:

- Club/ Gym (66.5m^2):
  - Open 6:30AM – 8:30PM daily
- Bar (19m^2):
  - Friday: Open 4:00PM – 9:00PM
  - Saturday: Open 3:00PM – 9:00PM
  - Sunday: Open 3:00PM – 9:00PM (off-peak), 11:00AM – 9:00PM (on-peak)
- Café (154m^2):
  - Open 6:30AM – 2:30PM

- Nippers (Children's Beach Program) (34.5m^2):
  - 8:45AM – 12:00PM
- Balcony Seats: 88 (70% occupancy during busiest period)
- Internal Seats: 54 (60% occupancy during busiest period, including café patrons)

There also exists some programs associated with Boardriders, a surfing association with events held in the premises.

Currently, there are 123 (approximately 8 unlined parallel) regular spaces and 4 accessible parking spaces with paid parking treatment. This is shown in Figure 2.2.

Figure 2.2: Car Park Aerial (Source: Nearmap, July 2023)

2.3 Existing Road Conditions

A schedule of the roads relevant to the site are outlined in Table 2.1.

Table 2.1: Schedule of Roads

Street Name	Classification	Direction	Speed Limit	No. of Lanes	Parking Permission
Ocean Street	Collector Road	N-S	50km/h	2	Not permitted
Malcolm Street	Local Road	E-W	50km/h	2	Permitted

2.3.1 2023 Classified Intersection Count

An intersection count had been commissioned and completed on Friday 21/07/2023 for the AM and PM peak at the intersection of Malcolm Street and Ocean Street.

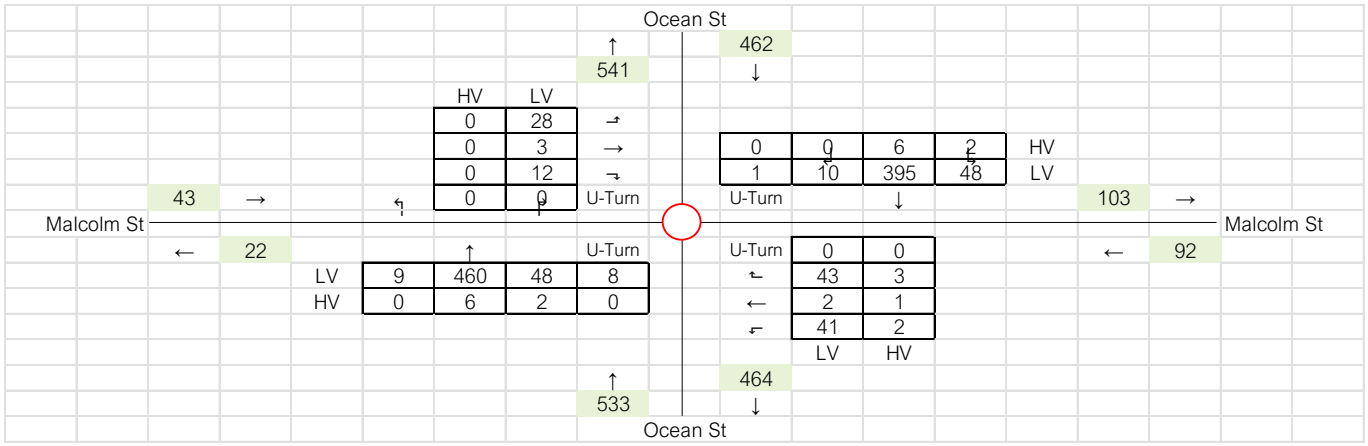


Figure 2.3: 2023 Surveyed Traffic Volumes (AM)

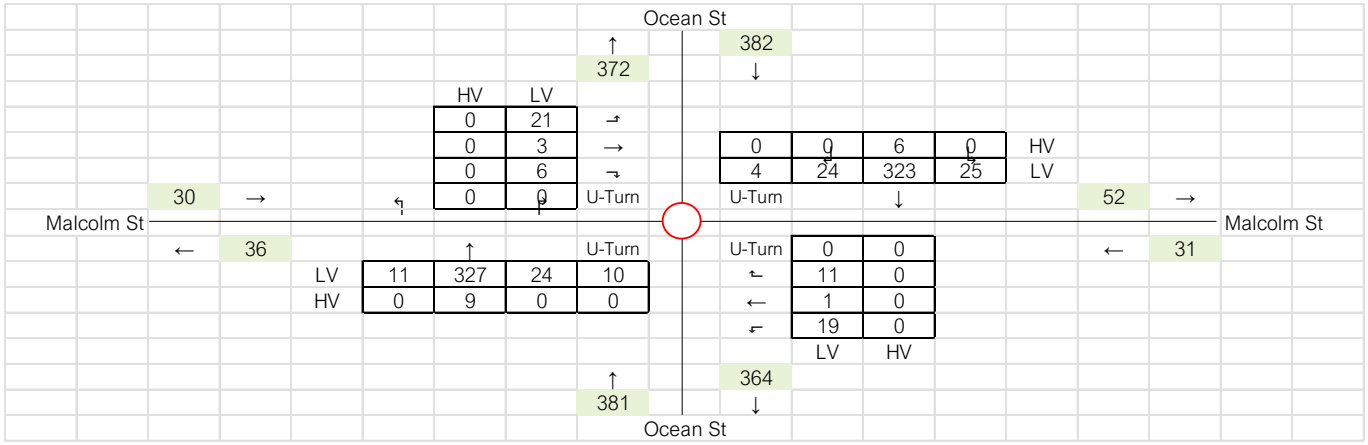


Figure 2.4: 2023 Surveyed Traffic Volumes (PM)

2.3.2 SIDRA Intersection 9.0 Existing Conditions Model

Intersection performance has been assessed using the SIDRA INTERSECTION 9.0 modeling software which uses the level of service (delay) model adopted by the Transport for NSW (TfNSW) in NSW to assess intersection performance. Average delay is used to determine the level of service (LOS) based on Table 2.2, sourced from the TfNSW's *'Guide to Traffic Generating Developments'* (GTGD) 2002.

Table 2.2: Level of Service Criteria for Intersections

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

The network results have been summarized in Table 2.3.

Table 2.3: 2023 Existing SIDRA Intersection Model

Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
AM	Ocean St/ Malcolm St	0.390	4.7	A	20.9
PM	Ocean St/ Malcolm St	0.272	4.4	A	11.6

The existing intersection operates very well with negligible delay.

2.4 Public Transport, Pedestrians and Cyclists

The area is serviced with bilateral bus stops outside the site's frontage. These stops service Route 155 – Bayview Garden Village to Narrabeen every 30 minutes.

2.5 Pedestrian and Active Transport

Footpaths are available on both sides of Ocean Street, and on the southern side of Malcolm Street.

Bicycle facilities are provided through the site. This is shown in Figure 2.5.

Figure 2.5: Bicycle Map (Source: Northern Beaches Council, July 2023)

3 Proposed Development

3.1 Development Description

The proposal includes the upgrade of the existing club and includes the expansion of ground and upper floor areas, namely:

- The addition of 44m^2 for board riders use
- The conversion of 151m^2 outdoor area for café/ dining

3.1.1 Parking and Access

The existing car parking will be retained as part of the development. This consists of 123 regular spaces and 4 accessible spaces.

A figure showing the proposed ground floor is shown in Figure 3.1 and Figure 3.2.

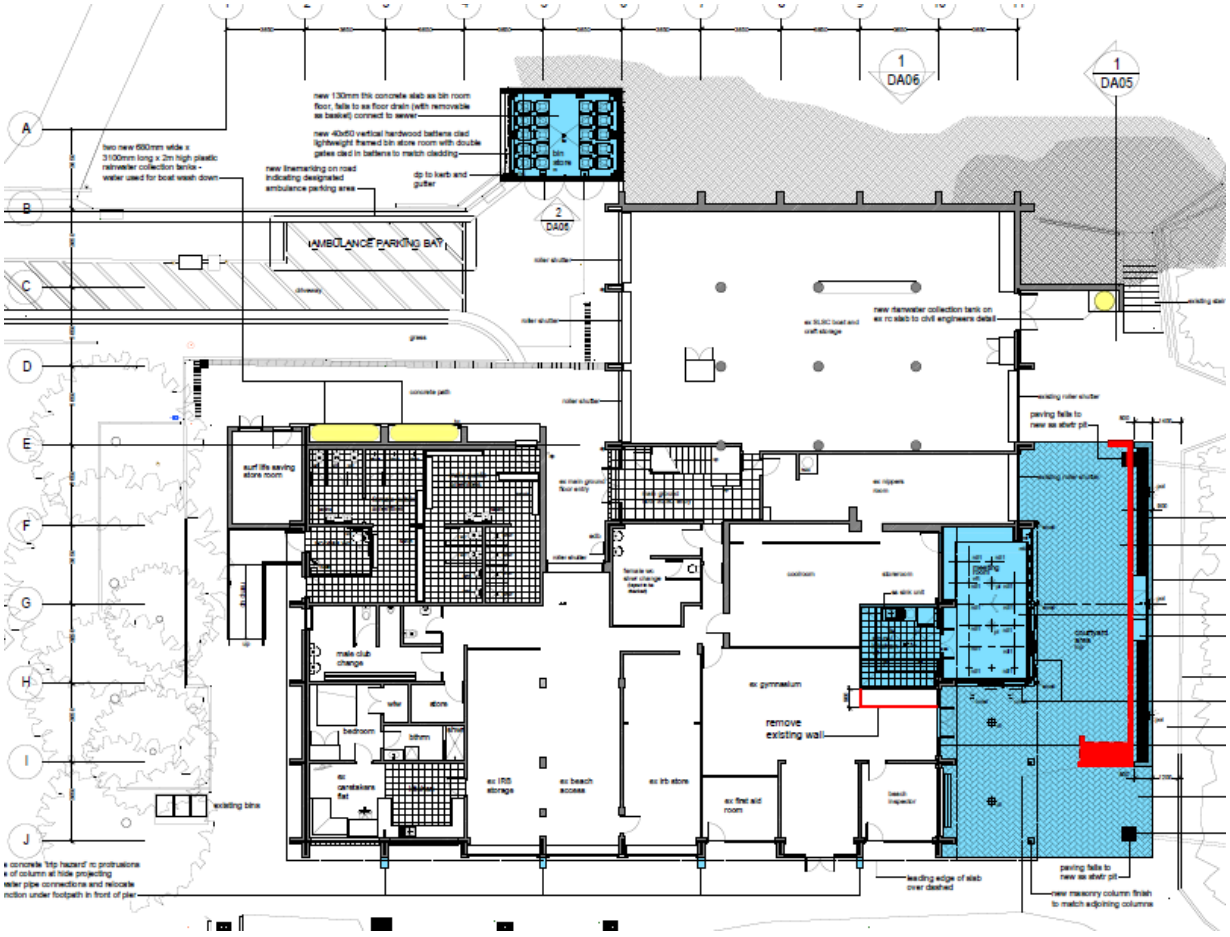


Figure 3.1: Proposed Ground Floor (Northern Beaches Council, September 2023)

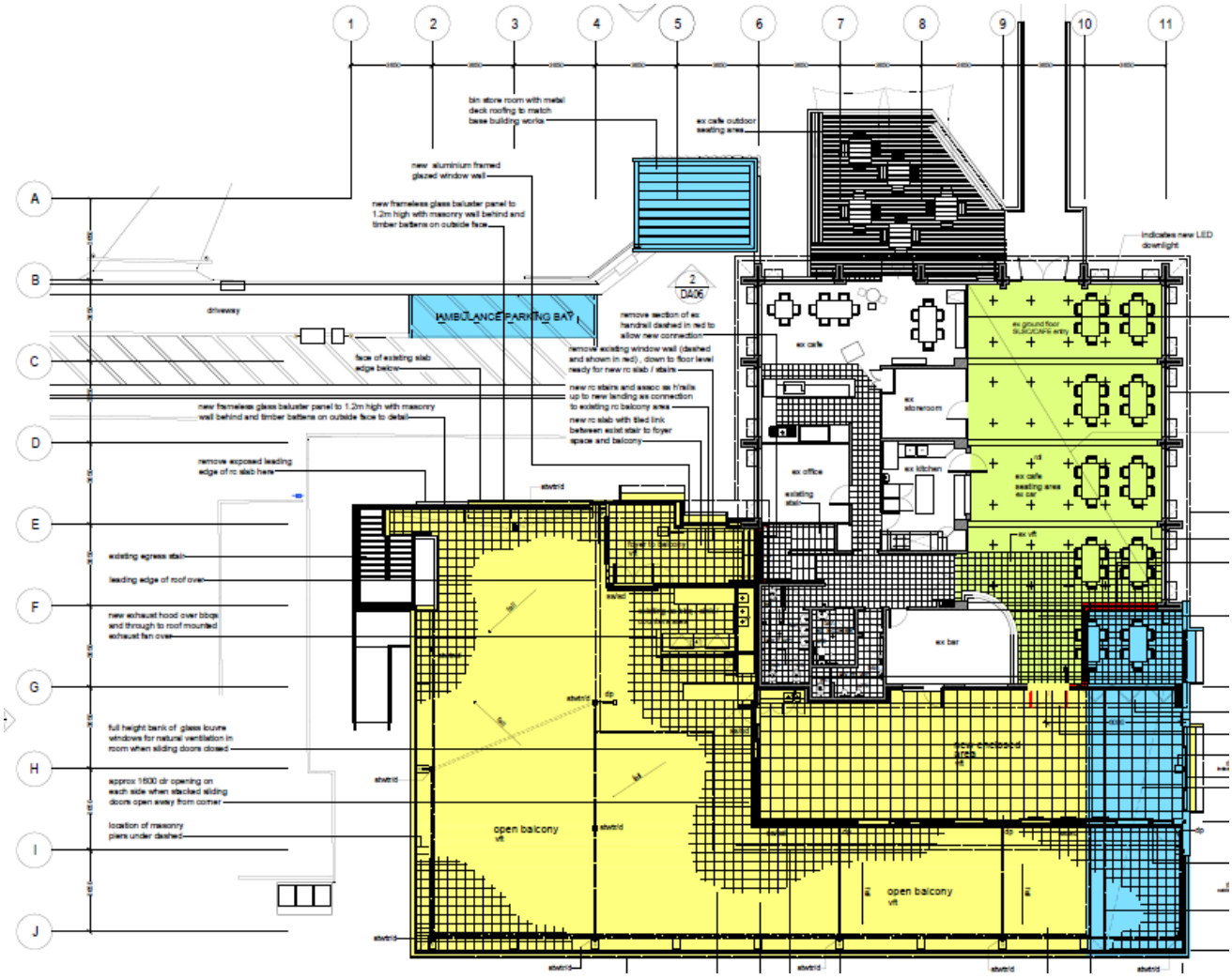


Figure 3.2: Proposed First Floor (Northern Beaches Council, September 2023)

3.1.2 Service Vehicles

The existing service vehicle arrangement will be retained for the site.

4 Car Parking Assessment

4.1 Parking Requirements

The proposed access and car parking provision has been assessed against the requirements of the Warringah DCP 2011. However, it is understood that the land's expected use will significantly deviate from rates outlined in the DCP due to external contexts and general behaviours.

4.1.1 Warringah DCP 2011

The Warringah DCP requires the following parking provisions:

- Gym: 4.5 spaces per 100m^2
- Bar & Café (considered 'Restaurant'): greater of 15 spaces per 100m^2 or 1 space per 3 seats
- Nippers (considered 'Childcare'): 1 space for every 4 children

No rates are provided for general lifeguard uses. The 'boardriders' use also does not have a direct correlative rate.

4.1.2 Site Context Discussion

The site generally services parking close to the beach front, and North Narrabeen beach will be the primary trip attractor during the surf/ beach season. This also correlates to the largest demand and is consistent with all water-front usages such as marinas and other beach-fronts. Additional land use for restaurants would not generate as much traffic as normal restaurants as the restaurant facilities often are ancillary to beach uses. Additionally, increases to the 'boardrider' space would generally generate traffic outside the time-of-day peak, as surfers generally surf early in the morning or late evening, and the peak demands for parking generally start around 10AM on weekends.

4.2 Parking Provision

It is proposed that the existing 123 spaces and 4 accessible spaces are sufficient for the development as the parking's peak demand generation is not the café, and the 'boardriders' club will operate outside of parking peak hours.

Therefore, the proposed development will not increase existing demand.

5 Traffic Assessment

5.1 Trip Generation

5.1.1 Existing Development

The existing development traffic has been captured in the traffic survey for the site dated 21/07/2023.

5.1.2 Proposed Development

As noted in Section 4, the primary trip generator/ attractor will continue to be North Narrabeen beach. Hence, it is expected that trip generation arising from expansion to the café and boardriders' areas will be significantly reduced. However, trip generation for the café has been calculated according to the TfNSW Guide to Traffic-Generating Developments (GTGD) 2002 and the boardriders' group has been assessed on first principles estimates.

The TfNSW GTGD 2002 rate for restaurants is as follows:

- 5 trips per 100m^2 GFA in the PM peak

Considering the opening times of the café, this trip generation has instead been allocated to the AM peak, and the PM would generate no trips. Hence some 8 trips would be added as part of the café development.

As an estimate of the boardriders' usage, 5 trips would be added as part of both AM and PM peak.

Hence the development is conservatively estimated to generate:

- 13 trips in the AM peak and
- 5 trips in the PM peak

5.1.3 Directional Distribution

It has been estimated that 50% of trips will be in, and 50% of trips will be out, and that 50% would be coming from/ heading to the north, and 50% would be coming from/ heading to the south, which is generally in accordance with surveyed behaviours. These distributions are shown in Figure 5.1 and Figure 5.2

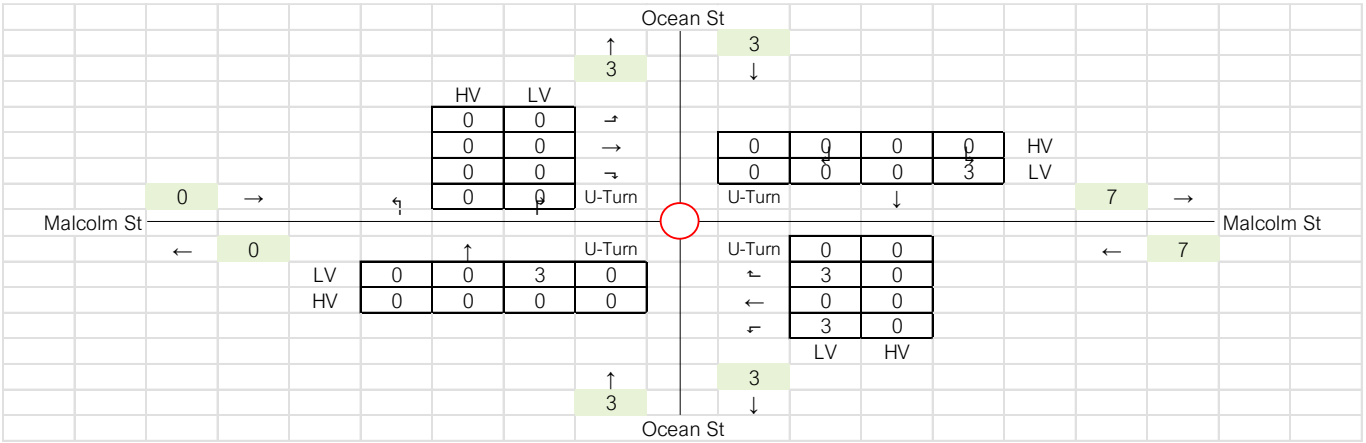


Figure 5.1: Directional Distribution (AM)

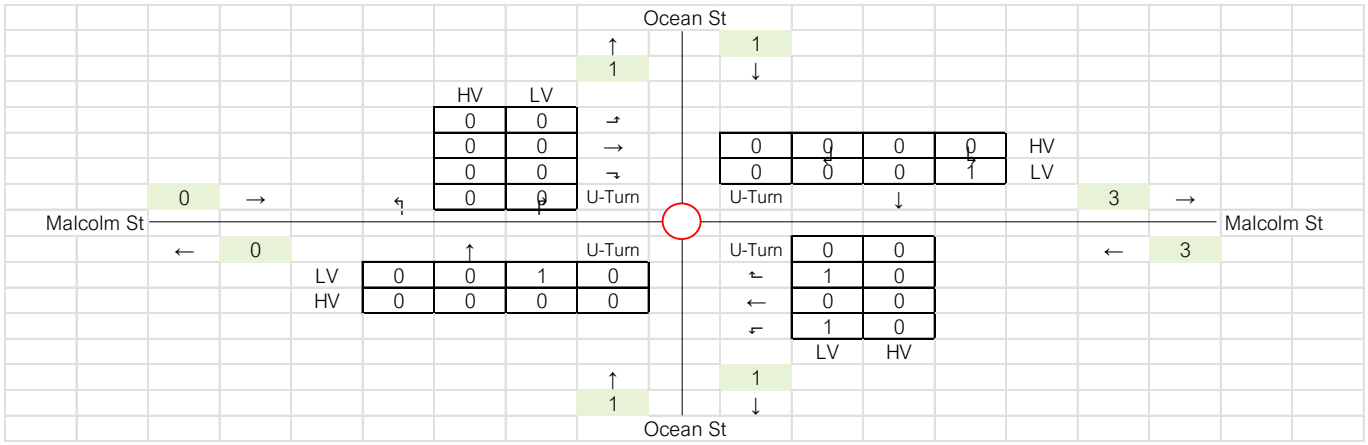


Figure 5.2: Directional Distribution (PM)

5.2 2023 Development SIDRA Intersection Modelling

Base modelling has been shown in Section 2.3.2 SIDRA modelling for the development has been shown in Table 5.1.

Table 5.1: 2023 Development SIDRA Intersection Model

Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
AM	Ocean St/ Malcolm St	0.394	4.8	A	21.2
PM	Ocean St/ Malcolm St	0.273	4.4	A	11.7

It can be observed that the development will continue to operate very well post-development.

5.3 2033 Base Year and Development SIDRA Intersection Modelling

The existing surveyed volumes have been projected for 2033, with an assumed 1.7% pa. growth. This is shown in Figure 5.3 and Figure 5.4.

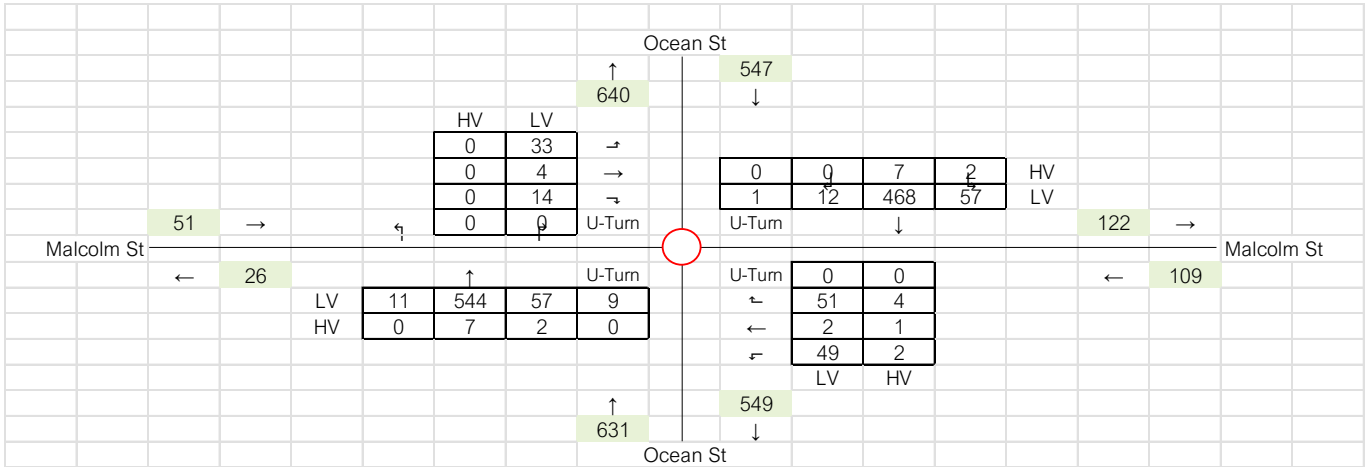


Figure 5.3: 2033 Base Traffic Volumes (AM)

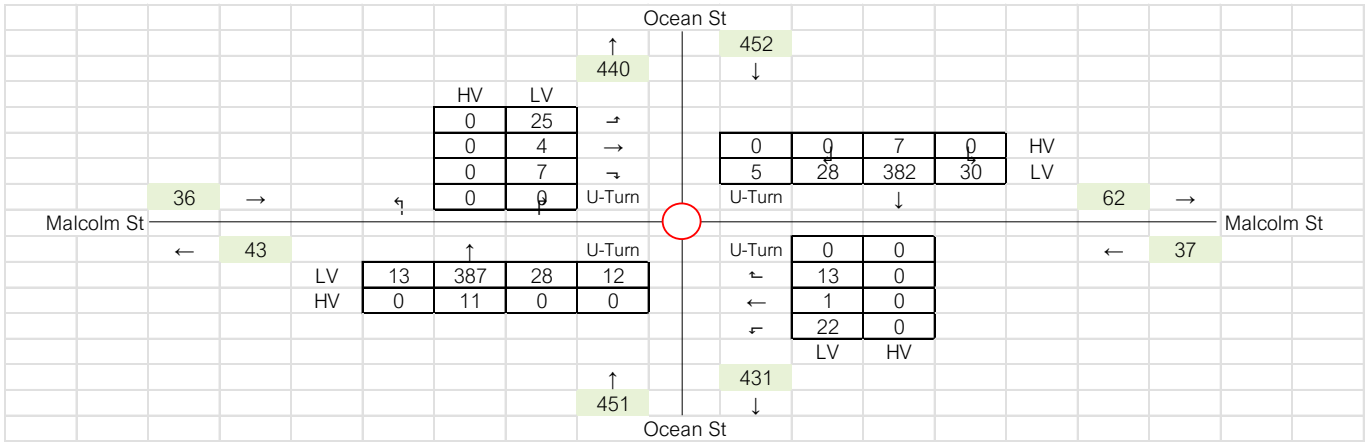


Figure 5.4: 2033 Base Traffic Volumes (PM)

Accordingly, the base and development SIDRA models are shown in Table 5.2.

Table 5.2: 2033 Existing and Development SIDRA Intersection Model

Scenario	Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
Base	AM	Ocean St/ Malcolm St	0.467	4.9	A	27.8
	PM	Ocean St/ Malcolm St	0.324	4.5	A	14.7
Development	AM	Ocean St/ Malcolm St	0.471	5.0	A	28.2
	PM	Ocean St/ Malcolm St	0325	4.5	A	14.9

The intersection is expected to continue to perform well in the future scenario, and the development does not significantly increase traffic.

6 Conclusion/Recommendations

This Traffic and Parking Impact Assessment has been prepared in accordance with the requirements of Warringah DCP 2011 and the NSW Government's 'Guide to Traffic Generating Developments' to accompany a Development Application for alterations and additions to the North Narrabeen SLSC.

The proposal includes alterations and additions to the existing café and boardriders club facilities to the order of some 151m^2 and 44m^2 respectively.

It is proposed that the existing 123 regular and 4 accessible spaces on-site will be retained. Due to the nature of the specific development, it is understood that small increases in the land size will not significantly impact parking demand, and the provided parking primarily services the North Narrabeen beach.

The proposed additional facilities are not expected to generate significant parking demand, as the primary trip generator for the stie will be the North Narrabeen beach, particularly during the peak season. Conservatively, this assessment has assumed a generation of 13 trips in the AM peak and 5 trips in the PM peak. The estimated generation will not significantly affect the intersection of Ocean Street and Malcolm Street, which operates without significant delay in both the AM and PM peak.

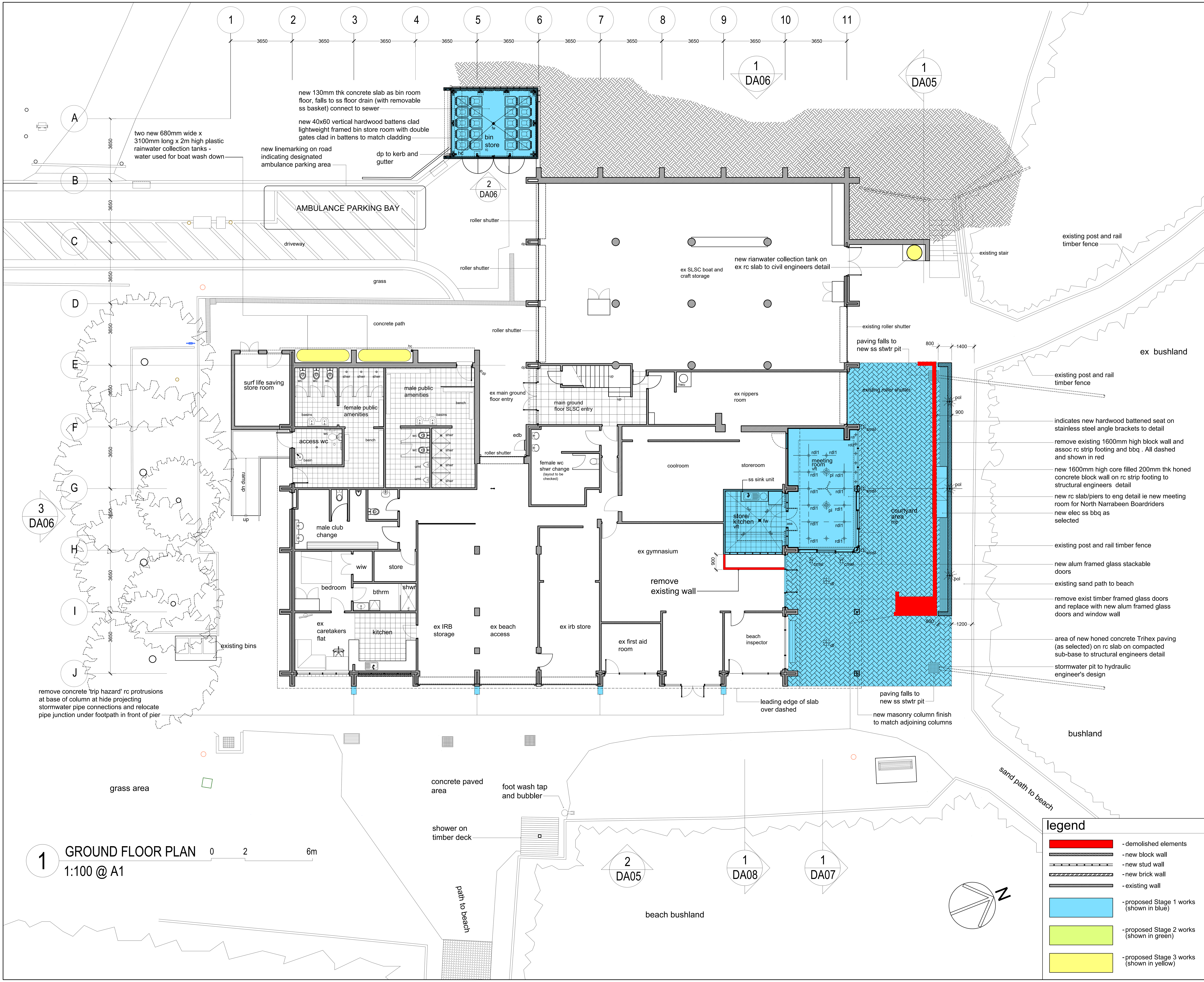
The Traffic and Parking Impact Assessment concludes that the subject site is suitable for the proposed development in relation to the impact of traffic, car parking provision, vehicle and pedestrian access and safety considerations.

7 References

Roads and Maritime Services, *'Guide to Traffic Generating Developments'* Version 2.2 dated October 2002.

Warringah DCP 2011

Attachment A - Site Plan



1 2 3 4 5 6 7 8 9 10 11
3650 3650 3650 3650 3650 3650 3650 3650 3650 3650
A B C D E F G H I J
1 DA06
1 DA05
2 DA06
3 DA06
new 130mm thk concrete slab as bin room floor, falls to ss floor drain (with removable ss basket) connect to sewer
new 40x60 vertical hardwood battens clad lightweight framed bin store room with double gates clad in battens to match cladding
bin store
two new 680mm wide x 3100mm long x 2m high plastic rainwater collection tanks - water used for boat wash down
new linemarking on road indicating designated ambulance parking area
dp to kerb and gutter
AMBULANCE PARKING BAY
driveway
grass
roller shutter
ex SLSC boat and craft storage
new rianwater collection tank on ex rc slab to civil engineers detail
existing stair
existing post and rail timber fence
concrete path
existing roller shutter
paving falls to new ss stwtr pit
800
1400
ex bushland
surf life saving store room
male public amenities
female public amenities
access wc
ex main ground floor entry
main ground floor SLSC entry
ex nippers room
existing post and rail timber fence
indicates new hardwood battened seat on stainless steel angle brackets to detail
remove existing 1600mm high block wall and assoc rc strip footing and bbq . All dashed and shown in red
new 1600mm high core filled 200mm thk honed concrete block wall on rc strip footing to structural engineers detail
new rc slab/piers to eng detail ie new meeting room for North Narrabeen Boardriders
new elec ss bbq as selected
existing post and rail timber fence
new alum framed glass stackable doors
existing sand path to beach
remove exist timber framed glass doors and replace with new alum framed glass doors and window wall
area of new honed concrete Trihex paving (as selected) on rc slab on compacted sub-base to structural engineers detail
stormwater pit to hydraulic engineer's design
ramp up
female wc shwr change
coolroom
storeroom
ss sink unit
meeting room
store/ kitchen
courtyard area
male club change
ex gymnasium
remove existing wall
900
wiw
store
bedroom
bthrm
shwr
ex caretakers flat
kitchen
ex IRB storage
ex beach access
ex irb store
ex first aid room
beach inspector
existing bins
remove concrete 'trip hazard' rc protrusions at base of column at hide projecting stormwater pipe connections and relocate pipe junction under footpath in front of pier
leading edge of slab over dashed
paving falls to new ss stwtr pit
new masonry column finish to match adjoining columns
bushland
grass area
concrete paved area
foot wash tap and bubbler
shower on timber deck
sand path to beach
path to beach
beach bushland
2 DA05
1 DA08
1 DA07
1 GROUND FLOOR PLAN
1:100 @ A1
0 2 6m
N

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23

northern beaches council

legend

- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
ground floor plan

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Dwg no: DA02/1
Scale: A.S.
Checked: BK
Issue no: C
Drawn by: MB

1 DA06

bin store room with metal deck roofing to match base building works

ex cafe outdoor seating area

new aluminium framed glazed window wall

new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face

indicates new LED downlight

2 DA06

driveway

AMBULANCE PARKING BAY

remove section of ex handrail dashed in red to allow new connection

remove existing window wall (dashed and shown in red) , down to floor level ready for new rc slab / stairs

face of existing slab edge below

new rc stairs and assoc ss h'rails up to new landing as connection to existing rc balcony area

new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face to detail

new rc slab with tiled link between exist stair to foyer space and balcony

remove exposed leading edge of rc slab here

existing egress stair

leading edge of roof over

new exhaust hood over bbqs and through to roof mounted exhaust fan over

3 DA06

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

approx 1600 clr opening on each side when stacked sliding doors open away from corner

location of masonry piers under dashed

remove sloped cfcbrd fascia panel and tubular substandard metal balustrade and replace with new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face to detail (incorporate LED lighting into balustrade to detail)

remove existing topping slab and tiling to entire existing outdoor and proposed enclosed balcony area and install new topping slab and tiling fall to floor drains

ex cafe

ex storeroom

ex office

existing stair

ex kitchen

ex ground floor SLSC/CAFE entry

rdl

ex cafe seating area ex car

ex vft

ex bar

ex access wc

ex f.wc

ex m wc

foyer to balcony vft

ss/sd

existing ss bbq / sink / counters area

new enclosed area vft

open balcony vft

open balcony vft

stwtr/d

dp

fall

up

wc

bsn

urnl

remove existing wall shown in red

existing window wall

new lighting and set plasterboard ceiling lining in this area

leading edge of cladding to roof spandrel over dashed

structural beams over dashed to be clad plastrbrd and paint

remove wall elements dashed shown in red

new single bank of louvre glass window for ventilation when concertinad bifold door closed

1 DA05

glased aluminium framed swing door and new pivot concertina doors stack to north end wall face where shown

remove existing alum framed glass doors dashed in red and replace with bank of adj glass louvre window

location of new masonry column under

new aluminium framed window wall

new rc slab floor area with vft over as selected

850mm clr alum framed glazed door for quick access to balcony when sliding doors closed

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

remove existing brick wall,splayed cfcmbrd fascia panel and aluminium framed glazed balustrade dashed

ss slot drain in front of new aluminium framed glass stacked sliding doors

indicates location of masonry piers under dashed

leading edge of roof over

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

3650 6000 18900

1 UPPER FLOOR PLAN
1:100 @ A1
0 2 6m

2 DA05

1 DA08

1 DA07

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
upper floor plan

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA03/1
Issue no: C

legend

- demolished elements
- existing walls
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

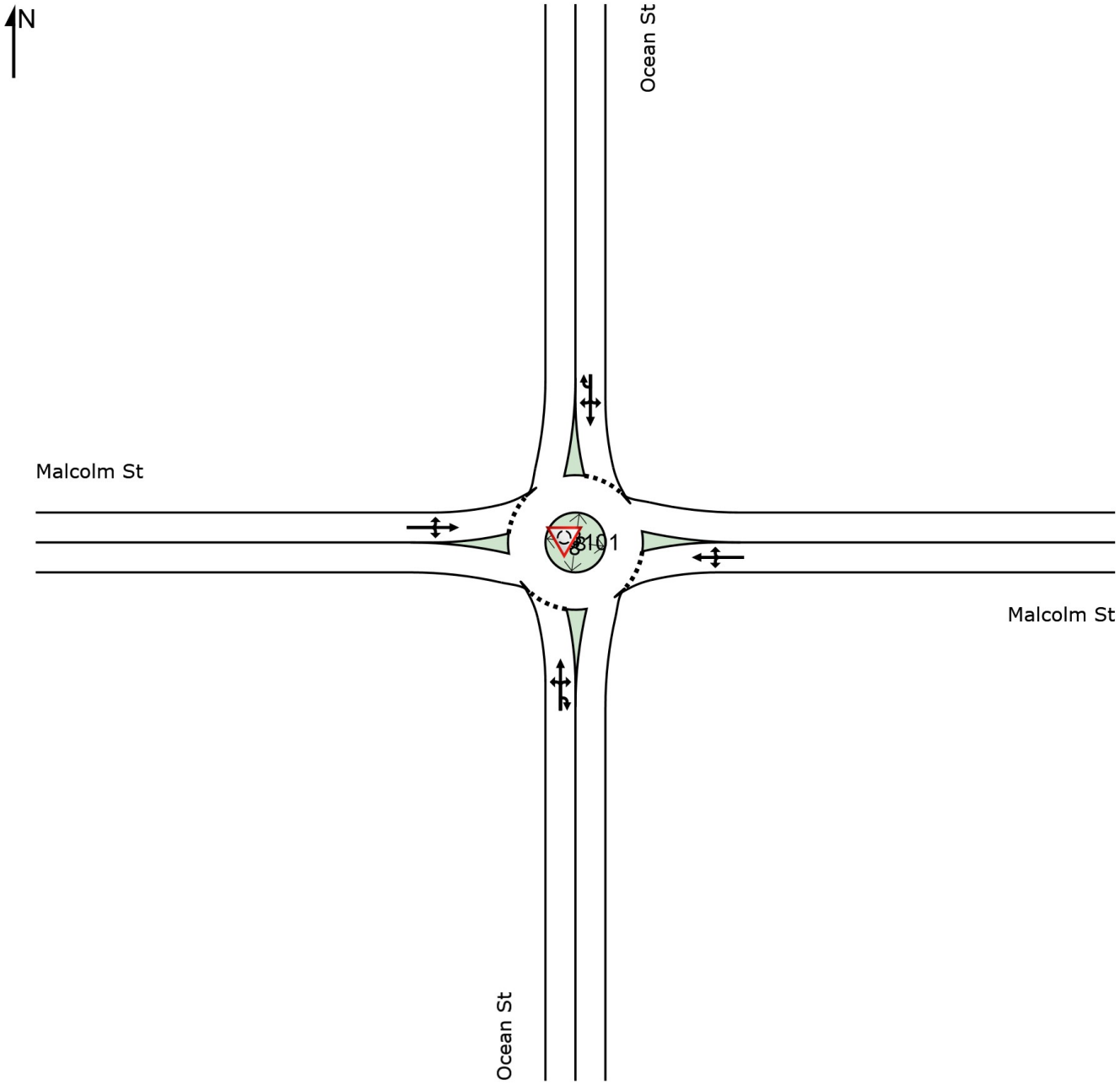
Appendix B – SIDRA Layout and Assessment

SITE LAYOUT

Site: 101 [1. 2023 AM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



USER REPORT FOR SITE

All Movement Classes

Project: 230478_SIDRA **Template: Summary**

Site: 101 [1. 2023 AM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	9	0	9	0.0	0.390	4.2	LOS A	2.9	20.9	0.28	0.45	0.28	44.1
2	T1	466	6	491	1.3	0.390	4.1	LOS A	2.9	20.9	0.28	0.45	0.28	46.8
3	R2	50	2	53	4.0	0.390	7.2	LOS A	2.9	20.9	0.28	0.45	0.28	29.2
3u	U	8	0	8	0.0	0.390	9.9	LOS A	2.9	20.9	0.28	0.45	0.28	50.1
Approach		533	8	561	1.5	0.390	4.5	LOS A	2.9	20.9	0.28	0.45	0.28	45.3
East: Malcolm St														
4	L2	43	2	45	4.7	0.106	5.9	LOS A	0.6	4.2	0.56	0.67	0.56	41.4
5	T1	3	1	3	33.3	0.106	6.4	LOS A	0.6	4.2	0.56	0.67	0.56	30.5
6	R2	46	3	48	6.5	0.106	9.0	LOS A	0.6	4.2	0.56	0.67	0.56	42.2
Approach		92	6	97	6.5	0.106	7.5	LOS A	0.6	4.2	0.56	0.67	0.56	41.6
North: Ocean St														
7	L2	50	2	53	4.0	0.346	4.3	LOS A	2.3	16.3	0.28	0.45	0.28	28.3
8	T1	401	6	422	1.5	0.346	4.1	LOS A	2.3	16.3	0.28	0.45	0.28	46.9
9	R2	10	0	11	0.0	0.346	7.2	LOS A	2.3	16.3	0.28	0.45	0.28	45.0
9u	U	1	0	1	0.0	0.346	9.9	LOS A	2.3	16.3	0.28	0.45	0.28	50.2
Approach		462	8	486	1.7	0.346	4.2	LOS A	2.3	16.3	0.28	0.45	0.28	45.0
West: Malcolm St														
10	L2	28	0	29	0.0	0.053	7.0	LOS A	0.3	2.0	0.62	0.66	0.62	42.0
11	T1	3	0	3	0.0	0.053	6.8	LOS A	0.3	2.0	0.62	0.66	0.62	13.8
12	R2	12	0	13	0.0	0.053	9.9	LOS A	0.3	2.0	0.62	0.66	0.62	42.7
Approach		43	0	45	0.0	0.053	7.8	LOS A	0.3	2.0	0.62	0.66	0.62	40.3
All Vehicles		1130	22	1189	1.9	0.390	4.7	LOS A	2.9	20.9	0.31	0.48	0.31	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [1. 2023 PM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	11	0	12	0.0	0.271	4.0	LOS A	1.6	11.6	0.17	0.44	0.17	44.5
2	T1	336	9	354	2.7	0.271	3.9	LOS A	1.6	11.6	0.17	0.44	0.17	47.1
3	R2	24	0	25	0.0	0.271	7.0	LOS A	1.6	11.6	0.17	0.44	0.17	29.5
3u	U	10	0	11	0.0	0.271	9.7	LOS A	1.6	11.6	0.17	0.44	0.17	50.5
Approach		381	9	401	2.4	0.271	4.3	LOS A	1.6	11.6	0.17	0.44	0.17	46.1
East: Malcolm St														
4	L2	19	0	20	0.0	0.032	5.3	LOS A	0.2	1.1	0.48	0.59	0.48	42.4
5	T1	1	0	1	0.0	0.032	5.2	LOS A	0.2	1.1	0.48	0.59	0.48	35.3
6	R2	11	0	12	0.0	0.032	8.3	LOS A	0.2	1.1	0.48	0.59	0.48	43.2
Approach		31	0	33	0.0	0.032	6.4	LOS A	0.2	1.1	0.48	0.59	0.48	42.6
North: Ocean St														
7	L2	25	0	26	0.0	0.272	4.0	LOS A	1.6	11.6	0.18	0.44	0.18	28.5
8	T1	329	6	346	1.8	0.272	3.9	LOS A	1.6	11.6	0.18	0.44	0.18	47.1
9	R2	24	0	25	0.0	0.272	7.0	LOS A	1.6	11.6	0.18	0.44	0.18	45.3
9u	U	4	0	4	0.0	0.272	9.7	LOS A	1.6	11.6	0.18	0.44	0.18	50.5
Approach		382	6	402	1.6	0.272	4.2	LOS A	1.6	11.6	0.18	0.44	0.18	45.9
West: Malcolm St														
10	L2	21	0	22	0.0	0.031	5.7	LOS A	0.2	1.1	0.49	0.58	0.49	43.1
11	T1	3	0	3	0.0	0.031	5.6	LOS A	0.2	1.1	0.49	0.58	0.49	14.1
12	R2	6	0	6	0.0	0.031	8.7	LOS A	0.2	1.1	0.49	0.58	0.49	43.9
Approach		30	0	32	0.0	0.031	6.3	LOS A	0.2	1.1	0.49	0.58	0.49	40.5
All Vehicles		824	15	867	1.8	0.272	4.4	LOS A	1.6	11.6	0.20	0.45	0.20	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [1. 2033 AM Ex Ocean/ Malcolm (Site Folder: 2033 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	11	0	12	0.0	0.467	4.3	LOS A	3.9	27.8	0.34	0.46	0.34	43.8
2	T1	551	7	580	1.3	0.467	4.2	LOS A	3.9	27.8	0.34	0.46	0.34	46.6
3	R2	59	2	62	3.4	0.467	7.3	LOS A	3.9	27.8	0.34	0.46	0.34	29.1
3u	U	9	0	9	0.0	0.467	10.0	LOS A	3.9	27.8	0.34	0.46	0.34	49.9
Approach		630	9	663	1.4	0.467	4.6	LOS A	3.9	27.8	0.34	0.46	0.34	45.1
East: Malcolm St														
4	L2	51	2	54	3.9	0.135	6.5	LOS A	0.8	5.6	0.62	0.71	0.62	40.9
5	T1	3	1	3	33.3	0.135	7.1	LOS A	0.8	5.6	0.62	0.71	0.62	29.7
6	R2	55	4	58	7.3	0.135	9.6	LOS A	0.8	5.6	0.62	0.71	0.62	41.6
Approach		109	7	115	6.4	0.135	8.1	LOS A	0.8	5.6	0.62	0.71	0.62	41.1
North: Ocean St														
7	L2	59	2	62	3.4	0.415	4.4	LOS A	3.0	21.5	0.33	0.46	0.33	28.2
8	T1	475	7	500	1.5	0.415	4.3	LOS A	3.0	21.5	0.33	0.46	0.33	46.7
9	R2	12	0	13	0.0	0.415	7.3	LOS A	3.0	21.5	0.33	0.46	0.33	44.8
9u	U	1	0	1	0.0	0.415	10.1	LOS A	3.0	21.5	0.33	0.46	0.33	50.1
Approach		547	9	576	1.6	0.415	4.4	LOS A	3.0	21.5	0.33	0.46	0.33	44.8
West: Malcolm St														
10	L2	33	0	35	0.0	0.070	7.9	LOS A	0.4	2.9	0.69	0.71	0.69	41.3
11	T1	4	0	4	0.0	0.070	7.8	LOS A	0.4	2.9	0.69	0.71	0.69	13.6
12	R2	14	0	15	0.0	0.070	10.9	LOS A	0.4	2.9	0.69	0.71	0.69	42.0
Approach		51	0	54	0.0	0.070	8.7	LOS A	0.4	2.9	0.69	0.71	0.69	39.4
All Vehicles		1337	25	1407	1.9	0.467	4.9	LOS A	3.9	27.8	0.37	0.49	0.37	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [1. 2033 PM Ex Ocean/ Malcolm (Site Folder: 2033 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	13	0	14	0.0	0.323	4.1	LOS A	2.1	14.7	0.20	0.44	0.20	44.4
2	T1	398	11	419	2.8	0.323	4.0	LOS A	2.1	14.7	0.20	0.44	0.20	47.0
3	R2	28	0	29	0.0	0.323	7.0	LOS A	2.1	14.7	0.20	0.44	0.20	29.5
3u	U	12	0	13	0.0	0.323	9.7	LOS A	2.1	14.7	0.20	0.44	0.20	50.4
Approach		451	11	475	2.4	0.323	4.3	LOS A	2.1	14.7	0.20	0.44	0.20	46.1
East: Malcolm St														
4	L2	22	0	23	0.0	0.039	5.7	LOS A	0.2	1.4	0.53	0.62	0.53	42.0
5	T1	1	0	1	0.0	0.039	5.6	LOS A	0.2	1.4	0.53	0.62	0.53	34.6
6	R2	13	0	14	0.0	0.039	8.7	LOS A	0.2	1.4	0.53	0.62	0.53	42.9
Approach		36	0	38	0.0	0.039	6.8	LOS A	0.2	1.4	0.53	0.62	0.53	42.2
North: Ocean St														
7	L2	30	0	32	0.0	0.324	4.1	LOS A	2.1	14.7	0.21	0.44	0.21	28.4
8	T1	388	6	408	1.5	0.324	4.0	LOS A	2.1	14.7	0.21	0.44	0.21	47.0
9	R2	28	0	29	0.0	0.324	7.1	LOS A	2.1	14.7	0.21	0.44	0.21	45.2
9u	U	5	0	5	0.0	0.324	9.8	LOS A	2.1	14.7	0.21	0.44	0.21	50.4
Approach		451	6	475	1.3	0.324	4.2	LOS A	2.1	14.7	0.21	0.44	0.21	45.8
West: Malcolm St														
10	L2	25	0	26	0.0	0.040	6.1	LOS A	0.2	1.5	0.54	0.61	0.54	42.8
11	T1	4	0	4	0.0	0.040	6.0	LOS A	0.2	1.5	0.54	0.61	0.54	14.0
12	R2	7	0	7	0.0	0.040	9.1	LOS A	0.2	1.5	0.54	0.61	0.54	43.6
Approach		36	0	38	0.0	0.040	6.7	LOS A	0.2	1.5	0.54	0.61	0.54	39.8
All Vehicles		974	17	1025	1.7	0.324	4.5	LOS A	2.1	14.7	0.23	0.45	0.23	45.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.