AGENDA
Local Traffic Committee

Wingecarribee SHIRE COUNCIL

We're with you

Thursday 18 July 2024

Bong Bong Room | Wingecarribee Shire Council Civic Centre

68 Elizabeth Street, Moss Vale at 10:30 am

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Our Mission, Our Vision, Our Values

1 OPENING OF THE MEETING

The Senior Traffic Engineer will open the meeting.

2 ACKNOWLEDGEMENT OF COUNTRY

"Wingecarribee Shire Council acknowledges the Gundungurra and Tharawal people as the traditional custodians of this land we now call the Wingecarribee Shire. I pay my respect to Elders both past, present and emerging. I would also like to extend that respect to all Aboriginal and Torres Strait Islanders present here today."

3 APOLOGIES

Nil at time of print.

4 ADOPTION OF MINUTES OF PREVIOUS MEETING

That the minutes of the Traffic Committee meeting held on 16 May 2024, recommendation numbers TC 2024/27 to TC 2024/36 inclusive, copies of which were forwarded to Committee members, have been received and noted.

5 DECLARATIONS OF INTEREST

The provisions of Chapter 14 of the Local Government Act 1993 regulate the way in which nominated staff of Council conduct themselves to ensure that there is no conflict between their private interests and their public trust.

The Act prescribes that where a member of Council (or a Committee of Council) has a direct or indirect financial (pecuniary) interest in a matter to be considered at a meeting of the Council (or Committee), that interest and the reasons for declaring such interest must be disclosed as soon as practicable after the start of the meeting.

As members are aware, the provisions of the Local Government Act restrict any member who has declared a pecuniary interest in any matter from participating in the discussions or voting on that matter and further require that the member vacate the Chamber.

Council's Code of Conduct provides that if members have a non-pecuniary conflict of interest, the nature of the conflict must be disclosed. The Code also provides for a number of ways in which a member may manage non pecuniary conflicts of interest.

Where necessary any Councillor, Committee Member and nominated staff of Council should disclose any interest and the reason for declaring such interest in the matters under consideration at this meeting.

Councillors and Committee Members are requested to complete the appropriate form to be handed up at the Meeting.

6 AGENDA REPORTS

6.1 Police Report on recent road crashes in the Shire

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

Reporting on recent road crashes in the Shire recorded by Police.

RECOMMENDATION

THAT the information be received and noted.

REPORT

BACKGROUND

At its meeting on 28 April 2010, Council adopted the recommendation of the Traffic Committee as follows:

THAT the Police report to each Traffic Committee meeting any fatal and serious injury crashes and locations where a pattern of crashes are developing AND THAT these crashes also be reported to Council staff to permit a timely investigation of the road environment.

CONCLUSION

That the information be received and noted.

ATTACHMENTS

Nil

6.2 Road Safety Officer Progress Report

Report Author: **Traffic Engineer**

Authoriser: **Shaun Robinson**

PURPOSE

The purpose of this report is to update the Traffic Committee on the progress of various projects undertaken by the Road Safety Officer.

RECOMMENDATION

***THAT** the information be received and noted.*

July 2024 REPORT

Background

There have been no fatal collisions in the Wingecarribee Shire thus far in 2024.

During 2023 five fatal motor vehicle crashes occurred killing six people.

During 2022 eight motor vehicle crashes occurred killing twelve people

RSO Projects 2023/2024

Transport for New South Wales (TfNSW) approved projects for 2023/24 under the Local Government Road Safety Program (LGRSP) for Wingecarribee Shire Council have recently been completed.

The 2023/24 projects included:

- Learner Driver Graduated Licencing Scheme workshops.
- Learner Driver Logbook Runs
- 65 Plus Senior Driver Safety workshops
- Child restraint fittings
- Motorcycle Awareness.

Other project being managed by the Road Safety Officer (RSO) include ‘U-Turn the Wheel’ for young drivers and ‘Speed Busters’ speed management campaign.

REPORT

Graduated Licencing System (GLS) Workshops and Logbook Runs

These workshops are being held face to face in Council's Theatrette at the Civic Centre.

GLS workshops are designed to assist parents/carers/supervisors of (or soon to be) learner drivers navigate their way through the GLS.

During the past fiscal year four workshops were offered with one cancelled. 28 free tickets were purchase on Eventbrite with 17 participants, two cancellations and 10 no shows.

Remaining 2024 Dates for GLS workshops:

- Sunday 25 August 2024
- Sunday 27 October 2024.

Logbook runs are to assist Learner drivers gain experience and knowledge through a practical drive with their supervisor. The logbook runs are conducted with the assistance of police and provide a workshop component allowing both supervisors and learners to ask questions, and to clarify issues they might be having, through the learner driver or GLS process.

During the past fiscal year four workshops were offered. Two were cancelled when numbers dropped to one group. There was a total of 20 group bookings over the year. A total of 10 groups (20 participants) attended the workshops.

2024 Dates for logbook runs:

- Sunday 22 September 2024.
- Sunday 10 November 2024.

The assistance of local Police with breath testing and engaging in discussion with the participants is appreciated.

Schools

School issues are regularly attended to be the traffic team. Following recent adjustment to signage at Hilltop Public school a banner was installed by council to assist Police enforcement in the area.

Young Road Users, 'U-Turn the Wheel Program'

'U-Turn the Wheel' program informs and educates senior high school students on issues surrounding road safety. The program is facilitated by Moss Vale Rotary Club and Council's RSO and held at the Mittagong RSL Club.

The 2024 U-turn the wheel is set to go over three days, July 29, August 12 and August 13, 2024.

Approximately 500 Year 11/12 high school students from Chevalier College, Frensham, Moss Vale High School, Oxley College and Bowral High School are expected to attend.

The program is run with the assistance of Moss Vale Rotary Club, NSW Police, Mittagong SES, Jarrad Ingram (a road crash survivor), Berrima Buslines, Mittagong RSL Club and other community organisations.

U-Turn the Wheel is a major event which has rebuilt post covid.

Motorcycle Awareness - Safe Riding

Motorcycles crashes are of constant concern within Wingecarribee, with four motorcyclists killed in the Shire in 2022.

Application has been made to Transport for NSW for a 'Mini Coffee with a Cop' project during 24/25. The activation is planned to be held at Robertson and involve a local retailer with various dates (to be confirmed) planned through the second half of 2024 and into 2025.

With the assistance of Local Police these activations are planned to help educate and inform motorcyclists and other road users of the dangers on local roads and to promote Motorcycle safety and awareness.

Speed Management - Speed Busters

The speed management program 'Speed Busters' involves the maintenance and management of six speed indicator signs across the Shire. The intention is to increase a driver's awareness of their travel speed upon approaching towns and villages with high/higher pedestrian activity, thus helping to reduce the risk of road related trauma.

The four original solar powered speed display signs are currently situated at Exeter, Bundanoon, Wingello and Robertson. Two further speed indicator signs were installed in 2023 on Merrigang Street, Bowral and Throsby Street Moss Vale.

Maintenance of the four old signs is becoming an increasing issue.

Separate to the Speed Busters program Council's Environment team secured funding and purchased two Variable Message Signs (VMS) to boost communications and improve driver awareness and behaviour on key roads which intersect koala habitats.

In addition, the Environment team also purchased four fixed Vehicle Activated Signs (VAS) which have been used to warn motorists of their travel speed in 'roadkill' areas. The VAS signs are operational with one on the Old Hume Highway Yerrinbool, two on Tourist Road, Glenquarry and one on Tugalong Road, Cayonleigh.

There are presently 10 flashing speed signs at various urban and rural locations throughout the Shire.

Child Restraint Fittings

With the assistance of Laurie Stewart Automotive, Mittagong, and TfNSW, there were 115 Child restraints fitted or checked under the 'free child restraint fitting program' in 2023/4.

A request to continue the program with funding of $6000 under the Local Government Road Safety Program has been submitted for 2024/25. This funding will enable a further 120 seats to be checked or fitted in 24/25.

Seniors

The free workshops for residents aged 65 years plus explore the many aspects of ageing and safe road use. With an ageing population and multiple fatalities involving elderly people in the Shire in 2022 and 2023, this is a continuing area of concern.

The TfNSW supported project under the Local Government Road Safety Program includes discussions about pedestrian safety, safe driving, information on driving tests, driver licence options and current road rules.

Four workshops were conducted during 23/24 to which 64 people attended.

Further opportunities to conduct similar presentations throughout the community in 2024/25 are welcomed.

ATTACHMENTS

1. Hilltop Public School [**6.2.1** - 1 page]


BUS ZONE
School Bus Zone
Do not stop or park here (buses excepted)
This is a safe zone for buses to pick up and set down
BUS ZONE
NSW GOVERNMENT
TOWARDS ZERO
Penalty exceeds $352 + 2 demerit points
Wingecarribee SHIRE COUNCIL

6.3 Access Road to Bowral Central Library Car Park, Bowral - Removal of Existing Pedestrian Crossing

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

- Removal of existing pedestrian crossing on the Access Road from Short Street to Bowral Central Library car park in Bowral;
- Installation of a proposed 5km/h speed limit sign at the approach to the Access Road; and
- Installation of a proposed 1.2m wide pedestrian walkway on the southern side the Access Road.

RECOMMENDATION

THAT the Council approves:

1. ***The removal of existing pedestrian crossing on the Access Road to the Bowral Central Library car park in Bowral.***
2. ***Installation of a proposed 5km/h speed limit sign at the approach to the Access Road.***
3. ***Installation of a proposed 1.2m wide pedestrian walkway marked with yellow paint on the southern side the Access Road.***

REPORT

BACKGROUND

A pedestrian crossing was installed on Access Road to the Bowral Central Library car park. There are two speed humps on the access road; one is located on the existing pedestrian crossing. There is no pram ramp or footpath on one side of the pedestrian crossing. The crossing leads pedestrians to a garden bed, and pedestrians also must step over the speed hump.

Both the crossing and speed hump are painted white. The council was notified that a visually impaired pedestrian had tripped on the speed hump as they were unable to distinguish the white crossing painting and the white speed hump.

An inspection of the location showed that the pedestrian crossing directed people from a kerb ramp straight into kerb and gutter and garden bed. The speed hump on the subject pedestrian crossing makes it hazardous. The pedestrian crossing needs to be removed.

The current speed humps have a 1.2m gap from the edge of the hump to the kerb and gutter to the south.

REPORT

The Access Road is currently shared by both traffic and pedestrians. There is no pram ramp or footpath on one side of the pedestrian crossing on the access road, forcing pedestrians to walk on the road and must negotiate with the existing speed hump.

RMS practice for numerical warrants for Pedestrian (Zebra) Crossings, which is referred to in Guide to Traffic Management, Section 8, 7.5.6:

i) Normal Warrant:

A pedestrian (Zebra) Crossing is warranted where: -

In each of three separates one-hour periods in a typical day (a) the pedestrian flow per hour (P) crossing the road is greater than or equal to 30

AND

(b) the vehicular flow per hour (V) through the site is greater than or equal to 500

AND

(c) the product PV is greater than or equal to 60,000

ii) Reduced Warrant for sites used predominantly by children and by aged or impaired pedestrians.

If the crossing is used predominantly by school children, is not suitable site for a Children's Crossing and in two counts of one hour duration immediately before and after school hours: -

(a) $P \geq 30$

AND

(b) $V \geq 200$

A pedestrian (Zebra) Crossing may be installed.

The parking capacity of the car park in the basement of Bowral Central Library is 50 including Accessible Parking spaces.

As per Guide to Traffic Management, Section 8, 7.5.6, the current volume of traffic and pedestrians does not warrant a pedestrian crossing in this location. Further, the speed hump on the subject pedestrian crossing makes it hazardous.

Therefore, it is recommended that the existing Pedestrian Crossing in the access road to the Bowral Central Library car park be removed.

Alternative Option

To upgrade the safety, both pedestrian and traffic flow should be kept separated on the access road. It is proposed to install a 1.2m walkway on the southern side of the access road.

Currently there is no designated speed limit for the access road.

It is recommended the installation of a 5km/h speed limit sign at the approach to Access Road.

CONCLUSION

Considering the current volume of traffic and pedestrians, a pedestrian crossing is not warranted in this location. Furthermore, the speed hump on the pedestrian crossing in question makes it hazardous.

The pedestrian crossing does not lead pedestrians along a safe path of travel and directs them across a speed hump. The speed hump is to remain as it improves road safety by slowing vehicles.

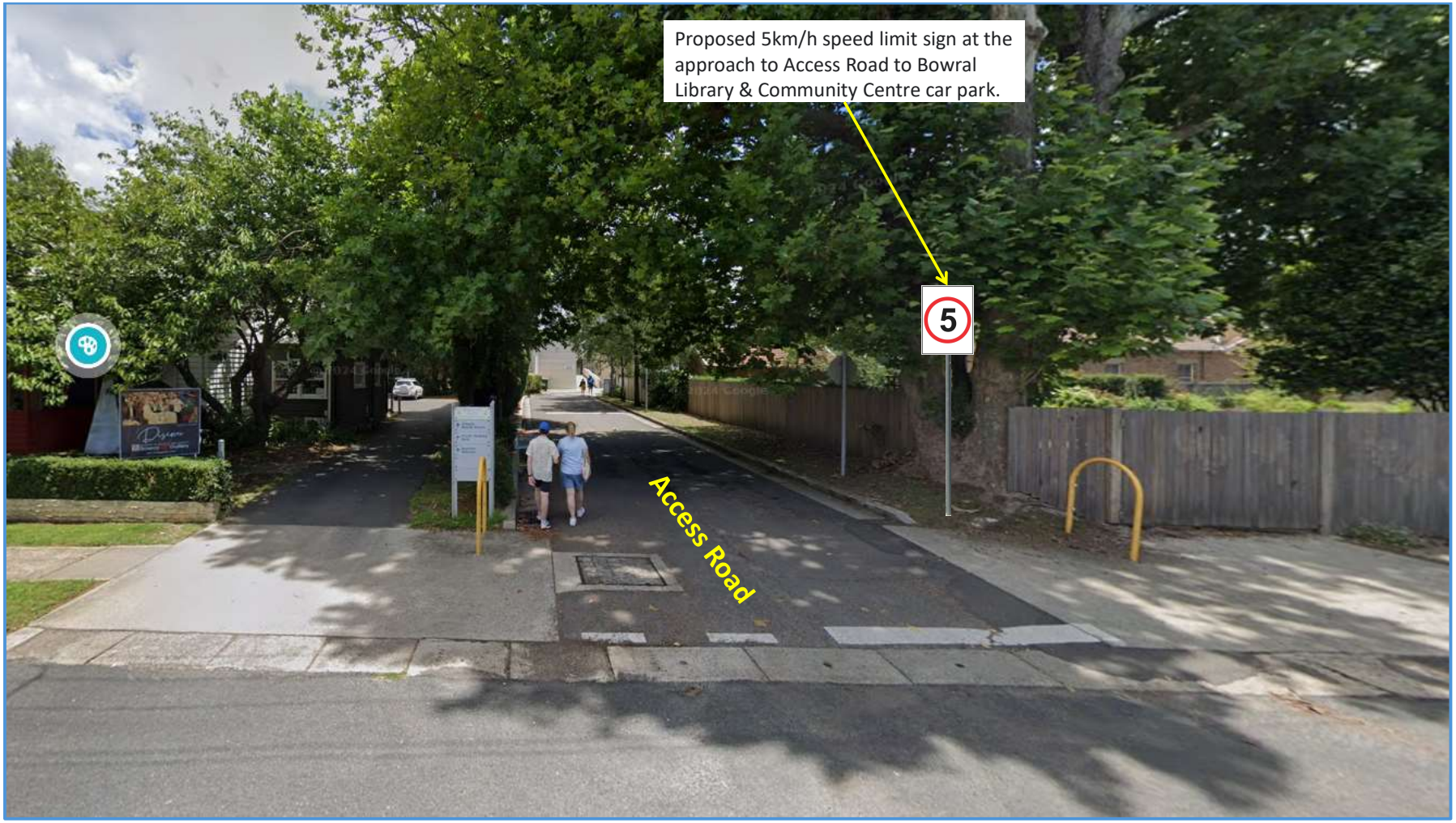
It is recommended that the Pedestrian Crossing on the access road to the Bowral Central Library car park be removed.

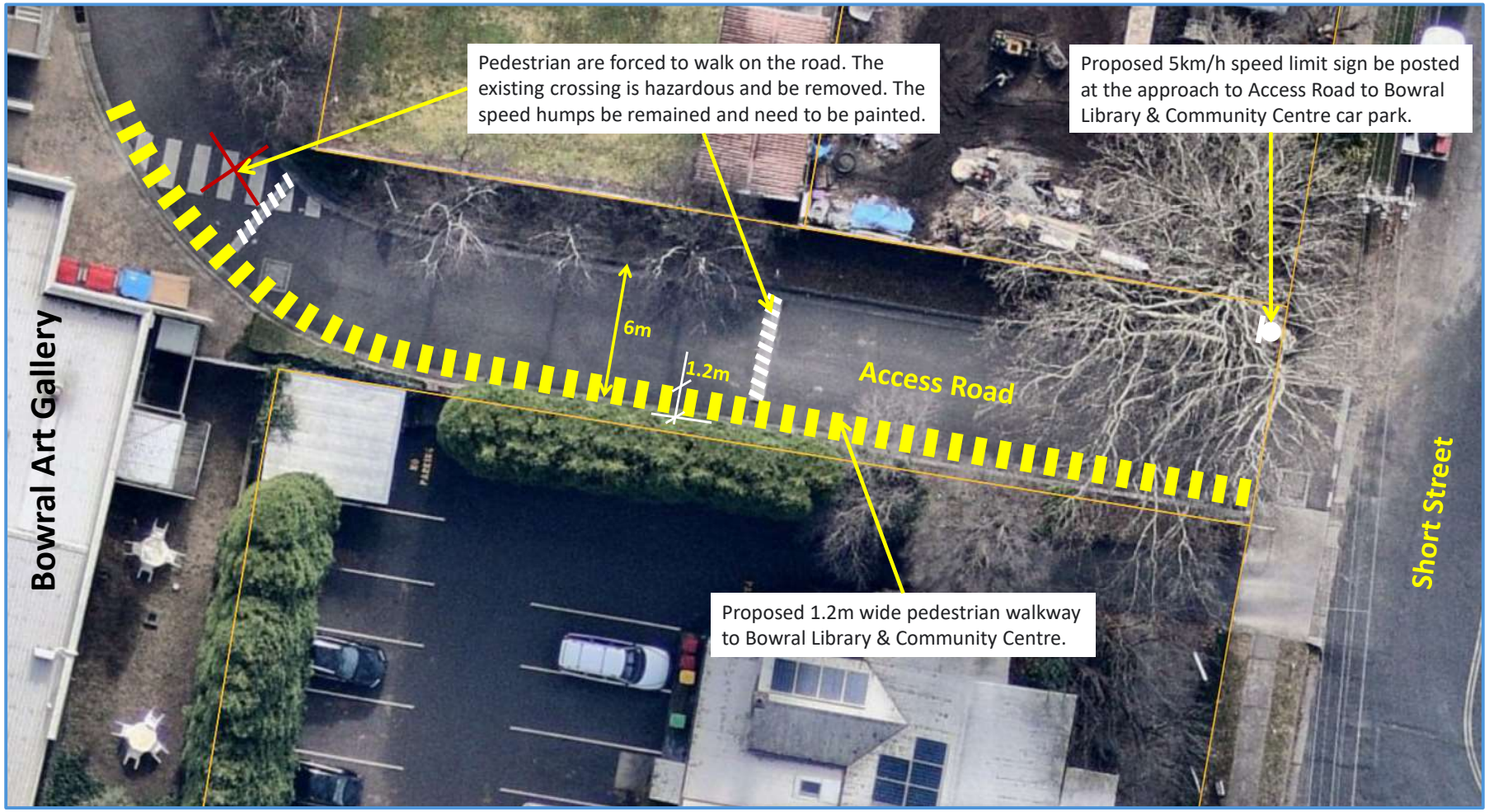
A 1.2m walkway could be installed on the southern side of the access road to keep pedestrians separate from traffic flow and improve safety. The walkway will be delineated with yellow paint.

It is recommended installation of a 5km/h speed limit sign at the approach to the Access Road.

ATTACHMENTS

{6.3.1 Access Road to Bowral Central Library car park, Bowral - Removal of existing pedestrian crossing}


Proposed 5km/h speed limit sign at the approach to Access Road to Bowral Library & Community Centre car park.
5
Access Road


Pedestrian are forced to walk on the road. The existing crossing is hazardous and be removed. The speed humps be remained and need to be painted.
Proposed 5km/h speed limit sign be posted at the approach to Access Road to Bowral Library & Community Centre car park.
6m
1.2m
Access Road
Bowral Art Gallery
Short Street
Proposed 1.2m wide pedestrian walkway to Bowral Library & Community Centre.

6.4 Belmore Falls Road Robertson - Proposed dividing barrier BB lines marking with RRPMs.

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To have Council's approval for the proposed installation of dividing barrier BB line marking with RRPMs on the bends in section 1 & 2 (refer to attachment) of Belmore Falls Road from South Street to McEvilly Road, Robertson; and further:

- Request that the existing 60km/h speed zone be reviewed between South Street and McEvilly Road.
- Existing missing/damaged warning signs be replaced and straightened up.
- Overgrown vegetation (both sides), overhanging dead branches be trimmed and cleaned up.

RECOMMENDATION

***THAT** the Council approves the proposed review/improvement:*

1. ***Installation of proposed dividing barrier BB lines marking with RRPMs** on **Belmore Falls Road from South Street to McEvilly Road, Robertson. The lines are to be placed centrally on the road with the exception on the tight bends where it will be placed 3.1m from the edge of the pavement on the outside of the bend.***

   a) 275m of BB line as shown in Section 1 of the attachment
   b) 210m of BB line as shown in Section 2 of the attachment

2. ***The Council requests that Transport for NSW undertake a review of the speed limit on Belmore Falls Road and determines curve advisory speeds the bends.***

3. ***Existing missing/damaged curve alignment markers and other advisory signage be replaced, straightened up, or vegetation cleared from obstructing the sign.***

REPORT

BACKGROUND

Council received a request from a resident concerned about road safety on Belmore Falls Road. The request included: -

- Better signage around the bends.
- Road lines markings.
- Installation of mirrors on the three dangerous bends to assist oncoming traffic, and
- Consideration given to overgrown/dead branches.

Furthermore, NSW Police raised concerns about Belmore Falls Road where truck and dog trailers and trucks carrying heavy machinery are utilising the road. Belmore Falls Road is a narrow winding road with thick vegetation. There is no guardrail. Vehicles heading up Belmore Falls Road are driving on the edge of the road that has a significant drop off to one side.

REPORT

Belmore Falls Road is a local two-lane sealed road with a speed limit of 60 km/hr. The pavement width of Belmore Falls Road varies between 6m – 7m, starting at South Street, Robertson and going downhill towards Belmore Falls. There is no shoulder on this section of the road. The edge of the road has a significant drop off to one side. The road does not have pavement marking and delineating lanes.

This road can attract a high volume of traffic by people attending Equestrian events held by Willoughby Hill and tourists going to Belmore Falls.

In a recent site visit, it was noticed that the verges of the road are overgrown with small trees, broken and cut down branches that prevent visual awareness of oncoming traffic. Some of the existing warning street signs are bent over or lying down in the table drain.

Due to no road marking and delineating lanes, drivers coming from South Street down Belmore Falls Road tend to use the middle of the road, especially around the blind bends, which has led to collisions.

Police reported to Council that a vehicle *with trailer partially go off the road due to a dog and trailer taking up most of the road on a sharp bend. There have been other events where a truck partially went off the edge, a vehicle and a vehicle towing a horse float collided.*

Dividing barrier BB lines (tow way)

Two-way barrier lines are two unbroken lines used to form a double dividing line (BB line). Movements across the lines, or to the right of the lines, for the purpose of overtaking or making a U turn in either direction, are prohibited.

Warrants for use BB lines

Dividing (barrier) lines shall be used to create no-overtaking zones, where there is restricted overtaking sight distance due to horizontal or vertical curves, or both, or where a hazardous condition exists, e.g. at approaches to major intersections or junctions and mid-block central carriageway obstructions.

Both horizontal and vertical curves exist in the sections of Bellmore Falls Road between South Street down to McEvilly Road. New dividing barrier BB lines marking with RRPMs are proposed along the winding section of Belmore Falls Road which includes three tight bends (Section 1 & 2). Street views below:

The proposed double barrier line is to be placed centrally on the road. The pavement width varies between 6m to 7m which provides appropriate lane widths on the straight section of road.

The pavement width on the sharp bends is between 6.2m and 6.7m. The double barrier line on these bends is to be placed 3.1m from the outside of the bend to allow more turning room for vehicles on the smaller radius of the inside of the bend.

Advisory speed signage will be required to slow vehicles to an appropriate speed to negotiate the designated lanes of the bends. The tightest bends have a radius between 15m and 20m. According

to Austroads turning paths, the speed will need to be between 15km/h and 20km/h for vehicles with trailers, single unit vehicles, buses and other articulated vehicles to negotiate these bends.

CONCLUSION

The northern section of Belmore Falls Road is winding, with tight bends, narrow pavement width and limited sight distance for oncoming vehicles.

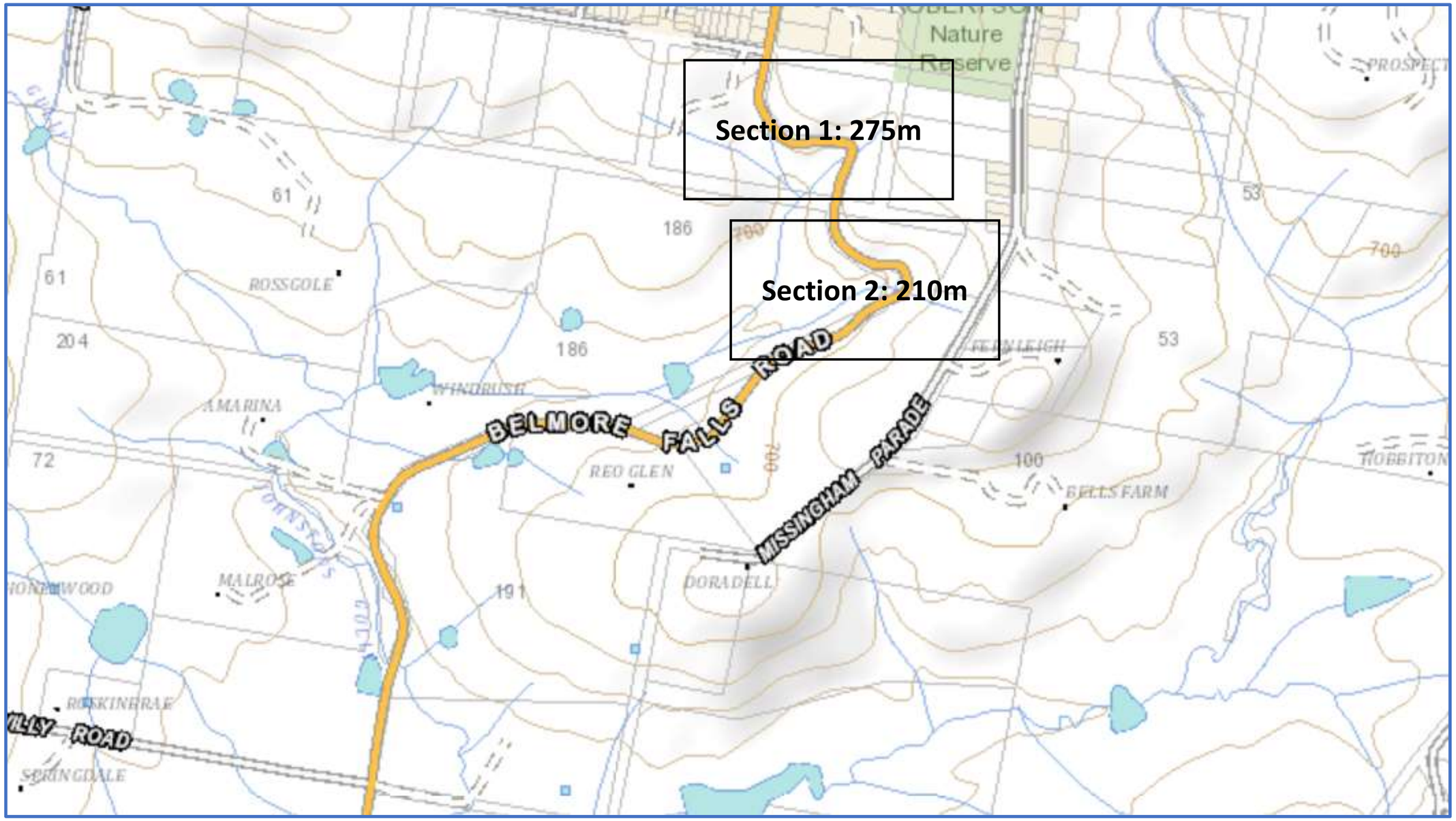
This report proposed to install centreline marking to guide vehicles to the correct side of the road. The existing signage is recommended to be replaced and repaired where needed. The Council also requests TfNSW to review the existing 60km/h speed zone between South Street and McEvilly Road.

There have been numerous accidents on this section of Belmore Falls Road, including head on collisions and vehicles running off the road.

The road safety measures proposed in this report are recommended for approval.

ATTACHMENTS

1. Belmore Falls Rd, Robertson - Proposed BB line marking [**6.4.1** - 3 pages]


Section 1: 275m
Section 2: 210m
Nature Reserve
ROSSGOLE
WINDRUSH
MARINA
RED GLEN
MALROSE
DORADELL
FERNLEIGH
BELLS FARM
HOBBITON
SPRINGDALE
BELMORE FALLS ROAD
MISSINGHAM PARADE
61
204
186
53
700
72
100
191


Section 1
7m
7m
Existing damaged and missing Chevron Fluoro (both sided) warning signs be fixed / re-installed.
Belmore Falls Road
Proposed 275m dividing (Barrier) lines (two way) markings with RRPMs in the sharp bend (Section 1) of Belmore Fall Road Robertson, as defined in TfNSW Delineation Section 4 – Longitudinal markings.
Dividing (Barrier) lines
BB
0.10
0.10
0.10
4.4


Section 2
Belmore Falls Road
Existing damaged and missing Chevron Fluoro (both sided), warning signs be fixed / re-installed.
Proposed 210m dividing (Barrier) lines (two way) markings with RRPMs in the sharp bend (Section 2) of Belmore Fall Road Robertson, as defined in TfNSW Delineation Section 4 – Longitudinal markings.
7m

6.5 Car Park Design at the Mittagong PCYC

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To review the existing car park layout at the Mittagong PCYC

RECOMMENDATION

THAT the existing car park layout at the Mittagong PCYC is deemed appropriate, and a redesign of the parking layout is not required

REPORT

Council installed line marking on the pavement adjacent to the Mittagong PCYC to delineate parking spaces. The line marking was installed in 2019 and was a response to the inefficient and haphazard parking that previously existed when people parked to use the PCYC building and Mittagong Pool.

Council's Engineering Design Branch designed a car park layout to maximise the number car parking spaces and create a more orderly and safe traffic flow around the car park area.

There was no line marking on the pavement before the current line marking was installed. The lack of clear designated parking bays led to much of the pavement area not being utilised for parking. The previous parking arrangement had no delineation of a controlled flow of traffic, which posed a safety risk for pedestrians.

The current car park design is attached.

Image 1 – Aerial Photograph showing the car park area in 2018

Image 2 – Aerial Photograph showing the car park with current line marking in 2022

CONCLUSION

The existing line marking for the car park area at the Mittagong PCYC was designed to maximise parking and to create a more orderly and safer direction of flow for traffic.

The existing car park layout was designed by Council's Engineering Design team in which different options were investigated.

The current car park design is recommended for approval and no review or redesign is necessary.

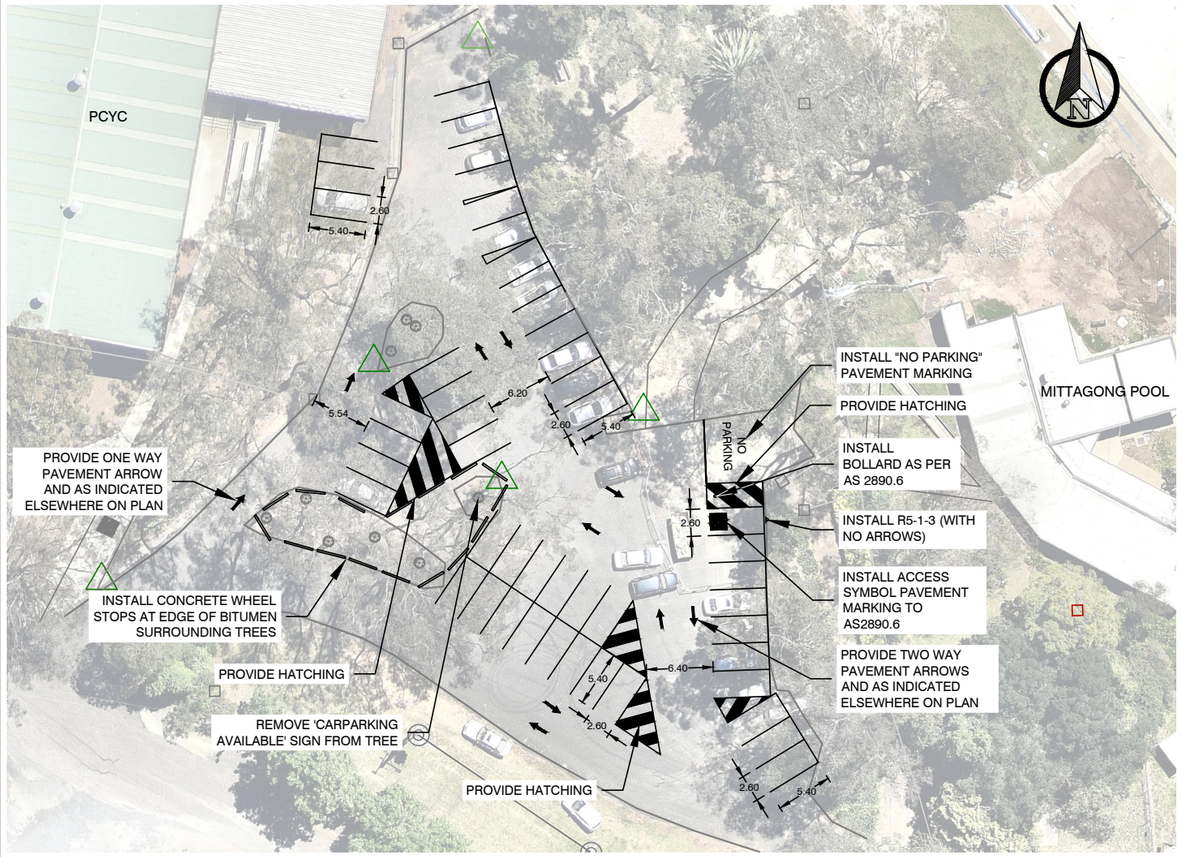
ATTACHMENTS

1. LINEMARKING PLAN PCYC Mittagong pool Carpark [**6.5.1** - 1 page]

PROPOSED CARPARK IMPROVEMENTS
MITTAGONG POOL/PCYC

GENERAL NOTES

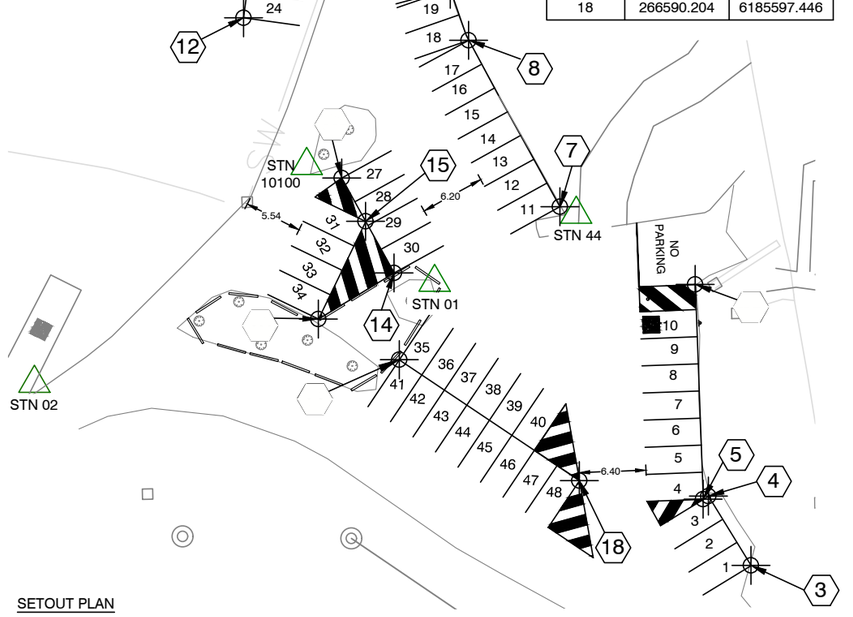
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTION OF THE "NATSPEC" SPECIFICATION.
2. DO NOT DEPART FROM THE DESIGN UNLESS AUTHORISED BY THE DESIGN & PROJECTS MANAGER. IF IN DOUBT, ASK.
3. COUNCIL'S WORK HEALTH AND SAFETY PRACTICES MUST BE COMPLIED WITH.
4. SUBMIT A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE RTA "TRAFFIC CONTROL AT WORKSITES" PRIOR TO CONSTRUCTION COMMENCING.
5. LOCATION AND DEPTH OF UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. NOT ALL SERVICES MAY BE SHOWN AND THE DETAILS MAY BE INACCURATE. ACCURATE LOCATION AND DEPTH OF SERVICES IS TO BE DETERMINED PRIOR TO CONSTRUCTION COMMENCING. OBTAIN CURRENT PUBLIC UTILITY PLANS BY PHONING DIAL BEFORE YOU DIG ON 1100.
6. INSTALL SEDIMENT AND EROSION CONTROL STRUCTURES PRIOR TO CONSTRUCTION. MAINTAIN THESE STRUCTURES DURING CONSTRUCTION.
7. PROVIDE A 'WORK AS EXECUTED' PLAN AT COMPLETION OF CONSTRUCTION.
8. UNDER NO CIRCUMSTANCES ARE ANY EXISTING TREES TO BE DISTURBED UNLESS SHOWN OTHERWISE ON PLANS.
9. REPLACE ANY SIGNS, LINE MARKING, OR REFLECTIVE PAVEMENT MARKERS IF DISTURBED, REMOVED, OR DAMAGED DURING CONSTRUCTION.
10. THESE DESIGN PLANS SHALL BE READ IN CONJUNCTION WITH THE ENVIRONMENTAL ASSESSMENT (E.A.) AND THE ENVIRONMENTAL MANAGEMENT PLAN (E.M.P.). SHOULD THE WORKS VARY FROM THE APPROVED PLANS. THEN THE E.A. AND E.M.P. MUST BE RENEWED.



GENERAL ARRANGEMENT PLAN

STATION COORDINATES			
POINT No.	EASTING	NORTHING	RL
60	266573.994	6185658.677	625.146
2	266537.924	6185606.778	628.286
1	266576.305	6185616.466	624.332
10100	266564.040	6185627.675	626.168
44	266589.887	6185622.997	622.682

SETOUT COORDINATES		
POINT No.	EASTING	NORTHING
3	266606.669	6185589.310
4	266602.589	6185595.958
5	266602.079	6185595.656
6	266601.316	6185616.242
7	266588.335	6185623.713
8	266579.590	6185639.675
9	266577.817	6185644.563
10	266575.081	6185654.597
11	266559.035	6185649.562
12	266557.986	6185641.833
13	266567.402	6185626.463
14	266572.426	6185617.357
15	266569.700	6185622.299
16	266565.175	6185612.936
17	266572.926	6185609.027
18	266590.204	6185597.446



SETOUT PLAN

ISSUE	AMENDMENTS	CHECKED	APPROVED	DATE
A	ISSUED FOR CONSTRUCTION	TW	PS	03/05/2019

SCALE 1:500 0 5 10 15 20 25

DATUM AHD
GRID
A3

PUBLIC UTILITIES LEGEND

WATER	—W—	SEWER	—S—	OVERHEAD ELECTRICITY	—E(OH)—	ELECT TRANSFORMER CABINET	
RECYCLED WATER	—RW—	MANHOLE		UNDERGROUND ELEC'TY	—E—	TELEPHONE CABLE	—T—
HYDRANT		LAMPHOLE		ELECTRICITY PIT		TELEPHONE PIT	
STOP VALVE		GAS	—G—	POWER POLE		TELEPHONE PILLAR	
AIR VALVE		GAS VALVE		POWER LIGHT POLE		TELEPHONE POLE	
WATER METER	M	GAS METER		LIGHT POLE		TELEPHONE CABLE MARKER	
WATER TAP				STAY POLE			
				POLE & TRANSFORMER			

SURVEYED 21/02/2019
DESIGNED BD
DRAWN BD
CHECKED TW
SURVEYOR MS

APPROVED
GROUP MANAGER INFRASTRUCTURE SERVICES
ASSET ENGINEER
MANAGER DESIGN CONSTRUCT MAINTENANCE

WINGECARRIBEE SHIRE COUNCIL
Civic Centre, Elizabeth Street, Moss Vale, N.S.W. 2577
PO Box 141, Moss Vale, N.S.W. 2577
Ph: (02) 4868 0888 Fax: (02) 4869 1203

WINGECARRIBEE SHIRE COUNCIL

MITTAGONG POOL CARPARK LINEMARKING
HAWKINS DRIVE
MITTAGONG
GENERAL ARRANGEMENT PLAN

SHEET 1 OF 1

PROJECT ID: NA | CAD FILE/PLAN No: 2355 | JOB No: 22255 | SCALE: 1:500 @A3 | ISSUE 1

PLOTTED BY : BIANCA DANNER DATED 17.06.2019 . WINGECARRIBEE SHIRE COUNCIL

FILE LOCATION : P:\Technical Services\Design and Projects\Design Plans\2355 - Mittagong Pool Carpark\base plan carpark mittagong pool.dwg

6.6 Burcham Road - Review existing school Bus Zone fronting Moss Vale High School

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

Review the proposal to extend the school Bus Zone on Burcham Road, fronting Moss Vale High School.

RECOMMENDATION

THAT Council approves:

The proposed 134 metres extension of the existing school Bus Zone, on Burcham Road, adjacent to Moss Vale High School.

REPORT

BACKGROUND

Council has received a request from Berrima Bus Lines to increase the capacity of the existing school bus zone in Burcham Road fronting Moss Vale High School.

Moss Vale High School is a main interchange for School Children in the Southern Highlands. The existing Bus Zone is under capacity to hold the number of buses that travel to Moss Vale High School.

REPORT

Moss Vale High School located at 21 Narellan Road at the intersection of Burcham Road, Moss Vale. Currently the school Bus Zone is on the school side on Burcham Road. Burcham Road is a local road with a pavement width of 10m with footpath on both sides.

There are 15 buses that undertake a coordinated exchange of students helping the network of 42 buses which accommodate 5500 students travelling to school.

The current bus zone is not long enough to accommodate 15 buses. Bus drivers must regularly deal with cars dropping in the Bus Zone, or parking in the Bus Zone creating a serious safety concern. Students are getting out of cars parked between buses, walking along the road and between parked buses.

The interchange at Moss Vale High School also acts as a 'layover' location for the bus driver.

Bus layover parking is a place where driver's park buses between services and may be situated on-street or off-street. The time a bus spends in a layover can vary from a few minutes to approximately an hour depending on the purpose of the layover. A layover may provide facilities for drivers, such as a meal room and toilet.

The provision of layover parking is essential in managing on-time running, as well as in managing the cost-of-service delivery. Layover allows for recovery time between services. In addition, an appropriately located layover means that drivers can take their designated breaks close to their last stop and not have to travel back to the depot.

The length of the existing school Bus Zone is 158m. Currently there is no parking restriction in the rest of Burcham Road. Parking demand in the morning and afternoon school hours is high around the school in both Narellan Road & Burcham Road. The proposed modification of the current school Bus Zone will provide additional parking spaces for Berrima Bus Line services on school days.

There is a high amount of spare parking capacity on Burcham Road for parents and teachers even when the new Bus Zone is imposed.

Proposed reviews and adjustments are shown in the attachments.

This report proposes to increase the length of existing school bus zone for additional 134m up to the intersection of Torulosa Drive Moss Vale.

CONCLUSION

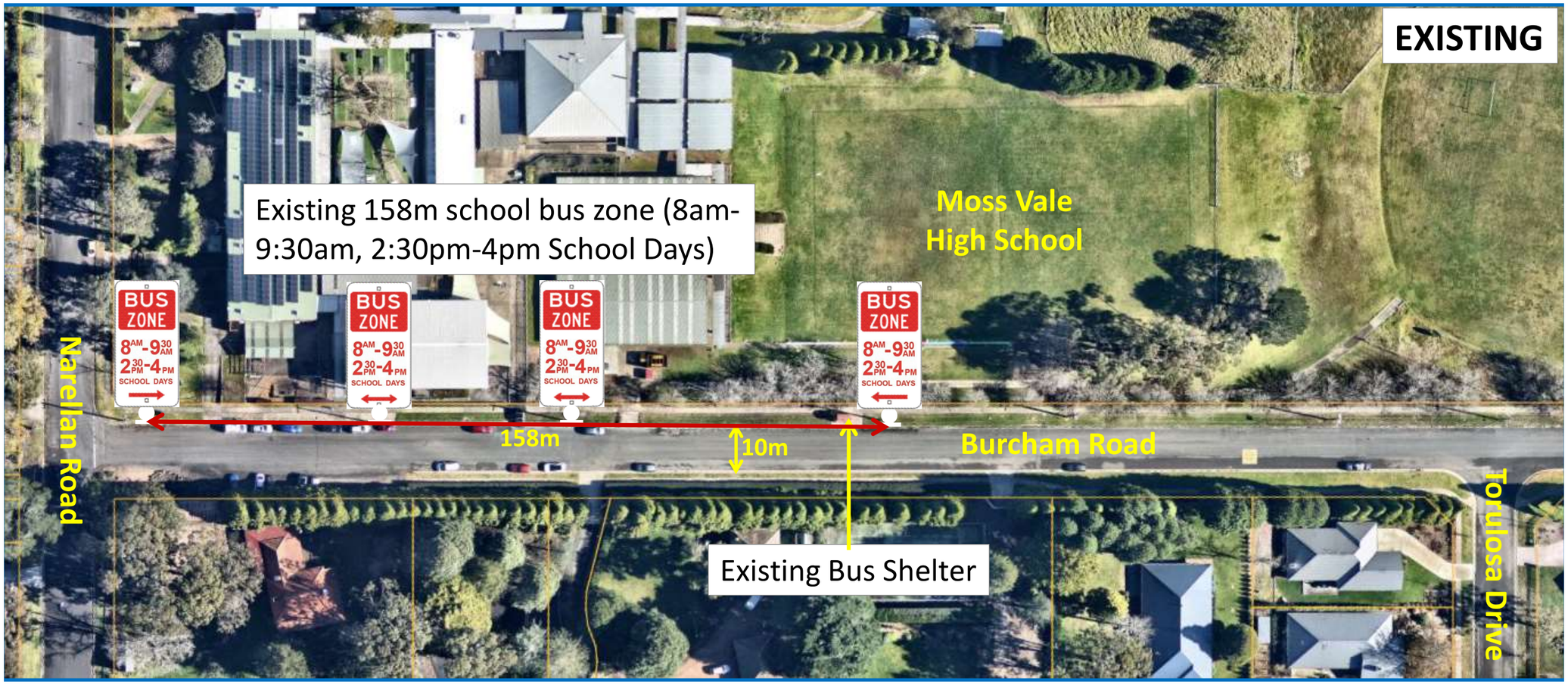
Moss Vale High School is a major interchange for school children in the Wingecarribee Shire. The existing 158m Bus Zone on Burcham Road does not have the capacity to cater for the number of buses that travel to Moss Vale High School.

The proposed 134 metre extension of current school Bus Zone, on Burcham Road, is recommended for approval.

ATTACHMENTS

{6.8.1 Burcham Road - Review existing school Bus Zone fronting Moss Vale High School}


ROBERTSON ROAD
JEHOVAH'S WITNESSES CHURCH
Moss Vale High School
Location
BURCHAM ROAD
TORULOSA DRIVE
WARRAWONG DRIVE
WOODVILLE ROAD
VILLIERS WATER PUMP STATION
MOSS VALE HIGH SCHOOL
NARELLAN ROAD
THROSBY
1:4,514
0 50 100m


EXISTING
Existing 158m school bus zone (8am-9:30am, 2:30pm-4pm School Days)
Moss Vale High School
BUS ZONE
8AM-9:30AM
2:30PM-4PM
SCHOOL DAYS
158m
10m
Burcham Road
Narellan Road
Torulosa Drive
Existing Bus Shelter


PROPOSED
Moss Vale
High School
Proposed extended school bus zone
(8am-9:30am, 2:30pm-4pm School Days)
Total Length - 158m+134m = 292m
BUS ZONE
8AM-9:30AM
2:30PM-4PM
SCHOOL DAYS
158m
10m
134m
Burcham Road
Narellan Road
Torulosa Drive
Existing Bus Shelter


SCHOOL ZONE
8-9
2-4
SCHOOL DAYS
40
Burcham Road
Street View


Torulosa Drive
Burcham Road
TORULOSA DR
Street View

6.7 Roundabout at the Intersection of Yarrawa Road, Spencer Street and Darran Road, Moss Vale

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To review the roundabout centre island and north approach raised splitter island at the intersection of Yarrawa Road, Spencer Street and Darran Road, Moss Vale.

RECOMMENDATION

THAT the roundabout centre island and north approach raised splitter island as designed in engineering design plan Project Ref. 18001, Stage No. 203 prepared by Beveridge Williams Land Development Consultants be recommended for approval.

REPORT

BACKGROUND

Local Traffic Committee reviewed a report at the 21 March 2024 meeting regarding the design plans for a recently constructed roundabout at the intersection of Yarrawa Road, Spencer Street and Darran Road, Moss Vale. The recommendation from that meeting was that the design be reviewed.

The signage and line marking for the roundabout were approved at the 4 April 2024 Out of Session Traffic Committee meeting.

REPORT

The roundabout design was undertaken by Beveridge Williams Land Development Consultants. The attached design plans include a geometric design, sight line plan and turning paths plan.

The roundabout centre island is mountable and is 6m in radius with a circulating lane that varies between 4.8m and 4.1m. Turning paths show that small vehicles such as cars can negotiate the roundabout when travelling at the design speed of 30km/h. Single unit vehicles such as small delivery trucks and buses, must travel over the mountable centre island. Vehicles longer than single unit vehicles will also drive over the mountable roundabout.

The sight lines for the roundabout show that the sight distance complies with Austroads Standards for a 60km hour road in all situations, except for the western approach. The western approach is substandard to Austroads guidelines but is the same as the approach to the previous Give Way sign.

The geometric design of the roundabout has been designed to meet Austroads Standards where possible and to allow for appropriate turning paths. The roundabout slows vehicles on the approach to the intersection which provides a safer environment than the previous Stop Sign arrangement.

A Road Safety Audit was also undertaken by DC Traffic Engineering. The recommendations from the Road Safety Audit are addressed below.

1 - Lack of physical devices when approaching, circulating and exiting the roundabout

The splitter islands are painted except for the north approach. The existing kerb and gutter geometry does not allow enough space for the installation of raised kerb splitter islands and have vehicles longer than cars negotiate the roundabout. The painted splitter island and mountable centre island allow for all vehicles to negotiate the roundabout. Painted splitter islands and mountable centre islands is a common treatment at intersections in the Shire where there is limited space between existing kerb lines.

2 - Pedestrian movements with the new roundabout

There is currently a footpath on the northeast approach to the roundabout. There is future plan to install footpaths on the southeast side of the roundabout as part of the Ashbourne development. Kerb ramps were placed at each leg of the intersection except for the north approach. The north approach has a raised splitter island which will prevent pedestrians crossing the road. Additional footpaths have not been planned but have been catered for with the kerb ramps.

3 - Swept paths for buses and trucks

As mentioned above, the roundabout is constructed between existing kerbs which do not provide enough room for a roundabout with sufficient space for a long vehicle to circulate around a centre island. There will be some tire marks on the white outer annulus of the roundabout and the hatched inner circle. The tire marks will need to be monitored by Council.

4, 5a and 5b – Advanced warning signage recommendations

These items have all been implemented as recommended by the Road Safety Audit

6 – Splitter island on the north approach

The splitter island on the north approach will provide a visual que that there is a roundabout at intersection which also happens to be the crest of a hill. The flat roundabout cannot be seen until close to the island from the north approach. The splitter island will provide advanced warning in conjunction with the roundabout signage.

7 – Tree branches on Darren Road obscuring Give Way sign

The Give Way sign has been requested to be placed in a location that it is obscured by tree branches.

8 – No Stopping signs on Spencer Street

The note on the plan is a mistake. The note should read ‘install No Stopping signs’ instead of ‘retain No Stopping sign'. The signs have been installed.

9 – Position of the roundabout centre island

The roundabout centre island has been positioned slightly to east of the Yarrawa Road centreline. This shift appears to be in place to create a more even circulating lane width in relation to the

existing kerbs. The turning paths in the design plans show that cars can negotiate the roundabout at a design speed of 30km/h.

CONCLUSION

The roundabout at the intersection of Yarrawa Road, Spencer Street and Darran Road has been designed to Austroads Standards where possible. Sight lines are like previous sight lines when the intersection was controlled by a Stop sign. Approach speed have now been slowed by the roundabout making the intersection safer.

Turning paths show that all vehicles can negotiate the roundabout as intended.

The items in the Road Safety Audit have been considered and actioned when appropriate.

The mountable roundabout and raised splitter island are recommended for approval.

ATTACHMENTS

1. Yarrawa Road Spencer Street Roundabout Design Plans [**6.7.1** - 10 pages]
2. PM E- PRO J-0002-01 DD RSA Moss Vale Rev 1 R A-2023-2926 [**6.7.2** - 34 pages]

YARRAWA ROAD/SPENCER STREET, MOSS VALE

ROUNDABOUT PLANS FOR S.138 APPROVAL

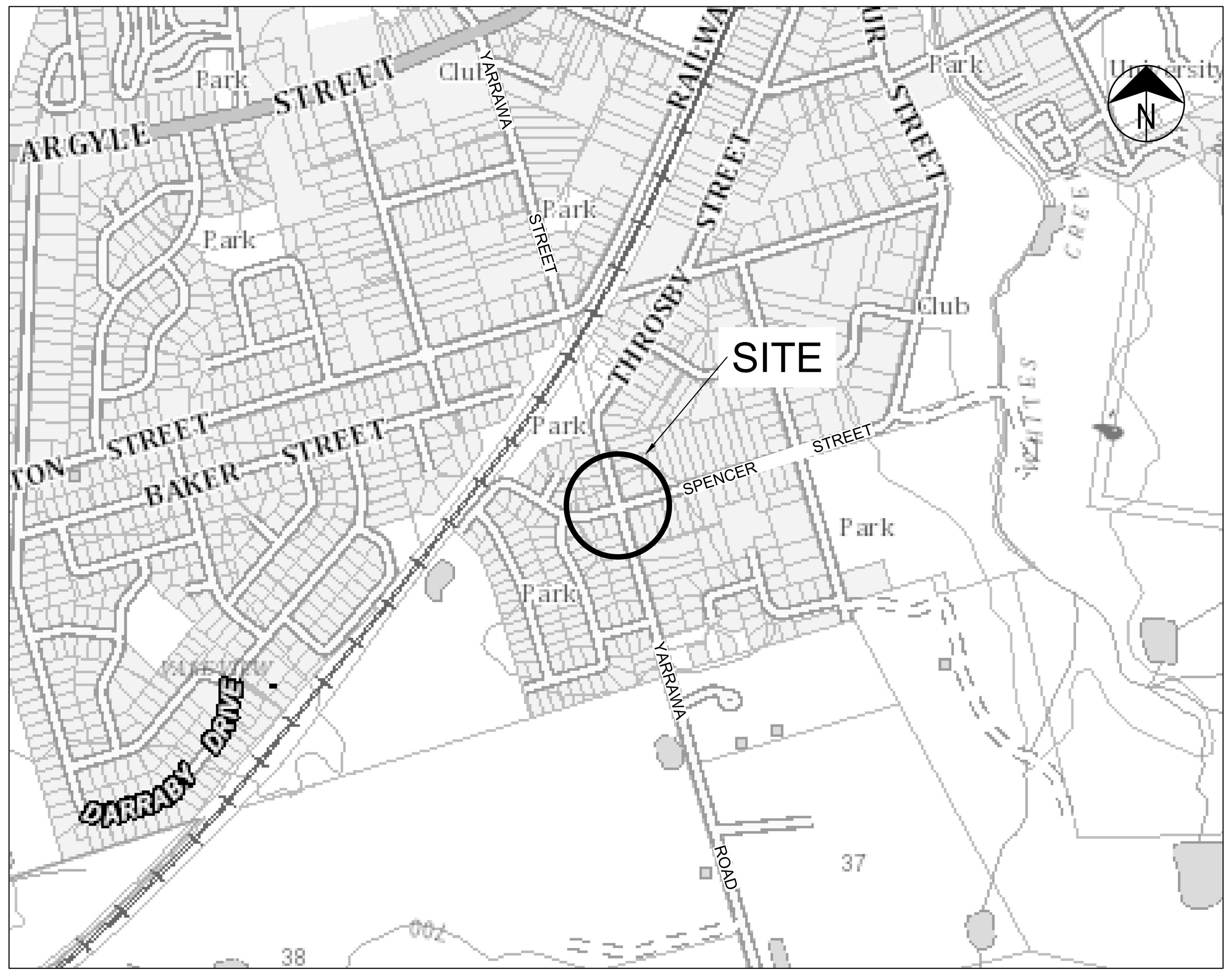
NOTES

GENERAL

G1 All Development Consent Conditions are to be fully complied with throughout the completion of the project.
G2 All work to be in accordance with Development Control Plan No 41 of the Wingecarribee Shire Council.
G3 Inspections by Council's Development Control Engineers are to be undertaken at critical stages when directed and where required by DCP 41. Generally a minimum of 48 hours notice is required for inspections, however this may vary for certain inspections - see DCP 41 for details.
G4 No work to be carried out on Council property or private property without the written permission of the owner. A copy of the written permission is to be sent to Council for its records.
G5 All rubbish, buildings, sheds, undergrowth, and fences are to be removed from the site and road reserves to the satisfaction of Council's Development Control Engineer
G6 Make smooth connection to all existing engineering work.
G7 All existing services to be located and levelled by the Contractor prior to the commencement of work.
G8 The Contractor shall provide traffic control which complies with AS1742.3 – 2002. A copy of the plan showing layout of proposed traffic control for the commencement of work and certified by a suitably qualified person is to be submitted to Council prior to commencement of any work. Further plans are to be submitted if work site alters.
G9 Any road restoration required shall be in 150mm layers of DGS 40 from the bottom of trench or top of sand overlay over any pipes, compacted to a minimum of 98% modified compaction with the final layer of 100mm of DGB 20 compacted to a minimum of 98% modified compaction and finished level with existing road surface.
G10 The Contractor shall maintain and/or restore any damage which may have been caused by the construction of the subdivision to the road pavement, roadside drainage or underground facilities in Council Road's which give access to the subdivision.
G11 All disturbed areas to be reinstated as nearly as possible to the pre-construction condition.
G12 Vehicular access and all services to be maintained at all times to adjoining properties affected by construction.
G13 The contractor shall ensure that effective sediment and erosion protection measures are in place on site at all times. Such measures shall be in accordance with the plans and the requirements of the Landcom manual "Managing Urban Stormwater Soils and Construction".
G14 The contractor shall obtain levels from the established benchmarks only.
G15 All works and procedures carried out in association with this development shall be completed in accordance with the requirements of the Workcover Authority and Occupational Health and Safety Legislation and Regulations.
G16 All contructors and demolition works shall be restricted to the following hours.
7am to 5pm Mondays to Fridays (inclusive)
8am to 1pm Saturdays
No work on Sundays and public holidays
G17 All waste shall be disposed of at an approved waste disposal depot and copies of all documentation associated with such disposal shall be provided to the principal. A waste control container shall be located on site and no waste material shall be stored on site other than in such container.
G18 Contractor shall erect a sign (minimum size of 300mmx400mm) at the entrance to the site prior to the commencement of any works advertising the following:-
- Full details of the PCA - Wingecarribee Shire Council
- Full details of the Construction Certificate
- Full details of the Development Consent DA ?????
- Full details of the builder/contractor

ROADWORKS

R1 Signposting and linemarking to conform with AS1742.2 raised retro-reflective pavement markers to conform with AS1906. All aprons and kerb face on central islands of roundabouts and all other islands should be delineated by reflective white marking.
R2 Road subgrade and pavement materials to be compacted in accordance with Council's specifications.
R3 Signposting and line marking where required is to conform to AS1742.2. Raised retro-reflective pavement markers where required to conform to AS1906. All aprons and kerb faces on central islands of roundabouts and other islands are to be delineated with reflective white markings.



LOCALITY SKETCH
(NOT TO SCALE)

EROSION AND SEDIMENT CONTROL

1. All erosion and sedimentation control measures, including revegetation and storage of soil and topsoil, shall be implemented in consultation with the Council during the construction phase.
2. Disturbance of vegetation shall be kept to a minimum by staging the development.
3. All disturbed areas shall be revegetated as soon as the relevant works are completed.
4. The capacity and effectiveness of runoff and sediment control measures shall be maintained at no less than 70% capacity at all times to the satisfaction of Wingecarribee Shire Council.
5. All controls should be inspected at the end of each day and particularly before weekends and/or when the site is to be left for extended periods.
6. All erosion and sediment control devices are to remain in position and be maintained until advised by Council's Development Engineer that they may be removed or until the 12 month maintenance period has lapsed.

SCHEDULE OF SHEETS

SHEET No.	ISSUE	DESCRIPTION
1	A	COVER SHEET
2	A	PLAN OF ADJUSTMENTS TO EXISTING FEATURES
3	A	PROPOSED ROUNDABOUT PLAN OF YARRAWA ROAD
4	A	LEG 1 SIGHT LINES
5	A	LEG 2 SIGHT LINES
6	A	LEG 3 SIGHT LINES
7	A	LEG 4 SIGHT LINES
8	A	CAR & BUS SWEPT PATH ANALYSIS'
9	A	B-DOUBLE SWEPT PATH ANALYSIS'
10	A	SERVICE VEHICLE SEPT PATH ANALYSIS'

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services are approximate only and their exact position should be proven on site.
No guarantee is given that all existing services are shown. Locate all underground services before commencement of works
DIAL 1100 BEFORE YOU DIG
www.1100.com.au

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.	REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.					

Client:
PRIME MOSS VALE PTY LTD

Designed	T.H.
Date	18-01-2023
Drawn	D.P.
Approved	T.H.
Date	18-01-2023
PS Number	-

Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS

Drawing Title: COVER SHEET

Sheet 01 of 10

Scale: NOT TO SCALE

Project Ref	Stage No	Drawing No	Rev
18001	203	001	A

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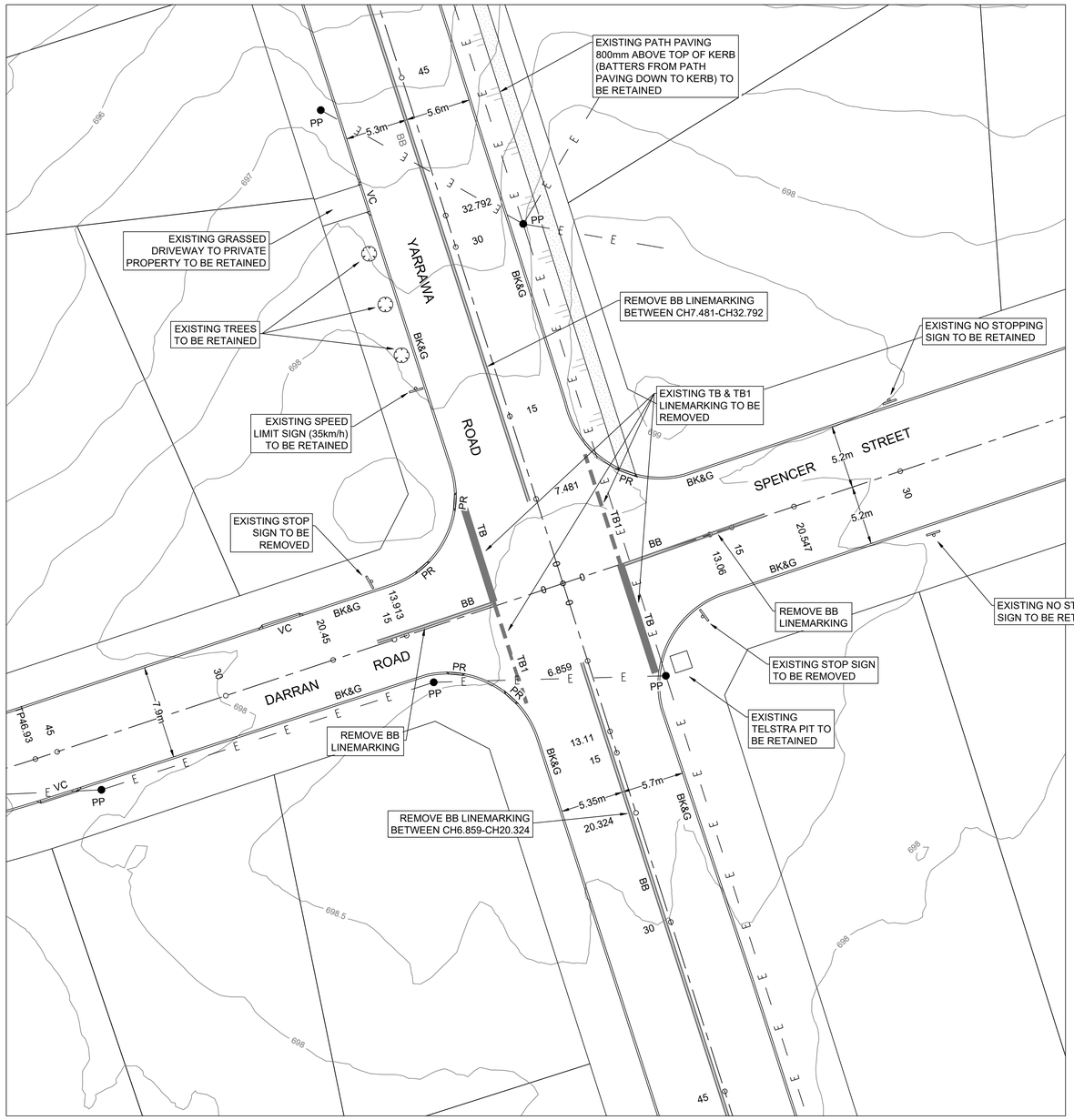

PLAN OF ADJUSTMENTS TO EXISTING FEATURES
RATIO:- 1:200

LEGEND

BK&G	DENOTES EXISTING BARRIER KERB & GUTTER TO BE RETAINED
699	DENOTES 0.5m EXISTING SURFACE CONTOURS
BB	DENOTES EXISTING BB LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 4.2
TB / TB1	DENOTES PROPOSED TB & TB1 LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 6.1
PR	DENOTES EXISTING PRAM RAMP TO BE RETAINED
VC	DENOTES EXISTING VEHICULAR CROSSING TO BE RETAINED
E / PP	DENOTES EXISTING POWER POLE & OVERHEAD ELECTRICITY TO BE RETAINED

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REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client:
PRIME MOSS VALE PTY LTD

0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed T.H. 18-01-2023
Drawn D.P.
Approved T.H. 18-01-2023
PS Number -

Beveridge Williams
32 Iolanthe St
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Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: PLAN OF ADJUSTMENTS TO EXISTING FEATURES

Sheet 02 of 10
Scale 1:200 @ A1

Project Ref	Stage No	Drawing No	Rev
18001	203	002	A

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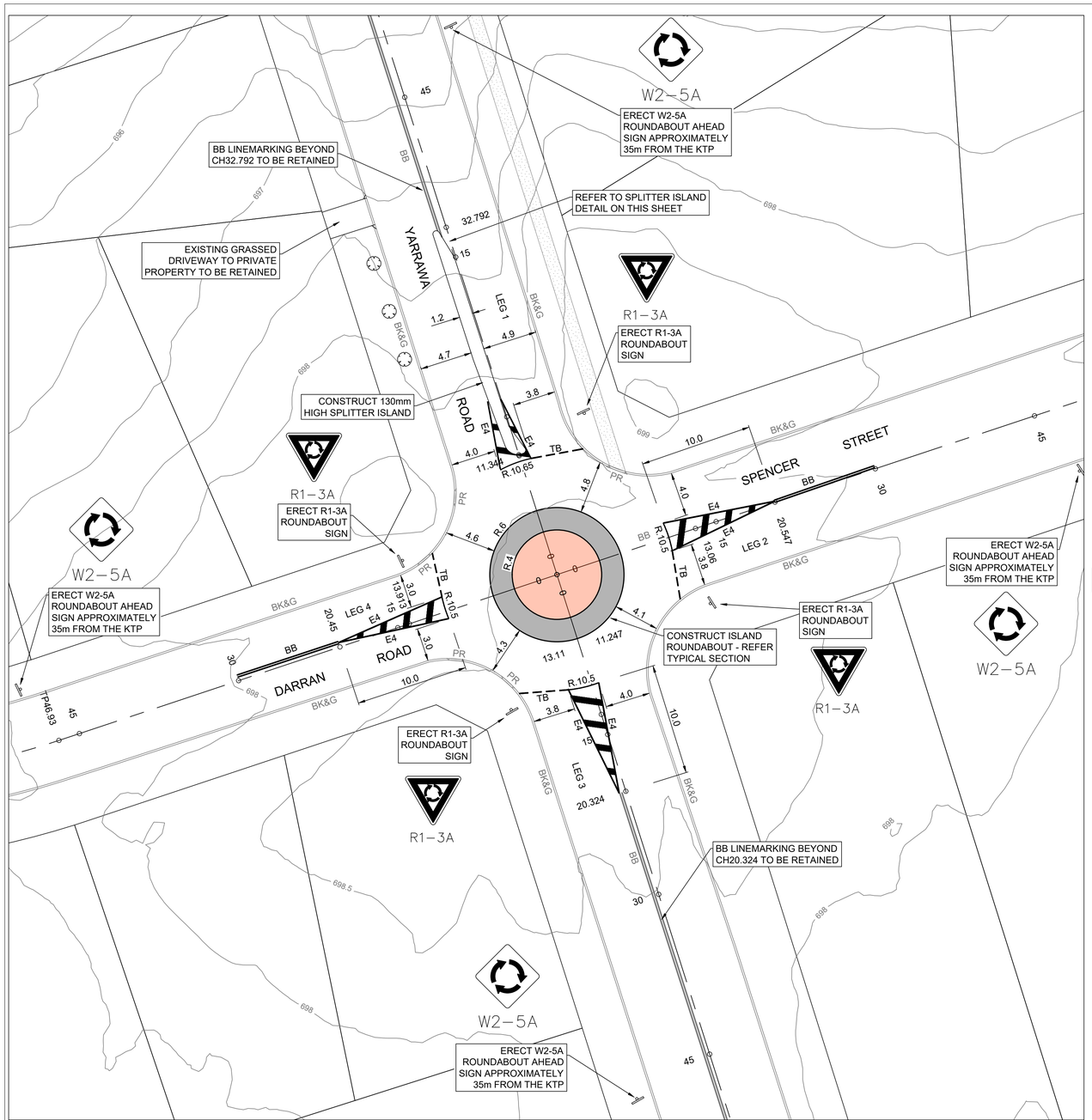
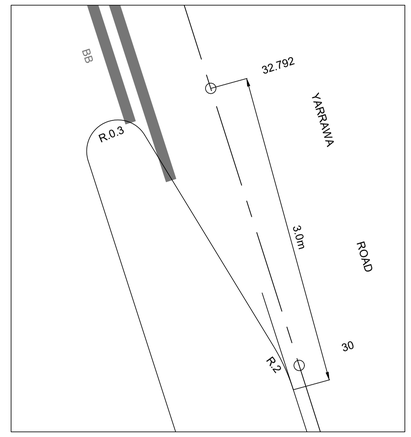


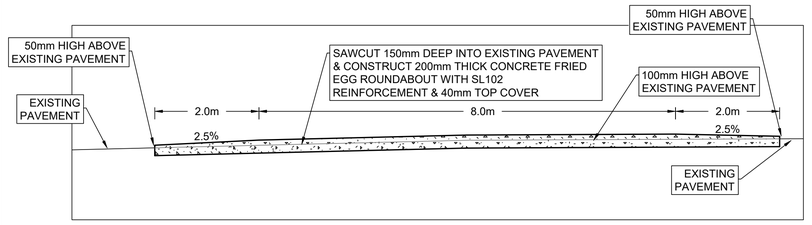
PLAN OF PROPOSED ROUNDABOUT

RATIO:- 1:200



SPLITTER ISLAND DETAIL

RATIO:- 1:20



ROUNDABOUT TYPICAL SECTION

RATIO:- 1:50

LEGEND

BK&G	DENOTES EXISTING BARRIER KERB & GUTTER TO BE RETAINED
PR	DENOTES EXISTING PRAM RAMP TO BE RETAINED
—699—	DENOTES 0.5m EXISTING SURFACE CONTOURS
	DENOTES CENTRAL ISLAND TO BE PAINTED TERRACOTTA OR SIMILIAR
	DENOTES OUTER ISLAND TO BE PAINTED WHITE
BB	DENOTES EXISTING BB LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 4.2
BB	DENOTES PROPOSED BB LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 4.2
TB	DENOTES PROPOSED TB HOLDING LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 6.1
E4	DENOTES PROPOSED E4 EDGE LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL TABLE 4.5
	DENOTES PROPOSED PAINTED MEDIAN LINEMARKING AS PER TRANSPORT FOR NSW DELINEATION MAUNUAL FIGURE 8.6

NOTE: PAINTED ISLANDS AND MEDIANS TO BE GENERALLY IN ACCORDANCE WITH AS1742.2

WARNING
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REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client: PRIME MOSS VALE PTY LTD

0 0.4 0.8 1.2 1.6
SCALE 1:20 AT A1 SIZE

0 0.5 1 2 3 4
SCALE 1:50 AT A1 SIZE

0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed	T.H.
Date	18-01-2023
Drawn	D.P.
Approved	T.H.
Date	18-01-2023
PS Number	-

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Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS

Drawing Title: PROPOSED ROUNDABOUT PLAN OF YARRAWA ROAD

Sheet 03 of 10

Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	010	A

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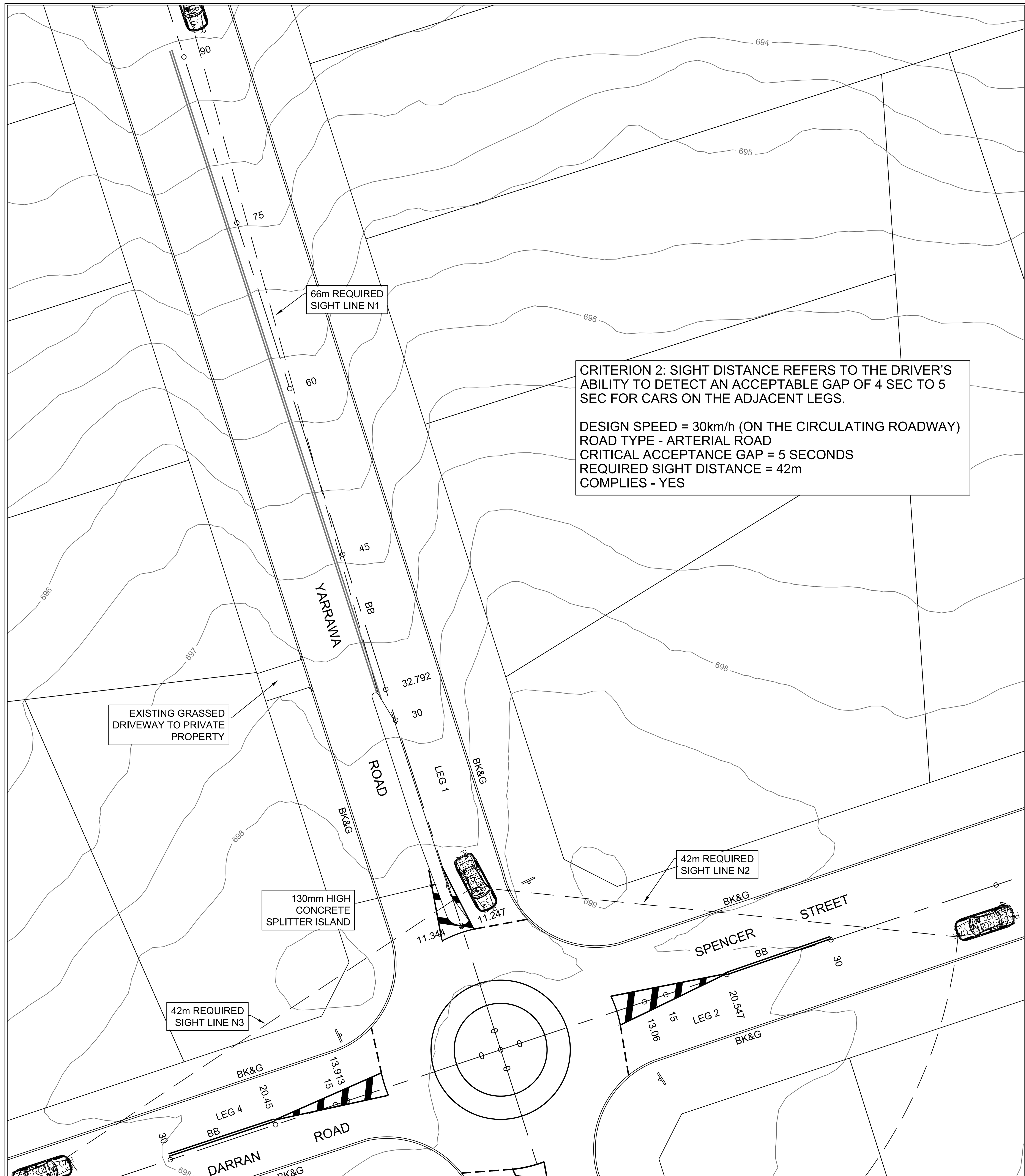
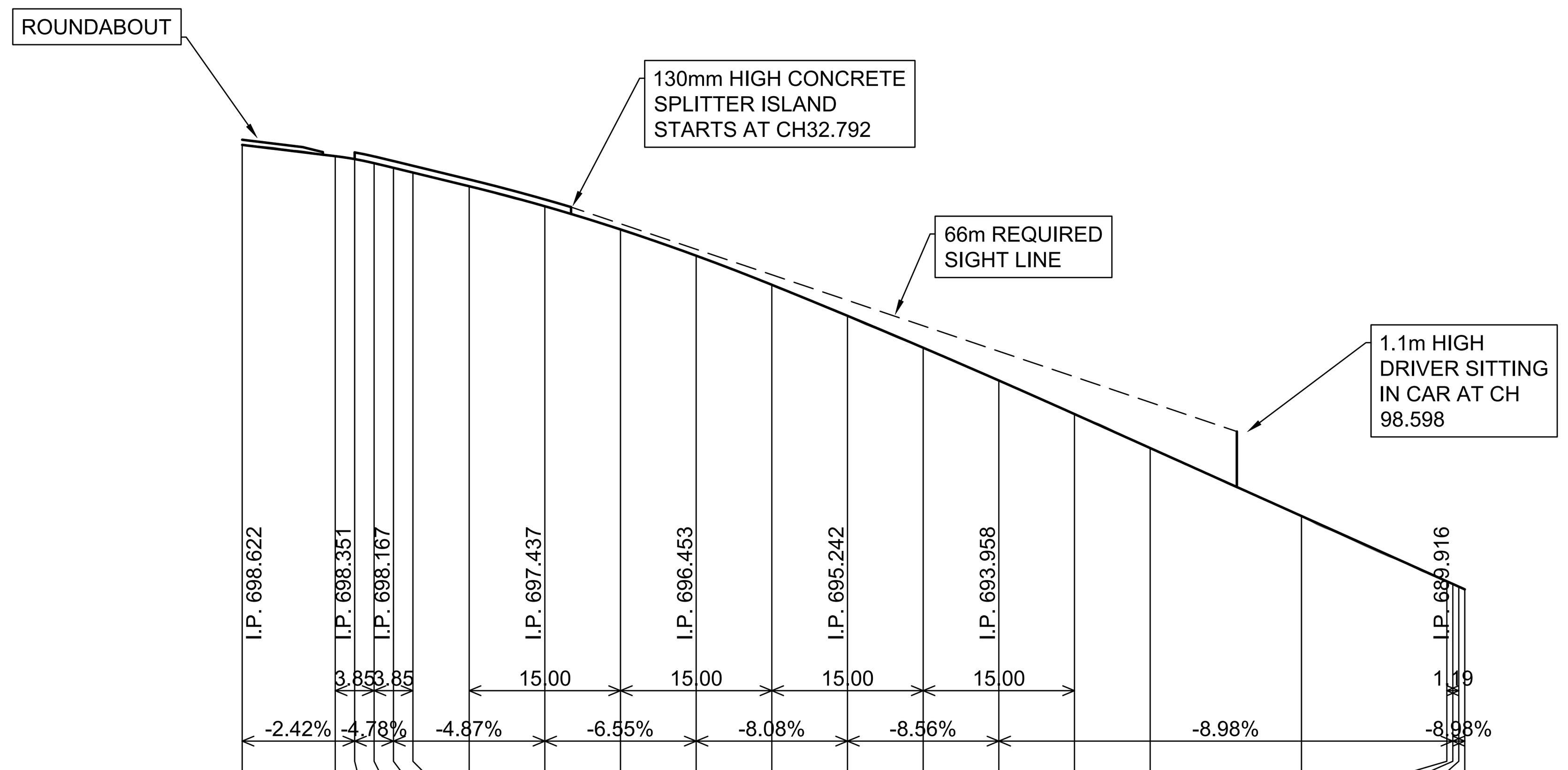


LEG 1 PLAN
RATIO:- 1:200

NOTE: ALL ROADS AT PROPOSED ROUNDABOUT ARE SIGNPOSTED AT 50km/h, THEREFORE A DESIGN SPEED OF 60km/h AND A REACTION TIME OF 2 SECONDS HAS BEEN ADOPTED AS RECOMMENDED IN AUSTROADS GUIDES.

BASIC APPROACH SIGHT DISTANCE (ASD) = 73m
CORRECTION FOR GRADE (8% UPGRADE) = -7m
REQUIRED ASD = 66m
AVAILABLE ASD = 70.6m (>66m)
COMPLIES - YES

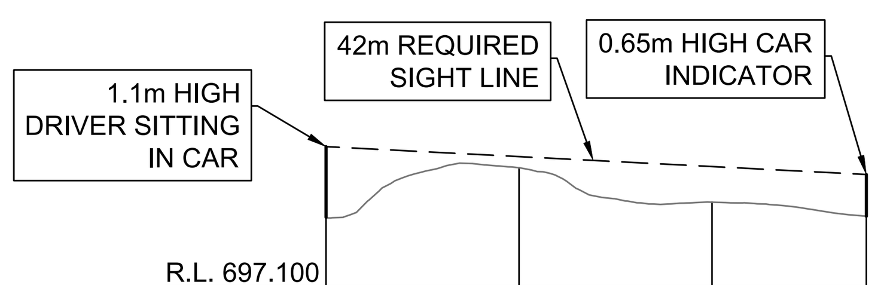


Design Levels	698.622	698.398	698.340	698.259	698.167	698.074	697.802	697.405	696.945	696.425	695.848
Existing Levels	698.622	698.402	698.340	698.263	698.167	698.075	697.796	697.405	696.958	696.425	695.838
Chainage	0.000	9.226	11.150	13.075	15.000	16.925	22.500	30.000	37.500	45.000	52.500

Design Levels	695.233	694.600	693.950	693.285	692.611	691.263	689.969	689.916	689.862	689.809
Existing Levels	695.233	694.594	693.951	693.278	692.613	691.255	689.959	689.916	689.867	689.809
Chainage	60.000	67.500	75.000	82.500	90.000	105.000	119.406	120.000	120.594	121.188

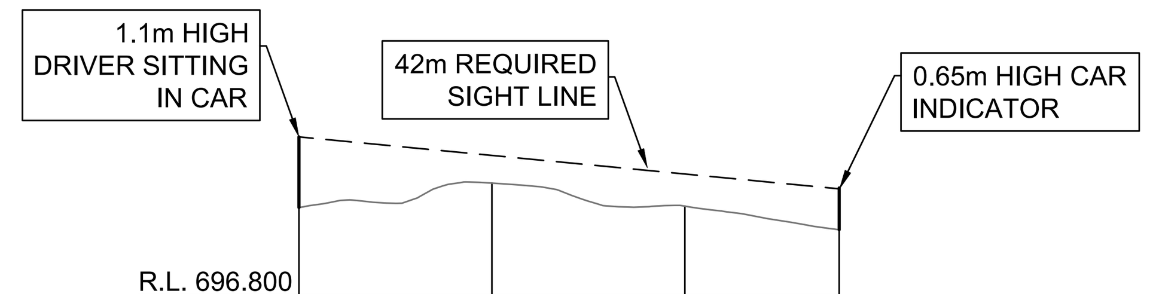
REPRESENTATION OF SIGHT LINE FOR SOUTHBOUND TRAFFIC APPROACHING ROUNDABOUT FROM NORTH - SIGHT LINE N1
RATIO:- H 1:500 V 1:100

AUSTROADS CRITERION 1 - APPROACH SIGHT DISTANCE



Existing Levels	698.175	698.955	698.420	698.200
Chainage	0.000	15.000	30.000	42.000

SIGHT LINE - LEG 1 TO LEG 2 (N2)
RATIO:- 1:100



Existing Levels	698.175	698.556	698.198	697.832
Chainage	0.000	15.000	30.000	42.000

SIGHT LINE - LEG 1 TO LEG 4 (N3)
RATIO:- 1:100

AUSTROADS CRITERION 2 - SIGHT DISTANCE

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client: PRIME MOSS VALE PTY LTD

SCALE 1:500 AT A1 SIZE (0 5 10 20 30 40)
SCALE 1:200 AT A1 SIZE (0 2 4 8 12 16)

Designed T.H. Date 18-01-2023
Drawn D.P.
Approved T.H. Date 18-01-2023
PS Number -

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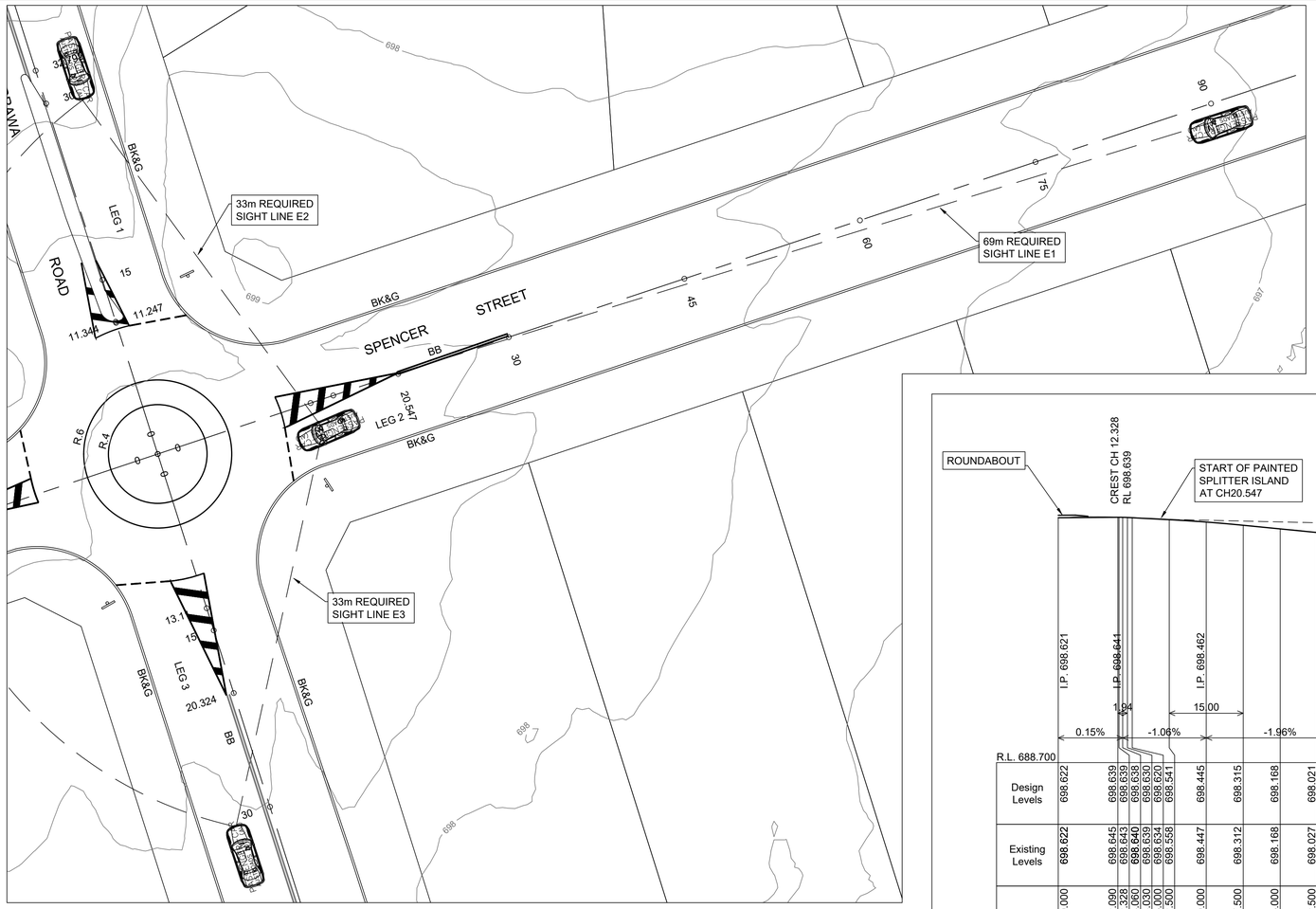
Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: LEG 1 SIGHT LINES

Sheet 04 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	011	A

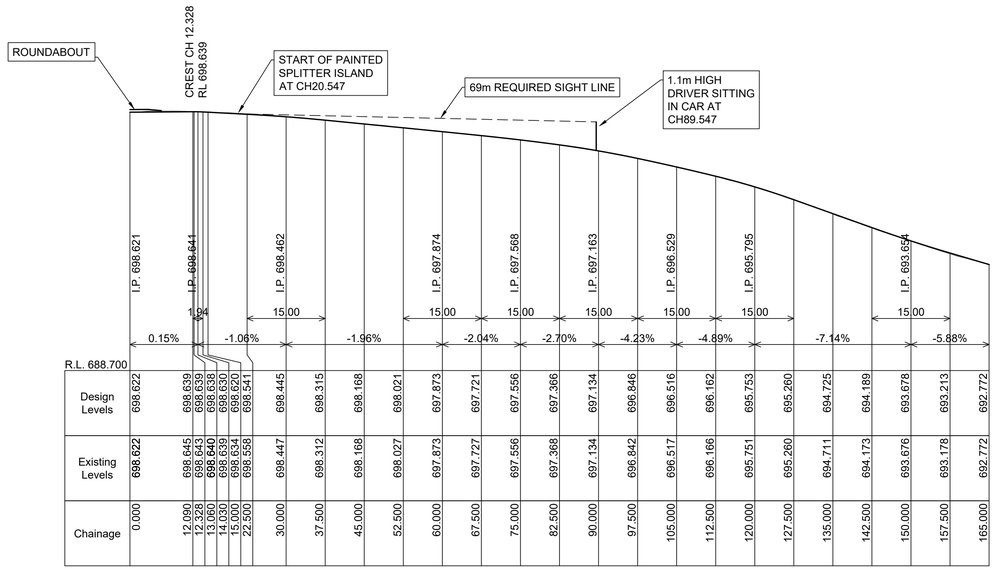
S:\JOBS\18\18001\EMW_Eng\18001_203_CC (S.138 for Spencer St Rabt)\Design\Drafting\18001_011_LAY.dwg



LEG 2 PLAN
RATIO:- 1:200

NOTE: ALL ROADS AT PROPOSED ROUNDABOUT ARE SIGNPOSTED AT 50km/h, THEREFORE A DESIGN SPEED OF 60km/h AND A REACTION TIME OF 2 SECONDS HAS BEEN ADOPTED AS RECOMMENDED IN AUSTROADS GUIDES.

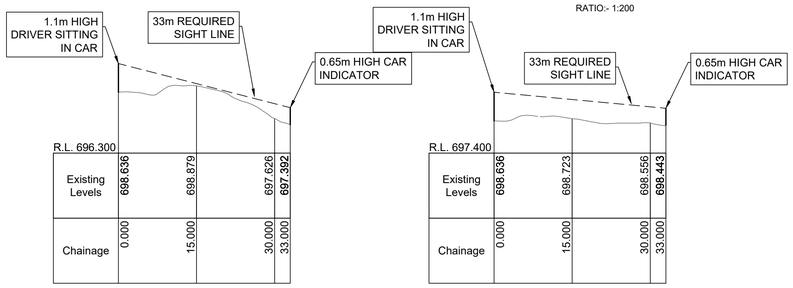
BASIC APPROACH SIGHT DISTANCE (ASD) = 73m
CORRECTION FOR GRADE (4% UPGRADE) = -4m
REQUIRED ASD = 69m
AVAILABLE ASD = 103.5m (>69m)
COMPLIES - YES



I.P.		698.621		698.641		698.462		697.874		697.568		697.163		696.529		695.795		693.654						
			1.94		15.00		15.00		15.00		15.00		15.00		15.00		15.00		15.00					
		0.15%		-1.06%		-1.96%		-2.04%		-2.70%		-4.23%		-4.89%		-7.14%		-5.88%						
R.L. 688.700																								
Design Levels	698.622	698.639	698.639	698.638	698.630	698.620	698.541	698.445	698.315	698.168	698.021	697.873	697.721	697.556	697.366	697.134	696.846	696.516	696.162	695.753	695.260	694.725	694.189	693.678	693.213	692.772
Existing Levels	698.622	698.645	698.643	698.640	698.639	698.634	698.558	698.447	698.312	698.168	698.027	697.873	697.727	697.556	697.368	697.134	696.842	696.517	696.166	695.751	695.260	694.711	694.173	693.676	693.178	692.772
Chainage	0.000	12.090	12.328	13.060	14.030	15.000	22.500	30.000	37.500	45.000	52.500	60.000	67.500	75.000	82.500	90.000	97.500	105.000	112.500	120.000	127.500	135.000	142.500	150.000	157.500	165.000

REPRESENTATION OF SIGHT LINE FOR WESTBOUND TRAFFIC APPROACHING ROUNDABOUT FROM EAST - SIGHTLINE E1
RATIO:- H 1:500 V 1:100

AUSTROADS CRITERION 1 - APPROACH SIGHT DISTANCE



R.L. 696.300				
Existing Levels	698.636	698.879	697.626	697.392
Chainage	0.000	15.000	30.000	33.000

SIGHT LINE - LEG 2 TO LEG 1 (E2)
RATIO:- 1:100

R.L. 697.400				
Existing Levels	698.636	698.723	698.556	698.443
Chainage	0.000	15.000	30.000	33.000

SIGHT LINE - LEG 2 TO LEG 3 (E3)
RATIO:- 1:100

CRITERION 2: SIGHT DISTANCE REFERS TO THE DRIVER'S ABILITY TO DETECT AN ACCEPTABLE GAP OF 4 SEC TO 5 SEC FOR CARS ON THE ADJACENT LEGS.

DESIGN SPEED = 30km/h (ON THE CIRCULATING ROADWAY)
ROAD TYPE - LOCAL STREET
CRITICAL ACCEPTANCE GAP = 4 SECONDS
REQUIRED SIGHT DISTANCE = 33m
COMPLIES - YES

AUSTROADS CRITERION 2 - SIGHT DISTANCE

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client: PRIME MOSS VALE PTY LTD

0 1 2 4 6 8
SCALE 1:100 AT A1 SIZE

0 5 10 20 30 40
SCALE 1:500 AT A1 SIZE

0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed	T.H.	
Date	18-01-2023	
Drawn	D.P.	
Approved	T.H.	
Date	18-01-2023	
PS Number	-	

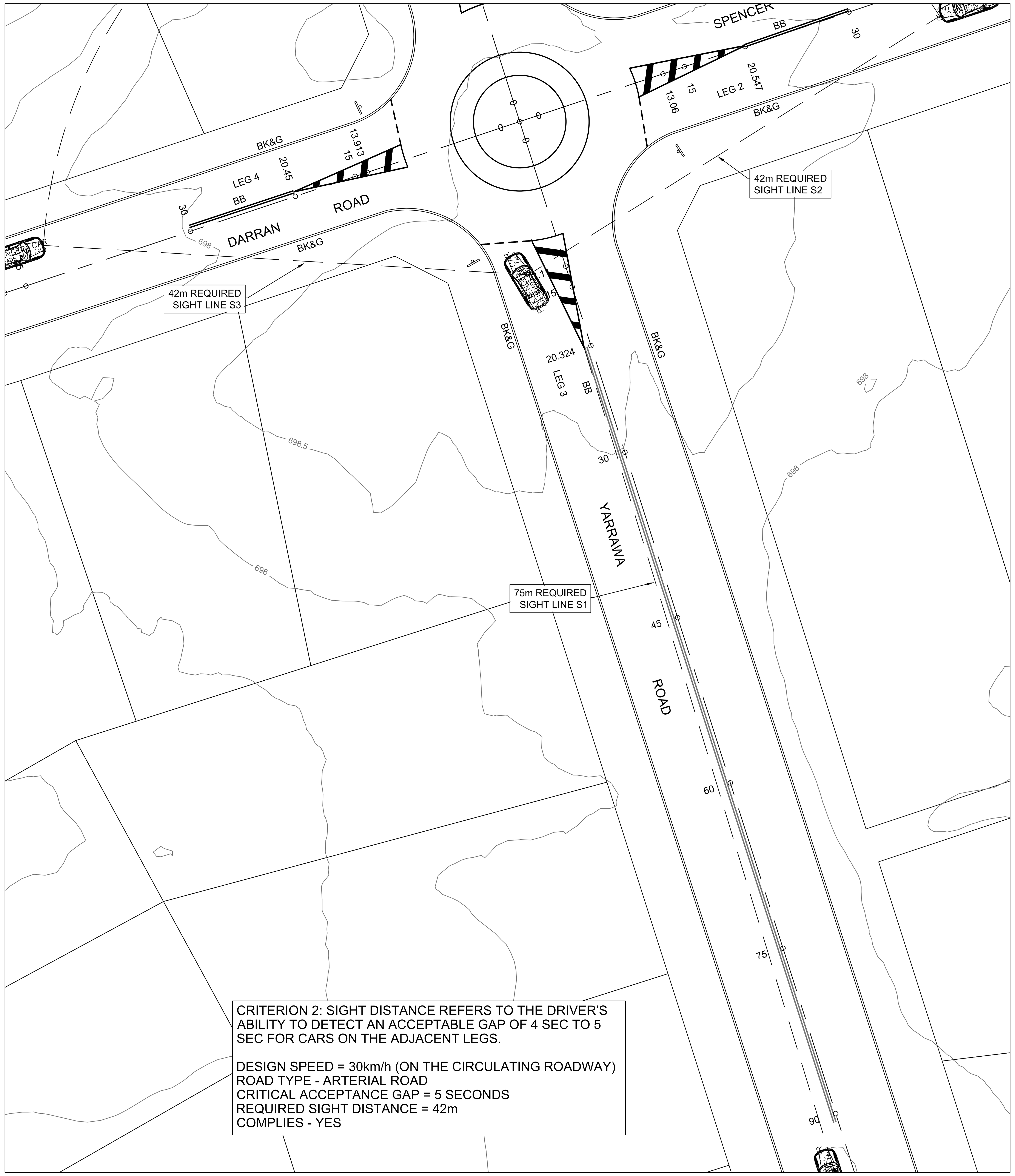
Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: LEG 2 SIGHT LINES

Sheet 05 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	012	A

S:\JOBS\18\18001\EMW_Eng\18001_203_CC (S.138 for Spencer St Rabt)\Design\Drafting\18001_012_LAY.dwg



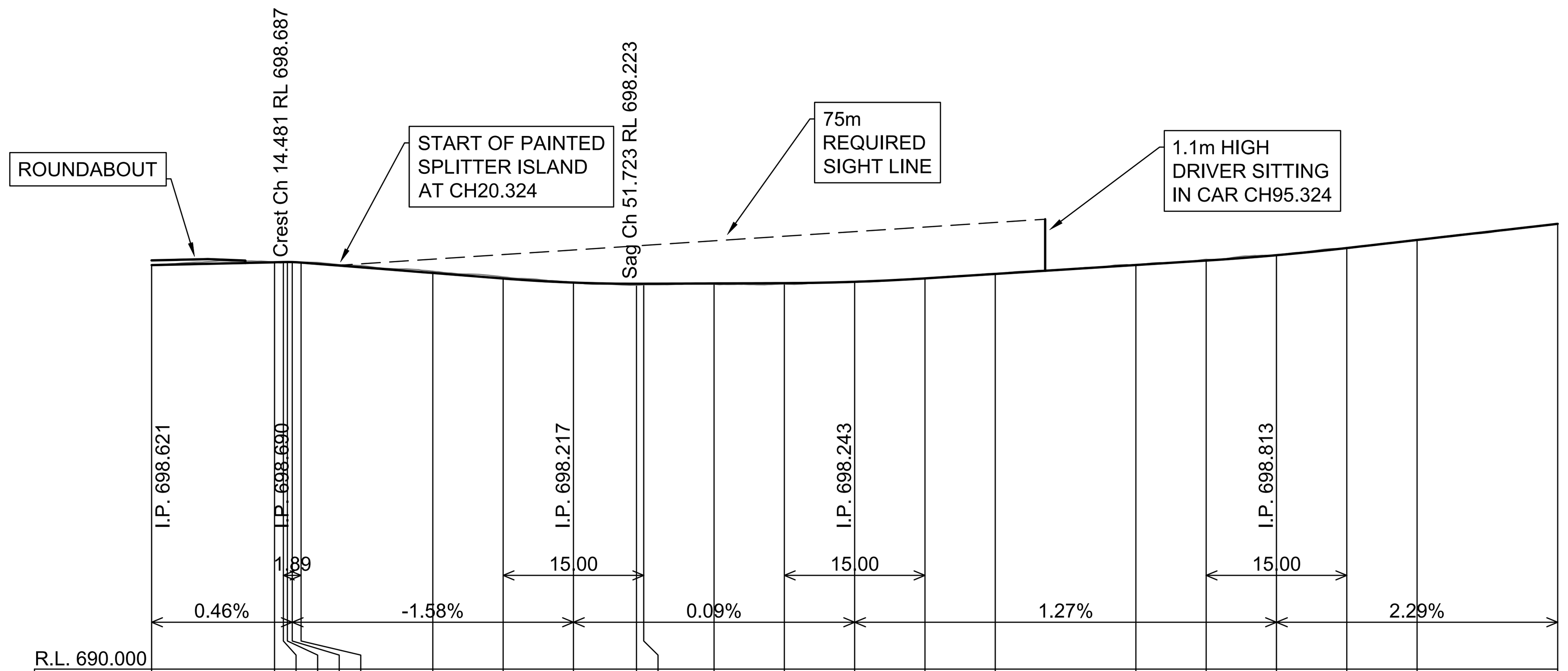
CRITERION 2: SIGHT DISTANCE REFERS TO THE DRIVER'S ABILITY TO DETECT AN ACCEPTABLE GAP OF 4 SEC TO 5 SEC FOR CARS ON THE ADJACENT LEGS.

DESIGN SPEED = 30km/h (ON THE CIRCULATING ROADWAY)
ROAD TYPE - ARTERIAL ROAD
CRITICAL ACCEPTANCE GAP = 5 SECONDS
REQUIRED SIGHT DISTANCE = 42m
COMPLIES - YES

LEG 3 PLAN
RATIO:- 1:200

NOTE: ALL ROADS AT PROPOSED ROUNDABOUT ARE SIGNPOSTED AT 50km/h, THEREFORE A DESIGN SPEED OF 60km/h AND A REACTION TIME OF 2 SECONDS HAS BEEN ADOPTED AS RECOMMENDED IN AUSTROADS GUIDES.

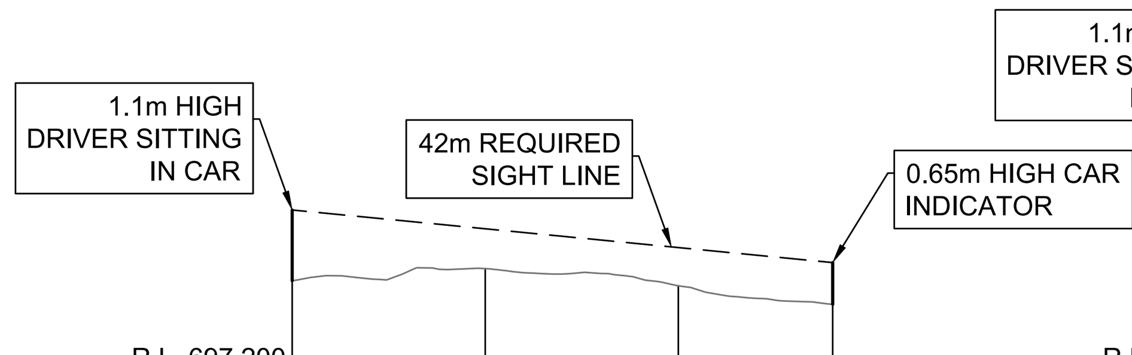
BASIC APPROACH SIGHT DISTANCE (ASD) = 73m
CORRECTION FOR GRADE (2% DOWNGRADE) = -2m
REQUIRED ASD = 75m
AVAILABLE ASD = 103.5m (>75m)
COMPLIES - YES



Chainage	Design Levels	Existing Levels
0.000	698.622	698.622
13.110	698.682	698.683
14.055	698.686	698.674
14.481	698.687	698.684
15.000	698.685	698.687
15.945	698.675	698.685
30.000	698.454	698.490
37.500	698.335	698.369
45.000	698.248	698.252
51.723	698.223	698.194
52.500	698.224	698.202
60.000	698.230	698.215
67.500	698.236	698.218
75.000	698.265	698.264
82.500	698.338	698.335
90.000	698.433	698.442
105.000	698.623	698.634
112.500	698.718	698.744
120.000	698.833	698.836
127.500	698.985	698.974
135.000	699.157	699.165
150.000	699.501	699.501

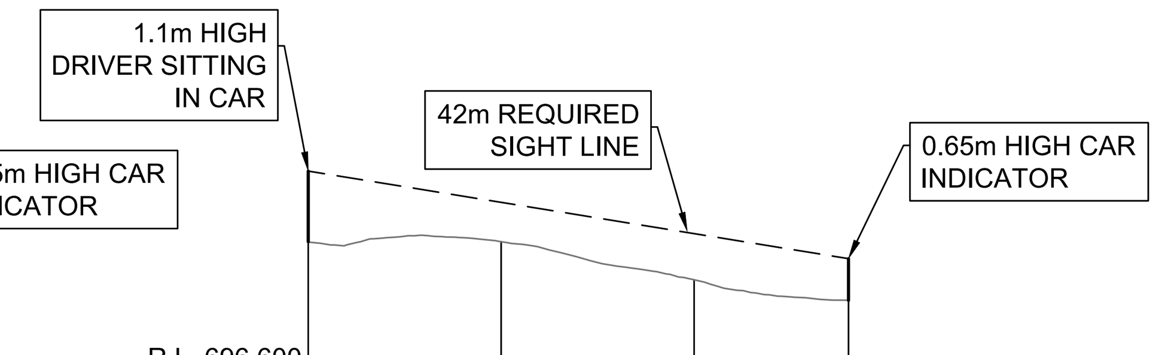
REPRESENTATION OF SIGHT LINE FOR NORTHBOUND TRAFFIC APPROACHING ROUNDABOUT FROM SOUTH - SIGHT LINE S1
RATIO:- H 1:500 V 1:100

AUSTROADS CRITERION 1 - APPROACH SIGHT DISTANCE



Chainage	Existing Levels
0.000	698.626
15.000	698.814
30.000	698.547
42.000	698.257

SIGHT LINE - LEG 3 TO LEG 2 (S2)
RATIO:- 1:100



Chainage	Existing Levels
0.000	698.626
15.000	698.632
30.000	698.040
42.000	697.719

SIGHT LINE - LEG 3 TO LEG 4 (S3)
RATIO:- 1:100

AUSTROADS CRITERION 2 - SIGHT DISTANCE

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client: PRIME MOSS VALE PTY LTD

SCALE 1:100 AT A1 SIZE (0 1 2 4 6 8)
SCALE 1:500 AT A1 SIZE (0 5 10 20 30 40)
SCALE 1:200 AT A1 SIZE (0 2 4 8 12 16)

Designed T.H.
Date 18-01-2023
Drawn D.P.
Approved T.H.
Date 18-01-2023
PS Number -

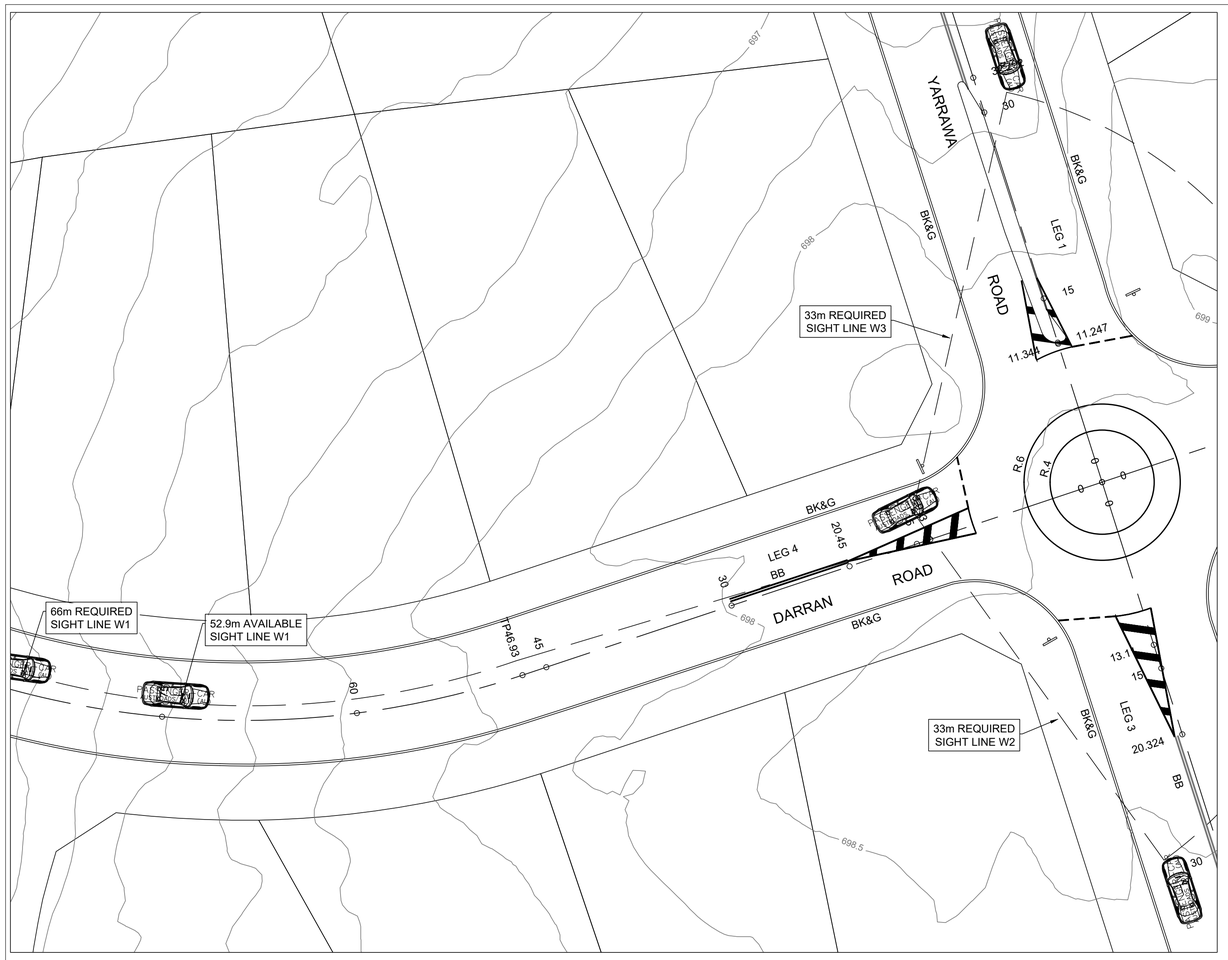
Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: LEG 3 SIGHT LINES

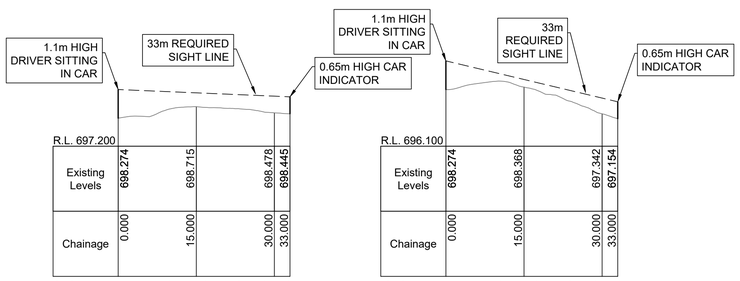
Sheet 06 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	013	A

S:\JOBS\18\18001\EMW_Eng\18001_203_CC (S.138 for Spencer St Rabt)\Design\Drafting\18001_013_LAY.dwg



LEG 4 PLAN
RATIO:- 1:200



SIGHT LINE - LEG 4 TO LEG 3 (W2)
RATIO:- 1:100

SIGHT LINE - LEG 4 TO LEG 1 (W3)
RATIO:- 1:100

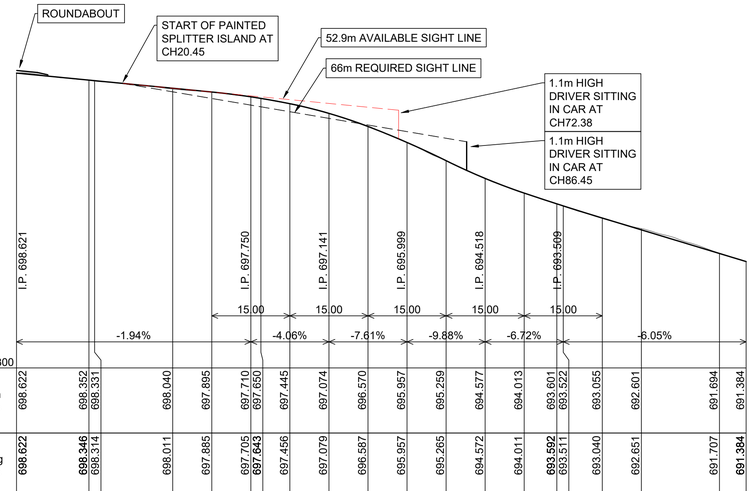
AUSTROADS CRITERION 2 - SIGHT DISTANCE

CRITERION 2: SIGHT DISTANCE REFERS TO THE DRIVER'S ABILITY TO DETECT AN ACCEPTABLE GAP OF 4 SEC TO 5 SEC FOR CARS ON THE ADJACENT LEGS.

DESIGN SPEED = 30km/h (ON THE CIRCULATING ROADWAY)
ROAD TYPE - LOCALSTREET
CRITICAL ACCEPTANCE GAP = 4 SECONDS
REQUIRED SIGHT DISTANCE = 33m
COMPLIES - YES

NOTE: ALL ROADS AT PROPOSED ROUNDABOUT ARE SIGNPOSTED AT 50km/h, THEREFORE A DESIGN SPEED OF 60km/h AND A REACTION TIME OF 2 SECONDS HAS BEEN ADOPTED AS RECOMMENDED IN AUSTROADS GUIDES.

BASIC APPROACH SIGHT DISTANCE (ASD) = 73m
CORRECTION FOR GRADE (8% UPGRADE) = -8m
REQUIRED ASD = 66m
AVAILABLE ASD = 52.9m (<66m)
COMPLIES - NO, NOTING THAT RESTRICTED SIGHT DISTANCE APPLIES EQUALLY TO THE EXISTING GIVE WAY SIGN CURRENTLY INSTALLED BY COUNCIL.



R.L. 687.300

Design Levels	698.622	698.352	698.331	698.040	697.895	697.710	697.650	697.445	697.074	696.570	695.957	695.259	694.577	694.013	693.601	693.522	693.055	692.601	691.694	691.384
Existing Levels	698.622	698.346	698.314	698.011	697.885	697.705	697.643	697.456	697.079	696.587	695.957	695.265	694.572	694.011	693.592	693.511	693.040	692.651	691.707	691.384
Chainage	0.000	13.913	15.000	30.000	37.500	45.000	46.930	52.500	60.000	67.500	75.000	82.500	90.000	97.500	103.768	105.000	112.500	120.000	135.000	140.123

REPRESENTATION OF SIGHT LINE FOR EASTBOUND TRAFFIC APPROACHING ROUNDABOUT FROM WEST - SIGHT LINE W1
RATIO:- H 1:500 V 1:100

AUSTROADS CRITERION 1 - APPROACH SIGHT DISTANCE

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client: PRIME MOSS VALE PTY LTD

0 1 2 4 6 8
SCALE 1:100 AT A1 SIZE

0 5 10 20 30 40
SCALE 1:500 AT A1 SIZE

0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

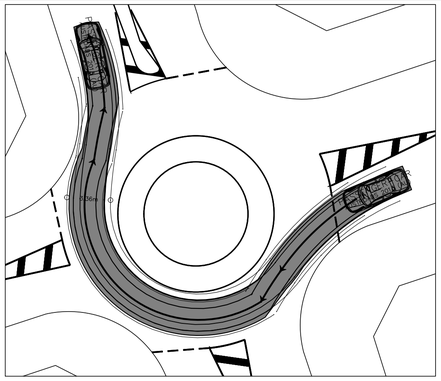
Designed	T.H.	
Date	18-01-2023	
Drawn	D.P.	
Approved	T.H.	
Date	18-01-2023	
PS Number	-	

Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

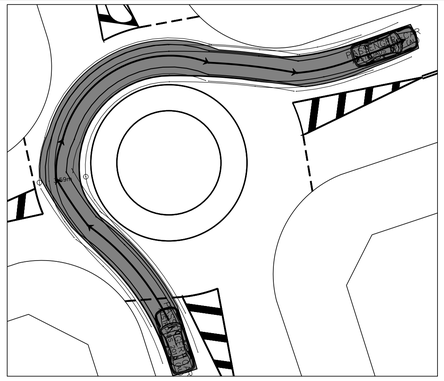
Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: LEG 4 SIGHT LINES
Sheet 07 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	014	A

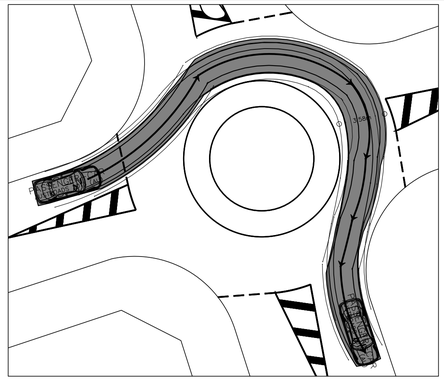
S:\JOBS\18\18001\EMW_Eng\18001_203_CC (S.138 for Spencer St Rabt)\Design\Drafting\18001_014_LAY.dwg



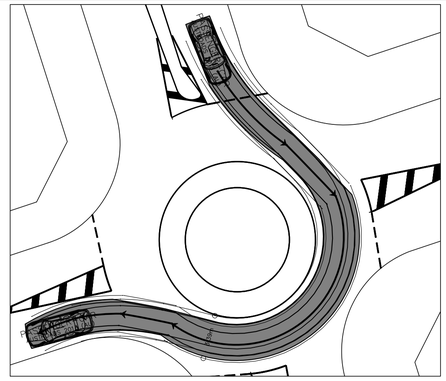
CAR TURN NORTHBOUND
RATIO:- 1:200



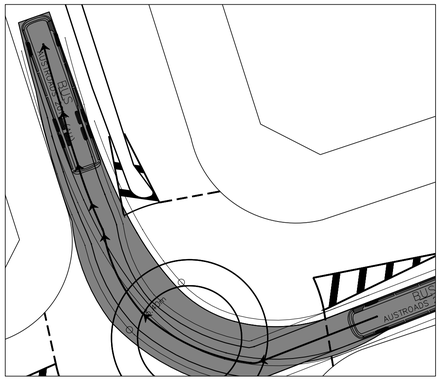
CAR TURN EASTBOUND
RATIO:- 1:200



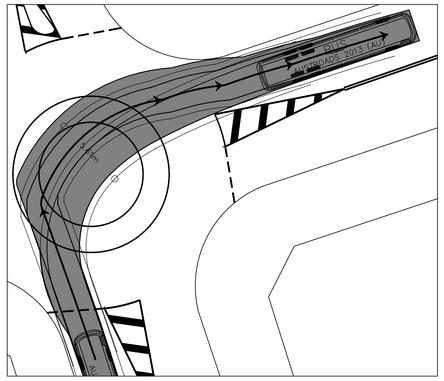
CAR TURN SOUTHBOUND
RATIO:- 1:200



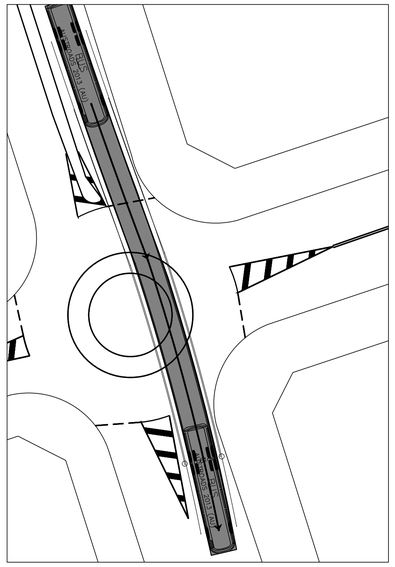
CAR TURN WESTBOUND
RATIO:- 1:200



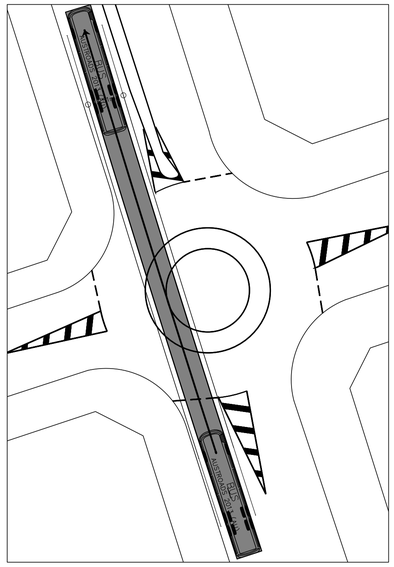
BUS TURN NORTHBOUND
RATIO:- 1:200



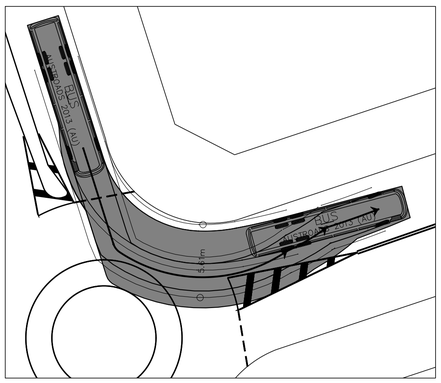
BUS TURN EASTBOUND 1
RATIO:- 1:200



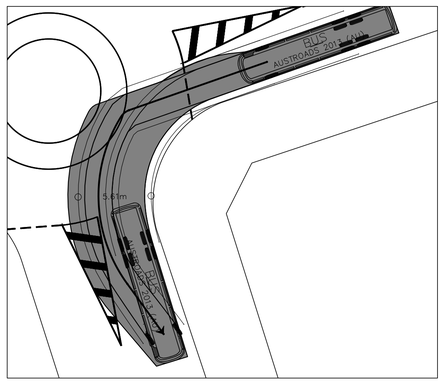
BUS NORTHBOUND 2
RATIO:- 1:250



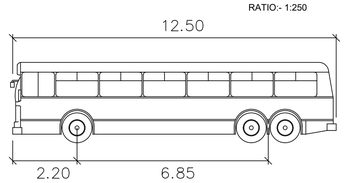
BUS NORTHBOUND 2
RATIO:- 1:250



BUS TURN EASTBOUND 2
RATIO:- 1:200

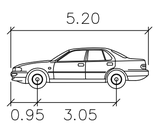


BUS TURN SOUTHBOUND
RATIO:- 1:200



BUS

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6



PASSENGER–CAR

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

LEGEND

FRONT TYRES	
REAR TYRES	
VEHICLE BODY	
0.5m CLEARANCE	

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client:
PRIME MOSS VALE PTY LTD

0 2.5 5 10 15 20
SCALE 1:250 AT A1 SIZE
0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed T.H. Date 18-01-2023
Drawn D.P.
Approved T.H. Date 18-01-2023
PS Number -

Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: CAR & BUS SWEPT PATH ANALYSIS'

Sheet 08 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	016	A

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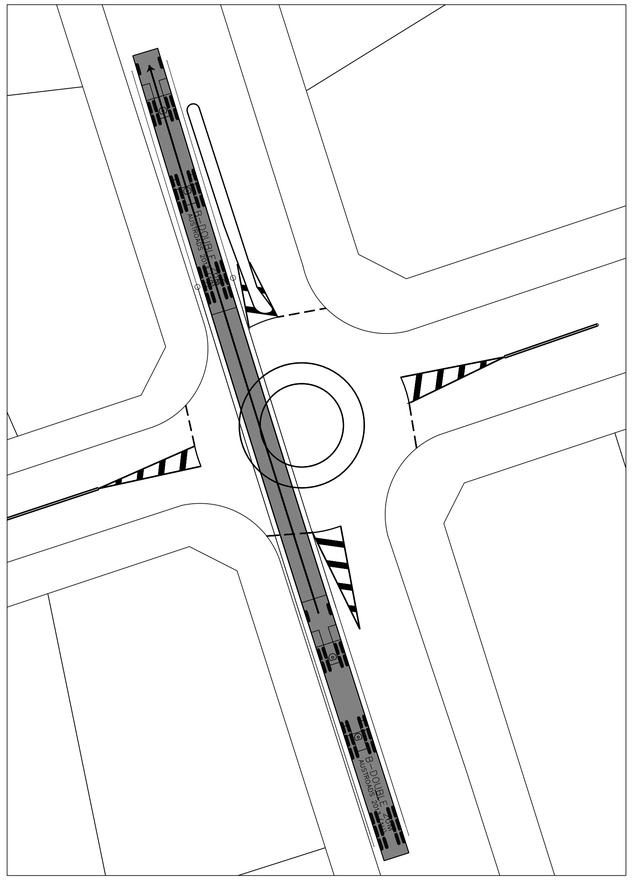
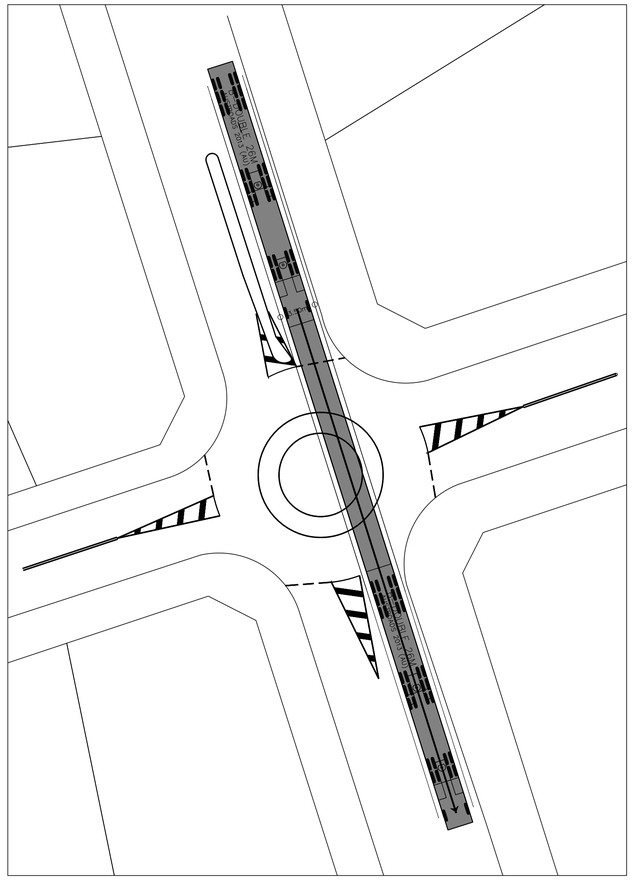
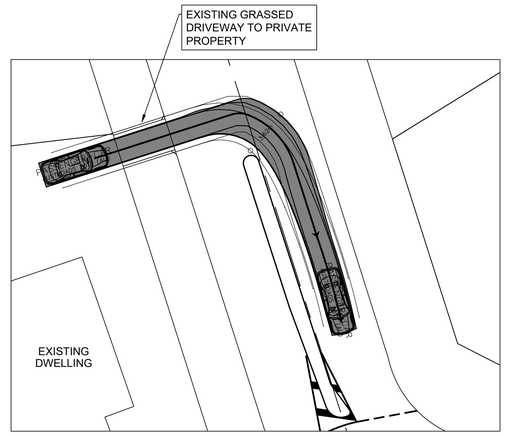


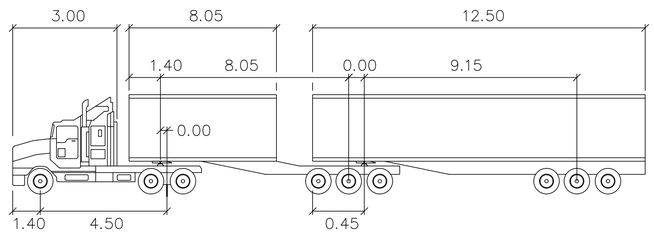
B-DOUBLE NORTHBOUND
RATIO:- 1:250



B-DOUBLE SOUTHBOUND
RATIO:- 1:250



CAR TURN OUT OF DRIVEWAY SOUTHBOUND
RATIO:- 1:200

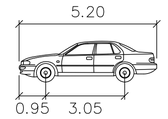


B–DOUBLE 26M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

LEGEND

FRONT TYRES	
REAR TYRES	
VEHICLE BODY	
0.5m CLEARANCE	



PASSENGER–CAR

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL

REV	DESCRIPTION	DATE	DRN	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

REV	DESCRIPTION	DATE	DRN	APP.

Client:
PRIME MOSS VALE PTY LTD

0 2.5 5 10 15 20
SCALE 1:250 AT A1 SIZE
0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed		T.H.
Date		18-01-2023
Drawn		D.P.
Approved		T.H.
Date		18-01-2023
PS Number		-

Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: B-DOUBLE SWEPT PATH ANALYSIS'

Sheet 09 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	017	A

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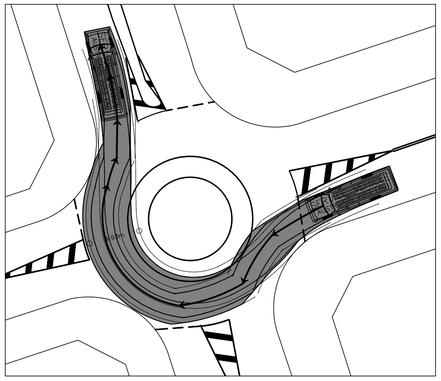
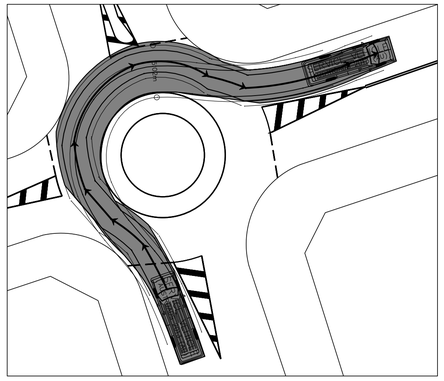


SERVICE VEHICLE TURN NORTHBOUND
RATIO:- 1:250



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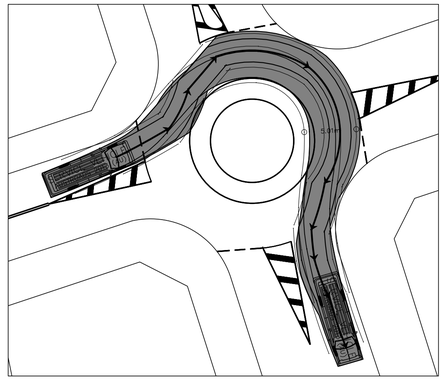
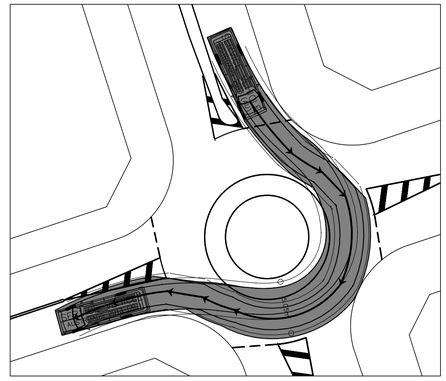
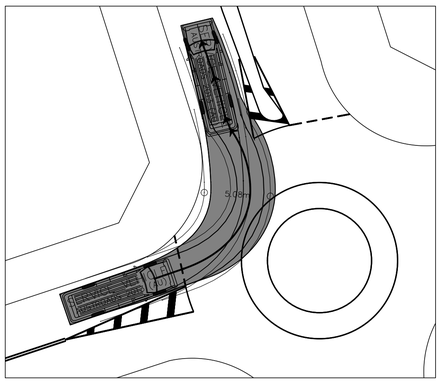
RATIO:- 1:250



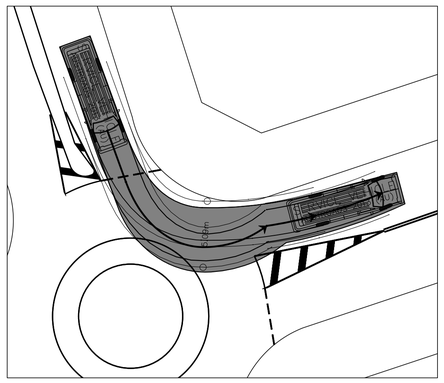
SERVICE VEHICLE TURN SOUTHTHBOUND
RATIO:- 1:250



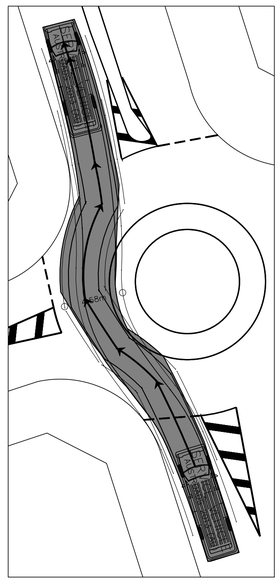
SERVICE VEHICLE TURN WESTBOUND
RATIO:- 1:250



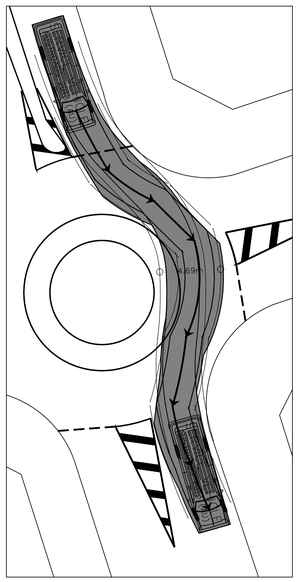
SERVICE VEHICLE TURN NORTHBOUND 2
RATIO:- 1:200



SERVICE VEHICLE TURN EASTBOUND 2
RATIO:- 1:200



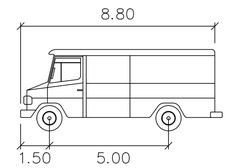
SERVICE VEHICLE NORTHBOUND 3
RATIO:- 1:200



SERVICE VEHICLE SOUTHBOUND 3
RATIO:- 1:200

LEGEND

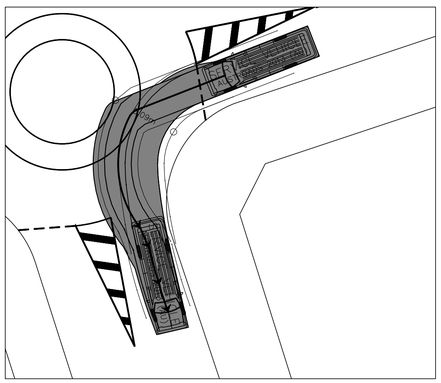
FRONT TYRES	
REAR TYRES	
VEHICLE BODY	
0.5m CLEARANCE	



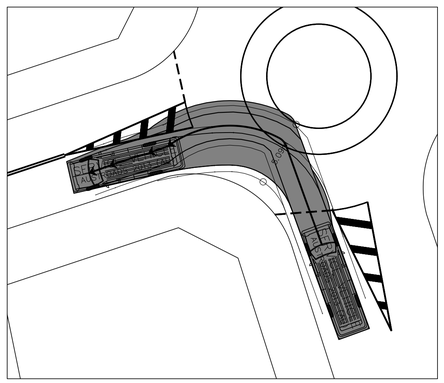
SERVICE VEHICLE

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

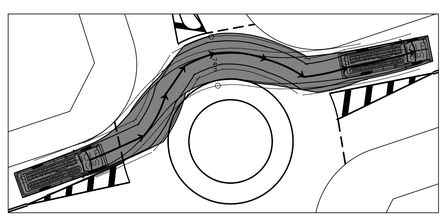
FOR CONSTRUCTION CERTIFICATE
ISSUED FOR S.138 APPROVAL



SERVICE VEHICLE TURN SOUTHBOUND 2
RATIO:- 1:200



SERVICE VEHICLE TURN WESTBOUND 2
RATIO:- 1:200



SERVICE VEHICLE EASTBOUND 3
RATIO:- 1:250

SERVICE VEHICLE TURN WESTBOUND 3
RATIO:- 1:250

REV	DESCRIPTION	DATE	DRN.	APP.
A	ISSUED FOR S.138 APPROVAL	18-01-2023	D.P.	T.H.

Client:
PRIME MOSS VALE PTY LTD

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SCALE 1:250 AT A1 SIZE
0 2 4 8 12 16
SCALE 1:200 AT A1 SIZE

Designed T.H. Date 18-01-2023
Drawn D.P.
Approved T.H. Date 18-01-2023
PS Number -

Beveridge Williams
32 Iolanthe St
Campbelltown, NSW 2560
ph: 02 4625 5055
www.beveridgewilliams.com.au

Project Details: YARRAWA ROAD/SPENCER STREET ROUNDABOUT PLANS
Drawing Title: SERVICE VEHICLE SEPT PATH ANALYSIS'

Sheet 10 of 10
Scale: AS SHOWN

Project Ref	Stage No	Drawing No	Rev
18001	203	018	A

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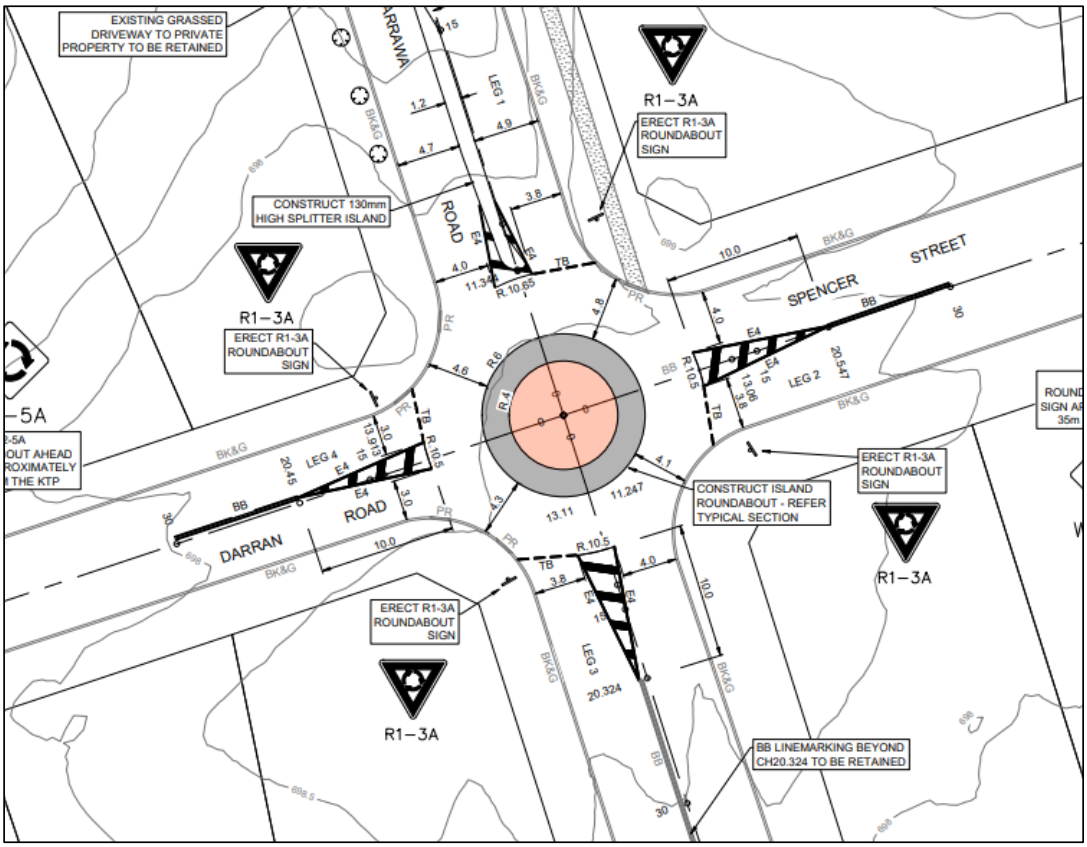
TRAFFIC ENGINEERING

Prime Moss Vale Pty Ltd

Yarrawa Road/ Spencer Street intersection, Moss Vale

Detailed design road safety audit



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Prime Moss Vale Pty Ltd

Yarrawa Road/ Spencer Street intersection, Moss Vale

Detailed design road safety audit

Authors Damien Chee

Report No PME-PROJ-0002-01 DD RSA MOSS VALE REV 1

Date 3/5/2023

This report has been prepared for Prime Moss Vale Pty Ltd.

CONTENTS

1 Introduction 2
1.1 Project and audit details 2
1.2 Responding to the audit report 3
1.3 Previous audits 3
2 Safety audit findings 4
3 Concluding statement 14

Appendices

Appendix A
Road Safety Audit Checklist

1 Introduction

1.1 Project and audit details

Details of the audit have been summarised in Table 1.

Table 1 Details of the road safety audit.

Audited project	Proposed roundabout at the Yarrawa Road/ Spencer Street/ Darran Road intersection, Moss Vale.
Client/ contact	Prime Moss Vale Pty Ltd c/- Beveridge Williams & Co Pty Ltd. Contact: Karen Worsnop Office Coordinator Western Sydney Ph: (02) 4625 5055 / 0408 066 843 E: worsnopk@bevwill.com.au
Audit type	*Detailed design* road safety audit.
Purpose	A *detailed design* road safety audit was required to identify potential safety issues for consideration prior to the construction phase.
Background	Prime Moss Vale Pty Ltd is developing the land at 32 Lovelle Street and 141 Yarrawa Road, Moss Vale. They have been issued Notice of Determination of a Modification Application 20/00227 by Wingecarribee Shire Council granting concept approval for a subdivision of a maximum of 1073 residential lots and stage 1 subdivision works comprising 178 lots. Condition B18(c) of the Notice of Determination states: > Construction of a roundabout and associated pedestrian facilities at the intersection of Yarrawa Road and Spencer Street as per Council's Standard Drawings and concept plans prepared by JMD Development Consultants; Reference No. 18001E2; Issue B; dated 29/06/21. The detailed design of the roundabout is to be accompanied by an independent Road Safety Audit, undertaken in accordance with relevant Austroads guidelines. In these respects, this report details the processes and findings associated with the *detailed design* road safety audit of the proposed roundabout at the Yarrawa Road/ Spencer Street intersection, in Moss Vale.
Scope of project/ audit	The following designs were issued to the audit team and were regarded as the auditable materials: SHEET No. / ISSUE / DESCRIPTION 1 / A / COVER SHEET 2 / A / PLAN OF ADJUSTMENTS TO EXISTING FEATURES 3 / A / PROPOSED ROUNDABOUT PLAN OF YARRAWA ROAD 4 / A / LEG 1 SIGHT LINES 5 / A / LEG 2 SIGHT LINES 6 / A / LEG 3 SIGHT LINES 7 / A / LEG 4 SIGHT LINES 8 / A / CAR & BUS SWEPT PATH ANALYSIS' 9 / A / B-DOUBLE SWEPT PATH ANALYSIS' 10 / A / SERVICE VEHICLE SEPT PATH ANALYSIS' Version/ revision details are also provided above.
Audit team details	Damien Chee, DC Traffic Engineering (level 3 and lead auditor – RSA-02-0094). Linda Chee, DC Traffic Engineering (level 2 road safety auditor - RSA-02-1069).

Audit methodology	The audit was undertaken using the following methodology: ▪ Formal review of plans on 1/5/2023. ▪ A site inspection was carried out on 29/4/2023 for familiarisation purposes. ▪ The road safety audit findings have been documented in this report in accordance with the NSW Centre for Road Safety's *Guidelines for Road Safety Audit Practices* (2011). ▪ This report includes completed *checklist 3 –detailed design stage audit* as sourced from the Austroads *Guide to Road Safety Part 6A: Implementing Road Safety Audits*.

1.2 Responding to the audit report

Road safety audits provide the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

The responsibility for the project rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Also, it is not the role of the auditor to agree to, or approve the project manager's responses to the audit.

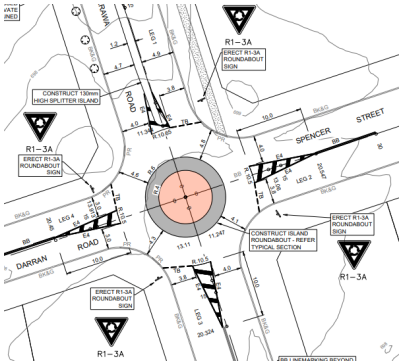
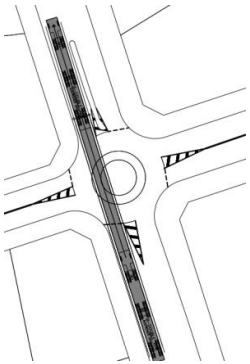
1.3 Previous audits

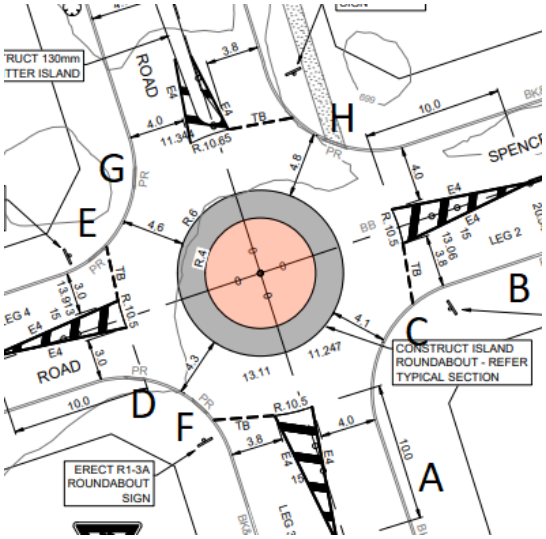
There were no previous audits of direct relevance to the design that were issued to the audit team.

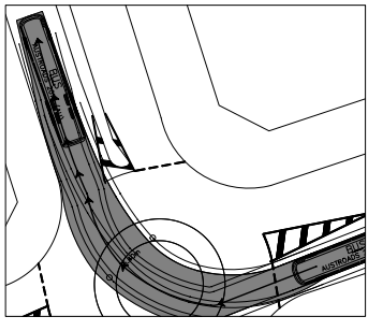
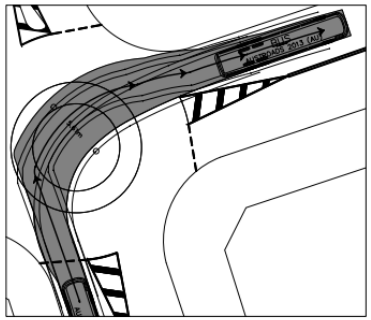
2 Safety audit findings

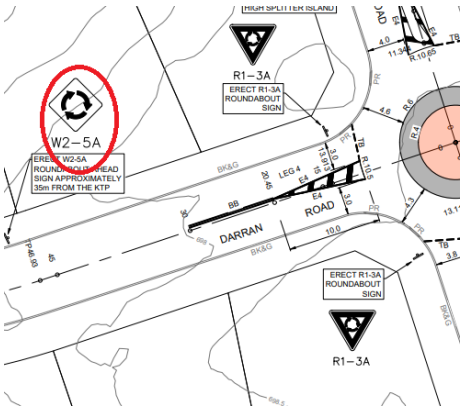
The road safety audit findings are presented in Table 2.

Table 2 Road safety audit findings.

Ref	Location	Road safety audit finding	Priority
1	General – Lack of physical devices to effect the horizontal deflection in approach to, when circulating and when departing the roundabout.	There are virtually no raised/ physical devices in place to effect the required horizontal deflection when entering, circulating and departing the roundabout. Horizontal deflection is one of the key requirements of safe roundabout design as it: ▪ Forces approaching traffic to slow down and enter the roundabout at an acute angle. The acute angle of entry reduces the potential severity of any vehicle-on-vehicle collision. The more acute the angle, the more the collision resembles a "glancing blow". ▪ Forces circulating traffic to maintain a low and steady speed when negotiating the roundabout. If drivers are forced on a circular path, they tend to have more compatible circulation speeds. This reduces the speed differential and *rear-end* crash potential. ▪ Forces departing traffic to steer a smooth transition back into the departure lane. By contrast, this roundabout has very little physical devices to effect the horizontal deflections described above. The splitter islands in the Spencer Street, Darran Road and Yarrawa Road southern leg are all painted and flush, and hence trafficable. These offer very little deterrent to vehicle movements and many vehicles will simply track over them. The roundabout island is also trafficable and offers very little vertical displacement. The edges will contain 50mm vertical lips. Although the island will be 100mm higher than the surrounding pavement, the 2m annulus will be profiled with 2.5% (1:40) slopes which will be barely noticeable by drivers. Many drivers will simply drive a straight line either fully mounting the central island or partially mounting it with the right wheels. With reduced (forced) horizontal deflection, and little vertical displacement in the splitter and central islands, many vehicles are likely to "straight line" through the roundabout or "cut the corner". This is likely to increase the negotiating speeds and hence crash risk. The other implication of increased speeds in approach to, when circulating and when departing the roundabout is that it affects the critical sight lines. The design included a sight line assessment which assumed that the circulation speed of the roundabout was 30km/h. In reality, with little physical devices and raised islands in place, the negotiation speeds may be a lot higher.   ***Left-hand image:*** *The design proposed painted splitter islands and a low-profile centre island which are trafficable and instil very little discipline with regards to circular paths through the roundabout.* ***Right-hand image:*** *The swept path model for buses and trucks (as per above) assumes "straight lining3" and corner-cutting behaviour.*	High

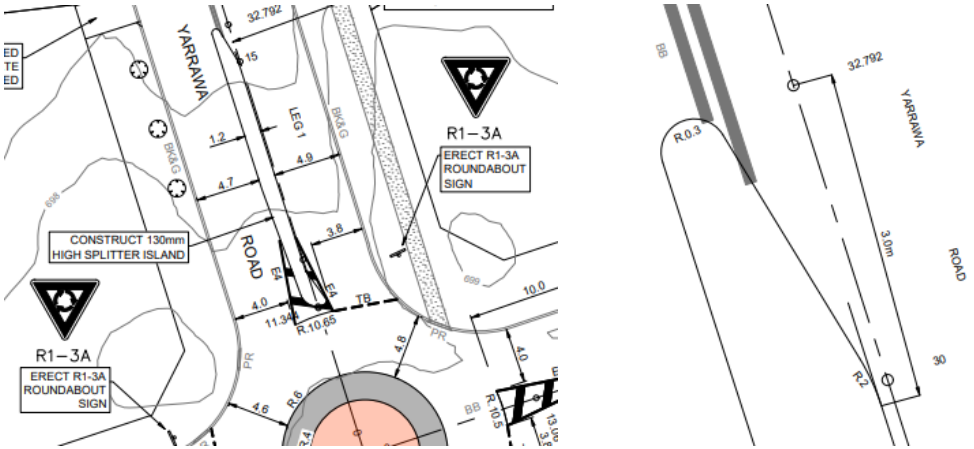
Ref	Location	Road safety audit finding	Priority
2	General – Pedestrian movements with the new roundabout in place.	There are numerous deficiencies with respects to pedestrian movements and facilities once the new roundabout is in place. Issues include: ▪ The kerb ramp at point H allows southbound pedestrians to enter the roadway. However, there is no receiving kerb ramp at point C and no continuing footpath along A and B. Also, any pedestrians that enter the road via H would be entering into the circulating lane of the roundabout and exposed to impacts by circulating traffic. ▪ There is an existing kerb ramp at point F but no corresponding kerb ramp at point C. Also, this point of entry puts pedestrians into the circulating lane of the roundabout. ▪ There is a kerb ramp at point G but no corresponding ramp at point H for this particular crossing path. Any pedestrians that use ramp G to enter the road would also be entering directly into the circulating lane of the roundabout. ▪ The Spencer Street, Darran Road and Yarrawa Road southern leg all contain painted splitter islands which are not suitable as pedestrian refuges. These do not offer any physical deterrent against vehicle encroachment. As such, any pedestrians that use these spaces would be exposed to impacts by approaching and departing vehicles. The Yarrawa Road northern leg contains a raised island. However, this has not been profiled as a pedestrian refuge. It is a kerbed 1.2m wide island which could pose as a trip hazard. See item 6 for more details.  ***Left:*** *There are existing kerb ramps (labelled as "PR") at points D, E, F, G and H. These are not compatible with the proposed roundabout and most of these ramps direct pedestrians into the circulating lane of the roundabout.*	Medium

Ref	Location	Road safety audit finding	Priority
3	Swept path models for trucks and buses.	The swept path models were predicated on the basis that left and right-turning trucks and buses would mount and cross over the central island of the roundabout without observing any circular path. Whilst this may be necessary given the spatial limitations, the roundabout island is likely to suffer damage in the form of chipped and broken edges, and scuff marks giving an unsightly appearance. Over time the scuff marks may also reduce the visual prominence of the central island. The high degree of tyre marks over the island will diminish driver "respect" for the island. That is, even if drivers are able to steer clear of the island, many may simply drive over it as it is perceived to be a more acceptable road user behaviour. This may also create false-confidence. Often, even if it safe to mount and cross a central island under dry conditions, there could be a high risk of tyre-slip and *loss of control* under wet conditions. Also, the vertical lip of the central island could topple motorcyclists.  BUS TURN NORTHBOUND RATIO:- 1:200  BUS TURN EASTBOUND 1 RATIO:- 1:200 ***Top left and right:*** *Examples of right-turn movements which were swept path tested. These models showed that the right-turning bus would need to mount and cross the central island of the roundabout.*  ***Bottom:*** *An example of a roundabout with a mountable central island at another site. This was a new build facility on a bus route. As shown, in the short time since the roundabout was built, it had already suffered a high degree of tyre/ scuff marks giving an unsightly appearance. Over time, this is likely to become worse and could also reduce the visual prominence of the island.*	Medium

Ref	Location	Road safety audit finding	Priority
4	Advanced warning to the roundabout for eastbound drivers on Darran Road.	The design indicates that a ROUNDABOUT AHEAD warning sign will be provided for eastbound drivers on Darran Road in approach to the roundabout. Note that this was incorrectly labelled with sign code W2-5A instead of W2-7. The sign is placed too close to the roundabout and would fail to give sufficient advanced warning to eastbound drivers. Further west along Darran Road, there is a left-hand horizontal curve (for eastbound traffic). This is a sight-restricted curve since there are trees on the inside of the curve. Ideally, the W2-7 ROUNDABOUT AHEAD sign should be placed upstream of the horizontal curve so that drivers have more advanced expectation of the roundabout. The location as proposed in the design is at a point where the driver will probably be able to see the roundabout anyway, and not need to rely on an advanced warning sign. The sight distance assessment, as included in the design, indicated that there would be limited *approach sight distance* from this approach. This is further justification for relocating this warning sign to upstream of the curve, to control the approach speeds and hence reduce the demand for sight distance (as sight distance is speed-dependent).   ***Left:*** *The signage design indicates that the ROUNDABOUT AHEAD sign for eastbound traffic on Darran Road will be placed downstream of the horizontal curve. This is too late and at a point where the driver would probably have visibility to the roundabout itself.* ***Right:*** *Looking eastbound along Darran Road towards the sight-restricted horizontal curve. The ROUNDABOUT AHEAD warning sign would be better placed upstream of this curve.*	Medium

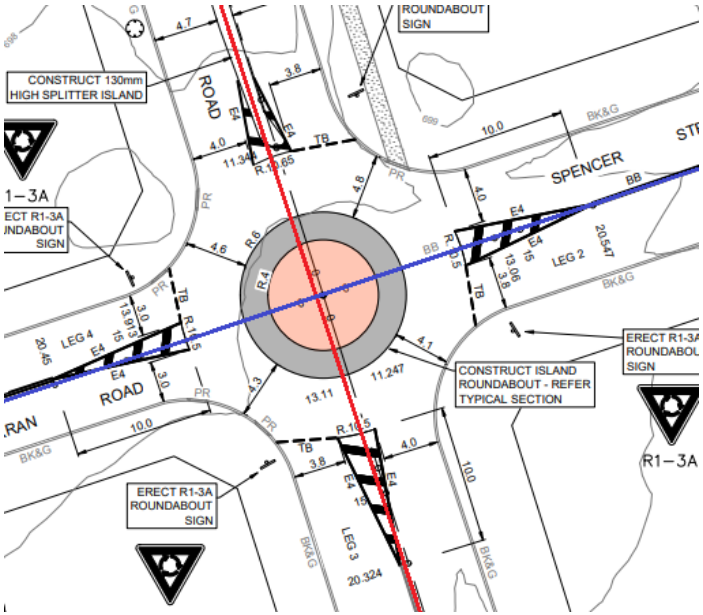
Ref	Location	Road safety audit finding	Priority
5a	Yarrawa Road northern leg.	The audit team notes the following with regards to the advanced warning signs in the Yarrawa Road northern leg to the roundabout: ▪ At present, under pre-project conditions, there is a W2-1 FOUR WAY CROSS INTERSECTION AHEAD sign in the Yarrawa Road northern leg. As shown in the left-hand image, this sign faces southbound traffic heading towards the existing intersection. The design fails to recognise this existing sign, and include instructions for its removal. This sign blade should be removed since it will no longer be an accurate reflection on the future intersection configuration (ie. a roundabout). The design proposes a ROUNDABOUT AHEAD sign (right-hand image) which will provide advanced warning to the intersection. ▪ The design (right-hand image) indicates that a ROUNDABOUT AHEAD sign will be provided for southbound traffic on Yarrawa Road in approach to the future roundabout. This sign ought to be placed on the same sign post as the redundant W2-1 sign discussed in the previous point. This is to provide the same degree of advanced warning to the roundabout as the existing W2-1 sign. A key deficiency in this design is that it assumes a circulation speed of 30km/h which may not be realistic given the lack of raised features to force the horizontal deflection. As such, an earlier advanced warning advice would encourage drivers to reduce speed when approaching the roundabout.  ***Left:*** *At present, under pre-project conditions, there is a W2-1 FOUR WAY CROSS INTERSECTION AHEAD sign in place for southbound traffic on Yarrawa Road. This sign should be removed as part of the project. The same signpost can be used to support the ROUNDABOUT AHEAD sign.* ***Right:*** *The design proposes a ROUNDABOUT AHEAD sign as circled in red. However, this would be better placed on the same signpost as the existing W2-1 sign (left-hand image).*	Medium

Ref	Location	Road safety audit finding	Priority
5b	Yarrawa Road southern leg.	Similar to item 5a, there is an existing W2-1 FOUR WAY CROSS INTERSECTION sign for northbound traffic on Yarrawa Road (ie. to the south of the intersection). The following actions are suggested: ▪ The W2-1 sign blade should be removed as part of the project/ design. ▪ The same signpost should be used to support the proposed ROUNDABOUT AHEAD sign, to ensure that a similar degree of advanced warning is provided to the roundabout compared with the existing case.  ***Above:*** *Looking northbound along Yarrawa Road towards the intersection where a W2-1 FOUR WAY CROSS INTERSECTION sign is in place. This sign blade should be removed as part of the project.*	Medium

Ref	Location	Road safety audit finding	Priority
6	Raised island on Yarrawa Road to the north of the roundabout.	The design indicates that a raised median island will be provided on Yarrawa Road to the north of the roundabout. This will be a 1.2m wide island creating a physical division between the northbound and southbound traffic lanes. The audit team is uncertain what the exact function of this median is. There are several layout anomalies as discussed below: ▪ If the raised island is to perform as a splitter island, it does not have the correct shape. As shown below, the island is mostly rectangular (oblong) and does not form the typical "wedge-shaped" splitter island to encourage deflection into the circulating path of the roundabout for southbound traffic, and transition back into the straight departure for northbound traffic. ▪ As there are no driveways or laybacks either side of Yarrawa Road for the length of the island, this means the island is clearly not meant for restricting right-turns. ▪ If the island is intended to stop cross centreline movements and dangerous overtaking movements, then the audit team questions why the Yarrawa Road southern leg was not treated in the same way. ▪ As shown in the design, the median island is not even used to support a median-based R1-3 ROUNDABOUT GIVE WAY sign. Such a median-based sign would be advantageous in making this sign and control more visually prominent. The audit team considers this a missed opportunity. If the function and need for the raised median was defined, it could be better designed to suit these needs. As a side note, the audit team notes that the approach centreline (BB double barrier as shown in the right-hand image) does not adequately shift the southbound traffic away from the nose of the median. These vehicles need to be sufficiently shifted to the left (east) to clear the raised kerb and median.  ***Left:*** *The design shows that a raised median will be provided in the Yarrawa Road northern leg to the roundabout.* ***Right:*** *The centreline in approach to the raised median does not adequately shift the southbound traffic to the left (east).*	Medium

Ref	Location	Road safety audit finding	Priority
7	Darran Road approach to the roundabout.	At present under pre-project conditions, the STOP sign for the Darran Road approach is partially obscured by a tree. The design indicates that the ROUNDABOUT GIVE WAY sign for the future roundabout will be placed at the same location. As such, the future sign is also likely to be obscured. Consideration should be given to pruning the tree or duplicating the sign on the right-hand side of the road.  ***Above:*** *Looking eastbound along Darran Road towards the existing four-way, STOP-controlled intersection. The STOP sign is partially obscured by a tree.*	Medium

Ref	Location	Road safety audit finding	Priority
8	NO STOPPING signs on Spencer Street.	The design (left-hand image) indicates that existing NO STOPPING signs on the northern and southern kerblines of Spencer Street should be retained. However, as shown in the right-hand image, there were no such signs in place at the time of the inspection. Since these signs no longer exist on site, the design should include instructions to install these, if the kerblines up to this point need to be kept clear of parked cars. Note: With no signs in place, NSW Road Rules 170(3) would apply. This rule stipulates no stopping within 10m of the intersection (roundabout). However, the existing signs as noted in the design would achieve a 20m *no stopping* zone.  ***Left:*** *The design indicated that the existing NO STOPPING signs on Spencer Street should be retained.* ***Right:*** *At the time of the inspection, there were no NO STOPPING signs in place on Spencer Street. This photo is the northern kerbline.*	Low

Ref	Location	Road safety audit finding	Priority
9	Central island of the roundabout.	The design extract below shows that the central island of the roundabout is not centrally positioned in the intersection. Rather it appears to be shifted to the east. The red line is the projection line of the centreline of the Yarrawa Road alignment. The blue line is the projection line of the centreline of Spencer Street-Darran Road. Since the roundabout is not symmetrical, the circulating lane width is variable throughout. This will vary from 4.1m wide to 4.8m wide. This is also undesirable as the width conditions are not uniform all the way around the circulating lane.  ***Left:*** *The central island of the roundabout is not centrally positioned in the intersection.*	Low

3 Concluding statement

DC Traffic Engineering has undertaken a *detailed design* road safety audit of this project in accordance with the methodology outlined in Section 1 of this report.

Issues identified have been noted in this report for the Project Manager to review, assess, and where appropriate, make the necessary recommendations to improve safety.

Damien Chee
Audit Team Leader
DC Traffic Engineering Pty Ltd

Appendix A

Road Safety Audit Checklist

Checklist questions	Comments
3.1 General topics	
3.1.1 Changes since previous audit ▪ Do the conditions for which the scheme was originally designed still apply? (i.e. no significant changes to the surrounding network or area to be served, or traffic mix). ▪ Has the design of the project remained unchanged since previous audit (if any)?	There were no previous audit reports of direct relevance to this design that were issued to the audit team.
3.1.2 Drainage ▪ Will the new road drain adequately? ▪ Are the road grades and crossfalls adequate for satisfactory drainage? ▪ Are flat spots avoided or adequately dealt with at start/end of superelevation? ▪ Has the possibility of surface flooding been adequately addressed, including overflow from surrounding or intersecting drains and water courses? ▪ Is gully pit spacing adequate to limit flooding? ▪ Is pit grate design safe for pedal cycles? (i.e. gaps not parallel with wheel tracks) ▪ Will footpaths drain adequately?	Yes.
3.1.3 Climatic conditions ▪ Has the design taken into account weather records or local experience which may indicate a particular problem? (for example, snow, ice, wind, fog)	Yes.
3.1.4 Landscaping ▪ Will drivers be able to see pedestrians (and vice versa) past or over the landscaping? ▪ Will intersection sight lines be maintained past or over the landscaping? ▪ Will safety be adequate with seasonal growth? (for example, no obscuring of signs, shading or light effects, slippery surface, etc.) ▪ Will roadside safety be adequate when trees or plantings mature (no roadside hazard)? ▪ Has 'frangible' vegetation been used in possible run-off road areas?	Sight-obstructing tree identified.
3.1.5 Services ▪ Does the design adequately deal with buried and overhead services? (especially in regard to overhead clearances, etc.) ▪ Has the location of fixed objects/furniture associated with services been checked? (including any loss of visibility, position of poles, and clearance to overhead wires)	Yes.

Checklist questions	Comments
3.1.6 Access to property and developments ▪ Can all accesses be used safely? ▪ Is the design free of any downstream or upstream effects from accesses, particularly near intersections? ▪ Do rest areas and truck parking area have adequate sight distance at access points?	Yes.
3.1.7 Emergencies, breakdowns, emergency and service vehicle access ▪ Has provision been made for safe access and movements by emergency vehicles? ▪ Does the design and positioning of medians and vehicle barriers allow emergency vehicles to stop and turn without unnecessarily disrupting traffic? ▪ Have broken-down vehicles or stopped emergency vehicles been adequately considered? ▪ Is provision for emergency telephones satisfactory? ▪ Are median breaks on divided carriageways safely located? (i.e. frequency, visibility)	Yes.
3.1.8 Future widening and/or realignments ▪ If the scheme is only a stage towards a wider or dual carriageway is the design adequate to impart this message to drivers? (is the reliance on signs minimal/appropriate, rather than excessive?) ▪ Is the transition between single and dual carriageway (either way) handled safely?	Unknown.

3.1.9 Staging of the scheme
▪ If the scheme is to be staged or constructed at different times:
  ▪ are the construction plans and program arranged to ensure maximum safety?
  ▪ do the construction plans and program include specific safety measures, signing; adequate transitional geometry; etc. for any temporary arrangements?
	Unknown.

3.1.10 Staging of the work ▪ If the construction is to be split into several subprojects, is the order safe? (i.e. the stages are not constructed in an order that creates unsafe conditions)	Unknown.
3.1.11 Adjacent developments ▪ Does the design handle accesses to major adjacent generators of traffic and developments safely? ▪ Is drivers' perception of the road ahead free of misleading effects of any lighting or traffic signals on an adjacent road? ▪ Has the need for screening against glare from lighting of adjacent property been adequately considered?	The future traffic volumes associated with the development were not known.

Checklist questions	Comments
3.1.12 Stability of cut and fill ▪ Is the stability of batters satisfactory? (for example, no potential for loose material to affect road users)	NA.
3.1.13 Skid resistance ▪ Has the need for anti-skid surfacing been considered where braking or good road adhesion is most essential? (for example, on gradients, curves, approaches to intersections and signals)	Yes.
3.2 Design issues (general*)*	
3.2.1 Geometry of horizontal and vertical alignment ▪ Does the horizontal and vertical design fit together correctly? ▪ Is the vertical alignment consistent and appropriate throughout? ▪ Is the horizontal alignment consistent throughout? ▪ Is the alignment consistent with the function of the road? ▪ Is the design free of misleading visual cues? (for example, visual illusions, subliminal delineation like lines of poles)	There is virtually no physical deflection in approach to, when circulating and when departing the roundabout. This is due to the lack of raised features.

3.2.2 Typical cross-sections
▪ Are lane widths, shoulders, medians and other cross section features adequate for the function of the road?
▪ Are the shoulder widths adequate for stationary vehicles and errant vehicles?
▪ Are median widths adequate for road furniture?
▪ Is superelevation consistent with the road environment?
▪ Is the width of traffic lanes and carriageways suitable in relation to:
  ▪ alignment?
  ▪ traffic volume?
  ▪ vehicle dimensions?
  ▪ the speed environment?
  ▪ combinations of speed and traffic volume?
▪ Are the shoulder crossfalls safe for vehicles to traverse?
▪ Are batter slopes drivable for cars, trucks?
▪ Are side slopes under structures appropriate?
▪ Have adequate facilities been provided for pedestrians and cyclists?
	There are no raised medians which is a significant shortcoming from the perspective of pedestrian safety and horizontal deflection of traffic entering and using the roundabout.

3.2.3 Effect of cross-sectional variation ▪ Is the design free of undesirable variations in cross section design? ▪ Are crossfalls safe? (particularly where sections of existing highway have been used, there have been compromises to accommodate accesses, at narrowings at bridges, etc.) ▪ Are any curves with adverse crossfall within appropriate limits? ▪ Is superelevation provided and sufficient at all locations where required?	Yes.

Checklist questions	Comments
3.2.4 Roadway layout ▪ Are all traffic management features designed so as to avoid creating unsafe conditions? ▪ Is the layout of road markings and reflective materials able to deal satisfactorily with changes in alignment? (particularly where the alignment may be substandard) ▪ Is there adequate provision for overtaking? ▪ Are overtaking lanes provided where required and safely commenced and ended? ▪ Are overtaking requirements satisfactory? ▪ Is the design free of sunrise/sunset problems? ▪ Have public transport requirements been adequately catered for?	Yes.

3.2.5 Shoulders and edge treatment
▪ Are the shoulders likely to be safe if used by slow moving vehicles or cyclists?
▪ Are the following safety aspects of shoulder provision satisfactory?
  ▪ provision of sealed or unsealed shoulders
  ▪ width and treatment on embankments
  ▪ crossfall of shoulders
	No new shoulders as part of the design.

3.2.6 Effect of departures from standards or guidelines ▪ Any approved departures from standards or guidelines:is safety maintained? ▪ Any hitherto undetected departures from standards: is safety maintained?	There is no physical deflection in the roundabout. Splitter islands are flush or unflared. The central island is trafficable.
3.2.7 Visibility and sight distance ▪ Are horizontal and vertical alignments consistent with visibility requirements? ▪ Has an appropriate design speed been selected for visibility requirements?	Sight-restrictions noted. The sight distance assessment was based on a circulation speed of 30km/h. This is unrealistic seeing that there is no physical deflection to force traffic to slow down when approaching and negotiating the roundabout.
3.2.8 Environmental treatments ▪ Has safety been considered in the location of environmental features? (for example, noise fences)	Yes.
3.3 Alignment details	

Checklist questions	Comments

3.3.1 Visibility; sight distance
▪ Are horizontal and vertical alignments consistent with the visibility requirements?
▪ Is the design free of sight line obstructions due to safety fences or barriers?
  ▪ boundary fences?
  ▪ street furniture?
  ▪ parking facilities?
  ▪ signs?
  ▪ landscaping?
  ▪ bridge abutments?
  ▪ parked vehicles in laybys or at the kerb?
  ▪ queued traffic?
▪ Are railway crossings, bridges and other hazards all conspicuous?
▪ Is the design free of any other local features which may affect visibility?
▪ Is the design free of overhead obstructions (for example, road or rail overpasses, sign gantries, overhanging trees) which may limit sight distance at sag curves?
▪ Has a clear headroom or a high vehicle detour been provided where necessary?
▪ Is visibility adequate at:
  ▪ any pedestrian, bicycle or cattle crossings?
  ▪ access roads, driveways, on and off ramps, etc.?
▪ Has the minimum sight triangle been provided at:
  ▪ entry and exit ramps?
  ▪ gore areas?
  ▪ intersections?
  ▪ roundabouts?
  ▪ other conflict points?
	Yes.

Checklist questions	Comments
3.3.2 New/existing road interface ▪ Have implications for safety at the interface been considered? ▪ Is the transition from old road to the new scheme satisfactory? ▪ If the existing road is of a lower standard than the new scheme, is there clear and unambiguous warning of the reduction in standard? ▪ Have the appropriate provisions for safety been made where sudden changes in speed are required? ▪ Is access or side friction handled safely? ▪ Does the interface occur well away from any hazard? (for example, a crest, a bend, a roadside hazard or where poor visibility/distractions may occur) ▪ If carriageway standards differ, is the change effected safely? ▪ Is the transition where the road environment changes (for example, urban to rural; restricted to unrestricted; lit to unlit) done safely? ▪ Has the need for advance warning been considered?	Yes.
3.3.3 Readability of the alignment by drivers ▪ Will the general layout, function and broad features be recognised by drivers in sufficient time? ▪ Will approach speeds be suitable and will drivers correctly track through the scheme?	Yes.
3.3.4 Detail of geometric design ▪ Are the design standards appropriate for all the requirements of the scheme? ▪ Is consistency of general standards and guidelines, such as lane widths and crossfalls, maintained?	Yes.
3.3.5 Treatment at bridges and culverts ▪ Is the geometric transition from the standard cross-section to that on the bridge handled safely?	NA.
3.4 Intersections	

Checklist questions	Comments

3.4.1 Visibility to and at intersections
▪ Are horizontal and vertical alignments at the intersection or on the approaches to the intersection consistent with the visibility requirements?
▪ Is the standard adopted for provision of visibility appropriate for the speed of traffic and for any unusual traffic mix?
▪ Will the design be free of sight line obstructions due to safety fences or barriers
  ▪ boundary fences?
  ▪ street furniture?
  ▪ parking facilities?
  ▪ signs?
  ▪ landscaping?
  ▪ bridge abutments?
  ▪ parked vehicles in laybys and at the kerb?
  ▪ queued traffic?
▪ Are railway crossings, bridges and other hazards all conspicuous?
▪ Is the design free of any other local features which may affect visibility?
	The sight distance assessment assumed a 30km/h circulation speed. However, this is unrealistic seeing that there is no physical deflection in the roundabout.

3.4.2 Layout ▪ Are intersections and accesses adequate for all vehicular movements? ▪ Have the appropriate design vehicle and check vehicle been used for turning dimensions? ▪ Are swept paths accommodated for all likely vehicle types? (has the appropriate design vehicle been used?) ▪ Are intersections free of any unusual features which could affect road safety? ▪ Are pedestrian fences provided where needed? (for example, to guide pedestrians or discourage parking) ▪ Has pavement anti-skid treatment been provided where needed? ▪ Have islands and signs been provided where required? ▪ Vehicles which may park at or close to the intersection: can they do this safely or does this activity need to be relocated? ▪ Are safety hazards due to parked vehicles avoided?	Swept paths for long vehicles assumed straight line movements and corner cutting. This defeats the purpose of a roundabout as a speed-attenuation device. There would be a lack of respect for the roundabout. Many drivers may resort to driving over the splitter and central islands since they are trafficable.

Checklist questions	Comments
3.4.3 Readability by drivers ▪ Will the existence of the intersection and its general layout, function and broad features be perceived correctly and in adequate time? ▪ Are the approach speeds and likely positions of vehicles tracking through the intersection safe? ▪ Is the design free of misleading elements? ▪ Is the design free of sunrise or sunset problems which may create a hazard for motorists?	Yes.

3.4.4 Detailed geometric design
▪ Can the layout safely handle unusual traffic mixes or circumstances?
▪ Does any median or any island safely account for:
  ▪ vehicle alignments and paths?
  ▪ future traffic signals?
  ▪ pedestrian storage space and surface?
  ▪ turning path clearance?
  ▪ stopping sight distance to the nose?
  ▪ mountability by errant vehicles?
▪ Is adequate vertical clearance to structures provided? (for example, powerlines, shop awnings)
	The raised median in the Yarrawa Road northern leg is a missed opportunity. The purpose of this raised median is not clear. As such, its layout fails to achieve the optimal safety outcome. For example, if it was more of a wedge shape, it could act as a splitter island and improve approach and departure trajectory. If it was meant to accommodate a sign, it could be made wider to improve lateral clearance between the traffic lane and the sign blade.

3.4.5 Traffic signals ▪ Is the signal phasing/sequence safe? ▪ Is adequate time provided for traffic movements and pedestrian movements? ▪ Will the signal lanterns be visible? (for example, not obstructed by trees, poles, signs or large vehicles) ▪ Are lanterns for other approach directions adequately shielded from view? ▪ Are high-intensity signals and/or target boards provided if likely to be affected by sunrise/sunset? ▪ Does the alignment (vertical and horizontal) provide satisfactory stopping sight distance to the intersection or back of queue? ▪ Are pedestrian facilities provided where they are required? ▪ Will approaching drivers be able to see pedestrians? ▪ Are partially or fully controlled turning phases provided where required? ▪ Are signal posts located where they are not an undue hazard? ▪ Are road markings for turning traffic satisfactory? ▪ Have adequate pedestrian phases been provided?	NA.

Checklist questions	Comments
3.4.6 Roundabouts ▪ Is adequate deflection provided to reduce approach speeds? ▪ If splitter islands are needed, are they adequate for sight distance, length, pedestrian storage, etc.? ▪ Is the central island prominent? ▪ Can the appropriate design vehicle and check vehicle be accommodated? ▪ Are the central island details satisfactory? (delineation, mountability, conspicuousness) ▪ Can pedestrians be seen by drivers in sufficient time? ▪ Can pedestrians determine whether vehicles are turning? (no obstructions to sight lines) ▪ Are direction markings in approach lanes provided where required? ▪ Is the lighting adequate?	Key deficiencies include a lack of physical deflection and hence reduced speed-reduction potential. The lack of deflection will also increase the entry angle (rather than being acute). This could also increase the severity of any *cross traffic* crashes. The lack of raised splitter islands also means there is no refuge space for pedestrians.
3.4.7 Other intersections ▪ Has the need for kerbed or painted islands and refuges been considered? ▪ Do intersections have adequate queue length/storage for turning movements (including in the centre of a staggered intersection)?	This is a key omission from the design.
3.5 Special road users	
3.5.1 Adjacent land ▪ Are all accesses to and from adjacent land/properties safe? ▪ Have the special needs of agriculture and stock movements been considered?	Yes.

Checklist questions	Comments

3.5.2 Pedestrians
▪ Can pedestrians cross safely at:
  ▪ intersections?
  ▪ signalised and pedestrian crossings?
  ▪ refuges?
  ▪ kerb extensions?
  ▪ bridges and culverts?
  ▪ other locations?
▪ Is each crossing point satisfactory for:
  ▪ visibility, for each direction?
  ▪ use by the disabled?
  ▪ use by the elderly?
  ▪ use by children/schools?
▪ Is pedestrian fencing on reservations and medians provided where required for each crossing?
▪ Is fencing adequate on freeways?
▪ Are pedestrians deterred from crossing roads at unsafe locations?
▪ Are pedestrian related signs appropriate and adequate?
▪ Is width and gradient of pedestrian paths, crossings, etc. satisfactory?
▪ Is surfacing of pedestrian paths, crossings, etc.satisfactory?
▪ Have dropped kerbs been provided for each crossing?
▪ Have channels and gullies been avoided at each crossing?
▪ Is lighting satisfactory for each crossing?
▪ Are crossings sited to provide maximum use?
▪ Is avoidance of a crossing unlikely? (for example, by more direct but less safe alternative)
	Lack of raised splitter islands for pedestrian refuge when crossing the road.
	Existing kerb ramps are not compatible with the ultimate roundabout design.

3.5.3 Cyclists
▪ Have the needs of cyclists been considered:
  ▪ at intersections (particularly roundabouts)?
  ▪ especially on higher speed roads?
  ▪ on cycle routes and crossings?
  ▪ at freeway entry and exit ramps?
▪ Are shared cycleway/footway facilities (including subways and bridges) safe and adequately signed?
	Yes.

Checklist questions	Comments
3.5.4 Motorcyclists ▪ Has the location of devices or objects that might destabilise a motorcycle been avoided on the road surface? ▪ Is the roadside clear of obstructions where motorcyclists may lean into curves? ▪ Will warning or delineation be adequate for motorcyclists? ▪ Has barrier kerb been avoided in high-speed areas? ▪ In areas more likely to have motorcycles run off the road is the roadside forgiving or safely yielded? ▪ Are all unnecessary poles, posts and devices removed or appropriately shielded? ▪ Are drainage pits and culverts traversable by motorcycle?	Straight lining could lead to toppling by motorcyclists if they clip the vertical lip of the central island of the roundabout.
3.5.5 Equestrians and stock ▪ Have the needs of equestrians been considered, including the use of verges or shoulders and rules regarding the useof the carriageway? ▪ Can underpass facilities be used by equestrians/stock?	NA.
3.5.6 Freight ▪ Have the needs of truck drivers been considered, including turning radii and lane widths? ▪ Have the needs of freight transport been considered, adequately signed and catered for?	Poor swept paths – no deflection.
3.5.7 Public transport ▪ Have the needs for public transport been considered, adequately signed and catered for? ▪ Have the needs of public transport users been considered? ▪ Have the manoeuvring needs of public transport vehicles been considered? ▪ Are bus stops well positioned for safety?	Poor swept paths – no deflection.
3.5.8 Road maintenance vehicles ▪ Have the needs of road maintenance vehicles been considered, adequately signed and catered for? ▪ Can maintenance vehicles be safely located?	Yes.
3.6 Lighting, signs and delineation	

Checklist questions	Comments
3.6.1 Lighting ▪ Has lighting been adequately provided where required? ▪ Is the design free of features which interrupt illumination? (for example, trees or overbridges) ▪ Is the design free of lighting poles that would present a fixed roadside hazard? ▪ Are frangible or slip-base poles to be provided? ▪ Ambient lighting: if it creates special lighting needs, have these been satisfied? ▪ Is the lighting scheme free of confusing or misleading effects on signals or signs? ▪ Does the lighting adequately illuminate crossings, nearby paths, refuges, etc.? ▪ Are all gore areas adequately illuminated? ▪ Are all merge areas adequately illuminated? ▪ Is the scheme free of any lighting black patches? ▪ If there are locations with accident problems that are ▪ known to be amenable to treatment with improved lighting, has this lighting been provided?	Lighting plans not issued.

3.6.2 Signs
▪ Are signs appropriate for their location?
▪ Are signs located where they can be seen and read in adequate time?
▪ Will signs be readily understood?
▪ Are signs appropriate to the driver's needs? (for example, direction signs, advisory speed signs, etc.)
▪ Are signs located so that drivers' sight distance is maintained?
▪ Are signs located so that visibility is maintained:
  ▪ to/from accesses and intersecting roads?
  ▪ to/from pedestrians and important features on the road?
▪ Have the consequences of vehicles striking signposts been considered?
▪ Are sign supports out of the clear zone?
▪ If not, are they:
  ▪ frangible?
  ▪ shielded by barriers (e.g. guard fence, crash cushions)?
▪ Has an over-reliance on signs (in lieu of adequate geometric design) been avoided?
▪ Are signs on the new scheme consistent with those on the adjoining section of road (or will the previous signs need to be upgraded)?
	Signage issues noted.

Checklist questions	Comments
3.6.3 Marking and delineation ▪ Are markings (lines, arrows, etc.) consistent with standard markings? ▪ Have any locations where standard markings might be confusing or misread been identified and treated in a way which considers road users' likely responses? ▪ Are barrier lines (no overtaking) provided where required? ▪ Are raised retroreflective pavement markers (RRPMs) provided where necessary? ▪ Are curve warning signs, advisory speed plates or chevron alignment markers provided where required? ▪ Are markings on the new scheme consistent with those on the adjoining section of road (or will the previous markings need to be upgraded)? ▪ Are diagonal markings or chevrons painted where required? ▪ Will markings and delineation be visible at night-time? ▪ Will markings and delineation be visible in wet weather? ▪ Has the need for profiled (audible) line marking been considered? ▪ Have both high and low-beam cases been considered? ▪ Are guide posts of the frangible type?	Yes.
3.7 Physical objects	
3.7.1 Median barriers ▪ Have median barriers been considered and properly detailed? ▪ Have all design features that require special attention (for example, end treatments) been considered?	NA.
3.7.2 Poles and other obstructions ▪ Are all poles located well away from moving traffic? ▪ Have frangible or breakaway poles been included where required? ▪ Are median widths adequate to accommodate lighting poles or trees? ▪ Is the position of traffic signal controllers and other service apparatus satisfactory? ▪ Is the roadside clear of any other obstructions that may create a safety hazard? ▪ Have all necessary measures been taken to remove, relocate or shield all hazards? ▪ Can roadside drains and channels be safely traversed by any vehicle that runs off the road?	Yes.

Checklist questions	Comments

3.7.3 Crash barriers
▪ Are crash barriers provided where necessary and properly detailed? (for example, at embankments, structures, trees,
▪ poles, drainage channels, bridge piers, gore areas) Is the crash barrier safe? (i.e. unlikely to create a danger for road users including pedestrians, cyclists, motorcyclists, etc.)
▪ Are the end conditions of the crash barrier safe and satisfactory?
▪ Is the guard fence designed according to standards for:
  ▪ end treatments?
  ▪ anchorages?
  ▪ post spacing?
  ▪ block outs?
  ▪ post depth?
  ▪ rail overlap?
  ▪ stiffening at rigid obstacles?
▪ Is all guard fence necessary? (i.e. what it shields is a greater hazard than the fence)
▪ Where pedestrians and cyclists travel behind guard fence, is the rear of the fence safe for them?
	NA.

3.7.4 Bridges, culverts and causeways/floodways
▪ Are bridge barriers and culvert end walls safe regarding:
  ▪ visibility?
  ▪ ease of recognition?
  ▪ proximity to moving traffic?
  ▪ the possibility of causing injury or damage?
  ▪ collapsible or frangible ends?
  ▪ signs and markings?
  ▪ connection of crash barriers?
  ▪ roadside hazard protection?
▪ Is the bridge railing at the correct level and strong enough?
▪ Is the shoulder width on the bridge the same as on the adjacent road lengths?
▪ Is safe provision made for non-vehicular traffic over structures? (for example, pedestrians, pedal cycles, horses/stock, etc).
▪ Are all culvert end walls (including driveway culverts) drivable or outside the clear zone?
▪ Have causeways/floodways etc. been given correct signing and adequate sight distance?
	NA.

3.8 Additional questions to be considered for development proposals	Questions omitted as this intersection is external to the development.
3.9 Any other matter	

Checklist questions	Comments
Safety aspects not already covered ▪ Is the road able to safely handle oversize vehicles, or large vehicles like trucks, buses, emergency vehicles, road maintenance vehicles? ▪ If required, can the road be closed for special events in a safe manner? ▪ If applicable, are special requirements of scenic or tourist routes satisfied? ▪ Have all unusual or hazardous conditions associated with special events been considered? ▪ Have all other matters which may have a bearing on safety been addressed?	No.

6.8 Bong Bong Common Burradoo - Proposed No Parking 'Authorised Vehicles Excepted'

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To review changes to parking at the Bong Bong Common car park, adjacent to Cecil Hoskins Nature Reserve access road, to include two parking spaces at the north end as No Parking "Authorised Vehicles Excepted" for sewage pumping vehicles.

RECOMMENDATION

***THAT** Council approves:*

The installation of No Parking "Authorised Vehicles Excepted" signage for the two spaces at the north end of the Bong Bong Common car park, adjacent to Cecil Hoskins Nature Reserve access road, Burradoo.

REPORT

BACKGROUND

A request was made by Coordinator Open Spaces and Buildings to convert two parking spaces to No Parking "Authorised Vehicles Excepted" at the north end of the Bong Bong Common car park, for vehicles to pump waste from the sewage tank adjacent to the new amenities building.

Currently there is no parking restrictions in the car park along Cecil Hoskins Nature Reserve access road. The nominated spaces close to amenities building frequently are occupied by other vehicles. It is difficult for waste pumping vehicles to find a space close to the sewage pit.

REPORT

Bong Bong Common is a historic site that now features an accessible pathway, cycleway, seating, walking, and scenic riverfront settings.

The upgrade works of Bong Bong Common were completed and opened to the public in late 2023. The upgrade included new place space areas, improved car parking, and other features to improve the area's amenity and riverfront access and highlight the site's significance to both Aboriginal and European histories.

Currently the sewage tank adjacent to the new amenities building is not connected with the Shire's sewage drainage system. The waste needs to be pumped out and collected regularly, which can occur up to three times a week.

Open Spaces and Buildings Branch nominated the first two parking spaces at the north end of the car park for the sewage collecting vehicle.

A plan is attached showing two proposed No Parking "Authorised Vehicles Excepted" spaces.

PROPOSAL

It is proposed to install No Parking "Authorised Vehicles Excepted" signage for the first two parking spaces at the north end of the Bong Bong Common car park, adjacent Cecil Hoskins access road.

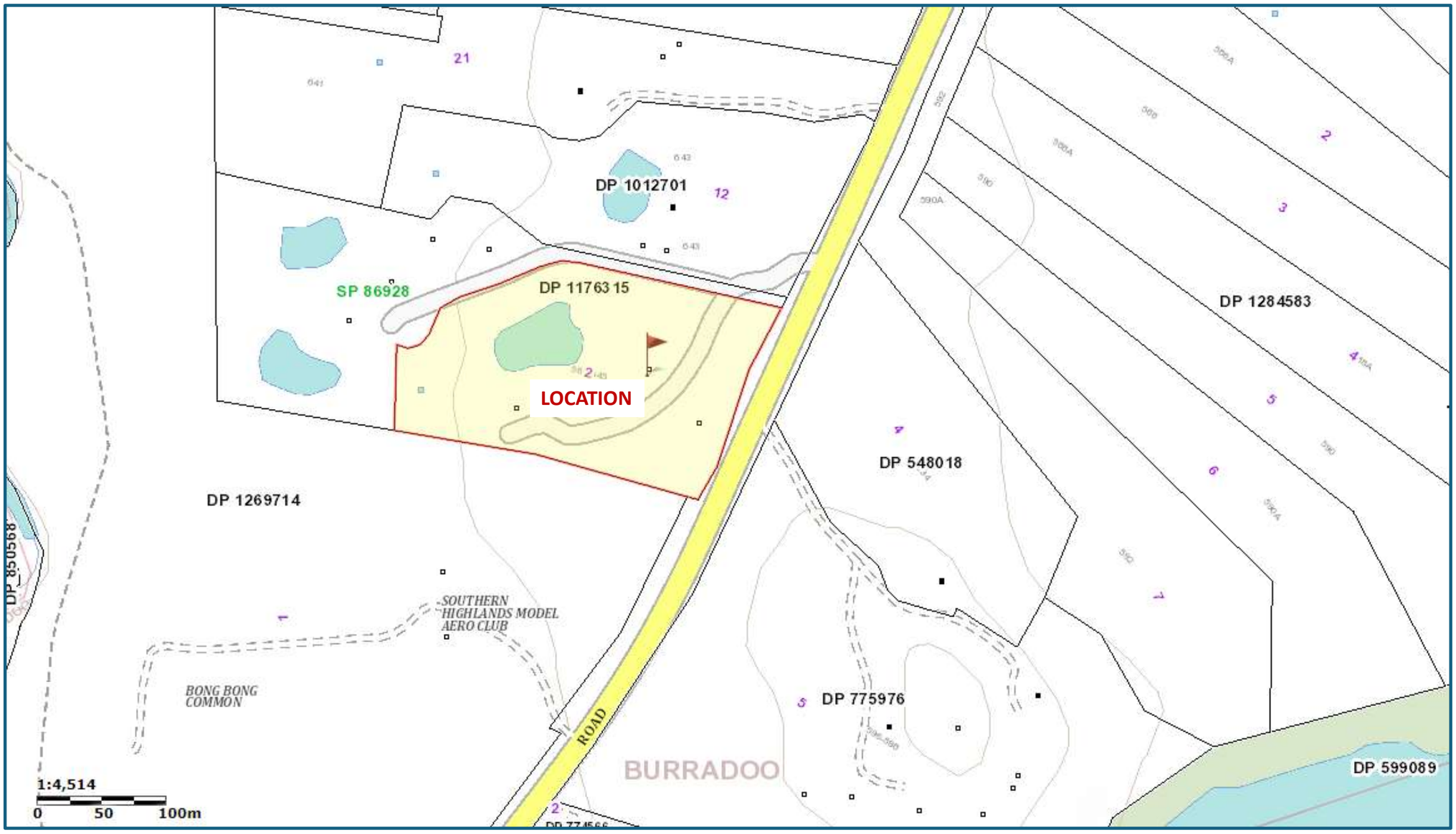
CONCLUSION

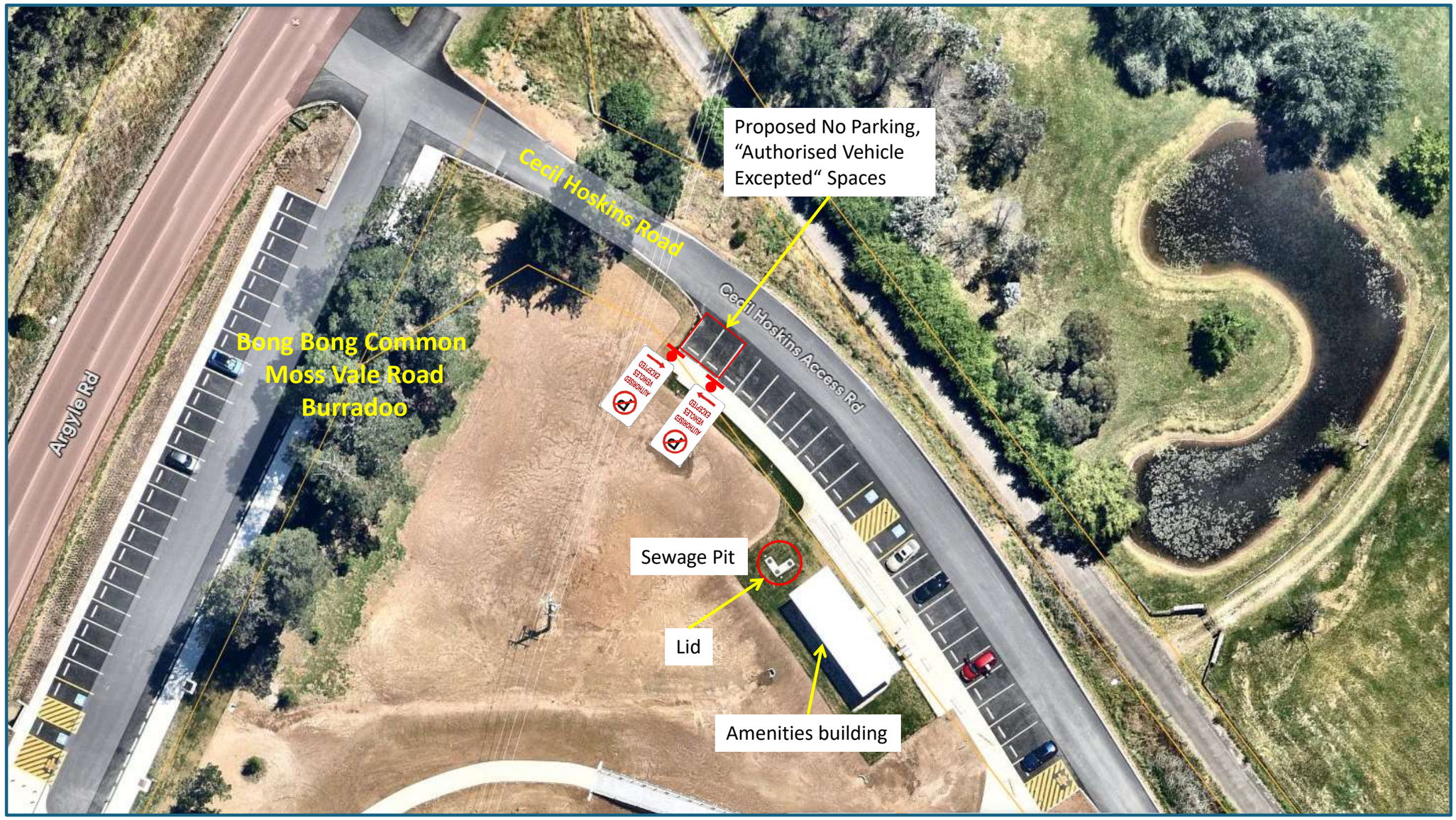
It is recommended that Council approves:

1. The installation of No Parking "Authorised Vehicles Excepted" signage is placed to include the two north most parking spaces in the Bong Bong Common car park, adjacent to the access road to Cecil Hoskins Nature Reserve.

ATTACHMENTS

{6.10.1 Bong Bong Common Burradoo - Proposed No Parking "Authorised Vehicles Excepted"}


DP 1012701
SP 86928
DP 1176315
LOCATION
DP 1284583
DP 548018
DP 1269714
DP 850568
SOUTHERN HIGHLANDS MODEL AERO CLUB
BONG BONG COMMON
ROAD
DP 775976
BURRADOO
DP 599089
1:4,514
0 50 100m


Proposed No Parking, "Authorised Vehicle Excepted" Spaces
Cecil Hoskins Road
Cecil Hoskins Access Rd
Bong Bong Common
Moss Vale Road
Burradoo
Argyle Rd
AUTHORISED VEHICLES EXCEPTED
AUTHORISED VEHICLES EXCEPTED
Sewage Pit
Lid
Amenities building


Proposed No Parking, "Authorised Vehicle Excepted" Spaces
AUTHORISED VEHICLES EXCEPTED
AUTHORISED VEHICLES EXCEPTED
AUTHORISED VEHICLES EXCEPTED
AUTHORISED VEHICLES EXCEPTED
Bong Bong Common
Moss Vale Road
Burradoo

6.9 Proposed No Parking Zone and Changes to Timed Parking on Old Hume Highway, Berrima

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To review the creation of a No Stopping zone and removal of a 15 Minute timed parking zone on Old Hume Highway, Berrima

RECOMMENDATION

***THAT** a proposed 40m No Stopping Zone west of the intersection of Old Hume Highway and Market Place, on the south side of Old Hume Highway is recommended for approval.*

***THAT** the existing 25m 15 Minute parking zone on the west side of Old Hume Highway be removed.*

REPORT

The Berrima Residents Association requested that Council review the unrestricted parking on the south side of Old Hume Highway to the west of Market Place. There is a concern that vehicles parked in this location restrict sight distance of vehicles travelling from the west.

A site inspection and a review on the aerial maps determined that cars legally parked in the parking lane restrict sight distance to approximately 80m. The sight distance looking west is restricted due to the bend moving away to the left.

Austroads Standards for sight distance at intersections states a minimum sight distance of 90m and a desirable sight distance of 97m for a 50km/h road.

Removal of parking on the south side of Old Hume Highway, west of Market Place will provide the desired 97m of sight distance as shown in Image 2.

The No Stopping zone will be controlled by standard No Stopping signs as shown in Image 2.

Table 3.2: Safe intersection sight distance (SISD) and corresponding minimum crest vertical curve size for sealed roads (S < L)

Design speed (km/h)	Based on safe intersection sight distance for cars[1] h_1 = 1.1; h_2 = 1.25, d = 0.36[2]; Observation time = 3 sec					
	R_T = 1.5 sec[3]		R_T = 2.0 sec		R_T = 2.5 sec	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97
120	–	–	324	112	341	124
130	–	–	365	143	383	157

1 *If the average grade over the braking length is not zero, calculate the safe intersection sight distance (SISD) values using the correction factors in Table 3.4 (or use Equation 2) by applying the average grade over the braking length.*
2 *A coefficient of deceleration of greater than 0.36 is not provided in this table. The provision of SISD requires more conservative values than for other sight distance models (e.g. the stopping sight distance model allows values up to 0.46 in constrained situations). This is because there is a much higher likelihood of colliding with hazards at intersections (that is, other vehicles). Comparatively, there is a relatively low risk of hitting a small object on the road (the stopping sight distance model).*
3 *A 1.5 sec reaction time is only to be used in constrained situations where drivers will be alert. Typical situations are given in Table 4.2 of AGRD Part 3. The general minimum reaction time is 2 sec.*

Image 1 – Austroads sight distance criteria for intersections

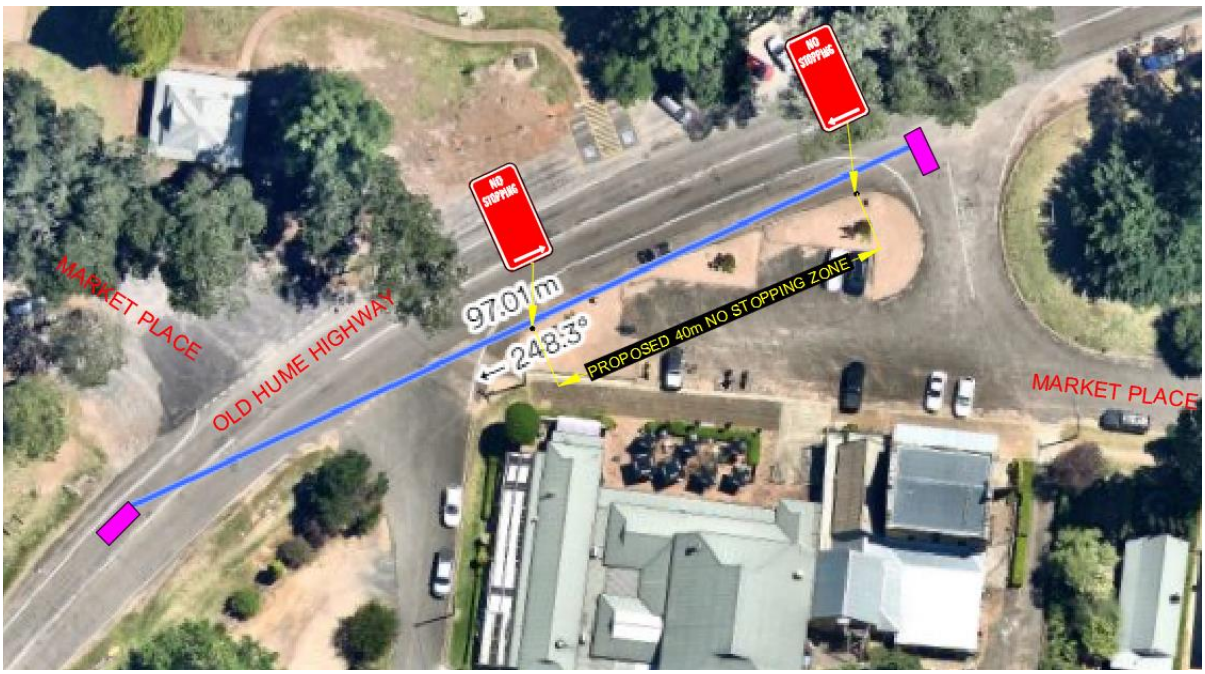


Image 2 – Proposed location of No Stopping Zone

Image 3 – View from the intersection of Old Hume Highway and Market Place, looking west

There is an existing 25m 15 Minute parking zone on the west side of Old Hume Highway near the Surveyor General Inn. The 15 Minute parking zone has been in place for many years and was originally put in place to facilitate the Post Office. The timed parking zone would allow for a quick turn over of vehicles when people collected their mail.

The post office has moved to a different location. The businesses surrounding the 15 Minute parking zone includes cafes, shops and Gumnut Bakery. The 15 Minute timed parking zone does not have a rational purpose anymore. The area is proposed to become unrestricted parking to better cater for the adjacent businesses. There is no other timed parking in Berrima, so to be consistent, this location is also proposed to be unrestricted.

Image 4 – Location of existing 25m long 15 Minute parking zone

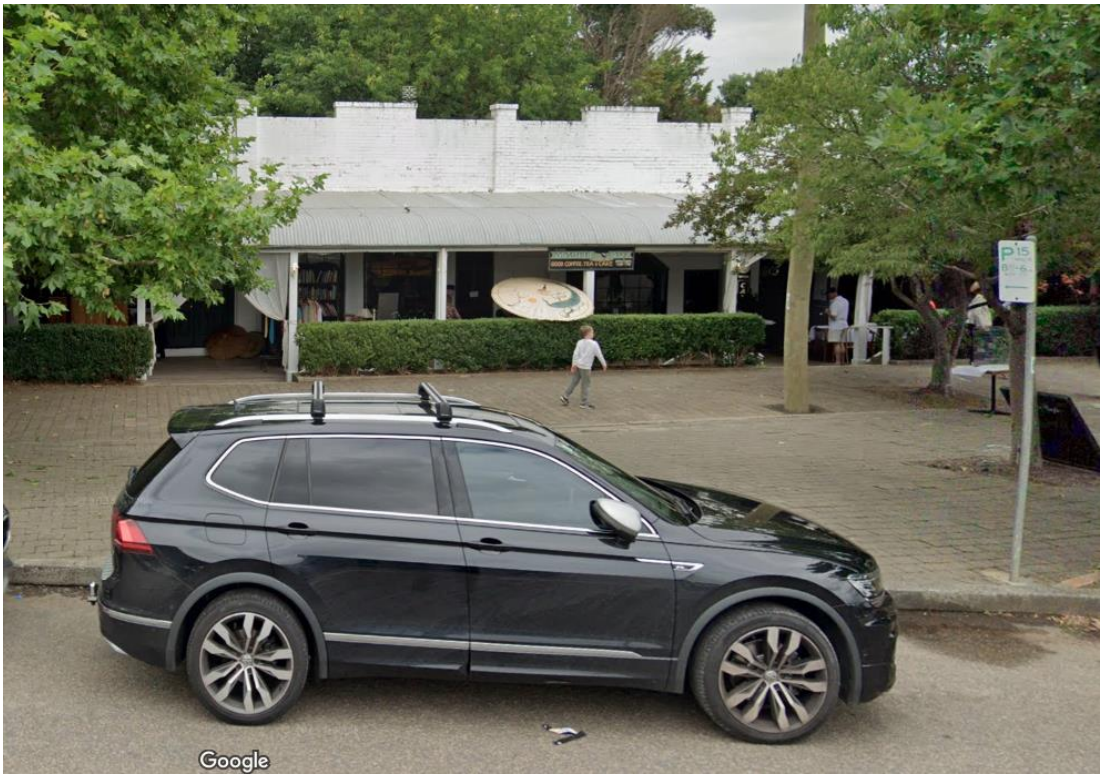


Image 5 – Street view of existing 15 Minute parking zone

CONCLUSION

Removal of parking on the south side of Old Hume Highway, west of Market Place with by installing a No Stopping zone will improve sight distance to meet Austroads Standards. The 40m No Stopping zone is recommended for approval.

The 15 Minute timed parking zone is not fit for purpose now that the Post Office has moved location. Removal of the 15 Minute time parking will better cater for the surrounding businesses and is recommended for approval.

ATTACHMENTS

Nil

6.10 Robertson Road Moss Vale - Footpath & Refuge Crossing adjacent to Moss Vale Showground

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To review the design of recently constructed kerb blisters on Robertson Road, Moss Vale. These devices are part of the 'Get NSW Active Program'. The kerb blisters are shown in Detail 1 of the attached design plan (Plan No. 1-41534).

RECOMMENDATION

1. ***THAT the design plans for the kerb blisters, as shown in DETAIL 1 – PEDESTRIAN CROSSING AND KERB BLISTERS, in Wingecarribee Council Design Plan No. 1-41534, on Robertson Road, Moss Vale be recommended for approval.***

REPORT

BACKGROUND

The 'Get NSW Active Program' provides local councils with funding for projects that create safe, easy, and enjoyable walking and cycling trips. These trips help to alleviate pressure on our roads and public transport networks and are part of a healthy lifestyle for NSW communities. The recently constructed kerb blisters on Robertson Road, Moss Vale form part of The Get NSW Active program.

REPORT

Get NSW Active's strategic objectives are aimed at:

- improving bike riding to and within centres, neighbourhoods and to key destinations.
- improving walkability in centres, neighbourhoods and at key destinations.
- enabling vibrant centres and liveable neighbourhoods through the creation of street environments that prioritise walking and cycling.

Transport for NSW under this grants program, encourages councils to plan, develop a program of works, and consider different funding options for proposed projects. This approach enables Transport for NSW to progressively plan and expand networks and support councils to develop a sustainable forward program of walking and cycling projects that provides tangible benefits for our communities and customers.

This project is made possible by a $194,157 grant from the NSW Government's Active Transport: Get NSW Active Program 2022/23. The funding is for the construction of a new footpath on

Robertson which connects the existing footpath at the west end of Moss Vale Showground to the existing footpath fronting Moss Vale High School.

The footpath crosses Roberston Road at the eastern end of Moss Vale Show Ground, which is a crest of a rise in the road and allows for the best possible sight distance for pedestrians and drivers. The blisters also shorten the length of travel that pedestrians require to cross the road.

The road lane widths are 3.5m wide which is consistent with the lane widths on the rest of the Illawarra Highway.

These improvements will create a safer and more accessible walking experience for all users, especially during the busy Showground events.

The design plans for the blisters and footpath are attached with this report.

CONCLUSION

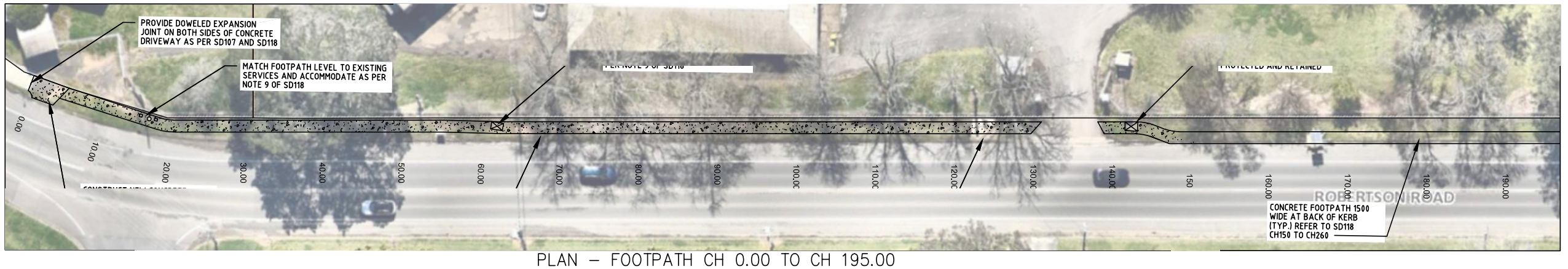
The recently constructed footpath on Roberston Road provides a safe and accessible route for pedestrians. The footpath crosses Roberston Road at the crest of a rise in the road to allow for the best possible sight distance for pedestrians and drivers. The blisters also shorten the length of travel that pedestrians require to cross the road.

The dimensions for the blisters and road are shown in DETAIL 1 – PEDESTRAN CROSSING AND KERB BLISTERS, in Design Plan 1-41534. The design plans are attached with this report.

The design plans for the recently constructed kerb blisters on Robertson Road, Moss Vale are recommended for approval.

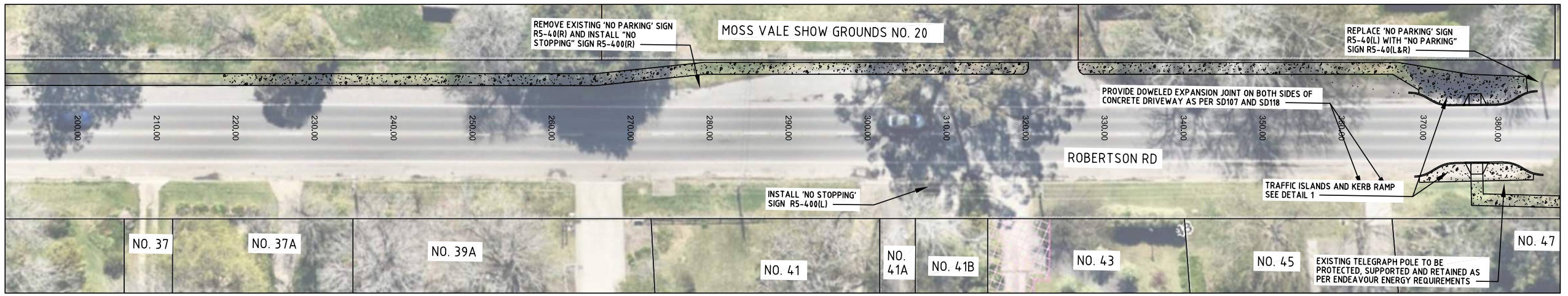
ATTACHMENTS

{6.11.1 Robertson Road Moss Vale - Footpath & Refuge Crossing adjacent to Moss Vale Showground}



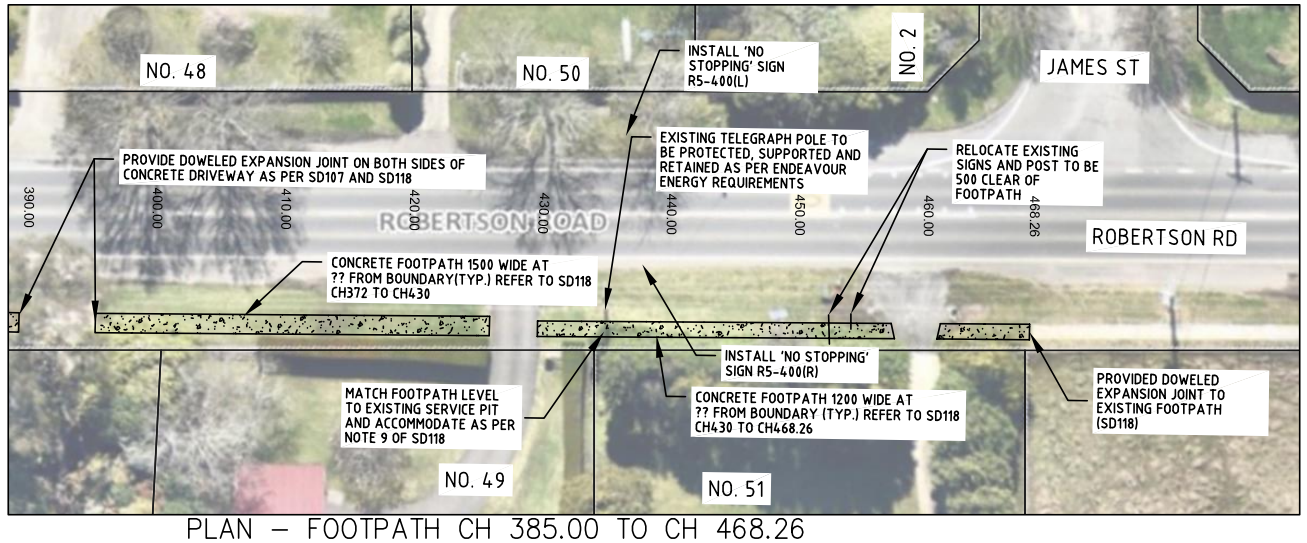
PLAN – FOOTPATH CH 0.00 TO CH 195.00

SCALE 1:250



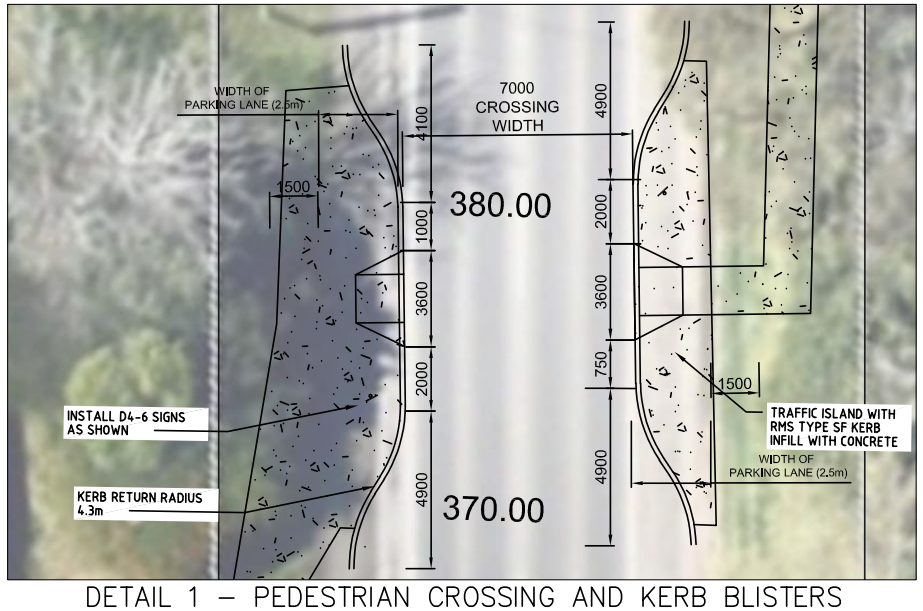
PLAN – FOOTPATH CH 195.00 TO CH 385.00

SCALE 1:250



PLAN – FOOTPATH CH 385.00 TO CH 468.26

SCALE 1:250



DETAIL 1 – PEDESTRIAN CROSSING AND KERB BLISTERS

SCALE 1:100

ISSUE	AMENDMENTS	CHECKED	APPROVED	DATE
P5	KERB RAMP – AS CONSTRUCTED			3/7/24
P4	PRELIMINARY ISSUE – KERB RETURNS			30/1/24
P3	PRELIMINARY ISSUE – CROSSING CHANGE			19/12/23
P2	PRELIMINARY ISSUE – FOR APPROVAL			3/11/23

SCALES

1:1000 0 10 20 30 40 50
1:500 0 5 10 15 20 25
1:250 0 5 10
1:200 0 2 4 6 8 10
1:100 0 1 2 3 4 5
1:50 0 0.5 1 1.5 2
1:20 0 0.5 1
1:10 0 0.5

DATUM N/A
GRID
A1

PUBLIC UTILITIES LEGEND

WATER	—W—	SEWER	—S—	OVERHEAD ELECTRICITY	—OE—	ELECT T'FORMER CABINET	
RECYCLED WATER	—RW—	MANHOLE		UNDERGROUND ELECT'Y	—UE—	TELEPHONE CABLE	—T—
HYDRANT		LAMPHOLE		ELECTRICITY PIT		TELEPHONE PIT	
STOP VALVE		GAS	—G—	POWER POLE		TELEPHONE PILLAR	
AIR VALVE		GAS VALVE		POWER LIGHT POLE		TELEPHONE POLE	
WATER METER		GAS METER		LIGHT POLE		TELEPHONE CABLE MARKER	
WATER TAP				STAY POLE			
				POLE & TRANSFORMER			

SURVEYED ..... N/A
DESIGNED ..... AJM
DRAWN ..... AJM
CHECKED ..... sign
SURVEYOR ..... sign

APPROVED
GROUP MANAGER INFRASTRUCTURE SERVICES
RECOMMENDED
MANAGER DESIGN CONSTRUCTION MAINTENANCE
NOTED
ASSETS ENGINEER

WINGECARRIBEE SHIRE COUNCIL

Civic Centre, Elizabeth Street, Moss Vale, N.S.W. 2577
PO Box 141, Moss Vale, N.S.W. 2577
Ph: (02) 4868 0888 Fax: (02) 4869 1203

WINGECARRIBEE SHIRE COUNCIL

GET NSW ACTIVE PROGRAM – FOOTPATH
ROBERTSON ROAD
MOSS VALE
GENERAL ARRANGEMENT

SHEET 1 OF 1

PROJECT ID: 00.00.00 | CAD FILE/PLAN No: 0000 | COST No: 1–41534 | ISSUE P5

FILE LOCATION : C:\Users\amaskiell\OneDrive - Wingecarribee Shire Council\41000 - Active Footpaths\Robertson Footpath Plan Rev 4.dwg

PLOTTED BY : ANDREW MASKIELL DATED 03/07/2024 - WINGECARRIBEE SHIRE COUNCIL

6.11 Proposed Traffic Treatments for Food Outlet on Sallys Corner Road, Sutton Forest

Report Author: **Traffic Engineer**

Authoriser: **Karin Targa**

PURPOSE

To assess the traffic arrangements for a proposed food outlet development on Sallys Corner Road, Sutton Forest.

RECOMMENDATION

THAT the civil design plans and associated traffic arrangements designed by Richmond and Ross Consulting Engineers (Plan No. 230139) and SLR Consulting (Plan No. 610.31088) be recommended for approval on the condition that the speed limit is reduced from 90km/h to 60km/h.

REPORT

BACKGROUND

Traffic Committee reviewed the attached civil design plans at the 16 May 2024 meeting and recommended that:

'THAT the civil design plans and associated traffic arrangements designed by Richmond and Ross Consulting Engineers (Plan No. 230139) and SLR Consulting (Plan No. 610.31088) not be recommended for approval, on the basis that further revision is required on the westernmost access'.

SLR Consulting have engaged a DC Traffic Engineering to undertake of road safety audit of the proposed traffic arrangement for the food outlet development.

The road safety audit is attached.

REPORT

There is a proposed development to build two food outlets on Sally Corner Road, opposite the current Heatherbrae Pies business.

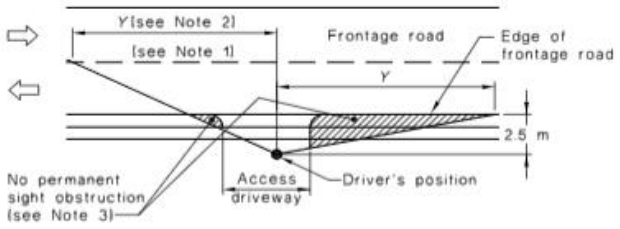
There are two driveways proposed. The eastern most driveway is currently in the 90km/h zone, and the western most driveway is in a 60km/h zone.

The developer has applied to TfNSW to extend the 60km/h zone approximately 250m to the east. This request is currently being reviewed.

The eastern driveway proposes to restrict the right turn into the car park and allow the right turn out of the car park.

The sight distance for vehicles exiting the eastern driveway, looking east is 130m. The minimum sight distance stated in Australian Standards for an access driveway at 90km/h is 130m.

Image 1 - Aerial image showing traffic facility arrangement and turning paths



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

NOTES:

1 Centre-line or centre of road (undivided road), or right hand edge of right hand through lane (divided road).

2 A check to the left is not required at a divided road where the median is wide enough to shelter a vehicle leaving the driveway.

3 Parking on this side of the frontage road may need to be restricted on either side of the driveway so that the sight distance required by the above table to an approaching vehicle is not obstructed.

4 This is the posted or general speed limit unless the 85th percentile speed is more than 5 km/h above the limit in which case the tabulated speed nearest the 85th percentile shall be adopted.

5 The values in the table apply only to left turn and right turn manoeuvres into two-way roads up to four lanes wide and one-way streets regardless of width, either for a 5 s gap, desirable at lower frontage road speeds, or minimum stopping sight distance based on 2 s reaction time.

Crossing manoeuvres (e.g. from an access opposite the steam of a T-junction) over four lanes or more, and turning manoeuvres into a six lane two-way road would require longer gaps unless there was a median wide enough to store a vehicle and allow a two stage manoeuvre.

6 These distances are based on stopping sight distances with reaction time of 1.5 s for traffic approaching along the frontage road and are applicable to a frontage road speed of up to 80 km/h only. Wherever practicable sight distance provided at domestic property accesses should meet the values given in the second or third columns of the Table.

7 When checking sight distance the driver's eye height and the height of the object (approaching vehicle) are to be taken as 1.15 m above the road surface.

FIGURE 3.2 SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS

The safe intersection sight distance of a car stopping to turn right into the eastern driveway is 214m allowing for 2 seconds of reaction time. The site does not allow for the required site distance therefore the right turn is proposed to be restricted. A median island and No Right Turn are proposed to restrict the right turn. Vehicle volumes accessing the site from the east are expected to be low. Vehicles assessing from the east will use the western driveway to turn right into the development.

Table 3.2: Safe intersection sight distance (SISD) and corresponding minimum crest vertical curve size for sealed roads (S < L)

Design speed (km/h)	Based on safe intersection sight distance for cars[1] h_1 = 1.1; h_2 = 1.25, d = 0.36[2]; Observation time = 3 sec					
	R_T = 1.5 sec[3]		R_T = 2.0 sec		R_T = 2.5 sec	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97
120	–	–	324	112	341	124
130	–	–	365	143	383	157

1 *If the average grade over the braking length is not zero, calculate the safe intersection sight distance (SISD) values using the correction factors in Table 3.4 (or use Equation 2) by applying the average grade over the braking length.*
2 *A coefficient of deceleration of greater than 0.36 is not provided in this table. The provision of SISD requires more conservative values than for other sight distance models (e.g. the stopping sight distance model allows values up to 0.46 in constrained situations). This is because there is a much higher likelihood of colliding with hazards at intersections (that is, other vehicles). Comparatively, there is a relatively low risk of hitting a small object on the road (the stopping sight distance model).*
3 *A 1.5 sec reaction time is only to be used in constrained situations where drivers will be alert. Typical situations are given in Table 4.2 of AGRD Part 3. The general minimum reaction time is 2 sec.*

Notes:
K is the length of vertical curve for a 1% change in grade.
To determine SISD for trucks around horizontal curves, use Equation 2 with an observation time of 2.5 sec.
Main Roads Western Australia have adopted a desirable minimum reaction time of 2.5 sec and an absolute minimum reaction time of 2.0 sec. A reaction time of 1.5 sec is not to be used in Western Australia.
Combinations of design speed and reaction times not shown in this table are generally not used.

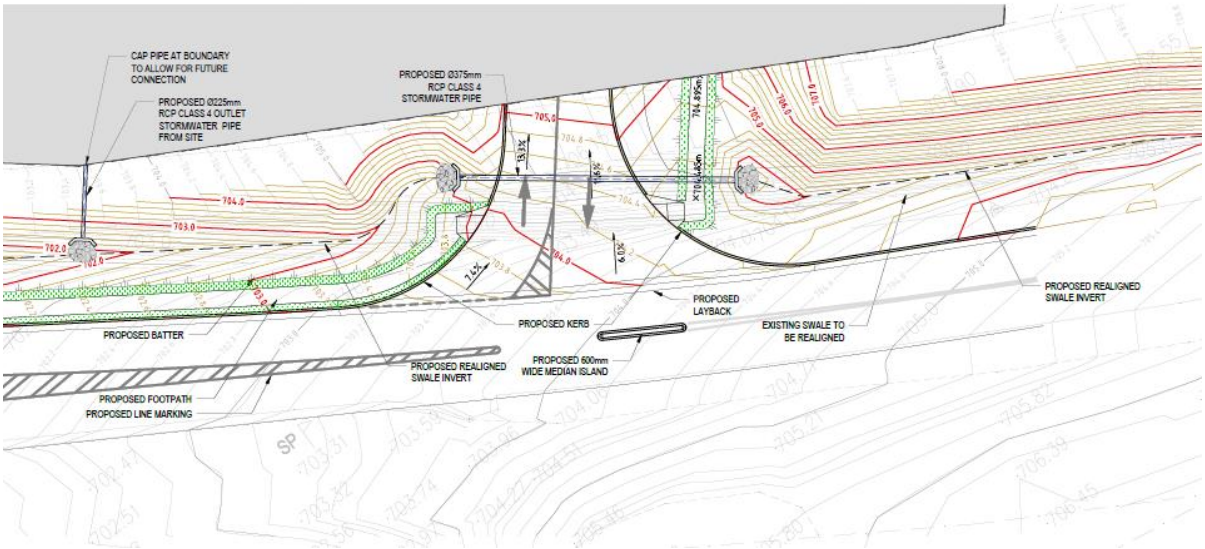


Image 2 – Traffic facility arrangement for eastern driveway

The western driveway proposes a short right turn lane with associated line marking and a pedestrian refuge. The right turn allows right turning cars to move off the through travel lane which

allows for better traffic flow and removes the possibility of a rear end accident. The turning arrangement into the development is like the right turn arrangement for the adjacent McDonalds and Heatherbrae Pies.

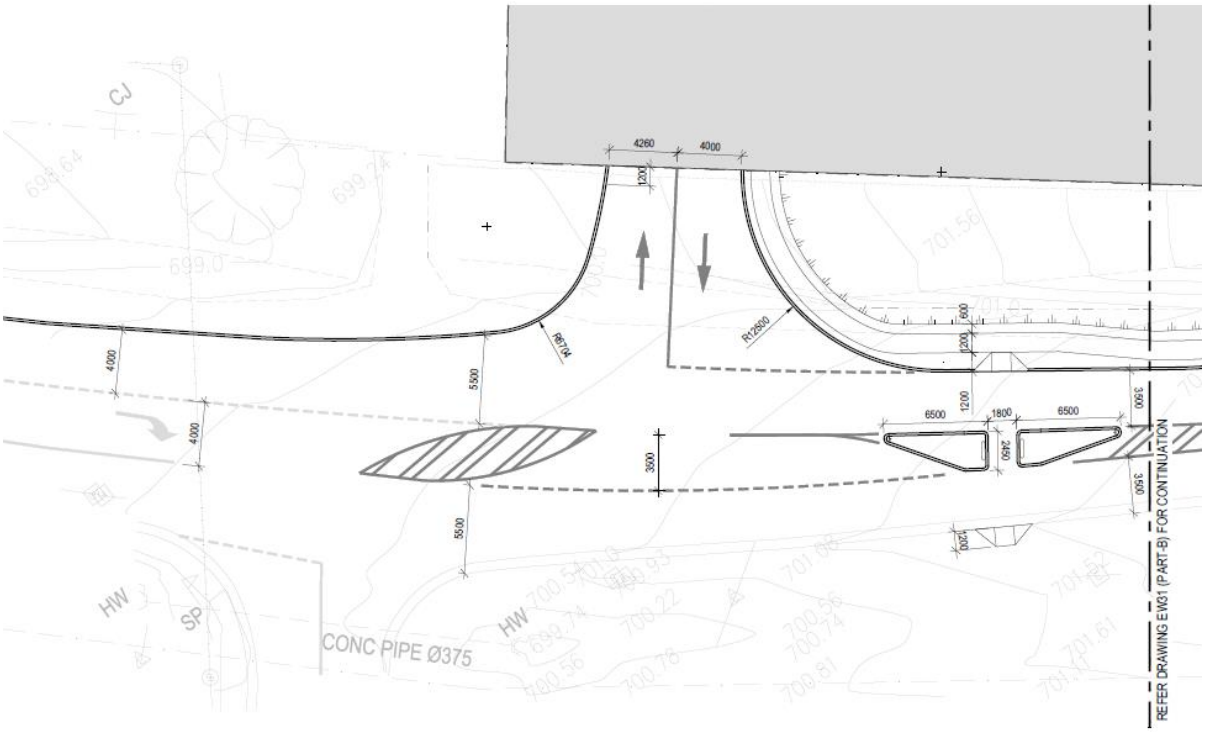


Image 3 – Right turn arrangements for eastern driveway and pedestrian refuge

The signage and line marking plan arrangements shown in the attached civil design plans (Job No. 230139). The signage and line marking plan numbers are EW 40 and EW 41 which are the 11th and 12th sheets of the attached civil design plans.

Road Safety Audit

Below is a list of the findings in the road safety audit. The items have been summarised. For further detail please read the attached road safety audit. The response comments from SLR Consultants can be found in the last column of the road safety audit.

The roads safety audit found 11 items for comment.

1a & 1b. That the speed limit transition from 90km/h to 60km/h be moved further east to allow vehicles to slow before reaching the food outlets. This suggestion is valid for the current development in the area. TfNSW are currently reviewing a request to lower the speed limit as suggested in the road safety audit.

2. The audit team suggests the speed limit be further reduced from 60km/h to 50km/h leading to the food outlets and Shell service station. This request can be suggested to TfNSW to be reviewed.

3. The audit team questions if preventing to the right turn into the east driveway is the best safety option. Preventing the right turn will avoid rear end accident but will introduce an extra right turn movement at the west driveway and potential conflict. They suggest considering restricting the right

turn at the west driveway to reduce conflict with the Heatherbrae Pies traffic and question that the length of the right turn bay into the west driveway. SLR argue that the number of vehicles that travel to and from the east on Sallys Corner Road is low and will not be a significant risk.

4a and 4b. The audit team raise the concern of the concern of the short length of the right turn lane into west driveway and potential to block sight distance to the pedestrian refuge. SLR's response is that the traffic volumes for right turning vehicles is low and that the length is sufficient. The short length of the right turn bay also doesn't allow for deceleration. The short right turn bay is further justification to reduce the speed to 50km/h

5. The audit team suggests that the median and signage to prevent the right turn into the east driveway will have frequent non-compliance and the signage will get hit on a regular basis. SLR have responded by saying that all drivers are expected the follow NSW road rules and that the signage would be replaced by council if damaged.

6. This item refers to the conflict zone between the existing Heatherbrae Pies driveway and the proposed west driveway. The response from SLR is that the traffic volumes travelling to and from the east is low.

7. The audit team raises the issue of having a footpath connection from the proposed development to the existing footpaths on the south side of Sallys Corner Road. This item will need to be considered through the development assessment process and possible added as a condition of consent.

8. The audit team found that the kerb ramps that cross the east driveway are at the flared section of the driveway and should be located at the narrowest part of the driveway. SRL agree and will amend the design.

9. The items relates to errors in the description of line marking codes. SRL agree and will amend the plans.

CONCLUSION

The proposed traffic arrangement for the development on Sally's Corner Road meets Australian Standards for driveway sight distances. Appropriate measures have been put in place to address the safe intersection sight distance for right turning vehicles into the eastern driveway.

Appropriate lane widths are provided. The right turn arrangement into the western driveway allows for vehicles to move from the travel lane and is like the turning arrangement for the adjacent food outlets.

A pedestrian footpath is provided and a pedestrian refuge.

A road safety audit has been produced for the attached design. SLR consulting have responded to all findings in the road safety audit with appropriate responses. The key response to numerous items is that potential conflicts from turning movements is mitigated due to the low traffic volumes travelling to and from the east to use the proposed food outlets. Most of the traffic using the food outlets will come from the Hume Highway to the west. Council's Senior Traffic Engineer agrees that there will be a low volume of traffic travelling to and from the east that will be accessing the proposed food outlets.

The proposed development on Sally's corner road is recommended for approval subject to the speed limit being reduced from 90km/h to 60km/h

ATTACHMENTS

1. Sally's Corner Road Proposed Development Civil Plans [**6.11.1** - 16 pages]
2. Road Safety Audit Sally Corner Road Food Outlet [**6.11.2** - 117 pages]

SALLYS CORNER ROAD

SUTTON FOREST, NSW 2579

EXTERNAL CIVIL WORKS DRAWINGS		
DWG. NO.	**AMDT.**	**DRAWING TITLE**
EW00	H	COVER PAGE & DRAWING LIST
SK-01		PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (CARS) & SIGHT DISTANCE
SK-02A		PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (TRUCKS)
EW01	F	OVERALL SITE PLAN
EW10	G	EXISTING & DEMOLITION SITE PLAN PART-A
EW11	E	EXISTING & DEMOLITION SITE PLAN PART-B
EW20	G	PROPOSED SITE PLAN PART-A
EW21	F	PROPOSED SITE PLAN PART-B
EW30	E	DIMENSION & SETOUT PLAN PART-A
EW31	E	DIMENSION & SETOUT PLAN PART-B
EW40	G	LINE MARK AND SIGNAGE PLAN PART-A
EW41	G	LINE MARKING AND SIGNAGE PLAN PART-B
EW50	F	PAVEMENT PLAN PART-A
EW51	E	PAVEMENT PLAN PART-B
EW52	C	PAVEMENT DETAILS (SHEET 1 OF 2)
EW53	D	PAVEMENT DETAILS (SHEET 2 OF 2)

REV No.	COMMENTS	DATE	INIT.
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	17.04.24	DJ
G	FOR APPROVAL	24.04.24	DJ
H	FOR S138 APPROVAL	30.04.24	DJ
J	FOR S138 APPROVAL	01.05.24	DJ

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond + Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
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COVER PAGE &
DRAWING LIST

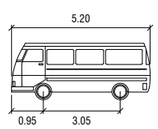
DATE:	MAY 2023	DRG.No.
SCALE:	N.T.S.	EW00
JOB No.	230139	REV J

LEVEL 16, 175 EAGLE ST
BRISBANE
QUEENSLAND 4000
AUSTRALIA
T: 61 7 3858 4800

www.slrconsulting.com

Project No:	610.31088
Date:	02/05/2024
Drawn by:	Charlie Seventekin
Certified by:	Charlie Seventekin
Sheet Size:	A3
Projection:	GDA2020

SWEPT PATH LEGEND
- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels



PASSENGER-VAN

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

N

0.0 7.5 15 22.5 30
METRES

SCALE 1:750

Australian Property Syndicates Pty Ltd

S138 Application

Proposed Right and Left Turn Arrangements (Cars) & Sight Distance

FIGURE SK-01

LEVEL 16, 175 EAGLE ST
BRISBANE
QUEENSLAND 4000
AUSTRALIA
T: 61 7 3858 4800

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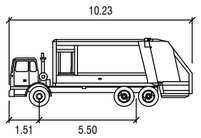
Project No:	610.31088
Date:	02/05/2024
Drawn by:	Charlie Seventekin
Certified by:	Charlie Seventekin
Sheet Size:	A3
Projection:	GDA2020

SWEPT PATH LEGEND

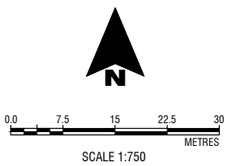
- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels



BCC Rear Load RCV (ACCO 2350)

meters

Width	:	2.50
Track	:	2.50
Lock to Lock Time	:	6.0
Steering Angle	:	40.3



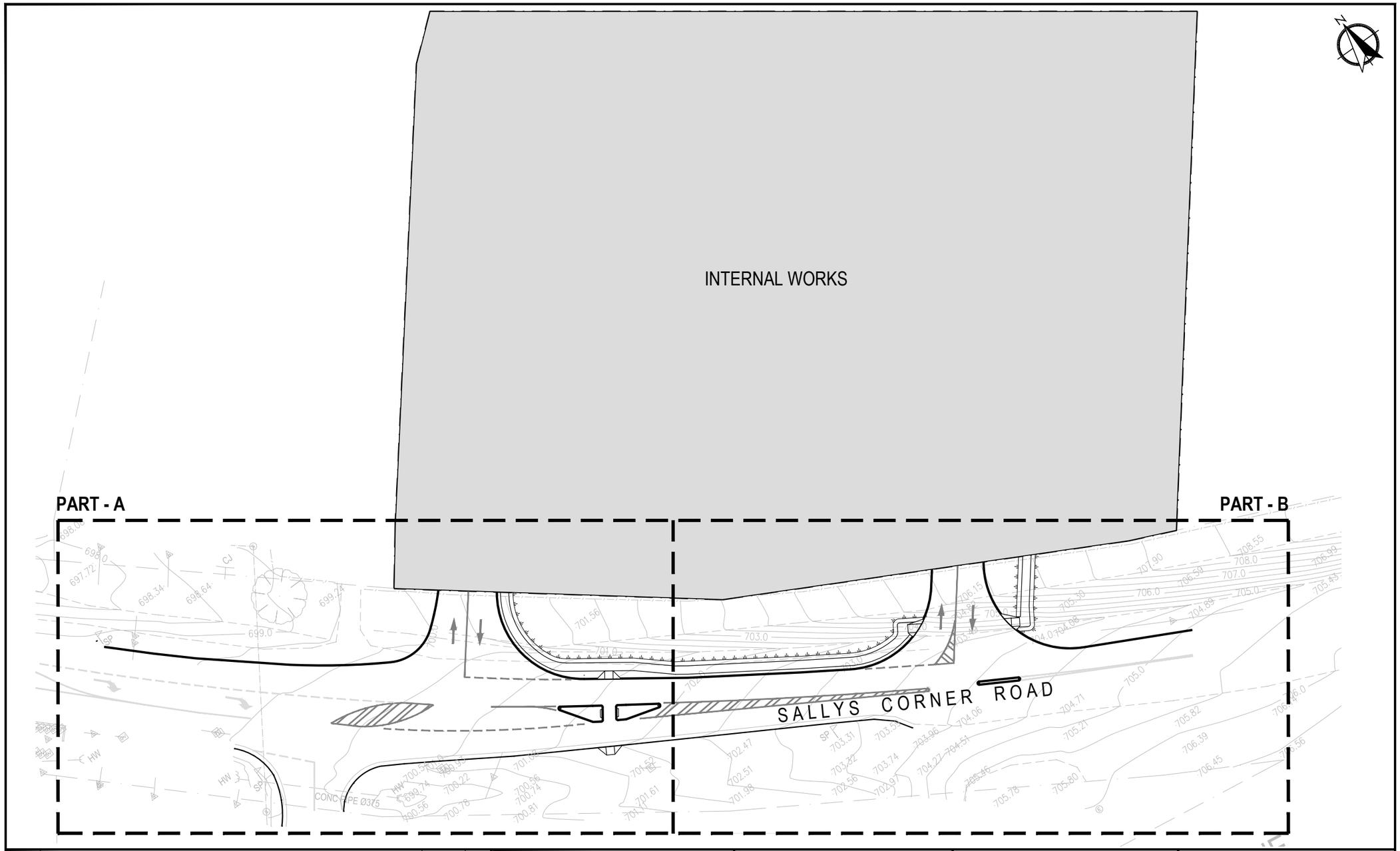
SCALE 1:750

Australian Property Syndicates Pty Ltd

S138 Application

Proposed Right and Left Turn Arrangements (Trucks)

FIGURE SK-02A



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 5000 10000 20000 30000
SCALE (mm) 1:500

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

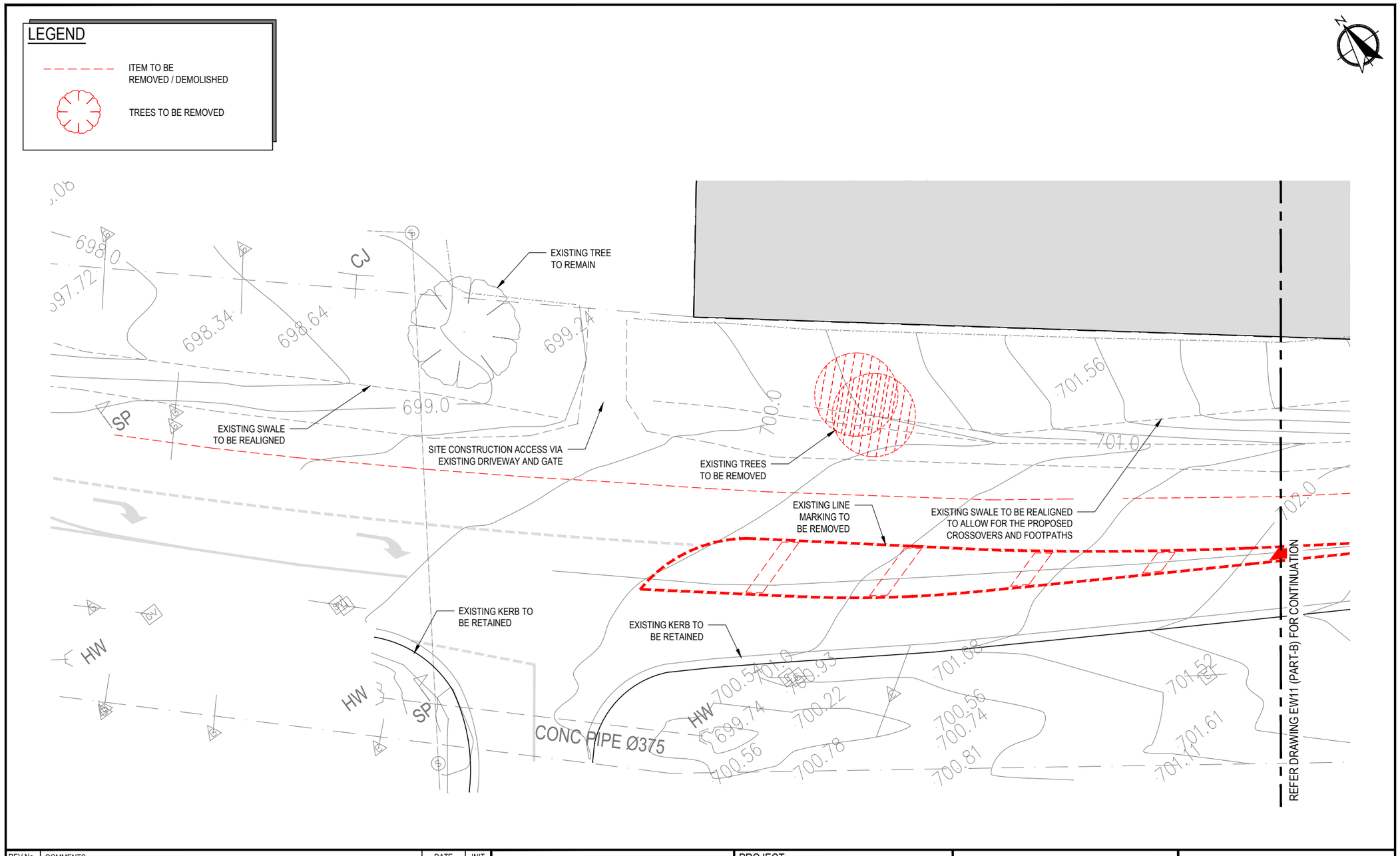
CLIENT:
APS

Richmond+Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

OVERALL SITE PLAN

DATE:	MAY 2023	DRG.No.
SCALE:	1:500 @ A3	EW01
JOB No.	230139	REV F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond+Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

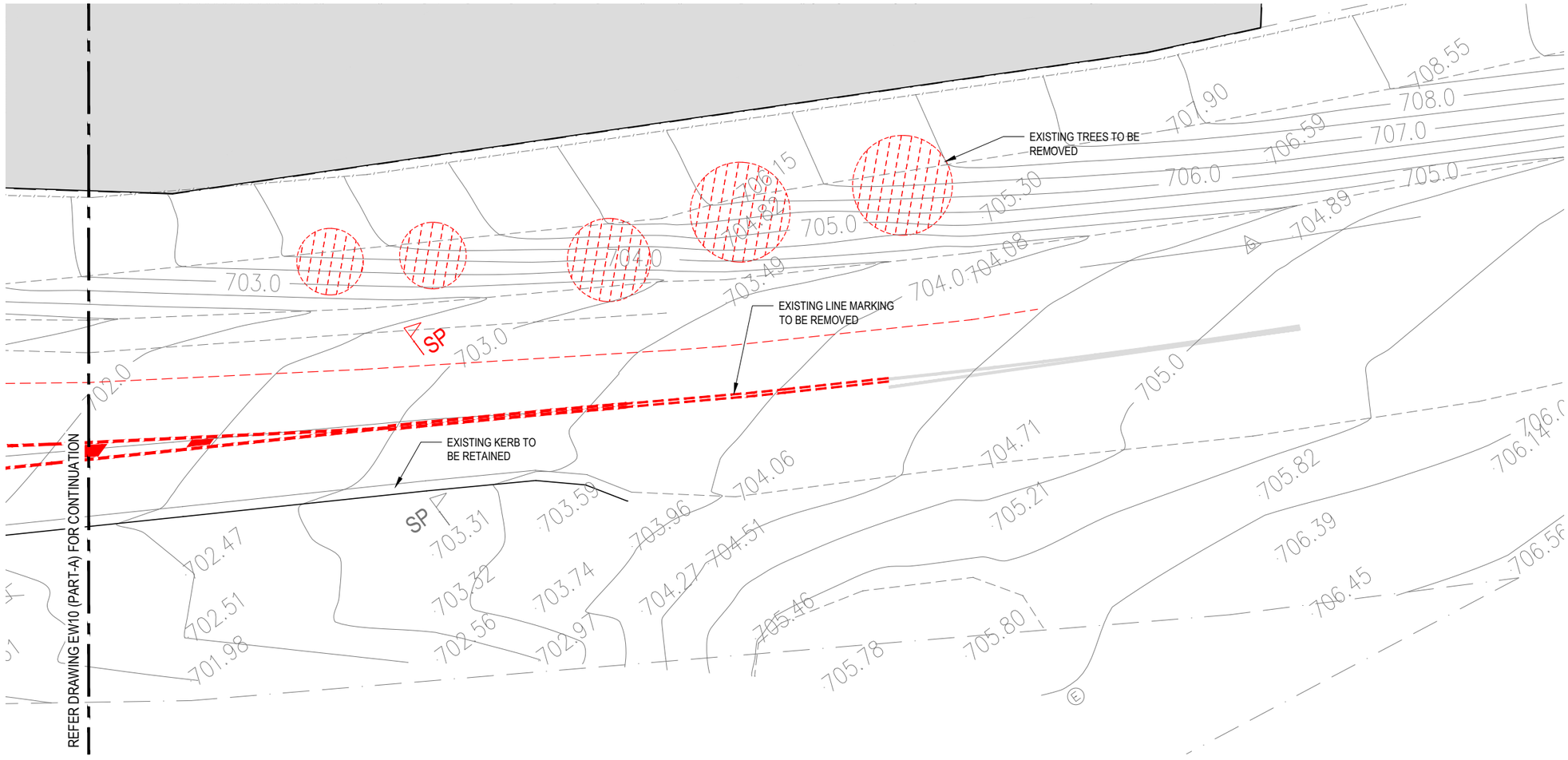
EXISTING & DEMOLITON SITE PLAN PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW10
JOB No.	230139	REV G

LEGEND

ITEM TO BE REMOVED / DEMOLISHED

TREES TO BE REMOVED



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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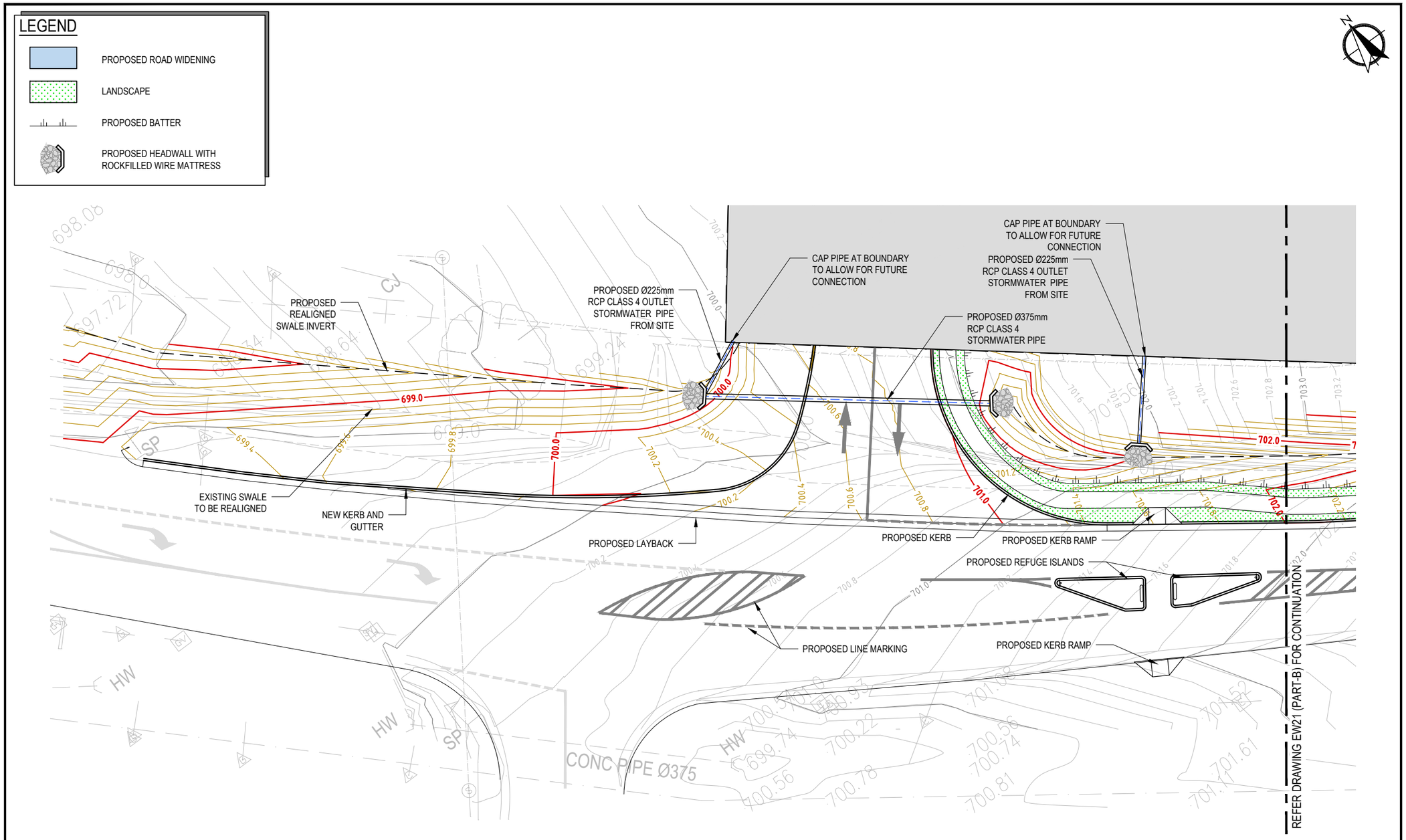
EXISTING & DEMOLITON SITE PLAN PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW11
JOB No.	230139	REV E



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
E	FOR APPROVAL	16.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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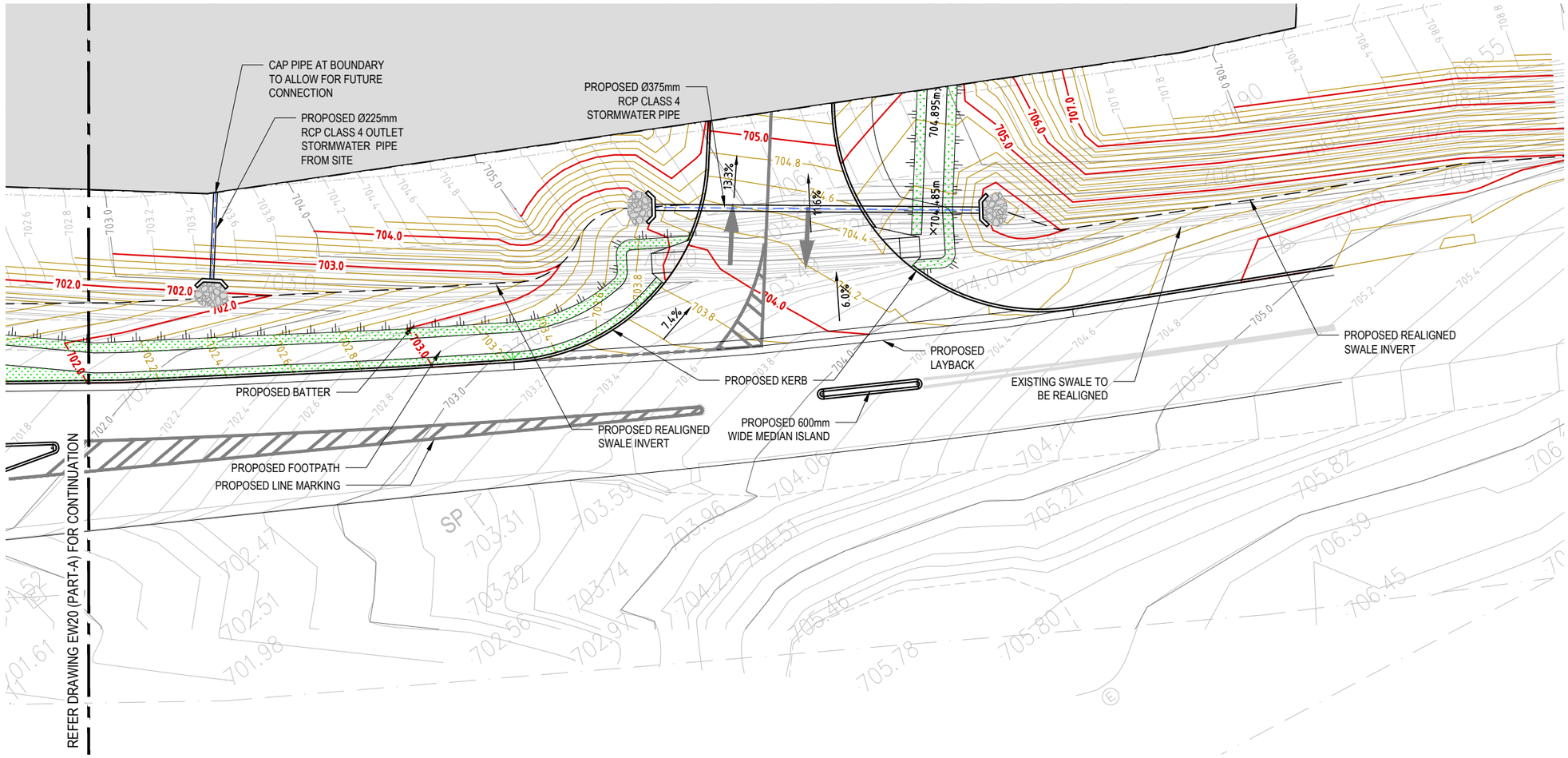
PROPOSED SITE PLAN
PART - A

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW20	
JOB No.	230139	REV	G

LEGEND

- PROPOSED ROAD WIDENING
- LANDSCAPE
- PROPOSED BATTER
- PROPOSED HEADWALL WITH ROCKFILLED WIRE MATTRESS



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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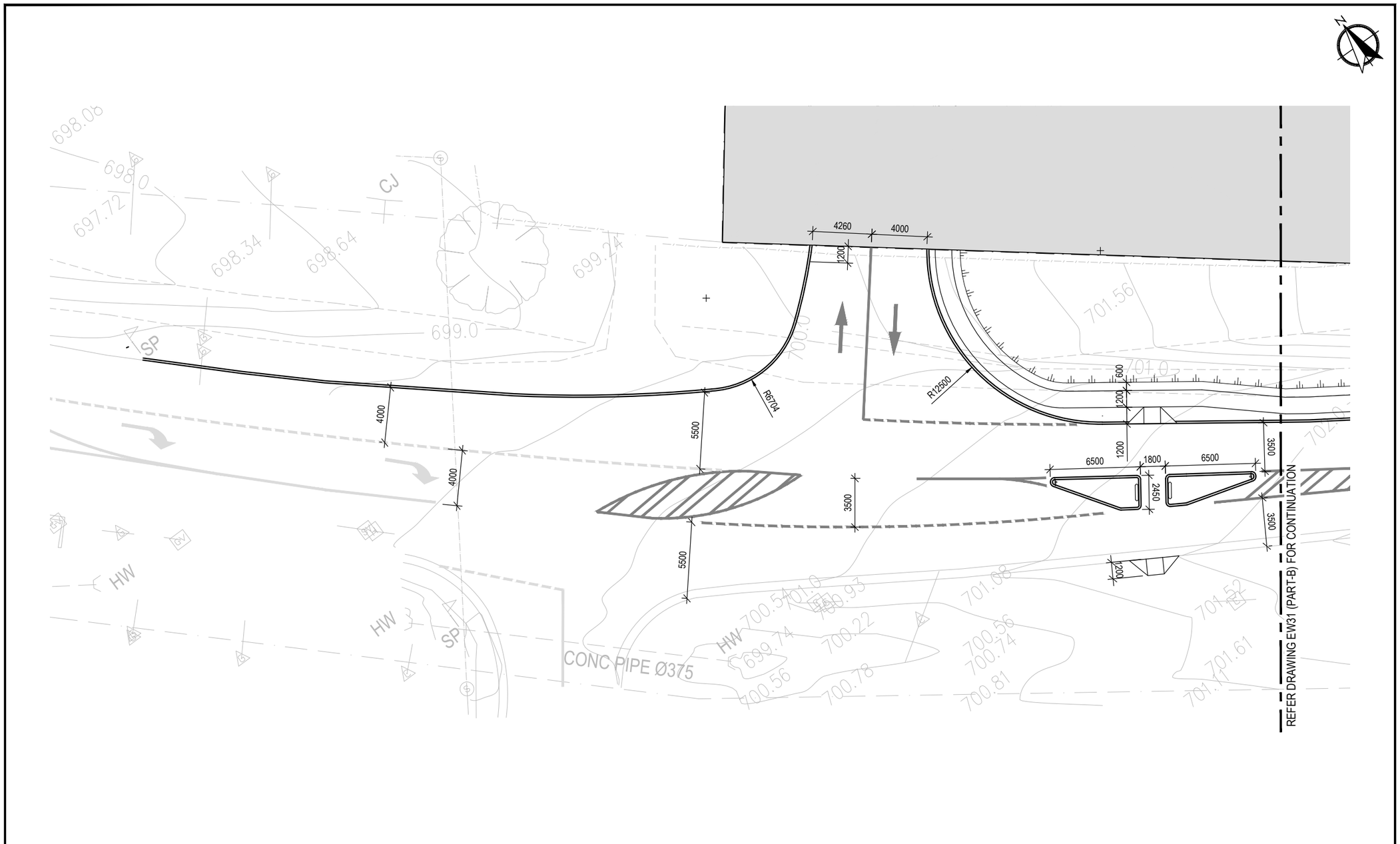
PROPOSED SITE PLAN
PART - B

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW21	
JOB No.	230139	REV	F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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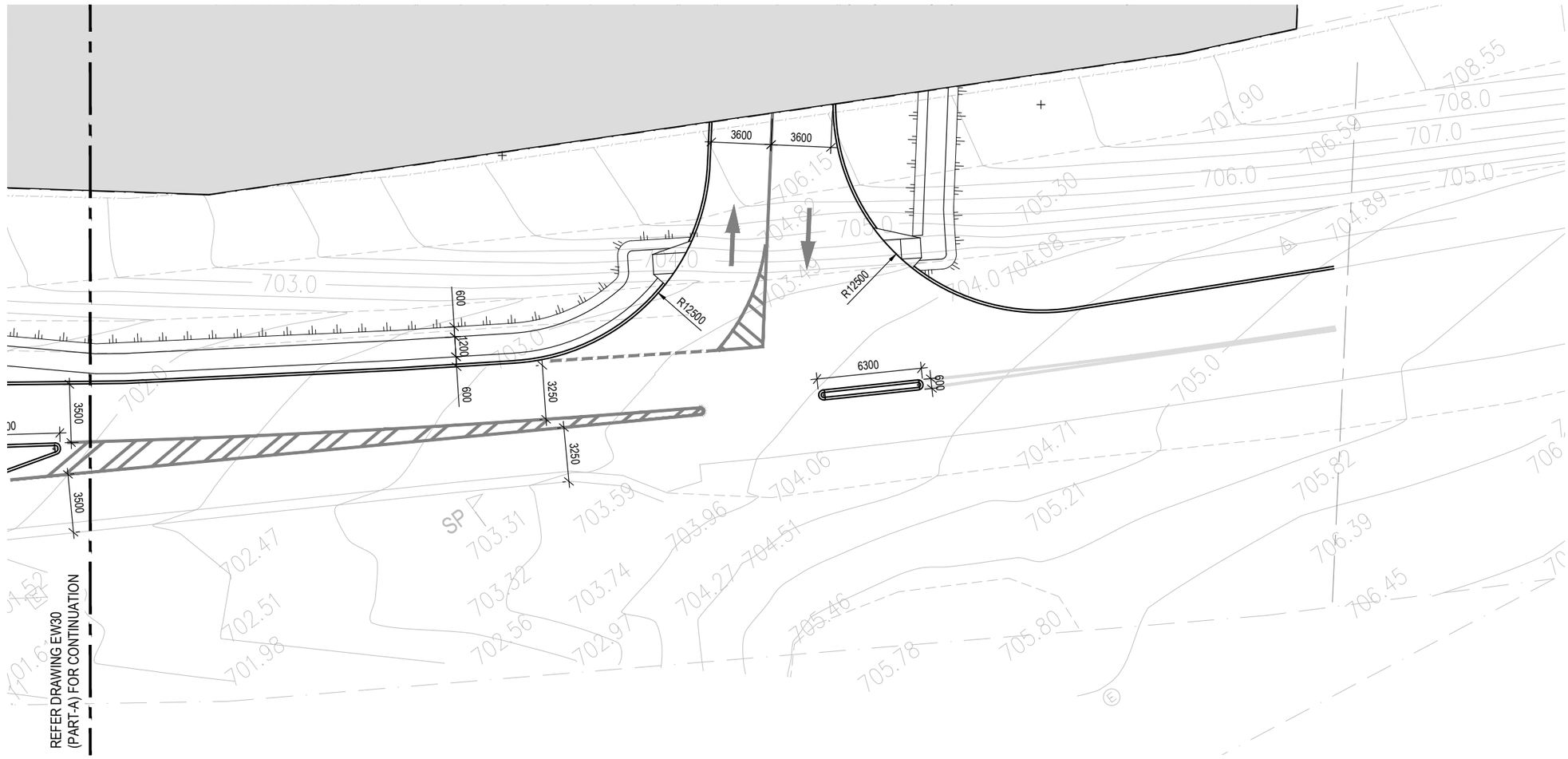
DIMENSION/SETOUT PLAN
PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW30
JOB No.	230139	REV E



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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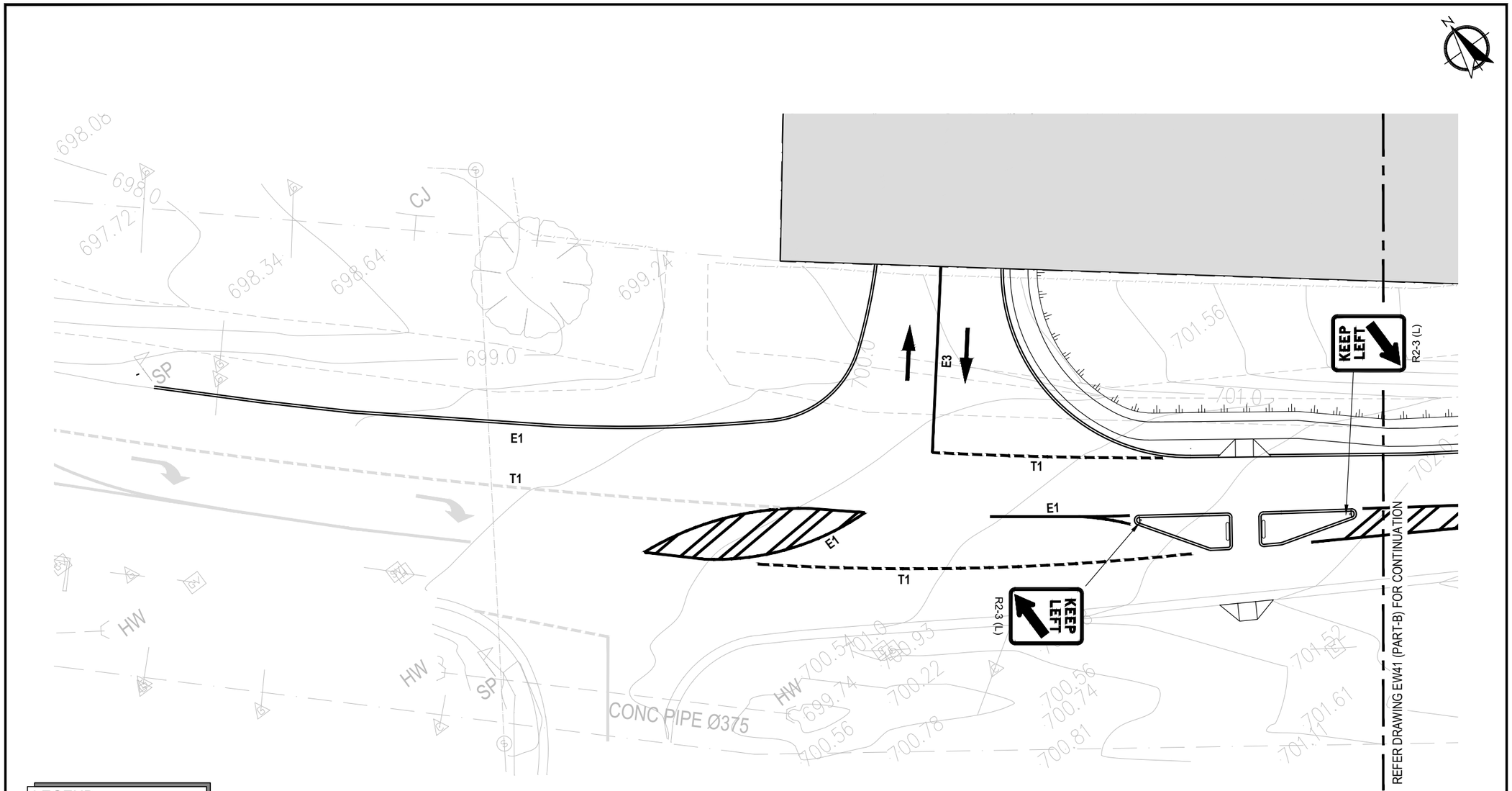
DIMENSION/SETOUT PLAN
PART - B

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW31	
JOB No.	230139	REV	E



LEGEND

E1, E3	EDGE LINEMARKING
T1	TURNING LINEMARKING

NOTE:

1. REFER TfNSW DELINEATION GUIDELINE SECTION 4.
2. EXISTING LINEMARKING SHOWN IS BASED ON HISTORICAL ARIEL IMAGERY. SALLYS CORNER ROAD HAS RECENTLY BEEN RESURFACED AND AS SUCH THE REVISED LINEMARKING MAY VARY FROM WHAT IS SHOWN ON PLAN. CONTACT ENGINEER PRIOR TO CONSTRUCTION OF EXISTING LINEMARKING ON SITE VARIES FROM EXISTING LINEMARKING ON PLANS.
3. PROPOSED EXTENSION OF THE 60 ZONE FURTHER TO THE EAST UNDER REVIEW BY TFNSW.

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436
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CROWS NEST, NSW 2065
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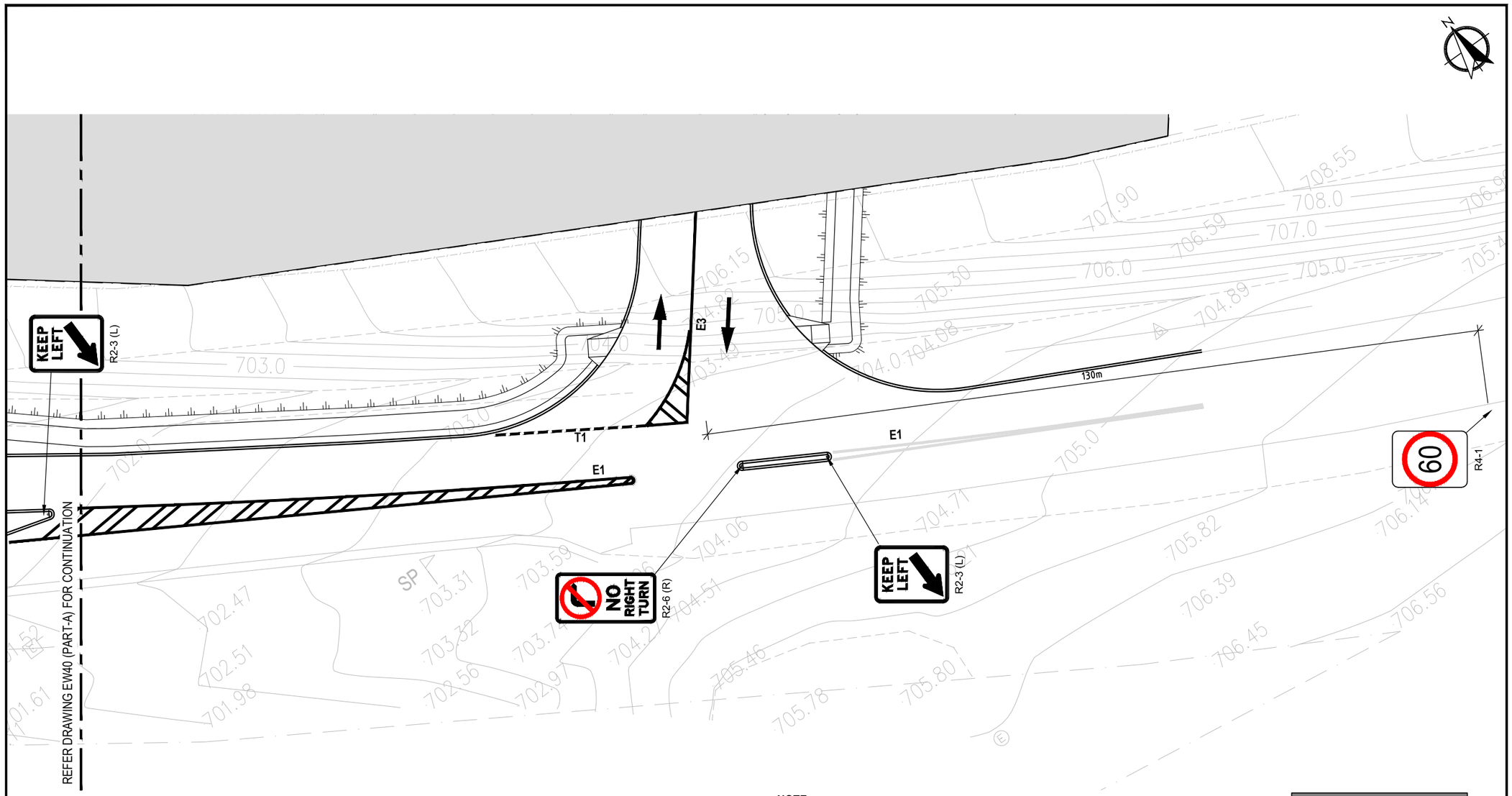
LINE MARKING AND SIGNAGE PLAN - PART - A

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW40	
JOB No.	230139	REV	G



NOTE:

1. REFER TfNSW DELINEATION GUIDELINE SECTION 4.
2. EXISTING LINEMARKING SHOWN IS BASED ON HISTORICAL ARIEL IMAGERY. SALLYS CORNER ROAD HAS RECENTLY BEEN RESURFACED AND AS SUCH THE REVISED LINEMARKING MAY VARY FROM WHAT IS SHOWN ON PLAN. CONTACT ENGINEER PRIOR TO CONSTRUCTION OF EXISTING LINEMARKING ON SITE VARIES FROM EXISTING LINEMARKING ON PLANS.
3. PROPOSED EXTENSION OF THE 60 ZONE FURTHER TO THE EAST UNDER REVIEW BY TFNSW.

LEGEND

E1, E3	EDGE LINEMARKING
T1	TURNING LINEMARKING

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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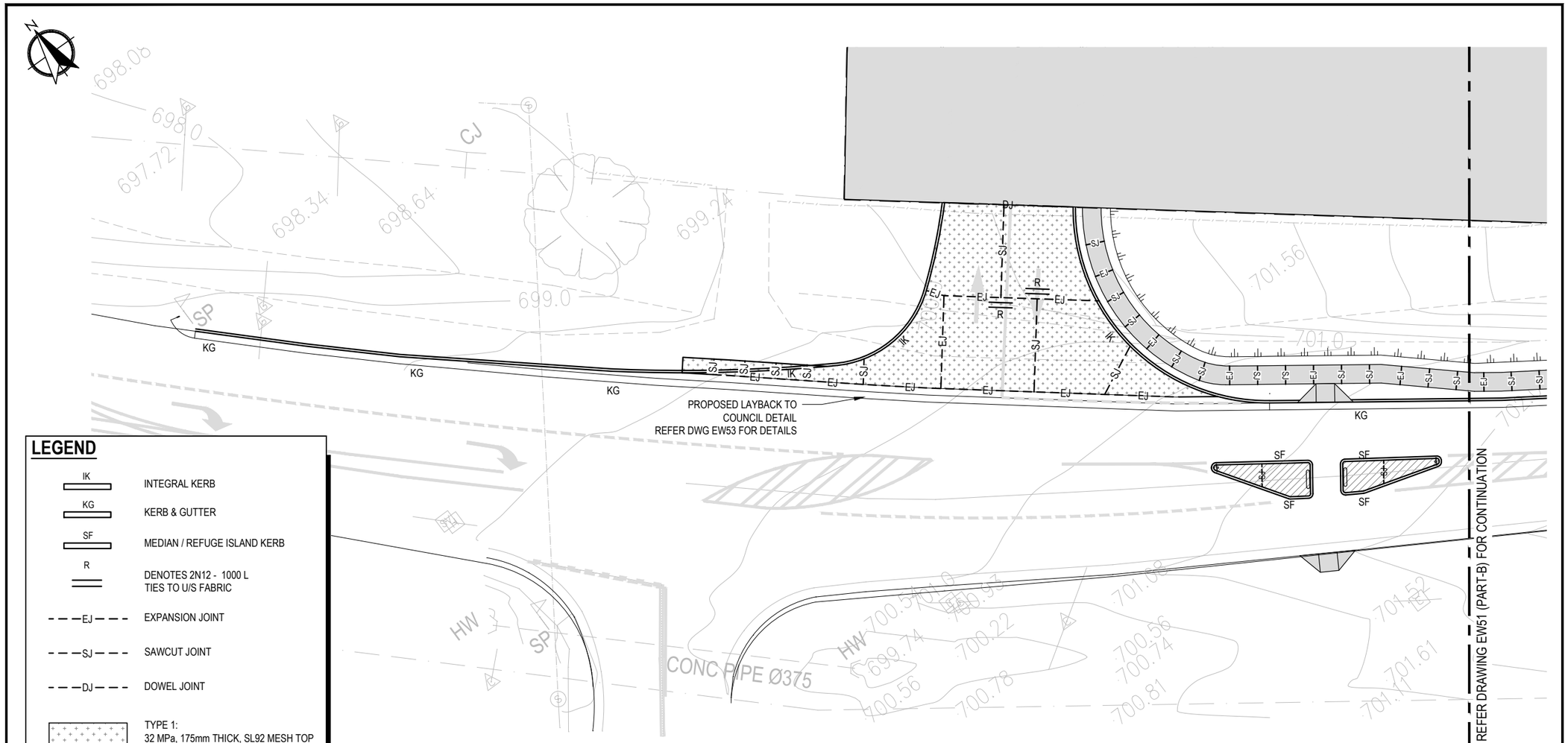
LINE MARKING AND SIGNAGE PLAN - PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW41
JOB No.	230139	REV G



LEGEND

IK	INTEGRAL KERB
KG	KERB & GUTTER
SF	MEDIAN / REFUGE ISLAND KERB
R	DENOTES 2N12 - 1000 L TIES TO U/S FABRIC
EJ	EXPANSION JOINT
SJ	SAWCUT JOINT
DJ	DOWEL JOINT
	TYPE 1: 32 MPa, 175mm THICK, SL92 MESH TOP 40mm COVER TOP. NATURAL CONCRETE BROOM FINISH.
	TYPE 2: 32 MPa, 100mm THICK, SL72 MESH CENTRAL NATURAL CONCRETE BROOM FINISH
	TYPE 3: 32 MPa, 130mm THICK, SL72 MESH CENTRAL NATURAL CONCRETE BROOM FINISH

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
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C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	17.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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38 WILLOUGHBY ROAD,
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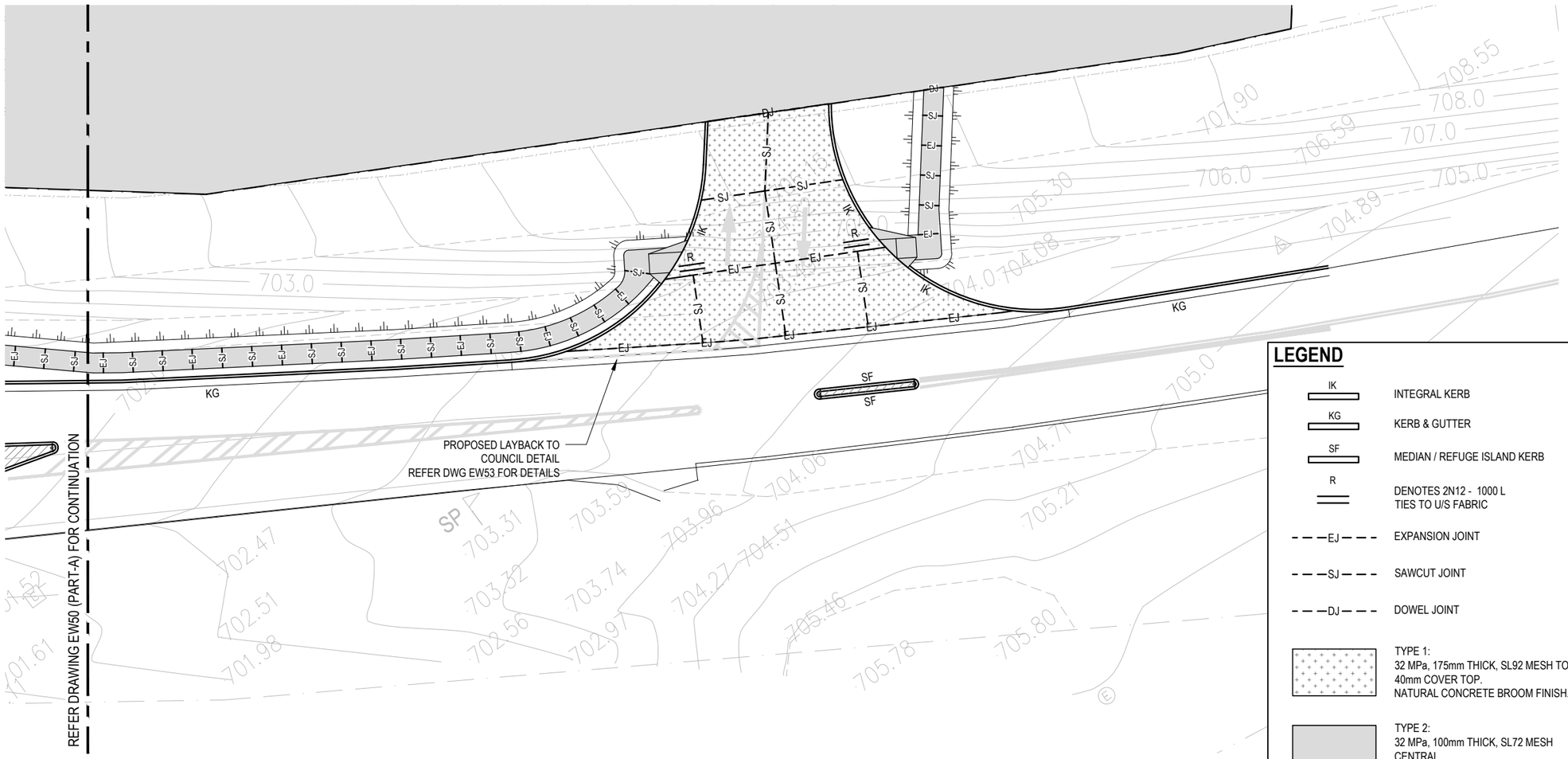
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT PLAN
PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW50
JOB No.	230139	REV F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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ABN 34 001 485 436

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CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT PLAN
PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW51
JOB No.	230139	REV E

PAVEMENT NOTES

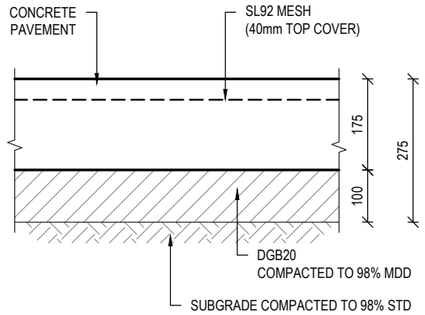
1. PAVEMENT MATERIALS SHALL BE IN ACCORDANCE WITH TfNSW SPEC 3051 : BASE COURSE DGB20
2. FILL MATERIALS WHICH ARE PRONE TO ACCELERATED WEATHERING WILL NOT BE ACCEPTED EG. SOME MUDSTONES, CLAYSTONES, SILTSTONES, SHALES AND OTHER ROCKS. ENDORSEMENT OF THE SUITABILITY OF THE PROPOSED FILLING MATERIAL IS TO BE MADE BY A GEOTECHNICAL ENGINEER PRIOR TO APPROVAL. FILL MATERIALS USED TO SUPPORT PAVEMENTS SHALL BE COMPACTED TO 95% STANDARD MAXIMUM DRY DENSITY UPTO 0.5M BELOW SUBGRADE LEVEL.
3. BASE COURSE SHALL BE COMPACTED TO 98% MODIFIED MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF STANDARD OPTIMUM, MINIMUM SOAKED CBR 80% UNO.
4. SUB BASE COURSE SHALL BE COMPACTED TO 95% MODIFIED MAXIMUM DRY DENSITY, MINIMUM SOAKED CBR 45% UNO.
5. SUBGRADE SHALL BE APPROVED NATURAL SUBGRADE OR IMPORTED FILL. PROOF ROLL AND COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY UNO.

CONCRETE PAVEMENT NOTES

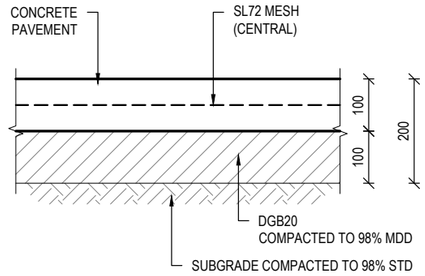
1. CONCRETE.
   - 1.1. ALL EXTERNAL CONCRETE SLABS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32MPA @ 28 DAYS (U.N.O.)
   - 1.2. ALL PEDESTRIAN TRAFFIC PAVEMENTS TO BE A MINIMUM OF 28MPa @ 28 DAYS
2. PROVIDE A HEAVY DUTY MEMBRANE UNDER ALL BUILDING SLABS AND TANK FARM PAVEMENTS.
3. ALL REINFORCEMENT SHALL BE SUPPORTED ON BAR CHAIRS AND DISCS - 50mm MIN COVER TO LIGS, CROSS BARS AND ALL REINFORCEMENT EXPOSED TO AIR OR AGAINST GROUND.
4. NO WATER SHALL BE PERMITTED TO BE ADDED TO PREMIXED CONCRETE ON SITE.
5. EACH TRUCK SHALL BE CHECKED FOR SLUMP USING A STANDARD CONE. SPECIFIED SLUMP TO BE 85MM ± 15MM. CONCRETE OUTSIDE THIS RANGE SHALL BE REJECTED.
6. ALL CONCRETE SHALL BE COMPACTED USING A VIBRATOR OR TRAVELLING SCREED.
7. MINIMUM TRAFFICABLE CURE TIME FOR CONCRETE SLAB AS FOLLOWS:
   - 7.1. 32MPA, 4MPA FLEXURAL = 7 DAYS UNLESS ACCELERATED WITH TfNSW COMPLIANT MIX IN WHICH CASE MAY TRAFFICKED 12 HOURS AFTER CURING
   - 7.2. 60MPA = 4 DAYS (NOT SUITABLE FOR USE WITH ACCELERANTS)
8. ALL SAWN JOINTS SHALL BE CUT USING A 'SOFT CUT' 4 HOURS AFTER POUR.
9. PROVIDE AT LEAST 48 HOURS NOTICE TO THE ENGINEER FOR INSPECTION OF REINFORCEMENT, PRIOR TO POUR.
10. MAINTAIN COVER TO ALL REINFORCEMENT IN ACCORDANCE WITH THE "REINFORCEMENT DETAIL".
11. USE ONLY GALVANISED DOWEL BARS (MIN 250 GRADE).
12. SEAL ALL JOINTS (U.N.O.) IN ACCORDANCE WITH RELEVANT JOINT SEAL DETAIL
13. THE EVAPORATION RATE SHALL BE MONITORED BY THE CONTRACTOR DURING CONCRETING OPERATIONS UNTIL SUCH TIME AS CURING COMMENCES. IF CONTROL MEASURES ARE NOT SUCCESSFUL OR ARE IMPRACTICAL, NO CONCRETE SHALL BE POURED.
14. WHERE WEATHER CONDITIONS ON SITE INDICATE AN EVAPORATION RATE FROM THE CONCRETE SURFACE IS LIKELY TO EXCEED 0.50 KG/M²/H, THE USE OF EVAPORATION RETARDANT MIST SPRAYS ON THE CONCRETE SLAB EXPOSED SURFACE ARE MANDATORY. SPRAYS MUST BE MIXED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND APPLIED WITHIN 10 MINUTES OF CONCRETE PLACEMENT AND INITIAL LEVELLING. SPRAYS ARE THEN APPLIED AGAIN FOLLOWING ANY SUBSEQUENT FLOATING OPERATION ON THE CONCRETE SURFACE.

PAVEMENT DESIGN CBR

PAVEMENTS DESIGNED USING AN ASSUMED CBR OF 4.5% PAVEMENT PROFILES
SUBJECT TO REVIEW ON COMPLETION OF GEOTECH INVESTIGATION



TYPE 1: HEAVY DUTY CONCRETE PAVEMENT
SCALE 1:10



TYPE 2: CONCRETE PAVEMENT FOR PEDESTRIAN ACCESS
SCALE 1:10

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	FOR APPROVAL	15.04.24	JK
C	FOR S138 APPROVAL	30.04.24	JK

0 100 200 400 600
SCALE (mm) 1:10

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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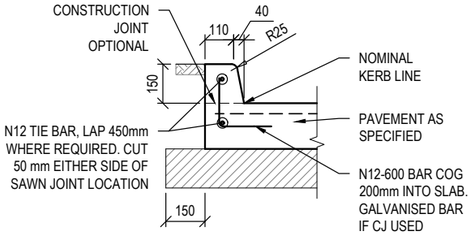
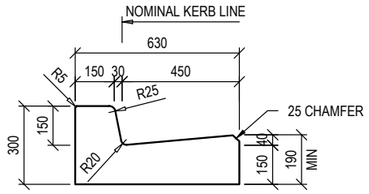
PAVEMENT DETAILS
SHEET 1 OF 2

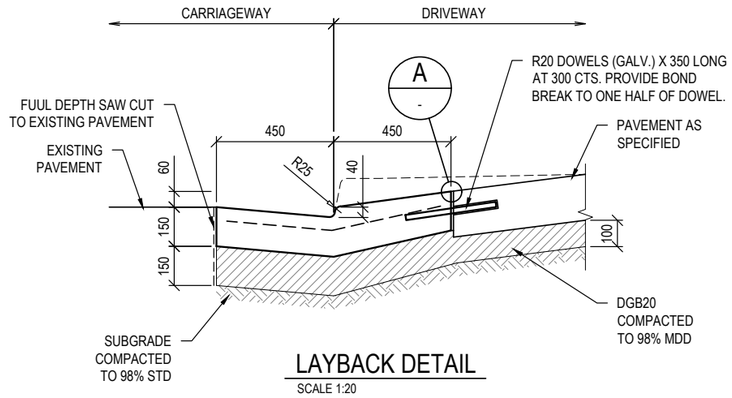
DATE:	MAY 2023	DRG.No.	EW52
SCALE:	1:10 @ A3	REV	C
JOB No.	230139		



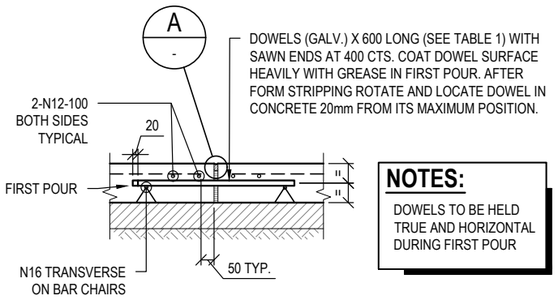
INTEGRAL KERB DETAIL 'IK'
SCALE 1:20



KERB & GUTTER DETAIL 'KG'
SCALE 1:20

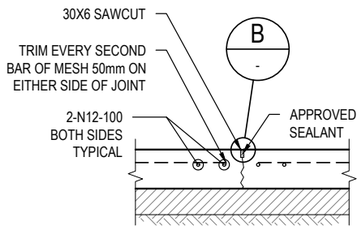


LAYBACK DETAIL
SCALE 1:20

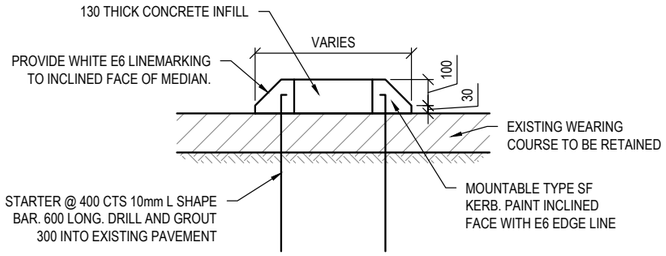


NOTES:
DOWELS TO BE HELD TRUE AND HORIZONTAL DURING FIRST POUR

EXPANSION JOINT (EJ)
SCALE 1:20



SAW CUT JOINT DETAIL (SJ)
SCALE 1:20

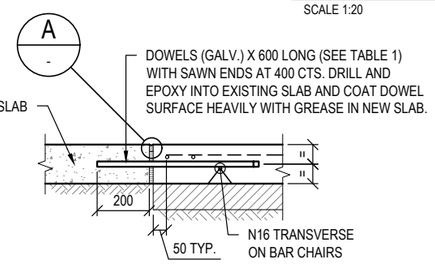


TYPICAL MEDIAN / REFUGE ISLAND SECTION (SF KERB)
SCALE 1:20

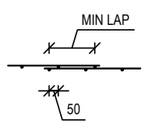
TABLE 1	
PAVEMENT THICKNESS	DOWEL DIAMETER
100	12mm
100 < T < 150	16mm
150 ≤ T ≤ 200	20mm

KERB NOTES

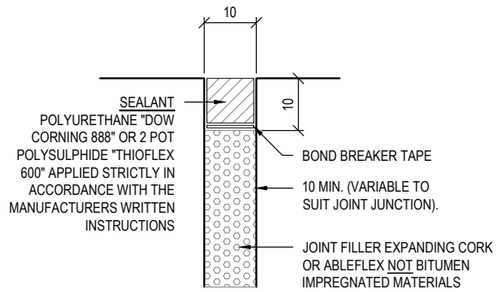
1. KERB PROFILE DIMENSIONS ARE INDICATED AS A GUIDE TO INTENT ONLY, AND MAY BE VARIED BY THE CIVIL ENGINEER TO SUIT STATE ROAD AUTHORITY OR LOCAL GOVERNMENT SPECIFICATIONS.
2. MINIMUM CONCRETE STRENGTH FOR KERBS SHALL BE: F'C = 25 MPA AT 28 DAYS.
3. PROVIDE FULL DEPTH CONTRACTION JOINTS AT 2400 CTS. MAX. BY USING 3mm STEEL TEMPLATE. JOINTS SHALL COINCIDE WITH PAVEMENT JOINTS WHERE POSSIBLE. EVERY THIRD JOINT BEING AN EXPOSITION JOINT



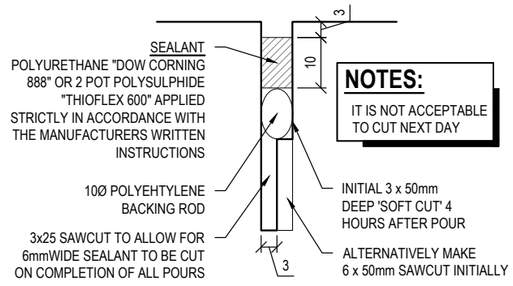
DOWEL JOINT (DJ)
SCALE 1:20



FABRIC LAP DETAIL
SCALE 1:20



A - EXPANSION JOINT DETAIL
SCALE 1:1



NOTES:
IT IS NOT ACCEPTABLE TO CUT NEXT DAY

B - SAW CUT JOINT SEAL
SCALE 1:1

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	JK
D	FOR S138 APPROVAL	30.04.24	JK

0 100 200 400 600
SCALE (mm) 1:10

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond+Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436
38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT DETAILS
SHEET 2 OF 2

DATE:	MAY 2023	DRG.No.	EW53
SCALE:	AS SHOWN @ A3	REV	D
JOB No.	230139		

Statement of Advice

KFC/ GYG Developments, 61 Sallys Corner Road Exeter

SLR Review of Road Safety Audit

ADDRESSED TO: Michael Rayner – Senior Traffic Engineer, Wingecarribee Shire Council	**DATE:** 5 July 2024
SLR PROJECT No: 610.031635.00001	**REVISION:** v1.0
AUTHOR: Charlie Seventekin	**REVIEWER:** Kris Stone

1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged to provide traffic engineering advice with respect to the above development matter. As you know, both developments have been approved by Wingecarribbee Shire Council (Council), and the Traffic Committee requested the undertaking of a Road Safety Audit in May 2024.

2.0 Background

SLR has worked on this project with Australian Property Syndicates (APS or The Applicant), Richmond + Ross (Civil Engineers), Council and Transport for New South Wales (TfNSW) since October 2022.

SLR's traffic engineers have undertaken several site inspections at the location, including one with the Council's officers in March 2024. Based on this, we consider that both the Council and SLR have an intimate understanding of the road network and vehicular movements in the subject area.

As requested by the Traffic Committee, SLR has commissioned DC Engineering to undertake a Road Safety Audit (RSA) in June 2024. To eliminate any question marks, SLR's Transport Advisory team commissioned external road safety auditors who are well-known in New South Wales for the quality of RSAs they have prepared in the past two decades.

This Statement of Advice references the following documents:

- DC Engineering Road Safety Audit dated 04/07/2024 - **Appendix A**.
- Richmond and Ross Section 138 Approval Plans dated May 2023 - **Appendix B**.
- SLR Statement of Advice for Access Arrangements dated 30/10/2023 – **Appendix C**.
- SLR Traffic Impact Assessment report for Kentucky Fried Chicken (KFC) Development dated 16/12/2022 - **Appendix D**.
- SLR Traffic Impact Assessment report for Guzman Y Gomez (GYG) Development dated 09/11/2022 - **Appendix E**.

3.0 Purpose

The purpose of this advice is to consider the findings of the RSA that DC Engineering prepared independently based on their review of the Section 138 approval plans prepared by Richmond + Ross. This RSA (Refer to **Appendix A**) and Section 138 approvals plans (Refer to **Appendix B**) are attached to this letter.

4.0 Technical Consideration

For completeness of an RSA, it is recommended that the Project Team's responses be included in the RSA. The Auditor can not modify the wording/ intent of the Project Team's statements.

In order to prevent a double-up, the Project Team's technical responses are not provided in this cover letter. We have provided our responses to DC Engineering for them to incorporate into the RSA, which is appended to this document.

Notwithstanding, for your information, the Project Team comprises the following personnel at SLR Consulting:

- Kris Stone – Principal Consultant and Senior Traffic Engineer, an accredited Level 1 Road Safety Auditor in New South Wales and Senior Road Safety Auditor in Queensland.
- Charlie Seventekin – Associate Consultant and Traffic Engineer, an accredited Level 1 Road Safety Auditor in New South Wales.

5.0 Conclusions

Based on our review of the RSA, we believe it did not raise any significant issues that would warrant re-examination of the already approved development application regarding site access and the proposed speed limit reduction.

The Project Team has responded to the RSA with clarifications and acceptance, or counter-views supported by technical justifications.

Based on our extensive consultations with the Council for this project in the past two years, we know that the Council will agree with us on many of the RSA's findings because we designed the development consistent with the Council's comments and recommendations.

Based on the above, the Project Team seeks the Traffic Committee's approval on the proposed access arrangements.

Should the Traffic Committee have any questions or comments, please contact Charlie Seventekin at SLR Consulting at 0412 969 987 or cseventekin@slrconsulting.com.

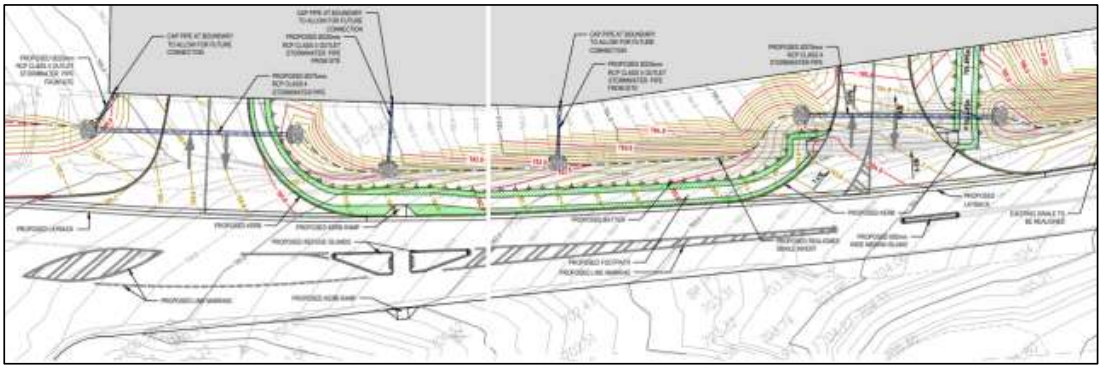
Appendix A DC Engineering – Road Safety Audit

TRAFFIC ENGINEERING

SLR Consulting Australia

61 Sallys Corner Road, Sutton Forest

Detailed design road safety audit



DC Traffic Engineering Pty Ltd
ABN 50 148 960 632
www.dctrafficengineering.com.au

SLR Consulting Australia

61 Sallys Corner Road, Sutton Forest

Detailed design road safety audit

Authors Damien Chee

Report No SLR-PROJ-0001-01 DD RSA 61 SALLYS CORNER Road^Lj Sutton Forest Rev 2

Date 4/7/2024

This report has been prepared for SLR Consulting Australia.

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1.1 Project and audit details 2
1.2 Responding to the audit report 3
1.3 Previous audits 4
2 Safety audit findings 5
3 Concluding statement 16

Appendices

Appendix A
Road Safety Audit Checklist

1 Introduction

1.1 Project and audit details

Details of the audit have been summarised in Table 1.

Table 1 Details of the road safety audit.

Audited project	Proposed GYG and KFC fast food development at 61 Sallys Corner Road, Sutton Forest.
Client/ contact	Charlie Seventekin Associate Consultant – Transport Advisory SLR Consulting Australia Pty Ltd. Ph: (02) 9424 2242 E: cseventekin@slrconsulting.com
Audit type	*Detailed design* road safety audit.
Purpose	A *detailed design* road safety audit was required to identify potential safety risks prior to the construction stage. This was also required to fulfil a request from the Wingecarribee Shire Council Local Traffic Committee.
Background	Australian Property Syndicates Pty Ltd is proposing to develop the land at 61 Sallys Corner Road, Sutton Forest. This land will be split into two parts with areas of 4001m^2 and 5160m^2. The smaller and western lot will be developed into a KFC restaurant with an internal car park, drive-through and inbound-outbound driveway allowing left-turns and right-turns in both directions. The larger and eastern lot will be developed into a GYG restaurant with an internal car park, and inbound-outbound driveway allowing *left-in-left-out-right-out* movements. Both lots will have internal traffic and pedestrian connectivity. The Wingecarribee Shire Council Local Traffic Committee requested that a road safety audit be carried out of the proposed access arrangements. Only the interfaces of the developments with Sallys Corner Road were required to be audited. The internal traffic, parking and circulation layouts were not required to be audited. In these respects, this report details the processes and findings associated with the *detailed design* road safety audit of the proposed access arrangements into and out of the proposed KFC and GYG developments.
Audit team details	Damien Chee, Level 3, lead road safety auditor – RSA-02-0094. Linda Chee, Level 2 road safety auditor – RSA-02-1069.
Audit methodology	The audit was undertaken using the following methodology: ▪ A review of the detailed design plans listed in *scope of project/audit* was carried out on 25/6/2024. ▪ A site inspection was carried out on 25/6/2024. This was only for the purposes of contextualising the detailed design against the existing road, traffic and land use conditions. ▪ The road safety audit findings have been documented in this report in accordance with the NSW Centre for Road Safety's *Guidelines for Road Safety Audit Practices* (2011). ▪ This report includes completed *checklist 3 –detailed design stage audit* as sourced from the Austroads *Guide to Road Safety Part 6A: Implementing Road Safety Audits*.
Meeting and assessment details	Review of plans carried out on 25/6/2024. Site inspection carried out on 25/6/2024. Close out comments issued to audit team on 4/7/2024.

Scope of project/ audit	The following Stage 1 DA drawings were issued to the audit team and included as the auditable materials: S1-C000 C COVER & DRAWING LIST S1-C001 A OVERALL SURVEY PLAN S1-C002 C OVERALL PROPOSED SITE PLAN S1-C003 B BULK EARTH WORK PLAN S1-C100 B SITE 1 OVERALL STORMWATER PLAN S1-C101 A SITE 1 PART A STORMWATER PLAN S1-C102 A SITE 1 PART B STORMWATER PLAN S1-C103 A STORMWATER SCHEDULE AND DETAILS S1-C104.1 A DRAINAGE SECTIONS SHEET 1 S1-C104.2 A DRAINAGE SECTIONS SHEET 2 S1-C104.3 A DRAINAGE SECTIONS SHEET 3 S1-C104.4 A DRAINAGE SECTIONS SHEET 4 S1-C104.5 A BIO RETENTION NOTES S1-C105 B SITE 1 EROSION AND SEDIMENT CONTROL PLAN S1-C106 A SITE 1 EROSION AND SEDIMENT DETAILS S2-A000 C COVER & DRAWING LIST S2-A001 B EXISTING SITE PLAN S2-A002 C OVERALL PROPOSED SITE PLAN S2-A003 D PROPOSED SITE PLAN S2-A004 C PROPOSED CAR CIRCULATION TURN PATH S2-A005 C PROPOSED WASTE TRUCK CIRCULATION TURN PATH S2-A006 C PROPOSED DELIVERY TRUCK CIRCULATION TURN PATH S2-A007 C DIMENSIONED SITE PLAN S2-A101 F PROPOSED FLOOR PLAN S2-A102 B WALL SETOUT PLAN S2-A120 A ROOF PLAN S2-A201 B PROPOSED ELEVATIONS - SHEET 1 OF 2 S2-A202 B PROPOSED ELEVATIONS - SHEET 2 OF 2 S2-A203a A FACADE FINISHES SCHEDULE - SHEET 1 OF 2 S2-A203b A FACADE FINISHES SCHEDULE - SHEET 2 OF 2 S2-A301 A PROPOSED BUILDING SECTIONS S2-S100 B SIGNAGE-LEGEND S2-S110 B SIGNAGE DETAILS - SHEET 1 S2-S111 A SIGNAGE DETAILS - SHEET 2 The revision numbers are provided in the second column. The following S138 Approval plans were issued to the audit team and also included as auditable materials: DWG. NO. / AMDT. / DRAWING TITLE EW00 J COVER PAGE & DRAWING LIST SK-01 PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (CARS) & SIGHT DISTANCE SK-02A PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (TRUCKS) EW01 F OVERALL SITE PLAN EW10 G EXISTING & DEMOLITION SITE PLAN PART-A EW11 E EXISTING & DEMOLITION SITE PLAN PART-B EW20 G PROPOSED SITE PLAN PART-A EW21 F PROPOSED SITE PLAN PART-B EW30 E DIMENSION & SETOUT PLAN PART-A EW31 E DIMENSION & SETOUT PLAN PART-B EW40 G LINE MARK AND SIGNAGE PLAN PART-A EW41 G LINE MARKING AND SIGNAGE PLAN PART-B EW50 F PAVEMENT PLAN PART-A EW51 E PAVEMENT PLAN PART-B EW52 C PAVEMENT DETAILS (SHEET 1 OF 2) EW53 D PAVEMENT DETAILS (SHEET 2 OF 2) The revision numbers are provided in the second column.

1.2 Responding to the audit report

Road safety audits provide the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

The responsibility for the project rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Also, it is not the role of the auditor to agree to, or approve the project manager's responses to the audit.

1.3 Previous audits

There were no previous road safety audit reports of direct relevance to this project, that were issued to the audit team.

2 Safety audit findings

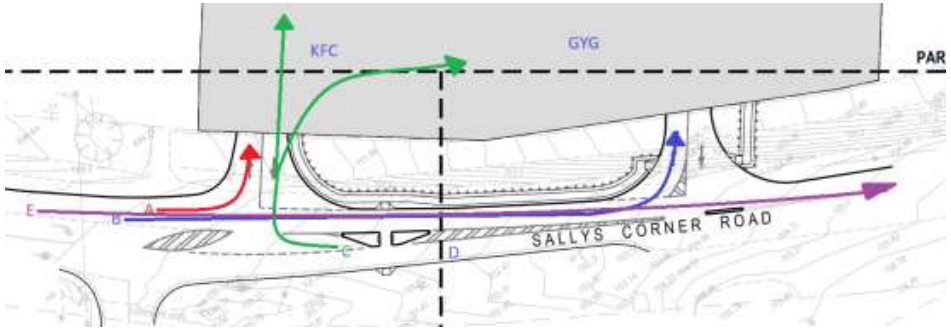
The road safety audit findings are presented in Table 2.

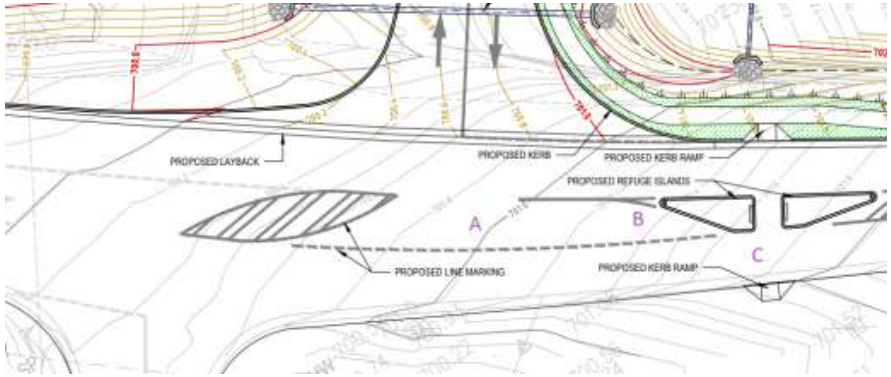
Table 2 Road safety audit findings.

Item details	Road safety audit finding	Project team's responses
Item 1a **Location/ theme:** 60/90 Speed zone boundary on Sallys Corner Road, near the GYG driveway. **Priority:** High	At present, there is a 60/90 speed zone boundary at this location, such that the speed limit to the west of this boundary is 60km/h and the speed limit to the east is 90km/h. For the westbound travel direction on Sallys Corner Road, this is considered too late a point for the reduction from 90km/h limit to the 60km/h limit. This is even under existing circumstances with no KFC and GYG restaurants in place. If a westbound driver continued driving at 90km/h until this boundary, and then decided to slow down from the speed zone boundary, they would have only 80m of road distance, on a downhill grade, until they reach the Heatherbrae Pies access. This means the intersection conflicts associated with this restaurant could be exposed to high-speed westbound traffic, that has not slowed down sufficiently. With the proposed KFC and GYG restaurants in place, the road safety risk would be even more prevalent, since these properties' driveways will be closer to the speed zone boundary, and hence more exposed to the higher speed westbound traffic. In these respects, the audit team agrees with the proposal* to relocate the speed zone boundary further east. This should be a substantial distance to ensure that all westbound traffic has sufficiently slowed down well before reaching the change in road character. The audit team considers the built roadside environment (including the new KFC and GYG restaurants) and the kerb and gutters used, to be the change in road character. Also, the new speed zone boundary should be accompanied by pavement numerals (the current speed zone boundary has no pavement numerals), and a SPEED RESTRICTION AHEAD sign (ie. 60 AHEAD sign) for westbound traffic. Also, the right-hand (northern) 60km/h SPEED LIMIT sign has graffiti on it and needs to be replaced. The lowered speed limit, and the improved assurance that most, if all, westbound traffic would actually be limited to 60km/h speeds is especially critical for aspects such as: ▪ The lowered speed in turn lowers the demand for stopping sight distance (SSD). Slower moving drivers/ vehicles require less distance to react and brake and bring the vehicle to a complete stop if faced with stationary or queued traffic, or vehicles turning into or across their path. ▪ The lowered speed in turn reduces the road distance covered during the critical gaps needed when drivers select gaps to turn into or across the path of another traffic stream. There are *minimum gap sight distances* (MGSD) that will apply to the outbound movements from KFC and GYG as well as the right-turning traffic turning into Heatherbrae Pies. It should be noted that the MGSD from the KFC and GYG driveways to the west will be limited by the curve in Sallys Corner Road, as well as vegetation on the inside of the curve. Continued over the page.	SLR's Traffic Engineers agree with the findings listed in Reference 1A and it is for that reason, a speed reduction application for Sallys Corner Road was lodged with TfNSW in February 2024. We believe it is best that TfNSW determines the location of the speed reduction, consistent with the state and local guidelines. We also anticipate that TfNSW may reduce the posted speed limit along the entirety of Sallys Corner Road from 90 km/h to 80 km/h, not only the section adjacent to the proposed development. TfNSW and Council have endorsed the speed reduction application. On that basis, we consider this item already being addressed.

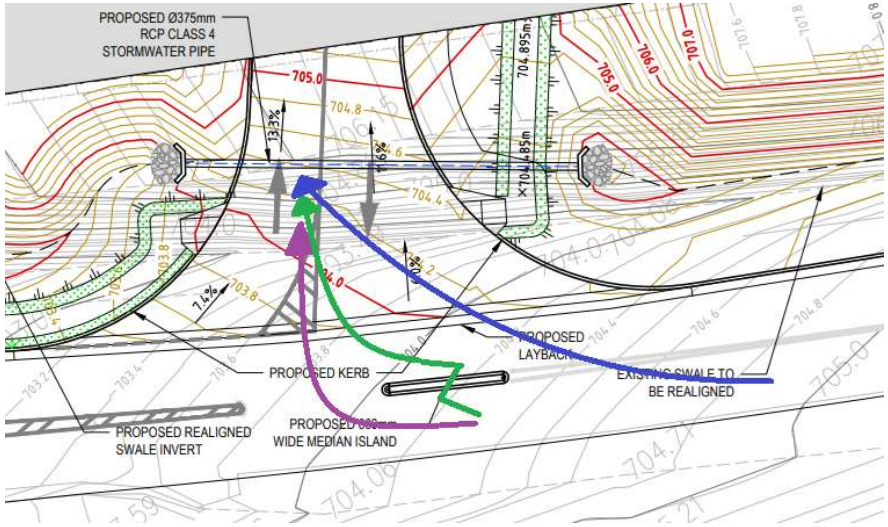
Item details	Road safety audit finding	Project team's responses
Item 1b **Location/ theme:** 60/90 Speed zone boundary on Sallys Corner Road, near the GYG driveway. **Priority:** High	Continued from item 1a… NOTE: This audit finding is associated with the location of the speed zone boundary, and in particular, the point of the reduced speed limit. The audit team also raised an issue about the value of the dropped speed limit in item 2. *NOTE: The advice of the proposed speed zone boundary relocation was given in separate correspondence and is not reflected on the design plans. Hence this has been raised as an audit finding.   ***Top:*** *Looking westbound along Sallys Corner Road towards the speed zone boundary. The westbound traffic is required to reduce speed to 60km/h or less. However, this is placed at too late a point as the Heatherbrae Pies driveway is a mere 80m downstream (point A). Point B is a driveway to the Shell Service Station/ Coolabah Café.* ***Bottom:*** *Looking east from the approximate position of the GYG driveway. There would be limited MGSD to the east due to the horizontal curve and the vegetation and batter on the inside of the curve. Furthermore, the westbound traffic would be approaching at speeds as high as 90km/h. When the critical gap (measured in seconds) is translated to a distance at the travel speed of 90km/h, this equates to a much longer sight line which is more likely to be horizontally constrained. It is critical that the speed zone location be relocated further east.*	Continued from 1a - no comments.

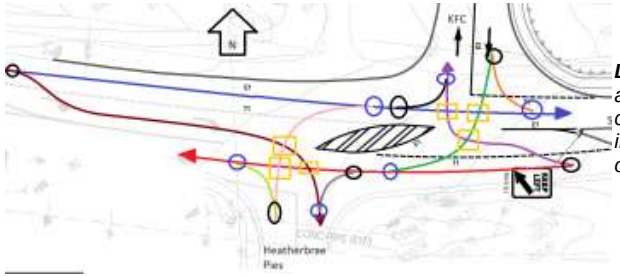
Item details	Road safety audit finding	Project team's responses
Item 2 **Location/ theme:** General – Appropriateness of the 60km/h speed limit. **Priority:** High	The lowered speed limit value is 60km/h which applies to the western-most section of Sallys Corner Road. In addition to the inappropriate location of the speed zone boundary (item 1), the audit team also questions and challenges the validity of the 60km/h limit. There is strong justification for a further lowering of the speed limit to 50km/h. 50km/h is considered to be the default speed limit value for urban and built up environments. That is, it is considered the starting point for urban situations unless other speed limit values can be justified. For an urban road to be zoned at 60km/h, it would normally have to fulfil more of a *mobility/ movement* function, and a relatively smaller *access/ amenity* function compared with a 50km/h road. By contrast, the subject section of Sallys Corner Road has a very high *access/ amenity* function serving the following purposes: (i) a rest area/ rest facility environment for the Hume Highway, (ii) a service centre with food outlets and fuel as a means of attracting patronage to this rest facility environment, (iii) a large parking capacity for cars, buses and trucks including facilities for medium-duration stays, (iv) numerous access and egress points to facilitate these service facilities, (v) a motorway-style interchange function, with an overbridge, twin service centre facilities, roundabout controls etc. Highway service centres typically experience very high extremes in traffic access demands. This could range from very quiet and low volume periods during the week, to over-saturated conditions in peak holiday seasons. The extreme peak periods could even result in a high volume of "overflow" parking on streets and verges, as well as queues and delays both coming off the motorway as well as re-entering the motorway. The proposed KFC and GYG developments would add to this overall parking, circulation, and entry-egress activity. Item 4a also discusses the potential for high pedestrian activity and crossing movements as generated by each service and food outlet. This is further justification for a lowered speed limit.	SLR's Traffic Engineers recommend that the decision on the posted speed limit value is made by TfNSW and Council, especially so that it is consistent with their possible plans for proposed speed limit reductions along other sections of Sallys Corner Road. Notwithstanding, we are of the view that the reduction to 60 km/h is sufficient and would be consistent with the urbanising locale. SLR and Council's traffic engineers have undertaken several site inspections and identified that sight distances and stopping distances are sufficient at 60 km/h.

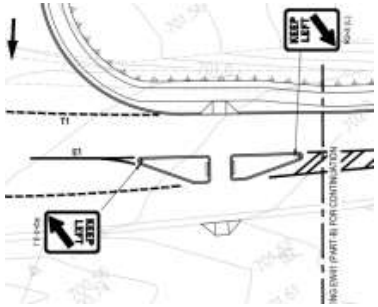
Item details	Road safety audit finding	Project team's responses
Item 3 **Location/ theme:** Access restrictions to GYG / KFC. **Priority:** Medium	The design indicates that the KFC driveway will allow both left and right turns in both inbound and outbound directions. The GYG driveway will allow for *left-in-left-out-right-out*, with no right turns permitted in the inbound direction. It is assumed that this is to reduce the overall exposure to conflicts between the different turning and *through* traffic streams. However, the audit team questions whether this is the best arrangement. Using the image below, all westbound right-turn demand into both KFC and GYG would only be catered at the KFC driveway (ie. traffic stream C). This right-turning traffic would be exposed to conflicts by traffic streams A, B and E which correspond to the eastbound left-turn into KFC, the eastbound left-turn into GYG and the eastbound *through* traffic on Sallys Corner Road respectively. The volume of opposing eastbound traffic would be made up of these three traffic streams and hence there would be less gaps available. By contrast, if the right-turn inbound opportunity was shifted to GYG instead of KFC, then traffic volume C would only be opposed by streams B and E. In these respects, there is more exposure to *right-through head-on* crashes at the KFC driveway versus the GYG driveway. Since the inbound right-turning traffic needs to use gaps in the eastbound flow, which is made up of streams A, B and E, there is more likely to be delays and queuing in this short right turn lane. Even with queues of 2-3 vehicles, the back of queue is likely to be in the adjacent *through* lane at point D. This would block access to the refuge crossing and also expose the back of queue to *rear-end* crash risk. The driveway to GYG still has a *rear-end* crash exposure, but the reduced traffic volume in the eastbound direction (due to the removed A stream) would present more gaps and hence less delays. Also, it is assumed that if the inbound right-turn is provided at GYG, an indented right-turn lane would be provided at that point. The full-access T intersection at KFC is also very close to the full-access T intersection of Heatherbrae Pies on the opposite side of the road. If the KFC driveway was given the right-turn restriction rather than the GYG driveway, this would also rationalise the number of *vehicle-to-vehicle* conflicts due to the combined presence and operation of these two driveways. For example, traffic stream C is also conflicted by the right-turn outbound traffic from Heatherbrae Pies at a point in time where the right turner from Heatherbrae Pies is still in "turning-mode". The right-turner from Heatherbrae Pies may not account for the commitment to turn by traffic stream C. These two traffic streams will still conflict if the inbound right-turn was moved to GYG, however, the conflict does not coincide with all the other gap-checking and gap-selection commitments when the Heatherbrae customer is in "turning mode".  ***Above:*** *The audit team questions the inbound right-turn allowance at KFC when the GYG driveway would be strategically better in reducing conflict exposure and reducing the number of coinciding conflicts.*	In response to the RSA, SLR's Traffic Engineers believe the proposed arrangements, which allow for right-turns at the KFC site only, are the best balanced outcome. The RSA does not consider the very low traffic volumes (customers) arriving from the east approach. SLR's TIA reports for the approved KFC and GYG developments forecasts that <10% of the customers will likely arrive from the east on Sallys Corner Road, which equates to no more than eight vehicles in the hour or one vehicle every seven minutes. Reverting to allow for a right-turn facility into GYG from KFC could increase the likelihood of rear end crashes because where Sallys Corner Road turns right at Darling Lane intersection is actually a crest and the sight distance to GYG driveway is less than the sight distance to the KFC driveway. SLR, Council and the proponent met on site to review the arrangements and the limiting of right turns into the GYG site was consider as the most logical adjustment to reduce collision risks.

Item details	Road safety audit finding	Project team's responses
Item 4a **Location/ theme:** Westbound right-turn lane to KFC. **Priority:** Medium	The sole inbound right-turn access will be via the KFC driveway. As shown below, a right-turn lane will be provided in the westbound direction of Sallys Corner Road. This lane is very short and would have a high likelihood of queue spillback out of the right-turn lane and into the adjacent *through* lane (ie. the westbound right turning traffic queueing from A to B and then to point C and beyond). This means the back of queue would be exposed to *rear-end* crash conflicts by trailing westbound traffic. Alternatively, the westbound *through* traffic would be penalised and blocked/ delayed. Furthermore, any queue spillback to point C and beyond would block pedestrian access to the median refuge. Northbound crossing pedestrians may resort to passing around or between queued vehicles and hence more hidden from the view of eastbound drivers. Large groups of southbound crossing pedestrians may be forced to wait out on the median island with unnecessary exposure to impacts by passing traffic. With the right-turn lane positioned immediately upstream of the median refuge (from the perspective of an eastbound driver), any vehicles queued between A and B may also block the mutual sight line from eastbound drivers to pedestrians on the median refuge. This could also increase the risk of *vehicle-pedestrian* crashes. As a side note, the audit team anticipates a high volume of road crossing movements. With holiday road traffic where there are multiple occupants in each car, it is very unlikely that all occupants will want to visit the same restaurant/ service facility. The project team should expect all possible combinations of crossing movements generated by cars being parked on one site but yet some occupants needing to cross the road to access other restaurants, eg. Shell-to McDonalds, McDonalds to Heatherbrae Pies, Heatherbrae Pies to GYG etc. There are also bus parking facilities at Shell, where bus patrons may also wish to access the KFC/GYG sites in large groups. The queue spillback risks (being a result of the short right turn lane) and the visibility obstructions to pedestrians using the median refuge would also be justification for shifting the inbound right-turn access to GYG, instead of KFC.  ***Above:*** *The short right turn lane is likely to queue out into the adjacent through lane where rear-end crash exposure is increased as well as the queued vehicles blocking access to the median refuge.*	In response to the RSA, SLR's Traffic Engineers firmly believe that the proposed right-turn lane into the KFC site is sufficiently long (18 metres) to retain all right-turning vehicles. The current arrangements can accommodate three light vehicles (or one heavy vehicle and one light vehicle) before the queues spill back into the through lane and block the westbound traffic. We expect at most eight customers in the hour from this direction, and the likelihood of queues spilling back is not HIGH, as stated in the RSA. Similarly, we are not concerned about queued vehicles blocking pedestrian movements. Additionally, we understand that there are coach facilities at Shell however the proposed KFC/GYG site will not accommodate coaches and therefore there will be no coach movements from/to KFC/GYG.

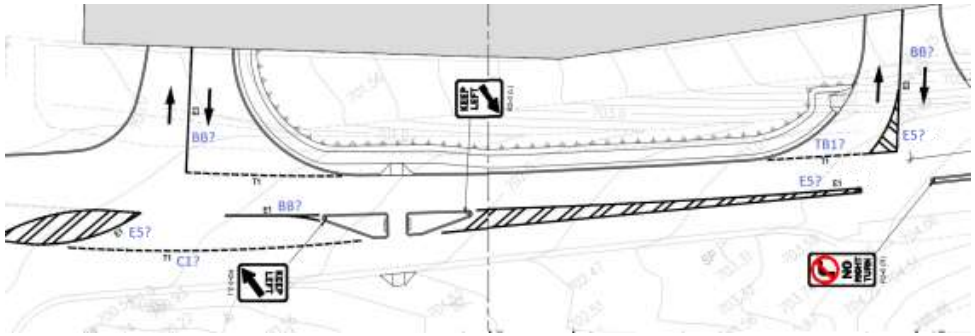
Item details	Road safety audit finding	Project team's responses
Item 4b **Location/ theme:** Westbound right-turn lane to KFC. **Priority:** Medium	Continued from item 4a… The short length of the westbound right-turn lane to KFC also means there is very little deceleration length within the indented lane. Drivers are unlikely to successfully decelerate from cruise speed to a complete stop within this short length and *loss of control* events would be a likely outcome. However, a more likely driver response is that they will require "pre-deceleration" whilst in the upstream portion of the *through* lane. This means there is increased *rear-end* crash exposure in the upstream portion of *through* lane due to the speed differentials involved. The obvious solution is to increase the length of the right-turn lane to allow for more deceleration. However, whilst ever the inbound right-turn access is provided at KFC (and not GYG), the length of this lane will be limited due to the GYG driveway further east. In item 3, the option of shifting the inbound right-turn allowance to GYG was raised as a strategically better alternative. If the right-turn lane cannot be lengthened, then this is even further justification for (i) the shift in speed zone boundary as discussed in item 1 and (ii) the lowering of the built-up area speed limit to 50km/h. These measures will reduce the potential speed differential even if there is queue spillback.	With the reduction of the posted speed limit by TfNSW, we believe this item will be addressed.

Item details	Road safety audit finding	Project team's responses
Item 5 **Location/ theme:** Prohibited inbound right-turn from Sallys Corner Road to GYG. **Priority:** Medium	The design proposes to ban the inbound right turn movement from Sallys Corner Road to GYG. This will be effected by a raised median and NO RIGHT TURN sign. The median is short and also narrow in profile. As such, there is likely to be frequent non-conformance and illegal right-turns by westbound traffic. This could include short-bypassing the median and tracking over the pavement chevrons in the driveway (purple arrow path), long-bypassing around the upstream part of the island and crossing the outbound lane of the driveway (blue arrow path), and even mounting and crossing the median (green arrow path). The median island is not likely to be 100% effective in preventing illegal turns. Furthermore, as a narrow-profiled median, the two signs on it (KEEP LEFT and NO RIGHT TURN) could be exposed to nuisance impacts. Any damaged or dislodged signs will nullify the regulatory messages they contain. For example, if the NO RIGHT TURN sign is damaged, becomes illegible or is dislodged, then it is no longer illegal to make that right turn.  ***Above:*** *The raised median will be rather ineffective in preventing illegal right-turns into GYG.*	All road users in New South Wales are expected and obliged to follow the road rules, including the proposed right-turn ban at the GYG driveway. The nuisance impacts on road furniture will be reported by the operators of KFC/GYG however it is Council and TfNSW's responsibility to maintain the road furniture. We also believe this item should be marked as LOW priority instead of MEDIUM.

Item details	Road safety audit finding	Project team's responses
Item 6 **Location/ theme:** Combined effect of the proposed KFC all-access T intersection and the existing Heatherbrae Pies all-access T intersection. **Priority:** Medium	The KFC driveway will form an all-access T intersection with Sallys Corner Road. This means that all left-turn, right-turn and *through* movements would be permitted. Similarly, the existing access of Heatherbrae Pies is an all-access T intersection. When the subject project is completed, there will be two back-to-back all-access T intersection in very close proximity to each other. An all-access T intersection has nine-possible *vehicle-to-vehicle* conflicts consisting of three diverge-related conflicts (circled in black) which are typically *rear-end* and *side-swipe* interactions, three merge-related conflicts (circled in blue) which are typically *side-swipe* interactions, and three crossing conflicts (which are boxed in orange) which are either "T-bone" or *right-through head-on* crash conflicts. The close proximity of one all-access T intersection to the other means that the conflict zone of one intersection starts to overlap the conflict zone of the other intersection. The audit team acknowledges that staggering of opposing T intersections is advantageous over a four-way cross intersection because it spatially separates the conflicts associated with each of the side road legs. However, this is normally a road safety improvement strategy when there is a demand for *through* movements from one side road to the other. This is not prevalent in the subject case as it would be rare that a driver will head from Heatherbrae Pies to KFC, and vice versa (rather, this access demand would be replaced by pedestrian crossing movements). In this respect, the (usual) benefit of staggered T intersections is not relevant since there is very little (and arguably no) demand for *through* movements from the side road legs. From the image below, the spatial overlap in conflict zones is very apparent. For example, an outbound right-turning driver from either of the properties, after assessing and selecting suitable *coinciding* gaps in the eastbound and westbound traffic stream of Sallys Corner Road, could be faced with conflicts with vehicles in the road ahead slowing down to turn into the opposing development. Similarly, they may be exposed to outbound movements and conflicts from the downstream driveway. In most scenarios, a driver making a right-turn from a side road would assess gap-quality on the main road and may overlook the need to assess any potential threats from an opposing and downstream driveway. Another example is a westbound driver intending to turn right into KFC (purple movement arrow). Typically, this driver would look to the west an assess for gaps in the blue traffic stream. However, these drivers may not account for any right-turning vehicles from Heatherbrae Pies (pink movement arrow). Furthermore, the pink movement is likely to rely on the same gap in the blue traffic stream to make this outbound right-turn, so it is very plausible how the purple and pink movements could coincide and therefore conflict with each other. These are just two example scenarios and there are many other scenarios that could give rise to crash exposure. Consideration should be given to access restrictions (eg. the suggestion to shift the inbound right-turn allowance to GYG instead, or even combining the two opposing accesses into a common intersection with a higher form of control (eg. roundabout).  ***Left:*** *The back-to-back opposing all-access T intersections means that the conflict zone associated with one intersection spatially overlaps that of the other intersection.*	In response to the RSA, it is essential to note that the vehicular traffic between Heatherbrae Pies and KFC/GYG developments is anticipated to be low. Additionally, it is anticipated that most inter-site demand will occur via foot, supported via a new proposed pedestrian refuge. Moreover, the traffic volumes on Sallys Corner Road is sufficiently low that infrequent trips between Heatherbrae Pies and KFC/GYG can be accommodated . In our expert opinion, the re-introduction of a right-turn bay from KFC to GYG is not the best balanced arrangement due to the lesser sight distances and carriageway geometry.

Item details	Road safety audit finding	Project team's responses
Item 7 **Location/ theme:** Southern verge of Sallys Corner Road at the median refuge. **Priority:** Low	The design proposes a median refuge as a crossing aid over Sallys Corner Road. This will be positioned between the KFC and GYG driveways. A footpath is also proposed on the northern side of Sallys Corner Road to connect the kerb ramp (associated with the refuge) with the KFC and GYG lots. However, there is no footpath proposed on the southern side of Sallys Corner Road. At present, under pre-project conditions, there is also no footpath in this verge. As shown in the right-hand image, this verge is also steeply sloped into a swale channel, with a culvert opening, headwall and rip-rap mattress. These conditions present multiple trip/slip hazards for pedestrians. The audit team anticipates a high volume of road crossing movements. With holiday road traffic where there are multiple occupants in each car, it is very unlikely that all occupants will want to visit the same restaurant/ service facility. The project team should expect all possible combinations of crossing movements generated by cars being parked on one site but yet some occupants needing to cross the road to access other restaurants, eg. Shell to McDonalds, McDonalds to Heatherbrae Pies, Heatherbrae Pies to GYG etc. On another note, there is no connecting footpath on the northern side of Sallys Corner Road from KFC to McDonalds. This is also likely to be a common walk-route, especially in busy holiday periods.   ***Left:*** *The median refuge proposed as part of the development and its accompanying footpath on the northern side of Sallys Corner Road.* ***Right:*** *The existing and pre-project conditions of the southern verge of Sallys Corner Road with no footpath in place.*	Noted - However, significant topographic challenges (drainage channel/high-pressure gas lines) exist that prevent pedestrian movement between McDonald's and KFC. Justified - no action. With regard to a pedestrian footpath on the southern side of Sallys Corner Road, we note that no other formed footpath exists. If the Council is desirous of adding a formed path, then (subject to Heatherbrae's consent) we would support the construction of a formed footpath from the road edge to Heatherbrae's carpark.

Item details	Road safety audit finding	Project team's responses
Item 8 **Location/ theme:** Pedestrian crossing movement over the GYG driveway. **Priority:** Low	A pair of kerb ramps is proposed at the GYG driveway with one ramp either side. This is positioned in a flared portion of the driveway such that a long crossing path is created (see blue line below). This increased crossing distance increases the exposure to the pedestrian to live traffic with risks of being impacted. Furthermore, the following are contributing factors: ▪ The pedestrian would be crossing at a point where vehicles are more likely to be turning. A turning vehicle presents a longer/wider spatial footprint compared to one that is moving in a straight line. In particular, a left-turning vehicle from Sallys Corner Road to the driveway could have a significant swept path footprint on the inside of the turn (close to the western kerb ramp). Any pedestrian that prematurely moves off this ramp could be exposed to impacts by the encroaching body of the vehicle, especially if this is a long vehicle or a vehicle-trailer combination. Also, in extreme cases, the swept path envelope could encroach over the kerb ramp itself. ▪ The crossing movement could also occur at a point where there is queued/ stacked outbound traffic. Pedestrian may resort to crossing between or behind queued vehicles and hence hidden from the view of inbound drivers. Consideration could be given to relocating the kerb ramp pairs further inside the property. For example, if placed along the orange line path, the crossing length would effectively become the red line, which is significantly shorter.  ***Above:*** *The indicated crossing location is at a flared portion of the driveway where the crossing length is long.*	Noted and agreed - This change will be incorporated into revised design and construction plan.

Item details	Road safety audit finding	Project team's responses
Item 9 **Location/ theme:** General - drafting errors on linemarking plan. **Priority:** To note – drafting error	There were several errors on the linemarking plan with the labelling of the lines. The corrections are marked below.  ***Above:*** *The correct (or perceived correct) linemarking types are labelled in blue font.*	Noted and agreed - This change will be incorporated into revised design and construction plan.

3 Concluding statement

DC Traffic Engineering has undertaken a *detailed design* road safety audit of this project in accordance with the methodology outlined in Section 1 of this report.

Issues identified have been noted in this report for the Project Manager to review, assess, and where appropriate, make the necessary recommendations to improve safety.

Damien Chee
Audit Team Leader
DC Traffic Engineering Pty Ltd

Appendix A

Road Safety Audit Checklist

Checklist questions	Comments
3.1 General topics	
3.1.1 Changes since previous audit ▪ Do the conditions for which the scheme was originally designed still apply? (i.e. no significant changes to the surrounding network or area to be served, or traffic mix). ▪ Has the design of the project remained unchanged since previous audit (if any)?	There were no previous road safety audit reports issued to the audit team.
3.1.2 Drainage ▪ Will the new road drain adequately? ▪ Are the road grades and crossfalls adequate for satisfactory drainage? ▪ Are flat spots avoided or adequately dealt with at start/end of superelevation? ▪ Has the possibility of surface flooding been adequately addressed, including overflow from surrounding or intersecting drains and water courses? ▪ Is gully pit spacing adequate to limit flooding? ▪ Is pit grate design safe for pedal cycles? (i.e. gaps not parallel with wheel tracks) ▪ Will footpaths drain adequately?	Yes.
3.1.3 Climatic conditions ▪ Has the design taken into account weather records or local experience which may indicate a particular problem? (for example, snow, ice, wind, fog)	Yes.
3.1.4 Landscaping ▪ Will drivers be able to see pedestrians (and vice versa) past or over the landscaping? ▪ Will intersection sight lines be maintained past or over the landscaping? ▪ Will safety be adequate with seasonal growth? (for example, no obscuring of signs, shading or light effects, slippery surface, etc.) ▪ Will roadside safety be adequate when trees or plantings mature (no roadside hazard)? ▪ Has 'frangible' vegetation been used in possible run-off road areas?	Landscaping plans not provided.
3.1.5 Services ▪ Does the design adequately deal with buried and overhead services? (especially in regard to overhead clearances, etc.) ▪ Has the location of fixed objects/furniture associated with services been checked? (including any loss of visibility, position of poles, and clearance to overhead wires)	Services plans not provided.

Checklist questions	Comments
3.1.6 Access to property and developments ▪ Can all accesses be used safely? ▪ Is the design free of any downstream or upstream effects from accesses, particularly near intersections? ▪ Do rest areas and truck parking area have adequate sight distance at access points?	Most issues are associated with or impacted by the new accesses-egresses.
3.1.7 Emergencies, breakdowns, emergency and service vehicle access ▪ Has provision been made for safe access and movements by emergency vehicles? ▪ Does the design and positioning of medians and vehicle barriers allow emergency vehicles to stop and turn without unnecessarily disrupting traffic? ▪ Have broken-down vehicles or stopped emergency vehicles been adequately considered? ▪ Is provision for emergency telephones satisfactory? ▪ Are median breaks on divided carriageways safely located? (i.e. frequency, visibility)	Yes.
3.1.8 Future widening and/or realignments ▪ If the scheme is only a stage towards a wider or dual carriageway is the design adequate to impart this message to drivers? (is the reliance on signs minimal/appropriate, rather than excessive?) ▪ Is the transition between single and dual carriageway (either way) handled safely?	Unknown.

3.1.9 Staging of the scheme
▪ If the scheme is to be staged or constructed at different times:
  ▪ are the construction plans and program arranged to ensure maximum safety?
  ▪ do the construction plans and program include specific safety measures, signing; adequate transitional geometry; etc. for any temporary arrangements?
	Unknown.

3.1.10 Staging of the work ▪ If the construction is to be split into several subprojects, is the order safe? (i.e. the stages are not constructed in an order that creates unsafe conditions)	Unknown.
3.1.11 Adjacent developments ▪ Does the design handle accesses to major adjacent generators of traffic and developments safely? ▪ Is drivers' perception of the road ahead free of misleading effects of any lighting or traffic signals on an adjacent road? ▪ Has the need for screening against glare from lighting of adjacent property been adequately considered?	Many of the issues highlighted the potential for high parking, circulation and recycled traffic movements, as well as pedestrian crossing movements as generated by the wider service centre facilities.

Checklist questions	Comments
3.1.12 Stability of cut and fill ▪ Is the stability of batters satisfactory? (for example, no potential for loose material to affect road users)	Yes.
3.1.13 Skid resistance ▪ Has the need for anti-skid surfacing been considered where braking or good road adhesion is most essential? (for example, on gradients, curves, approaches to intersections and signals)	Yes.
3.2 Design issues (general*)*	
3.2.1 Geometry of horizontal and vertical alignment ▪ Does the horizontal and vertical design fit together correctly? ▪ Is the vertical alignment consistent and appropriate throughout? ▪ Is the horizontal alignment consistent throughout? ▪ Is the alignment consistent with the function of the road? ▪ Is the design free of misleading visual cues? (for example, visual illusions, subliminal delineation like lines of poles)	There is a sight-limiting curve to the east. However, this risk would be attenuated by the lowering of the speed limit.

3.2.2 Typical cross-sections
▪ Are lane widths, shoulders, medians and other cross section features adequate for the function of the road?
▪ Are the shoulder widths adequate for stationary vehicles and errant vehicles?
▪ Are median widths adequate for road furniture?
▪ Is superelevation consistent with the road environment?
▪ Is the width of traffic lanes and carriageways suitable in relation to:
  ▪ alignment?
  ▪ traffic volume?
  ▪ vehicle dimensions?
  ▪ the speed environment?
  ▪ combinations of speed and traffic volume?
▪ Are the shoulder crossfalls safe for vehicles to traverse?
▪ Are batter slopes drivable for cars, trucks?
▪ Are side slopes under structures appropriate?
▪ Have adequate facilities been provided for pedestrians and cyclists?
	Yes.

3.2.3 Effect of cross-sectional variation ▪ Is the design free of undesirable variations in cross section design? ▪ Are crossfalls safe? (particularly where sections of existing highway have been used, there have been compromises to accommodate accesses, at narrowings at bridges, etc.) ▪ Are any curves with adverse crossfall within appropriate limits? ▪ Is superelevation provided and sufficient at all locations where required?	Yes.

Checklist questions	Comments
3.2.4 Roadway layout ▪ Are all traffic management features designed so as to avoid creating unsafe conditions? ▪ Is the layout of road markings and reflective materials able to deal satisfactorily with changes in alignment? (particularly where the alignment may be substandard) ▪ Is there adequate provision for overtaking? ▪ Are overtaking lanes provided where required and safely commenced and ended? ▪ Are overtaking requirements satisfactory? ▪ Is the design free of sunrise/sunset problems? ▪ Have public transport requirements been adequately catered for?	Combined effect of closely spaced intersections and overlap of conflict zones could exacerbate road safety impacts.

3.2.5 Shoulders and edge treatment
▪ Are the shoulders likely to be safe if used by slow moving vehicles or cyclists?
▪ Are the following safety aspects of shoulder provision satisfactory?
  ▪ provision of sealed or unsealed shoulders
  ▪ width and treatment on embankments
  ▪ crossfall of shoulders
	NA.

3.2.6 Effect of departures from standards or guidelines ▪ Any approved departures from standards or guidelines:is safety maintained? ▪ Any hitherto undetected departures from standards: is safety maintained?	No known departures from guidelines. The road character appears to be more suited to a 50km/h speed zone compared with a 60km/h speed zone.
3.2.7 Visibility and sight distance ▪ Are horizontal and vertical alignments consistent with visibility requirements? ▪ Has an appropriate design speed been selected for visibility requirements?	MGSD constraints identified from GYG driveway to the east to be risk-managed by lowering the speed limit further east.
3.2.8 Environmental treatments ▪ Has safety been considered in the location of environmental features? (for example, noise fences)	Yes.
3.3 Alignment details	

Checklist questions	Comments

3.3.1 Visibility; sight distance
▪ Are horizontal and vertical alignments consistent with the visibility requirements?
▪ Is the design free of sight line obstructions due to safety fences or barriers?
  ▪ boundary fences?
  ▪ street furniture?
  ▪ parking facilities?
  ▪ signs?
  ▪ landscaping?
  ▪ bridge abutments?
  ▪ parked vehicles in laybys or at the kerb?
  ▪ queued traffic?
▪ Are railway crossings, bridges and other hazards all conspicuous?
▪ Is the design free of any other local features which may affect visibility?
▪ Is the design free of overhead obstructions (for example, road or rail overpasses, sign gantries, overhanging trees) which may limit sight distance at sag curves?
▪ Has a clear headroom or a high vehicle detour been provided where necessary?
▪ Is visibility adequate at:
  ▪ any pedestrian, bicycle or cattle crossings?
  ▪ access roads, driveways, on and off ramps, etc.?
▪ Has the minimum sight triangle been provided at:
  ▪ entry and exit ramps?
  ▪ gore areas?
  ▪ intersections?
  ▪ roundabouts?
  ▪ other conflict points?
	See item 3.2.7.

Checklist questions	Comments
3.3.2 New/existing road interface ▪ Have implications for safety at the interface been considered? ▪ Is the transition from old road to the new scheme satisfactory? ▪ If the existing road is of a lower standard than the new scheme, is there clear and unambiguous warning of the reduction in standard? ▪ Have the appropriate provisions for safety been made where sudden changes in speed are required? ▪ Is access or side friction handled safely? ▪ Does the interface occur well away from any hazard? (for example, a crest, a bend, a roadside hazard or where poor visibility/distractions may occur) ▪ If carriageway standards differ, is the change effected safely? ▪ Is the transition where the road environment changes (for example, urban to rural; restricted to unrestricted; lit to unlit) done safely? ▪ Has the need for advance warning been considered?	These are all relevant issues which were considered in the identification and substantiation of the audit findings.
3.3.3 Readability of the alignment by drivers ▪ Will the general layout, function and broad features be recognised by drivers in sufficient time? ▪ Will approach speeds be suitable and will drivers correctly track through the scheme?	Yes.
3.3.4 Detail of geometric design ▪ Are the design standards appropriate for all the requirements of the scheme? ▪ Is consistency of general standards and guidelines, such as lane widths and crossfalls, maintained?	Yes.
3.3.5 Treatment at bridges and culverts ▪ Is the geometric transition from the standard cross-section to that on the bridge handled safely?	NA.
3.4 Intersections	

Checklist questions	Comments

3.4.1 Visibility to and at intersections
▪ Are horizontal and vertical alignments at the intersection or on the approaches to the intersection consistent with the visibility requirements?
▪ Is the standard adopted for provision of visibility appropriate for the speed of traffic and for any unusual traffic mix?
▪ Will the design be free of sight line obstructions due to safety fences or barriers
  ▪ boundary fences?
  ▪ street furniture?
  ▪ parking facilities?
  ▪ signs?
  ▪ landscaping?
  ▪ bridge abutments?
  ▪ parked vehicles in laybys and at the kerb?
  ▪ queued traffic?
▪ Are railway crossings, bridges and other hazards all conspicuous?
▪ Is the design free of any other local features which may affect visibility?
	See item 3.2.7.

3.4.2 Layout ▪ Are intersections and accesses adequate for all vehicular movements? ▪ Have the appropriate design vehicle and check vehicle been used for turning dimensions? ▪ Are swept paths accommodated for all likely vehicle types? (has the appropriate design vehicle been used?) ▪ Are intersections free of any unusual features which could affect road safety? ▪ Are pedestrian fences provided where needed? (for example, to guide pedestrians or discourage parking) ▪ Has pavement anti-skid treatment been provided where needed? ▪ Have islands and signs been provided where required? ▪ Vehicles which may park at or close to the intersection: can they do this safely or does this activity need to be relocated? ▪ Are safety hazards due to parked vehicles avoided?	Most issues were associated with the new driveway layouts and their relative positions amongst other access-egress points.

Checklist questions	Comments
3.4.3 Readability by drivers ▪ Will the existence of the intersection and its general layout, function and broad features be perceived correctly and in adequate time? ▪ Are the approach speeds and likely positions of vehicles tracking through the intersection safe? ▪ Is the design free of misleading elements? ▪ Is the design free of sunrise or sunset problems which may create a hazard for motorists?	Issue raised with speed zone boundary and appropriateness of the built up area speed limit.

3.4.4 Detailed geometric design
▪ Can the layout safely handle unusual traffic mixes or circumstances?
▪ Does any median or any island safely account for:
  ▪ vehicle alignments and paths?
  ▪ future traffic signals?
  ▪ pedestrian storage space and surface?
  ▪ turning path clearance?
  ▪ stopping sight distance to the nose?
  ▪ mountability by errant vehicles?
▪ Is adequate vertical clearance to structures provided? (for example, powerlines, shop awnings)
	The raised median at GYG is intended to stop illegal inbound right-turns. However, this is not likely to be effective.

3.4.5 Traffic signals ▪ Is the signal phasing/sequence safe? ▪ Is adequate time provided for traffic movements and pedestrian movements? ▪ Will the signal lanterns be visible? (for example, not obstructed by trees, poles, signs or large vehicles) ▪ Are lanterns for other approach directions adequately shielded from view? ▪ Are high-intensity signals and/or target boards provided if likely to be affected by sunrise/sunset? ▪ Does the alignment (vertical and horizontal) provide satisfactory stopping sight distance to the intersection or back of queue? ▪ Are pedestrian facilities provided where they are required? ▪ Will approaching drivers be able to see pedestrians? ▪ Are partially or fully controlled turning phases provided where required? ▪ Are signal posts located where they are not an undue hazard? ▪ Are road markings for turning traffic satisfactory? ▪ Have adequate pedestrian phases been provided?	NA.

Checklist questions	Comments
3.4.6 Roundabouts ▪ Is adequate deflection provided to reduce approach speeds? ▪ If splitter islands are needed, are they adequate for sight distance, length, pedestrian storage, etc.? ▪ Is the central island prominent? ▪ Can the appropriate design vehicle and check vehicle be accommodated? ▪ Are the central island details satisfactory? (delineation, mountability, conspicuousness) ▪ Can pedestrians be seen by drivers in sufficient time? ▪ Can pedestrians determine whether vehicles are turning? (no obstructions to sight lines) ▪ Are direction markings in approach lanes provided where required? ▪ Is the lighting adequate?	NA.
3.4.7 Other intersections ▪ Has the need for kerbed or painted islands and refuges been considered? ▪ Do intersections have adequate queue length/storage for turning movements (including in the centre of a staggered intersection)?	Raised median at GYG not likely to be effective.
3.5 Special road users	
3.5.1 Adjacent land ▪ Are all accesses to and from adjacent land/properties safe? ▪ Have the special needs of agriculture and stock movements been considered?	Issues raised.

Checklist questions	Comments

3.5.2 Pedestrians
▪ Can pedestrians cross safely at:
  ▪ intersections?
  ▪ signalised and pedestrian crossings?
  ▪ refuges?
  ▪ kerb extensions?
  ▪ bridges and culverts?
  ▪ other locations?
▪ Is each crossing point satisfactory for:
  ▪ visibility, for each direction?
  ▪ use by the disabled?
  ▪ use by the elderly?
  ▪ use by children/schools?
▪ Is pedestrian fencing on reservations and medians provided where required for each crossing?
▪ Is fencing adequate on freeways?
▪ Are pedestrians deterred from crossing roads at unsafe locations?
▪ Are pedestrian related signs appropriate and adequate?
▪ Is width and gradient of pedestrian paths, crossings, etc. satisfactory?
▪ Is surfacing of pedestrian paths, crossings, etc.satisfactory?
▪ Have dropped kerbs been provided for each crossing?
▪ Have channels and gullies been avoided at each crossing?
▪ Is lighting satisfactory for each crossing?
▪ Are crossings sited to provide maximum use?
▪ Is avoidance of a crossing unlikely? (for example, by more direct but less safe alternative)
	Issues raised with position of pedestrian refuge and risk of pedestrians being visually or physically blocked.
	No footpath on southern side of Sallys Corner Road.

3.5.3 Cyclists
▪ Have the needs of cyclists been considered:
  ▪ at intersections (particularly roundabouts)?
  ▪ especially on higher speed roads?
  ▪ on cycle routes and crossings?
  ▪ at freeway entry and exit ramps?
▪ Are shared cycleway/footway facilities (including subways and bridges) safe and adequately signed?
	Yes.

Checklist questions	Comments
3.5.4 Motorcyclists ▪ Has the location of devices or objects that might destabilise a motorcycle been avoided on the road surface? ▪ Is the roadside clear of obstructions where motorcyclists may lean into curves? ▪ Will warning or delineation be adequate for motorcyclists? ▪ Has barrier kerb been avoided in high-speed areas? ▪ In areas more likely to have motorcycles run off the road is the roadside forgiving or safely yielded? ▪ Are all unnecessary poles, posts and devices removed or appropriately shielded? ▪ Are drainage pits and culverts traversable by motorcycle?	Yes.
3.5.5 Equestrians and stock ▪ Have the needs of equestrians been considered, including the use of verges or shoulders and rules regarding the use of the carriageway? ▪ Can underpass facilities be used by equestrians/stock?	Yes.
3.5.6 Freight ▪ Have the needs of truck drivers been considered, including turning radii and lane widths? ▪ Have the needs of freight transport been considered, adequately signed and catered for?	Within reason.
3.5.7 Public transport ▪ Have the needs for public transport been considered, adequately signed and catered for? ▪ Have the needs of public transport users been considered? ▪ Have the manoeuvring needs of public transport vehicles been considered? ▪ Are bus stops well positioned for safety?	Yes.
3.5.8 Road maintenance vehicles ▪ Have the needs of road maintenance vehicles been considered, adequately signed and catered for? ▪ Can maintenance vehicles be safely located?	Yes.
3.6 Lighting, signs and delineation	

Checklist questions	Comments
3.6.1 Lighting ▪ Has lighting been adequately provided where required? ▪ Is the design free of features which interrupt illumination? (for example, trees or overbridges) ▪ Is the design free of lighting poles that would present a fixed roadside hazard? ▪ Are frangible or slip-base poles to be provided? ▪ Ambient lighting: if it creates special lighting needs, have these been satisfied? ▪ Is the lighting scheme free of confusing or misleading effects on signals or signs? ▪ Does the lighting adequately illuminate crossings, nearby paths, refuges, etc.? ▪ Are all gore areas adequately illuminated? ▪ Are all merge areas adequately illuminated? ▪ Is the scheme free of any lighting black patches? ▪ If there are locations with accident problems that are ▪ known to be amenable to treatment with improved lighting, has this lighting been provided?	Lighting plans not issued.

3.6.2 Signs
▪ Are signs appropriate for their location?
▪ Are signs located where they can be seen and read in adequate time?
▪ Will signs be readily understood?
▪ Are signs appropriate to the driver's needs? (for example, direction signs, advisory speed signs, etc.)
▪ Are signs located so that drivers' sight distance is maintained?
▪ Are signs located so that visibility is maintained:
  ▪ to/from accesses and intersecting roads?
  ▪ to/from pedestrians and important features on the road?
▪ Have the consequences of vehicles striking signposts been considered?
▪ Are sign supports out of the clear zone?
▪ If not, are they:
  ▪ frangible?
  ▪ shielded by barriers (e.g. guard fence, crash cushions)?
▪ Has an over-reliance on signs (in lieu of adequate geometric design) been avoided?
▪ Are signs on the new scheme consistent with those on the adjoining section of road (or will the previous signs need to be upgraded)?
	Signs on the narrow median are exposed to impacts.

Checklist questions	Comments
3.6.3 Marking and delineation ▪ Are markings (lines, arrows, etc.) consistent with standard markings? ▪ Have any locations where standard markings might be confusing or misread been identified and treated in a way which considers road users' likely responses? ▪ Are barrier lines (no overtaking) provided where required? ▪ Are raised retroreflective pavement markers (RRPMs) provided where necessary? ▪ Are curve warning signs, advisory speed plates or chevron alignment markers provided where required? ▪ Are markings on the new scheme consistent with those on the adjoining section of road (or will the previous markings need to be upgraded)? ▪ Are diagonal markings or chevrons painted where required? ▪ Will markings and delineation be visible at night-time? ▪ Will markings and delineation be visible in wet weather? ▪ Has the need for profiled (audible) line marking been considered? ▪ Have both high and low-beam cases been considered? ▪ Are guide posts of the frangible type?	Linemarking drafting errors noted.
3.7 Physical objects	
3.7.1 Median barriers ▪ Have median barriers been considered and properly detailed? ▪ Have all design features that require special attention (for example, end treatments) been considered?	NA.
3.7.2 Poles and other obstructions ▪ Are all poles located well away from moving traffic? ▪ Have frangible or breakaway poles been included where required? ▪ Are median widths adequate to accommodate lighting poles or trees? ▪ Is the position of traffic signal controllers and other service apparatus satisfactory? ▪ Is the roadside clear of any other obstructions that may create a safety hazard? ▪ Have all necessary measures been taken to remove, relocate or shield all hazards? ▪ Can roadside drains and channels be safely traversed by any vehicle that runs off the road?	Yes.

Checklist questions	Comments

3.7.3 Crash barriers
▪ Are crash barriers provided where necessary and properly detailed? (for example, at embankments, structures, trees,
▪ poles, drainage channels, bridge piers, gore areas) Is the crash barrier safe? (i.e. unlikely to create a danger for road users including pedestrians, cyclists, motorcyclists, etc.)
▪ Are the end conditions of the crash barrier safe and satisfactory?
▪ Is the guard fence designed according to standards for:
  ▪ end treatments?
  ▪ anchorages?
  ▪ post spacing?
  ▪ block outs?
  ▪ post depth?
  ▪ rail overlap?
  ▪ stiffening at rigid obstacles?
▪ Is all guard fence necessary? (i.e. what it shields is a greater hazard than the fence)
▪ Where pedestrians and cyclists travel behind guard fence, is the rear of the fence safe for them?
	NA.

3.7.4 Bridges, culverts and causeways/floodways
▪ Are bridge barriers and culvert end walls safe regarding:
  ▪ visibility?
  ▪ ease of recognition?
  ▪ proximity to moving traffic?
  ▪ the possibility of causing injury or damage?
  ▪ collapsible or frangible ends?
  ▪ signs and markings?
  ▪ connection of crash barriers?
  ▪ roadside hazard protection?
▪ Is the bridge railing at the correct level and strong enough?
▪ Is the shoulder width on the bridge the same as on the adjacent road lengths?
▪ Is safe provision made for non-vehicular traffic over structures? (for example, pedestrians, pedal cycles, horses/stock, etc).
▪ Are all culvert end walls (including driveway culverts) drivable or outside the clear zone?
▪ Have causeways/floodways etc. been given correct signing and adequate sight distance?
	Culverts are present in areas that pedestrians are likely to walk (on southern side of Sallys Corner Road).

3.8 Additional questions to be considered for development proposals	Questions omitted as issues adequately covered by other checklist questions.
3.9 Any other matter	

Checklist questions	Comments
Safety aspects not already covered ▪ Is the road able to safely handle oversize vehicles, or large vehicles like trucks, buses, emergency vehicles, road maintenance vehicles? ▪ If required, can the road be closed for special events in a safe manner? ▪ If applicable, are special requirements of scenic or tourist routes satisfied? ▪ Have all unusual or hazardous conditions associated with special events been considered? ▪ Have all other matters which may have a bearing on safety been addressed?	No.

Appendix B Richmond + Ross S138 Approval Plans

SALLYS CORNER ROAD

SUTTON FOREST, NSW 2579

EXTERNAL CIVIL WORKS DRAWINGS		
DWG. NO.	**AMDT.**	**DRAWING TITLE**
EW00	H	COVER PAGE & DRAWING LIST
SK-01		PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (CARS) & SIGHT DISTANCE
SK-02A		PROPOSED RIGHT AND LEFT TURN ARRANGEMENTS (TRUCKS)
EW01	F	OVERALL SITE PLAN
EW10	G	EXISTING & DEMOLITION SITE PLAN PART-A
EW11	E	EXISTING & DEMOLITION SITE PLAN PART-B
EW20	G	PROPOSED SITE PLAN PART-A
EW21	F	PROPOSED SITE PLAN PART-B
EW30	E	DIMENSION & SETOUT PLAN PART-A
EW31	E	DIMENSION & SETOUT PLAN PART-B
EW40	G	LINE MARK AND SIGNAGE PLAN PART-A
EW41	G	LINE MARKING AND SIGNAGE PLAN PART-B
EW50	F	PAVEMENT PLAN PART-A
EW51	E	PAVEMENT PLAN PART-B
EW52	C	PAVEMENT DETAILS (SHEET 1 OF 2)
EW53	D	PAVEMENT DETAILS (SHEET 2 OF 2)

REV No.	COMMENTS	DATE	INIT.
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	17.04.24	DJ
G	FOR APPROVAL	24.04.24	DJ
H	FOR S138 APPROVAL	30.04.24	DJ
J	FOR S138 APPROVAL	01.05.24	DJ

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond + Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

COVER PAGE &
DRAWING LIST

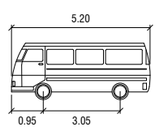
DATE: MAY 2023
SCALE: N.T.S.
JOB No. 230139
DRG.No. EW00
REV J

LEVEL 16, 175 EAGLE ST
BRISBANE
QUEENSLAND 4000
AUSTRALIA
T: 61 7 3858 4800

www.slrconsulting.com

Project No:	610.31088
Date:	02/05/2024
Drawn by:	Charlie Seventekin
Certified by:	Charlie Seventekin
Sheet Size:	A3
Projection:	GDA2020

SWEPT PATH LEGEND
- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels



PASSENGER-VAN

meters

Width	:	1.94
Track	:	1.84
Lock to Lock Time	:	6.0
Steering Angle	:	33.6

N

0.0 7.5 15 22.5 30
METRES

SCALE 1:750

Australian Property Syndicates Pty Ltd

S138 Application

Proposed Right and Left Turn Arrangements (Cars) & Sight Distance

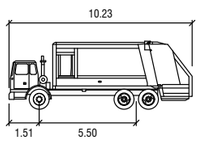
FIGURE SK-01

LEVEL 16, 175 EAGLE ST
BRISBANE
QUEENSLAND 4000
AUSTRALIA
T: 61 7 3858 4800

www.slrconsulting.com

Project No:	610.31088
Date:	02/05/2024
Drawn by:	Charlie Seventekin
Certified by:	Charlie Seventekin
Sheet Size:	A3
Projection:	GDA2020

SWEPT PATH LEGEND
- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels



BCC Rear Load RCV (ACCO 2350)

meters

Width	:	2.50
Track	:	2.50
Lock to Lock Time	:	6.0
Steering Angle	:	40.3

N

0.0 7.5 15 22.5 30
METRES

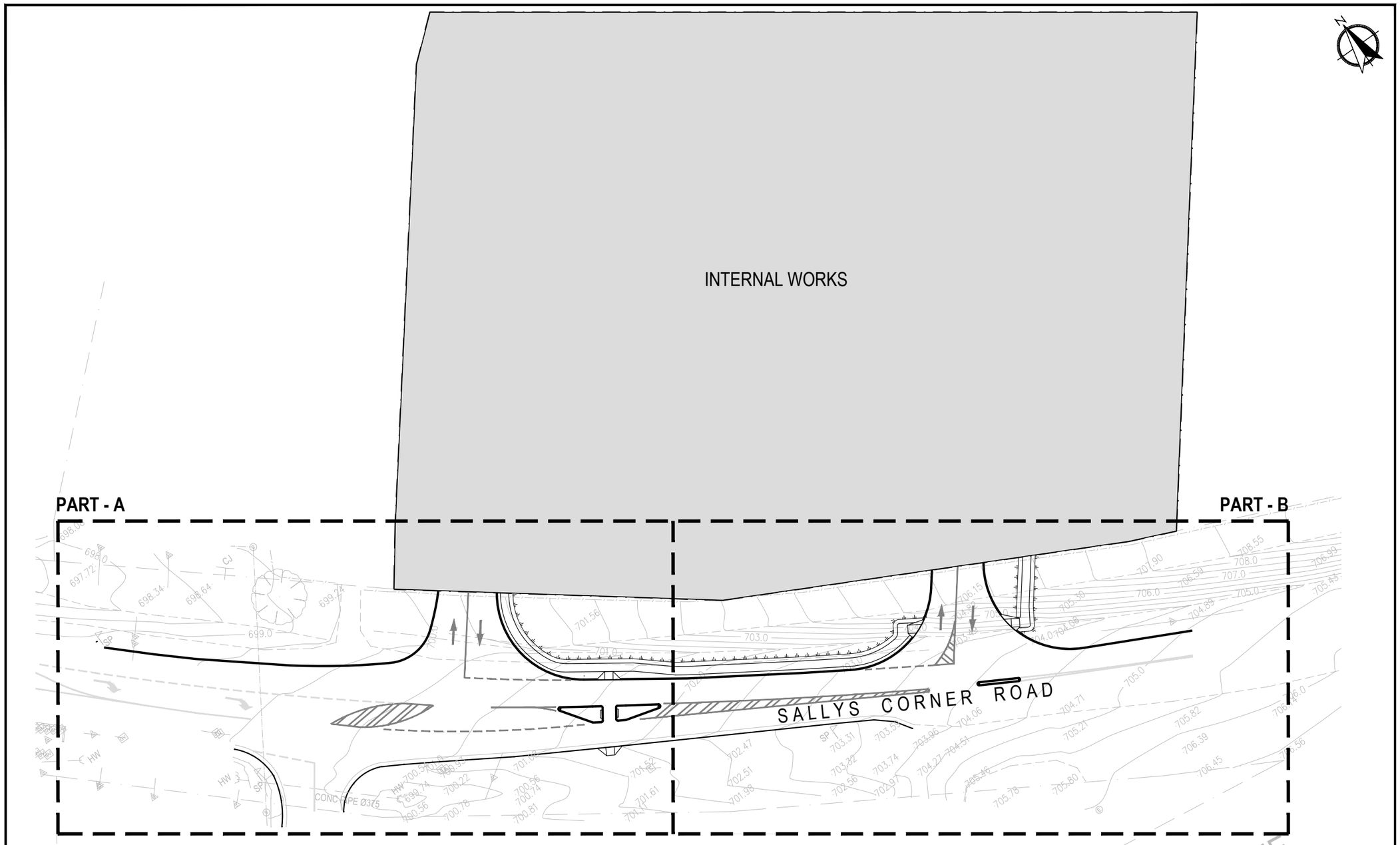
SCALE 1:750

Australian Property Syndicates Pty Ltd

S138 Application

Proposed Right and Left Turn Arrangements (Trucks)

FIGURE SK-02A



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 5000 10000 20000 30000
SCALE (mm) 1:500

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

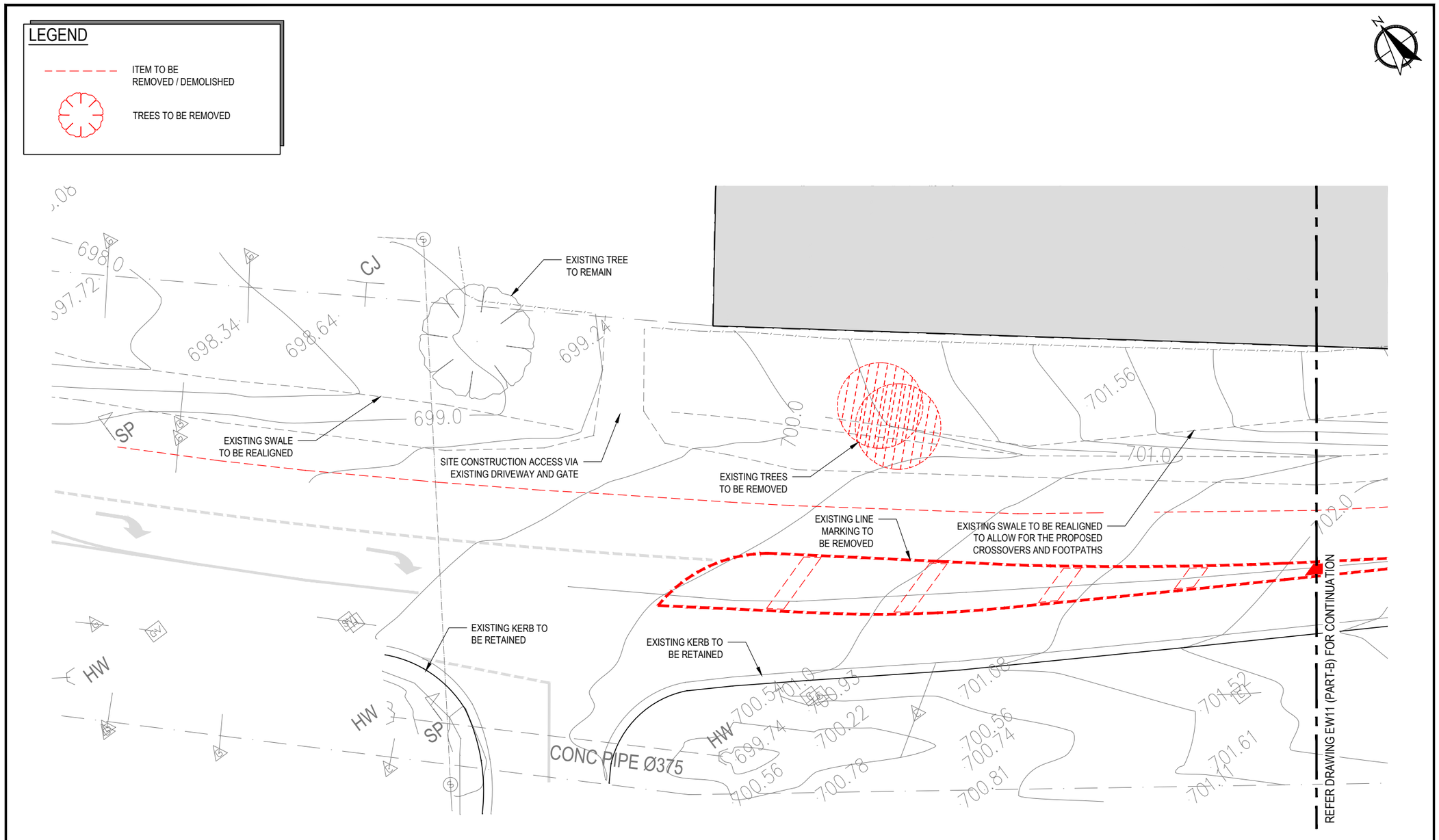
CLIENT:
APS

Richmond + Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

OVERALL SITE PLAN

DATE:	MAY 2023	DRG.No.
SCALE:	1:500 @ A3	EW01
JOB No.	230139	REV F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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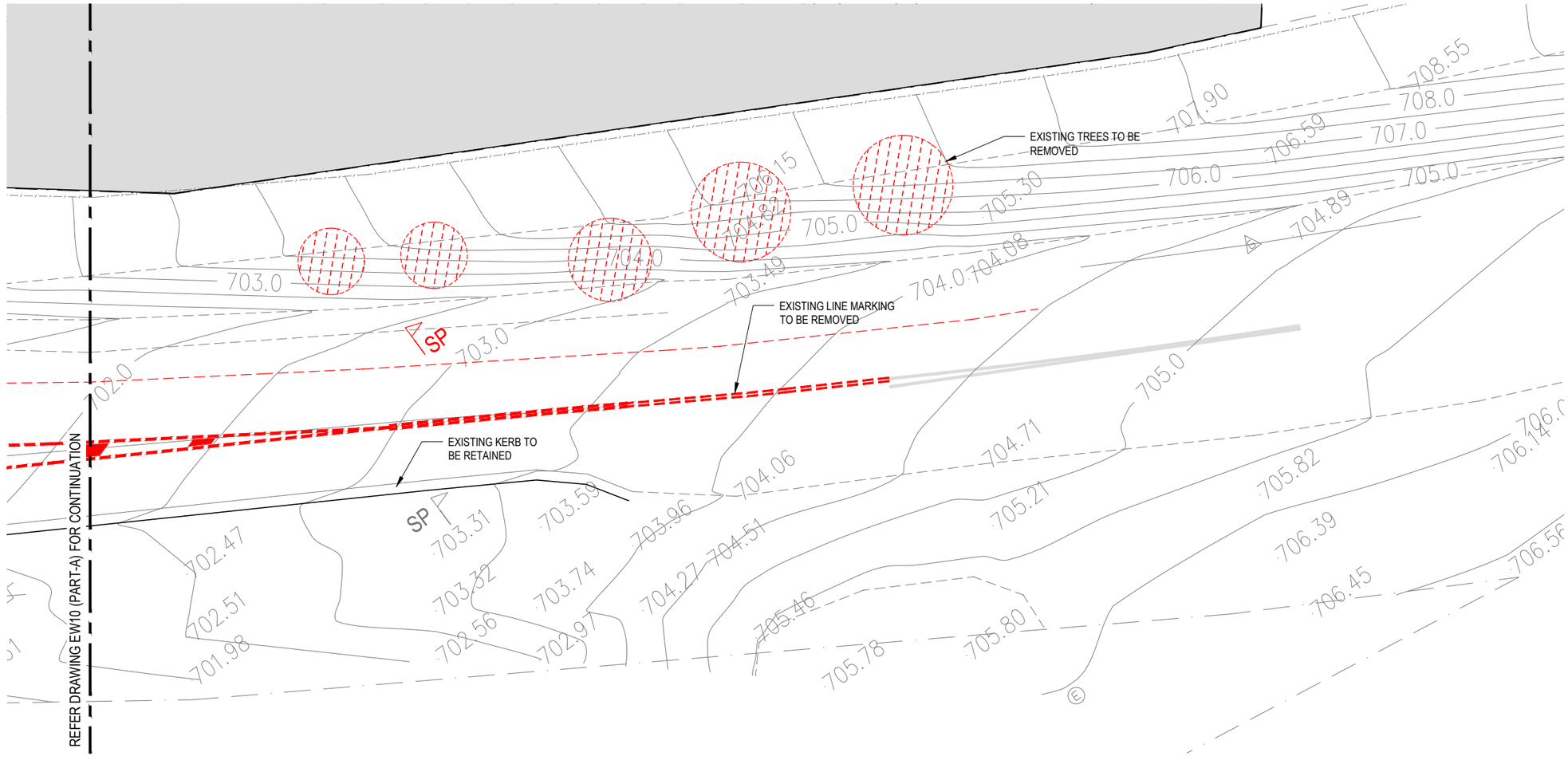
EXISTING & DEMOLITON SITE PLAN PART - A

DATE:	MAY 2023	DRG.No.	EW10
SCALE:	1:250 @ A3		
JOB No.	230139	REV	G

LEGEND

ITEM TO BE REMOVED / DEMOLISHED

TREES TO BE REMOVED



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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CROWS NEST, NSW 2065
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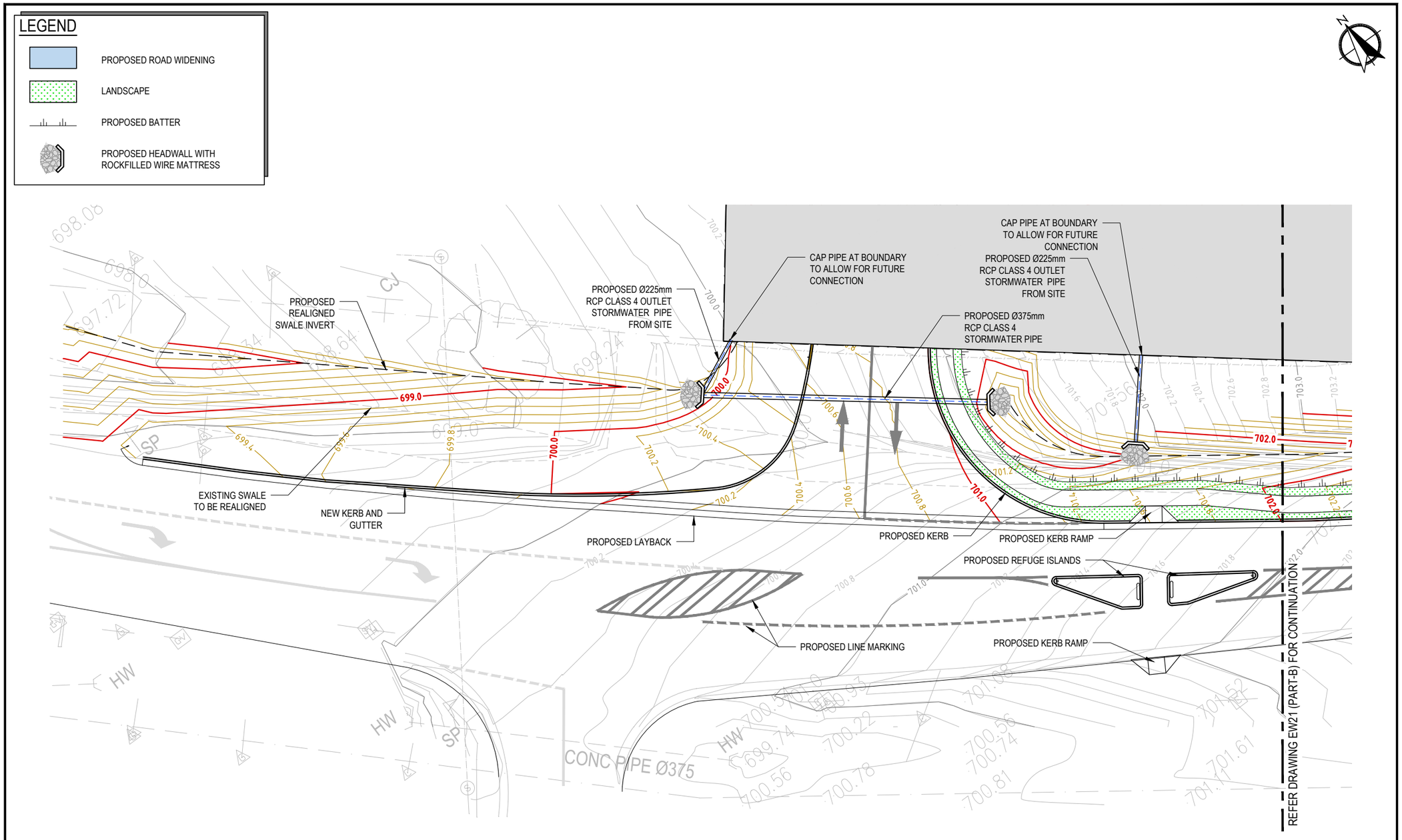
EXISTING & DEMOLITON SITE PLAN PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW11
JOB No.	230139	REV E



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	07.06.23	FS
B	TENDER ISSUE	18.10.23	FS
C	TENDER ISSUE	13.02.24	DJ
D	FOR APPROVAL	12.04.24	DJ
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F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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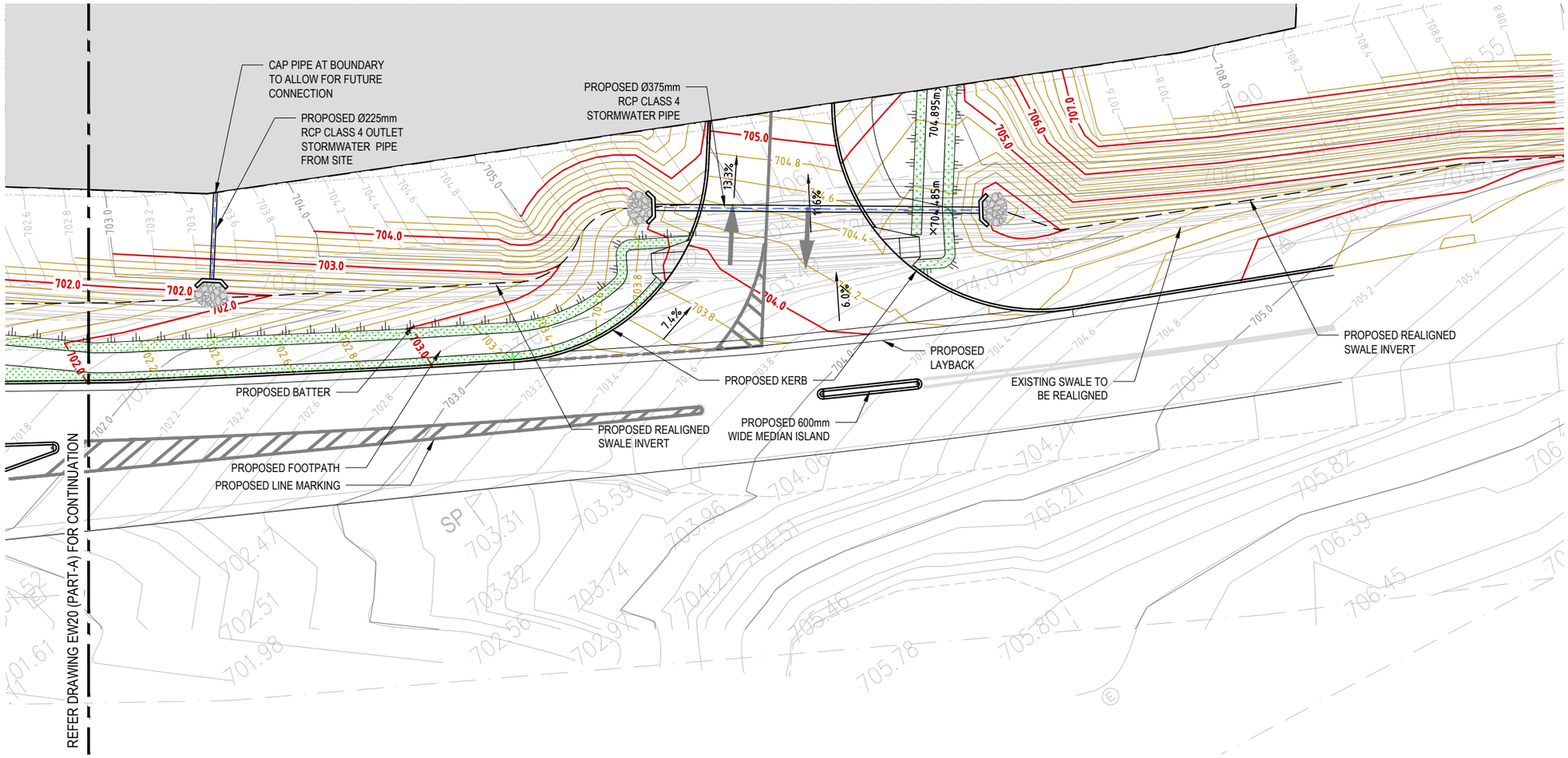
PROPOSED SITE PLAN
PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW20
JOB No.	230139	REV G

LEGEND

- PROPOSED ROAD WIDENING
- LANDSCAPE
- PROPOSED BATTER
- PROPOSED HEADWALL WITH ROCKFILLED WIRE MATTRESS



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
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C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
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CROWS NEST, NSW 2065
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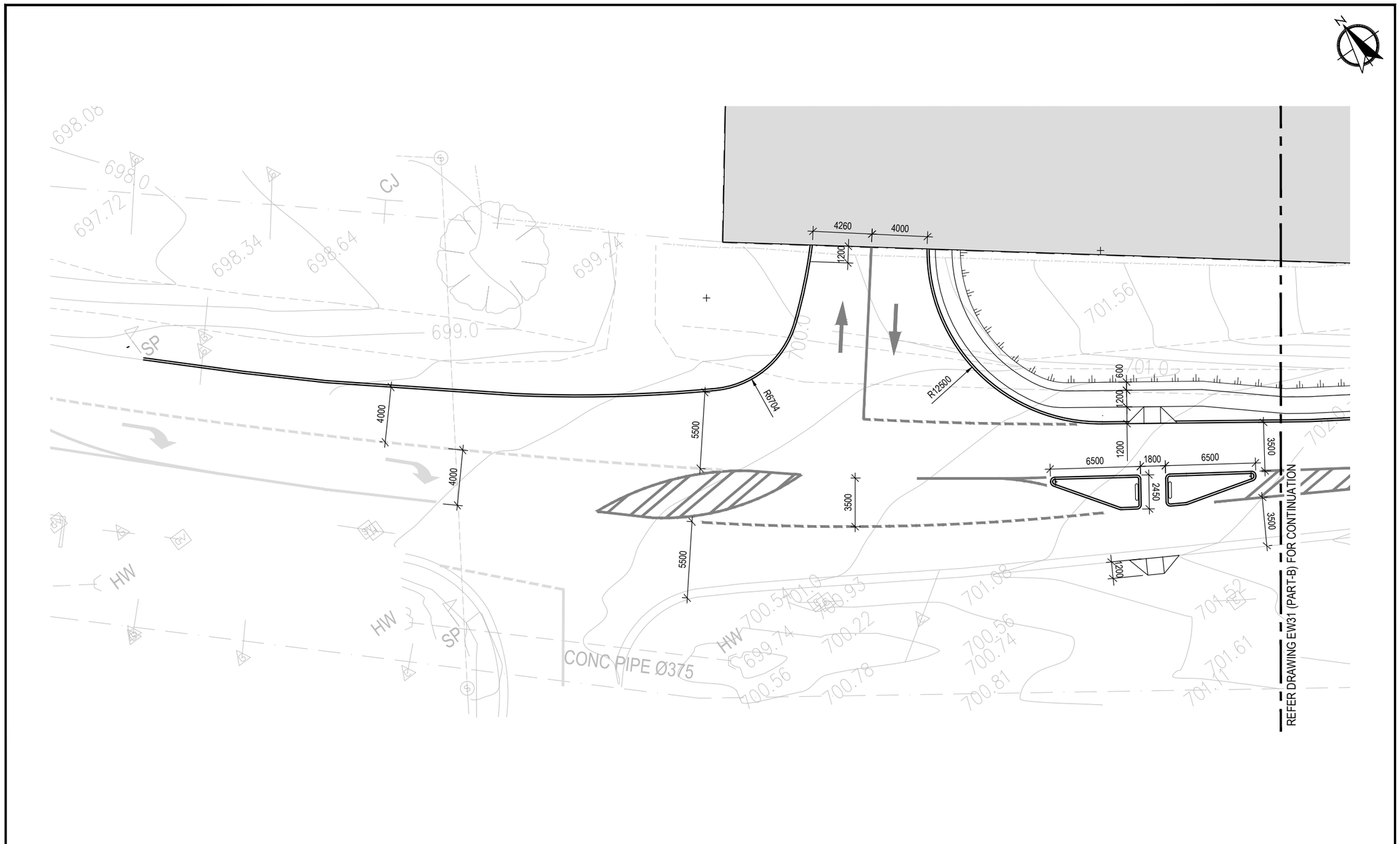
PROPOSED SITE PLAN
PART - B

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW21	
JOB No.	230139	REV	F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
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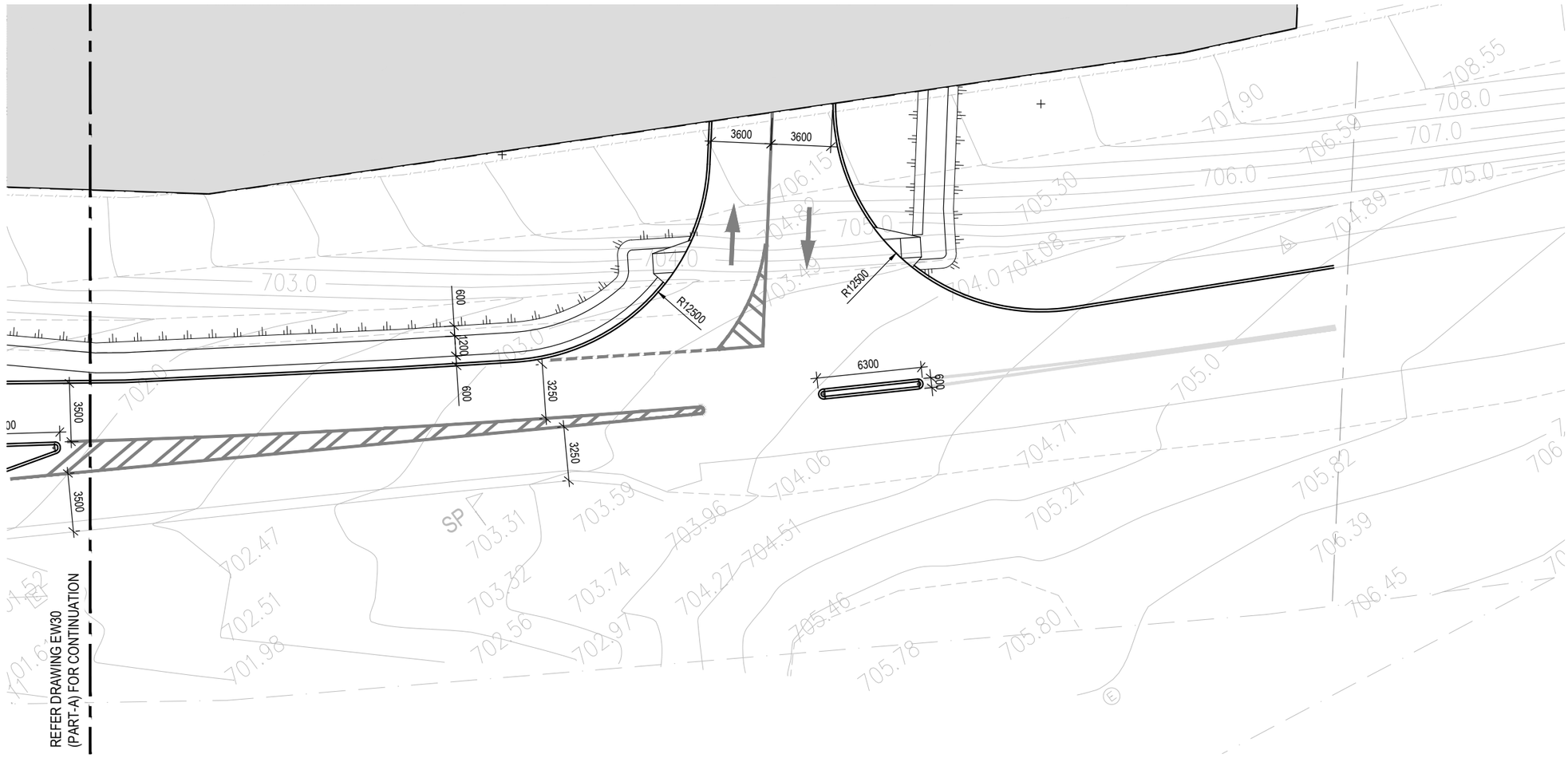
DIMENSION/SETOUT PLAN
PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW30
JOB No.	230139	REV E



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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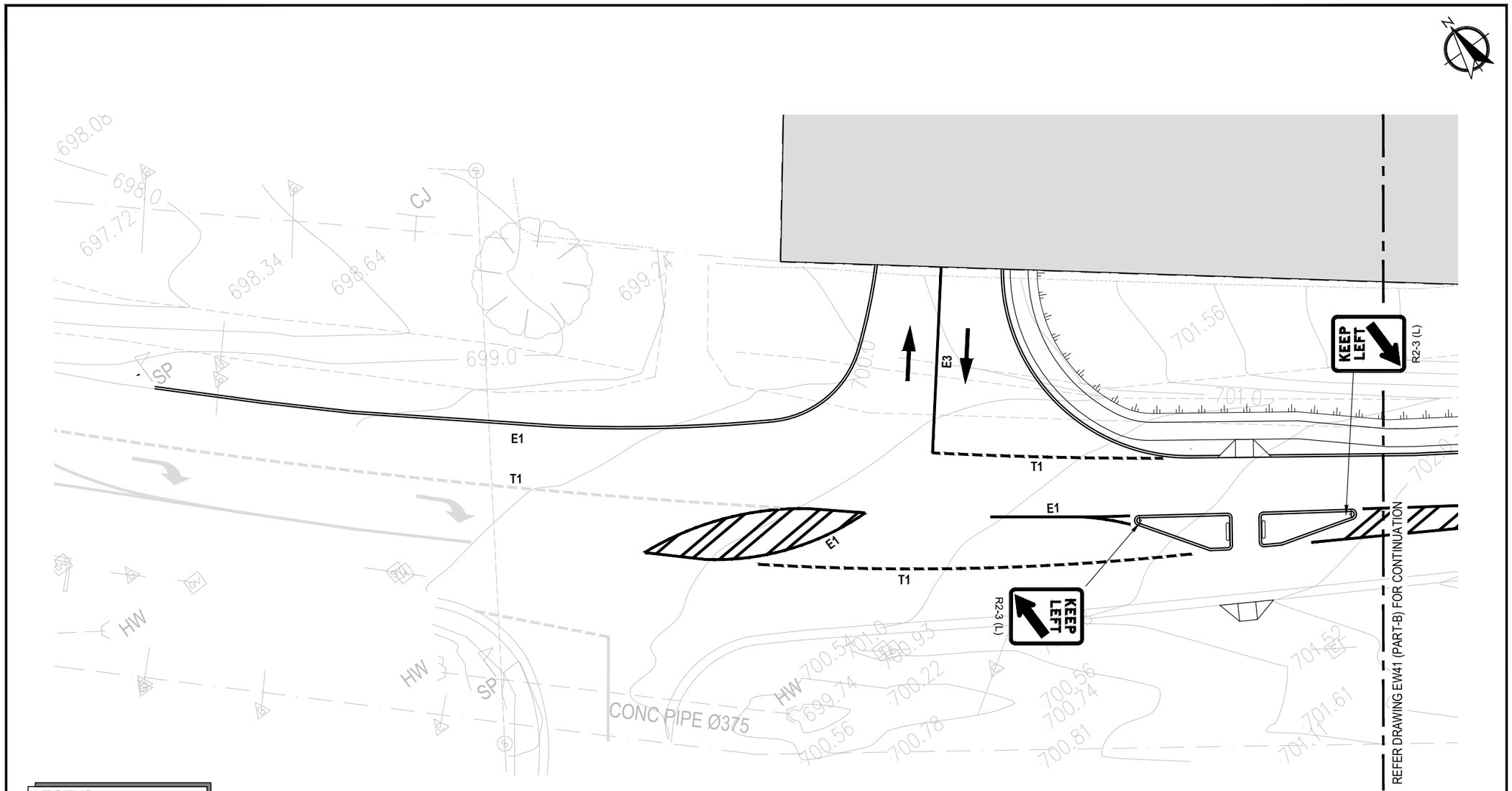
DIMENSION/SETOUT PLAN
PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW31
JOB No.	230139	REV E



LEGEND

E1, E3	EDGE LINEMARKING
T1	TURNING LINEMARKING

NOTE:

1. REFER TfNSW DELINEATION GUIDELINE SECTION 4.
2. EXISTING LINEMARKING SHOWN IS BASED ON HISTORICAL ARIEL IMAGERY. SALLYS CORNER ROAD HAS RECENTLY BEEN RESURFACED AND AS SUCH THE REVISED LINEMARKING MAY VARY FROM WHAT IS SHOWN ON PLAN. CONTACT ENGINEER PRIOR TO CONSTRUCTION OF EXISTING LINEMARKING ON SITE VARIES FROM EXISTING LINEMARKING ON PLANS.
3. PROPOSED EXTENSION OF THE 60 ZONE FURTHER TO THE EAST UNDER REVIEW BY TFNSW.

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	16.04.24	DJ
E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436

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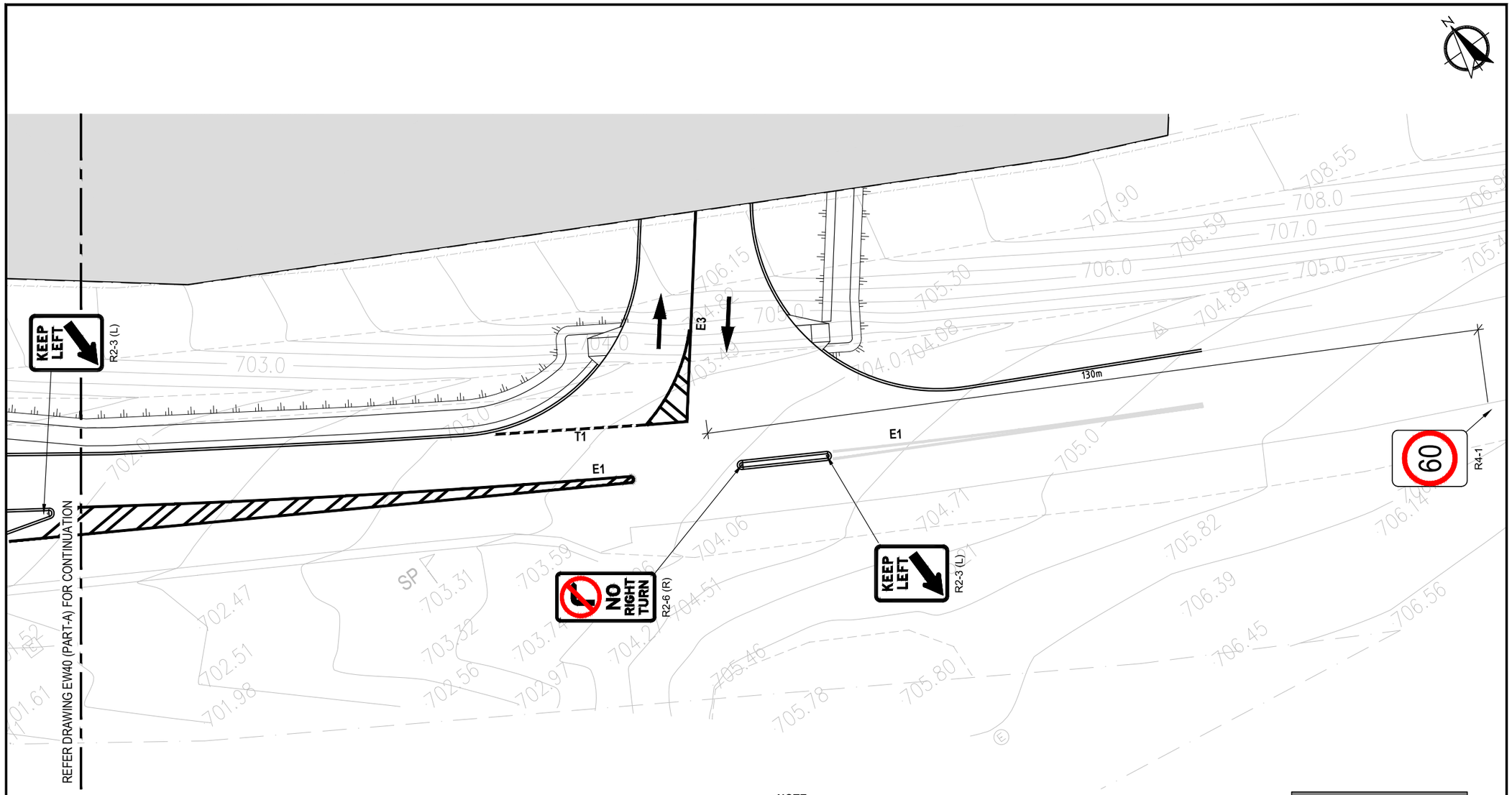
TEL : (02) 9490 9600
FAX : (02) 9438 1224

LINE MARKING AND SIGNAGE PLAN - PART - A

DATE:	MAY 2023	DRG.No.	
SCALE:	1:250 @ A3	EW40	
JOB No.	230139	REV	G



NOTE:

1. REFER TfNSW DELINEATION GUIDELINE SECTION 4.
2. EXISTING LINEMARKING SHOWN IS BASED ON HISTORICAL ARIEL IMAGERY. SALLYS CORNER ROAD HAS RECENTLY BEEN RESURFACED AND AS SUCH THE REVISED LINEMARKING MAY VARY FROM WHAT IS SHOWN ON PLAN. CONTACT ENGINEER PRIOR TO CONSTRUCTION OF EXISTING LINEMARKING ON SITE VARIES FROM EXISTING LINEMARKING ON PLANS.
3. PROPOSED EXTENSION OF THE 60 ZONE FURTHER TO THE EAST UNDER REVIEW BY TFNSW.

LEGEND

E1, E3	EDGE LINEMARKING
T1	TURNING LINEMARKING

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
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E	FOR APPROVAL	17.04.24	DJ
F	FOR APPROVAL	24.04.24	DJ
G	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

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ABN 34 001 485 436

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CROWS NEST, NSW 2065
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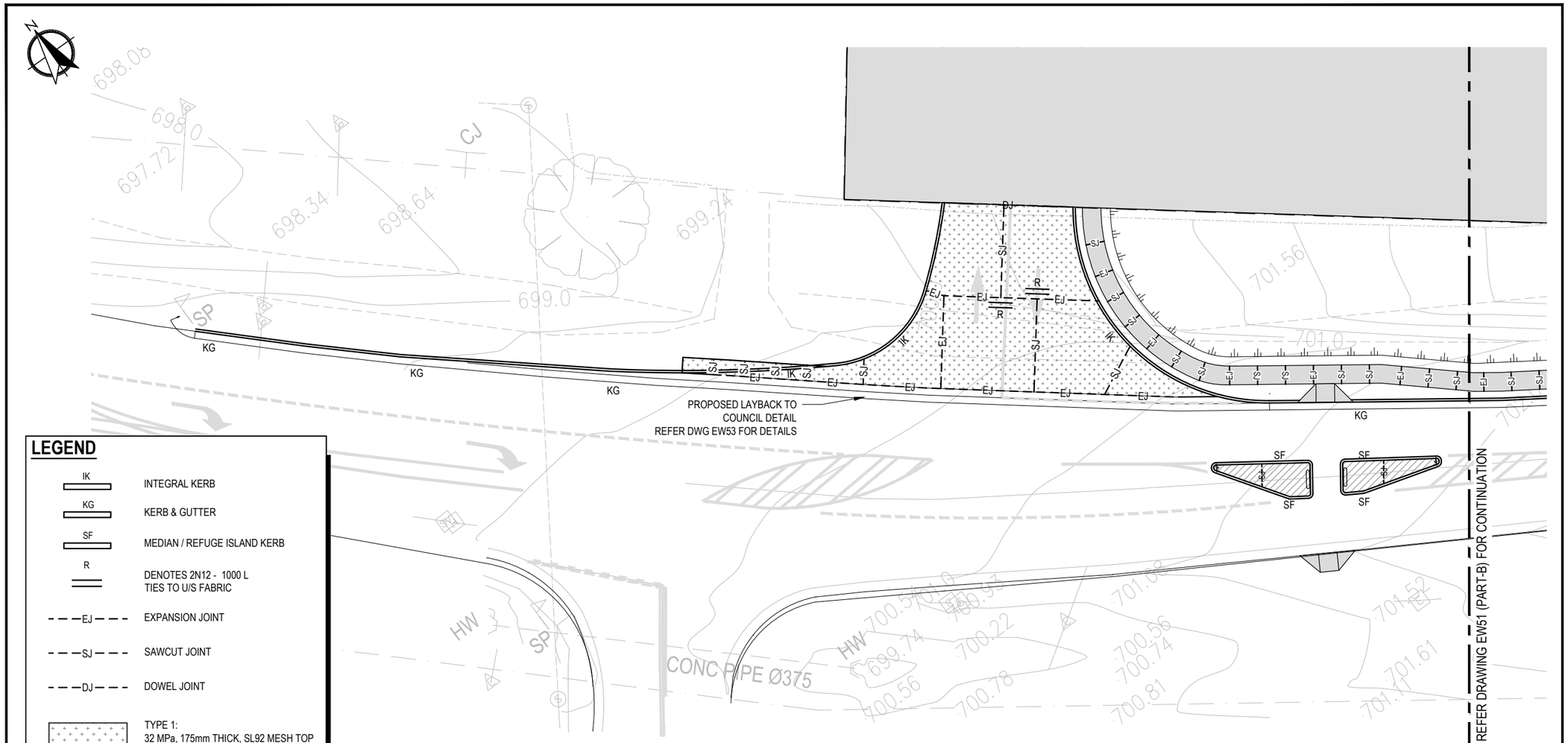
LINE MARKING AND SIGNAGE PLAN - PART - B

DATE:	MAY 2023	DRG.No.	EW41
SCALE:	1:250 @ A3		
JOB No.	230139	REV	G



LEGEND

IK	INTEGRAL KERB
KG	KERB & GUTTER
SF	MEDIAN / REFUGE ISLAND KERB
R	DENOTES 2N12 - 1000 L TIES TO U/S FABRIC
EJ	EXPANSION JOINT
SJ	SAWCUT JOINT
DJ	DOWEL JOINT
	TYPE 1: 32 MPa, 175mm THICK, SL92 MESH TOP 40mm COVER TOP. NATURAL CONCRETE BROOM FINISH.
	TYPE 2: 32 MPa, 100mm THICK, SL72 MESH CENTRAL NATURAL CONCRETE BROOM FINISH
	TYPE 3: 32 MPa, 130mm THICK, SL72 MESH CENTRAL NATURAL CONCRETE BROOM FINISH

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	17.04.24	DJ
E	FOR APPROVAL	24.04.24	DJ
F	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

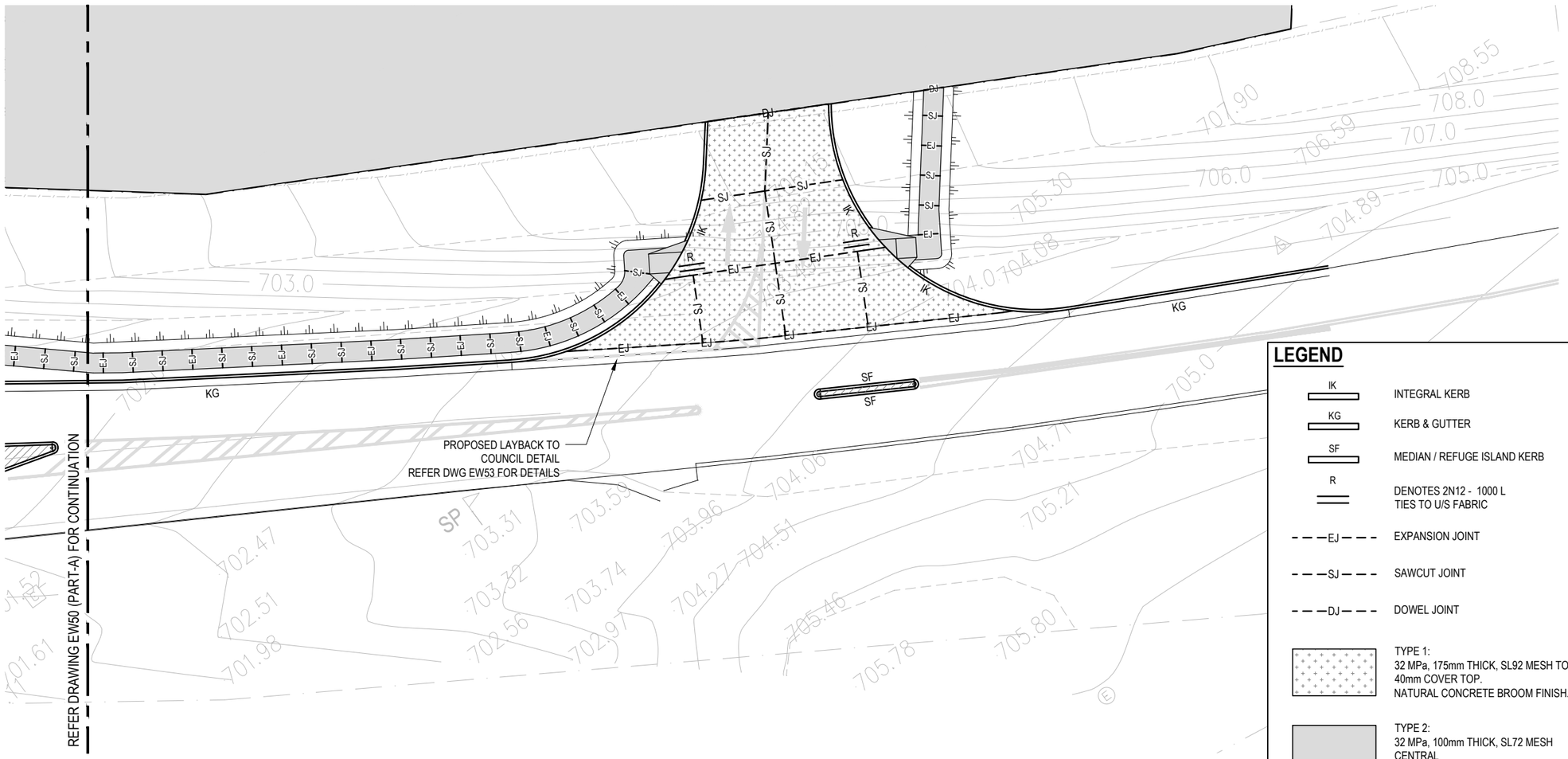
PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond + Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436
38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT PLAN
PART - A

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW50
JOB No.	230139	REV F



REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	DJ
D	FOR APPROVAL	24.04.24	DJ
E	FOR S138 APPROVAL	30.04.24	DJ

0 2500 5000 10000 15000
SCALE (mm) 1:250

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

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TEL : (02) 9490 9600
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PAVEMENT PLAN
PART - B

DATE:	MAY 2023	DRG.No.
SCALE:	1:250 @ A3	EW51
JOB No.	230139	REV E

PAVEMENT NOTES

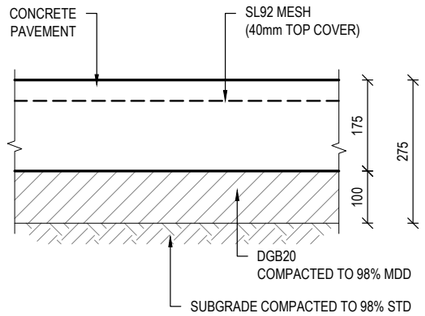
1. PAVEMENT MATERIALS SHALL BE IN ACCORDANCE WITH TfNSW SPEC 3051 : BASE COURSE DGB20
2. FILL MATERIALS WHICH ARE PRONE TO ACCELERATED WEATHERING WILL NOT BE ACCEPTED EG. SOME MUDSTONES, CLAYSTONES, SILTSTONES, SHALES AND OTHER ROCKS. ENDORSEMENT OF THE SUITABILITY OF THE PROPOSED FILLING MATERIAL IS TO BE MADE BY A GEOTECHNICAL ENGINEER PRIOR TO APPROVAL. FILL MATERIALS USED TO SUPPORT PAVEMENTS SHALL BE COMPACTED TO 95% STANDARD MAXIMUM DRY DENSITY UPTO 0.5M BELOW SUBGRADE LEVEL.
3. BASE COURSE SHALL BE COMPACTED TO 98% MODIFIED MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF STANDARD OPTIMUM, MINIMUM SOAKED CBR 80% UNO.
4. SUB BASE COURSE SHALL BE COMPACTED TO 95% MODIFIED MAXIMUM DRY DENSITY, MINIMUM SOAKED CBR 45% UNO.
5. SUBGRADE SHALL BE APPROVED NATURAL SUBGRADE OR IMPORTED FILL. PROOF ROLL AND COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY UNO.

CONCRETE PAVEMENT NOTES

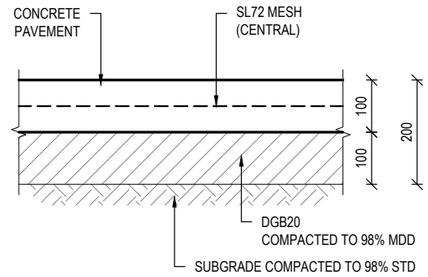
1. CONCRETE.
   - 1.1. ALL EXTERNAL CONCRETE SLABS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32MPA @ 28 DAYS (U.N.O.)
   - 1.2. ALL PEDESTRIAN TRAFFIC PAVEMENTS TO BE A MINIMUM OF 28MPa @ 28 DAYS
2. PROVIDE A HEAVY DUTY MEMBRANE UNDER ALL BUILDING SLABS AND TANK FARM PAVEMENTS.
3. ALL REINFORCEMENT SHALL BE SUPPORTED ON BAR CHAIRS AND DISCS - 50mm MIN COVER TO LIGS, CROSS BARS AND ALL REINFORCEMENT EXPOSED TO AIR OR AGAINST GROUND.
4. NO WATER SHALL BE PERMITTED TO BE ADDED TO PREMIXED CONCRETE ON SITE.
5. EACH TRUCK SHALL BE CHECKED FOR SLUMP USING A STANDARD CONE. SPECIFIED SLUMP TO BE 85MM ± 15MM. CONCRETE OUTSIDE THIS RANGE SHALL BE REJECTED.
6. ALL CONCRETE SHALL BE COMPACTED USING A VIBRATOR OR TRAVELLING SCREED.
7. MINIMUM TRAFFICABLE CURE TIME FOR CONCRETE SLAB AS FOLLOWS:
   - 7.1. 32MPA, 4MPA FLEXURAL = 7 DAYS UNLESS ACCELERATED WITH TfNSW COMPLIANT MIX IN WHICH CASE MAY TRAFFICKED 12 HOURS AFTER CURING
   - 7.2. 60MPA = 4 DAYS (NOT SUITABLE FOR USE WITH ACCELERANTS)
8. ALL SAWN JOINTS SHALL BE CUT USING A 'SOFT CUT' 4 HOURS AFTER POUR.
9. PROVIDE AT LEAST 48 HOURS NOTICE TO THE ENGINEER FOR INSPECTION OF REINFORCEMENT, PRIOR TO POUR.
10. MAINTAIN COVER TO ALL REINFORCEMENT IN ACCORDANCE WITH THE "REINFORCEMENT DETAIL".
11. USE ONLY GALVANISED DOWEL BARS (MIN 250 GRADE).
12. SEAL ALL JOINTS (U.N.O.) IN ACCORDANCE WITH RELEVANT JOINT SEAL DETAIL
13. THE EVAPORATION RATE SHALL BE MONITORED BY THE CONTRACTOR DURING CONCRETING OPERATIONS UNTIL SUCH TIME AS CURING COMMENCES. IF CONTROL MEASURES ARE NOT SUCCESSFUL OR ARE IMPRACTICAL, NO CONCRETE SHALL BE POURED.
14. WHERE WEATHER CONDITIONS ON SITE INDICATE AN EVAPORATION RATE FROM THE CONCRETE SURFACE IS LIKELY TO EXCEED 0.50 KG/M²/H, THE USE OF EVAPORATION RETARDANT MIST SPRAYS ON THE CONCRETE SLAB EXPOSED SURFACE ARE MANDATORY. SPRAYS MUST BE MIXED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND APPLIED WITHIN 10 MINUTES OF CONCRETE PLACEMENT AND INITIAL LEVELLING. SPRAYS ARE THEN APPLIED AGAIN FOLLOWING ANY SUBSEQUENT FLOATING OPERATION ON THE CONCRETE SURFACE.

PAVEMENT DESIGN CBR

PAVEMENTS DESIGNED USING AN ASSUMED CBR OF 4.5% PAVEMENT PROFILES
SUBJECT TO REVIEW ON COMPLETION OF GEOTECH INVESTIGATION



TYPE 1: HEAVY DUTY CONCRETE PAVEMENT
SCALE 1:10



TYPE 2: CONCRETE PAVEMENT FOR PEDESTRIAN ACCESS
SCALE 1:10

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	FOR APPROVAL	15.04.24	JK
C	FOR S138 APPROVAL	30.04.24	JK

0 100 200 400 600
SCALE (mm) 1:10

S138 APPROVAL

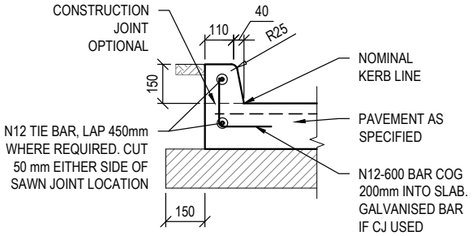
PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

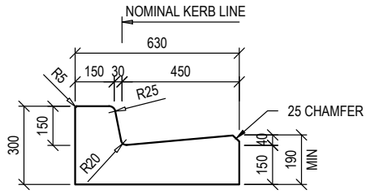
Richmond + Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436
38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT DETAILS
SHEET 1 OF 2

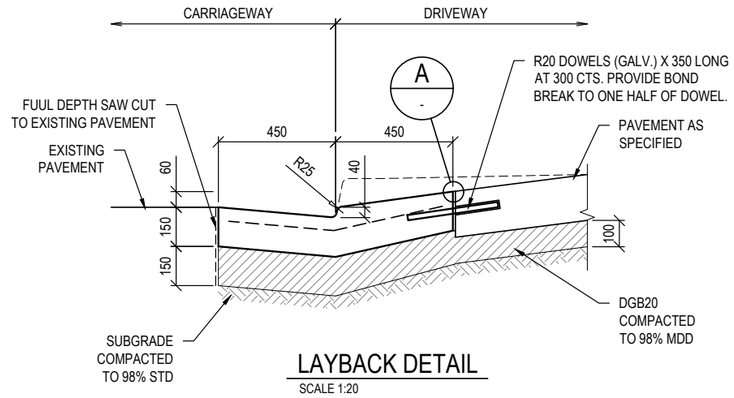
DATE:	MAY 2023	DRG.No.	EW52
SCALE:	1:10 @ A3	REV	C
JOB No.	230139		



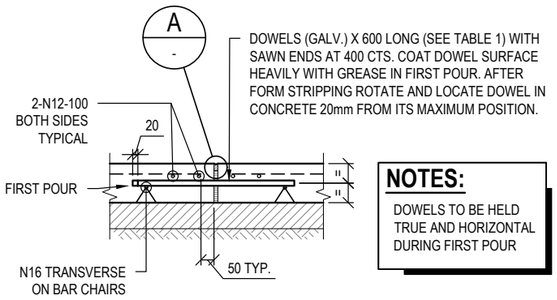
INTEGRAL KERB DETAIL 'IK'
SCALE 1:20



KERB & GUTTER DETAIL 'KG'
SCALE 1:20

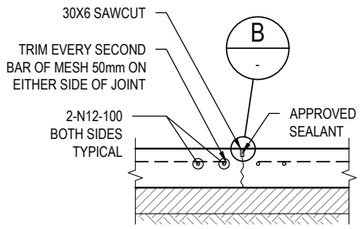


LAYBACK DETAIL
SCALE 1:20

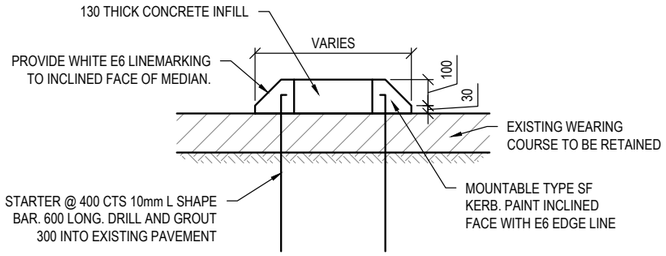


NOTES:
DOWELS TO BE HELD TRUE AND HORIZONTAL DURING FIRST POUR

EXPANSION JOINT (EJ)
SCALE 1:20



SAW CUT JOINT DETAIL (SJ)
SCALE 1:20



TYPICAL MEDIAN / REFUGE ISLAND SECTION (SF KERB)
SCALE 1:20

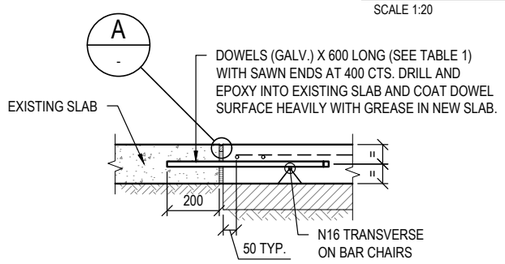
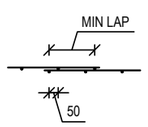


TABLE 1	
PAVEMENT THICKNESS	DOWEL DIAMETER
100	12mm
100 < T < 150	16mm
150 ≤ T ≤ 200	20mm

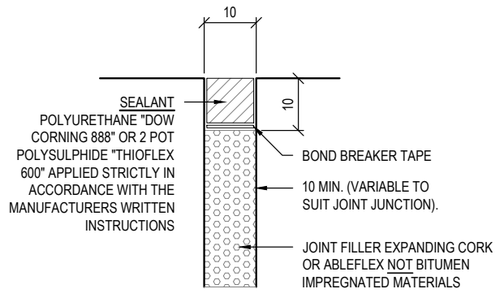
DOWEL JOINT (DJ)
SCALE 1:20

KERB NOTES

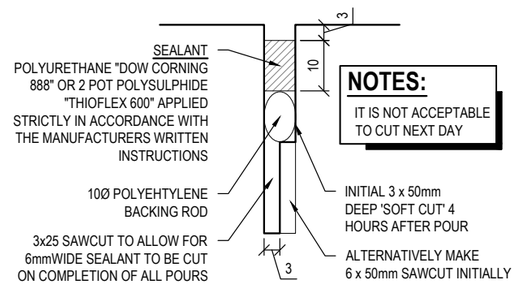
1. KERB PROFILE DIMENSIONS ARE INDICATED AS A GUIDE TO INTENT ONLY, AND MAY BE VARIED BY THE CIVIL ENGINEER TO SUIT STATE ROAD AUTHORITY OR LOCAL GOVERNMENT SPECIFICATIONS.
2. MINIMUM CONCRETE STRENGTH FOR KERBS SHALL BE: F'C = 25 MPA AT 28 DAYS.
3. PROVIDE FULL DEPTH CONTRACTION JOINTS AT 2400 CTS. MAX. BY USING 3mm STEEL TEMPLATE. JOINTS SHALL COINCIDE WITH PAVEMENT JOINTS WHERE POSSIBLE. EVERY THIRD JOINT BEING AN EXPOSITION JOINT



FABRIC LAP DETAIL
SCALE 1:20



A - EXPANSION JOINT DETAIL
SCALE 1:1



NOTES:
IT IS NOT ACCEPTABLE TO CUT NEXT DAY

B - SAW CUT JOINT SEAL
SCALE 1:1

REV No.	COMMENTS	DATE	INIT.
A	TENDER ISSUE	18.10.23	FS
B	TENDER ISSUE	13.02.24	DJ
C	FOR APPROVAL	12.04.24	JK
D	FOR S138 APPROVAL	30.04.24	JK

0 100 200 400 600
SCALE (mm) 1:10

S138 APPROVAL

PROJECT:
SALLYS CORNER ROAD
SUTTON FOREST NSW 2579

CLIENT:
APS

Richmond+Ross PTY LIMITED
CONSULTING ENGINEERS AND PROJECT LEADERS
ABN 34 001 485 436
38 WILLOUGHBY ROAD,
CROWS NEST, NSW 2065
TEL : (02) 9490 9600
FAX : (02) 9438 1224

PAVEMENT DETAILS
SHEET 2 OF 2

DATE:	MAY 2023	DRG.No.	EW53
SCALE:	AS SHOWN @ A3	REV	D
JOB No.	230139		

Appendix C SLR Statement of Advice for Access Arrangements

Statement of Advice

Fast Food Development, 61 Sallys Corner Road, Exeter

Supplementary Traffic Engineering Consideration

CLIENT: Southern Restaurants Trust C/- Richmond + Ross	**DATE:** 30 October 2023
SLR PROJECT No: 610.31088	**REVISION:** v1.0
AUTHOR: Kris Stone	**REVIEWER:** Charlie Seventekin

1.0 Introduction

SLR Consulting Australia Pty Ltd (**SLR**) has been engaged to provide traffic engineering advice with respect to the above development matter.

This Statement of Advice references the SLR Traffic Impact Assessment (**TIA**) dated December 2023, and the Wingecarribee Shire Council (**Council**) Notice of Determination dated 13 April 2023.

2.0 Background

SLR prepared a TIA (631.31088 v1.0 dated 16 December 2022) which accompanied the subject development application. Section 7.1 of the TIA recommended a BAR/BAL site access intersection arrangement based on the turn warrant assessment process outlined in *Austroads Guide to Traffic Management* (AGTM6-20).

Council issued a Notice of Determination to approve the development with conditions, including Condition 17 which is reproduced below:

"Condition 17 Section 138 Roads Act 1993 Approval…

- *A copy of approved design plans related to the development and proposed works to be undertaken.*
- *The plan shall include:*
  - *A signage and line marking plan showing BAR/BAL intersection treatment at the access driveway for the site.*
  - *The location of the proposed commercial crossovers and any associated tree removal works."…*

Condition 2 references the approved plans. Based on SLR's review of the plan set, none of the referenced plans illustrate the proposed or conditioned site access arrangement.

3.0 Purpose

The purpose of this advice is to consider the conditioned arrangement and evaluate a refined or modified interpretation of Condition 17, specifically the reference to the BAR treatment.

Accompanying concept plans prepared by Richmond+Ross are included in **Attachment A**.

4.0 Technical Consideration

4.1 Previously Submitted Technical Approach

The SLR TIA (Section 7.1) adopted the AGTM6-20 auxiliary turn warrants developed by Arndt, Troutbeck, Handley and Slattery (2006). The numerical warrants are based on research that quantified the threshold at which the crash reduction cost benefit of a higher-standard intersection treatment exceeded the construction cost over a prescribed design life.

SLR referenced these warrants for the subject development access as a deliberate conservative approach with the primary objective being to confirm that a channelised CHR(s) right turn treatment was not warranted.

The adoption of the 2006 warrants is very conservative and not strictly applicable in this instance for the following reasons:

- The warrants were developed specifically for road intersections, not site access driveways. This is evidenced by the AGTM6-20 statement "…not intended for direct application to accesses and driveways…" (AGTM6-20, Page 208).
- The warrants were developed specifically for greenfield locations, not brownfield locations. This is evidenced by the AGTM6-20 statement "The warrants are based on the construction of intersections on new roads (i.e., Greenfield sites). Therefore, their most appropriate application is to the selection of turn types for intersections on new roads." (AGTM6-20, Page 208)
- The subject fronting road and surrounding built environment are categorised as brownfield in accordance with Austroads AGRD4A-23, Page 146.

The SLR TIA finding …"it is recommended that a….Basic Right Turn [BAR] be provided at the access driveway" was more accurately intended to conclude <u>that a Channelised Right Turn CHR(s) arrangement was not warranted</u>.

It was not the intention of the author (undersigned as part of this advice) to recommend a BAR treatment explicitly in accordance with Austroads incorporating an overtaking shoulder or lane, but instead a 'basic' treatment.

4.2 Supplementary Evaluation

4.2.1 Additional Austroads Research

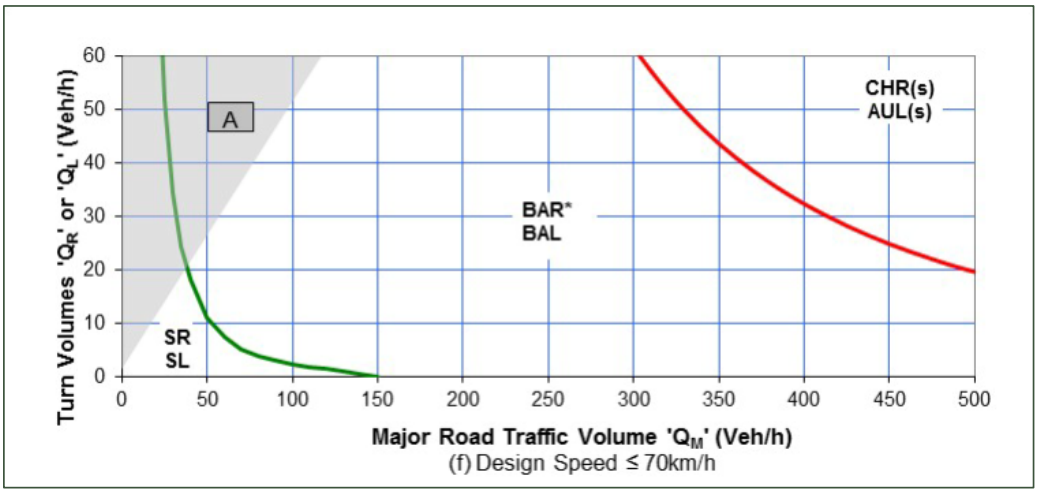
There has been additional research undertaken by Arndt, Gough and Sullivan[1] (2014) that expands upon the 2006 guidance documented in AGTM6-20. The additional research findings have since been adopted by some States as supplementary guidance to Austroads[2].

The expanded 2014 research addresses several limitations of the earlier guidance, including the specification of new warrants for:

- Lower speed environments with speed limits between 50km/h and 70km/h.
- Brownfield locations comprising "Simple Right" (SR) and "Simple Left" (SL) treatments.

The supplementary warrants applicable for brownfield locations with a 70km/h design speed (or lower) are reproduced in **Figure 1**.

Figure 1 Expanded Turn Warrants Arndt et.all 2014 (Figure 4A-A 4)



The SLR TIA adopted a peak hour traffic generation rate of 73vph for the subject fast-food development. Assuming 5% of trips travel to the site from the northeast, the right turning demand equates to approx. 2vph.

Disregarding the Section 4.1 statement fact that these warrants are "…not intended for direct application to accesses and driveways…", **Figure 1** shows that the through traffic flow would have to exceed 150vph for the BAR treatment threshold to be exceeded.

Existing through traffic volumes on the Sallys Corner Road development frontage were not surveyed as part of the SLR TIA but based on two site inspections undertaken in September 2022 and December 2022, it is forecast that the two-way traffic volume would be materially lower than 150 vph during peak development traffic generation periods.

[1] *Expanded warrants for unsignalised intersection turn treatments. Arndt, Gough and Sullivan (2015)*
[2] *Road Planning & Design Manual – Edition 2: Volume 3. Transport and Main Roads, November 2021*

4.2.2 Consistency with Nearby Development

The conditioned right-turn treatment for the subject fast-food development is equitable to the following left-turn treatments for existing nearby development:

- Left turn into Heatherbrae's Pie development. Based on Nearmap imagery, this development access does not incorporate a BAL arrangement.
- Left turn into the Hume Highway Service Centre development. Based on Nearmap imagery, this development access does not incorporate a BAL arrangement.

4.2.3 BAR Safety Implications

Based on a desktop safety review, SLR has identified that a BAR arrangement comprising an overtaking lane has the potential to introduce additional risk given the proximity to the existing left turn entry into the Heatherbrae's Pies development at 24 Sallys Corner Road.

As shown in **Figure 2**, there is a potential rear-end crash risk inherent with the BAR treatment, which can enable through vehicles to maintain full speed:

- Vehicle 1 props to turn right into the subject development site.
- Vehicle 2 indicates left to enter the Heatherbrae's Pie site while also overtaking Vehicle 1 using the wider pavement facilitated by a BAR treatment.
- Vehicle 3, following Vehicle 2, misinterprets the left turn indication as passing Vehicle 1 and fails to recognise that Vehicle 3 actually intends to slow and turn left.

Figure 2 Potential BAR Safety Issues (Rear-End Crash Risk)

Regardless of the infrequent nature of this occurrence, it is avoided with a Simple Right treatment whereby any movement following Vehicle 1 must slow down and wait for them to complete the right turn. The very low demands (turning and through movements) and the resulting near-zero delays mean this arrangement is reasonable.

4.2.4 Richmond+Ross Concept Plan

The Richmond+Ross concept plan (**Attachment A**) has been reviewed by SLR. The Simple Right (SR) arrangement is considered sufficient and consistent with the original and supplementary assessment findings. The arrangement would enable safe and efficient movement.

5.0 Summary and Conclusions

SLR Consulting Australia Pty Ltd (**SLR**) has been engaged to provide traffic engineering advice with respect to the above development matter. This advice considers the proposed refinement or modification to Condition 17, specifically the condition reference to the BAR site access treatment.

Accompanying concept plans of the proposed site access arrangement prepared by Richmond+Ross are included in **Attachment A**.

- SLR prepared a Traffic Impact Assessment (**TIA**), which accompanied the subject development application. Section 7.1 of the TIA recommended a BAR/BAL site access intersection arrangement based on the turn warrant assessment process outlined in the Austroads Guide to Traffic (AGTM6-20).
- Condition 17 of the Notice of Determination requires "A signage and line marking plan showing BAR/BAL intersection treatment at the access driveway for the site."
- SLR understand that the conditioned BAR treatment is a direct reference to the TIA.
- The SLR finding …"it is recommended that a….Basic Right Turn [BAR] be provided at the access driveway" was more accurately intended to conclude that a Channelised Right Turn arrangement is not warranted.
- It was not the intention of the SLR author (undersigned as part of this advice), to recommend a BAR treatment explicitly in accordance with Austroads, but instead a basic treatment like the Simple Right (SR) arrangement.
- The strict adoption of the 2006 (or 2014) warrants is not explicitly valid in this particular case (not greenfield, not an intersection of roads).
- Expanded warrants were prepared in 2014, including guidance for Simple Right (SR) treatments in brownfield locations where turning demands are very low. The development site is more akin to this example, irrespective of the warrants not being directly relevant to site access.
- The forecast very low demand for right-turning traffic, in combination with the modified speed environment, good sight distance, and proximity to other site access does not warrant a dedicated auxiliary right-turn traffic lane.
- Based on the original and supplementary technical consideration of the matter, SLR is of the professional view that a Simple Right arrangement like that shown on the Richmond+Ross concept (**Attachment A)** is sufficient and consistent with the TIA findings and would enable safe and efficient movement.
- If required, Condition 17 could be revised (or interpreted) as follows:

  Condition 17 Section 138 Roads Act 1993 Approval…

  - *…The plan shall include:*
  - *A signage and line marking plan showing SR/BAL intersection treatment at the access driveway for the site.*

Yours sincerely,

Kris Stone,
Principal – Transport Advisory

Appendix D SLR TIA Report for KFC Development

KENTUCKY FRIED CHICKEN

Fast Food Development with Drive Through
61 Sallys Corner Road, Exeter
Traffic Impact Assessment

Prepared for:

Southern Restaurants Trust c/- Richmond+Ross
Level 1, 38 Willoughby Road
Crows Nest NSW 2065

SLR Ref: 631.31088.00000-R01
Version No: -v1.0
December 2022

PREPARED BY

SLR Consulting Australia Pty Ltd
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Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street
North Sydney NSW 2060 Australia
T: +61 2 9427 8100
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Southern Restaurants Trust c/- Richmond+Ross (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
631.31088.00000-R01-v1.0	16 December 2022	Kanella Dimos	Charlie Seventekin	Kris Stone

EXECUTIVE SUMMARY

SLR has been commissioned by Richmond and Ross to prepare a Traffic Impact Assessment for the proposed fast-food (Kentucky Fried Chicken) development located at 61 Sally's Corner Road, Exeter. The site is also formally known as Lot 101 in DP 1205383.

Plans for the development have been prepared by Richmond and Ross and is included at Appendix A.

Based on the analysis and assessment conducted as part of this TIA, the following conclusions have been made:

- The proposed vehicular access arrangements are considered compliant on the following basis:
  - The entry / exit points are consistent with Wingecarribee DCP 2010. The proposed development considers one driveway crossover on Sallys Corner Road and two internal connections to the proposed neighbouring GYG;
  - The entry / exit points can accommodate the anticipated development design vehicles and gradients are designed in accordance with AS2890.1, AS2890.2 and AS2890.6; and
  - The entry / exit points provide sufficient sight distances to other external movements.
- The trafficable design including access, circulation, car parking and servicing is appropriate and consistent with the applicable provisions of the AS2890 suite of Australian Standards;
- The proposed 31 car parking spaces are consistent with TfNSW Guide 2002 and the Wingecarribee DCP 2010;
- The proposed development includes sufficient parking for persons with a disability and complies with BCA;
- The proposed development includes provision for one rigid vehicle (8.8m long medium rigid vehicle or 10.2m long rear-loading refuse collection vehicle) to undertake loading, maintenance and refuse collection activities; and
- The publicly available crash dataset does not indicate any recurring crash type or theme that isn't typical of a rural environment or that would preclude development or warrant safety mitigations.

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APPENDICES

Appendix A Development Plans
Appendix B Planning Portal Property Report
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Appendix D Swept Path Assessments

1 Introduction

1.1 Context

SLR Consulting Pty Ltd (SLR) has been commissioned by Southern Restaurants Trust to prepare a Traffic Impact Assessment (TIA) report for the proposed Kentucky Fried Chicken (KFC) fast-food development located at 61 Sally's Corner Road, Exeter.

Plans for the development proposal are prepared by Richmond and Ross. A copy of the development plans is included at Appendix A. The property report generated by the NSW planning portal[1] is provided at Appendix B.

1.2 Application

This development application (DA) seeks approval for the development of a new KFC fast-food development with on-site seating (internal only) and drive-through facilities located on a pad site supporting the larger Sutton Forest Highway Service Centre masterplan area, which is readily approved. The site is currently a free standing greenfield with no dwellings.

It is understood that the approved masterplan provides for up to six fast food operators, a hotel and a caravan park along with other ancillary uses. Hence, the proposed KFC development represents only a small part of the approved uses. For completeness, Appendix C of this report provides the following documents:

- Wingecarribbee Shire Council's consent (2015) for Highway Service Centre Masterplan;
- Approved engineering drawings (2011); and
- Masterplan traffic assessment dated (2009).

The proposed development will provide on-site car parking for customers and a loading bay for deliveries, servicing and refuse collection.

At the time of writing, there is another development application for a fast-food facility lodged with Wingecarribee Shire Council for the neighbouring lot. It is understood that this application is for the development of a Guzman Y Gomez (GYG) with a drive through. It is worth noting that the KFC and proposed GYG will have internal connections for the vehicular and pedestrian movements. More information about the connectivity of these two lots is provided in this report.

1.3 Assessment Scope

This TIA report assesses the consistency of the proposed development with Council and State planning requirements and evaluates the impacts of the proposed development on the surrounding transport network.

This TIA identifies the transport infrastructure required to support the development, and provides an assessment of the traffic and transport specific aspects of the development against the requirements of the following relevant authorities:

- City of Wingecarribee Shire Council (WSC); and
- Transport for New South Wales (TfNSW).

[1] www.planningportal.nsw.gov.au

2 Existing Conditions Appraisal

2.1 Subject Site

The subject site is located at 61 Sallys Corner Road, Exeter. The land is formally known as Lot 101 on DP1205383 is within Zone C3 (Environmental Management) of the Wingecarribee Local Environmental Plan (LEP) 2010.

The site is bound by Sallys Corner Road to the south and high-pressure gas pipeline (easement) to the west, vacant land to the north and future GYG fast-food development to the east. At the time of writing, the lodgement of a DA for the neighbouring GYG development had taken place. This separate DA forms a part of the greater Sutton Forest Highway Service Centre masterplan area, sharing:

- The eastern boundary and two internal bi-directional vehicle crossovers.

This arrangement will allow for the efficient and safe circulation of traffic across the centre. For conservatism, this report has been prepared with consideration of the GYG development. In its current form, the site has one formal vehicular crossover; located at the site's Sallys Corner Road frontage and as far as possible from the driveway crossover of the future GYG site. The site location in the regional context is shown in Figure 1.

Figure 1 Site Location – Regional Context

The site location in the local context and the existing access arrangements are shown in Figure 2.

Figure 2 Site Location – Local Context

2.2 Surrounding Road Network

Details of the key roads surrounding the subject site are provided in Table 1.

Table 1 Key Roads

Road Name	Classification	Authority	Existing Form	Posted Speed
Hume Highway	State Road (No: 167)	TfNSW	Two traffic lanes in each direction, divided with a median, rural cross-section. Stopping or parking is not permitted other than emergencies.	110 km/h
Sallys Corner Road	Local Road	Council	One traffic lane in each direction, partially divided, rural cross-section. Informal parking is possible in the verge in some sections.	60 km/h and 90 km/h
Darling Lane	Local Road	Council	One traffic lane in each direction, undivided, rural cross-section, partially sealed. Informal parking is possible in the verge.	Unposted (Default 50 km/h)

2.3 Crash History

In order to highlight any safety deficiencies in the surrounding road network in proximity to the subject site, crash data has been extracted from TfNSW Centre for Road Safety website[2]. Crashes for the most recent five-year period between 2017 and 2021 (inclusive) were evaluated. The locations of the reported crashes are illustrated in Figure 3 with details and RUM codes summarised in Table 2.

Figure 3 Crash Locations

Table 2 Details of Reported Crashes (2017 – 2021) near the Proposed Development

Location	Crash ID	Year	Severity	Rum Code	Description
Hume Hwy (Northbound)	1131377	2017	Non-casualty (towaway)	66	Object on road
Hume Hwy Northbound Exit	1155662	2017	Moderate Injury	85	Off rt/lft bnd => obj
Hume Hwy Northbound Exit	1259073	2021	Non-casualty (towaway)	71	Off rt/lft bnd => obj
Hume Highway/Sallys Corner Road	1208715	2019	Moderate Injury	85	Off rt/lft bnd => obj

As shown in Table 2, there were a total of four reported crashes in the vicinity of the site in the five-year assessment period, with three crashes occurring in the highway. Two of these reported crashes resulted in moderate injuries and there were no reported fatal crashes within the entire five-year period.

[2] https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4

Based on the desktop evaluation of the crash record, there appears to be no singular or recurring road safety issue that would preclude the development or be materially exacerbated by the development.

2.4 Road Network Planning

In order to determine the location and nature of any planned upgrades of the surrounding road network, SLR carried out a review of the publicly available material. This review indicated that there are no major transport infrastructure upgrades planned by TfNSW and Council in the surrounds of the study area.

3 Development Overview

3.1 Proposed Development

Based on the development plans prepared by Richmond and Ross, the proposed Guzman Y Gomez fast-food development (restaurant) will comprise a GFA of 354 sqm.

The proposal also includes the following:

- External loading bay and internal waste storage area;
- Dual lane drive-through facility and supporting signage;
- Construction of a car park comprising 30 regular parking spaces, one PWD[3] parking space and one loading space; and
- Landscaping throughout the site.

The proposed land use and yields associated with the development are described in Table 3.

Table 3 Development Summary

Development Component	Yield / Number of
Fast Food	354 sqm GFA
Car Parking Spaces	31 (inclusive of one PWD space)
Drive Through Lane Capacity (After Ordering)	13
Drive Through Lane Capacity (Before Ordering)	2 in the drive through, 6 more in the car park
Drive Through Waiting Bays	0
Total Drive Through Capacity	21/23, considering the additional queuing space between the first car parking aisle and end of drive-through area
Bicycle Parking Spaces	0
Loading / Servicing / Refuse Collection Bay	1

3.2 Site Access and Car Parking

Vehicular access to the development is proposed via the following arrangements:

- One bi-directional access driveway crossover on Sallys Corner Road to the south-west of the site; and
- Two bi-directional internal connections to the proposed neighbouring GYG development.

Additional details for the vehicular access locations are provided below:

South-Western Access Driveway:

This driveway is approx. 8.00m wide at its narrowest point and will provide the main access to the site. Delivery and refuse collection vehicles (RCVs) will only use this driveway however light vehicles can also use the internal connections to/ from the neighbouring GYG site.

[3] PWD: persons with a disability.

Due to the lack of speed data from Sally's Corner Road, the following posted and design speed information was adopted by SLR to determine the Safe Intersection Sight Distance (SISD) assessment. The access driveway is located in the 60 km/h zone; however, it is also near where the speed limit transitions to 60 km/h from 90 km/h (eastbound) or 90km/h to 60km/h (westbound).

Based on both fast-food development applications (KFC and GYG), and the other nearby fast-food development; it is considered reasonable that the nature of the road is increasingly urban compared to the predominate rural arrangement further to the south. Given the cumulative development, it would be reasonable to consider a modification (relocation) of the existing posited speed limit transition approximately 200m to the east in line with the modified post-development urban/rural 'interface'. This would result in the current 60km/h posted speed limit being applicable along the entire frontage and driver speeds would accordingly be lower, in the order of 60-70km/h (posted-posted plus 10km/h).

Based on the proposed posted speed limit of 60 km/h (design speed of 70 km/h), the required SISD was calculated for the access driveway crossover as per Austroads Guide to Road Design, Part 4A, Section 3.2.2. The formula applied is illustrated in Equation 1.

Equation 1 SISD Formula

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where

SISD	=	safe intersection sight distance (m)
D_T	=	decision time (sec) = observation time (3 sec) + reaction time (sec) – refer to *AGRD Part 3* (Austroads 2016b) for a guide to values
V	=	operating (85th percentile) speed (km/h)
d	=	coefficient of deceleration – refer to Table 3.3 and *AGRD Part 3* for a guide to values
a	=	longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)

According to Austroads Guidelines, the required SISD for 70 km/h design speed is provided in Table 4 below.

Table 4 Access Location SISD and Parameters

Approach	D_T (s) [1]	V (km/h)	d [2]	a (%) [3]	SISD (m)
West	5	70	0.36	-1.8	153.63
East	5	70	0.36	3.3	146.31

[1] D_T = 3 seconds observation time + 2 seconds reaction time *(AGRD Part 4A table 5.2)*
[2] d = 0.36 *'for the 90th percentile value for breaking on wet, sealed roads.' (AGRD Part 4A table 5.3)*
[3] a% was obtained from NearMap topographical data

SLR overlaid the development plans on high-resolution NearMap aerials in AutoCAD and reviewed the horizontal and vertical geometry of Sally's Corner Road. It was identified that, under the existing conditions, a SISD of 155m can be achieved for the vehicles travelling in the westbound direction (east approach). SISD of 200m+ can also be achieved for the eastbound direction (west approach), as shown in Figure 4. However, this sight distance should be confirmed by site survey.

Figure 4 Sight Distances

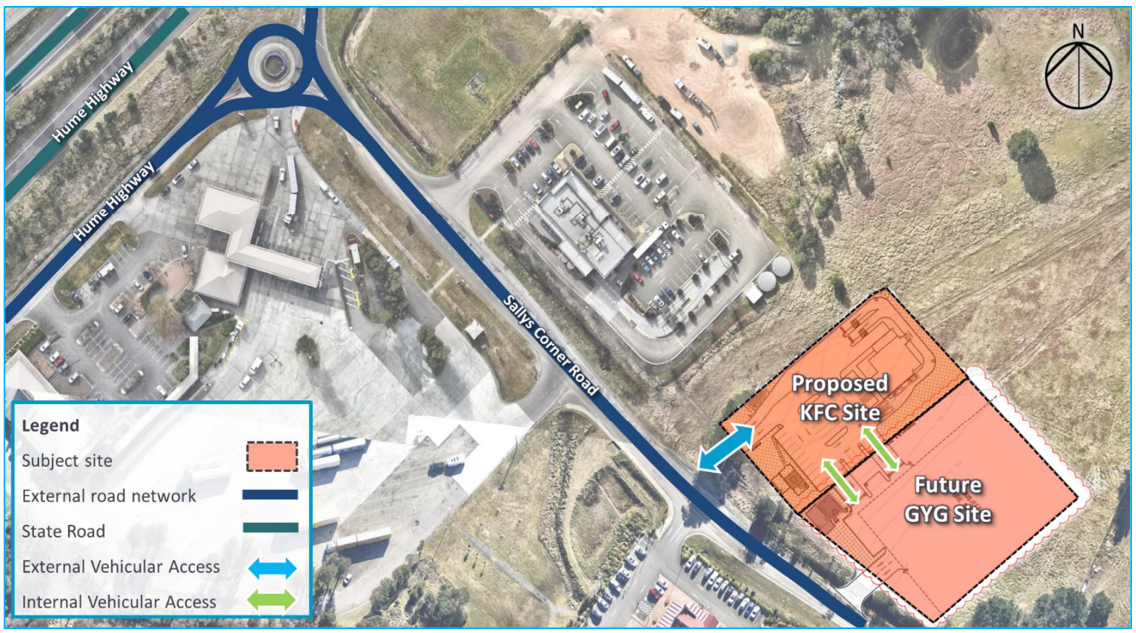
It should also be noted that the gradients of this driveway are provided in the plans and SLR confirms that gradients (less steep than 1 in 53) comply with AS2890.2.

Internal Connections to/ from GYG:

There are two internal connections to/ from the neighbouring proposed GYG site where both connections are bi-directional. The southern connection is 6.6m wide and the northern connection is 7.0m wide.

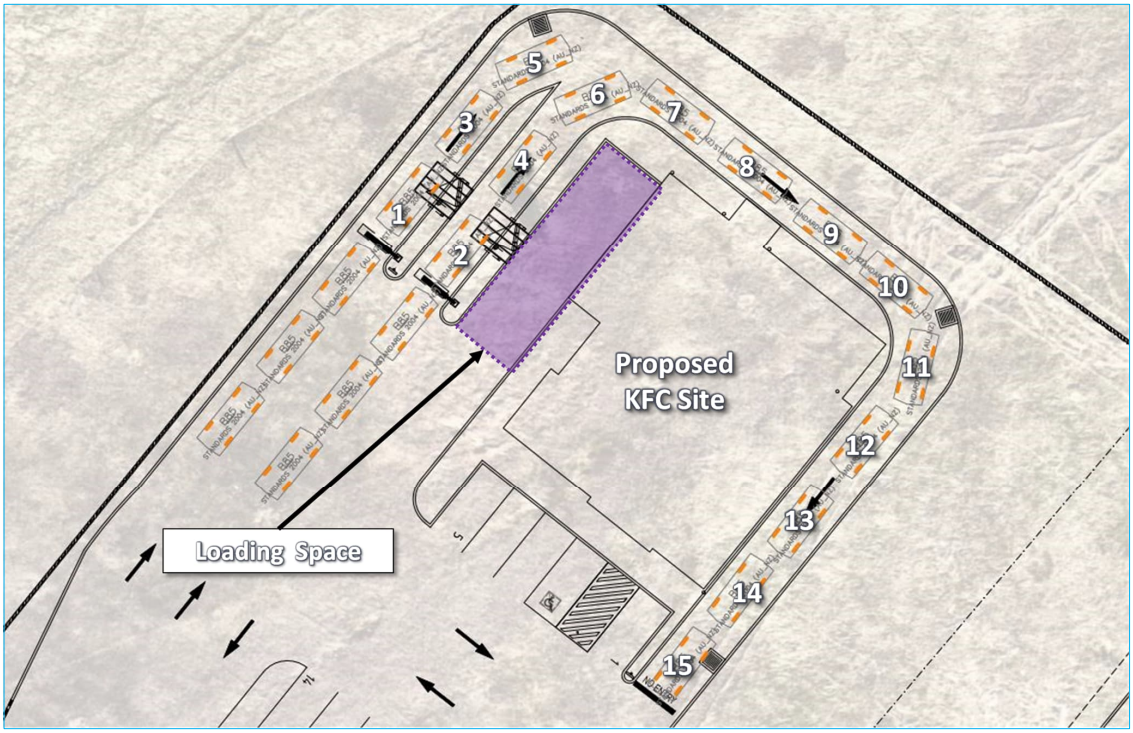
To summarise the above, the proposed site access arrangements are illustrated in Figure 5.

Figure 5 Proposed Site Access Arrangements



A total of 31 car parking spaces are proposed within the site, inclusive of one space for PWD. There is also sufficient queuing space for 15 vehicles within the drive-through facility and an additional six vehicles in the car parking area which will not impact the traffic circulation, as shown in Figure 6.

Figure 6 Drive-Through Queuing Provisions



A loading zone space will also be dedicated to the proposed 10.2m long RCVs in order to undertake the delivery, maintenance and refuse collection activities. More information on this is provided in Section 3.3.

3.3 Servicing

The access driveway crossover located on Sallys Corner Road has been designed to accommodate the 10.2m long rear-loading RCVs (See swept path assessments in Appendix C). This will enable convenient service vehicle access (for deliveries / maintenance vehicles) as well as convenient customer access from Sallys Corner Road.

There is one loading space dedicated to 10.2m long RCVs adjacent to the proposed storage and waste areas to enable safe and efficient loading/ unloading activities. Waste enclosure will be located at the rear of the loading space so that refuse can be collected efficiently at the loading bay, which is 4.5m wide x approx. 16m long.

The concept design has been developed so as to minimise the reversing manoeuvres of service vehicles[4] and RCVs while approaching/ departing from the loading space. Swept path assessments in Appendix C indicates that the MRVs/RCVs will reverse into the loading bay and exit in a forward gear with only a single movement in each direction.

[4] Typically, 8.8m long Medium Rigid Vehicle (MRV).

4 Design Considerations

4.1 Overview

A review of the proposed internal traffic arrangements, as shown in the development plan included in Appendix A, was undertaken against the following relevant documents:

- Wingecarribee DCP 2010 - Part B4.9: Design of Off-Street Parking Facilities;
- RTA Guide to Traffic Generating Developments – Section 5.8: Refreshments;
- Australian Standards for Parking facilities Part 1: Off-street car parking (AS2890.1);
- Australian Standards for Parking facilities Part 2: Off-Street Commercial Vehicle Facilities (AS2890.2); and
- Australian Standards for Parking facilities Part 6: Off-street parking for people with disabilities (AS2890.6).

4.2 Statutory Requirements

4.2.1 Site Access and Parking

SLR has reviewed Part B4 of Wingecarribee DCP 2010 and understood that Council does not specify the dimensional details of car parks for fast-food developments and refers to AS2890 suite.

However, Council has the following general statutory requirements in relation to traffic- and parking-specific matters:

- *"To ensure that adequate off-street parking is provided in conjunction with development in order to discourage the use of streets for the parking of vehicles associated with additional traffic generated by new developments;*
- *To provide communal public car parking in appropriate areas, funded from developer contributions, where the development cannot accommodate adequate on-site parking, and/or where Council chooses to aggregate parking into a centralised location(s);*
- *To ensure that car parking areas are safe and functional;*
- *To ensure that parking supply is equitable and includes at least the minimum number of accessible spaces in accordance with AS2890 series;*
- *To ensure that car parking areas are visually attractive; and*
- *To ensure that vehicular access points to the site are located to minimise danger or disruption to vehicles and pedestrians on the public street system."*

Proposed development plans satisfy the requirements above. In addition, the proposed development's access arrangements provide adequate separation from intersections. All driveways have a width larger than the minimum requirements of AS2890.1 and have been checked with swept path assessments, using AutoTURN.

Figure 7 provides an overview of the adopted signage as part of the concept design development.

Figure 7 Proposed Signage within the Development

The proposed access driveway crossover designs comply with the requirements specified in AS2890.1 and consideration has been given to the proposed 10.2m long RCV as a part of AS2890.2.

The all-movements driveway crossover on Sallys Corner Road (south-west access) is proposed to accommodate predominantly light vehicle and also MRV/ RCV traffic approaching from Sallys Corner Road travelling in the eastbound and westbound directions. The proposed development will not be frequented by any vehicle larger than a 10.2m long RCV.

Swept path assessments have been prepared using the largest design vehicle for each access driveway mentioned above. These swept paths assessments are provided in Appendix C.

4.2.2 Car Parking Provisions

The minimum car parking provisions for a take-away food and drink premise are specified in Part B4.9 of Wingecarribee DCP 2010. This has also been compared to the parking provisions outlined in the RTA Guide to Traffic Generating Developments 2002.

The development plans (Appendix A) indicate that the site will have 50 internal seats. For ease of reference, the required parking rates by both sources have been included in Table 5.

Table 5 Minimum Car Parking Requirements

Code	Land Use Description	Yield	Car Parking Rate	Requirement
Wingecarribee DCP 2010	Fast Food / Take Away Food Outlets	50 seats (internal)	1 space per 2 seats (internal)	25
NSW RTA Guide to Traffic Generating Developments 2002	Developments with on-site seating and drive-through facilities	50 seats (internal)	1 space per 2 seats (internal)	25
Average				*25 spaces*

As shown in the development plan in Appendix A, the development will provide 31 car parking spaces, inclusive of one PWD parking space. In addition to the 31 permanent parking spaces, it is important to note that a queuing space for 15 vehicles (4.91m long B85 design vehicles) from the pick-up point.

The NSW RTA Guide 2002 requires the following provisions at drive-through facilities:

- An exclusive area for queuing of cars for a drive-through facility is required (queue length of 8 cars, measured from pick-up point); - *proposed development provides queuing space for 15 cars.*

- There should also be a minimum of four car spaces for cars queued from ordering point. *- proposed development provides at least 8 cars' length of queuing space from the ordering point.*

Based on the above, in SLR's traffic engineering view, the proposed parking and queuing provisions are consistent with the most relevant statutory requirements as set out in Table 5.

4.2.3 PWD Car Parking Provision

The Building Code of Australia (BCA) stipulates the PWD car parking requirements based on the building classification. The building proposed as part of the development is categorised as a Class 6 building by the BCA, and as such, requires one PWD space for every 50 car parking spaces or part thereof (for up to 1,000 parking spaces).

The site plan for the proposed development indicates that one accessible car parking space is proposed immediately in-front of the proposed development. This provision accords with the BCA requirements.

4.2.4 Internal Traffic Arrangements

The design of the proposed car parking and circulation elements has been assessed against the requirements within AS2890.1, AS2890.2 and AS2890.6. This assessment is summarised in Table 6.

Table 6 Car Park and Circulation Compliance Review

Component	AS2890.1, AS2890.2 or AS2890.6 Requirement	Provision	Compliant
Parking Spaces	2.6m x 5.4m with 6.6m wide aisle (Class 3A)	2.6m x 5.4m with 6.6m wide aisle	✔
PWD Parking Spaces	2.4m x 5.4m space plus 2.4m x 5.4m adjacent area	2.6m x 5.4m space plus 2.6m x 5.4m adjacent area	✔
Blind Aisle End Space	Aisle length extended by 1m	No blind aisles.	✔
Parking Spaces Next to Walls	300mm parking space extension.	No high kerbs or walls next to parking spaces.	✔
Access Driveway Width	6.0m (Class 3A)	8.0m+ wide	✔
Parking Module Gradients	1:40 (2.5%) maximum – any direction	Not provided in concept plans but must comply in the detailed design drawings	✔
Driveway Gradients	Transitions: 1 in 16 for a minimum 7.0m Remainder: 1 in 6.5 maximum.	Less steep than 1 in 50.	✔

As identified in Table 6 and demonstrated by plans/ swept path assessments provided in the appendices, the angled parking bays, PWD parking bays, aisle widths and circulating roadway widths exceed the spatial requirements of AS2890.1, AS2890.2 and AS2890.6.

5 Servicing Considerations

The current Wingecarribee DCP 2010 does not outline any specific service vehicle requirements for the proposed fast-food development however, 8.8m long MRVs or 10.2m long rear-loading RCVs are typically accepted as service vehicles for these types of development.

Council's generic comments on servicing considerations are summarised in Table 7.

Table 7 Loading and Unloading Facilities

Performance Criteria	Acceptable Solutions
Loading and Unloading Facilities	
All business developments where future tenants will require regular deliveries of goods and the removal of waste and resource recovery material must ensure that loading facilities are adequate for the realistic needs of the proposed service vehicles. In the past, the servicing of retail developments by large trucks has often caused considerable traffic disruption with further potential danger to pedestrians.	Based on SLR's experience on other fast-food developments, SLR is of the view that the proposed servicing and refuse collection arrangements will be sufficient for the needs of the proposed development.
Full details of anticipated vehicle sizes, volumes and frequency of delivery and other service vehicles must be supplied with the development application. These estimates, particularly vehicle sizes, must be realistic and based on established averages for the range of businesses likely to occur in the development.	Although the frequency of deliveries is not known at the time of writing, it is proposed that the site will be serviced by 8.8m long MRVs for maintenance & deliveries and 10.2m long rear-loading RCVs for refuse collection. The proposed loading bay is 4.50m wide x 16.0m long.
AUSTROADS Design Vehicles and Turning Templates must be used for all vehicle movements on, or on to, public roads.	Please see the swept path assessments in Appendix C, which are undertaken with AutoTURN.
The turning templates from Australian Standard AS2890.1 and AS2890.2 must be used for on-site manoeuvring, including reversing manoeuvres and vertical clearance requirements.	SLR uses AutoTURN software which is an add-on for AutoCAD software. AutoTURN produces swept path assessments that are consistent with the requirements of AS2890.1 and AS2890.2.

Based on the above, it is concluded that the proposed loading arrangements are consistent with Wingecarribee DCP 2010.

6 Active and Public Transport Considerations

Due to the rural nature of the study area, there is no active transport infrastructure in the vicinity of the proposed development. Based on a review of publicly available material, it is also identified that there are currently no public transport opportunities in the vicinity of the site.

7 Operational Assessment

As discussed in Section 3.1, the proposed KFC development is a fast-food restaurant a drive-through facility. The development will have a capacity of 50 internal seats.

Consideration has been given to the following two documents to identify an anticipated traffic generating rate for the proposed KFC development:

- *RTA Guide to Traffic Generating Developments (2002)*; and
- *Bitzios Consulting: Trip Generation and Parking Demand Surveys of Fast-Food Outlets Analysis Report (2016) commissioned by Roads and Maritime Services (RMS).*

TfNSW (then Roads and Maritime Services) commissioned Bitzios Consulting in 2016 to review any changes in traffic and parking impacts of fast-food outlets given the latest data was collected in 2002 (RTA Guide to Traffic Generating Developments). This study surveyed several KFC developments and recommended a trip generation rate of *73 PM network peak hour trips*.

KFCs do not open early enough to provide an AM peak hour traffic generation rate and therefore there was no consideration of an AM peak in this study. The 2016 Bitzios report did consider weekends; however, a recommended rate or discussions was not made. Based on this, SLR reviewed the collected survey data and identified that on average, the weekend midday peak hour trip generation was approximately 5% less than the weekday PM peak trip generation. However, for conservativeness, 100% of weekday PM peak trip generation was also adopted for the purposes of Saturday midday peak hour analysis.

To summarise the above discussions, the following trip generation rates were adopted:

- Weekday PM Peak Hours: 73 vph; and
- Saturday Midday Peak Hour: 73 vph.

The following assumptions regarding the development related traffic should also be noted:

- Directional Split: 50% IN and 50% OUT;
- Trip Distribution: 45% from/to southbound travel along Hume Highway, 45% from/to northbound travel along Hume Highway and 10% from/to Exeter township on Sallys Corner Road.

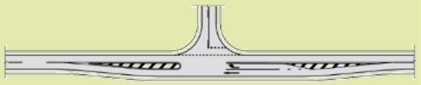
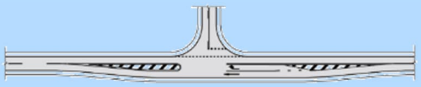
It is also anticipated that almost 100% of the customers approaching the site from Hume Highway will be passing trade (drop-in traffic) and not new trips. Therefore, no new trips are anticipated to take place along Hume Highway.

7.1 Turn Warrant Assessments

Turn warrant assessments have been undertaken to establish the desirable form of the proposed Sally's Corner Road / Site Access in accordance with the industry research summarised within the Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (AGTM6-20).

The warrants provide guidance where turning lanes should be provided based on design traffic volumes. A pictorial description of the various turn treatments considered is provided in Table 8 and Figure 8 to assist with reader interpretation of this assessment.

Table 8 Turn Treatment Types

Acronym	Right Turn Treatment	Left Turn Treatment
BAR or BAL	 BAR (Basic Right Turn)	 BAL (Basic Left Turn)
CHR(S) or AUL(S)	 CHR(S) (Channelised Right Turn [Short])	 AUL(S) (Auxiliary Left Turn [Short])
CHR or AUL/CHL	 CHR (Channelised Right Turn)	 CHL (Channelised Left Turn)  AUL (Auxiliary Left Turn)

* Source: AGTM6-20

Figure 8 Turn Treatment Types and Volume Criteria

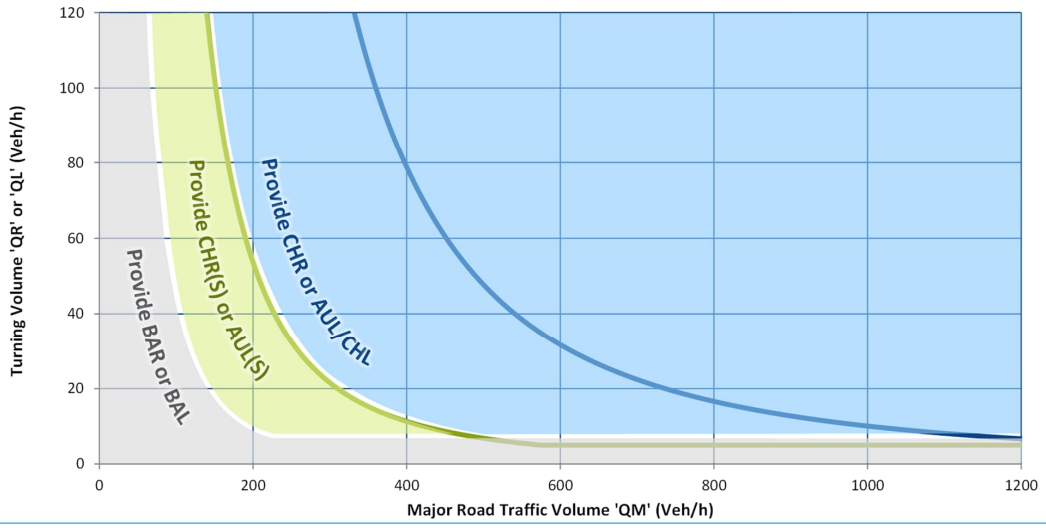


Figure 9 below illustrates a worse-case[5] turn warrant assessment undertaken for the Sally's Corner Road / Site Access. Due to the absence of traffic volume information from Sally's Corner Road, SLR identified a threshold for the through traffic where an Auxiliary Left Turn (AUL) or Channelised Right Turn (CHR-S) would be warranted.

The assessment was based on the following criteria:

- Design Domain – Normal Design Domain;
- Road configuration – two-lane two-way;
- Design Year – 10 years;
- Design speed – less than or equal to 70km/h (based on 70 km/h design speed); and
- Left turn splitter island – No.

Figure 9 Turn Warrant Assessment (KFC specific trips only)

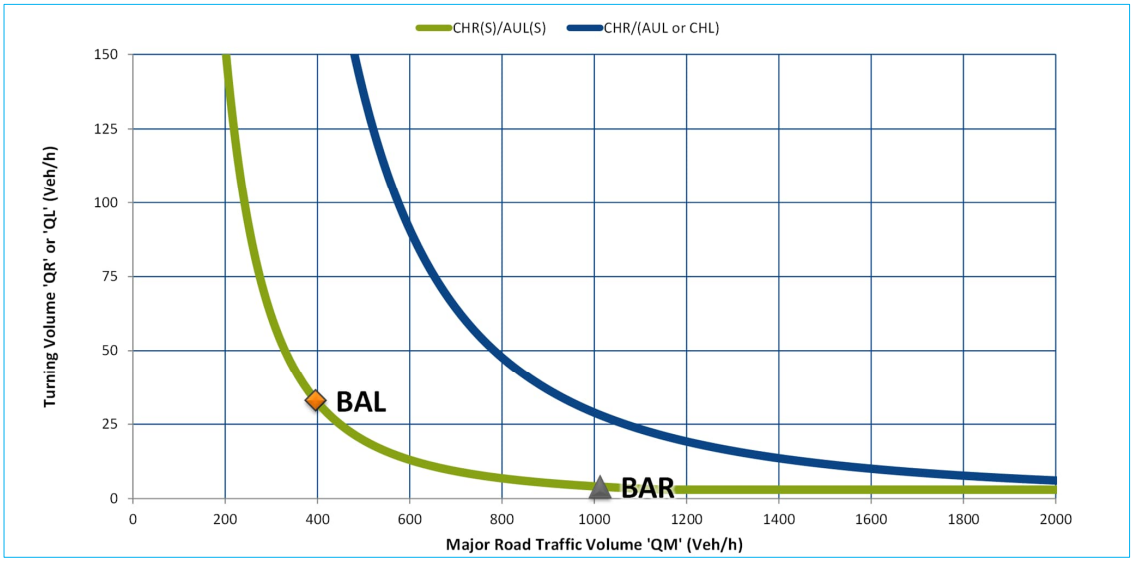


Figure 9 identifies that through traffic in the eastbound direction needed to be 396 vehicles per hour (vph) to trigger a need for an AUL treatment and 584 vph in the westbound direction to trigger a need for a CHR(S) treatment, based on the strict interpretation of the Austroads warrants.

Based on a site inspection that was undertaken in September 2022, traffic volumes appeared to be much lower than 396 vph in the eastbound direction and 584 vph in the westbound direction. Based on this, it is recommended that a Basic Left Turn [BAL] and Basic Right Turn [BAR] be provided at the access driveway.

[5] Where through volumes assumed to be 396 vehicles per hour in the eastbound direction and 584 vph in the westbound direction.

An additional turn warrant assessment was undertaken to illustrate a scenario assuming that the neighbouring GYG development prohibits right-turn entry movements from Sally's Corner Road (westbound travel). This assessment assumed that all 'right in' traffic generated by the neighbouring GYG utilised KFC's access driveway crossover. These vehicles would then access the GYG facility via either of the two internal connections from the KFC site. It was assumed that the GYG also generated 73 trips (in and out) in the peak hour, as it was the highest volume surveyed in the Bitzios Consulting 2016 report (refer to Section 7). The same directional the trip distribution assumptions adopted for KFC were applied to the GYG:

- Directional Split: 50% IN and 50% OUT; and
- Trip Distribution: 45% from/to southbound travel along Hume Highway, 45% from/to northbound travel along Hume Highway and 10% from/to Exeter township on Sally's Corner Road.

Therefore, it was identified that four additional vehicles along Sally's Corner Road would utilise the right-turn entry movement to access the GYG development via the KFC driveway within the peak hour.

Figure 10 Turn Warrant Assessment (KFC and GYG specific trips)

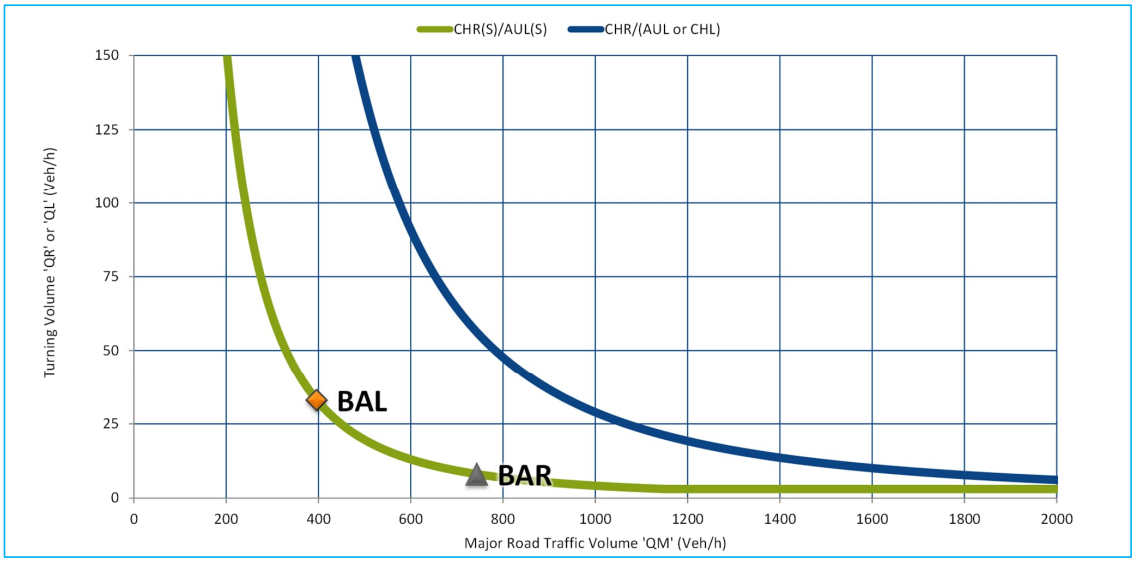


Figure 10 identifies that through traffic in the eastbound direction needed to be 315 vehicles per hour (vph) to trigger a need for an AUL treatment and 396 vph in the westbound direction to trigger a need for a CHR(S) treatment, based on the strict interpretation of the Austroads warrants.

Based on a site inspection that was undertaken in September 2022, traffic volumes appeared to be much lower than 396 vph in the eastbound direction and 315 vph in the westbound direction. Based on this, it is recommended that a Basic Left Turn [BAL] and Basic Right Turn [BAR] be provided at the access driveway.

8 Conclusions and Summary

SLR has been commissioned by Richmond and Ross to prepare a Traffic Impact Assessment for the proposed fast-food (Kentucky Fried Chicken) development located at 61 Sally's Corner Road, Exeter. The site is also formally known as Lot 101 in DP 1205383.

Plans for the development have been prepared by Richmond and Ross and is included at Appendix A.

Based on the analysis and assessment conducted as part of this TIA, the following conclusions have been made:

- The proposed vehicular access arrangements are considered compliant on the following basis:
  - The entry / exit points are consistent with Wingecarribee DCP 2010. The proposed development considers one driveway crossover on Sallys Corner Road and two internal connections to the proposed neighbouring GYG;
  - The entry / exit points can accommodate the anticipated development design vehicles and gradients are designed in accordance with AS2890.1, AS2890.2 and AS2890.6; and
  - The entry / exit points provide sufficient sight distances to other external movements.
- The trafficable design including access, circulation, car parking and servicing is appropriate and consistent with the applicable provisions of the AS2890 suite of Australian Standards;
- The proposed 31 car parking spaces are consistent with TfNSW Guide 2002 and the Wingecarribee DCP 2010;
- The proposed development includes sufficient parking for persons with a disability and complies with BCA;
- The proposed development includes provision for one rigid vehicle (8.8m long medium rigid vehicle or 10.2m long rear-loading refuse collection vehicle) to undertake loading, maintenance and refuse collection activities; and
- The publicly available crash dataset does not indicate any recurring crash type or theme that isn't typical of a rural environment or that would preclude development or warrant safety mitigations.

Appendix E SLR TIA Report for GYG Development

GUZMAN Y GOMEZ SUTTON FOREST

Fast Food Development with Drive Through
61 Sallys Corner Road, Exeter
Traffic Impact Assessment

Prepared for:

Guzman Y Gomez Pty Limited
Level 2, 64-76 Kippax Street,
Surry Hills, NSW 2010

SLR Ref: 631.30756.00000-R01
Version No: -v1.1
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Guzman Y Gomez Pty Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
631.30756.00000-R01-v1.1	9 November 2022	Semini Hettigoda / Kanella Dimos	Charlie Seventekin	Kris Stone

EXECUTIVE SUMMARY

SLR has been commissioned by Guzman Y Gomez to prepare a Traffic Impact Assessment for the proposed fast-food (Guzman Y Gomez) development located at 61 Sallys Corner Road, Exeter. The site is also formally known as Lot 101 in DP 1205383.

Plans for the development have been prepared by Richmond and Ross and is included at **Appendix A**.

This DA seeks approval for the development of a new fast-food development with on-site seating and drive-through facilities. The proposed development will provide on-site car parking for the customers and a loading zone for deliveries, servicing and refuse collection.

Based on the analysis and assessment conducted as part of this TIA, the following conclusions have been made:

- The proposed vehicular access arrangements are considered reasonable on the following basis:
  - The entry / exit points are generally consistent with Wingecarribbee DCP 2010. The proposed development considers one driveway crossover on Sallys Corner Road and two internal connections to the proposed neighbouring KFC;
  - The entry / exit points can accommodate the anticipated development design vehicles and gradients will be designed in accordance with AS2890.1, AS2890.2 and AS2890.6; and
  - The entry / exit points provide for reasonable sight distance to other external movements.
- The trafficable design including access, circulation, car parking and servicing is appropriate and consistent with the applicable provisions of the AS2890 suite of Australian Standards;
- The proposed 48 car parking spaces are considered reasonable and consistent with TfNSW Guide 2002 and the Wingecarribbee DCP 2010;
- The proposed development includes sufficient parking for persons with a disability and complies with BCA;
- The proposed development includes provision for one rigid vehicle to undertake loading, maintenance and refuse collection activities; and
- The publicly available crash dataset does not indicate any recurring crash type or theme that isn't typical of a rural environment or that would preclude development or warrant safety mitigations.

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APPENDICES

Appendix A Development Plans
Appendix B Planning Portal Property Report
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1 Introduction

1.1 Context

SLR Consulting Pty Ltd (SLR) has been commissioned by Guzman Y Gomez to prepare a Traffic Impact Assessment (TIA) report for the proposed fast-food (Guzman Y Gomez) development located at 61 Sallys Corner Road, Exeter.

Plans for the development proposal have been prepared by Richmond and Ross. A copy of the development plans is included at **Appendix A**.

1.2 Application

This development application (DA) seeks approval for the development of a new Guzman Y Gomez fast-food development with on-site seating (internal and external) and drive-through facilities located on a pad site supporting the larger Sutton Forest Highway Service Centre masterplan area. The site is currently a free standing greenfield with no structures.

The proposed development will provide on-site car parking for customers and a loading zone for deliveries, servicing and refuse collection.

At the time of writing, there is another development application for a fast-food facility lodged with Wingecarribee Shire Council for the neighbouring lot. It is understood that this application is for the development of a Kentucky Fried Chicken (KFC) with a drive through. It is worth noting that the proposed KFC and Guzman Y Gomez will have internal connections for the vehicular and pedestrian movements. More information about the connectivity of these two lots is provided in this report.

1.3 Assessment Scope

This TIA report assesses the consistency of the proposed development with Council and State planning requirements and evaluates the impacts of the proposed development on the surrounding transport network.

This TIA identifies the transport infrastructure required to support the development, and provides an assessment of the traffic and transport specific aspects of the development against the requirements of the following relevant authorities:

- City of Wingecarribee Shire Council (WSC); and
- Transport for New South Wales (TfNSW).

2 Existing Conditions Assessment

2.1 Subject Site

The subject site is located at 61 Sallys Corner Road, Exeter. The land is formally known as Lot 101 on DP1205383 is within Zone C3 (Environmental Management) of the Wingecarribee Local Environmental Plan (LEP) 2010. The property report generated by the NSW planning Portal[1] is provided at **Appendix B**.

The site is bound by Sallys Corner Road to the south and vacant land to the west, north and a farmhouse to the east. At the time of writing, the lodgement of a DA for a KFC development adjacent to the site had taken place. This separate DA forms a part of the greater Sutton Forest Highway Service Centre masterplan area, sharing:

- The western boundary with the subject site; and
- Two internal bi-directional vehicle crossovers.

This arrangement will allow for the efficient and safe circulation of traffic across the centre. For conservatism, this report has been prepared with consideration of the KFC development. In its current form, the site has one formal vehicular crossover; located at the site's Sallys Corner Road frontage. The site location in the regional context is shown in **Figure 1**.

Figure 1 Site Location – Regional Context

The site location in the local context and the existing access arrangements are shown in **Figure 2**.

[1] www.planningportal.nsw.gov.au

Figure 2 Site Location – Local Context

2.2 Surrounding Road Network

Details of the key roads surrounding the subject site are provided in **Table 1**.

Table 1 Key Roads

Road Name	Classification	Authority	Existing Form	Posted Speed
Hume Highway	State Road (No: 167)	TfNSW	Two traffic lanes in each direction, divided, rural cross-section with a median. Stopping or parking is not permitted in any motorway.	60 km/h
Sallys Corner Road	Local Road	Council	One traffic lane in each direction, divided, rural cross-section. Informal parking is possible in the verge near the proposed development.	60 km/h and 90 km/h
Darling Lane	Local Road	Council	One traffic lane in each direction, undivided, rural cross-section. Informal parking is possible in the verge across the proposed development.	Unposted (50 km/h)

2.3 Crash History

In order to highlight any safety deficiencies in the surrounding road network in proximity to the subject site, crash data has been extracted from TfNSW Centre for Road Safety website[2]. Crashes for the most recent five-year period between 2016 and 2020 (inclusive) were evaluated. The locations of the reported crashes are illustrated in **Figure 3** with details and RUM codes summarised in **Table 2**.

Figure 3 Crash Locations

Table 2 Details of Reported Crashes (2016 – 2020) near the Proposed Development

Location	Crash ID	Year	Severity	Rum Code	Description
Hume Hwy (Southbound North)	1090443	2016	Non-casualty (towaway)	71	Off rd left => obj
Hume Hwy (Southbound South)	1105274	2016	Non-casualty (towaway)	34	Lane change right
Hume Hwy (Northbound)	1131377	2017	Non-casualty (towaway)	66	Object on road
Hume Hwy Northbound Exit	1155662	2017	Moderate Injury	85	Off rt/lft bnd => obj
Hume Hwy / Sallys Corner Rd	1208715	2019	Moderate Injury	85	Off rt/lft bnd => obj

As shown in **Table 2**, there were a total of five reported crashes in the vicinity of the site in the five-year assessment period, with three crashes occurring in the highway. Two of these reported crashes resulted in moderate injuries and there were no reported fatal crashes within the entire five-year period.

[2] https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4

Based on the desktop evaluation of the crash record, there appears to be no singular or recurring road safety issue that would preclude the development or be materially exacerbated by the development.

2.4 Road Network Planning

In order to determine the location and nature of any planned upgrades of the surrounding road network, SLR carried out a review of publicly available material. The review indicated that there are no major transport infrastructure upgrades planned by TfNSW and Council in the surrounds of the study area.

3 Development Overview

3.1 Proposed Development

Based on the development plans prepared by Richmond and Ross, the proposed Guzman Y Gomez fast-food development (restaurant) will comprise a GFA of 334 sqm (exclusive of a 51 sqm terrace / al fresco dining area).

The proposal also includes the following:

- External loading bay and internal waste storage area;
- Dual lane drive-through facility and supporting signage;
- Construction of car parking area consisting of 44 regular spaces, one PWD[3] parking space, three caravan parking spaces, one loading space and two waiting bays; and
- Landscaping throughout the site.

The proposed land use and yields associated with the development are described in **Table 3**.

Table 3 Development Summary

Development Component	Yield / Number of
Fast Food	334 sqm GFA (dining room) 51 sqm GFA (al fresco dining/terrace) Total: 385 sqm GFA
Car Parking Spaces	48 (inclusive of one PWD space and three caravan spaces)
Drive Through Lane Capacity	18
Drive Through Waiting Bays	2 (separate to drive-through queueing spaces)
Total Drive Through Capacity	20
Bicycle Parking Spaces	4 (two loops)
Loading / Servicing / Refuse Collection Bay	1

3.2 Site Access and Car Parking

Vehicular access to the development is proposed via the following arrangements:

- One bi-directional access driveway crossover on Sallys Corner Road to the south-west of the site; and
- Two bi-directional internal connections to the proposed neighbouring KFC development.

Additional details for the vehicular access locations are provided below:

South-Western Access Driveway:

This driveway is 7.20m wide at its narrowest point and will provide the main access to the site. Delivery and refuse collection vehicles (RCVs) will only use this driveway however light vehicles can also use the internal connections to/from the neighbouring KFC site.

[3] PWD: persons with a disability.

Due to the lack of speed data from Sallys Corner Road, the following posted and design speed information was adopted by SLR to determine the Safe Intersection Sight Distance (SISD) assessment. The access driveway is located where the speed limit transitions to 60 km/h from 90 km/h. Given two more fast-food developments (GYG and KFC) are proposed in addition to the existing McDonald's in the vicinity, it is recommended that the speed limit transition be relocated approximately 200m to the east from its current location. This is to reduce the vehicle speeds before vehicles arrive at the top of the crest, which is also a right-turn bend in the westbound direction.

Based on the proposed posted speed limit of 60 km/h (design speed of 70 km/h), the required SISD was calculated for each access location as per of Austroads Guide to Road Design, Part 4A, Section 3.2.2. The formula applied is illustrated in **Equation 1.**

Equation 1 SISD Formula

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where

SISD	=	safe intersection sight distance (m)
D_T	=	decision time (sec) = observation time (3 sec) + reaction time (sec) – refer to *AGRD Part 3* (Austroads 2016b) for a guide to values
V	=	operating (85th percentile) speed (km/h)
d	=	coefficient of deceleration – refer to Table 3.3 and *AGRD Part 3* for a guide to values
a	=	longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)

According to Austroads Guidelines, the required SISD for 70 km/h design speed is provided in **Table 4** below.

Table 4 Access Location SISD and Parameters

Approach	D_T (s) [1]	V (km/h)	d [2]	a (%) [3]	SISD (m)
West	5	70	0.36	3.9	146
East	5	70	0.36	-2.6	155

[1] D_T = 3 seconds observation time + 2 seconds reaction time *(AGRD Part 4A table 5.2)*
[2] d = 0.29 for cars braking on dry sealed roads (AGRD Part 4A table 5.3)
[3] a% was obtained from NearMap topographical data

SLR also undertook a review of the SISD for constrained locations (Extended Design Domain – EDD) as a part of Austroads Guide to Road Design (AGRD) Part 4A. This guideline confirms that EDD may be considered when new intersections are being retrofitted on existing roads in constrained locations. Based on Table A10 in AGRD Part 4A and Table A5 in AGRD Part 3, in constrained environments such as Sallys Corner Road (due to its geometric features), a SISD of 110m would be acceptable.

SLR overlaid the development plans on high-resolution NearMap aerials in AutoCAD and reviewed the horizontal and vertical geometry of Sallys Corner Road. It was identified that, under the existing conditions, a SISD of 120m can be achieved for the vehicles travelling in the westbound direction. SISD of 146m can also be achieved for the eastbound direction.

It should also be noted that the gradients of this driveway is not provided in the plans but gradients must comply with AS2890.2 during the detailed design stage.

Internal Connections to/from KFC:

There are two internal connections to/from the neighbouring proposed KFC site where both connections are bi-directional. The southern connection is 6.6m wide and the northern connection is 7.0m wide.

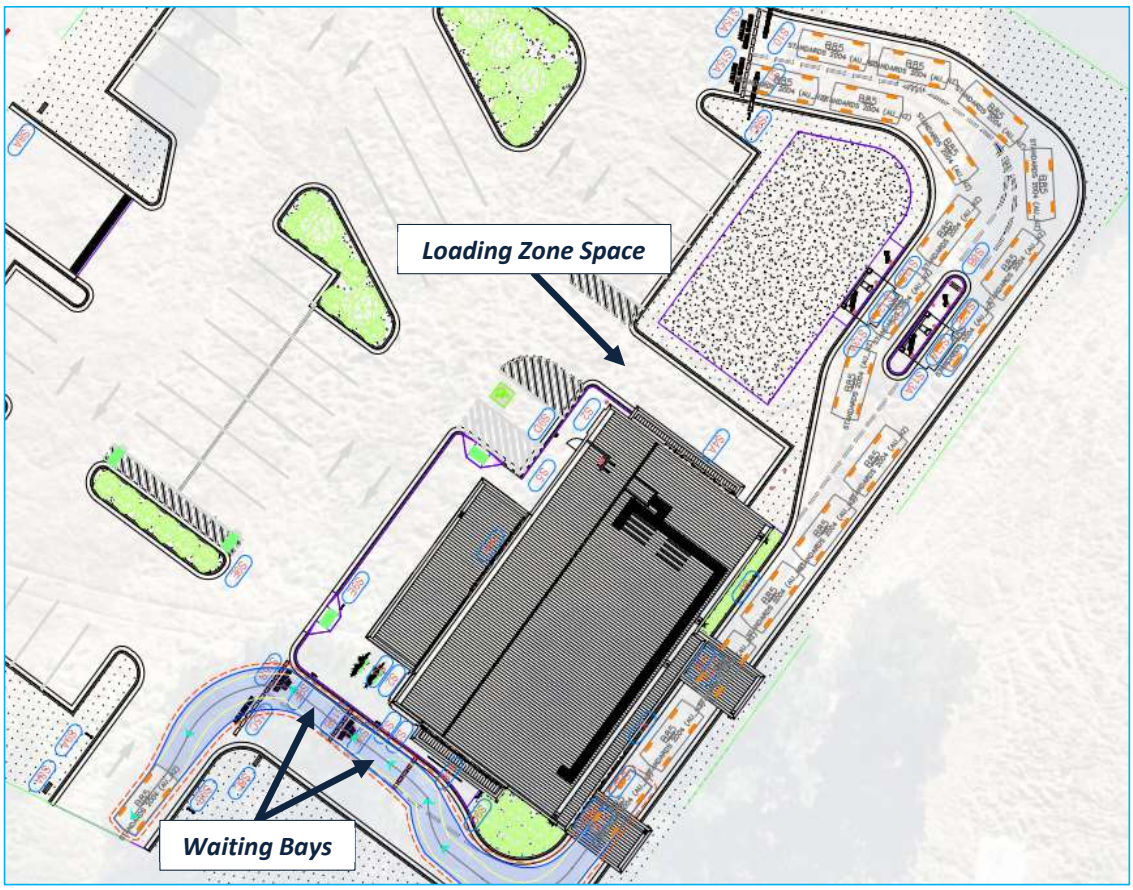
To summarise the above, the proposed site access arrangements are illustrated in **Figure 4.**

Figure 4 Proposed Site Access Arrangements

A total of 48 car parking spaces are proposed within the site, inclusive of one space for PWD and three spaces for caravans.

There is sufficient queuing space for 18 vehicles (4.91m long B85) within the GYG drive-through facility. There are two waiting bays beyond the pick-up point, which increases the total drive-through customer parking provisions to 20 vehicles, as shown in **Figure 5**.

Figure 5 Drive-Through Queuing Provisions



A loading zone space will also be dedicated to the proposed medium rigid vehicle (8.8m long MRV) in order to undertake the delivery, maintenance and refuse collection activities. More information on this is provided in **Section 3.3**.

3.3 Servicing

The access driveway crossover located on Sallys Corner Road has been designed to accommodate 8.8m long MRV movements, as the design can readily accommodate the larger 10.2m rear-loading RCVs (See SK-01A and SK-01B in Appendix C). This will enable convenient service vehicle access (for deliveries / maintenance vehicles) as well as customer access from the westbound traffic along Sallys Corner Road.

There is one loading space dedicated to 8.8m long MRVs or 10.2m long RCVs adjacent to the proposed storage and waste areas to enable safe and efficient loading / unloading activities. Waste enclosure will be located at the rear of the loading space (4.70m wide x 13.15m long) so that refuse can be collected efficiently.

The concept design has been developed so as to minimise the reversing manoeuvres of MRVs/RCVs while approaching and departing from the loading space. Swept path assessments in **Appendix C** indicates that the MRVs/RCVs will reverse into the loading bay and exit in a forward gear with only a single movement in each direction.

4 Design Considerations

4.1 Overview

A review of the proposed internal traffic arrangements, as shown in the development plan included in **Appendix A**, was undertaken against the following relevant documents:

- Wingecarribbee DCP 2010 - Part B4.9: Design of Off-Street Parking Facilities;
- RTA Guide to Traffic Generating Developments – Section 5.8: Refreshments;
- Australian Standards for Parking facilities Part 1: Off-street car parking (AS2890.1);
- Australian Standards for Parking facilities Part 2: Off-Street Commercial Vehicle Facilities (AS2890.2); and
- Australian Standards for Parking facilities Part 6: Off-street parking for people with disabilities (AS2890.6).

4.2 Statutory Requirements

4.2.1 Site Access and Parking

SLR has reviewed the Part B4 of Wingecarribbee DCP 2010 and understood that Council does not specify the dimensional details of car parks of fast-food developments and refers to AS2890 suite.

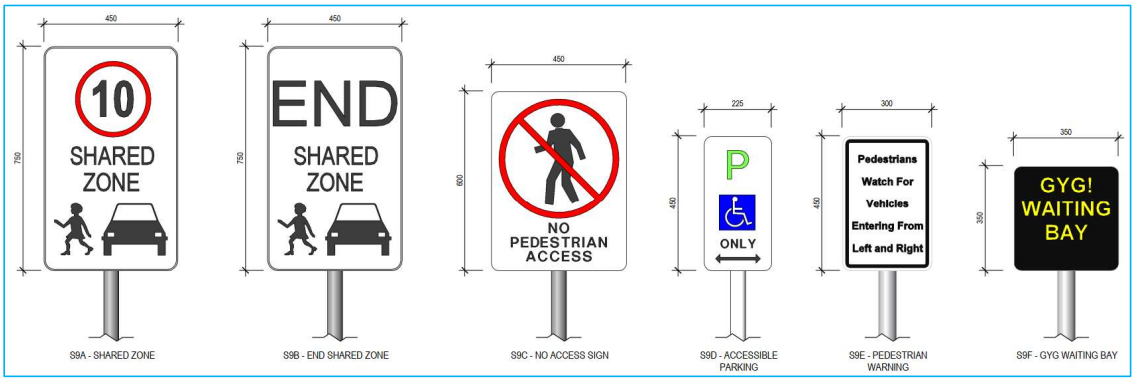
However, Council has the following general statutory requirements in relation to traffic- and parking-specific matters:

- To ensure that adequate off-street parking is provided in conjunction with development in order to discourage the use of streets for the parking of vehicles associated with additional traffic generated by new developments;
- To provide communal public car parking in appropriate areas, funded from developer contributions, where the development cannot accommodate adequate on-site parking, and/or where Council chooses to aggregate parking into a centralised location(s);
- To ensure that car parking areas are safe and functional;
- To ensure that parking supply is equitable and includes at least the minimum number of accessible spaces in accordance with AS2890 series;
- To ensure that car parking areas are visually attractive; and
- To ensure that vehicular access points to the site are located to minimise danger or disruption to vehicles and pedestrians on the public street system.

Proposed development plans satisfy the requirements above. In addition, the proposed development's access arrangements provide adequate separation from intersections. All driveways have a width larger than the minimums specified as per AS2890.1 and have been confirmed with swept path assessments. Pages 9 to 12 of the plans (Drawing Number DA051-C, DA052-B, DA053-B and DA054-B) provides the locations of the proposed signage.

Figure 6 provides an overview of the adopted signage as part of the concept design development.

Figure 6 Proposed Signage within the Development



The proposed access designs comply with the requirements specified in AS2890.1 and consideration has been given to the proposed 10.2m long RCV as a part of AS2890.2.

The all-movements driveway crossover on Sallys Corner Road (south-west access) is proposed to accommodate predominantly light vehicle and also MRV/RCV traffic approaching from Sallys Corner Road travelling in the eastbound and westbound directions.

The proposed development will not be frequented by any vehicle larger than a 10.2m long RCV.

Swept path assessments have been prepared using the largest design vehicle for each access driveway mentioned above. These swept paths assessments are provided in **Appendix C**.

4.2.2 Car Parking Provisions

The minimum car parking provisions for a take-away food and drink premise are specified in Part B4.9 of Wingecarribbee DCP 2010. This has also been compared to the parking provisions outlined in the RTA Guide to Traffic Generating Developments 2002.

For ease of reference, the required parking rates by both sources have been included in **Table 6.**

At the time of writing, development plans (**Appendix A**) did not indicate seating arrangements. As such, the total number of seats, 144, has been derived based on the 48 car spaces available. The split between internal and external seating has been approximated based on the GFA of the internal and alfresco dining rooms as outlined in **Table 5** below:

Table 5 Seating arrangements

Dining Area	GFA (sqm)	% GFA	Seats
Internal	334	87%	125
External	51	13%	19
Total	385	100%	144

Based on SLR's experience with other fast-food developments of similar GFAs, the assumption of 144 seats is extremely conservative. It is likely that the site will provide substantially less seating.

Table 6 Minimum Car Parking Requirements

Code	Land Use Description	Yield	Car Parking Rate	Requirement
Wingecarribbee DCP 2010	Fast Food / Take Away Food Outlets	144 seats (125 internal and 19 external)	1 space per 3 seats (both internal and external)	48
NSW RTA Guide to Traffic Generating Developments 2002	Developments with on-site seating and drive-through facilities	144 seats (125 internal and 19 external)	1 space per 3 seats (internal and external)	48
Average				***48 spaces***

As shown in the development plan in **Appendix A**, the development will provide 48 car parking spaces, inclusive of one PWD parking space and three caravan spaces. In addition to the 48 permanent parking spaces, it is important to note that a queuing space for 18 vehicles (4.91m long B85 design vehicles) from the pick-up point, exclusive of the two waiting bays that are also proposed.

The NSW RTA Guide 2002 requires the following provisions at drive-through facilities:

- An exclusive area for queuing of cars for a drive-through facility is required (queue length of 5 to 12[4] cars, measured from pick-up point); - *proposed development provides queuing space for 18 cars.*
- There should also be a minimum of four car spaces for cars queued from ordering point. - *proposed development provides at least 11 cars' length of queuing space from the ordering point.*

Based on the above, in SLR's traffic engineering view, the proposed parking and queuing provisions are consistent with the most relevant statutory requirements as set out in **Table 6**.

4.2.3 PWD Car Parking Provision

The Building Code of Australia (BCA) stipulates the PWD car parking requirements based on the building classification. The building proposed as part of the development is categorised as a Class 6 building by the BCA, and as such, requires one PWD space for every 50 car parking spaces or part thereof (for up to 1,000 parking spaces).

The site plan for the proposed development indicates that one accessible car parking space is proposed immediately in-front of the proposed development. This provision accords with the BCA requirements.

[4] This is a McDonald's rate according to RTA Guide 2002. In our view, the proposed Guzman Y Gomez will be more similar to a KFC rather than a McDonald's. The recommended queuing provision for a KFC is 8 car lengths.

4.2.4 Internal Traffic Arrangements

The design of the proposed car parking and circulation elements has been assessed against the requirements within AS2890.1, AS2890.2 and AS2890.6. This assessment is summarised in **Table 7**.

Table 7 Car Park and Circulation Compliance Review

Component	AS 2890.1 or AS2890.6 Requirement	Provision	Compliant
Parking Spaces	2.6m x 5.4m with 6.6m wide aisle (Class 3A)	2.6m x 5.4m with 7.2m wide aisle	✔
PWD Parking Spaces	2.4m x 5.4m space plus 2.4m x 5.4m adjacent area	2.4m x 5.4m space plus 2.4m x 5.4m adjacent area	✔
Blind Aisle End Space	Aisle length extended by 1m	No blind aisles.	✔
Parking Spaces Next to Walls	300mm parking space extension.	No high kerbs or walls next to parking spaces.	✔
Access Driveway Width	6.0m (Class 3A)	7.20m wide	✔
Parking Module Gradients	1:40 (2.5%) maximum – any direction	Not provided in concept plans but must comply in the detailed design drawings	✔
Driveway Gradients	Transitions: 1 in 16 for a minimum 7.0m Remainder: 1 in 6.5 maximum.	Not provided in concept plans but must comply in the detailed design drawings	✔

As identified in **Table 7** and demonstrated by swept path assessments provided in **Appendix C**, the angled parking bays, PWD parking bays, aisle widths and circulating roadway widths exceed the spatial requirements of AS2890.1, AS2890.2 and AS2890.6. However, additional information will need to be provided in relation to the gradients of the driveway crossover.

5 Servicing Considerations

The current Wingecarribbee DCP 2010 does not outline any specific service vehicle requirements for the proposed fast-food development however, MRVs or RCVs are typically accepted as service vehicles for these types of development.

Council's generic comments on servicing considerations are summarised in **Table 8**.

Table 8 Loading and Unloading Facilities

Performance Criteria	Acceptable Solutions
Loading and Unloading Facilities	
All business developments where future tenants will require regular deliveries of goods and the removal of waste and resource recovery material must ensure that loading facilities are adequate for the realistic needs of the proposed service vehicles. In the past, the servicing of retail developments by large trucks has often caused considerable traffic disruption with further potential danger to pedestrians.	Based on SLR's experience on other GYG developments, SLR is of the view that the proposed servicing and refuse collection arrangements will be sufficient for the needs of the proposed development.
Full details of anticipated vehicle sizes, volumes and frequency of delivery and other service vehicles must be supplied with the development application. These estimates, particularly vehicle sizes, must be realistic and based on established averages for the range of businesses likely to occur in the development.	Although the frequency of deliveries is not known at the time of writing, it is proposed that the site will be serviced by 8.8m long MRVs for maintenance & deliveries and 10.2m long rear-loading RCVs for refuse collection. The proposed loading bay is 4.70m wide x 13.15m long.
AUSTROADS Design Vehicles and Turning Templates must be used for all vehicle movements on, or on to, public roads.	Please see the swept path assessments in **Appendix C**.
The turning templates from Australian Standard AS 2890.1 and AS 2890.2 must be used for on-site manoeuvring, including reversing manoeuvres and vertical clearance requirements.	SLR uses AutoTURN software which is an add-on for AutoCAD software. AutoTURN produces swept path assessments that are consistent with the requirements of AS2890.1 and AS2890.2.

Based on the above, it is concluded that the proposed loading arrangements are consistent with Wingecarribbee DCP 2010.

6 Active and Public Transport Considerations

Due to the rural nature of the study area, there is no active transport infrastructure in the vicinity of the proposed development. However, the proposed development will have two bicycle hoops that can accommodate four bicycles.

Based on a review of publicly available material, it is also identified that there are currently no public transport opportunities in the vicinity of the site.

7 Operational Assessment

As discussed in **Section 3.1**, the proposed Guzman Y Gomez development is a fast-food restaurant a drive-through facility. The development will have a maximum capacity of 144 seats. It is anticipated that there will be no more than 125 internal and 19 external seats.

Consideration has been given to the following two documents to identify an anticipated traffic generating rate for the proposed Guzman Y Gomez development:

- *RTA Guide to Traffic Generating Developments (2002)*; and
- *Bitzios Consulting: Trip Generation and Parking Demand Surveys of Fast-Food Outlets Analysis Report (2016) commissioned by Roads and Maritime Services (RMS).*

TfNSW (then Roads and Maritime Services) commissioned Bitzios Consulting in 2016 to review any changes in traffic and parking impacts of fast-food outlets given the latest data was collected in 2002 (RTA Guide to Traffic Generating Developments). This study captured five fast-food outlets as opposed to the two fast-food outlets that were captured in 2002. SLR considered adopting either of the KFC, Hungry Jacks or Oporto rates. Out of the three, KFC data returned the highest traffic impact and therefore the most conservative survey results. Based on this, KFC's baseline trip generation rate of ***73 PM network peak hour trips*** were adopted.

Following the adoption of 73 PM network peak hour trips, the AM and Saturday midday trip generation rates were derived based on how they proportioned against the PM trip generation rates. KFCs do not open early enough to provide an AM peak hour traffic generation rate and therefore consideration was given to McDonald's, results of which are as per the below:

- McDonald's AM peak hour demand is 30% less than PM peak hour demand in metropolitan areas;
- McDonald's AM peak hour demand is 4% less than PM peak hour demand in regional areas;
- Exeter is certainly a regional area however given the site is located alongside Hume Highway, SLR conservatively assumed that AM demand would be as high as PM peak hour at **73 *AM network peak hour trips.***

The 2016 Bitzios report did consider weekends; however, a recommended rate or discussions was not made. Based on this, SLR reviewed the collected survey data and identified that on average, the weekend midday peak hour trip generation was approximately 5% less than the weekday PM peak trip generation. However, for conservativeness, 100% of weekday PM peak trip generation was also adopted for the purposes of Saturday midday peak hour analysis.

To summarise the above discussions, the following trip generation rates were adopted:

- Weekday AM and PM Peak Hours: 73 vph; and
- Saturday Midday Peak Hour: 73 vph.

The following assumptions regarding the development related traffic should also be noted:

- Directional Split: 50% IN and 50% OUT;
- Trip Distribution: 45% from/to southbound travel along Hume Highway, 45% from/to northbound travel along Hume Highway and 10% from/to Exeter township on Sallys Corner Road.

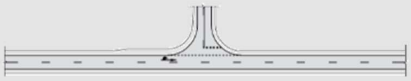
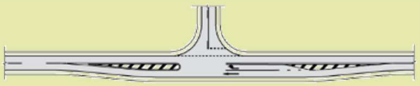
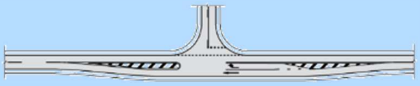
It is also anticipated that almost 100% of the customers approaching the site from Hume Highway will be passing trade (drop-in traffic) and not new trips. Therefore, no new trips are anticipated along Hume Highway.

7.1 Turn Warrant Assessments

Turn warrant assessments have been undertaken to establish the desirable form of the proposed Sallys Corner Road / Site Access in accordance with the industry research summarised within the Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (AGTM6-20).

The warrants provide guidance where turning lanes should be provided based on design traffic volumes. A pictorial description of the various turn treatments considered is provided in **Table 9** and **Figure 7** to assist with reader interpretation of this assessment.

Table 9: Turn Treatment Types

Acronym	Right Turn Treatment	Left Turn Treatment
BAR or BAL	 **BAR** (Basic Right Turn)	 **BAL** (Basic Left Turn)
CHR(S) or AUL(S)	 **CHR(S)** (Channelised Right Turn [Short])	 **AUL(S)** (Auxiliary Left Turn [Short])
CHR or AUL/CHL	 **CHR** (Channelised Right Turn)	 **CHL** (Channelised Left Turn)  **AUL** (Auxiliary Left Turn)

* Source: AGTM6-20

Figure 7: Turn Treatment Types and Volume Criteria

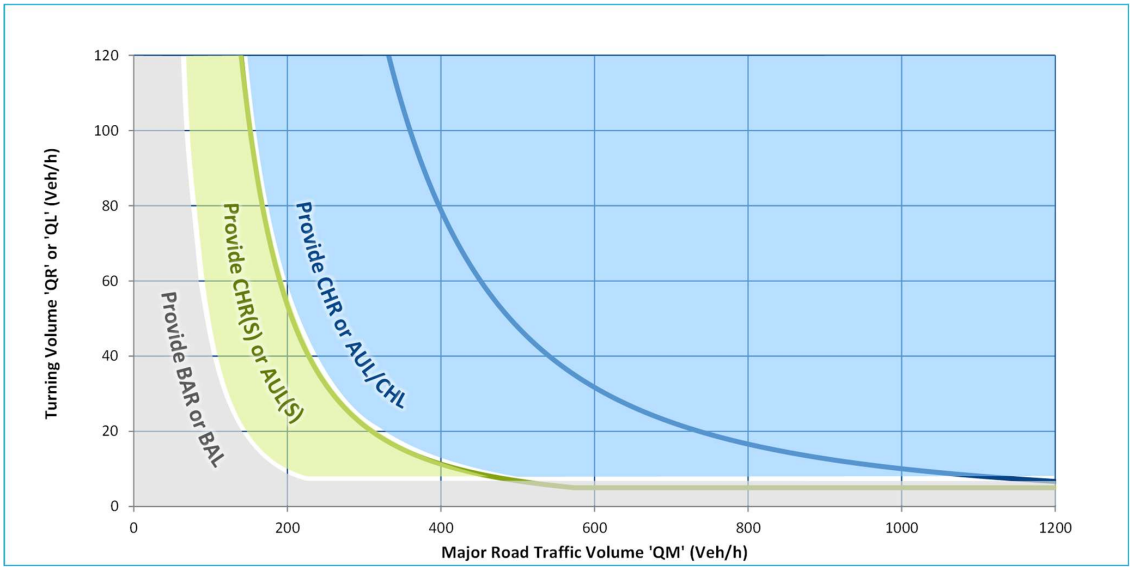


Figure 8 below illustrates a worse case turn warrant assessment undertaken for the Sallys Corner Road / Site Access. Due to the absence of traffic volume information from Sallys Corner Road, SLR identified a threshold for the through traffic where Auxiliary Left Turn (AUL) could be necessary.

The assessment was based on the following criteria:

- Design Domain – Normal Design Domain;
- Road configuration – two-lane two-way;
- Design Year – 10 years;
- Design speed – between 70km/h and 100 km/h (based on posted speed limit); and
- Left turn splitter island – No.

It was identified that through traffic in the eastbound direction needed to be 248 vehicles per hour (vph) to trigger an AUL treatment. Based on a site inspection that was undertaken in September 2022, eastbound traffic volumes appeared to be much lower than 248 vph.

It is also worth noting that due to the low right-turn movements (4 vph) into the proposed development from Sallys Corner Road, CHR would not be triggered irrespective of the through traffic in the westbound direction.

Figure 8: Turn Warrant Assessment

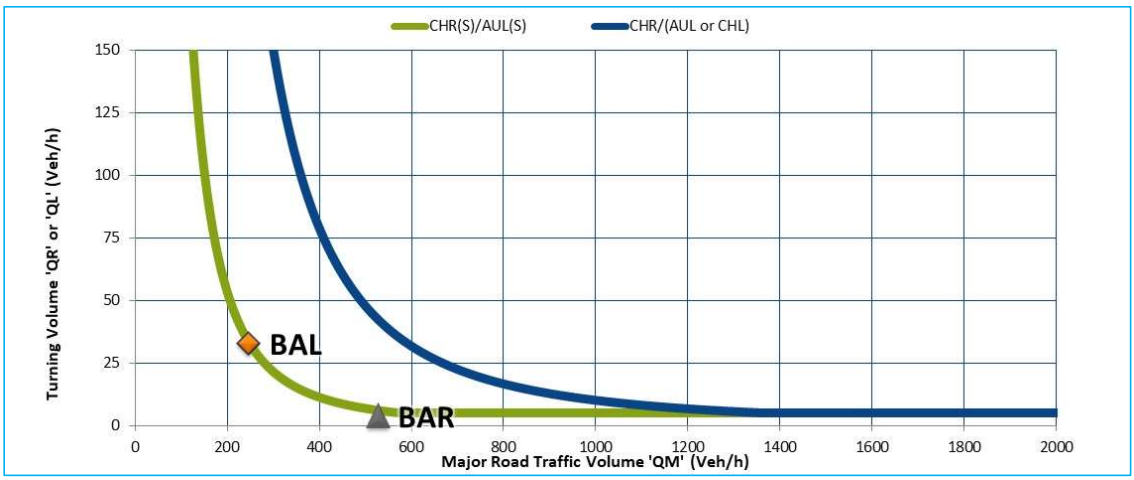


Figure 8 indicates that a Basic Right Turn [BAR] and Basic Left Turn [BAL] treatments are adequate on Sallys Corner Road.

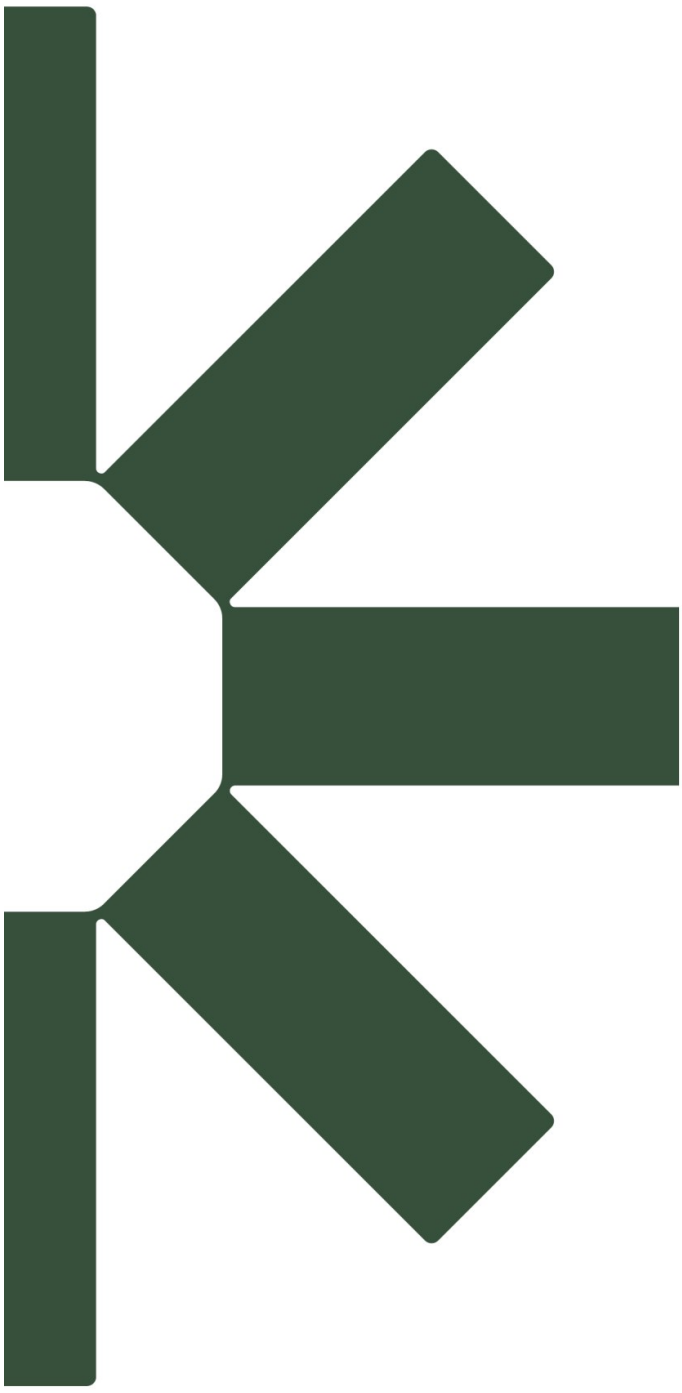
8 Conclusions and Summary

SLR has been commissioned by Guzman Y Gomez to prepare a Traffic Impact Assessment for the proposed fast-food (Guzman Y Gomez) development located at 61 Sallys Corner Road, Exeter. The site is also formally known as Lot 101 in DP 1205383.

Plans for the development have been prepared by Richmond and Ross and is included at **Appendix A**.

Based on the analysis and assessment conducted as part of this TIA, the following conclusions have been made:

- The proposed vehicular access arrangements are considered reasonable on the following basis:
  - The entry / exit points are generally consistent with Wingecarribbee DCP 2010. The proposed development considers one driveway crossover on Sallys Corner Road and two internal connections to the proposed neighbouring KFC;
  - The entry / exit points can accommodate the anticipated development design vehicles and gradients will be designed in accordance with AS2890.1, AS2890.2 and AS2890.6; and
  - The entry / exit points provide for reasonable sight distance to other external movements.
- The trafficable design including access, circulation, car parking and servicing is appropriate and consistent with the applicable provisions of the AS2890 suite of Australian Standards;
- The proposed 48 car parking spaces are considered reasonable and consistent with TfNSW Guide 2002 and the Wingecarribbee DCP 2010;
- The proposed development includes sufficient parking for persons with a disability and complies with BCA;
- The proposed development includes provision for one rigid vehicle to undertake loading, maintenance and refuse collection activities; and
- The publicly available crash dataset does not indicate any recurring crash type or theme that isn't typical of a rural environment or that would preclude development or warrant safety mitigations.



Making Sustainability Happen

7 DATE OF NEXT MEETING

The next meeting will be held on Thursday 19th September 2024 in the Council Chambers, Civic Centre, Elizabeth Street, Moss Vale commencing at 10am**.**

8 MEETING CLOSURE