FABCOT

TRANSPORT AND ACCESSIBILITY IMPACT ASSESSMENT FOR PROPOSED SHOPPING CENTRE, WOONGARRAH ROAD, WARNERVALE

MODIFICATION OF MP10_0195

JULY 2024
(Amended MARCH 2025)

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1. INTRODUCTION

1.1 Colston Budd Rogers and Kafes Pty Ltd has been commissioned by Fabcot to prepare a amended report on the traffic implications of the proposed modifications to the approved Warner Vale Town Centre – Woolworths – MP10_0195. The report has been amended to assess to updated plans prepared by Clark Hopkins Clarke (DA2.3 and DA2.4) dated 18 March 2025.

Site Location

1.2 The site (DP 1200804) is located on Woongarrah Road in Warnervale, within the Central Coast Local Government Area (LGA). The subject site forms part of the Warnervale Town Centre, which was to be a new retail, commercial, and community growth centre. As part of the new town centre a rail station was proposed adjacent to the site. However, the Warnervale Train Station will no longer proceed at this location. The site is bounded by Woongarrah Road to the west and the future Gibraltar Road (partially constructed) to the south. The site location is shown in Figure 1.

1.3 Key features of the site are:

- the site has frontage to the Woongarrah Road of approximately 190 metres and frontage to Gibraltar Road of approximately 210 metres.

- the site is currently uncleared bushlands.

Key features of the locality are:

- the site is approximately 23km north of the Gosford and approximately 4km north of the Wyong;

- the area surrounding the site is mostly undeveloped. There are some 140 low density residential lots south of the site.

Previous Approval

1.4 The Site benefits from an activated consent being the Warner Vale Town Centre – Woolworths – MP10_0195, which was granted approval on 12 September 2013 for the following:

- retail facility with a total GFA of 33,112m^2 comprising:
  - 22,092m^2 of retail floor space (including 1,892m^2 bulky goods retail);
  - 3,608m^2 of commercial floor space;
  - 3,742m^2 of entertainment uses (cinema); and
  - 3,669m^2 for circulation space/mall and amenities, toilets etc
- car parking totalling 1,524 spaces including 1,283 basement car parking spaces, at grade commuter car park comprising 225 spaces, and on street parking for 16 cars;
- 'civic square' straddling the proposed Main Street with a total area of 2,852m^2 (including the roadway) and 2,481m^2 (excluding the roadway);
- site preparation and bulk earthworks;
- road construction within the site including Road W06 and W05, and road works outside the site including the roundabout on Road W05, and Road W08;
- associated infrastructure works and servicing, including subdivision;
- use and fit out within the buildings of the proposed Woolworths Supermarket and Big W Discount Department Store;

- site remediation and landscaping/

1.5 The proposed development seeks to modify this consent due to changes in the delivery of the Warnervale Town Centre Railway Station.

1.6 As part of the consultation process, a meeting with TfNSW was held on 8 April. As part of those discussions, TfNSW indicated general support, subject to a number of matters being addressed as set out in Chapters 7 and 9.

Report Structure

1.7 This report assesses the traffic, transport and accessibility implications of the proposed development, through the following chapters:

- Chapter 2 - proposed development;
- Chapter 3 - public and active transport aspects;
- Chapter 4 - green travel plan;
- Chapter 5 - parking provision;
- Chapter 6 - access, car parking layout, circulation and servicing;
- Chapter 7 - traffic effects;
- Chapter 8 – draft construction traffic management plan; and
- Chapter 9 – consultation with authorities.

2. PROPOSED DEVELOPMENT

2.1 The Modification to MP10_0195 seeks to modify the 2013 Consent to enable the construction and operation of a shopping centre (identified as the Warnervale Shopping Centre), comprising:

- Extension of Woongarah Road to just north of the site (with a temporary cul-de-sac);
- Extension of Gibraltar Road (to connect to Woongarrah Road);
- construction of a shopping centre complex including:
    - 7,753m^2 of retail floor space (including 1,193m^2 large format retail and 878m^2 food and beverage);
    - 840m^2 of commercial floor space;
    - 791m^2 gym;
    - 440m^2 medical centre; and
    - 2,422m^2 e-commerce facilities.
- vehicle crossovers to Woongarrah Road and Gibraltar Road;
- 492 on-site car parking spaces (including eight DTB spaces); and
- associated public domain works and landscaping.

2.2 Vehicular access for the proposed development will be provided from Woongarrah Road and Gibraltar Road. Two separate combined entry / exit driveways accessing the car park and one entry / exit driveway accessing the northern service lane and loading dock, will be provided from Woongarrah Road. A separate combined entry/ exit driveway accessing the car park and supermarket loading dock will be provided from the partially constructed Gibraltar Road.

3. PUBLIC AND ACTIVE TRANSPORT NETWORK

Bus Services

3.1 The site currently has limited access to public transport. Local bus services are provided by Redbus and Transport NSW and operate Sparks Road. These services include:

- Route 11 – Lake Haven to Tuggerah via Warnervale;
- Route 29 – Bay Village to Wyong Hospital via Lake Haven; and
- Route 78 – Lake Haven to Tuggerah via Warnervale and Wadalba.

3.2 The closest bus stop to the site is located on Sparks Road, some 750 metres to the south of the site. The DCP does not indicate any future bus routes in the area although this is likely to as development is completed in the area and demand for access to bus services increases.

Active Transport

3.3 The site currently provides pedestrian connectivity and accessibility. Pedestrian footpaths are provided along the eastern side Woongarrah Road and the northern side of Gibraltar Road. Clear pedestrian paths will be provided from the surrounding road network into the shopping centre.

3.4 The proposed development will provide pedestrian access and bicycle facilities connecting to the surrounding available active transport network. Bicycle parking

and end of trip facilities, including change rooms, lockers and showers, will also be provided internal to the site.

3.5 In association with the proposed development, employees and visitors will be made aware of the available means of travel, including access to the site by public transport, walking and cycling. A Green Travel Plan will be prepared and made available to all employees and visitors to the site.

4. GREEN TRAVEL PLAN

Introduction

4.1 A framework Green Travel Plan (GTP) has been developed to identify measures to promote sustainable transport options and to encourage travel modes away from single occupant private vehicles. It adopts a transport management approach and provides a site-specific management strategy for delivering long term behavioural change and sustainable travel patterns. It outlines a range of actions and initiatives to increase travel modes such as walking, cycling, public transport and carpooling, as well as influencing behaviours that lead to better organisational outcomes, improving environmental impacts, improving viability of public transport services and creating healthier lifestyles, while reducing traffic on the surrounding road network. The framework GTP ensures that staff and visitors to the centre feel safe, secure and well informed about travel to and from the site.

Public Transport

4.2 As set out in Chapter 3 of the traffic report, local bus services are provided by Redbus and Transport NSW, with services operating along Sparks Road, located some 750 metres to the south of the site. As development is completed and demand increases, bus services are likely to be extended through area.

Active Transport

4.3 As part of the development, footpaths will be constructed on the eastern side of Woongarrah Road and the northern side of Gibraltar Road. Pedestrian refuges will

be provided at the intersection of Woongarrah Road and Gibraltar Road. The intersection of Woongarrah Road and Sparks Road provides signalized pedestrian crossings on the northern and eastern legs of the intersection. As the area surrounding the site develops, more pedestrian facilities will be provided.

4.4 Pedestrian footpaths, shared paths, marked pedestrian crossings and pedestrian facility within the existing traffic signals on the surrounding road network, combine to provide convenient pedestrian and cycle access to and from the site.

4.5 As set out in the traffic report, bicycle parking and end of trip facilities, including change rooms, lockers and showers, will be provided for staff. Bicycle racks will be provided on site.

Objective of the Framework Green Travel Plan

4.6 The framework GTP will comprise a package of measures designed to address the specific travel needs of the site. The main objectives of the framework GTP include:

- reducing dependence on private vehicles and encourage the use of more sustainable travel modes;
- reduce the number of car trips to and from the site, by encouraging the use of public transport;
- provide facilities for staff and visitors to commute by sustainable transport modes, including walking and cycling;
- promoting public transport and carpooling;

- advise all new, staff and visitors of the available public transport options to and from the site;

- reduce the environmental footprint of the development;

- reducing congestion in the local area; and

- promote the health benefits of active transport and create a more active social culture.

Framework Green Travel Plan

4.7 The framework GTP will be refined in consultation with council, public transport operators and other stakeholders. It will include the following measures:

- Travel Planning and Demand Management

  - develop a Travel Access Guide. The travel guide will provide public transport information, maps, car share vehicle locations and public transport timetable;

  - management and promotion of the travel guide by encouraging, staff and visitors to travel actively and to help develop a healthy, active culture and meet travel mode targets;

  - promote carpooling scheme. Staff that live in the same area and work at a similar time would be encouraged to carpool when travelling to and from the centre;

- Encourage the Use of Public Transport

  - encourage the use of public transport by providing information and resources, through the development of a Travel Access Guide;

  - work with public transport providers to improve services;

  - meet or exceed TfNSW bus planning guidelines;

  - promote the provision of travel passes to staff/trainers to encourage use of public transport;

  - develop a carpool scheme to help staff find someone to share their travel to and from the site;

- Encouraging Active Transport (Cycling and Walking)

  - provide appropriate bicycle parking facilities;

  - provide convenient end of trip facilities, including showers, change rooms, lockers, etc, to encourage people to walk and cycle;
  - create a Bicycle User Group (BUG) to educate and encourage others to ride. BUG members can provide helpful tips on cycling, share route plans or form 'bike bus' to travel to and from the site;

- Influencing Travel Behavior

- provision of a Travel Access Guide. This provides information on walking and cycling routes, and travel by bus to and from the site. Contacts of the travel plan coordinator for the GTP will also be provided.

Monitoring and Reviewing the Framework Green Travel Plan

4.8 The framework GTP will be monitored to ensure that it is meeting its objectives and having the intended impact on car use and transport choices for staff and visitors. The framework GTP will be reviewed annually and if required updated to reflect changing circumstances and to identify which initiatives are having an impact or need to be modified to ensure appropriate travel behaviour.

4.9 The operator of the centre will provide a travel plan coordinator (TPC) that will oversee the measures and resultant impacts of the framework GTP. This person will review and assess the travel mode data against the existing travel data available for the area and make appropriate recommendations.

4.10 In association with the framework GTP, a Travel Access Guide will be prepared for the centre. The plan will provide public transport information, maps, car share vehicle locations and public transport timetable.

5. PARKING PROVISION

Car Parking

5.1 An assessment of parking requirements has been undertaken based on the Warnervale Town Centre DCP 2012. The DCP sets out the following rates:

- business (commercial) premises – one space per 30m^2;
- retail premises (including food tenancies): - one space per 20m^2;
- medical – one space per 25m^2;
- large format retail (bulky goods): - one space per 50m^2;
- gym (recreational facilities) – seven spaces per 100m^2;
- e-commerce – no rate, DCP recommends adopting TfNSW rate (warehouse one space per 300m^2).

5.2 The parking requirements for the development are summarized by use in Table 5.1 below:

Table 5.1: Summary of Parking Requirements

Use	Gross Floor Area	Parking Rate	Parking Required
Retail	6,560m^2	1/20m^2	328
Business	840m^2	1/30m^2	28
Large Format Retail	1,193m^2	1/50m^2	24
Medical	440m^2	1/25m^2	18
E-Commerce	2,423m^2	1/300m^2	8
Gym	792m^2	7/100m2	55
		Total	461

5.3 As seen in Table 5.1, the development would require 461 parking spaces. The provision of 492 parking spaces satisfies this requirement.

5.4 The provision of Direct to Boot (DTB) facilities has resulted in reduction in parking demand as customers using the DTB spend less time in the car park as customer shopping in store. No reduction in parking has been applied as result of the DTB.

Accessible Parking

5.5 The Warnervale Town Centre DCP specifies a rate of one disabled parking space per 100 standard parking spaces. With 492 parking spaces, five accessible spaces would be required. The provision of eight accessible spaces satisfies this requirement.

Bicycle Parking

5.6 The Warnervale Town Centre DCP sets out the following rates for bicycle parking:

Supermarkets

- one space per 750m^2 for employees;
- one space per 1000m^2 for visitors;

Specialty retail/Bulky Goods (LFR)

- one space per 300m^2 for employees;
- one space per 300m^2 for visitors;

Commercial/Medical

- one space per 150m^2 for employees;

- one space per 750m^2 for visitors;

Gym (Recreational Facility)

- one space per 200m^2 for visitors;

E-Commerce

- no rate, however, a rate of one space per 750m^2 for employees has been adopted;

5.7 On this basis the centre would be required to provide 52 bicycle parking spaces (30 for staff and 22 for visitors). 50 bicycle parking spaces are provided adjacent to the northern access to the centre in accordance with Council's DCP.

Motorcycle Parking

5.8 The Warnervale Town Centre DCP does not specify a rate for motorcycle parking for retail, commercial or E-Commerce uses. However, the Central Coast Council DCP general requirements sets out a rate of one motorcycle space per 50 standard parking spaces. With some 400 spaces required for these uses, the development would be required to provide 8 motorcycle parking spaces. For recreational facilities (gyms), the Warnervale Town Centre DCP specifies a rate of one motorcycle space per 25 standard spaces. With some 55 spaces required for the gym, two motorcycle parking spaces would be required, bringing the total motorcycle parking required to 10 spaces . Motorcycle parking 12 motorcycle parking spaces are provided along the southern section of the car park, satisfying the requirements set out by the DCP.

6. ACCESS, CAR PARK LAYOUT, CIRCULATION AND SERVICING

Access Arrangements

6.1 Vehicular access to the proposed development will be provided via three combined entry and exit driveways from Woongarrah Road and a combined entry and exit driveway off Gibraltar Road. The northern most driveway on Woongarrah Road is a service lane providing service access to the specialty retail tenancies. All movements will be permitted at the four driveways. A channelized right turn lane is provided on Woongarrah Road along the frontage of the site for all three driveways.

6.2 The southern access from Gibraltar Road has been designed accommodate both service and customer access. Within the shared section of the access (before it splits to provide access to the car park and service area), the access is some 10 metres wide with no parking located along the shared section. All vehicles travelling along the shared section would do so in a forward direction with no maneuvering of service vehicles. Thus sharing of this short section of the southern access by cars and service vehicles is no different to that experienced on the adjacent road network.

6.3 The proposed access arrangements will be provided in accordance with the Australian Standard for Parking Facilities Part 1: Off-street car parking and Part 2: Off-street commercial vehicle facilities (AS2890.1-2004 and AS2890.2-2018). They will provide appropriate sight lines for vehicles entering and exiting the site to observe pedestrians on the adjacent footpaths. The driveways will be designed to cater for the swept path of the largest service vehicle required to access the site

and to allow vehicles to enter and exit the site in a forward direction. The swept path of vehicles accessing the site and circulating through the site are shown in Appendix A.

Car Park Layout and Internal Circulation

6.4 Car parking dimensions and aisle widths will be provided in accordance with the Australian Standard for Parking Facilities (Part 1: Off-street car parking), AS2890.1-2004. Parking spaces will be provided with dimensions of 2.6 metres wide by 5.6 metres long and aisle widths of 6.6 metres. Spaces located adjacent to obstructions will be 300mm wider to appropriately provide for doors to open.

6.5 Disabled parking spaces will be provided in accordance with the Australian Standard for Parking Facilities Part 6: Off-street parking for people with disabilities (AS2890.6-2022). These spaces will be 2.4 metres wide by 5.6 metres long with an adjacent shared zone of 2.4 metres wide for wheelchair access. These dimensions are in accordance with the Australian Standards AS2890.1-2004 and AS2890.6-2022.

Servicing and Emergency Vehicles

6.6 The development will be serviced by two separate loading docks, one along the northern boundary of the site (specialty retail) with access from Woongarrah Road and the other in the southeastern corner of the site (supermarket) with access from Gibraltar Road.

6.7 The specialty retail dock will be designed to cater for vehicles up to 12.5 metre large rigid trucks. The access driveway and the internal circulation road will be

designed to cater for the swept paths of these vehicles to enter and exit the site in a forward direction.

6.8 The supermarket dock will be designed to cater for vehicles up to 19.0 metre semi-trailers. The dock also provides five home delivery bays for 8.8 metre medium rigid trucks. A single indented loading dock is provided on the eastern side of the southern specialty retail tenancy that will cater for vehicles up to 12.5 metre large rigid trucks. The access driveway and the internal circulation road will be designed to cater for the swept paths of these vehicles to enter and exit the site in a forward direction.

6.9 With regards to emergency vehicle access, a service road will be provided along the eastern boundary of the site with access from Gibraltar Road. A turning head will be provided at the northern end of the road. The service road will be designed to allow specialist fire appliance vehicles up to 12.5 metres in length to circulate.

6.10 Following DA approval, access arrangements, parking layouts, servicing and vehicle swept paths should be reviewed and confirmed for compliance certification.

7. TRAFFIC EFFECTS

7.1 The traffic effects of the proposed development are assessed through the following sections:

- road network;
- traffic flows;
- intersection analysis;
- traffic generation;
- traffic effects; and
- future traffic conditions.

Road Network

7.2 The road network in the vicinity of the site includes Woongarrah Road and Sparks Road. Woongarrah Road Runs along the western boundary of the site and connects with Sparks Road via a signalised T-intersection. In the vicinity of the site, it provides one traffic lane in each direction with a continuous right turn bay along the frontage of the site. As part of the development, Woongarrah Road will be extended north of the site with a turning head to be constructed at the end of the road.

7.3 Sparkes Road is an arterial road connecting the Pacific Highway to the east (at Lake Haven) with the M1 Motorway to the west. It is located to the south of the site and provides the southern boundary of the Warnervale Town Centre. In the vicinity of the site, it generally provides one traffic lane in each direction with additional lanes at intersections.

7.4 Gibraltar Road will form the southern boundary of the site once it is constructed. Once constructed it will provide one traffic lane and one parking lane in each direction. It will connect with Woongarrah Road at the western end of the road via a priority controlled T-intersection with a high angle left turn slip lane into Woongarrah Road. It provides access to the existing and future residential precincts to the east of the development.

Traffic Flows

7.5 Traffic generated by the proposed development will have its greatest effects during the weekday morning and afternoon peak periods when it combines with other traffic on the surrounding road network. Traffic flows along Sparks Road were undertaken in 2019. In order to assess 2024 traffic conditions, these flows have been increased by 2 per cent per annum compounded yearly.

7.6 Traffic flows in 2024 along Sparks Road would be some 2,000 vehicles per hour (two-way) in the weekday morning and afternoon peak periods. Based on existing residential development with access to Sparks Road, it has been assumed that traffic flows along Woongarrah Road would be some 200 to 400 vehicles per hour (two-way) during the morning and afternoon peak periods.

Intersection Analysis

7.7 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The intersection of Sparks Road and Woongarrah Road has been analysed using SIDRA 9 for the traffic flows shown in Figures 2 and 3.

7.8 SIDRA simulates the operations of intersections to provide a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required
57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

7.9 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E, if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

7.10 The SIDRA analysis found that in 2024:

- the intersection of Sparks Road and Woongarrah Road would operate with average delays of less than 20 seconds per vehicle in the weekday morning and afternoon peak hours. This represents level of service B, a satisfactory level of intersection operation in both the weekday morning and afternoon peak hours; and

- the priority controlled intersections along Wongarrah Road would operate with average delays of less than 20 seconds per vehicle in the weekday morning and afternoon peak hours. This represents level of service B, a satisfactory level of intersection operation in both the weekday morning and afternoon peak hours.

Traffic Generation

7.11 As outlined in Chapter 1, in 2013 approval was given for a staged retail development with ancillary commercial, leisure components and petrol station to the north of the main retail area, with a total floor area of some 29,442m^2 and a traffic generation of some 870 and 1,740 vehicles per hour (two-way) during the morning and afternoon

peaks hours respectively and a daily traffic generation of some 18,500 vehicles per day (two way). The current proposal is for a smaller development with a floor area of some 12,075m^2 and hence will generate less traffic than the approved development.

7.12 Traffic generated by the proposed development would have its greatest effects during weekday morning and afternoon peak periods when it combines with commuter, school and retail traffic on the surrounding road network.

7.13 TfNSW's "Guide to Traffic Generating Developments" indicates the following two-way weekday morning and afternoon peak hour traffic generation rates:

- supermarkets: 15.5 vehicles per hour per 100m^2 in the weekday PM peak hour (50% in the weekday AM peak hour);
- specialty retail: 4.6 vehicles per hour per 100m^2 in the weekday PM peak hour (50% in the weekday AM peak hour); and
- commercial: 1.6 vehicles per hour per 100m^2 in the weekday AM and 1.2 vehicles per hour per 100m^2 PM peak hour;
- bulky goods, 1.51 vehicles per hour per 100m^2 in the weekday PM peak hour (not open in the weekday AM peak hour);
- medical, 2.5 vehicles per hour per 100m^2 in the weekday AM and PM peak hours
- gym, 3.0 vehicles per hour per 100m^2 on weekday AM and PM peak hours;
- e-commerce, 1.0 vehicles per hour per 100m^2 on weekday AM and PM peak hours.

7.14 Estimates of traffic generation are set out in Table 7.1.

Table 7.1: Summary of Traffic Generation					
Use	Size	Rate		Generation (vph)	
		AM	PM	AM	PM
Supermarket	3,952m^2	7.7/100m^2	15.5/100m^2	304	614
Specialty Retail	2,608m^2	2.3/100m^2	4.6/100m^2	60	120
Business	1,280m^2	1.6/100m^2	1.2/100m^2	21	15
Bulky Goods (LFR)	1,193m^2	N/A	1.5/100m^2	0	18
Medical	440m^2	2.5/100m^2	2.5/100m^2	11	11
Gym	791m^2	3.0/100m^2	3.0/100m^2	24	24
E-Commerce	2,422m^2	1.0/100m^2	1.0/100m^2	25	25
Total				445	827

7.15 On this basis, the proposed development would have a traffic generation of some 827 vehicles per hour two-way during weekday afternoon peak hour. Weekday morning peak hour traffic generation would be about half the afternoon peak hour (some 449 vehicles per hour two-way). Daily traffic generation would be some 8,200 vehicles per day (two way). Some 5% of traffic generated would be trucks with majority (some 4%) small trucks associated with home deliveries.

7.16 Woolworths has advised that due to the surrounding area not being fully developed and given the constraints in the road network that will limit access to the site, in the short term the shopping centre is likely to generate some 75% of the expected traffic generation when the area is fully developed. Notwithstanding this, our assessment has adopted 100% traffic generation for the development.

7.17 TfNSW guidelines indicate that some 25% of retail traffic will be passing trade, i.e., traffic which would have driven past the centre, regardless of its visit to the centre.

7.18 The distribution of development traffic to the road network has been based on access to the regional road network and is set out below:

- 35% to/from the west via Sparks Road;
- 50% to/from the east via Sparks Road;
- 10% to/from the east via Gibraltar Road;
- 5% to/from the south via Cardiff Avenue.

Traffic Effects

7.19 Base (2024) peak hour traffic flows plus the development traffic are shown in Figures 2 and 3, and summarised in Table 7.2.

Table 7.2: Base (2024) Peak Hour 2-Way (sum of both directions) Traffic Flows

Road/Location	Morning		Afternoon	
	Base	+ Dev	Base	+ Dev
Sparks Road				
– east of Woongarrah Road	2110	+155	2031	+305
– west of Woongarrah Road	2150	+95	1991	+185
Woongarrah Road				
– north of Sparks Road	400	+340	400	+660
– west of Cardiff Avenue	250	+260	250	+500
– south of Gibraltar Road	0	+260	0	+500
– south of Central Access	0	+240	0	+460
– south of northern Access	0	+180	0	+340
– north of northern Access	0	+0	0	+0
Gibraltar Road				
– east of Woongarrah Road	0	+20	0	+40
– east of southern access	0	+180	0	+320
– east of Cardiff Avenue	50	+60	50	+80
Cardiff Avenue				
– north of Woongarrah Road	50	+120	50	+240
– south of Woongarrah Road	200	+0	200	+0
Site Access				
– north of Gibraltar Road	0	+200	0	+360
– east of Woongarrah Road (central)	0	+60	0	+120
– east of Woongarrah Road (northern)	0	+180	0	+340

7.20 Table 7.1 reveals that:

- traffic flows on Sparks Road would increase by some 95 to 305 vehicles per hour (two-way) in the weekday morning and afternoon peak hours;

- traffic flows on the Woongarrah Road would increase by some 180 to 660 vehicles per hour (two-way) in the weekday morning and afternoon peak hours;

- traffic flows on in the short section of Cardiff Avenue, north of Woongarrah Road, would increase by some 120 to 240 vehicles per hour (two-way) in the weekday morning and afternoon peak hours; and

- traffic flows on Gibraltar Road would increase by some 20 to 80 vehicles per hour (two-way) in the weekday morning and afternoon peak hours, except for the short section between the site access and Cardiff Avenue where traffic flows would increase by some 160 to 320 vehicles per hour (two-way).

7.21 The intersections analysed in Section 7.10 plus the site accesses have been reanalysed with development traffic in place. The analysis found that:

- the intersection of Sparks Road and Woongarrah Road would operate with average delays of less than 25 seconds per vehicle in the weekday morning and afternoon peak hours. This represents level of service B, a good level of intersection operation in both the weekday morning and afternoon peak hour;

- the priority controlled intersections along Woongarrah Road would operate with average delays of less than 35 seconds per vehicle in the weekday morning and afternoon peak hours. This represents level of service C, a satisfactory level

of intersection operation in both the weekday morning and afternoon peak hour

- the intersections of Woongarrah Road and the central and northern site access and the intersection of the site (southern) access on Gibraltar Road would operate with delays of less than 15 seconds per vehicle in the weekday morning and afternoon peak periods. This represents a level of service A/B, a good level of intersection operation.

7.22 The SIDRA analysis has found that all the site access points (including the intersection of Gibraltar Road and the southern access) would operate at a good level of service (LOS A/B) in the weekday morning and afternoon peak periods. Therefore, a roundabout is not required at the intersection of Gibraltar Road and the southern access.

Future Traffic Conditions

7.23 The future traffic arrangements have been identified in the Warnervale Town Centre DCP. It identifies the following changes in the vicinity of the proposed development:

- an additional fourth (southern) leg at the intersection of Sparks Road and Woongarrah Road;
- traffic signals at the intersection of Woongarrah Road and Cardiff Avenue; and
- traffic signals at the intersection of Woongarrah Road and Gibraltar Road.

7.24 The DCP identified traffic signals at the intersections of Woongarrah Road with Cardiff Avenue and Gibraltar Road, based on the previously approved development

on the subject site, resulting in much higher traffic flows on Woongarrah Road. The traffic assessment in Section 7.22 has identified that in the short term (with existing and proposed development traffic) that these intersections would operate at satisfactory levels of service under the existing priority controls. As such the requirement and timing of traffic signals at these intersections should be assessed as future development in the area occurs.

7.25 To assess future traffic conditions, TfNSW has provided 2031 weekday morning and afternoon traffic flows at the intersection of Sparks Road and Woongarrah Road which includes the proposed fourth (southern) leg to the intersection. These traffic flows include traffic generated by the previously approved larger retail development of some 29,442m^2. These traffic flows have been adjusted to reflect the smaller scale of development on the site (a reduction of some 200 and 400 vehicles per hour (two way) in the weekday morning and afternoon peak hours respectively).

7.26 The intersection of Sparks Road and Woongarrah Road has been reanalysed for the future traffic conditions, including the addition of the fourth (southern) leg with the 2031 traffic flows provided by TfNSW. The analysis found that the intersection would operate with average delays of less than 45 seconds per vehicles during the weekday morning and afternoon peak periods. This represents a level of service C/D, a satisfactory level of service.

7.27 SIDRA movement summaries are provided in Appendix B

7.28 Therefore, the future road network will be able to cater for traffic generated by the proposed shopping centre.

8. DRAFT CONSTRUCTION TRAFFIC MANAGEMENT PLAN

8.1 A draft construction traffic management plan (CTMP) has been prepared. The construction methodology, process and staging for the proposed shopping centre has not yet been precisely defined. The successful builder / contractor will be responsible for the preparation of a construction traffic management plan, which will be prepared prior to the commencement of work, taking into account relevant consent conditions.

8.2 The CTMP will be prepared in consultation with the Central Coast Council and TfNSW, and will include the following:

- location of all proposed work zones;
- proposed crane locations and methods of erection and dismantling;
- haulage routes;
- construction vehicle access arrangements;
- proposed construction hours;
- construction fencing and hoardings;
- estimated number and type of construction vehicle movements including morning and afternoon peak and off peak movements;
- construction program highlighting details of peak construction activities and proposed construction staging;
- identify any potential impacts to general traffic, cyclists, pedestrians and bus services within the vicinity of the site from construction vehicles, during the period of construction;
- identify measures to mitigate any associated impacts, including signage, traffic management and traffic control.

Overall Principles for Traffic Management

8.3 The overall principles for traffic management during construction are:

- minimise effects on pedestrian and cyclist movements and amenity;
- manage and control vehicular movements to and from the site;
- maintain traffic capacity at intersections and mid-block around the site;
- restrict vehicle activity to designated truck routes through the area;
- maintain safety for workers;
- provide appropriate access to the site for construction traffic; and
- manage and control construction vehicle activity in the vicinity of the site.

Hours of Work

8.4 Subject to conditions of consent, work associated with construction activities will be carried out between the following hours:

- Monday to Friday: - 7:00am to 7:00pm;
- Saturday: - 7:00am to 5:00pm; and
- Sunday/public holidays: - No work.

8.5 These hours will be subject to DPE approval. Work outside these hours may be undertaken, subject to prior approval from the Planning Secretary and Central Coast Council, if works are inaudible, or if NSW Police require deliveries outside normal business hours due to safety concerns.

8.6 All work including excavation and construction work during the approved hours will be carried out in accordance with the conditions of consent and the Australian Standard AS2436.10 Guide to Noise Control and Construction, Maintenance and

Demolition Sites. The site contractor will be responsible to instruct and control all workers and sub-contractors regarding the hours of work.

Construction Access and Truck Routes

8.7 During excavation and construction, trucks removing spoil and transporting material to the site will be accommodated on-site. Access to and from the site will be provided from Woongarrah Road, via temporary construction access driveways. Access arrangements and vehicle movements to and from the site will be managed by qualified traffic controllers. They will ensure that access driveways are kept clear at all times to allow trucks unobstructed access to the site.

8.8 The construction access driveways will provide appropriate sight lines for construction vehicle access, with regards to the number, type and size of construction vehicles. Pedestrian warning signs will be erected adjacent to the driveways and on pedestrian paths adjacent to the construction activity, in accordance with SafeWork NSW requirements.

8.9 Traffic movements on surrounding roads and continued access to adjacent properties will be maintained during construction. Trucks will enter and exit the site in a forward direction. They will be restricted to designated truck routes and will be confined to the main road network in the vicinity of the site.

8.10 The proposed truck routes are shown on Figure 6, These roads include Woongarrah Road, Sparks Road and Pacific Highway. Truck drivers will be advised of the presence of traffic controls and of the designated truck routes through the area.

8.11 All traffic controllers will be fully qualified with the relevant TfNSW Traffic Controllers qualifications.

Construction Traffic Effects

8.12 The number of vehicles generated during the various stages of construction will be determined when the construction methodology, process and staging is finalised by the builder. The peak construction traffic activity will generally occur during bulk excavation, with the removal of excavated material from the site, and during concrete pours, with the delivery of concrete to the site.

8.13 It is anticipated that there will be up to three to four concrete pours per week. For construction projects this size, concrete pours will range from some 10 to 15 concrete trucks for small to moderate pours and some 30 to 40 concrete trucks for large pours. This traffic generation translates to an average of some six to eight trucks per jour (two-way) over the day, entering and exiting the site for large pours.

8.14 At other times during construction, the number of trucks associated with the delivery of reinforcement, formworks, blockwork and other construction materials including removal of waste bins, will be lower at some 15 to 20 trucks per day.

8.15 These are relatively modest traffic flows. Th surrounding road network will be able to accommodate this construction traffic. Notwithstanding this, construction traffic will be managed to minimize the overall traffic effects.

Construction Workers

8.16 The number of construction workers will be determined when the construction methodology, process and staging is finalised by the builder. Appropriate amenities

and construction worker parking will be provided on site. Site sheds and on-site storage facilities, for the storage of tools, will also be provided.

8.17 Construction workers will be required to undergo site induction before access to the site is permitted. They will be advised of the presence of the traffic controllers and of the construction traffic management procedures to be adopted for the site. Construction workers will also be issued with public transport timetables, to encourage the use of public transport.

Pedestrians and Cyclists

8.18 No construction vehicles will be parked, nor will material/equipment be stored on the public footpaths adjacent to the site. Appropriate construction fence/hoarding will be erected around the perimeter of the site. The design, set-out and erection of the construction safety fence/hoarding and access to the site will be the responsibility of the site contractor/builder.

8.19 The openings in the construction fencing at the construction access driveways will be managed and controlled by qualified traffic controllers. Pedestrian warning signs will be erected adjacent to the driveways, in accordance with SafeWork NSW requirements.

8.20 The movement of trucks entering and exiting the site, and the movement of pedestrians across the construction access driveways when in use, will be managed and controlled by traffic controllers.

Community Public Consultation

8.21 In regard to community public consultation process relating to the site preparation, excavation and construction activity, the appointed builder/contractor will undertake meetings and discussions with Central Coast Council and other authorities. A line of communication will be established between the builder and the various stakeholders to discuss the proposed construction staging.

8.22 In addition, the builder/contractor will establish a 24 hour feedback telephone hotline and complaints register and establish procedures to respond to issues raised by stakeholders, public and community groups. A dedicated website will be established containing information about the project, status of work and other relevant notices.

Draft Construction Traffic Management Plan

8.23 The draft construction traffic management plan for construction includes the principles of traffic management and is subject to SafeWork NSW requirements, as well as survey and final design.

8.24 The appointed builder/contractor will be responsible for the preparation of a detailed construction traffic management plan, to incorporate these principles and refine the construction methodology, staging and timing.

8.25 Site operations, signage, construction fencing/hoarding, overhead protection, safety barriers and line marking detail will be provided in accordance with Australian Standards and the TfNSW Manual for Traffic Control at Work Sites. A copy of the traffic management plan will be kept on-site at all times. Signage details, traffic

management, the control of pedestrians in the vicinity of the site, and the control of trucks to and from the site will be the responsibility of the site contractor.

8.26 The draft construction traffic management plan includes the following:

- all construction activity to be provided for on-site;
- the construction activity to be coordinated with the construction of other developments in the vicinity of the site;
- construction vehicle access to be provided from Woongarrah Road;
- construction fencing/hoarding and scaffolding to be erected around the construction site;
- construction work to be restricted to the approved hours of construction. Any work outside the approved hours would be subject to prior approval from Central Coast Council and DPE;
- the movement of trucks entering and exiting the site to be managed and controlled by traffic controllers in accordance with a safe work method statement and appropriate traffic control plans;
- construction vehicles will include single unit dump truck, truck and trailer combinations, concrete trucks, large rigid delivery trucks and articulated vehicles;
- truck movements to and from the site to be restricted to the designated truck route;

- trucks to enter and exit the site in a forward direction;

- openings to be provided in the construction fence for access to the site for construction vehicles;

- traffic controllers to ensure that the construction access driveways are kept clear at all times, to allow trucks unobstructed access to the site;

- the management of the site works will be the responsibility of the site contractor/builder;

- pedestrian and cyclist warning signs to be utilised in the vicinity of the site;

- pedestrian arrangements, construction activity and erection of safety fencing will be provided in accordance with SafeWork NSW requirements;

- the construction site manager/builder to be responsible for the management of the site, the movement of trucks on and off the site, signage detail, traffic management and the control of pedestrians/cyclists; and

- construction signage to be provided in accordance with Australian Standards and the TfNSW Manual for Traffic Control at Work Sites.

9. CONSULTATION WITH AUTHORITIES

9.1 Woolworths and Colston Budd Rogers & Kafes Pty Ltd (CBRK) have undertaken consultation with TfNSW and Central Coast Council.

9.2 Following a meeting with TfNSW on 8 April 2024, TfNSW identified a number of traffic matters to be addressed in the traffic report. A summary of the matters raised by TfNSW and the responses are set out below in Table 9.1.

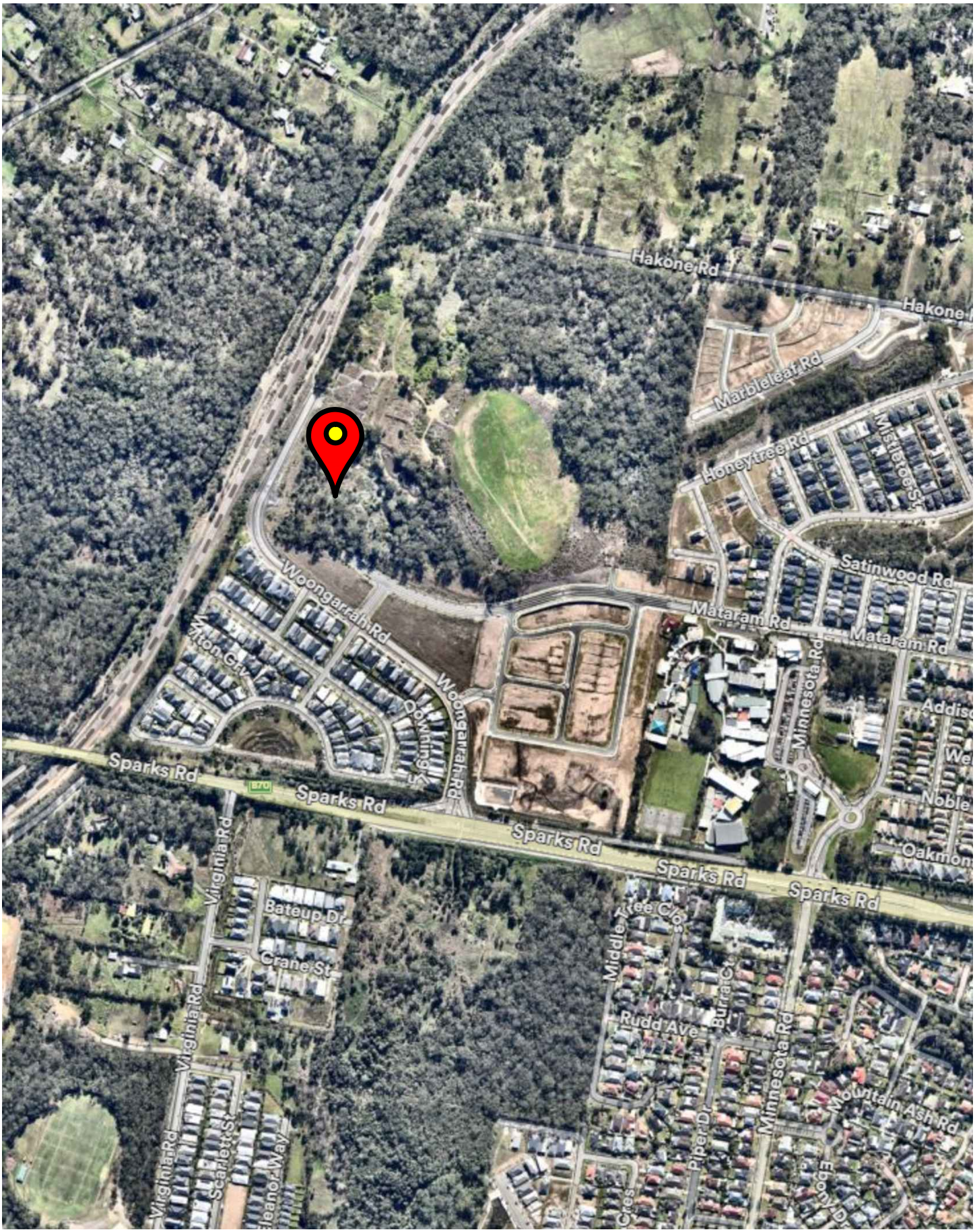
Table 9.1	**Response to Traffic Matters Raised by TfNSW**
Matter Raised:	*Response*
1. The Central Coast Development Control Plan (DCP) 2012 outlines that a signalised intersection will be required along Woongarrah Road. Discussions around the requirement of this should be directed towards Central Coast Council.	**Response:** The traffic assessment set out Chapter 7 has identified the with proposed development in place, traffic signals are not required at the intersections along Woongarrah Road.
2. The SIDRA modelling has been reviewed by TfNSW. Comments are provided in the attached Excel spreadsheet.	**Response:** SIDRA modelling has been updated to reflect these comments.
3. The traffic volumes have been taken on a Friday. The *RTA Guide to Traffic Generating Developments 2002* outlines that the highest daily traffic generation usually occurs on a Thursday. The traffic volumes should be retaken on a Thursday to show the worst-case scenario.	**Response:** Traffic volumes were taken on Thursday 8 August 2019. These were updated to reflect 2024 traffic flows.
4. The provided Traffic Impact Assessment (TIA) was prepared in June 2011 and does not accurately	**Response:** This report is an updated TIA that addresses these matters in Chapters 3, 4, 5, 6, 7 and 8.

reflect the current environment or traffic conditions. A new TIA will need to be prepared, and should include the following: a. A map of the surrounding road network identifying the site access, nearby accesses, intersections and transport related facilities. b. The total impact of existing and proposed development on the road network with consideration for a 10-year horizon. This should include; i. Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections. ii. Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon. iii. The volume and distribution of existing and proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly	

where they coincide with the network peak hour. iv. The type and frequency of design vehicles accessing the development site c. Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include sight distance, turn treatment warrants and swept path analysis. d. A review of crash data along the identified transport route/s for the most recent 5-year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056. e. Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit. f. Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.	

g. Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling. h. Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s. i. Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017.	

9.3 A pre-DA meeting was held with Central Coast Council on 8 May 2024. Traffic matters were not raised by Council at the meeting.



Location Plan

Colston Budd Rogers & Kafes Pty Ltd

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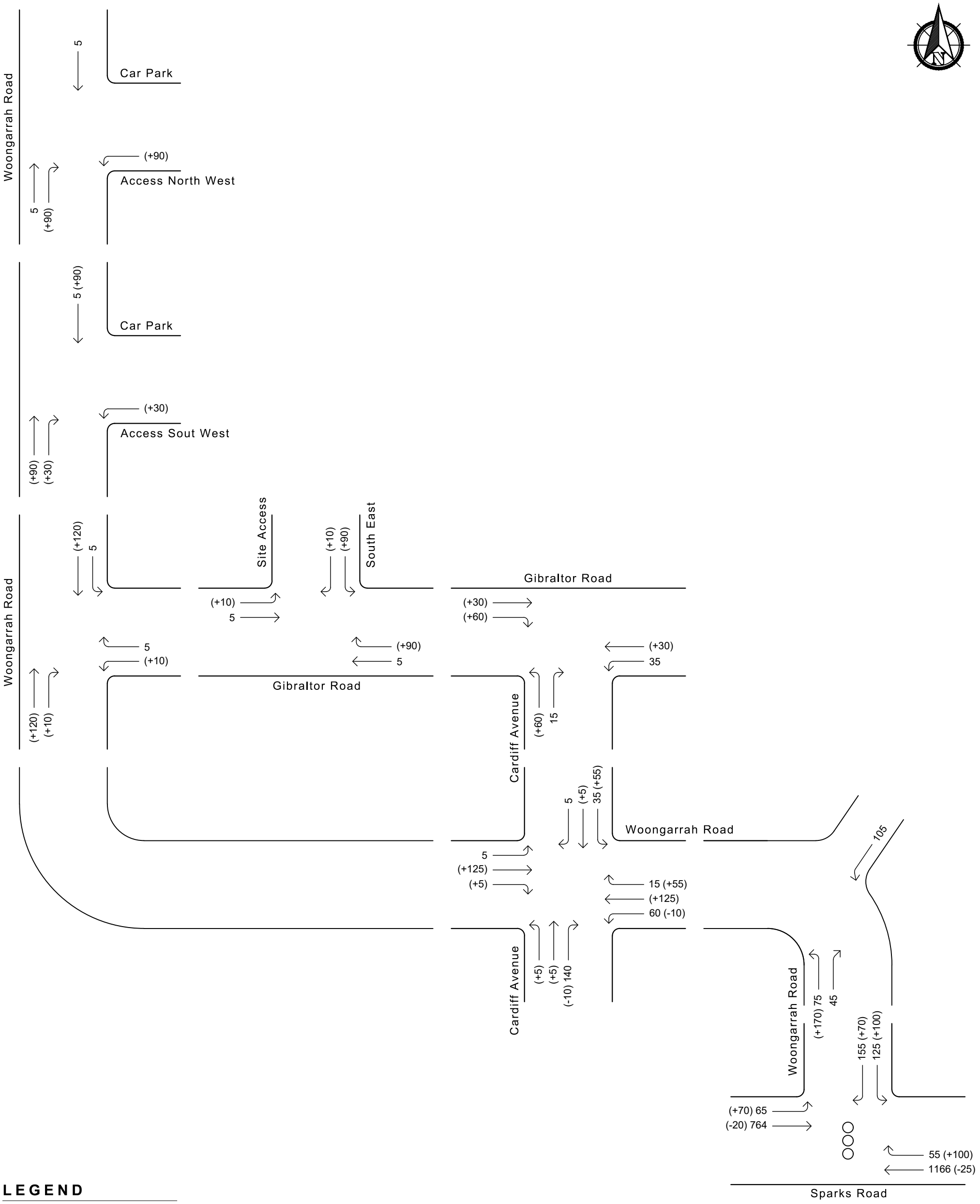
Figure 1



LEGEND

100 - Base (2024) Peak Hour Traffic Flows
(+10) - Additional Development Traffic
- Traffic Signals

Base (2024) weekday morning peak hour traffic flows plus development traffic

Figure 2

Colston Budd Rogers & Kafes Pty Ltd

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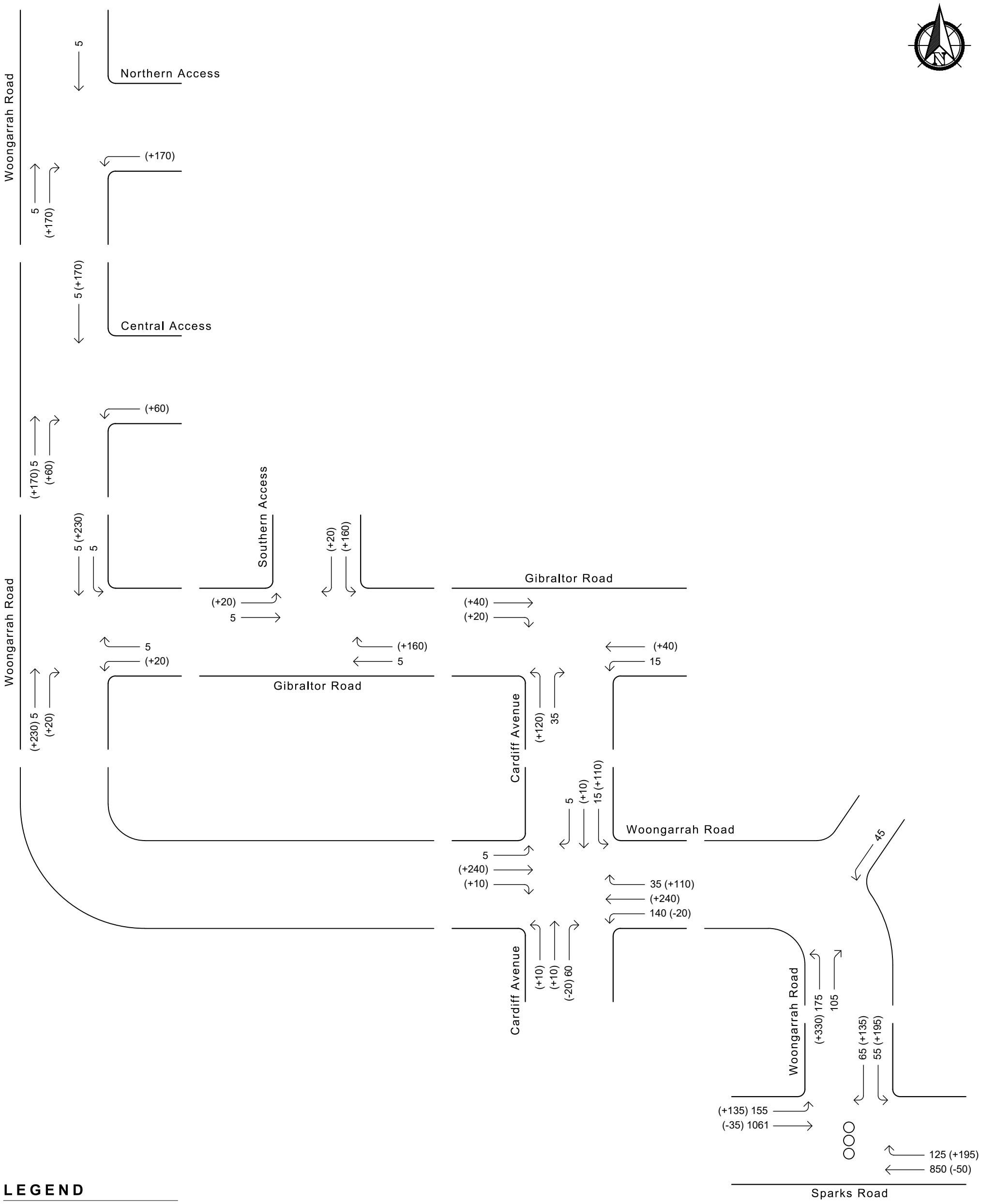

LEGEND

100 - Base (2024) Peak Hour Traffic Flows
(+10) - Additional Development Traffic
- Traffic Signals

Base (2024) weekday afternoon peak hour traffic flows plus development traffic

Figure 3

Colston Budd Rogers & Kafes Pty Ltd

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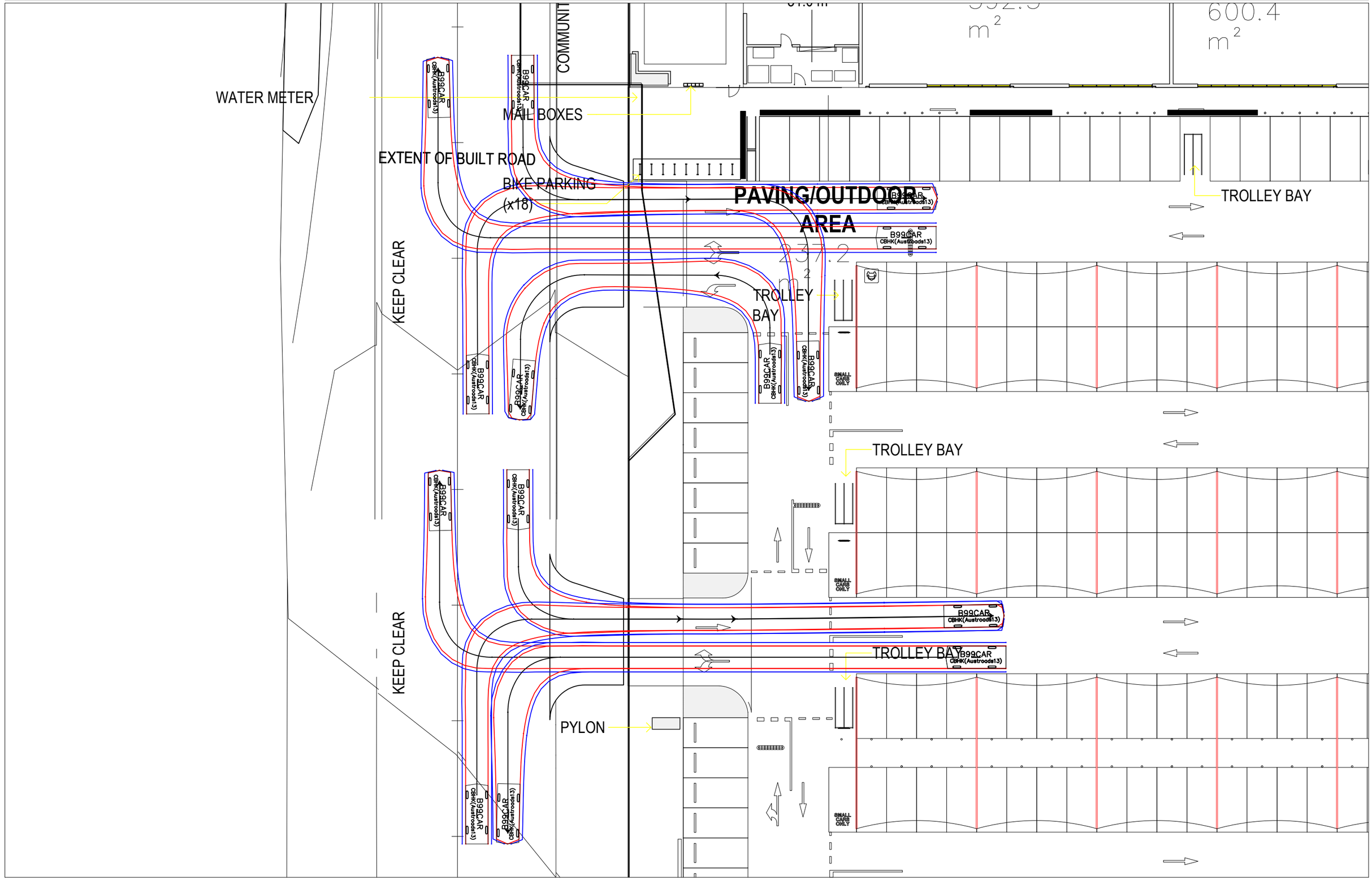
APPENDIX A

VEHICLE SWEPT PATHS



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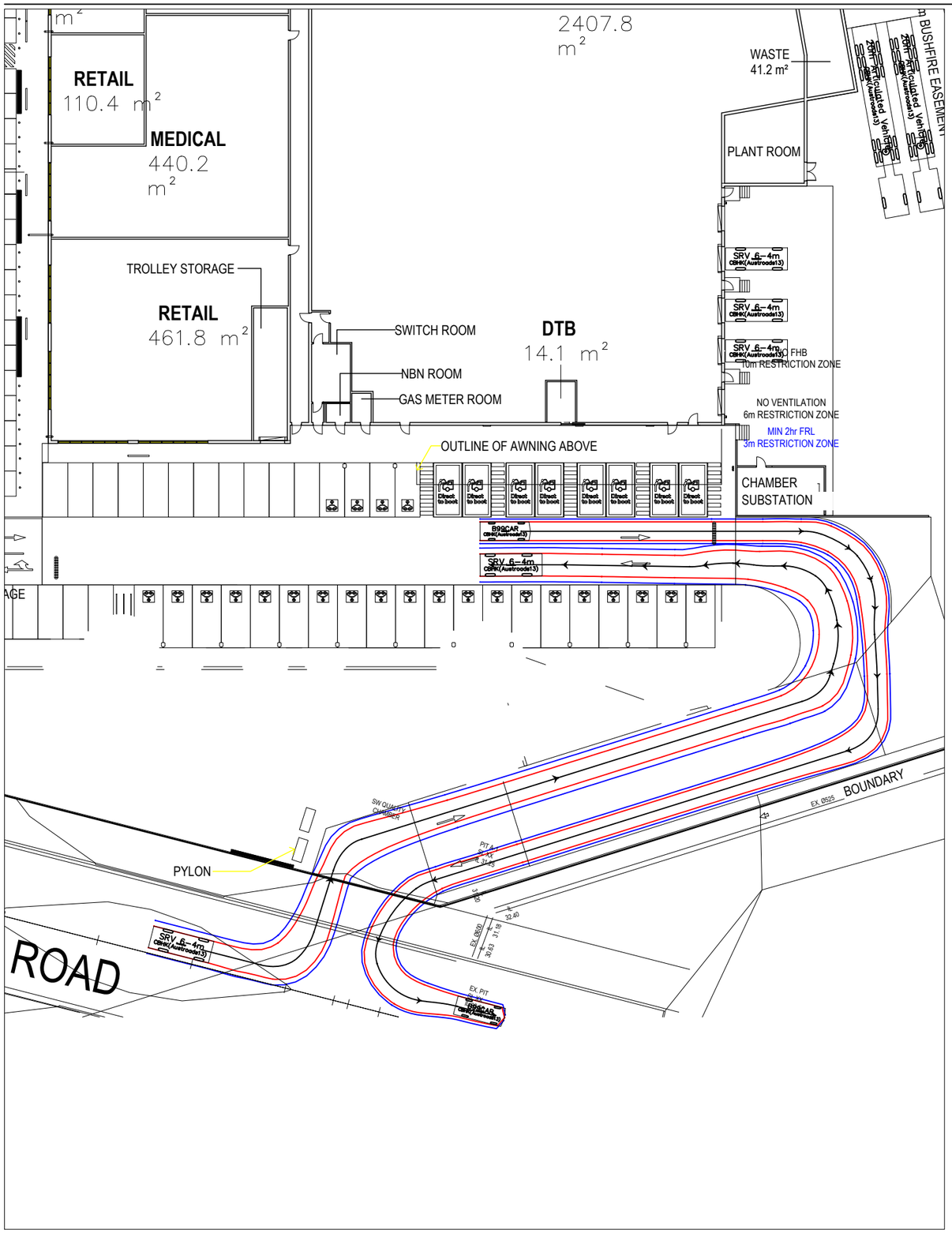
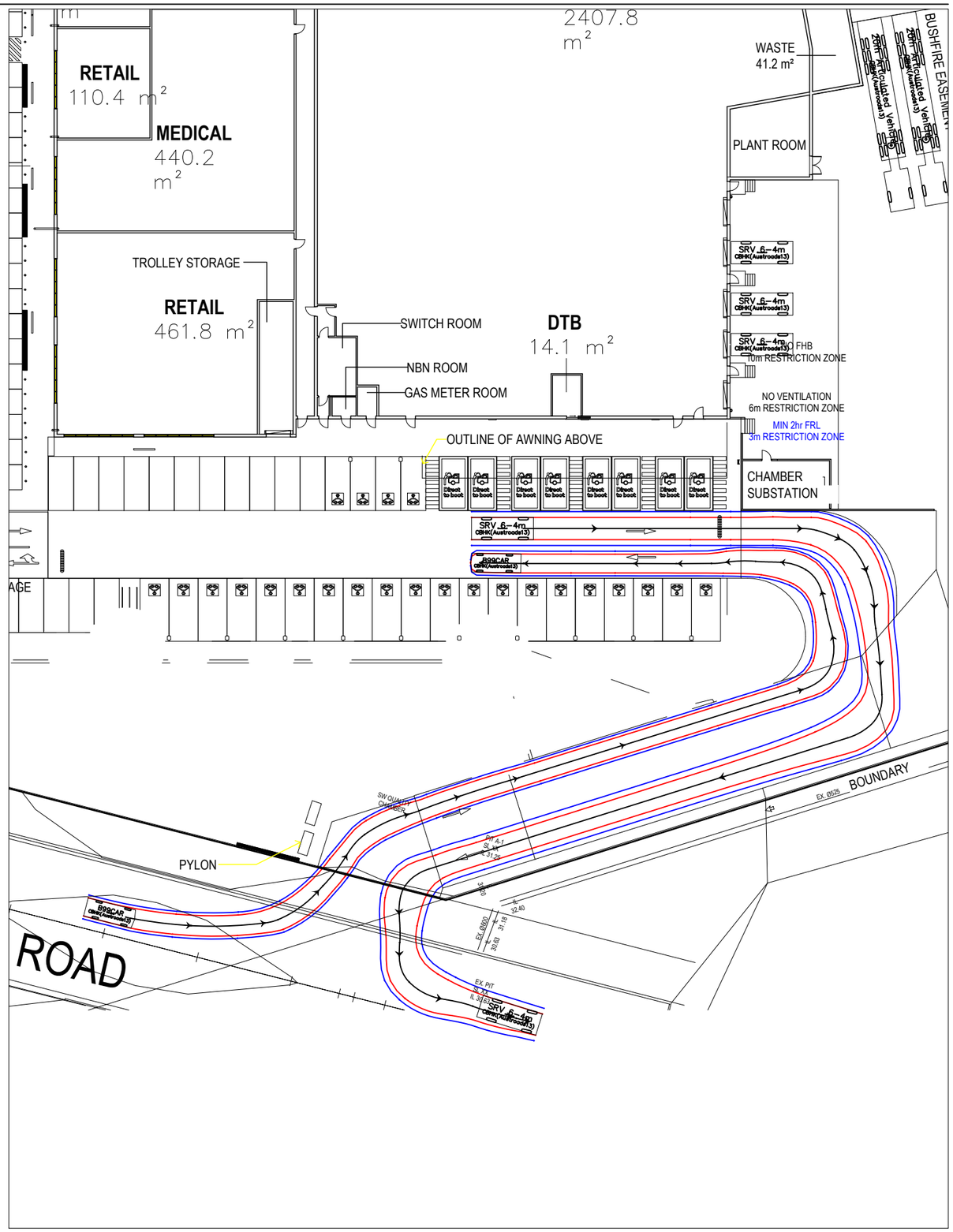
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A1





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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 & 6.4m SMALL RIGID VEHICLE SWEPT PATHS

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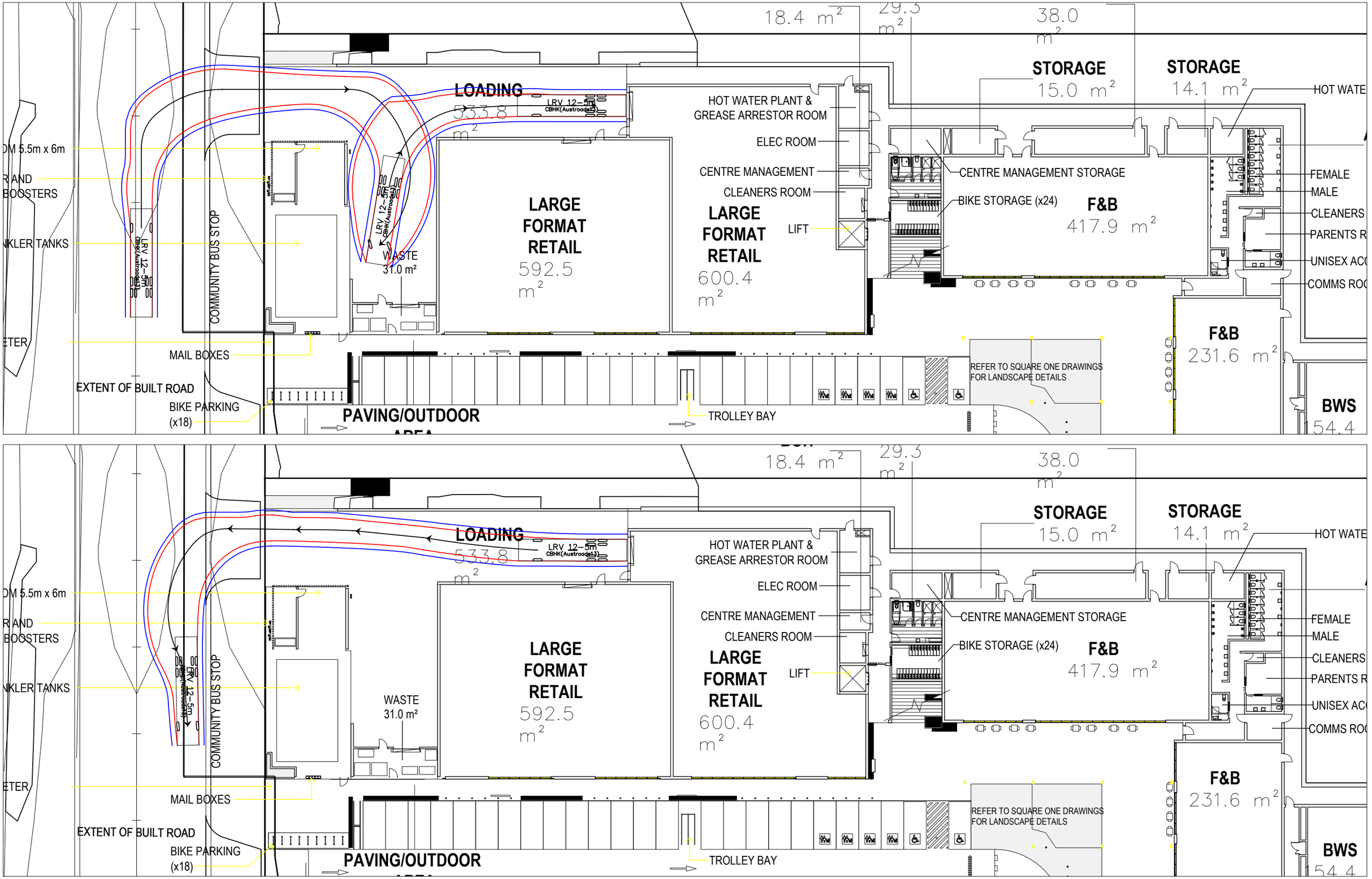
A2



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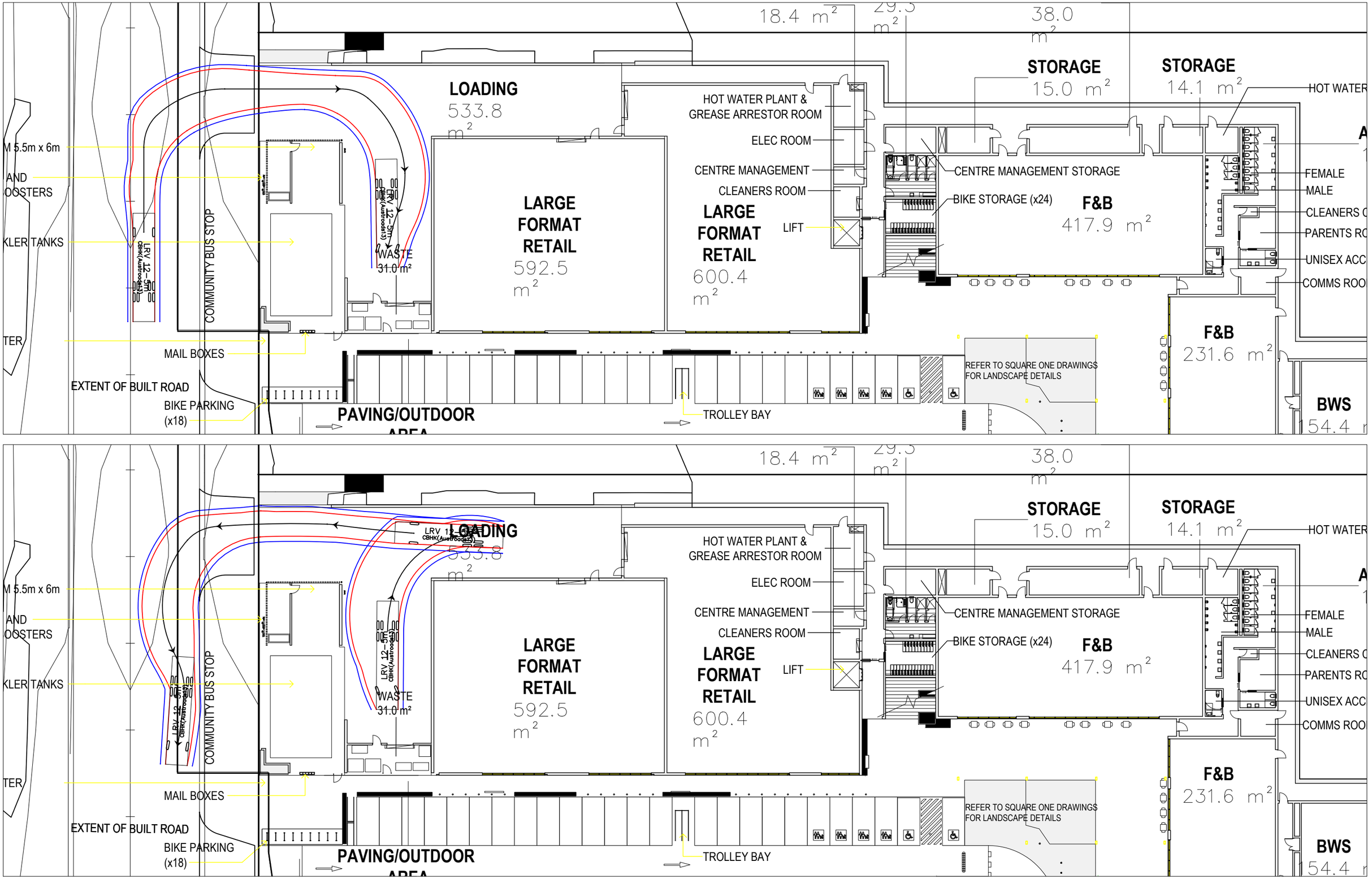
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

12.5m LARGE RIGID VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A3



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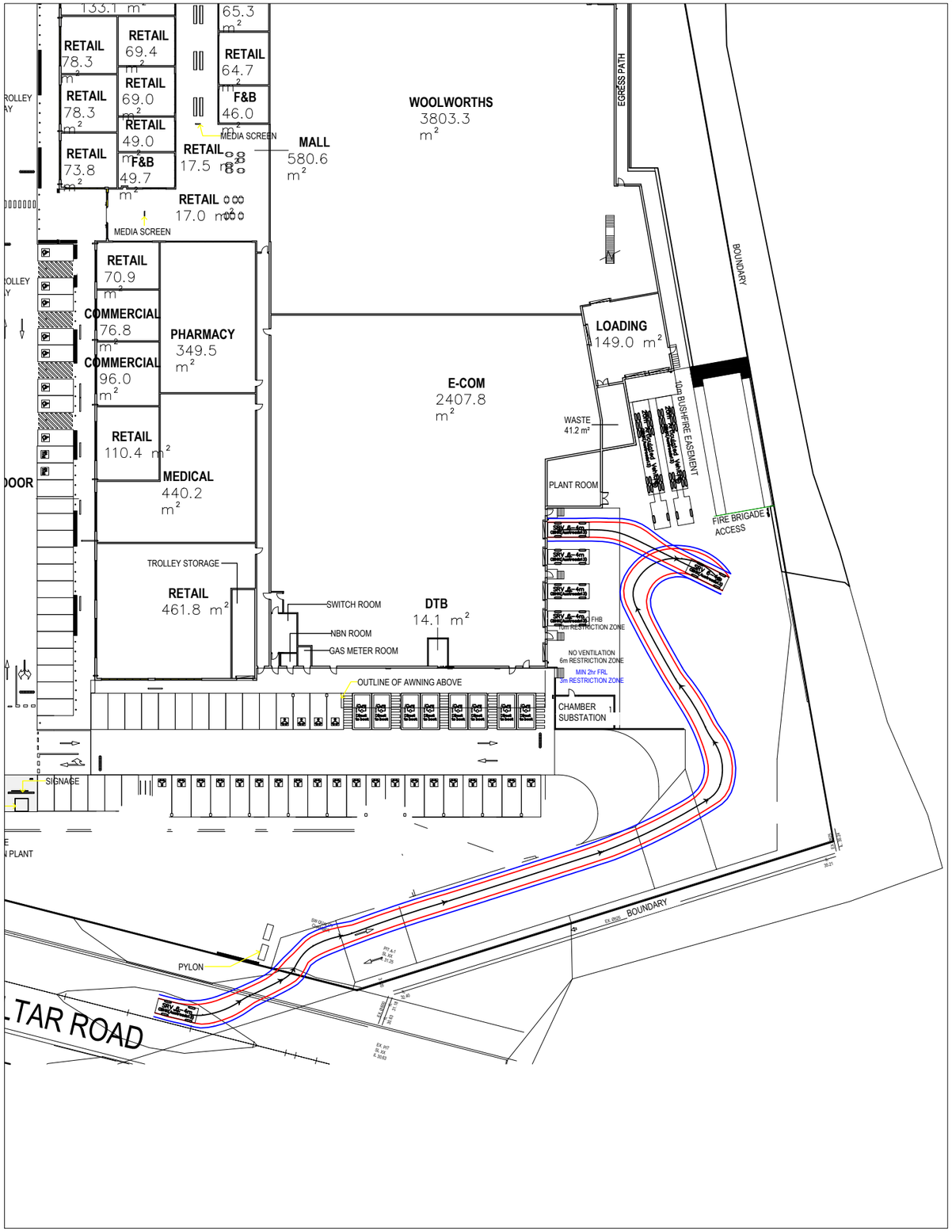
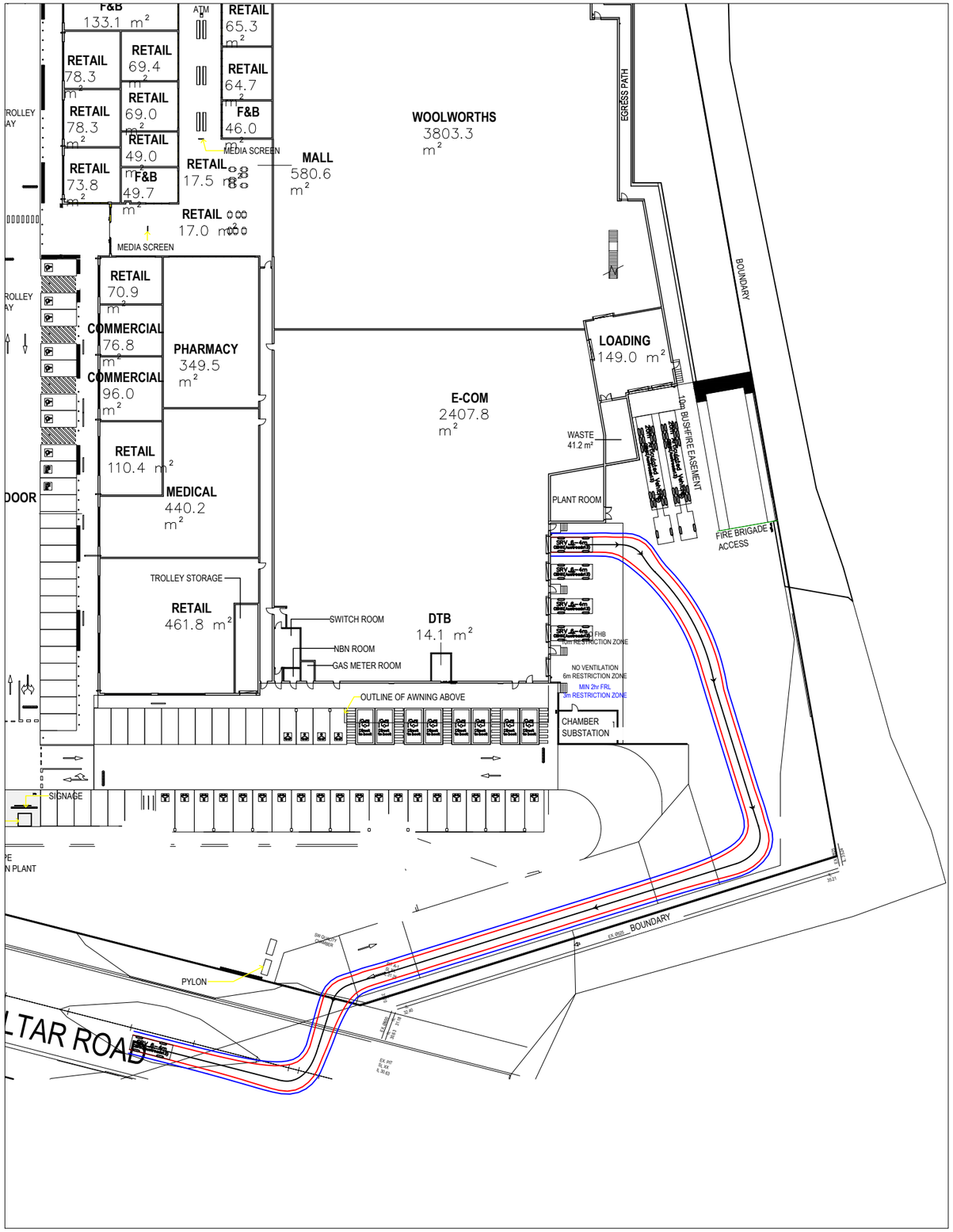
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

12.5m LARGE RIGID VEHICLE SWEPT PATHS (WASTE COLLECTION)

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A4





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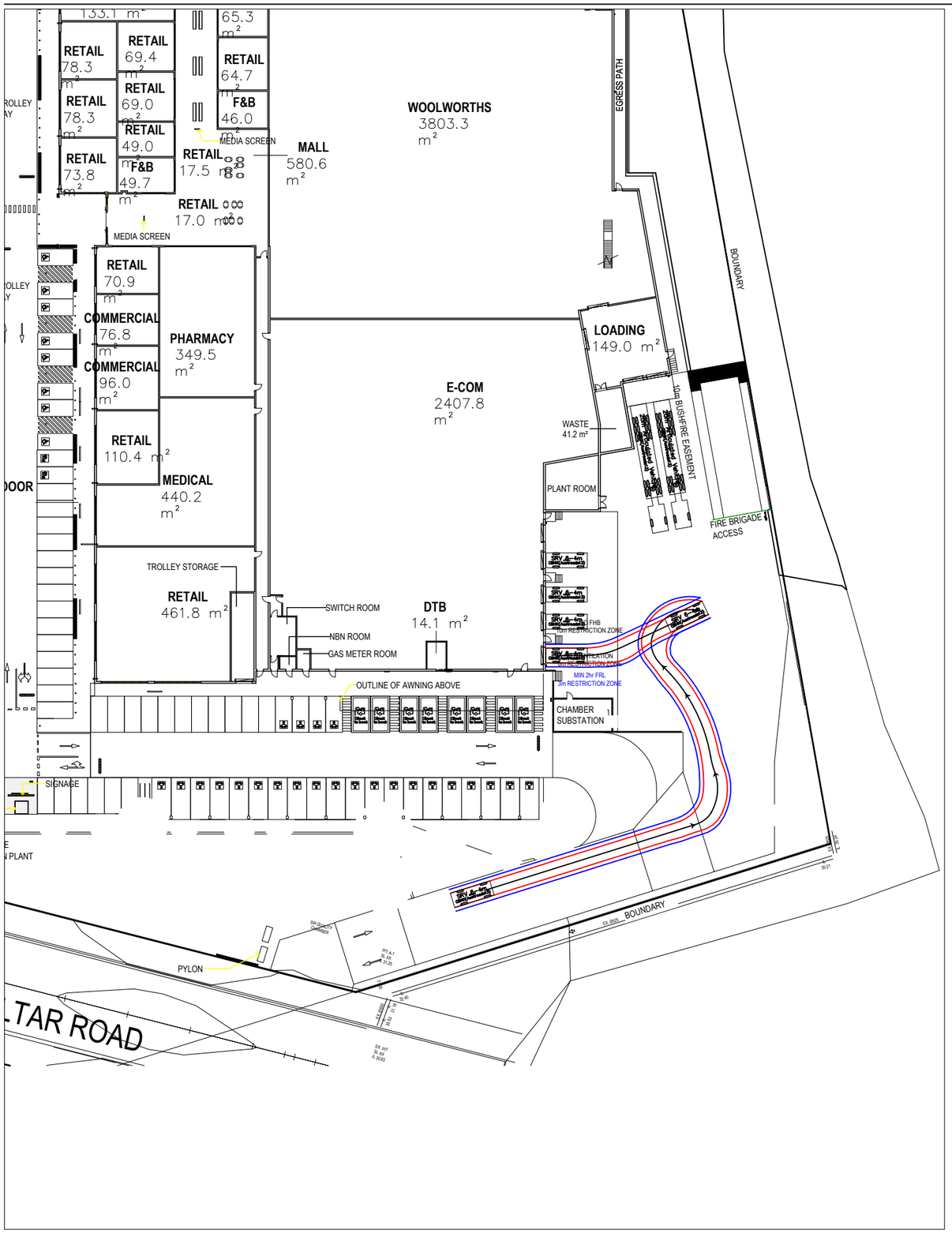
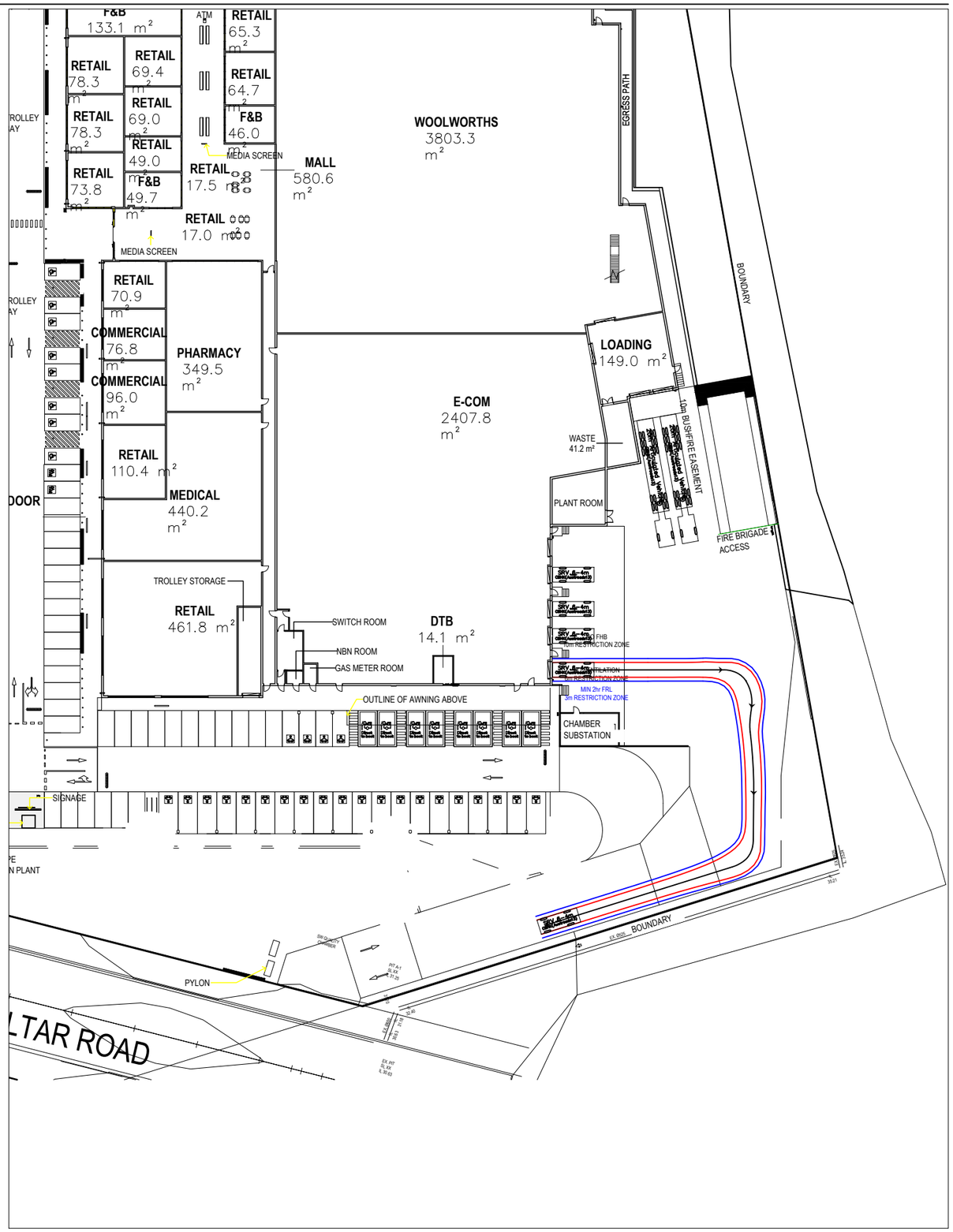
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

6.4m SMALL RIGID VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A5





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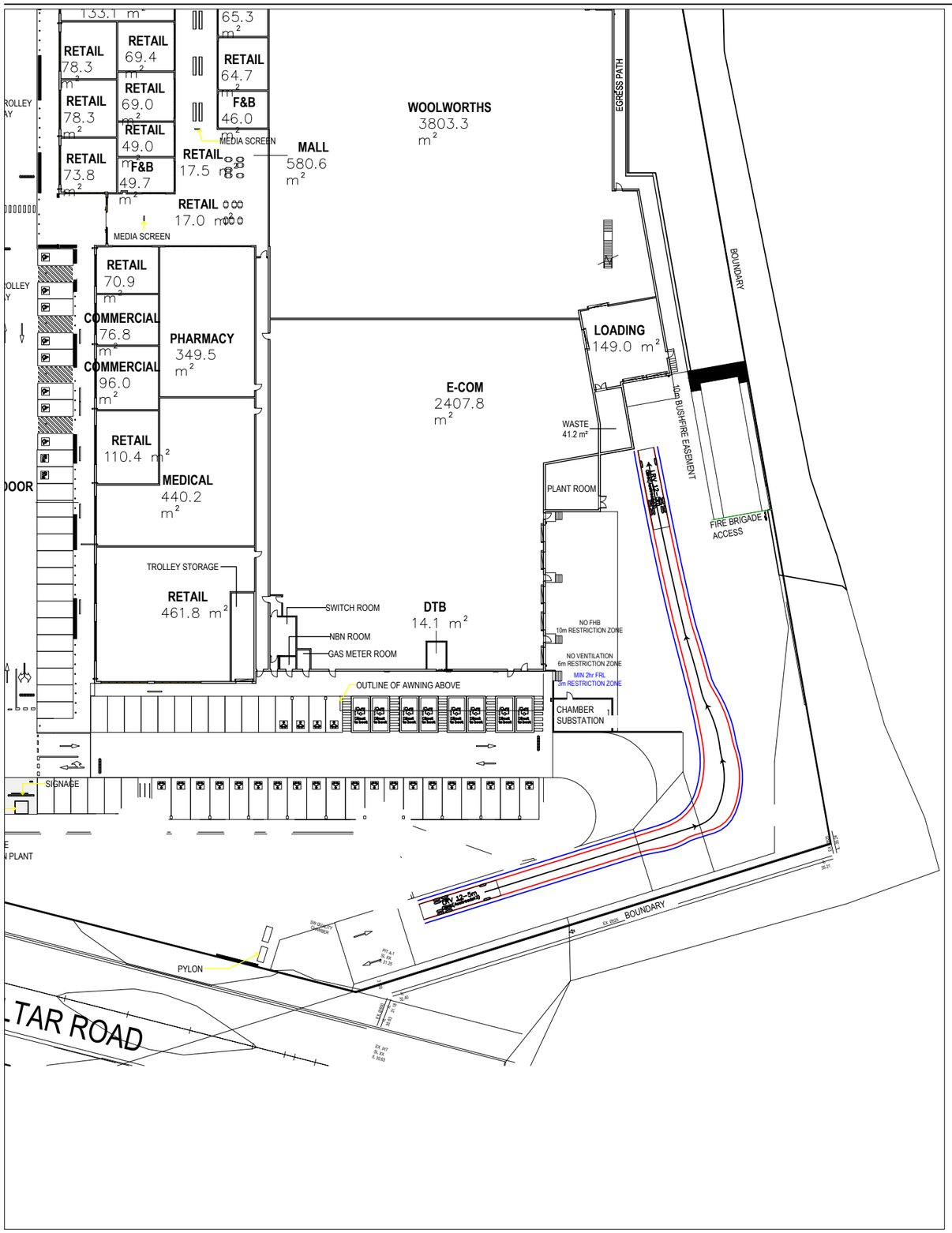
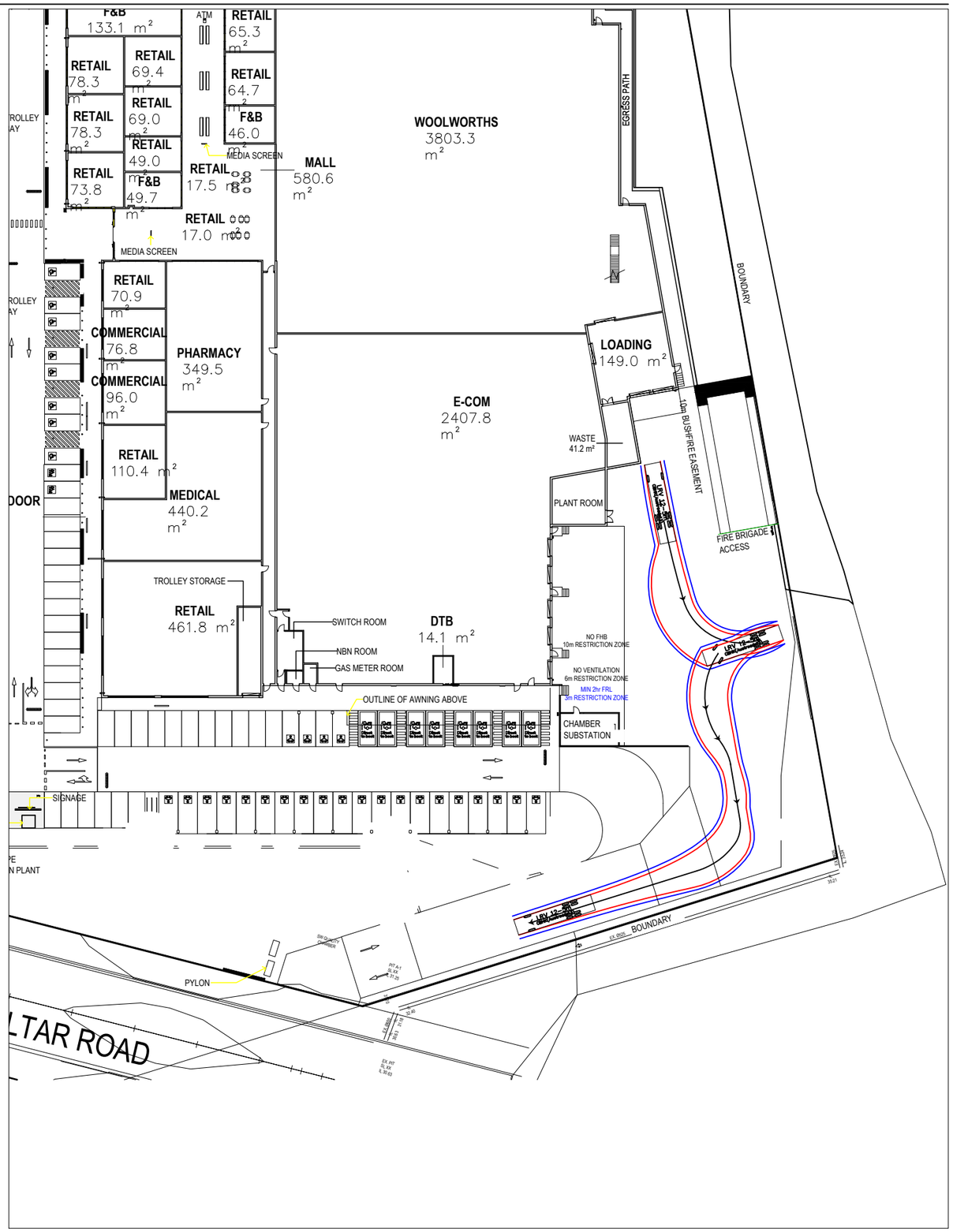
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

6.4m SMALL RIGID VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A6





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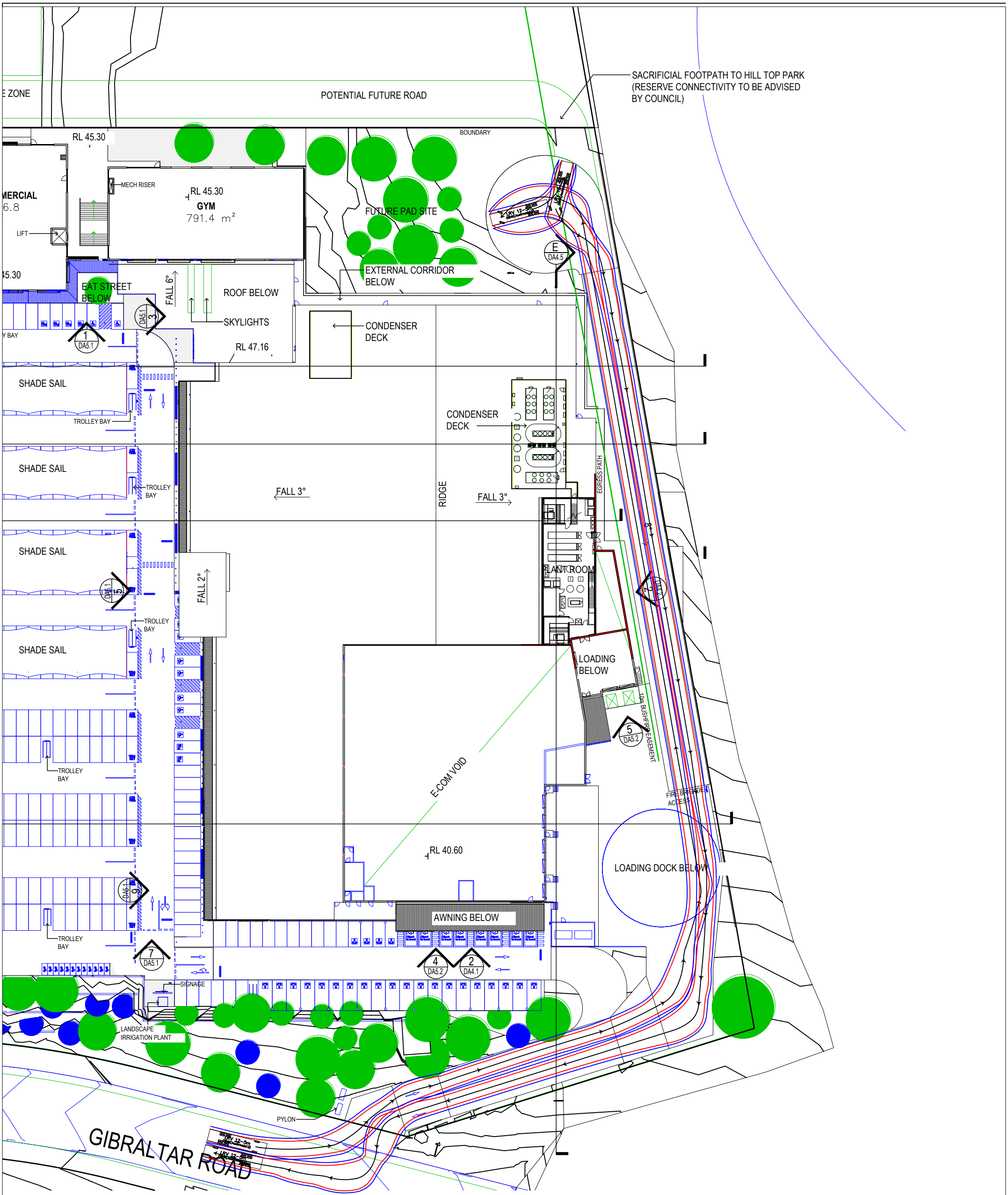
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

12.5m LARGE RIGID VEHICLE SWEPT PATHS (WASTE COLLECTION)

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A7



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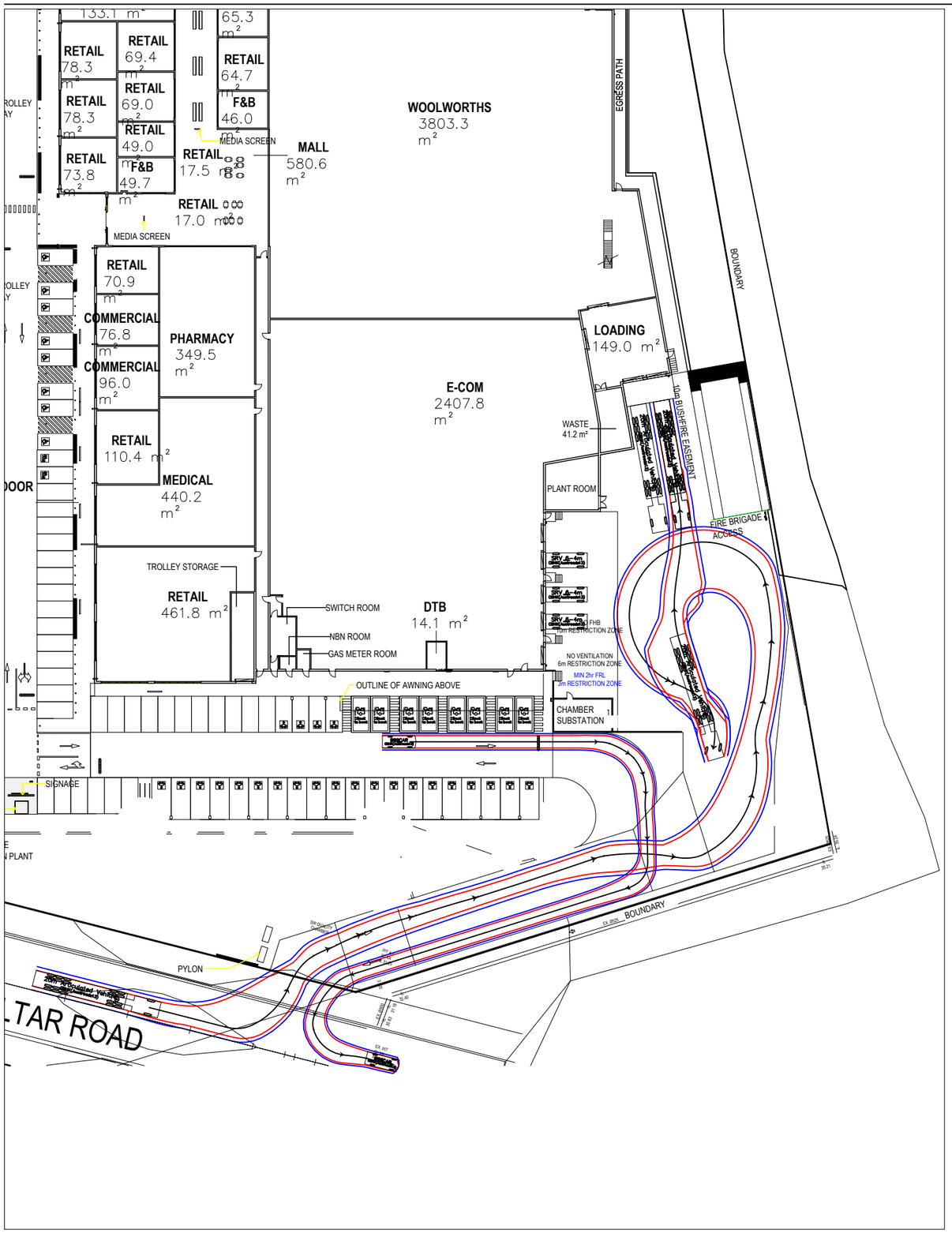
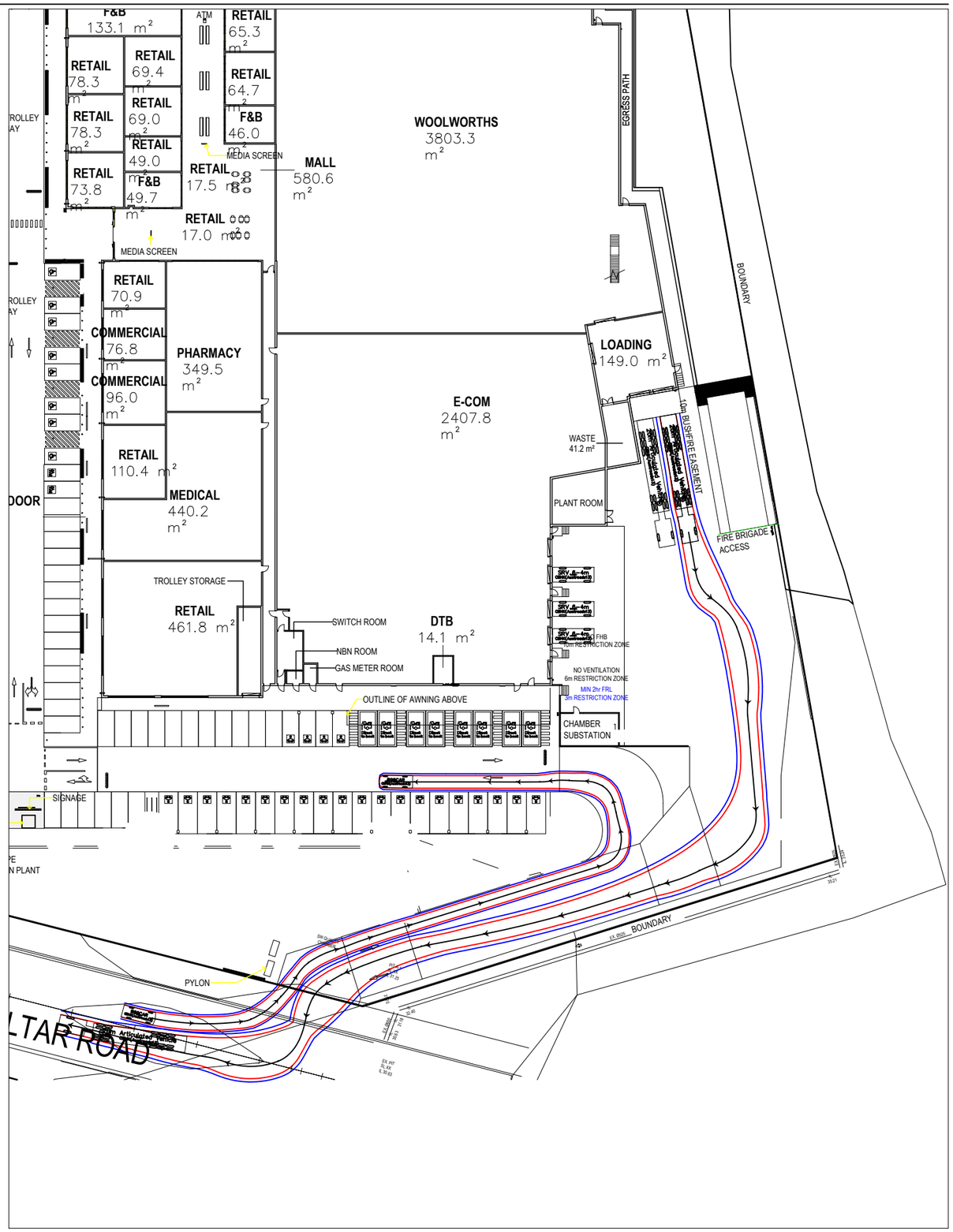
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

12.5m LARGE RIGID VEHICLE SWEPT PATHS (SPECIALIST FIRE APPLIANCE)

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A8





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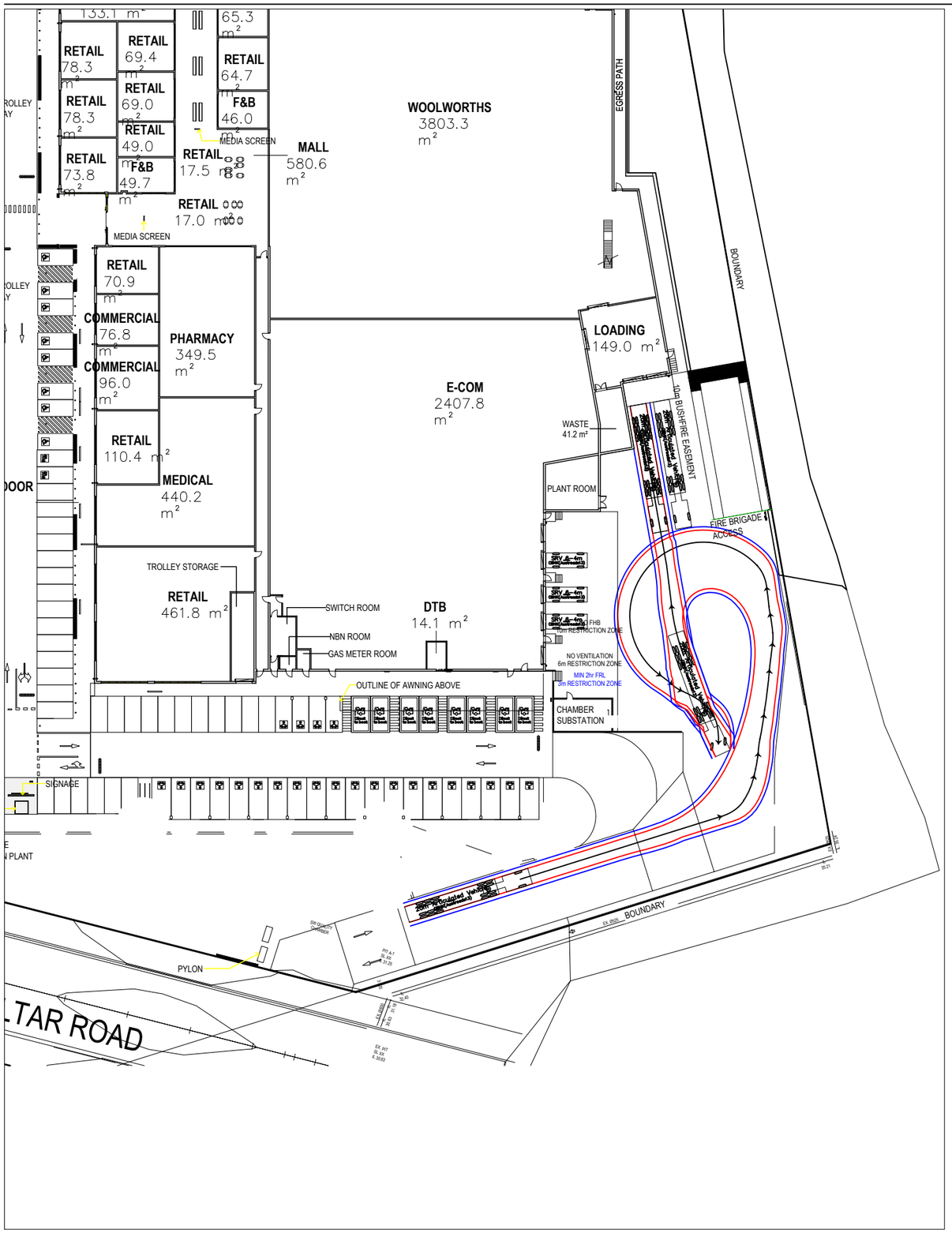
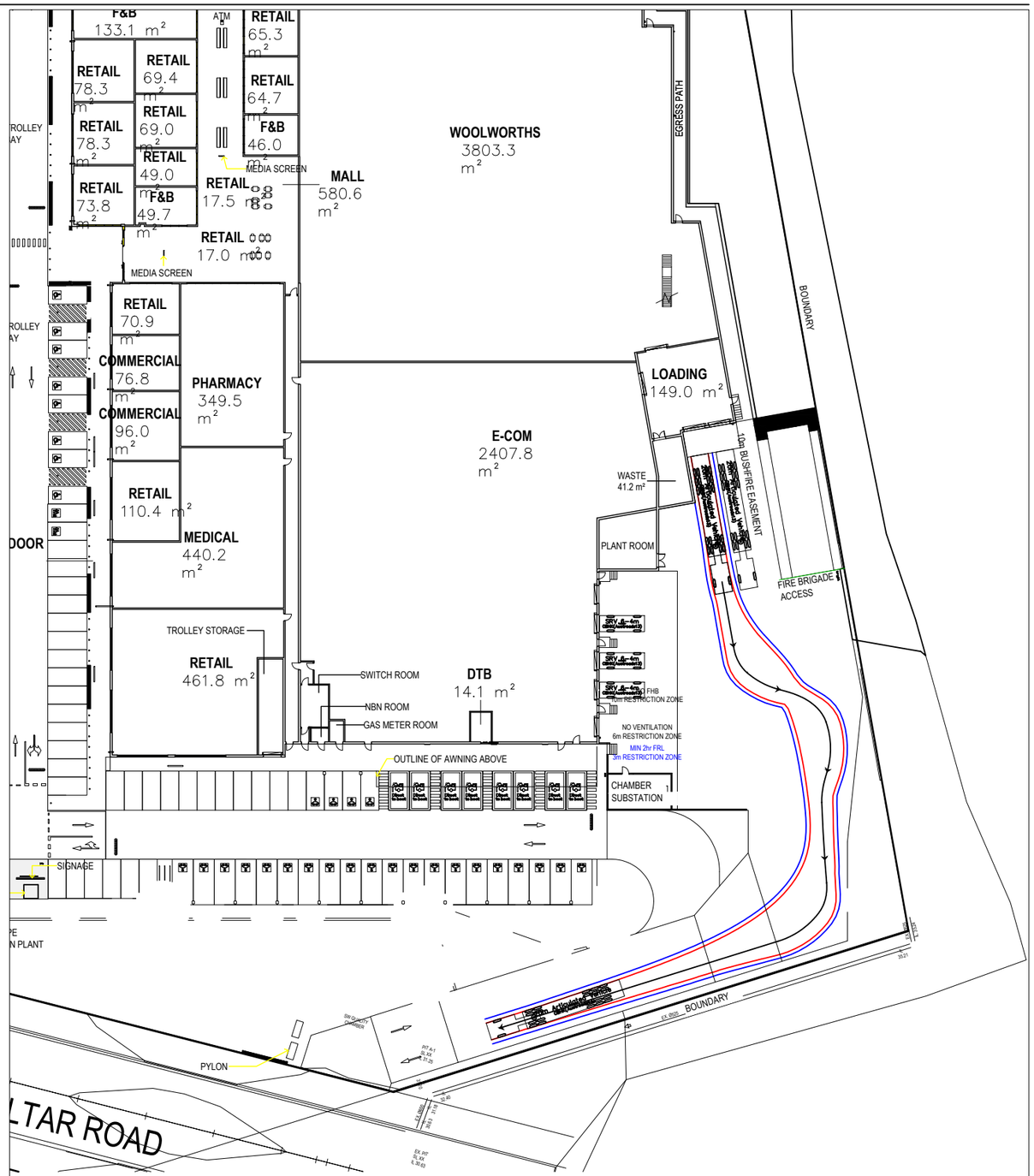
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 & 19.0m ARTICULATED VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A9





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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

19.0m ARTICULATED VEHICLE SWEPT PATHS

DRAWN BY CBRK Pty Ltd_mc Ref: 12232 25.03.2025

A10

APPENDIX B

SIDRA MOVEMENT SUMMARIES

USER REPORT FOR SITE

All Movement Classes

Project: Sparks Road - Woongarrah Road 240626 | **Template: Movement Summaries**

Site: 101 [AM 2024 - Sparks Road - Woongarrah Road (Site Folder: AM 2024)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Trailing Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sparks Road														
5	T1	1166	6.0	1227	6.0	* 0.454	0.4	LOS A	1.1	7.8	0.04	0.04	0.04	69.4
6	R2	55	2.0	58	2.0	0.318	58.3	LOS E	1.8	12.5	0.99	0.72	0.99	31.6
Approach		1221	5.8	1285	5.8	0.454	3.0	LOS A	1.8	12.5	0.08	0.07	0.08	65.9
North: Woongarrah Road														
7	L2	125	2.0	132	2.0	0.128	34.6	LOS C	2.4	17.1	0.78	0.73	0.78	39.2
9	R2	155	2.0	163	2.0	* 0.278	46.3	LOS D	3.6	25.5	0.92	0.76	0.92	34.6
Approach		280	2.0	295	2.0	0.278	41.1	LOS C	3.6	25.5	0.86	0.75	0.86	36.5
West: Sparks Road														
10	L2	65	2.0	68	2.0	0.043	7.2	LOS A	0.2	1.7	0.14	0.62	0.14	56.6
11	T1	764	7.7	804	7.7	0.361	10.8	LOS A	9.9	73.7	0.55	0.48	0.55	58.0
Approach		829	7.3	873	7.3	0.361	10.6	LOS A	9.9	73.7	0.52	0.49	0.52	57.9
All Vehicles		2330	5.9	2453	5.9	0.454	10.3	LOS A	9.9	73.7	0.33	0.30	0.33	57.5

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

* Critical Movement (Signal Timing)

Site: 101 [PM 2024 - Sparks Road - Woongarrah Road (Site Folder: AM 2024)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Trailing Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sparks Road														
5	T1	850	6.0	895	6.0	0.331	0.4	LOS A	0.6	4.7	0.03	0.03	0.03	69.5
6	R2	125	2.0	132	2.0	* 0.542	56.9	LOS E	4.0	28.3	0.99	0.76	1.00	32.0
Approach		975	5.5	1026	5.5	0.542	7.6	LOS A	4.0	28.3	0.16	0.12	0.16	60.4
North: Woongarrah Road														
7	L2	55	2.0	58	2.0	0.053	32.2	LOS C	1.0	7.1	0.74	0.69	0.74	40.2
9	R2	35	2.0	37	2.0	* 0.063	44.4	LOS D	0.8	5.5	0.88	0.69	0.88	35.2
Approach		90	2.0	95	2.0	0.063	36.9	LOS C	1.0	7.1	0.79	0.69	0.79	38.1
West: Sparks Road														
10	L2	155	2.0	163	2.0	0.107	7.7	LOS A	0.9	6.4	0.19	0.63	0.19	56.4
11	T1	1061	4.0	1117	4.0	* 0.507	13.3	LOS A	16.0	116.0	0.64	0.57	0.64	55.9
Approach		1216	3.7	1280	3.7	0.507	12.6	LOS A	16.0	116.0	0.58	0.58	0.58	55.9
All Vehicles		2281	4.4	2401	4.4	0.542	11.4	LOS A	16.0	116.0	0.41	0.39	0.41	56.7

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

* Critical Movement (Signal Timing)

Site: 101 [AM 2024 + Dev - Sparks Road - Woongarrah Road (Site Folder: AM 2024 + Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Trailing Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sparks Road														
5	T1	1141	6.0	1201	6.0	* 0.453	0.4	LOS A	1.0	7.6	0.04	0.04	0.04	69.4
6	R2	155	2.0	163	2.0	0.417	50.9	LOS D	4.6	32.7	0.95	0.77	0.95	33.8
Approach		1296	5.5	1364	5.5	0.453	6.5	LOS A	4.6	32.7	0.15	0.12	0.15	61.7
North: Woongarrah Road														
7	L2	225	2.0	237	2.0	0.186	29.9	LOS C	4.0	28.5	0.73	0.74	0.73	41.2
9	R2	225	2.0	237	2.0	* 0.407	47.4	LOS D	5.3	38.0	0.94	0.78	0.94	34.2
Approach		450	2.0	474	2.0	0.407	38.6	LOS C	5.3	38.0	0.84	0.76	0.84	37.4
West: Sparks Road														
10	L2	135	2.0	142	2.0	0.096	7.7	LOS A	0.8	5.5	0.19	0.63	0.19	56.4
11	T1	744	7.7	783	7.7	0.408	15.0	LOS B	11.4	84.7	0.64	0.56	0.64	54.4
Approach		879	6.8	925	6.8	0.408	13.9	LOS A	11.4	84.7	0.57	0.57	0.57	54.7
All Vehicles		2625	5.4	2763	5.4	0.453	14.5	LOS A	11.4	84.7	0.41	0.38	0.41	53.5

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

* Critical Movement (Signal Timing)

Site: 101 [PM 2024 + Dev - Sparks Road - Woongarrah Road (Site Folder: AM 2024 + Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Trailing Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sparks Road														
5	T1	800	6.0	842	6.0	0.318	0.4	LOS A	0.6	4.3	0.03	0.03	0.03	69.5
6	R2	320	2.0	337	2.0	* 0.622	47.9	LOS D	9.4	67.1	0.96	0.81	0.96	34.8
Approach		1120	4.9	1179	4.9	0.622	14.0	LOS A	9.4	67.1	0.30	0.25	0.30	54.1
North: Woongarrah Road														
7	L2	250	2.0	263	2.0	0.181	26.4	LOS B	4.1	29.3	0.68	0.73	0.68	42.9
9	R2	200	2.0	211	2.0	* 0.362	47.0	LOS D	4.7	33.5	0.94	0.78	0.94	34.3
Approach		450	2.0	474	2.0	0.362	35.5	LOS C	4.7	33.5	0.80	0.75	0.80	38.6
West: Sparks Road														
10	L2	290	2.0	305	2.0	0.223	9.2	LOS A	3.0	21.6	0.29	0.67	0.29	55.4
11	T1	1026	4.0	1080	4.0	* 0.600	20.3	LOS B	19.1	138.6	0.79	0.70	0.79	50.5
Approach		1316	3.6	1385	3.6	0.600	17.9	LOS B	19.1	138.6	0.68	0.69	0.68	51.5
All Vehicles		2886	3.8	3038	3.8	0.622	19.1	LOS B	19.1	138.6	0.55	0.53	0.55	49.8

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

* Critical Movement (Signal Timing)

Site: 101 [AM Base + Dev - Woongarrah Road - Cardiff Avenue (Site Folder: AM 2024 + Development)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cardiff Avenue														
1	L2	5	5.0	5	5.0	0.437	10.0	LOS A	2.2	16.2	0.01	1.01	0.01	39.4
2	T1	5	5.0	5	5.0	0.437	16.2	LOS B	2.2	16.2	0.01	1.01	0.01	39.5
3	R2	130	5.0	137	5.0	0.437	19.6	LOS B	2.2	16.2	0.01	1.01	0.01	39.4
Approach		140	5.0	147	5.0	0.437	19.2	LOS B	2.2	16.2	0.01	1.01	0.01	39.4
East: Woongarrah Road														
4	L2	50	5.0	53	5.0	0.030	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
5	T1	125	5.0	132	5.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	70	5.0	74	5.0	0.060	5.2	LOS A	0.2	1.5	0.21	0.53	0.21	45.9
Approach		245	5.0	258	5.0	0.071	2.4	NA	0.2	1.5	0.06	0.26	0.06	48.0
North: Cardiff Avenue														
7	L2	90	5.0	95	5.0	0.110	8.2	LOS A	0.4	3.0	0.11	0.94	0.11	44.6
8	T1	5	5.0	5	5.0	0.110	13.8	LOS A	0.4	3.0	0.11	0.94	0.11	44.8
9	R2	5	5.0	5	5.0	0.110	13.5	LOS A	0.4	3.0	0.11	0.94	0.11	44.7
Approach		100	5.0	105	5.0	0.110	8.8	LOS A	0.4	3.0	0.11	0.94	0.11	44.6
West: Woongarrah Road														
10	L2	5	5.0	5	5.0	0.021	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
11	T1	125	5.0	132	5.0	0.052	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.9
12	R2	5	5.0	5	5.0	0.004	5.3	LOS A	0.0	0.1	0.28	0.50	0.28	45.7
Approach		135	5.0	142	5.0	0.052	0.5	NA	0.0	0.1	0.01	0.04	0.01	49.7
All Vehicles		620	5.0	653	5.0	0.437	6.8	NA	2.2	16.2	0.05	0.49	0.05	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [PM Base + Dev - Woongarrah Road - Cardiff Avenue (Site Folder: AM 2024 + Development)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cardiff Avenue														
1	L2	10	2.0	11	2.0	0.324	10.5	LOS A	1.2	8.5	0.00	1.00	0.00	35.9
2	T1	10	2.0	11	2.0	0.324	24.0	LOS B	1.2	8.5	0.00	1.00	0.00	36.0
3	R2	40	2.0	42	2.0	0.324	33.5	LOS C	1.2	8.5	0.00	1.00	0.00	35.9
Approach		60	2.0	63	2.0	0.324	28.1	LOS B	1.2	8.5	0.00	1.00	0.00	35.9
East: Woongarrah Road														
4	L2	120	2.0	126	2.0	0.069	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
5	T1	240	5.0	253	5.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
6	R2	145	2.0	153	2.0	0.139	5.8	LOS A	0.5	3.6	0.32	0.59	0.32	45.7
Approach		505	3.4	532	3.4	0.139	2.8	NA	0.5	3.6	0.09	0.29	0.09	47.8
North: Cardiff Avenue														
7	L2	125	2.0	132	2.0	0.193	8.3	LOS A	0.7	5.3	0.20	0.90	0.20	44.0
8	T1	10	2.0	11	2.0	0.193	25.9	LOS B	0.7	5.3	0.20	0.90	0.20	44.1
9	R2	5	2.0	5	2.0	0.193	24.2	LOS B	0.7	5.3	0.20	0.90	0.20	44.0
Approach		140	2.0	147	2.0	0.193	10.1	LOS A	0.7	5.3	0.20	0.90	0.20	44.0
West: Woongarrah Road														
10	L2	5	2.0	5	2.0	0.040	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	49.2
11	T1	240	5.0	253	5.0	0.099	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
12	R2	10	2.0	11	2.0	0.011	6.1	LOS A	0.0	0.3	0.41	0.56	0.41	45.5
Approach		255	4.8	268	4.8	0.099	0.5	NA	0.0	0.3	0.02	0.03	0.02	49.7
All Vehicles		960	3.5	1011	3.5	0.324	4.8	NA	1.2	8.5	0.08	0.36	0.08	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [AM 2031 - Wongarrah Road - Sparkes Road (Site Folder: 2031)]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 121 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, D1*, D2*, E, E1*, E2*, F, G1*, G2*
Output Phase Sequence: A, D, E, F, G1*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Road														
1	L2	154	0.0	154	0.0	0.382	49.7	LOS D	7.8	54.9	0.90	0.79	0.90	34.7
2	T1	68	0.0	68	0.0	*0.696	66.8	LOS E	4.3	30.1	1.00	0.81	1.16	28.9
3	R2	145	0.0	145	0.0	0.203	50.3	LOS D	3.6	25.4	0.88	0.75	0.88	34.5
Approach		367	0.0	367	0.0	0.696	53.1	LOS D	7.8	54.9	0.91	0.78	0.94	33.4
East: Sparks Road (e)														
4	L2	195	0.0	195	0.0	0.151	14.8	LOS B	3.9	27.5	0.37	0.70	0.37	53.6
5	T1	1650	4.0	1650	4.0	*0.937	26.9	LOS B	49.8	360.7	0.84	0.86	0.97	50.6
6	R2	178	0.0	178	0.0	0.820	76.3	LOS F	5.8	40.6	1.00	0.87	1.33	28.3
Approach		2023	3.3	2023	3.3	0.937	30.1	LOS C	49.8	360.7	0.81	0.85	0.94	47.6
North: Wongarrah Road														
7	L2	328	0.0	328	0.0	0.557	57.4	LOS E	9.1	64.0	0.97	0.81	0.97	32.3
8	T1	12	0.0	12	0.0	0.123	62.7	LOS E	0.7	5.0	0.98	0.67	0.98	29.9
9	R2	685	0.0	685	0.0	*0.960	86.8	LOS F	26.2	183.7	1.00	1.09	1.49	25.8
Approach		1025	0.0	1025	0.0	0.960	77.1	LOS F	26.2	183.7	0.99	0.99	1.32	27.6
West: Sparks Road (w)														
10	L2	348	0.0	348	0.0	0.249	12.6	LOS A	6.3	44.1	0.34	0.70	0.34	55.1
11	T1	1321	8.0	1321	8.0	0.781	23.5	LOS B	29.1	217.5	0.80	0.72	0.80	53.0
12	R2	422	0.0	422	0.0	*0.972	95.8	LOS F	16.3	114.2	1.00	1.05	1.62	24.5
Approach		2091	5.1	2091	5.1	0.972	36.3	LOS C	29.1	217.5	0.76	0.78	0.89	43.2
All Vehicles		5506	3.1	5506	3.1	0.972	42.7	LOS D	49.8	360.7	0.83	0.85	0.99	39.6

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

* Critical Movement (Signal Timing)

Site: 101 [PM 2031 - Wongarrah Road - Sparkes Road (Site Folder: 2031)]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, D1*, D2*, E, E1*, E2*, F, G1*, G2*
Output Phase Sequence: A, D, E, F, G1*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Road														
1	L2	45	0.0	45	0.0	0.088	37.5	LOS C	1.8	12.5	0.78	0.71	0.78	39.2
2	T1	16	0.0	16	0.0	0.149	56.7	LOS E	0.9	6.0	0.98	0.68	0.98	31.4
3	R2	141	0.0	141	0.0	0.413	58.8	LOS E	3.7	26.2	0.99	0.76	0.99	32.0
Approach		202	0.0	202	0.0	0.413	53.9	LOS D	3.7	26.2	0.94	0.74	0.94	33.3
East: Sparks Road (e)														
4	L2	153	0.0	153	0.0	0.132	17.0	LOS B	3.3	23.4	0.44	0.71	0.44	52.0
5	T1	1359	6.0	1359	6.0	0.704	9.8	LOS A	17.2	126.5	0.51	0.46	0.51	66.0
6	R2	214	0.0	214	0.0	* 0.697	64.7	LOS E	6.0	42.1	1.00	0.83	1.13	31.1
Approach		1726	4.7	1726	4.7	0.704	17.3	LOS B	17.2	126.5	0.57	0.53	0.58	56.7
North: Wongarrah Road														
7	L2	253	0.0	253	0.0	0.353	47.8	LOS D	6.0	41.8	0.91	0.78	0.91	35.3
8	T1	57	0.0	57	0.0	* 0.530	59.0	LOS E	3.2	22.4	1.00	0.75	1.02	30.8
9	R2	255	0.0	255	0.0	* 0.747	62.9	LOS E	7.2	50.6	1.00	0.87	1.17	30.9
Approach		565	0.0	565	0.0	0.747	55.8	LOS D	7.2	50.6	0.96	0.82	1.04	32.7
West: Sparks Road (w)														
10	L2	756	0.0	756	0.0	0.576	16.4	LOS B	20.0	140.2	0.54	0.78	0.54	52.3
11	T1	1378	6.0	1378	6.0	* 0.750	17.5	LOS B	26.5	195.3	0.73	0.66	0.73	58.0
12	R2	417	0.0	417	0.0	0.679	56.0	LOS D	10.9	76.5	0.99	0.84	1.03	33.4
Approach		2551	3.2	2551	3.2	0.750	23.5	LOS B	26.5	195.3	0.72	0.72	0.72	50.3
All Vehicles		5044	3.3	5044	3.3	0.750	26.2	LOS B	26.5	195.3	0.70	0.67	0.72	48.3

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

* Critical Movement (Signal Timing)