

DEVELOPMENT APPLICATION
483/2022
Amended/Additional Information
Randwick City Council
5 May 2023
Records Received

PROPOSED MIXED USE DEVELOPMENT 2-6 GIRAWAH PLACE, MATRAVILLE

TRAFFIC IMPACT ASSESSMENT REPORT

SALT³

PROPOSED MIXED USE DEVELOPMENT 2-6 GIRAWAH PLACE, MATRAVILLE

Client: Horme Group Pty Ltd

Report Reference: 22031T

File Path: Y:\2022\22031TW - 2-6 GIRAWAH PLACE, MATRAVILLE\08 Reports\22031TREP01F02.3.docx

Tuesday, May 02, 2023

Document Control

Version:	Prepared By:	Position:	Date:	Reviewed By:	Position:	Date:
D01	Claudia Goodliffe	Traffic Engineer	16 May 2022	Jo Garretty	Director	23 May 2022
D02	Claudia Goodliffe	Traffic Engineer	26 May 2022	Jo Garretty	Director	27 May 2022
F01	Claudia Goodliffe	Traffic Engineer	5 September 2022	Jo Garretty	Director	7 September 2022
F02	Claudia Goodliffe	Traffic Engineer	19 April 2023	Jo Garretty	Director	21 April 2023

© Sustainable Transport Surveys Pty Ltd All Rights Reserved. Copyright in the whole and every part of this document belongs to Sustainable Transport Surveys Pty Ltd and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person without the prior written consent of Sustainable Transport Surveys Pty Ltd.

This document is produced by Sustainable Transport Surveys for the benefits and use by the client in accordance with the terms of engagement. Sustainable Transport Surveys does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by any third party on the content of this document

MELBOURNE

Level 3, 51 Queen St Melbourne VIC 3000

T: +61 3 9020 4225

SYDNEY

Suite 303/61 Marlborough St Surry Hills NSW 2010

T: +61 2 9068 7995

HOBART

Level 4, 116 Bathurst St Hobart TAS 7000

T: +61 400 535 634

CANBERRA

Level 3, 33-35 Ainslie PI Canberra ACT 2601

T: +61 2 9068 7995

ADELAIDE

Level 21, 25 Grenfell St Adelaide SA 5000

T: +61 8 8484 2331

www.salt3.com.au



CONTENTS

1	INTRODUCTION	2
2	EXISTING CONDITIONS	2
2.1	Location and Land Use	2
2.2	Zoning and Policy	3
2.3	Road Network	3
2.3.1	Girawah Place	3
2.3.2	Botany Road	4
2.4	Sustainable Transport	4
2.4.1	Public Transport	4
2.4.2	Walking	4
2.4.3	Cycling	4
2.5	Traffic Volumes	5
3	PROPOSAL	6
4	CAR PARKING	7
4.1	Statutory Requirements	7
4.2	Temporal Demand Assessment	8
4.3	Adequacy of Car Parking Provision	9
4.4	Accessible Parking	9
5	BICYCLE PARKING	9
5.1	Statutory Requirements	9
5.2	Adequacy of Bicycle Parking Provision	9
6	MOTORCYCLE PARKING	9
6.1	Statutory Requirements	9
6.2	Adequacy of Motorcycle Parking Provision	10
7	LOADING FACILITIES	11
7.1	Statutory Requirements	11
7.2	Adequacy of Loading Bay Provisions	11
8	DESIGN CONSIDERATIONS	11
8.1	Access Arrangements	11
8.2	Car Parking Layout	12
8.3	Ramps and Gradients	12
8.4	Headroom	12
8.5	Loading Provisions	12
8.6	Waste Collection	12
9	TRAFFIC CONSIDERATIONS	13
9.1	Traffic Generation	13
9.2	Traffic Distribution	14
9.3	SIDRA Analysis	16
10	CONCLUSIONS	18
APPENDIX 1	SWEPT PATH DIAGRAMS	19
APPENDIX 2	SIDRA RESULTS	20
	Existing Conditions	21
	Post Development	23
	10-years Post Development	25

LIST OF FIGURES

Figure 1	Subject site locality.....	2
Figure 2	Aerial view of subject site.....	3
Figure 3	Subject site zoning.....	3
Figure 4	Bicycle network.....	4
Figure 5	Existing peak hour traffic volumes.....	5
Figure 6	Estimated traffic distribution.....	15
Figure 7	Post development PM peak hour volumes.....	15
Figure 8	SIDRA intersection layout.....	17

LIST OF TABLES

Table 1	Proposed schedule of areas.....	6
Table 2	Car parking requirements.....	7
Table 3	Temporal parking demand assessment.....	8
Table 4	Motorcycle parking requirements.....	10
Table 5	Loading bay requirements.....	11
Table 6	Traffic generation as per RTA Guide.....	13
Table 7	Empirical traffic generation assessment.....	14
Table 8	Control delay for vehicle LoS calculations (RTA NSW Method).....	16
Table 9	PM peak hour SIDRA results.....	17

1 INTRODUCTION

SALT has been engaged by Horne Group Pty Ltd to undertake Traffic Impact Assessment of the proposed mixed-use development to be located at 2-6 Girawah Place in Matraville.

In the course of preparing this report:

- The development plans and relevant background information have been reviewed;
- A desktop investigation of the subject site and surrounding environs has been conducted;
- Design input and advice regarding parking and access has been provided to the project team; and
- The parking and traffic implications of the proposal have been assessed.

The following sets out SALT's findings with respect to the traffic engineering matters of the proposed development.

2 EXISTING CONDITIONS

2.1 LOCATION AND LAND USE

The subject site encompasses 2, 4 and 6 Girawah Place, Matraville, on the north-eastern corner of Botany Road and Girawah Place. The site is currently vacant and has a total area of approximately 8060m².

The surrounding land is largely industrial in nature, with residential areas to the north and east of the site. To the north of the site is 10-12 Girawah Place (The Borough Zone 1901), an industrial / business development currently under construction.

Bunnerong Creek runs in a generally east-west alignment within the site land, towards the northern boundary.

The intersection of Botany Road and Girawah Place has recently been upgraded to a signalised T-intersection, completed in 2021.

The location of the subject site with respect to the surrounding road network is depicted in **Figure 1**. An aerial view of the subject site is provided in **Figure 2**.

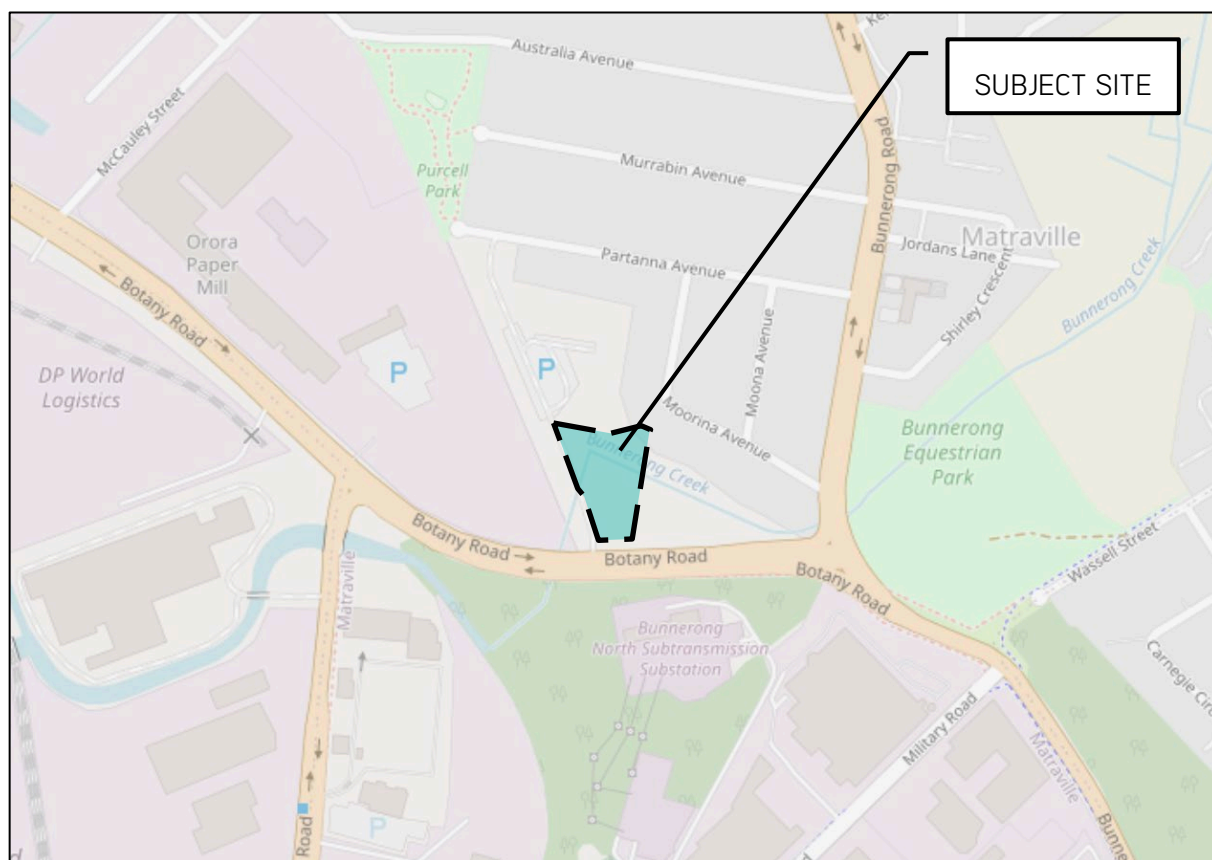


Figure 1 Subject site locality



Figure 2 Aerial view of subject site

2.2 ZONING AND POLICY

The subject site is located within both a General Industrial (IN1) and Public Recreation (RE1) land zones. Numbers 2 and 6 Girawah Place are zoned as IN1 and 4 Girawah Place is zoned as RE1, as can be seen in Figure 3.

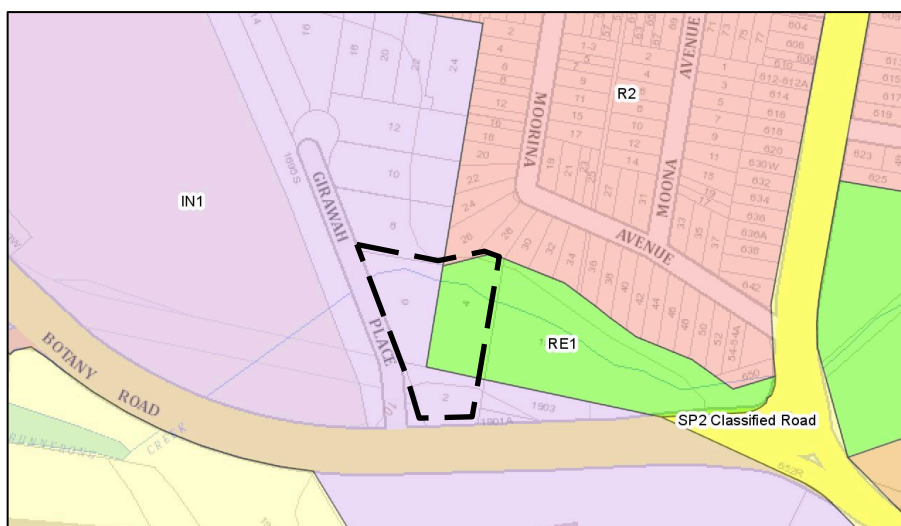


Figure 3 Subject site zoning

2.3 ROAD NETWORK

2.3.1 GIRAWAH PLACE

Girawah Place is a private access road running in a generally north-south alignment from Botany Road and extending approximately 200m before terminating. It has been recently constructed, completed in March 2021.

Girawah Place has a carriageway width of approximately 6.8m, allowing two-way vehicle access, including that for heavy vehicles.

The intersection of Girawah Place and Botany Road has recently been upgraded to a signalised intersection. A median is located along the southern part of the site frontage to Girawah Place. A pedestrian footpath is provided along the eastern side of Girawah Place.

There are signs erected to restrict parking along the length of Girawah Place. The default speed limit of 50km/hr applies.

2.3.2 BOTANY ROAD

Botany Road is an arterial road, extending in an east-west orientation in the vicinity of the site. It provides three traffic lanes in each direction, separated by a median. An additional left and right turn lane into Girawah Place are provided.

On-street parking is not permitted on either side of Botany Road. Pedestrian footpaths are provided on both sides of Botany Road in the vicinity of the site.

The speed limit on Botany Road is 70km/hr at the site frontage, reducing to 60km/hr just each of the site.

2.4 SUSTAINABLE TRANSPORT

2.4.1 PUBLIC TRANSPORT

The site is accessible by public transport, with bus route 309 servicing the area. The closest bus stop to the site is located on Bunnerong Road at Moorina Avenue, approximately 350m (4-minute walk) to the east of the site. Bus route 309 operates between Port Botany and Redfern. This provides connection to key destinations and the greater public transport network including multiple schools, gardens, Green Square Station and Redfern Station.

There are no train stations located within a convenient distance to the subject site.

2.4.2 WALKING

The site has good walking facilities in place, with pedestrian footpaths provided along both sides of Botany Road and along the site frontage on Girawah Place. Pedestrian crossing facilities are provided at the intersection of Girawah Place and Botany Road, allowing safe and convenient pedestrian access to the site.

The site is within convenient walking distance to the residential precinct to the north of the site.

2.4.3 CYCLING

There are no on- or off-road bicycle paths provided in close proximity to the site. The nearest bike track is along the length of Military Road to the south of the site. **Figure 4** shows the nearby bicycle network.

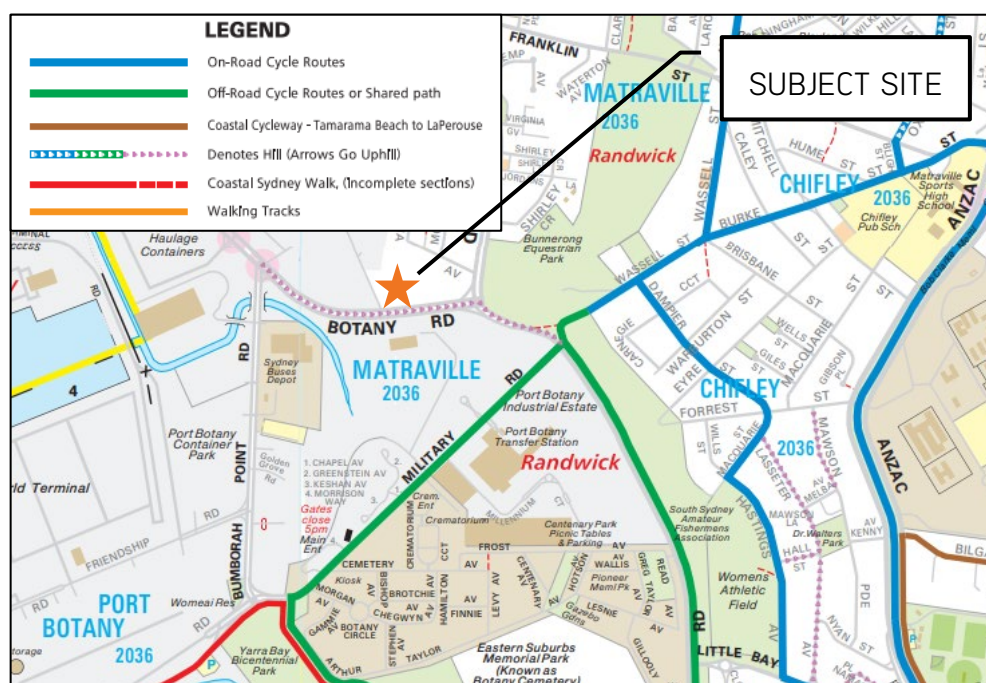


Figure 4 Bicycle network

2.5 TRAFFIC VOLUMES

In order to ascertain the existing level of traffic at the adjacent intersection of Botany Road and Girawah Place, SCATS data has been sourced from Transport for NSW.

The traffic volume data was provided for each loop detector in 15-minute intervals over the course of 24 hours on Wednesday 29 March 2023. This represents a typical weekday not impacted by school holidays or public holidays.

By review of the data, the peak hours of activity at the intersection occurred between 8:00am-9:00am and 5:00pm-6:00pm. The traffic volumes during these peak hours are presented in **Figure 5**.

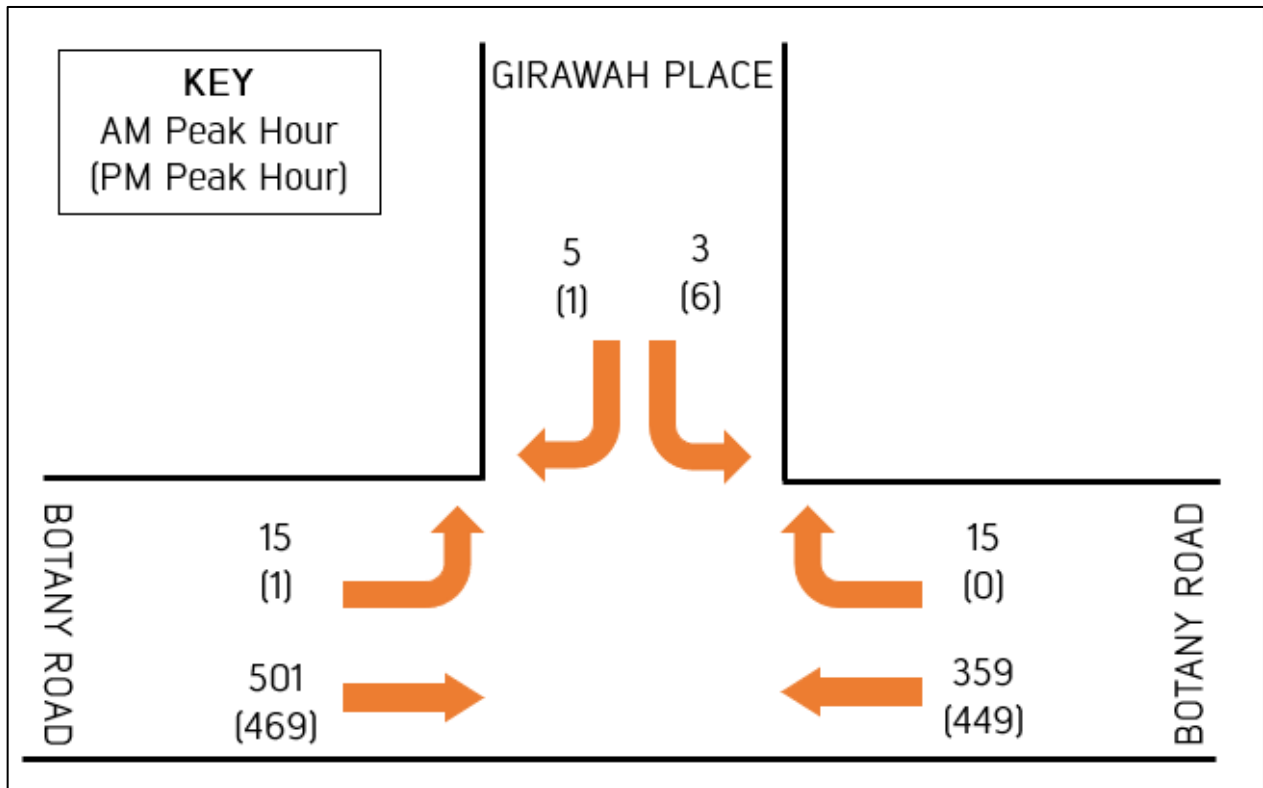


Figure 5 Existing peak hour traffic volumes

From **Figure 5**, it is observed that traffic volumes currently entering and exiting Girawah Place are low even during peak hours. The intersection of Botany Road and Girawah Place was recently upgraded to a signalised intersection in anticipation of development at the subject site and surrounding lots.

3 PROPOSAL

The proposal involves the development of three mixed-use buildings across the site.

4 Girawah Place is proposed to be a 5-storey building, located within the RE1 land zone. This is to comprise of an aquatic centre, gymnasium, childcare centre, retail tenancies, restaurant and indoor recreation room.

2 Girawah Place is proposed to be a 4-storey building to comprise of a brewery, co-work warehouses and hi-tech workspaces, common areas, meeting rooms and a retail tenancy.

6 Girawah Place is proposed to be a 3-storey building to comprise co-work warehouses and hi-tech workspaces, retail tenancies, common areas and meeting rooms

The first basement level is proposed to also provide further facilities including retail tenancies and common areas. A schedule of the proposed areas is provided in **Table 1**.

Vehicle access to the site is proposed from Girawah Place, with a new 7.0m wide crossover to be constructed. This is to provide access to the two basement levels of car parking. A total of 167 car parking spaces are proposed, with 67 spaces on Basement Level 1 and 100 spaces on Basement Level 2.

Pedestrian access to the ground level shared Plaza is proposed from Girawah Place. The shared Plaza provides pedestrian access to the lobbies and receptions areas for the three buildings.

Bicycle parking is to be provided on Basement 1 with a total of 25 spaces comprising 15 wall-mounted and 10 floor spaces. A total of 15 motorcycle parking spaces are proposed over Basement 1 and Basement 2.

Two loading docks are proposed to be provided on Basement Level 1 each with two (2) loading bays. Waste collection is proposed to occur from Basement 1 with a separate waste collection bay proposed.

Table 1 Proposed schedule of areas

Land Use	Size
Childcare Centre	80 children, 15 staff (671m ²)
Aquatic Centre	1032m ²
Gymnasium	827m ²
Warehouses / Hi Tech Workshops	5641m ²
Brewery	570m ²
Cafés / Restaurants	65m ² + 85m ² = 150m ²
Indoor Recreation	305m ²
Showrooms (associated with workshops)	240m ²

4 CAR PARKING

4.1 STATUTORY REQUIREMENTS

Table 1 to Section 3.2 of the Randwick Development Control Plan (DCP) specifies the number of car parking spaces required for various land uses. Given that the proposed car parking provisions are to be shared amongst the three buildings and multiple land uses, the site will be assessed as a whole to determine the statutory car parking requirements.

The following assumptions are made in regard to the parking requirements:

- The Hi-Tech workshops will operate as an industrial / warehouse land use
- The brewery on ground level (540m²) is assumed to operate with 2/3 of its area available to the public, operating as a food and drink premises and 1/3 of its area operating as a light industry brewery.

The car parking requirements for the proposal are summarised in **Table 2**.

Table 2 Car parking requirements

Land Use	Area	DCP Car Parking Rate	No. Required ¹ Spaces
Childcare Centre (80 children, 15 staff)	671m ²	1 space per 8 children for drop off and pick up; and 1 space per 2 staff	18 spaces
Gymnasium (indoor recreation facility)	827m ²	1 space per 25m ² GFA	33 spaces
Pool (indoor recreation facility)	1032m ²	1 space per 25m ² GFA	41 spaces
Warehouses / Hi-Tech	5641m ²	1 space per 300m ²	19 spaces
Brewery (light industry)	186m ²	1 space per 80m ² GFA	2 spaces
Brewery Dining Area (restaurant or café)	384m ²	1 space per 40m ² GFA for the first 80m ² GFA, the 1 space per 20m ² GFA thereafter	17 spaces
Restaurant or café	150m ²	1 space per 40m ² GFA for the first 80m ² GFA, the 1 space per 20m ² GFA thereafter	6 spaces
Indoor Recreation Space	305m ²	1 space per 25m ² GFA	12 spaces
Retail Tenancies / Showroom	240m ²	1 space per 40m ² GFA	6 spaces
TOTAL PARKING REQUIRED			154 spaces
PROPOSED PARKING PROVISION			167 spaces
PARKING SHORTFALL / SURPLUS			+ 13 spaces

¹ Rounded to the nearest whole number as per the Randwick DCP

Therefore, the proposed development provides car parking in excess of the statutory requirements, with a surplus of 13 spaces.

The development is also highly likely to attract multi-purpose trips and generate peak parking demands at various times of the day considering the mixed-use nature of the land uses. This further reduces the overall parking demand as discussed below.

4.2 TEMPORAL DEMAND ASSESSMENT

Considering the nature of the proposal, many of the parking demands are likely to overlap due to the variance in peak usage across the day and week. To account for this, temporal demand assessment has been undertaken which involves placing a demand percentage on car parking for each land use at various typical peak days and times throughout the week to determine peak time / day for parking demands of the entire site.

This involves placing a demand percentage on car parking for each land use at various typical peak days and times throughout the week to determine peak time / day for parking demands of the entire site. The temporal demand assessment is provided in **Table 3**.

Table 3 Temporal parking demand assessment

Land Use	Spaces Required	Temporal Demand Assessment							
		Weekday Lunchtime	Demand	Friday Evening (5-7pm)	Demand	Friday Evening (7-9pm)	Demand	Saturday Morning / Lunchtime	Demand
Childcare Centre	18	30%	6	90%	17	10%	2	0%	0
Gymnasium	33	20%	7	70%	23	30%	10	80%	26
Pool	41	20%	8	70%	29	30%	12	80%	33
Warehouses / Hi-Tech	19	80%	15	30%	6	10%	2	30%	6
Brewery	2	80%	2	50%	1	30%	1	30%	1
Brewery Dining Area	17	80%	14	100%	17	80%	14	50%	9
Restaurant	6	50%	3	100%	6	80%	5	100%	6
Indoor Recreation Space	12	20%	2	70%	8	50%	6	80%	10
Retail Tenancies	6	50%	3	80%	5	50%	3	80%	5
TOTAL PARKING REQUIRED	154	-	60	-	112	-	55	-	96
PROPOSED PARKING PROVISION	167	-	167	-	167	-	167	-	167
PARKING SURPLUS / SHORTFALL	+13	-	+107	-	+55	-	+112	-	+71

Based on the above, the temporal demand assessment indicates that the peak parking demand for the site is expected to occur on a Friday evening from 5:00pm-7:00pm at which there is a parking demand of 112 spaces.

4.3 ADEQUACY OF CAR PARKING PROVISION

The proposed provision of 167 car parking spaces will adequately accommodate the parking demands at all times and days of the week. Even during the expected peak period on a Friday 5:00pm-7:00pm there is anticipated peak parking demand of 112. At this time there would be an excess of 55 spaces.

Furthermore, multi-purpose trips to the site are highly expected given the large variety of facilities available. For example, employees of the warehouses are likely to make use of the other facilities including the gymnasium, aquatic centre, childcare centre, restaurant etc. The above assessment assumed that all land uses would attract individual trips, so the occurrence of multi-purpose trips further reduces the car parking demands.

Therefore, the parking demands generated by the proposal can be easily accommodated on-site.

4.4 ACCESSIBLE PARKING

The Building Code of Australia (BCA) specify the number of accessible parking spaces required for various building types. The site would fall under the Class 9b – Other assembly building. This has a requirement to provide 1 DDA space for every 50 car parking spaces.

With a proposal of 167 car parking spaces, this results in a requirement for three (3) DDA spaces.

This is met by the proposal which includes three (3) DDA spaces, to be located on Basement level 1.

5 BICYCLE PARKING

5.1 STATUTORY REQUIREMENTS

Table 3 to Section 4.2 of the Randwick DCP specifies the number of bicycle parking spaces required for various land uses. Similar to car parking, the site will be assessed as a whole as bicycle parking provisions are to be shared for all land uses.

All of the land uses included within the proposal fall under the category for 'All other development' including commercial, retail, industrial, community, educational and recreational tenancies. These all have a requirement for 1 bike space per 10 car parking spaces.

With a statutory requirement for 154 parking spaces, the proposal generates a requirement for 15 bicycle parking spaces.

5.2 ADEQUACY OF BICYCLE PARKING PROVISION

The proposal includes the provision of 25 bicycle parking spaces, greatly exceeding the requirement for 15 spaces. This includes 15 wall mounted spaces and 10 floor mounted spaces.

This arrangement meets the requirement of Australian Standard AS2890.3 for a minimum of 20% of bicycle parking to be provided as ground level (horizontal) spaces to ensure accessibility for users.

6 MOTORCYCLE PARKING

6.1 STATUTORY REQUIREMENTS

The required number of motorcycle parking spaces for various land uses are included within Table 1 to Section 3.2 of the Randwick DCP.

Applied to the proposal, the motorcycle parking requirements are as summarised in **Table 4**.

Table 4 Motorcycle parking requirements

Land Use	Area / No. People	DCP Motorcycle Parking Rate	Car Parking Requirement	No. Motorcycle Spaces Required ¹
Childcare Centre	671m ²	N/A	18 spaces	0 spaces
Gymnasium (indoor recreation facility)	827m ²	5% of the car parking rate	33 spaces	2 spaces
Pool (indoor recreation facility)	1032m ²	5% of the car parking rate	41 spaces	2 spaces
Hi-Tech Workspaces (business / office premises)	5641m ²	5% of the car parking rate	19 spaces	1 space
Brewery (light industry)	186m ²	5% of the car parking rate	2 spaces	0 spaces
Brewery Dining Area (restaurant or café)	384m ²	N/A	17 spaces	0 spaces
Restaurant	150m ²	N/A	6 spaces	0 spaces
Indoor Recreation Space	305m ²	5% of the car parking rate	12 spaces	1 space
Retail / Showroom Tenancies	240m ²	5% of the car parking rate	6 spaces	0 spaces
TOTAL				6 spaces

¹ Rounded to the nearest whole number as per the Randwick DCP

Therefore, there is a requirement to provide 6 motorcycle parking spaces to the proposal.

6.2 ADEQUACY OF MOTORCYCLE PARKING PROVISION

The proposal includes the provision of 15 motorcycle parking spaces to be located on over both basement levels, exceeding the requirement for 8 spaces. The motorcycle parking spaces are shown to be 12m wide and 2.5m long, at a 90-degree angle to the accessway. These dimensions comply with Section 3.7 of the Randwick DCP.

7 LOADING FACILITIES

7.1 STATUTORY REQUIREMENTS

The required number of loading bays has been determined utilising the rates provided in the DCP based on the types of land uses proposed. The statutory loading bay requirements are calculated in **Table 5**.

Table 5 Loading bay requirements

Land Use Type	Total Area	Loading Bay Requirement	No. Loading Bays Required
Commercial (childcare centre, aquatic centre, gym, workspaces)	8,476m ²	1 space per 4,000m ² GFA up to 20,000m ² GFA plus 1 space per 8,000m ² thereafter	2 bays
Supermarket, Shops, Restaurant (restaurants, retail)	774m ²	1 space per 400m ² GFA up to 2,000m ² GFA plus one space per 1,000m ² thereafter	2 bays
Industrial (workspaces, brewery)	186m ²	1 space per 800m ² GFA up to 8,000m ² GFA plus 1 space per 1,000m ² thereafter	0 bays
TOTAL			4 bays

Based on the above, there is a statutory requirement to provide four (4) loading bays to the proposed development.

7.2 ADEQUACY OF LOADING BAY PROVISIONS

Basement level 1 is proposed to be provided with a total of four (4) loading bays located in two separate loading docks, meeting the above requirement.

The loading bays are proposed to accommodate Small Rigid Vehicles (SRV) trucks as deemed suitable to accommodate each of the proposed land uses and likely loading activity. The loading bays are measured at 3.5m wide and 7.0m long, exceeding the statutory dimension requirements of Australian Standard AS2890.2.

8 DESIGN CONSIDERATIONS

8.1 ACCESS ARRANGEMENTS

Vehicular access to the site is proposed to occur via a new 7.0m wide crossover from Girawah Place. This will adequately accommodate two-way vehicle movements and access for waste vehicles as seen in the swept path diagrams provided in Error! Reference source not found.

The on-site car park provides parking for a variety of users including long-term stay employees and short-term stay visitors. The majority of parking will be utilised by employees (long-stay) considering the number of Hi Tech Workspaces proposed, thus a single 7.0m wide access point is found appropriate to meet the requirement of Australian Standard AS2890.1 for a car park of this size and nature.

The crossover is to be located approximately 60m from the intersection with Botany Road and past the median, allowing fully directional entry and exit for vehicles.

Access to the bicycle parking on Basement 1 is proposed to occur from the northern boundary of the site. Alternatively, a ramp to the plaza on ground floor is proposed, allowing comfortable access for cyclists to the ground level bicycle parking.

Pedestrian access to the plaza is proposed from Girawah Place and the northern boundary of the site. Stairs and ramps are provided up to the plaza level, leading to the lobbies and reception points of the various buildings.

A pedestrian sight triangle 2.5m by 2.0m is to be provided at the exit lane of the accessway with planting in this area to be kept below 900mm in height, ensuring exiting drivers can observe any pedestrians at the site frontage.

8.2 CAR PARKING LAYOUT

All parking spaces are shown to be 2.6m wide and 5.4m long, accessed from a 6.2m wide accessway. This complies with the requirements of the DCP and Australian Standard AS2890.1.

DDA parking is also shown to be 2.6m wide and 5.4m long, with shared spaces of the same dimensions, meeting the requirements of AS2890.6.

Columns are located such that the required clearances to parking spaces have been provided, allowing for access and door opening, as per AS2890.1.

Parking spaces at dead end aisles have been provided with additional aisle length of minimum 1.0m, allowing adequate space for vehicles to comfortably enter and exit these spaces. Access to key parking spaces can be seen by swept path analysis in Error! Reference source not found..

8.3 RAMPS AND GRADIENTS

The ramp from Girawah Place to Basement 1 provides access to the site for all vehicles, including a Small Rigid Vehicle (SRV) waste truck. This requires the ramp to have a maximum grade of 1:6.5 and ramp grade transitions to not exceed 1:12 in 4.0m of travel, as specified by AS2890.2 for commercial vehicles. The ramp is proposed to have a grade of 1:20 for a length of 6.0m from the road frontage and a grade of 1:12 for a length of 8.5m to the basement level.

These grades allow safe access for all vehicles and minimise the risk of scraping or bottoming, with appropriate transitions provided for the SRV trucks. The 1:20 section ensures pedestrian safety at the top of the ramp, in line with AS2890.1.

The ramp between Basement 1 and Basement 2 is shown to have a gradient of 1:6 for a length of 15m, with 2m transitions at 1:8 at either end. This complies with the requirements of AS2890.1 which specifies a maximum gradient of 1 in 5 for a straight ramp in a public car park. The transitions provided will create a comfortable ramp and reduce the chance of scraping or bottoming from occurring.

8.4 HEADROOM

Basement 1 is proposed to have a headroom of 4.2m which greatly exceeds the requirement of AS2890.1 for a minimum 2.2m headroom. This will adequately accommodate the vehicles expected to require access to this level including a small waste truck and SRV service vehicles.

Basement 2 is proposed to have a headroom of 2.7m. This complies with the requirements of the Australian Standards AS2890.6 considering the accessible parking spaces are proposed to be located on Basement 2.

8.5 LOADING PROVISIONS

As discussed in **Section 7**, the proposal includes two loading docks, one either side of the accessway on Basement 1, each with two loading bays. Each loading bay is proposed to be 3.5m wide and 7.0m long, exceeding the statutory dimension requirements of Australian Standard AS2890.2.

Other loading is anticipated to occur by other SRV trucks and vans which can adequately access and park in the loading docks.

8.6 WASTE COLLECTION

Waste collection is to occur via a 6.4m truck by a private contractor within Basement 1. A separate loading bay is proposed to accommodate the waste truck, on top of those for regular loading activity. A 6.4m waste collection vehicle has been determined suitable to accommodate the waste generated by the proposed development. Refer to the Waste Management Plan prepared by SALT for further information.

The waste truck can suitably enter and exit the site and loading dock in a forward direction, before reversing into the waste collection turning bay area to exit the loading dock and site in a forward direction. Waste collection is intended to occur in the mornings, outside of the peak arrival/departure time for those accessing the site, to reduce the risk of conflict between the waste vehicle movements and other staff or visitors.

9 TRAFFIC CONSIDERATIONS

9.1 TRAFFIC GENERATION

The traffic generated by the development is anticipated to peak during the Friday evening 5:00pm-7:00pm period, aligning with the peak parking demand. This is when the childcare pick-up time, peak gym, pool and restaurant usage occur as well as a large proportion of employees (warehouses, office spaces) will leave the site.

The RTA Guide to Traffic Generating Developments specifies the rate of trips generated for various land uses. These are applied to the proposal as summarised in **Table 6** under the following assumptions:

- The aquatic centre will generate traffic at a similar rate to the gymnasium, as no rate is specified for an aquatic centre;
- The Hi Tech Workspaces will generate evening peak traffic at the rate of 1 trip per parking space, considering there is no relevant rate provided for such a land use;
- The brewery will generate traffic at a similar rate to a warehouse;
- The retail tenancies will generate traffic as per the specialty shops in the RTA Guide which are not primary attractors to the centre.

The proportion of inbound and outbound trips has also been estimated based on the expected activity for each land use during the peak hour on a Friday evening.

Table 6 Traffic generation as per RTA Guide

Land Use	Area / Size	Peak Hour Trip Generation Rate	Peak Hour Trips
Childcare Centre	80 children	0.7 trips per child	56 trips
Gymnasium	827m ²	9 trips / 100m ² GFA in sub-regional areas	74 trips
Pool	1032m ²	9 trips / 100m ² GFA in sub-regional areas	93 trips
Warehouses / Hi Tech	5641m ²	0.5 trips / 100m ² GFA	28 trips
Brewery	186m ²	1 trip / 100m ² GFA	2 trips
Brewery Dining Area	384m ²	5 trips / 100m ² GFA	19 trips
Restaurant	150m ²	5 trips / 100m ² GFA	8 trips
Indoor Recreation Space	305m ²	9 trips / 100m ² GFA in sub-regional areas	27 trips
Retail Tenancies	240m ²	5.6 trips / 100m ² GFA	13 trips
TOTAL			320 trips

The above traffic generation assessment overestimates the traffic generation as it assumed each land use will generate independent trips whereas multi-purpose trips are highly likely in this case.

To account for this, an empirical demand assessment has been undertaken based on the car parking demands previously determined in **Table 3** and the expected activity at each of the land uses at this time.

This is considered a more realistic assessment of trips generated given the likelihood of multi-purpose trips. **Table 7** summarises the empirical trip generation calculations for the site.

Table 7 Empirical traffic generation assessment

Land Use	No. Parking Spaces Required	Activity/Demand on Friday 5-7pm	PM Peak Hour Trips Generated	Arrivals / Departures	Trips In	Trips Out
Childcare Centre	18 spaces	Peak pick up period, arrive and depart in the same hour	36 trips	100% / 100%	18 trips	18 trips
Gymnasium	33 spaces	70% demand	23 trips	50% / 50%	11 trips	12 trips
Pool	41 spaces	70% demand	29 trips	50% / 50%	14 trips	15 trips
Warehouses	19 spaces	80% of employees leave for the day	15 trips	0% / 100%	0 trips	15 trips
Brewery	2 spaces	0% (staff remain on site)	0 trips	-	0 trips	0 trips
Brewery Dining Area	17 spaces	100% patrons arriving and leaving	17 trips	50% / 50%	8 trips	9 trips
Restaurant	6 spaces	100% patrons arriving and leaving	6 trips	50% / 50%	3 trips	3 trips
Indoor Recreation Space	12 spaces	70% demand	8 trips	0% / 100%	0 trips	4 trips
Retail Tenancies	6 spaces	50% employees leaving, customers arriving	3 trips	50% / 50%	1 trip	2 trips
TOTAL					55 trips	78 trips

9.2 TRAFFIC DISTRIBUTION

The distribution of the traffic generated by the proposal is determined by analysis of the surrounding road network and key destinations.

Girawah Place terminates to the north of the site, thus it is assumed that all traffic to and from the site will be distributed to and from Botany Road to the south.

By review of the existing traffic volume data at Botany Road / Girawah Place, it is concluded that during the PM peak hour, traffic is generally evenly distributed to the east and west. Therefore, the traffic generated by the proposal is estimated to be distributed 50% eastbound and 50% westbound.

The estimated traffic distribution is shown diagrammatically in **Figure 6**. The resulting total traffic at Botany Road / Girawah Place post development in the critical PM peak hour period is depicted in Figure 7.



Figure 6 Estimated traffic distribution

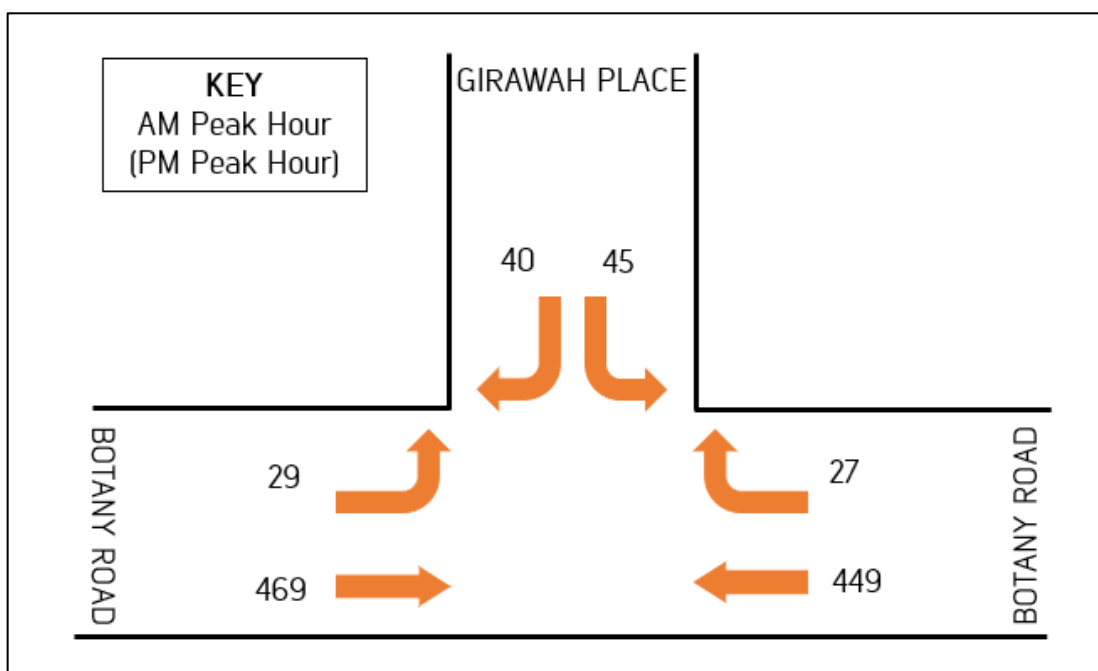


Figure 7 Post development PM peak hour volumes

9.3 SIDRA ANALYSIS

To quantify the impact of the additional traffic on the operation of the intersection of Botany Road and Girawah Place during the critical weekday AM and PM peak hours, the intersection has been modelled using SIDRA Intersection v9.1.

SIDRA is an advanced micro-analytical traffic evaluation tool that provides estimates of capacity and performance statistics (delay, queue lengths etc) on a lane-by-lane basis.

Key performance criteria include:

Degree of Saturation (DOS): This represents the ratio of traffic volume to capacity. Generally speaking, a DOS of below 0.9 indicates acceptable performance. A DOS of over 1.0 indicates that capacity has been exceeded.

Level of Service (LOS): An index of the operational performance of traffic based on service measures such as delay, degree of saturation, density and speed during a given flow period. A guide to LOS ratings is provided in Error! Reference source not found.

Average Delay: The average delay time that can be expected for a given movement.

95th Percentile Queue: The maximum queue length that can be expected in 95% of all observed queue lengths during the hour.

Table 8 Control delay for vehicle LoS calculations (RTA NSW Method)

Level of Service	Control delay per vehicle in seconds (d) (including geometric delay)	Traffic Signals, Roundabout	Give Way and Stop Signs Good operation
	All intersection types		
A	$d < 14$	Good operation	Good operation
B	$d < 15$ to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	$d < 29$ to 42	Satisfactory	Satisfactory, but accident study required
D	$d < 43$ to 56	Operating near capacity	Near capacity & accident study required
E	$d \leq 57$ to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	$d > 70$	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

Adopted settings are summarised as follows:

- The RTA NSW method has been adopted with Delay determining the LOS (refer **Table 8**);
- Extra bunching set to 15% on both legs of Botany Road to account for the nearby signals approximately 170m to the west and east; and
- A compounding annual growth rate of 2% has been estimated for the Botany Road through volumes.

The intersection has been modelled under existing conditions with the volumes of **Figure 5**, post-development conditions with the traffic volumes of **Figure 7** and in the 10-year scenario. The SIDRA layout of the intersection is provided in **Figure 8** with lane geometry measured from aerial imagery.

The key SIDRA outputs during the critical weekday PM peak hour are summarised in **Table 9**, with the SIDRA outputs provided in **APPENDIX 2**.

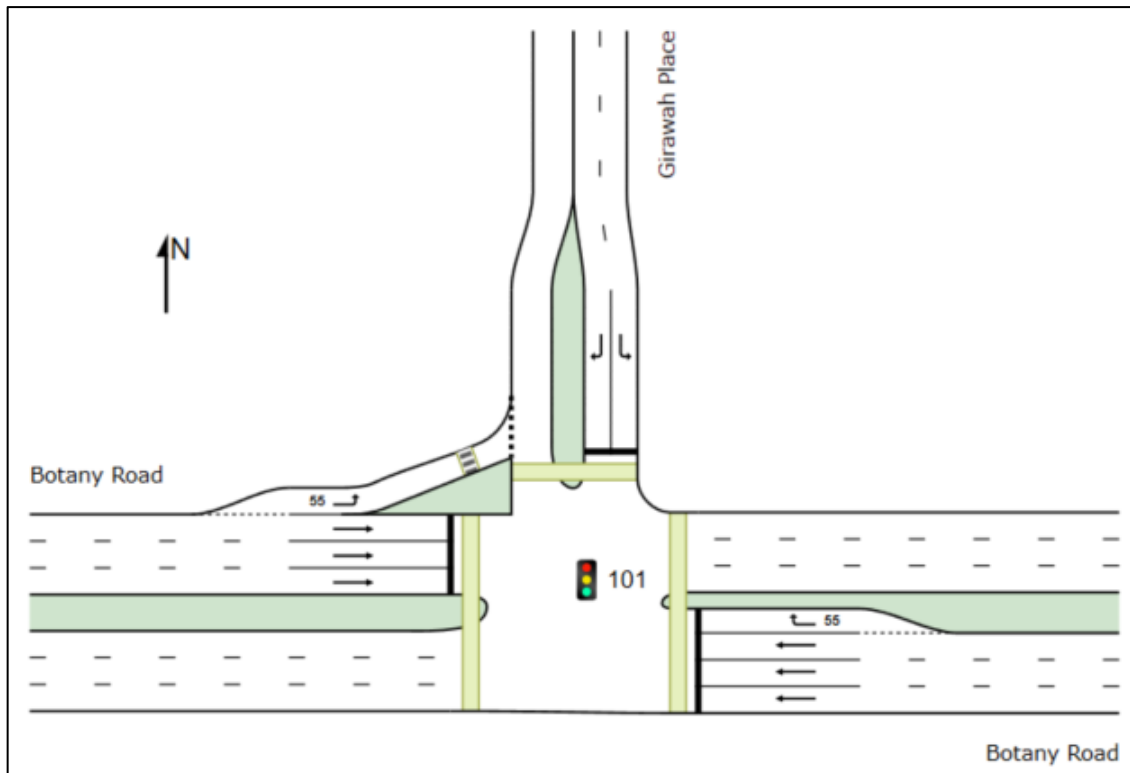


Figure 8 SIDRA intersection layout

Table 9 PM peak hour SIDRA results

Leg	Turn	Existing Conditions				Post Development				10-years Post Development			
		DOS	LOS	Delay (s)	Queue (m)	DOS	LOS	Delay (s)	Queue (m)	DOS	LOS	Delay (s)	Queue (m)
Botany Road (east)	T	0.160	A	8.1	19.1	0.160	A	8.1	19.1	0.198	A	9.0	25.4
	R	0.003	B	17.9	0.1	0.086	B	18.5	3.3	0.090	B	19.4	3.5
Girawah Place	L	0.005	A	9.9	0.5	0.041	A	10.0	3.9	0.041	A	10.2	4.1
	R	0.002	B	23.7	0.2	0.085	B	24.7	7.3	0.080	B	24.5	7.4
Botany Road (west)	L	0.001	A	6.3	0.0	0.020	A	6.3	0.7	0.020	A	6.3	0.7
	T	0.531	B	27.9	38.1	0.531	B	27.9	38.1	0.621	C	29.6	49.6

From **Table 9**, it is concluded that the intersection of Botany Road and Girawah Place can adequately accommodate the traffic generated by the proposed development.

The Level of Service remains within acceptable limits for all movements on each leg of the intersection post development and in the 10-year scenario. The critical movement is the through movements on the western leg of Botany Road in the 10-year scenario for which a LOS C is achieved. This is due to the general traffic growth (2% per annum assumed) and still remains satisfactorily.

The additional traffic due to the proposal has minimal impact on the intersection operation with marginal increases to delays (no more than 1 second added to any movement) and queues (no more than 7.1m or one vehicle added to any movement). No 95th percentile queue length is found to exceed the actual length of the lanes.

Based on the above, whilst the development is anticipated to generate a moderate amount of traffic, this can be suitably accommodated by the surrounding road network and intersections. The proposal is not expected to have any major adverse impact on the operation of the existing road network.

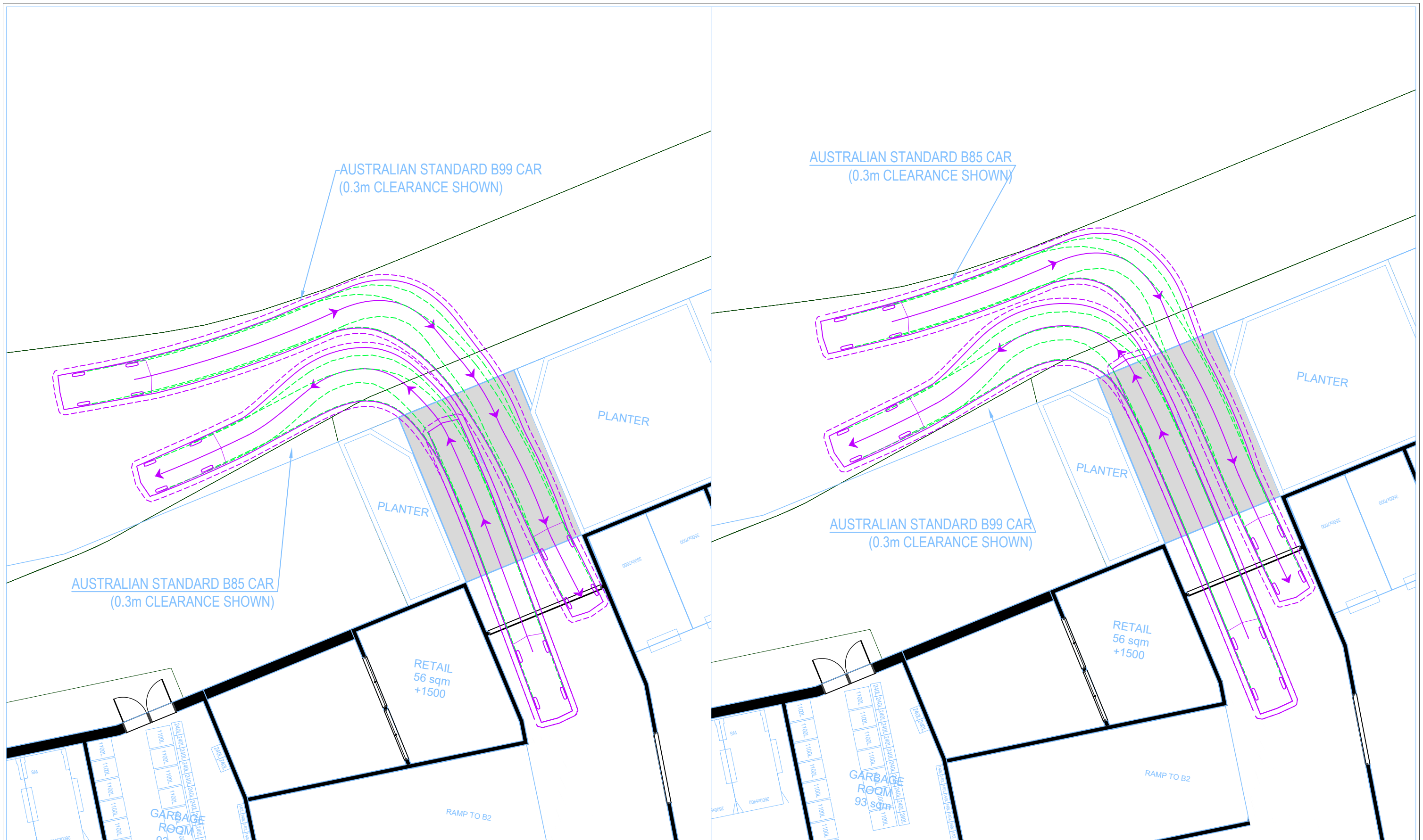
10 CONCLUSIONS

Based on the preceding analysis, the following is concluded:

- It is proposed to develop the site into three buildings of mixed-use nature comprising of a childcare centre, gymnasium, pool, warehouses / hi-tech workshops, retail, brewery, restaurant and common areas;
- There is a statutory requirement to provide 154 parking spaces as per the Randwick DCP requirements. This is exceeded by the proposal which includes 167 spaces;
- A temporal parking demand assessment shows the peak parking demand to occur on a Friday evening 5:00pm–7:00pm, during which a demand for 112 parking spaces will occur. With a proposed provision of 167 spaces, there is a surplus of 55 spaces at this peak period;
- A total of 25 bicycle parking is proposed to be provided, exceeding the DCP requirement for 15 spaces;
- 15 motorcycle parking spaces are proposed, exceeding the requirement for 8 spaces as per the DCP;
- The car parking layout and dimensions generally comply with the requirements of the DCP and Australian Standards;
- Adequate provisions have been made for loading and waste collection; and
- The traffic generated by the proposal is not anticipated to cause any significant adverse impacts on the surrounding intersections or road network.

Therefore, the proposal is supported from a traffic engineering perspective.

APPENDIX 1 SWEPT PATH DIAGRAMS



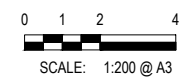
B85		B99	
Width	1870	Width	1940
Track	1770	Track	1840
Lock to Lock Time	6.0	Lock to Lock Time	6.0
Steering Angle	34.1	Steering Angle	33.9

HORME GROUP PTY LTD
PROPOSED MIXED USE DEVELOPMENT
2-6 GIRAWAH PLACE
MATRAVILLE
SWEEP PATH DIAGRAM - BASEMENT 1

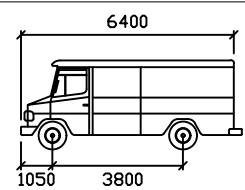
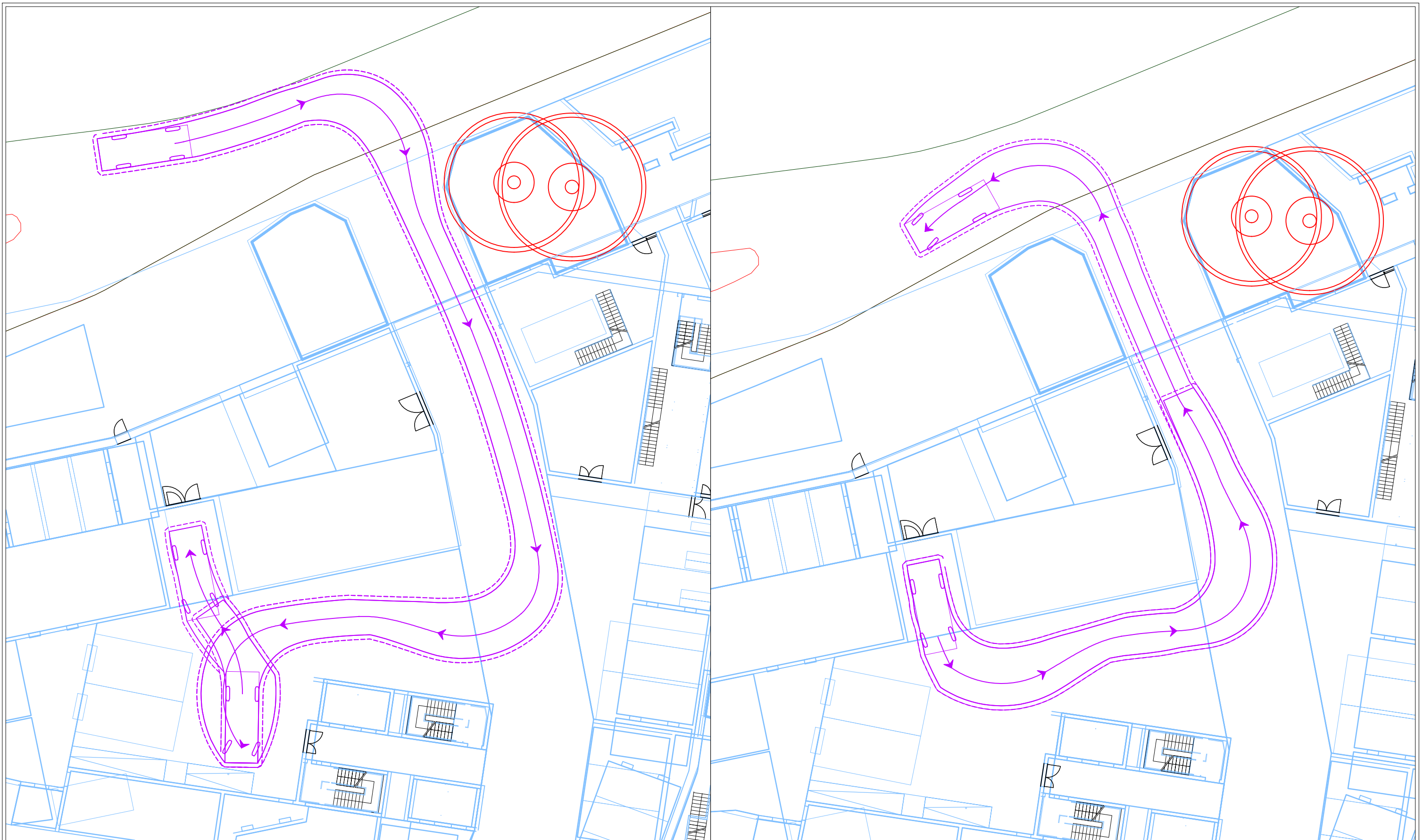


Service. Approachability. Loyalty. Transparency.

Email: salt@salt3.com.au
ABN: 18 439 813 274
Ph: 03 9020 4225
Melbourne: Level 3, 51 Queen St Melbourne VIC 3000
Sydney: 303, 61 Marlborough Street Surry Hills NSW 2010
Hobart: Level 4, 116 Bathurst St Hobart TAS 7000
Canberra: 45 West Row Canberra ACT 2601



DRAWN / CHECKED CG / JG	DATE 30-05-2022	SIZE A3
DRAWING NUMBER 22031-SK-001	REVISION 1	



SRV

Width : 2300
Track : 2300
Lock to Lock Time : 6.0
Steering Angle : 38.1

HORME GROUP PTY LTD
PROPOSED MIXED USE DEVELOPMENT
2-6 GIRAWAH PLACE
MATRAVILLE
SWEEP PATH DIAGRAM - BASEMENT 1

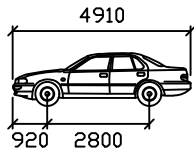
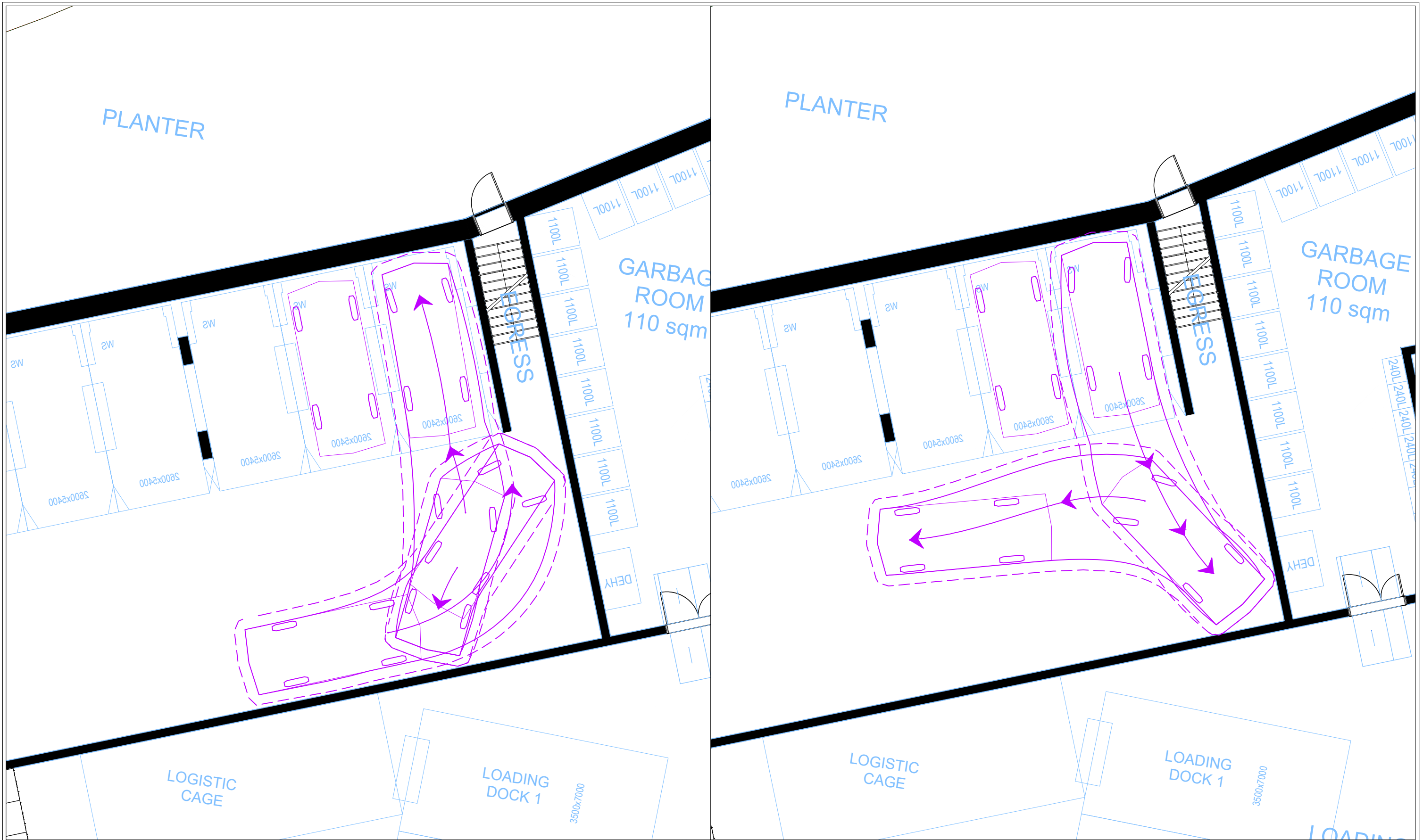


Service. Approachability. Loyalty. Transparency.
Email: salt@salt3.com.au
ABN: 18 439 813 274
Ph: 03 9020 4225
Melbourne: Level 3, 51 Queen St Melbourne VIC 3000
Sydney: 303, 61 Marlborough Street Surry Hills NSW 2010
Hobart: Level 4, 116 Bathurst St Hobart TAS 7000
Canberra: 45 West Row Canberra ACT 2601

0 1.25 2.5 5
SCALE: 1:250 @ A3



DRAWN / CHECKED CG / JG	DATE 05-09-2022	SIZE A3
DRAWING NUMBER 22031-SK-002	REVISION 3	



B85

Width : 1870
Track : 1770
Lock to Lock Time : 6.0
Steering Angle : 34.1

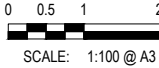
mm

HORME GROUP PTY LTD
PROPOSED MIXED USE DEVELOPMENT
2-6 GIRAWAH PLACE
MATRAVILLE
SWEEP PATH DIAGRAM - BASEMENT 1



Service. Approachability. Loyalty. Transparency.

Email: salt@salt3.com.au
ABN: 18 439 813 274
Ph: 03 9020 4225
Melbourne: Level 3, 51 Queen St Melbourne VIC 3000
Sydney: 303, 61 Marlborough Street Surry Hills NSW 2010
Hobart: Level 4, 116 Bathurst St Hobart TAS 7000
Canberra: 45 West Row Canberra ACT 2601



SCALE: 1:100 @ A3



MELWAY MAP REF
0 0

DRAWN / CHECKED
CG / JG

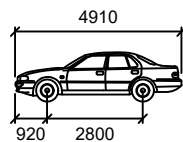
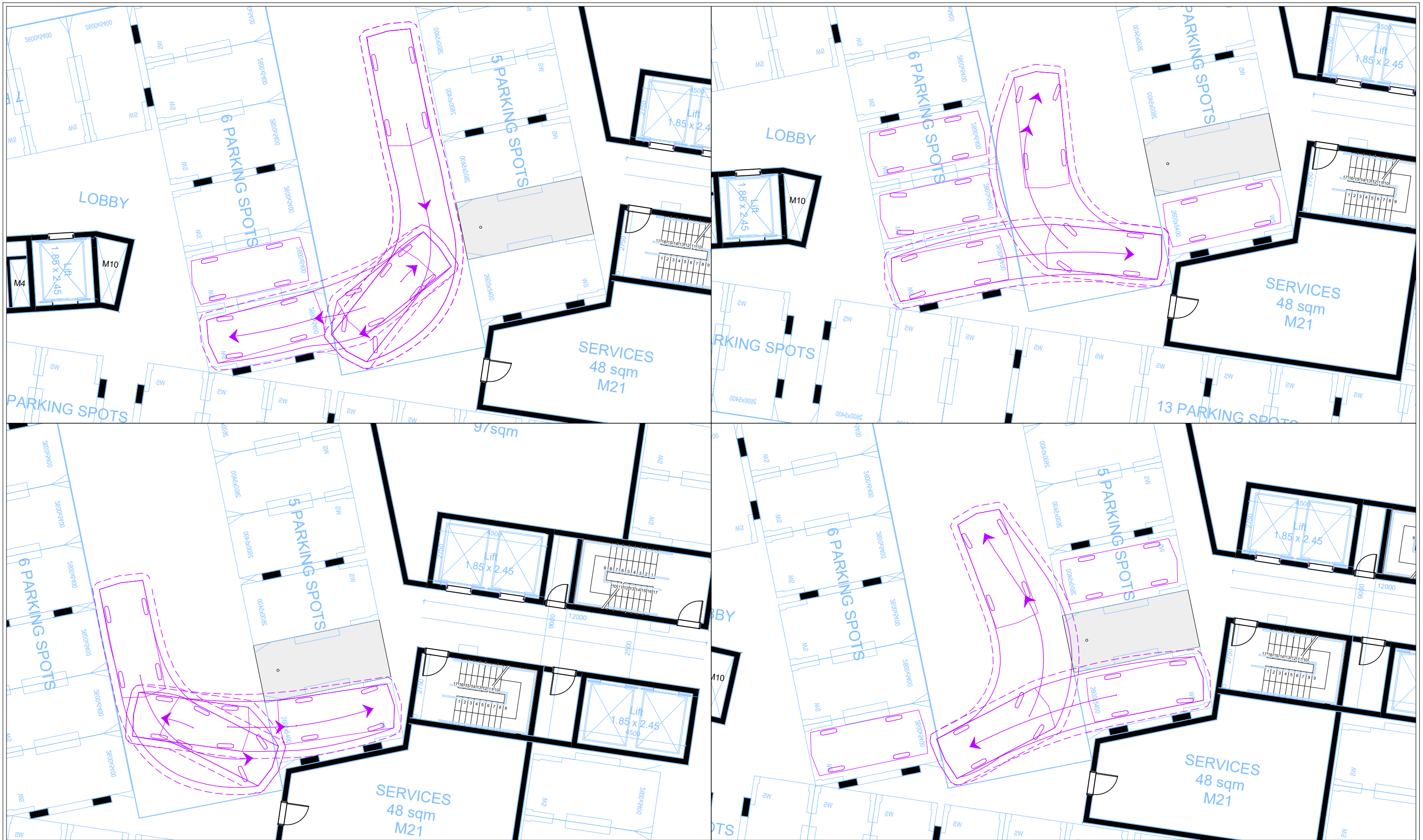
DRAWING NUMBER

DATE
05-09-2022

22031-SK-003

SIZE
A3

REVISION
2



B85

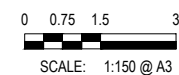
Width : 1870
Track : 1770
Lock to Lock Time : 6.0
Steering Angle : 34.1

HORME GROUP PTY LTD
PROPOSED MIXED USE DEVELOPMENT
2-6 GIRAWAH PLACE
MATRAVILLE
SWEPT PATH DIAGRAMS - BASEMENT 2



Service. Approachability. Loyalty. Transparency.

Melbourne: Level 3, 51 Queen St Melbourne VIC 3000
Sydney: 303, 61 Marlborough Street Surry Hills NSW 2010
Hobart: Level 4, 116 Bathurst St Hobart TAS 7000
Canberra: 45 West Row Canberra ACT 2601



DRAWN / CHECKED CG / JG	DATE 05-09-2022	SIZE A3
DRAWING NUMBER 22031-SK-004	REVISION 2	

APPENDIX 2 SIDRA RESULTS

Existing Conditions

MOVEMENT SUMMARY

 **Site: 101 [Botany / Girawah - PM - Existing (Site Folder: General)]**

Output produced by **SIDRA INTERSECTION Version: 9.1.1.200**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que Stop Rate	Eff. Rate	Aver. No. of Cycles	Aver. Speed km/h
			[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		veh	m				
East: Botany Road															
5	T1	All MCs	473	10.0	473	10.0	0.160	8.1	LOS A	2.5	19.1	0.53	0.44	0.53	53.0
6	R2	All MCs	1	5.0	1	5.0	0.003	17.9	LOS B	0.0	0.1	0.83	0.58	0.83	45.1
Approach			474	10.0	474	10.0	0.160	8.2	LOS A	2.5	19.1	0.53	0.44	0.53	52.9
North: Girawah Place															
7	L2	All MCs	6	5.0	6	5.0	0.005	9.9	LOS A	0.1	0.5	0.37	0.61	0.37	49.6
9	R2	All MCs	1	5.0	1	5.0	0.002	23.7	LOS B	0.0	0.2	0.74	0.58	0.74	42.2
Approach			7	5.0	7	5.0	0.005	11.9	LOS A	0.1	0.5	0.42	0.61	0.42	48.4
West: Botany Road															
10	L2	All MCs	1	5.0	1	5.0	0.001	6.3	LOS A	0.0	0.0	0.19	0.56	0.19	52.3
11	T1	All MCs	494	10.0	494	10.0	0.531	27.9	LOS B	5.0	38.1	0.96	0.77	0.96	41.2
Approach			495	10.0	495	10.0	0.531	27.9	LOS B	5.0	38.1	0.96	0.77	0.96	41.2
All Vehicles			976	10.0	976	10.0	0.531	18.2	LOS B	5.0	38.1	0.75	0.61	0.75	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

PHASING SUMMARY

 **Site: 101 [Botany / Girawah - PM - Existing (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: SCATS

Input Phase Sequence: A, B, C, D

Output Phase Sequence: A, B, C, D

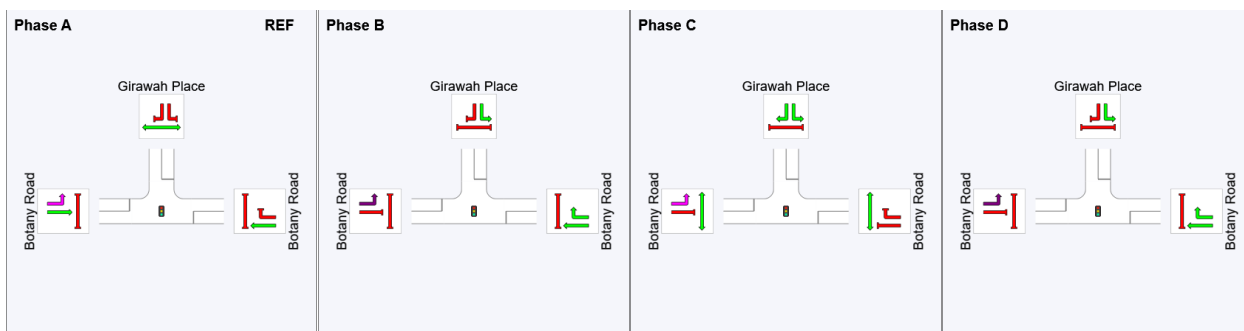
Reference Phase: Phase A

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	17	29	53
Green Time (sec)	11	6	18	6
Phase Time (sec)	17	12	24	12
Phase Split	26%	18%	37%	18%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence













REF:

Reference

Phase

VAR: Variable Phase

 Normal Movement	 Permitted/Opposed
 Slip/Bypass-Lane Movement	 Opposed Slip/Bypass-Lane
 Stopped Movement	 Turn On Red
 Other Movement Class (MC) Running	 Undetected Movement
 Mixed Running & Stopped MCs	 Continuous Movement
 Other Movement Class (MC) Stopped	 Phase Transition Applied

MOVEMENT SUMMARY

 **Site: 101 [Botany / Girawah - PM - Post Development (Site Folder: General)]**

Output produced by **SIDRA INTERSECTION Version: 9.1.1.200**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que Stop	Eff. Rate	Aver. No. of Cycles	Aver. Speed km/h
			[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		veh	m				
East: Botany Road															
5	T1	All MCs	473	10.0	473	10.0	0.160	8.1	LOS A	2.5	19.1	0.53	0.44	0.53	53.0
6	R2	All MCs	28	5.0	28	5.0 *	0.086	18.5	LOS B	0.5	3.3	0.86	0.69	0.86	44.7
Approach			501	9.7	501	9.7	0.160	8.7	LOS A	2.5	19.1	0.55	0.45	0.55	52.4
North: Girawah Place															
7	L2	All MCs	47	5.0	47	5.0	0.041	10.0	LOS A	0.5	3.9	0.38	0.65	0.38	49.5
9	R2	All MCs	42	5.0	42	5.0 *	0.085	24.7	LOS B	1.0	7.3	0.77	0.70	0.77	41.8
Approach			89	5.0	89	5.0	0.085	16.9	LOS B	1.0	7.3	0.56	0.67	0.56	45.5
West: Botany Road															
10	L2	All MCs	31	5.0	31	5.0	0.020	6.3	LOS A	0.1	0.7	0.19	0.58	0.19	52.3
11	T1	All MCs	494	10.0	494	10.0 *	0.531	27.9	LOS B	5.0	38.1	0.96	0.77	0.96	41.2
Approach			524	9.7	524	9.7	0.531	26.7	LOS B	5.0	38.1	0.92	0.76	0.92	41.7
All Vehicles			1115	9.3	1115	9.3	0.531	17.8	LOS B	5.0	38.1	0.72	0.62	0.72	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

PHASING SUMMARY

 **Site: 101 [Botany / Girawah - PM - Post Development (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: SCATS

Input Phase Sequence: A, B, C, D

Output Phase Sequence: A, B, C, D

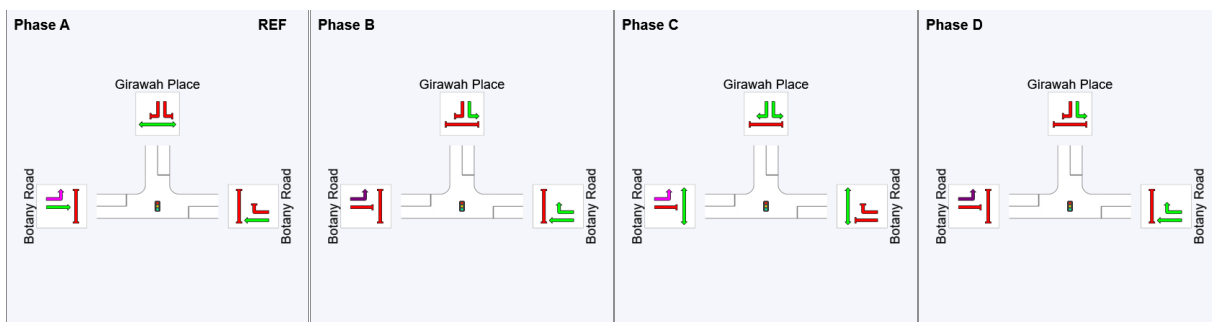
Reference Phase: Phase A

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	17	29	53
Green Time (sec)	11	6	18	6
Phase Time (sec)	17	12	24	12
Phase Split	26%	18%	37%	18%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence




REF:

VAR: Variable Phase

Reference

Phase

 Normal Movement	 Permitted/Opposed
 Slip/Bypass-Lane Movement	 Opposed Slip/Bypass-Lane
 Stopped Movement	 Turn On Red
 Other Movement Class (MC) Running	 Undetected Movement
 Mixed Running & Stopped MCs	 Continuous Movement
 Other Movement Class (MC) Stopped	 Phase Transition Applied

MOVEMENT SUMMARY

 **Site: 101 [Botany / Girawah - PM - Post Development - 10 years (Site Folder: General)]**

Output produced by **SIDRA INTERSECTION Version: 9.1.1.200**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Minimum Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Botany Road															
5	T1	All MCs	576	10.0	576	10.0	0.198	9.0	LOS A	3.3	25.4	0.56	0.46	0.56	52.3
6	R2	All MCs	28	5.0	28	5.0 *	0.090	19.4	LOS B	0.5	3.5	0.87	0.69	0.87	44.3
Approach			605	9.8	605	9.8	0.198	9.5	LOS A	3.3	25.4	0.57	0.47	0.57	51.8
North: Girawah Place															
7	L2	All MCs	47	5.0	47	5.0	0.041	10.2	LOS A	0.6	4.1	0.38	0.65	0.38	49.4
9	R2	All MCs	42	5.0	42	5.0 *	0.080	24.5	LOS B	1.0	7.4	0.75	0.70	0.75	41.8
Approach			89	5.0	89	5.0	0.080	16.9	LOS B	1.0	7.4	0.56	0.67	0.56	45.5
West: Botany Road															
10	L2	All MCs	31	5.0	31	5.0	0.020	6.3	LOS A	0.1	0.7	0.19	0.58	0.19	52.4
11	T1	All MCs	602	10.0	602	10.0 *	0.621	29.6	LOS C	6.5	49.6	0.97	0.81	1.01	40.4
Approach			632	9.8	632	9.8	0.621	28.5	LOS B	6.5	49.6	0.94	0.80	0.97	40.9
All Vehicles			1326	9.4	1326	9.4	0.621	19.0	LOS B	6.5	49.6	0.74	0.64	0.76	45.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

PHASING SUMMARY

 **Site: 101 [Botany / Girawah - PM - Post Development - 10 years (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Minimum Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: SCATS

Input Phase Sequence: A, B, C, D

Output Phase Sequence: A, B, C, D

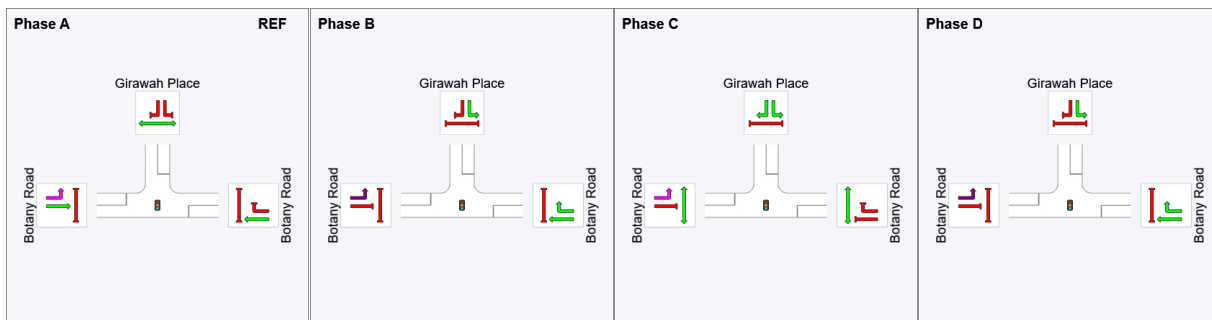
Reference Phase: Phase A

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	18	30	56
Green Time (sec)	12	6	20	6
Phase Time (sec)	18	12	26	12
Phase Split	26%	18%	38%	18%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF:

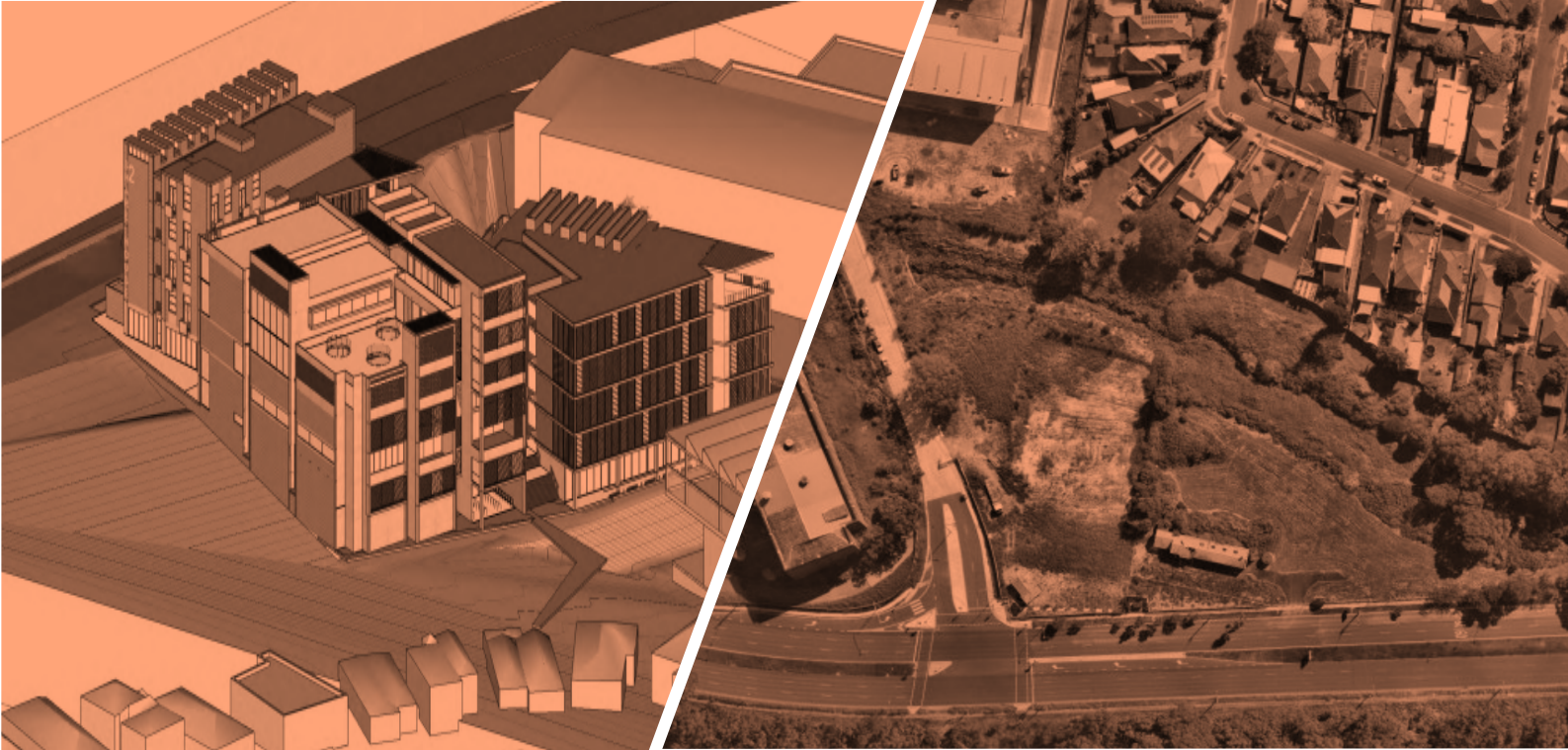
Reference

Phase

VAR: Variable Phase

 Normal Movement	 Permitted/Opposed
 Slip/Bypass-Lane Movement	 Opposed Slip/Bypass-Lane
 Stopped Movement	 Turn On Red
 Other Movement Class (MC) Running	 Undetected Movement
 Mixed Running & Stopped MCs	 Continuous Movement
 Other Movement Class (MC) Stopped	 Phase Transition Applied

This page is intentionally left blank



Service. Approachability. Loyalty. Transparency.

MELBOURNE

Level 3, 51 Queen St Melbourne VIC 3000

T: +61 3 9020 4225

SYDNEY

Suite 303/61 Marlborough St Surry Hills NSW 2010

T: +61 2 9068 7995

HOBART

Level 4, 116 Bathurst St Hobart TAS 7000

T: +61 400 535 634

CANBERRA

Level 3, 33-35 Ainslie PI Canberra ACT 2601

T: +61 2 9068 7995

ADELAIDE

Level 21, 25 Grenfell St Adelaide SA 5000

T: +61 8 8484 2331

www.salt3.com.au

