



urbii

Sustainable Transport. Safe Solutions

310 - 326 Hale Road, Wattle Grove

Proposed Mixed Use Development

TRANSPORT IMPACT ASSESSMENT



Prepared for:
Su Family Trust

March 2024

310 - 326 Hale Road, Wattle Grove

Prepared for: Su Family Trust
Prepared by: Paul Ghanous
Date: 11 March 2024
Project number: U23.056

Version control

Version No.	Date	Prepared by	Revision description	Issued to
U23.056.r01	15/09/23	Paul Ghanous	DRAFT	Dynamic Planning
U23.056.r01a	11/03/24	Paul Ghanous	FINAL	Dynamic Planning



Urbii Consulting Pty Ltd
ABN 34 630 529 476
PO BOX 4315
BALDIVIS WA 6171
T: + 61 433 858 164
E: customer@urbii.com.au
W: www.urbii.com.au

Contents

1	INTRODUCTION	6
2	EXISTING SITUATION	7
2.1	Existing site use, access and parking	7
2.2	Surrounding road network and traffic management on roads	10
2.3	Existing traffic volumes on roads and major intersections	13
2.4	Existing operation of surrounding intersections	13
2.5	Heavy vehicles	14
2.6	Public transport access	14
2.7	Pedestrian access	17
2.8	Bicycle access	18
2.9	Crash data and safety	20
3	DEVELOPMENT PROPOSAL	22
4	VEHICLE ACCESS	23
5	CHANGES TO SURROUNDING TRANSPORT NETWORKS	25
6	INTEGRATION WITH SURROUNDING AREA	26
7	TRAFFIC ASSESSMENT	27
7.1	Assessment period	27
7.2	Existing traffic flows	28
7.3	Traffic generation	29
7.4	Trip distribution and assignment	30
7.5	Analysis of intersections and development access	34
7.6	Impact on surrounding roads	34
7.7	Impact on neighbouring areas	34
7.8	Traffic noise and vibration	35
8	PARKING	36
8.1	Parking supply	36
8.2	Parking requirements	36
8.3	Parking demand modelling	36
8.4	Parking demand management	40
9	PROVISION FOR SERVICE VEHICLES	41
10	PUBLIC TRANSPORT ASSESSMENT	43
11	WALKING ASSESSMENT	44
12	CYCLING ASSESSMENT	45
12.1	Bicycle parking and end of trip facilities	45
12.2	Sustainable transport catchment	45
13	CONCLUSION	46
	APPENDICES	47

Figures

Figure 1: Subject site	6
Figure 2: Historic site frontage from Hale Road	7
Figure 3: Historic and existing vehicle access.....	8
Figure 4: Location context plan	9
Figure 5: Main Roads WA road hierarchy plan	11
Figure 6: Main Roads WA road speed zoning plan	11
Figure 7: Road types and criteria for Western Australia.....	12
Figure 8: Weekday traffic profile (Hale Road west of Tonkin Highway)	13
Figure 9: Closest bus stops serving the proposed development.....	15
Figure 10: Transperth public transport plan	16
Figure 11: Perth bicycle network plan	18
Figure 12: Strava cycling heatmap.....	19
Figure 13: 5-year crash map in the locality (2018-2022).....	20
Figure 14: Proposed vehicle access	23
Figure 15: Adjacent funeral parlour access.....	24
Figure 16: Surveyed existing traffic flows – weekday AM and PM peak hours	28
Figure 17: Proposed development traffic distribution	30
Figure 18: 2036 forecast base traffic flows (without development traffic).....	32
Figure 19: 2036 forecast traffic flows (including development traffic).....	33
Figure 20: City of Kalamunda – Method of travel to work data (2016-21)	37
Figure 21: Probability analysis for children’s drop-off/pick-up	38
Figure 22: Sustainable transport hierarchy	40
Figure 23: Adopted checking vehicle for swept path analysis	42
Figure 24: Cycling and micro-mobility catchment.....	45

Tables

Table 1: Existing traffic volume and speed on local roads	13
Table 2: 5-year crash history in the locality (2018-2022)	21
Table 3: Adopted trip rates for traffic generation	29
Table 4: Traffic generation – Weekday AM and PM peak hours	29
Table 5: Population forecasts – City of Kalamunda	31
Table 6: ITE parking generation rates	36
Table 7: Peak parking generation for proposed land uses	38
Table 8: Hourly parking demand distribution (weekdays).....	39
Table 9: Example of the number of service bays required for business	41
Table 10: Traffic volume thresholds for pedestrian crossings	44

Appendices

Appendix A: Proposed development plans	47
Appendix B: SIDRA analysis outputs	49
Appendix C: Temporal distribution of parking demand	61
Appendix D: Swept path diagrams	63

1 Introduction

This Transport Impact Assessment has been prepared by **Urbii** on behalf of **Su Family Trust** with regards to the proposed mixed-use development, located at 310 - 326 Hale Road, Wattle Grove.

The subject site is situated on the northern side of Hale Road and western side of Wimbridge Road, as shown in Figure 1. A mixed-use development is proposed on the eastern portion of the site, at the corner of Hale Road and Wimbridge Road. The remaining portion of land is subject to future planning. The mixed-use development is the subject of this TIA.

The aim of this Transport Impact Assessment (TIA) is to assess the impact of the proposal on the existing transport network. The TIA was prepared in accordance with the WAPC *Transport Assessment Guidelines* 2016.



Figure 1: Subject site

2 Existing situation

2.1 Existing site use, access and parking

The site previously accommodated several uses including a Garden Centre and residential dwelling (Figure 2). The proposed development is located on the south-east portion of the site (310-318 Hale Road). The south-west portion of the site (326 Hale Road) may accommodate a future funeral parlour, which is subject to a separate application and Transport Impact Statement (TIS).



Figure 2: Historic site frontage from Hale Road

Source: Google streetview (2017)

A least three crossovers were previously provided along the Hale Road frontage. As a footpath was recently constructed, some of these crossovers were closed (Figure 3).

The site is surrounded by a mix of residential and commercial land uses, refer to Figure 4 for a context plan showing surrounding land use. Wattle Grove Primary School is located nearby to the north. Aldi, 7-eleven and other commercial uses are located on Hale Road to the west.



Figure 3: Historic and existing vehicle access

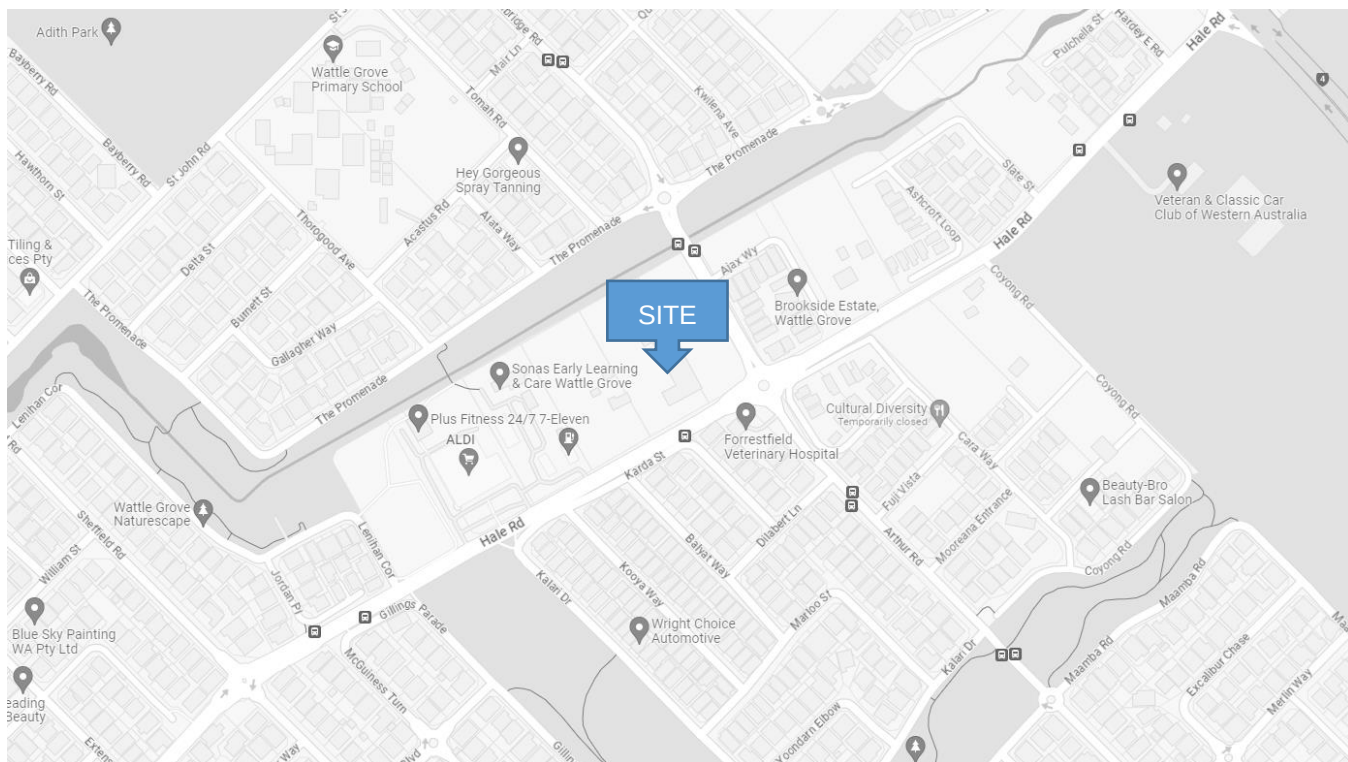


Figure 4: Location context plan



2.2 Surrounding road network and traffic management on roads

Information from online mapping services, Main Roads WA, Local Government, and site visits was collected to assess the existing traffic management on frontage roads.

2.2.1 Hale Road

Hale Road near the subject site is an approximately 11.5m wide, two-lane divided road. The road features a 4m wide, flush red-asphalt median with raised paved islands at intersections and walk crossings. Paths for walking and cycling are provided along both sides of the road.

Hale Road is classified as a *Distributor B* road in the Main Roads WA road hierarchy (Figure 5) and operates under a speed limit of 60km/h (Figure 6). Distributor B roads are the responsibility of Local Government and are typically for the reduced capacity but high traffic volumes travelling between industrial, commercial and residential areas (Figure 7).

2.2.2 Wimbridge Road

Wimbridge Road near the subject site is an approximately 9m wide, two-lane divided road. The road features a 2.2m wide, flush red-asphalt median. Paths for walking and cycling are provided along both sides of the road.

Wimbridge Road is classified as a *Local Distributor* road in the Main Roads WA road hierarchy (Figure 5) and operates under a built-up area speed limit of 50km/h (Figure 6). Local Distributor roads are the responsibility of Local Government and are typically for the movement of traffic within local areas and connect access roads to higher order Distributors (Figure 7).

Hale Road and Wimbridge Road form a 4-way roundabout intersection at the corner of the subject site.

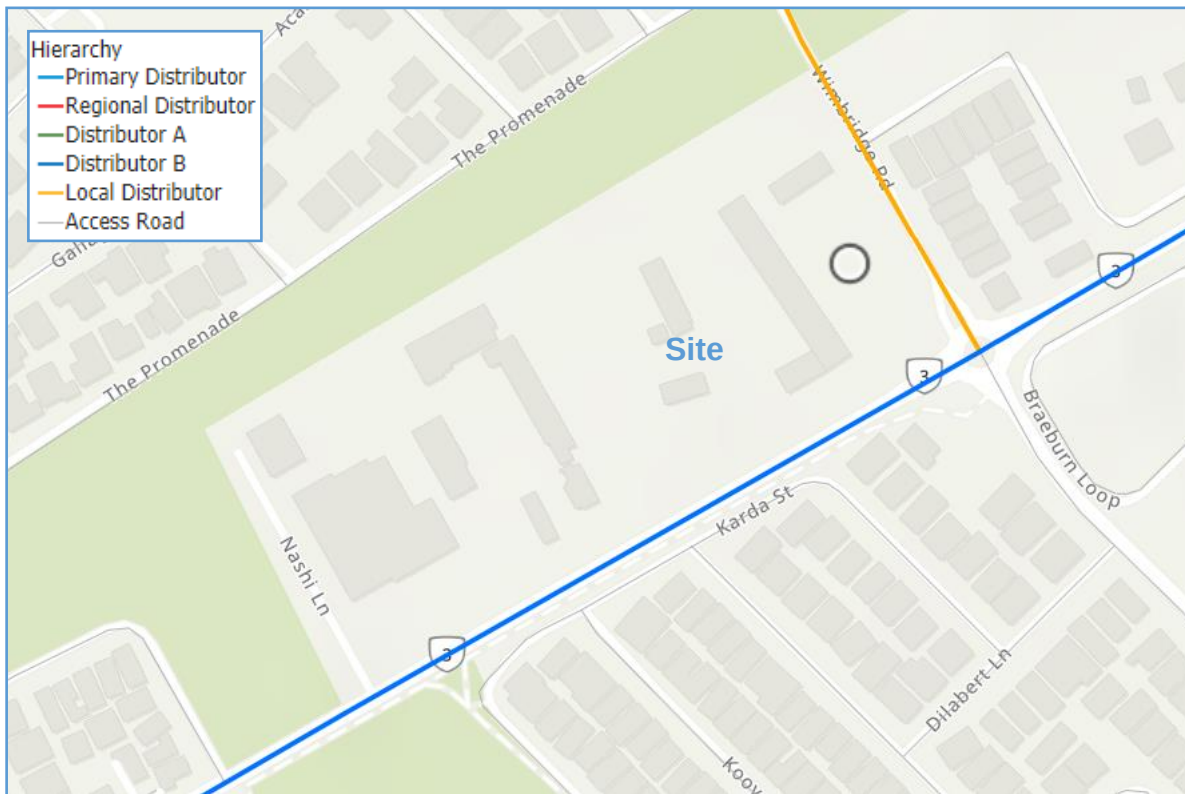


Figure 5: Main Roads WA road hierarchy plan

Source: Main Roads WA Road Information Mapping System (RIM)

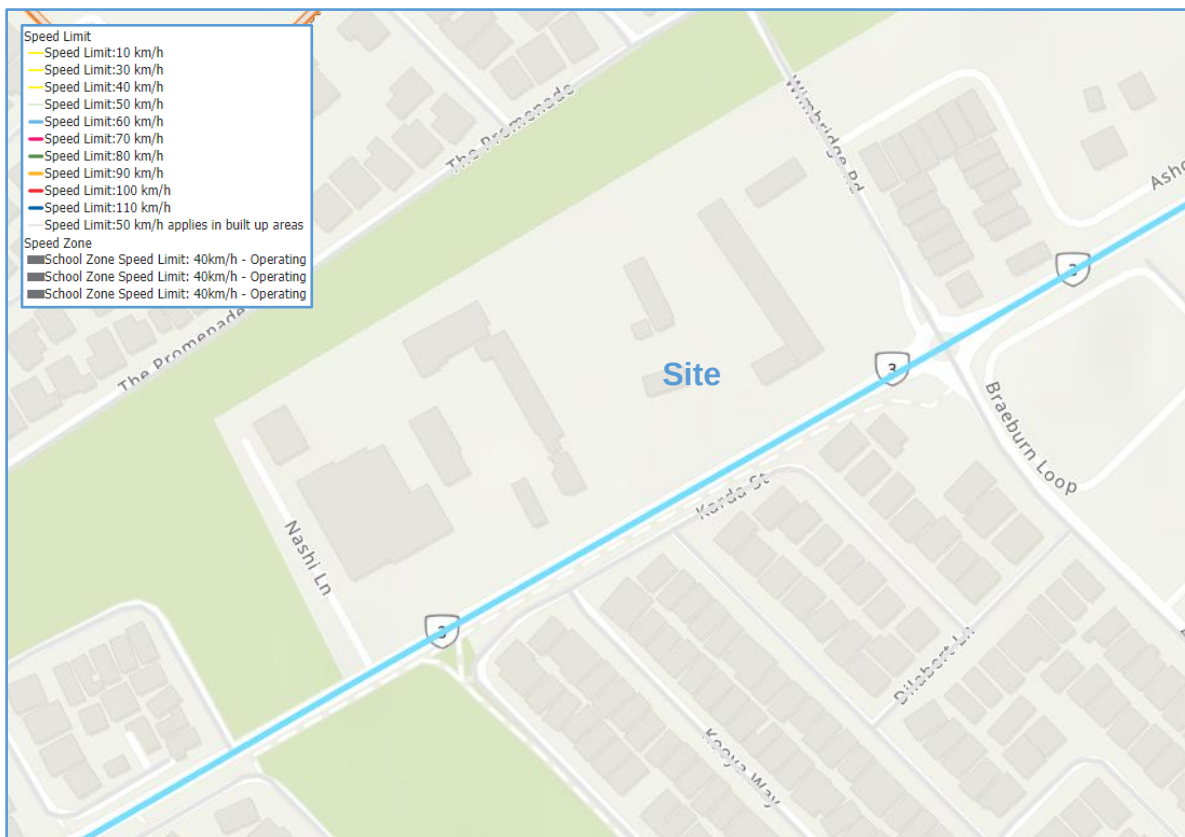


Figure 6: Main Roads WA road speed zoning plan

Source: Main Roads WA Road Information Mapping System (RIM)

ROAD HIERARCHY FOR WESTERN AUSTRALIA
ROAD TYPES AND CRITERIA (see Note 1)

CRITERIA	PRIMARY DISTRIBUTOR (PD) (see Note 2)	DISTRICT DISTRIBUTOR A (DA)	DISTRICT DISTRIBUTOR B (DB)	REGIONAL DISTRIBUTOR (RD)	LOCAL DISTRIBUTOR (LD)	ACCESS ROAD (A)
<i>Primary Criteria</i>						
1. Location (see Note 3)	All of WA incl. BUA	Only Built Up Area.	Only Built Up Area.	Only Non Built Up Area. (see Note 4)	All of WA incl. BUA	All of WA incl. BUA
2. Responsibility	Main Roads Western Australia.	Local Government.	Local Government.	Local Government.	Local Government.	Local Government.
3. Degree of Connectivity	High. Connects to other Primary and Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	Medium. Minor Network Role Connects to Distributors and Access Roads.	Low. Provides mainly for property access.
4. Predominant Purpose	Movement of inter regional and/or cross town/city traffic, e.g. freeways, highways and main roads.	High capacity traffic movements between industrial, commercial and residential areas.	Reduced capacity but high traffic volumes travelling between industrial, commercial and residential areas.	Roads linking significant destinations and designed for efficient movement of people and goods between and within regions.	Movement of traffic within local areas and connect access roads to higher order Distributors.	Provision of vehicle access to abutting properties
<i>Secondary Criteria</i>						
5. Indicative Traffic Volume (AADT)	In accordance with Classification Assessment Guidelines.	Above 8 000 vpd	Above 6 000 vpd.	Greater than 100 vpd	Built Up Area - Maximum desirable volume 6 000 vpd. Non Built Up Area – up to 100 vpd.	Built Up Area - Maximum desirable volume 3 000 vpd. Non Built Up Area – up to 75 vpd.
6. Recommended Operating Speed	60 – 110 km/h (depending on design characteristics).	60 – 80 km/h.	60 – 70 km/h.	50 – 110 km/h (depending on design characteristics).	Built Up Area 50 - 60 km/h (desired speed) Non Built Up Area 60 – 110 km/h (depending on design characteristics).	Built Up Area 50 km/h (desired speed). Non Built Up Area 50 – 110 km/h (depending on design characteristics).
7. Heavy Vehicles permitted	Yes.	Yes.	Yes.	Yes.	Yes, but preferably only to service properties.	Only to service properties.
8. Intersection treatments	Controlled with appropriate measures e.g. high speed traffic management, signing, line marking, grade separation.	Controlled with appropriate measures e.g. traffic signals.	Controlled with appropriate Local Area Traffic Management.	Controlled with measures such as signing and line marking of intersections.	Controlled with minor Local Area Traffic Management or measures such as signing.	Self controlling with minor measures.
9. Frontage Access	None on Controlled Access Roads. On other routes, preferably none, but limited access is acceptable to service individual properties.	Prefer not to have residential access. Limited commercial access, generally via service roads.	Residential and commercial access due to its historic status. Prefer to limit when and where possible.	Prefer not to have property access. Limited commercial access, generally via lesser roads.	Yes, for property and commercial access due to its historic status. Prefer to limit whenever possible. Side entry is preferred.	Yes.
10. Pedestrians	Preferably none. Crossing should be controlled where possible.	With positive measures for control and safety e.g. pedestrian signals.	With appropriate measures for control and safety e.g. median/islands refuges.	Measures for control and safety such as careful siting of school bus stops and rest areas.	Yes, with minor safety measures where necessary.	Yes.
11. Buses	Yes.	Yes.	Yes.	Yes.	Yes.	If necessary (see Note 5)
12. On-Road Parking	No (emergency parking on shoulders only).	Generally no. Clearways where necessary.	Not preferred. Clearways where necessary.	No – emergency parking on shoulders – encourage parking in off road rest areas where possible.	Built Up Area – yes, where sufficient width and sight distance allow safe passing. Non Built Up Area – no. Emergency parking on shoulders.	Yes, where sufficient width and sight distance allow safe passing.
13. Signs & Linemarking	Centrelines, speed signs, guide and service signs to highway standard.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs and guide signs.	Speed and guide signs.	Urban areas – generally not applicable. Rural areas - Guide signs.
14. Rest Areas/Parking Bays	In accordance with Main Roads' <i>Roadside Stopping Places Policy</i> .	Not Applicable.	Not Applicable.	Parking Bays/Rest Areas. Desired at 60km spacing.	Not Applicable.	Not Applicable.

Figure 7: Road types and criteria for Western Australia

Source: Main Roads Western Australia D10#10992

2.3 Existing traffic volumes on roads and major intersections

Traffic volume and speed data obtained from Main Roads WA indicates Hale Road carried average weekday traffic flows of around 6,800 vehicles per day (west of Tonkin Highway) in 2022. The weekday peak hours occur at around 8am to 9am and between 3pm to 5pm, as detailed in Figure 8.

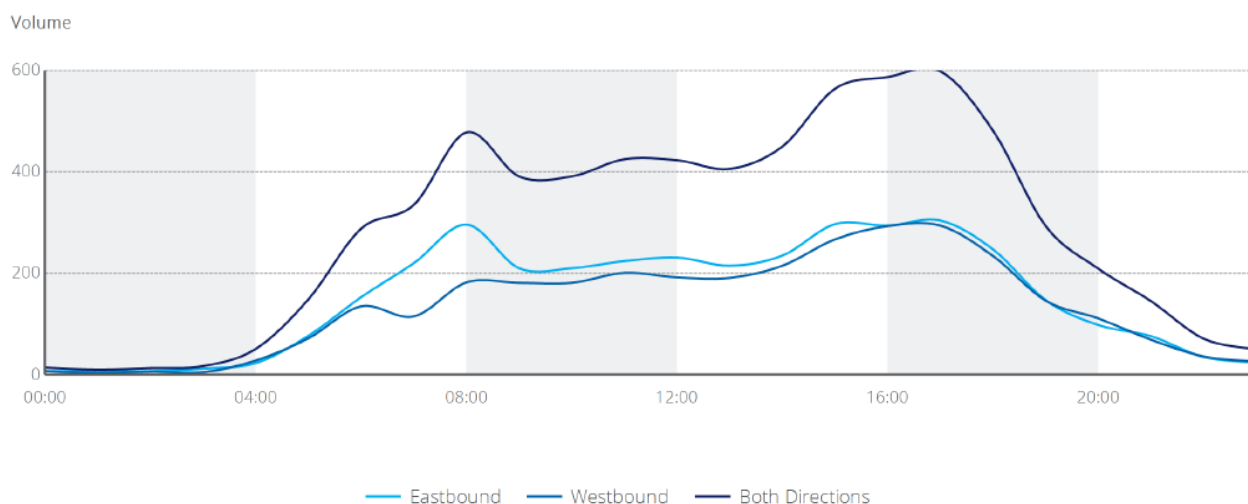


Figure 8: Weekday traffic profile (Hale Road west of Tonkin Highway)

Traffic data obtained from Main Roads WA and the City of Kalamunda for the local road network is summarised in Table 1. The peak hours on the local road network occur at 8am to 9am and 3pm to 4pm, due to the proximity to a local school.

Table 1: Existing traffic volume and speed on local roads

Road	Location	Daily traffic	85 th percentile speed
Hale Rd	West of Tonkin Hwy	6,800 vpd	59.6 km/h
Wimbridge Rd	North of Ajax Wy	2,600 vpd	51 km/h

To establish existing base traffic flows at nearby intersections, a video traffic survey was undertaken at the roundabout intersection of Hale Road and Wimbridge Road. The survey was undertaken on Tuesday 01 August 2023, on a school day. The survey was undertaken between 8am and 9am in the morning and 3pm and 4pm in the afternoon.

The base peak hour traffic flows derived for analysis are detailed in Section 7.2 of this report.

2.4 Existing operation of surrounding intersections

The operation of existing intersections is documented in Section 7.5 of this report.



2.5 Heavy vehicles

The roads near the subject site form part of RAV Network 1 which permits 19m semi-trailers to travel on these roads under general access, or “as of right” status. General access vehicles may operate state-wide provided they are:

- not a road train or b-double;
- within regulation axle mass limits;
- 19 metres or less in combination length (or a maximum 12.5 metres for rigid vehicles);
- total combination mass less than 42.5 tonnes;
- width less than 2.5 metres (excluding mirrors and lights); and
- height less than 4.3 metres.

2.6 Public transport access

Information was collected from Transperth and the Public Transport Authority to assess the existing public transport access to and from the site.

The subject site has access to the following bus services within walking distance:

- Bus Route 280: High Wycombe Stn - Carousel Shop Ctr via Wattle Grove & Cannington Stn.

Public transport services provide a viable alternative mode of transport for visitors and staff of the proposed development.

The closest bus stops are located on Hale Road abutting and across the site (Figure 9). Bus services provide excellent coverage and connectivity to the rail network.

The public transport network plan is shown in Figure 10.



Figure 9: Closest bus stops serving the proposed development

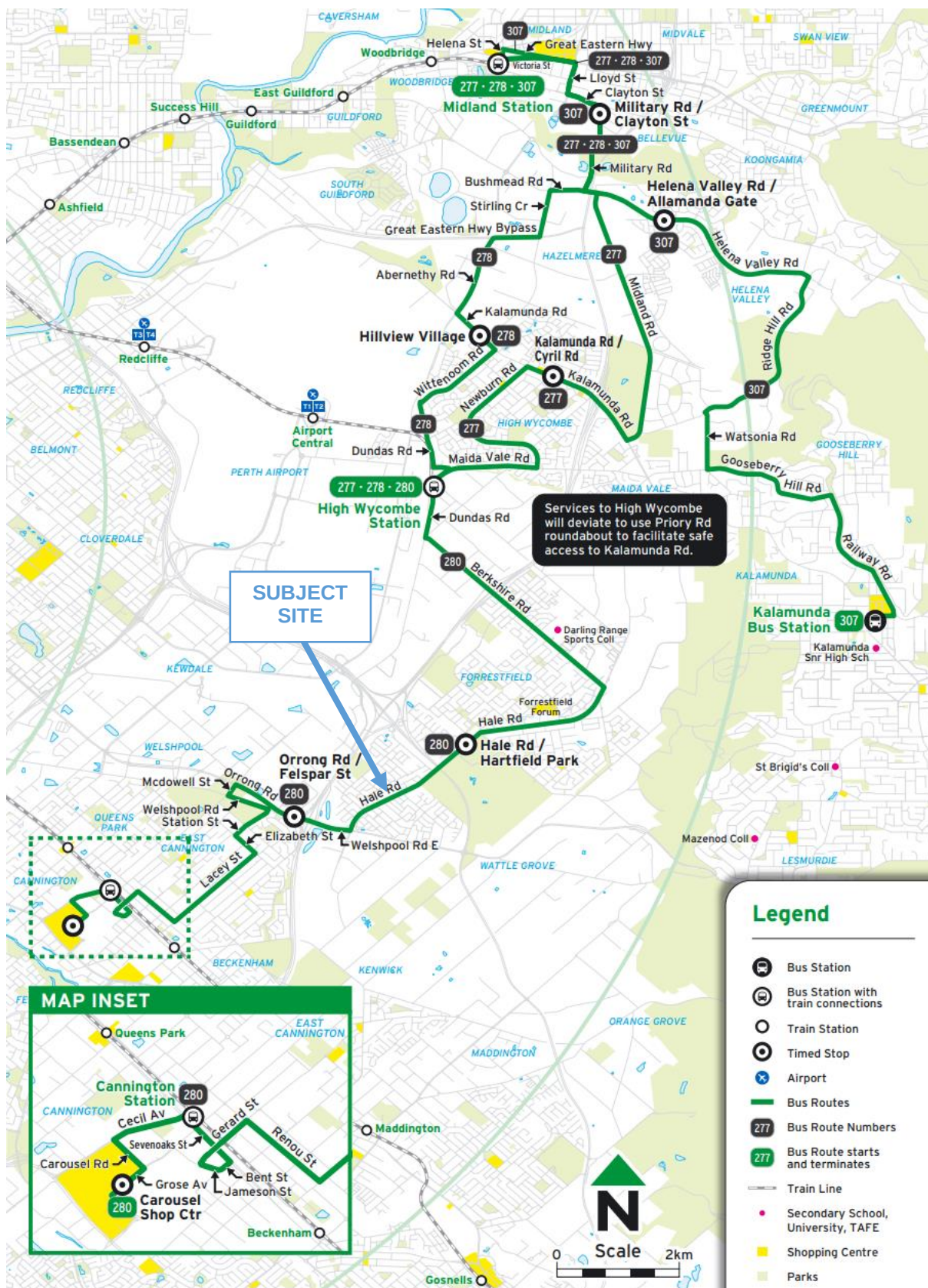


Figure 10: Transperth public transport plan

Source: Path Transit

2.7 Pedestrian access

Information from online mapping services, Main Roads WA, Local Government, and site visits was collected to assess the pedestrian access for the proposed development.

Footpaths are provided on both sides of Hale Road and Wimbridge Road adjacent to the subject site.

Kerb ramps and median refuge are provided on all four approaches of the roundabout intersection of Hale Road and Wimbridge Road, which promotes improved access for bicycles, wheelchairs and prams.



2.8 Bicycle access

Information from online mapping services, Department of Transport, Local Government, and/or site visits was collected to assess bicycle access for the proposed development.

The Department of Transport Perth Bicycle Network Map (see Figure 11) shows the existing cycling connectivity to the subject site. Higher order cycling facilities are accessible within close cycling distance of the site, including a shared path on Hale Road, which is also labeled as a 'Good Road Riding Environment.'

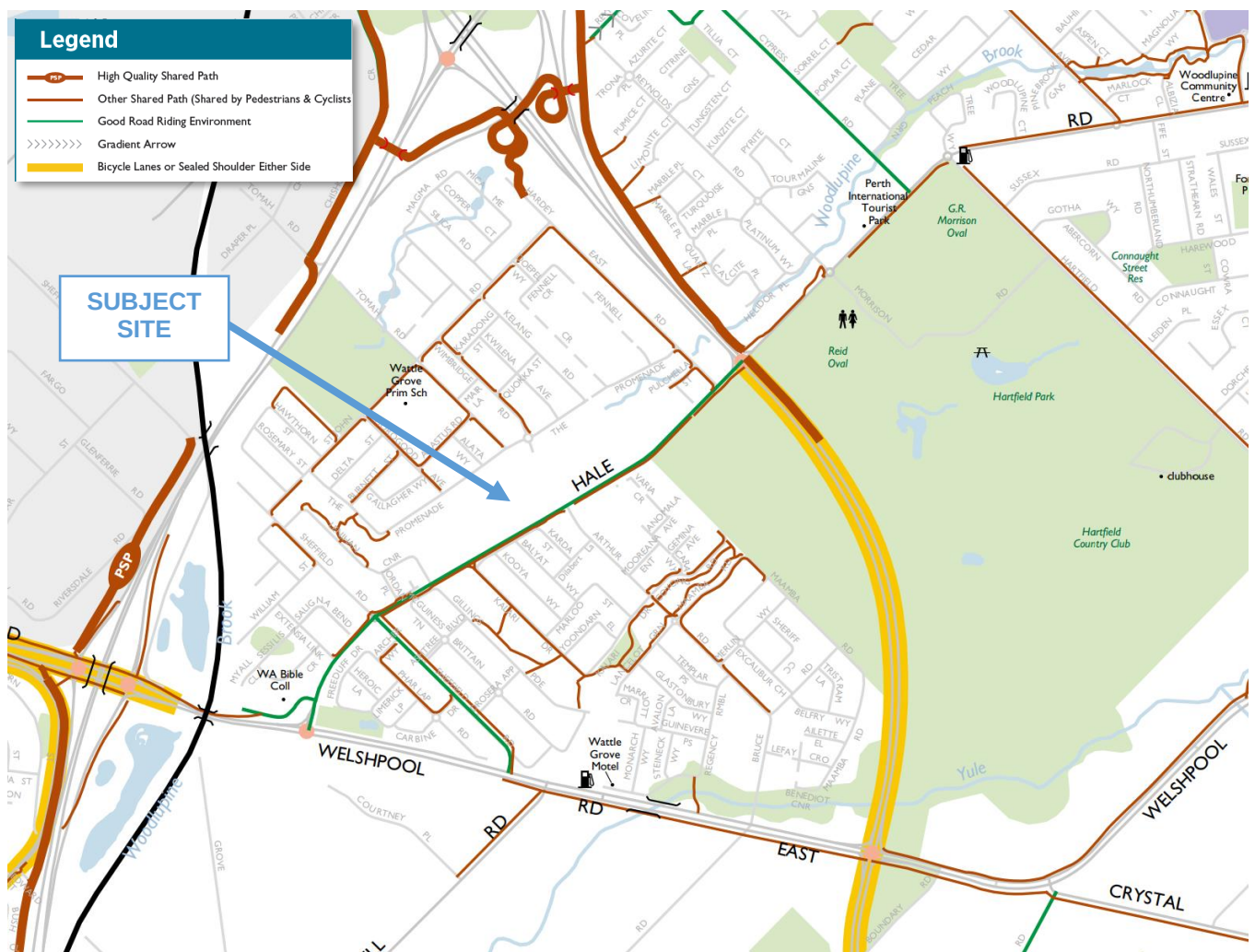


Figure 11: Perth bicycle network plan

The Strava cycling heatmap tool shows that Hale Road and Wimbridge Road are relatively popular cycling routes in the area (Figure 12).

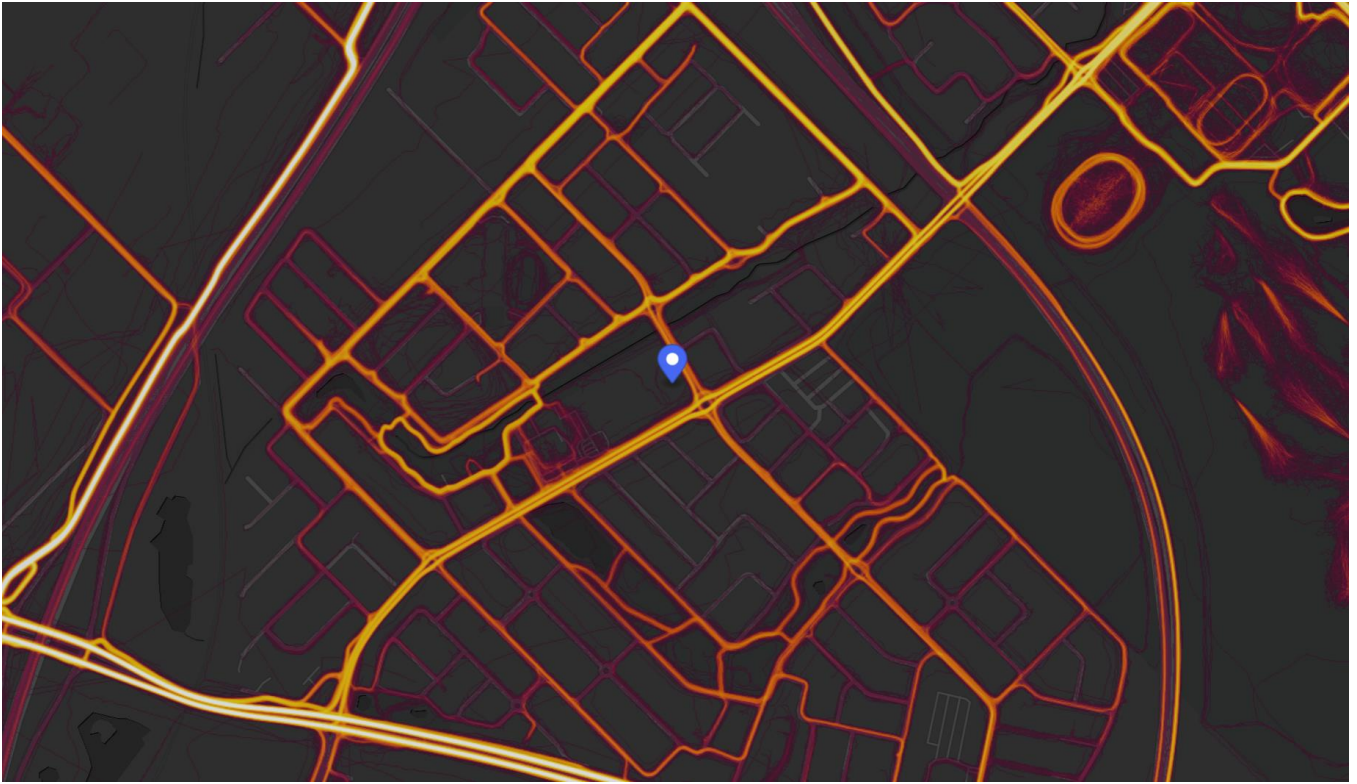


Figure 12: Strava cycling heatmap

2.9 Crash data and safety

The five-year crash history in the vicinity of the site was obtained from Main Roads WA. As detailed in Figure 13, 12 crashes were recorded in the immediate locality in the last five years. The detailed crash history is presented in Table 2.

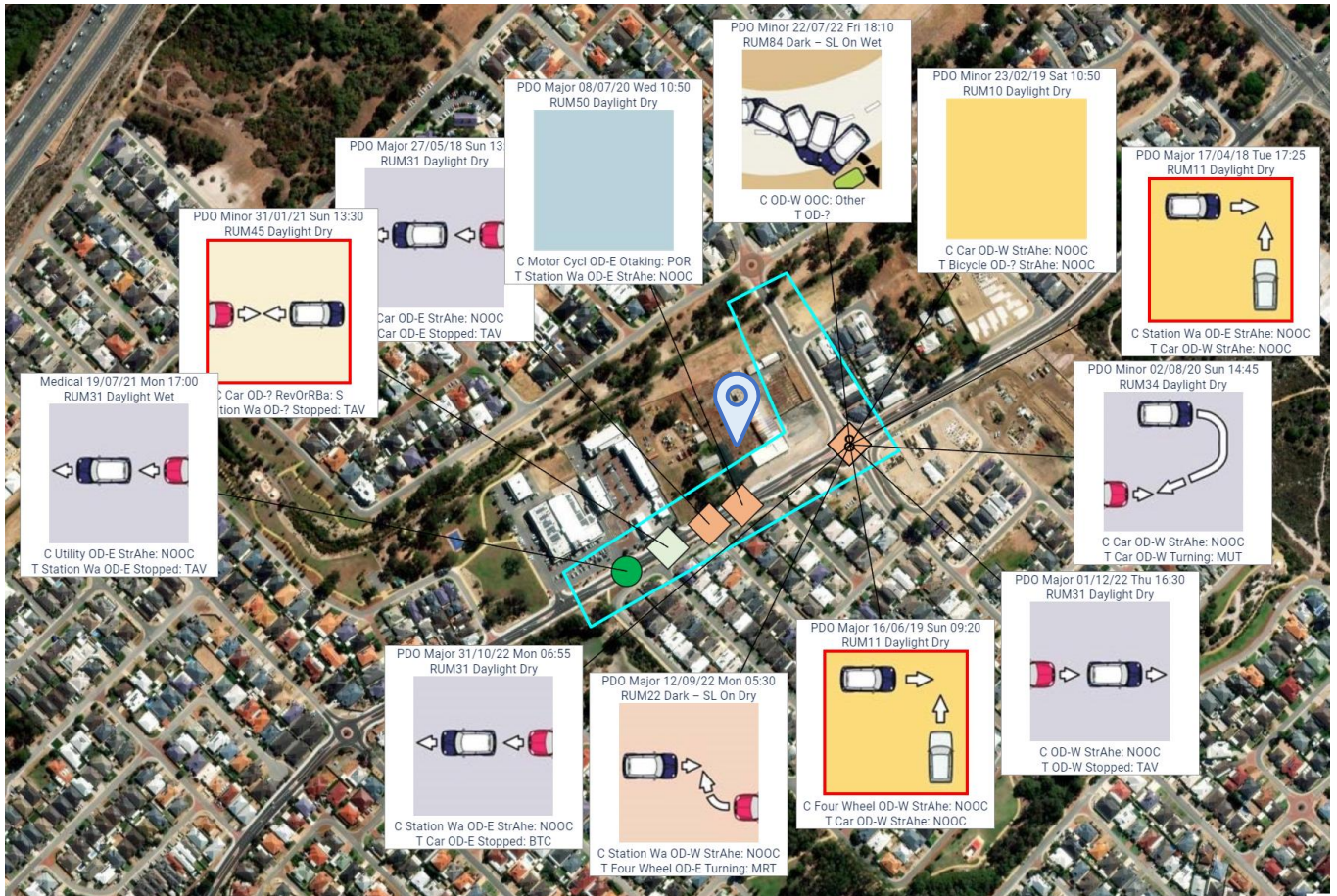


Figure 13: 5-year crash map in the locality (2018-2022)

Source: MRWA crash mapping tool

Table 2: 5-year crash history in the locality (2018-2022)

Severity	No.	%
Fatal	0	0
Hospital	0	0
Medical	1	8.33
PDO Major	7	58.33
PDO Minor	4	33.33
Year	No.	%
2018	2	16.67
2019	2	16.67
2020	2	16.67
2021	2	16.67
2022	4	33.33
Nature	No.	%
Head On	0	0
Hit Animal	0	0
Hit Object	1	8.33
Hit Pedestrian	0	0
Non Collision	0	0
Not Known	0	0
Other / Unknown	2	16.67
Rear End	4	33.33
Right Angle	3	25.00
Right Turn Thru	1	8.33
Sideswipe Opposite Dirn	0	0
Sideswipe Same Dirn	1	8.33
Light	No.	%
Dark - Street Lights Not Provided	0	0
Dark - Street Lights Off	0	0
Dark - Street Lights On	2	16.67
Dawn Or Dusk	0	0
Daylight	10	83.33
Not Known	0	0
Conditions	No.	%
Dry	10	83.33
Not Known	0	0
Wet	2	16.67
Alignment	No.	%
Curve	3	25.00
Not Known	0	0
Straight	9	75.00
Total	12	



3 Development proposal

A mixed-use development is proposed for the subject site, which will combine the complementary uses of childcare, medical centre, other medical services and pharmacy. Some minor variations in floor area may take place as further plan amendments are made. The proposed development plans include:

- Child care centre for 84 children and up to 17 staff.
- Medical centre – 299m².
- Pharmacy – 150m².
- Physio/Chiro/Remedial – 150m².
- Podiatry – 101m².
- Dental – 101m².
- Medical – 144m².

A total of 61 car parking spaces are provided, including 5 ACROD parking spaces. Parking for 11 bicycles is also provided, with bicycle racks spread throughout the site. Two raised walk crossings are provided in the car park, which connect to the public path on Hale Road and Wimbridge Road.

The proposed development plans are included in Appendix A.

4 Vehicle access

The proposed vehicular access arrangements have been reviewed for efficient and safe traffic circulation.

The proposed access arrangements are shown in Figure 14. Two crossovers are proposed on Hale Road and one crossover on Wimbridge Road. The eastern crossover on Hale Road and the crossover on Wimbridge Road are proposed to accommodate full-movement, two-way traffic flows. The western crossover on Hale Road is proposed to be for left-in movements only.

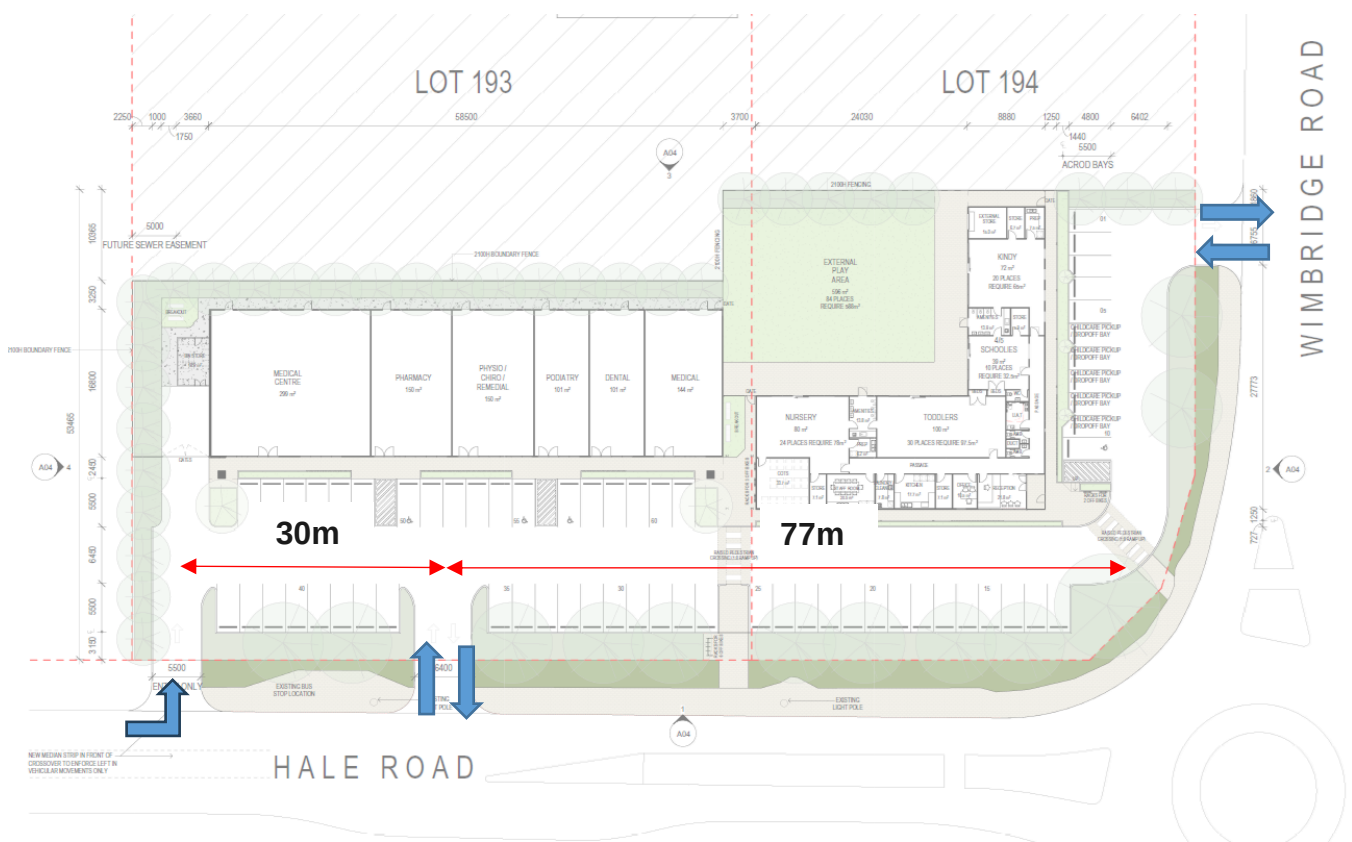


Figure 14: Proposed vehicle access

Urbii met with the City of Kalamunda on Tuesday 27 February 2024, to discuss the proposed access arrangements on Hale Road. The City was concerned that the western crossover on Hale Road was close to the adjoining site (funeral parlour) crossover. It was agreed that this crossover will be permitted for left turn entry movements only.

The adjacent funeral parlour crossover is proposed to be left-out only, with the existing median island on Hale Road extended. It is recommended that the proposed development proponents liaise with the adjacent funeral parlour proponents, to coordinate further extension of the median past the western site crossover. This will be undertaken at subsequent design stages.



5 Changes to surrounding transport networks

The City of Kalamunda was consulted for planned changes to the surrounding transport networks. No significant changes are planned in the vicinity of the development.



6 Integration with surrounding area

The proposed development integrates well with the surrounding area. A portion of the site to the north and west will likely be developed with residential lots in the future (subject to a separate development application).

The portion of the site immediately west of the development is planned to accommodate a funeral parlour. The funeral parlour requires independent vehicle access to accommodate service and hearse vehicle movements. Independent access arrangements will also reduce the incidence of overflow parking from the funeral parlour into the proposed development.

7 Traffic assessment

7.1 Assessment period

Two time periods are considered in the traffic assessment:

- Weekday AM peak hour: 8am to 9am.
- Weekday PM peak hour: 3pm to 4pm.

The analysis was undertaken for the following scenarios:

- Existing situation (without proposed development traffic).
- 10yr post-development situation (assumed to be 2036 with development traffic included).



7.2 Existing traffic flows

To establish existing base traffic flows at nearby intersections, a video traffic survey was undertaken at the roundabout intersection of Hale Road and Wimbridge Road. The survey was undertaken on Tuesday 01 August 2023, on a school day. The survey was undertaken between 8am and 9am in the morning and 3pm and 4pm in the afternoon.

The existing traffic flows are presented in Figure 16.



Figure 16: Surveyed existing traffic flows – weekday AM and PM peak hours

7.3 Traffic generation

The traffic volume that will be generated by the proposed development has been estimated using trip generation rates derived with reference to the following sources:

- ITE *Trip Generation Manual 10th Edition*;
- Roads and Traffic Authority of New South Wales *Guide to Traffic Generating Developments (2002)*; and
- RTA TDT 2013/ 04a.

The trip generation rates adopted are detailed in Table 3.

Table 3: Adopted trip rates for traffic generation

Land use	Trip rate source	Daily rate	AM rate	PM rate	AM-in	AM-out	PM-in	PM-out
Consulting Room	RTA Medical Centre	1.04	0.104	0.088	50%	50%	50%	50%
Pharmacy	ITE Pharmacy (880)	0.969	0.032	0.092	65%	35%	50%	50%
Child Care	RTA Child Care Centre	4	0.8	0.8	50%	50%	50%	50%

The RTA Guide specifies a rate of 1.4 trips per child between 7am and 9am (2 hours), so it was assumed that 0.8 trip per child would be generated in the peak hour (8am to 9am). The RTA Guide specifies 0.8 trips per child between 2:30pm and 4:00pm. For simplicity, it was conservatively assumed 0.8 trip per child would also be generated in the PM peak hour.

Child care centres have well defined peak periods in their daily traffic profiles therefore the daily trip rate would be no more than 4 trips per child.

The estimated traffic generation of the proposed development is detailed in Table 4. The proposed development is estimated to generate a total of 1,375 vehicles per day (vpd), with 160 and 157 vehicles per hour (vph) generated during the AM and PM peak hours, respectively.

These trips include both inbound and outbound vehicle movements. It is anticipated that most of the vehicle types would be passenger cars and SUVs.

Table 4: Traffic generation – Weekday AM and PM peak hours

Land use	Quantity	Daily Trips	AM Trips	PM Trips	AM Peak Trips		PM Peak Trips	
					IN	OUT	IN	OUT
Medical	850m2*	884	88	75	44	44	38	37
Pharmacy	160m2*	155	5	15	3	2	8	7
Child Care	84 places	336	67	67	34	33	34	33
Total		1375	160	157	81	79	80	77

*Note: Floor area has been rounded up to provide flexible for future minor plan revisions

It should be noted that the above analysis is conservative, as it does not apply any discounts for cross trade between the development land uses.



7.4 Trip distribution and assignment

Development traffic was assigned to the crossovers and surrounding intersections as detailed in Figure 17. The distribution assumptions were based on the existing traffic distributions in and out of the roundabout.

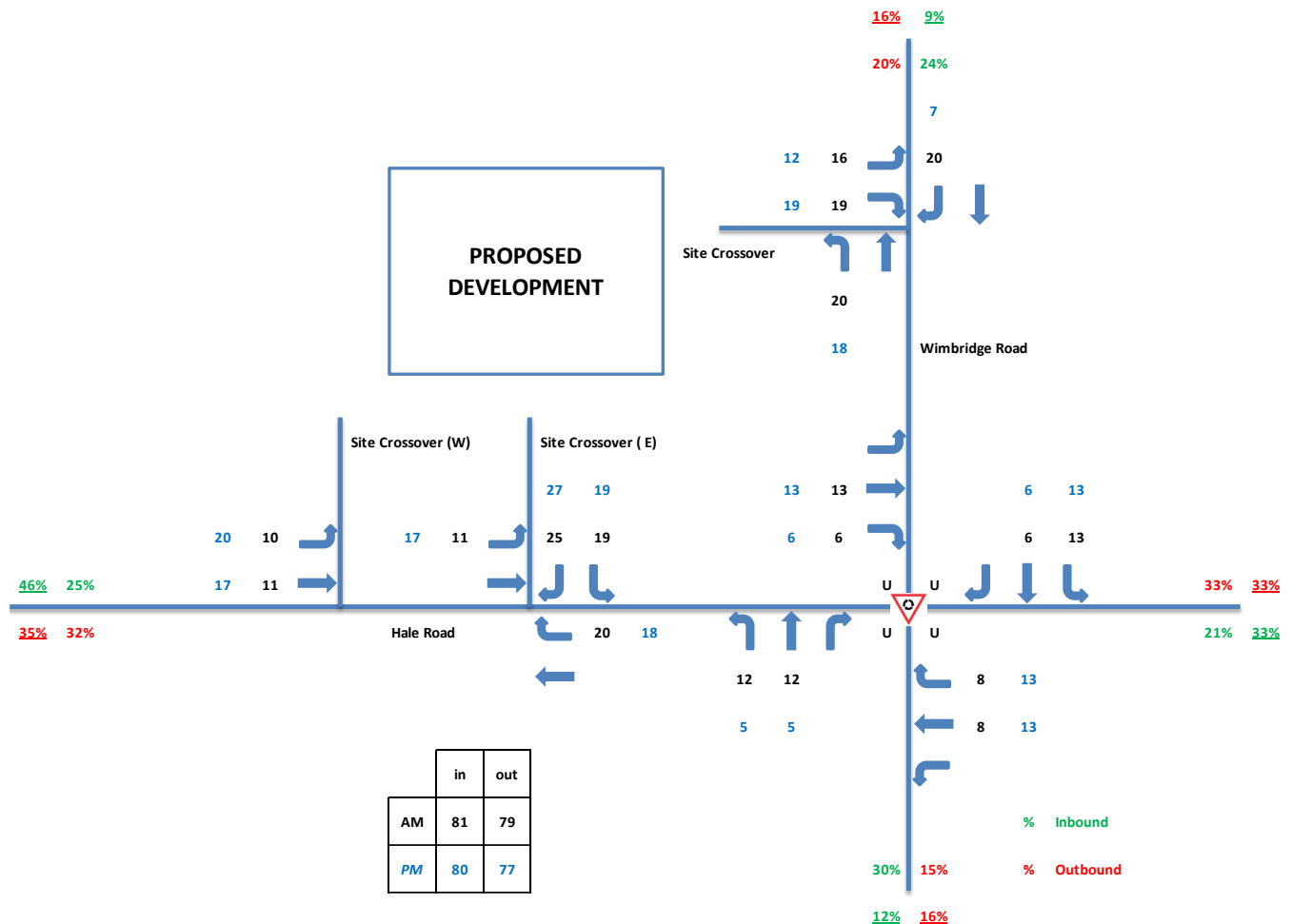


Figure 17: Proposed development traffic distribution

Note: Underlined distribution percentages represent the PM peak hour.

7.4.1 10-year post development forecasting

Forecasting background traffic volumes for the 10 year post development scenario is a complex exercise. Transport demand forecasting is shifting from fixed forecasts to ‘scenario modelling.’ Scenario modelling recognises that there are multiple known and unknown disrupters to transport behaviour in the coming years, for example:

- Increased work from home activity;
- Increased popularity of micromobility devices such as e-scooters;
- Increased provision of public transport such as light rail and trackless trams;
- Electric Vehicles;
- Autonomous Vehicles; and,
- Government Net Zero emission targets.

For simplicity, this transport assessment refers to population forecasts for the City of Kalamunda and the suburb of Wattle Grove. As shown in Table 5, the City of Kalamunda has a forecast average annual population growth of 0.74% per annum. The suburb of Wattle Grove has a higher forecast growth of 1.08% per annum.

Table 5: Population forecasts – City of Kalamunda

City of Kalamunda	Forecast year					Change between 2021 and 2041	
Area	2021↕	2026↕	2031↕	2036↕	2041↕	Total change↕	Avg. annual % change↕
Shire of Kalamunda	60,803	62,997	65,843	68,110	70,407	+9,604	+0.74
Forrestfield	13,768	14,326	14,683	14,830	15,004	+1,236	+0.43
Gooseberry Hill	3,498	3,569	3,668	3,743	3,833	+335	+0.46
High Wycombe	12,621	12,758	13,283	13,857	14,428	+1,807	+0.67
Kalamunda	7,421	7,894	8,299	8,629	8,930	+1,509	+0.93
Lesmurdie	8,542	8,520	8,624	8,676	8,745	+203	+0.12
Maida Vale	4,684	5,331	6,112	6,737	7,306	+2,622	+2.25
Rural East - Walliston	3,536	3,645	3,676	3,734	3,815	+279	+0.38
Wattle Grove	6,734	6,955	7,499	7,903	8,346	+1,612	+1.08
Source: Population and household forecasts, 2021 to 2041, prepared by <u>id</u> (informed decisions), March 2023.							

This TIA conservatively adopts a compounded traffic growth rate of 2% per annum. Applying this rate for traffic growing from the assessment years of 2023 to 2036 will result in a 29% increase in background traffic volumes. This traffic increase adequately caters for the development in Wattle Grove, including the remaining portions of the subject site.

The base 2036 traffic flows are detailed in Figure 18. The total 2036 post development traffic volumes are detailed in Figure 19.



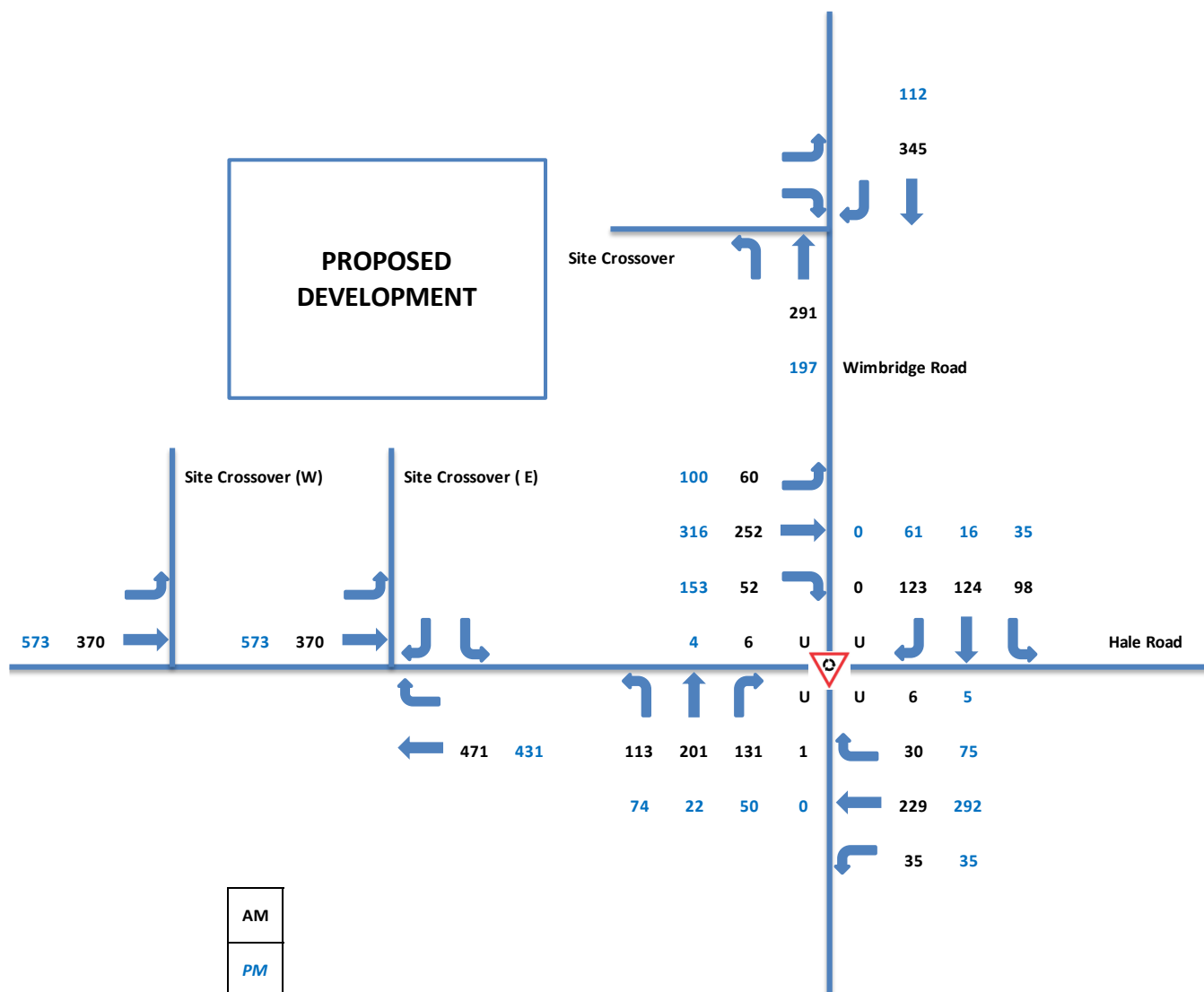


Figure 18: 2036 forecast base traffic flows (without development traffic)

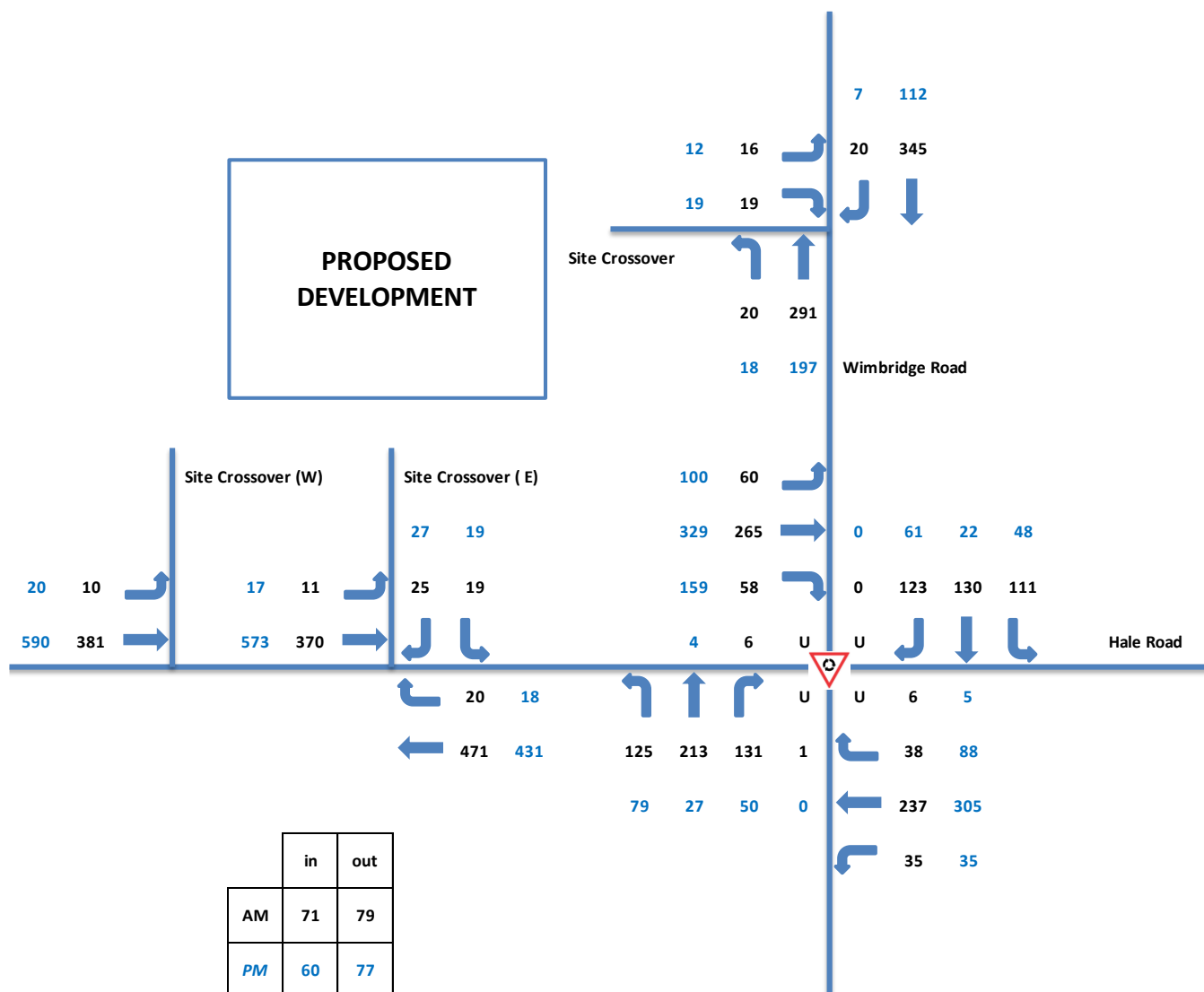


Figure 19: 2036 forecast traffic flows (including development traffic)

7.5 Analysis of intersections and development access

Capacity analysis of intersections was undertaken using the SIDRA 9 computer software package. SIDRA 9 is an intersection modelling tool commonly used by traffic engineers for all types of intersections.

Four intersections were analysed as following:

- Hale Rd / Wimbridge Rd / Arthur Rd (Existing and 2036 AM & PM peak hours).
- Site crossover (E) / Hale Rd (2036 AM & PM peak hours).
- Site crossover (W) / Hale Rd (2036 AM & PM peak hours).
- Site crossover / Wimbridge Rd (2036 AM & PM peak hours).

Overall, the SIDRA results indicate that the proposed development will have minimal impact on the road network. Most traffic movements operated at level of service A with minimal delays and queuing.

Detailed SIDRA outputs for each intersection are provided in Appendix B.

7.6 Impact on surrounding roads

The WAPC Transport Impact Assessment Guidelines for Developments (2016) provides the following guidance on the assessment of traffic impacts:

“As a general guide, an increase in traffic of less than 10 percent of capacity would not normally be likely to have a material impact on any particular section of road but increases over 10 percent may. All sections of road with an increase greater than 10 percent of capacity should therefore be included in the analysis. For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 percent of capacity. Therefore, any section of road where development traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis.”

The proposed development will not increase traffic flows on any roads adjacent to the site by the quoted WAPC threshold of +100vph to warrant further analysis. Therefore, the impact on the surrounding road network is minor.

7.7 Impact on neighbouring areas

The traffic generated by the proposed development is not expected to significantly affect surrounding areas and the proposed land uses are in line with planning for the local area. Therefore, there is not expected to be any impact on neighbouring areas that would require any further consideration.

7.8 Traffic noise and vibration

It requires a doubling of traffic volumes on a road to produce a perceptible 3dB (A) increase in road noise. The proposed development will not increase traffic volumes or noise on surrounding roads anywhere near this level to result in any perceptible increase in noise.



8 Parking

8.1 Parking supply

A total of 61 car parking bays are proposed for the development. This includes five bays allocated for ACROD parking. Five bays will be reserved for the exclusive use of childcare pick-up/drop-off.

8.2 Parking requirements

Advice provided by the project Town Planner indicates that the applicable planning scheme will result in a significant 'on-paper' parking shortfall.

8.3 Parking demand modelling

Urbii has undertaken an independent parking demand modelling exercise, to estimate the combined parking demand for the site, based on floor area for tenancies and the number of staff and children in the child care centre. This exercise was undertaken to assess if total parking onsite will be sufficient, independent of specific tenant operations and parking allocations.

Reference was made to the Institute of Transport Engineers (ITE) *Parking Generation Manual* for peak parking demand rates for the proposed medical and pharmacy uses. The relevant parking generation rates for the applicable uses are detailed in Table 6.

Table 6: ITE parking generation rates

Land use	Reference	Peak Parking Demand Rate	Measurement
Medical/Dental Office	ITE - Medical-dental (720)	3.48	per 100 sqm GFA
Pharmacy	ITE - Pharmacy (880)	2.36	per 100 sqm GFA
CCC Staff	Traffic modelling	0.80	per staff member
CCC Children	Traffic modelling		Refer to modelling

Child care centre staff

As detailed in Figure 20, census data indicates that around 75% of workers employed in education and training in the City of Kalamunda travelled to work by driving a car.

An **80%** car driver mode share is considered a reasonable target for staff working at the child care centre, which is located within short walking distance of a bus stop.

The proposed development provides end of trip facilities including a shower, change room and lockers plus bicycle parking for staff, to further encourage sustainable transport to the site.

This results in an anticipated peak parking demand of **14 bays for 17 staff**.

Child care centre pick-up / drop-off

Modelling was undertaken to estimate the demand for children's pick-up/drop-off parking. As detailed in Section 7 of this report, the peak inbound traffic for children's drop-off is estimated to be 34 cars in a 60-minute period. The RTA NSW *Guide to Traffic Generating Developments* surveyed the average length of stay for drop-offs to be 6.8 minutes.

For conservative analysis, it was assumed that the average length of stay would be 7 minutes. The Poisson Distribution modelling presented in Figure 21 shows that in any 7-minute period during the peak hour, the 95th percentile number of pick-ups/drop-offs will be **7 vehicles or less**. Outside of peak hours the demand for visitor parking will be much lower.

Local workers method of travel to work							
reset ↺ export 📄							
City of Kalamunda - Education and Training	2021			2016			Change
Main method of travel	Number	%	Western Australia	Number	%	Western Australia	2016 - 2021
Car, as driver	1,590	80.6	75.5	1,443	81.5	75.0	+147
Car, as passenger	53	2.7	3.1	38	2.1	3.1	+15
Train	0	0	1.7	8	0.5	2.4	-8
Bus	16	0.8	1.4	5	0.3	1.6	+11
Ferry	0	0	0.0	0	0	0	--
Tram	0	0	0.0	0	0	0.0	--
Truck	0	0	0.0	0	0	0.0	--
Motorbike/Motor scooter	0	0	0.2	11	0.6	0.4	-11
Bicycle	0	0	0.9	5	0.3	1.4	-5
Taxi/Other	0	0	0.2	0	0	0.1	--
Other - multiple methods	6	0.3	0.2	13	0.7	0.7	-7
Walked only	31	1.6	2.6	42	2.4	3.4	-11
Worked at home	51	2.6	4.1	38	2.1	2.1	+13
Did not go to work	220	11.2	10.1	162	9.1	9.4	+58
Not stated	5	0.3	0.1	6	0.3	0.4	-1
Total	1,972	100.0	100.0	1,771	100.0	100.0	+201
Source: Australian Bureau of Statistics, Census of Population and Housing 2016 and 2021. Compiled and presented by .id (informed decisions) Please refer to specific data notes for more information							

Figure 20: City of Kalamunda – Method of travel to work data (2016-21)

Source: Australian Bureau of Statistics, Census of Population and Housing, 2016 and 2021.



Traffic volume 34 (vph) 0.00944 (vps)

Time period 7 (min) 420 (sec)

Mean number of vehicles 3.96667

Probability distribution table 95th percentile: 7 vehicles

(x)	p(x)	P(x)
1	0.07511	0.09405
2	0.14898	0.24303
3	0.19698	0.44001
4	0.19534	0.63535
5	0.15497	0.79032
6	0.10245	0.89277
7	0.05806	0.95083
8	0.02879	0.97961
9	0.01269	0.9923
10	0.00503	0.99733
11	0.00181	0.99915
12	0.0006	0.99975
13	0.00018	0.99993
14	5.2E-05	0.99998
15	1.4E-05	1
16	3.4E-06	1
17	7.9E-07	1
18	1.7E-07	1
19	3.6E-08	1
20	7.2E-09	1

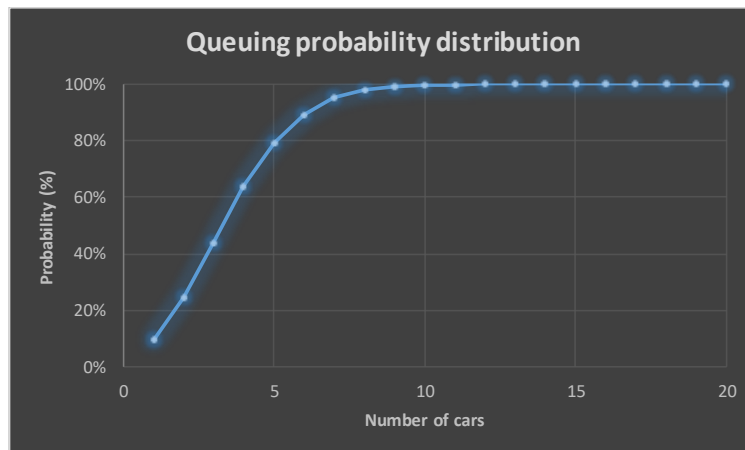


Figure 21: Probability analysis for children’s drop-off/pick-up

The calculated peak parking demand for the different site land uses is presented in Table 7.

Table 7: Peak parking generation for proposed land uses

Land use	Reference	Quantity	Peak Parking Demand
Medical/Dental Office	ITE - Medical-dental (720)	850m2	30
Pharmacy	ITE - Pharmacy (880)	160m2	4
CCC Staff	Traffic modelling	17 staff	14
CCC Children	Traffic modelling	84 children	7

The ITE *Parking Generation Manual* provides the percentage distribution of parking demand for every hour of the day for different land uses. Extracts from ITE detailing the hourly parking distributions are included in Appendix C.

The total hourly parking demand for the development on weekdays is presented in Table 8. Peak parking demand is estimated to be 53 bays at 3:00pm. There are 61 car parking bays provided onsite, which equates to 87% peak occupancy.

The independent parking demand modelling provides confidence that the total car parking provided onsite is sufficient for the scale and type of land uses.

Table 8: Hourly parking demand distribution (weekdays)

Time	Medical	Pharmacy	Child Care	Total
7:00	4	0	18	22
8:00	13	0	21	34
9:00	27	2	18	47
10:00	30	2	16	48
11:00	30	2	16	48
12:00	25	2	16	43
13:00	23	3	16	42
14:00	29	3	18	50
15:00	28	4	21	53
16:00	26	3	21	50
17:00	17	3	18	38
18:00	15	3	11	29
19:00	15	2	0	17
20:00	0	2	0	2
21:00	0	2	0	2



8.4 Parking demand management

It is considered that there is enough parking to meet the needs of the development. However, should there be a need to manage car parking demand in the future, several strategies can be considered.

A sustainable transport network should prioritise active and sustainable modes of transport, with walking, cycling, public transport, car sharing, and then single occupancy cars ranked in order of priority (Figure 22).

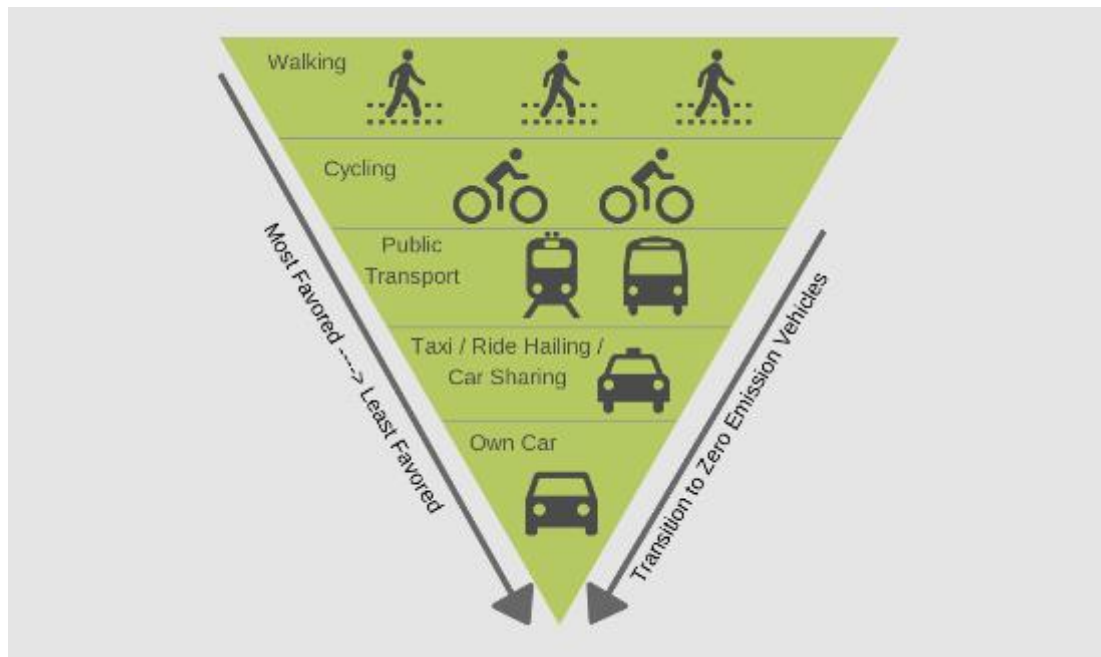


Figure 22: Sustainable transport hierarchy

Some strategies which can be considered for promoting sustainable transport and lowering demand for car parking may include, but are not limited to:

- Running healthy, active transport campaigns and promotions in the workplace. For example, tracking walking and active transport and offering prizes or other incentives for participants.
- Educating staff on public transport, walking and cycling travel options as part of training and recruitment.
- Offering subsidies or other incentives for using public transport.
- Monitoring and maintaining bicycle parking to ensure enough parking is provided and is maintained in good condition.
- Providing free charging stations for micro-mobility vehicles such as e-scooters and e-bikes.
- Implementing a car-pooling register for staff to match-up and car pool together. This can also be incentivised by issuing car-pooling badges for display on the dashboard and providing allocated priority car-pooling parking bays within the site.
- Offer tele-commuting work opportunities for staff who can complete work duties remotely, for example administrative staff.

9 Provision for service vehicles

The *Austroads Guide to Traffic Management Part 11: Parking Management Techniques* recommends allowance for 1 x Medium Rigid Vehicle (MRV) service bay for business/office developments in the range of 1,000m² to 2,500m² GFA (Table 9).

Table 9: Example of the number of service bays required for business

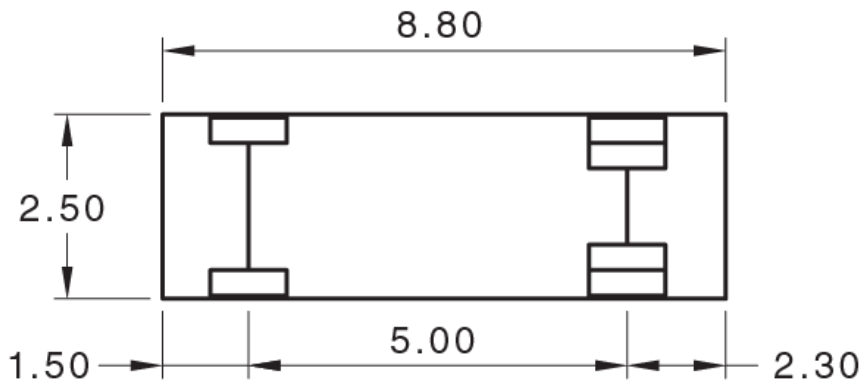
Development type	Gross floor area (GFA), m ²	Number of service bays required by vehicle class			
		Small rigid vehicle	Medium rigid vehicle	Heavy rigid vehicle	Articulated vehicle
Business/office	0–99	1	–	–	–
	1 000–2 499	–	1	–	–
	2 500–7 999	1	1	–	–
	8 000–19 999	2	1	–	–
	20 000–34 999	2	2	–	–
	35 000–64 999	2	2	1	–
	> 65 000	2	3	1	–
Shop/restaurant	0–199	1	–	–	–
	200–599	–	1	–	–
	600–1 499	1	1	–	–
	1 500–1 999	2	1	–	–
	2 000–2 799	2	2	–	–
	2 800–4 399	2	2	1	–
	4 400–8 499	2	2	1	1
	8 500–11 499	3	2	1	1
	11 500–20 999	3	3	1	1
	21 000–23 999	3	3	2	1
	24 000–32 999	3	3	2	2
	> 33 000	3	4	3	2
Hotel/motel	0–199	–	1	–	–
	200–399	–	1	1	–
	400–599	1	1	1	–
	> 600	2	1	1	–

Source: *Austroads Guide to Traffic Management Part 11: Parking Management Techniques*



The proposed development provides one shared loading bay for deliveries, large service vehicles and onsite waste collection.

Swept path analysis was prepared for an 8.8m Medium Rigid Vehicle (MRV), as detailed in Figure 23. Swept path analysis confirms satisfactory service vehicle movements and is presented in Appendix D. Service vehicles are able to enter and exit the site in forward gear.



(b) Medium rigid vehicle
Clearance height 4.50
Design turning radius 10.0

Figure 23: Adopted checking vehicle for swept path analysis

Source: AS2890.2 *Off-street commercial vehicle facilities*

It is recommended that a small rear-loader waste truck be used for private waste collection.

10 Public transport assessment

The existing public transport services as documented in Section 2.6 of this report provide excellent accessibility for the subject site. No changes to public transport are proposed as part of this development.



11 Walking assessment

The WAPC Transport Impact Assessment Guidelines for Developments (2016) provide warrants for installing pedestrian priority crossing facilities. This is based on the volume of traffic as the key factor determining if pedestrians can safely cross a road. The guidelines recommend pedestrian priority crossing facilities be considered once the peak hour traffic exceeds the volumes detailed in Table 10.

The traffic volumes in this table are based on a maximum delay of 45 seconds for pedestrians, equivalent to Level of Service E. Traffic volumes on the road network adjacent to the site are below the threshold for safe pedestrian crossing. Therefore, the pedestrian crossing level of service is satisfactory on the adjacent road network.

Table 10: Traffic volume thresholds for pedestrian crossings

Road cross-section	Maximum traffic volumes providing safe pedestrian gap
2-lane undivided	1,100 vehicles per hour
2-lane divided (with refuge)	2,800 vehicles per hour
4-lane undivided*	700 vehicles per hour
4-lane divided (with refuge)*	1,600 vehicles per hour

12 Cycling assessment

12.1 Bicycle parking and end of trip facilities

A total of 11 bicycle parking spaces are provided for the development. Consideration should be given to the provision of end of trip facilities including showers, change rooms and lockers to encourage active transport for staff.

12.2 Sustainable transport catchment

As detailed in Figure 24, the subject site is well placed for staff, guests and visitors to travel by sustainable modes of transport. A comfortable 8km or 20-25min cycle will provide the development with a large catchment for staff and visitors.

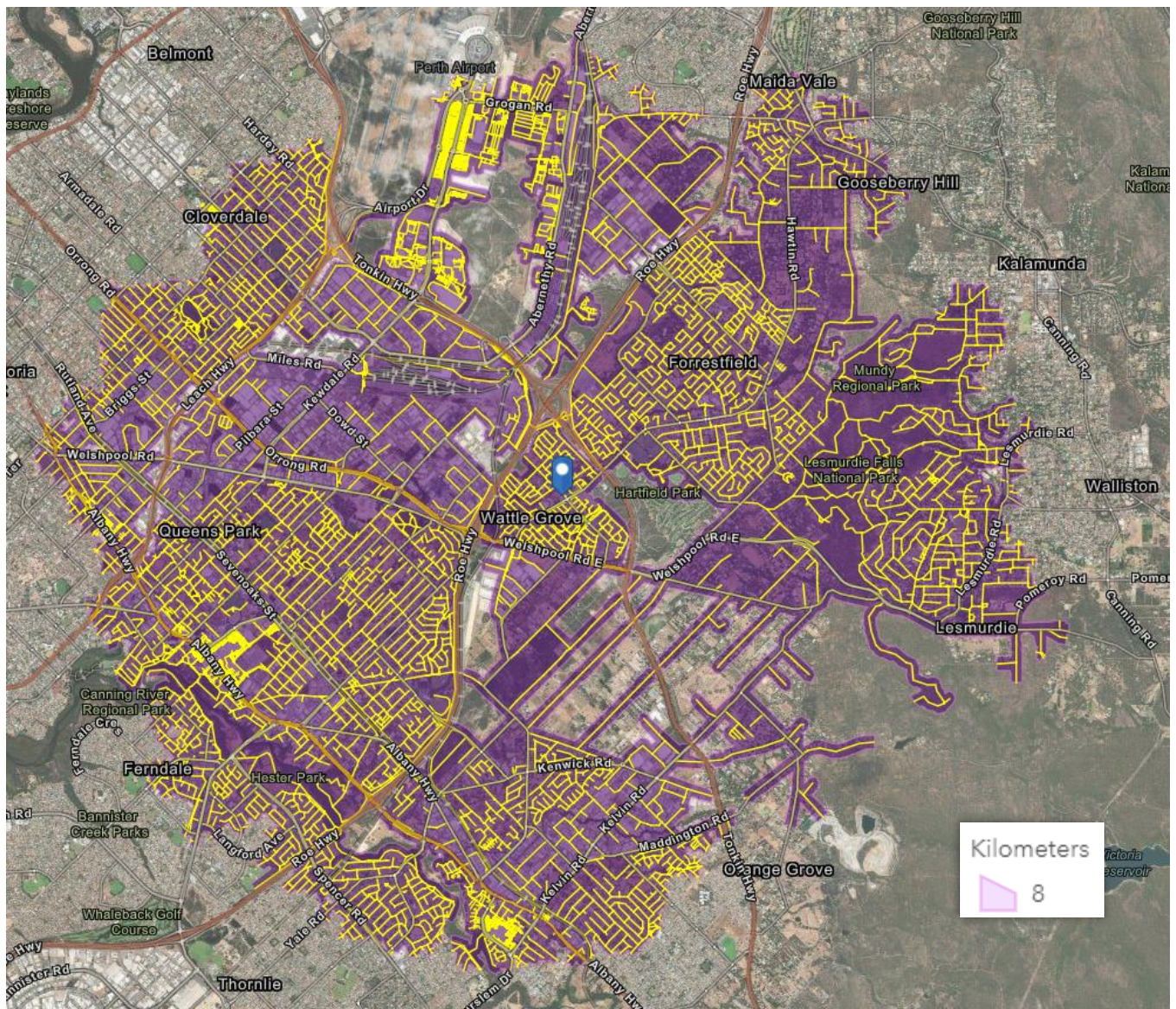


Figure 24: Cycling and micro-mobility catchment



13 Conclusion

This Transport Impact Assessment has been prepared by Urbii on behalf of Su Family Trust with regards to the proposed mixed-use development, located at 310 - 326 Hale Road, Wattle Grove.

The subject site is situated on the northern side of Hale Road and western side of Wimbridge Road.

The site promotes good connectivity with the existing and planned road, cycling and pedestrian network.

The traffic analysis undertaken in this report shows that the traffic generation of the proposed development can be accommodated by the surrounding roads and intersections. The proposed car parking supply is expected to meet the needs of the proposed development.

It is concluded that the findings of this Transport Impact Assessment are supportive of the proposed development.

Appendices

Appendix A: Proposed development plans



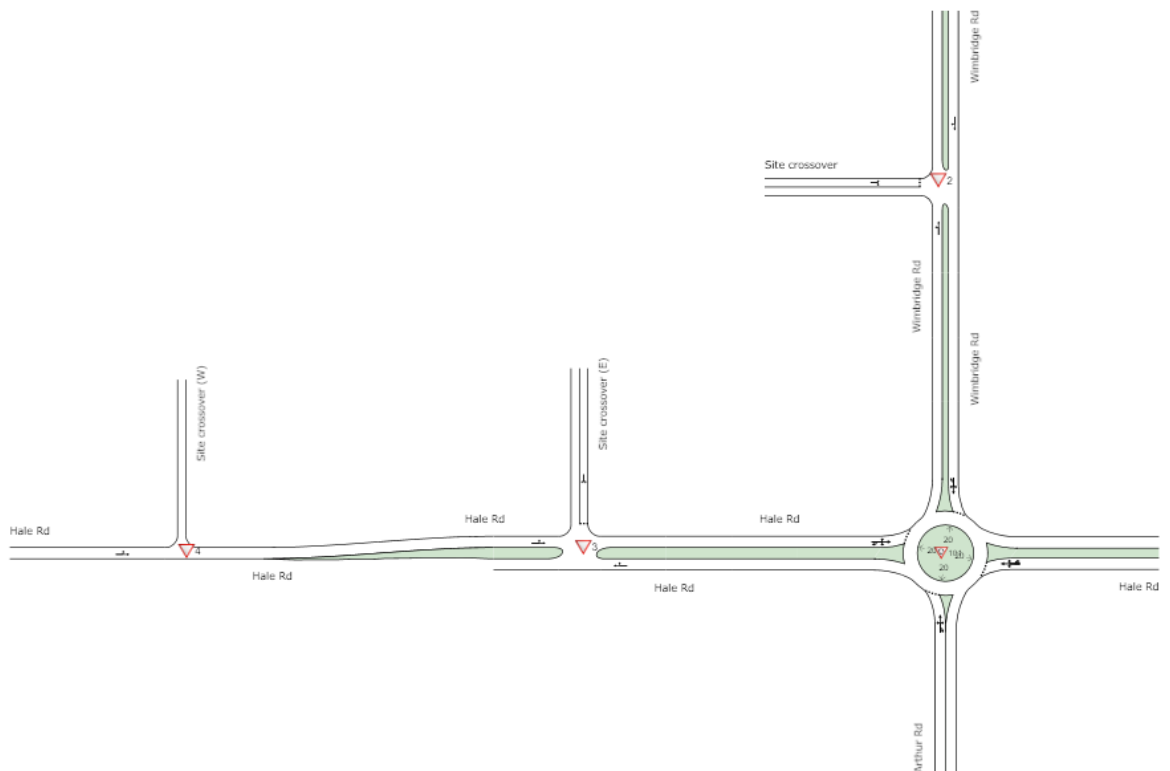
Appendix B: SIDRA analysis outputs

SIDRA outputs are presented in the form of Degree of Saturation, Level of Service, Average Delay and 95% Queue. These characteristics are defined as follows:

- **Degree of Saturation (DoS):** is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The Degree of Saturation ranges from close to zero for varied traffic flow up to one for saturated flow or capacity.
- **Level of Service (LoS):** is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. In general, there are 6 levels of service, designated from A to F, with Level of Service A representing the best operating condition (i.e. free flow) and Level of Service F the worst (i.e. forced or breakdown flow).
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection.
- **95% Queue:** is the queue length below which 95% of all observed queue lengths fall.



Coded Network



SITES IN NETWORK		
Site ID	CCG ID	Site Name
▽101	NA	Hale Rd / Wimbridge Rd / Arthur Rd - AM 2036 PD
▽2	NA	Site Crossover / Wimbridge Rd - AM 2036 PD
▽3	NA	Site Crossover (E) / Hale Rd - AM 2036 PD
▽4	NA	Site Crossover (W) / Hale Rd - AM 2036 PD

Analysis Outputs – Movement Summary Tables

Existing AM and PM peak hour

MOVEMENT SUMMARY

Site: 101 [Hale Rd / Wimbridge Rd / Arthur Rd - AM Existing (Site Folder: General)]

Roundabout Intersection Hale Rd / Wimbridge Rd / Arthur Rd

Existing AM peak hour

Site Category: (None)

Roundabout

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. Dist]		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Arthur Rd														
1	L2	87	0.0	92	0.0	0.354	5.0	LOS A	2.4	16.8	0.59	0.64	0.59	35.8
2	T1	155	1.0	163	1.0	0.354	5.0	LOS A	2.4	16.8	0.59	0.64	0.59	24.1
3	R2	101	4.0	106	4.0	0.354	9.6	LOS A	2.4	16.8	0.59	0.64	0.59	43.5
3u	U	1	100.0	1	100.0	0.354	14.6	LOS B	2.4	16.8	0.59	0.64	0.59	30.6
Approach		344	1.9	362	1.9	0.354	6.4	LOS A	2.4	16.8	0.59	0.64	0.59	33.2
East: Hale Rd														
4	L2	27	4.0	28	4.0	0.225	5.3	LOS A	1.4	9.7	0.48	0.57	0.48	43.3
5	T1	177	2.0	186	2.0	0.225	5.5	LOS A	1.4	9.7	0.48	0.57	0.48	37.6
6	R2	23	4.0	24	4.0	0.225	10.2	LOS B	1.4	9.7	0.48	0.57	0.48	34.3
6u	U	5	0.0	5	0.0	0.225	12.1	LOS B	1.4	9.7	0.48	0.57	0.48	51.1
Approach		232	2.4	244	2.4	0.225	6.1	LOS A	1.4	9.7	0.48	0.57	0.48	38.1
North: Wimbridge Rd														
7	L2	76	1.0	80	1.0	0.293	4.6	LOS A	1.9	13.8	0.62	0.67	0.62	41.7
8	T1	96	4.0	101	4.0	0.293	4.8	LOS A	1.9	13.8	0.62	0.67	0.62	36.1
9	R2	95	0.0	100	0.0	0.293	8.9	LOS A	1.9	13.8	0.62	0.67	0.62	22.0
9u	U	1	0.0	1	0.0	0.293	10.7	LOS B	1.9	13.8	0.62	0.67	0.62	17.3
Approach		268	1.7	282	1.7	0.293	6.2	LOS A	1.9	13.8	0.62	0.67	0.62	31.9
West: Hale Rd														
10	L2	46	7.0	48	7.0	0.293	5.8	LOS A	1.9	13.5	0.56	0.62	0.56	22.9
11	T1	195	4.0	205	4.0	0.293	5.9	LOS A	1.9	13.5	0.56	0.62	0.56	44.9
12	R2	40	0.0	42	0.0	0.293	10.5	LOS B	1.9	13.5	0.56	0.62	0.56	34.7
12u	U	5	0.0	5	0.0	0.293	12.5	LOS B	1.9	13.5	0.56	0.62	0.56	26.1
Approach		286	3.9	301	3.9	0.293	6.6	LOS A	1.9	13.5	0.56	0.62	0.56	39.9
All Vehicles		1130	2.5	1189	2.5	0.354	6.3	LOS A	2.4	16.8	0.57	0.63	0.57	35.9



MOVEMENT SUMMARY

Site: 101 [Hale Rd / Wimbridge Rd / Arthur Rd - PM Existing (Site Folder: General)]

Roundabout Intersection Hale Rd / Wimbridge Rd / Arthur Rd

Existing PM peak hour

Site Category: (None)

Roundabout

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. Dist]		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Arthur Rd														
1	L2	57	2.0	60	2.0	0.124	4.8	LOS A	0.7	5.1	0.53	0.61	0.53	35.9
2	T1	17	24.0	18	24.0	0.124	5.3	LOS A	0.7	5.1	0.53	0.61	0.53	24.0
3	R2	39	0.0	41	0.0	0.124	9.2	LOS A	0.7	5.1	0.53	0.61	0.53	44.6
3u	U	1	0.0	1	0.0	0.124	11.0	LOS B	0.7	5.1	0.53	0.61	0.53	33.7
Approach		114	4.6	120	4.6	0.124	6.4	LOS A	0.7	5.1	0.53	0.61	0.53	37.5
East: Hale Rd														
4	L2	27	7.0	28	7.0	0.283	5.1	LOS A	1.7	12.2	0.42	0.55	0.42	43.2
5	T1	226	3.0	238	3.0	0.283	5.2	LOS A	1.7	12.2	0.42	0.55	0.42	37.7
6	R2	58	0.0	61	0.0	0.283	9.8	LOS A	1.7	12.2	0.42	0.55	0.42	34.5
6u	U	4	25.0	4	25.0	0.283	12.4	LOS B	1.7	12.2	0.42	0.55	0.42	46.6
Approach		315	3.1	332	3.1	0.283	6.1	LOS A	1.7	12.2	0.42	0.55	0.42	37.7
North: Wimbridge Rd														
7	L2	27	4.0	28	4.0	0.102	4.7	LOS A	0.6	4.3	0.59	0.65	0.59	40.1
8	T1	12	8.0	13	8.0	0.102	4.9	LOS A	0.6	4.3	0.59	0.65	0.59	34.5
9	R2	47	4.0	49	4.0	0.102	9.0	LOS A	0.6	4.3	0.59	0.65	0.59	21.6
9u	U	1	0.0	1	0.0	0.102	10.7	LOS B	0.6	4.3	0.59	0.65	0.59	17.1
Approach		87	4.5	92	4.5	0.102	7.1	LOS A	0.6	4.3	0.59	0.65	0.59	28.6
West: Hale Rd														
10	L2	77	1.0	81	1.0	0.359	4.6	LOS A	2.4	17.1	0.37	0.53	0.37	23.5
11	T1	244	3.0	257	3.0	0.359	4.8	LOS A	2.4	17.1	0.37	0.53	0.37	46.1
12	R2	118	2.0	124	2.0	0.359	9.5	LOS A	2.4	17.1	0.37	0.53	0.37	35.6
12u	U	3	0.0	3	0.0	0.359	11.5	LOS B	2.4	17.1	0.37	0.53	0.37	26.7
Approach		442	2.4	465	2.4	0.359	6.1	LOS A	2.4	17.1	0.37	0.53	0.37	39.6
All Vehicles		958	3.1	1008	3.1	0.359	6.2	LOS A	2.4	17.1	0.43	0.56	0.43	37.7

2036 Post Development AM peak hour

MOVEMENT SUMMARY

Site: 101 [Hale Rd / Wimbridge Rd / Arthur Rd - AM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development AM Network (Network Folder: General)]

Roundabout Intersection Hale Rd / Wimbridge Rd / Arthur Rd
2036 AM peak hour (with development)
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Arthur Rd														
1	L2	132	0.0	132	0.0	0.536	7.0	LOS A	4.6	32.5	0.77	0.80	0.84	26.5
2	T1	224	1.0	224	1.0	0.536	7.0	LOS A	4.6	32.5	0.77	0.80	0.84	26.5
3	R2	138	4.0	138	4.0	0.536	11.6	LOS B	4.6	32.5	0.77	0.80	0.84	41.5
3u	U	1	100.0	1	100.0	0.536	17.9	LOS B	4.6	32.5	0.77	0.80	0.84	29.0
Approach		495	1.8	495	1.8	0.536	8.3	LOS A	4.6	32.5	0.77	0.80	0.84	32.7
East: Hale Rd														
4	L2	37	4.0	37	4.0	0.334	6.0	LOS A	2.2	16.0	0.61	0.65	0.61	42.2
5	T1	249	2.0	249	2.0	0.334	6.2	LOS A	2.2	16.0	0.61	0.65	0.61	40.4
6	R2	40	4.0	40	4.0	0.334	10.9	LOS B	2.2	16.0	0.61	0.65	0.61	40.4
6u	U	6	0.0	6	0.0	0.334	12.8	LOS B	2.2	16.0	0.61	0.65	0.61	50.0
Approach		333	2.4	333	2.4	0.334	6.9	LOS A	2.2	16.0	0.61	0.65	0.61	40.9
North: Wimbridge Rd														
7	L2	117	1.0	117	1.0	0.455	6.2	LOS A	3.5	24.8	0.79	0.80	0.81	39.7
8	T1	137	4.0	137	4.0	0.455	6.4	LOS A	3.5	24.8	0.79	0.80	0.81	33.5
9	R2	129	0.0	129	0.0	0.455	10.5	LOS B	3.5	24.8	0.79	0.80	0.81	20.9
9u	U	1	0.0	1	0.0	0.455	12.3	LOS B	3.5	24.8	0.79	0.80	0.81	20.9
Approach		384	1.7	384	1.7	0.455	7.8	LOS A	3.5	24.8	0.79	0.80	0.81	33.4
West: Hale Rd														
10	L2	63	7.0	63	7.0	0.446	6.3	LOS A	3.3	23.7	0.72	0.74	0.72	27.3
11	T1	279	4.0	279	4.0	0.446	6.4	LOS A	3.3	23.7	0.72	0.74	0.72	43.9
12	R2	61	0.0	61	0.0	0.446	10.9	LOS B	3.3	23.7	0.72	0.74	0.72	32.9
12u	U	6	0.0	6	0.0	0.446	13.0	LOS B	3.3	23.7	0.72	0.74	0.72	27.3
Approach		409	3.8	409	3.8	0.446	7.2	LOS A	3.3	23.7	0.72	0.74	0.72	40.9
All Vehicles		1621	2.4	1621	2.4	0.536	7.6	LOS A	4.6	32.5	0.73	0.75	0.76	36.9

MOVEMENT SUMMARY

Site: 2 [Site Crossover / Wimbridge Rd - AM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development AM Network (Network Folder: General)]

Site Crossover / Wimbridge Rd
2036 AM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Wimbridge Rd														
1	L2	21	0.0	21	0.0	0.170	3.7	LOS A	0.0	0.0	0.00	0.03	0.00	7.6
2	T1	306	3.0	306	3.0	0.170	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.6
Approach		327	2.8	327	2.8	0.170	0.2	NA	0.0	0.0	0.00	0.03	0.00	46.6
North: Wimbridge Rd														
8	T1	363	2.0	363	2.0	0.203	0.1	LOS A	0.2	1.4	0.06	0.03	0.06	49.3
9	R2	21	0.0	21	0.0	0.203	6.0	LOS A	0.2	1.4	0.06	0.03	0.06	46.4
Approach		384	1.9	384	1.9	0.203	0.4	NA	0.2	1.4	0.06	0.03	0.06	49.1
West: Site crossover														
10	L2	17	0.0	17	0.0	0.045	1.0	LOS A	0.2	1.1	0.43	0.38	0.43	40.7
12	R2	20	0.0	20	0.0	0.045	4.1	LOS A	0.2	1.1	0.43	0.38	0.43	15.6
Approach		37	0.0	37	0.0	0.045	2.7	LOS A	0.2	1.1	0.43	0.38	0.43	34.9
All Vehicles		748	2.2	748	2.2	0.203	0.5	NA	0.2	1.4	0.05	0.05	0.05	47.5



MOVEMENT SUMMARY

▼ Site: 3 [Site Crossover (E) / Hale Rd - AM 2036 PD (Site Folder: General)]

■ Network: N101 [2036 Post Development
AM Network (Network Folder: General)]

Site Crossover / Hale Rd
2036 AM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Hale Rd														
8	T1	496	1.0	496	1.0	0.265	0.1	LOS A	0.2	1.7	0.06	0.03	0.06	59.3
9	R2	21	0.0	21	0.0	0.265	6.9	LOS A	0.2	1.7	0.06	0.03	0.06	41.8
Approach		517	1.0	517	1.0	0.265	0.4	NA	0.2	1.7	0.06	0.03	0.06	59.1
North: Site crossover (E)														
10	L2	20	0.0	20	0.0	0.072	1.4	LOS A	0.2	1.7	0.51	0.49	0.51	14.0
12	R2	26	0.0	26	0.0	0.072	6.1	LOS A	0.2	1.7	0.51	0.49	0.51	43.4
Approach		46	0.0	46	0.0	0.072	4.1	LOS A	0.2	1.7	0.51	0.49	0.51	38.0
West: Hale Rd														
1	L2	12	0.0	12	0.0	0.202	3.1	LOS A	0.0	0.0	0.00	0.02	0.00	24.9
2	T1	389	3.0	389	3.0	0.202	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	57.7
Approach		401	2.9	401	2.9	0.202	0.1	NA	0.0	0.0	0.00	0.02	0.00	53.7
All Vehicles		964	1.7	964	1.7	0.265	0.5	NA	0.2	1.7	0.06	0.04	0.06	57.2

MOVEMENT SUMMARY

▼ Site: 4 [Site Crossover (W) / Hale Rd - AM 2036 PD (Site Folder: General)]

■ Network: N101 [2036 Post Development
AM Network (Network Folder: General)]

Site Crossover / Hale Rd
2036 AM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
West: Hale Rd														
1	L2	11	0.0	11	0.0	0.208	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	53.3
2	T1	401	3.0	401	3.0	0.208	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		412	2.9	412	2.9	0.208	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
All Vehicles		412	2.9	412	2.9	0.208	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4

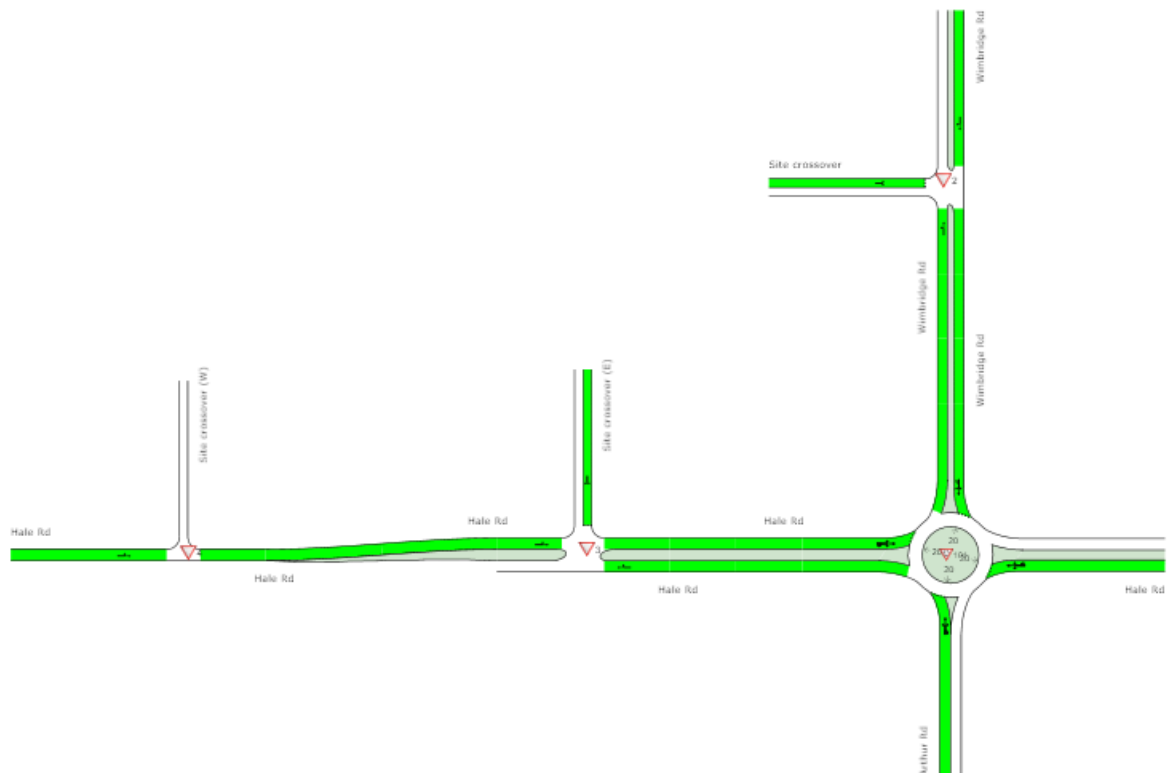
LEVEL OF SERVICE

Lane Level of Service

■ ■ Network: N101 [2036 Post Development AM Network (Network Folder: General)]

U23.056 - 310 - 326 Hale Road, Wattle Grove

Network Category: (None)



Colour code based on Level of Service

LOS A
 LOS B
 LOS C
 LOS D
 LOS E
 LOS F

Delay Model: SIDRA Standard (Geometric Delay is included).



QUEUE STORAGE RATIO (PERCENTILE)

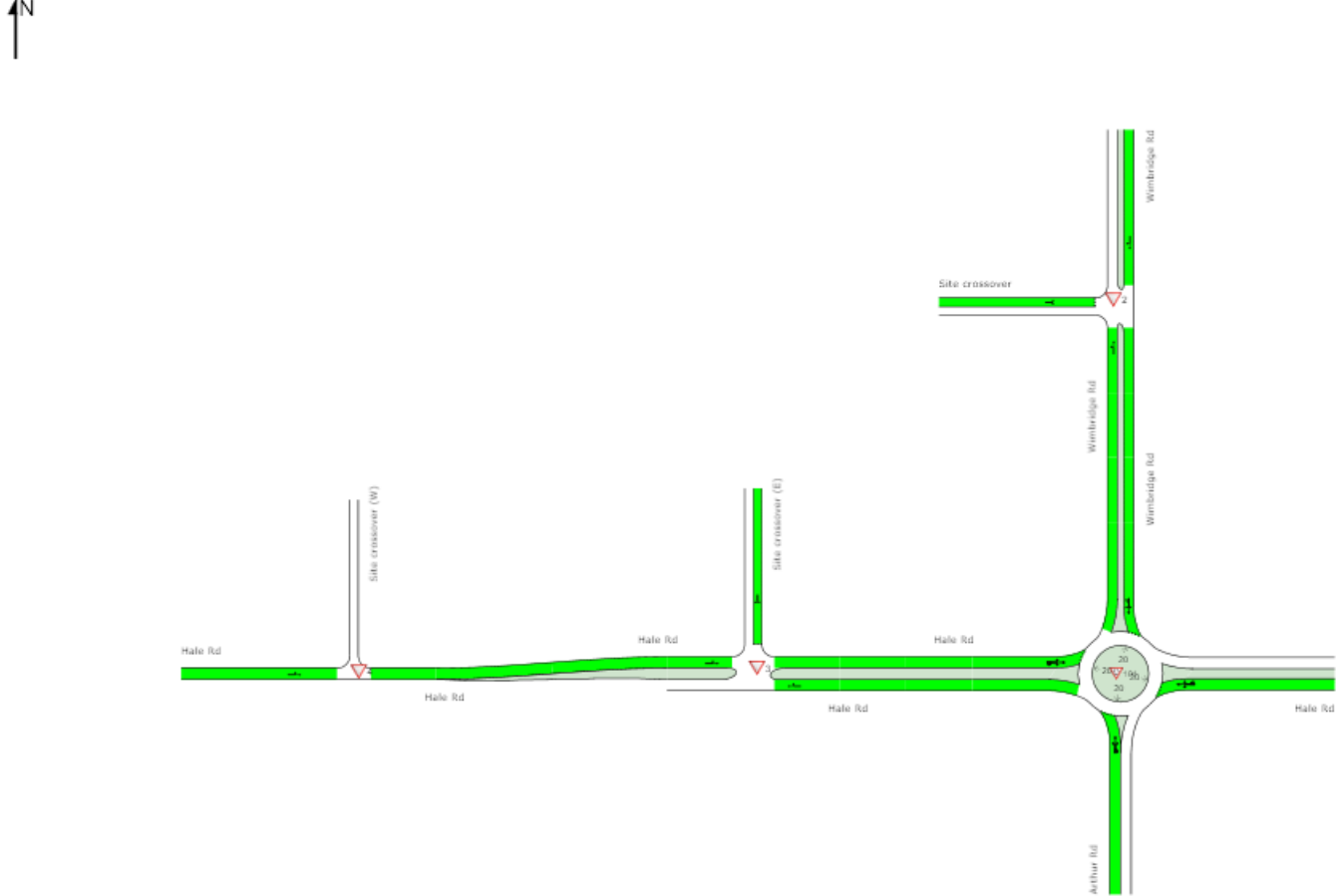
Ratio of the 95% Back of Queue Distance to the available queue storage distance per lane

■ ■ Network: N101 [2036 Post Development AM Network (Network Folder: General)]

U23.056 - 310 - 326 Hale Road, Wattle Grove

Network Category: (None)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 - 0.7] [0.7 - 0.8] [0.8 - 0.9] [0.9 - 1.0] [> 1.0]

Queue Model: SIDRA Standard.

2036 Post Development PM peak hour

MOVEMENT SUMMARY

Site: 101 [Hale Rd / Wimbridge Rd / Arthur Rd - PM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development PM Network (Network Folder: General)]

Roundabout Intersection Hale Rd / Wimbridge Rd / Arthur Rd
2036 PM peak hour (with development)
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Arthur Rd														
1	L2	83	2.0	83	2.0	0.195	5.8	LOS A	1.2	8.7	0.66	0.70	0.66	27.6
2	T1	28	24.0	28	24.0	0.195	6.5	LOS A	1.2	8.7	0.66	0.70	0.66	27.6
3	R2	53	0.0	53	0.0	0.195	10.2	LOS B	1.2	8.7	0.66	0.70	0.66	43.4
3u	U	1	0.0	1	0.0	0.195	12.0	LOS B	1.2	8.7	0.66	0.70	0.66	32.5
Approach		165	5.1	165	5.1	0.195	7.4	LOS A	1.2	8.7	0.66	0.70	0.66	34.8
East: Hale Rd														
4	L2	37	7.0	37	7.0	0.414	5.8	LOS A	2.8	20.4	0.56	0.62	0.56	42.1
5	T1	321	3.0	321	3.0	0.414	5.9	LOS A	2.8	20.4	0.56	0.62	0.56	40.5
6	R2	93	0.0	93	0.0	0.414	10.4	LOS B	2.8	20.4	0.56	0.62	0.56	40.5
6u	U	5	25.0	5	25.0	0.414	13.2	LOS B	2.8	20.4	0.56	0.62	0.56	45.7
Approach		456	3.0	456	3.0	0.414	6.9	LOS A	2.8	20.4	0.56	0.62	0.56	40.8
North: Wimbridge Rd														
7	L2	51	4.0	51	4.0	0.181	6.0	LOS A	1.2	8.4	0.72	0.74	0.72	38.7
8	T1	23	8.0	23	8.0	0.181	6.3	LOS A	1.2	8.4	0.72	0.74	0.72	32.7
9	R2	64	4.0	64	4.0	0.181	10.3	LOS B	1.2	8.4	0.72	0.74	0.72	20.6
9u	U	1	0.0	1	0.0	0.181	12.0	LOS B	1.2	8.4	0.72	0.74	0.72	20.6
Approach		139	4.6	139	4.6	0.181	8.1	LOS A	1.2	8.4	0.72	0.74	0.72	32.0
West: Hale Rd														
10	L2	105	1.0	105	1.0	0.508	4.6	LOS A	4.0	28.4	0.52	0.59	0.52	29.2
11	T1	346	3.0	346	3.0	0.508	4.9	LOS A	4.0	28.4	0.52	0.59	0.52	45.5
12	R2	167	2.0	167	2.0	0.508	9.4	LOS A	4.0	28.4	0.52	0.59	0.52	34.2
12u	U	4	0.0	4	0.0	0.508	11.5	LOS B	4.0	28.4	0.52	0.59	0.52	29.2
Approach		623	2.4	623	2.4	0.508	6.1	LOS A	4.0	28.4	0.52	0.59	0.52	41.1
All Vehicles		1383	3.1	1383	3.1	0.508	6.7	LOS A	4.0	28.4	0.57	0.63	0.57	39.5

MOVEMENT SUMMARY

Site: 2 [Site Crossover / Wimbridge Rd - PM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development PM Network (Network Folder: General)]

Site Crossover / Wimbridge Rd
2036 PM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Wimbridge Rd														
1	L2	19	0.0	19	0.0	0.117	3.7	LOS A	0.0	0.0	0.00	0.05	0.00	7.6
2	T1	207	3.0	207	3.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.6
Approach		226	2.7	226	2.7	0.117	0.3	NA	0.0	0.0	0.00	0.05	0.00	45.7
North: Wimbridge Rd														
8	T1	118	5.0	118	5.0	0.067	0.1	LOS A	0.1	0.4	0.05	0.03	0.05	49.4
9	R2	7	0.0	7	0.0	0.067	5.3	LOS A	0.1	0.4	0.05	0.03	0.05	46.5
Approach		125	4.7	125	4.7	0.067	0.4	NA	0.1	0.4	0.05	0.03	0.05	49.2
West: Site crossover														
10	L2	13	0.0	13	0.0	0.031	0.6	LOS A	0.1	0.7	0.32	0.26	0.32	41.6
12	R2	20	0.0	20	0.0	0.031	1.9	LOS A	0.1	0.7	0.32	0.26	0.32	17.1
Approach		33	0.0	33	0.0	0.031	1.4	LOS A	0.1	0.7	0.32	0.26	0.32	35.1
All Vehicles		384	3.2	384	3.2	0.117	0.4	NA	0.1	0.7	0.04	0.06	0.04	46.2



MOVEMENT SUMMARY

Site: 3 [Site Crossover (E) / Hale Rd - PM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development
PM Network (Network Folder: General)]

Site Crossover / Hale Rd
2036 PM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Hale Rd														
8	T1	454	3.0	454	3.0	0.250	0.3	LOS A	0.3	2.1	0.08	0.03	0.08	58.9
9	R2	19	0.0	19	0.0	0.250	8.6	LOS A	0.3	2.1	0.08	0.03	0.08	41.0
Approach		473	2.9	473	2.9	0.250	0.6	NA	0.3	2.1	0.08	0.03	0.08	58.7
North: Site crossover (E)														
10	L2	20	0.0	20	0.0	0.100	2.6	LOS A	0.3	2.2	0.65	0.65	0.65	12.2
12	R2	28	0.0	28	0.0	0.100	8.6	LOS A	0.3	2.2	0.65	0.65	0.65	41.5
Approach		48	0.0	48	0.0	0.100	6.1	LOS A	0.3	2.2	0.65	0.65	0.65	36.0
West: Hale Rd														
1	L2	18	0.0	18	0.0	0.312	3.1	LOS A	0.0	0.0	0.00	0.02	0.00	24.9
2	T1	603	2.0	603	2.0	0.312	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	57.6
Approach		621	1.9	621	1.9	0.312	0.1	NA	0.0	0.0	0.00	0.02	0.00	53.7
All Vehicles		1142	2.2	1142	2.2	0.312	0.6	NA	0.3	2.2	0.06	0.05	0.06	56.4

MOVEMENT SUMMARY

Site: 4 [Site Crossover (W) / Hale Rd - PM 2036 PD (Site Folder: General)]

Network: N101 [2036 Post Development
PM Network (Network Folder: General)]

Site Crossover / Hale Rd
2036 PM peak hour (with development)
Site Category: (None)
Give-Way (Two-Way)

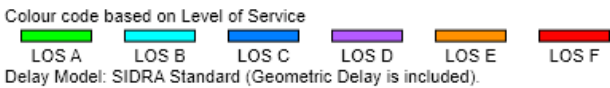
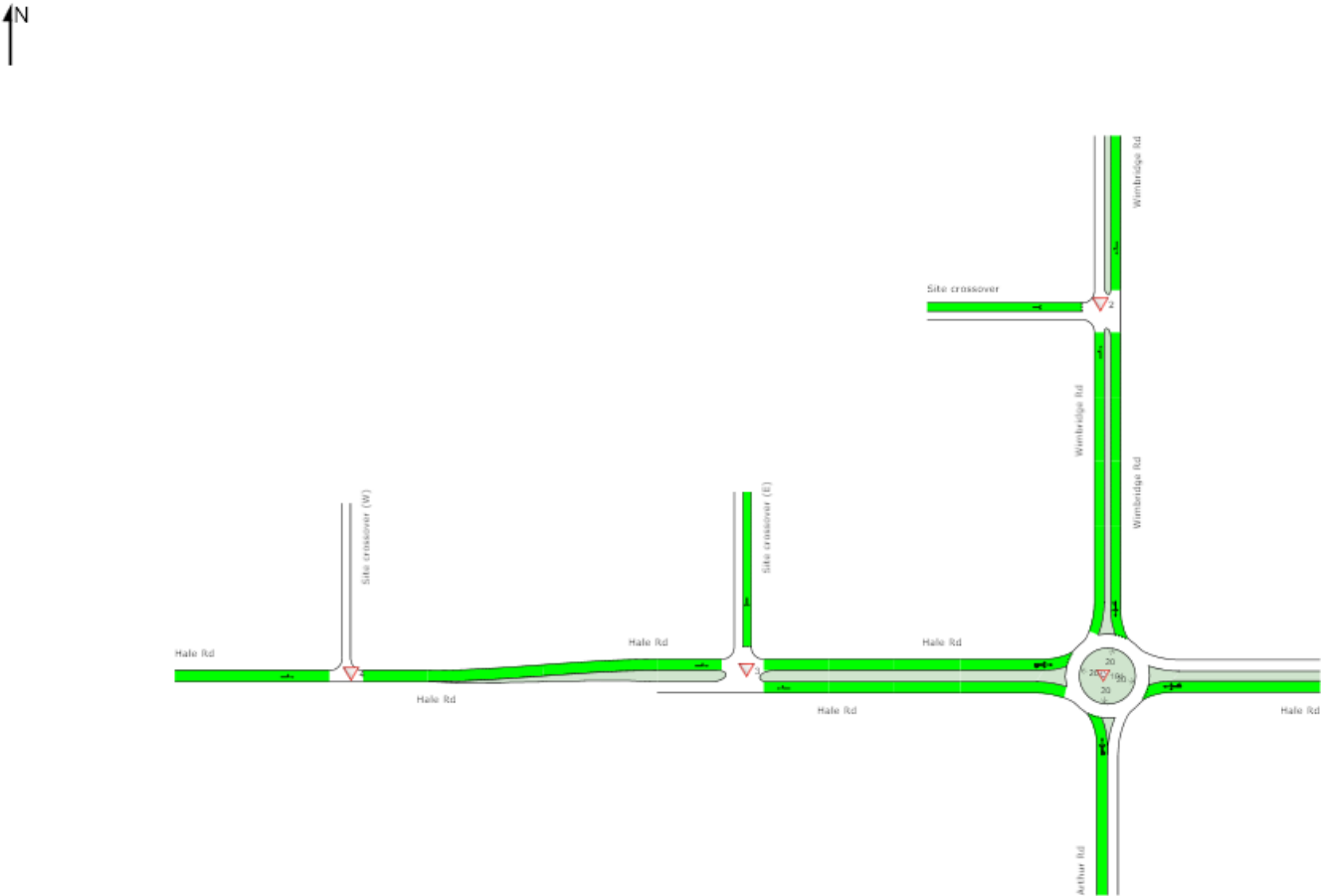
Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
West: Hale Rd														
1	L2	21	0.0	21	0.0	0.324	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	53.1
2	T1	621	3.0	621	3.0	0.324	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.4
Approach		642	2.9	642	2.9	0.324	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.2
All Vehicles		642	2.9	642	2.9	0.324	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.2

LEVEL OF SERVICE

Lane Level of Service

Network: N101 [2036 Post Development PM Network (Network Folder: General)]

U23.056 - 310 - 326 Hale Road, Wattle Grove
Network Category: (None)



QUEUE STORAGE RATIO (PERCENTILE)

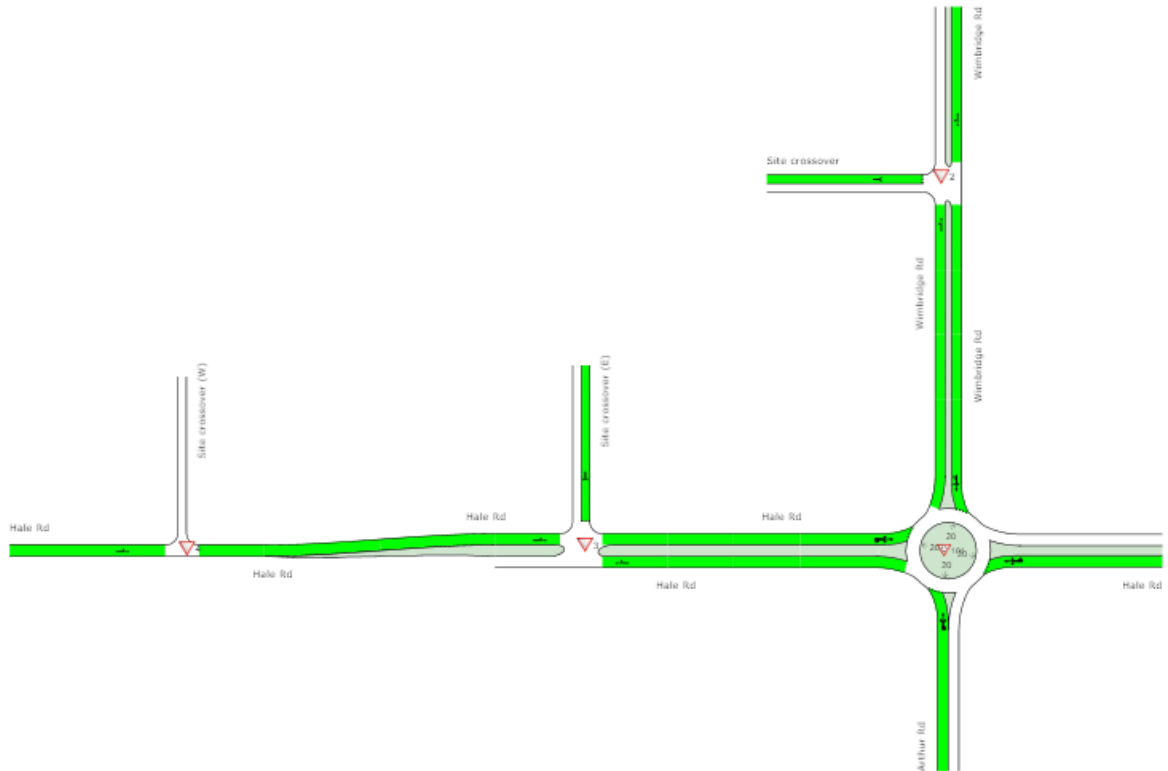
Ratio of the 95% Back of Queue Distance to the available queue storage distance per lane

■ ■ Network: N101 [2036 Post Development PM Network (Network Folder: General)]

U23.056 - 310 - 326 Hale Road, Wattle Grove

Network Category: (None)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 - 0.7] [0.7 - 0.8] [0.8 - 0.9] [0.9 - 1.0] [> 1.0]

Queue Model: SIDRA Standard.

Appendix C: Temporal distribution of parking demand

Source: ITE *Parking Generation Manual*

Land Use: 720 Medical-Dental Office Building

Description

A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility. General office building (Land Use 710), small office building (Land Use 712), and clinic (Land Use 630) are related uses.

Time of Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday at 27 study sites in a general urban/suburban setting and two study sites in a dense multi-use urban setting.

Hour Beginning	Percent of Weekday Peak Parking Demand	
	General Urban/Suburban	Dense Multi-Use Urban
12:00–4:00 a.m.	–	–
5:00 a.m.	–	–
6:00 a.m.	–	–
7:00 a.m.	12	–
8:00 a.m.	43	61
9:00 a.m.	88	62
10:00 a.m.	99	96
11:00 a.m.	100	56
12:00 p.m.	83	29
1:00 p.m.	74	67
2:00 p.m.	94	100
3:00 p.m.	93	82
4:00 p.m.	86	79
5:00 p.m.	54	71
6:00 p.m.	–	–
7:00 p.m.	–	–
8:00 p.m.	–	–
9:00 p.m.	–	–
10:00 p.m.	–	–
11:00 p.m.	–	–

Land Use: 880 Pharmacy/Drugstore without Drive-Through Window

Description

A pharmacy/drugstore is a retail facility that primarily sells prescription and non-prescription drugs. These facilities may also sell cosmetics, toiletries, medications, stationery, personal care products, limited food products, and general merchandise. The drug stores in this category do not contain drive-through windows. Pharmacy/drugstore with drive-through window (Land Use 881) is a related use.

Time of Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday at one study site in a general urban/suburban setting.

Hour Beginning	Percent of Weekday Peak Parking Demand
12:00–4:00 a.m.	—
5:00 a.m.	—
6:00 a.m.	—
7:00 a.m.	—
8:00 a.m.	—
9:00 a.m.	—
10:00 a.m.	41
11:00 a.m.	41
12:00 p.m.	41
1:00 p.m.	55
2:00 p.m.	59
3:00 p.m.	100
4:00 p.m.	68
5:00 p.m.	59
6:00 p.m.	73
7:00 p.m.	50
8:00 p.m.	—
9:00 p.m.	—
10:00 p.m.	—
11:00 p.m.	—

Appendix D: Swept path diagrams

Swept path diagrams are included in this section of the report. Different coloured lines are employed to represent the various envelopes of the vehicle swept path, as described below:

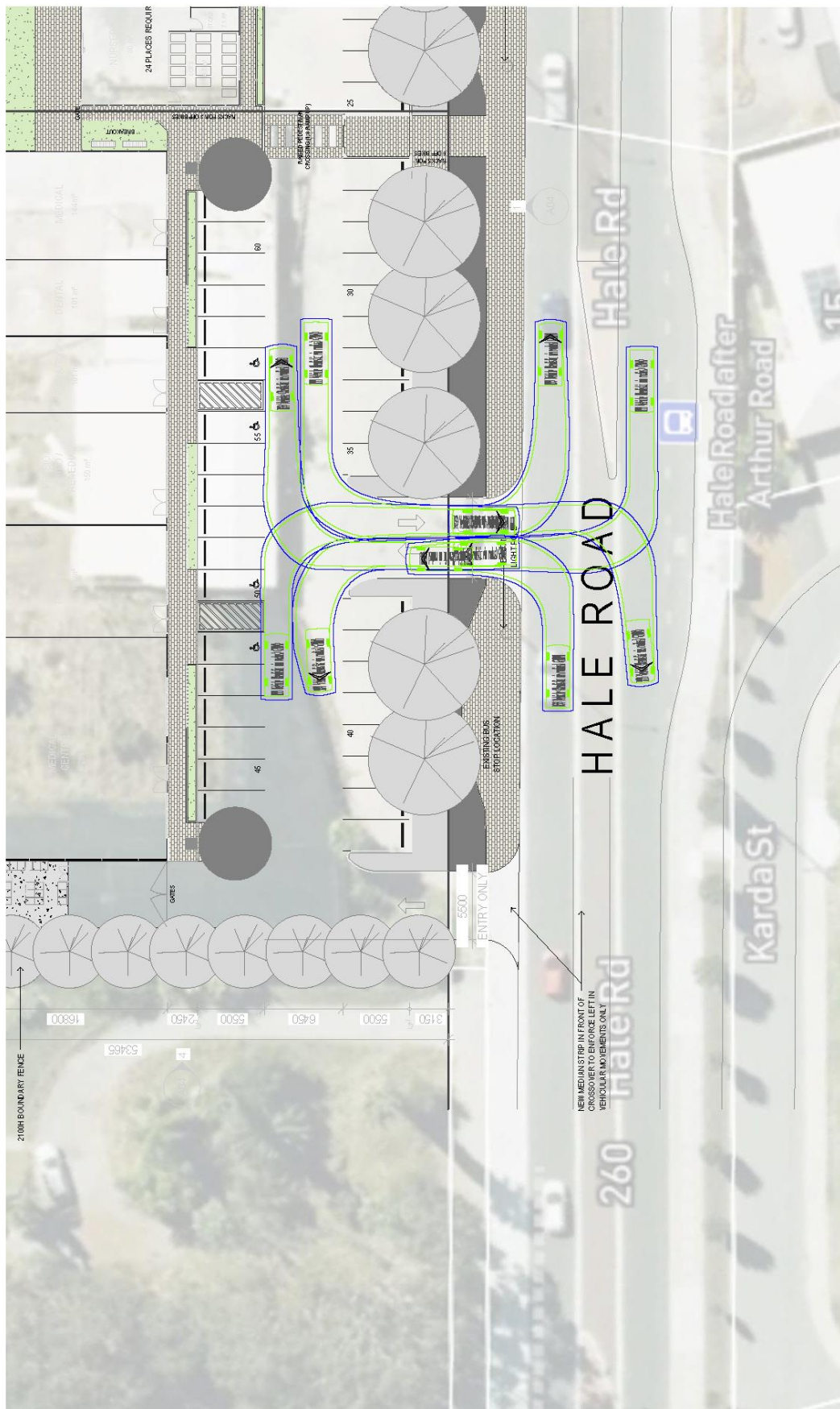
Cyan represents the wheel path of the vehicle

Green represents the vehicle body envelope

Blue represents a buffer 300mm/500mm line, offset from the vehicle swept path

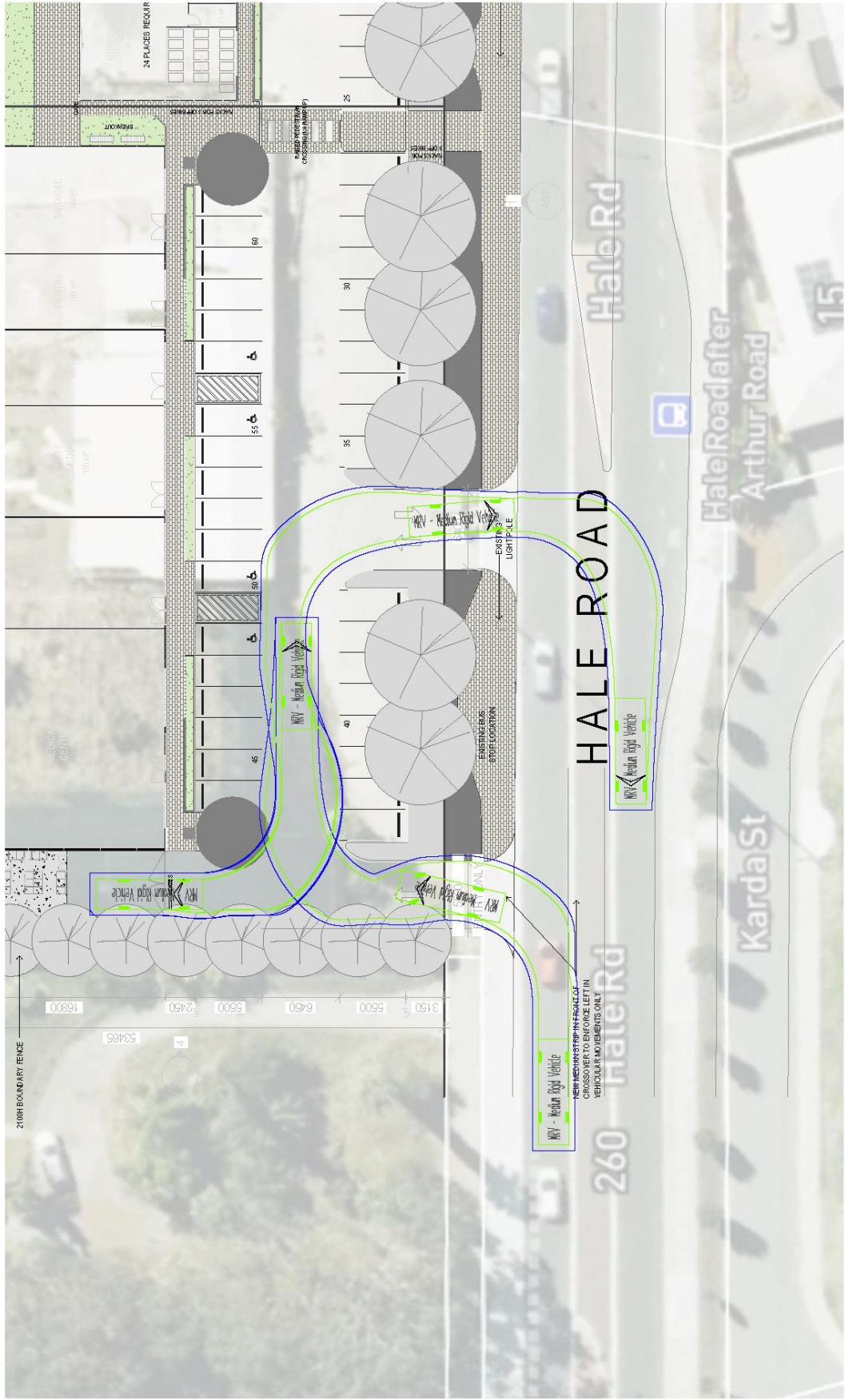
The swept path diagrams are also provided separately in high-quality, A3 PDF format.





Revision notes:		Notes:	
Rev:	Date:	Rev:	Date:
1	14/02/2024	1	14/02/2024
Dark blue swept path line represents a 300mm buffer		Dark blue swept path line represents a 300mm buffer	
Drawn by: Paul Olanrewaju		Project: U23.056 - 310 - 326 Hale Road, Wattle Grove Proposed Mixed Use Development	
Client: Su Family Trust		Drawing Title: Swept path analysis AS2580.1 - 800 Vehicle	
Date: 11/02/2024		Scale: @A3 1:300	
Revision: s01		Revision: s01	


urbii
 Sustainable Transport. Safe Solutions
PO Box 516, Bayside WA 6157
t 08 9438 9191
e info@urbii.com.au



urbii

Sustainable Transport. Safe Solutions

100, Box 1116, Bayside NSW 1518
t: 02 9391 1116
e: info@urbii.com.au

Revision notes:

Rev:

Date:

11/02/2024

Notes:

Dark blue swept path line represents a 500mm buffer

Date:	11/02/2024
Scale:	@1:300
Revision:	002

Project:	U23006 - 310 - 320 Hale Road, Wattle Grove Proposed Mixed Use Development
Drawing Title:	Swept path analysis AS2590.2 - 8.8m Medium Right Vehicle (MRV)

Drawn by:	Paul Olanfour
Client:	Su Family Trust

Revision notes:	
Rev:	1
Date:	11/02/2024
Notes:	Dark blue swept path line represents a 500mm buffer

65

APPENDIX 4 – BAL rating



PLANNING IN BUSHFIRE PRONE AREAS

BAL ASSESSMENT (BASIC) REPORT

A BAL REPORT FOR A PROPOSED BUILDING ON A SITE THAT IS NOT WITHIN 100 METRES OF BUSHFIRE PRONE VEGETATION

Please read the **BAL Assessment (Basic) fact sheet** before completing this report.

1. Fire Danger Index (FDI)

Determine the FDI for your site. The FDI for all of Western Australia is 80.

80

2. Bushfire prone vegetation

Determine if there is bushfire prone vegetation within 100 metres of the proposed building. Insert NIL where there is no bushfire prone vegetation within 100 metres of the proposed building.

nil

3. Distance between the proposed building and bushfire prone vegetation

Determine the horizontal distance between the proposed building and the nearest bushfire prone vegetation in the area surrounding the proposed building. Insert YES where the horizontal distance is greater than 100 metres on flat land and 110 metres on sloping land.

YES

4. Slope of the land under bushfire prone vegetation

Determine the horizontal distance between the proposed building and the nearest bushfire prone vegetation. Insert N/A where the horizontal distance is greater than 100 metres on flat land and 110 metres on sloping land.

N/A

Step 5: Bushfire Attack Level (BAL)

Determine the BAL for the proposed building or development. Insert the BAL.

LOW

If the BAL is BAL-LOW, then this report may be used to support a relevant application for the proposed building or development. If the BAL is **not** BAL-LOW, this report should not be used.

Attach any supporting information (i.e. site plans, photos, aerial photography and other design documents and specifications) as evidence that your site is not within 100 metres of bushfire prone vegetation.

I certify that the inputs into this BAL assessment (basic) report are a true and accurate representation of the conditions of the proposed building and site on the date of this assessment for the site located at:

Lots 193 (No. 318) and 194 (No.310) Hale Street Wattle Grove, Kalamunda 6076

And being the whole of the land described in Certificate of Title: **193/DP413819 & 194/DP413818**

The BAL rating is: **BAL-LOW** Date of assessment: **18/03/2024**

Signed:

Postal address: **PO Box 688, Inglewood**

Phone: **(08)9275 4455**

Email: **admin@dynamicplanning.net.au**

APPENDIX 5 – Design Review Panel Responses



WATTLE GROVE MIXED DEVELOPMENT

310-326 HALE ROAD, WATTLE GROVE

HCP JOB REF: 93.22

DATE: MARCH 2024

Proposed Site Plan



SITE INFORMATION:	
TOTAL LOT AREA:	23,578m ²
TOTAL PROPOSED SITE AREA:	5,675m ²
TOTAL CHILDCARE CENTRE FOOTPRINT:	612m ²
TOTAL COMMERCIAL BUILDING FOOTPRINT:	989m ²
TOTAL SITE COVERAGE:	28.2%
PROPOSED DEEP SOIL AREA:	750m ²
PROPOSED TREE CANOPY COVERAGE:	~21%





WATTLE GROVE MIXED DEVELOPMENT

310-326 HALE ROAD, WATTLE GROVE

HCP JOB REF: 93.22

DATE: MARCH 2024



Hodge Collard Preston
ARCHITECTS



Existing Site Conditions



STREET VIEW ON HALE ROAD



STREET VIEW ON WIMBRIDGE ROAD



EXISTING SITE ELEVATIONS - STREET VIEW FROM HALE ROAD



EXISTING SITE ELEVATIONS - VIEW FROM WIMBRIDGE ROAD



Existing (largely) vacant site with minimal trees and landscaping



Vet clinic and house fencing opposite to site

Hale Road Street View

PROPOSED DEVELOPMENT:

1. New single-storey developments in line with scale of surrounding residences and existing commercial development west of site.
2. Proposal to increase street-facing landscaping and provide deep soil area suited for medium-sized trees, forming a buffer between Hale Road and new carparking area.





Existing (largely) vacant site with minimal trees and landscaping



Housing frontages opposite to site

Wimbridge Road Street View

PROPOSED DEVELOPMENT:

1. Proposal to increase street-facing landscaping and provide deep soil area suited for medium-sized trees, forming a buffer between Wimbridge Road and new carparking area.
2. New childcare centre car bays located away from Wimbridge Street side for improved safety at drop-off / pick-up and more separation from houses opposite to site.



DESIGN RESPONSE

1. CONTEXT AND CHARACTER
2. LANDSCAPE QUALITY
3. BUILT FORM AND SCALE
4. FUNCTIONALITY AND BUILD QUALITY
5. SUSTAINABILITY
6. AMENITY
7. LEGIBILITY
8. SAFETY
9. COMMUNITY
10. AESTHETICS



01 Context and Character

DAC COMMENTS:

- Although there is no established context and character for the site, there is opportunity to start creating a precedent for the site. Consider the local and over Kalamunda context for colours and materials to be introduced to the development.
- Even if there is not a strong context and character established for the immediate locality, consider the broad context of Kalamunda. The bush setting context is recommended to be strengthened within the design.

DESIGN RESPONSE:

1. Conscious of the scale and aesthetics of the residential and commercial buildings in the site's immediate vicinity, the proposal strives to exercise restraint in its built forms and façade design. A contemporary material palette is proposed to introduce a point of difference to the development – yet the textural scale and subtlety of the selected materials will ensure the overall design remains cohesive and harmonious with its context.
2. Timber– look battens and slatted cladding, as well as pockets of land designated for native landscaping and trees, are introduced to the development in a bid to strengthen the bush context of Kalamunda.



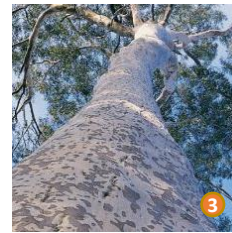
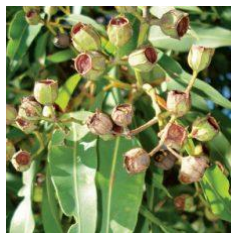


INSPIRATIONAL IMAGERY



LANDSCAPE DESIGN NOTES

- 1 Proposed native hedge planting around car park as a soft barrier
- 2 Proposed mix of native shrubs and groundcovers to provide colour interest and textures. Planting layout to follow the CPTD principles
- 3 Proposed native small, medium, or large trees





02 Landscape Quality

DAC COMMENT:

- Consider nature play and shade cover for childcare.
- Panel does not recommend astro turf due to chemicals and toxins.
- Engage a landscape professional to provide details on landscape species and plant mixes.
- Consider cascading landscaping in planters instead of plants which will grow up and block the view into the tenancies.
- Recommend spacing the trees in front of the building to stagger the façade.
- Consider a reduction in some bays (subject to City approval) to provide larger trees in the parking area on the northern parking bays to reduce provide shade on carpark.
- Consider the width dimensions of the planters to provide meaningful landscaping and viability of the plants in the long term.
- Recommend extending landscaping into the Hale Road streetscape and consider re-alignment of the trees so the base of the tree is not up against a paved surface to allow for better growing conditions.

DESIGN RESPONSE:

1. Example of nature play design that could be implemented in the allocated childcare external area with consideration to use natural turf as much as possible. Final design to be agreed with childcare operator.
2. Example imagery of landscape design intent provided – waterwise landscaping and natives will be implemented.
3. Planters replaced with landscaped kerbs; trees have also been strategically added to stagger frontages of both the childcare centre and commercial development without obstructing views into tenancy entrances.
4. Width of all planters increased to accommodate meaningful and viable long-term landscaping.
5. Landscaping strips abutting Hale road adjusted with trees realigned for better growth. Tree diamonds deleted.



03 Built Form and Scale

DESIGN RESPONSE:

- 1. Built forms are kept as a single storey buildings. This is in line with the nearby existing commercial developments and will complement the surrounding low density housing.
- 2. Trees and landscaping introduced to improve and soften the streetscape.
- 3. To reduce perceived scale of the proposed buildings from Hale Road and Wimbridge Road, the following are incorporated into planning and design:
 - Fragmentation of the façade by varying the cladding materials
 - Significant setback (by way of car parking and driveway) from street frontages
- 4. Street canopies at lower heights have also been introduced in both the commercial and childcare buildings to reduce the perceived scale at pedestrian level.
- 5. Pedestrian arrival feature canopy promotes connection between the childcare centre and commercial development.



EXISTING COMMERCIAL
DEVELOPMENTS NEARBY



04 Functionality & Build Quality

DAC COMMENT:

- Consider the conflict between the breakout space for the medical centre and the privacy /noise restrictions /nurturing environment required for the childcare premises.
- Consider the width of the pedestrian pathways to ensure there is sufficient space for users with prams or wheelchairs.
- Bicycle parking bays appears to take up too much space for the footpath. Consider location of bike parking or creating two separate bike parking spaces that do not obstruct pedestrian movement.
- Review window placement to consider conflicts such a bicycle bays and noise, views in and out of the building, light quality throughout the day and passive surveillance.

DESIGN RESPONSE:

1. Durable and low-maintenance materials such as precast concrete and CFC claddings are selected to ensure longevity of the buildings.
2. Building height, form, and spatial configuration of the childcare centre are informed by the functional requirements the tenant and the necessity for an entry statement as wayfinding.
3. Monolithic façade of the commercial development will simplify construction while providing flexibility in location of the intertenancy walls.
4. Childcare centre window placement has been rationalized with consideration towards interior functionality. Introduction of playful round windows to the façade and lowering the surrounding coloured glass awning result in a building that is of a more child-friendly scale and aesthetic. Windows facing communal breakout space relocated to improve privacy.
5. All internal childcare centre spaces have access to direct and borrowed natural lighting. Skylights (Solatube or similar) will also be installed to the childcare centre passage as part of sustainability commitment.
6. Fixed louvre fencing and gate introduced between childcare external play area and communal breakout space; louvre blades strategically angled to allow light through but will limit visibility into childcare centre.
7. All footpaths have been widened to accommodate wheelchairs and prams – refer dimensions on plan drawings.
8. Bicycle parking location and type have been rationalised to prevent obstruction of footpaths.



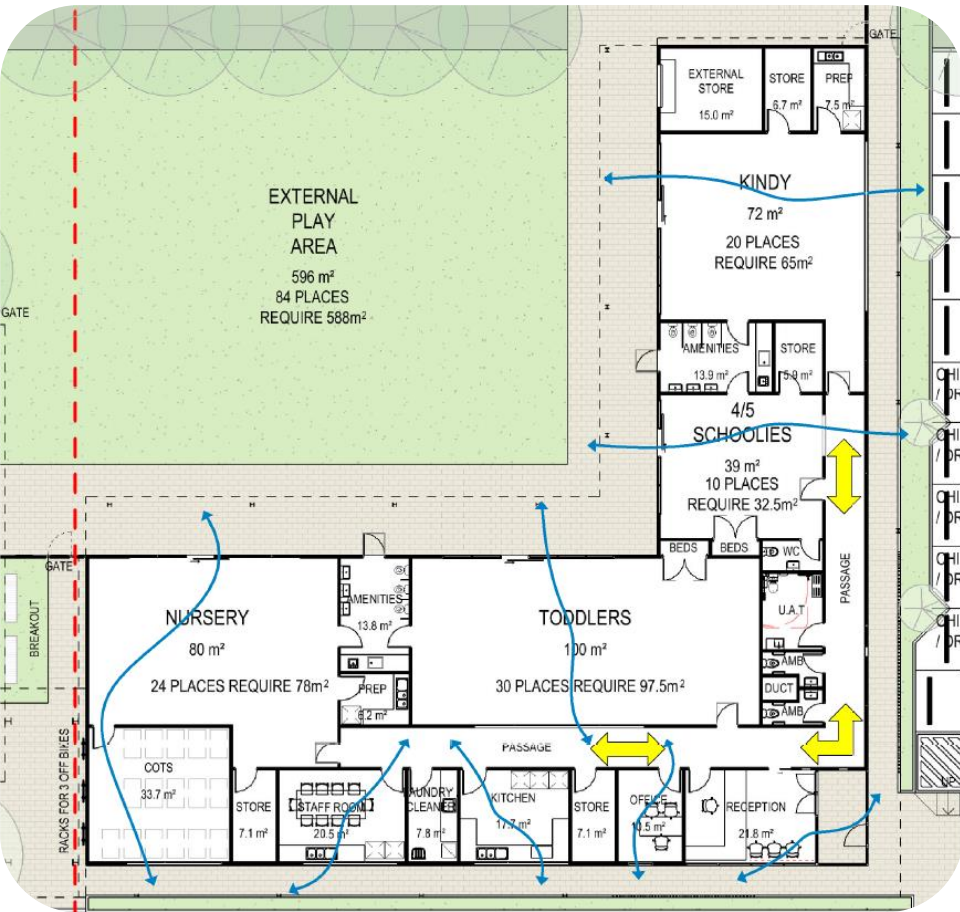
05 Sustainability

DAC COMMENT:

- Provide sustainability commitments as part of the submission.
- Recommend provision of solar panels on the roof. Provide future location of invertors and future battery locations.
- Recommend provision of mechanical ventilation and associated screening.
- Consider roof vents for cross ventilation.
- Provide a list of commitments for the sustainability of the development (LED lighting, water usage).

DESIGN RESPONSE:

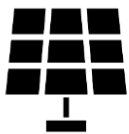
1. Insulation will be provided to comply with Section J of the NCC.
2. Shading devices have been added to all north, east and west facing glazing.
3. Louvres added to all childcare centre windows facing the public domain to maintain natural cross ventilation without compromising security.
4. Mechanical ventilation equipment to be installed on roof behind parapet walls. Additional louvered screening will be provided where parapet wall is not present.
5. Sustainability commitment:
 - 5-star WELS rated plumbing fixtures and fittings will be utilized.
 - LED lighting with sensors will be used throughout
 - Waterwise landscaping will be implemented.
 - Solar panels will be installed to meet energy target – location of inverters and batteries to be determined with childcare operator and commercial tenants.
 - Provision for future EV charging bays will be included.
 - Skylights (Solatube or similar) will also be installed to the childcare centre passage.
 - All habitable interior spaces have windows and louvres to access natural light and ventilation.



Provision for future
EV Charging



PV Panels



Mixed Mode
Ventilation & Lighting



WELS Rated Fixtures &
Waterwise Landscaping



06 Amenity

DESIGN RESPONSE:

SITE

1. The childcare centre and commercial building share a bin store, communal breakout spaces, and majority of the proposed car bays.
2. Bin store located adjacent to the commercial building - accessible via a landscaped path to the north to mitigate the potential disturbance / noise issues to the childcare centre caused by bin collection.
3. Bicycle racks have been provided in the vicinity of childcare centre, commercial development, and the pedestrian arrival feature canopy connecting the two buildings.
4. Where accessible by foot traffic, both buildings are equipped with awnings to shelter pedestrians from sun and rain.
5. The proposed verge tree will provide shading for car bays located further away from the buildings.
6. The revised childcare centre entrance and feature canopy reinforce the sense of arrival onto the development. Pedestrian movement from existing crossings on Hale Road and Wimbridge Road have also been considered and incorporated into the overall site planning.

CHILDCARE CENTRE

1. The proposed childcare centre plan has a logical and easily navigated layout. A central spine distributes users of the building to children's areas effectively.
2. Room sizes and shapes are appropriate for their use, and flow directly out into the exterior play areas.
3. Access to natural light (direct and indirect) have been carefully considered and incorporated through glazed doors and windows.
4. Access to natural ventilation has been incorporated through large openings to the play areas and louvred windows throughout.

CHILDCARE CENTRE ACCOMMODATION			
AGE GROUP	NUMBER OF PLACES	STAFF TO CHILDREN RATIO	NUMBER OF STAFF
NURSERY (BIRTH – 2 YEARS)	24	1:4	6
TODDLERS (2-3 YEARS)	30	1:5	6
KINDY (3-4 YEARS)	20	1:10	2
PRE-SCHOOL (4-5 YEARS)	10	1:10	1
TOTAL NO. OF CHILDREN	84	TOTAL NO. OF STAFF	15
CHILDCARE CENTRE PARKING REQUIREMENT			
1 PER 10 PLACES	$84 \div 10 = 8.4 = 9 \text{ BAYS}$		
1 PER STAFF	15 BAYS		
TOTAL	24 BAYS		





07 Legibility

DAC COMMENT:

- Recommend redesigning the entrance to the childcare to create a strong entry point clear to frequent and new users.

DESIGN RESPONSE:

- Design of childcare centre entrance reworked to achieve a lighter aesthetic.
- Ceiling and soffit over entry / reception have been raised to create a sense of arrival. Introduction of slatted cladding creates a playful wayfinding feature and helps to bring down the scale of the entrance so that it remains child-friendly.
- Designated signage zones have also been added to the south elevation of the commercial building to ensure cohesive sizing.
- Streetside trees and landscaping have been proposed off Hale Road and Wimbridge Road to increase the street presence of the development.
- Walkways proposed to connect to existing footpaths along Hale Road and Wimbridge Road to promote pedestrian access onto the development.



08 Safety

DAC COMMENT:

- Consider bringing the bin store forward towards the building façade and create a staff break out area at the back.
- Consider raising the crossings slightly to slow down vehicles. Ensure that these are tested with appropriate consultants.
- Consider treatments for recessed areas (bin store) and northern edge of children's centre, and how these concealed spaces can lead to antisocial behaviour.

DESIGN RESPONSE:

1. Bin store brought closer to Hale Road to accommodate a staff breakout space adjacent to the commercial building.
2. Pedestrian crossings have all been raised and paved to marginally slow down vehicular traffic and improve safety of pedestrians.
3. Site planning reworked to reduce recessed areas. Strategic fencing & gates with access control alongside the use of CCTV and artificial lighting (on timer after-hours) will help to deter antisocial behaviour within unavoidable recessed spaces.
4. Planter boxes added to the childcare centre footpaths, alongside a 1200mmH fencing at the entrance to improve children safety and provide protection from vehicular traffic when entering / leaving the childcare centre. Traffic consultant had reviewed and confirmed no manoeuvring issue for all proposed car bays.
5. Car bays for childcare centre are mostly located to the building side to minimize children crossing through vehicular traffic.
6. Public access to tenancies in the commercial building all from carpark side only for ease of surveillance.



Double-layered entry at childcare centre



Raised pedestrian crossings

09 Community

DAC COMMENT:

- Consider incorporating a skylight into the childcare premises to act as a beacon at the corner and showcase the entry and act as a feature to the local community.

DESIGN RESPONSE:

1. The redesigned childcare centre entrance introduces more glazing to allow penetration of natural light. Skylights (Solatube) or similar will be installed as part of the client's sustainability commitment.
2. The development will provide benefits and convenience for the neighbouring residents to meet the high demand of childcare and health care in the community.





10 Aesthetics

DAC COMMENT:

- Recommend providing location of AC units and screening to ensure there is reduced impact on the aesthetics of the overall site.
- Consider further articulation to the medical centre block to provide a grain a texture that encompasses the broader Kalamunda area.
- The corner entry element of the childcare centre is to be reconsidered
- to enhance the entry and wayfinding opportunity.

DESIGN RESPONSE:

1. AC units will be located on roof – all street-facing elevations have parapet walls which will conveniently assist with concealment.
2. The slatted cladding and building form of the childcare centre entrance create a strong wayfinding feature for the local community.
3. There is unity in the material scale and palette between the childcare centre and the commercial development. The overall design concept for the site aims to strengthen the bush context of Kalamunda while maintaining a sensible scale to ensure harmonious transition to the existing surrounding housing estates.
4. While most childcare centres tend to incorporate colours in their design for visual interest, to ensure the proposed buildings remain harmonious amongst the context from streetside, splashes of colour will be introduced by way of coloured glass / acrylic awnings. Through interaction with sunlight throughout the day, the awnings will cast colourful shadows on the pedestrian pathways and/or wall claddings. Colours will be present and ever-changing while remaining completely invisible from the street-facing facades.
5. On the northern side (concealed by 2100H acoustic boundary fencing), the childcare centre features painted wall panels to echo colours in the front-facing coloured glass / acrylic awnings.

END