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Proposed Mixed Commercial Development

Lots 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo

Transport Impact Assessment

PREPARED FOR:
Bella Build & Design

November 2023

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Project: Lots 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo

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1 Introduction

This TIA has been prepared by Transcore on behalf of Bella Build & Design with regards to the proposed Mixed Commercial Development to be located at Lot 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo in the City of Wanneroo.

Transcore was the traffic engineer for the original DAP for the precinct, the approved and constructed development to the north of Mowatt Cl and the approved and constructed service station to the south of Mowatt Cl. Transcore was also involved with the application for the signalisation of the intersection of Wanneroo Rd/Clarkson Ave/Mowatt Cl and the approved and constructed development at the southeast corner of this intersection. Consequently, the traffic modelling methodology and assumptions employed for all the previous approved and constructed projects, which were accepted by the approval authorities (namely JDAP, City of Wanneroo and Main Roads WA), have been adopted and updated for this current project.

The subject site is currently vacant and is located at the south-west corner of the four-way signalised intersection of Wanneroo Road/Clarkson Avenue/Mowatt Close as shown in **Figure 1**. This intersection serves the endorsed Detailed Development Plan (DAP) for Drovers Place Central Precinct to the west of Wanneroo Road. The proposed development is part of this precinct. A copy of the endorsed DAP is provided in **Appendix A**.

Figure 1 illustrates the location of the Central Precinct and the subject site.

Figure 1: Location of the subject site

The key issues that will be addressed in this report include the traffic generation of the proposed development, turn paths for service vehicles, capacity analysis of the existing internal 4-way intersection on Mowatt Close and the recently constructed 4-way signalised intersection of Wanneroo Road/Clarkson Avenue/Mowatt Close. The proposal also includes a left in only crossover intersection on Wanneroo Road with a left turn lane which will be assessed as part of this TIA. This proposed crossover intersection on Wanneroo Road has already been approved by Main Roads WA.

The location of the subject site within the *Metropolitan Region Scheme* is illustrated in **Figure 2**. The subject site is zoned as *"Urban"* in the *MRS*. The MRS map also classifies Wanneroo Road as a *"Primary Regional Road"*.

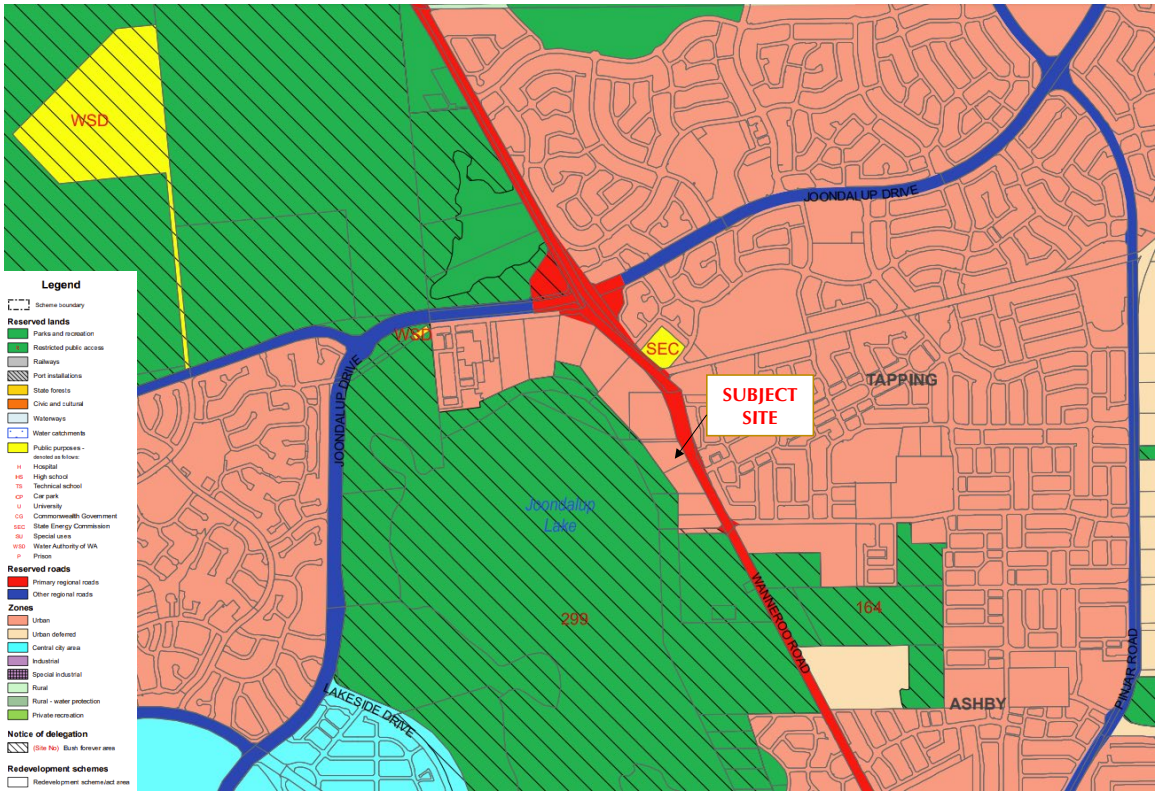

Figure 2. Site location within Metropolitan Region Scheme

2 Existing Situation

2.1 Existing Site Use

Currently the site is vacant and does not generate any traffic. The land to the west of the site is also currently vacant. There are existing retail and commercial land uses within the northern part of the Central Precinct.

2.2 Surrounding Road Network and Traffic Management on Frontage Roads

The existing road network and its classification in the Main Roads WA *Functional Road Hierarchy* is illustrated in **Figure 3**.

Figure 3: Existing Road Hierarchy

Wanneroo Road is a dual divided carriageway with a speed limit of 70km/h in the vicinity of the subject site. On street cycle lanes are provided on both sides of the road. Wanneroo Road is reserved as a Primary Regional Road in the Metropolitan Region Scheme and is classified as a Primary Distributor Road in the Main Roads WA Functional Road Hierarchy.

The intersection of Wanneroo Road/Clarkson Avenue/Mowatt Close has recently been constructed as a four-way signalised intersection. The intersection of Wanneroo Road and Joondalup Drive has recently been upgraded to a grade separated interchange.

There is an existing intersection on Wanneroo Road serving the existing retail/commercial complex within the Central Precinct and located at lots 810 and 811. This intersection is located approximately 200m south of Wanneroo Road/Joondalup Drive interchange and operates as left-in/left-out/right-in, with a left-turn slip lane and right-turn pocket on Wanneroo Road.

Clarkson Avenue is a single undivided carriageway with pedestrian paths on both sides of the road. It is classified as a Local Distributor in Main Roads WA Functional Road Hierarchy and operates under the speed limit of 50km/h in the vicinity of the subject site.

Drovers Place provides access to properties along the northern frontage of the Drovers Place Precinct. It is constructed as a 6m-wide, kerbed single carriageway road. Drovers Place is subject to the 50 km/h speed limit.

Mowatt Close in the vicinity of the subject site is recently constructed as a single divided carriageway road with pedestrian path on the northern side of the road.

2.3 Existing Traffic Volumes on Roads

According to the latest available traffic count data from Main Roads WA, Wanneroo Road (south of Joondalup Drive) carried an average weekday traffic volume of about 23,733vpd in 2020/21. The recorded heavy vehicle component of total traffic mix was approximately 8.2%.

According to the latest available traffic count data from Main Road WA, Clarkson Avenue (east of Wanneroo Road) carried an average weekday traffic volume of 3,384vpd in 2017/18. The recorded heavy vehicle component of total traffic mix was approximately 4.3%. Existing weekday AM and PM peak hour traffic flows from February 2022 SCATS data for the Wanneroo Road/Clarkson Avenue/Mowatt Close signalised intersection are shown in **Figure 4**.

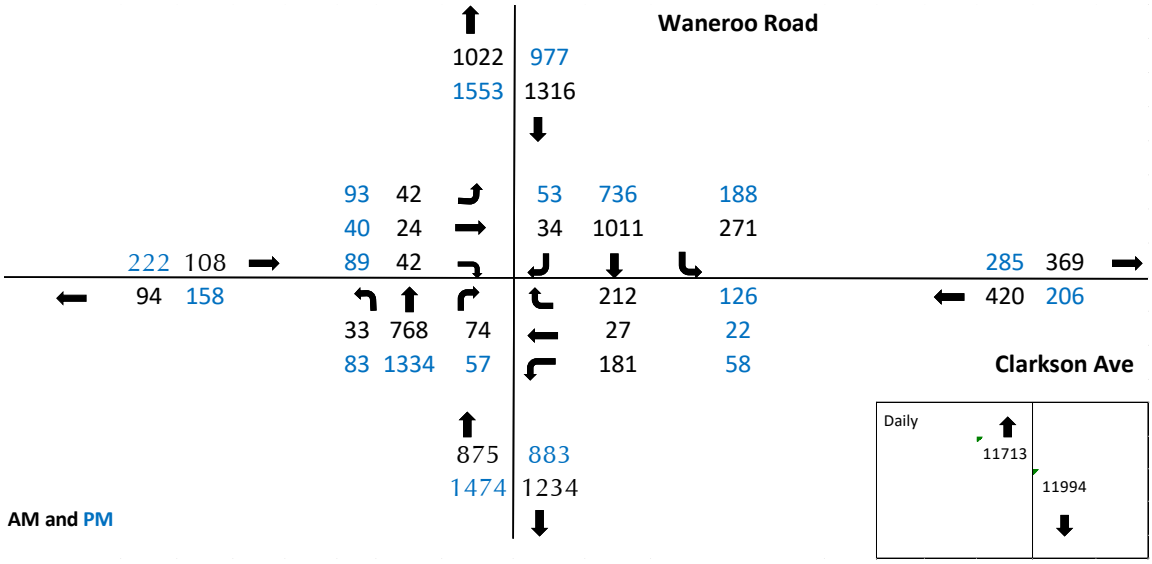

Figure 4: Existing traffic turn volumes AM and PM peak hours – SCATS data

2.4 Heavy Vehicles

Restricted Access Vehicle (RAV) Network routes are designated for access by large heavy vehicle combinations, which is managed by Main Roads WA.

Wanneroo Road and Mowatt Close adjacent to the subject site forms part of RAV Tandem Drive Network 4 as shown in **Figure 5**. The RAV 4 Network classification permits a variety of prime mover and trailer combinations, up to a maximum length of 27.5m.

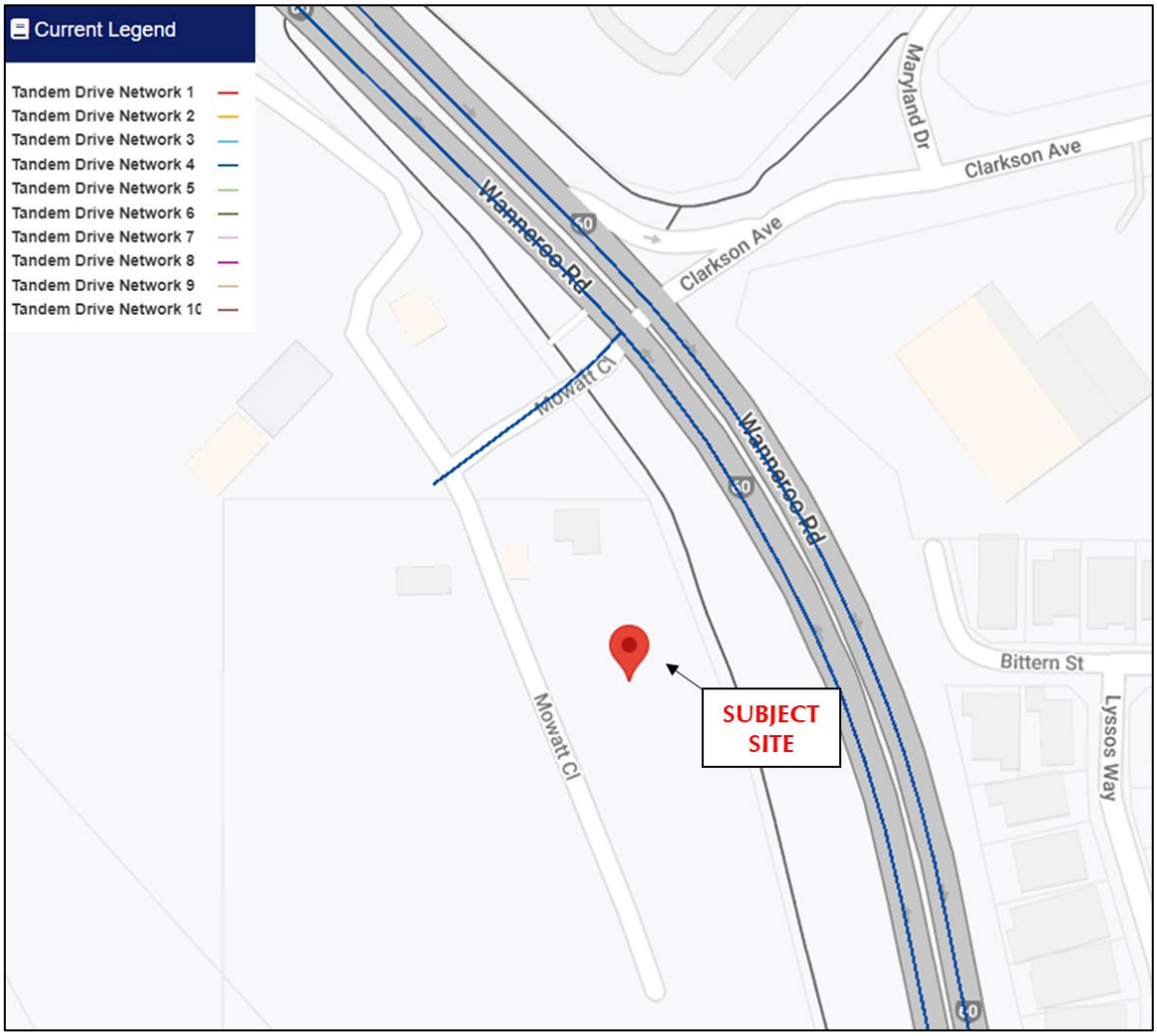

Figure 5: Existing heavy vehicle road network classification (RAV)

2.5 Public Transport Access

Nearby public transport services are illustrated in Figure 6. The closest existing bus route to the development area is Bus Route No. 468 which traverses along Wanneroo Road. This bus route provides service between Whitfords Station and Joondalup Station via Wanneroo Central Shopping Centre.

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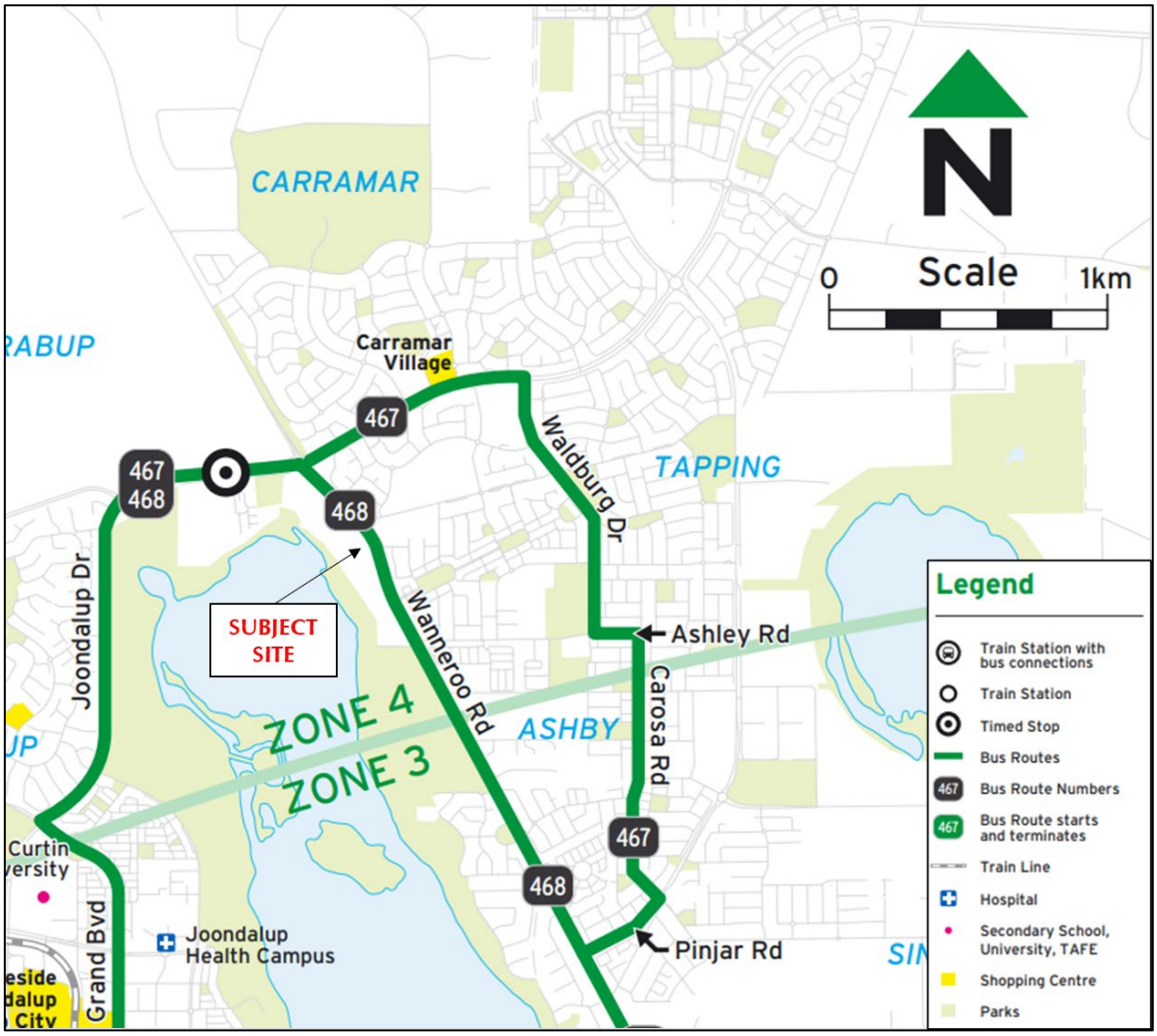


Figure 6: Existing bus routes (Source: Transperth)

2.6 Pedestrian and Cyclist Facilities

Currently a concrete shared path exists along Wanneroo Road fronting the subject site. This shared path continues north and connects with Drovers Place. A shared path is also in place along the northern side of Mowatt Close. Pedestrian crossing facilities are provided at the signalised intersection of Wanneroo Road/ Clarkson Avenue/ Mowatt Close to facilitate the safe pedestrian/cyclist crossing at the intersection.

The Department of Transport's Perth Bike Map series (refer **Figure 7**) shows that Wanneroo Road also has a shared path on the eastern side which connects to the existing shared path on Clarkson Avenue.

Figure 7: Existing pedestrian and cyclist facilities (source: Department of Transport)

2.7 Public Transport Network Planning

The Department of Transport plan, Public Transport for ultimate network for city of 3.5 million population, envisages a combination of a future light rail and bus rapid transit route from Perth to Joondalup providing a cross-suburban link between these two areas. However, this is a long-term plan beyond 2031 (refer **Figure 8**).

Figure 8: Transperth Service Development Plan Map

2.8 Crash Data

Information available on Main Roads WA website provides crash statistics for Wanneroo Road/Clarkson Avenue/Mowatt Close intersection during the five-year

period ending in December 2022. The intersection was upgraded into a signalised intersection in September 2020.

The crash records indicate that Wanneroo Road/Clarkson Avenue/Mowatt Close intersection recorded a total of 8 crashes with no casualty and no fatalities. The majority of crashes recorded were rear end types. More details on the crash records are provided in **Table 1**.

Table 1: Crash history for the Wanneroo Road/Clarkson Avenue/Mowatt Close intersection

Intersection				Total Crashes	Casualty
Wanneroo Road/Clarkson Avenue/Mowatt Close				8	0
Right Angle	Rear End	Rt Turn Thru	Other	Wet	Dry
1	5	1	1	1	7

3 Development Proposal

3.1 Proposed Site Use

The proposal entails the development of four pad sites, with three designated for fast food outlets featuring drive-thru facilities, and a coffee shop that also includes a drive-thru facility. The proposed development would be located immediately to the south of the recently constructed service station south of Mowatt Cl. The proposed floor space of the development is summarised in **Table 2**.

Table 2: Proposed land uses

Land Use	Floor Area
Fast Food Outlet with Drive-Thru (Tenancy 1)	260 m^2
Fast Food Outler with Drive-Thru (Tenancy 3)	240 m^2
Fast Food Outlet with Drive-Thru (Tenancy 4)	200 m^2
Coffee Shop with Drive-Thru (Tenancy 2)	214 m^2
Total	**914 m^2**

The layout of the proposed development is included in **Appendix B**. The subject site is proposed to gain access from the internal road connecting to Mowatt Close and a new proposed left-in only access point from Wanneroo Road. It is understood that Main Roads WA has already approved the proposed left in crossover intersection on Wanneroo Road. **Appendix C** shows the 100% design for the proposed left in only crossover intersection on Wanneroo Road and the approval letter from Main Roads WA dated 14 February 2023.

The parking provision for the development shown on the proposed site plan is a total of 70 parking bays inclusive of 4 ACROD bays. Additional 40 bays are also available via drive through facilities.

3.2 Proposed Access for all Modes

The access and egress to/from the proposed development would be via the proposed crossovers for each pad site on the internal road connecting to Mowatt Close and a new proposed left-in only access point from Wanneroo Road.

Figure 9 illustrates the proposed development crossovers on internal road connecting to Mowatt Close and the proposed left-in only access from Wanneroo Road.

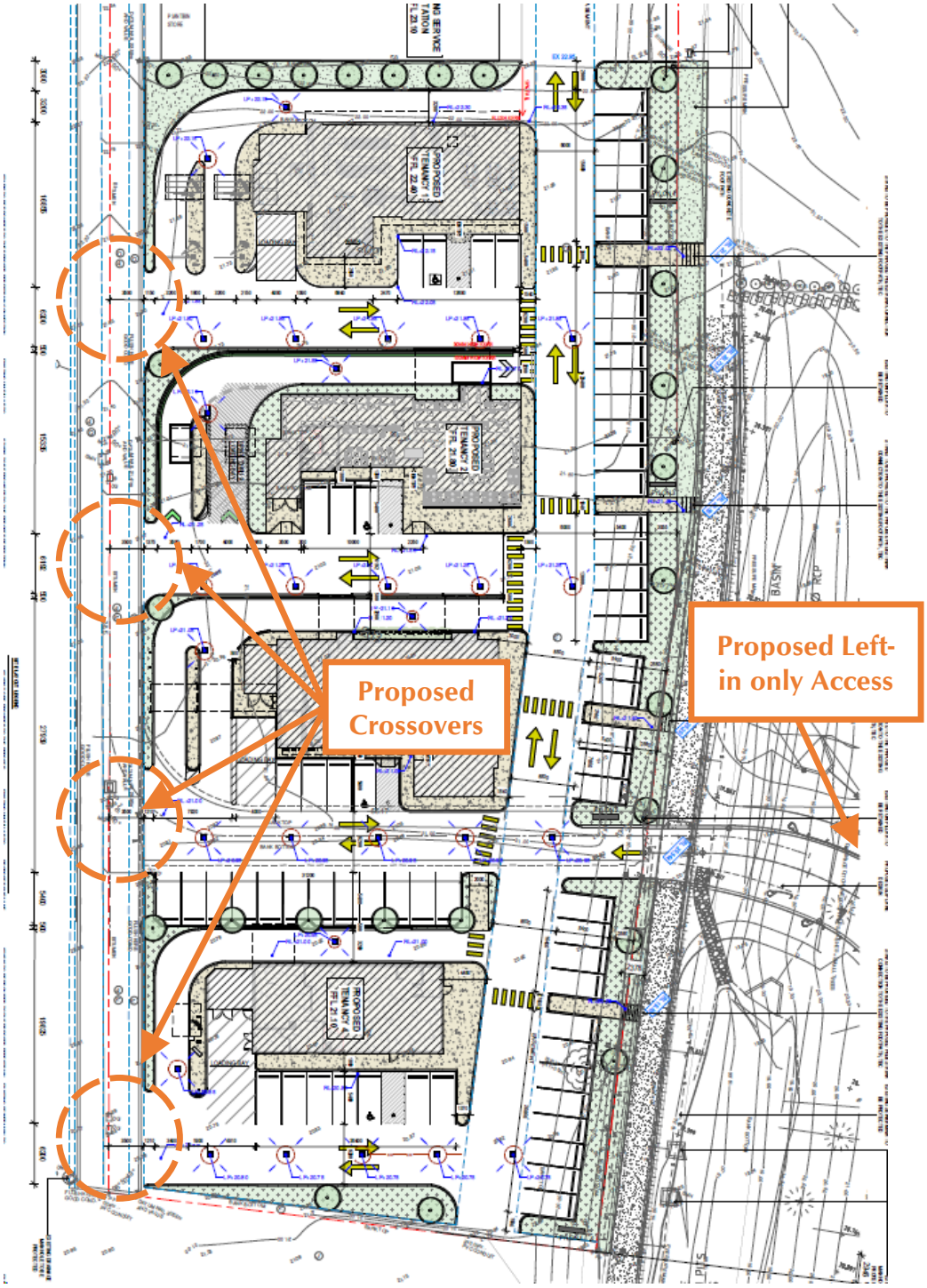


Figure 9: Proposed development access/egress points

4 Changes to Surrounding Transport Networks

The recent changes to the surrounding road network include signalisation of the Wanneroo Road/Clarkson Avenue/Mowatt Close and construction of the grade separated interchange at Wanneroo Road and Joondalup Drive intersection.

A left in only crossover intersection is proposed on Wanneroo Road approximately 200m south of the signalised intersection as part of this proposal.

According to the information obtained from Main Roads WA Wanneroo Road may be upgraded to six lanes in this vicinity in the longer term.

5 Integration with Surrounding Area

The proposed development land use is in line with existing and planned land uses in the locality. The proposed development promotes internal connectivity with other planned uses in the Central Precinct area.

Drovers Place connects with Mowatt Close via a connection through the approved development to the north of Mowatt Close.

6 Traffic Assessment

6.1 Assessment Period

The assessment years that have been adopted for this analysis are immediately post-development (assumed as 2024) and 2034 for the 10-year post development scenario.

6.2 Existing Development Trip Generation

The subject site is presently vacant and does not generate any traffic.

6.3 Proposed Development Traffic Generation

The traffic volumes that would be generated by the proposed development have been estimated using trip generation rates derived from:

- ITE Trip Generation Manual 11th Edition

The trip rates which were used to estimate the proposed fast-food outlets' traffic generation are as following:

Fast-Food Restaurant with Drive-Through Window (934)

- AM Peak hour: 48.02 trips per 100m^2 GFA;
- PM Peak hour: 35.55 trips per 100m^2 GFA; and,
- Weekday, daily: 503.19 trips per 100m^2 GFA

The trip rates which were used to estimate the proposed coffee shop's traffic generation are as following:

Coffee/Donut Shop with Drive-Through Window (937)

- AM Peak hour: 92.44 trips per 100m^2 GFA;
- PM Peak hour: 41.97 trips per 100m^2 GFA; and,
- Weekday, daily: 574.33 trips per 100m^2 GFA

Due to the land use mix within the proposed development incidences of multi-purpose trips[1] (i.e., cross-trade) are anticipated between the proposed land uses.

[1] *Multi-purpose trips are incidences where more than one shop/outlet are visited within the development (also referred to as "cross-trade")*

Accordingly, the applied cross-trade adjustment is calculated to result in a moderate overall reduction in trip generation of approximately 20% (in accordance with RTA NSW – Guide to Traffic Generating Developments) but only during the PM peak period and for the overall daily trip.

The proposed land uses can also attract a significant proportion of their customers from the traffic that is already passing the site on the surrounding road network. The ITE Trip Generation Handbook (3rd Edition) provides useful guidance on the proportion of trips that are attracted as pass-by trips rather than primary trips where the trip is specifically undertaken to visit the land uses at the subject site. The proportion of trips as pass-by trips for relevant land uses are established as follows:

- Fast-Food restaurant with drive-through: 50%; and,
- Coffee/donut shop with drive-through window: 89%

Data sources and other assumptions in this analysis are as follows:

- Trip rates are documented as above and **Table 3**;
- Fast-food and coffee shop outlets trip rates are sourced from ITE land use #934, #937 respectively; and,
- Directional splits of 50% in / 50% out assumed for all uses as they are all dominated by customer arrival / departure.

As detailed in **Table 3**, it is estimated that the proposed development would generate approximately 3,801 external trips per day (both inbound and outbound) with approximately 427 and 271 trips during AM and PM peak hours respectively.

The distribution of trips that will be attracted to the subject site has been estimated based on the distribution of surrounding residential areas as well as the available access and egress routes to and from the site. The total proposed development traffic is outlined in **Figure 10**.

Table 3: Estimated proposed development traffic generation

Land use	Quantity	Daily Rate	Weekd-AM Peak	Weekd-PM Peak	Cross Trade	Daily Trips	Weekd-AM trips	Weekd-PM trips	AM		PM	
									IN	OUT	IN	OUT
Tenancy 4 (Fast Food)	200	5.03	0.48	0.36	0.20	805	77	57	38	38	28	28
Tenancy 3 (Fast Food)	240	5.03	0.48	0.36	0.20	966	92	68	46	46	34	34
Tenancy 2 (coffe shop)	214	5.74	0.92	0.42	0.20	983	158	72	79	79	36	36
Tenancy 1 (Fast Food)	260	5.03	0.48	0.36	0.20	1047	100	74	50	50	37	37
Total traffic						**3801**	**427**	**271**	**214**	**214**	**135**	**135**

AM		PM	
IN	OUT	IN	OUT
19	19	14	14
23	23	17	17
70	70	32	32
25	25	18	18
138	**138**	**82**	**82**

AM		PM	
IN	OUT	IN	OUT
19	19	14	14
23	23	17	17
9	9	4	4
25	25	18	18
76	**76**	**54**	**54**

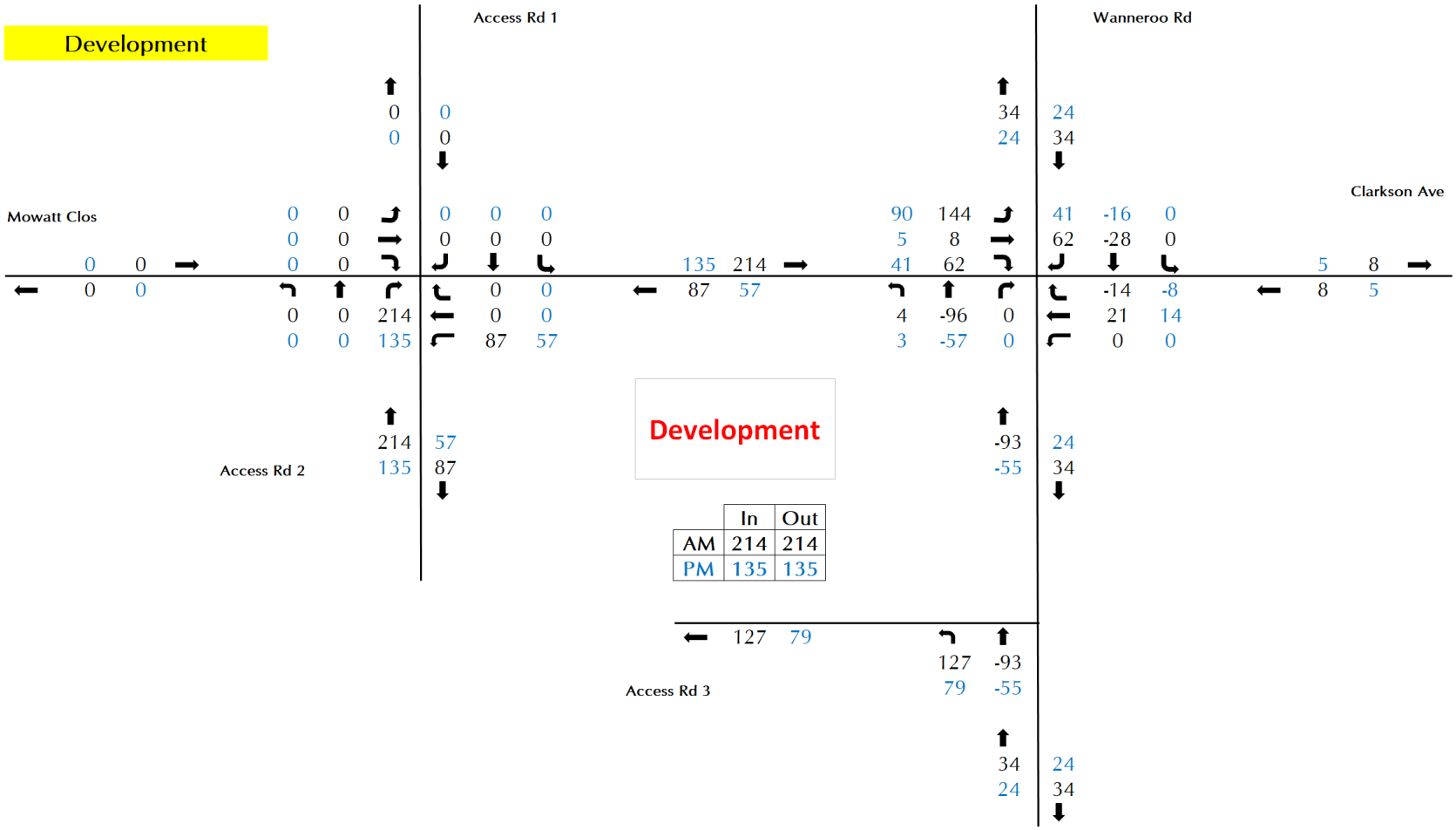


Figure 10: Total peak hour traffic generated by the proposed development –AM and PM peak hours

6.4 Traffic Flow

The existing traffic volumes for the relevant roads were established from June 2023 SCATS data (refer **Figure 4**). The total post development traffic for the assessment year of 2024 is detailed in **Figure 11**.

To approximate the 10-year post development traffic, a conservative traffic growth of 20% was assumed and applied to the background traffic through the intersection of Wanneroo Road/ Clarkson Avenue/ Mowatt Close.

The total ten-year post-development traffic volumes are presented in **Figure 12**.

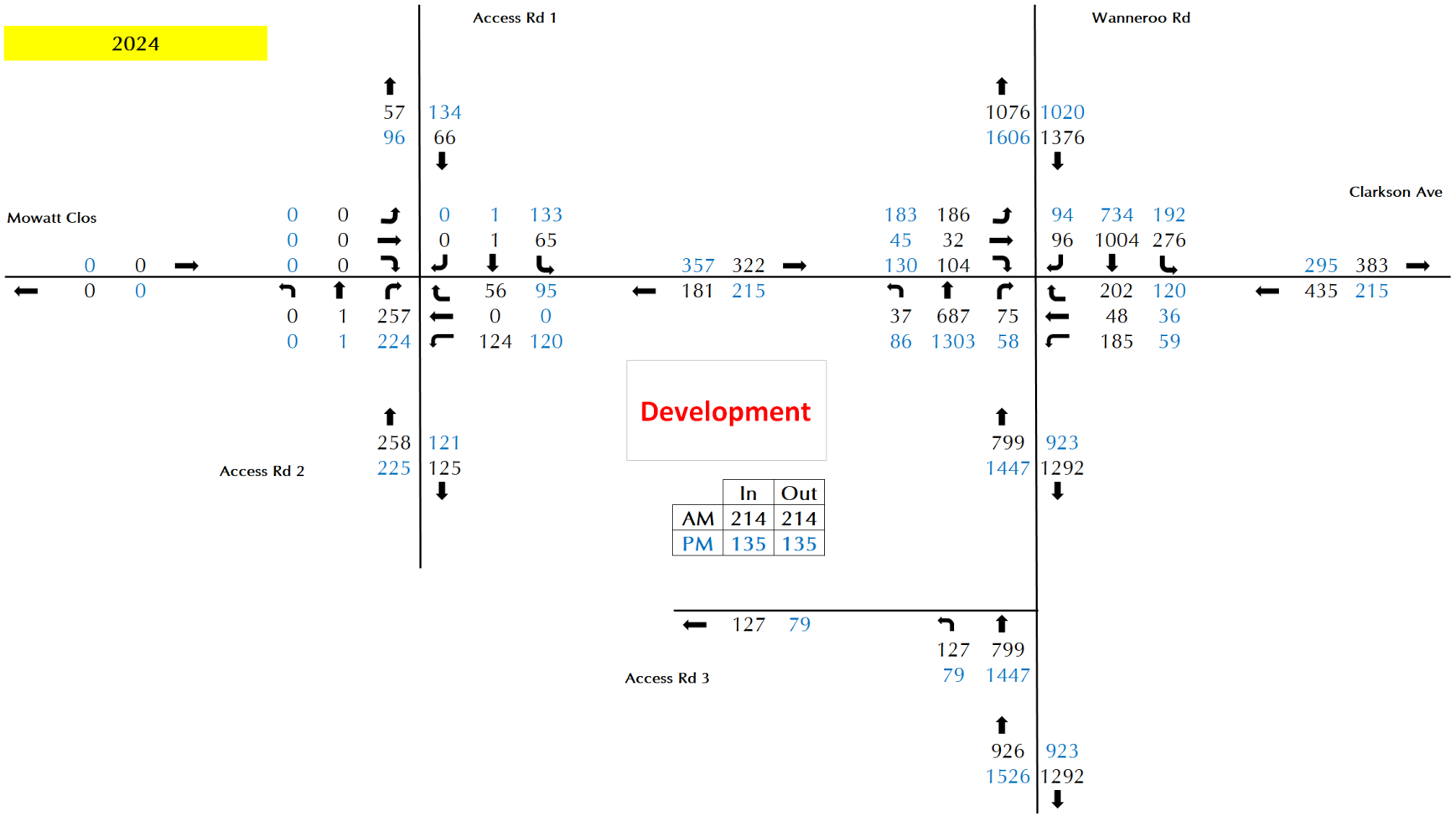


Figure 11: Post-development traffic flows–2024 AM and PM peak hours

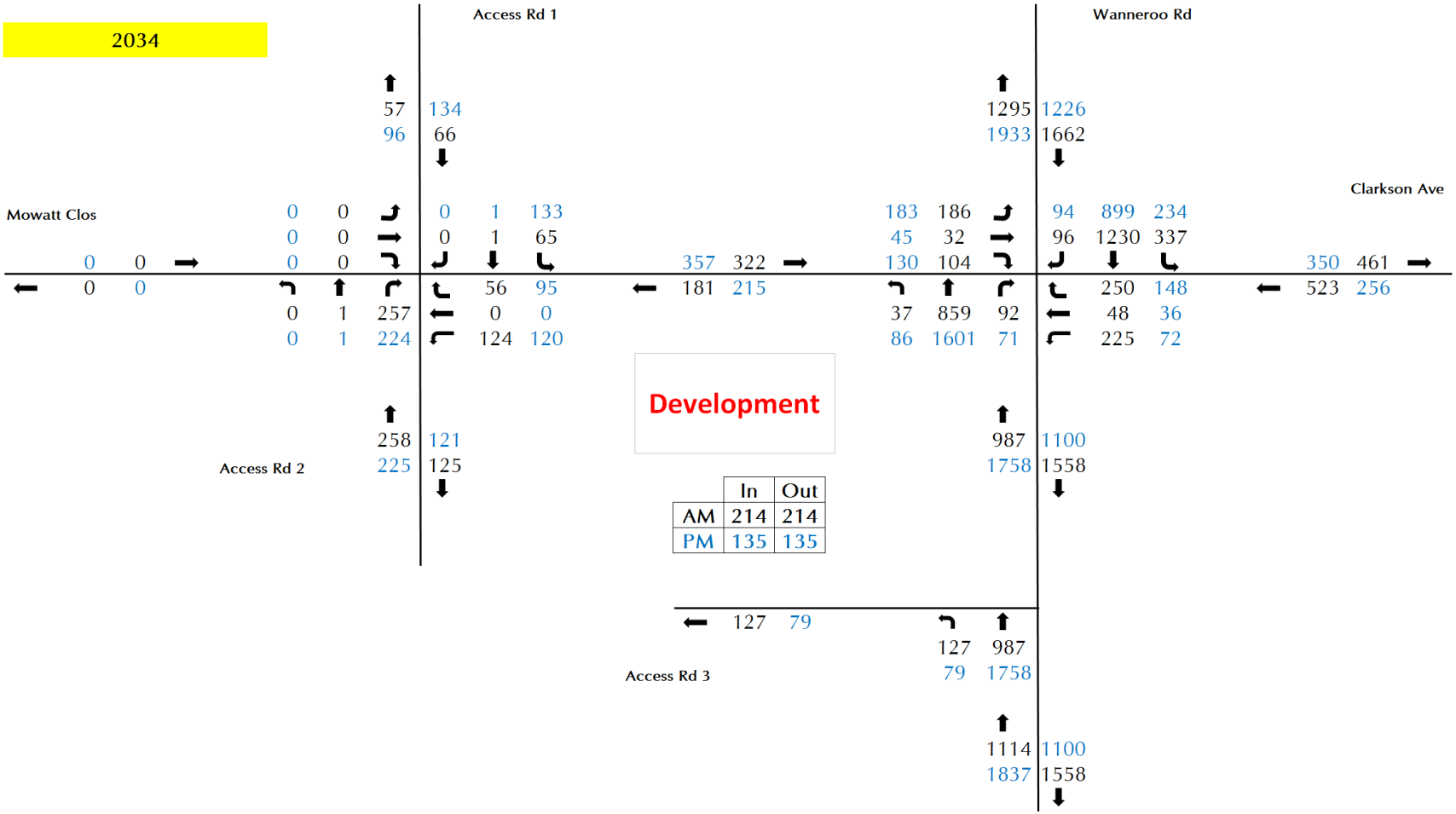


Figure 12: Estimated 10-year post-development traffic flows – 2034 AM and PM peak hours

6.5 Analysis of Local Intersections & Crossovers

The operation of the signalised intersection of Wanneroo Road/ Clarkson Avenue/Mowatt Close and the development connections to Mowatt Close has been analysed for existing, post-development and 10-year post development scenarios for the weekday AM and PM peak hours. The post development scenarios also include the proposed left in crossover intersection on Wanneroo Road.

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

The results of the SIDRA analysis are detailed in **Appendix D** and briefly explained in this section of the report.

A Network SIDRA model was prepared to assess the exiting intersection of Wanneroo Road/ Clackson Avenue/Mowatt Close and the development connections to Mowatt Close and Wanneroo Road. A conceptual diagram of the SIDRA model developed for analysis is shown in **Figure 13**.

The SIDRA model was coded with reference to the *Main Roads Operation Modelling Guidelines Version No. 1.1*. All relevant parameters such as heavy vehicle groups, PCU factors etc. were coded as per Main Roads Guidelines.

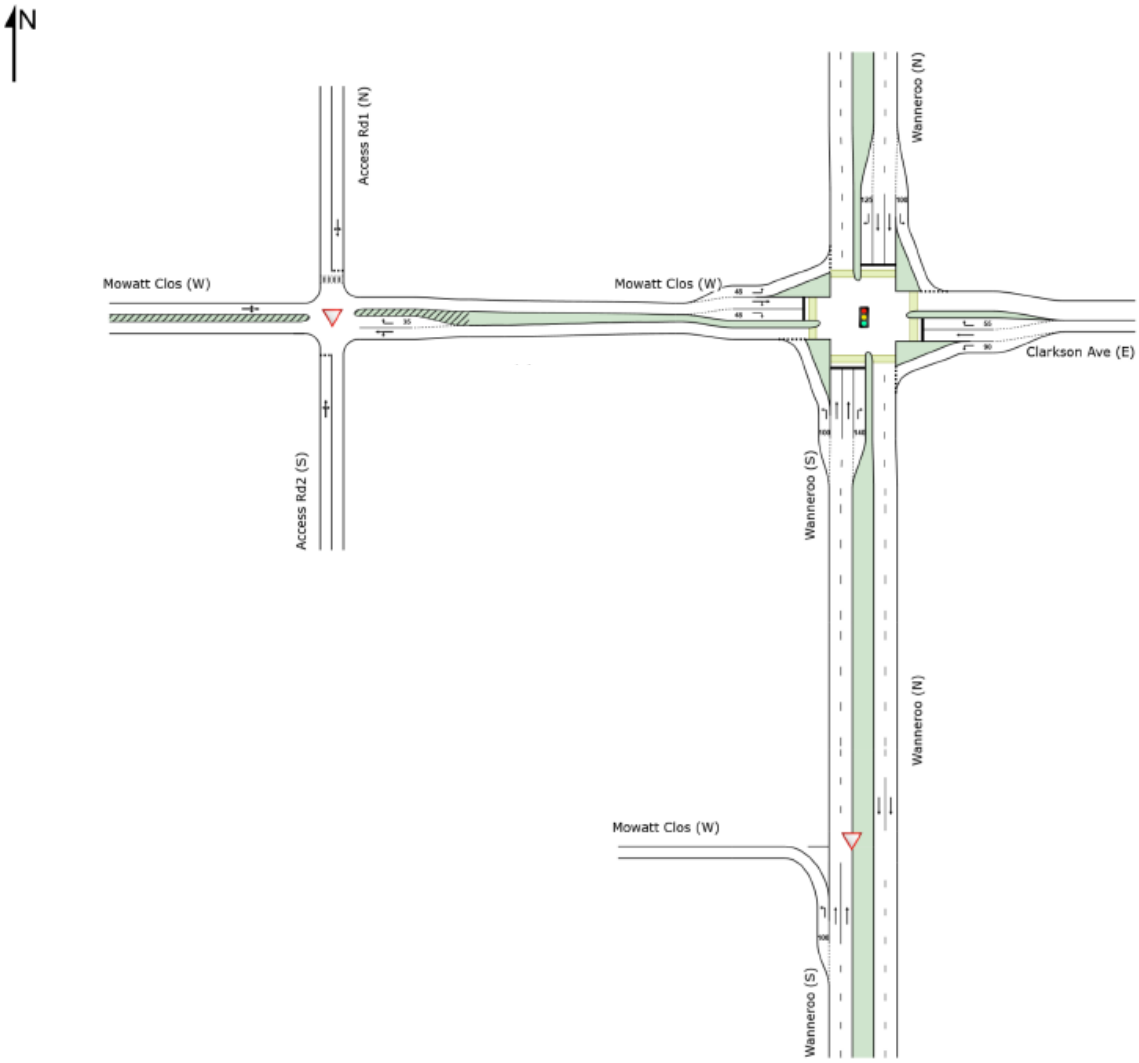


Figure 13: post development SIDRA Network Model

Wanneroo Road traffic signals

SIDRA analysis indicate that existing signalised intersection of Wanneroo Road/ Mowatt Close/ Clarkson Avene is operating satisfactorily with overall level of service C and D during the AM and PM peak hours respectively.

SIDRA analysis further indicates that this intersection would continue to operate satisfactorily with overall level of service C and D during the post development (2024) AM and PM scenarios respectively. The 95% queue back at the traffic lights on Mowatt Close is approximately 32m-43m for both AM and PM peak hours which would not extend to the internal intersection.

According to the 10-year post-development analysis, the overall level of service during AM and PM peak hours is reported as E and F, respectively. The analysis indicates increased delays and queues for through traffic on Wanneroo Road. However, it is noted that these anticipated delays, although reported, do not show as to excessive queuing. According to the information obtained from Main Roads WA Wanneroo

Road may be upgraded to six lanes in this vicinity sometime in the future which will improve traffic operations at the intersection.

Internal 4-way intersection on Mowatt Close

SIDRA analysis indicates that the internal intersection on Mowatt Close will operate satisfactorily in the post development scenarios during both AM and PM peak hours. All movements operate well with minimal delays and queues.

Left-in only crossover on Wanneroo Road

SIDRA analysis indicates that the left-in only crossover on Wanneroo Road will operate satisfactorily in the post development scenarios during both AM and PM peak hours.

6.6 Network Operation

Relevant SIDRA network outputs were reviewed for both AM and PM peak hours to assess the operation of the proposed internal intersection, the left-in only crossover intersection and the signalised intersection as a network.

As detailed in **Figure 14** and **Figure 15**, no queue backs from the traffic lights to the internal four-way intersection is reported during the 2034 AM and PM peak hours.

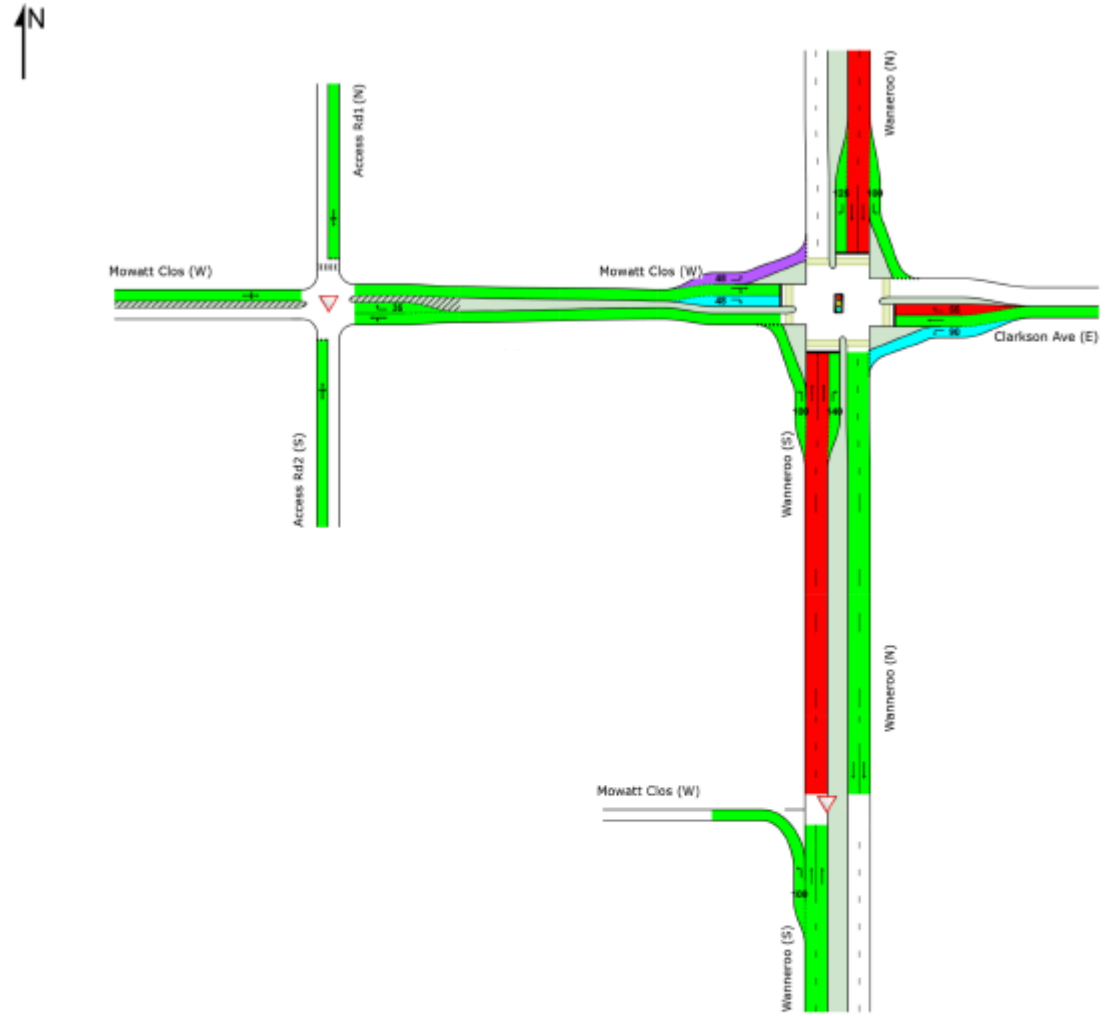


Figure 14: 10-year Post-development weekday AM peak hour network analysis – queue storage ratio

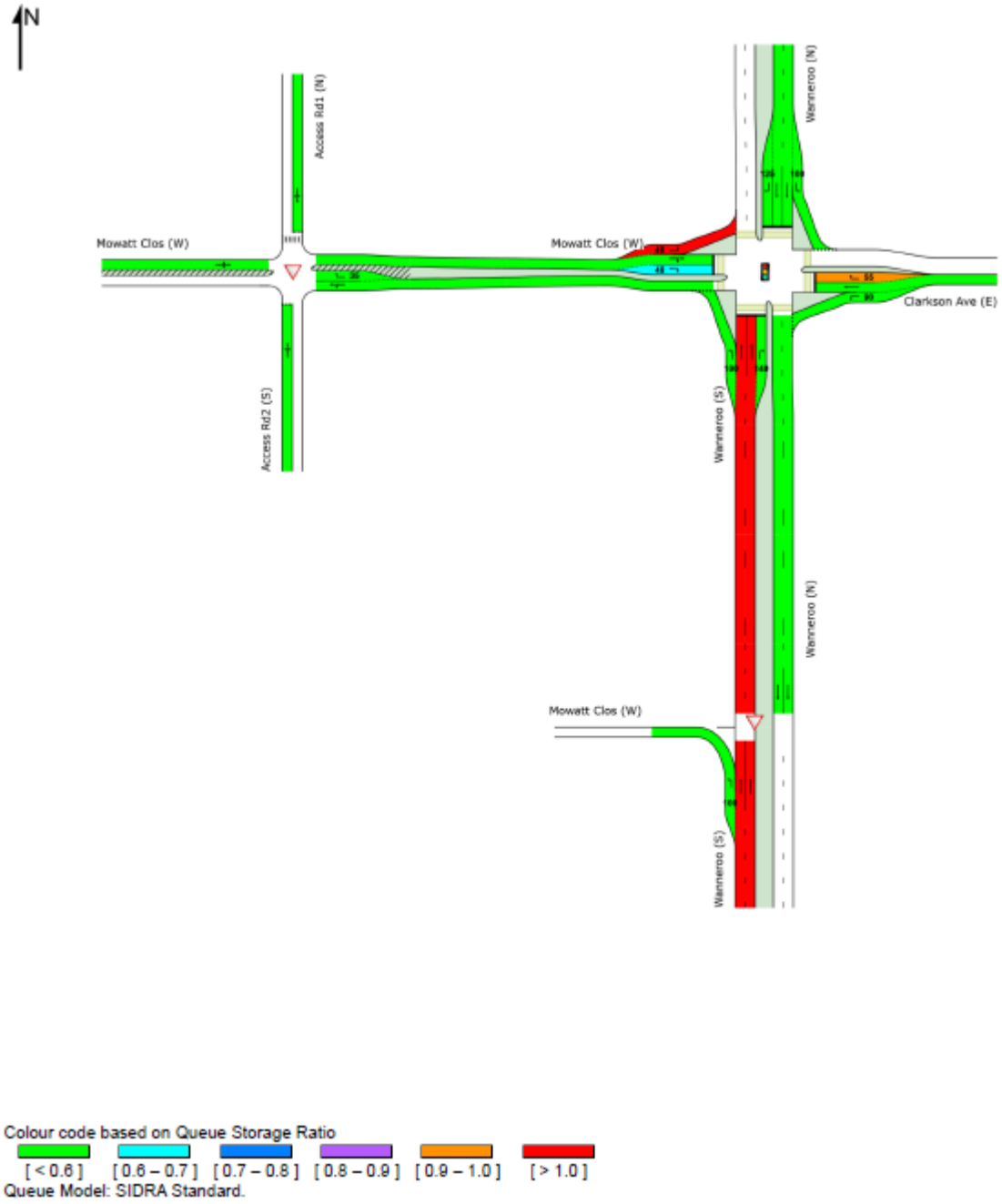


Figure 15: 10-year post-development weekday PM peak hour network analysis – queue storage ratio

As outlined earlier, the anticipated future upgrade of Wanneroo Road in this vicinity will improve traffic operations at the signalised intersection.

6.7 Impact on Surrounding Roads

The WAPC *Transport Impact Assessment Guidelines* (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 all the surrounding roads except a short section of Mowat Cl near the quoted WAPC threshold to warrant further detailed analysis. The Mowat Cl approaches to the signalised intersection provides widening to accommodate separate left and right turn lanes at the signalised intersection. Accordingly, the impact on the surrounding road network will be insignificant.

6.8 Impact on Neighbouring Areas

The traffic generated by the proposed development is not expected to significantly affect surrounding areas and the road network has been designed to accommodate this type of development traffic.

6.9 Traffic Noise and Vibration

It generally 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 on surrounding roads anywhere near this level.

7 Parking

The proposed development will provide 70 parking bays including four ACROD bays and three waiting bays. This car parking provision does not include bays within the drive-through systems. It is considered that the proposed parking provision is adequate to meet the parking demand of the proposed development.

8 Provision for Heavy Vehicles

Based on the advice provided to Transcore, the largest size vehicle which is expected to service the proposed development is an 8.8m service vehicle.

The service vehicle will enter the site from the proposed left-in only access on Wanneroo Road and will exit via the internal road connecting to Mowatt Close. Each outlet has a designated loading area for service vehicles.

Turn path analysis undertaken for 8.8m service vehicle confirm satisfactory access, egress and circulation within each pad site. Turn path plans are included in **Appendix E**.

9 Public Transport Access

The existing public transport services within the vicinity of the site are outlined in Sections 2.5 and 2.7 of this report.

10 Pedestrian and Cyclist Access

Details of the pedestrian and cyclist facilities in this locality are detailed in **Section 2.6** of the report.

11 Conclusions

This TIA has been prepared by Transcore on behalf of Bella Build & Design with regards to the proposed Mixed Commercial Development to be located at Lot 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo in the City of Wanneroo.

The proposal entails the development of four pad sites, with three of them designated for fast food outlets featuring drive-thru facilities, with one coffee shop that also includes a drive-thru facility.

The subject site is proposed to gain access from the internal road connecting to Mowatt Close and a new approved left-in only access point from Wanneroo Road.

The proposed development layout has been assessed with respect to the movements of service vehicles. Swept path analysis confirms that the proposed entry and egress arrangements and the site layout facilitate safe and efficient vehicle circulation.

It is estimated that the proposed development would generate approximately 3,801 external trips per day (both inbound and outbound) with approximately 427 and 271 trips during AM and PM peak hours respectively.

The SIDRA Network analysis undertaken as part of the Transport Impact Assessment allows for the approved and constructed development traffic on both sides of Mowatt Close and confirms satisfactory operation of the 4-way intersection on Mowatt Close and the existing signalised intersection of Wanneroo Road/ Clarkson Avenue/Mowatt Close for post-development and 10 years post-development scenarios.

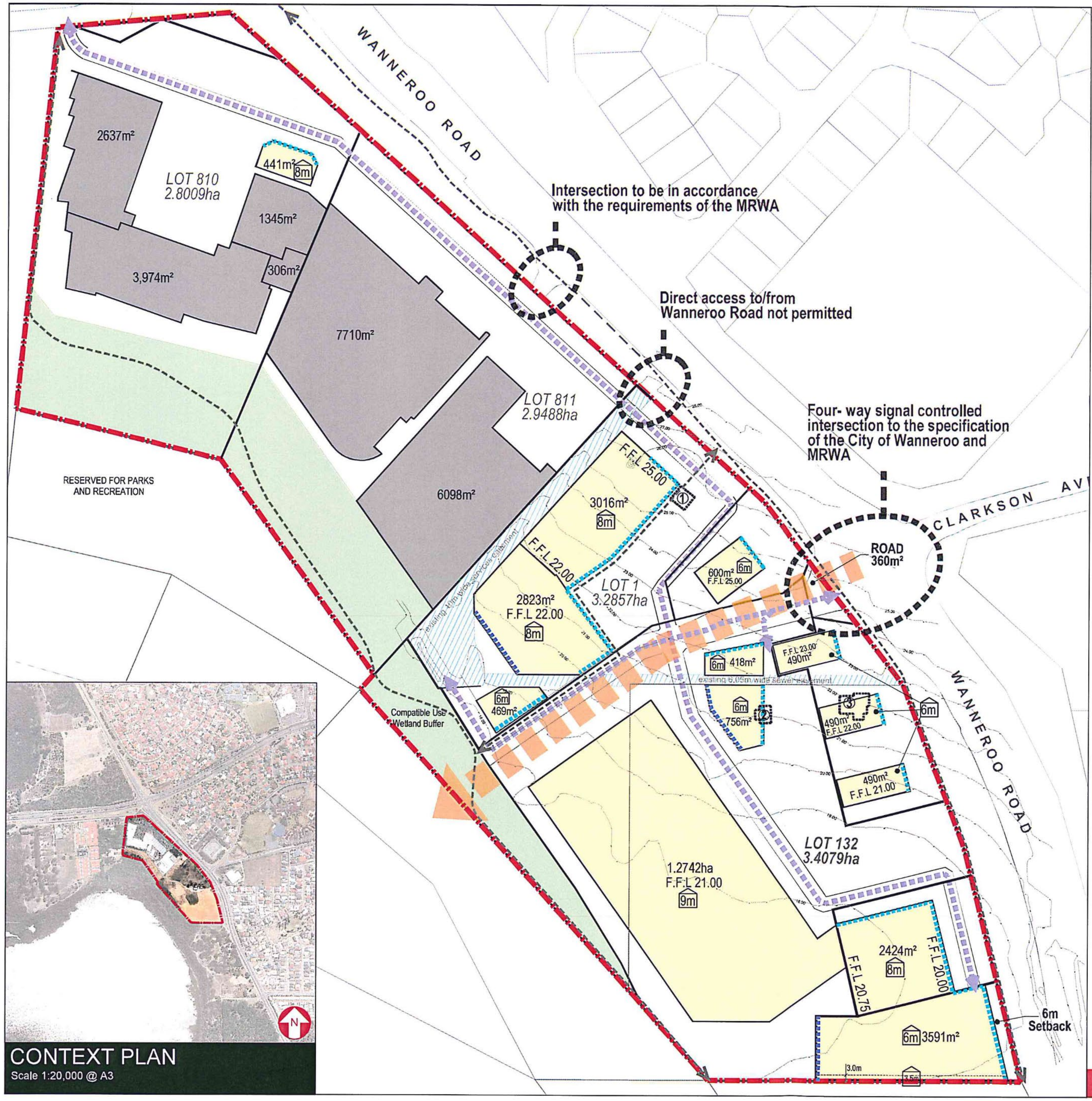
In conclusion, the findings of this Transport Impact Assessment are supportive of the proposed development.

Appendix A

ENDORSED DETAIL AREA PLAN

transcore

Engineering a better future for over 20 years!


WANNEROO ROAD
2637m²
LOT 810
2.8009ha
441m²
8m
1345m²
306m²
3,974m²
7710m²
LOT 811
2.9488ha
6098m²
RESERVED FOR PARKS AND RECREATION
Intersection to be in accordance with the requirements of the MRWA
Direct access to/from Wanneroo Road not permitted
Four- way signal controlled intersection to the specification of the City of Wanneroo and MRWA
CLARKSON AV
ROAD
360m²
F.F.L 25.00
3016m²
8m
F.F.L 22.00
2823m²
F.F.L 22.00
8m
LOT 1
3.2857ha
600m²
6m
F.F.L 25.00
418m²
6m
F.F.L 23.00
490m²
existing 6.05m wide sewer easement
6m
469m²
6m
756m²
490m²
F.F.L 22.00
6m
490m²
F.F.L 21.00
Compatible Use Wetland Buffer
1.2742ha
F.F.L 21.00
9m
LOT 132
3.4079ha
2424m²
8m
F.F.L 20.75
F.F.L 20.00
6m
3591m²
3.0m
3.5m
6m
Setback
CONTEXT PLAN
Scale 1:20,000 @ A3
N

LEGEND

- Drovers Place Central Precinct Boundaries
- Indicative Lot Boundaries
- Existing Lot Boundary
- ▨ Sewer Easement
- Indicative Building Envelope
- Existing Building
- Movement and Parking Areas
- 8m Maximum Building Heights (metres) as measured from finished floor level to pitch of the roof.
- Mandatory Active Frontages
- Secondary Frontages
- Indicative Shared Path
- 🟩 Compatible Use Wetland Buffer
- Reciprocal Rights of Access
- View Corridor
- Intersection Modification/ Upgrade
- F.F.L 22.00 Indicative Finished Floor Level
- Municipal Heritage Inventory Listed Properties

Municipal Heritage Inventory Listed Properties

① Charles Ashby House
② Henry Chitty House
③ Ernie Chitty House

ENDORSEMENT TABLE

This Detailed Area Plan is endorsed by the City of Wanneroo.

[illegible]

Manager Planning Implementation

28/11/13

Date

DETAILED AREA PLAN

0 40 80 m

DROVERS PLACE CENTRAL PRECINCT, WANNEROO

Date: 4th July, 2013 Designer: MD
Scale: 1:2000 @ A3 Drawn: PR
Drawing No. 713-130 DAP2A 040713.dwg

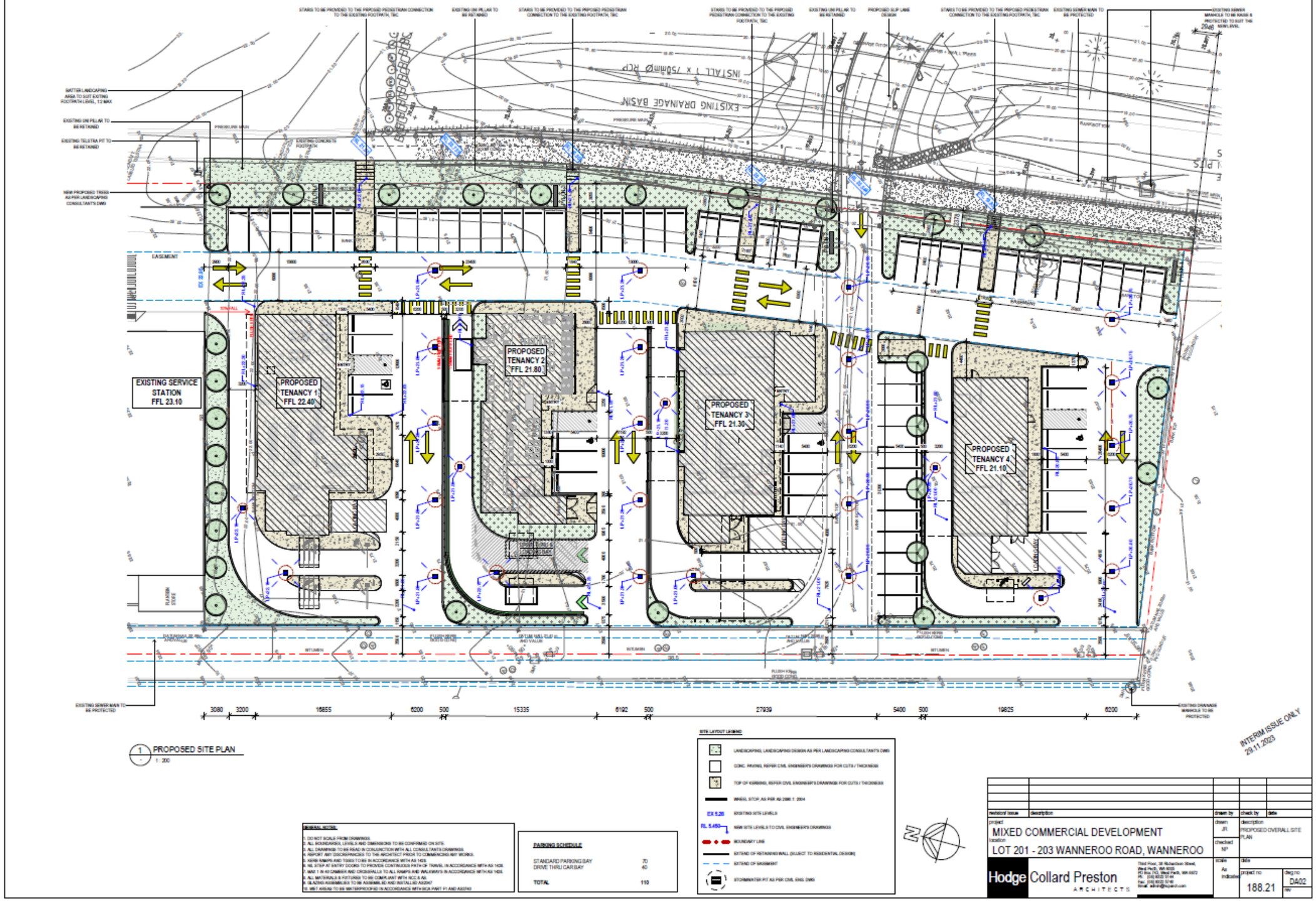
TOWN PLANNING AND URBAN DESIGN

Level 7, 182 St Georges Terrace Perth Western Australia 6000
PO Box 7375 Cloisters Square Perth Western Australia 6850
Telephone +61 08 9289 8300 Facsimile +61 08 9321 4786 www.tpgwa.com.au
The Planning Group WA Pty Ltd ABN 36 097 273 222

Appendix B

PROPOSED SITE PLAN

Engineering a better future for over 20 years!

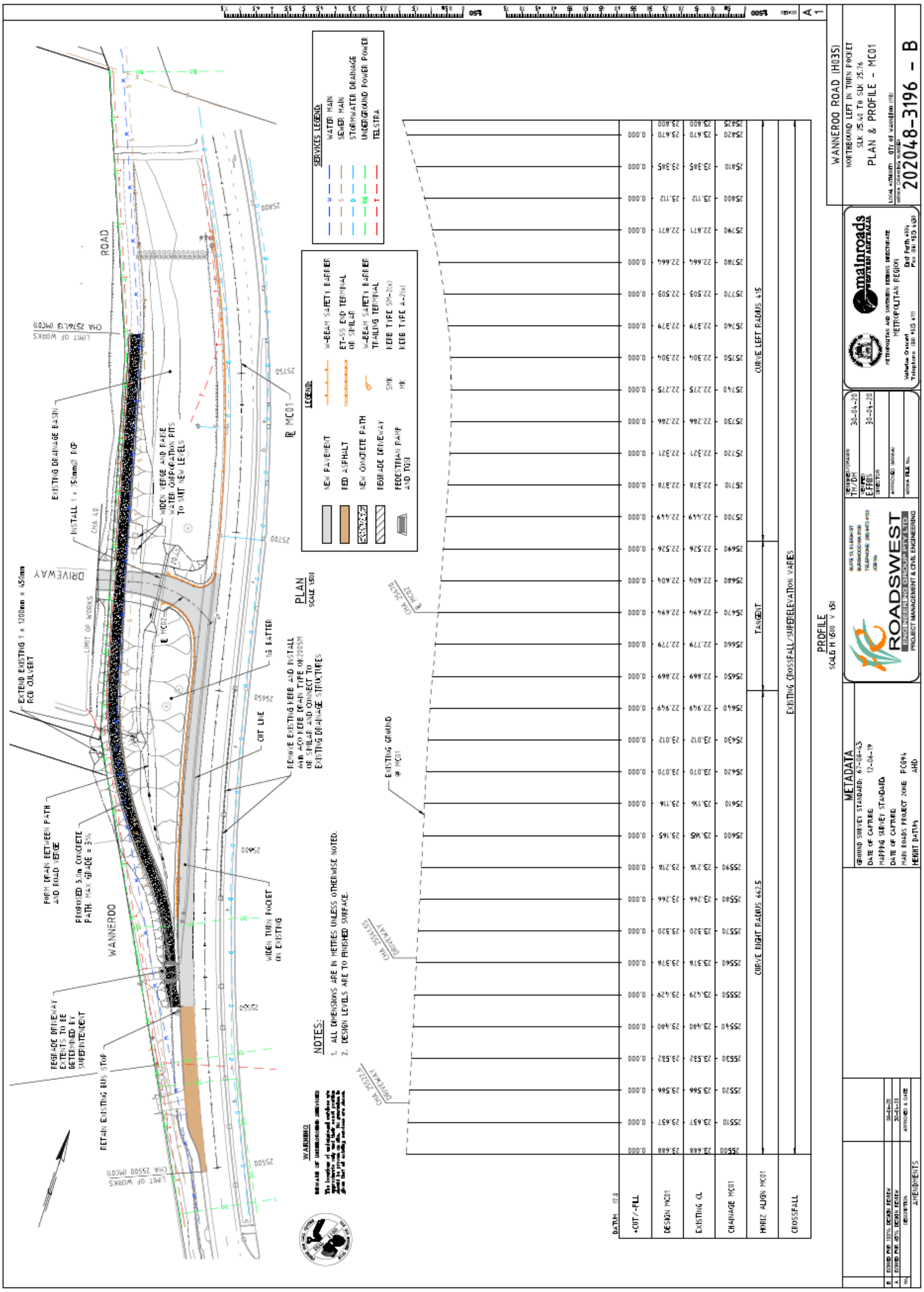

EXISTING SERVICE STATION FFL 23.10
PROPOSED TENANCY 1 FFL 22.40
PROPOSED TENANCY 2 FFL 21.80
PROPOSED TENANCY 3 FFL 21.30
PROPOSED TENANCY 4 FFL 21.10
EXISTING DRAINAGE BASIN
INSTALL 1 x 750mmØ RCP
EASEMENT
3080
3200
16855
6200
500
15335
6192
500
27939
5400
500
19825
6200
PROPOSED SITE PLAN
1 : 200
GENERAL NOTES
1. DO NOT SCALE FROM DRAWINGS.
2. ALL BOUNDARIES, LEVELS AND DIMENSIONS TO BE CONFIRMED ON SITE.
3. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH ALL CONSULTANTS DRAWINGS.
4. REPORT ANY DISCREPANCIES TO THE ARCHITECT PRIOR TO COMMENCING ANY WORKS.
5. KERB RAMPS AND TGSI'S TO BE IN ACCORDANCE WITH AS 1428.
6. NIL STEP AT ENTRY DOORS TO PROVIDE CONTINUOUS PATH OF TRAVEL IN ACCORDANCE WITH AS 1428.
7. MAX 1 IN 40 CAMBER AND CROSSFALLS TO ALL RAMPS AND WALKWAYS IN ACCORDANCE WITH AS 1428.
8. ALL MATERIALS & FIXTURES TO BE COMPLIANT WITH NCC & AS.
9. GLAZING ASSEMBLIES TO BE ASSEMBLED AND INSTALLED AS2047
10. WET AREAS TO BE WATERPROOFED IN ACCORDANCE WITH NCA PART F1.4 AND AS3740
PARKING SCHEDULE
STANDARD PARKING BAY 70
DRIVE THRU CAR BAY 40
TOTAL 110
SITE LAYOUT LEGEND
LANDSCAPING, LANDSCAPING DESIGN AS PER LANDSCAPING CONSULTANT'S DWG
CONC. PAVING, REFER CIVIL ENGINEER'S DRAWINGS FOR CUTS / THICKNESS
TOP OF KERBING, REFER CIVIL ENGINEER'S DRAWINGS FOR CUTS / THICKNESS
WHEEL STOP, AS PER AS 2890.1: 2004
EX 5.20 EXISTING SITE LEVELS
FL 5.450 NEW SITE LEVELS TO CIVIL ENGINEER'S DRAWINGS
BOUNDARY LINE
EXTEND OF RETAINING WALL (SUBJECT TO RESIDENTIAL DESIGN)
EXTEND OF AWNING
STORMWATER PIT AS PER CIVIL ENG. DWG
N
INTERIM ISSUE ONLY 29.11.2023
revision/ issue
description
drawn by
check by
date
project
MIXED COMMERCIAL DEVELOPMENT
location
LOT 201 - 203 WANNEROO ROAD, WANNEROO
drawn JR
checked MP
description PROPOSED OVERALL SITE PLAN
Hodge Collard Preston ARCHITECTS
Third Floor, 38 Richardson Street, West Perth, WA 6005
PO Box 743, West Perth, WA 6872
Ph: (08) 9322 3144
Fax: (08) 9322 3146
Email: admin@hcparch.com
scale As indicated
date
project no 188.21
dwg no DA02
rev

Appendix C

100% DESIGN FOR THE PROPOSED LEFT IN ONLY CROSSOVER ON WANNEROO ROAD

transcore

Engineering a better future for over 20 years!


WANNEROO ROAD (H035)
NORTHBOUND LEFT IN TURN POCKET
SLK 25.40 TO SLK 25.76
PLAN & PROFILE - MC01
202048-3196 - B
PLAN
PROFILE
NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. DESIGN LEVELS ARE TO FINISHED SURFACE.
SERVICES LEGEND:
WATER MAIN
SEWER MAIN
STORMWATER DRAINAGE
UNDERGROUND POWER POWER
TELSTRA
LEGEND:
NEW PAVEMENT
RED ASPHALT
NEW CONCRETE PATH
REGRADE DRIVEWAY
PEDESTRIAN RAMP AND TGSI
W-BEAM SAFETY BARRIER
ET-SS END TERMINAL OR SIMILAR
W-BEAM SAFETY BARRIER TRAILING TERMINAL
KERB TYPE SM-2(x)
KERB TYPE A-2(x)
METADATA
ROADSWEST
mainroads WESTERN AUSTRALIA
METROPOLITAN REGION
AMENDMENTS

Appendix D

SIDRA ANALYSIS

Engineering a better future for over 20 years!

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - Existing - AM (Site Folder: Existing)]

Network: N101 [AM (Network Folder: Existing)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 117 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	35	3.9	35	3.9	0.023	7.1	LOS A	0.2	1.2	0.14	0.61	0.14	38.8
2	T1	808	9.7	808	9.7	0.542	26.7	LOS C	17.1	141.7	0.80	0.70	0.80	39.4
3	R2	78	4.1	78	4.1	*0.373	59.3	LOS E	4.2	33.1	0.96	0.77	0.96	23.9
Approach		921	9.0	921	9.0	0.542	28.7	LOS C	17.1	141.7	0.79	0.70	0.79	37.3
East: Clarkson Ave (E)														
4	L2	191	4.1	191	4.1	0.238	14.9	LOS B	4.6	35.4	0.50	0.70	0.50	43.1
5	T1	28	6.1	28	6.1	0.077	41.7	LOS D	1.3	10.5	0.84	0.65	0.84	25.8
6	R2	223	3.9	223	3.9	*0.620	52.0	LOS D	11.8	91.7	0.96	0.83	0.96	32.7
Approach		442	4.1	442	4.1	0.620	35.4	LOS D	11.8	91.7	0.76	0.76	0.76	35.3
North: Wanneroo (N)														
7	L2	285	4.3	285	4.3	0.191	6.8	LOS A	0.4	2.9	0.03	0.60	0.03	55.7
8	T1	1064	10.3	1064	10.3	*0.858	39.4	LOS D	30.2	250.3	0.91	0.90	1.02	32.6
9	R2	36	4.1	36	4.1	0.299	65.5	LOS E	2.0	15.7	0.97	0.73	0.97	20.3
Approach		1385	8.9	1385	8.9	0.858	33.3	LOS C	30.2	250.3	0.73	0.83	0.82	36.6
West: Mowatt Clos (W)														
10	L2	44	4.1	44	4.1	0.051	11.6	LOS B	0.9	6.8	0.42	0.61	0.42	44.9
11	T1	25	3.7	25	3.7	*0.175	52.1	LOS D	1.9	14.6	0.94	0.70	0.94	23.8
12	R2	44	3.8	44	3.8	0.175	56.4	LOS E	1.9	14.6	0.94	0.72	0.94	11.5
Approach		114	3.9	114	3.9	0.175	38.0	LOS D	1.9	14.6	0.74	0.67	0.74	24.4
All Vehicles		2862	8.0	2862	8.0	0.858	32.4	LOS C	30.2	250.3	0.75	0.77	0.79	36.1

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - Existing - AM (Site Folder: Existing)]

Network: N101 [AM (Network Folder: Existing)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.053	4.6	LOS A	0.2	1.6	0.07	0.54	0.07	37.4
2	T1	1	2.0	1	2.0	0.053	4.8	LOS A	0.2	1.6	0.07	0.54	0.07	28.1
3	R2	45	2.0	45	2.0	0.053	5.6	LOS A	0.2	1.6	0.07	0.54	0.07	34.0
Approach		47	2.0	47	2.0	0.053	5.5	LOS A	0.2	1.6	0.07	0.54	0.07	33.9
East: Clarkson Ave (E)														
4	L2	40	2.0	40	2.0	0.023	4.3	LOS A	0.0	0.0	0.00	0.51	0.00	38.0
5	T1	1	2.0	1	2.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.51	0.00	37.6
6	R2	59	2.0	59	2.0	0.033	4.3	LOS A	0.1	1.0	0.02	0.55	0.02	25.0
Approach		100	2.0	100	2.0	0.033	4.3	NA	0.1	1.0	0.01	0.53	0.01	30.5
North: Access Rd1 (N)														
7	L2	68	2.0	68	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	19.9
8	T1	1	2.0	1	2.0	0.045	0.5	LOS A	0.2	1.4	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.045	1.0	LOS A	0.2	1.4	0.01	0.00	0.01	27.5
Approach		71	2.0	71	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	20.4
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.7	LOS A	0.0	0.1	0.09	0.34	0.09	27.2
11	T1	1	2.0	1	2.0	0.002	0.1	LOS A	0.0	0.1	0.09	0.34	0.09	35.1
12	R2	1	2.0	1	2.0	0.002	4.7	LOS A	0.0	0.1	0.09	0.34	0.09	39.3
Approach		3	2.0	3	2.0	0.002	3.2	NA	0.0	0.1	0.09	0.34	0.09	33.6
All Vehicles		221	2.0	221	2.0	0.053	3.2	NA	0.2	1.6	0.02	0.36	0.02	28.5

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - Existing - PM (Site Folder: Existing)] **Network: N101 [PM (Network Folder: Existing)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 98 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	87	3.9	87	3.9	0.060	7.3	LOS A	0.4	3.1	0.17	0.62	0.17	38.4
2	T1	1404	9.7	1404	9.7	*0.964	63.0	LOS E	48.2	399.2	1.00	1.25	1.45	24.7
3	R2	60	4.1	60	4.1	0.422	55.6	LOS E	2.9	22.7	0.99	0.75	0.99	24.9
Approach		1552	9.2	1552	9.2	0.964	59.6	LOS E	48.2	399.2	0.95	1.19	1.36	24.8
East: Clarkson Ave (E)														
4	L2	61	4.1	61	4.1	0.071	8.2	LOS A	0.6	4.9	0.30	0.62	0.30	48.9
5	T1	23	6.1	23	6.1	0.079	39.2	LOS D	1.0	7.6	0.88	0.66	0.88	26.7
6	R2	133	3.9	133	3.9	*0.463	46.9	LOS D	5.9	46.0	0.95	0.79	0.95	34.3
Approach		217	4.2	217	4.2	0.463	35.2	LOS D	5.9	46.0	0.76	0.73	0.76	36.0
North: Wanneroo (N)														
7	L2	198	4.3	198	4.3	0.133	6.8	LOS A	0.2	1.7	0.03	0.59	0.03	55.7
8	T1	775	10.3	775	10.3	0.508	18.5	LOS B	11.2	92.7	0.65	0.56	0.65	45.5
9	R2	56	4.1	56	4.1	*0.347	54.0	LOS D	2.6	20.1	0.95	0.75	0.95	23.2
Approach		1028	8.8	1028	8.8	0.508	18.2	LOS B	11.2	92.7	0.54	0.58	0.54	46.1
West: Mowatt Clos (W)														
10	L2	98	4.1	98	4.1	0.134	19.9	LOS B	2.7	20.8	0.63	0.68	0.63	38.1
11	T1	42	3.7	42	3.7	*0.311	43.8	LOS D	3.1	24.3	0.95	0.74	0.95	26.1
12	R2	94	3.8	94	3.8	0.311	48.1	LOS D	3.1	24.3	0.95	0.75	0.95	13.1
Approach		234	3.9	234	3.9	0.311	35.6	LOS D	3.1	24.3	0.82	0.72	0.82	25.2
All Vehicles		3031	8.3	3031	8.3	0.964	41.9	LOS D	48.2	399.2	0.79	0.92	1.00	31.0

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - Existing - PM (Site Folder: Existing)] **Network: N101 [PM (Network Folder: Existing)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.128	4.6	LOS A	0.5	4.0	0.14	0.57	0.14	35.7
2	T1	1	2.0	1	2.0	0.128	5.1	LOS A	0.5	4.0	0.14	0.57	0.14	27.0
3	R2	94	2.0	94	2.0	0.128	6.8	LOS A	0.5	4.0	0.14	0.57	0.14	31.8
Approach		96	2.0	96	2.0	0.128	6.7	LOS A	0.5	4.0	0.14	0.57	0.14	31.8
East: Clarkson Ave (E)														
4	L2	66	2.0	66	2.0	0.037	4.3	LOS A	0.0	0.0	0.00	0.52	0.00	37.9
5	T1	1	2.0	1	2.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	37.5
6	R2	100	2.0	100	2.0	0.056	4.3	LOS A	0.2	1.7	0.02	0.55	0.02	25.0
Approach		167	2.0	167	2.0	0.056	4.3	NA	0.2	1.7	0.01	0.53	0.01	30.3
North: Access Rd1 (N)														
7	L2	140	2.0	140	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	19.9
8	T1	1	2.0	1	2.0	0.089	1.0	LOS A	0.4	2.9	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.089	1.3	LOS A	0.4	2.9	0.01	0.00	0.01	27.5
Approach		142	2.0	142	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	20.2
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.7	LOS A	0.0	0.1	0.12	0.33	0.12	27.1
11	T1	1	2.0	1	2.0	0.002	0.1	LOS A	0.0	0.1	0.12	0.33	0.12	34.8
12	R2	1	2.0	1	2.0	0.002	4.8	LOS A	0.0	0.1	0.12	0.33	0.12	39.1
Approach		3	2.0	3	2.0	0.002	3.2	NA	0.0	0.1	0.12	0.33	0.12	33.4
All Vehicles		408	2.0	408	2.0	0.128	3.4	NA	0.5	4.0	0.04	0.36	0.04	27.7

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - 2024 - AM (Site Folder: 2024)] **Network: N101 [AM (Network Folder: 2024)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 117 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	39	3.9	39	3.9	0.028	7.8	LOS A	0.3	2.2	0.19	0.62	0.19	37.2
2	T1	723	9.7	723	9.7	0.484	25.9	LOS C	14.8	122.8	0.77	0.67	0.77	39.9
3	R2	79	4.1	79	4.1	*0.378	59.4	LOS E	4.3	33.6	0.96	0.77	0.96	23.9
Approach		841	8.9	841	8.9	0.484	28.2	LOS C	14.8	122.8	0.76	0.68	0.76	37.5
East: Clarkson Ave (E)														
4	L2	195	4.1	195	4.1	0.248	16.3	LOS B	5.0	38.9	0.53	0.71	0.53	39.5
5	T1	51	6.1	51	6.1	0.137	42.4	LOS D	2.4	19.0	0.85	0.68	0.85	25.5
6	R2	213	3.9	213	3.9	*0.591	51.7	LOS D	11.2	86.8	0.96	0.82	0.96	32.8
Approach		458	4.2	458	4.2	0.591	35.6	LOS D	11.2	86.8	0.77	0.76	0.77	33.8
North: Wanneroo (N)														
7	L2	291	4.3	291	4.3	0.196	6.8	LOS A	0.4	3.0	0.03	0.60	0.03	55.7
8	T1	1057	10.3	1057	10.3	*0.855	39.0	LOS D	28.7	237.8	0.91	0.89	1.01	28.4
9	R2	101	4.1	101	4.1	0.845	72.7	LOS E	6.4	49.5	1.00	0.89	1.30	18.8
Approach		1448	8.7	1448	8.7	0.855	34.9	LOS C	28.7	237.8	0.74	0.83	0.84	32.8
West: Mowatt Clos (W)														
10	L2	196	4.1	196	4.1	0.215	11.5	LOS B	4.1	31.9	0.45	0.65	0.45	45.0
11	T1	34	3.7	34	3.7	*0.363	53.6	LOS D	4.0	30.8	0.97	0.75	0.97	23.1
12	R2	109	3.8	109	3.8	0.363	58.0	LOS E	4.0	30.8	0.97	0.76	0.97	4.6
Approach		339	3.9	339	3.9	0.363	30.7	LOS C	4.1	31.9	0.67	0.70	0.67	26.9
All Vehicles		3086	7.6	3086	7.6	0.855	32.7	LOS C	28.7	237.8	0.74	0.76	0.79	33.6

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - 2024 - AM (Site Folder: 2024)]

Network: N101 [AM (Network Folder: 2024)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.323	4.6	LOS A	1.6	12.4	0.25	0.58	0.25	36.4
2	T1	1	2.0	1	2.0	0.323	5.2	LOS A	1.6	12.4	0.25	0.58	0.25	27.4
3	R2	271	2.0	271	2.0	0.323	6.3	LOS A	1.6	12.4	0.25	0.58	0.25	32.7
Approach		273	2.0	273	2.0	0.323	6.3	LOS A	1.6	12.4	0.25	0.58	0.25	32.7
East: Clarkson Ave (E)														
4	L2	131	2.0	131	2.0	0.073	4.3	LOS A	0.0	0.0	0.00	0.52	0.00	37.8
5	T1	1	2.0	1	2.0	0.073	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	37.4
6	R2	59	2.0	59	2.0	0.033	4.3	LOS A	0.1	1.0	0.02	0.55	0.02	25.0
Approach		191	2.0	191	2.0	0.073	4.3	NA	0.1	1.0	0.00	0.53	0.00	34.0
North: Access Rd1 (N)														
7	L2	68	2.0	68	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	20.0
8	T1	1	2.0	1	2.0	0.045	1.0	LOS A	0.2	1.4	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.045	1.0	LOS A	0.2	1.4	0.01	0.00	0.01	27.5
Approach		71	2.0	71	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	20.4
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.9	LOS A	0.0	0.1	0.19	0.32	0.19	26.8
11	T1	1	2.0	1	2.0	0.002	0.3	LOS A	0.0	0.1	0.19	0.32	0.19	34.0
12	R2	1	2.0	1	2.0	0.002	5.0	LOS A	0.0	0.1	0.19	0.32	0.19	38.7
Approach		3	2.0	3	2.0	0.002	3.4	NA	0.0	0.1	0.19	0.32	0.19	33.0
All Vehicles		537	2.0	537	2.0	0.323	4.7	NA	1.6	12.4	0.13	0.48	0.13	31.8

MOVEMENT SUMMARY

Site: [Wanneroo Rd & Access Rd3 - 2024 - AM (Site Folder: 2024)]

Network: N101 [AM (Network Folder: 2024)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	134	3.9	134	3.9	0.077	8.5	LOS A	0.0	0.0	0.00	0.67	0.00	50.8
2	T1	841	9.7	841	9.7	0.241	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
Approach		975	8.9	975	8.9	0.241	1.2	NA	0.0	0.0	0.00	0.09	0.00	66.0
North: Wanneroo (N)														
8	T1	1360	10.3	1360	10.3	0.391	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.7
Approach		1360	10.3	1360	10.3	0.391	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.7
All Vehicles		2335	9.8	2335	9.8	0.391	0.5	NA	0.0	0.0	0.00	0.04	0.00	68.3

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - 2024 - PM (Site Folder: 2024)] **Network: N101 [PM (Network Folder: 2024)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 98 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	91	3.9	91	3.9	0.065	7.8	LOS A	0.6	4.7	0.22	0.63	0.22	37.2
2	T1	1372	9.7	1372	9.7	*0.942	54.1	LOS D	29.5	244.8	1.00	1.18	1.36	27.2
3	R2	61	4.1	61	4.1	0.429	55.6	LOS E	3.0	23.1	0.99	0.75	0.99	24.9
Approach		1523	9.2	1523	9.2	0.942	51.4	LOS D	29.5	244.8	0.95	1.13	1.28	27.2
East: Clarkson Ave (E)														
4	L2	62	4.1	62	4.1	0.073	8.5	LOS A	0.7	5.3	0.31	0.62	0.31	47.2
5	T1	38	6.1	38	6.1	0.129	39.7	LOS D	1.6	12.6	0.89	0.68	0.89	26.5
6	R2	126	3.9	126	3.9	*0.441	46.7	LOS D	5.6	43.6	0.95	0.79	0.95	34.3
Approach		226	4.3	226	4.3	0.441	35.0	LOS D	5.6	43.6	0.76	0.73	0.76	34.9
North: Wanneroo (N)														
7	L2	202	4.3	202	4.3	0.136	6.8	LOS A	0.2	1.7	0.03	0.59	0.03	55.7
8	T1	773	10.3	773	10.3	0.506	18.5	LOS B	11.1	92.4	0.65	0.56	0.65	41.4
9	R2	99	4.1	99	4.1	*0.616	55.9	LOS E	4.8	37.5	0.99	0.80	1.04	22.6
Approach		1074	8.6	1074	8.6	0.616	19.7	LOS B	11.1	92.4	0.56	0.59	0.57	42.1
West: Mowatt Clos (W)														
10	L2	193	4.1	193	4.1	0.257	19.9	LOS B	5.4	42.5	0.66	0.71	0.66	38.1
11	T1	47	3.7	47	3.7	*0.423	44.6	LOS D	4.3	33.4	0.97	0.76	0.97	25.7
12	R2	137	3.8	137	3.8	0.423	48.9	LOS D	4.3	33.4	0.97	0.77	0.97	5.4
Approach		377	3.9	377	3.9	0.423	33.6	LOS C	5.4	42.5	0.81	0.74	0.81	24.9
All Vehicles		3200	8.0	3200	8.0	0.942	37.5	LOS D	29.5	244.8	0.79	0.87	0.95	31.3

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - 2024 - PM (Site Folder: 2024)] **Network: N101 [PM (Network Folder: 2024)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.328	4.7	LOS A	1.6	12.4	0.26	0.62	0.28	34.6
2	T1	1	2.0	1	2.0	0.328	5.6	LOS A	1.6	12.4	0.26	0.62	0.28	26.3
3	R2	236	2.0	236	2.0	0.328	7.6	LOS A	1.6	12.4	0.26	0.62	0.28	30.4
Approach		238	2.0	238	2.0	0.328	7.6	LOS A	1.6	12.4	0.26	0.62	0.28	30.4
East: Clarkson Ave (E)														
4	L2	126	2.0	126	2.0	0.071	4.3	LOS A	0.0	0.0	0.00	0.52	0.00	37.8
5	T1	1	2.0	1	2.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	37.4
6	R2	100	2.0	100	2.0	0.056	4.3	LOS A	0.2	1.7	0.02	0.55	0.02	25.0
Approach		227	2.0	227	2.0	0.071	4.3	NA	0.2	1.7	0.01	0.53	0.01	32.4
North: Access Rd1 (N)														
7	L2	140	2.0	140	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	20.0
8	T1	1	2.0	1	2.0	0.089	1.3	LOS A	0.4	2.9	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.089	1.3	LOS A	0.4	2.9	0.01	0.00	0.01	27.5
Approach		142	2.0	142	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	20.2
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.9	LOS A	0.0	0.1	0.18	0.32	0.18	26.8
11	T1	1	2.0	1	2.0	0.002	0.3	LOS A	0.0	0.1	0.18	0.32	0.18	34.1
12	R2	1	2.0	1	2.0	0.002	5.0	LOS A	0.0	0.1	0.18	0.32	0.18	38.7
Approach		3	2.0	3	2.0	0.002	3.4	NA	0.0	0.1	0.18	0.32	0.18	33.0
All Vehicles		611	2.0	611	2.0	0.328	4.6	NA	1.6	12.4	0.11	0.44	0.11	29.3

MOVEMENT SUMMARY

Site: [Wanneroo Rd & Access Rd3 - 2024 - PM (Site Folder: 2024)] **Network: N101 [PM (Network Folder: 2024)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	83	3.9	83	3.9	0.048	8.5	LOS A	0.0	0.0	0.00	0.67	0.00	50.8
2	T1	1523	9.7	1523	9.7	0.436	0.1	LOS A	14.0	115.7	0.00	0.00	0.00	69.6
Approach		1606	9.4	1606	9.4	0.436	0.6	NA	14.0	115.7	0.00	0.03	0.00	68.1
North: Wanneroo (N)														
8	T1	972	10.3	972	10.3	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
Approach		972	10.3	972	10.3	0.279	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.8
All Vehicles		2578	9.8	2578	9.8	0.436	0.4	NA	14.0	115.7	0.00	0.02	0.00	68.8

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - 2034 - AM (Site Folder: 2034)] **Network: N101 [AM (Network Folder: 2034)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 117 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	39	3.9	39	3.9	0.028	7.8	LOS A	0.3	2.2	0.19	0.62	0.19	37.2
2	T1	904	9.7	904	9.7	0.606	27.7	LOS C	19.8	164.5	0.83	0.73	0.83	38.8
3	R2	97	4.1	97	4.1	*0.464	60.1	LOS E	5.3	41.7	0.98	0.78	0.98	23.8
Approach		1040	9.0	1040	9.0	0.606	30.0	LOS C	19.8	164.5	0.82	0.73	0.82	36.5
East: Clarkson Ave (E)														
4	L2	237	4.1	237	4.1	0.324	22.5	LOS C	7.8	60.3	0.66	0.75	0.66	34.9
5	T1	51	6.1	51	6.1	0.137	42.4	LOS D	2.4	19.0	0.85	0.68	0.85	25.5
6	R2	263	3.9	263	3.9	*0.748	55.4	LOS E	14.8	114.8	0.99	0.88	1.07	31.8
Approach		551	4.2	551	4.2	0.748	40.1	LOS D	14.8	114.8	0.84	0.80	0.87	32.1
North: Wanneroo (N)														
7	L2	355	4.3	355	4.3	0.242	6.9	LOS A	0.5	4.1	0.04	0.60	0.04	55.7
8	T1	1295	10.3	1295	10.3	*1.098	149.8	LOS F	75.4	625.6	1.00	1.64	1.98	10.4
9	R2	101	4.1	101	4.1	0.845	72.7	LOS E	6.4	49.5	1.00	0.89	1.30	18.8
Approach		1751	8.8	1751	8.8	1.098	116.4	LOS F	75.4	625.6	0.80	1.38	1.55	14.7
West: Mowatt Clos (W)														
10	L2	196	4.1	196	4.1	0.247	15.7	LOS B	5.2	40.6	0.55	0.69	0.55	41.3
11	T1	34	3.7	34	3.7	*0.363	53.6	LOS D	4.0	30.8	0.97	0.75	0.97	23.1
12	R2	109	3.8	109	3.8	0.363	58.0	LOS E	4.0	30.8	0.97	0.76	0.97	4.6
Approach		339	3.9	339	3.9	0.363	33.1	LOS C	5.2	40.6	0.73	0.72	0.73	25.8
All Vehicles		3680	7.7	3680	7.7	1.098	72.9	LOS E	75.4	625.6	0.81	1.05	1.16	20.9

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - 2034 - AM (Site Folder: 2034)]

Network: N101 [AM (Network Folder: 2034)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.323	4.6	LOS A	1.6	12.4	0.25	0.58	0.25	36.4
2	T1	1	2.0	1	2.0	0.323	5.2	LOS A	1.6	12.4	0.25	0.58	0.25	27.4
3	R2	271	2.0	271	2.0	0.323	6.3	LOS A	1.6	12.4	0.25	0.58	0.25	32.7
Approach		273	2.0	273	2.0	0.323	6.3	LOS A	1.6	12.4	0.25	0.58	0.25	32.7
East: Clarkson Ave (E)														
4	L2	131	2.0	131	2.0	0.073	4.3	LOS A	0.0	0.0	0.00	0.52	0.00	37.8
5	T1	1	2.0	1	2.0	0.073	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	37.4
6	R2	59	2.0	59	2.0	0.033	4.3	LOS A	0.1	1.0	0.02	0.55	0.02	25.0
Approach		191	2.0	191	2.0	0.073	4.3	NA	0.1	1.0	0.00	0.53	0.00	34.0
North: Access Rd1 (N)														
7	L2	68	2.0	68	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	20.0
8	T1	1	2.0	1	2.0	0.045	1.0	LOS A	0.2	1.4	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.045	1.0	LOS A	0.2	1.4	0.01	0.00	0.01	27.5
Approach		71	2.0	71	2.0	0.045	0.0	LOS A	0.2	1.4	0.01	0.00	0.01	20.4
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.9	LOS A	0.0	0.1	0.19	0.32	0.19	26.8
11	T1	1	2.0	1	2.0	0.002	0.3	LOS A	0.0	0.1	0.19	0.32	0.19	34.0
12	R2	1	2.0	1	2.0	0.002	5.0	LOS A	0.0	0.1	0.19	0.32	0.19	38.7
Approach		3	2.0	3	2.0	0.002	3.4	NA	0.0	0.1	0.19	0.32	0.19	33.0
All Vehicles		537	2.0	537	2.0	0.323	4.7	NA	1.6	12.4	0.13	0.48	0.13	31.8

MOVEMENT SUMMARY

Site: [Wanneroo Rd & Access Rd3 - 2034 - AM (Site Folder: 2034)]

Network: N101 [AM (Network Folder: 2034)]

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	134	3.9	134	3.9	0.077	8.5	LOS A	0.0	0.0	0.00	0.67	0.00	50.8
2	T1	1039	9.7	1039	9.7	0.343	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	69.7
Approach		1173	9.1	1173	9.1	0.343	1.1	NA	0.0	0.0	0.00	0.08	0.00	66.5
North: Wanneroo (N)														
8	T1	1640	10.3	1526	10.3	0.439	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.6
Approach		1640	10.3	1526[N 1]	10.3	0.439	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.6
All Vehicles		2813	9.8	2699[N 1]	10.2	0.439	0.5	NA	0.0	0.0	0.00	0.03	0.00	68.4

MOVEMENT SUMMARY

Site: [Clarkson Ave & Wanneroo Rd - 2034 - PM (Site Folder: 2034)] **Network: N101 [PM (Network Folder: 2034)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 98 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	91	3.9	91	3.9	0.065	7.8	LOS A	0.6	4.7	0.22	0.63	0.22	37.2
2	T1	1685	9.7	1685	9.7	*1.157	196.2	LOS F	29.5	244.8	1.00	2.09	2.55	10.3
3	R2	75	4.1	75	4.1	0.525	56.1	LOS E	3.7	28.6	1.00	0.77	1.00	24.7
Approach		1851	9.2	1851	9.2	1.157	181.3	LOS F	29.5	244.8	0.96	1.97	2.37	10.6
East: Clarkson Ave (E)														
4	L2	76	4.1	76	4.1	0.098	9.9	LOS A	1.1	8.2	0.37	0.64	0.37	45.5
5	T1	38	6.1	38	6.1	0.129	39.7	LOS D	1.6	12.6	0.89	0.68	0.89	26.5
6	R2	156	3.9	156	3.9	*0.544	47.5	LOS D	7.1	54.9	0.97	0.80	0.97	34.1
Approach		269	4.3	269	4.3	0.544	35.9	LOS D	7.1	54.9	0.79	0.74	0.79	34.8
North: Wanneroo (N)														
7	L2	246	4.3	246	4.3	0.167	6.8	LOS A	0.3	2.2	0.03	0.59	0.03	55.7
8	T1	946	10.3	946	10.3	0.620	19.8	LOS B	15.0	124.6	0.71	0.63	0.71	40.2
9	R2	99	4.1	99	4.1	*0.616	55.9	LOS E	4.8	37.5	0.99	0.80	1.04	22.6
Approach		1292	8.7	1292	8.7	0.620	20.1	LOS C	15.0	124.6	0.60	0.64	0.61	41.8
West: Mowatt Clos (W)														
10	L2	193	4.1	193	4.1	0.308	25.1	LOS C	6.5	50.3	0.75	0.74	0.75	34.9
11	T1	47	3.7	47	3.7	*0.423	44.6	LOS D	4.3	33.4	0.97	0.76	0.97	25.7
12	R2	137	3.8	137	3.8	0.423	48.9	LOS D	4.3	33.4	0.97	0.77	0.97	5.4
Approach		377	3.9	377	3.9	0.423	36.2	LOS D	6.5	50.3	0.85	0.75	0.85	23.8
All Vehicles		3788	8.2	3788	8.2	1.157	101.6	LOS F	29.5	244.8	0.82	1.31	1.51	16.4

MOVEMENT SUMMARY

Site: [Mowatt Clos & Access Rd1 & Access Rd2 - 2034 - PM (Site Folder: 2034)] **Network: N101 [PM (Network Folder: 2034)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Access Rd2 (S)														
1	L2	1	2.0	1	2.0	0.328	4.7	LOS A	1.6	12.4	0.26	0.62	0.28	34.6
2	T1	1	2.0	1	2.0	0.328	5.6	LOS A	1.6	12.4	0.26	0.62	0.28	26.3
3	R2	236	2.0	236	2.0	0.328	7.6	LOS A	1.6	12.4	0.26	0.62	0.28	30.4
Approach		238	2.0	238	2.0	0.328	7.6	LOS A	1.6	12.4	0.26	0.62	0.28	30.4
East: Clarkson Ave (E)														
4	L2	126	2.0	126	2.0	0.071	4.3	LOS A	0.0	0.0	0.00	0.52	0.00	37.8
5	T1	1	2.0	1	2.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	37.4
6	R2	100	2.0	100	2.0	0.056	4.3	LOS A	0.2	1.7	0.02	0.55	0.02	25.0
Approach		227	2.0	227	2.0	0.071	4.3	NA	0.2	1.7	0.01	0.53	0.01	32.4
North: Access Rd1 (N)														
7	L2	140	2.0	140	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	20.0
8	T1	1	2.0	1	2.0	0.089	1.3	LOS A	0.4	2.9	0.01	0.00	0.01	30.9
9	R2	1	2.0	1	2.0	0.089	1.3	LOS A	0.4	2.9	0.01	0.00	0.01	27.5
Approach		142	2.0	142	2.0	0.089	0.0	LOS A	0.4	2.9	0.01	0.00	0.01	20.2
West: Mowatt Clos (W)														
10	L2	1	2.0	1	2.0	0.002	4.9	LOS A	0.0	0.1	0.18	0.32	0.18	26.8
11	T1	1	2.0	1	2.0	0.002	0.3	LOS A	0.0	0.1	0.18	0.32	0.18	34.1
12	R2	1	2.0	1	2.0	0.002	5.0	LOS A	0.0	0.1	0.18	0.32	0.18	38.7
Approach		3	2.0	3	2.0	0.002	3.4	NA	0.0	0.1	0.18	0.32	0.18	33.0
All Vehicles		611	2.0	611	2.0	0.328	4.6	NA	1.6	12.4	0.11	0.44	0.11	29.3

MOVEMENT SUMMARY

Site: [Wanneroo Rd & Access Rd3 - 2034 - PM (Site Folder: 2034)] **Network: N101 [PM (Network Folder: 2034)]**

Wanneroo Rd/ Clarkson Ave
Site Category: (None)
Give-Way (Two-Way)

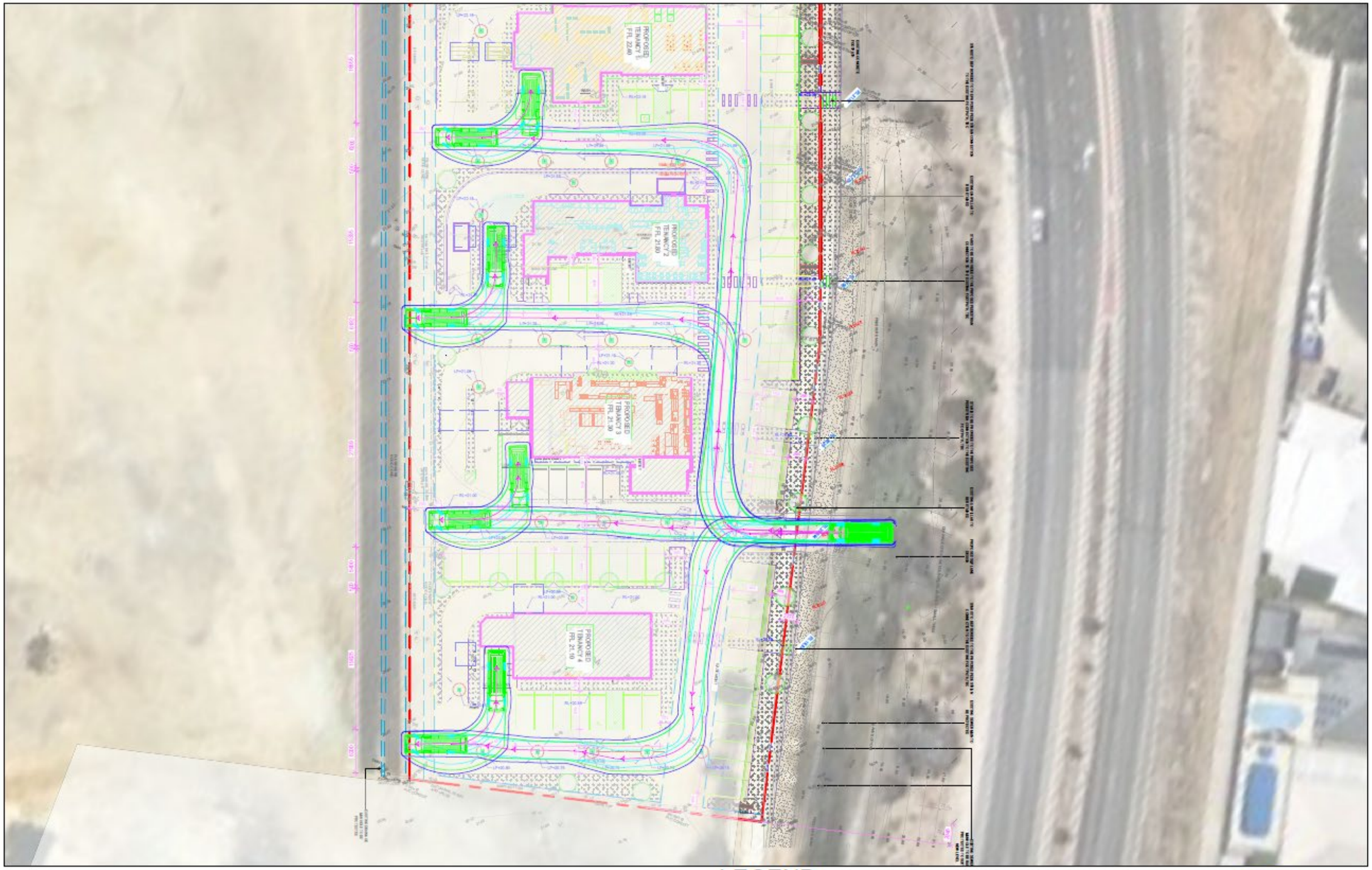
Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wanneroo (S)														
1	L2	83	3.9	83	3.9	0.048	8.5	LOS A	0.0	0.0	0.00	0.67	0.00	50.8
2	T1	1851	9.7	1851	9.7	0.530	0.2	LOS A	72.7	602.6	0.00	0.00	0.00	69.4
Approach		1934	9.5	1934	9.5	0.530	0.6	NA	72.7	602.6	0.00	0.03	0.00	68.2
North: Wanneroo (N)														
8	T1	1158	10.3	1158	10.3	0.333	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.7
Approach		1158	10.3	1158	10.3	0.333	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.7
All Vehicles		3092	9.8	3092	9.8	0.530	0.4	NA	72.7	602.6	0.00	0.02	0.00	68.9

Appendix E

TURN PATH PLANS

Engineering a better future for over 20 years!



Lots 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo

Austroads 2013: 8.8m SRV

Service vehicle entry

LEGEND

Vehicle Body

Wheel Path

500mm Clearance

t23.176.sk05

30/11/2023

Scale: 1:500 @ A3

Lots 202 (9), 203 (15) & 204 (21) Herdsman Lane, Wanneroo
Austroads 2013: 8.8m SRV
Service vehicle exit

LEGEND
Vehicle Body
Wheel Path
500mm Clearance

t23.176.sk06
30/11/2023
Scale: 1:500 @ A3

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