Proposed Revised Local Structure Plan

Piara Waters

Revised Transport Impact Assessment

PREPARED FOR:
Stockland

December 2021

Document history and status

Author	Revision	Approved by	Date approved	Revision type
M Rasouli	r01	B Bordbar	27/04/2021	Draft
M Rasouli	r01a	B Bordbar	20/05/2021	Final
M Rasouli	r01b	B Bordbar	28/05/2021	Minor revision
M Rasouli	r01c	B Bordbar	08/06/2021	2nd Minor revision
M Rasouli	r01d	B Bordbar	30/11/2021	Third revision
M Rasouli	r01e	B Bordbar	8/12/2021	Final
M Rasouli	r01f	B Bordbar	20/12/2021	Minor amendment

File name: t21.050-mr-r01f

Author: M Rasouli

Project manager: M Rasouli

Client: Stockland

Project: Revised Local Structure Plan (LSP), Piara Waters

Document revision: r01f

Project number: t21.050

TABLE OF CONTENTS

REPORT FIGURES

REPORT TABLES

1.0 Introduction and Background

This revised Transport Impact Assessment (TIA) has been prepared by Transcore on behalf of Stockland with regard to the proposed revised Local Structure Plan (LSP) at the north east corner of the intersection of Armadale Road and Warton Road (subject site), Piara Waters, in the City of Armadale.

The original TIA and other relevant supporting documents for the original LSP was provided to the City of Armadale in June 2021. The City reviewed the reports (inclucing the TIA) and provided comments in October 2021. Accordingly, CLE prepared a revised LSP to address the City's comments and Transcore has prepared this revised TIA to reflect the revised LSP.

Transcore prepared a Transport Impact Assessment (TIA) in 2019 on behalf of West Piara Waters Land Owners Pty Ltd with regard to the proposed Metropolitan Region Scheme (MRS) Amendment for the West Piara Urban Precinct in the City of Armadale. A copy of the concept plan supporting MRS Amendment is provided in **Appendix A**.

This revised TIA aims to review the future traffic flows that would be generated by the proposed revised LSP, establish traffic volumes on the internal road network and through the proposed external intersections and review the revised LSP for:

- Compatibility with the MRS amendment concept plan for West Piara Urban Precinct;
- Suitability of the proposed road connections; and,
- External and internal road hierarchy and adequacy of the internal road reserves.

The location of the site subject for the revised LSP application is shown in **Figure 1**.

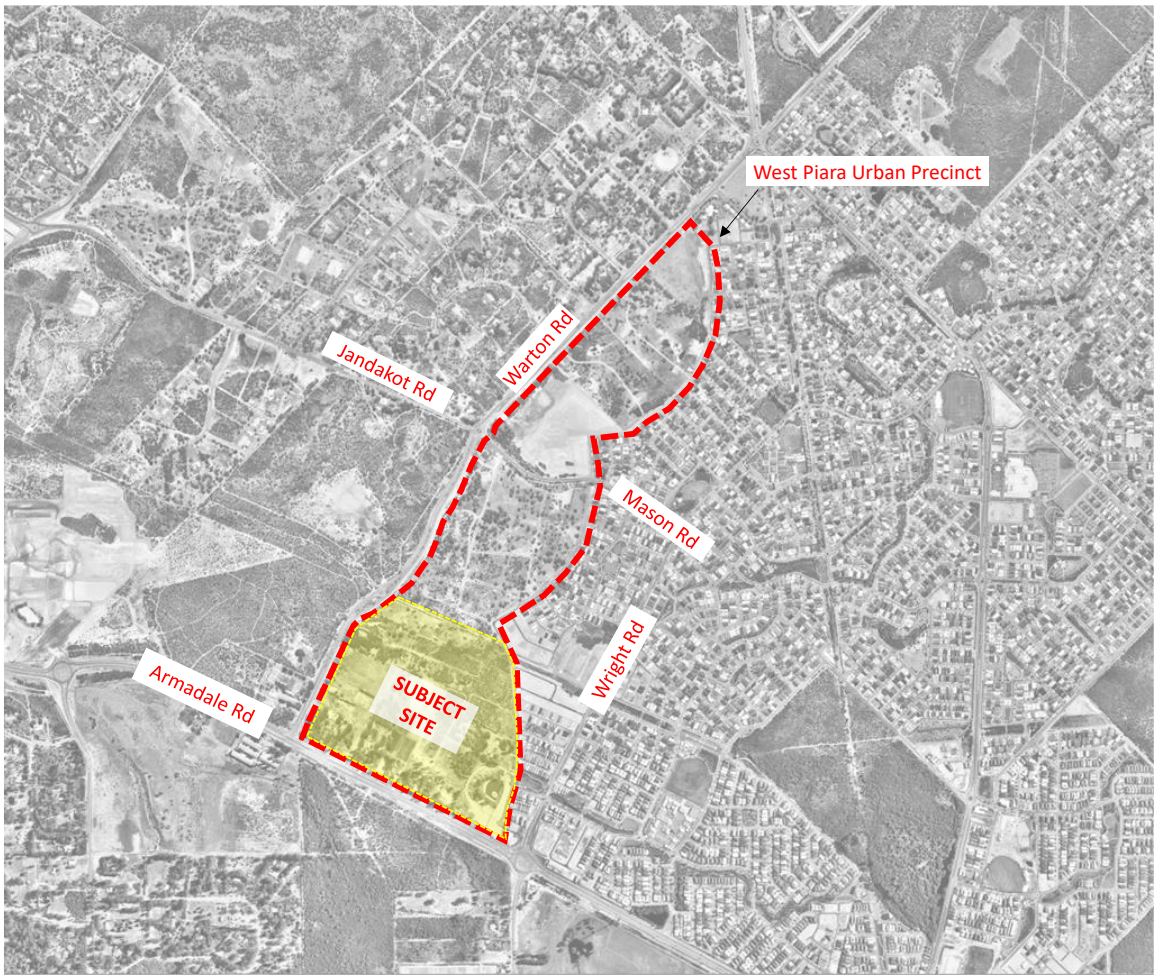


Figure 1: Location of the subject site within the MRS Amendment area

2.0 Proposed Revised Local Structure Plan

The proposed Revised Concept Local Structure Plan for the site is shown in **Figure 2** and **Appendix B**. The revised LSP area is estimated to accommodate lot yield range of 760 – 770 dwellings when fully developed.

The revised LSP area will be served mainly by a full movement priority-controlled T-intersection on Warton Road. A secondary left in/ left out connection to the revised LSP area would be also available at the boundary between Lot 88 and Lot 9009. The revised LSP also shows a potential connection to the north-east along the wetland area. The proposed east-west road within the revised LSP area would connect to Baltic Approach to the east.

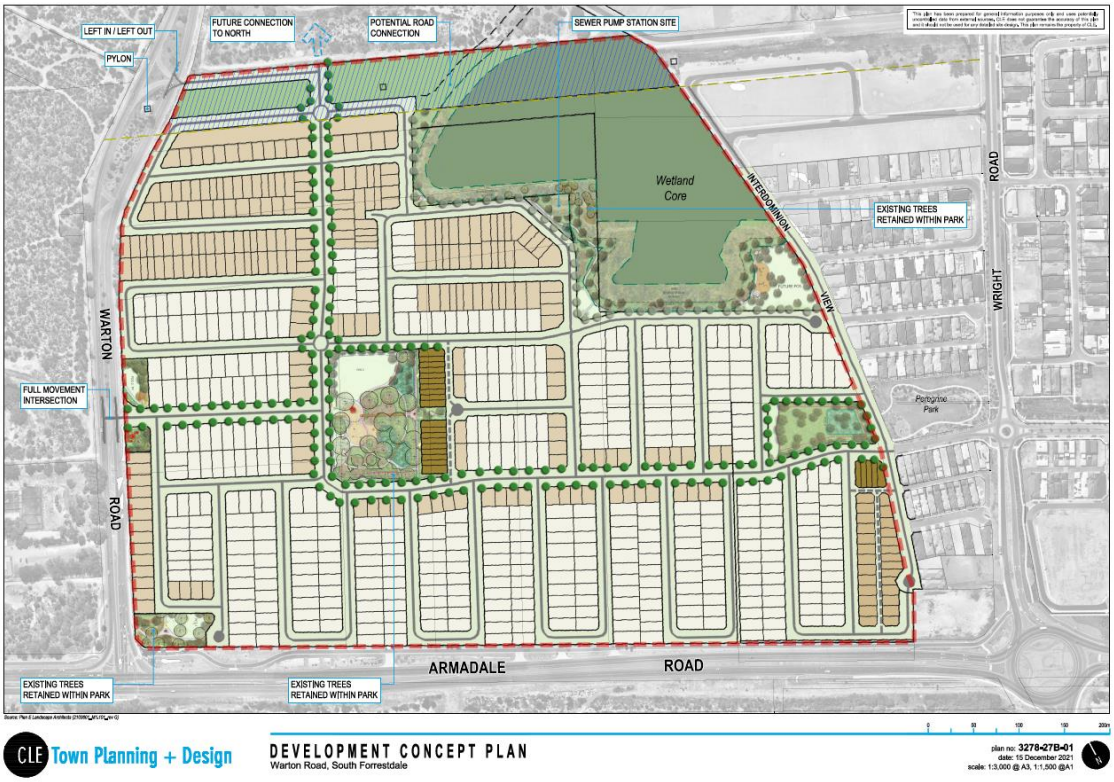


Figure 2: Proposed revised Concept Local Structure Plan

3.0 Existing Situation

3.1 Existing Land Use

The subject site is currently mainly rural in nature and occupied by few residential properties.

3.2 Existing Road Network

Armadale Road is a Primary Regional Road under care and control of Main Roads WA. It is classified as a Primary Distributor road according to the Main Roads WA functional road hierarchy. Armadale Road has been upgraded to dual divided carriageway standard (two lanes each way) recently in this locality. The posted speed limit on this section of Armadale Road is 80 km/h.

Warton Road is a District Distributor A Road of dual divided carriageway standard (two lanes each way) with a speed limit of 80km/h adjacent to the subject site. According to the information sourced from Main Roads WA Warton Road is a Primary Freight Route.

Jandakot Road is of single carriageway standard with a speed limit of 80km/h to the west of Warton Road. According to Main Roads WA functional road hierarchy, Jandakot Road is a Regional Distributor and a District Distributor (B) in accordance with City of Cockburn classification.

Mason Road is classified as a Local Distributor in the Main Roads WA functional road hierarchy. It is constructed as a single carriageway rural road from Warton Road to Southampton Drive but has been upgraded to an urban Neighbourhood Connector A standard (one lane each way, on road cycle lanes and 2m median) from Southampton Drive to Wright Road. The default built up area speed limit of 50km/h applies.

Wright Road is classified as a Local Distributor. It is constructed to an urban Neighbourhood Connector A standard (one lane each way, on road cycle lanes and 2m median). The default built up area speed limit of 50km/h applies on Wright Road. The intersection of Wright Road and Armadale Road has recently been upgraded to a dual lane roundabout. Wright Road flares out to two lanes on its approach to and departure from the roundabout.

Interdominion View forms the eastern boundary of the subject site and is constructed as single carriageway urban street (6m width between kerbs) and the default built up area speed limit of 50km/h applies to this road.

3.3 Existing Traffic Counts

Existing average weekday traffic volumes on the major roads in this area have been obtained from the Main Roads WA website and are shown on **Figure 3**.

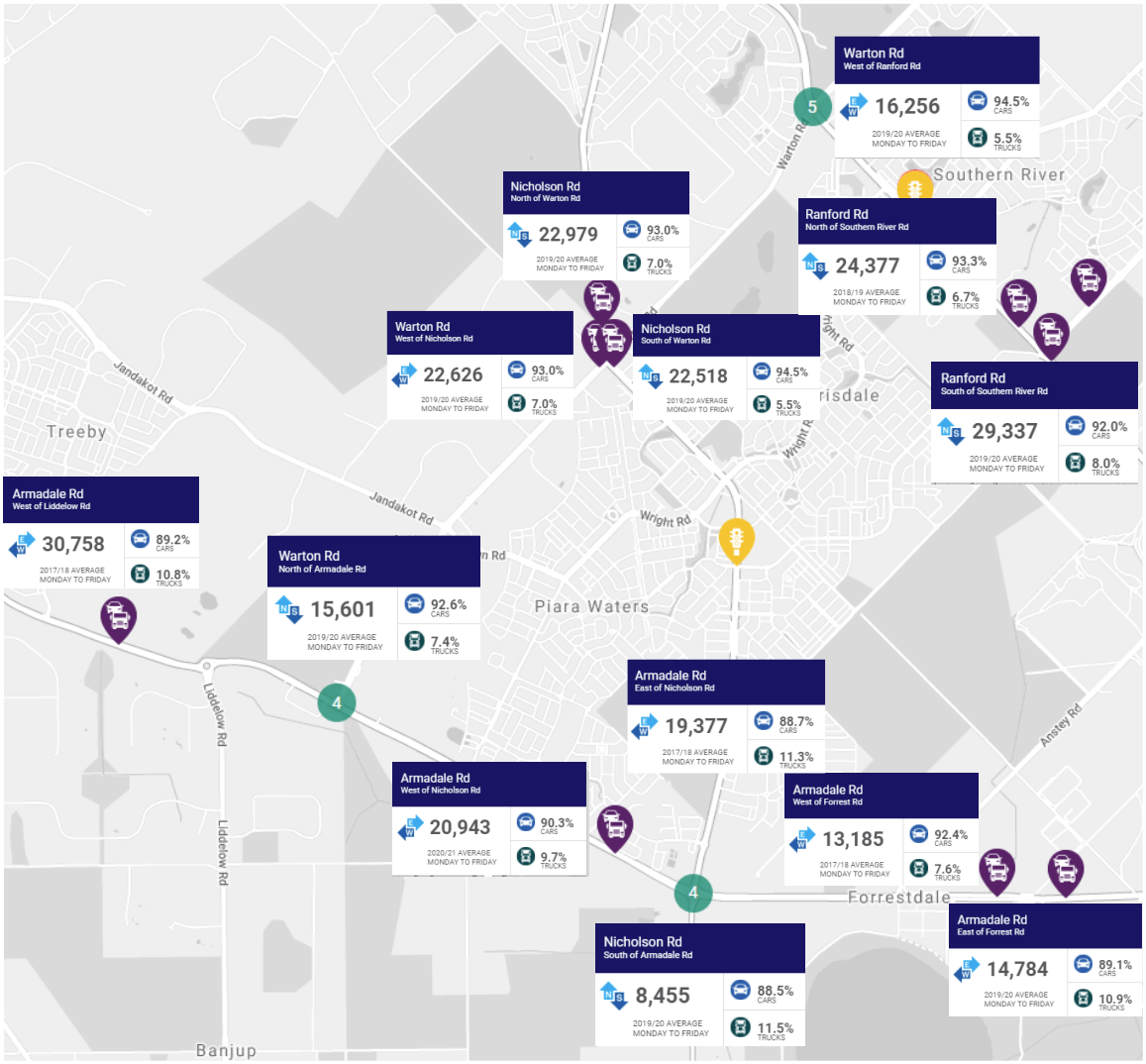


Figure 3: Existing Traffic Volumes

3.4 Existing RAV Network

Armadale Road, Warton Road, Jandakot Road and Nicholson Road (north of Warton Road) and Nicholson Road (south of Armadale Road) are currently included as part of Restricted Access Vehicles (RAV) Network 4, as shown in **Figure 4**. RAV Networks 2 to 4 allow access for heavy vehicle combinations up to 27.5m long (e.g. B-doubles), subject to other restrictions on vehicle height, width and mass, with the appropriate RAV permit issued by Main Roads WA.

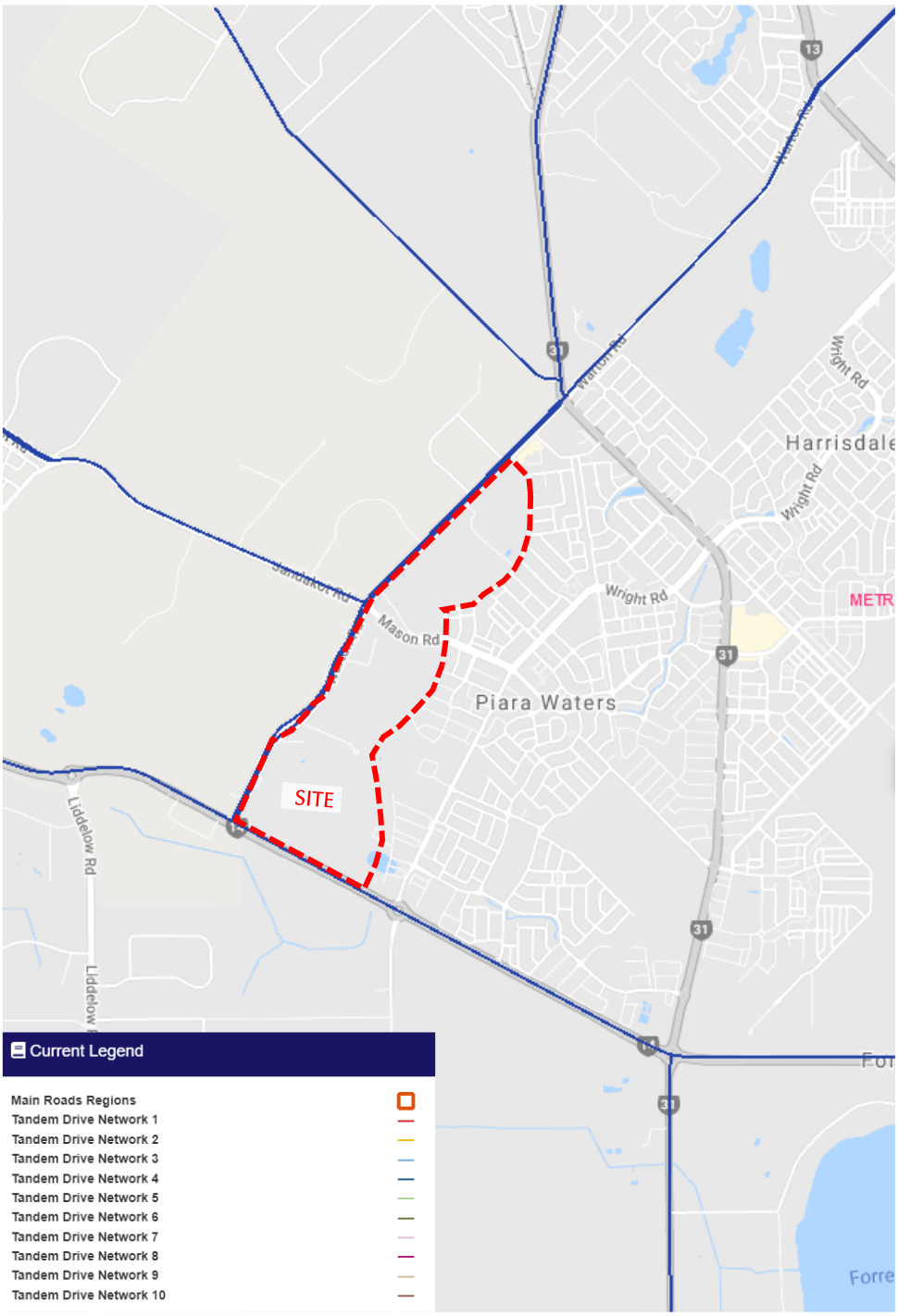


Figure 4: Restricted Access Vehicles Network

3.5 Public Transport

Public transport services within the vicinity of the revised LSP are shown in **Figure 5.** The revised LSP area is well served by bus routes 518 and 233 which operates along Armadale Road adjacent to revised LSP area. Bus route 518 runs between Murdoch TAFE to Cockburn Central Station via Murdoch Station. Bus route 233 traverses between Gosnells Station to Cockburn Central Station via Southern River. Both bus routes also provide convenient public transport services within the area of

Harrisdale and Piara Waters. Location of the nearby bus stops are shown in **Figure 5.**

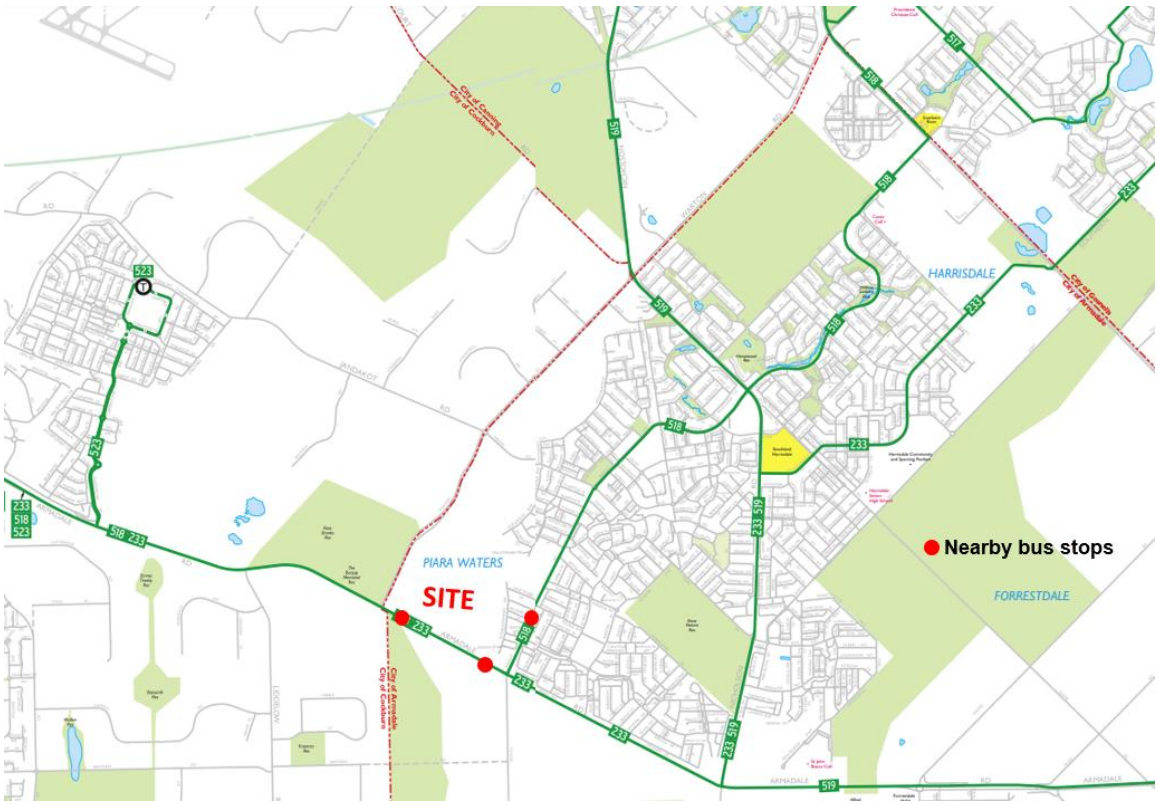


Figure 5: Existing Bus Routes

3.6 Pedestrian and Cyclist Facilities

A 2.5m concrete shared path is in place at the eastern side of Warton Road (from Armadale Road to north of Nicholson Road) fronting/adjacent to the proposed revised LSP area.

The Department of Transport's Perth Bike Map (as at 2016, see **Figure 6**) shows that bicycle lanes or sealed shoulder are provided either side of Armadale Road and Jandakot Road.

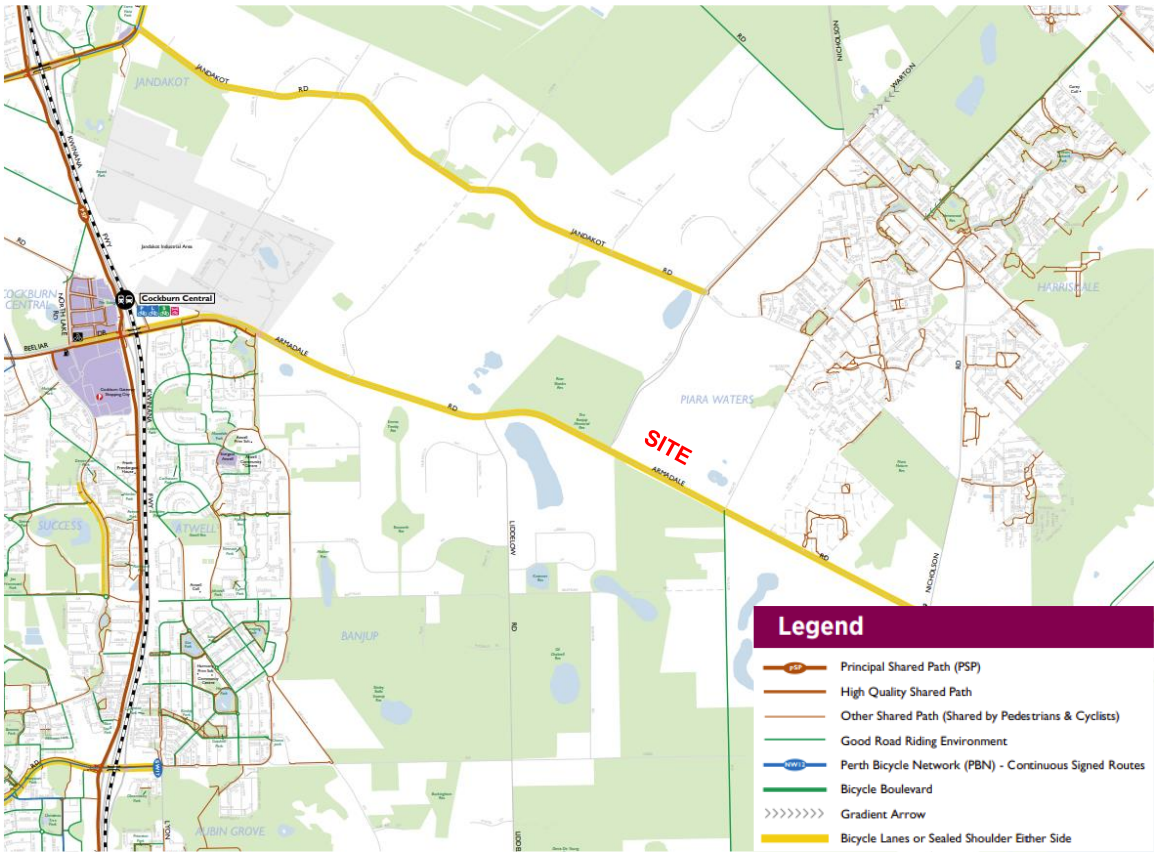


Figure 6: Bike Map

The residential access street network east of the subject site typically includes a footpath on at least one side of all streets, including a 2m path on the east side of Interdominion View.

3.7 Changes to the Surrounding Road Network

Armadale Road is currently undergoing roadworks associated with the Armadale Road to North Lake Road Bridge project. This project will upgrade this section of Armadale Road to dual carriageway standard (two lanes each way) with a 4m-wide Principal Shared Path along the northern side.

The Armadale Rd / Nicholson Rd intersection has recently been reconstructed as a grade separated roundabout (Armadale Rd through lanes passing over the roundabout as illustrated in **Figure 7**), and the Armadale Rd / Wright Rd / Taylor Rd intersection has also been upgraded as a two-lane roundabout. The existing Armadale Rd / Warton Road signalised intersection will not be altered by this project.

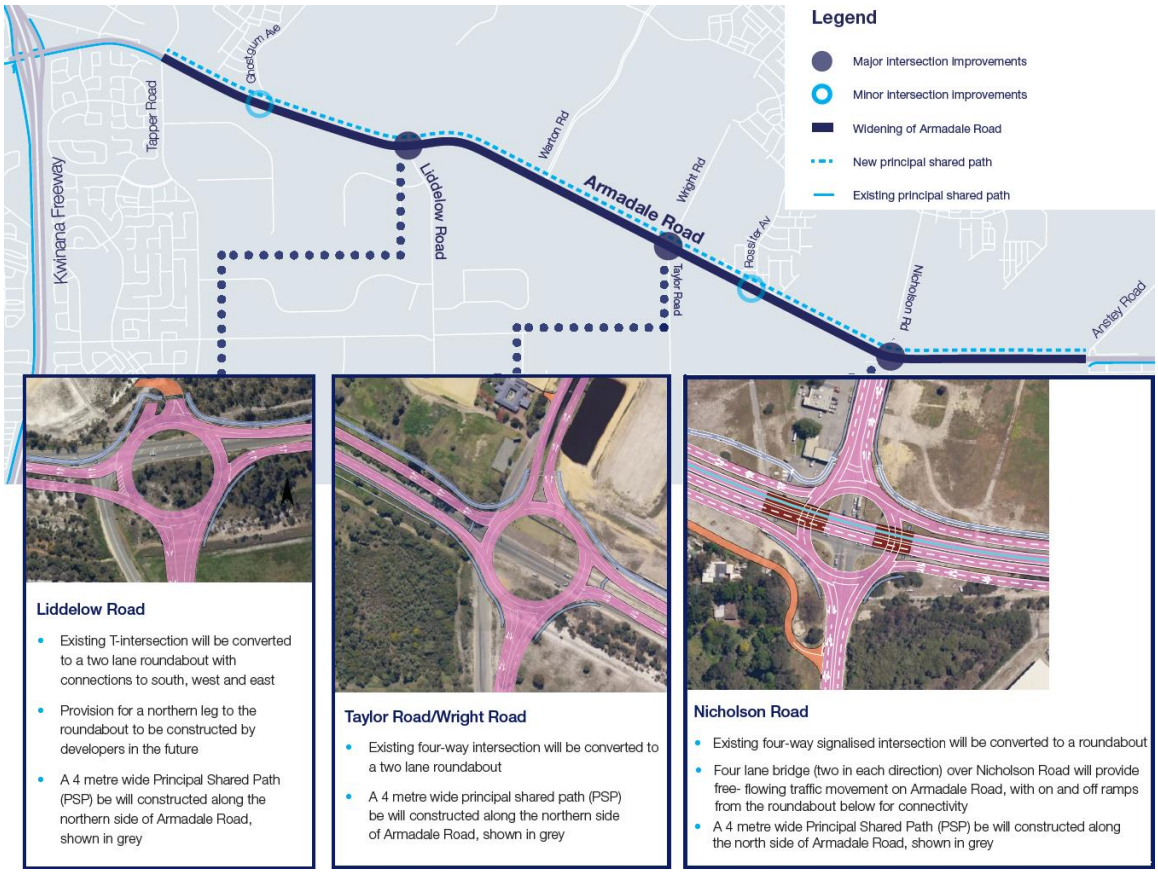


Figure 7: Armadale Road Upgrade project

In the longer term it is anticipated that some sections of Armadale Road may need to be upgraded to six lanes to accommodate forecast future traffic flows. Jandakot Road is planned to be progressively upgraded to dual carriageway standard as urban development progresses from west to east along the southern side of Jandakot Road.

The report Perth and Peel @ 3.5million – The Transport Network (Department of Transport, et al. March 2018) shows Warton Road and Jandakot Road as future integrator arterial roads, potentially implying the same status as existing Other Regional Roads in the Metropolitan Region Scheme. That report also identifies Armadale Road and Warton Road as secondary freight roads in the 2050 freight network.

3.8 Public Transport Network Planning

Perth and Peel @ 3.5million – The Transport Network (Department of Transport, et al. March 2018) shows Armadale Road as a "proposed high-priority transit corridor" from Armadale to Cockburn Central. This initiative reflects the previous 2011 Department of Transport plan, *Public Transport for Perth in 2031*, which envisaged a future bus rapid transit route from Armadale to Cockburn Central providing a cross-suburban link between the Mandurah and Armadale railway lines.

4.0 Proposed Transport Network

4.1 Road Hierarchy

The proposed hierarchy of roads within the revised LSP is illustrated in **Figure 8** using the road hierarchy classification from Liveable Neighbourhoods (2007).

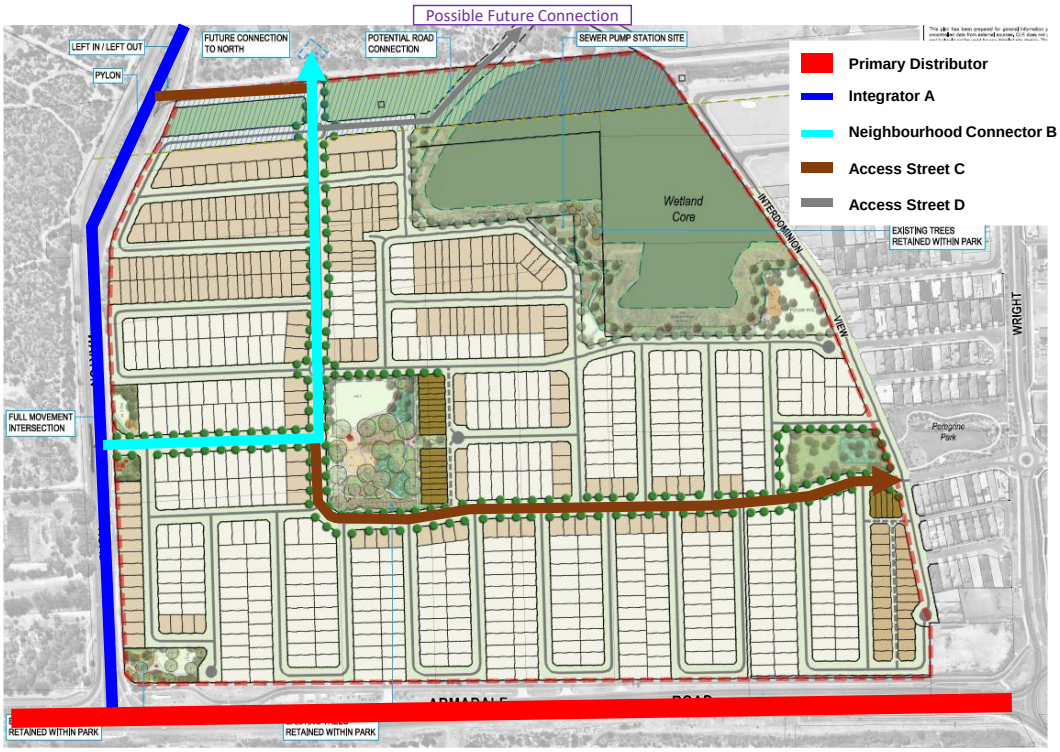


Figure 8: Proposed road hierarchy

Some key characteristics of the relevant road classifications have been summarised in **Table 1** . These are generally based on Liveable Neighbourhoods Guidelines.

Table 1: Key Characteristics for the Proposed revised LSP Road Classifications

Road Classification	Indicative upper volume (vpd)	Indicative road reserve width (m)	Indicative road pavement width (m)
Neighbourhood Connector B	3,000	20m	7.0m and embayed parking
Access Street C	3,000	16m	6m (plus embayed parking) or 7.2m (with no embayed parking)
Access Street D	1,000	15m	6m

It should be noted that the outlined reservation widths are indicative only and are subject to further adjustment in consultation with the Department of Planning and City of Armadale during detailed subdivision design process.

It is anticipated that most of the access streets shown in the proposed revised LSP (including the possible future connection to the north-east) would carry less than 1,000vpd and therefore will be classified as Access Street D. The basic standard of Access Street D roads within the revised LSP area is a 6m wide carriageway in a 15m road reserve. The Access Street D generally entails 4.5m verges on both sides, with embayed parking accommodated in the verges where required, such as to provide visitor parking for lots serviced by rear laneways.

The traffic projections along Interdominion View are expected to be less than 1,000vpd fronting the revised LSP area and therefore will be classified as Access Street D with 15.4m reserve as per LN Guidelines.

The e-w Access Street shown in Figure 8 is expected to carry about 1,000vpd and therefore is classified as Access Street C. This is based on a 16m road reserve width and either a 7.2m carriageway width or 6m plus embayed parking adjacent to POS areas.

The revised LSP roads with future traffic volume between 1,000vpd and 3,000vpd will be designed as Neighbourhood Connector B roads as shown in blue in Figure 8. For the revised LSP main access connection to Warton Road local widening in form of separate left and right turn lanes is proposed on this road on the approach to Warton Road to improve traffic operations and safety.

4.2 Public Transport

Existing bus services in this area are described in section 3.5 of this report and current planning by the Public Transport Authority is discussed in section 3.8. Our understanding is that there are currently no plans for a future bus service on Warton Road but after full development of the rezoning area it may become appropriate to plan for a future bus service on Warton Road. The dual carriageway, Integrator A standard of Warton Road would be able to accommodate such a future bus service when required.

4.3 Pedestrian and Cyclist Facilities

Figure 9 outlines the proposed pedestrian and cyclist network for the revised LSP area. The proposed pedestrian and cyclist facilities aim to provide a permeable road network within the subject site and create excellent opportunities for the provision of good pedestrian and cyclist facilities that maximise the use of non-motorised transport modes.

According to the WAPC Liveable Neighbourhoods Policy shared paths and footpaths are proposed along all Neighbourhood Connector roads.

Existing and proposed shared paths on the surrounding major roads are also illustrated, including the 4m Principal Shared Path that is included in the current Armadale Road Upgrade project.

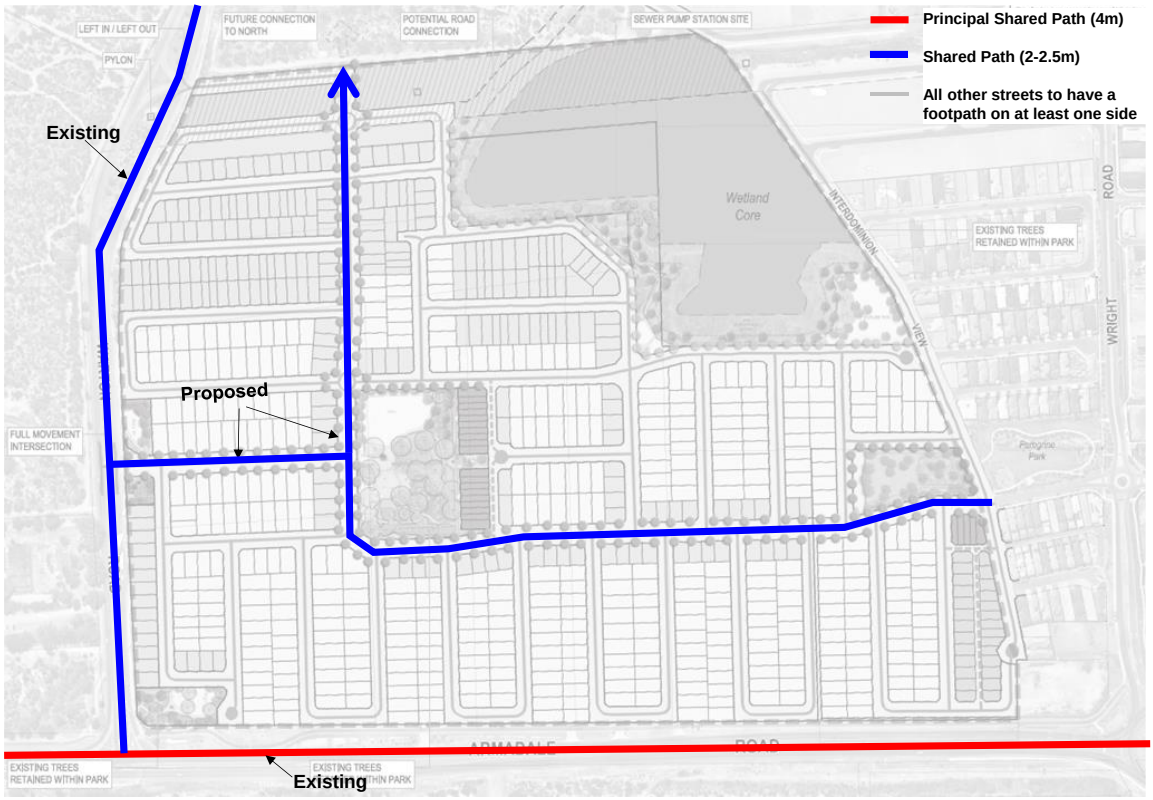


Figure 9: Proposed Pedestrian and Cyclist Network

4.4 Integration with Surrounding Area

The proposed land uses for the revised LSP area are all residential dwellings, which are in line with the approved rezoning and future surrounding land uses in this area, particularly as a westward extension of existing urban development in Piara Waters.

The proposed road network of the revised LSP area will connect to the surrounding road network including Warton Road and Interdominion View.

5.0 Analysis of the Transport Network

5.1 Assessment Period

The assessment year that has been adopted for this analysis is year 2031 assuming full development of the revised LSP and MRS Amendment area.

The proposed road network for year 2031 assumed to be the same as that recommended in the approved MRS Amendment.

5.2 Traffic generation and distribution

The daily traffic generation rate used for the revised LSP area for this assessment is 8 vehicle trips per day (vpd) per dwelling, which corresponds to peak hour trip generation rates of 0.8vph per dwelling recommended in the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments (2006). The anticipated 820 dwellings (average of the lot yield range of 760 – 770) within the revised LSP area will therefore generate approximately 6,120vpd (765 x 8 =6,120). **Table 2** and **Table 3** summarise the daily and peak hour trip generation of the proposed revised LSP respectively.

Table 2: Daily trip generation of the proposed revised LSP

Land use	Quantity	Daily Rate	Weekday-AM Peak	Weekday-PM Peak	Internal Trips	Daily Trips
Residential	765	8	0.8	0.8	0.00	6,120
Total traffic						6,120

Table 3: Weekday morning peak hour and afternoon peak hour trip generation for the proposed revised LSP

Land use	Quantity	Weekday-AM trips	Weekday-PM trips	AM		PM	
				IN	OUT	IN	OUT
Residential	765	612	612	122	490	490	112

5.3 Traffic Flow Forecast

Total daily traffic generated by the proposed revised LSP for year 2031 is presented in **Figure 10**.

The 2031 traffic projection on Warton Road were sourced from Transcore's 2019 TIA report for the MRS Amendment and presented in **Figure 10.**

The 2031 peak hour traffic volumes at revised LSP intersection on Warton Road were established by converting the daily traffic volumes to peak hour volumes. For the conversion of the daily traffic volume to peak hour volumes, it was assumed that the in/ out traffic split for residential traffic would be 20%/ 80% during the weekday AM peak hour and reverse during the PM peak hour. **Figure 11** illustrate the total 2031 traffic volumes at the revised LSP intersection on Warton Road.

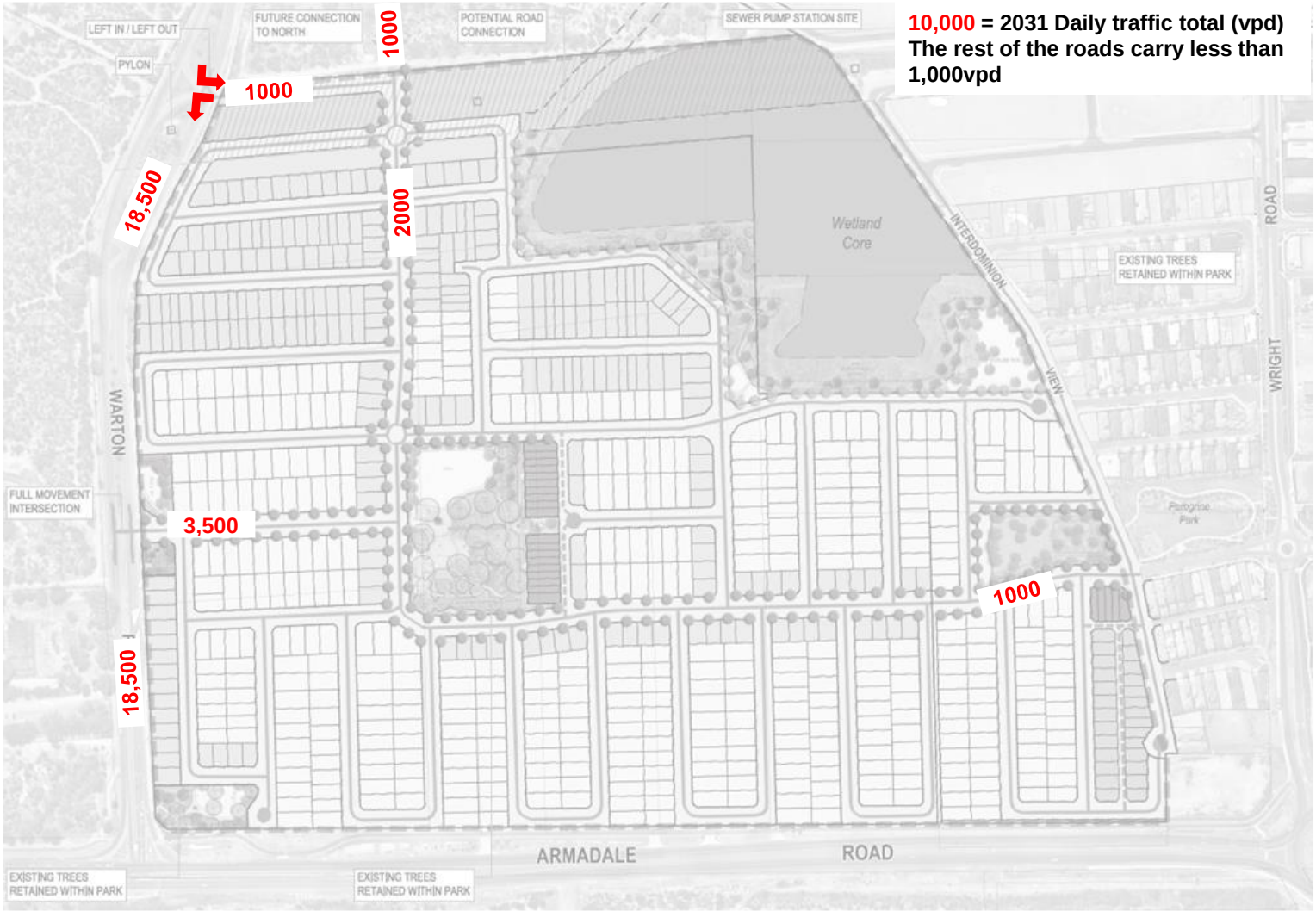


Figure 10: ***Total daily traffic generated by the proposed revised LSP in 2031***

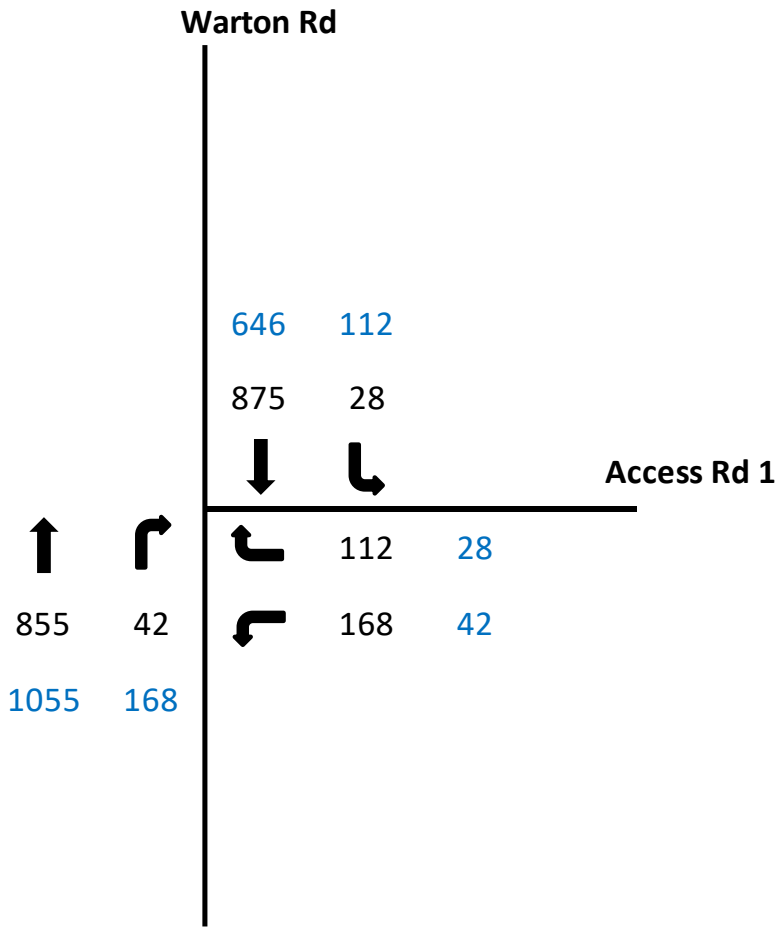


Figure 11: Total 2031 traffic flows– Warton Road intersection - Weekday AM and PM peak hours

5.4 Roads and Intersections

The proposed road network to accommodate these traffic volumes has been detailed in section 4 of this TIA, including the details of the proposed road hierarchy in section 4.1. **Figure 12** details the proposed intersection controls for key intersections within and around the revised LSP area.

The revised LSP area will be served mainly by a full movement priority-controlled T-intersection on Warton Road. A secondary left in/ left out connection to the revised LSP area would be also available on Warton Road at the boundary between Lot 88 and Lot 9009. It should be noted that at the time of the rezoning application for the revised LSP area and in accordance with the concept rezoning plan, a full movement intersection was originally planned at this location, however, further investigations by Civil Engineers of the project (Cossill and Webley) have indicated that due to potential sight line issues a full movement intersection may not be feasible at this location and accordingly this intersection is downgraded to left in/ left out as part of the proposed revised LSP.

The central connection to Warton Road is proposed as fully channelised, full movement T-intersection as shown in **Figure 12**. The exact location and layout of this intersection would need to be considered and confirmed during the detailed design stage of the project. Cossill and Webley has prepared an initial concept plan and profile for the proposed Warton Road intersection which is provided in **Appendix C**.

The proposed revised LSP includes three 4-way intersections. Roundabouts are proposed at the key 4-way intersections along n-s Neighbourhood Connector Road to facilitate circulating traffic flows and assist with speed management.

There are three other four-way intersections shown on the revised LSP on low-traffic-volume roads. These intersections are recommended to be constructed as priority-controlled intersections with Give Way control on the minor road approaches as suggested in Liveable Neighbourhoods document. Appropriate entry treatments are recommended on the side roads to help to alert drivers to the presence of the intersections and that traffic on the major road has priority.

Appropriate Local Area Traffic Management (LATM) devices are suggested for long straight sections of the proposed e-w Access Street C within the revised LSP. The exact location and appropriate type of LATM will need to be finalised during the detailed design stage of the project and in consultation with the City.

Review of the 2031 traffic projections (refer **Figure 10**) indicates that a total of about 1,000vpd or 100vph would be distributed to the eastern portion of the revised LSP area at the proposed Interdominion Way/ Baltic App intersection. The majority of the revised LSP traffic which would distribute to the east would use Baltic App and Wright Road to join Armadale Road. The current standard of Baltic App and Wright Road and the existing intersections along these roads would be able to accommodate the revised LSP traffic in 2031.

Figure 12: Intersection Treatments

5.5 Intersection Analysis

Capacity analysis of the proposed full movement revised LSP intersection on Warton Road was undertaken using the SIDRA computer software package for AM and PM peak hours for 2031 scenario. This analysis was undertaken in accordance with Main Roads WA guidelines.

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 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 infrequent traffic flow up to one for saturated flow or capacity.
- Level of Service 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.

Appendix D shows the layout and standard of the intersection modelled in SIDRA. The large median on Warton Road provides the opportunity for the right turn movement out of the revised LSP access road to cross the Warton Road traffic and make the right turn in two stages. SIDRA analysis undertaken indicates that the proposed fully channelised T-intersection on Warton Road would be able to accommodate the revised LSP traffic in 2031 satisfactorily and with minimal queues and delays reported at the intersection.

5.6 Access to Frontage Properties

The WAPC *Liveable Neighbourhoods* policy requires that "Development along integrator B and neighbourhood connector streets with ultimate vehicle volumes over 5,000 vehicles per day should be designed either so vehicles entering the street can do so travelling forward, or are provided with alternative forms of vehicle access. Wider lots with paired driveways and protected reversing areas in the parking lane may be used on streets with up to 7,000 vehicles per day."

All of the Access Streets within the revised LSP area are expected to carry less than 5,000vpd, so no restriction on vehicular access is required on the proposed neighbourhood connector roads.

No direct access is permitted for the properties along Warton Road and Armadale Road.

5.7 Pedestrian / Cycle Networks

The proposed network of shared paths for pedestrians and cyclists is described in section 4.3 of this revised TIA. This network of paths will provide an excellent level of accessibility and permeability for pedestrians and cyclists within the revised LSP area, and connections to neighbouring precincts at strategic locations.

5.8 Access to Public Transport

WAPC Transport Impact Assessment Guidelines (2016) suggest that it is desirable for at least 90 per cent of dwellings to be within 400m straight line distance of a bus route.

Our understanding is that there are currently no plans for a future bus service on Warton Road but with further developments in this area including the subject LSP, then it may be appropriate for PTA to plan for a future bus service on Warton Road, which would then satisfy that WAPC guideline.

The dual carriageway, Integrator A standard of Warton Road would be able to accommodate such a future bus service when required.

6.0 Conclusions

This revised Transport Impact Assessment (TIA) has been prepared by Transcore on behalf of Stockland with regard to the proposed revised Local Structure Plan at the north east corner of the intersection of Armadale Road and Warton Road, Piara Waters, in the City of Armadale.

The proposed revised LSP area is anticipated to accommodate approximately 765 dwellings. The total revised LSP area is expected to generate traffic flows of about 6,120vpd or 612vph (peak hour) after full development.

The road network of the revised LSP area is based on WAPC Liveable Neighbourhoods guidelines to accommodate the future traffic flows that will be generated in this area. Appropriate Local Area Traffic Management (LATM) devices are recommended for long straight sections of the proposed e-w Access Street C within the revised LSP. The exact location and appropriate type of LATM will need to be finalised during the detailed design stage of the project and in consultation with the City.

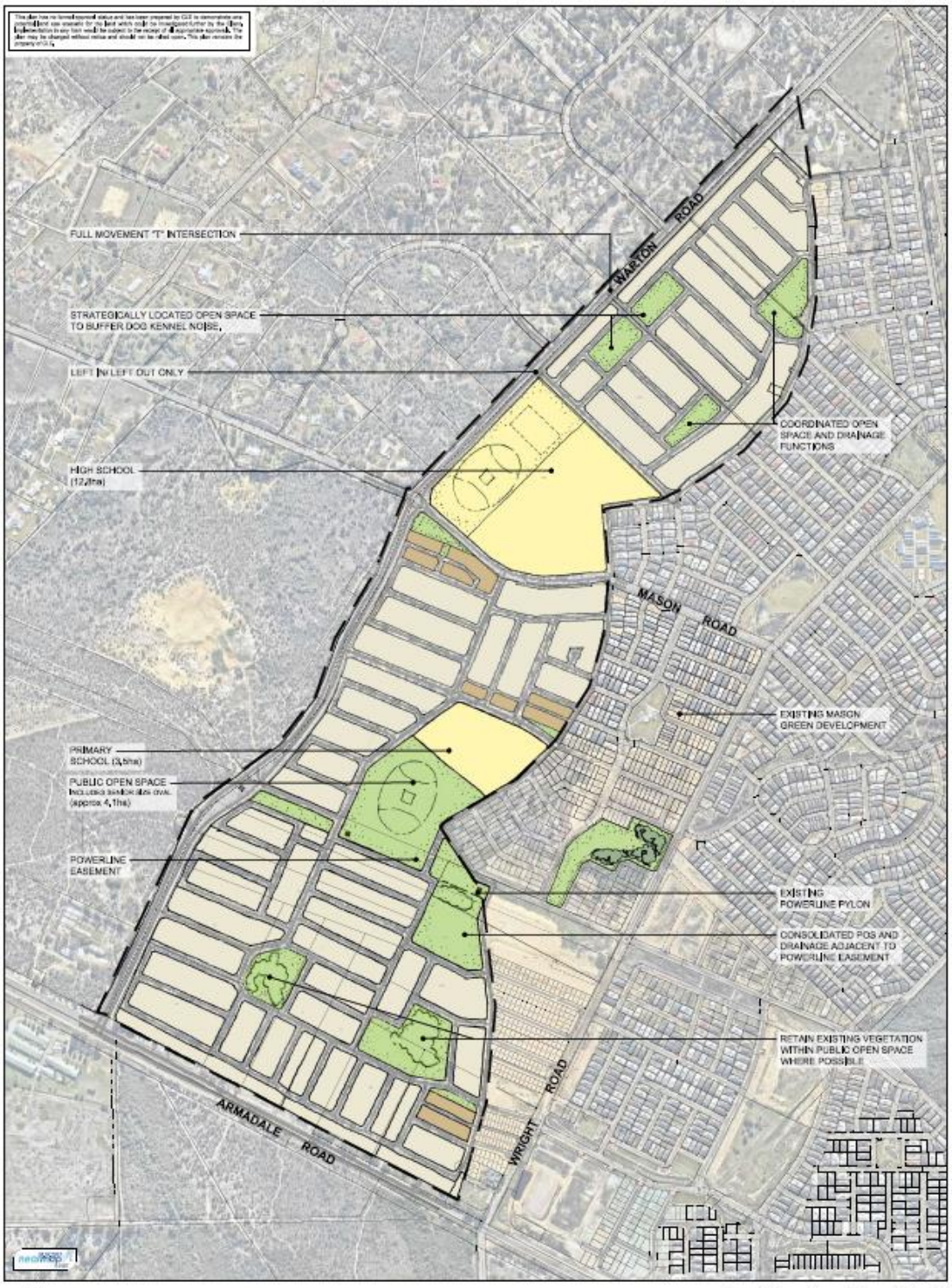
The revised LSP connection to Warton Road is proposed as fully channelised, full movement T-intersection. The exact location and layout of this intersection would need to be considered and confirmed during the detailed design stage of the project. Cossill and Webley has prepared a concept plan and profile for the proposed Warton Road intersection which is provided in **Appendix C**.

Intersection modelling and analysis undertaken for the proposed full movement T-intersection on Warton Road indicates that the proposed layout of this intersection would be able to accommodate the revised LSP traffic in 2031 (full development of the revised LSP and MRS Amendment area).

The proposed revised LSP road layout doesn't depart significantly from the MRS Amendment layout for this area. The standards and road reserves for the proposed internal roads are expected to be satisfactory to accommodate the revised LSP traffic.

Appendix A

CONCEPT PLAN SUPPORTING MRS AMENDMENT


FULL MOVEMENT "T" INTERSECTION
WARTON ROAD
STRATEGICALLY LOCATED OPEN SPACE TO BUFFER DOG KENNEL NOISE,
LEFT IN/LEFT OUT ONLY
COORDINATED OPEN SPACE AND DRAINAGE FUNCTIONS
HIGH SCHOOL (12.2ha)
MASON ROAD
EXISTING MASON GREEN DEVELOPMENT
PRIMARY SCHOOL (3.5ha)
PUBLIC OPEN SPACE
(approx 4.1ha)
POWERLINE EASEMENT
EXISTING POWERLINE PYLON
CONSOLIDATED POS AND DRAINAGE ADJACENT TO POWERLINE EASEMENT
RETAIN EXISTING VEGETATION WITHIN PUBLIC OPEN SPACE WHERE POSSIBLE
ARMADALE ROAD
WRIGHT ROAD
CLE Town Planning + Design
www.cleplan.com.au
CONCEPT PLAN
Warton Road, South Forrestdale
DRAFT
plan no: 2285-58E-01
date: 4 October 2019
scale: 1:7,500 @ A3

Appendix B

PROPOSED REVISED LOCAL STRUCTURE PLAN

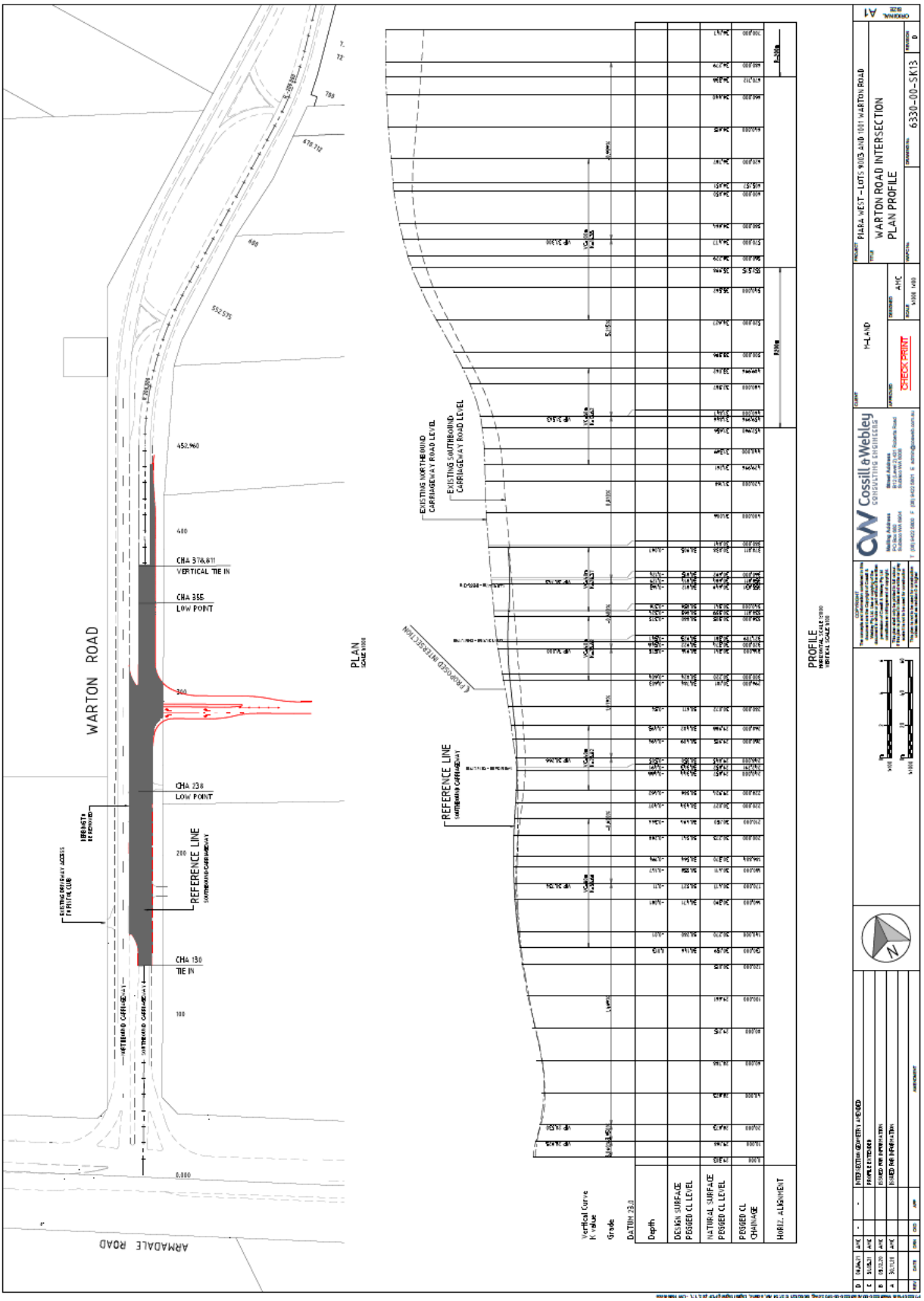
CLE Town Planning + Design

DEVELOPMENT CONCEPT PLAN
Warton Road, South Forrestdale

plan no: **3278-27B-01**
date: 15 December 2021
scale: 1:3,000 @ A3, 1:1,500 @A1

Appendix C

WARTON ROAD INTERSECTION PLAN PROFILE


WARTON ROAD
ARMADALE ROAD
REFERENCE LINE
CHA 378.611
VERTICAL TIE IN
CHA 355
LOW POINT
CHA 238
LOW POINT
CHA 150
TIE IN
PLAN
PROFILE
EXISTING NORTHBOUND CARRIAGEWAY ROAD LEVEL
EXISTING SOUTHBOUND CARRIAGEWAY ROAD LEVEL
PROPOSED INTERSECTION
REFERENCE LINE
Depth
DESIGN SURFACE PEGGED CL LEVEL
NATURAL SURFACE PEGGED CL LEVEL
PEGGED CL CHAINAGE
HORIZ. ALIGNMENT
Vertical Curve K Value
Grade
DATUM 28.0
WARTON ROAD INTERSECTION
PLAN PROFILE
6330-00-SK13
PLAN SHEET - LOTS 9003 AND 1001 WARTON ROAD
CHECK PRINT
A1
ORIGINAL SIZE
Cossill & Webley
CONSULTING ENGINEERS
H-LAND
AMC


WARTON ROAD

Appendix D

INTERSECTION ANALYSIS

NETWORK LAYOUT

Network: N101 [AM -2031 - Seperate Left & Right (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

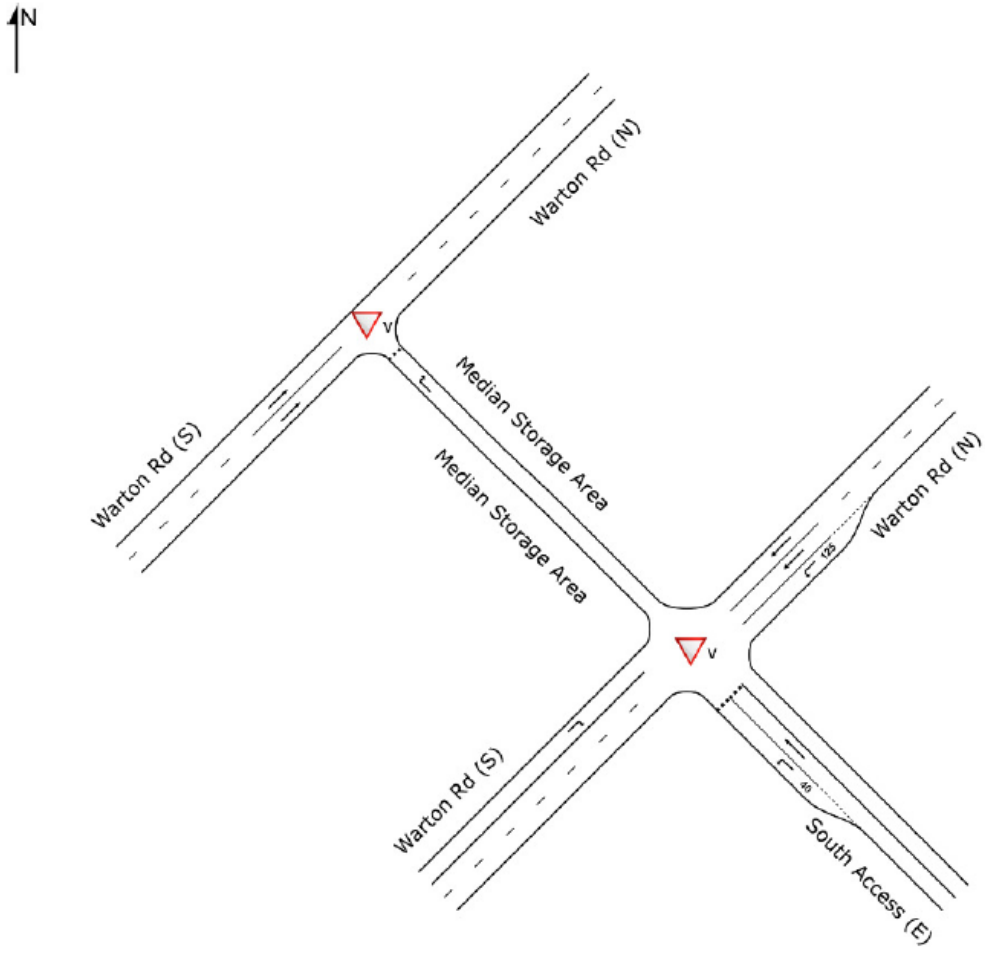


Figure C1: Intersection layout modelled in SIDRA

MOVEMENT SUMMARY

Site: v [2- Warton Rd - South Access - 2031 - First Stage - AM - (Seperate Left & Right) (Site Folder: General)]

Network: N101 [AM -2031 - Seperate Left & Right (Network Folder: General)]

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
SouthEast: South Access (E)														
21	L2	177	2.0	177	2.0	0.227	2.9	LOS A	0.9	6.6	0.52	0.49	0.52	22.8
22	T1	118	2.0	118	2.0	0.542	26.4	LOS D	2.6	19.4	0.90	1.21	1.37	6.0
Approach		295	2.0	295	2.0	0.542	12.3	LOS B	2.6	19.4	0.67	0.78	0.86	13.7
NorthEast: Warton Rd (N)														
7	L2	29	2.0	29	2.0	0.016	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	57.4
25	T1	921	8.4	921	8.4	0.259	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach		951	8.2	951	8.2	0.259	0.3	NA	0.0	0.0	0.00	0.02	0.00	78.9
SouthWest: Warton Rd (S)														
32	R2	44	2.0	44	2.0	0.172	17.0	LOS C	0.5	4.1	0.78	0.91	0.79	16.3
Approach		44	2.0	44	2.0	0.172	17.0	NA	0.5	4.1	0.78	0.91	0.79	16.3
All Vehicles		1289	6.6	1289	6.6	0.542	3.6	NA	2.6	19.4	0.18	0.22	0.22	61.1

MOVEMENT SUMMARY

Site: v [2- Warton Rd - South Access - 2031 - Second Stage - AM (Site Folder: General)]

Network: N101 [AM -2031 - Seperate Left & Right (Network Folder: General)]

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
SouthEast: Median Storage Area														
6	R2	118	2.0	118	2.0	0.200	5.5	LOS A	0.7	5.0	0.64	0.73	0.65	52.3
Approach		118	2.0	118	2.0	0.200	5.5	LOS A	0.7	5.0	0.64	0.73	0.65	52.3
SouthWest: Warton Rd (S)														
31	T1	900	8.3	900	8.3	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach		900	8.3	900	8.3	0.252	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		1018	7.6	1018	7.6	0.252	0.7	NA	0.7	5.0	0.07	0.09	0.08	76.6

MOVEMENT SUMMARY

Site: v [2- Warton Rd - South Access - 2031 - First Stage - PM - (Seperate Left & Right) (Site Folder: General)]

Network: N101 [PM -2031 - Seperate Left & Right (Network Folder: General)]

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
SouthEast: South Access (E)														
21	L2	44	2.0	44	2.0	0.048	1.6	LOS A	0.2	1.3	0.40	0.29	0.40	24.2
22	T1	29	2.0	29	2.0	0.113	13.5	LOS B	0.4	3.0	0.79	0.79	0.79	9.1
Approach		74	2.0	74	2.0	0.113	6.4	LOS A	0.4	3.0	0.55	0.49	0.55	17.4
NorthEast: Warton Rd (N)														
7	L2	118	2.0	118	2.0	0.066	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	57.3
25	T1	680	8.4	680	8.4	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		798	7.5	798	7.5	0.191	1.1	NA	0.0	0.0	0.00	0.09	0.00	75.6
SouthWest: Warton Rd (S)														
32	R2	177	2.0	177	2.0	0.514	17.8	LOS C	2.4	18.4	0.80	1.02	1.22	15.9
Approach		177	2.0	177	2.0	0.514	17.8	NA	2.4	18.4	0.80	1.02	1.22	15.9
All Vehicles		1048	6.2	1048	6.2	0.514	4.3	NA	2.4	18.4	0.17	0.28	0.25	61.2

MOVEMENT SUMMARY

Site: v [2- Warton Rd - South Access - 2031 - Second Stage - PM (Site Folder: General)]

Network: N101 [PM -2031 - Seperate Left & Right (Network Folder: General)]

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
SouthEast: Median Storage Area														
6	R2	29	2.0	29	2.0	0.066	7.2	LOS A	0.2	1.5	0.70	0.77	0.70	50.0
Approach		29	2.0	29	2.0	0.066	7.2	LOS A	0.2	1.5	0.70	0.77	0.70	50.0
SouthWest: Warton Rd (S)														
31	T1	1111	8.3	1111	8.3	0.312	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach		1111	8.3	1111	8.3	0.312	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		1140	8.1	1140	8.1	0.312	0.2	NA	0.2	1.5	0.02	0.02	0.02	79.0