

URBIS

**EAST WANNEROO
CELL 6 (DARCH/
MADELEY)
AGREED LOCAL
STRUCTURE
PLAN NO 8
PROPOSED AMENDMENT N° 46**

PREPARED FOR
THE CITY OF WANNEROO
AUGUST 2023

PROJECT TEAM



Proponent
Fabcot Pty Ltd (Woolworths Group)



Town Planning
Urbis



Architect
Hames Sharley



Traffic and Transport
Stantec



Retail Sustainability
LocationIQ



Stormwater Management
Urbaqua

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Kris Nolan
Consultant	Matthew Filov
Project Code	P0043692
Report Number	Final Lodgement.

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We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

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PROPOSED STRUCTURE PLAN AMENDMENT

Amendment No.46 to the East Wanneroo Cell 6 Agreed Local Structure Plan (ASP8).

The City of Wanneroo, pursuant to its District Planning Scheme No.2, hereby amends the Agreed Structure Plan by:

1. Amending the zoning of a portion of 50K (Lot 9002) Attadale Avenue, Darch as shown on the Zoning Plan from Business Precinct and Residential Precinct, to Commercial Zone;
2. Amending the zoning of a portion of 50K (Lot 9002) Attadale Avenue, Darch as shown on the Structure Plan from Business Precinct and Residential Precinct, to Commercial Zone;
3. Modifying Part One Clause 3 - Schedule 1: Retail Floorspace Provision to introduce the 'Cell 6 Neighbourhood Centre (north east) with a maximum net lettable area of 5,000sq.m;

TABLE OF AMENDMENTS

The following table records the amendments made to ASP8 as a result of the proposed amendment.

Amendment Number	Description of Amendment	WAPC Endorsement
46	<ol style="list-style-type: none">1. Amending the zoning of a portion of 50K (Lot 9002) Attadale Avenue, Darch as shown on the Zoning Plan from Business Precinct and Residential Precinct, to Commercial Zone;2. Amending the zoning of a portion of 50K (Lot 9002) Attadale Avenue, Darch as shown on the Structure Plan from Business Precinct and Residential Precinct, to Commercial Zone;3. Modifying Schedule 1: Retail Floorspace Provision to introduce the 'Cell 6 Neighbourhood Centre (north east) with a maximum net lettable area of 5,000sq.m;	

ENDORSEMENT PAGE

This Local Structure Plan amendment is prepared under the provisions of the City of Wanneroo District Planning Scheme No. 2.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN AMENDMENT NO.46 TO THE EAST WANNEROO CELL 6 AGREED LOCAL STRUCTURE PLAN (AGREED LOCAL STRUCTURE PLAN 8) WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

Signed for and on behalf of the Western Australian Planning Commission:

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

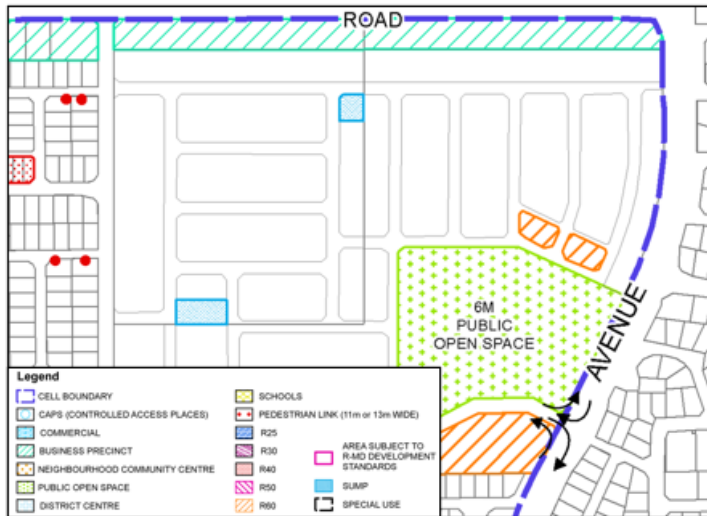
Witness

Date

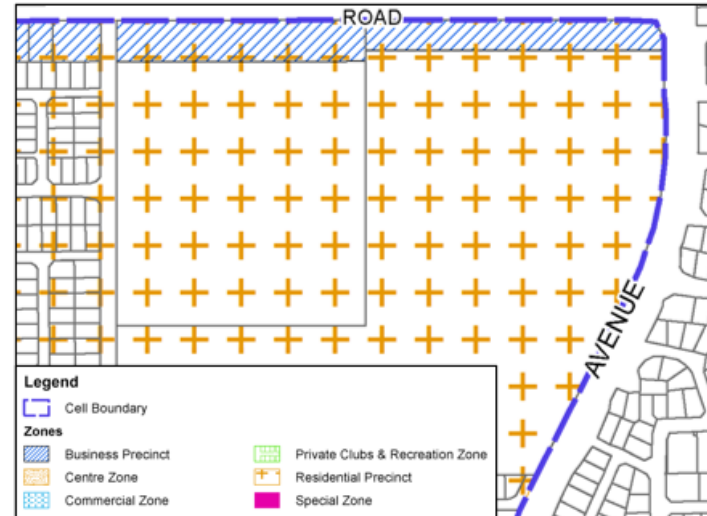
Date of Expiry

EAST WANNEROO CELL 6 (DARCH / MADELEY) AGREED STRUCTURE PLAN NO.8

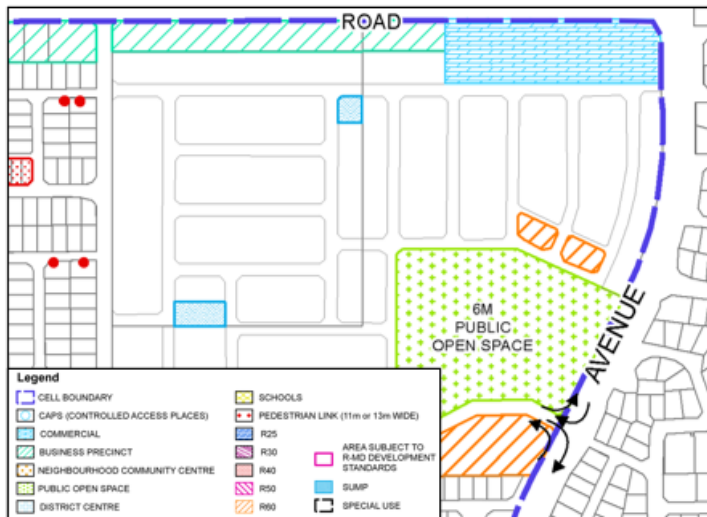
EXISTING STRUCTURE PLAN



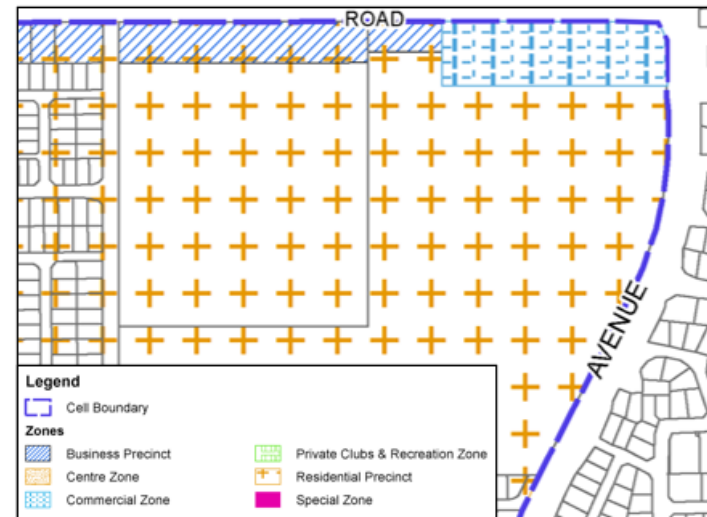
EXISTING ZONING PLAN

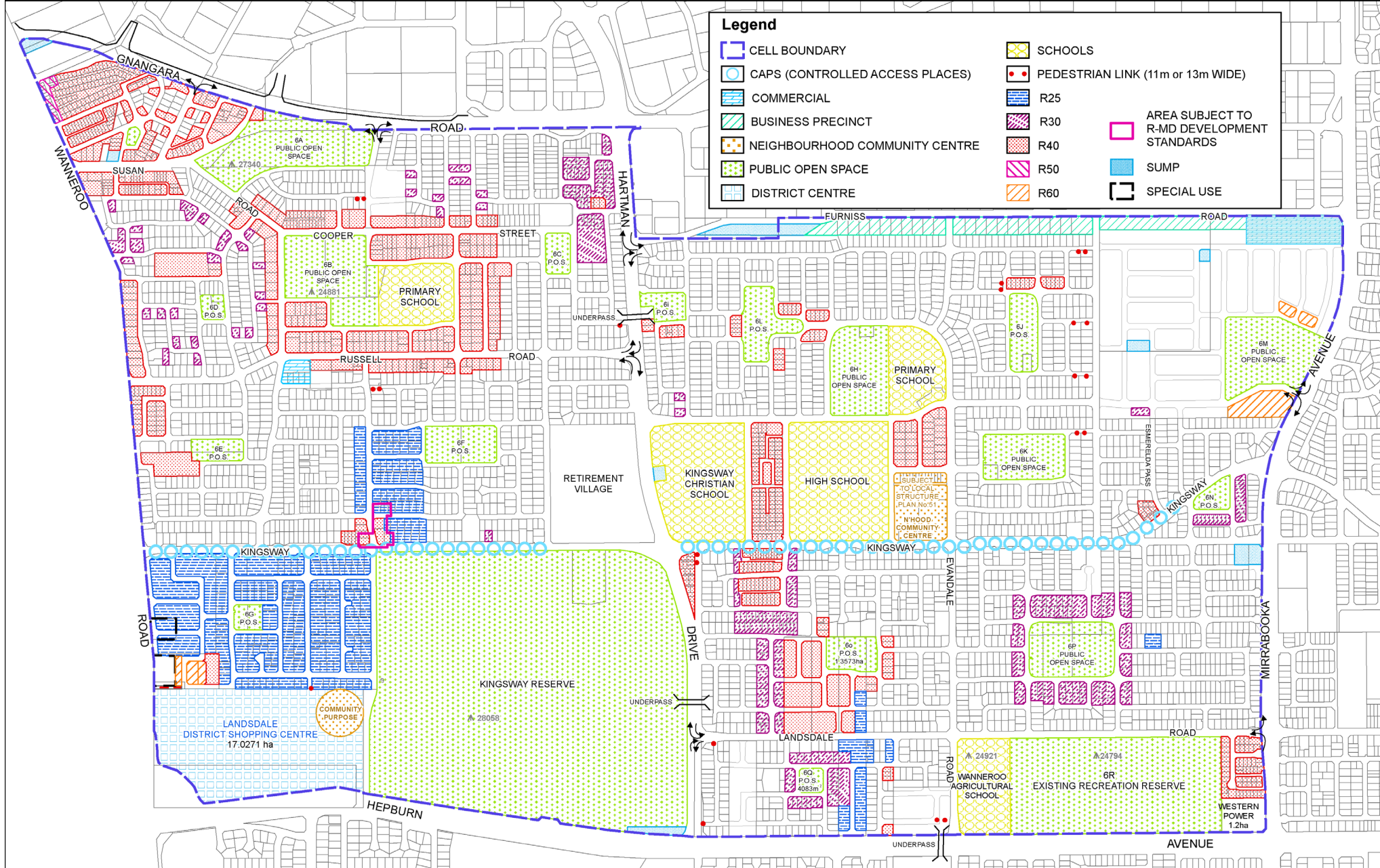


PROPOSED AMENDMENT NO.46 STRUCTURE PLAN



PROPOSED AMENDMENT NO.4 ZONING PLAN





Legend

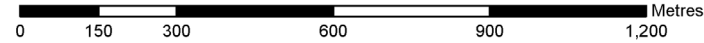
CELL BOUNDARY	SCHOOLS
CAPS (CONTROLLED ACCESS PLACES)	PEDESTRIAN LINK (11m or 13m WIDE)
COMMERCIAL	R25
BUSINESS PRECINCT	R30
NEIGHBOURHOOD COMMUNITY CENTRE	R40
PUBLIC OPEN SPACE	R50
DISTRICT CENTRE	R60
	AREA SUBJECT TO R-MD DEVELOPMENT STANDARDS
	SUMP
	SPECIAL USE

NOTE:
RESIDENTIAL LAND IS CODED R20
UNLESS OTHERWISE SPECIFIED
WITHIN THE STRUCTURE PLAN.
(REFER PART 4.1 OF THE LSP)

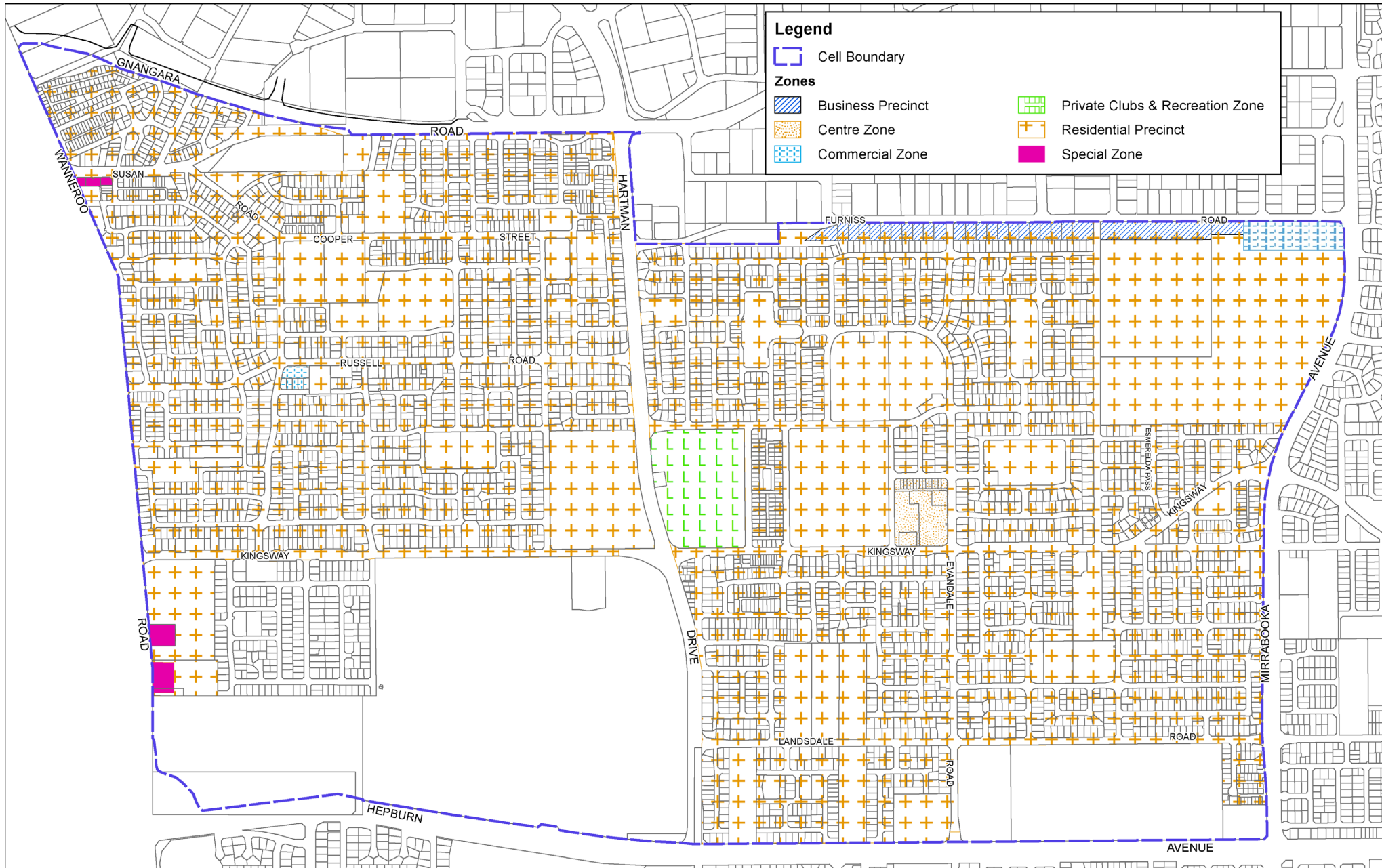


EAST WANNEROO STRUCTURE PLAN - CELL 6

COMMENT : Includes Amendments
1, 3-7, 9-16, 18-28, 30, 33-40, 42-44

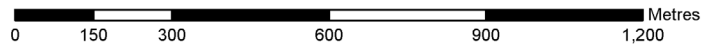


Produced by Customer & Information Services
15/03/2023
KACE : 89196



EAST WANNEROO ZONING PLAN - CELL 6

COMMENT : Includes Amendments
1, 3-7, 9-16, 18-28, 30, 33-40, 42-44



PART TWO

EXPLANATORY

REPORT

EXECUTIVE SUMMARY

This report has been prepared by Urbis on behalf of Fabcot Pty Ltd (Woolworths) in support the Proposed Amendment No.46 to the East Wanneroo Cell 6 (Darch / Madeley) Agreed Local Structure Plan No.8 to provide additional Commercial Zoned land and facilitate the development of a new neighbourhood centre on the corner of Furniss Road and Mirrabooka Avenue.

Proposed Amendment No.46 has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Structure Plan Framework (2015)* guidelines and represents Woolworths commitment to delivering a high-quality retail offering to service the needs of both the established, and emerging Darch community.

Overall, the intent of Proposed Amendment No.46 is to facilitate the delivery of a full-line supermarket (anchored by Woolworths), accompanying speciality retail and a café that will provide the locality (and future residential local community introduced through Kinmore Green Estate surrounding the subject site) with an appropriately sized supermarket retail offering that is capable of servicing residents daily and weekly shopping needs.

The project team are pleased to reach this milestone and look forward to working with the City of Wanneroo and other key stakeholders on this proposal.



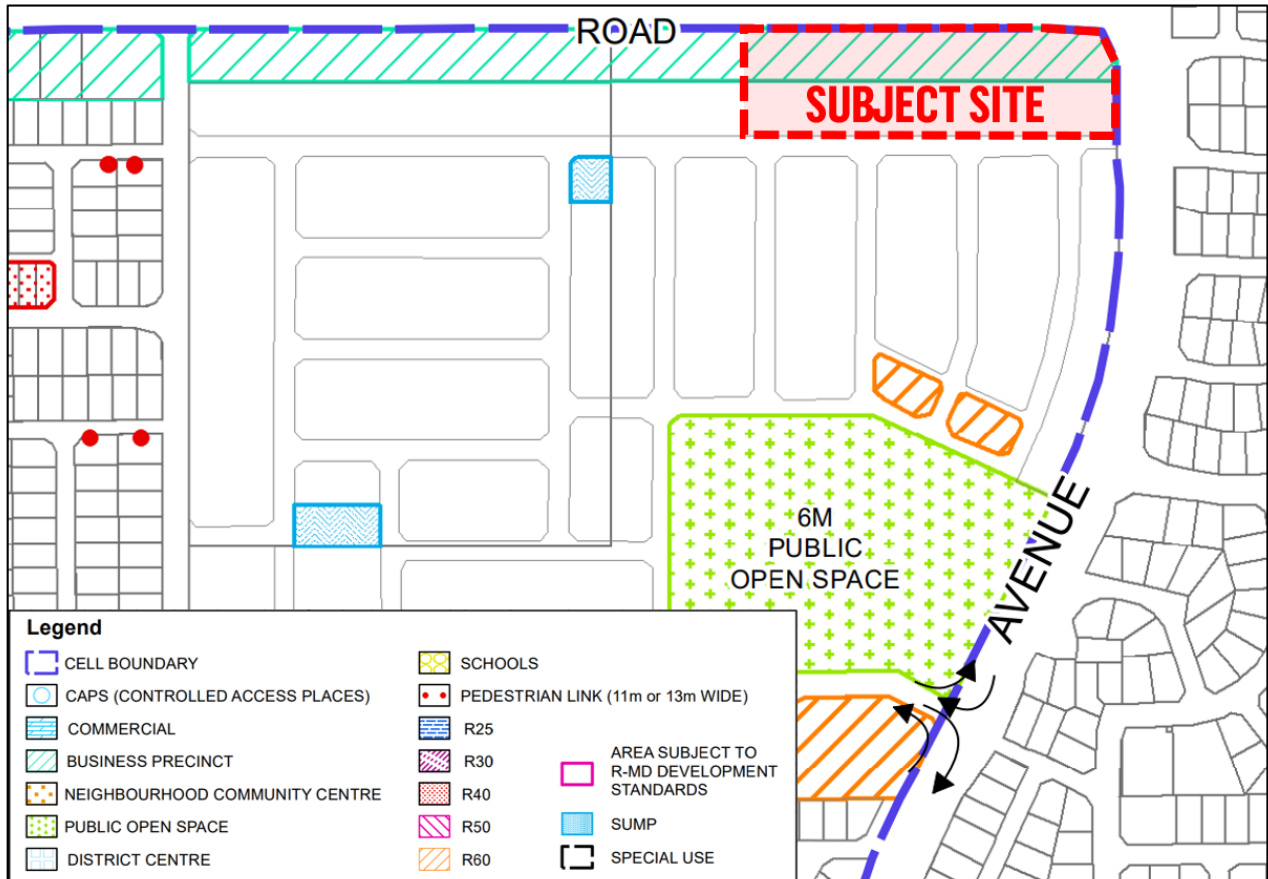
1. BACKGROUND

1.1. SUBJECT SITE

The following proposed structure plan amendment applies to all areas within the cell boundary identified on the East Wanneroo Structure Plan – Cell 6 Map (ASP8). More specifically, the proposed amendment applies to the portion of land in northeastern most corner of the structure plan boundary, which is currently identified as a Business and Residential Precinct under the existing ASP8.

The portion of the land subject to the proposed amendment is situated on the corner of 50K (Lot 9002) Attadale Avenue, Darch – referred to as ‘the subject site’ (refer Figure 1 below).

Figure 1 – The Subject Site



Source: [City of Wanneroo]

1.2. INTRODUCTION AND PURPOSE

This proposed structure plan amendment seeks to modify the East Wanneroo Cell 6 (Darch / Madeley) Agreed Local Structure Plan No.8 (ASP8) to facilitate the development of a neighbourhood centre on the corner of Furniss Road and Mirrabooka Avenue (as demonstrated in **Figure 1**).

Primarily, the intent of the amendment is to enable the delivery of a full-line supermarket, accompanying speciality retail and café (referred to in this report as '**the proposed centre**') that will be anchored by Woolworths and provide the locality (and future residential local community introduced through Kinmore Green Estate surrounding the subject site) with an appropriately sized supermarket retail offering.

Key objectives for the amendment include:

- The rezoning of 'Residential' and 'Business' zoned land to deliver new 'Commercial' zoned land for predominantly retail purposes, providing an opportunity for a diverse retail offering within the locality to service the existing and future (growing) residential catchment.
- The introduction of one central, full movement crossover to Furniss Avenue that will provide access and egress for future customers. In addition, a second 'left in only' entrance is proposed further east along Furniss Avenue to provide a dedicated access point for customers into the proposed centre.
- Two full movement crossovers to Manderson Approach (an approved neighbourhood connector road) on the southern side of the site, that will provide access and egress for future customers.
- One additional full movement crossover to Manderson Approach, and Furniss Road to provide access specifically for service and delivery vehicles for the future supermarket.
- The delivery of two vacant pad sites (located in the eastern portion of the subject site) that are capable of future commercial development.
- **Figure 2** overleaf provides a concept plan/overview of the proposed neighbourhood centre layout, with the concept plan also provided at **Appendix E**.

Please Note: Figure 2 overleaf demonstrates the two pad sites developability by displaying a Fast Food development on the northern pad site, and a Childcare Centre development on the southern pad site. It is noted that these are indicative land uses and designs only, and future development on the pad sites may differ from this.



Figure 2 – Proposed Neighbourhood Centre Layout



Source: [Hames Sharley]

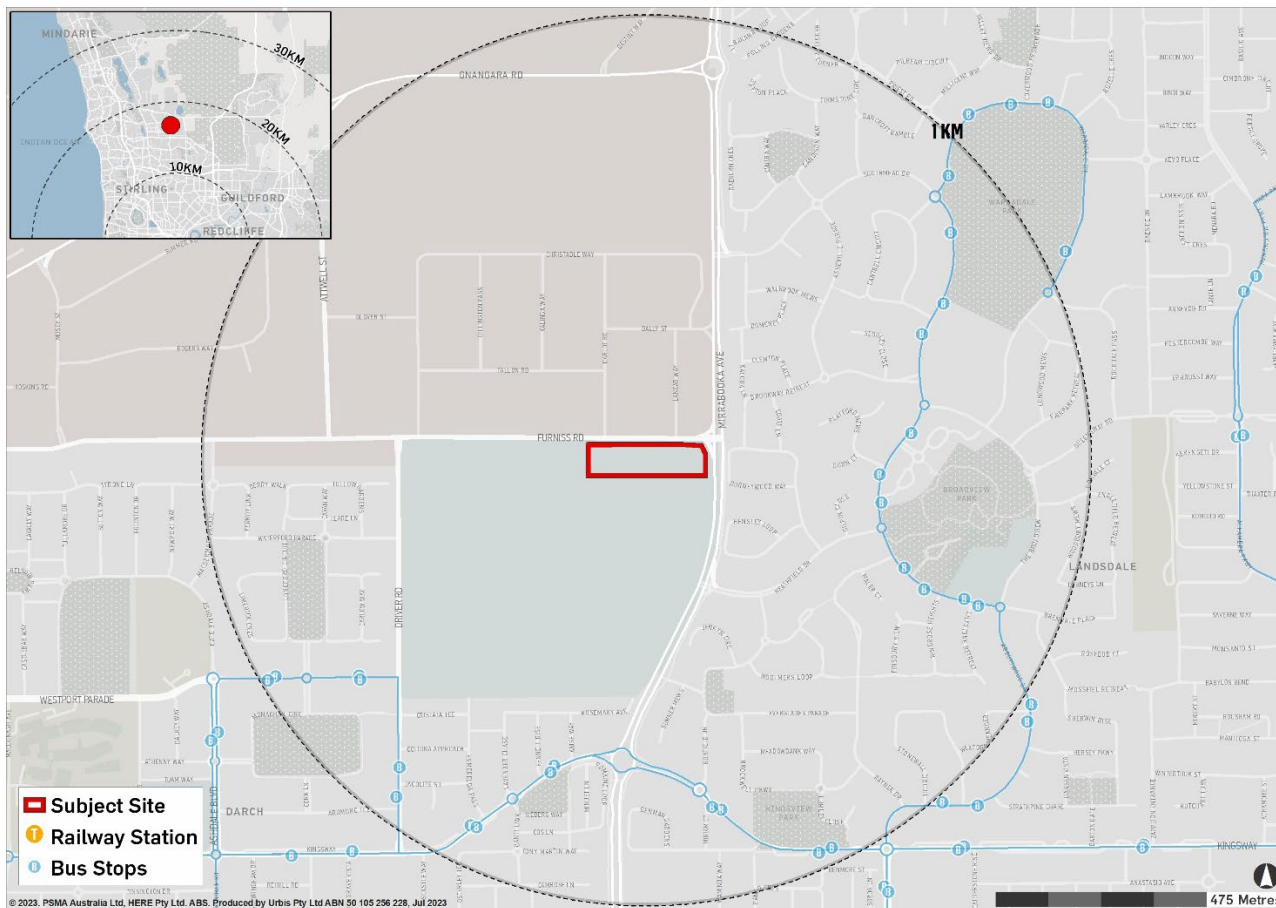
1.3. LAND DESCRIPTION

1.3.1. Location

The subject site is in the suburb of Darch, approximately 16km north of Perth's Central Business District, 10km southeast of the Joondalup City Centre and approximately 7.5km southeast of the Wanneroo Town Centre. The subject site is surrounded by the residential suburbs of Landsdale, Madeley, Alexander Heights and the industrial suburb of Wangara. Refer to **Figure 3** below.

The subject site land fronts Furniss Road and Mirrabooka Avenue, which are arterial roads providing prominent east /west and north / south connections between Perth's northern suburbs and the CBD.

Figure 3 – Location Plan



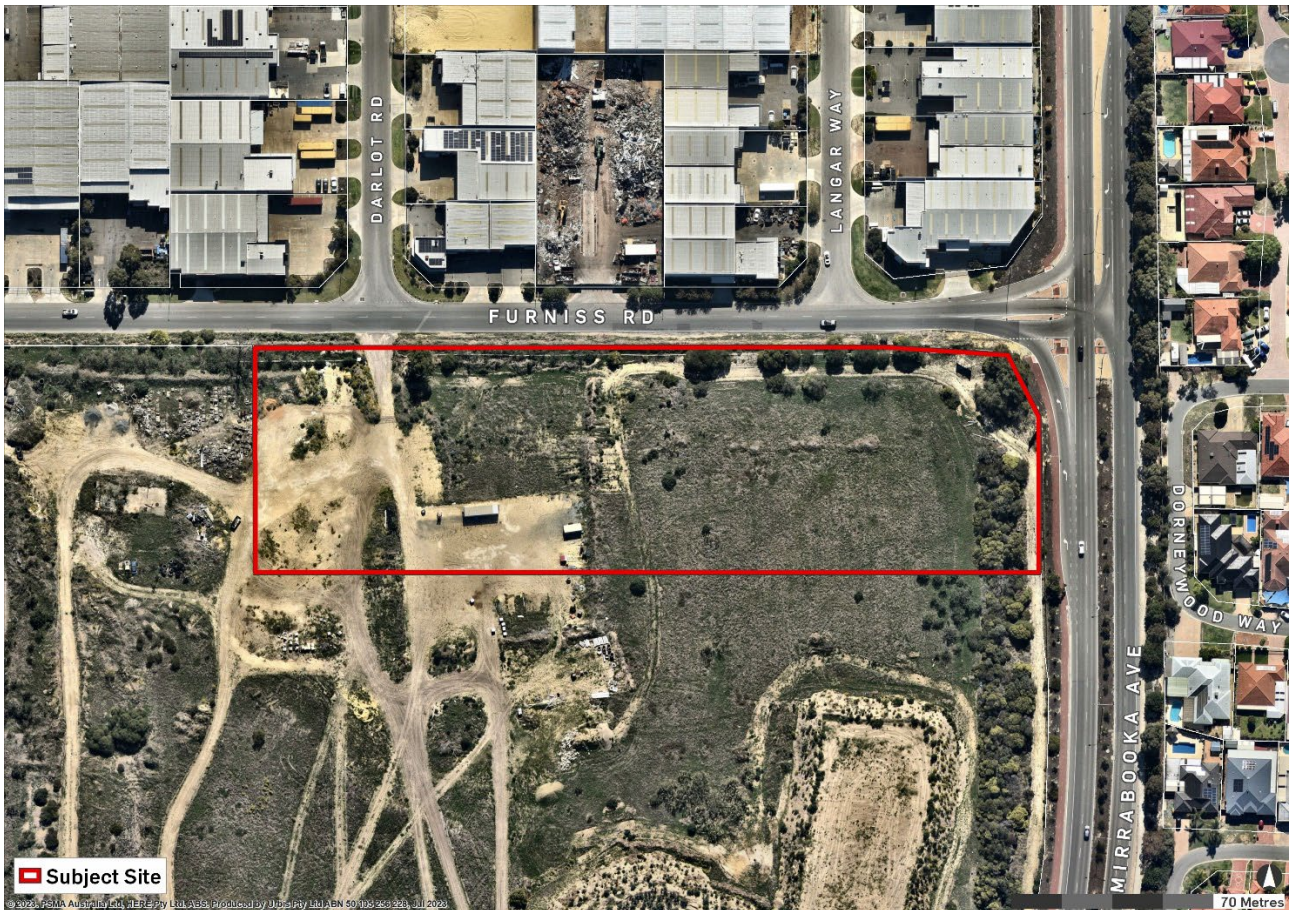
Source: [Urbis]

1.3.2. Area and Land Use

The subject site is situated within the broader East Wanneroo locality. The subject site is currently vacant and is ripe for redevelopment (refer **Figure 4** below), with the remainder of the estate currently being developed for residential purposes.

Beyond the subject site, land in the East Wanneroo Area is generally developed with low-to-medium residential development predominately comprising detached single houses. However, directly north of the subject site is the Wangara Industrial Area.

Figure 4 – Aerial Photograph



Source: [Urbis]

1.3.3. Legal Description and Ownership

The subject site is located wholly within Lot 9002 on Deposited Plan 421605 (Refer **Figure 5** and **Table 1** below). The subject site is vacant pending development.

The Certificate of Title for Lot 9002 lists various separate limitations, interests and encumbrances and notifications, which mostly relate to site contamination as a result of the lands history as a landfill precinct. The Certificate of Title is provided at **Appendix A** of this report.

Table 1 – Subject Site Lot Details

Lot	Deposited Plan	Vol/ Folio	Landowner	Lot Area (hectares)
9002	DP421605	4031/990	Parcel Darch Pty Ltd	19.1812ha

Figure 5 – Cadastral Plan



Source: [Urbis]

2. PLANNING FRAMEWORK

2.1. ZONING AND RESERVATION

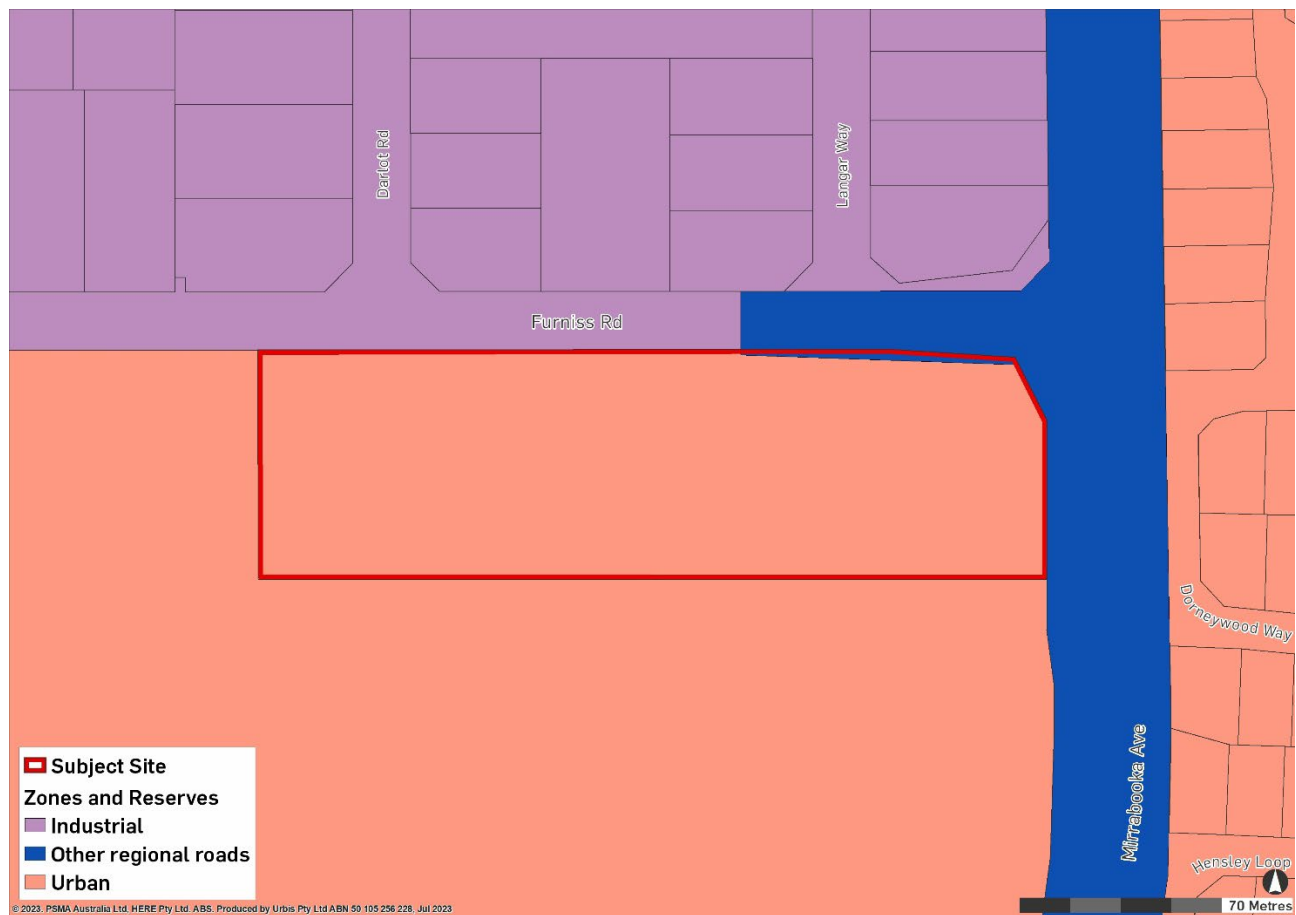
Metropolitan Region Scheme

The subject site is predominately zoned 'Urban' under the Metropolitan Region Scheme which is land reserved for areas in which a range of activities are undertaken, including residential, commercial recreational and light industry.

Mirrabooka Avenue to the immediate east of the subject is reserved as an 'Other Regional Road' under the MRS, which is considered a road of regional significance in the planned road network, for which the planning responsibilities are shared by the WAPC and local governments.

Further to the above, it is noted that a sliver of the Other Regional Road Reservation encroaches into the northwest corner of the subject site along the Furniss Road and Mirrabooka Avenue intersection (refer to **Figure 6** below). This has been considered throughout the design phase of the project and as such, landscaping (and a vacant sand pad) has been proposed within this area to ensure that land is readily available (if required) to facilitate a future intersection upgrade.

Figure 6 – Metropolitan Region Scheme Zoning



Source: [Urbis]

City of Wanneroo District Planning Scheme No.2 (DPS 2)

The subject site land is zoned Urban Development under DPS2 (refer **Figure 7** below). The purpose of this zone is to provide for the orderly and proper planning of larger areas through the provision of comprehensive structure planning to ensure that development is undertaken in an integrated manner.

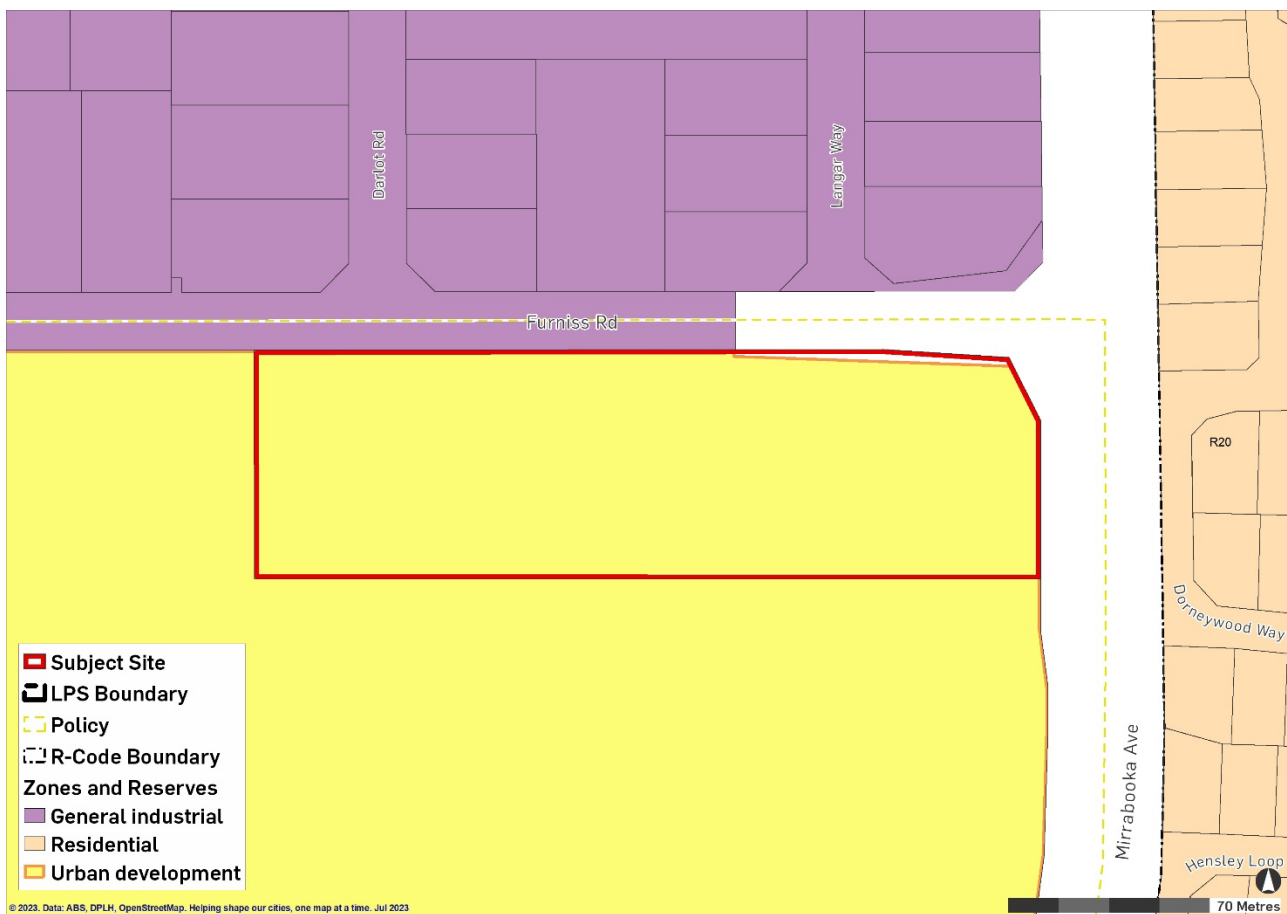
The objectives of the 'Urban Development' Zone are to:

- (a) To provide an intention of future land use and a basis for more detailed structure planning in accordance with the provisions of this Scheme.
- (b) To provide for a range of residential densities to encourage a variety of residential accommodation.
- (c) To provide for the progressive and planned development of future urban areas for residential purposes and for commercial and other uses normally associated with residential development.
- (d) To provide an intermediate transitional zone following the lifting of an urban deferred zoning within the Metropolitan Region Scheme.

It is understood that as per Schedule 6 (Requirement 2.1), no subdivision (including strata or survey strata subdivision), or other development should be commenced or carried out in an Urban Development or Industrial Development zone until a structure plan has been prepared and adopted under the provisions of Part 4 of the deemed provisions.

As the subject site falls within an approved structure plan area, the intent of the proposed amendment is to allow the orderly development of the land and is consistent with the objectives of the 'Urban Development' Zone.

Figure 7 – City of Wanneroo District Planning Scheme No.2 Zoning



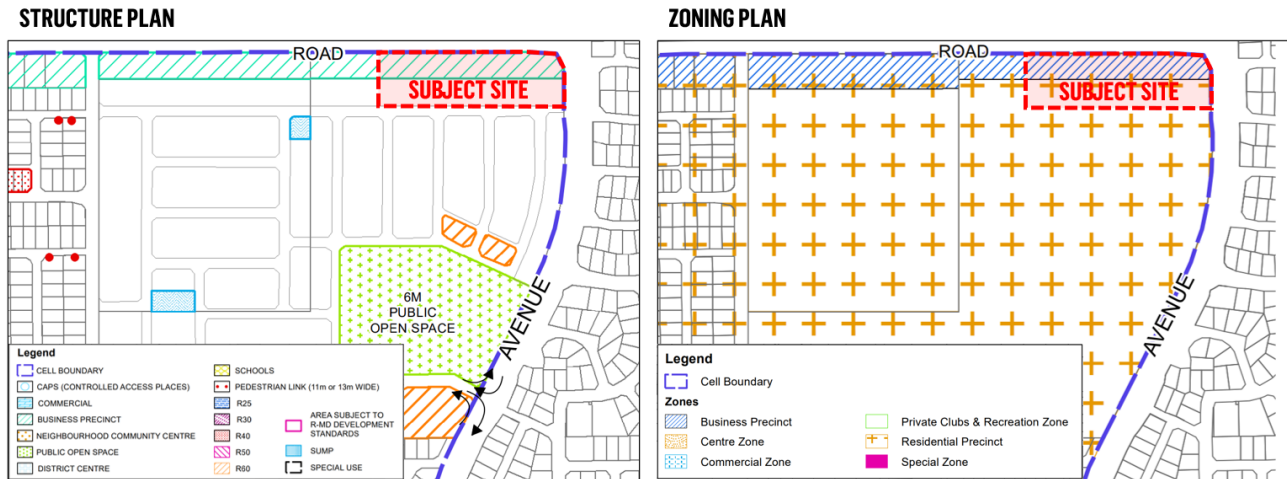
Source: [Urbis]

East Wanneroo Cell 6 (Darch / Madeley) Agreed Structure Plan No.8 (ASP8)

ASP8 was first adopted in October 2004, and has since been subject to numerous amendments. The subject site land is partially zoned Business Precinct (northern portion of site), and Residential Precinct (southern portion of site) under ASP8 (Refer **Figure 8** below).

This structure plan amendment seeks to rezone the subject site to 'Commercial Zone' to facilitate the development of future neighbourhood centre, which will comprise a full-line supermarket, accompanying speciality retail, a café and two vacant pad sites for future development (for commercial purposes).

Figure 8 – Existing APS 8 Maps



Source: [City of Wanneroo]

East Wanneroo Cell 6 (Madeley / Pearsall) – Developer Contribution Plan

The subject site land is located in the East Wanneroo Cell 6 (Madeley / Pearsall) developer contribution area. It is noted that the proponents are aware of the developer contributions associated with the future development of the subject site, and intend to discuss this further with the City of Wanneroo at the appropriate time (which is considered to be at the development application stage).

2.2. STRATEGIC PLANNING FRAMEWORK

Directions 2031 and Beyond

Directions 2031 recognises the benefits of a more consolidated city while working from historic patterns of urban growth. The framework aims to provide for different lifestyle choices, vibrant nodes for economic and social activity and a more sustainable urban transport network. The framework will also encourage a long-term approach to the provision of infrastructure in an economically sustainable way.

Whilst the framework places importance on meeting infill and greenfield housing targets, there is emphasis placed on the importance of the Activity Centre Hierarchy and the provision of services, employment and activities that are appropriate for and accessible to the communities they support.

The subject site is in relatively close proximity to the Joondalup Strategic Metropolitan Centre, as well as the Wanneroo, Warwick and Mirrabooka Secondary Activity Centres. The introduction of an appropriately sized Neighbourhood Centre in this context is fitting to ensure that the main daily shopping needs of the community (which typically include a supermarket grouped together with a small range of other uses) are provided to ensure the locality has adequate retail opportunity at a local level.

Perth and Peel @3.5 Million and North West Sub-Regional Planning Framework

Perth and Peel @ 3.5 Million and associated North-West Sub-Regional Planning Framework provides the overarching strategic planning framework guiding sustainable urban growth and efficient use of infrastructure. Key priorities for the North-West Sub-Region include achieving a more consolidated urban form and strengthening key activity centres and employment nodes to meet the future needs of industry, commerce, and the community.

The framework identifies the subject site land as Urban with no notable development constraints listed for the subject site. The City of Wanneroo is assigned an urban infill target of 27,920 additional dwellings by 2050. The intensification of dwellings facilitated by the development of the estate surrounding the subject site will contribute to achieving this target, and the newly introduced neighbourhood centre delivered through this structure plan amendment will assist in servicing future and existing residents.

2.3. PLANNING POLICIES

State Planning Policy 4.2 – Activity Centres for Perth and Peel (SPP 4.2)

The main purpose of SPP 4.2 is to specify broad planning requirements for the planning and development of new activity centres and the redevelopment and renewal of existing centres in Perth and Peel. It is mainly concerned with the distribution, function, broad land use and urban design criteria of activity centres, and the coordination of their land use and infrastructure planning.

Contextually, the subject site is nestled within the suburb of Darch, which is broadly surrounded by a number of different activity centres (of different types) - including the following:

Secondary Centres

- Warwick Grove – 7.9km south-west of the site
- The Square Mirrabooka – 8km south of the site
- Wanneroo Central – 10km north of the site

District Centres

- Alexander Heights Shopping Centre – 3km south of the site
- Kingsway City – 4.5km south-west of the site

Neighbourhood, Local and Other Centres

- The Market Place Ballajura – 3.1km south-west of the site
- Wanneroo Markets – 3.7km north-west of the site

A Needs Assessment and Net Benefit Test has been prepared by LocationIQ to demonstrate that the proposed Neighbourhood Centre will not impact, or compromise the activity centre hierarchy that has been established for broader local government area. This is discussed further at **Section 3.4** of this report.

2.4. PRE-LODGEEMENT CONSULTATION

The project team has conducted a considerable amount of pre-lodgement engagement, which has occurred at a Local and State government level prior to the lodgement of this development application.

Discussions with the City have occurred since November of 2022. This includes liaison at an Officer and Manager level through various meetings, phone calls and emails. Most notably:

- **Meeting with the City of Wanneroo (Retail Sustainability)** - held on the 15th of November 2022 to present / discuss retail sustainability, the potential proposal of a new neighbourhood centre in this location, and to demonstrate that there would be no negative impact on surrounding neighbourhood centres.
- **Meeting with the City of Wanneroo (Concept Planning & Process)** – held on the 22nd of February 2023 to discuss an initial concept plan (prepared by Hames Sharley), site layout, access, landscaping and the general ‘next steps’ associated with lodging a structure plan amendment.
- **Pre-Lodgement Meeting with the City of Wanneroo** – held on the 24th of March 2023 to discuss the lodgement of the proposal, and the requirements (level of reporting, technical input and design progression) associated with lodging the structure plan amendment.
- **Pre-Lodgement Meeting with DPLH** – held on the 19th of March 2023 to discuss the proposal, retail sustainability the requirements (level of reporting, technical input and design progression) associated with lodging the structure plan amendment.
- **General Liaison** – the project team has worked collaboratively with the City throughout the pre-lodgement phase of the project, with various discussions over the phone and email which has been of great assistance and has informed the structure plan amendment reporting.

2.5. HISTORICAL SITE CONDITIONS

2.5.1. Landform, Soils and Contamination

Historically, the subject site formed part of the landfill precinct and as such, has been subject to various environmental and geotechnical studies to identify soil types and assess any potential environmental risks to ensure the site is suitable for future development.

The proponents have liaised directly with current landowner, Parcel Property, and have reviewed the environmental and geotechnical reporting completed to facilitate the development of the broader residential estate (the Kinmore Green Estate) surrounding the subject site. Through a review of this reporting, it is understood that the land is capable of redevelopment.

Further, through discussions with the City it was confirmed that a sufficient amount of Geotechnical Reporting had been completed historically to provide the City with enough certainty that there is no impediment, or reason to believe that the land cannot be remediated for uses such as commercial, residential or public open space. This is further demonstrated by the residential development completed to date in the southwest corner of the broader subject site.

2.5.2. Groundwater and Surface Water

Based on a review of previous reporting undertaken on the site, it is understood that site specific groundwater measurements were undertaken by Galt to inform the LWMS prepared by Urbaqua to inform the previous structure plan amendment prepared to facilitate the development of the Kinmore Green Estate. The site-specific groundwater measurement undertaken on the site indicated there was a trend of rising groundwater levels in the surrounding locality following cessation of market gardening and transition to urban residential use.

To ensure that the introduction of a neighbourhood centre on the subject site will not compromise the work conducted to date, Urbaqua have completed an LWMS / UWMP Addendum that conducts modelling to confirm that demonstrates the proposal will achieve the water management strategies in place for the broader Kinmore Green Estate, and will have limited impact on regional groundwater levels. This is demonstrated further at **Section 3.4** of this report.

2.5.3. Servicing / Infrastructure

Based on a review of the previous reporting undertaken by Tabec Civil Engineering to facilitate the development of the broader Kinmore Green Estate, it is understood that that:

- The existing underground power infrastructure that surrounds the site would have sufficient capacity to service future proposed centre and will provide power supply in accordance with previous WAPC Approvals granted in relation to this.
- Connections to existing ATCO gas assets in the surrounding road network are expected to be made to service the proposed centre in future, with ample supply and access identified in previous planning for the site.
- Water Corporation has existing wastewater planning that includes the subject site (and the broader Kinmore Green Estate) and has previously confirmed the subject site can be serviced via extension of the existing gravity sewer network.
- NBN Co has substantially commenced the NBN rollout within the Darch area, with a large portion of the existing residential area already serviced. NBN services would be extended to service the future residential subdivision of the subject site.
- There are a number of Water Corporation reticulation and distribution water mains surrounding the subject site. This includes infrastructure in Driver Road, Furniss Road and a trunk main in Mirrabooka Avenue. Adequate capacity exists to extend the existing water infrastructure to service the proposed centre. It is suggested that the developer would provide a 'deferred' water service for the purpose of achieving title, whilst Woolworths would apply for a water metre from the Water Corporation in conjunction with the Building Permit.
- Stormwater drainage will be detained on site via underground detention and infiltration in accordance with the LWMS / UWMP Addendum (refer Appendix C), which confirms that the development site can contain the 1% AEP stormwater event on site. Pritchard Francis have reviewed the UWMP addendum and have confirmed that the proposed underground detention solution is a feasible solution which shall be implemented during detailed design.

3. THE PROPOSED NEIGHBOURHOOD CENTRE

3.1. VISION AND DESIGN CONSIDERATIONS

This proposal seeks to deliver a high-quality Neighbourhood Centre (**the proposed centre**) that will serve the already established, and rapidly growing Darch community. The proposed centre will deliver the locality with the full line supermarket, and will provide the local community with their daily and weekly household needs, and a small range of other convenience services. In turn, this will diversify the retail offering of the area and cater for the demand of the local community.

At a high level, the proposed centre has been designed to provide a walkable environment for surrounding residents, with the landscaping a focus as the residential interface to ensure a vibrant and inviting outcome is achieved. Bound by Furniss Road to the north, Mirrabooka Avenue to the east and Manderson Approach to the south, the proposed centre will provide an opportunity for residents to meet, connect and also deliver a range of employment opportunities.

SITE RESPONSIVE DESIGN

The proposed centre has been designed to respond to the site's topography and location within an established, but rapidly growing residential community. There has been particular focus placed on ensuring that any future development on the subject site will be legible, connected and accessible for the local community. Further, considerations have been made to the future residential community that will surround the proposed centre once the remainder of the Kinmore Green Estate has been delivered. In doing so, the design has ensured that landscaped edges are prioritised to ensure that an inviting interface is delivered along emerging residential streets.

CONNECTIVITY

The proposed centre is well located on the corner of Furniss Road and Mirrabooka Avenue, which are arterial roads providing prominent east /west and north / south connections between Perth's northern suburbs and the Perth CBD. With various access points proposed along both Furniss Road (to the north) and Manderson Approach (to the south), the subject site will be accessible for local residents and generate better permeability for the broader Kinmore Green Estate.

Through the delivery of the proposed centre, there will be better links to the broader pedestrian footpath network of the locality by allowing for greater connectivity within and around the centre. This is reinforced by the proposed landscaping surrounding the centre, which will enable strong green connections to be established along major roads.

COMMUNITY

Above all else, the proposed centre will deliver a 'neighbourhood hub' where residents can meet, obtain their daily needs and enjoy a variety of uses. By delivering a compact and cohesive urban form that complements the surrounding built form character in style and scale, the centre will contribute to the future public realm by ensuring an enhanced and activated streetscape is achieved.

COORDINATION WITH ADJOINING LAND

The design of the proposed centre has been considered in the context of both the existing built form, and the planned urban form that surrounds the subject site. The proposed centre design has carefully considered the existing and planned road network, and located entrance and exit points in locations that will not compromise the functionality of the local road network.

3.2. TRAFFIC AND TRANSPORT

Stantec have prepared a Transport Impact Assessment (TIA) to conduct a review the established road network surrounding the subject site, and assess the proposed traffic operations and access arrangements of the proposed centre. Please refer **Appendix B** to review the TIA.

EXISTING MOVEMENT NETWORK PERFORMANCE

As described within Section 2.3 of the TIA, under the Main Roads WA Functional Road Hierarchy, Mirrabooka Avenue (east of the subject site) is a Distributor A Road, Furniss Road (north of the subject site) is a Local Distributor and Manderston Approach (south of the subject site) is earmarked to be an Access Road. Meaning, all roads are under the jurisdiction of the City of Wanneroo and are capable of facilitating access in and out of the subject site.

The nearest key intersection to the site is the Furniss Road / Mirrabooka Avenue intersection located on the northeastern corner of the Site as shown in **Figure 2.5**. Furniss Road / Mirrabooka Avenue intersection is currently a 'give way controlled' intersection with Furniss Road being the minor approach. The TIA has conducted an analysis of the Furniss Road / Mirrabooka Avenue Intersection using the SIDRA Analysis Program, and SIDRA results show that in 2023 the Furniss Road / Mirrabooka Avenue intersection already operates beyond practical capacity during the AM and PM Weekday peak hours.

Therefore, upgrading the intersection to a controlled intersection (roundabout or signals) is already justified based on existing traffic volumes and background growth, regardless of whether the proposed development proceeds. As such, it is recommended that a signalised intersection upgrade is completed, as this would be the most suitable type of controlled intersection and should be investigated by the City of Wanneroo through Main Roads TSAP process. Further, based on any analysis of available crash data, this intersection is a prequalified location for both the State and Federal Black Spot programmes and would be eligible for funding to address the existing crash history.

For the reasons set out above, the proposed structure plan amendment and subsequent proposed development presents itself as a timely opportunity for the proponents to work with the City of Wanneroo to facilitate the upgrade of the Furniss Road / Mirrabooka Avenue intersection and improve the functionality of the local road network. It is recommended that the City seek to facilitate the intersection upgrade when 50% or more of the 5,000sq.m (NLA) retail floorspace is proposed to be delivered on the subject site.

PROPOSED VEHICLE ACCESS ARRANGEMENTS

Notwithstanding the above, the results of the SIDRA Analysis conducted for the proposed centre indicate that all proposed access points (three cross overs on both Furniss Road and Manderson Avenue) will operate satisfactorily for all scenarios, notwithstanding the current performance of the Furniss Road / Mirrabooka Avenue intersection.

3.3. LOCAL WATER MANAGEMENT

Urbaqua have prepared a LWMS / UWMP Addendum (**the Addendum**) to support the proposed centre, and provide updated stormwater management principles, identify water and efficiency measures specific to the subject site and the proposed centre. Please refer **Appendix C** to review the Addendum.

The Addendum confirms that when the LWMS and UWMP were prepared for subject site (as part of the structure plan amendment for the development of the Kinmore Green Estate), approximately half of the subject site being developed for commercial-type purposes and approximately half for residential purposes. Therefore, consistent with the previously identified stormwater management strategy for the business precinct that was identified in the LWMS and UWMP, stormwater will be managed internally. This includes retention of up to the 1% AEP event in underground storage.

Based on the modelling conducted, development of the subject site will not require implementation of the broader stormwater management system that was previously proposed and will potentially reduce the storage requirement (to be confirmed when development). On this basis, a stormwater management plan has been prepared (refer Figure 3 of **Appendix C**) that depicts the size and location of the underground stormwater storage systems, confirming that all future stormwater can be fully contained within the stormwater system with no flooding.

3.4. RETAIL SUSTAINABILITY

In accordance with the requirements of State Planning Policy 4.2 – Activity Centres (**SPP 4.2**), LocationIQ have prepared a Needs Assessment and Net Benefit Test to examine the trade area (study area) that surrounds the proposed centre, and determine the likely trading impacts on surrounding activity centres, and determine if the proposed centre will result in a net community benefit. Refer **Appendix D** to review the Retail Needs Analysis and Net Benefit Test (**Retail Report**).

It is the conclusion of the Retail Report that a substantial net community benefit would result from the proposed centre. Offsetting the trading impacts on some existing retailers, there are substantial positive impacts including the following (with reference to SPP 4.2 *Implementation Guidelines A.24*):

STRATEGIC ALIGNMENT, INFRASTRUCTURE & SERVICES:

- **Optimal Site:** the site occupies a high-profile and easily-accessible location for the existing and future local resident population – capitalising on the existing and planned infrastructure.
- **Enhanced Uses:** the proposed centre would provide a significant improvement in the range of retail facilities and services that would be available to existing and future local residents.
- **Aligned With SPP 4.2 Objectives & Outcomes:** the proposed centre strongly aligns with the core policy objectives and outcomes, aiming to retain people, create employment opportunities through retail, and services – within a well-connected community. The development would efficiently and cohesively cater to community needs and consumer choice, while also avoiding significant disruptions to the existing activity centre hierarchy.

PRODUCTIVITY:

- **Employment:** the proposed centre would result in the creation of additional employment, both during the construction period, and more importantly, on an ongoing basis once the development is complete and operational. In total, approximately 654 jobs (563 excluding indicative pad site uses) are likely to be created both directly and indirectly because of the proposed development - including ongoing employment (230), construction (79) and multiplier effects (345). The additional permanent employees are projected to earn combined annual salary/wages of approximately \$9.8 million.
- **Impact on Activity Centres:** as demonstrated within Section 5.3 of the Retail Report (refer **Appendix D**), the proposed centre would not impact on the viability or continued operation of any existing or proposed centres in the surrounding region, with all of the impacts well within the normal competitive range (low to medium) of less than 10%; and the forecasted impact is expected to be ameliorated in the short term with population growth. Further, generally one full-line supermarket of approximately 3,000 sq.m and larger is typically provided for every 8,000 – 10,000 persons. On this basis, the main trade area's existing population of 24,920 people can already comfortably support the proposed full-line supermarket.

QUALITY OF LIFE:

- **Compatible & Complementary Uses:** the proposed centre is compatible with the Kinmore Green Estate masterplan and other surrounding uses. The proposed range of uses that would form part of the development are also typical of many convenience-based centres and are considered complementary to one-another – including a major full-line supermarket, retail specialty shops, a childcare centre, and fast food pad site.
- **Aligned with Consumer Trends & Expectations:** the nature of consumer demand continues to develop and evolve, reflecting social changes within society, such as increasing time pressures on working families; population/income growth; the evolution of new retail formats/operators. The demands of retailers, as well as consumers, combine to add pressure for additional retail floorspace. The design and location of the proposed centre would be highly convenient for local families who would visit on a regular basis – and therefore, help to retain some of the significant spending and visitation that is currently escaping the area.

- **Enhanced Amenity & Retained Vibrancy:** the proposed centre would improve choice of location and allow for price competition as part of this retention. The level of supermarket spending (generated by main trade area residents) being retained within the main trade area is estimated at \$25.9 million (19.4%). This means that 80.6% (\$107.6 million) of supermarket expenditure is currently escaping the trade area (and much of the LGA). The development of Aldi (East Landsdale Shopping Centre) and Woolworths Darch in 2025/26 will result in retained supermarket spending increasing to \$69.8 million (48.7%), reflecting a significant reduction in leakage (from 80.6% in 2022/23 to 51.3% in 2025/26).
- **Limited Specialty Floorspace:** the proposed development has limited specialty floorspace (714 sq.m), which would mean residents will continue to frequent other centres/shops in the surrounding area for a variety of tenants that are not likely to be provided as part of the proposed site. Given most shopfronts in the locality and nearby activity centres would not compete directly with a full-line supermarket, impacts on local retail would be limited and most would stand to benefit from increased customer visitation, activity and retained spending associated with the full-line Woolworths supermarket. The ability for local residents, for example, to undertake both a weekly shop at the subject site, as well as convenience, late-night and top-up shopping at Woolworths Kinmore Green Estate, Darch the 24-hour Darch Plaza IGA, late-trading Farmer Jacks Landsdale Forum, or complementary Aldi supermarket, would represent a holistic food and grocery experience.

ENVIRONMENTAL SUSTAINABILITY, EQUITY & SOCIAL INCLUSION:

- **Reduced Trips or Drive Distance:** the retention of spending and visitation within the main trade area and LGA would also reflect a reduction in car-based trips (drive time and distance) to full-line supermarket-based centres (often multiple times per week) further afield such as Kingsway City, Alexander Heights, and Wyatt Grove.
- **Localised Jobs & Services:** the provision of employment floorspace within the main trade area will help to retain job opportunities for local residents, as well as providing a large number of youth employment prospects, given retail developments generally employ many younger staff.

For the reasons set out above, the proposed centre is considered appropriate from a Retail Sustainability Perspective, as it would result in substantial net community benefit, that will more than offset anticipated trading impacts for a small number of existing and proposed retail centres – all of which would remain viable, and the impacts are expected to be ameliorated in the short term.

4. CONCLUSION

This report has been prepared in support the Proposed Amendment No.46 to the East Wanneroo Cell 6 (Darch / Madeley) Agreed Local Structure Plan No.8 to provide additional Commercial Zoned land and facilitate the development of a new neighbourhood centre on the corner of Furniss Road and Mirrabooka Avenue.

Proposed Amendment No.46 represents:

- The rezoning of 'Residential' and 'Business' zoned land to deliver new 'Commercial' zoned land for predominantly retail purposes, providing an opportunity for a diverse retail offering within the locality to service the existing and future (growing) residential catchment.
- The delivery of a high-quality full-line supermarket and associated specialty tenancies (and a café), with the provision of two vacant pad sites that are capable of delivering a diverse range of complementary uses (such as fast food, or a childcare centre).
- An integrated and functional traffic, transport and access arrangement that overall provides the opportunity to improve the local road network and create a safer and
- A proposal that has demonstrated consistency with current State and local planning framework.

The project team are pleased to reach this milestone and look forward to working with the City of Wanneroo and other key stakeholders on this proposal.



DISCLAIMER

This report is dated 11 August 2023 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd (**Urbis**) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Fabcot Pty Ltd (**Instructing Party**) for the purpose of Structure Plan Amendment (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A

CERTIFICATE OF TITLE

WESTERN



AUSTRALIA

TITLE NUMBER

Volume Folio

4040 364

RECORD OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 9002 ON DEPOSITED PLAN 421605

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

PARCEL DARCH PTY LTD OF 301 VINCENT STREET LEEDERVILLE WA 6007

(AF P693056) REGISTERED 11/9/2023

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. K192639 NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 16/5/2007.
2. L796683 NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 30/11/2011.
3. O898012 MEMORIAL. CONTAMINATED SITES ACT 2003 (CONTAMINATED SITE - REMEDIATION REQUIRED) REGISTERED 7/10/2021.
4. O951557 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA REGISTERED 23/11/2021.
5. EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR DRAINAGE/SEWERAGE PURPOSES TO LOCAL AUTHORITY - SEE DEPOSITED PLAN 421605 AS CREATED ON DEPOSITED PLAN 423249
6. EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR DRAINAGE/IRRIGATION/WATER SUPPLY/SEWERAGE PURPOSES TO WATER CORPORATION DEPOSITED PLAN 421605 AS CREATED ON DEPOSITED PLAN 423249
7. EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR DRAINAGE/SEWERAGE PURPOSES TO LOCAL AUTHORITY - SEE DEPOSITED PLAN 421605
8. P693061 RESTRICTIVE COVENANT TO ELECTRICITY NETWORKS CORPORATION SEE DEPOSITED PLAN 421605 REGISTERED 11/9/2023.
9. P693062 NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 11/9/2023.
10. P693066 CAVEAT BY CITY OF WANNEROO LODGED 11/9/2023.
11. P706014 CAVEAT BY CITY OF WANNEROO LODGED 11/9/2023.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

END OF PAGE 1 - CONTINUED OVER

RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: 9002/DP421605

VOLUME/FOLIO: 4040-364

PAGE 2

SKETCH OF LAND:

DP421605

PREVIOUS TITLE:

4040-336

PROPERTY STREET ADDRESS:

50K ATTADALE AV, DARCH.

LOCAL GOVERNMENT AUTHORITY:

CITY OF WANNEROO

APPENDIX B

TRANSPORT IMPACT ASSESSMENT

Woolworths Darch

Transport Impact Assessment

Rev C

Prepared for: Fabcot Pty Ltd

Date: 27 September 2023

Ref: 300304726

Stantec Australia Pty Ltd

Revision

Revision	Date	Comment	Prepared By	Approved By
Rev A	28 July 2023	Final for Submission	EH	SGL
Rev B	27 September 2023	Final for Submission	EH	SGL
Rev C	27 September 2023	Clarification of retail floorspace	EH	SGL

For and on behalf of

Stantec Australia Pty Ltd

Ground Floor, 226 Adelaide Terrace, Perth WA 6000

Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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Woolworths Darch

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Appendices

- Appendix A. WAPC Checklist
- Appendix B. Development Plans
- Appendix C. SIDRA Result



1. Introduction

1.1 Background and Proposal

Stantec has been engaged by Fabcot Pty Ltd to prepare a Transport Impact Assessment (TIA) for the proposed rezoning of the existing land use for retail and commercial development located within the suburb of Darch.

This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)* and the checklist is included in **Appendix A**.



2. Existing Situation

2.1 Site Location

The subject site is bound by Furniss Road to the north, Mirrabooka Avenue to the east and vacant land to the west and south as shown in **Figure 2.1**.

Figure 2.1 – Site Location



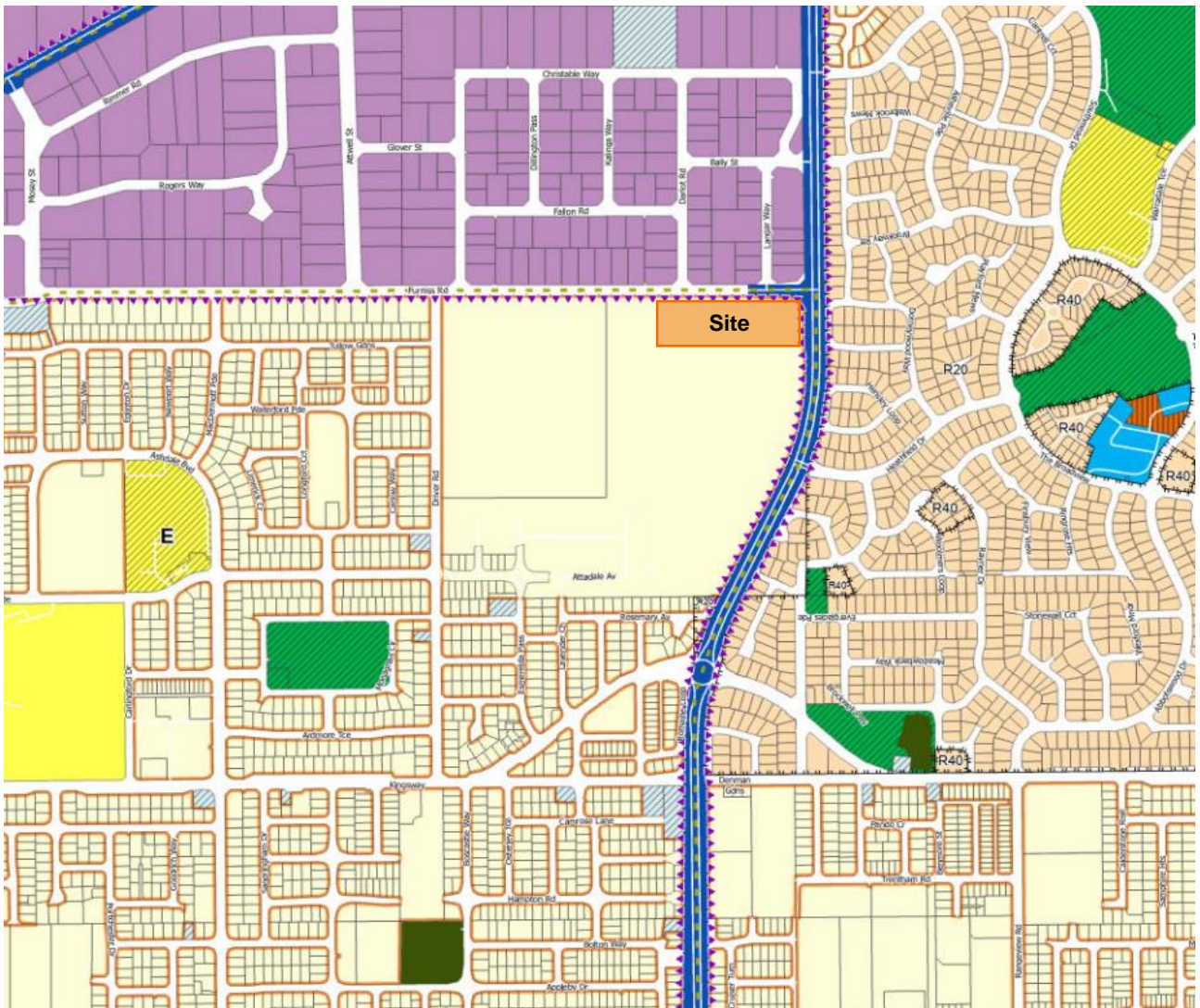
Source: Metromap

2.2 Surrounding Land Uses

The site is located within an urban development zone as noted in the City of Wanneroo's District Planning Scheme No.2 (DPS No. 2). The urban development zone extends through to the west and south with the north comprising mostly of industrial zoning and the east comprising mostly of residential zoning as shown in **Figure 2.2**.



Figure 2.2 – Zoning Map DPS



LEGEND

REGION SCHEME RESERVES (MRS)

- Other Regional Roads
- Primary Regional Roads
- Railways
- Regional Parks & Recreation
- State Forest
- Waterways
- Water Catchment

- Public Purposes
- Commonwealth Government
- High School
- Special Uses
- State Energy Commission
- Water Authority of WA

LOCAL SCHEME RESERVES

- Environmental Conservation
- Public Open Space
- Civic & Community
- Drainage & Waterways

LOCAL SCHEME ZONES

- Residential
- Urban Development
- Smart Growth Community
- Rural
- Rural Residential
- Rural Resource
- Landscape Enhancement
- Light Industry
- General Industry
- Industrial Development

- Public Purpose
- Education
- Local Road

OTHER CATEGORIES

- (See scheme text for additional information)
- Scheme Boundary
 - Local Government Boundary
 - Locality Boundary
 - Residential Codes*
 - Additional Uses
 - Restricted Uses
 - Rural Residential
 - Environmental Condition
 - Special Control
 - Developer Contribution

LOCAL SCHEME RESERVES

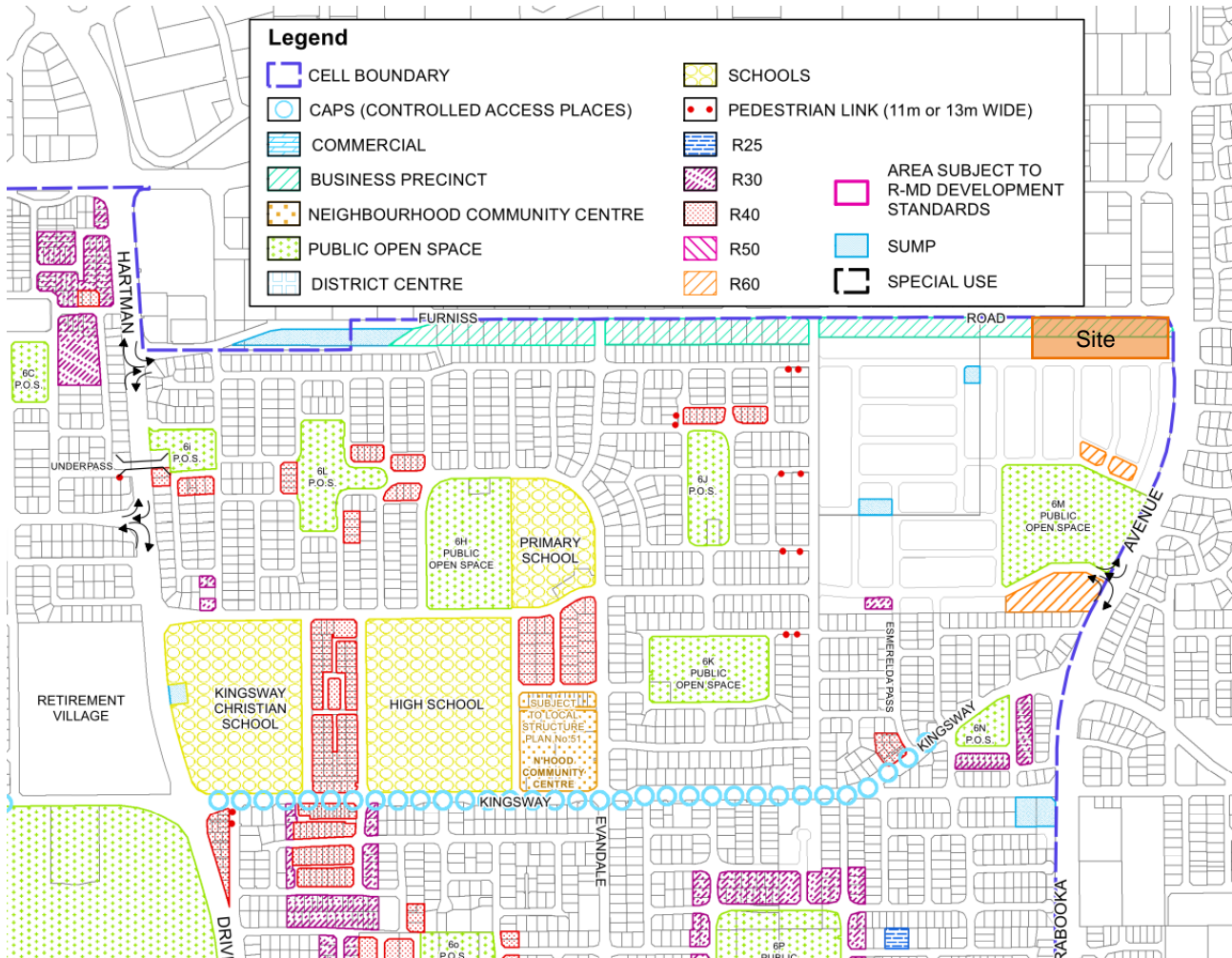
- Environmental Conservation
- Public Open Space
- Civic & Community
- Drainage & Waterways
- Public Purpose
- Education
- Local Road

Source: City of Wanneroo DPS No.2



An approved structure plan is also present under the East Wanneroo Structure Plan – Cell 6 as shown in **Figure 2.3**. Under this structure plan, the site is located within the business precinct zone.

Figure 2.3 – East Wanneroo Structure Plan – Cell 6



Source: City of Wanneroo

2.3 Existing Road Network

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

Primary Distributors (light blue): Form the regional and inter-regional grid of Main Roads WA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes and all are National or State Roads.

District Distributor A (green): These carry traffic between industrial, commercial and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining properties. They are managed by Local Government.

Local Distributors (orange): Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.

Access Roads (grey): Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.



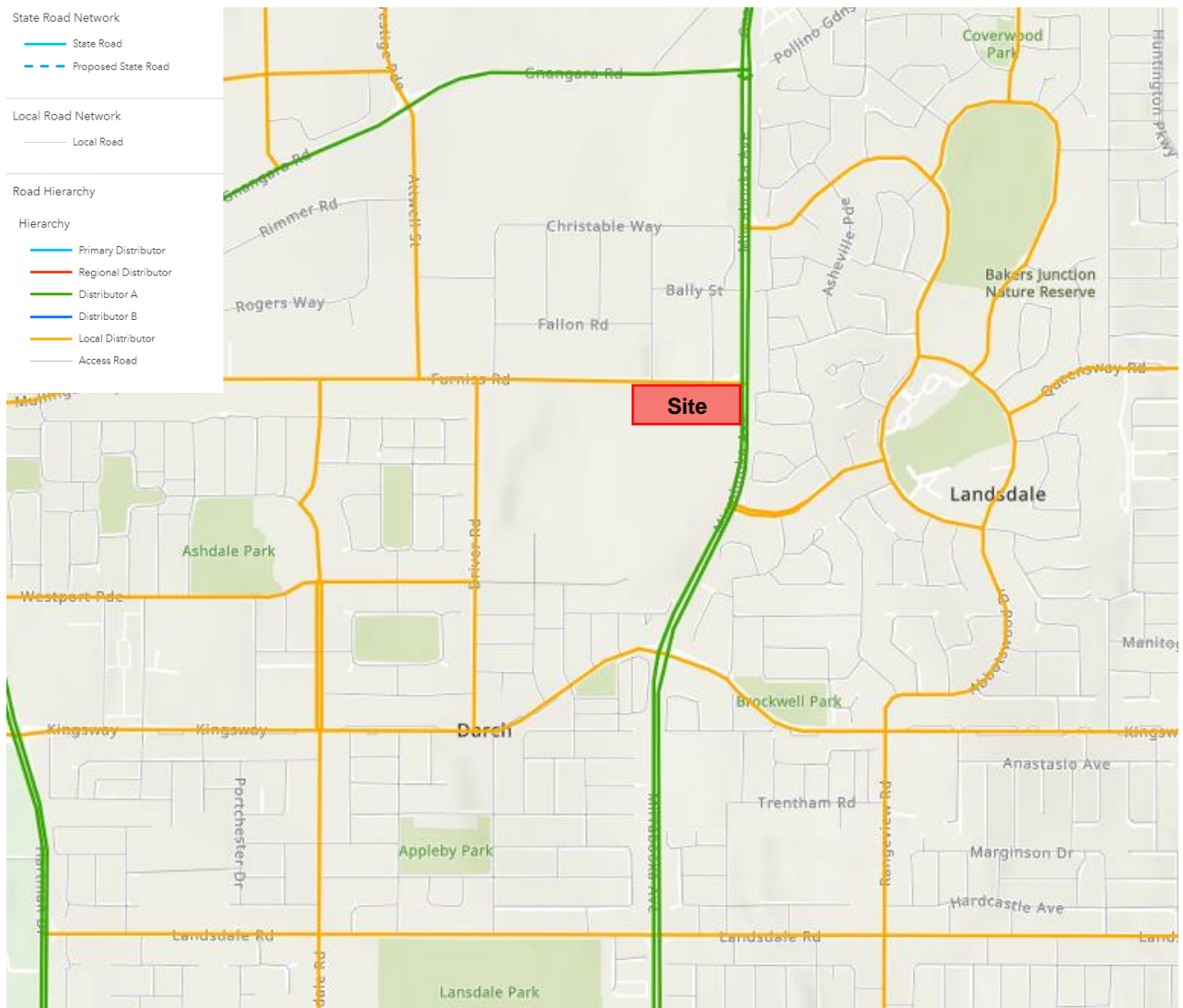
The subject site's surrounding road network is further described in. The layout and classification of the roads under the Main Roads WA Road Hierarchy surrounding the Site are presented in **Table 2.1** and illustrated in **Figure 2.4**.

Table 2.1 – Road Network

Road Name	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Road Width (m)	Posted Speed Limit (km/h)
Mirrabooka Avenue	Distributor A	Local Govt.	4	2	23.5m including median	70km/h
Furniss Road	Local Distributor	Local Govt.	2	0	9.5m	60km/h
Manderston Approach*	TBD (likely Access Road)	Local Govt.	2	TBD	TBD	TBD (likely 50km/h)

* Manderston Approach is a planned future road located on the southern frontage of the Site and is not currently classified under Main Roads' Road Hierarchy. However, given the planned surrounding environment, it is likely that Manderston Approach will be an Access Road with a 50km/h speed limit.

Figure 2.4 – Main Roads WA Road Hierarchy



Source: MRWA Road Mapping Information System



2.4 Existing Traffic Volumes

Traffic volumes have been collated from SCATS data obtained from MRWA Traffic Map and are summarised in **Table 2.2**.

Table 2.2 – Existing Traffic Volumes

Road Name	Date	Daily Traffic Volume	AM Peak	PM Peak
Mirrabooka Avenue	2021	18,199	1,269	1,550

2.5 Existing Intersections

The nearest key intersection to the site is the Furniss Road/Mirrabooka Avenue intersection located on the north eastern corner of the Site as shown in **Figure 2.5**. Furniss Road/Mirrabooka Avenue intersection is currently give way controlled with Furniss Road being the minor approach.

Figure 2.5 – Mirrabooka Avenue and Furniss Road



Source: Metromap

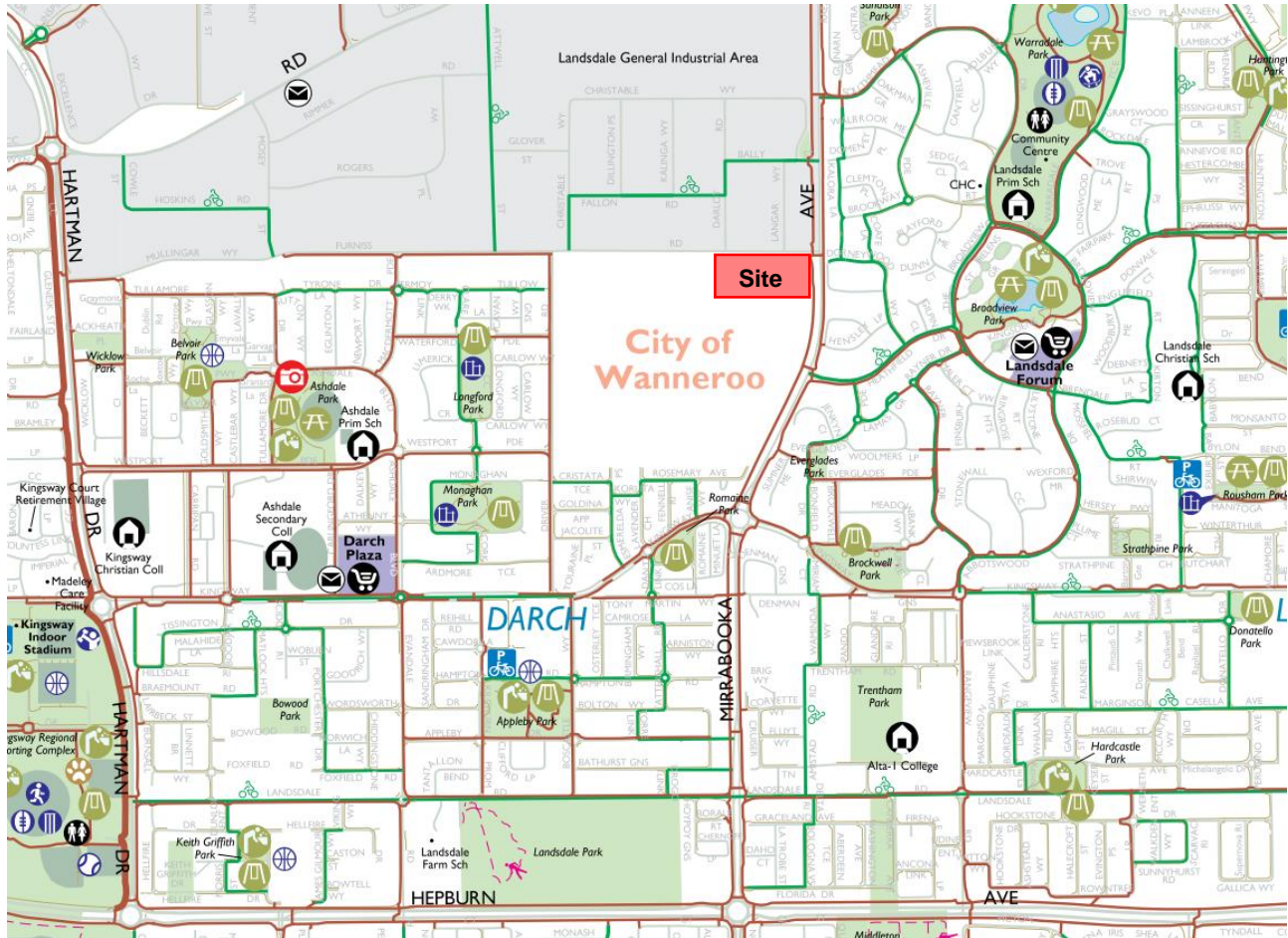


2.6 Existing Pedestrian and Cycle Facilities

Existing pedestrian/cycling facilities include a shared path which runs along both sides of Mirrabooka Avenue. There are currently no path facilities along the Furniss Road frontage between Driver Road and Mirrabooka Avenue.

Figure 2.6 shows the surrounding cycle network as shown in the City of Wanneroo's Your Move map.

Figure 2.6 – City of Wanneroo Bike Map



Legend

High Quality Shared Path (Bikes and Pedestrians)	Traffic Light	Soccer
Shared Path & Public Access Way (Bikes and Pedestrians)	Road Bridge, Footbridge and Underpass	Basketball / Netball
Local Bike Friendly Route	Local Attractions / Lookout	Cricket, Hockey
Bicycle Lanes or Sealed Shoulder Either Side	Drinking Fountain	Frisbee
Footpath	Playground	Tennis / Squash
Walk Trail (Unsealed)	Picnic Area & Barbeque	Lawn Bowls
Bicycle Shelter	Public Artwork	Skate Park, BMX Facilities
Bicycle Parking, Bicycle Shop	Swimming Pool	Supermarket / Shopping Centre
Bicycle Repair Station	Gym / Fitness Centre	Delicatessen / Convenience Store
Train and Bus Transfer	Athletics, Fitness Equipment	School (Primary, Secondary & College)
Railway	Football, Rugby	Public Toilet, Accessible Toilet
	Baseball / Softball / Teeball	Post Office, Post Box
		Dog Exercise Area

Source: Wanneroo Your Move

Overall, pedestrian and cycling amenity within the surrounding area is considered to be good, however there are limited facilities on the immediate approaches to the Site. As the surrounding area is developed for residential purposes, the path network will be extended to reach the Site from the south, ensuring easy access on foot or bicycle.

2.7 Existing Public Transport Facilities

The nearest bus stop is located 800m east of the subject site on The Broadview providing access to bus route 376. Bus route 450 is also located at a similar distance south of the site along Kingsway. The bus stop locations and routes are shown in **Figure 2.7** and **Figure 2.8** respectively.

Overall, the public transport accessibility within the area surrounding the site is poor due to distance from the nearest public transport services, with the nearest bus service located approximately 800m from the Site. Furthermore, the nearest available services generally operate at a low/moderate frequency to a limited number of locations.

With the full development of Kinmore Green estate to the south, there may be an opportunity for the PTA to reconsider the routing of bus services in this area. However it is anticipated that this would have limited impact on the Site as customer catchments will generally be nearby residents – who can walk or cycle to the site – or nearby workers who would visit on their way to/from work by private vehicle.

Table 2.3 – Public Transport Routes and Frequencies

Bus Route	Route Description	Frequencies		
		Weekdays	Saturdays	Sundays and Public Holidays
376	Mirraboooka Bus Stn – Whitfords Stn (via Mirraboooka Av & Gngara Dr)	15 minutes during peak hours	30 minutes	60 minutes
450	Warwick Stn – Landsdale (via Kingsway City Shop Ctr)	20 minutes during peak hours	30 minutes	60 minutes

Figure 2.7 – Bus Stop Locations

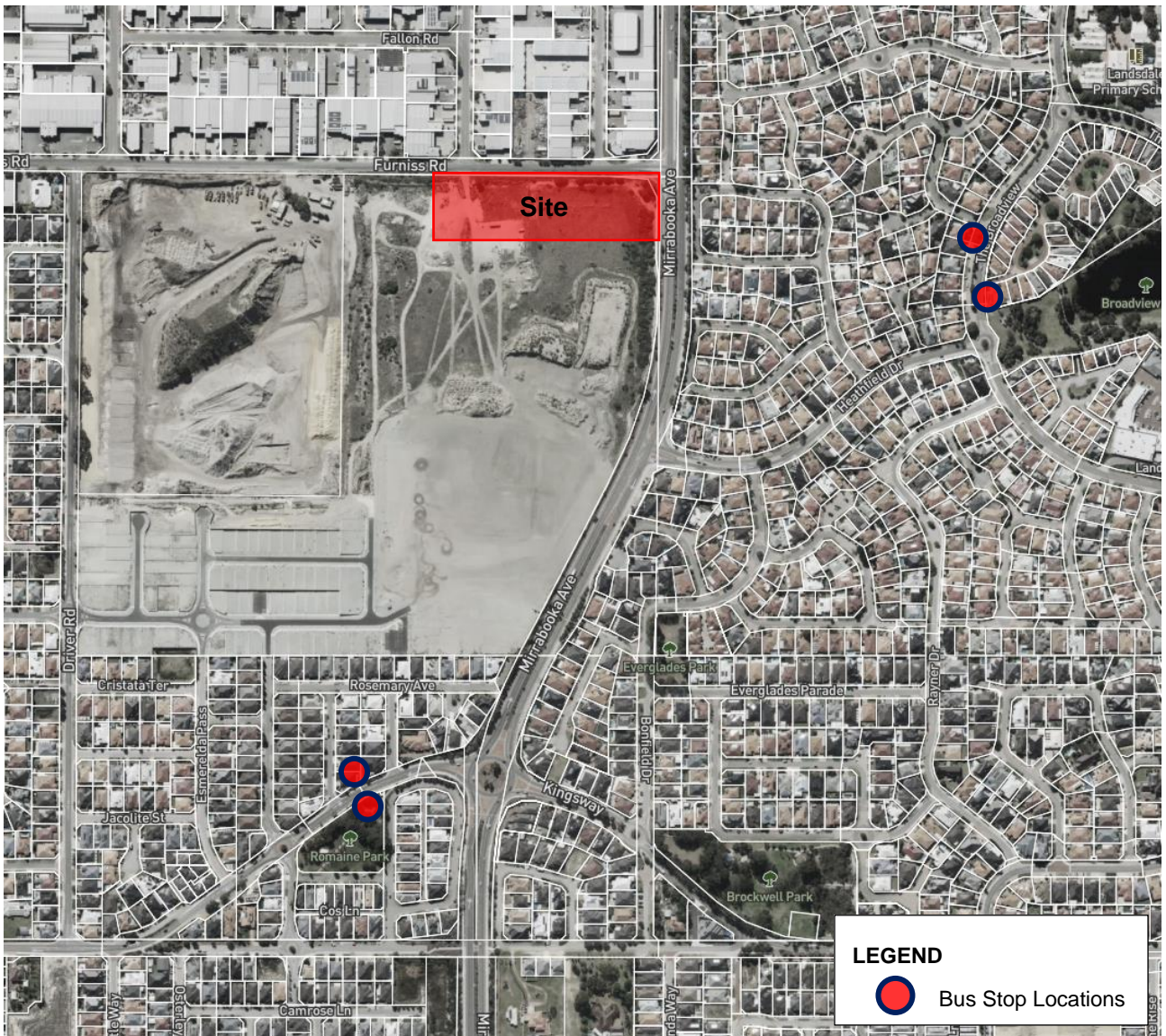


Figure 2.8 – Bus Routes within the Surrounding Area



Legend

- Bus Route and Bus Stop (All routes accessible)
- Transperth Zone Fare Boundary
- Train and Bus Transfer
- Bus Route Terminus
- Railway
- Traffic Light
- Road Bridge, Footbridge and Underpass
- Local Attractions / Lookout
- Drinking Fountain
- Picnic Area & Barbeque
- Swimming Pool
- Gym / Fitness Centre
- Football, Rugby
- Athletics, Fitness Equipment
- Baseball / Softball / Teeball
- Soccer
- Basketball / Netball
- Cricket, Hockey
- Frisbee
- Tennis / Squash
- Lawn Bowls
- Skate Park, BMX Facilities
- Supermarket / Shopping Centre
- Delicatessen / Convenience Store
- School (Primary, Secondary & College)
- Public Toilet, Accessible Toilet
- Post Office, Post Box
- Dog Exercise Area
- Bicycle Shelter
- Bicycle Parking

Source: Wanneroo Your Move

2.8 Crash Assessment

A review of crashes that have been reported within the 5-year period from 2018 – 2022 has been undertaken using the MRWA Crash Analysis Reporting System Crash Map. **Table 2.4** provides a summary of all crashes that occurred within the vicinity of the Site, with the location of these crashes shown in **Figure 2.9**.

Table 2.4 – Total Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Right Angle	-	1	-	2	-	3
Hit Object	-	-	-	2	-	2
Rear End	-	-	-	2	-	2
Right Turn Thru	-	1	1	-	-	2
Total	0	2	1	6	0	9

In particular, the following **Table 2.5** describes the crash history for the Furniss Rd/Mirraboooka Ave signalised intersection.

Table 2.5 – Furniss Rd/Mirraboooka Ave Intersection Crashes

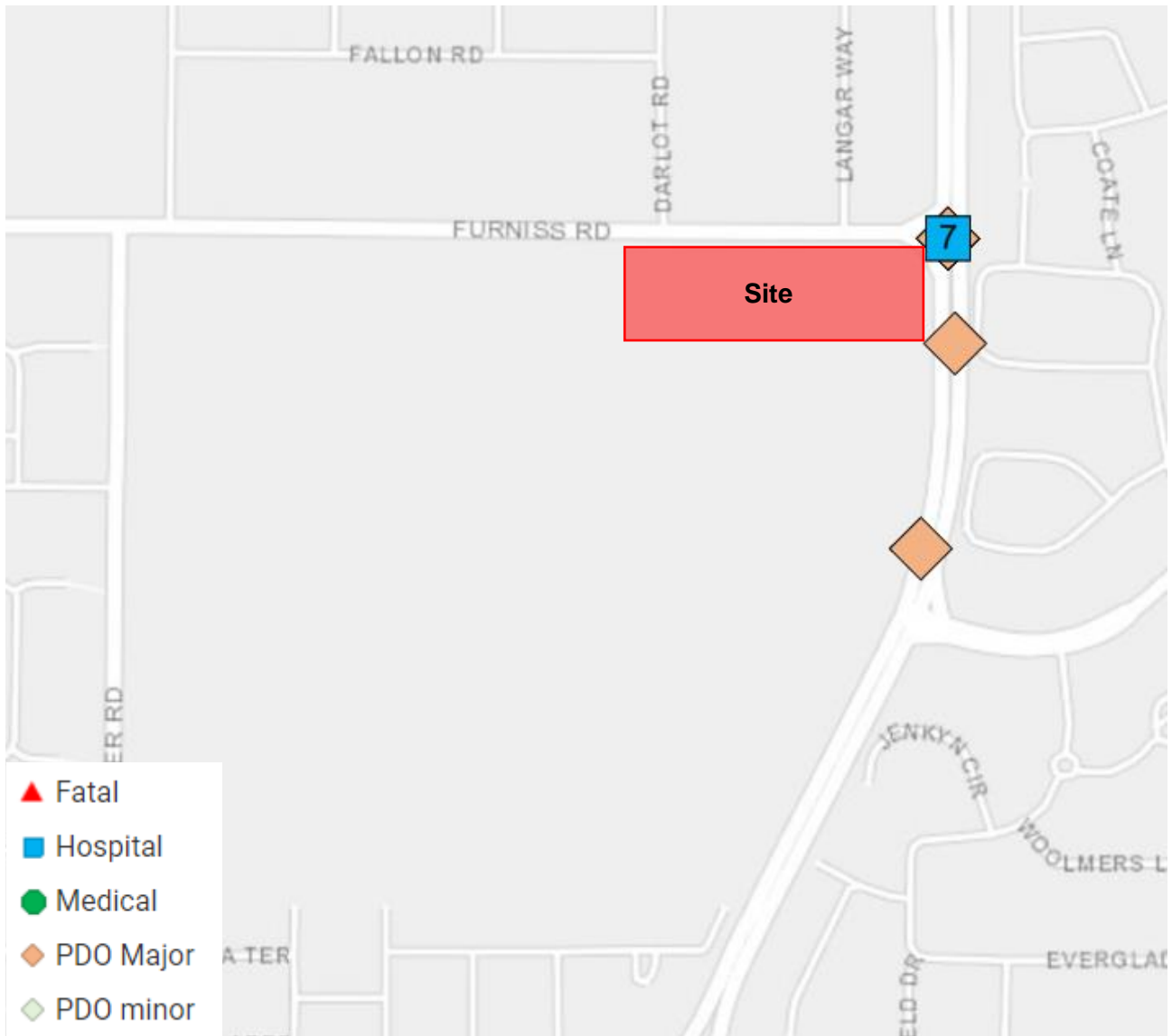
Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Right Angle	-	1	-	2	-	3
Hit Object	-	-	-	1	-	1
Rear End	-	-	-	1	-	1
Right Turn Thru	-	1	1	-	-	2
Total	0	2	1	4	0	7

Crash data are summarised as follows:

- A total of 9 crashes were recorded within the vicinity of the Site, with no fatal crashes recorded.
- Most crashes that occurred within the surrounding area resulted in major property damage.
- 2 crashes resulted in hospitalisation and 1 crash required medical attention.
- The majority of crashes occurred at the Furniss Rd/Mirraboooka Ave intersection. This intersection is a prequalified location for both the State and Federal Black Spot programmes and would be eligible for funding to address the existing crash history.
- No crashes occurred on Furniss Road away from the Mirraboooka Avenue intersection.



Figure 2.9 – Crash Map



Source: Main Roads Crash Map

3. Development Proposal

3.1 Proposed Zoning Changes

As mentioned in Section 1.1, the report focuses on the traffic impacts of a proposed change of use to commercial zoning to facilitate development of a neighbourhood centre. The proposed neighbourhood centre can accommodate an anchor supermarket tenancy and associated speciality retail of approximately 3,500sq.m NLA, with the adjacent pad-sites capable of accommodating other retail uses totalling up to 1,500sq.m NLA of retail floorspace.

For the purposes of assessing the transport impact of the proposed rezoning, the following indicative land use yields have been adopted:

- Supermarket – 3,700 m²
- 2 Speciality stores – 204 m² and 260 m²
- Kiosk – 45 m²
- Café/restaurant – 205 m²
- Parking provision is to be determined at development applications stage, however, parking will be provided in accordance with District Planning Scheme and can be accommodated within the site

- Pad site 1 – fast food – 250 m²
- Pad site 2 – early learning centre (ELC) – 80 children

Figure 3.1 shows the site layout. The development plans are included in Appendix B.

Figure 3.1 – Site Plan



Source: Hames Sharley

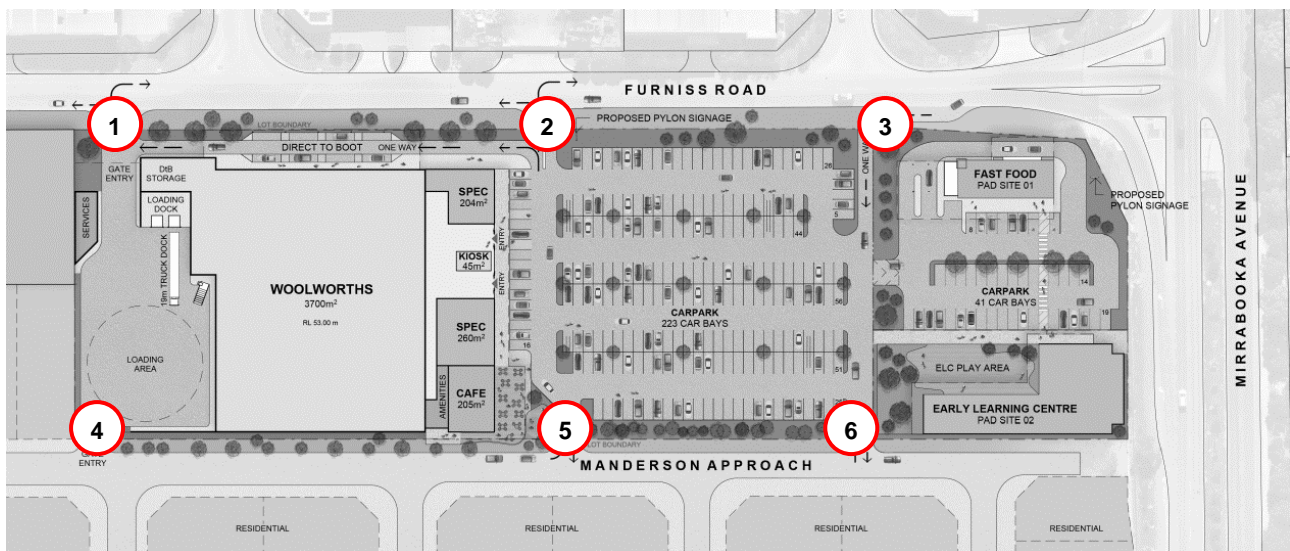


3.2 Access Arrangements

Six site access points are proposed, as shown in **Figure 3.2**.

- Access 1: Full movement access on Furniss Road to the loading area. This access is restricted to delivery/service vehicles and staff only.
- Access 2: Full movement access on Furniss Road to the main car park. This access is intended to be the secondary access point for customers and the main egress point for customers.
- Access 3: Left in only on Furniss Road to the main car park and serves as the main access for customers for both the supermarket and the pad sites.
- Access 4: Full movement access on Manderston Approach to the loading area. This access is intended to be a secondary access for small vehicles only. Delivery trucks will not use this access into the residential area.
- Access 5: Full movement access on Manderston Approach to the main car park and serves as a secondary access for customers from the residential area.
- Access 6: Full movement access on Manderston Approach to the main car park and serves as a secondary access for customers from the residential area.

Figure 3.2 – Site Access Locations



3.2.1 Service and Waste Vehicles

The loading area for service and waste vehicles is accessed via Access 1 located on Furniss Road. A secondary access (Access 4) is also provided to the south onto Manderston Approach for light vehicle access and egress only. The largest design vehicle anticipated for the Site is a 19m semi-trailer. A turntable is provided within the loading area to allow 19m semi-trailers to both enter and exit the site in forward gear.

4. Changes to Surrounding Area

4.1 Road Network

Manderston Approach and the local roads within the Kinmore Green residential development are planned as shown in **Figure 4.1**. Other than the local roads, there are current no planned changes to the wider road network within the surrounding area.

Figure 4.1 – Indicative Local Road Network



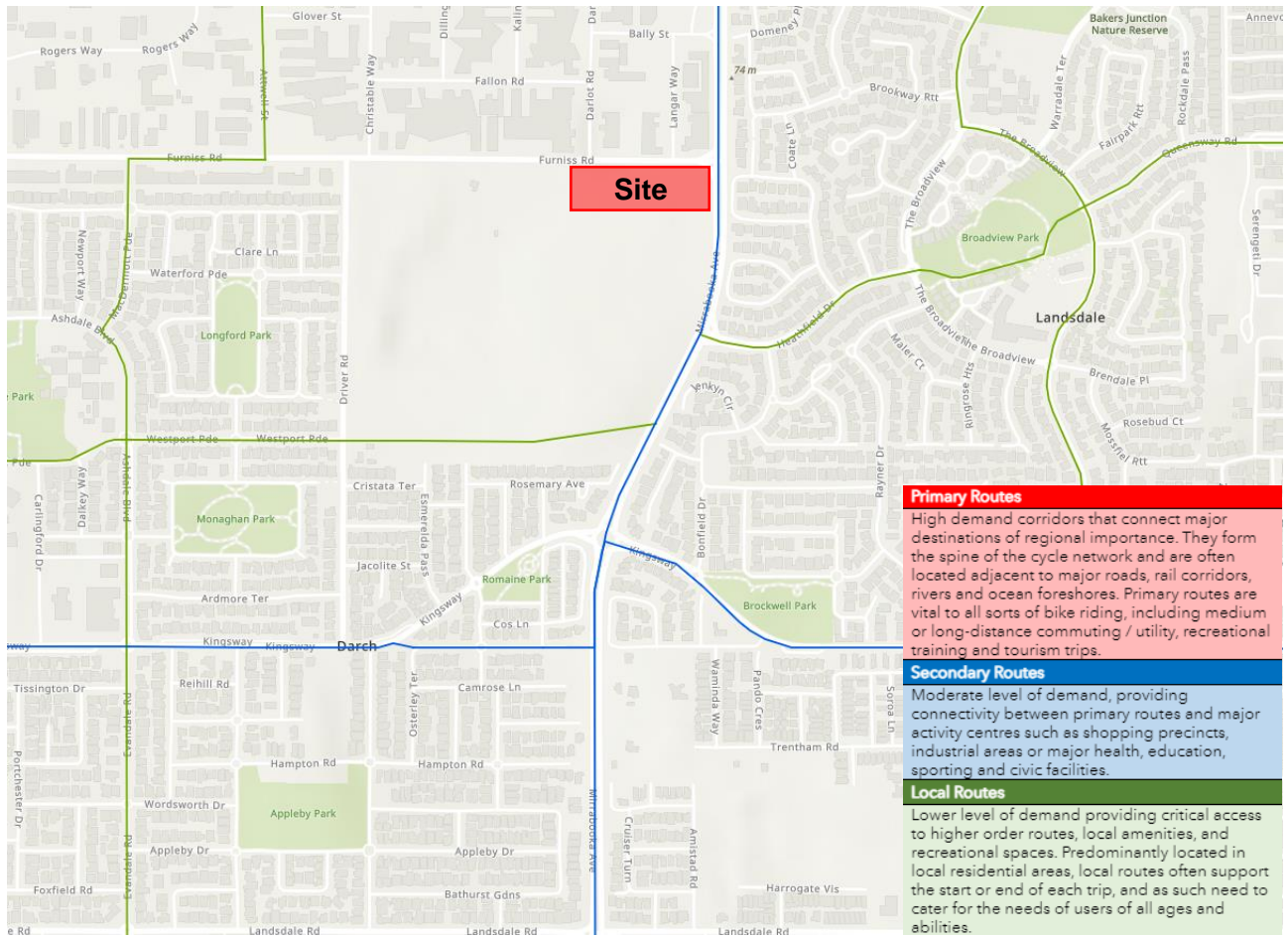
Source: Rowe Group Design

4.2 Pedestrian/Cycle Networks

The Department of Transport's Long Term Cycle Network (LTCN) plan indicates the status of bike routes within the local network. As **Figure 4.2** shows, the long term plans for cycling which has identified Mirrabooka Avenue as a Secondary Route. Other than Mirrabooka Avenue, there are no other nearby roads that have been nominated as a key cycling priority routes.



Figure 4.2 – Long Term Cycle Network (LTCN)



Source: Department of Transport

4.3 Intersection Controls

Based on the available information, there are no planned changes to nearby intersection controls.

4.4 Public Transport Services

The Public Transport Authority (PTA) have advised that there are no short to medium term plans for changes to bus services in the vicinity of the Site.

5. Integration with Surrounding Area

5.1 Surrounding Attractors/Generators

The main surrounding area key generators include the industrial area to the north. Other key generators include various schools located to the east and west of the site.

For the proposed supermarket, the key customer catchments include the residential areas to the south and south west, as well as employees at the nearby industrial area and passing vehicles along Mirrabooka Avenue.

5.2 Proposed Changes to Surrounding Land Use

Other than the remainder of the Kinmore Green residential estate which is currently being developed, there are no proposed changes to the surrounding area land uses based on the available information.



6. Analysis of Transport Networks

6.1 Analysis Parameters

6.1.1 Assessment Years and Time Period

Three assessment years as per below will be analysed:

- Existing Condition – 2023 traffic data
- Year 2025: Assumed opening year of the development
- Year 2035: 10-year horizon after the completion of the development

Based on examination of traffic surveys undertaken on Thursday, 22nd June and Saturday, 24th June, the following background traffic peak hours were identified for analysis:

- Weekday AM Peak: 7:45 AM to 8:45 AM
- Weekday PM Peak: 3:00 PM to 4:00 PM
- Weekend Peak: 11:30 AM to 12:30 PM

It is noted that the supermarket peak hour is typically later than 3pm but for the purposes of robust assessment it has been assumed to occur at the same time as the background traffic peak hour.

6.1.2 Analysis Overview

To identify the impact of the proposed development on the surrounding road network, the intersection performance of the following intersections have been analysed in network format, using SIDRA analysis software:

- Furniss Road/Mirrabooka Avenue
- Furniss Road/Access 2
- Furniss Road/Access 3

The following scenarios have been analysed as part of this assessment:

- Scenario 1 – Existing Traffic without Development
- Scenario 2 – 2025 Traffic without Development
- Scenario 3 – 2025 Traffic with Development
- Scenario 4 – 2035 Traffic without Development
- Scenario 5 – 2035 Traffic with Development

6.2 Key Factors and Assumptions

- Existing traffic volumes were obtained from traffic surveys conducted on a Thursday and a Saturday to capture the likely peak operating periods for the proposed site.
- Opening year has been assumed to be 2025;
- A background traffic growth rate of 2% per annum has been applied to Mirrabooka Avenue volumes for the opening year and to the 10-year horizon analysis for a robust assessment;
- Background traffic on Furniss Road has been estimated based on the full development of the existing Cell 6 land uses – refer to **Section 6.3**.
- Traffic distribution has been determined based on the anticipated trip capture from the surrounding areas with consideration for similar developments located within the vicinity (as people are less likely to travel to this site if there is a similar development that is located closer to where they are located).
- The Kinmore Green residential estate and wider Darch area to the south of the Site will account for a sizable proportion of vehicle trips to and from the proposed site. For the purposes of this assessment, it is assumed that this subdivision will account for 30% of vehicle trips and will access the site on Manderston Approach via the two proposed accesses (Access 5 and 6 from **Figure 3.2**). Furthermore, the accesses on Manderston Approach have not been assessed in SIDRA as the expected traffic volumes along this road is very low.
- The SIDRA model has been calibrated to the observed queues from the traffic surveys.
- Heavy vehicle percentages were also obtained through the traffic surveys.



- For the purposes of this assessment, the traffic generated by the 2 pad sites was also included in the trip generation (with the assumed land uses being fast food and an early learning centre). Note that the proposed land uses are still indicative and subject to change.

6.3 Background Traffic

Background traffic flow for the Furniss Road/Mirrabooka Avenue intersection has been obtained from traffic surveys that were conducted on Thursday 22nd June and Saturday 24th June.

A summary of the future background traffic growth methodology are as follows:

- A linear traffic growth of 2% was applied to Mirrabooka Avenue to estimate the future traffic volumes.
- For Furniss Road, the main growth along this section of road will be from East Wanneroo Cell 6. The traffic report suggests that this area will generate approximately 900 vpd from the residential component and 1,285 vpd from the businesses located along Furniss Road.

To determine the peak period traffic generated from the provided daily traffic, the traffic surveys data was used to determine the current peak hour traffic proportion at the Furniss Road/Mirrabooka Avenue and applied to the daily traffic generated by Cell 6. The portion of peak period traffic is provided below:

- AM Peak Period: 11% of weekday traffic
- PM Peak Period: 12% of weekday traffic
- Weekend Peak Period: 8% of weekday traffic

Table 6.1 provides a summary of the future traffic generated by the subdivision onto Furniss Road.

Table 6.1 – East Wanneroo Cell 6 Traffic Generation

Land Use	AM Peak Hour		PM Peak Hour		Weekend Peak	
	In	Out	In	Out	In	Out
Residential	26	73	69	39	39	34
Commercial Businesses	124	17	28	126	56	48
Total	150	90	97	165	95	82

Figure 6.1 through Figure 6.3 shows the existing and future background volumes.



Figure 6.1 – Background Traffic 2023

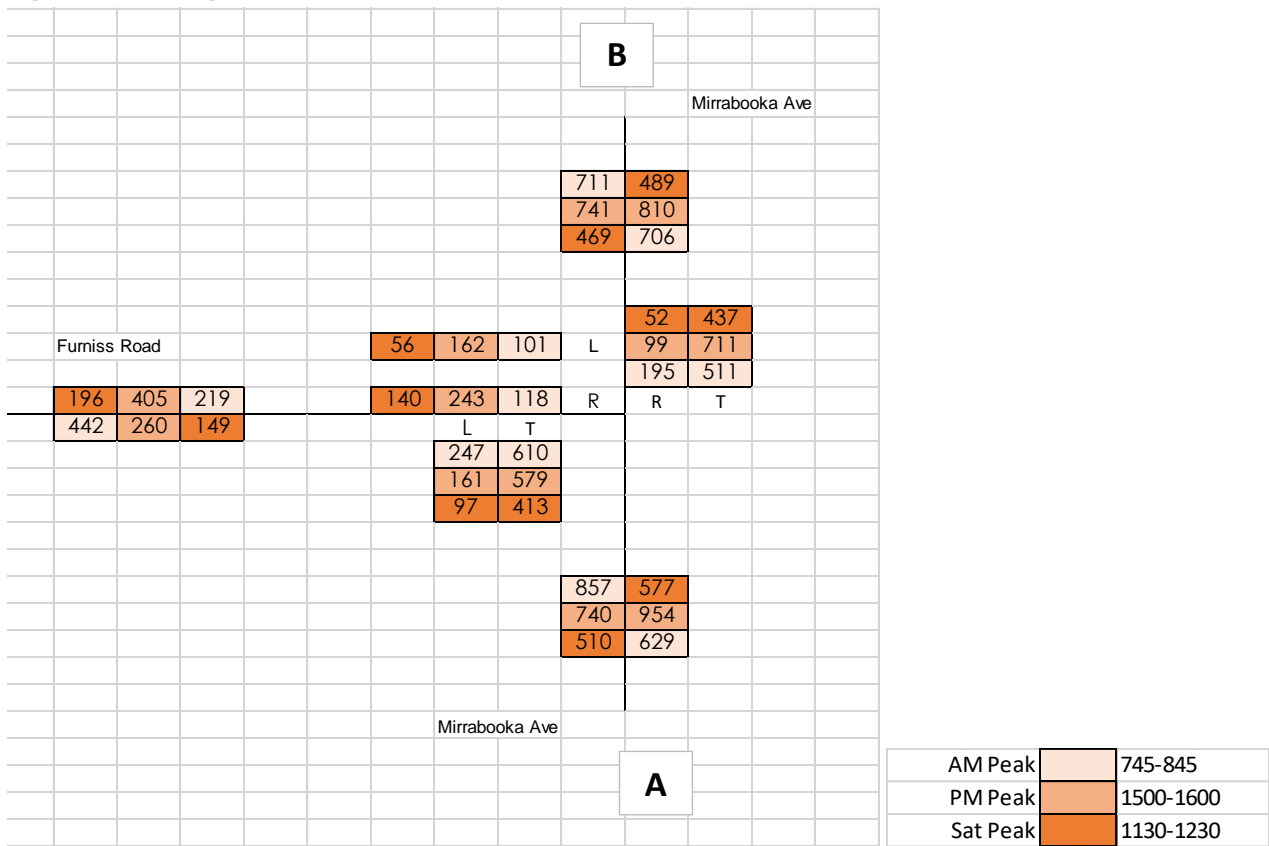


Figure 6.2 – Background Traffic 2025

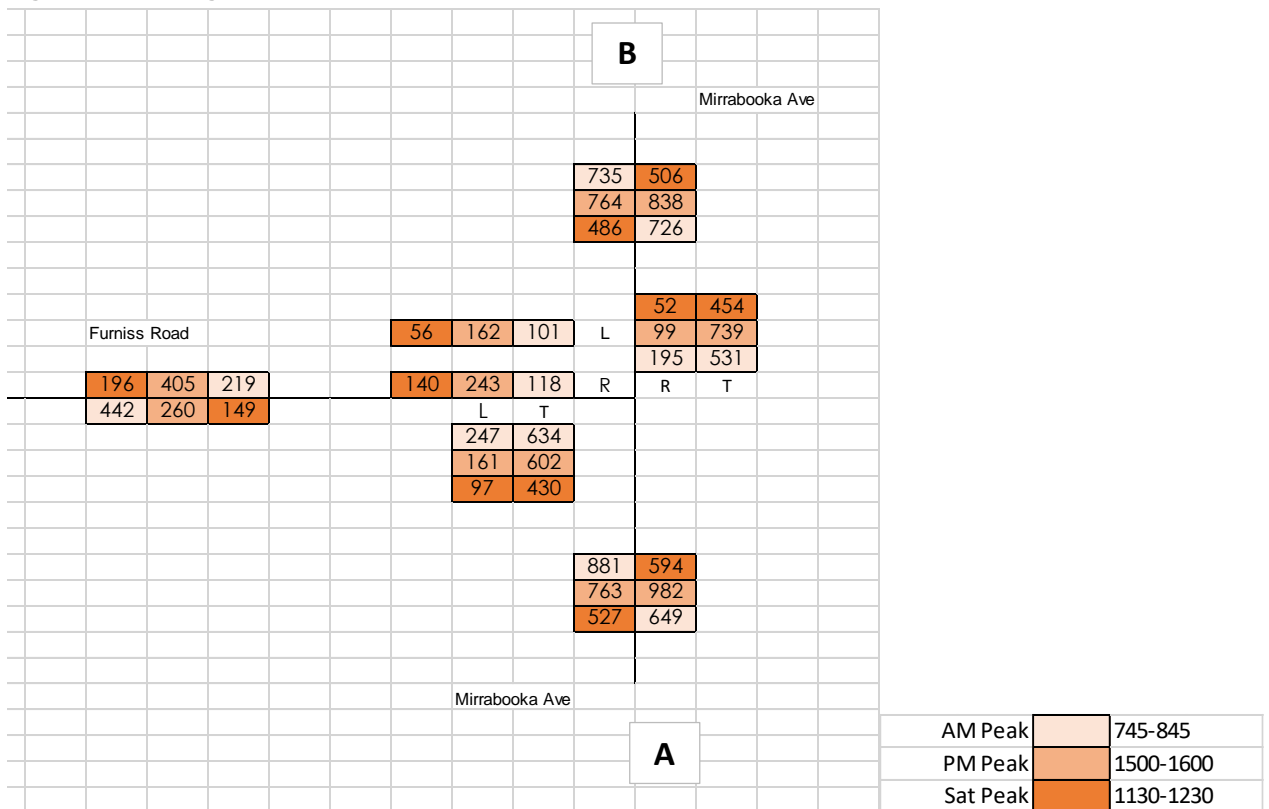
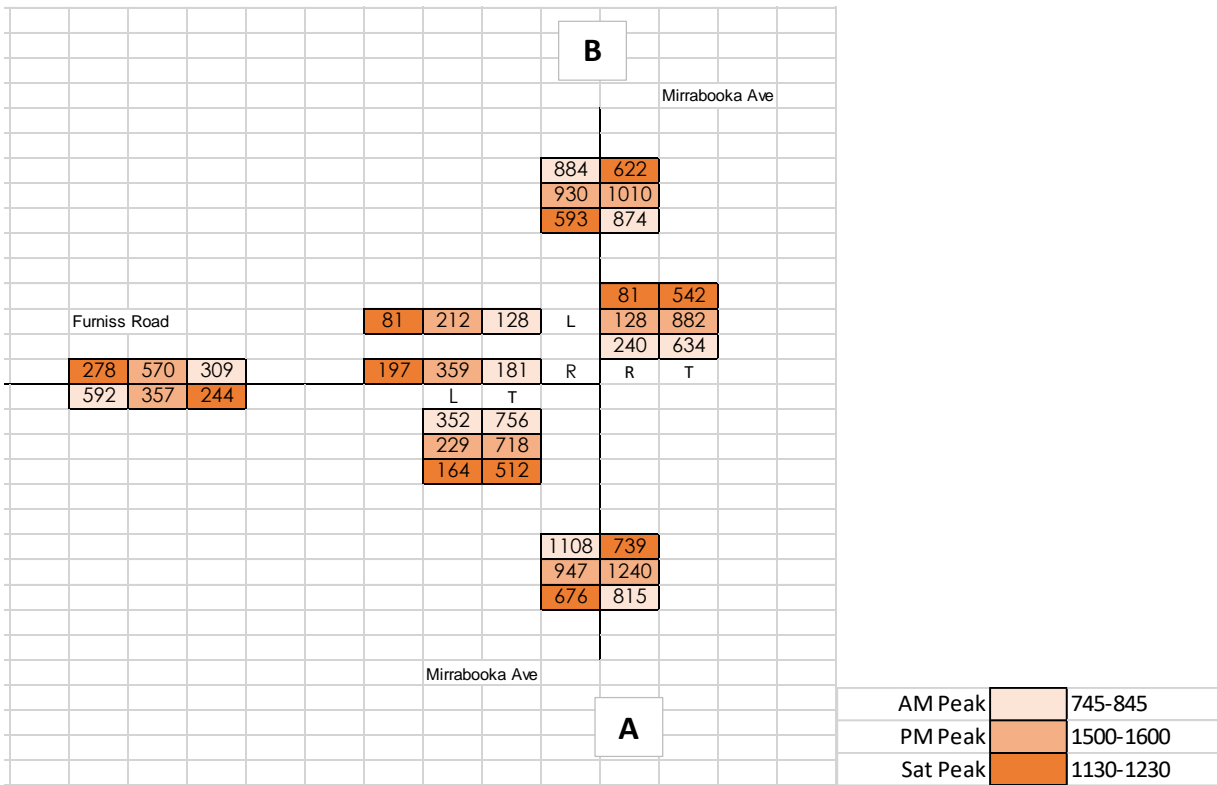


Figure 6.3 – Background Traffic 2035



6.4 Development Traffic Generation

Trip generation rates for the components of the proposed development are outlined in the **Table 6.2** below. The adopted trip rates are a conservative estimate of the traffic generated by the proposed development.

Table 6.3 and **Table 6.4** shows the distribution rates and development trip generation.

Table 6.2 – Trip Generation Rates

Land Use	ITE Code/Source	Yield	AM Peak	PM Peak	Weekend Peak
Supermarket	ITE 850	3,700 m ²	7.18 trips per 100 m ²	8.18 trips per 100 m ²	11.13 trips per 100 m ²
Specialty	ITE 875	464 m ²	2.3 trips per 100 m ²	3.02 trips per 100 m ²	3.71 trips per 100 m ²
Kiosk*	ITE 850	45 m ²	7.18 trips per 100 m ²	8.18 trips per 100 m ²	11.13 trips per 100 m ²
Café/Restaurant	ITE 932	205 m ²	15.11 trips per 100 m ²	18.74 trips per 100 m ²	12.05 trips per 100 m ²
Fast Food**	RMS Surveys - HJs	250 m ²	5.1 trips per 100 m ²	21.5 trips per 100 m ²	31.2 trips per 100 m ²
ELC**	RTA	80 children	0.8 per child	0.7 per child	0

*For the purpose of this assessment, the kiosk is considered to be part of the supermarket land use.

**For the purpose of this assessment, the traffic generated by the 2 pads sites have also been included (fast food and early learning centre (ELC)). The fast food yield is based on the measured area on the site plan. The ELC yield is estimated based on similar sized developments of similar use.

Table 6.3 – Trip Distribution

Land Use	AM Peak Hour		PM Peak Hour		Weekend Peak	
	In	Out	In	Out	In	Out
Supermarket	52%	48%	52%	48%	51%	49%
Specialty	51%	49%	45%	55%	53%	47%
Kiosk	52%	48%	52%	48%	51%	49%
Café/Restaurant	57%	43%	52%	48%	51%	49%
Fast Food	53%	47%	50%	50%	49%	51%
ELC	53%	47%	53%	47%	50%	50%

Table 6.4 – Development Trip Generation at Opening Year 2024

Land Use	AM Peak Hour		PM Peak Hour		Weekend Peak	
	In	Out	In	Out	In	Out
Supermarket	138	128	157	145	211	202
Specialty	5	5	6	8	10	9
Kiosk	2	2	2	2	3	3
Café/Restaurant	18	13	20	18	13	13
Total (Site Only)	163	148	186	173	237	227
Fast Food	7	6	27	27	39	40
ELC	34	30	30	26	0	0
Total (Site + Pad Sites)	204	184	242	226	276	267

The proposed development (excluding the pads sites) represents a two-way trip generation of approximately 311 vehicles during the weekday AM peak hour, 359 vehicles during the weekday PM peak hour and 464 vehicles during the weekend peak hour.



It should be noted that there are existing land uses already contemplated on the subject site as part of the East Wanneroo Cell 6 Structure Plan that would generate traffic movements onto Furniss Road. The subject site is currently zoned "Business Precinct". Based on existing land uses on the southern side of Furniss Road, west of Driver Road, a land use category of ITE 180 'Speciality Trade Contractor' was considered most appropriate to estimate the current Structure Plan traffic. A comparison between the proposed rezoning and the existing zoning is presented in **Table 6.5**.

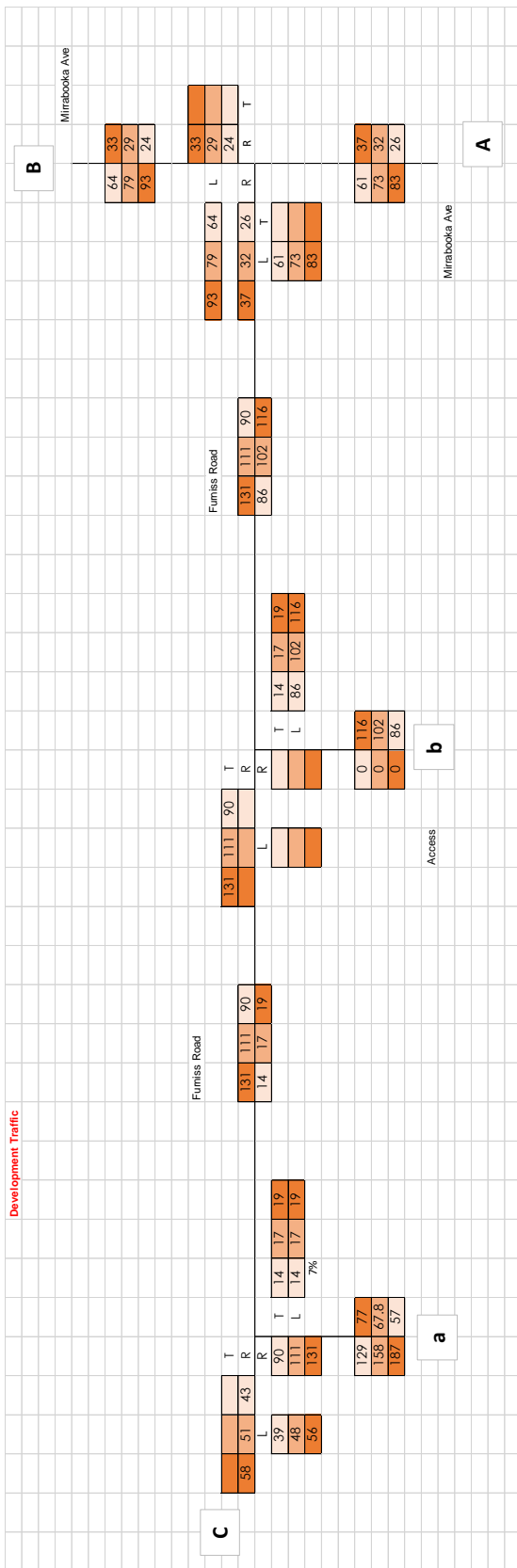
Table 6.5 – Trip Distribution

Land Use	AM Peak Hour Trips	PM Peak Hour Trips	Weekend Peak Hour Trips
Proposed Rezoning (Supermarket + Pad Sites)	387	469	543
Existing Zoning (business precinct as per EWSP Cell 6)	240	266	0
Difference	+148	+202	+543



Figure 6.4 shows the distribution of the estimated development traffic.

Figure 6.4 – Development Traffic Flows



6.5 Total Background and Development Traffic

Estimated total background and development traffic for year 2025 and 2035 are shown in **Figure 6.5** and **Figure 6.6** respectively.

Figure 6.5 – Background and Development Traffic Flow 2025

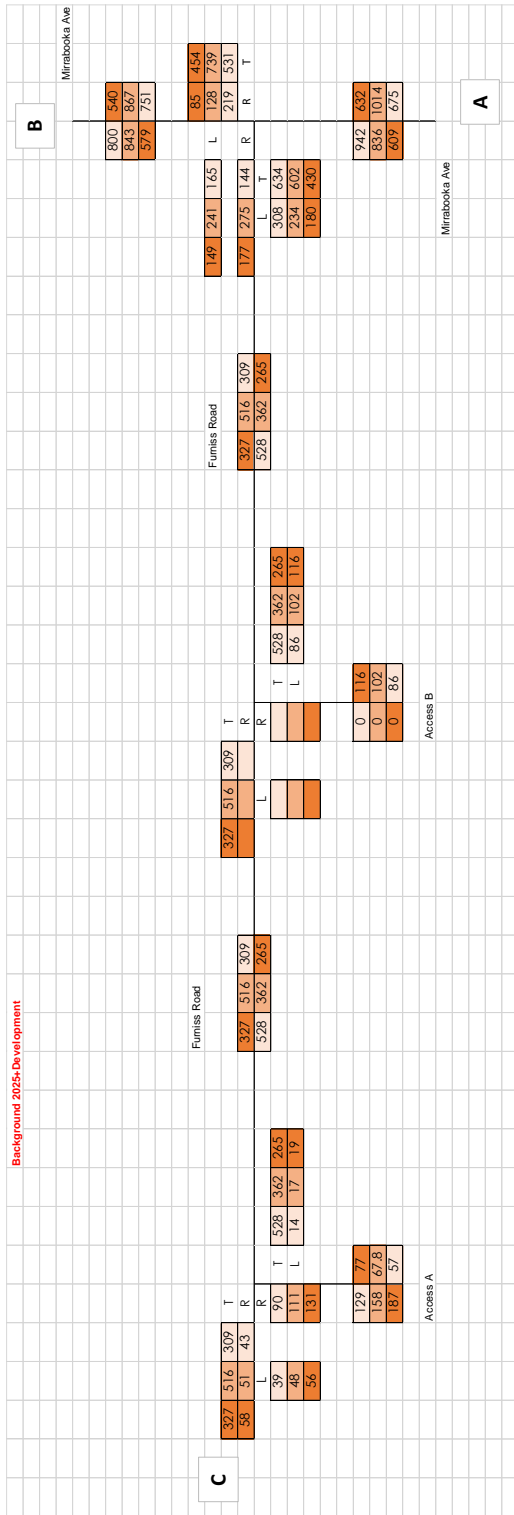
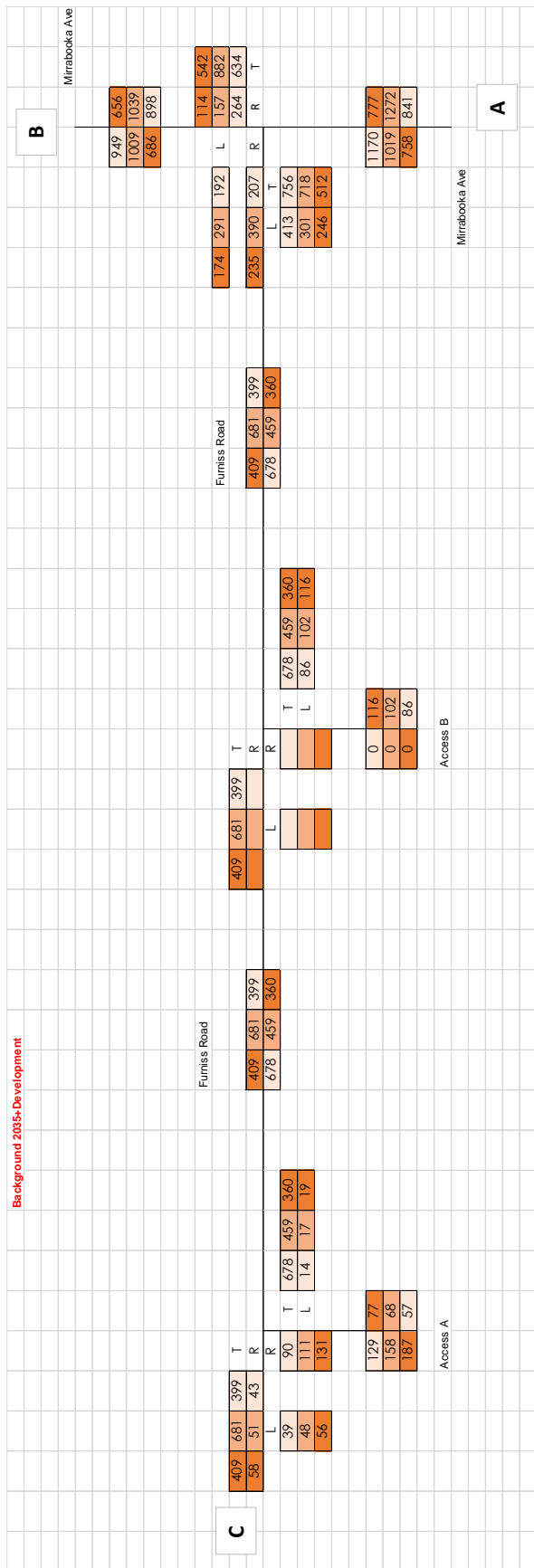


Figure 6.6 – Background and Development Traffic Flow 2035



6.6 Intersection Performance

The identified intersections have been analysed using the SIDRA analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters 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 theoretical intersection capacity is exceeded for an un-signalized intersection where $DOS > 0.80$;
- 95% Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- Average Delay: is the average of all travel time delays for vehicles through the intersection. An unsignalized intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 6.6**.

Table 6.6 – Level of Service (LOS) Performance Criteria

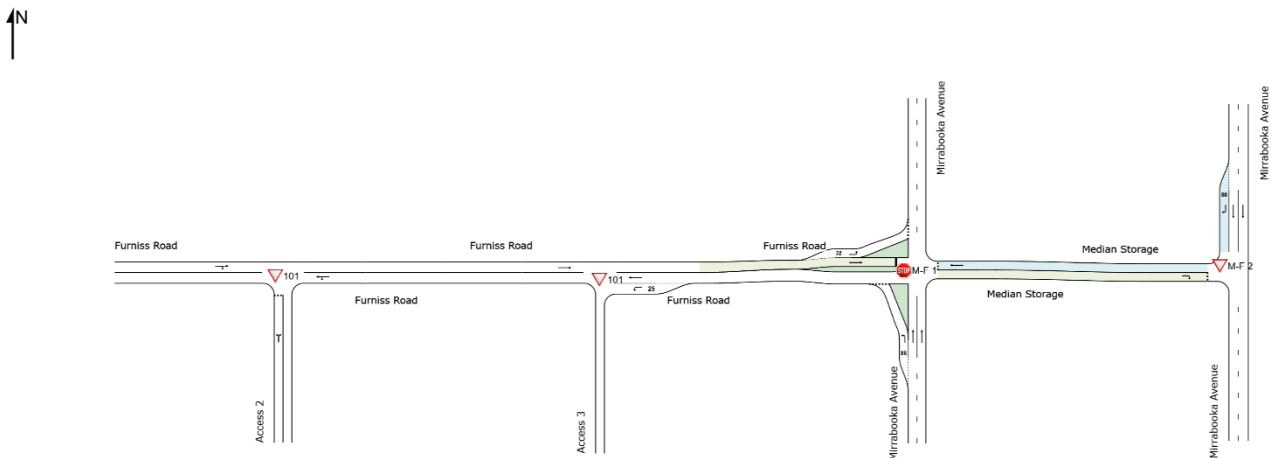
LOS	Description	Signalized Intersection	Unsignalized Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

A LOS exceeding these values indicates that the road section is exceeding its practical capacity. Above these values, users of the intersection are likely to experience unsatisfactory queuing and delays during the peak hour periods.

6.7 Traffic Analysis

Analysis has been undertaken using the SIDRA traffic analysis software. Details of the results are presented in **Appendix C**. Opening year scenarios for all the intersections analysed has been modelled as a network in SIDRA. **Figure 6.7** illustrates the SIDRA network model for all the intersections to be analysed.

Figure 6.7 – SIDRA Network Model (for Scenario 3 and 5)



6.7.1 Furniss Road/Mirrabooka Avenue Intersection

The SIDRA layout of the Furniss Road/Mirrabooka Avenue intersection is presented in **Figure 6.8**. The analysis results are presented in **Table 6.7** to **Table 6.11**.

Figure 6.8 – Furniss Road/Mirrabooka Avenue Intersection

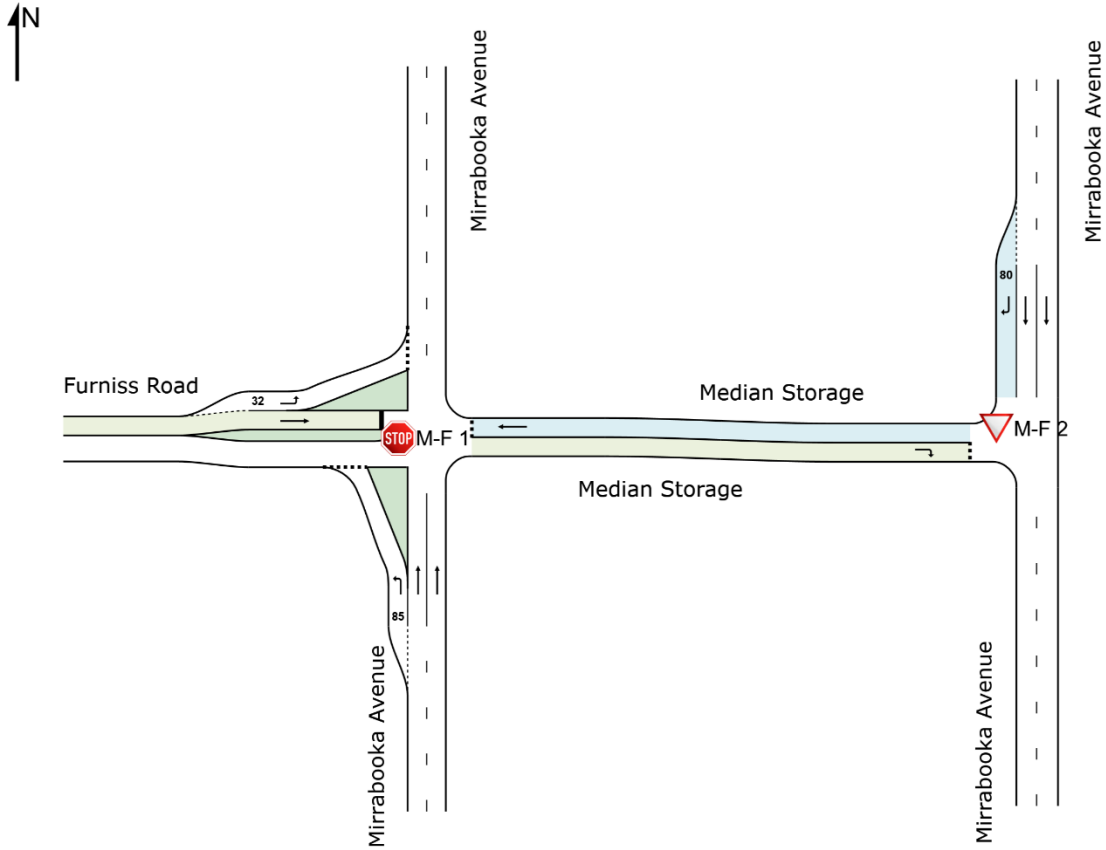


Table 6.7 – Scenario 1: Furniss Road/Mirrabooka Avenue – Existing 2023

Intersection Approach	Furniss Road/Mirrabooka Avenue – Existing 2023												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirrabooka Ave (S)	L	0.239	7.9	A	9	0.124	7.2	A	4.6	0.077	6.9	A	2.4
	T	0.176	0	A	0	0.17	0	A	0	0.116	0	A	0
Mirrabooka Ave (N)	T	0.15	0	A	0	0.198	0	A	0	0.121	0	A	0
	R	0.261	9.8	A	0	0.129	9.2	A	0	0.054	8	A	0
Furniss Rd (W)	L	0.098	6.3	A	3.4	0.145	6.1	A	4.7	0.044	5.6	A	1.3
	R	1.011	146.4	F	100.2	1.061	112.4	F	144.4	0.29	16.3	C	10.4
All Vehicles		1.011	12.2	B	100.2	1.061	15.6	C	144.4	0.29	3.1	A	10.4



Table 6.8 – Scenario 2: Furniss Road/Mirrabooka Avenue – 2025 without Development

Intersection Approach	Furniss Road/Mirrabooka Avenue – 2025 without Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirrabooka Ave (S)	L	0.239	7.9	A	9	0.124	7.2	A	4.6	0.077	6.9	A	2.4
	T	0.183	0	A	0	0.177	0	A	0	0.121	0	A	0
Mirrabooka Ave (N)	T	0.156	0	A	0	0.206	0	A	0	0.125	0	A	0
	R	0.269	10.1	B	0	0.132	9.4	A	0	0.055	8.1	A	0
Furniss Rd (W)	L	0.099	6.4	A	3.5	0.147	6.2	A	4.8	0.045	5.6	A	1.3
	R	1.065	180.2	F	124.6	1.059	112.4	F	143.9	0.299	16.9	C	10.8
All Vehicles		1.065	14.1	B	124.6	1.059	15.2	C	143.9	0.299	3.1	A	10.8

Table 6.9 – Scenario 3: Furniss Road/Mirrabooka Avenue – Opening Year 2025 with Development

Intersection Approach	Furniss Road/Mirrabooka Avenue – Opening Year 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirrabooka Ave (S)	L	0.307	8.2	A	12.2	0.185	7.4	A	7.2	0.147	7.1	A	5
	T	0.183	0	A	0	0.177	0	A	0	0.121	0	A	0
Mirrabooka Ave (N)	T	0.156	0	A	0	0.206	0	A	0	0.125	0	A	0
	R	0.302	10.3	B	0	0.171	9.5	A	0	0.091	8.1	A	0
Furniss Rd (W)	L	0.162	5.8	A	5.9	0.218	5.7	A	7.5	0.119	5	A	3.7
	R	1.474	497.4	F	136.7	1.25	264	F	136.7	0.428	19.4	C	17.9
All Vehicles		1.474	38.8	E	136.7	1.25	34.6	D	136.7	0.428	4.2	A	17.9

Table 6.10 – Scenario 4: Furniss Road/Mirrabooka Avenue – 2035 without Development

Intersection Approach	Furniss Road/Mirrabooka Avenue – 2035 without Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirrabooka Ave (S)	L	0.36	8.5	A	15.4	0.181	7.4	A	7	0.134	7	A	4.5
	T	0.218	0	A	0	0.211	0	A	0	0.144	0	A	0
Mirrabooka Ave (N)	T	0.186	0	A	0	0.246	0	A	0	0.15	0	A	0
	R	0.387	12.1	B	0	0.198	10.4	B	0	0.094	8.6	A	0
Furniss Rd (W)	L	0.136	6.8	A	4.8	0.206	6.6	A	6.9	0.067	5.8	A	2
	R	2.909	1774	F	852.9	1.948	883.7	F	984.6	0.575	25.5	D	25.7
All Vehicles		2.909	143.4	F	852.9	1.948	127.3	F	984.6	0.575	4.6	A	25.7

Table 6.11 – Scenario 5: Furniss Road/Mirraboooka Avenue – 2035 with Development

Intersection Approach	Furniss Road/Mirraboooka Avenue – 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirraboooka Ave (S)	L	0.436	9.3	A	23.6	0.246	7.6	A	10	0.208	7.2	A	7.4
	T	0.218	0	A	0	0.211	0	A	0	0.144	0	A	0
Mirraboooka Ave (N)	T	0.186	0	A	0	0.246	0	A	0	0.15	0	A	0
	R	0.426	12.4	B	0.5	0.243	10.7	B	0	0.133	8.7	A	0
Furniss Rd (W)	L	0.204	6.3	A	7.5	0.282	6.1	A	9.9	0.145	5.3	A	4.6
	R	3.835	2602	F	136.7	2.255	1158	F	136.7	0.861	44.9	E	56.7
All Vehicles		3.835	221.9	F	136.7	2.255	167.2	F	136.7	0.861	7.8	A	56.7

6.7.2 Furniss Road/Access 2 Intersection

The SIDRA layout of the Furniss Road/Access 2 intersection is presented in **Figure 6.9** and the analysis results are presented in **Table 6.12** to **Table 6.13**.

Figure 6.9 – Furniss Road/Access 2 Intersection

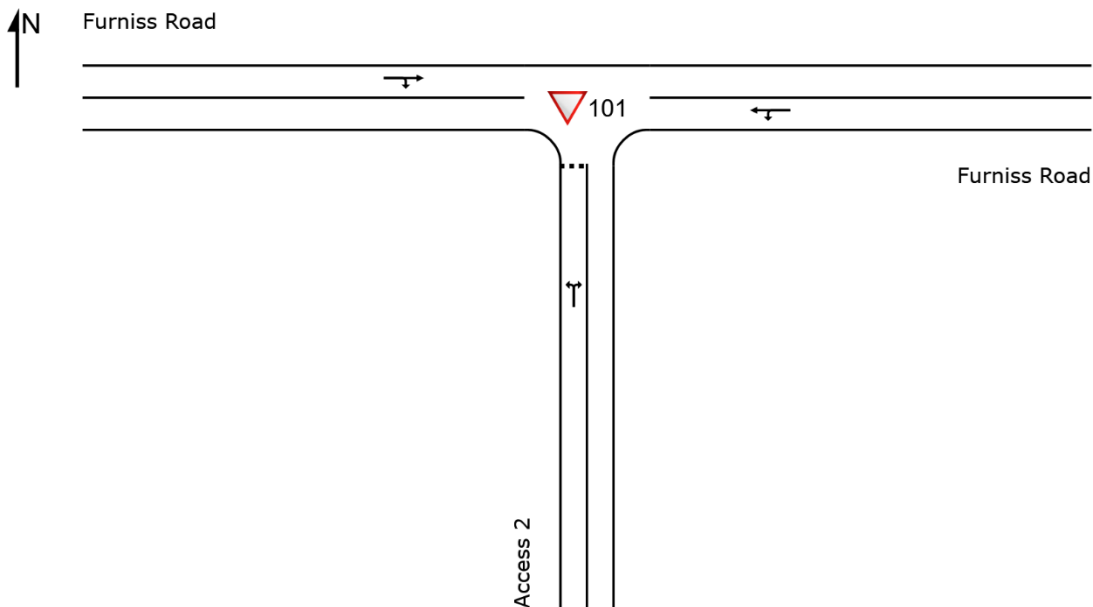


Table 6.12 – Scenario 3: Furniss Road/Access 2 – Opening Year 2025 with Development

Intersection Approach	Furniss Road/Access 2 – Opening Year 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Access 2 (S)	L	0.375	9.4	A	7.7	0.462	9.2	A	10.6	0.263	6.7	A	7.4
	R	0.375	14	B	7.7	0.462	15.6	C	10.6	0.263	9.8	A	7.4
Furniss Rd (E)	L	0.306	5.5	A	0	0.217	5.5	A	0	0.153	5.5	A	0
	T	0.306	0	A	0	0.217	0	A	0	0.153	0	A	0
Furniss Rd (W)	T	0.243	0.7	A	5.1	0.335	0.4	A	5.3	0.221	0.3	A	4.1
	R	0.243	8.8	A	5.1	0.335	7.8	A	5.3	0.221	6.8	A	4.1
All Vehicles		0.375	2.3	A	7.7	0.462	2.6	A	10.6	0.263	2.6	A	7.4

Table 6.13 – Scenario 5: Furniss Road/Access 2 – 2035 with Development

Intersection Approach	Furniss Road/Access 2 – 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Access 2 (S)	L	0.681	17.9	C	97.8	0.885	34	D	104.3	0.327	7.7	A	9.9
	R	0.681	26.5	D	97.8	0.885	46.7	E	104.3	0.327	12.3	B	9.9
Furniss Rd (E)	L	0.39	5.5	A	0	0.273	5.5	A	0	0.204	5.5	A	0
	T	0.39	0	A	0	0.273	0	A	0	0.204	0	A	0
Furniss Rd (W)	T	0.314	1.1	A	530.9	0.434	0.6	A	690.8	0.27	0.4	A	4.9
	R	0.314	11.1	B	530.9	0.434	9.3	A	690.8	0.27	7.5	A	4.9
All Vehicles		0.681	3.3	A	530.9	0.885	5.7	A	690.8	0.327	2.7	A	9.9

6.7.3 Furniss Road/Access 3 Intersection

The SIDRA layout of the Furniss Road/Access 3 is presented in **Figure 6.10** and the analysis results are presented in **Table 6.14** and **Table 6.15**.

Figure 6.10 – Furniss Road/Access 3 Intersection

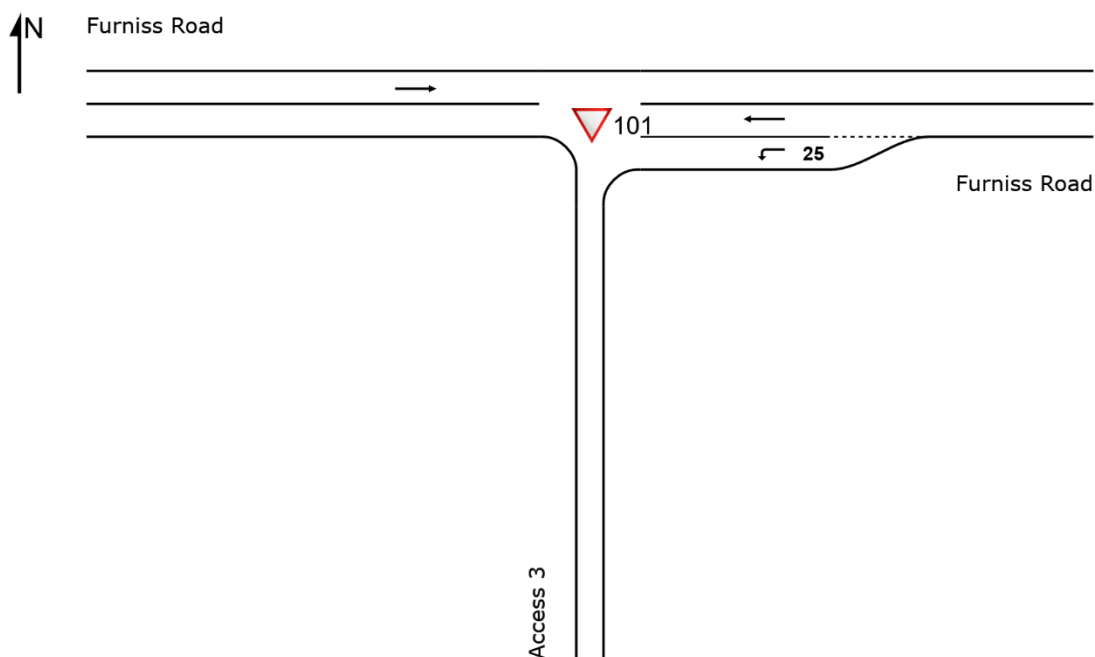


Table 6.14 – Scenario 3: Furniss Road/Access 3 – Opening Year 2025 with Development

Intersection Approach	Furniss Road/Access 3 – Opening Year 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Furniss Rd (E)	L	0.047	4.1	A	0	0.056	4.1	A	0	0.063	4.1	A	0
	T	0.298	0	A	0	0.208	0	A	0	0.143	0	A	0
Furniss Rd (W)	T	0.2	0	A	213.5	0.291	0	A	208.8	0.175	0	A	0
All Vehicles		0.298	0.4	A	213.5	0.291	0.4	A	208.8	0.175	0.7	A	0

Table 6.15 – Scenario 5: Furniss Road/Access 3 – Opening Year 2035 with Development

Intersection Approach	Furniss Road/Access 3 – Opening Year 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Furniss Rd (E)	L	0.047	4.1	A	0	0.056	4.1	A	0	0.063	4.1	A	0
	T	0.383	0	A	0	0.264	0	A	0	0.194	0	A	0
Furniss Rd (W)	T	0.258	0	A	248.5	0.384	0	A	248.5	0.224	0	A	0
All Vehicles		0.383	0.3	A	248.5	0.384	0.4	A	248.5	0.224	0.5	A	0

6.7.4 Summary of SIDRA Results

A summary of the SIDRA results is as follows:

- The SIDRA results show that in 2023 the Furniss Road/Mirrabooka Avenue intersection already operates beyond practical capacity during the AM and PM Weekday peak hours, with DOS >1.0 and delays in excess of 100 seconds for vehicles turning right from Furniss Road onto Mirrabooka Avenue. Based on these results, upgrading the intersection to a controlled intersection (roundabout or signals) is already justified based on existing traffic volumes and background growth, regardless of whether the subject development proceeds.
- In 2035, background traffic growth increases the DOS to over 2.0 in the AM Peak Hour, and the delay to nearly 30 minutes, for the right turn movement onto Mirrabooka Avenue. While these results are unlikely to occur in reality due to traffic diverting through residential areas to seek alternative routes, they indicate that action is required by the City to provide additional capacity at this intersection, regardless of whether the subject development proceeds.
- In addition to the individual turn movement delays outlined above, the length of queue on Furniss Avenue also impacts access to/from abutting lots on the northern side of Furniss Road, as well as access to/from Langar Way and Darlot Road, causing flow-on effects for users of these roads.
- Once the development traffic is added to the Furniss Road/Mirrabooka Avenue intersection, the performance deteriorates further into unrealistic levels of saturation and delay.
- Therefore, to accommodate the existing traffic, the increase in background traffic, and the development generated traffic, a controlled intersection is required. This is discussed further in **Section 6.7.5** below.
- The SIDRA results indicate that both Access and 2 Access 3 will operate satisfactorily for all scenarios, notwithstanding the performance of the Furniss Road/Mirrabooka Avenue intersection.

6.7.5 Intersection Options Assessment

Two options were considered to address the performance issues at the Furniss Road/Mirrabooka Avenue intersection:

- **Roundabout** – based on the current lane configuration, a dual lane roundabout would be required which would necessitate a significant amount of land being acquired around the intersection. **Figure 6.11** shows the likely area required (including an additional 5m offset representing the verge area) to accommodate a dual lane roundabout based on the footprint of the Gngalara Road/Mirrabooka Avenue intersection to the north. As demonstrated on the sketch, the roundabout encroaches over several residential dwelling to the east as well as over the industrial site located on the north western corner and reduce the available area for the pad site on the south western corner.
- **Signalised Intersection** – as this option requires no or very little additional land requirements, signalisation is likely to be the most feasible option for this location. To measure the potential operational improvements gained from signalisation, a SIDRA assessment has been conducted with the layout shown in **Figure 6.12** and results summarised in **Table 6.16** and **Table 6.17**.

The SIDRA results for the **Signalised Intersection** option show a significant improvement in operation as a result of signalising the Furniss Road/Mirrabooka Avenue intersection. In particular:

- For 2025 (Opening Year), Degree of Saturation is reduced to 0.61 in the worst performing peak hour (AM Peak) and average delay is reduced to 21 seconds;
- For 2035 (Opening Year + 10), Degree of Saturation remains acceptable at 0.839 for the worst performing peak hour (PM Peak) and average delay is only 27 seconds.

Importantly, these metrics exceeds the performance requirements for Opening Year and Opening Year +10 for new signalised intersections in Main Roads' Traffic Signals Approval Policy (TSAP).

Furthermore, the operation of the site accesses are also improved as the traffic issues at the Furniss Road/Mirrabooka Avenue intersection are no longer compounded across the network (as shown in **Table 6.18** to **Table 6.21**).

Overall, it is considered that the signalised intersection option is the most suitable type of controlled intersection and should be investigated by the City of Wanneroo through Main Roads' TSAP process.



Figure 6.11 – Indicative Area Required for the Furniss Road/Mirrabooka Avenue Roundabout

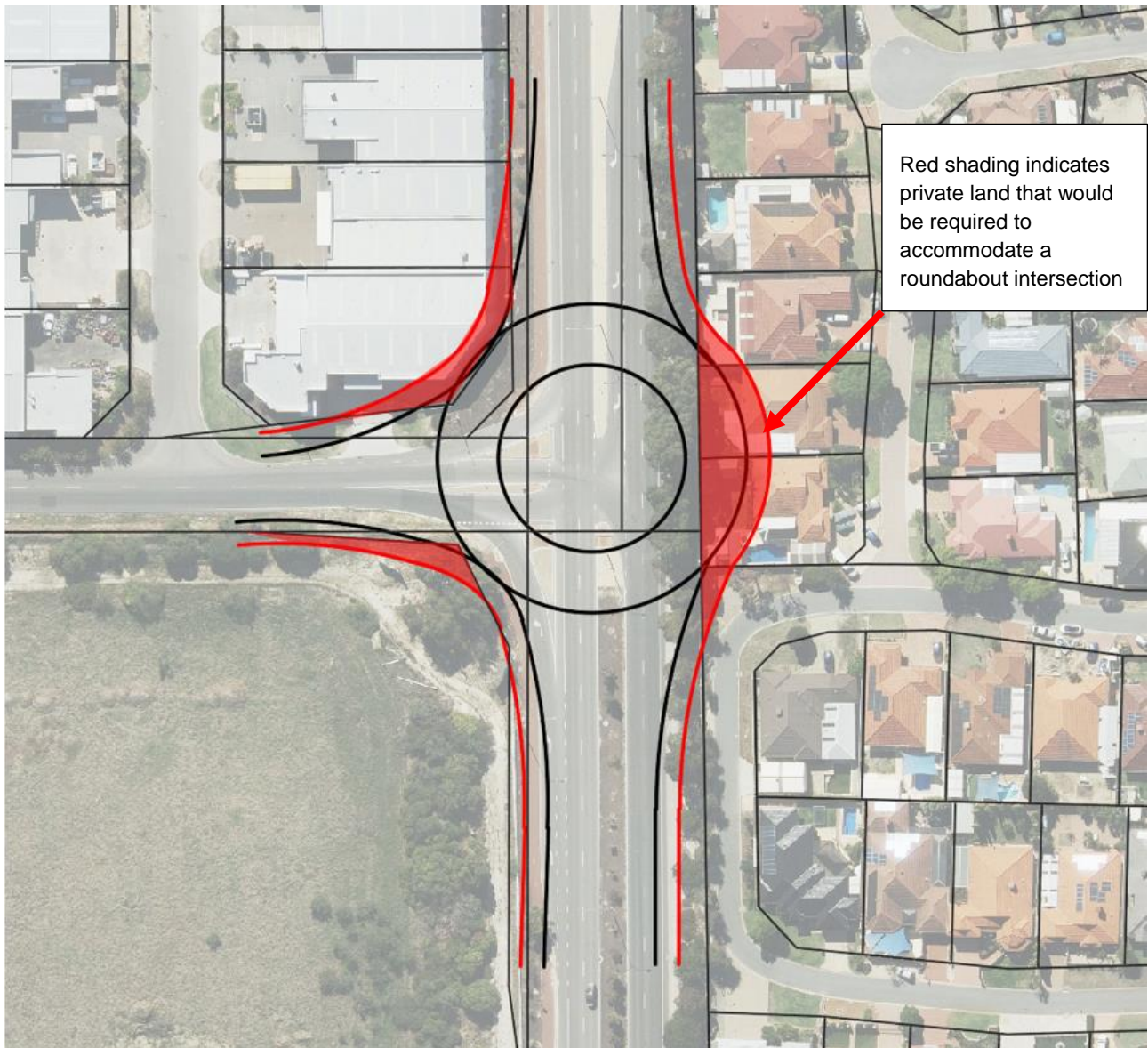


Figure 6.12 – Furniss Road/Mirrabooka Avenue Intersection (Signalised)

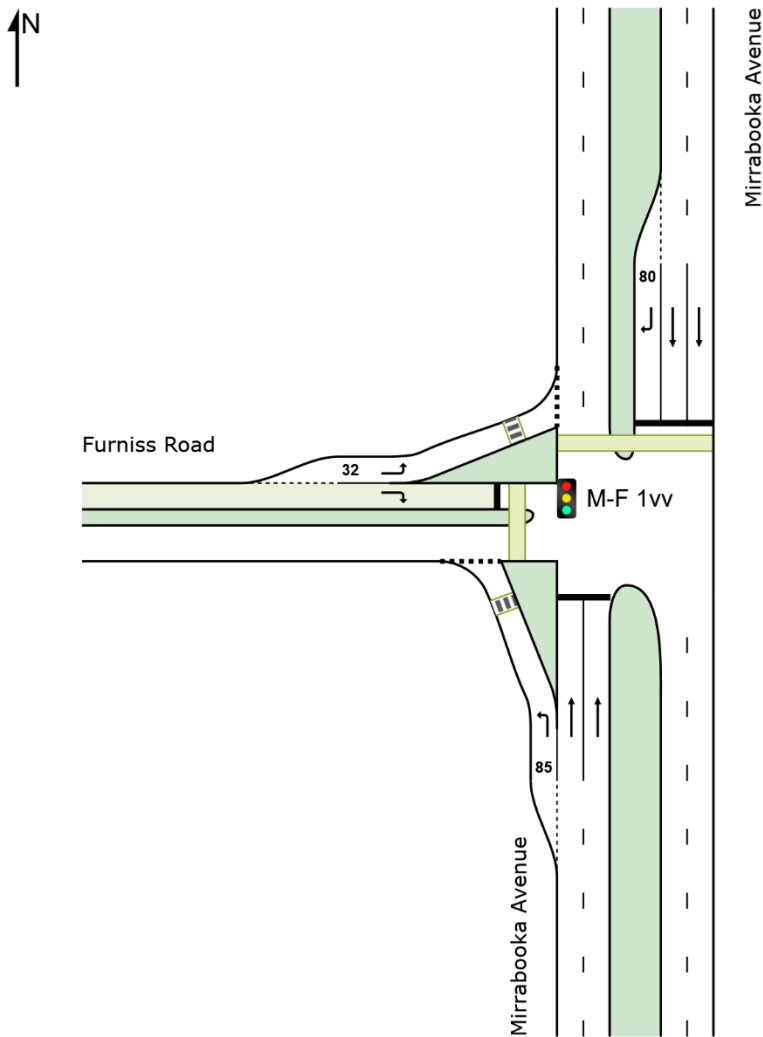


Table 6.16 – Scenario 3: Furniss Road/Mirrabooka Avenue – 2025 with Development (Signalised)

Intersection Approach	Furniss Road/Mirrabooka Avenue – 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirrabooka Ave (S)	L	0.255	9.1	A	16.2	0.182	8.2	A	9.5	0.128	7.6	A	4.7
	T	0.610	26.3	C	54.9	0.600	29.4	C	60.3	0.359	21.7	C	31.7
Mirrabooka Ave (N)	T	0.269	8.6	A	26.4	0.428	15.9	B	52	0.231	9.9	A	22.4
	R	0.609	38.1	D	39.5	0.619	49.3	D	27.9	0.358	41.7	D	15.2
Furniss Rd (W)	L	0.176	7.3	A	10.3	0.24	7.5	A	15.5	0.138	5.9	A	5.4
	R	0.415	30.7	C	30.2	0.617	26.3	C	48	0.347	27.4	C	27
All Vehicles		0.61	19	B	54.9	0.619	21.1	C	60.3	0.359	16.6	B	31.7

Table 6.17 – Scenario 5: Furniss Road/Mirraboooka Avenue – 2035 with Development (Signalised)

Intersection Approach	Furniss Road/Mirraboooka Avenue – 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Mirraboooka Ave (S)	L	0.351	9.9	A	26.8	0.237	8.6	A	14.2	0.178	7.8	A	7.6
	T	0.759	30.9	C	73.7	0.839	41.6	D	90.1	0.462	24.1	C	40.4
Mirraboooka Ave (N)	T	0.328	9.5	A	33.8	0.576	20.7	C	72.9	0.283	10.8	B	28.3
	R	0.734	41	D	51.2	0.835	56.3	E	38.1	0.440	41.2	D	20.4
Furniss Rd (W)	L	0.21	8.4	A	14.3	0.293	9.1	A	22.7	0.165	6.4	A	7.6
	R	0.741	34.7	C	48.8	0.814	31.3	C	55	0.469	27.5	C	36.6
All Vehicles		0.759	21.5	C	73.7	0.839	27.2	C	90.1	0.469	17.8	B	40.4

Table 6.18 – Scenario 3: Furniss Road/Access 2 – Opening Year 2025 with Development (Impact of Furniss Road/Mirraboooka Avenue Signalisation)

Intersection Approach	Furniss Road/Access 2 – Opening Year 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Access 2 (S)	L	0.266	8.7	A	2.9	0.333	8	A	3.9	0.263	6.7	A	3
	R	0.266	13.3	B	2.9	0.333	14.5	B	3.9	0.263	9.8	A	3
Furniss Rd (E)	L	0.306	5.5	A	0	0.217	5.5	A	0	0.153	5.5	A	0
	T	0.306	0	A	0	0.217	0	A	0	0.153	0	A	0
Furniss Rd (W)	T	0.243	0.7	A	2	0.335	0.4	A	2.2	0.221	0.3	A	1.6
	R	0.243	8.8	A	2	0.335	7.8	A	2.2	0.221	6.8	A	1.6
All Vehicles		0.306	2.2	A	2.9	0.335	2.4	A	3.9	0.263	2.6	A	3

Table 6.19 – Scenario 5: Furniss Road/Access 2 – 2035 with Development (Impact of Furniss Road/Mirrabooka Avenue Signalisation)

Intersection Approach	Furniss Road/Access 2 – 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Access 2 (S)	L	0.402	11.7	B	4.5	0.521	11.7	B	6.4	0.327	7.7	A	4
	R	0.402	20.4	C	4.5	0.521	24.3	C	6.4	0.327	12.3	B	4
Furniss Rd (E)	L	0.39	5.5	A	0	0.273	5.5	A	0	0.204	5.5	A	0
	T	0.39	0	A	0	0.273	0	A	0	0.204	0	A	0
Furniss Rd (W)	T	0.314	1.1	A	3.4	0.434	0.6	A	3.4	0.27	0.4	A	2
	R	0.314	11.1	B	3.4	0.434	9.3	A	3.4	0.27	7.5	A	2
All Vehicles		0.402	2.6	A	4.5	0.521	3.1	A	6.4	0.327	2.7	A	4

Table 6.20 – Scenario 3: Furniss Road/Access 3 – Opening Year 2025 with Development (Impact of Furniss Road/Mirrabooka Avenue Signalisation)

Intersection Approach	Furniss Road/Access 3 – Opening Year 2025 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Furniss Rd (E)	L	0.047	4.1	A	0	0.056	4.1	A	0	0.063	4.1	A	0
	T	0.298	0	A	0	0.208	0	A	0	0.143	0	A	0
Furniss Rd (W)	T	0.2	0	A	0	0.464	0.1	A	0	0.175	0	A	0
All Vehicles		0.298	0.4	A	0	0.464	0.5	A	0	0.175	0.7	A	0

Table 6.21 – Scenario 5: Furniss Road/Access 3 – Opening Year 2035 with Development (Impact of Furniss Road/Mirrabooka Avenue Signalisation)

Intersection Approach	Furniss Road/Access 3 – Opening Year 2035 with Development												
		AM Peak				PM Peak				Weekend peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Furniss Rd (E)	L	0.047	4.1	A	0	0.056	4.1	A	0	0.063	4.1	A	0
	T	0.383	0	A	0	0.264	0	A	0	0.194	0	A	0
Furniss Rd (W)	T	0.421	0.1	A	0	0.384	0	A	23.9	0.25	0	A	0
All Vehicles		0.421	0.3	A	0	0.384	0.4	A	23.9	0.25	0.6	A	0

7. Site Specific Issues

7.1.1 Lot 623 (No. 140) Furniss Road Access

As shown in **Figure 7.1**, the proposed main site access (Access 2) is located directly opposite an existing crossover to Lot 623 Furniss Road. Lot 623 is currently occupied by a demolition business.

Video surveys undertaken for this Transport Impact Assessments indicated that large trucks typically reverse from Furniss Road into the Lot 623 and then exit in forward gear as shown in **Figure 7.2**. Observations indicate that the reversing truck movement disrupts traffic traveling in both directions for approximately 2 mins.

Examination of Nearthmap aerial imagery indicates that Lot 623 was developed in 2013. At this time, AS2890.2 permitted reversing movements into lots from a minor road, subject to local authority agreement. It is unclear whether reversing into Lot 623 from Furniss Road is considered to be a standard operation that has been approved by the City.

Figure 7.1 – Demolition Site Crossover Location

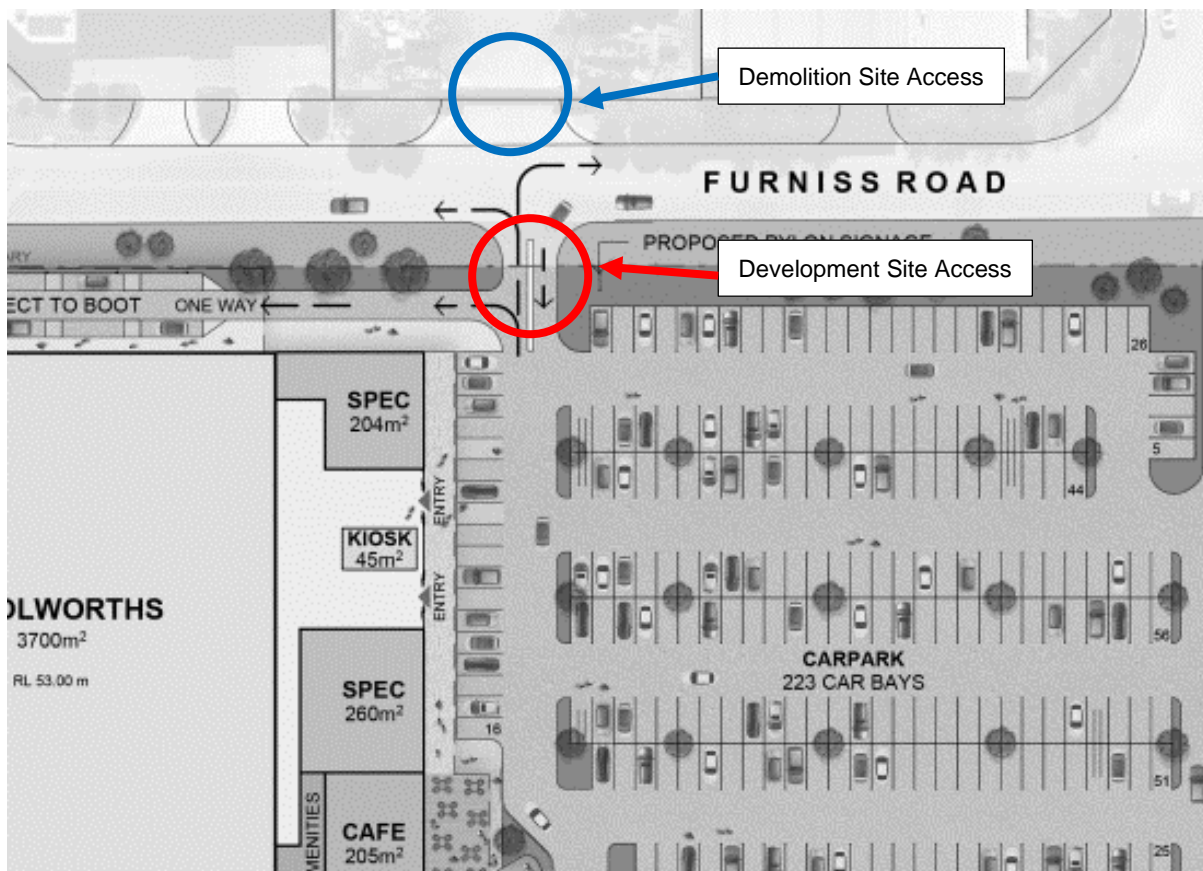


Figure 7.2 – Truck Reversing into the Demolition Site



The total number of vehicles entering and exiting the demolition site is summarised in **Table 7.1** based on the traffic surveys conducted Thursday 22nd June 2023 (the coloured text highlighting the AM and PM peaks). On Saturday, 24th June only one car was recorded entering and exiting the site across the entire day.

Table 7.1 – Summary of Traffic Entering/Exiting the Demolition Site – Thursday 22 June 2023

Time	Cars (IN)	Cars (OUT)	Trucks (IN)	Trucks (OUT)
Before 7:00	0	0	0	0
7:00	1	1	4	1
8:00	0	1	1	1
9:00	1	1	3	3
10:00	1	0	2	1
11:00	0	1	4	1
12:00	1	0	2	3
13:00	3	1	2	1
14:00	0	0	2	3
15:00	2	1	1	1
16:00	0	2	0	0
17:00 onwards	0	0	0	0
Total	9	8	21	15

Overall, Lot 623 currently generates a total of 36 truck movements and 17 car movements per weekday, with minimal/no activity on Saturday. It is noted that there are no truck movements to the site occurring after 16:00, which is when the supermarket peak occurs on a weekday.

With the low number of movements, and the fact that the movements occur outside of peak supermarket periods (weekdays after 4pm and Saturdays) it is considered that the supermarket access in this location will function acceptably. It is noted that when Lot 623 is eventually redeveloped, the City would likely require all entry/exit movements to occur in forward gear and therefore the reversing movements would be eliminated.

8. Summary

This Transport Impact Assessment outlines the transport aspects of the proposed development focusing on traffic operations, access. Included are discussions regarding pedestrian, cycle and public transport considerations.

This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*.

The following conclusions have been made regarding the proposal:

- The indicative land uses proposed are summarised as follows:
 - Supermarket – 3,700 m²
 - 2 Speciality stores – 204 m² and 260 m²
 - Kiosk – 45 m²
 - Café/restaurant – 205 m²
 - 223 car bays
 - 2 pad sites, consisting of a child care centre and a fast food tenancy.
- The proposed development (excluding the pads sites) represents a two-way trip generation of approximately 311 vehicles during the weekday AM peak hour, 359 vehicles during the weekday PM peak hour and 464 vehicles during the weekend peak hour.
- Six vehicular access points are proposed to the development; along Furniss Road and Manderston Approach.
- A summary of the SIDRA results are as follows:
 - The SIDRA results show that in 2023 the Furniss Road/Mirraboooka Avenue intersection already operates beyond practical capacity during the AM and PM Weekday peak hours
 - In 2035, background traffic growth increases the DOS and delay for the right turn movement onto Mirraboooka Avenue. While these results are unlikely to occur in reality due to traffic diverting through residential areas to seek alternative routes, they indicate that action is required by the City to provide additional capacity at this intersection, regardless of whether the subject development proceeds.
 - In addition to the individual turn movement delays outlined above, the length of queue on Furniss Avenue also impacts access to/from abutting lots on the northern side of Furniss Road, as well as access to/from Langar Way and Darlot Road, causing flow-on effects for users of these roads.
 - Once the development traffic is added to the Furniss Road/Mirraboooka Avenue intersection, the performance deteriorates further into unrealistic levels of saturation and delay.
 - The SIDRA results indicate that both Access and 2 Access 3 will operate satisfactorily for all scenarios, notwithstanding the performance of the Furniss Road/Mirraboooka Avenue intersection.
- As a result of the performance issues at the Furniss Road./Mirraboooka Avuenue intersection, two potential remedial options were investigated.
 - The roundabout option was considered to be unfeasible due to the significantly levels of encroachment onto adjacent private land in all directions.
 - Signalisation resulted in significant improvements at the Furniss Road./Mirraboooka Avenue intersection as well as the site accesses. Overall, it is considered that the signalised intersection option is the most suitable type of controlled intersection and should be investigated by the City of Wanneroo through Main Roads' TSAP process.
- Parking will be provided in accordance with the District Planning Scheme and can be accomodated within the subject site.
- A review of the crash data shows that the majority of crashed within the surrounding area occurred at the Funiss Road/Mirraboooka Avenue intersection. This intersection is a prequalified location for both the State and Federal Black Spot programmes and would be eligible for funding to address the existing crash history.
- Overall, the public transport amenity within the surrounding area of the site is poor due to the lack of any public transport services located within a walkable distance to the site with the nearest bus service located approximately 800m from the Site. Furthermore, the nearest available services generally operate at a low/moderate frequency to a limited number of locations.
- Overall, pedestrian and cycling amenity within the surrounding area is considered to be poor as there is a lack of pedestrian and cycling connections to and from the site. As the surrounding area is currently undeveloped, there is no demand for these facilities. These facilities will be required in the future when developments such as Kinmore Green residential subdivision progresses.



- The proposed main site access (Access 2) is located directly opposite an existing crossover to Lot 623 Furniss Road. The traffic generate by Lot 623 is considered to be low and unlikely to impact the traffic operation at Access 2. Trucks were observed to reverse into the site off the road though this arrangement will likely change once this site is eventually redeveloped.



Appendices

We design with community in mind



Appendix A. WAPC Checklist

Item	Provided	Comments / Proposals
Introduction/Background		
name of applicant and consultant	Section 1	
development location and context	Section 2	
brief description of development proposal	Section 1	
key issues	N/A	
Background information	Section 1	
Existing situation		
existing site uses (if any)	Section 2.2	
existing parking and demand (if appropriate)	N/A	
existing access arrangements	Section 2	
existing site traffic	Section 2.4	
surrounding land uses	Section 2.2	
surrounding road network	Section 2	
traffic management on frontage roads	Section 2	
traffic flows on surrounding roads (usually am and pm peak hours)	Section 2	
traffic flows at major intersections (usually am and pm peak hours)	Section 6.2	
operation of surrounding intersections	Section 6.5	
existing pedestrian/cycle networks	Section 2.6	
existing public transport services surrounding the development	Section 2.7	
Crash data	Section 2.8	
Development proposal		
regional context	Section 2.2	
proposed land uses	Section 3.1	
table of land uses and quantities	Section 3.1	
access arrangements	Section 3.2	
parking provision	Section 3.4	
end of trip facilities	N/A	



any specific issues	N/A	
road network	N/A	
intersection layouts and controls	N/A	
pedestrian/cycle networks and crossing facilities	N/A	
public transport services	N/A	
Integration with surrounding area		
surrounding major attractors/generators	Section 5.1	
committed developments and transport proposals	Section 4	
proposed changes to land uses within 1200 metres	Section 5.2	
travel desire lines from development to these attractors/generators	N/A	
adequacy of existing transport networks	N/A	
deficiencies in existing transport networks	N/A	
remedial measures to address deficiencies	N/A	
Analysis of transport networks		
assessment years	Section 6.1	
time periods	Section 6.1	
development generated traffic	Section 6.4	
distribution of generated traffic	Section 6.4	
parking supply & demand	Section 3.4	
base and "with development" traffic flows	Section 6.4	
analysis of development accesses	Section 6.7	
impact on surrounding roads	Section 6.7	
impact on intersections	Section 6.7	
impact on neighbouring areas	Section 5	
road safety	Section 2.8	
public transport access	Section 4	
pedestrian access / amenity	Section 4	
cycle access / amenity	Section 4	
analysis of pedestrian / cycle networks	Section 4	
safe walk/cycle to school (for residential and school site developments only)	N/A	
Traffic management plan (where appropriate)	N/A	



Appendix B. Development Plans





PROPOSED MASTERPLAN
WOOLWORTHS KINMORE ESTATE

Status: **PRELIMINARY**
Path: P:\44686 Woolworths Kinmore Green\03
Production\01 Design\BIM and Links\Central
File\44686 - Woolworths Kinmore Estate.rvt

Scale: 1:1000 @ A3
0 40
© Hames Sharley



Project Number: 44686
Drawing Number: MP-SK01
Revision: A
Date: 11/07/23



Appendix C. SIDRA Result



MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2023 AM (Site Folder: S1-Existing 2023)]

Network: SCTI-B
[Mirrabooka / Furniss 2023 AM (Network Folder: S1)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	538	9.0	538	9.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	205	2.5	205	2.5	0.131	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		743	7.2	743	7.2	0.150	1.8	NA	0.0	0.0	0.00	0.18	0.00	65.1
West: Median Storage														
1	R2	124	26.3	124	26.3	0.171	3.6	LOS A	0.6	5.6	0.49	0.58	0.49	35.3
Approach		124	26.3	124	26.3	0.171	3.6	LOS A	0.6	5.6	0.49	0.58	0.49	35.3
All Vehicles		867	9.9	867	9.9	0.171	2.0	NA	0.6	5.6	0.07	0.24	0.07	59.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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Project: K:\Projects\CW1200740_300304726_Fabcot Pty Ltd_Woolworths Darch - Traffic Advice\5_Technical\Traffic\Modelling\CW1200740-TR-Woolworths Darch SIDRA V3.sip9

MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2023 AM (Site Folder: S1-Existing 2023)]

 Network: SCTI-B
[Mirrabooka / Furniss 2023 AM
(Network Folder: S1)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	260	10.1	260	10.1	0.239	7.9	LOS A	1.1	9.0	0.37	0.62	0.37	45.6
4	T1	642	5.9	642	5.9	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		902	7.1	902	7.1	0.239	2.3	LOS A	1.1	9.0	0.11	0.18	0.11	62.2
East: Median Storage														
5	T1	205	2.5	205	2.5	0.261	3.4	LOS A	1.1	8.1	0.57	0.60	0.60	23.6
Approach		205	2.5	205	2.5	0.261	3.4	LOS A	1.1	8.1	0.57	0.60	0.60	23.6
West: Furniss Road														
1	L2	106	13.9	106	13.9	0.098	6.3	LOS A	0.4	3.4	0.41	0.61	0.41	40.9
2	T1	124	26.3	124	26.3	1.011	142.8	LOS F	10.3	100.2	1.00	1.84	3.93	2.1
Approach		231	20.6	231	20.6	1.011	79.8	LOS F	10.3	100.2	0.73	1.27	2.31	7.6
All Vehicles		1338	8.7	1338	8.7	1.011	15.8	NA	10.3	100.2	0.28	0.43	0.56	37.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2023 PM (Site Folder: S1-Existing 2023)]

Network: SCTI-B
[Mirrabooka / Furniss 2023 PM (Network Folder: S1)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	748	4.5	748	4.5	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	104	3.0	104	3.0	0.058	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		853	4.3	853	4.3	0.198	0.8	NA	0.0	0.0	0.00	0.08	0.00	67.9
West: Median Storage														
1	R2	256	8.6	256	8.6	0.378	5.5	LOS A	1.6	13.4	0.62	0.86	0.81	39.3
Approach		256	8.6	256	8.6	0.378	5.5	LOS A	1.6	13.4	0.62	0.86	0.81	39.3
All Vehicles		1108	5.3	1108	5.3	0.378	1.9	NA	1.6	13.4	0.14	0.26	0.19	60.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2023 PM (Site Folder: S1-Existing 2023)]

 Network: SCTI-B
[Mirrabooka / Furniss 2023 PM
(Network Folder: S1)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	169	14.3	169	14.3	0.124	7.2	LOS A	0.5	4.6	0.22	0.56	0.22	46.4
4	T1	609	7.3	609	7.3	0.170	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		779	8.8	779	8.8	0.170	1.6	LOS A	0.5	4.6	0.05	0.12	0.05	64.3
East: Median Storage														
5	T1	104	3.0	104	3.0	0.129	2.8	LOS A	0.5	3.5	0.52	0.48	0.52	24.7
Approach		104	3.0	104	3.0	0.129	2.8	LOS A	0.5	3.5	0.52	0.48	0.52	24.7
West: Furniss Road														
1	L2	171	5.5	171	5.5	0.145	6.1	LOS A	0.6	4.7	0.40	0.61	0.40	43.2
2	T1	256	8.6	256	8.6	1.061	106.9	LOS F	17.8	144.4	1.00	2.82	7.08	2.8
Approach		426	7.4	426	7.4	1.061	66.6	LOS F	17.8	144.4	0.76	1.94	4.41	8.3
All Vehicles		1309	7.9	1309	7.9	1.061	22.9	NA	17.8	144.4	0.32	0.74	1.51	31.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2023 SAT (Site Folder: S1-Existing 2023)]

Network: SCTI-B
[Mirrabooka / Furniss 2023 SAT (Network Folder: S1)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	460	3.9	460	3.9	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	55	1.9	55	1.9	0.030	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		515	3.7	515	3.7	0.121	0.7	NA	0.0	0.0	0.00	0.07	0.00	68.2
West: Median Storage														
1	R2	147	3.6	147	3.6	0.153	2.4	LOS A	0.5	3.9	0.42	0.48	0.42	46.3
Approach		147	3.6	147	3.6	0.153	2.4	LOS A	0.5	3.9	0.42	0.48	0.42	46.3
All Vehicles		662	3.7	662	3.7	0.153	1.1	NA	0.5	3.9	0.09	0.16	0.09	63.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2023 SAT (Site Folder: S1-Existing 2023)]

 Network: SCTI-B
[Mirrabooka / Furniss 2023 SAT
(Network Folder: S1)]

Staged Crossing at T Intersection Type B

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	102	5.2	102	5.2	0.077	6.9	LOS A	0.3	2.4	0.15	0.55	0.15	47.3
4	T1	435	3.9	435	3.9	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		537	4.1	537	4.1	0.116	1.3	LOS A	0.3	2.4	0.03	0.10	0.03	65.3
East: Median Storage														
5	T1	55	1.9	55	1.9	0.054	1.6	LOS A	0.2	1.4	0.42	0.31	0.42	27.2
Approach		55	1.9	55	1.9	0.054	1.6	LOS A	0.2	1.4	0.42	0.31	0.42	27.2
West: Furniss Road														
1	L2	59	1.8	59	1.8	0.044	5.6	LOS A	0.2	1.3	0.30	0.54	0.30	44.9
2	T1	147	3.6	147	3.6	0.290	13.9	LOS B	1.4	10.4	0.65	1.04	0.74	17.5
Approach		206	3.1	206	3.1	0.290	11.5	LOS B	1.4	10.4	0.55	0.90	0.61	27.6
All Vehicles		798	3.7	798	3.7	0.290	4.0	NA	1.4	10.4	0.19	0.32	0.21	56.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025 AM (Site Folder: S2-BG 2025)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 AM (Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	559	9.0	559	9.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	205	2.5	205	2.5	0.133	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		764	7.3	764	7.3	0.156	1.7	NA	0.0	0.0	0.00	0.18	0.00	65.3
West: Median Storage														
1	R2	124	26.3	117	26.3	0.166	3.8	LOS A	0.6	5.4	0.50	0.59	0.50	35.1
Approach		124	26.3	117 ^{N1}	26.3	0.166	3.8	LOS A	0.6	5.4	0.50	0.59	0.50	35.1
All Vehicles		888	9.9	881 ^{N1}	10.0	0.166	2.0	NA	0.6	5.4	0.07	0.23	0.07	60.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025 AM (Site Folder: S2-BG 2025)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 AM
(Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	260	10.1	260	10.1	0.239	7.9	LOS A	1.1	9.0	0.37	0.62	0.37	45.6
4	T1	667	5.9	667	5.9	0.183	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		927	7.1	927	7.1	0.239	2.2	LOS A	1.1	9.0	0.10	0.17	0.10	62.4
East: Median Storage														
5	T1	205	2.5	205	2.5	0.269	3.7	LOS A	1.1	8.4	0.58	0.62	0.63	23.2
Approach		205	2.5	205	2.5	0.269	3.7	LOS A	1.1	8.4	0.58	0.62	0.63	23.2
West: Furniss Road														
1	L2	106	13.9	106	13.9	0.099	6.4	LOS A	0.4	3.5	0.42	0.62	0.42	40.9
2	T1	124	26.3	124	26.3	1.065	176.4	LOS F	12.8	124.6	1.00	2.00	4.52	1.7
Approach		231	20.6	231	20.6	1.065	98.0	LOS F	12.8	124.6	0.73	1.36	2.63	6.3
All Vehicles		1363	8.7	1363	8.7	1.065	18.6	NA	12.8	124.6	0.28	0.44	0.61	34.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025 PM (Site Folder: S2-BG 2025)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 PM (Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	778	4.5	778	4.5	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	104	3.0	104	3.0	0.058	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		882	4.3	882	4.3	0.206	0.8	NA	0.0	0.0	0.00	0.08	0.00	68.0
West: Median Storage														
1	R2	256	8.6	242	8.6	0.370	5.7	LOS A	1.6	12.8	0.64	0.86	0.82	39.0
Approach		256	8.6	242 ^{N1}	8.6	0.370	5.7	LOS A	1.6	12.8	0.64	0.86	0.82	39.0
All Vehicles		1138	5.3	1124 ^{N1}	5.3	0.370	1.8	NA	1.6	12.8	0.14	0.25	0.18	61.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025 PM (Site Folder: S2-BG 2025)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 PM
(Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	169	14.3	169	14.3	0.124	7.2	LOS A	0.5	4.6	0.22	0.56	0.22	46.4
4	T1	634	7.3	634	7.3	0.177	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		803	8.8	803	8.8	0.177	1.5	LOS A	0.5	4.6	0.05	0.12	0.05	64.4
East: Median Storage														
5	T1	104	3.0	104	3.0	0.132	3.0	LOS A	0.5	3.6	0.53	0.50	0.53	24.4
Approach		104	3.0	104	3.0	0.132	3.0	LOS A	0.5	3.6	0.53	0.50	0.53	24.4
West: Furniss Road														
1	L2	171	5.5	171	5.5	0.147	6.2	LOS A	0.6	4.8	0.41	0.62	0.41	43.1
2	T1	256	8.6	256	8.6	1.059	106.7	LOS F	17.7	143.9	1.00	2.78	6.99	2.8
Approach		426	7.4	426	7.4	1.059	66.5	LOS F	17.7	143.9	0.76	1.91	4.36	8.3
All Vehicles		1334	7.9	1334	7.9	1.059	22.4	NA	17.7	143.9	0.31	0.72	1.46	31.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025 SAT (Site Folder: S2-BG 2025)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 SAT (Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	478	3.9	478	3.9	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	55	1.9	55	1.9	0.030	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		533	3.7	533	3.7	0.125	0.7	NA	0.0	0.0	0.00	0.07	0.00	68.3
West: Median Storage														
1	R2	147	3.6	147	3.6	0.155	2.5	LOS A	0.5	4.0	0.43	0.49	0.43	46.1
Approach		147	3.6	147	3.6	0.155	2.5	LOS A	0.5	4.0	0.43	0.49	0.43	46.1
All Vehicles		680	3.7	680	3.7	0.155	1.1	NA	0.5	4.0	0.09	0.16	0.09	63.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025 SAT (Site Folder: S2-BG 2025)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 SAT (Network Folder: S2)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	102	5.2	102	5.2	0.077	6.9	LOS A	0.3	2.4	0.15	0.55	0.15	47.3
4	T1	453	3.9	453	3.9	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		555	4.1	555	4.1	0.121	1.3	LOS A	0.3	2.4	0.03	0.10	0.03	65.4
East: Median Storage														
5	T1	55	1.9	55	1.9	0.055	1.7	LOS A	0.2	1.5	0.42	0.32	0.42	27.0
Approach		55	1.9	55	1.9	0.055	1.7	LOS A	0.2	1.5	0.42	0.32	0.42	27.0
West: Furniss Road														
1	L2	59	1.8	59	1.8	0.045	5.6	LOS A	0.2	1.3	0.31	0.55	0.31	44.9
2	T1	147	3.6	147	3.6	0.299	14.4	LOS B	1.4	10.8	0.66	1.05	0.76	17.1
Approach		206	3.1	206	3.1	0.299	11.9	LOS B	1.4	10.8	0.56	0.90	0.63	27.2
All Vehicles		816	3.7	816	3.7	0.299	4.0	NA	1.4	10.8	0.19	0.32	0.21	56.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025+DEV AM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV AM (Network Folder: S3)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	559	9.0	559	9.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	231	2.5	231	2.5	0.162	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		789	7.1	789	7.1	0.162	1.9	NA	0.0	0.0	0.00	0.19	0.00	64.8
West: Median Storage														
1	R2	152	26.3	102	26.3	0.145	3.7	LOS A	0.5	4.7	0.49	0.58	0.49	35.2
Approach		152	26.3	102 ^{N1}	26.3	0.145	3.7	LOS A	0.5	4.7	0.49	0.58	0.49	35.2
All Vehicles		941	10.2	892 ^{N1}	10.8	0.162	2.1	NA	0.5	4.7	0.06	0.24	0.06	60.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025+DEV AM (Site Folder: S3-BG 2025+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV AM (Network Folder: S3)]

Staged Crossing at T Intersection Type B

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	324	10.1	324	10.1	0.307	8.2	LOS A	1.5	12.2	0.42	0.65	0.42	47.3
4	T1	667	5.9	667	5.9	0.183	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		992	7.3	992	7.3	0.307	2.7	LOS A	1.5	12.2	0.14	0.21	0.14	62.9
East: Median Storage														
5	T1	231	2.5	231	2.5	0.302	3.9	LOS A	1.3	10.0	0.59	0.66	0.68	9.5
Approach		231	2.5	231	2.5	0.302	3.9	LOS A	1.3	10.0	0.59	0.66	0.68	9.5
West: Furniss Road														
1	L2	174	13.9	174	13.9	0.162	5.8	LOS A	0.7	5.9	0.44	0.63	0.44	41.3
2	T1	152	26.3	152	26.3	1.474	493.7	LOS F	14.0	136.7	1.00	3.19	8.84	0.5
Approach		325	19.7	325	19.7	1.474	233.2	LOS F	14.0	136.7	0.70	1.82	4.35	2.7
All Vehicles		1547	9.2	1547	9.2	1.474	51.3	NA	14.0	136.7	0.32	0.62	1.10	17.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV AM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV AM (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	41	0.0	41	0.0	0.375	9.4	LOS A	1.0	7.7	0.67	0.92	0.86	48.5
3	R2	95	0.0	95	0.0	0.375	14.0	LOS B	1.0	7.7	0.67	0.92	0.86	42.5
Approach		136	0.0	136	0.0	0.375	12.7	LOS B	1.0	7.7	0.67	0.92	0.86	45.1
East: Furniss Road														
4	L2	15	0.0	15	0.0	0.306	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	57.0
5	T1	556	6.4	556	6.4	0.306	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		571	6.2	571	6.2	0.306	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
West: Furniss Road														
11	T1	325	20.0	325	20.0	0.243	0.7	LOS A	0.6	5.1	0.20	0.09	0.20	56.6
12	R2	45	0.0	45	0.0	0.243	8.8	LOS A	0.6	5.1	0.20	0.09	0.20	56.3
Approach		371	17.6	371	17.6	0.243	1.7	NA	0.6	5.1	0.20	0.09	0.20	56.6
All Vehicles		1077	9.3	1077	9.3	0.375	2.3	NA	1.0	7.7	0.15	0.15	0.18	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV AM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV AM (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh.]	[Dist]				
East: Furniss Road														
4	L2	91	0.0	91	0.0	0.047	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	556	6.4	556	6.4	0.298	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		646	5.5	646	5.5	0.298	0.6	NA	0.0	0.0	0.00	0.08	0.00	54.5
West: Furniss Road														
11	T1	325	20.0	325	20.0	0.200	0.0	LOS A	23.3	213.5	0.00	0.00	0.00	59.9
Approach		325	20.0	325	20.0	0.200	0.0	NA	23.3	213.5	0.00	0.00	0.00	59.9
All Vehicles		972	10.4	972	10.4	0.298	0.4	NA	23.3	213.5	0.00	0.05	0.00	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025+DEV PM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV PM (Network Folder: S3)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	778	4.5	778	4.5	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	135	3.0	135	3.0	0.075	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		913	4.3	913	4.3	0.206	1.0	NA	0.0	0.0	0.00	0.10	0.00	67.5
West: Median Storage														
1	R2	289	8.6	230	8.6	0.352	5.6	LOS A	1.5	11.9	0.63	0.84	0.79	39.2
Approach		289	8.6	230 ^{N1}	8.6	0.352	5.6	LOS A	1.5	11.9	0.63	0.84	0.79	39.2
All Vehicles		1202	5.3	1143 ^{N1}	5.6	0.352	1.9	NA	1.5	11.9	0.13	0.25	0.16	61.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025+DEV PM (Site Folder: S3-BG 2025+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV PM (Network Folder: S3)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	246	14.3	246	14.3	0.185	7.4	LOS A	0.8	7.2	0.27	0.57	0.27	48.6
4	T1	634	7.3	634	7.3	0.177	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		880	9.3	880	9.3	0.185	2.1	LOS A	0.8	7.2	0.08	0.16	0.08	64.4
East: Median Storage														
5	T1	135	3.0	135	3.0	0.171	3.1	LOS A	0.6	4.8	0.54	0.52	0.54	10.7
Approach		135	3.0	135	3.0	0.171	3.1	LOS A	0.6	4.8	0.54	0.52	0.54	10.7
West: Furniss Road														
1	L2	254	5.5	254	5.5	0.218	5.7	LOS A	1.0	7.5	0.43	0.63	0.43	43.7
2	T1	289	8.6	289	8.6	1.250	258.4	LOS F	16.8	136.7	1.00	4.53	13.20	0.9
Approach		543	7.2	543	7.2	1.250	140.3	LOS F	16.8	136.7	0.73	2.71	7.24	4.2
All Vehicles		1558	8.0	1558	8.0	1.250	50.4	NA	16.8	136.7	0.35	1.08	2.61	17.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV PM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV PM (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	51	0.0	51	0.0	0.462	9.2	LOS A	1.4	10.6	0.65	0.92	0.93	47.9
3	R2	117	0.0	117	0.0	0.462	15.6	LOS C	1.4	10.6	0.65	0.92	0.93	41.5
Approach		167	0.0	167	0.0	0.462	13.7	LOS B	1.4	10.6	0.65	0.92	0.93	44.2
East: Furniss Road														
4	L2	18	0.0	18	0.0	0.217	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
5	T1	381	8.6	381	8.6	0.217	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		399	8.2	399	8.2	0.217	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
West: Furniss Road														
11	T1	543	7.1	543	7.1	0.335	0.4	LOS A	0.7	5.3	0.13	0.06	0.14	57.9
12	R2	54	0.0	54	0.0	0.335	7.8	LOS A	0.7	5.3	0.13	0.06	0.14	56.9
Approach		597	6.5	597	6.5	0.335	1.0	NA	0.7	5.3	0.13	0.06	0.14	57.7
All Vehicles		1163	6.1	1163	6.1	0.462	2.6	NA	1.4	10.6	0.16	0.17	0.21	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV PM (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV PM (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist m				km/h
East: Furniss Road														
4	L2	107	0.0	107	0.0	0.056	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	381	8.6	381	8.6	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		488	6.7	488	6.7	0.208	0.9	NA	0.0	0.0	0.00	0.12	0.00	53.5
West: Furniss Road														
11	T1	543	7.1	543	7.1	0.291	0.0	LOS A	26.2	208.8	0.00	0.00	0.00	59.8
Approach		543	7.1	543	7.1	0.291	0.0	NA	26.2	208.8	0.00	0.00	0.00	59.8
All Vehicles		1032	6.9	1032	6.9	0.291	0.4	NA	26.2	208.8	0.00	0.06	0.00	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2025+DEV SAT (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV SAT (Network Folder: S3)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	478	3.9	478	3.9	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	89	1.9	89	1.9	0.049	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		567	3.6	567	3.6	0.125	1.0	NA	0.0	0.0	0.00	0.10	0.00	67.3
West: Median Storage														
1	R2	186	3.6	186	3.6	0.197	2.6	LOS A	0.7	5.2	0.44	0.51	0.44	46.0
Approach		186	3.6	186	3.6	0.197	2.6	LOS A	0.7	5.2	0.44	0.51	0.44	46.0
All Vehicles		754	3.6	754	3.6	0.197	1.4	NA	0.7	5.2	0.11	0.20	0.11	62.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2025+DEV SAT (Site Folder: S3-BG 2025+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2025 +DEV SAT (Network Folder: S3)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	189	5.2	189	5.2	0.147	7.1	LOS A	0.6	5.0	0.21	0.56	0.21	49.1
4	T1	453	3.9	453	3.9	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		642	4.3	642	4.3	0.147	2.1	LOS A	0.6	5.0	0.06	0.16	0.06	64.3
East: Median Storage														
5	T1	89	1.9	89	1.9	0.091	1.7	LOS A	0.3	2.5	0.43	0.34	0.43	13.4
Approach		89	1.9	89	1.9	0.091	1.7	LOS A	0.3	2.5	0.43	0.34	0.43	13.4
West: Furniss Road														
1	L2	157	1.8	157	1.8	0.119	5.0	LOS A	0.5	3.7	0.33	0.56	0.33	45.5
2	T1	186	3.6	186	3.6	0.428	16.8	LOS C	2.4	17.9	0.73	1.10	1.03	12.8
Approach		343	2.8	343	2.8	0.428	11.5	LOS B	2.4	17.9	0.55	0.86	0.71	29.4
All Vehicles		1075	3.6	1075	3.6	0.428	5.0	NA	2.4	17.9	0.25	0.40	0.30	53.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV SAT (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV SAT (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	59	0.0	59	0.0	0.263	6.7	LOS A	1.0	7.4	0.50	0.76	0.53	51.1
3	R2	138	0.0	138	0.0	0.263	9.8	LOS A	1.0	7.4	0.50	0.76	0.53	46.6
Approach		197	0.0	197	0.0	0.263	8.9	LOS A	1.0	7.4	0.50	0.76	0.53	48.5
East: Furniss Road														
4	L2	20	0.0	20	0.0	0.153	5.5	LOS A	0.0	0.0	0.00	0.04	0.00	56.7
5	T1	279	3.5	279	3.5	0.153	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.3
Approach		299	3.3	299	3.3	0.153	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.1
West: Furniss Road														
11	T1	344	2.7	344	2.7	0.221	0.3	LOS A	0.5	4.1	0.16	0.09	0.16	57.1
12	R2	61	0.0	61	0.0	0.221	6.8	LOS A	0.5	4.1	0.16	0.09	0.16	56.5
Approach		405	2.3	405	2.3	0.221	1.3	NA	0.5	4.1	0.16	0.09	0.16	57.0
All Vehicles		901	2.1	901	2.1	0.263	2.6	NA	1.0	7.4	0.18	0.22	0.19	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV SAT (Site Folder: S3-BG 2025+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2025+DEV SAT (Network Folder: S3)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	122	0.0	122	0.0	0.063	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	279	3.5	279	3.5	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		401	2.4	401	2.4	0.143	1.3	NA	0.0	0.0	0.00	0.17	0.00	52.8
West: Furniss Road														
11	T1	344	2.7	344	2.7	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		344	2.7	344	2.7	0.175	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		745	2.6	745	2.6	0.175	0.7	NA	0.0	0.0	0.00	0.09	0.00	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035 AM (Site Folder: S4-BG 2035)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 AM (Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	667	9.0	667	9.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	253	2.5	253	2.5	0.230	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		920	7.2	920	7.2	0.230	1.8	NA	0.0	0.0	0.00	0.18	0.00	65.1
West: Median Storage														
1	R2	191	26.3	64	26.3	0.104	4.5	LOS A	0.3	3.2	0.53	0.62	0.53	34.4
Approach		191	26.3	64 ^{N1}	26.3	0.104	4.5	LOS A	0.3	3.2	0.53	0.62	0.53	34.4
All Vehicles		1111	10.5	984 ^{N1}	11.8	0.230	1.9	NA	0.3	3.2	0.03	0.21	0.03	62.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035 AM (Site Folder: S4-BG 2035)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 AM
(Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	371	10.1	371	10.1	0.360	8.5	LOS A	1.8	15.4	0.46	0.67	0.47	45.1
4	T1	796	5.9	796	5.9	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1166	7.2	1166	7.2	0.360	2.7	LOS A	1.8	15.4	0.15	0.21	0.15	61.2
East: Median Storage														
5	T1	253	2.5	253	2.5	0.387	5.7	LOS A	1.8	13.9	0.67	0.84	0.89	20.3
Approach		253	2.5	253	2.5	0.387	5.7	LOS A	1.8	13.9	0.67	0.84	0.89	20.3
West: Furniss Road														
1	L2	135	13.9	135	13.9	0.136	6.8	LOS A	0.6	4.8	0.47	0.66	0.47	40.6
2	T1	191	26.3	191	26.3	2.909	1769.5	LOS F	87.5	852.9	1.00	3.81	11.49	0.2
Approach		325	21.2	325	21.2	2.909	1039.3	LOS F	87.5	852.9	0.78	2.51	6.92	0.6
All Vehicles		1744	9.1	1744	9.1	2.909	196.5	NA	87.5	852.9	0.34	0.73	1.52	6.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035 PM (Site Folder: S4-BG 2035)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 PM (Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	928	4.5	928	4.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
3	R2	135	3.0	135	3.0	0.076	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		1063	4.3	1063	4.3	0.246	0.8	NA	0.0	0.0	0.00	0.08	0.00	67.8
West: Median Storage														
1	R2	378	8.6	193	8.6	0.355	7.1	LOS A	1.4	11.4	0.70	0.91	0.89	37.4
Approach		378	8.6	193 ^{N1}	8.6	0.355	7.1	LOS A	1.4	11.4	0.70	0.91	0.89	37.4
All Vehicles		1441	5.4	1256 ^{N1}	6.2	0.355	1.8	NA	1.4	11.4	0.11	0.21	0.14	62.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035 PM (Site Folder: S4-BG 2035)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 PM
(Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	241	14.3	241	14.3	0.181	7.4	LOS A	0.8	7.0	0.27	0.57	0.27	46.1
4	T1	756	7.3	756	7.3	0.211	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		997	9.0	997	9.0	0.211	1.8	LOS A	0.8	7.0	0.06	0.14	0.06	63.5
East: Median Storage														
5	T1	135	3.0	135	3.0	0.198	4.0	LOS A	0.7	5.5	0.59	0.59	0.59	22.6
Approach		135	3.0	135	3.0	0.198	4.0	LOS A	0.7	5.5	0.59	0.59	0.59	22.6
West: Furniss Road														
1	L2	223	5.5	223	5.5	0.206	6.6	LOS A	0.9	6.9	0.47	0.67	0.47	42.7
2	T1	378	8.6	378	8.6	1.948	876.6	LOS F	121.1	984.6	1.00	7.74	25.35	0.3
Approach		601	7.4	601	7.4	1.948	553.6	LOS F	121.1	984.6	0.80	5.12	16.11	1.1
All Vehicles		1733	8.0	1733	8.0	1.948	193.4	NA	121.1	984.6	0.36	1.90	5.67	6.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035 SAT (Site Folder: S4-BG 2035)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 SAT (Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	571	3.9	571	3.9	0.150	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	85	1.9	85	1.9	0.046	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		656	3.6	656	3.6	0.150	0.8	NA	0.0	0.0	0.00	0.09	0.00	67.8
West: Median Storage														
1	R2	207	3.6	207	3.6	0.240	3.1	LOS A	0.8	6.4	0.49	0.59	0.49	45.0
Approach		207	3.6	207	3.6	0.240	3.1	LOS A	0.8	6.4	0.49	0.59	0.49	45.0
All Vehicles		863	3.6	863	3.6	0.240	1.4	NA	0.8	6.4	0.12	0.21	0.12	62.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035 SAT (Site Folder: S4-BG 2035)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 SAT
(Network Folder: S4)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	173	5.2	173	5.2	0.134	7.0	LOS A	0.6	4.5	0.20	0.56	0.20	46.9
4	T1	539	3.9	539	3.9	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		712	4.2	712	4.2	0.144	1.7	LOS A	0.6	4.5	0.05	0.14	0.05	63.9
East: Median Storage														
5	T1	85	1.9	85	1.9	0.094	2.2	LOS A	0.3	2.5	0.47	0.40	0.47	26.0
Approach		85	1.9	85	1.9	0.094	2.2	LOS A	0.3	2.5	0.47	0.40	0.47	26.0
West: Furniss Road														
1	L2	85	1.8	85	1.8	0.067	5.8	LOS A	0.3	2.0	0.35	0.57	0.35	44.6
2	T1	207	3.6	207	3.6	0.575	22.4	LOS C	3.4	25.7	0.80	1.18	1.37	12.0
Approach		293	3.1	293	3.1	0.575	17.5	LOS C	3.4	25.7	0.67	1.00	1.07	21.5
All Vehicles		1089	3.7	1089	3.7	0.575	6.0	NA	3.4	25.7	0.25	0.39	0.36	51.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035+DEV AM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV AM (Network Folder: S5)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	667	9.0	667	9.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	278	2.5	278	2.5	0.154	6.4	LOS A	0.1	0.5	0.00	0.66	0.00	45.6
Approach		945	7.1	945	7.1	0.186	1.9	NA	0.1	0.5	0.00	0.19	0.00	64.8
West: Median Storage														
1	R2	218	26.3	55	26.3	0.090	4.4	LOS A	0.3	2.8	0.53	0.61	0.53	34.5
Approach		218	26.3	55 ^{N1}	26.3	0.090	4.4	LOS A	0.3	2.8	0.53	0.61	0.53	34.5
All Vehicles		1163	10.7	1001 ^{N1}	12.4	0.186	2.0	NA	0.3	2.8	0.03	0.22	0.03	62.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035+DEV AM (Site Folder: S5-BG 2035+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV AM (Network Folder: S5)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	435	10.1	435	10.1	0.436	9.3	LOS A	2.8	23.6	0.51	0.74	0.61	46.2
4	T1	796	5.9	796	5.9	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1231	7.4	1231	7.4	0.436	3.3	LOS A	2.8	23.6	0.18	0.26	0.21	61.8
East: Median Storage														
5	T1	278	2.5	278	2.5	0.426	6.0	LOS A	2.0	15.7	0.69	0.90	0.95	7.4
Approach		278	2.5	278	2.5	0.426	6.0	LOS A	2.0	15.7	0.69	0.90	0.95	7.4
West: Furniss Road														
1	L2	202	13.9	202	13.9	0.204	6.3	LOS A	0.9	7.5	0.49	0.68	0.49	40.6
2	T1	218	26.3	218	26.3	3.835	2597.6	LOS F	14.0	136.7	1.00	3.77	11.46	0.1
Approach		420	20.3	420	20.3	3.835	1350.6	LOS F	14.0	136.7	0.75	2.28	6.18	0.5
All Vehicles		1928	9.5	1928	9.5	3.835	297.1	NA	14.0	136.7	0.38	0.79	1.62	3.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV AM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035+DEV AM (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	41	0.0	41	0.0	0.681	17.9	LOS C	13.3	97.8	0.82	1.09	1.44	42.2
3	R2	95	0.0	95	0.0	0.681	26.5	LOS D	13.3	97.8	0.82	1.09	1.44	33.8
Approach		136	0.0	136	0.0	0.681	23.9	LOS C	13.3	97.8	0.82	1.09	1.44	37.2
East: Furniss Road														
4	L2	15	0.0	15	0.0	0.390	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.0
5	T1	714	6.4	714	6.4	0.390	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.5
Approach		728	6.3	728	6.3	0.390	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
West: Furniss Road														
11	T1	420	20.0	420	20.0	0.314	1.1	LOS A	59.0	530.9	0.21	0.07	0.26	56.0
12	R2	45	0.0	45	0.0	0.314	11.1	LOS B	59.0	530.9	0.21	0.07	0.26	55.9
Approach		465	18.1	465	18.1	0.314	2.1	NA	59.0	530.9	0.21	0.07	0.26	55.9
All Vehicles		1329	9.8	1329	9.8	0.681	3.3	NA	59.0	530.9	0.16	0.14	0.24	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV AM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035+DEV AM (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	91	0.0	91	0.0	0.047	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	714	6.4	714	6.4	0.383	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		804	5.7	804	5.7	0.383	0.5	NA	0.0	0.0	0.00	0.06	0.00	55.0
West: Furniss Road														
11	T1	420	20.0	420	20.0	0.258	0.0	LOS A	27.1	248.5	0.00	0.00	0.00	59.8
Approach		420	20.0	420	20.0	0.258	0.0	NA	27.1	248.5	0.00	0.00	0.00	59.8
All Vehicles		1224	10.6	1224	10.6	0.383	0.3	NA	27.1	248.5	0.00	0.04	0.00	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035+DEV PM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV PM (Network Folder: S5)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	928	4.5	928	4.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
3	R2	165	3.0	165	3.0	0.101	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		1094	4.3	1094	4.3	0.246	1.0	NA	0.0	0.0	0.00	0.10	0.00	67.4
West: Median Storage														
1	R2	411	8.6	183	8.6	0.336	7.0	LOS A	1.3	10.6	0.70	0.89	0.87	37.5
Approach		411	8.6	183 ^{N1}	8.6	0.336	7.0	LOS A	1.3	10.6	0.70	0.89	0.87	37.5
All Vehicles		1504	5.5	1276 ^{N1}	6.4	0.336	1.8	NA	1.3	10.6	0.10	0.21	0.12	62.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035+DEV PM (Site Folder: S5-BG 2035+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV PM (Network Folder: S5)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	317	14.3	317	14.3	0.246	7.6	LOS A	1.2	10.0	0.32	0.59	0.32	48.1
4	T1	756	7.3	756	7.3	0.211	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1073	9.4	1073	9.4	0.246	2.3	LOS A	1.2	10.0	0.09	0.17	0.09	63.9
East: Median Storage														
5	T1	165	3.0	165	3.0	0.243	4.3	LOS A	0.9	7.2	0.61	0.64	0.65	9.0
Approach		165	3.0	165	3.0	0.243	4.3	LOS A	0.9	7.2	0.61	0.64	0.65	9.0
West: Furniss Road														
1	L2	306	5.5	306	5.5	0.282	6.1	LOS A	1.3	9.9	0.49	0.68	0.49	43.2
2	T1	411	8.6	411	8.6	2.255	1151.0	LOS F	16.8	136.7	1.00	8.04	26.93	0.2
Approach		717	7.3	717	7.3	2.255	661.8	LOS F	16.8	136.7	0.78	4.90	15.63	0.9
All Vehicles		1955	8.1	1955	8.1	2.255	244.3	NA	16.8	136.7	0.39	1.95	5.84	4.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV PM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035
+DEV PM (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	51	0.0	51	0.0	0.885	34.0	LOS D	14.2	104.3	0.82	1.42	2.54	34.6
3	R2	117	0.0	117	0.0	0.885	46.7	LOS E	14.2	104.3	0.82	1.42	2.54	25.1
Approach		167	0.0	167	0.0	0.885	42.9	LOS E	14.2	104.3	0.82	1.42	2.54	28.7
East: Furniss Road														
4	L2	18	0.0	18	0.0	0.273	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	56.9
5	T1	483	8.6	483	8.6	0.273	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		501	8.3	501	8.3	0.273	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
West: Furniss Road														
11	T1	717	7.1	717	7.1	0.434	0.6	LOS A	87.1	690.8	0.14	0.05	0.18	57.8
12	R2	54	0.0	54	0.0	0.434	9.3	LOS A	87.1	690.8	0.14	0.05	0.18	56.8
Approach		771	6.6	771	6.6	0.434	1.2	NA	87.1	690.8	0.14	0.05	0.18	57.6
All Vehicles		1439	6.4	1439	6.4	0.885	5.7	NA	87.1	690.8	0.17	0.20	0.39	51.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV PM (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035+DEV PM (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	107	0.0	107	0.0	0.056	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	483	8.6	483	8.6	0.264	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		591	7.0	591	7.0	0.264	0.8	NA	0.0	0.0	0.00	0.10	0.00	53.9
West: Furniss Road														
11	T1	717	7.1	717	7.1	0.384	0.0	LOS A	31.2	248.5	0.00	0.00	0.00	59.7
Approach		717	7.1	717	7.1	0.384	0.0	NA	31.2	248.5	0.00	0.00	0.00	59.7
All Vehicles		1307	7.1	1307	7.1	0.384	0.4	NA	31.2	248.5	0.00	0.05	0.00	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 2 [Mirrabooka/Furniss Stage 2 2035+DEV SAT (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV SAT (Network Folder: S5)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
North: Mirrabooka Avenue														
2	T1	571	3.9	571	3.9	0.150	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3	R2	120	1.9	120	1.9	0.065	6.4	LOS A	0.0	0.0	0.00	0.66	0.00	45.6
Approach		691	3.6	691	3.6	0.150	1.1	NA	0.0	0.0	0.00	0.11	0.00	67.0
West: Median Storage														
1	R2	247	3.6	247	3.6	0.286	3.4	LOS A	1.1	8.5	0.51	0.64	0.55	44.6
Approach		247	3.6	247	3.6	0.286	3.4	LOS A	1.1	8.5	0.51	0.64	0.55	44.6
All Vehicles		938	3.6	938	3.6	0.286	1.7	NA	1.1	8.5	0.13	0.25	0.15	61.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: M-F 1 [Mirrabooka/Furniss Stage 1 2035+DEV SAT (Site Folder: S5-BG 2035+DEV)]

 Network: SCTI-B
[Mirrabooka / Furniss 2035 +DEV SAT (Network Folder: S5)]

Staged Crossing at T Intersection Type B

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	259	5.2	259	5.2	0.208	7.2	LOS A	0.9	7.4	0.26	0.57	0.26	48.6
4	T1	539	3.9	539	3.9	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		798	4.3	798	4.3	0.208	2.4	LOS A	0.9	7.4	0.09	0.19	0.09	63.5
East: Median Storage														
5	T1	120	1.9	120	1.9	0.133	2.3	LOS A	0.5	3.6	0.48	0.43	0.48	12.2
Approach		120	1.9	120	1.9	0.133	2.3	LOS A	0.5	3.6	0.48	0.43	0.48	12.2
West: Furniss Road														
1	L2	183	1.8	183	1.8	0.145	5.3	LOS A	0.6	4.6	0.37	0.58	0.37	45.3
2	T1	247	3.6	247	3.6	0.861	41.5	LOS E	7.4	56.7	0.90	1.57	2.78	5.6
Approach		431	2.8	431	2.8	0.861	26.1	LOS D	7.4	56.7	0.67	1.15	1.76	17.0
All Vehicles		1348	3.6	1348	3.6	0.861	9.9	NA	7.4	56.7	0.31	0.51	0.65	44.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV SAT (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035+DEV SAT (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	59	0.0	59	0.0	0.327	7.7	LOS A	1.3	9.9	0.60	0.85	0.74	49.7
3	R2	138	0.0	138	0.0	0.327	12.3	LOS B	1.3	9.9	0.60	0.85	0.74	44.3
Approach		197	0.0	197	0.0	0.327	10.9	LOS B	1.3	9.9	0.60	0.85	0.74	46.6
East: Furniss Road														
4	L2	20	0.0	20	0.0	0.204	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
5	T1	379	3.5	379	3.5	0.204	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		399	3.3	399	3.3	0.204	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
West: Furniss Road														
11	T1	431	2.7	431	2.7	0.270	0.4	LOS A	0.7	4.9	0.17	0.08	0.17	57.3
12	R2	61	0.0	61	0.0	0.270	7.5	LOS A	0.7	4.9	0.17	0.08	0.17	56.6
Approach		492	2.4	492	2.4	0.270	1.3	NA	0.7	4.9	0.17	0.08	0.17	57.2
All Vehicles		1087	2.3	1087	2.3	0.327	2.7	NA	1.3	9.9	0.18	0.20	0.21	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV SAT (Site Folder: S5-BG 2035+DEV)]

Network: SCTI-B
[Mirrabooka / Furniss 2035+DEV SAT (Network Folder: S5)]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	122	0.0	122	0.0	0.063	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	379	3.5	379	3.5	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		501	2.6	501	2.6	0.194	1.0	NA	0.0	0.0	0.00	0.14	0.00	53.3
West: Furniss Road														
11	T1	431	2.7	431	2.7	0.224	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		431	2.7	431	2.7	0.224	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		932	2.7	932	2.7	0.224	0.5	NA	0.0	0.0	0.00	0.07	0.00	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2025+Dev AM (Site Folder: Signals (2025))] **Network:** N101 [Mirrabooka / Furniss 2025+DEV AM (signals) (Network Folder: Signals (2025))]

Staged Crossing at T Intersection Type B
 Site Category: (None)
 Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Mirrabooka Avenue														
3	L2	324	10.1	324	10.1	0.255	9.1	LOS A	2.0	16.2	0.34	0.67	0.34	46.3
4	T1	667	5.9	667	5.9	*0.610	26.3	LOS C	7.0	54.9	0.91	0.78	0.91	36.4
Approach		992	7.3	992	7.3	0.610	20.7	LOS C	7.0	54.9	0.73	0.74	0.73	38.3
North: Mirrabooka Avenue														
11	T1	559	9.0	559	9.0	0.269	8.6	LOS A	3.3	26.4	0.52	0.45	0.52	58.3
12	R2	231	2.5	231	2.5	*0.609	38.1	LOS D	5.2	39.5	0.96	0.82	0.96	28.8
Approach		789	7.1	789	7.1	0.609	17.3	LOS B	5.2	39.5	0.65	0.56	0.65	48.2
West: Furniss Road														
1	L2	174	13.9	174	13.9	0.176	7.3	LOS A	1.2	10.3	0.37	0.64	0.37	39.1
3	R2	152	26.3	152	26.3	*0.415	30.7	LOS C	3.1	30.2	0.87	0.79	0.87	8.5
Approach		325	19.7	325	19.7	0.415	18.2	LOS B	3.1	30.2	0.60	0.71	0.60	22.4
All Vehicles		2106	9.1	2106	9.1	0.610	19.0	LOS B	7.0	54.9	0.68	0.67	0.68	41.0

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
					[Ped ped	Dist] m					
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	66.2	41.6	0.63
West: Furniss Road											
P1	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	58.7	31.8	0.54
All Pedestrians		11	34.2	LOS D	0.0	0.0	0.93	0.93	62.5	36.7	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV AM (Site Folder: Signals (2025))]

Network: N101 [Mirrabooka / Furniss 2025+DEV AM (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	41	0.0	41	0.0	0.266	8.7	LOS A	0.4	2.9	0.67	0.89	0.77	49.0
3	R2	95	0.0	95	0.0	0.266	13.3	LOS B	0.4	2.9	0.67	0.89	0.77	43.3
Approach		136	0.0	136	0.0	0.266	11.9	LOS B	0.4	2.9	0.67	0.89	0.77	45.8
East: Furniss Road														
4	L2	15	0.0	15	0.0	0.306	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	57.0
5	T1	556	6.4	556	6.4	0.306	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		571	6.2	571	6.2	0.306	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
West: Furniss Road														
11	T1	325	20.0	325	20.0	0.243	0.7	LOS A	0.2	2.0	0.20	0.09	0.20	56.6
12	R2	45	0.0	45	0.0	0.243	8.8	LOS A	0.2	2.0	0.20	0.09	0.20	56.3
Approach		371	17.6	371	17.6	0.243	1.7	NA	0.2	2.0	0.20	0.09	0.20	56.6
All Vehicles		1077	9.3	1077	9.3	0.306	2.2	NA	0.4	2.9	0.15	0.15	0.16	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV AM (Site Folder: Signals (2025))]

Network: N101 [Mirrabooka / Furniss 2025+DEV AM (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	91	0.0	91	0.0	0.047	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	556	6.4	556	6.4	0.298	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		646	5.5	646	5.5	0.298	0.6	NA	0.0	0.0	0.00	0.08	0.00	54.5
West: Furniss Road														
11	T1	325	20.0	325	20.0	0.200	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		325	20.0	325	20.0	0.200	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		972	10.4	972	10.4	0.298	0.4	NA	0.0	0.0	0.00	0.05	0.00	55.9

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

MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2025+Dev PM (Site Folder: Signals (2025))] **Network:** N102 [Mirrabooka / Furniss 2025+DEV PM (signals) (Network Folder: Signals (2025))]

Staged Crossing at T Intersection Type B
 Site Category: (None)
 Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	[Dist] m				km/h
South: Mirrabooka Avenue														
3	L2	246	13.4	246	13.4	0.182	8.2	LOS A	1.1	9.5	0.24	0.64	0.24	48.1
4	T1	634	8.2	634	8.2	*0.600	29.4	LOS C	7.4	60.3	0.91	0.78	0.91	34.5
Approach		880	9.7	880	9.7	0.600	23.4	LOS C	7.4	60.3	0.72	0.74	0.72	36.5
North: Mirrabooka Avenue														
11	T1	778	4.5	778	4.5	0.428	15.9	LOS B	6.7	52.0	0.69	0.60	0.69	51.1
12	R2	135	3.0	135	3.0	*0.619	49.3	LOS D	3.7	27.9	1.00	0.81	1.04	24.5
Approach		913	4.3	913	4.3	0.619	20.9	LOS C	6.7	52.0	0.74	0.63	0.74	46.2
West: Furniss Road														
1	L2	254	5.5	254	5.5	0.240	7.5	LOS A	2.0	15.5	0.37	0.65	0.37	40.9
3	R2	289	8.6	289	8.6	*0.617	26.3	LOS C	5.9	48.0	0.80	0.79	0.80	8.3
Approach		543	7.2	543	7.2	0.617	17.5	LOS B	5.9	48.0	0.60	0.72	0.60	22.1
All Vehicles		2336	7.0	2336	7.0	0.619	21.1	LOS C	7.4	60.3	0.70	0.69	0.70	39.3

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	[Dist] m			sec	m	m/sec
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	39.2	LOS D	0.0	0.0	0.93	0.93	71.2	41.6	0.58
West: Furniss Road											
P1	Full	5	39.2	LOS D	0.0	0.0	0.93	0.93	63.7	31.8	0.50
All Pedestrians		11	39.2	LOS D	0.0	0.0	0.93	0.93	67.4	36.7	0.54

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV PM (Site Folder: Signals (2025))]

Network: N102 [Mirrabooka / Furniss 2025+DEV PM (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	51	0.0	51	0.0	0.333	8.0	LOS A	0.5	3.9	0.65	0.88	0.81	48.6
3	R2	117	0.0	117	0.0	0.333	14.5	LOS B	0.5	3.9	0.65	0.88	0.81	42.6
Approach		167	0.0	167	0.0	0.333	12.5	LOS B	0.5	3.9	0.65	0.88	0.81	45.2
East: Furniss Road														
4	L2	18	0.0	18	0.0	0.217	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
5	T1	381	8.6	381	8.6	0.217	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		399	8.2	399	8.2	0.217	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
West: Furniss Road														
11	T1	543	7.1	543	7.1	0.335	0.4	LOS A	0.3	2.2	0.13	0.06	0.14	57.9
12	R2	54	0.0	54	0.0	0.335	7.8	LOS A	0.3	2.2	0.13	0.06	0.14	56.9
Approach		597	6.5	597	6.5	0.335	1.0	NA	0.3	2.2	0.13	0.06	0.14	57.7
All Vehicles		1163	6.1	1163	6.1	0.335	2.4	NA	0.5	3.9	0.16	0.17	0.19	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV PM (Site Folder: Signals (2025))]

Network: N102 [Mirrabooka / Furniss 2025+DEV PM (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	107	0.0	107	0.0	0.056	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	381	8.6	381	8.6	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		488	6.7	488	6.7	0.208	0.9	NA	0.0	0.0	0.00	0.12	0.00	53.5
West: Furniss Road														
11	T1	543	7.1	543	7.1	0.464	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		543	7.1	543	7.1	0.464	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles		1032	6.9	1032	6.9	0.464	0.5	NA	0.0	0.0	0.00	0.06	0.00	55.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2025+Dev SAT] **Network:** N103 [Mirrabooka / Furniss 2025+DEV SAT (signals) (Network Folder: Signals (2025))]

Staged Crossing at T Intersection Type B
 Site Category: (None)
 Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	[HV %	[Total veh/h	[HV %	v/c	sec		[Veh. veh	[Dist. m				km/h
South: Mirrabooka Avenue														
3	L2	189	5.2	189	5.2	0.128	7.6	LOS A	0.6	4.7	0.22	0.64	0.22	48.9
4	T1	453	3.9	453	3.9	*0.359	21.7	LOS C	4.1	31.7	0.80	0.67	0.80	39.7
Approach		642	4.3	642	4.3	0.359	17.5	LOS B	4.1	31.7	0.63	0.66	0.63	41.3
North: Mirrabooka Avenue														
11	T1	478	3.9	478	3.9	0.231	9.9	LOS A	2.9	22.4	0.55	0.46	0.55	56.9
12	R2	89	1.9	89	1.9	*0.358	41.7	LOS D	2.0	15.2	0.95	0.77	0.95	27.3
Approach		567	3.6	567	3.6	0.358	14.9	LOS B	2.9	22.4	0.61	0.51	0.61	51.1
West: Furniss Road														
1	L2	157	1.8	157	1.8	0.138	5.9	LOS A	0.7	5.4	0.28	0.62	0.28	44.7
3	R2	186	3.6	186	3.6	*0.347	27.4	LOS C	3.5	27.0	0.83	0.78	0.83	26.7
Approach		343	2.8	343	2.8	0.347	17.5	LOS B	3.5	27.0	0.58	0.70	0.58	31.9
All Vehicles		1553	3.7	1553	3.7	0.359	16.6	LOS B	4.1	31.7	0.61	0.62	0.61	43.9

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	[Dist. m			sec	m	m/sec
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	66.2	41.6	0.63
West: Furniss Road											
P1	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	58.7	31.8	0.54
All Pedestrians		11	34.2	LOS D	0.0	0.0	0.93	0.93	62.5	36.7	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Woolworths Darch SIDRA V3.sip9

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2025+DEV SAT (Site Folder: Signals (2025))]

Network: N103 [Mirrabooka / Furniss 2025+DEV SAT (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	59	0.0	59	0.0	0.263	6.7	LOS A	0.4	3.0	0.50	0.76	0.53	51.1
3	R2	138	0.0	138	0.0	0.263	9.8	LOS A	0.4	3.0	0.50	0.76	0.53	46.6
Approach		197	0.0	197	0.0	0.263	8.9	LOS A	0.4	3.0	0.50	0.76	0.53	48.5
East: Furniss Road														
4	L2	20	0.0	20	0.0	0.153	5.5	LOS A	0.0	0.0	0.00	0.04	0.00	56.7
5	T1	279	3.5	279	3.5	0.153	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.3
Approach		299	3.3	299	3.3	0.153	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.1
West: Furniss Road														
11	T1	344	2.7	344	2.7	0.221	0.3	LOS A	0.2	1.6	0.16	0.09	0.16	57.1
12	R2	61	0.0	61	0.0	0.221	6.8	LOS A	0.2	1.6	0.16	0.09	0.16	56.5
Approach		405	2.3	405	2.3	0.221	1.3	NA	0.2	1.6	0.16	0.09	0.16	57.0
All Vehicles		901	2.1	901	2.1	0.263	2.6	NA	0.4	3.0	0.18	0.22	0.19	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2025+DEV SAT (Site Folder: Signals (2025))]

Network: N103 [Mirrabooka / Furniss 2025+DEV SAT (signals) (Network Folder: Signals (2025))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	122	0.0	122	0.0	0.063	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	279	3.5	279	3.5	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		401	2.4	401	2.4	0.143	1.3	NA	0.0	0.0	0.00	0.17	0.00	52.8
West: Furniss Road														
11	T1	344	2.7	344	2.7	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		344	2.7	344	2.7	0.175	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		745	2.6	745	2.6	0.175	0.7	NA	0.0	0.0	0.00	0.09	0.00	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2035+Dev AM (Site Folder: Signals (2035))] **Network:** N101 [Mirrabooka / Furniss 2035+DEV AM (signals) (Network Folder: Signals (2035))]

Staged Crossing at T Intersection Type B
 Site Category: (None)
 Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Mirrabooka Avenue														
3	L2	435	10.1	435	10.1	0.351	9.9	LOS A	3.2	26.8	0.40	0.69	0.40	44.9
4	T1	796	5.9	796	5.9	*0.759	30.9	LOS C	9.3	73.7	0.97	0.89	1.07	33.6
Approach		1231	7.4	1231	7.4	0.759	23.5	LOS C	9.3	73.7	0.77	0.82	0.83	35.9
North: Mirrabooka Avenue														
11	T1	667	9.0	667	9.0	0.328	9.5	LOS A	4.2	33.8	0.56	0.49	0.56	57.3
12	R2	278	2.5	278	2.5	*0.734	41.0	LOS D	6.7	51.2	0.99	0.88	1.10	27.5
Approach		945	7.1	945	7.1	0.734	18.8	LOS B	6.7	51.2	0.69	0.60	0.72	46.9
West: Furniss Road														
1	L2	202	13.9	202	13.9	0.210	8.4	LOS A	1.7	14.3	0.42	0.65	0.42	37.5
3	R2	218	26.3	218	26.3	*0.741	34.7	LOS C	5.0	48.8	0.91	0.88	1.07	7.7
Approach		420	20.3	420	20.3	0.741	22.0	LOS C	5.0	48.8	0.67	0.77	0.76	19.3
All Vehicles		2596	9.4	2596	9.4	0.759	21.5	LOS C	9.3	73.7	0.72	0.73	0.78	38.6

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	66.2	41.6	0.63
West: Furniss Road											
P1	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	58.7	31.8	0.54
All Pedestrians		11	34.2	LOS D	0.0	0.0	0.93	0.93	62.5	36.7	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV AM (Site Folder: Signals (2035))]

Network: N101 [Mirrabooka / Furniss 2035+DEV AM (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	41	0.0	41	0.0	0.402	11.7	LOS B	0.6	4.5	0.82	1.00	1.08	45.4
3	R2	95	0.0	95	0.0	0.402	20.4	LOS C	0.6	4.5	0.82	1.00	1.08	38.0
Approach		136	0.0	136	0.0	0.402	17.8	LOS C	0.6	4.5	0.82	1.00	1.08	41.1
East: Furniss Road														
4	L2	15	0.0	15	0.0	0.390	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.0
5	T1	714	6.4	714	6.4	0.390	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.5
Approach		728	6.3	728	6.3	0.390	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
West: Furniss Road														
11	T1	420	20.0	420	20.0	0.314	1.1	LOS A	0.4	3.4	0.21	0.07	0.26	56.0
12	R2	45	0.0	45	0.0	0.314	11.1	LOS B	0.4	3.4	0.21	0.07	0.26	55.9
Approach		465	18.1	465	18.1	0.314	2.1	NA	0.4	3.4	0.21	0.07	0.26	55.9
All Vehicles		1329	9.8	1329	9.8	0.402	2.6	NA	0.6	4.5	0.16	0.13	0.20	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV AM (Site Folder: Signals (2035))]

Network: N101 [Mirrabooka / Furniss 2035+DEV AM (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	91	0.0	91	0.0	0.047	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	714	6.4	714	6.4	0.383	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		804	5.7	804	5.7	0.383	0.5	NA	0.0	0.0	0.00	0.06	0.00	55.0
West: Furniss Road														
11	T1	420	20.0	420	20.0	0.421	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		420	20.0	420	20.0	0.421	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles		1224	10.6	1224	10.6	0.421	0.3	NA	0.0	0.0	0.00	0.04	0.00	56.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2035+Dev PM (Site Folder: Signals (2035))] **Network:** N102 [Mirrabooka / Furniss 2035+DEV PM (signals) (Network Folder: Signals (2035))]

Staged Crossing at T Intersection Type B

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Mirrabooka Avenue														
3	L2	317	13.4	317	13.4	0.237	8.6	LOS A	1.7	14.2	0.27	0.64	0.27	47.4
4	T1	756	8.2	756	8.2	*0.839	41.6	LOS D	11.0	90.1	1.00	0.99	1.21	28.5
Approach		1073	9.7	1073	9.7	0.839	31.8	LOS C	11.0	90.1	0.78	0.89	0.93	31.0
North: Mirrabooka Avenue														
11	T1	928	4.5	928	4.5	0.576	20.7	LOS C	9.4	72.9	0.81	0.71	0.81	47.2
12	R2	165	3.0	165	3.0	*0.835	56.3	LOS E	5.0	38.1	1.00	0.93	1.35	22.4
Approach		1094	4.3	1094	4.3	0.835	26.1	LOS C	9.4	72.9	0.84	0.74	0.89	42.5
West: Furniss Road														
1	L2	306	5.5	306	5.5	0.293	9.1	LOS A	2.9	22.7	0.42	0.66	0.42	38.5
3	R2	411	8.6	411	8.6	*0.814	31.3	LOS C	6.8	55.0	0.80	0.87	0.97	7.2
Approach		717	7.3	717	7.3	0.814	21.8	LOS C	6.8	55.0	0.64	0.78	0.73	18.6
All Vehicles		2883	7.1	2883	7.1	0.839	27.2	LOS C	11.0	90.1	0.77	0.81	0.87	34.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	39.2	LOS D	0.0	0.0	0.93	0.93	71.2	41.6	0.58
West: Furniss Road											
P1	Full	5	39.2	LOS D	0.0	0.0	0.93	0.93	63.7	31.8	0.50
All Pedestrians		11	39.2	LOS D	0.0	0.0	0.93	0.93	67.4	36.7	0.54

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV PM (Site Folder: Signals (2035))]

Network: N102 [Mirrabooka / Furniss 2035+DEV PM (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	51	0.0	51	0.0	0.521	11.7	LOS B	0.9	6.4	0.82	1.04	1.24	44.0
3	R2	117	0.0	117	0.0	0.521	24.3	LOS C	0.9	6.4	0.82	1.04	1.24	36.0
Approach		167	0.0	167	0.0	0.521	20.5	LOS C	0.9	6.4	0.82	1.04	1.24	39.3
East: Furniss Road														
4	L2	18	0.0	18	0.0	0.273	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	56.9
5	T1	483	8.6	483	8.6	0.273	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		501	8.3	501	8.3	0.273	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
West: Furniss Road														
11	T1	717	7.1	717	7.1	0.434	0.6	LOS A	0.4	3.4	0.14	0.05	0.18	57.8
12	R2	54	0.0	54	0.0	0.434	9.3	LOS A	0.4	3.4	0.14	0.05	0.18	56.8
Approach		771	6.6	771	6.6	0.434	1.2	NA	0.4	3.4	0.14	0.05	0.18	57.6
All Vehicles		1439	6.4	1439	6.4	0.521	3.1	NA	0.9	6.4	0.17	0.15	0.24	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV PM (Site Folder: Signals (2035))]

Network: N102 [Mirrabooka / Furniss 2035+DEV PM (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	[Dist m				
East: Furniss Road														
4	L2	107	0.0	107	0.0	0.056	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	483	8.6	483	8.6	0.264	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		591	7.0	591	7.0	0.264	0.8	NA	0.0	0.0	0.00	0.10	0.00	53.9
West: Furniss Road														
11	T1	717	7.1	717	7.1	0.384	0.0	LOS A	3.0	23.9	0.00	0.00	0.00	59.7
Approach		717	7.1	717	7.1	0.384	0.0	NA	3.0	23.9	0.00	0.00	0.00	59.7
All Vehicles		1307	7.1	1307	7.1	0.384	0.4	NA	3.0	23.9	0.00	0.05	0.00	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

Site: M-F 1vv [Mirrabooka/Furniss Roundabout 2035+Dev SAT] **Network:** N103 [Mirrabooka / Furniss 2035+DEV SAT (signals) (Network Folder: Signals (2035))]

Staged Crossing at T Intersection Type B

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Mirrabooka Avenue														
3	L2	259	5.2	259	5.2	0.178	7.8	LOS A	1.0	7.6	0.25	0.65	0.25	48.5
4	T1	539	3.9	539	3.9	*0.462	24.1	LOS C	5.3	40.4	0.85	0.72	0.85	37.9
Approach		798	4.3	798	4.3	0.462	18.8	LOS B	5.3	40.4	0.66	0.70	0.66	39.9
North: Mirrabooka Avenue														
11	T1	571	3.9	571	3.9	0.283	10.8	LOS B	3.7	28.3	0.58	0.50	0.58	55.9
12	R2	120	1.9	120	1.9	*0.440	41.2	LOS D	2.7	20.4	0.95	0.78	0.95	27.5
Approach		691	3.6	691	3.6	0.440	16.1	LOS B	3.7	28.3	0.65	0.55	0.65	50.0
West: Furniss Road														
1	L2	183	1.8	183	1.8	0.165	6.4	LOS A	1.0	7.6	0.32	0.63	0.32	43.7
3	R2	247	3.6	247	3.6	*0.469	27.5	LOS C	4.8	36.6	0.85	0.79	0.85	26.8
Approach		431	2.8	431	2.8	0.469	18.5	LOS B	4.8	36.6	0.62	0.72	0.62	31.2
All Vehicles		1919	3.7	1919	3.7	0.469	17.8	LOS B	5.3	40.4	0.65	0.65	0.65	42.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Mirrabooka Avenue											
North: Mirrabooka Avenue											
P4	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	66.2	41.6	0.63
West: Furniss Road											
P1	Full	5	34.2	LOS D	0.0	0.0	0.93	0.93	58.7	31.8	0.54
All Pedestrians		11	34.2	LOS D	0.0	0.0	0.93	0.93	62.5	36.7	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Furniss/Access 2 2035+DEV SAT (Site Folder: Signals (2035))]

Network: N103 [Mirrabooka / Furniss 2035+DEV SAT (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Access 2														
1	L2	59	0.0	59	0.0	0.327	7.7	LOS A	0.5	4.0	0.60	0.85	0.74	49.7
3	R2	138	0.0	138	0.0	0.327	12.3	LOS B	0.5	4.0	0.60	0.85	0.74	44.3
Approach		197	0.0	197	0.0	0.327	10.9	LOS B	0.5	4.0	0.60	0.85	0.74	46.6
East: Furniss Road														
4	L2	20	0.0	20	0.0	0.204	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
5	T1	379	3.5	379	3.5	0.204	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		399	3.3	399	3.3	0.204	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
West: Furniss Road														
11	T1	431	2.7	431	2.7	0.270	0.4	LOS A	0.3	2.0	0.17	0.08	0.17	57.3
12	R2	61	0.0	61	0.0	0.270	7.5	LOS A	0.3	2.0	0.17	0.08	0.17	56.6
Approach		492	2.4	492	2.4	0.270	1.3	NA	0.3	2.0	0.17	0.08	0.17	57.2
All Vehicles		1087	2.3	1087	2.3	0.327	2.7	NA	0.5	4.0	0.18	0.20	0.21	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

Site: 101 [Furniss/Access 3 2035+DEV SAT (Site Folder: Signals (2035))]

Network: N103 [Mirrabooka / Furniss 2035+DEV SAT (signals) (Network Folder: Signals (2035))]

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

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Furniss Road														
4	L2	122	0.0	122	0.0	0.063	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
5	T1	379	3.5	379	3.5	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		501	2.6	501	2.6	0.194	1.0	NA	0.0	0.0	0.00	0.14	0.00	53.3
West: Furniss Road														
11	T1	431	2.7	431	2.7	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		431	2.7	431	2.7	0.250	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
All Vehicles		932	2.7	932	2.7	0.250	0.6	NA	0.0	0.0	0.00	0.07	0.00	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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APPENDIX C

**LOCAL WATER MANAGEMENT
STRATEGY ADDENDUM**

3 August 2023

Craig Wansbrough
Manager Land Development
City of Wanneroo
23 Dundebur Road
Wanneroo WA 6065

Re: Kinmore Green, Woolworths: LWMS/UWMP addendum

I write in the context of the proposed Woolworths which is to be located at the corner of Mirabooka Avenue and Furniss Road in Darch. The subject site is within the Study Area of the approved *Lot 2 Driver Road Darch Local Water Management Strategy* (Urbaqua, 2021) and the approved *Kinmore Green Urban Water Management Plan* (Urbaqua 2021), herein referred to as the LWMS and UWMP, as shown in Figure 1.

This addendum has been prepared to support an amendment to *East Wanneroo Cell 6 Agreed Structure Plan* (ASP No. 8) and subsequent subdivision application(s).

This addendum provides updated stormwater management proposals and identifies water conservation and efficiency measures that are specific to the subject site. All other water management measures proposed in the LWMS and UWMP remain unchanged.

Water conservation and efficiency measures

To reduce the consumption of scheme water, new facilities within the subject site will meet the following criteria:

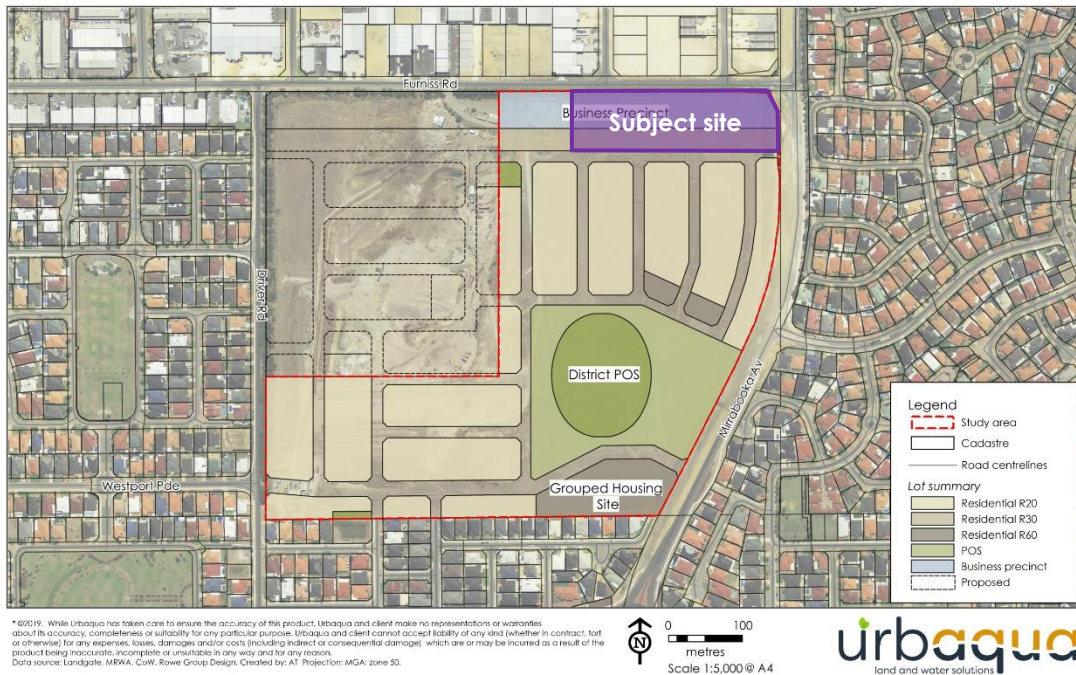
- All taps installed will be better than the minimum WELS 4 Star rating;
- All toilets will be dual flush and exceed the minimum WELS 4 Star rating; and
- All water using appliances installed are rated WELS 4 Star or above.

Landscaping will contribute to water efficiency by using waterwise native plantings and water sensitive irrigation designs will be applied.

Stormwater management

The LWMS and UWMP both contemplated approximately half of the subject site being developed for commercial purposes and approximately half for residential purposes and the land was identified as being partially within catchment 3, draining to Basin 3/3a as shown in Figure 2.

Parcel Property - Lot 2 Driver Road, Darch Local Water Management Strategy
 Figure 3 - Concept plan



Parcel Property - Kinmore Green, Darch Urban Water Management Plan
 Figure 1 - Study area

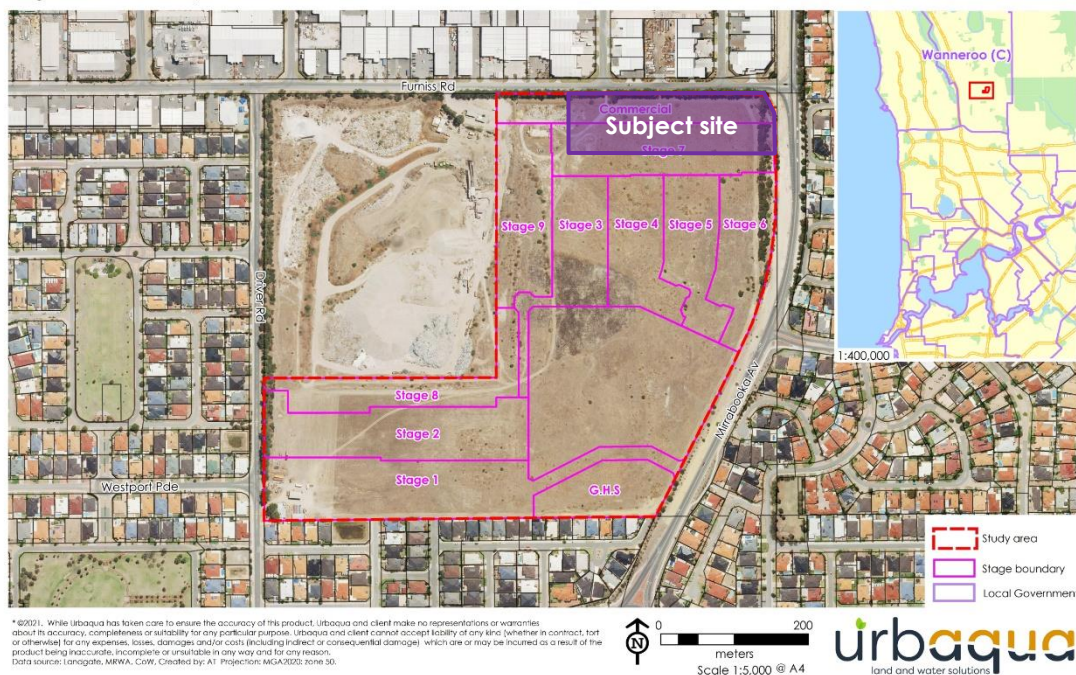
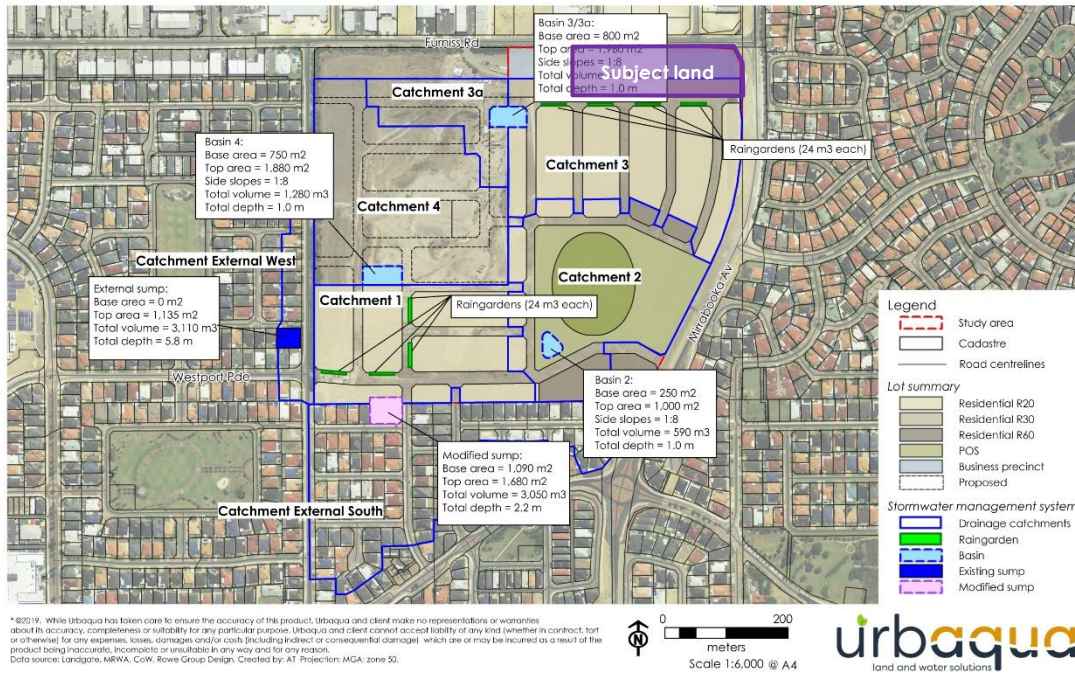


Figure 1: LWMS and UWMP Study area plans identifying the subject site for this addendum

Parcel Property - Lot 2 Driver Road, Darch Local Water Management Strategy
 Figure 15 - Stormwater management system



Parcel Property - Kinmore Green, Darch Urban Water Management Plan
 Figure 8 - Post-development stormwater management system

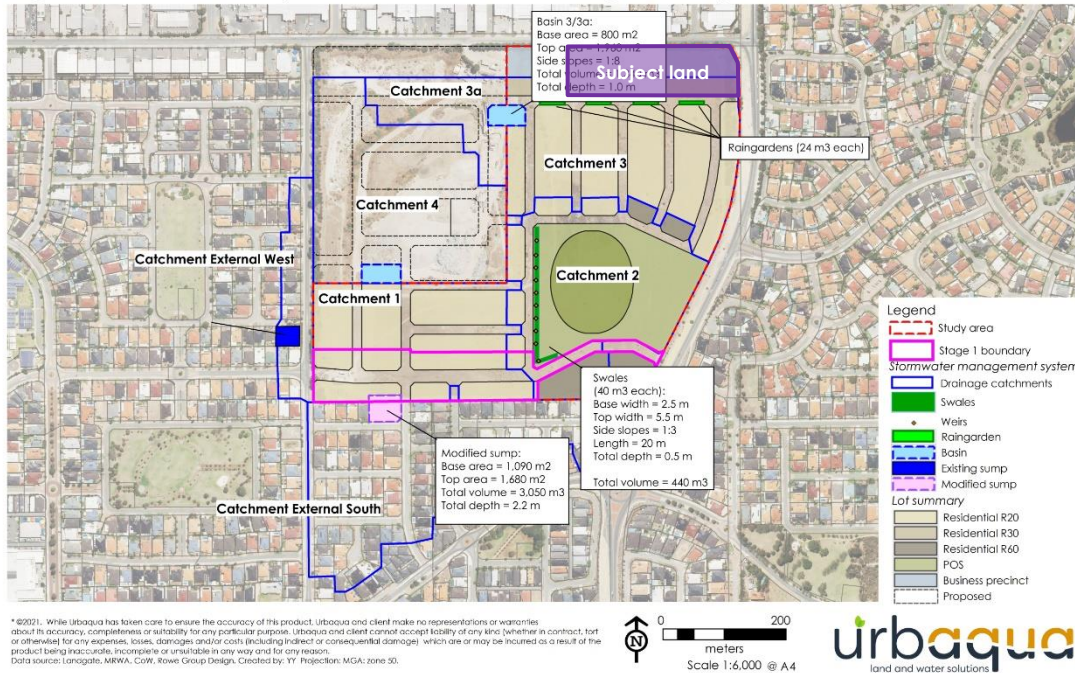


Figure 2: LWMS and UWMP Stormwater plans identifying the subject site for this addendum

Consistent with the identified stormwater management strategy for the business precinct that was identified in the LWMS and UWMP, stormwater will be managed internally. This includes retention of up to the 1% AEP event in underground storage.

Therefore, development of the subject site will not require implementation of the broader stormwater management system that was proposed for Catchment 3/3a and will potentially reduce the storage requirement at Basin 3/3a, to be confirmed when development of the remainder of catchment 3/3a proceeds.

The details of the proposed stormwater management system for the subject site are provided in Figure 3.

The current design for the subject site includes three underground storages consisting of:

- Storage A
 - 0.37m deep, 260m² footprint
 - 96m³ total volume
 - 0.7m cover to surface
- Storage B
 - 0.37m deep, 435m² footprint
 - 161m³ total volume
 - 0.7m cover to surface
- Storage C
 - 0.37m deep, 192m² footprint
 - 71m³ total volume
 - 0.7m cover to surface

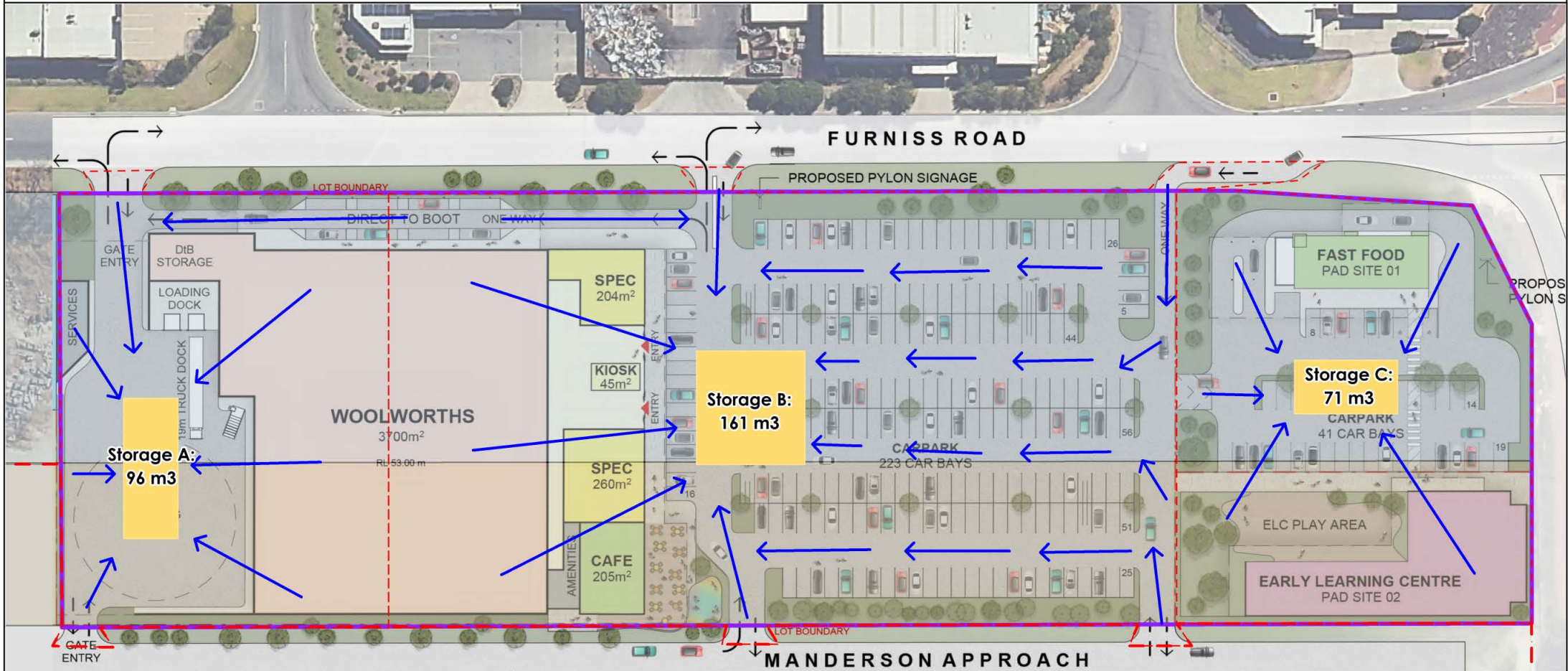
Modelling of the subject land has been undertaken, applying catchment parameters consistent with the model originally developed for the UWMP for the currently proposed layout and stormwater system shown in Figure 3.

All roofs and hardstand areas, including driveways into the subject site have been modelled as 100% effective impervious areas draining into underground storages as shown. The 1% AEP event is fully contained within the stormwater system shown in Figure 3 with no flooding.

An infiltration rate of 5m/day has been applied at the base of each modelled storage element which is consistent with rates used in the UWMP.

Woolworths Group - Kinmore Green, Darch LWMS/UWMP Addendum

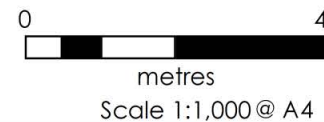
Figure 3 - Stormwater management plan



Legend

- Subject site
- Business Precinct
- Residential R20
- Roads
- Underground storage
- Flow direction
- Internal subcatchments
- Amended external catchment 3 boundary

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Data source: Landgate, MRWA, CoW, Rowe Group Design. Created by: HB Projection: MGA2020: zone 50.



I trust that this letter provides sufficient information to support the proposed amendment to *East Wanneroo Cell 6 Agreed Structure Plan* (ASP No. 8) and subsequent subdivision application(s), demonstrating that the proposal is consistent with the water management strategies and designs presented in the approved *Lot 2 Driver Road Darch Local Water Management Strategy* (Urbaqua, 2021) and the approved *Kinmore Green Urban Water Management Plan* (Urbaqua 2021).

Please do not hesitate to contact me on (08) 9328 4663 or at helen@urbaqua.org.au should you have any questions.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Helen Brookes', with a stylized flourish at the end.

Helen Brookes
DIRECTOR
URBAQUA

APPENDIX D

RETAIL NEEDS ASSESSMENT & NET BENEFITS ANALYSIS

August 2023

Woolworths Kinmore Green Estate, Darch

Needs Assessment & Net Benefit Test
Prepared for Woolworths Group



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Introduction

This report presents an independent assessment of the demand, need, and net benefit for retail uses as part of a proposed Woolworths supermarket-based development at Darch, in the City of Wanneroo Local Government Area (LGA).

The proposal is referred to as the 'Woolworths Kinmore Estate'; 'Woolworths Darch'; 'proposed' or 'subject' development/site throughout the remainder of this report.

The report is structured and presented in **five (5) sections** as follows:

- **Section 1** details the location of the proposed Woolworths Darch site and discusses the context of the site within the City of Wanneroo LGA. The proposed development scheme is also outlined.
- **Section 2** examines the trade area (study area) which is relevant for the proposed development (study area), including current and projected population and retail spending levels. The socio-economic profile of the trade area population is also reviewed.
- **Section 3** provides an overview of the retail structure within the surrounding region.
- **Section 4** outlines an assessment of the sales potential for the retail component of the proposed Woolworths Darch development. Likely trading impacts on other activity centres throughout the surrounding region are considered, as are the employment and other consumer impacts, both positive and negative, of the proposal.
- **Section 5** summarises the key conclusions of the Needs Assessment and Net Benefit Test for the proposed Woolworths Darch development.

Executive Summary

The key points to note from this report regarding the demand, need and net benefit for retail uses as part of a proposed Woolworths supermarket-based development at Darch, include the following:

- i. Woolworths Group propose a new development as part of the Kinmore Green residential estate at Darch, in the northern suburbs of Perth. The site enjoys a high-profile location at the corner of Furniss Road and Mirrabooka Avenue – which is a major north-south traffic route.
- ii. The Kinmore Green residential estate is currently underway, with first homes assumed from 2024 and a total of around 300 homes (900 persons) anticipated by completion in 2031.
- iii. The proposed development would comprise a full-line Woolworths supermarket of approximately 3,700 sq.m, as well as retail specialty shops totalling around 714 sq.m (across three tenancies and one kiosk). A fast food outlet (up to 500 sq.m) and childcare centre would also be provided as external pad sites along the eastern portion. The first full year of trading for the development is assumed to be 2025/26. In total, combined retail floorspace across each of the components would be less than 5,000 sq.m.
- iv. Parking would be facilitated via a large at-grade car park with multiple ingress and egress points to the north (Furniss Road) and south (future Manderson Road). A total of 223 dedicated retail car spaces are planned across the development, equating to a provision of 5.1 bays per 100 sq.m – which would be at the upper end of comparable neighbourhood shopping centre thresholds. The pad site uses (fast food and childcare) would be serviced by a separate at-grade car park of 41 bays, as well as the two-lane drive thru facility for the fast food operator.
- v. The defined main trade area for the proposed Woolworths Darch development includes one primary sector and one secondary sector. The trade area is considered to be an appropriate study area for the purposes of needs assessment.
- vi. The main trade area population is currently estimated at 25,720 (2023) and is projected to increase to 29,920 by 2041, at an average rate of 0.8% per annum (or 233 persons).
- vii. There are no full-line supermarkets currently provided across the main trade area, with the only offers being Farmer Jacks (1,200 sq.m) at Landsdale Forum, and IGA (1,514 sq.m) at Darch Plaza. An additional non full-line Aldi supermarket (1,843 sq.m) will also be provided at East Landsdale Shopping Centre from 2025/26.
- viii. Demonstrating this undersupply, the current provision of supermarket and shopping centre floorspace across the main trade area is well below the metropolitan Perth benchmark levels (around one-quarter). Even allowing for East Landsdale Shopping Centre (Aldi) and the subject development (Woolworths) from 2024/26, the provision would remain well below benchmark levels – and continue to fall thereafter with continued population growth.
- ix. Beyond the main trade area, the nearest Activity Centres are at Alexander Heights Shopping Centre (Woolworths and Coles) and Madeley (Kingsway City, which includes Woolworths and Aldi). Existing supermarkets beyond the main trade area are understood to trade at levels above the Australian average of \$9,000 - \$10,000 per sq.m and draw significant business from the Landsdale main trade area (leakage).

- x. Total retail forecast sales for the Darch development are \$46.0 million in 2025/26, including Woolworths forecast sales of \$39.2 million (\$10,606 per sq.m). Key information regarding projected impacts of -4.0% or more are as follows:
- **Madeley District Centre:** the highest impact in dollar terms at -\$11.7 million (-8.3%).
 - **Alexander District Centre:** a total impact of -\$8.9 million, or around -9.1%.
 - **East Landsdale:** an impact of so -\$2.9 million, or -8.1% as compared with the base case.
 - **Landsdale:** a total impact of so -\$1.9 million, or -8.2%.
 - **Darch:** an impact of -\$1.9 million, or around -8.0%.
 - **The Market Place Ballajura:** a total impact of -\$0.9 million (-4.6%).
- xi. All other projected impacts are less than -\$2.1 million, or -3.2% on any one centre. In addition, minor impacts totalling -\$4.0 million in combination (around 8.7% of the total forecast sales) are projected to fall on a range of centres located beyond the main trade area. This accounts for workers at the nearby industrial precinct.
- xii. Most of the impacts will be absorbed by Woolworths and Coles supermarkets throughout the surrounding area that are understood to trade at levels above the Australian average of \$9,000 - \$10,000 per sq.m. The proposed Woolworths Darch development would not impact on the viability or continued operation of any existing or proposed centres (as per SPP 4.2) in the surrounding region, with all of the impacts well within the normal competitive range (low to medium) of less than -10%.
- xiii. All sales impacts across the identified centres are within an acceptable range, and when considered in the context of the size, performance and role and function of surrounding centres, would be highly unlikely to result in a material reduction of retail service provision. Further, residential growth would also see sales regain quickly. With retail expenditure growth across the main trade area growing by an average of 1.8% (2023-26) to 2.1% (2026-31) per year – even the most significant impacts could be ameliorated in the short term.
- xiv. It is the conclusion of this report that a substantial net community benefit would result from the proposed Woolworths Darch development. Offsetting the trading impacts on some existing retailers, there are very substantial positive impacts including the following (with reference to SPP 4.2 *Implementation Guidelines A.24*):

Strategic Alignment, Infrastructure & Services:

- **Optimal Site:** the site occupies a high-profile and easily-accessible location for the existing and future local resident population – capitalising on the existing and planned infrastructure.
- **Liveable Neighbourhood:** the positioning of the development within the Kinmore Green Estate also aligns with the strategic vision for the area, including urban growth and settlement, as well as the concept of liveable neighbourhoods.
- **Enhanced Uses:** the development would provide a significant improvement in the range of retail facilities and services that would be available to existing and future local residents.
- **Aligned With SPP 4.2 Objectives & Outcomes:** the proposed development strongly aligns with the core policy objectives and outcomes, aiming to create and retain people, employment opportunities, retail, and

services – within a well-connected community. The development would efficiently and cohesively cater to community needs and consumer choice, while also avoiding significant disruptions to the existing activity centre hierarchy.

Productivity

- **Employment:** the proposed development would result in the creation of additional employment, both during the construction period, and more importantly, on an ongoing basis once the development is complete and operational. Approximately 690 jobs (563 excluding pad site uses) are likely to be created both directly and indirectly because of the subject development - including ongoing employment (249), construction (79) and multiplier effects (363).

The additional permanent employees (249 jobs) are projected to earn combined annual salary/wages of some \$10.5 million (\$8.8 million for the retail component, and \$1.7 million for the indicative pad site uses).

- **Impact on Activity Centres:** as above, the proposed development would not impact on the viability or continued operation of any existing or proposed centres in the surrounding region, with all of the impacts well within the normal competitive range (low to medium) of less than -10%; and expected to be ameliorated in the short term with population growth.

Quality of Life

- **Compatible & Complementary Uses:** the development is compatible with the Kinmore Green Estate masterplan and other surrounding uses. The proposed range of uses that would form part of the development are also typical of many convenience-based centres and are considered complementary to one-another – including a major full-line supermarket, retail specialty shops, a childcare centre, and fast food pad site.
- **Aligned with Consumer Trends & Expectations:** the nature of consumer demand continues to develop and evolve, reflecting social changes within society, such as increasing time pressures on working families; population/income growth; the evolution of new retail formats/operators. The demands of retailers, as well as consumers, combine to add pressure for additional retail floorspace. The design of the proposed development would be highly convenient for local families who would visit on a regular basis – and therefore help to retain some of the significant spending and visitation that is currently escaping the area.
- **Enhanced Amenity & Retained Vibrancy:** the proposed development would improve choice of location and allow for price competition as part of this retention. The level of supermarket spending (generated by main trade area residents) being retained within the main trade area is estimated at \$25.9 million (19.4%). This means that 80.6% (\$107.6 million) of supermarket expenditure is currently escaping the trade area (and much of the LGA). The development of Aldi (East Landsdale Shopping Centre) and Woolworths Darch in 2025/26 will result in retained supermarket spending increasing to \$69.8 million (48.7%), reflecting a significant reduction in leakage (from 80.6% in 2022/23 to 51.3% in 2025/26).
- **Limited Specialty Floorspace:** the proposed development has limited specialty floorspace (714 sq.m), which would mean residents will continue to frequent other centres/shops in the surrounding area for a variety of tenants that are not likely to be provided as part of the proposed site. Given most shopfronts in the locality and nearby activity centres would not compete directly with a full-line supermarket, impacts on local retail would be limited and most would stand to benefit from increased customer visitation, activity and retained spending associated with the full-line Woolworths supermarket. The ability for local residents, for example, to

undertake both a weekly shop at the subject site, as well as convenience, late-night and top-up shopping at the 24-hour Darch Plaza IGA, late-trading Farmer Jacks Landsdale Forum, or complementary Aldi supermarket, would represent a holistic food and grocery experience.

Environmental Sustainability, Equity & Social Inclusion

- **Reduced Trips or Drive Distance:** the retention of spending and visitation within the main trade area and LGA would also reflect a reduction in car-based trips (drive time and distance) to full-line supermarket-based centres (often multiple times per week) further afield such as Kingsway City, Alexander Heights, and Wyatt Grove.
- **Localised Jobs & Services:** the provision of employment floorspace within the main trade area will help to retain job opportunities for local residents, as well as providing a large number of youth employment prospects, given retail developments generally employ many younger staff.

xv. In conclusion, this assessment demonstrates that proposed Woolworths Darch development would result in substantial net community benefit, that will more than offset anticipated trading impacts for a small number of existing and proposed retail centres – all of which would remain viable, and be ameliorated in the short term with continued population growth.

1 Location & Composition

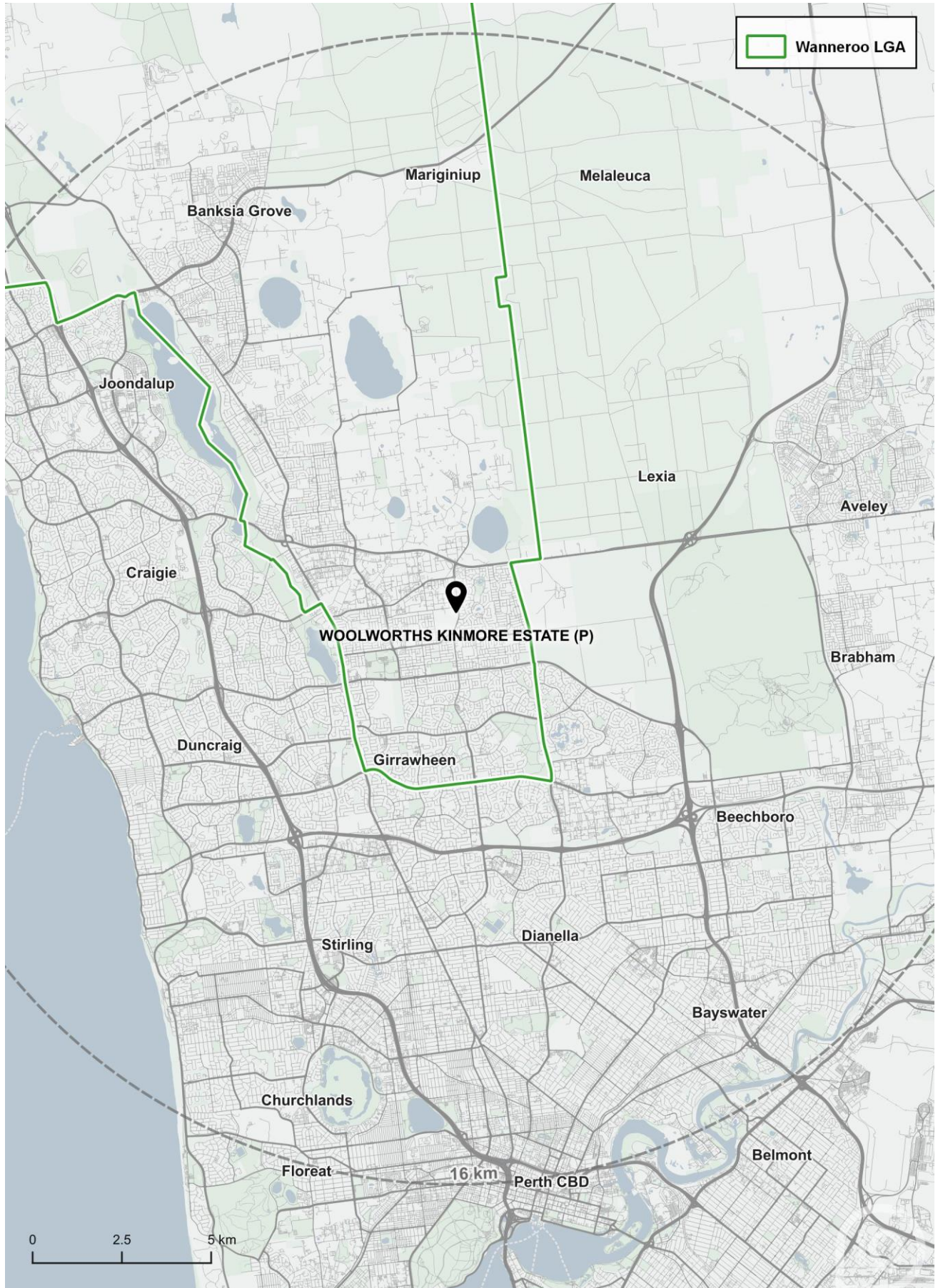
This section of the report reviews the regional and local context of the proposed Woolworths Darch site and provides an overview of the indicative development scheme.

1.1. Regional Context

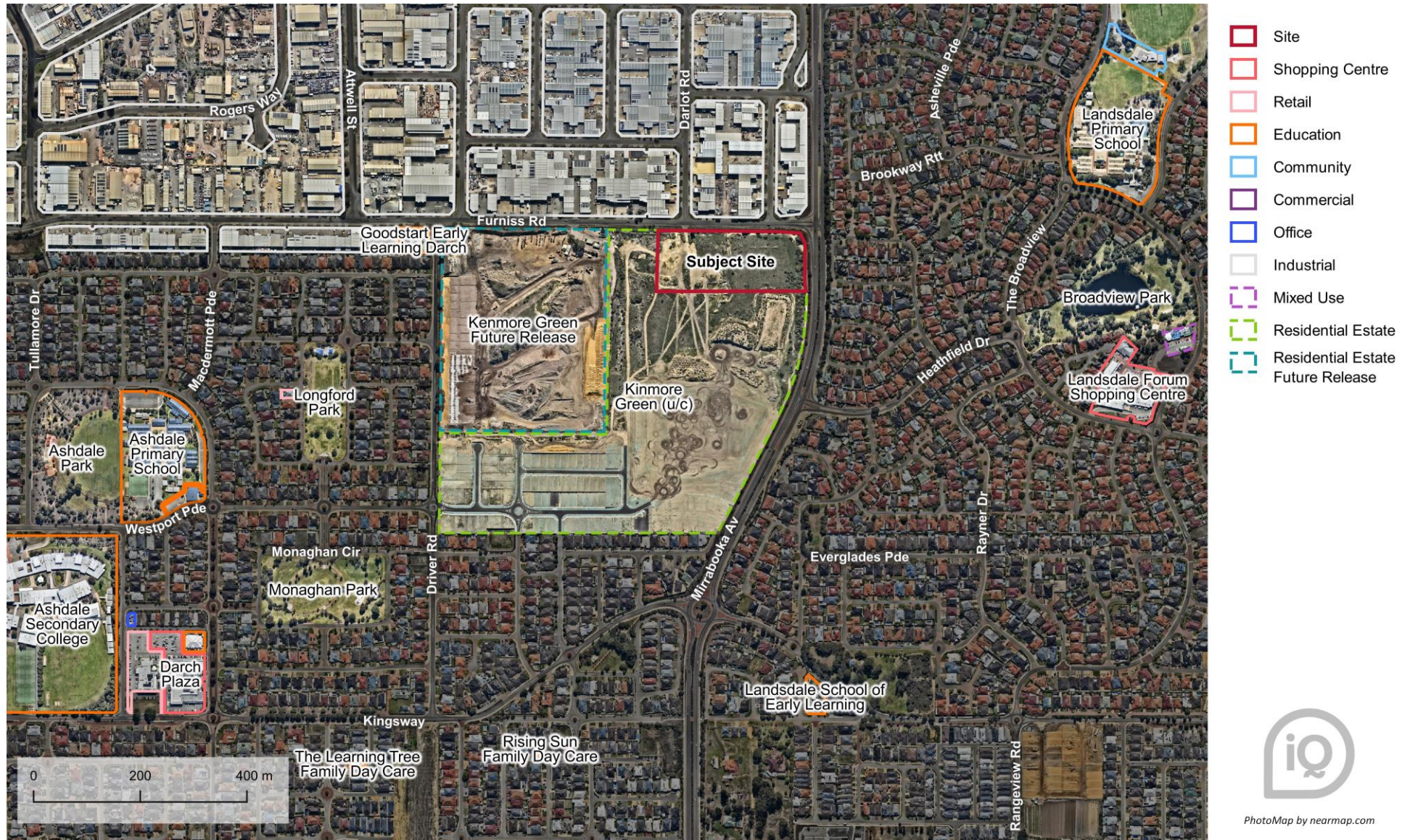
- i. The northern Perth suburb of Darch is part of the City of Wanneroo Local Government Area (LGA), approximately 17 km (by road) from the Perth Central Business District (CBD) (refer Map 1.1).
- ii. Darch is an established and developing residential area that is bordered by commercial and light manufacturing areas to the north. Residential development within Darch commenced from around 2001 when it was released as part of the East Wanneroo Development Area
- iii. Woolworths Group propose a new development as part of the Kinmore Green residential estate at the south-western corner of Mirrabooka Avenue and Furniss Road (refer Map 1.2). Siteworks commenced in late 2021 at Kinmore Green, with first homes assumed from 2024. In total, almost 300 homes, (or some 900 persons) will be accommodated at the site upon completion in 2031.
- iv. The proposed site would be at the high-profile intersection of Mirrabooka Avenue and Furniss Road estate (Lot 9002 (50K) Attadale Avenue, Darch) – in the north-east corner of the Estate. Mirrabooka Avenue is a major north-south route through the northern suburbs of Perth, with a four-lane dual carriageway extending its entire length. Mirrabooka Avenue extends from the residential and industrial areas around Gnangara Road in the north (around Landsdale), down to Nollamara Avenue (near the intersection of Reid Highway) in the south.
- v. Based on the most recent traffic counts from Main Roads Western Australia (2020/21), an average of 18,199 vehicles were recorded each day along Mirrabooka Avenue (north of Hepburn Avenue –1.5 km south of the subject site). This equates to total passing traffic of more than 6.6 million vehicles per year.
- vi. Furniss Road is a single lane east-west connection between Mirrabooka Avenue in the east, and Hartman Drive in the west.
- vii. Map 1.2 provides an illustration of the local context of the site, with key points to note including:
 - A provision of light industrial and commercial uses are located on both sides of Furniss Road, but predominantly to the north-west of the subject site.
 - Two local centres are within 1.2 – 1.9 km, namely Landsdale Forum (Farmer Jacks of 1,200 sq.m), and Darch Plaza (IGA of 1,514 sq.m). These centres would cater for the top-up and convenience needs of residents.
 - A range of education facilities are provided throughout the area, including two primary schools, a secondary college, and multiple childcare centres.

- viii. Overall, the proposed Woolworths Darch site enjoys a high-profile location with exposure and connectivity to two major traffic routes. The site is easily accessible for the local and wider region population and is well-located to service future residents accommodated in the Kinmore Green residential estate, as well as workers in the light industrial areas to the immediate north.

MAP 1.1. REGIONAL CONTEXT



MAP 1.2. LOCAL CONTEXT



1.2. Planned Development Scheme

- i. Woolworths Group propose a traditional neighbourhood centre at the Darch site, which will be positioned at the north-east corner of the Kinmore Green Estate. The development would indicatively comprise the following key components (refer Figure 1.1 & Table 1.1):
 - **A full-line Woolworths supermarket of around 3,700 sq.m** that would also service 'Direct to Boot' sales. The supermarket would be provided behind a small 'airlock'. The full-line Woolworths supermarket would account for the majority (83.8%) of proposed retail floorspace.
 - **Retail specialty shops totalling around 714 sq.m** across three tenancies and one kiosk. Retail tenancies would each enjoy external frontage to the large at-grade car park, while the kiosk would be provided centrally within the airlock (in front of the supermarket). Adjacent tenancies would also be accessible via the airlock.

This level of specialty floorspace is significantly smaller than the *Urbis Averages (2021/22)* for comparable single supermarket shopping centres (2,004 sq.m).
 - **A fast food pad site** (retail) with a building GLA of up to 500 sq.m.
 - **A childcare centre** (non-retail) with an internal component of an estimated 1,000 sq.m.
- ii. In total, combined retail floorspace across each of the components would be less than 5,000 sq.m.
- iii. Parking would be facilitated via a large at-grade car park with multiple ingress and egress points to the north (Furniss Road) and south (future Manderson Road). A total of 223 dedicated retail car spaces are planned across the development, equating to a provision of 5.1 bays per 100 sq.m – which would be at the upper end of comparable neighbourhood shopping centre thresholds.
- iv. The pad site uses (fast food and childcare) are indicative, and would be serviced by a separate at-grade car park of 41 bays, as well as the two-lane drive thru facility for the fast food operator.
- v. The Woolworths Darch development would deliver a modern neighbourhood shopping centre, anchored by a convenient, full-line Woolworths supermarket, and a small provision of specialty shops.
- vi. The proposed full-line supermarket at the site would significantly increase the provision of services for the local population and maximise amenity, by way of excellent, modern design.
- vii. The first full year of trading for the development is assumed to be 2025/26.

TABLE 1.1. WOOLWORTHS DARCH (KINMORE GREEN ESTATE) PROPOSED DEVELOPMENT COMPOSITION

	Composition		
	Tenants (no.)	GLA (sq.m)	% of Total
Retail (sq.m)			
Woolworths (incl. BOH and DTB)	1	3,700	83.8%
Specialty Shops	4	714	16.2%
Total Retail	5	4,414	100%
Pad Site Uses			
		<i>est. building GLA</i>	
Childcare Centre	1	1,000	
Fast Food	1	500	
Parking			
Retail Parking Bays	223		-
Pad Site Parking Bays	41		-

Source: Woolworths Group

BOH = Back of House
DTB = Direct to Boot

Gross Lettable Area (GLA) vs Net Lettable Area (NLA)

In the shopping centre industry, only Gross Lettable Area (GLA) is typically reported and considered. Both the Property Council of Australia and the Australian Property Institute support this unit of measurement and a range of industry benchmarks that allow comparison are also based on GLA (i.e. the Urbis Retail Averages). This RSA adopts GLA in accordance with this standard.

FIGURE 1.1. WOOLWORTHS KINMORE GREEN ESTATE (DARCH)



	PROPOSED MASTERPLAN WOOLWORTHS KINMORE ESTATE	Status: PRELIMINARY Path: P:\44686 Woolworths Kinmore Green\03 Production\01 Design\BIM and Links\Central Files\44686 - Woolworths Kinmore Estate.rvt	Scale: 1:1000 @ A3 © Hames Sharley	North:	Project Number: 44686 Drawing Number: MP-SK01 Revision: A Date: 11/07/23	

1.3. State Planning Policy 4.2 Activity Centres (2023)

- i. The activity centres policy is a state planning policy for the planning and development of activity centres throughout Western Australia.

Activity centres are a significant focus for economic development and future growth. They are thriving community hubs that provide a diverse range of homes, jobs close to where people live, retail and commercial opportunities and other activities easily accessible by walking, cycling and public transport.

The main purpose of this policy is to ensure planning, development and decision making adequately consider the distribution, function, broad land use, access and urban form considerations for activity centres in Perth, Peel and Bunbury.

Other purposes of the policy include:

- *ensuring a diversity of employment opportunities and the promotion of business clustering*
- *providing for a choice of housing within and adjacent activity centres*
- *designing activity centres to be more walkable and better integrated with public transport*

- ii. The Western Australian Planning Commission engaged extensively with stakeholders to review *State Planning Policy 4.2 Activity Centres (2023)*, and the policy has been gazetted and become operational since 3 July 2023.

- iii. Of relevance to this assessment, key changes to the policy (from *SPP 4.2 Activity Centres for Perth and Peel 2010*) include the additional implementation guidelines for *Needs Assessment*, as well as the shift from *Retail Sustainability Assessments* to *Net Benefit Test*, as follows:

7.2 Needs Assessment

a) A needs assessment provides an information base to support decision-making by including an assessment of projected land use needs of communities in a local government area. The needs assessment should consider and assess the demand for all activity centre uses and is to be prepared as part of a local planning strategy to guide future development.

b) Where a local planning strategy does not have a Needs Assessment, or the Needs Assessment has not been updated for more than five years, a new Needs Assessment may be prepared in support of a:

- *local planning scheme/scheme amendment*
- *precinct structure plan*
- *standard structure plan at the district or local level.*

Note: Needs Assessments should not be prepared for development applications. In circumstances where the relevant strategy or structure plan does not include a Needs Assessment, development applications should be accompanied by a Net Benefit Test.

c) Once proposed floorspace and/or land requirements are identified, this information should be shown spatially within the planning document being prepared and include an indicative range of activity centre use floorspace per activity centre.

d) Guidance on the appropriate approach and methodology for a Needs Assessment is provided within the Implementation Guidelines (Appendix G1).

...

7.8 Net Benefit Test (NB Test)

a) Major development proposals within activity centres and out-of-centre developments can have an adverse effect on the extent and adequacy of facilities and services available to a local community, and the ability to access them in an efficient and equitable manner by walking, cycling and public transport.

b) It is therefore important to ensure that development of activity centre uses within an area generally complies with the floorspace need identified for specific activity centres in local planning strategies or structure plans (a Needs Assessment, refer section 7.2) and where a proposal exceeds that floorspace need, the proposal is to demonstrate a net benefit to the community of any impacted centres.

c) The purpose of the Net Benefit (NB) Test is to ensure that development applications and planning instruments align with the objectives of this policy.

d) A net benefit occurs when the benefits (pros) to the community arising from a proposal out weigh any identified impacts (cons) to the community arising from a proposal.

e) Where an endorsed local planning strategy or structure plan includes an indicative amount of activity centre use floorspace for the activity centre derived from a Needs Assessment, a NB Test is only required where this indicative activity centre use floorspace is proposed to be exceeded.

The NB Test is to demonstrate that the proposal will:

- not have an unreasonable and detrimental impact on the activity centre hierarchy or the existing or planned functions of activity centres
- not have an unreasonable and detrimental impact upon existing, committed and planned public and private investment in activity centres
- deliver net benefit to the community and not reduce the level of access to services by the community.

i) A NB Test is to be prepared by the proponent in accordance with the methodology provided within the Implementation Guidelines (section 5) and is to be submitted with the relevant planning instrument or development application.

1.3.1. Implementation Guidelines

- i. The *Implementation Guidelines* provide explanatory detail to assist in the implementation of *State Planning Policy 4.2 Activity Centres* (SPP 4.2) and other relevant Western Australian Planning Commission (WAPC) policies and guidelines.
- ii. The Guidelines explain the intent and interpretation of SPP 4.2 and can be used in the preparation, review and assessment of planning instruments and development applications. Key extracts pertaining to this assessment are as follows:

5 Net Benefit Test

5.1 Requirements

The Net Benefit (NB) Test shall assess the potential impacts and benefits to the community of a proposal on existing and planned activity centres in the locality, considering:

- the supportable retail/commercial floorspace for an appropriate service population
- the implications for and optimal use of public and private infrastructure and services provided or planned in the locality
- the overall costs and benefits of the proposal to the community, considering the objectives, outcomes and measures of SPP 4.2.

b) The potential loss and/or gain of services and any associated detriment/benefit to the community caused by a proposal shall be assessed. The assessment must consider impacts and benefits in relation to all activity centres that may be affected, which are not necessarily just those closest to the proposal and may be in neighbouring local government areas. The extent of activity centres considered should be proportionate to the development.

5.2 Assumptions

a) The detail provided in the NB Test should be appropriate to the scale and context of the proposal, drawing on existing information where possible. Applicants and local and State planning authorities should seek to agree the scope, key impacts/benefits for assessment, and level of detail required in advance of applications being submitted.

b) The methodology, assumptions and data used in the NB Test must be specified and be appropriate, transparent and verifiable. A template methodology is provided at Appendix G2 as a guide to assist proponents and decision-makers in the preparation and assessment of a NB Test.

c) The assumptions and findings of a NB Test may be validated through an independent peer review. This independent peer review should be overseen by the responsible authority, with costs to be shared equally between the proponent and the responsible authority.

5.3 Assessment

The following key considerations should be used to guide the assessment:

- Is there a demand for additional floorspace, and how does the proposal meet this demand?
- How will the proposed development impact on the role of the activity centre and/or the viability and vibrancy of other activity centres in the hierarchy?
- What is the anticipated loss and/or gain of services to the community?
- What is the anticipated impact on access (distance, time, mode of travel) to services by the community?
- Will the proposal contribute to a net increase in employment?
- Does the proposal align with the objectives and outcomes of this policy and the planning framework?
- Are any potential impacts reduced over the longer term?

b) A judgement as to whether the likely impacts/benefits are significant can only be reached considering local circumstances (such as the role, offering and performance of an activity centre and the level of service to the community).

c) Competition between businesses in and of itself is not considered a relevant planning consideration. In this regard, the NB Test is not to be used in a way purely to prevent competition between businesses.

5.4 Implementing Net Benefit

a) Where items or components of a development (refer s2.8.1 of SPP 7.2 Precinct Design Guidelines) are proposed to demonstrate net benefit being achieved, they are to be genuinely over and above what would normally be required to address the requirements of the planning framework.

For example, undertaking road upgrades to cater for increased traffic from the development is not to be included as a benefit as the development cannot occur without the upgrade.

b) The responsible authority may impose reasonable conditions on development approvals to ensure that such items/development components are delivered. Similarly, where such items are proposed as part of a scheme amendment or structure plan process, it is reasonable to include these items as scheme or structure plan requirements to be satisfied by subsequent development.

c) As a general principle, such items or development components should not burden the responsible authority or other landowners without their agreement.

d) There should be a demonstrated need for such items or development component, which are best articulated in a local planning strategy or through the local government's Strategic Community Plan/ Corporate Business Plan.

- iii. Figures 1.2 – 1.5 summarise Appendices G1 & G2 of the Guidelines, which provide an example of the scope and methodology for Needs Assessment and Net Benefit Test.
- iv. The remainder of this document assesses the need and net benefits for the proposed Woolworths Darch development, as set out within SPP 4.2, and with reference to this documentation, where relevant.

FIGURE 1.2. SPP 4.2 GUIDELINES – APPENDIX G1 – SCOPE & METHODOLOGY FOR NEEDS ASSESSMENT



APPENDIX G1 – SCOPE AND METHODOLOGY FOR NEEDS ASSESSMENT

A1.1 SCOPE

The need for **activity centre uses** refers to the scale and mix of non-residential uses likely to be needed within a catchment area over the plan period (10 years for precinct and standard structure plans, 15 years for local planning strategies and scheme amendments). The assessment should measure demand for the area and identify the scale of supply necessary to appropriately accommodate this demand in square metres **net lettable area (NLA)**.

The scale and detail of the assessment should be commensurate with the planning process or proposal being considered. Only future scenarios that could be reasonably expected to occur should be considered.

The assessment of need must be based on facts and unbiased evidence. The methodology used must be transparent and verifiable.

The WAPC's *Land Use and Employment Survey* Planning Land Use Categories (PLUC) system may be used in lieu of scheme land use terms (refer definition of **activity centre uses** for relevant PLUC codes).

A1.2 INPUTS

Verifiable data sources must be provided with preference given to publicly available and transparent data sets (e.g. Australian Bureau of Statistics, *Land Use and Employment Survey, WA Tomorrow*). Data sources used must be justified.

The Needs Assessment should include an estimate of current supply of **activity centre uses** and historical and forecast population.

A1.3 METHODOLOGY

The following table provides a guide on what should be included in a Needs Assessment:

1. Purpose and objectives

2. Study parameters:

- a) Define study area
- b) Identify study period (10 years for a precinct structure plan or standard structure plan; 15 years for a local planning strategy or scheme amendment)
- c) Define **activity centre uses** to be assessed by study

3. Review drivers of floorspace, including:

- a) Historical and forecast population growth and its socio-economic characteristics
- b) Employment growth
- c) Visitor growth
- d) Existing infrastructure
- e) Infrastructure investment
- f) Government policy – including centre policy and **hierarchy**
- g) Changing expenditure patterns
- h) Technological influences impacting floorspace demand
- i) New product and services growth

4. Property market profile:

- a) Rents – current and rental growth
- b) Sale prices – current and price growth
- c) Vacancy – current and historical
- d) Yields – current and historical

5. Floorspace supply for the relevant study area and not just the immediate local government area – current, in development, and planned in terms of:

- a) Scale – land area, gross floor area
- b) Location
- c) Type – zoning, lot size
- d) Occupancy – proportion vacant vs occupied

6. Floorspace demand for the relevant region:

- a) Historical consumption rates – site area, NLA
- b) Employment projections by industry sector with particular focus on relevant activity centre-based sectors

7. Net demand assessment:

- a) Overall LGA net floorspace demand by 5-year intervals
- b) Activity centre/market net floorspace demand
- c) Identification of risk factors, issues and opportunities

8. Land use development options:

- a) Base case (business as usual)
- b) High growth scenario
- c) Low growth scenario

FIGURE 1.3. SPP 4.2 GUIDELINES – APPENDIX G2 – SCOPE & METHODOLOGY FOR NET BENEFIT TEST

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APPENDIX G2 – SCOPE AND METHODOLOGY FOR NET BENEFIT TEST

A2.1 APPROACH

Verifiable and current data sources must be provided with preference given to publicly available and transparent data sets (e.g. Australian Bureau of Statistics, *Land Use and Employment Survey, WA Tomorrow*). Data sources used must be justified.

The **Net Benefit (NB)** Test must provide a short description of the model and methodology used. All assumptions are to be clearly articulated.

The assessment:

- only evaluates the external costs and benefits to the community of the proposal
- only includes costs and benefits that have a net impact on community welfare impacts that simply transfer benefits and costs between individuals and businesses in the community are not included
- quantifies impacts and benefits where possible.

A2.2 IMPACTS

A critical output from the modelling process is an estimate of the impact of the proposal on existing and planned activity centres and the level of service to the community.

A.2.2.1 Non-retail proposals

For proposals without shop/retail or other retail, no impact modelling is required.

A.2.2.2 Retail proposals

For retail proposals, the **NB Test** should include the supply of shop/retail (PLUC5-SHP) and/or Other Retail (PLUC6-RET) floorspace (present period and over a defined future time period – minimum five years) within relevant **activity centres** and the retail turnover estimates for each **activity centre** for the base year and NB test year/s. An estimate of the retail turnover for each relevant **activity centre** should be identified for the following scenarios:

- base case - without the planning proposal/ development and
- with the new planning proposal/ development.

The differences between the scenarios is the turnover impact for each **activity centre**.

When estimating impacts, the assessment should include the following detail:

Location of proposed development

Provide a contextual description of the proposal and location with supporting maps, identifying if out-of-centre, within-centre or new activity centre

Size of the proposal

Detail the change in net lettable area (NLA) of the shop/retail (PLUC5-SHP) and/or other retail (PLUC6-RET) floor space

Describe the following for the existing situation

- Definition of trade area (including primary trade area and any secondary and tertiary trade areas)
- Estimated current and historical population of the trade area
- Overview of trade area resident attributes and implications for floorspace need and spending estimates
- Estimated historical expenditure of the trade area using latest ABS Household Expenditure Survey or other reliable source

Detail the following for the proposed situation

- Definition of trade area (same as existing situation)
- Estimated forecast population of the trade area
- Estimated forecast expenditure of the trade area

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Estimate the average annual sales turnover (aggregate and per m²) for the proposed development and/or activity centre pre-and post-development proposal.

The following impact percentage and risk level for retail turnover is provided as a general guide and should not be used as the only indicator of acceptability of a proposal:

Impact Percentage	Risk Level	Description
0-5%	Low	Any impacts are likely to be temporary and have no long-term effects on the viability of individual activity centres.
5-10%	Medium	Impacts are likely to be more significant for individual centres but overall network sustainability is unlikely to be undermined in the long-term.
10% +	High	Impacts are likely to be very significant for individual centres and will undermine the long-term network sustainability.

Where the short-term impact is initially high before falling to a medium or low level in the long term, consideration should be given to how the development can be staged or if there needs to be any additional short-term benefits to ensure that level of service is always maintained.

A2.3 BENEFITS

When estimating benefits to the community, the assessment should consider:

What benefit will occur and how important the benefit will be?

- Detail what benefit will occur due to the proposed development
- Wherever possible use existing data and standards to measure the size of the benefit and how important it will be to the community.

Who in the community are expected to experience the benefit?

- Identify those in the community who will be likely to experience the benefit – customers and employees, the local community, different socio-economic groups
- Define the geographic boundary where the benefit is experienced – the site, the surrounding area, the local government.

How much benefit is expected?

- Estimate how many individuals are expected to experience the benefit
- Describe the degree of change expected due to the benefit
- Determine the expected duration for which stakeholders are expected to experience the benefit.

The following assessment template should be used to evaluate the net benefit to the community of a proposal. The criteria should be examined when assessing the merits of the planning/development proposal against the base case or current situation.

FIGURE 1.4. SPP 4.2 GUIDELINES – APPENDIX G2.4 – SCOPE & METHODOLOGY FOR NET BENEFIT TEST (1/2)

A2.4 NET BENEFIT ASSESSMENT TEMPLATE

CRITERIA	COMMUNITY COSTS AND BENEFITS – NET BENEFIT			
	BASE CASE – CURRENT SITUATION For the subject centre and nearby centres/trade area	PLANNING/DEVELOPMENT PROPOSAL For the subject centre and nearby centres/trade area	QUANTITATIVE COST/BENEFIT Is there a quantified cost or benefit that the proposal will bring to the community? What is it? Where a cost or benefit cannot be quantified, state NIL.	QUALITATIVE COST/BENEFIT Outline the qualitative benefits to the community of the proposal. Can a non-quantifiable benefit or impact be described?
STRATEGIC ALIGNMENT				
Is the proposal consistent with the strategic planning for the area? Is it aligned with the relevant regional strategy and approved local planning strategy?	Describe how the current situation (zoning, land uses, development, built form) is aligned or otherwise with the strategic planning for the area.	Describe how the proposal will enable development that is compatible with and achieves the objectives of the strategic planning for the area.		
Is the proposal consistent with the objectives and outcomes of SPP 4.2?	Describe how the existing situation is/is not consistent with the objectives and outcomes of SPP 4.2.	Describe how the proposal achieves the objectives and meets the outcomes of SPP 4.2.		
What are the potential impacts on the activity centre hierarchy? Is the size and scale of the proposal consistent with the level of the hierarchy?	Describe how the existing situation aligns with the activity centre hierarchy and detail the size and scale in net lettable area (NLA) of existing and planned development.	Describe how the proposal may impact on the existing and planned activity centre hierarchy. Detail the size and scale (NLA) of the proposal.		
PRODUCTIVITY				
Does the proposal provide new jobs in addition to any that may be lost elsewhere – net additional jobs?	Outline the estimated existing employment located on site and in the surrounding area.	Provide an estimation of the expected additional employment to be provided on site and in the local area as a direct result of the proposal.		
Does the proposal contribute to diversifying local jobs – creating more strategic employment versus population-driven employment?	Describe the existing employment mix and the ratio of strategic vs population-driven employment on site and in the surrounding area.	Provide details of the changes to the employment mix that the proposal will bring on site and in the surrounding area.		

CRITERIA	COMMUNITY COSTS AND BENEFITS – NET BENEFIT			
	BASE CASE – CURRENT SITUATION For the subject centre and nearby centres/trade area	PLANNING/DEVELOPMENT PROPOSAL For the subject centre and nearby centres/trade area	QUANTITATIVE COST/BENEFIT Is there a quantified cost or benefit that the proposal will bring to the community? What is it? Where a cost or benefit cannot be quantified, state NIL.	QUALITATIVE COST/BENEFIT Outline the qualitative benefits to the community of the proposal. Can a non-quantifiable benefit or impact be described?
For retail proposals, how is the proposal expected to impact upon the current and expected turnover and role of relevant activity centres?	<i>See Scope and Methodology for Impacts above</i>	<i>See Scope and Methodology for Impacts above</i>		
Will the proposal increase the choice and availability of goods and services in the area?	Describe the range of choice and the availability of goods and services in the area for the existing situation.	Describe how the proposal will enable a greater range of choice and improve the availability of goods and services in the area.		
QUALITY OF LIFE				
Is the proposal compatible with surrounding land uses? Will there be an improvement in the level of amenity and vibrancy that benefits the wider community?	Describe the existing land uses, built form and public realm. Detail the character and level of amenity provided by the existing situation.	Describe how the proposal will/will not be compatible with the surrounding land uses and contribute to improvements in the amenity provided by the built form and public realm.		
Does the proposal include land uses such as healthcare, education and community facilities?	Describe the existing level of healthcare, education and community facilities in the area.	Detail any additional or potential loss of healthcare, education and community facilities in the area as a result of the proposal.		
ENVIRONMENTAL SUSTAINABILITY				
Would the proposal have an impact on overall vehicle trips? Would car-based net trips (by distance) increase or reduce as a result of the proposal?	Describe the existing vehicle trips for the existing situation within the trade area.	Calculate the potential increase or decrease in vehicle trips within the trade area as a result of the proposal.		

FIGURE 1.5. SPP 4.2 GUIDELINES – APPENDIX G2.4 – SCOPE & METHODOLOGY FOR NET BENEFIT TEST (2/2)

CRITERIA	COMMUNITY COSTS AND BENEFITS – NET BENEFIT			
	BASE CASE – CURRENT SITUATION For the subject centre and nearby centres/trade area	PLANNING/DEVELOPMENT PROPOSAL For the subject centre and nearby centres/trade area	QUANTITATIVE COST/BENEFIT Is there a quantified cost or benefit that the proposal will bring to the community? What is it? Where a cost or benefit cannot be quantified, state NIL.	QUALITATIVE COST/BENEFIT Outline the qualitative benefits to the community of the proposal. Can a non-quantifiable benefit or impact be described?
Does the proposal contribute to improved air and water quality – such as incorporating water sensitive urban design (WSUD), or walking and cycling infrastructure that reduces emissions from vehicles?	Describe the existing situation for the area in relation to WSUD and the provision of walking and cycling infrastructure.	Describe how the proposal will improve air and water quality through incorporation of WSUD, the provision of new and/or enhancement of existing walking and cycling infrastructure, or other measures.		
Does the proposal protect or enhance remnant vegetation or contribute to improving the urban tree canopy?	Describe the existing levels and quality of vegetation on site and the extent of urban tree canopy.	Provide details of how the proposal will protect and/or enhance vegetation on site and improve the urban tree canopy in the area, over and above any requirements of the planning framework.		
Does the proposal help reduce energy consumption and emissions – for example through sustainable construction methods and/or incorporating renewable energy systems?	Describe the current situation with regards to how energy is produced and consumed on site.	Describe how the proposal will help reduce emissions and incorporate renewable energy on site.		
INFRASTRUCTURE AND SERVICES				
Is there significant government investment in services, infrastructure or development in the area or nearby centres that may be affected by the proposal? Will the proposal impact patronage/viability of the investment and what is the expected impact?	Describe the government services (Federal, State and local) that already exist in the area or nearby centres. Describe government investments in infrastructure or government-led (re) development in the area or nearby centres.	Detail how the proposal may impact upon or benefit the provision of government services in the area or nearby centres. Detail how the proposal may or may not undermine government investment in infrastructure or (re)development in the area or nearby centres.		

CRITERIA	COMMUNITY COSTS AND BENEFITS – NET BENEFIT			
	BASE CASE – CURRENT SITUATION For the subject centre and nearby centres/trade area	PLANNING/DEVELOPMENT PROPOSAL For the subject centre and nearby centres/trade area	QUANTITATIVE COST/BENEFIT Is there a quantified cost or benefit that the proposal will bring to the community? What is it? Where a cost or benefit cannot be quantified, state NIL.	QUALITATIVE COST/BENEFIT Outline the qualitative benefits to the community of the proposal. Can a non-quantifiable benefit or impact be described?
Does the proposal include new, or improvements to existing transport infrastructure, particularly walking, cycling and public transport, that increases access and helps manage congestion?	Describe the transport infrastructure in the area and the current estimated mode split.	Detail how the proposal will improve transport infrastructure in the area with a focus on walking, cycling and public transport, over and above any requirements of the planning framework.		
Does the proposal include enhancements to utilities that benefit the local area?	Describe the existing provision of utilities.	Provide detail on any improvements to utilities that the proposal will bring.		
EQUITY AND SOCIAL INCLUSION				
Does the proposal have the potential to improve access to economic opportunity for minority and vulnerable groups?	Describe the existing services and employment opportunities.	Detail how the proposal will improve access to economic opportunity.		

A2.5 CONCLUSIONS

An executive summary should provide a comparison of the impact and benefit of the proposal to determine acceptability of the proposal in accordance with the requirements of SPP 4.2 and these Guidelines.

2 Trade Area Analysis (Study Area)

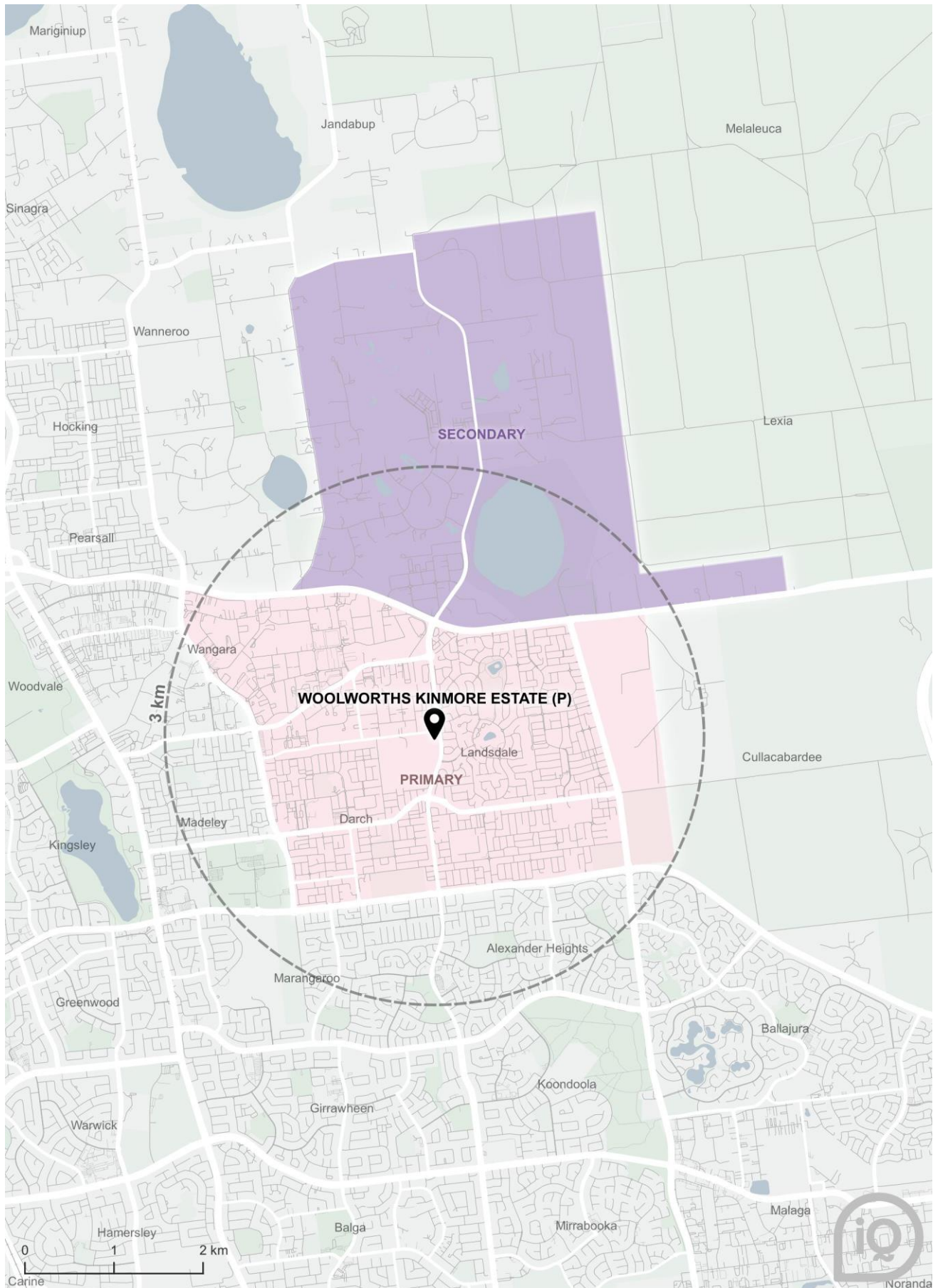
This section of the report outlines the trade area likely to be served by the proposed Woolworths Darch development, including current and projected population and retail spending levels. The trade area is considered to be an appropriate 'study area' for the purposes of needs assessment. The socio-economic profile of the trade area population is also reviewed.

2.1. Trade Area Definition

- i. The trade area for the proposed Woolworths supermarket-based shopping centre has been defined considering the following:
 - The scale and composition of the proposed development, including a full-line Woolworths supermarket as the largest retail tenant.
 - The provision of existing and proposed retail facilities throughout the region.
 - Regional and local accessibility.
 - The pattern of urban development.
 - Significant physical barriers such as major roads.
- ii. The trade area defined for the proposed development is also based on the experience of Location IQ, which has been established and refined over many years across many similar assessments. Location IQ has also been provided with existing store customer data (including exit-survey results, transaction data, mobile phone ping data and the like), which assists in the refinement and cross-checking of trade area boundaries for existing networks - and can then be utilised for future scenarios.
- iii. The trade area defined for the proposed development is based on Australian Bureau of Statistics (ABS) SA1 statistical areas, which is common convention for trade area definitions - given SA1's are the smallest unit area released in Census data. SA1s typically have a population of between 200 and 800 persons, and an average population size of approximately 400 persons.
- iv. Map 2.1 illustrates the defined main trade area for the proposed Woolworths Darch development which includes one primary sector, and one secondary sector as follows:
 - The **primary sector** extends 2 – 3 km in all directions and is limited to the south by Hepburn Avenue, to the west by Hartman Drive, and to the north by Gnangara Road. The sector encompasses the suburbs of Landsdale, Darch, and Wangara.

- The **secondary sector** stretches north of Gngara Road to incorporate the large rural-residential areas of Gngara.
- v. The defined main trade area is consistent with most supermarkets in similar urban fringe locations across Australia, acknowledging overlapping catchments are typical in any retail hierarchy.
- vi. It is observed in any established population area that residents/customers move freely between different shopping facilities depending on choice, offer, complementary trip purposes, place of work, place of education, place of recreation and the like. It is not unreasonable to expect consumers to make choices about their shopping patterns based on these types of criteria and conversely, it is highly unlikely that residents would just undertake shopping at their closet facility all the time.

MAP 2.1. WOOLWORTHS DARCH MAIN TRADE AREA



2.2. Main Trade Area Population

- i. Table 2.1 details the current and projected population levels for the proposed Woolworths Darch main trade area, based on the following:
 - The 2011, 2016, and 2021 Census of Population and Housing undertaken by the Australian Bureau of Statistics (ABS);
 - New dwelling approval statistics sourced from the ABS over the period from 2011/12 – 2021/22 (refer Charts 2.1 – 2.2);
 - WA Tomorrow (2018) forecasts prepared by the Western Australian Planning Commission at an SA2 level;
 - Forecast.id City of Wanneroo population projections March 2023.
 - Perth and Peel Urban Land development outlook provided by the Western Australian Government (Department of Planning, Lands and Heritage), 2020/21.
 - Investigations by this office in relation to residential development within the main trade area.
- ii. Official population projections above have been taken into consideration when projecting future population within the main trade area, and more specifically the primary sector - given the planned future growth within the Landsdale region. Chart 2.3 provides a comparison between official population projection sources and those presented in this assessment, based on key overlap assumptions. This includes population and household forecasts prepared by .id (informed decisions) for the City of Wanneroo (as at March 2023), as well as WA Tomorrow projections by the State Government. As shown, Location IQ projections are generally in-line (or lower) than official sources, and consequently can be considered conservative.
- iii. The Darch main trade area population is currently estimated at 25,720 (2023), including 24,205 persons in the key primary sector. The main trade area population is projected to increase to 26,920 by 2026 (i.e. year of opening), including 25,255 persons in the primary sector.
- iv. Population within the main trade area population is projected to increase at an average rate of 0.8% (or 233 persons) per annum to 29,920 by 2041, including 27,505 persons in the primary sector. Once again, this is considered a conservative estimate, and lower than historical rates which saw the main trade area population grow by some 928 persons per annum over the 2011 – 2021 period.
- v. Projected population growth rate takes into consideration the Kinmore Green Estate, as well as a number of smaller in-fill developments. Key points to note regarding the assumed rate of development within the **primary sector** include:
 - Kinmore Green Estate is currently underway and first homes are assumed from 2024. In total, almost 300 homes (900 persons) will be accommodated at the site, and completion is assumed to be by 2031 – reflecting a development rate of around 35 homes per year.
 - First homes were completed at Basil Heights Estate in late-2018, and less than five of the total 50 homes remain to be developed.

- Fiori Private Estate is expected to include 103 homes upon completion. To date, some 70 homes have been developed, and the indicative timeline for completion is 2025 (a rate of around 20 homes per year).
 - Salita Estate will include a total of 85 homes and is nearing completion (less than 5 homes yet to be completed).
 - The Garden Estate has commenced siteworks for the 28-lot development that is expected to reach completion over a five year timeline.
 - A new subdivision adjacent to Crest Landsdale has been cleared ready for first homes and is expected to yield a total of 36 dwellings by 2031.
 - Pomodoro Gardens is nearing completion, with five lots remaining for development.
 - Rose Garden Estate will comprise around 60 lots upon completion, with preliminary stages being marketed and a ten-year horizon assumed.
 - Trigon Lane is currently under construction and will yield a total of 28 dwellings upon completion in 2024.
 - Vermont Gardens Estate will include 133 homes upon completion – which is assumed by 2025 (given around 25 homes remain).
 - The Perth and Peel Urban Land Development Outlook also highlights the potential development of several lots throughout the primary sector - with approximately 700 additional homes anticipated to be delivered over the forecast period.
- vi. It is important to note that the population projections in this report are based on current market conditions and the latest available information that has been sourced by this office. If market conditions change, this would impact population and sales projections outlined in this assessment.
- vii. Ultimately the defined main trade area has the potential capacity to support population growth over-and-above what has been assumed - depending on demand. If this was to occur, modelled retail floorspace demand would be higher and the subject development would be supportable earlier than assumed.

TABLE 2.1. MAIN TRADE AREA POPULATION, 2011 – 2041

Population	Actual			Forecast					Change 2023-41
	2011	2016	2021	2023	2026	2031	2036	2041	
Primary	14,392	20,160	23,505	24,205	25,255	26,755	27,255	27,505	3,300
Secondary	<u>1,252</u>	<u>1,184</u>	<u>1,415</u>	<u>1,515</u>	<u>1,665</u>	<u>1,915</u>	<u>2,165</u>	<u>2,415</u>	<u>900</u>
Main Trade Area	15,644	21,344	24,920	25,720	26,920	28,670	29,420	29,920	4,200

Average Annual Change (No.)	Actual		Forecast					Change 2023-41	
	2011-16	2016-21	2021-23	2023-26	2026-31	2031-36	2036-41		
Primary		1,154	669	350	350	300	100	50	183
Secondary		<u>-14</u>	<u>46</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>
Main Trade Area		1,140	715	400	400	350	150	100	233

Average Annual Change (%)	Actual		Forecast					Change 2023-41	
	2011-16	2016-21	2021-23	2023-26	2026-31	2031-36	2036-41		
Primary		7.0%	3.1%	1.5%	1.4%	1.2%	0.4%	0.2%	0.7%
Secondary		<u>-1.1%</u>	<u>3.6%</u>	<u>3.5%</u>	<u>3.2%</u>	<u>2.8%</u>	<u>2.5%</u>	<u>2.2%</u>	<u>2.6%</u>
Main Trade Area		6.4%	3.1%	1.6%	1.5%	1.3%	0.5%	0.3%	0.8%
<i>Greater Perth</i>		1.9%	1.2%	1.0%	1.5%	1.3%	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>Australian Average</i>		1.6%	1.2%	0.3%	1.3%	1.3%	1.2%	1.1%	<i>n.a.</i>

All figures as at June and based on 2021 SA1 boundary definition.

CHART 2.1. PRIMARY SECTOR NEW DWELLING APPROVALS, 2011/12 – 2021/22

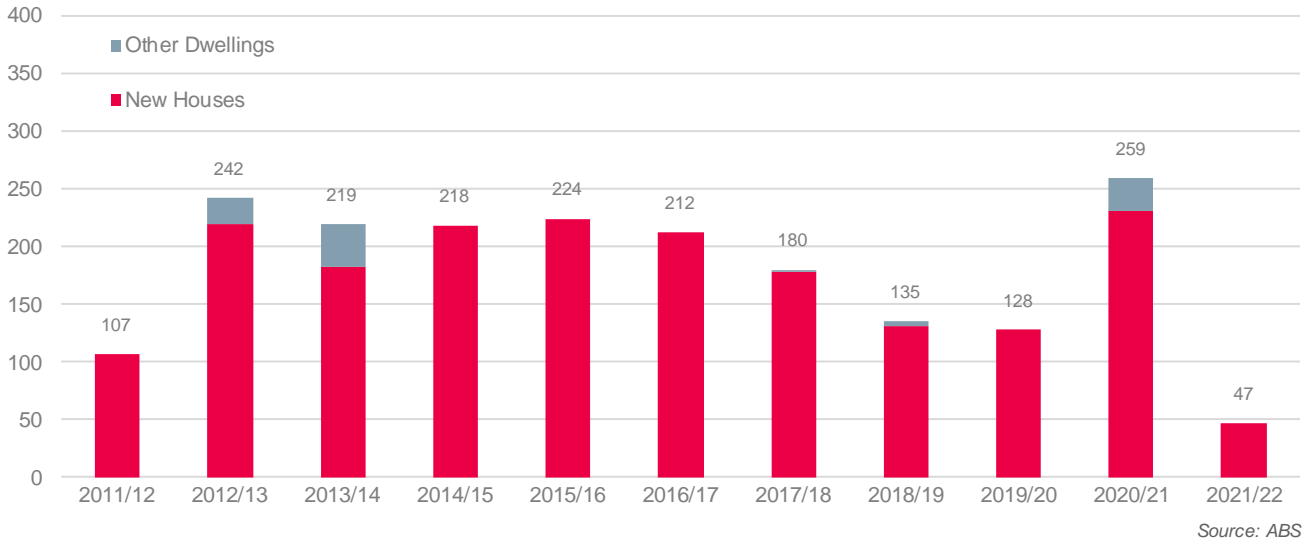


CHART 2.2. SECONDARY SECTOR NEW DWELLING APPROVALS, 2011/12 – 2021/22

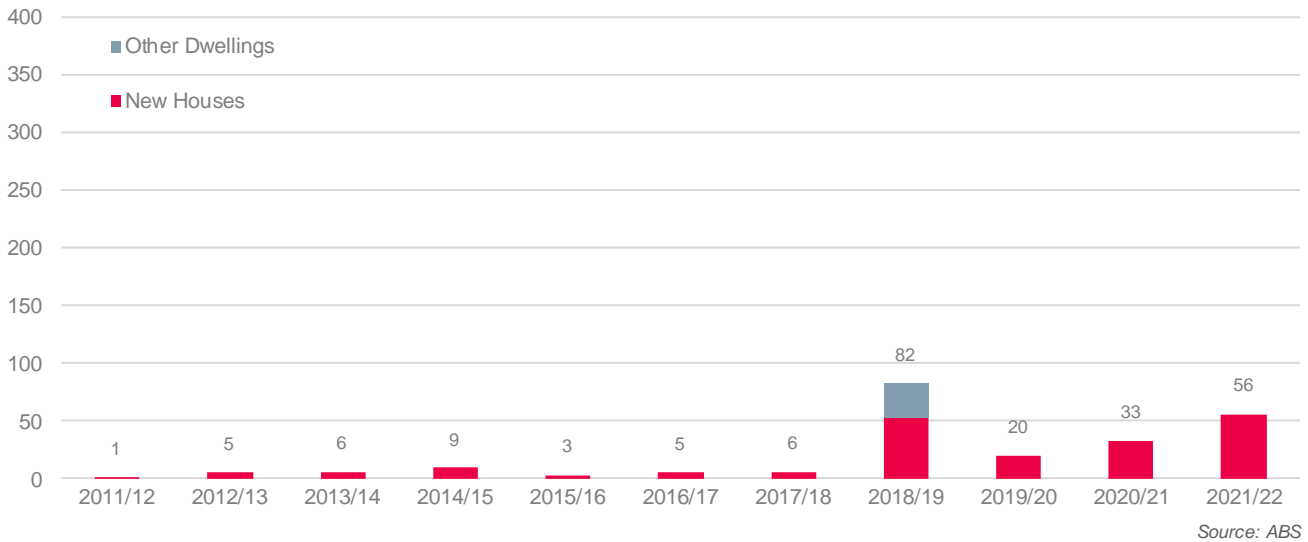
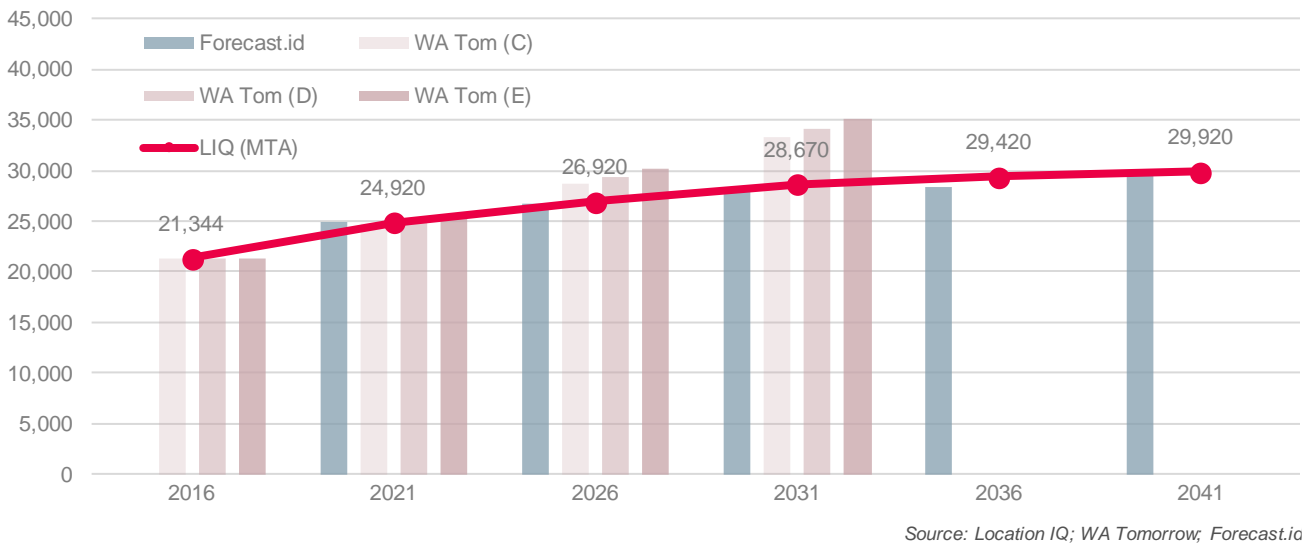
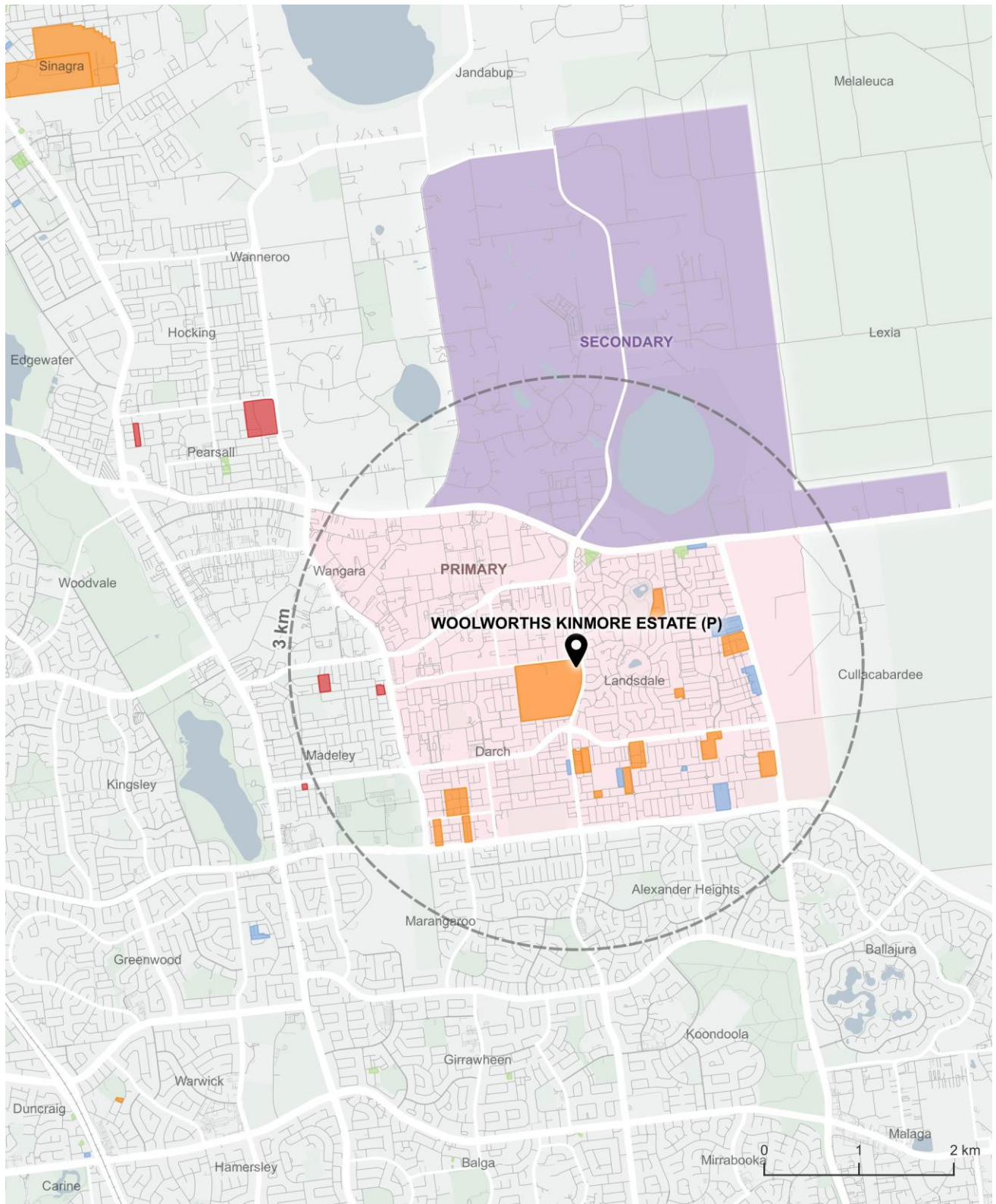


CHART 2.3. OFFICIAL POPULATION PROJECTIONS COMPARISON



MAP 2.2. RESIDENTIAL LAND DEVELOPMENT OUTLOOK (BROADHECTARE)



Residential Land Development Outlook - Broadhectare

- Short term (0 - 5 years)
- Medium term (6-10 years)
- Short term with current conditional approval (0-5 years)
- Long term (10 plus years)



2.3. Socio-economic Profile

- i. Table 2.2 summarises the socio-economic profile of the main trade area population as compared with the metropolitan Perth and Australian benchmarks. This information is based on the 2021 Census of Population and Housing, with key points to note including:
 - Main trade area residents earn average per capita income levels that are slightly below the metropolitan Perth benchmark, reflecting a larger household size (3.2 persons). However, average household income levels exceed the benchmark – likely reflecting ‘two working parents’ families.
 - The main trade area population is generally younger than the benchmark, with an average age of 34.2 years – as compared with 38.6 years across the metropolitan area. This is evidenced by the high proportion of children aged 0 – 19 years (30.9%) across the main trade area (compared with 24.6% across Perth). The primary sector average age is 33.3 years.
 - Reflecting the above, the dominant household type is traditional families (i.e. couples with dependent children), at 61.7%. The Perth metropolitan average, by comparison, is 46.4%.
 - There main trade area is predominantly Australian-born (59.6%), however, there is a higher proportion of Asian-born residents (16.3%) when compared with the benchmarks (12.5%).
 - A large proportion of resident own their own home (87.3%), as opposed to rent (12%).
- ii. Charts 2.4 – 2.9 illustrate the key socio-economic changes across the **main trade area** over the 2011 – 2021 Census periods. As shown, recent (i.e. post 2016) and planned population growth across the area has and is expected to continue attracting more affluent families and couples who own their own houses.
- iii. These residents should be provided with a range of convenience-based facilities (including a full-line supermarket) in close proximity to their homes.

TABLE 2.2. MAIN TRADE AREA SOCIO-ECONOMIC PROFILE, 2021 CENSUS

Characteristic	Primary Sector	Secondary Sector	Main TA	Greater Perth Average	Australia Average
People					
Age Distribution (% of Pop'n)					
Aged 0-14	24.3%	10.6%	23.5%	18.8%	18.0%
Aged 15-19	7.3%	8.1%	7.3%	5.8%	5.7%
Aged 20-29	12.2%	9.5%	12.1%	13.1%	13.3%
Aged 30-39	16.6%	6.8%	16.0%	15.3%	14.6%
Aged 40-49	15.6%	7.9%	15.1%	13.4%	13.0%
Aged 50-59	12.7%	15.3%	12.8%	12.4%	12.5%
Aged 60+	11.3%	41.9%	13.0%	21.1%	23.0%
Average Age	33.3	48.9	34.2	38.6	39.5
Birthplace (% of Pop'n)					
Australian	59.2%	66.2%	59.6%	63.4%	72.0%
Overseas	40.8%	33.8%	40.4%	36.6%	28.0%
• Asia	17.1%	3.0%	16.3%	12.5%	12.1%
• Europe	9.6%	21.9%	10.3%	13.1%	7.2%
• Other	14.1%	8.9%	13.8%	11.1%	8.7%
Family					
Average Household Size	3.3	2.6	3.2	2.5	2.5
Family Type (% of Pop'n)					
Couple with dep't children	63.2%	35.3%	61.7%	46.4%	44.2%
Couple with non-dep't child.	10.1%	14.9%	10.4%	7.3%	7.7%
Couple without children	14.3%	33.7%	15.3%	22.8%	23.8%
Single with dep't child.	6.5%	3.7%	6.3%	8.4%	8.6%
Single with non-dep't child.	2.2%	1.7%	2.1%	3.5%	4.0%
Other family	0.6%	1.1%	0.7%	1.0%	1.0%
Lone person	3.1%	9.5%	3.5%	10.5%	10.8%
Employment					
Income Levels					
Average Per Capita Income	\$56,905	\$52,053	\$56,590	\$58,917	\$55,301
Per Capita Income Variation	-3.4%	-11.7%	-4.0%	n.a.	n.a.
Average Household Income	\$137,693	\$106,078	\$135,665	\$114,361	\$109,594
Household Income Variation	20.4%	-7.2%	18.6%	n.a.	n.a.
Housing					
Tenure Type (% of Dwellings)					
Owned	87.1%	89.5%	87.3%	71.7%	67.4%
Rented	12.3%	8.5%	12.0%	26.7%	30.8%
Other Tenure Type	0.6%	2.0%	0.7%	1.6%	1.8%

Sources: ABS Census of Population and Housing 2021

CHART 2.4. MAIN TRADE AREA AGE DISTRIBUTION (%), 2011 – 2021

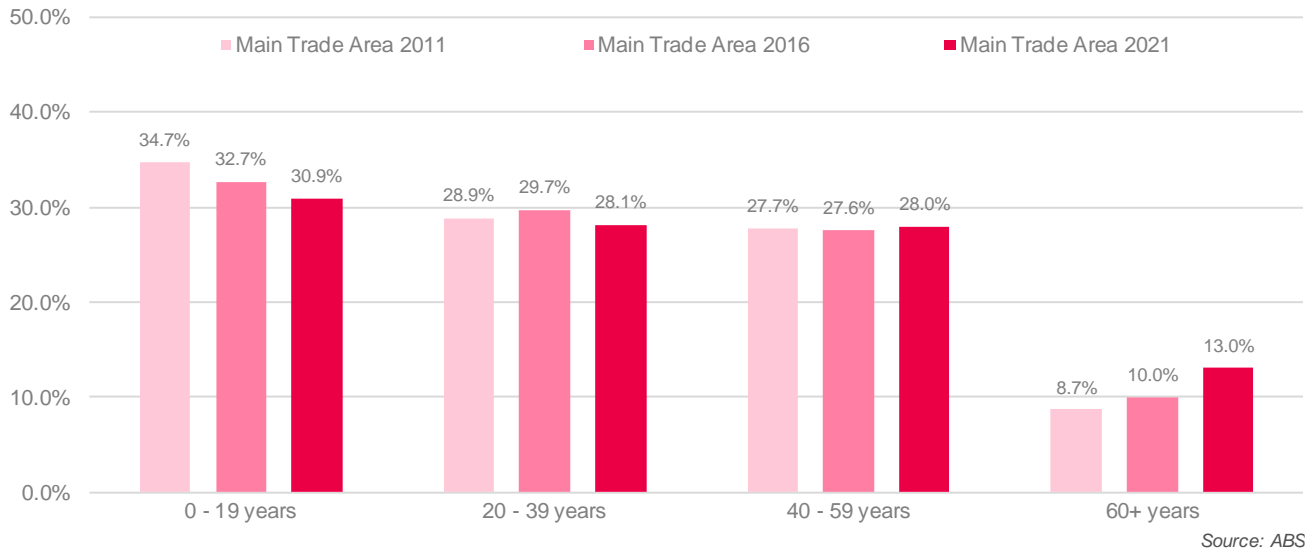


CHART 2.5. MAIN TRADE AREA INCOME LEVELS, 2011 – 2021

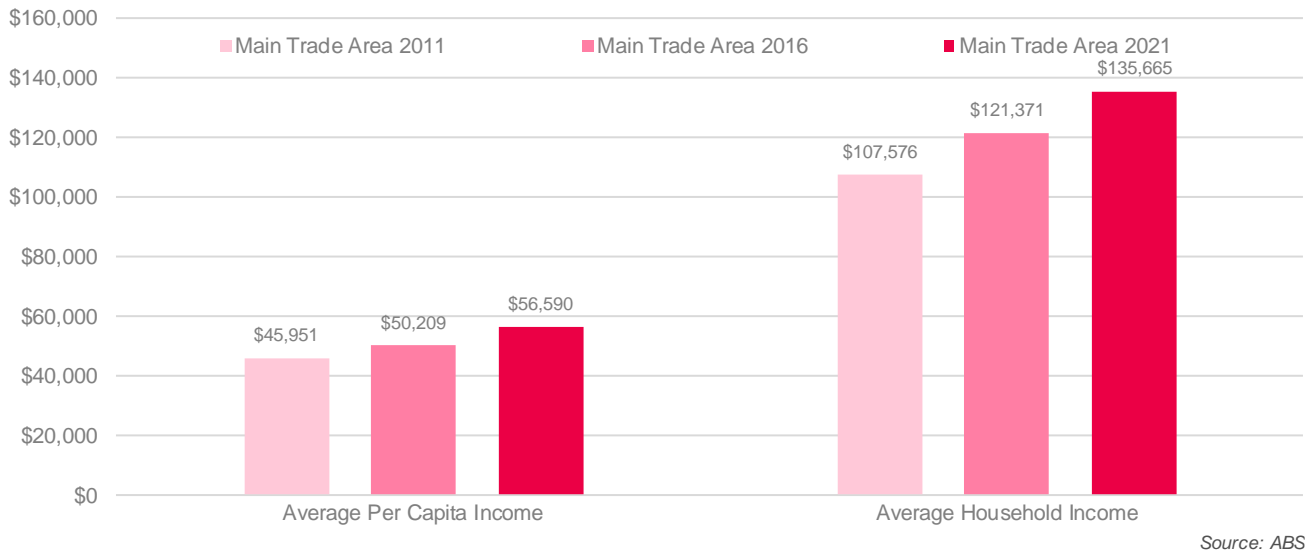


CHART 2.6. MAIN TRADE AREA PLACE OF BIRTH, 2011 – 2021

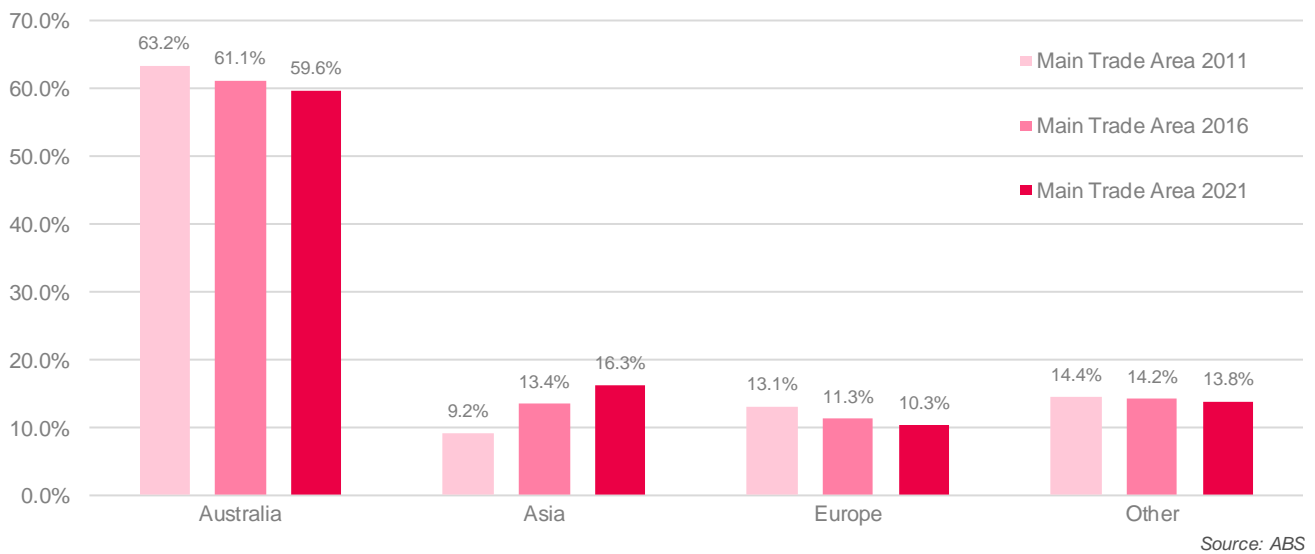


CHART 2.7. MAIN TRADE AREA HOUSEHOLD STRUCTURE, 2011 – 2021

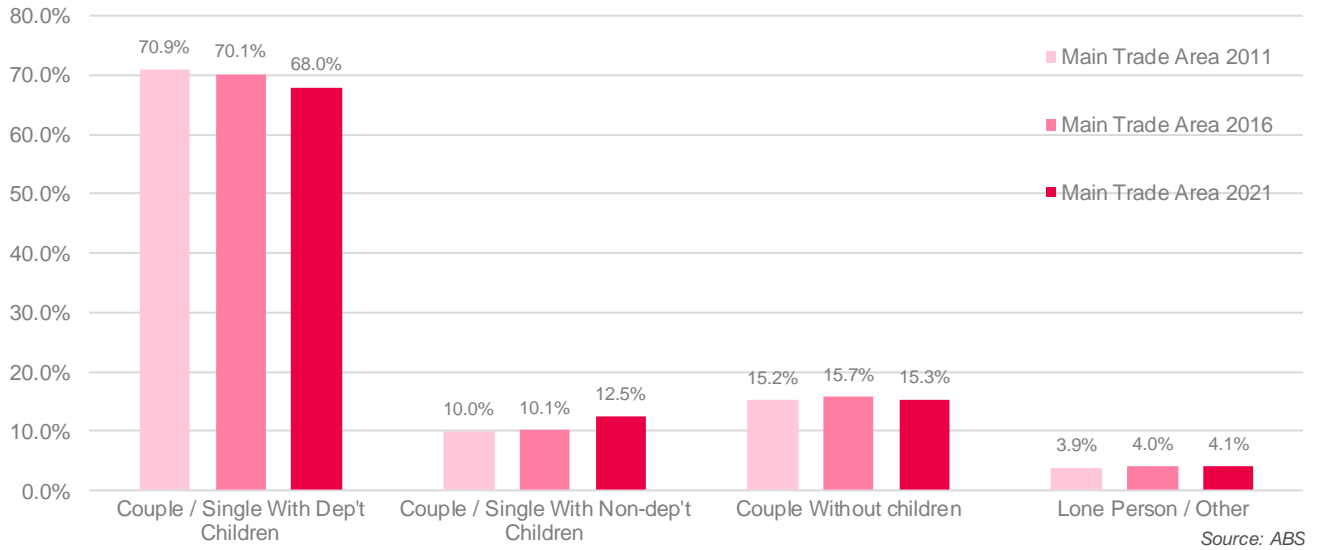


CHART 2.8. MAIN TRADE AREA DWELLING TYPE, 2011 – 2021

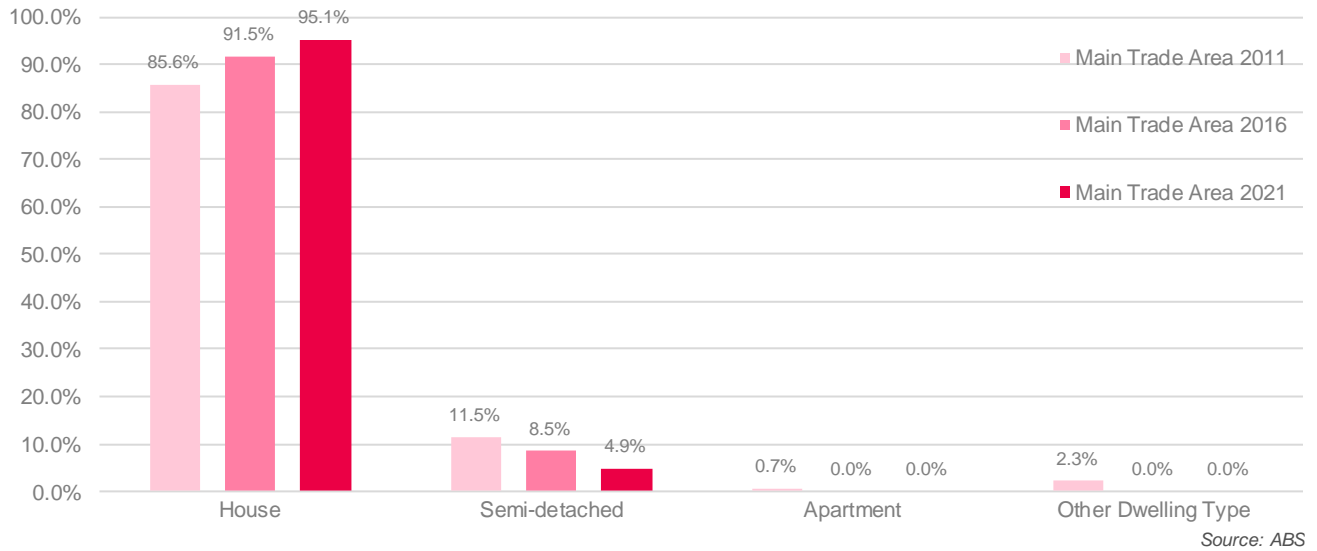
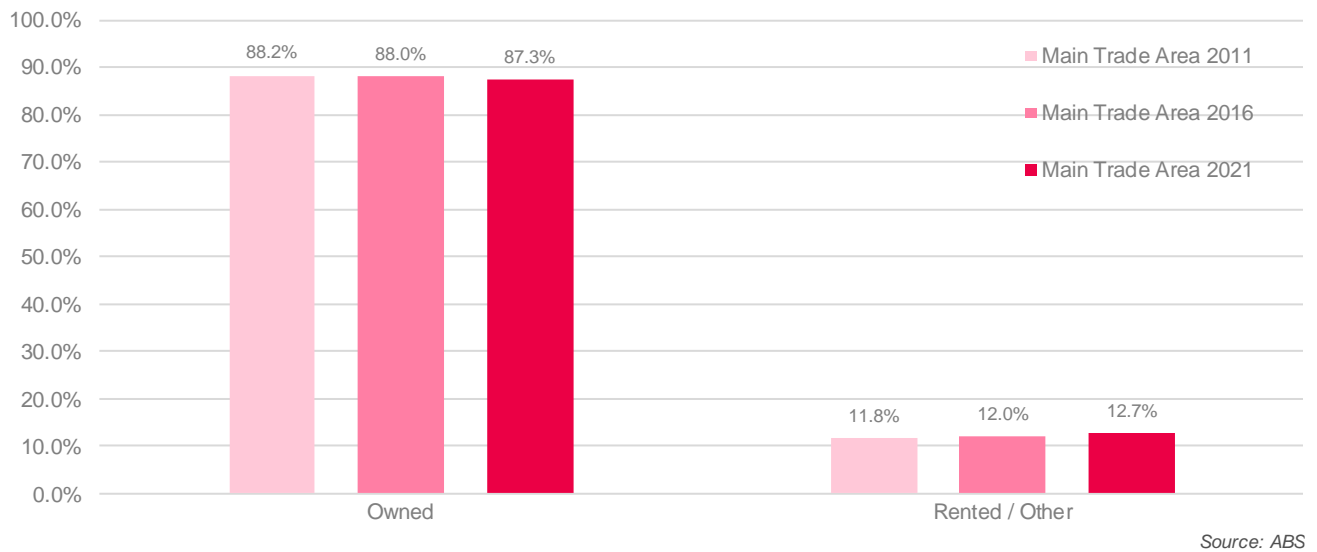


CHART 2.9. MAIN TRADE AREA TENURE TYPE, 2011 – 2021



2.4. Main Trade Area Retail Expenditure

- i. The estimated retail expenditure capacity of the Darch main trade area population is based on actual transaction data sourced from CommBank iQ Retail Spend Insights.
- ii. CommBank iQ Retail Spend Insights is a new dataset that was first released in April 2023 (Calendar Year 2022) and is to be released for each Financial Year and Calendar Year going forward (i.e. released every six months). The dataset has initially been adopted by the four leading economic property consultants in Australia.
- iii. Retail Spend Insights is a modelled view of retail spend per capita across Australia. It is provided at the granularity of SA1 allowing for the creation of bespoke catchments to facilitate a view on resident spend by category for the area. The dataset is based on de-identified, privacy treated retail banking transactions, normalised to be representative of the Australian population. Transactions may include purchases and refunds from credit card, debit card, EFTPOS cards, BPay and direct debit.
- iv. CommBank iQ Retail Spend Insights excludes cash and buy now pay later services (CBNPL). The data provides the average annual (for CY22) spend across 81 categories for people aged 18 years and older. The data is also split out by instore and online transactions. Location IQ has adjusted the raw data for cash and buy now pay later services.
- v. Charts 2.10 – 2.12 illustrate retail spending levels per person across the main trade area, as compared with the Perth metropolitan averages in 2022/23. Reflecting household income levels, per capita spending is broadly similar to the benchmark, with subtle variations by sub-category.
- vi. Table 2.3 outlines the total retail expenditure levels generated by the main trade area population. The total retail expenditure level is currently estimated at \$551.6 million and is projected to increase at an average rate of 1.6%, to \$734.9 million in 2041 (base). All figures presented in this report are in constant 2022/23 dollars and include GST.
- vii. The projected growth rate of the main trade area retail spending market considers the following:
 - **Inflation:** held at 0.0% across the forecast period to 2041 (constant 2022/23 dollars).
 - **Real growth** in retail spending per capita of 0.0% is assumed over the period to 2024/25, reflecting the impact of the pandemic and inflationary pressures on wages and the economy. From 2025/26 real growth per capita is assumed at 0.5% annually for food retail and 1.0% for non-food retail over the period to 2040/41.
 - **Population Growth** across the main trade area, which is projected at around 2.1% per annum.
- viii. Table 2.4 presents a breakdown of retail spending by key commodity group, indicating the largest spending market is supermarkets (at \$133.5 million), which is a relevant consideration for the potential sales and performance of the proposed Woolworths at Darch.

CHART 2.10. MAIN TRADE AREA RETAIL EXPENDITURE PER CAPITA, 2022/23

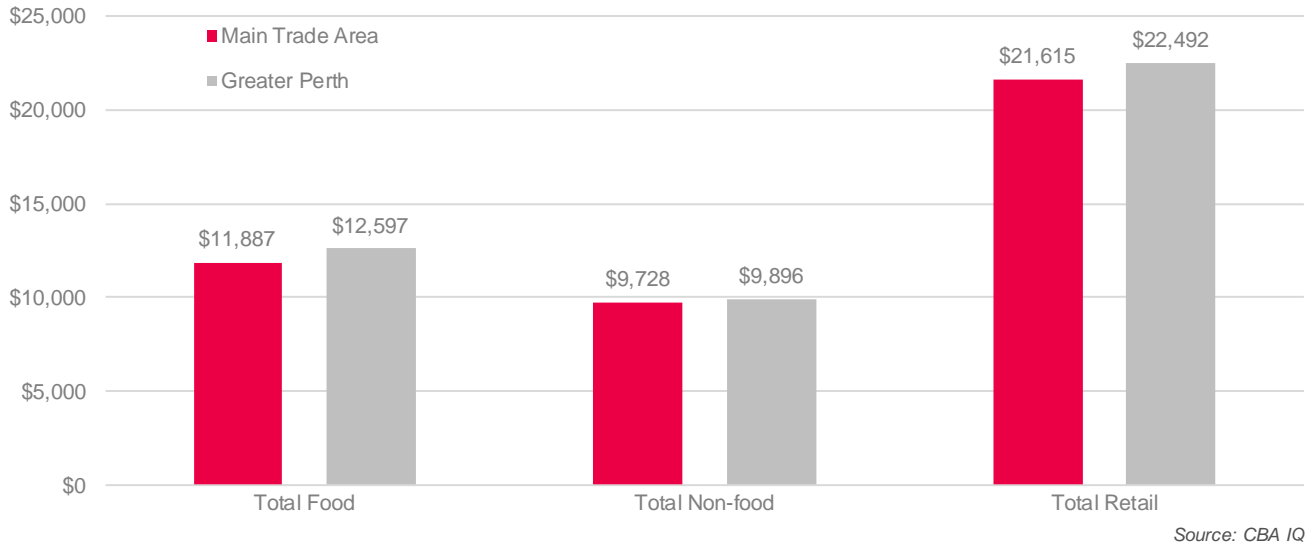


CHART 2.11. MAIN TRADE AREA RETAIL EXPENDITURE PER CAPITA BY CATEGORY, 2022/23

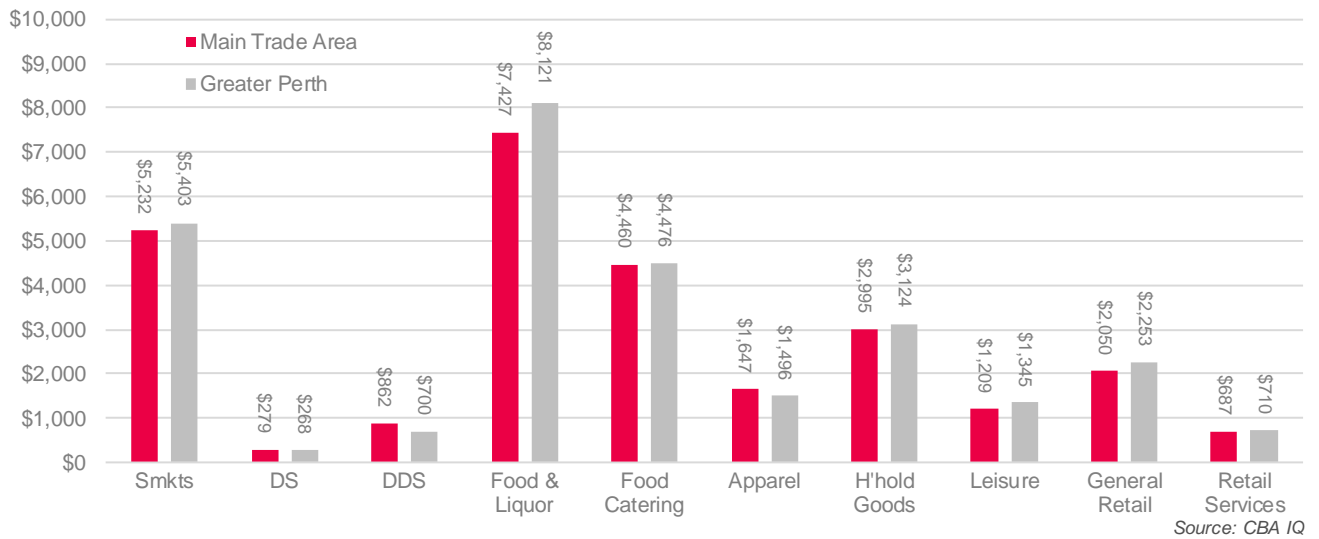


CHART 2.12. MTA RETAIL EXPENDITURE BY CATEGORY PER CAPITA VARIATION FROM PERTH AVE. 2022/23

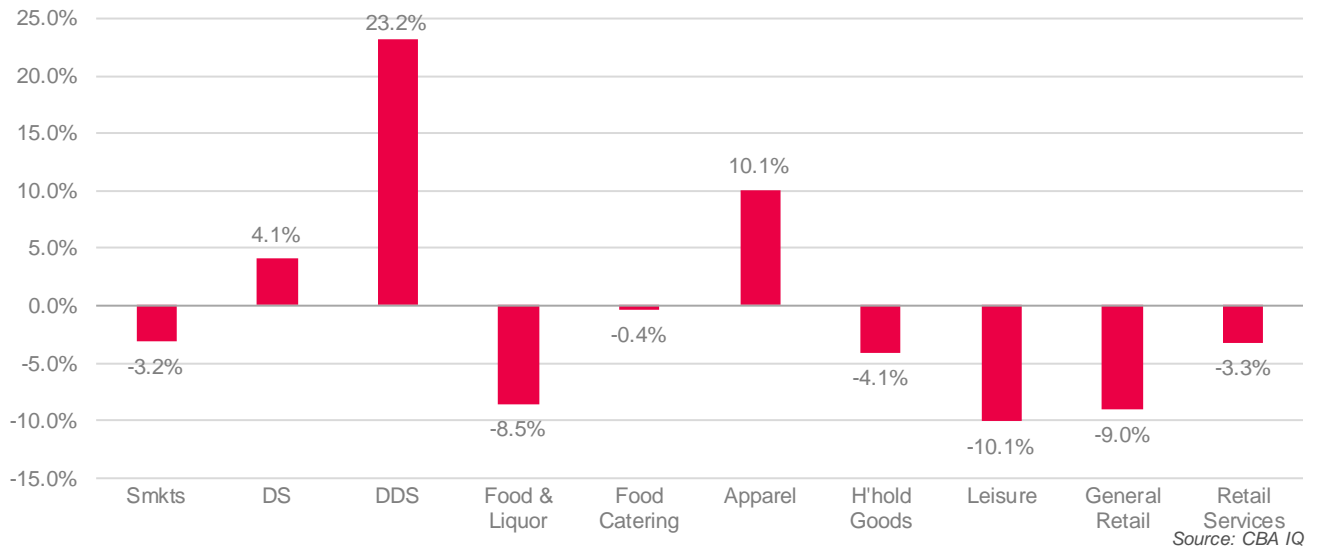


TABLE 2.3. MAIN TRADE AREA RETAIL EXPENDITURE, 2023 – 2041

Y/E June	Primary Sector	Secondary Sector	Main TA
2023	517.9	33.7	551.6
2024	525.4	34.8	560.2
2025	532.9	36.0	568.8
2026	544.8	37.4	582.2
2027	556.3	38.8	595.1
2028	567.3	40.3	607.5
2029	578.5	41.7	620.2
2030	589.9	43.3	633.1
2031	601.5	44.8	646.4
2032	611.0	46.4	657.4
2033	618.2	47.9	666.2
2034	625.5	49.5	675.0
2035	632.9	51.2	684.1
2036	640.4	52.9	693.2
2037	647.4	54.5	701.9
2038	653.8	56.2	710.0
2039	660.3	57.9	718.2
2040	666.9	59.6	726.5
2041	673.5	61.5	734.9
Expenditure Growth			
2023-26	26.9	3.7	30.6
2026-31	56.7	7.4	64.2
2031-36	38.9	8.0	46.9
2036-41	33.1	8.6	41.7
2023-41	155.6	27.7	183.4
Average Annual Growth Rate			
2023-26	1.7%	3.5%	1.8%
2026-31	1.9%	3.7%	2.1%
2031-36	2.1%	3.3%	1.4%
2036-41	2.0%	3.1%	1.2%
2023-41	1.8%	3.4%	1.6%

**Constant 2022/23 dollars & including GST
Source : CBA IQ, Location IQ*

TABLE 2.4. MAIN TRADE AREA RETAIL EXPENDITURE BY KEY COMMODITY GROUP, 2023 – 2041

Y/E June	Supermarket	Department Store	Discount Dept Store	Food & Liquor	Food Catering	Apparel	H'hold Goods	Leisure	General Retail	Retail Services
2023	133.5	7.1	22.0	56.0	113.8	42.0	76.4	30.9	52.3	17.5
2024	135.6	7.2	22.3	56.9	115.6	42.7	77.6	31.3	53.1	17.8
2025	137.7	7.3	22.7	57.8	117.3	43.3	78.8	31.8	54.0	18.1
2026	140.5	7.5	23.1	59.0	120.3	44.4	80.9	32.6	55.3	18.5
2027	143.2	7.6	23.6	60.1	123.2	45.5	82.8	33.4	56.7	19.0
2028	145.7	7.7	24.0	61.2	126.0	46.5	84.7	34.2	58.0	19.4
2029	148.3	7.9	24.4	62.3	128.9	47.6	86.7	35.0	59.3	19.9
2030	151.0	8.0	24.9	63.4	131.8	48.7	88.7	35.8	60.7	20.3
2031	153.7	8.2	25.3	64.5	134.8	49.8	90.7	36.6	62.0	20.8
2032	155.8	8.3	25.7	65.4	137.4	50.7	92.4	37.3	63.2	21.2
2033	157.4	8.4	25.9	66.1	139.5	51.5	93.9	37.9	64.2	21.5
2034	159.0	8.4	26.2	66.8	141.6	52.2	95.3	38.5	65.2	21.8
2035	160.7	8.5	26.4	67.5	143.7	53.0	96.8	39.1	66.2	22.2
2036	162.4	8.6	26.7	68.2	145.9	53.8	98.3	39.7	67.2	22.5
2037	163.9	8.7	27.0	68.9	148.0	54.6	99.7	40.2	68.2	22.8
2038	165.3	8.8	27.2	69.4	150.0	55.3	101.1	40.8	69.1	23.1
2039	166.7	8.8	27.4	70.0	152.0	56.1	102.4	41.3	70.0	23.4
2040	168.1	8.9	27.6	70.6	154.0	56.8	103.8	41.9	71.0	23.8
2041	169.5	9.0	27.9	71.3	156.1	57.6	105.3	42.5	71.9	24.1
Expenditure Growth										
2023-26	7.0	0.4	1.1	3.0	6.5	2.4	4.4	1.8	3.0	1.0
2026-31	13.2	0.7	2.2	5.6	14.5	5.3	9.8	4.0	6.7	2.2
2031-36	8.7	0.4	1.4	3.7	11.1	4.1	7.6	3.1	5.2	1.7
2036-41	7.2	0.4	1.2	3.1	10.1	3.7	7.0	2.8	4.7	1.6
2023-41	36.0	1.9	5.9	15.2	42.3	15.5	28.8	11.6	19.6	6.5
Average Annual Growth Rate										
2023-26	1.7%	1.7%	1.7%	1.7%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
2026-31	1.8%	1.8%	1.8%	1.8%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
2031-36	1.1%	1.1%	1.1%	1.1%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2036-41	0.9%	0.8%	0.9%	0.9%	1.4%	1.3%	1.4%	1.4%	1.4%	1.4%
2023-41	1.3%	1.3%	1.3%	1.3%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%

*Constant 2022/23 dollars & including GST

Source : CBA IQ, Location IQ

3 Competitive Environment

This section of the report reviews the competitive retail environment within which the proposed Woolworths Darch would operate, to assist with the assessment of likely trading impacts. As outlined previously, this assessment considered to need and net benefit of retail uses as part of the Woolworths Darch development, with relevant centres illustrated in Map 3.1.

The hierarchy of shopping centres presented in this Retail Need and Sustainability Assessment is consistent with SPP4.2, including:

- Capital City
- Strategic
- Specialised
- Secondary
- District
- Neighbourhood
- Secondary
- Local Centres

Information on the size, composition and performance of centres outlined (refer Table 3.1) is based on the Location IQ proprietary databases that includes information from the following sources:

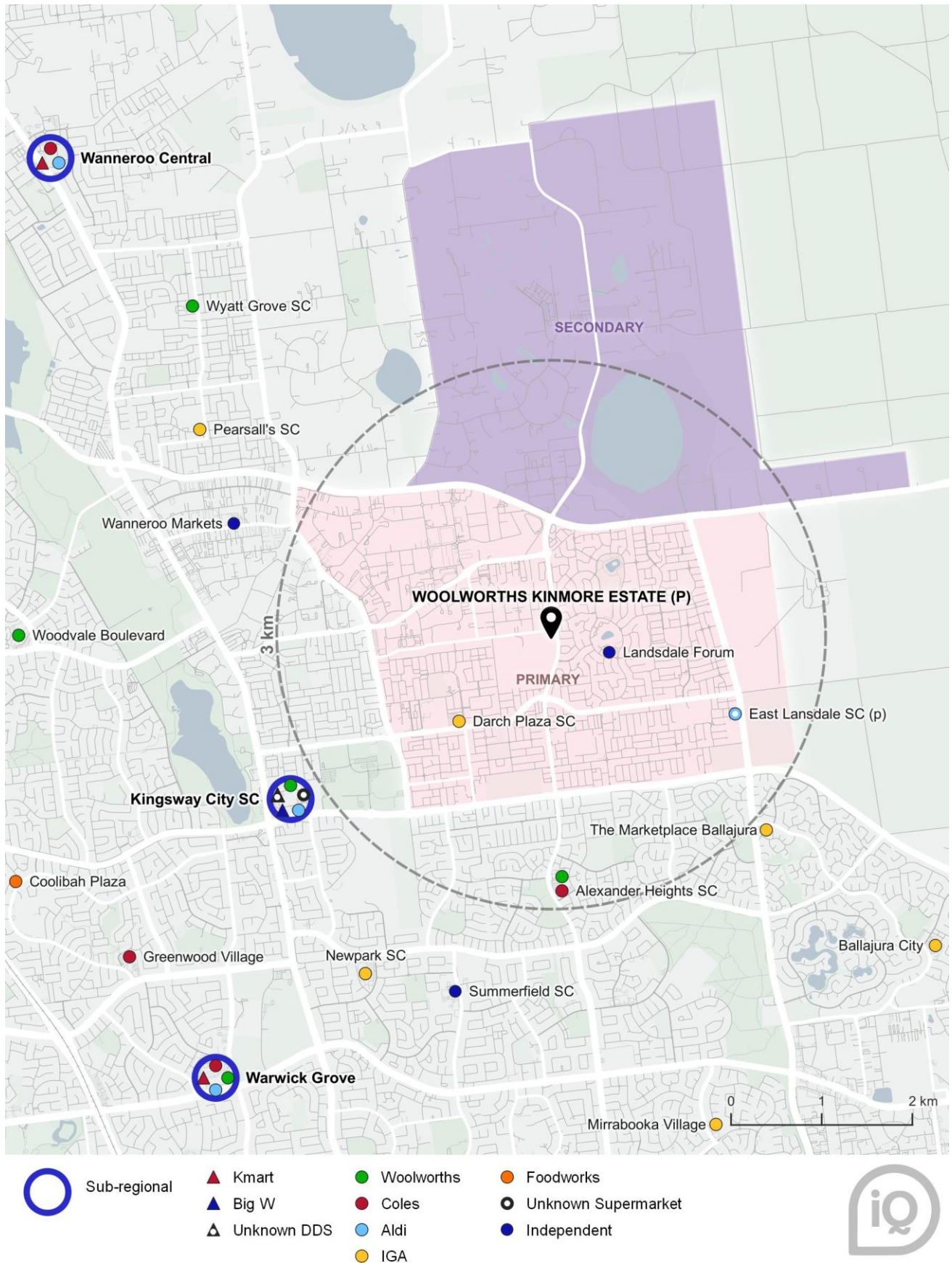
- The 2015/17 Land Use and Employment Survey conducted by the Department of Planning, Lands and Heritage which contains the Shop/Retail Planning Land Use Category (PLUC);
- The PCA Database;
- Actual size information provided by retail and property owners;
- Annual reports;
- Cordell database;
- Council floorspace surveys and planning documents;
- Press releases in relation to new store openings, closures and asset transactions;
- Site visits and floorspace surveys;
- Measurements undertaken by this office.

TABLE 3.1. COMPETITIVE ENVIRONMENT

Centre	Shopfront GLA (sq.m)	Anchor Tenants	Dist. From Site (km)
Secondary Centres			
<u>Warwick</u>	<u>32,474</u>		<u>7.9</u>
• Warwick Grove	32,117	Kmart (7,430), Coles (4,053), Woolworths (3,238), Aldi (1,500)	
• Other	361		
<u>Mirrabooka</u>	<u>43,446</u>		<u>8.0</u>
• The Square Mirrabooka	42,458	Big W (7,868), Kmart (7,700), Coles (5,169), Woolworths (3,605), Aldi (1,500)	
• Other	2,561		
<u>Wanneroo</u>	<u>21,393</u>		<u>10.0</u>
• Wanneroo Central	18,199	Kmart (6,500), Coles (3,700), Aldi (1,725)	
• Other	3,194		
District Centres (Within 8 km)			
<u>Alexander Heights</u>	<u>13,892</u>		<u>3.0</u>
• Alexander Heights Shopping Centre	13,892	Woolworths (3,698), Coles (3,016)	
<u>Madeley</u>	<u>27,564</u>		<u>4.5</u>
• Kingsway City	27,203	Big W (7,868), Woolworths (4,182), Aldi (1,600)	
• Other	361		
<u>Girrawheen</u>	<u>11,355</u>		<u>5.4</u>
• Newpark Shopping Centre	9,761	Supa IGA (2,576)	
• Marangaroo Shopping Centre	1,594		
<u>Woodvale</u>	<u>9,962</u>		<u>6.6</u>
• Woodvale Boulevard	6,158	Woolworths (3,443)	
• Other	3,804		
<u>Greenwood</u>	<u>5,168</u>		<u>7.5</u>
• Greenwood Village	5,168	Coles (2,362 sq.m)	
Neighbourhood, Local & Other Centres			
Landsdale Forum	3,401	Farmer Jacks (1,200)	1.2
Darch Plaza	3,375	Supa IGA (1,514)	1.9
The Market Place Ballajura	3,646	IGA (843)	4.3
Wanneroo Markets	7,500	Spudshed (2,000)	4.4
Summerfield Shopping Centre	5,055	NP Supermarket (2,800)	5.1
Pearsall's Shopping Centre	2,500	IGA (1,300)	5.7
Summerlakes Village	1,077	IGA Xpress (250)	6.2
Ballajura City	6,961	IGA (1,500)	6.9
Wyatt Grove Shopping Centre	5,400	Woolworths (3,200)	7.0
Kingsley Village	3,495	IGA (1049)	7.6
Coolibah Plaza	1,600	Foodworks (1,070)	7.8

Source: Location IQ Database

MAP 3.1. MAIN TRADE AREA & COMPETITION



3.1. Within the Main Trade Area

- i. There are limited retail facilities currently provided throughout the main trade area, as follows:
 - **Landsdale Forum** is along The Broadview, 1.2 km to the east of the subject site (primary sector). The local centre is anchored by a Farmer Jacks supermarket of 1,200 sq.m, as well as a collection of around 15 shops that includes a mix of food catering, retail services, and non-retail tenants. The centre is served by at-grade car parking, and includes a childcare centre, and a number of medical tenants provided at the outskirts of the site.
 - **Darch Plaza** is positioned on the corner of Kingsway and Ashdale Boulevard, around 1.9 km south-west of the Landsdale site (primary sector). The centre is anchored by a Supa IGA supermarket of 1,514 sq.m that operates 24 hours a day, as well as approximately 20 shops. The Kingsway Bar & Bistro, and a childcare centre are within the at-grade car park.
- ii. There are no supermarket or traditional shopping centre facilities located within the secondary sector.

3.2. Beyond the Main Trade Area

- i. Beyond the main trade area, supermarkets are more than 3 km from the subject site (or a 6 km round-trip), including the nearest full-line supermarkets. Retail facilities within the region generally form a typical retail hierarchy, as follows:

Secondary Centres

- **Warwick Grove** is within the Warwick Secondary Centre (7.9 km to the south-west) and totals 32,117 sq.m in size, with Moving Annual Turnover (MAT) in the order of \$228 million. The shopping centre is anchored by a cinema complex, Kmart discount department store, as well as Coles (4,053 sq.m), Woolworths (3,238 sq.m), and Aldi supermarkets.
- **The Square Mirrabooka** is the major component of the Mirrabooka Secondary Centre (8 km to the south) and totals 42,458 sq.m, with annual turnover of around \$302 million. Anchor tenants include Big W and Kmart discount department stores, as well as Coles (5,169 sq.m), Woolworths (3,605 sq.m), and Aldi (1,500 sq.m) supermarkets.

The shopping centre was sold in 2021 and has development approval for a new dining precinct, as well as other upgrades that have been deferred indefinitely.

- **Wanneroo** is 10 km to the north, with Wanneroo Central the largest component. This centre is around 18,000 sq.m in size and is based on Kmart, Coles, Aldi, and shops.

District Centres

- **Alexander Heights Shopping Centre** comprises the nearest full-line supermarkets to the Darch site – approximately 3 km south along Mirrabooka Avenue. Woolworths (3,698 sq.m) and Coles (3,016 sq.m) anchor the centre, which totals 13,892 sq.m (GLA) and is served by at-grade car parking.

- **Kingsway City** (27,203 sq.m) is a sub-regional shopping centre positioned at the high-profile intersection of Hepburn Avenue and Wanneroo Road - 4.5 km to the south-west of the subject site (within the **Madeley District Centre**). The centre comprises a Big W discount department store, as well as Woolworths (3,605 sq.m) and Aldi (1,500 sq.m) supermarkets. The large at-grade car park also includes a range of pad site services such as fast food, service stations and medical facilities.

A previous development application has been deferred indefinitely, having proposed an additional discount department store and supermarket for the site, as well as residential dwellings and commercial floorspace. This is considered unlikely and has not been assumed for the purposes of this assessment.

- Other District Centre precincts are each located more than 5 km from the subject site and are of limited competitive relevance.

Neighbourhood, Local & Other Centres

- There are only two other neighbourhood or local shopping centre facilities beyond the main trade area that are within 5 km of the subject site, including:
 - **The Market Place Ballajura** is a local shopping centre comprising IGA (843 sq.m) and handful of shops that include several non-retail uses. A service station, small commercial centre (around six shopfronts) and The Alexander Bar & Bistro are provided on the outskirts of the precinct.
 - **Wanneroo Markets** has a wide selection of variety stalls, a food court and bar that is open Thursday to Sunday. Spudshed (2,000 sq.m) is also within the precinct and open seven days a week.

3.3. Proposed Developments

i. Within the main trade area, key proposed competitive developments include:

- **East Landsdale Shopping Centre** (DAP/21/02142) is the most relevant future development, approved to comprise a supermarket (1,843 sq.m), restaurant (208 sq.m), medical centre (440 sq.m), pharmacy (216 sq.m), service station, car wash, liquor store, office suites, three drive-thru fast food outlets, take away food outlets, and around 13 retail specialty tenancies. The centre will be served by a provision of 369 car bays. For the purposes of this assessment East Landsdale Shopping Centre has been assumed to open with an Aldi supermarket (1,843 sq.m) and total retail GLA of 4,235 sq.m from 2025/26.
- **Dordaak Kepap** is a library and youth centre currently being designed at Landsdale Forum, which could also include a café and other community facilities.
- **Tall Tree Early Learning** is currently under construction at 5 Grayswood Court, Landsdale – and is expected to open in 2023/24.
- **Trigon Lane** has development approval for a 90-place childcare facility and medical centre (comprising seven suites) along Pollino Gardens in Landsdale.
- A childcare centre at **390 Kingsway** is approved for a 100-place facility but remains deferred.

- ii. Beyond the main trade area, there are limited competitive developments of relevance, including a service station at Malanga, as well as showroom and fast food facilities at Mirrabooka. **Bulkyplex Wangara** and an additional service station development at **359 Gnangara Road** each had development approval, but have since been abandoned.

3.4. Summary & Floorspace Demand

- i. There are no full-line supermarkets currently provided across the main trade area, with the only offers being Farmer Jacks (1,200 sq.m) at Landsdale Forum, and IGA (1,514 sq.m) at Darch Plaza. An additional non full-line supermarket (Aldi of 1,843 sq.m) will also be provided at East Landsdale Shopping Centre from 2025/26.
- ii. These stores provide for the basic convenience and top up shopping needs of local residents, who would still have to frequent larger, full-line supermarkets in the surrounding area on a regular basis – in order to undertake a full weekly shop and access a wider variety of products.
- iii. Existing supermarkets beyond the main trade area are understood to perform at levels above the Australian average of \$9,000 - \$10,000 per sq.m. These supermarkets would be drawing significant customers and sales from the Darch main trade area (leakage).
- iv. Table 3.2 provides a summary of the current and future provision of supermarket and shopping centre floorspace within the Darch main trade area, as compared with the metropolitan Perth (401 sq.m per 1,000 persons for supermarkets and 1,085 sq.m for shopping centres) benchmark:

- **Supermarkets:** the current provision of supermarket floorspace across the main trade area (112 sq.m per 1,000 persons) is well below the metropolitan Perth benchmark levels (almost one-quarter). Allowing for the Aldi supermarket at East Landsdale Shopping Centre (1,843 sq.m), the main trade area supermarket floorspace provision would reach just 180 sq.m per 1,000 persons in 2025/26.

Assuming the proposed full-line Woolworths (3,700 sq.m) at Darch (2025/26), the main trade area supermarket floorspace provision would remain significantly lower than benchmark levels (323 sq.m per 1,000 persons) – and fall thereafter with continued population growth.

- **Shopping Centres:** the current provision of shopping centre floorspace across the main trade area (263 sq.m per 1,000 persons) is similarly below the metropolitan Perth benchmark levels (less than one-quarter). Allowing for East Landsdale Shopping Centre (4,235 sq.m), the main trade area supermarket shopping centre floorspace provision would reach just 409 sq.m per 1,000 persons in 2025/26.

Assuming the Woolworths centre development (4,414 sq.m) at Darch (2025/26), the main trade area floorspace provision would remain significantly lower than benchmark levels (573 sq.m per 1,000 persons) – and once again decline thereafter.

- v. Residents of the region should be provided with a wide range of food and grocery items within proximity to their homes. The opening of the proposed Woolworths Darch development would provide a key anchor for the area that would benefit the overall offer and range of services available.

TABLE 3.2. SUPERMARKET & SHOPPING CENTRE FLOORSPACE PROVISION (PER 1,000 PERSONS), 2023 – 2041

	Main Trade Area					Greater Perth Average ²
	2023	2026	2031	2036	2041	
Supermarkets (sq.m per 1,000 persons)	<i>East Landsdale SC</i>					
Supermarket Floorspace Provision	112	180	170	167	166	401
• Assuming Woolworths Darch (3,700 sq.m)		323	305	299	297	
Shopping Centre GLA (sq.m per 1,000 persons)	<i>East Landsdale SC</i>					
Shopping Centre Floorspace Provision	263	409	384	374	368	1,085
• Assuming Woolworths Darch (4,414 sq.m)		573	538	524	516	

Sources: ABS, LIQ SC Database

below | above Greater Perth Ave.

2. Estimated 2023

4 Potential for Retail Facilities

This section of the report provides an assessment of the sales potential for the retail component of the proposed Woolworths Darch development. Likely trading impacts on other activity centres throughout the surrounding region are considered, as are the employment and other consumer impacts, both positive and negative, of the proposal.

4.1. Sales Overview

- i. To assess the potential economic benefits and impacts that may arise from the development of the proposed Woolworths Darch, the retail sales level which the development is forecast to achieve is outlined.
- ii. The sales performance of any retail facility, be it an individual store or a collection of stores provided in a shopping centre or precinct, is determined by a combination of the following critical factors:
 - The composition and quality of the facility, including the major trader or traders; the specialty mix; centre layout and configuration; ease of accessibility and parking; and the overall feel of the centre.
 - The size of the available catchment which the facility serves.
 - The location and strength of competitive retail facilities.

4.2. Methodology

- i. Assessing a proposed retail development fundamentally requires an understanding of a variety of factors and methodologies, including:
 - Retail turnover;
 - Market shares;
 - Retail supply, demand and impacts.
- ii. Location IQ adopt an evidence-based model that has been tested and refined over more than 10 years and across a range of clients. The model uses all available data, including the Location IQ proprietary database of supermarket and shopping centre tenant size and sales figures.
- iii. Location IQ has undertaken more than 100 retail need/economic impact assessments in Australia over the last decade, adopting a similar methodology as presented in this report for the high-level overview of retail demand. A range of other property consulting firms also adopt the approach outlined by Location IQ.
- iv. Specifically, this approach has been utilised by Location IQ for recent Retail Need and Sustainability Assessments that have subsequently been approved, including:
 - North Perth - 318 – 334 (Lots 104-106 & 108-110) Charles Street (DAP/19/01710)

- Highgate - 291,295 & 307 Stirling Street (DAP/19/01614)
 - Inglewood - 861 Beaufort St (DA18/2091)
 - Mount Pleasant – 855 - 857 Canning Highway Applecross & 37 - 41 Reynolds Road, Mount Pleasant (DAP/16/01123 & DA-2016-1080)
 - Whiteman Edge Town Centre – Lot 9040 Woollcott Avenue (Brabham Albion District Structure Plan Amendment No. 1 & Local Structure Plan No. 1C Amendment)
 - Maylands – 168 Guildford Road (DAP/21/02033)
- v. This methodology and data sources utilised within this Assessment are verifiable and current – in accordance with SPP 4.2 *Implementation Guidelines (A2.1)*, and all assumptions have been articulated.

4.3. Supermarket Sales Potential

- i. The proposed Woolworths supermarket at the subject site will be approximately 3,700 sq.m in size (GLA), including a Direct to Boot service. The supermarket spending market was discussed and measured in Section 2.4 of this report.
- ii. Table 4.1 details the forecast sales for the proposed Woolworths supermarket at Darch. The calculations in this Table go through a series of steps, commencing with the existing level of supermarket expenditure generated by main trade area residents, which is based on actual transaction data sourced from CommBank iQ Retail Spend Insights - noting that supermarkets are defined as grocery and dry goods stores of at least 500 sq.m.
- iii. The assessment detailed in Table 4.1 is based on the experience of many comparable analyses in locations throughout Australia, and is summarised as follows:

Existing (2022/23)

- **Spending to Supermarkets:** The total supermarket spending market for the main trade area (defined earlier in this report) is estimated at \$133.5 million in 2022/23.
- **Supermarket Spending Retained by MTA Supermarkets:** The next step in the analysis is to estimate the proportion of supermarket expenditure which is being (and will be) retained by main trade area supermarkets; specifically in this case, the proportion of expenditure that is retained by existing and proposed supermarkets, as compared with spending directed to supermarkets beyond the main trade area.

Currently the only supermarkets within the main trade area are IGA (1,514 sq.m) and Farmer Jacks (1,200 sq.m) at Darch Plaza and Landsdale Forum, respectively. Given the smaller size, these supermarkets would serve the basic top up shopping needs of local residents, who would still have to frequent larger, full-line supermarkets in the surrounding area on a regular basis - to undertake a full weekly shop and access a wider variety of products.

Based on this, the level of supermarket spending being retained within the main trade area is estimated at just \$25.9 million (19.4%). This means that 80.6% (\$107.6 million) of supermarket expenditure is

currently escaping the trade area (and much of the LGA) – the majority of which would be directed to supermarkets at Kingsway City, Alexander Heights, and Wyatt Grove (leakage).

- **Supermarket Spending From Beyond MTA:** Additionally, supermarket sales are likely to be attracted from beyond the defined main trade area. The current proportion of supermarket sales attracted from beyond the main trade area is estimated at 7.5%.
- **Distribution of MTA Supermarket Sales:** Based on the above, existing supermarkets within the main trade area are estimated to record sales of \$28.0 million in combination, or an average of \$10,307 per sq.m in 2022/23.

Development Year (2025/26)

- **Assumptions:** For the purposes of this assessment, Aldi (1,834 sq.m) at East Lansdale Shopping Centre and Woolworths (3,700 sq.m) at Darch are assumed to open by 2025/26.
- **Spending to Supermarkets:** Total supermarket spending for the main trade area is estimated at \$143.3 million in 2025/26 (including a small uplift from the base case, associated with supply-induced growth).
- **Supermarket Spending Retained by MTA Supermarkets:** The level of supermarket spending being retained within the main trade area is projected to increase to \$69.8 million (48.7%) by 2025/26.

This reflects a significant reduction in leakage (from 80.6% in 2022/23 to 51.3% in 2025/26). Based on our experience, this is a conservative figure and reflects the geographic extent of the main trade area, as well as the current and future network of supermarkets.

- **Supermarket Spending From Beyond MTA:** The proportion of supermarket sales attracted from beyond the main trade area is projected to increase to around 16% (average) in 2025/26.

This would reflect the introduction of Woolworths Darch (estimated at around 10% - given the high-profile location and surrounding worker population), as well as Aldi at East Lansdale - which is nearby the edge of the main trade area and likely to attract a more significant proportion of sales from beyond the main trade area (40%).

- **Distribution of MTA Supermarket Sales:** Based on the above, existing and proposed supermarkets within the main trade area are estimated to record sales of \$83.1 million in combination, or an average of \$10,186 per sq.m in 2022/23, including the following:
 - **Woolworths Darch:** The subject supermarket is forecast to achieve sales of \$39.2 million in 2025/26, at an average of \$10,606 per sq.m. This sales figure is expected to increase strongly, in-line with population growth, reaching \$47.1 million (\$12,738 per sq.m) by 2040/41.
 - **Other MTA Supermarkets:** Non full-line supermarkets within the main trade area are projected to record combined sales of \$43.8 million in 2025/26, or an average of \$9,838 per sq.m.

- iv. Overall, there is strong existing and future demand for the proposed Woolworths supermarket at Darch, as well as other non full-line supermarkets within the main trade area (existing and proposed).

- v. Forecast sales of \$39.2 million in 2025/26 (\$10,606 per sq.m) for Woolworths can be compared with the Australian average of approximately \$9,000 - \$10,000 per sq.m, and the balance of non full-line supermarkets are also projected to trade at or above benchmark levels.
- vi. Impacts for the Woolworths supermarket would be spread across several centres (as outlined subsequently in Section 4.5), which would mean the impact on any one supermarket/centre would not detrimentally affect the performance of any stores, and each would remain viable.
- vii. The highest impacts would likely fall on the replicated supermarket brands (Woolworths), also noting that all supermarkets serve significant and overlapping population catchments and some have unique attractions or specialty products.

TABLE 4.1. SUPERMARKET SALES POTENTIAL, 2023 – 2041

	Financial Year				
	2023	2026 ⁺	2031 ⁺	2036 ⁺	2041 ⁺
Spending to Smkts (\$M)					
Primary	125.2	134.0	145.7	152.8	158.2
Secondary	<u>8.3</u>	<u>9.3</u>	<u>11.0</u>	<u>12.8</u>	<u>14.7</u>
Main Trade Area	133.5	143.3	156.8	165.6	172.9
Supermarket Spending Retained by TA Smkts					
Primary (@ 20% incr. to 50% in 25/26)	25.0	67.0	72.9	76.4	79.1
Secondary (@ 10% incr. to 30% in 25/26)	<u>0.8</u>	<u>2.8</u>	<u>3.3</u>	<u>3.8</u>	<u>4.4</u>
Main Trade Area	25.9	69.8	76.2	80.2	83.5
Supermarket Spending From Beyond TA					
Supermarket Sales from Beyond TA (@ 7.5% incr. to 16% in 25/26)	<u>2.1</u>	<u>13.3</u>	<u>14.5</u>	<u>15.3</u>	<u>15.9</u>
Total Supermarket Sales for TA Smkts	28.0	83.1	90.7	95.5	99.4
<hr/>					
Smkt Floorspace in TA (sq.m)**	2,714	8,157	8,157	8,157	8,157
Average Trading Level (\$/sq.m)	10,307	10,186	11,117	11,710	12,189
Distribution of TA Smkt Sales					
Woolworths Darch	0.0	39.2	42.9	45.2	47.1
Other TA Supermarkets**	<u>28.0</u>	<u>43.8</u>	<u>47.8</u>	<u>50.3</u>	<u>52.3</u>
Total TA Smkt Sales	28.0	83.1	90.7	95.5	99.4

*Constant 2022/23 dollars & including GST

+ includes supply-induced growth (exceeds base)

**Existing supermarket in TA as at 2023, as well as East Landsdale (1,843 sq.m) assumed to open from 2025/26.

4.4. Total Retail Sales Potential

- i. Table 4.2 shows total retail forecast sales for the proposed Woolworths Darch development, including the supermarket (as outlined previously) and retail specialty floorspace.
- ii. As shown, retail specialty forecast sales are \$6.7 million in 2025/26, representing some \$9,400 per sq.m – which aligns with the current (2021/22) *Urbis Shopping Centre Averages* for single-supermarket shopping centres.
- iii. This would reflect total centre retail forecast sales of \$46.0 million in 2025/26 for the proposed development.
- iv. Shopping centres generally include a mix of both retail and non-retail specialty shops, which typically often reflect a ratio of 80:20 (retail : non-retail). For this assessment, if a provision of non-retail tenants were to be allowed for (in place of retail floorspace), forecast sales, as well as impacts on surrounding centres, would be lower than presented.

TABLE 4.2. WOOLWORTHS DARCH FORECAST SALES, 2025/26

	Composition			Sales	
	Tenants (no.)	GLA (sq.m)	% of Total	(\$'000)	(\$/sq.m)
Retail (sq.m)					
Woolworths (incl. BOH and DTB)	1	3,700	83.8%	\$39,242	\$10,606
Specialty Shops	4	714	16.2%	\$6,712	\$9,400
Total Retail	5	4,414	100%	\$45,954	\$20,006
Pad Site Uses <i>est. building GLA</i>					
Childcare Centre	1	1,000			
Fast Food	1	500			
Parking					
Retail Parking Bays	223		-		
Pad Site Parking Bays	41		-		

Source: Woolworths Group

BOH = Back of House
DTB = Direct to Boot

4.5. Impacts

- i. This sub-section of the report outlines the likely sales impacts on competitive retail facilities as a result of the opening of the retail component of the proposed Woolworths Darch development.
- ii. There is no requirement for the impact on individual retailers to be specifically stated in Need Assessments and Net Benefit Tests. Key points required under the *State Planning Policy 4.2 Activity Centres Implementation Guidelines* are as follows:

A2.2 Impacts

A critical output from the modelling process is an estimate of the impact of the proposal on existing and planned activity centres and the level of service to the community.

A2.2.2 Retail Proposals

For retail proposals, the NB Test should include the supply of shop/retail (PLUC:5-SHP) and/or Other Retail (PLUC:6-RET) floorspace (present period and over a defined future time period – minimum five years) within relevant activity centres and the retail turnover estimates for each activity centre for the base year and NB test year/s. An estimate of the retail turnover for each relevant activity centre should be identified for the following scenarios:

- *base case - without the planning proposal/development and*
- *with the new planning proposal/ development.*

- iii. The following factors are typically considered when assessing the potential impacts of a new supermarket-based development on each existing facility or centre:
 - The distance of the (impacted) centre, by road, from the proposed development.
 - The size of the centre, in terms of total retail floorspace.
 - The amount of supermarket floorspace, and brands of these supermarkets.
 - The quality of offer and unique attributes including 24 hour trading (such as IGA at Darch Plaza) and the like.
 - The role and function of the centre.
 - Relative accessibility and convenience compared with the proposed retail development.
 - The estimated performance of the centre (in current sales) and future performance (in the impact year), accounting for any future developments in the region that may also impact on the future sales of existing centres.
 - The share of available expenditure which the centre attracts from the identified main trade area of the proposed development. A centre may not be situated in the identified main trade area of the proposed development, but its main trade area may extend to include parts, or all, of the main trade area. For example, the main trade area for large regional shopping centres typically includes circa 250,000 persons. Such a trade area is likely to include (partially or completely) trade areas for surrounding smaller convenience-based centres, sub-regional centres, retail strips and stand-alone supermarkets.

iv. The following key principles are then relied on when assessing the dollar (and percentage) impacts that are likely to be absorbed by existing facilities/centres:

- The greatest impacts are typically absorbed by the closest comparable centres. For example, a new Woolworths supermarket is generally likely to impact the closest nearby Woolworths supermarket to the greatest extent, followed by impacts on other comparable supermarkets (e.g. Coles), and at the lower end of the spectrum, smaller scale supermarkets/foodstores, which serve much more limited roles.
- Impacts on smaller local supermarkets/foodstores tend to be smaller in scale, as these stores normally attract a lower market share of available main trade area expenditure and perform a different role and function within the hierarchy, often serving the local walkable catchments surrounding them, and/or serving more specialised/discerning needs (e.g. a smaller IGA).

v. Table 4.3 outlines forecast sales impacts from the proposed Woolworths Darch development on surrounding centres. The steps involved in assessing the sales and impacts on surrounding centres are presented as follows:

- **Step 1** - Estimate sales levels for existing centres in the 2022/23 financial year. Existing sales for all centres outlined are based on:
 - Expert opinions formed through qualitative consideration of factors including location, catchment, brand and infrastructure (our experience);
 - Multiple visits to Perth over the last 10 years, including to the subject site;
 - Local knowledge of Western Australian staff;
 - Actual data that includes publicly available information and Location IQ proprietary data (acquired from various retail clients and similar).

For centres where actual data was not available, the current sales levels are conservatively estimated. Retail specialty floorspace sales productivity levels of \$5,000 - \$6,000 per sq.m have been applied on average, which is well below those assumed for the subject development (conservative) and reported benchmark levels as follows:

- Supermarket based shopping centres: \$8,946 per sq.m (*Urbis Retail Averages 2021/22*).
- Sub-regional shopping centres: \$8,567 per sq.m (*Urbis Retail Averages 2021/22*).
- Regional shopping centres: \$9,680 per sq.m (*Urbis Retail Averages 2021/22*).
- Warwick Grove: \$8,890 per sq.m (*Shopping Centre News Little Guns 2022*).
- Kingsway City: \$7,519 per sq.m (*Shopping Centre News Little Guns 2020*).

This means that sales could well be higher at these centres, and as a result, impacts would be lower in percentage terms.

- **Step 2** – Forecast sales are presented for existing and proposed developments in 2025/26, which is the first full year of trading for the proposed development. These projections include a conservative view of retail market growth and are presented in constant 2022/23 dollars (i.e. excluding inflation).

- **Step 3** - Outline the change in sales at each centre in 2025/26, because of the development of the proposed Woolworths Darch site. Again, all sales are expressed in constant 2022/23 dollars.
 - **Step 4** - Show the impact on sales in 2025/26, both in dollar terms and as a percentage of sales for each centre.
- vi. Based on the SPP 4.2 Implementation Guidelines, the following impact percentage and risk level for retail turnover is provided as a general guide:
- **Low (0 to 5%):** Any impacts are likely to be temporary and have no longterm effects on the viability of individual activity centres.
 - **Medium (5 to 10%):** Impacts are likely to be more significant for individual centres, but overall network sustainability is unlikely to be undermined in the long-term
 - **High (10%+):** Impacts are likely to be very significant for individual centres and will undermine the long-term network sustainability.
- Where the short-term impact is initially high before falling to a medium or low level in the long term, consideration should be given to how the development can be staged or if there needs to be any additional short-term benefits to ensure that level of service is always maintained.*
- vii. Other factors such as trading performance; expansions/refurbishments of centres; potential loss of services to the community; expected growth; and overall net community benefit should be considered.
- viii. As outlined previously, the proposed Woolworths Darch development is forecast to record sales of \$46.0 million in 2025/26, including Woolworths supermarket sales of \$39.2 million. Key information regarding projected impacts as outlined in the above Table 4.3 is summarised as follows:
- **Warwick Secondary Centre:** a total impact of -\$2.1 million, with most of this impact falling on Warwick Grove, by way of the existing supermarkets at the centre. This centre also includes the largest concentration of retail and non-retail shops in the region, as well as Liquorland. In percentage terms, the total impact would total -0.9%.
 - **Mirrabooka Secondary Centre:** an impact of -\$2.1 million (-0.6%), the majority of which would fall on supermarkets at The Square Mirrabooka (namely Coles, Woolworths, and Aldi), which are understood to achieve sales above the Australian benchmark of \$9,000 - \$10,000 per sq.m.
 - **Wanneroo Secondary Centre:** an impact of -\$1.4 million (-1.0%), the majority of which would fall on supermarkets at Wanneroo Central (namely Coles and Aldi).
 - **Alexander Heights District Centre:** most of the impact on this centre is anticipated to be absorbed by the Woolworths and Coles supermarkets. A total impact of approximately -\$8.9 million, or -9.1% is projected, however, Woolworths and Coles would still trade strongly and continue to anchor the retail offer.
 - **Madeley District Centre:** a total impact of -\$11.7 million (-8.3%) is projected, with most of this impact falling on the existing supermarkets at Kingsway City – specifically Woolworths, which is understood to achieve sales well above the Australian benchmark. This centre would still be the major food and non-food retail destination for main trade area residents.

- **Girrawheen, Woodvale, and Greenwood District Centres:** most of the impact on these centres is anticipated to be absorbed by the Woolworths supermarket at Woodvale Boulevard, the IGA supermarket at Newpark Shopping Centre (Girrawheen District Centre), and Coles at Greenwood Village. These supermarkets would remain strong offers. A total impact of -\$3.6 million (or around -1.8%) is projected across these centres in combination.
- **Landsdale Forum, Darch Plaza & East Landsdale Centres:** total impacts of -\$1.9 million, -\$1.9 million are -\$2.9 million area projected across these respective centres, with the majority falling on the supermarkets (Farmer Jacks, Supa IGA and Aldi). In percentage terms, the total projected impact is -8.1% across these centres.

The proposed Woolworths Darch development would, however, also retain additional spending locally, which could have flow on benefits for incumbent retailers in Darch, Landsdale and East Landsdale - as residents would now be able to undertake a broader spectrum of shopping closer to their homes. The ability for local residents, for example, to undertake both a weekly shop at the subject site, as well as convenience, late-night and top-up shopping at the 24-hour Darch Plaza IGA, late-trading Farmer Jacks Landsdale Forum, or complementary Aldi supermarket would represent a holistic food and grocery experience.

- **Neighbourhood, Local and Other Centres:** most of the remaining projected impacts are anticipated to be absorbed by supermarkets at these Neighbourhood, Local and Other Centres. Across the nine remaining, represented centres a total impact of -\$5.4 million (-2.1%) in impacts are projected, which in percentage terms would be less than -4.6% on any one site – and in most cases far lower.
- ix. In addition, minor impacts totalling -\$4.0 million in combination (around 8.7% of the total forecast sales) are projected to fall on a range of centres located beyond the main trade area and not represented in Table 4.3. This accounts for workers of the nearby industrial precinct.
 - x. Overall, the proposed Woolworths Darch development would not impact on the viability or continued operation of any existing or proposed centres (as per SPP 4.2) in the surrounding region, with all of the impacts well within the normal competitive range (low to medium) of less than 10%.
 - xi. In addition, with retail expenditure growth across the main trade area growing by an average of 1.8% (2023-26) to 2.1% (2026-31) per year – even the most significant impacts could be ameliorated within around four years.
 - xii. It is emphasised that Woolworths is committed to be the operator of the supermarket at the Darch site. Consequently, the existing Woolworths supermarket network within the region would be expected to absorb a significant proportion of the projected impacts from the opening of the development.
 - xiii. Based on actual market data, it is our experience that the greatest impacts are typically absorbed by the closest comparable retailers/centres. For example, a new Woolworths supermarket is generally likely to impact the closest nearby Woolworths supermarket to the greatest extent, followed by impacts on other comparable supermarkets (e.g. Coles), and at the lower end of the spectrum, smaller scale supermarkets/foodstores, which serve much more limited roles.
 - xiv. Woolworths has assessed the levels of impact on the existing and future Woolworths store network, with only a moderate anticipated reduction in trading volumes which would not compromise the future viability of other Woolworths supermarkets.

- xv. In addition, the proposed development has limited specialty floorspace (approximately 714 sq.m), which would mean residents will continue to frequent other centres/shops in the surrounding area for a variety of tenants that are not likely to be provided as part of the proposed Woolworths Darch site.
- xvi. In summary, all sales impacts across the identified centres are within an acceptable range, and when considered in the context of the size, performance and role and function of surrounding centres, would be highly unlikely to result in a material reduction of retail service provision.
- xvii. The proposed Woolworths Darch development would add to the range of services and retention of escaped expenditure within the region. Further, residential population growth would also see sales regain quickly.

TABLE 4.3. WOOLWORTHS DARCH PROJECTED IMPACTS, 2023 – 2026

	Unit	Base Case Turnover* ¹		Proj. Turn. (Darch) 2026	Impact vs. Base 2026	
		2023	2026		\$M	%
Woolworths Darch Site	\$M	-	-	46.0	n.a.	n.a.
Secondary Centres						
Warwick	\$M	229.8	240.9	238.8	-2.1	-0.9%
Mirrabooka	\$M	314.8	330.6	328.5	-2.1	-0.6%
Wanneroo	\$M	137.0	143.5	142.1	-1.4	-1.0%
District Centres (Within 8 km)						
Alexander Heights	\$M	100.0	98.0	89.0	-8.9	-9.1%
Madeley	\$M	143.8	141.9	130.2	-11.7	-8.3%
Girrawheen	\$M	56.8	59.0	57.8	-1.2	-2.0%
Woodvale	\$M	86.0	89.4	87.6	-1.8	-2.0%
Greenwood	\$M	47.7	49.9	49.2	-0.6	-1.3%
Neighbourhood, Local & Other Centres						
Landsdale Forum	\$M	24.0	23.7	21.8	-1.9	-8.2%
Darch Plaza	\$M	24.3	24.0	22.1	-1.9	-8.0%
East Landsdale SC	\$M	-	36.3	33.4	-2.9	-8.1%
The Market Place Ballajura	\$M	18.2	18.5	17.7	-0.9	-4.6%
Wanneroo Markets	\$M	47.5	48.9	47.3	-1.6	-3.2%
Summerfield Shopping Centre	\$M	31.3	32.8	32.4	-0.3	-1.0%
Pearsall's Shopping Centre	\$M	18.5	19.2	18.9	-0.4	-1.9%
Summerlakes Village	\$M	6.1	6.4	6.4	-0.1	-1.0%
Ballajura City	\$M	42.3	44.1	43.5	-0.7	-1.5%
Wyatt Grove Shopping Centre	\$M	45.4	46.9	45.5	-1.3	-2.8%
Kingsley Village	\$M	22.2	23.4	23.2	-0.1	-0.5%
Coolibah Plaza	\$M	12.7	13.3	13.2	-0.1	-0.5%

*Constant 2022/23 dollars & including GST

¹ Proposed centres and expansions assumed to be trading for a full year by 2025/26 - including East Landsdale Shopping Centre (Aldi)

4.6. Employment and Consumer Impacts

- i. The proposed Woolworths Darch would result in a range of important economic benefits which will be of direct benefit to the local community. These employment impacts and contributions are described as follows:

Ongoing Employment Generation

- Table 4.4 summarises the projected level of ongoing employment likely to be generated by the retail and complementary non-retail components of the Woolworths Darch development. The employment benchmarks (jobs per 1,000 sq.m) used to calculate the indicative total jobs generated is based on typical floorspace and employment yield benchmarks.
- The supermarket component of the development is projected to employ around 185 persons, while the retail specialty component of the development is projected to employ around 43 persons.
- Indicative pad site uses are projected to employ a combined 49 persons, including the childcare centre (24) and fast food offer (25).
- Taking a conservative view and allowing for an estimated 10% of the total increase to be because of reduced employment at existing facilities, net additional jobs are estimated at 249, including 205 across the retail components, and 44 across indicative pad site uses.
- Based on *Average Weekly Earnings* data released by the ABS in November 2022 (Cat. 6302.0), the additional permanent employees would earn annual combined salary/wages of some \$10.5 million (\$8.8 million for the retail component, and \$1.7 million for the indicative pad site uses).
- This reflects salary/wages for the local economy, as a direct result of the supermarket, retail and non-retail component of the proposed development alone.

Construction

- Construction of the entire development is estimated to incur total capital costs of approximately \$25 million, generating significant employment within the construction and associated industries during the development of the project.
- By using the appropriate ABS Input/Output Multipliers that were last produced in 1996/97 and a deflated estimated total capital cost of construction of \$11.2 million (i.e. in 1996/97 dollars), it is estimated that the construction period of the proposed retail component (in isolation) would directly create 63 full-time, part time and temporary jobs over the development timeline (refer Table 4.5), while the pad site uses would create 16 jobs.

Multiplier Effect

- Overall, the total centre is estimated to directly generate 328 jobs (249 excluding indicative pad site uses), including (refer Table 4.6):
 - **Ongoing Employment from Planned Floorspace:** 249 jobs (205 excluding pad site uses).
 - **Construction Phase:** 79 jobs (63 excluding pad site uses).

- In addition to this direct employment, multiplier effects will flow through the local economy and indirectly generate additional employment opportunities through ancillary businesses/suppliers that support the development and services, as well as additional consumption expenditure by workers employed within the precinct (spending wages).
 - Again, by using the appropriate ABS Input/Output Multipliers that were last produced in 1996/97 and adjusting for inflationary and other changes to present, it is estimated that an additional 363 jobs will be created indirectly (295 excluding pad site uses).
- ii. Overall, approximately 690 jobs (563 excluding pad site uses) are likely to be created both directly and indirectly because of the subject development (including ongoing employment, construction and multiplier effects).

TABLE 4.4. ONGOING EMPLOYMENT GENERATING FLOORSPACE

Component	Total Floorspace (sq.m)	Employment Potential		
		Employ. per 1,000 sq.m	Indic. Total Jobs	Net Increase ¹
Retail				
Supermarket	3,700	50.0	185	167
Retail Specialty Shops	<u>714</u>	<u>60.0</u>	<u>43</u>	<u>39</u>
Total Retail	4,414		228	205
Pad Site Uses				
Childcare	1,000	24.0	24	22
Fast Food PAD Site	<u>500</u>	<u>50.0</u>	<u>25</u>	<u>23</u>
Total Pad Site Uses	1,500		49	44

1. Indicates the estimated number of net additional ongoing jobs as a result of the proposed development
 Source : Australian National Accounts: Input-Output Tables 1996-97

TABLE 4.5. CONSTRUCTION GENERATED EMPLOYMENT

Metric	Retail Floorspace	Pad Site Uses	Total
Estimated Capital Costs of Construction			
Estimated Capital Costs 2022/23 (\$M)*	\$20.0	\$5.0	\$25.0
Estimated Capital Costs 1996/97 (\$M)	\$9.00	\$2.2	\$11.2
Direct Employment Generation			
Construction Jobs per \$1 million (2022/23)	3.15	3.15	3.15
Total Construction Jobs¹	63	16	79

Source : Australian National Accounts: Input-Output Tables 1996-97
 Employment totals include both full-time and part-time work. Indicates the estimated number of jobs over the life of the construction project plus ongoing multiplier effects, for the equivalent of one year

TABLE 4.6. ESTIMATED TOTAL EMPLOYMENT GENERATED

Metric / Category	Est. Net Employment Increase ¹	Employment Multiplier Effects	Total Employment
Ongoing Employment from Planned Floorspace			
Retail	205	195	400
Pad Site Uses	<u>44</u>	<u>42</u>	<u>86</u>
Total	249	236	486
Construction Phase			
Retail	63	101	164
Pad Site Uses	<u>16</u>	<u>25</u>	<u>41</u>
Total	79	126	205
Net Additional Employment	328	363	690

1. Net increase includes an allowance for reduced employment levels at impacted centres estimated at 10% of the total increase

5 Needs & Net Benefit Summary

The final section of this report summarises the key conclusions of the Needs Assessment and Net Benefit Test for the proposed Woolworths Darch development.

'Need' or 'Community Need' in a planning sense is a relative concept that relates to the overall wellbeing of a community. A use is needed, for example, if it would, on balance, improve the services and facilities available in a locality. The reasonable demands and expectations of a community are important, therefore, in assessing need.

Several important factors that relate to need, particularly economic need, include:

- Population and demand.
- Consumer trends and expenditure patterns.
- Location and infrastructure.
- Impacts on existing retail facilities and the retail hierarchy.
- Net community benefits.

5.1. Floorspace Demand

- i. The proposed Woolworths Darch would enjoy a high-profile location at the south-west corner of Mirrabooka Avenue and Furniss Road, which would be very convenient and easily accessible for the local population and passing traffic.
- ii. The main trade area population is currently 25,720 (2023) and is projected to increase to 29,920 persons by 2041, reflecting an average annual growth rate of 0.8% (or 233 persons).
- iii. There are no full-line supermarkets currently provided across the main trade area, with the only offers being Farmer Jacks (1,200 sq.m) at Landsdale Forum, and IGA (1,514 sq.m) at Darch Plaza. An additional non full-line Aldi supermarket (1,843 sq.m) will also be provided at East Landsdale Shopping Centre from 2025/26. These stores provide for the basic convenience and top up shopping needs of local residents, who would still have to frequent larger, full-line supermarkets in the surrounding area on a regular basis – in order to undertake a full weekly shop and access a wider variety of products.
- iv. Demonstrating this undersupply, Table 3.2 previously summarised of the current and future provision of supermarket and shopping centre floorspace within the Darch main trade area, as compared with the metropolitan Perth (401 sq.m per 1,000 persons for supermarkets and 1,085 sq.m for shopping centres) benchmark:

- **Supermarkets** the current provision of supermarket floorspace across the main trade area (112 sq.m per 1,000 persons) is well below the metropolitan Perth benchmark levels (almost one-quarter). Allowing for both Aldi at East Landsdale Shopping Centre (1,843 sq.m) the proposed full-line Woolworths (3,700 sq.m) at Darch (2025/26), the main trade area supermarket floorspace provision would remain significantly lower than benchmark levels (323 sq.m per 1,000 persons) – and fall thereafter.
 - **Shopping Centres:** the current provision of shopping centre floorspace across the main trade area (263 sq.m per 1,000 persons) is similarly below the metropolitan Perth benchmark levels (less than one-quarter). Allowing for East Landsdale Shopping Centre (4,235 sq.m) and the Woolworths Darch development (4,414 sq.m) in 2025/26, the main trade area floorspace provision would remain significantly lower than benchmark levels (573 sq.m per 1,000 persons) – and once again decline thereafter.
- v. Recent and planned population growth across the area has, and is expected to continue, attracting more affluent families and couples who own their own houses. These residents should be provided with a wide range of food and grocery items within proximity to their homes. The proposed Woolworths supermarket would therefore result in an increased level of facilities and services available to the local community.
- vi. Reflecting a low provision of supermarket floorspace across the region, existing supermarkets in the wider region (which Darch main trade area residents would utilise frequently) are understood to trade at levels above the Australian average of \$9,000 - \$10,000 per sq.m.

5.2. Consumer & Expenditure Trends

- i. Retail precincts in Australia play fundamental roles in the economies of Australia's metropolitan areas, having developed around the need to meet consumer demand. The nature of consumer demand continues to develop and evolve, reflecting social changes within society, such as:
- Increasing time pressures on working families.
 - Population and income growth.
 - The evolution of new retail formats and traders.
 - Competitive retail developments and precincts.
- ii. The demands of retailers, as well as consumers, combine to add pressure for additional retail floorspace.
- iii. There is a strong need for a new full-line supermarket within proximity to the homes of main trade area residents more generally, with consumers visiting supermarkets two to three times a week on average.
- iv. Over the past decade, there has been an increasing trend towards convenience shopping. This trend has been largely driven by broader social trends that have resulted in consumers becoming more time poor, such as longer working hours and an increase in the number of women in the labour force.
- v. Time pressures are ranked at the top of the list of issues that consumers face when undertaking their regular food and grocery shopping. As a result, there is growing demand for convenience shopping facilities to meet the needs of residents. Convenience has moved beyond the quick and easy concept, toward a simplification model, where

consumers can get precisely what they need without having to think overly hard or navigate unnecessary obstacles. Convenience and quick delivery times are very important for time poor consumers.

- vi. One of the key behavioural shifts in retail shopping habits during the pandemic was a preference for local shopping over higher-order shopping centres. There were several key drivers behind this shift, but most notably work from home trends, travel restrictions, health concerns associated with large crowds, and closure of non-essential tenants (that dominate the composition of large centres). Even post-pandemic, the home is becoming more of a central hub of work and socialising, and so retailers are having to meet consumers where they are. In this sense, centres will continue to evolve.
- vii. The design of the proposed development, including a full-line Woolworths supermarket, limited specialty floorspace, and easily accessible car parking, would be highly convenient for local families who would visit on a regular basis. A full-line Woolworths supermarket would also help to retain some of the significant spending that is currently escaping the main trade area (and LGA).
- viii. As outlined previously in Section 4.3, the level of supermarket spending (generated by main trade area residents) being retained within the main trade area is estimated at just \$25.9 million (19.4%). This means that 80.6% (\$107.6 million) of supermarket expenditure is currently escaping the trade area (and much of the LGA) – the majority of which would be directed to supermarkets at Kingsway City, Alexander Heights, and Wyatt Grove (leakage).
- ix. The development of Aldi (East Landsdale Shopping Centre) and Woolworths Darch in 2025/26 is projected see retained supermarket spending increase to \$69.8 million (48.7%), reflecting a significant reduction in leakage (from 80.6% in 2022/23 to 51.3% in 2025/26). Based on our experience, this is a conservative figure and reflects the geographic extent of the main trade area, as well as the current and future network of supermarkets.

5.3. Impacts on Existing and Proposed Centres

- i. As outlined in SPP 4.2 *Implementation Guidelines*, a critical output from the modelling process is an estimate of the impact of the proposal on existing and planned activity centres and the level of service to the community.
- ii. Residents of the region should be provided with a wide range of food and grocery items within proximity to their homes, and the opening of the proposed Woolworths Darch development would provide a key anchor for the area that would benefit the overall offer and range of services available - increasing the ability of the population to shop locally, while not impacting the future viability of current centres in the surrounding area.
- iii. The ability for local residents, for example, to undertake both a weekly shop at the subject site, as well as convenience, late-night and top-up shopping at the 24-hour Darch Plaza IGA, late-trading Farmer Jacks Landsdale Forum, or complementary Aldi supermarket, would represent a holistic food and grocery experience.
- iv. In addition, increased competition between supermarkets is beneficial to consumers and will not adversely affect the balance of the centre hierarchy. The analysis of impacts provided in the previous section of this report shows the projected impacts on other centres from the proposed development would not threaten the viability or continued operation of any centre. Further, there would be no depletion or dilution in the range of services which are available to residents.

v. As outlined previously, the proposed Woolworths Darch development is forecast to record sales of \$46.0 million in 2025/26, including Woolworths supermarket sales of \$39.2 million. Key information regarding projected impacts of -4.0% or more as outlined in the previous Table 4.3 is summarised as follows:

- **Madeley District Centre:** the highest impact in dollar terms at -\$11.7 million (-8.3%).
- **Alexander District Centre:** a total impact of -\$8.9 million, or around -9.1%.
- **East Landsdale:** an impact of so -\$2.9 million, or -8.1% as compared with the base case.
- **Landsdale:** a total impact of so -\$1.9 million, or -8.2%.
- **Darch:** an impact of -\$1.9 million, or around -8.0%.
- **The Market Place Ballajura:** a total impact of -\$0.9 million (-4.6%).

All other project impacts are less than -\$2.1 million or -3.2% on any one centre. In addition, minor impacts totalling -\$4.0 million in combination (around 8.7% of the total forecast sales) are projected to fall on a range of centres located beyond the main trade area. This accounts for workers of the nearby industrial precinct.

vi. Most of the above impacts will be absorbed by Woolworths and Coles supermarkets throughout the area that are understood to trade at levels above the Australian average of \$9,000 - \$10,000 per sq.m. All supermarkets would remain viable.

vii. It is emphasised that Woolworths is committed to be the operator of the supermarket at the Darch site. Consequently, the existing Woolworths supermarket network within the region would be expected to absorb a significant proportion of the projected impacts from the opening of the Darch development. Based on actual market data, it is our experience that the greatest impacts are typically absorbed by the closest comparable retailers/centres. Woolworths has assessed the levels of impact on the existing and future Woolworths store network, with only a moderate anticipated reduction in trading volumes which would not compromise the future viability of other Woolworths supermarkets.

viii. The proposed Woolworths Darch development would not impact on the viability or continued operation of any existing or proposed centres (as per SPP 4.2) in the surrounding region, with all of the impacts well within the normal competitive range (low to medium) of less than -10%.

ix. In summary, all sales impacts across the identified centres are within an acceptable range, and when considered in the context of the size, performance and role and function of surrounding centres, would be highly unlikely to result in a material reduction of retail service provision. The proposed Woolworths Darch development would add to the range of services and retention of escaped expenditure within the region.

x. Further, residential growth would also see sales regain quickly. With retail expenditure growth across the main trade area growing by an average of 1.8% (2023-26) to 2.1% (2026-31) per year – even the most significant impacts could be ameliorated within in the short term with population growth.

5.4. Net Benefits

- i. It is the conclusion of this report that a substantial net community benefit would result from the proposed Woolworths Darch development. Offsetting the trading impacts on some existing retailers, there are very substantial positive impacts including the following (with reference to SPP 4.2 *Implementation Guidelines A.24*):

Strategic Alignment, Infrastructure & Services

- **Optimal Site:** the site occupies a high-profile and easily-accessible location for the existing and future local resident population – capitalising on the existing and planned infrastructure.
- **Liveable Neighbourhood:** the positioning of the development within the Kinmore Green Estate also aligns with the strategic vision for the area, including urban growth and settlement, as well as the concept of liveable neighbourhoods – which has a primary objective of promoting the design of walkable neighbourhoods and places that support community, sense-of-place, mixed-use and active streets, accessible and sustainable parking, energy efficient design, and housing choice.
- **Enhanced Uses:** the development would provide a significant improvement in the range of retail facilities and services that would be available to existing and future local residents. This includes satiating existing and future projected retail and supermarket floorspace demand to be generated by main trade area residents.
- **Aligned With SPP 4.2 Objectives:** the proposed development strongly aligns with the core policy objectives, aiming to create and retain people, employment opportunities, retail, and services – within a well-connected community.
- **Aligned With SPP 4.2 Outcomes:** the development also aligns with the specified outcomes, insofar as it efficiently and cohesively caters to community needs and consumer choice, while also avoiding significant disruptions to the existing activity centre hierarchy. As outlined within this sub-section and the broader assessment, the development would be of net positive benefit to the local community.

Productivity

- **Employment:** the proposed Woolworths Darch development would result in the creation of additional employment, both during the construction period, and more importantly, on an ongoing basis once the development is complete and operational. In total, approximately 690 jobs (563 excluding indicative pad site uses) are likely to be created both directly and indirectly because of the proposed development - including ongoing employment (249), construction (79) and multiplier effects (363).

Based on Average Weekly Earnings data released by the ABS in November 2022 (Cat. 6302.0), the additional permanent employees (249, or 205 excluding pad site uses) would earn combined total salary/wages of some \$10.5 million (\$8.8 million for the retail component, and \$1.7 million for the indicative pad site uses).

- **Impact on Activity Centres:** as outlined previously, the proposed development would not impact on the viability or continued operation of any existing or proposed centres in the surrounding region, with all of

the impacts well within the normal competitive range (low to medium) of less than -10%; and expected to be ameliorated in the short term with population growth.

Quality of Life

- **Compatible with Surrounding Land Uses:** the development is compatible with the Kinmore Green Estate masterplan and other surrounding uses.
- **Complementary Range of Uses:** the proposed range of uses that would form part of the development are also typical of many convenience-based centres and are considered complementary to one-another – including a major full-line supermarket, retail specialty shops, a childcare centre, and fast food pad site.
- **Aligned with Consumer Trends & Expectations:** the nature of consumer demand continues to develop and evolve, reflecting social changes within society, such as increasing time pressures on working families; population/income growth; the evolution of new retail formats/operators. The demands of retailers, as well as consumers, combine to add pressure for additional retail floorspace in existing retail precincts. The design of the proposed development, including a full-line Woolworths supermarket, limited specialty floorspace, and easily accessible car parking, would be highly convenient for local families who would visit on a regular basis – and therefore help to retain some of the significant spending and visitation that is currently escaping the area.
- **Enhanced Amenity & Retained Vibrancy:** the proposed development would improve choice of location and allow for price competition as part of this retention. As outlined previously the level of supermarket spending (generated by main trade area residents) being retained within the main trade area is estimated at just \$25.9 million (19.4%). This means that 80.6% (\$107.6 million) of supermarket expenditure is currently escaping the trade area (and much of the LGA). The development of Aldi (East Landsdale Shopping Centre) and Woolworths Darch in 2025/26 is projected see retained supermarket spending increase to \$69.8 million (48.7%), reflecting a significant reduction in leakage (from 80.6% in 2022/23 to 51.3% in 2025/26).
- **Limited Specialty Floorspace:** the proposed development has limited specialty floorspace (approximately 714 sq.m) as compared with the *Urbis Averages (2021/22)* for comparable single supermarket shopping centres (2,004 sq.m). This would mean residents will continue to frequent other centres/shops in the surrounding area for a variety of tenants that are not likely to be provided as part of the proposed site. Given most shopfronts in the locality and nearby activity centres would not compete directly with a full-line supermarket, impacts on local retail would be limited and most would stand to benefit from increased customer visitation, activity and retained spending associated with the full-line Woolworths supermarket. The ability for local residents, for example, to undertake both a weekly shop at the subject site, as well as convenience, late-night and top-up shopping at the 24-hour Darch Plaza IGA, late-trading Farmer Jacks Landsdale Forum, or complementary Aldi supermarket, would represent a holistic food and grocery experience.

Environmental Sustainability, Equity & Social Inclusion

- **Reduced Trips or Drive Distance:** the retention of spending and visitation within the main trade area and LGA would also reflect a reduction in car-based trips (drive time and distance) to full-line supermarket-based centres (often multiple times per week) further afield such as Kingsway City, Alexander Heights, and Wyatt Grove.

- **Localised Jobs & Services:** the provision of employment floorspace within the main trade area will help to retain job opportunities for local residents, as well as providing a large number of youth employment prospects, given retail developments generally employ many younger staff.
- ii. In conclusion, this assessment demonstrates that proposed Woolworths Darch development would result in substantial net community benefit, that will more than offset anticipated trading impacts for a small number of existing and proposed retail centres – all of which would remain viable, and be ameliorated in the short term.



Location*iq*

Contact Us

(02) 8248 0100

Level 27 | 25 Martin Place

Sydney NSW 2000

locationiq.com.au

APPENDIX E

PROPOSED CONCEPT PLAN



