Metro Inner Development Assessment Panel Agenda

Meeting Date and Time: Wednesday, 5 August 2026; 9:30am
Meeting Number: MIDAP/145
Meeting Venue: 140 William Street, Perth

A live stream will be available at the time of the meeting, via the following link:
MIDAP/145 - 5 August 2026 - City of Stirling

PART A – INTRODUCTION

1. Opening of Meeting, Welcome and Acknowledgement
2. Apologies
3. Noting of Minutes

PART B – CITY OF STIRLING

1. Declarations of Due Consideration
2. Disclosure of Interests
3. Form 1 DAP Applications
   - 3.1 Strata lots 1-8 and common property, house numbers 1-8/367 Scarborough beach road, Innaloo Lots 1-5 and 1-3, house numbers 278-270 and 277-273 Ewen street, Innaloo / woodlands Lot 66, house number 6 Bowra avenue (Lakides lane), Innaloo / woodlands Public road (Ewen street) reserve pin1282926 / land id number 3159135, Innaloo / woodlands Public road (Scarborough beach road) reserve pin11785750 / land id number 3815884, Innaloo Public road (Ewen street) reserve pin11785751 / land id number 3815885, Innaloo / woodlands Pedestrian access way lot 167 (Ewen street), Innaloo / woodlands Lot 12, house number 365 Scarborough beach road, Innaloo / woodlands - New Commercial Development and Alterations to Existing Service Station – DAP/25/02974
   - 3.2 Lot 166 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No.200) Karrinyup Road, Karrinyup - Modifications to access arrangements and additional parking – DAP/24/02809
4. Form 2 DAP Applications
5. Section 31 SAT Reconsiderations

PART C – OTHER BUSINESS

1. State Administrative Tribunal Applications and Supreme Court Appeals
2. Meeting Closure

Please note, presentations for each item will be invited prior to the items noted on the agenda and the presentation details will be contained within the related information documentation

DAP Members
Dale Page (Presiding Member)
Francesca Lefante (Deputy Presiding Member)
Heidi Herget
Cr Suzanne Migdale (Part B – City of Stirling)
Cr Rob Paparde (Part B – City of Stirling)

DAP Secretariat
Kristen Gray
Ashlee Kelly

PART A – INTRODUCTION

1. **Opening of Meeting, Welcome and Acknowledgement**

2. **Apologies**

3. **Noting of Minutes**

PART B – CITY OF STIRLING

1. Declarations of Due Consideration

2. Disclosure of Interests

3. Form 1 DAP Applications

3.1 Strata lots 1-8 and common property, house numbers 1-8/367 Scarborough beach road, Innaloo Lots 1-5 and 1-3, house numbers 278-270 and 277-273 Ewen street, Innaloo / woodlands Lot 66, house number 6 Bowra avenue (Lakides lane), Innaloo / woodlands Public road (Ewen street) reserve pin1282926 / land id number 3159135, Innaloo / woodlands Public road (Scarborough beach road) reserve pin11785750 / land id number 3815884, Innaloo Public road (Ewen street) reserve pin11785751 / land id number 3815885, Innaloo / woodlands Pedestrian access way lot 167 (Ewen street), Innaloo / woodlands Lot 12, house number 365 Scarborough beach road, Innaloo / woodlands - New Commercial Development and Alterations to Existing Service Station – DAP/25/02974

3.2 Lot 166 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No.200) Karrinyup Road, Karrinyup - Modifications to access arrangements and additional parking – DAP/24/02809

4. Form 2 DAP Applications

Nil.

5. Section 31 SAT Reconsiderations

Nil.

Part B – Item 3.1
STRATA LOTS 1-8 AND COMMON PROPERTY, HOUSE NUMBERS 1-8/367 SCARBOROUGH BEACH ROAD, INNALOO
LOTS 1-5 AND 1-3, HOUSE NUMBERS 278-270 AND 277-273 EWEN STREET, INNALOO / WOODLANDS
LOT 66, HOUSE NUMBER 6 BOWRA AVENUE (LAKIDES LANE), INNALOO / WOODLANDS
PUBLIC ROAD (EWEN STREET) RESERVE PIN1282926 / LAND ID NUMBER 3159135, INNALOO / WOODLANDS
PUBLIC ROAD (SCARBOROUGH BEACH ROAD) RESERVE PIN11785750 / LAND ID NUMBER 3815884, INNALOO
PUBLIC ROAD (EWEN STREET) RESERVE PIN11785751 / LAND ID NUMBER 3815885, INNALOO / WOODLANDS
PEDESTRIAN ACCESS WAY LOT 167 (EWEN STREET), INNALOO / WOODLANDS
LOT 12, HOUSE NUMBER 365 SCARBOROUGH BEACH ROAD, INNALOO / WOODLANDS

RESPONSIBLE AUTHORITY REPORT – FORM 1	
DAP Name:	Metro Inner DAP
DAP File No:	DAP/25/02974
LG Reference:	DA25/0807
Proposed Development:	New Commercial Development and Alterations to Existing Service Station
Value of Development:	$70 million
Owner:	Deltaview Pty Ltd One Fund Services Ltd Crown, State of Western Australia
Applicant:	Planning Solutions
Local Government Area:	City of Stirling
Responsible Authority:	City of Stirling
Authorising Officer:	Giovanna Lumbaca, Acting Director Planning and Development
Application Acceptance Date:	16 September 2025

LOCATION PLAN

Figure 1 Location Plan and Surrounding Context

RESPONSIBLE AUTHORITY RECOMMENDATION

That the Metro Inner DAP resolves to **APPROVE** DAP Application reference DAP/25/02974 for the proposed "Woodlands North" commercial development (one Recreation - Private tenancy, two Restaurant tenancies and eight Shop tenancies) at Strata Lots 1-8 and common property, House Numbers 1-8/367 Scarborough Beach Road, Lots 1-5 and 1-3, House Numbers 278-270 and 277-273 Ewen Street, Lot 66, House Number 6 Bowra Avenue (Lakides Lane), Public Road (Ewen Street) Reserve PIN1282926 / Land ID Number 3159135, Public Road (Scarborough Beach Road) Reserve PIN11785750 / Land ID Number 3815884, Public Road (Ewen Street) Reserve PIN11785751 / Land ID Number 3815885 and Pedestrian Access Way Lot 167 (Ewen Street), Innaloo and Woodlands, and the proposed alterations to the existing Service Station at Lot 12, House Number 365 Scarborough Beach Road, Innaloo, in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the Planning and Development (Local Planning Schemes) Regulations 2015, and the provisions of the City of Stirling Local Planning Scheme No. 3, subject to the following conditions:

1. The development is to be undertaken in accordance with the approved plans and documents attached to this approval, as listed below, except where amended by subsequent conditions:

Plan/ Document Name	Reference	Date
Feature and Contour Survey	RM Surveys WIND-EWEN-DW-001 Rev 1	9 July 2025
Boundary Information	Place Fabric page 4 Rev F	April 2026
Demolition Plan	Place Fabric page 5 Rev F	April 2026
Site Plan	Place Fabric page 6 Rev F	April 2026
Tenancies Site Plan	Place Fabric page 7 Rev F	April 2026
Level 1 Plan	Place Fabric page 8 Rev F	April 2026
Roof Plan	Place Fabric page 9 Rev F	April 2026
Materiality	Place Fabric page 12 Rev F	April 2026
Elevations	Place Fabric page 13 Rev F	April 2026
North Elevations	Place Fabric page 14 Rev F	April 2026
South Elevations	Place Fabric page 15 Rev F	April 2026
East Elevations	Place Fabric page 16 Rev F	April 2026
West Elevations	Place Fabric page 17 Rev F	April 2026
Laneway Elevations	Place Fabric page 18 Rev F	April 2026
Schedule Breakdown	Place Fabric page 19 Rev F	April 2026

2. This decision constitutes planning approval only and is valid for a period of four years from the date of approval, being 5 August 2030. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect.

<u>Advertisements</u>

3. All proposed signage authorised as part of this approval is to be contained with the signage zones, to the satisfaction of the City. These signs must:

   a. not interfere with or imitate traffic control signals or signage;

b. not advertise services or products other than those available on the lot;

c. comply with the Australian Association of National Advertisers Code of Ethics in respect to content of the advertising sign;

d. not contain any discriminatory, offensive, obscene or vulgar material, including but not limited to adult-only related industries;

e. not be illuminated contrary to Australian Standard AS4282:2023;

f. not exceed a maximum luminance of 300 cd/m^2;

g. not incorporate running, flashing or pulsating lights, or rapid changes to images on a screen;

h. digital format signage to contain only static words and objects and not include video or animation;

to the satisfaction of the City of Stirling.

Any other signage is to be in strict accordance with the City of Stirling Local Planning Policy 6.1 - Advertising Signs, unless further development approval is obtained.

Building Design

4. The colours, materials and finishes of the development shall be in accordance with the details and annotations as specified on the approved plans unless alternatives are otherwise accepted by the City of Stirling.

5. All awnings are to have a minimum clearance of 1.0 metre to all public road pavement edges and on-street parking bays.

Construction Management

6. Prior to lodgement of the Building Permit application, a Construction Management Plan (CMP) shall be submitted to, and approved by, the City of Stirling in consultation with any relevant referral agencies. The CMP shall include specific details on the management of aspects including but not limited to; dust, noise, vibration, waste management, parking, traffic, street tree protection zones, storage of materials, site safety / security and any other relevant matters to the satisfaction of the City of Stirling. The CMP shall be implemented upon commencement of development, and shall be complied with for the duration of construction, to the satisfaction of the City of Stirling.

Landscaping

7. Prior to the commencement of works, a detailed Landscaping Plan is to be provided for the City of Stirling's approval, that is generally in accordance with the landscaping plans prepared by UDLA dated 4 September 2025, subject to:

a. The removal of all trees and landscaped areas along the Scarborough Beach Road frontage that prevent a 2.5 metres wide public footpath being provided; and

b. The removal of all trees along the Scarborough Beach Road and Odin Road / Ewen Street intersection frontage that interferes with existing signal infrastructure or is located within the vehicle sightline areas for the traffic lights;

and that demonstrates compliance with the approved development plans, all revised drawing conditions of this approval and City of Stirling Local Planning Policy 6.6 Trees and Landscaping – Non-Residential, to the satisfaction of the City of Stirling.

8. Prior to occupation of the development, all trees provided in the approved detailed Landscaping Plan must be planted on site in the area indicated on the approved plan to the satisfaction of the City of Stirling and be thereafter maintained for the duration of the development. The trees must be provided with the approved deep soil area at ground level free of intrusions, to the satisfaction of the City of Stirling. The landscaping areas shall include:

a. A minimum mulch depth of 100mm within all deep soil areas; and
b. Installation of waterwise reticulation systems.

9. Prior to occupation of the development, all landscaped areas shall be planted, reticulated and mulched to a minimum depth of 100mm and maintained thereafter for the life of the development, to the satisfaction of the City of Stirling.

<u>Legal</u>

10. The land constituting the proposed commercial development shall be amalgamated in a manner consistent with draft Deposited Plan 64022 version 7 approved by the Western Australian Planning Commission on 3 October 2025, prior to practical completion of the development, to the satisfaction of the City of Stirling.

11. Prior to the occupation of any part of the development the subject of this application, the owners of the land, for that portion of the land designated as:

a. The deceleration lane (left turn pocket) to the Scarborough Beach Road crossover;

b. The new public footpaths, on the Scarborough Beach Road and Ewen Street frontages, where the existing public footpath on the verge has been displaced (by the proposed deceleration lane and associated crossover and the proposed on-street parking and loading bays), with a minimum unobstructed footpath width of 2.5 metres, except where adjacent to the on-street car parking bays and service vehicle bay on Ewen Street where the minimum width is 2.0 metres; and

c. Planning Control Area No. 166 Scarborough Beach Road - Hinderwell Street to Odin Road and King Edward Road to Main Street, as depicted in Western Australian Planning Commission Plan Number 1.7995; and

such land to be ceded free of cost and vested in the Crown and without any payment of compensation by the Crown, to the satisfaction of the City of Stirling.

12. Prior to the occupation of any part of the development the subject of this application, the owner of the land constituting the proposed commercial development, shall grant an easement in gross pursuant to Sections 195 and 196 of the *Land Administration Act 1997* for the benefit of the City of Stirling and the public at large over that portion of the land designated for Public Parking bays, for the purposes of providing unrestricted public vehicular access, to the satisfaction of the City of Stirling.

13. Where the satisfaction of any condition requires the preparation of a legal agreement, these agreements are to be prepared by the City of Stirling's solicitors and, all costs incidental to the satisfaction of these conditions, including the City of Stirling's legal costs and registration fees and stamp duty (if any), must be paid by the landowner.

<u>Lighting and Security</u>

14. Lighting shall be provided to all public spaces including under awnings, parking areas, service areas, entry and exit points and thereafter maintained for the life of the development, to the satisfaction of the City of Stirling.

15. Details of any outside lighting shall be submitted at the Building Permit application stage demonstrating compliance with *Australian/New Zealand Standard 4282:2023 - Control of the obtrusive effects of outdoor lighting (AS/NZS 4282*). External lighting shall thereafter be installed prior to occupation so as not to adversely affect the amenity of the locality in accordance with AS/NZS 4282.

<u>Off-Site Engineering</u>

16. Prior to the commencement of works, detailed civil engineering construction drawings of the works to Scarborough Beach Road and Ewen Street are to be submitted to the City of Stirling for written approval. These works include the deceleration lane, on-street parking bays, the modifications to the public footpaths, the modifications to the existing on-street parking bays, the modifications to the central median islands, and modifications to the roadway or verge relating to the vehicle access into and out the subject sites. The following modifications are required:

    a. The number of on-street car bays on Ewen Street to be reduced from three to two car bays, with the removal of the proposed end car parking bay, as it obstructs the existing pedestrian ramp crossing, which is to be retained.

    b. The inclusion of traffic management on Ewen Street to reduce vehicle speeds for vehicles entering and exiting the car park.

Prior to the commencement of the civil engineering works, the owner shall pay the City of Stirling a bond to be calculated by the City of Stirling based upon the approved civil engineering construction plans, which will be returned once all works within the road reserve have been completed in accordance with the approved civil engineering construction plans, to the satisfaction of the City of Stirling.

Prior to the occupation of the development, the approved civil engineering works for Scarborough Beach Road and Ewen Street shall be undertaken at the owner's cost, in accordance with the design approved by the City of Stirling.

17. Prior to occupation of the development, existing street lighting columns affected by the proposed car parking bays and footpath modifications works on Ewen Street, are to be relocated at the owner's expense to ensure that these do obstruct proposed footpaths and embayed parking bays to the specifications of Electricity Networks Corporation (Western Power) and to the satisfaction of the City of Stirling.

18. Prior to occupation of the development, street lighting along the development's Ewen Street frontage is to be upgraded to comply with Australian Standard AS 1158, demonstrating Category V lighting provisions, at the owner's expense, in compliance with recommendation of the "Shawmac" Road Safety Audit - Stage 2 – Preliminary Design Audit Reference: 260518-RSA-001 - item 2.1 Issue Date 25 May 2026, to the specifications of Electricity Networks Corporation (Western Power) and to the satisfaction of the City of Stirling.

19. Prior to occupation of the development, the owner shall pay the City of Stirling for the installation of the on-street parking signage required for the on-street car parking bays and service vehicle bay.

20. Prior to the occupation of the development, the City of Stirling is to be provided with "as constructed" copies in '.dwg' and '.pdf' format, of all road and drainage modification works.

21. Prior to the occupation of the development, a payment is to be made to the City of Stirling of an inspection fee equivalent to 3.0%, or 1.5% where a consulting engineer has been engaged to design and supervise the construction, of the cost of construction works within the road reserve.

22. Prior to the occupation of the development, a payment to the City of Stirling of a 12 months defects liability period retention bond of 5% is required for the construction of all roads, footpaths, landscaping and associated drainage works, as estimated by the City of Stirling.

23. No permanent structures such as retaining walls are permitted to be constructed within the retained road reserves and the widened road reserves, unless otherwise approved in writing by the City of Stirling.

<u>Parking and Vehicle Access</u>

24. The number and allocation of car, bicycle and motorcycle/scooter parking bays on-site shall be provided as follows:

a. 165 commercial car parking bays, with a:
   i. Minimum 87 of the commercial bays to be Public Parking bays; and
   ii. Minimum 60% of the Public Parking bays to be Short Stay Parking bays.

b. A minimum 21 bicycle spaces, with a:
   i. Minimum 15 bicycle spaces to be accessible to employees; and
   ii. Minimum six (6) bicycle spaces to be accessible to customers.

c. A minimum four (4) commercial motorcycle/scooter bays.

These parking bays and spaces shall be available during the operating hours of the development, to the satisfaction of the City.

25. Prior to occupation of the development all parking bays, manoeuvring and circulation areas shall be sealed/paved, drained and shall comply with *Australian/New Zealand Standard 2890.1-2004 - Off-street car parking*. The accessible parking bay indicated on the approved plans shall comply with *Australian Standard 2890.6:2022 - Off-street Parking for People with Disabilities.* The parking bays and manoeuvring areas shall be maintained for the life of the development, to the satisfaction of the City of Stirling.

26. The design and construction of the bicycle parking spaces shall be in accordance with *Australian Standard 2890.3-2015 – Bicycle Parking.*

27. No vehicles larger than a 12.5 metres rigid vehicle are permitted to use the Scarborough Beach Road loading dock crossover, unless otherwise approved by the City of Stirling.

28. Prior to occupation of the development, the proposed vehicle crossovers and left turn pocket deceleration lane shall be designed, constructed, and installed to the satisfaction of the City of Stirling.

29. Prior to occupation of the development, all driveways, parking and manoeuvring areas shall be sealed, drained and thereafter maintained to the satisfaction of the City of Stirling.

30. Prior to the occupation or use of the development, any redundant crossover(s) shall be removed and the kerbing and road verge reinstated at the owners cost in accordance with the City of Stirling's Local Planning Policy 6.7 - Parking and Access.

31. Unless otherwise approved, no walls, fences, letterboxes or other structures above 0.75 metres in height to be constructed within the 1.5 metre width x 1.5 metre depth triangular area of where:
    a. Walls, letterboxes or fences adjoin vehicular access points to the site, or
    b. A driveway meets a public or private street, or
    c. Two street intersect,

    unless the further approval of the City of Stirling is obtained.

<u>Public Art</u>

32. Prior to occupation of the development, a public art proposal for the subject development to the value of 1% of the construction value up to $50 million and 0.5% of the construction value greater than $50 million shall be submitted to, and approved by, the City of Stirling. The approved public art proposal shall be completed and installed by the developer prior to occupation and thereafter maintained by the landowner for the life of the development, to the satisfaction of the City of Stirling.

Universal Design

33. Prior to occupation of the development, pedestrian pathways providing wheelchair accessibility from all entries to buildings to public footpath and car parking areas shall comply with *Australian Standard 1428.1:2021 - Design for access and mobility, Part 1: General requirements for access – New building work,* to the satisfaction of the City of Stirling.

Utilities, Facilities and External Fixtures

34. All external fixtures, building services, roof equipment (including air-conditioning) and utilities of the development are to be integrated into the building and/or screened for the life of the development, to the satisfaction of the City of Stirling.

35. Prior to the lodgement of a Building Permit application, the development's fire service needs to be designed to ensure that a Department of Fire and Emergency Services "Fire Appliance Hardstand" and associated line marking is not required to be installed within the road reserve abutting the development road frontages. The details, location and elevations of the fire booster are to be submitted for the approval of the City of Stirling. The Fire Service must ensure that the fire truck when stopped at the fire booster cabinet does not block traffic movements along the abutting road network.

36. A safety barrier, which may be provided as appropriately designed boundary fencing, is to be installed within the subject site adjacent to the excavated service area, to protect vehicles and pedestrians from falling into the service area, to be designed and installed to the satisfaction of the City of Stirling.

Waste Management

37. The development shall be consistent with the approved Waste Management Plan (WMP) prepared by Talis Consultants. The WMP shall be implemented and thereafter complied with by the landowner for the life of the development, to the satisfaction of the City of Stirling.

Water Management

38. Stormwater from all roofed and paved areas shall be collected and contained on site. Stormwater shall not affect or be allowed to flow onto or into any other property or road reserve. There shall be no connection to the City's drainage infrastructure without the written consent of the City of Stirling.

Advice Notes

1. Where an approval has so lapsed, no development shall be carried out without the further approval of the Development Assessment Panel or City of Stirling.

2. If an Applicant is aggrieved by this determination there is a right of appeal under Part 14 of the *Planning and Development Act 2005*. An appeal must be lodged within 28 days of the determination with the State Administrative Tribunal.

3. This is a Development Approval issued under the City of Stirling Local Planning Scheme and related policies. It is not a Building Permit or an approval to commence or carry out development under any other law. It is the responsibility of the Applicant to obtain any other necessary approvals, consents and licenses required under any other law, and to commence and carry out development in accordance with all relevant laws.

4. This approval is not an authority to ignore any constraint to development on the land, which may exist through statute, regulation, contract or on title, such as an easement or restrictive covenant. It is the responsibility of the Applicant and not the Development Assessment Panel or City of Stirling to investigate any such constraints before commencing development. This approval will not necessarily have regard to any such constraint to development, regardless of whether or not it has been drawn to the Development Assessment Panel or City of Stirling's attention.

5. The Applicant is responsible for ensuring all lot boundaries as shown on the approved plans are correct.

6. Development shall comply in all respects with the attached approved plans and any requisite amended plans required by a condition of this approval which have been stamped accordingly.

7. Where, in the opinion of the City of Stirling, achieving compliance with the conditions of approval requires significant modifications to the approved plans, a Form 2 application shall be required for consideration in accordance with *Clause 17 or 17A of the Planning and Development (Development Assessment Panels) Regulations 2011.*

8. The landowner is advised that any future strata title or community title subdivision of the property must be consistent with this approval and the lot sizes demonstrated in the application.

<u>Advertisements</u>

9. All signage is to be in accordance with the approved plans, unless exempt from development approval by being in strict accordance with the Planning and Development (Local Planning Schemes) Regulations 2015 including City of Stirling Local Planning Policy 6.1 Advertising Signs, or further development approval has been obtained.

<u>Contaminated Sites</u>

10. Due to the nature and extent of groundwater contamination beneath Lots 12 and 66, the abstraction of groundwater for any purpose is not recommended. Lots 12 and 66 are to be managed in accordance with the Ongoing Site Management Plan as detailed in the document Ongoing Site Management Plan at the Caltex Doubleview Service Station (55486), 365 Scarborough Beach Road, Doubleview, WA 6108 (AECOM, October 2017).

Food Premises

11. All food premises activities are to comply with the *Food Act 2008*, Australian New Zealand Food Standards Code and City of Stirling Food Business Guide Design Construction Operation.

12. A Food Business Notification form is to be submitted for the premise with supporting plans and specifications of the food handling facilities for approval at the Building Permit Application stage or prior to installation and operation.

Legal

13. The exact road widenings required along the Scarborough Beach Road and Ewen Street frontages will be determined as part of the City of Stirling's approval of the detailed design of the off-site engineering works.

Noise

14. The location, installation and operation of all fixed plant and equipment shall ensure that noise emissions will comply with the assigned levels of the *Environmental Protection (Noise) Regulations 1997.*

15. All construction works shall comply with the requirements of the *Environmental Protection Act 1986* and the *Environmental Protection (Noise) Regulations 1997*. Noisy construction work outside the period 7:00am to 7:00pm Monday to Saturday and at any time on Sundays and Public Holidays is not permitted unless an approved Noise Management Plan for the construction site has been approved in writing by the City of Stirling.

Off-Site Engineering

16. For all proposed works within the road reserve relating to the subject development, a separate written approval is required from the City of Stirling's Engineering Services Business Unit. Detailed civil engineering construction plans must be submitted by a suitably qualified person. Written approval must be obtained from the City of Stirling, prior to any work occurring within the road reserve.

    The design of the works will be subject to the following requirements:

    a. The on-street car parking bays and service vehicle bay to be surfaced in red bitumen.

    b. The submission of a parking signage plan in accordance with AS1742.11 for the parking signage for the on-street car parking bays and service

vehicle bay, including the service vehicle bay being available for deliveries during normal business hours.

c. All footpaths along the development's frontage within the road reserve to provide a consistent brick paving type, pattern and colour, that defines and provides a contrast from the internal development's footpath areas.

d. The modifications to the central median islands on Ewen Street associated with the vehicle access to and from the car park must maintain vehicle access to the neighbouring properties on the opposite side of the street.

17. All drainage affected by the proposed road modification works within Scarborough Beach Road and Ewen Street are to be modified to the satisfaction of the City of Stirling.

18. Associated line marking and signage of the Scarborough Beach Road and Ewen Street road modification works is subject to Main Roads Western Australia approvals, and at the landowner's expense.

Parking and Vehicle Access

19. Public Parking is defined in the City of Stirling Local Planning Scheme No. 3 as: "means the parking of vehicles on land by members of the public at any time on any day whether or not payment of a fee is required."

20. Short Stay Public Parking is defined in the City of Stirling Local Planning Scheme No. 3 as: "means parking bays that are available to the public where at least 50% of vehicles stay less than 4 hours and at least 90% stay less than 6 hours."

Public Art

21. In relation to the Public Art condition, please refer to the City of Stirling Developer's Guide to Public Art, the City of Stirling Public Art Masterplan and City of Stirling Local Planning Policy 6.12 - Public Art on Private Land. Based on the estimated cost of development identified on the development application forms ($70 million), the 1% up to $50 million and 0.5% greater than $50 million public art contribution will equate to $600,000.

Waste Management

22. The bin enclosures shall comply with the requirements of the City of Stirling's *Waste Management Local Law 2010.*

PROPOSAL:

The key components of the proposed development are summarised as follows:

- The construction of a single-storey "Woodlands North" commercial development (shopping centre) with associated roof-top car parking.
- The shopping centre contains 11 commercial tenancies, consisting of:
  - Eight Shop tenancies, including one tenancy exceeding 3,800m^2 in floor area.
  - Two Restaurant tenancies, including associated outdoor dining areas.
  - One Recreation-Private tenancy.

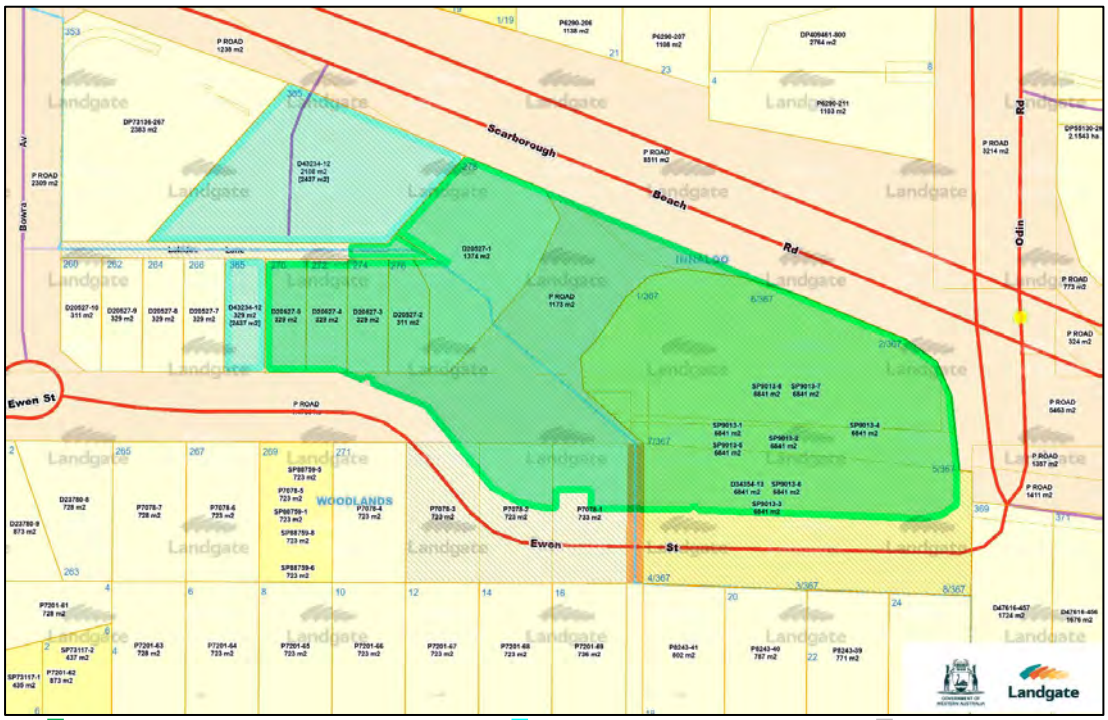
- A landscaped outdoor pedestrian space between Scarborough Beach Road and Ewen Street, providing access to the commercial tenancies in the shopping centre.
- A total of 165 car bays, located in the roof-top car park. All car bays are capable of being publicly accessible.
- Vehicle access and service arrangements are from Scarborough Beach Road and Ewen Street.
- Modifications to the Scarborough Beach Road vehicle access for the existing "Ampol" Service Station development at Lot 12, House Number 365 Scarborough Beach Road and the resultant removal of the affected fuel board sign and the affected section of the retaining wall.

SUBJECT SITE AND SURROUNDS:

The subject site is located on the corner of Scarborough Beach Road and Ewen Street in Innaloo and Woodlands and consists of multiple lots as listed below:

- Proposed commercial development land:
  - Strata Lots 1-8 and common property, House Numbers 1-8/367 Scarborough Beach Road (all owned by Deltaview Pty Ltd).
  - Lots 1-5 and 1-3, House Numbers 278-270 and 277-273 Ewen Street (all owned by Deltaview Pty Ltd).
  - Lakides Lane – Lot 66, House Number 6 Bowra Avenue (owned by Deltaview Pty Ltd).
  - Public Road reserves – the former alignment of Ewen Street and its former intersection with Scarborough Beach Road (Crown land).
  - Lot 167 – a former pedestrian access way (Crown land).
- Alterations to the existing Service Station land:
  - Lot 12, House Number 365 Scarborough Beach Road (owned by One Fund Services Ltd).

The subject site is shown in Figure 2 below.



Proposed Lots 100 & 105 Lot 12 All lots

Figure 2: Subject Site (Base Map: Western Australian Land Information Authority)

The subject site is located within the Stirling City Centre Strategic Metropolitan Centre in the City's Local Planning Strategy and within the Stirling City Centre Special Control Area of the City's Local Planning Scheme No. 3. Scarborough Beach Road is identified as an Other Regional Road under the Metropolitan Region Scheme, a District Distributor A road under the City's Functional Road Hierarchy and a Corridor Class 2 Road in the City's Local Planning Strategy. Ewen Street is a District Distributor B road under the City's Functional Road Hierarchy. Lakides Lane is a Category 1 right-of-way under the City's Rights of Way Management Strategy.

The commercial development is proposed to be constructed on proposed Lot 100, House Number 367 Scarborough Beach Road, Innaloo and proposed Lot 105 (street numbering to be determined), in reference to the draft Deposited Plan submitted with the application. The combined site area of proposed Lots 100 and 105 is 10,993m^2 and is currently vacant land, with some remnant paving and vegetation from prior uses of this land. An existing high voltage power pole is located on the south western side of the site. There is part of an existing crossover and driveway in the northern corner on the site that provides vehicle access to the adjoining Service Station from Scarborough Beach Road.

Proposed Lot 100 is an irregularly shaped 10,901m^2 lot and has an approximately 130 metres frontage to Scarborough Beach Road to the north east, an approximately 42 metres frontage to Ewen Street to the east, an approximately 188 metres frontage to Ewen Street to the south and south west, and a 20.1 metres frontage to Lakides Lane to the north. Proposed Lot 105 is a 92m^2 lot excised from the existing Lakides Lane lot and has a 5.3 metres frontage to the retained Lakides Lane to the west. The existing topography of Proposed Lot 100 generally rises from east to west, by approximately four to five metres.

Lot 12, House Number 365 Scarborough Beach Road, Innaloo contains an existing Service Station development, which includes a convenience store building and fuel pumps underneath a canopy structure, that are being retained. Within the identified works area on Lot 12, there is part of an existing crossover and driveway that provides vehicle access to the Service Station from Scarborough Beach Road, a retaining wall and signage.

The surrounding properties are predominately commercial buildings or vacant land. Residential developments are located on the opposite side of Ewen Street, to the south.

BACKGROUND:

There are no valid development approvals in place for proposed Lots 100 and 105 and no previous applications have been considered by a Development Assessment Panel on this site. There are no valid development approvals in place for future proposed works/uses to Lot 12.

Deltaview Pty Ltd has previously obtained conditional subdivision approval on multiple occasions from the Western Australian Planning Commission, which includes the amalgamation of most of their landholdings and the redundant public road reserves into one large lot, and the ceding of the privately owned land that the realigned Ewen Street was built upon between 2012 and 2014, to the Crown. This subdivision has most of Lakides Lane being ceded to the Crown, and widened by 0.72 metres where abutting Proposed Lot 100. The subdivision will additionally amalgamate the Deltaview Pty Ltd landholdings located south of Ewen Street into one lot, and cede some City owned land into the Ewen Street Public Road reserve. The draft Deposited Plan submitted with the application, Deposited Plan 64022 version 7, obtained final endorsement from the Western Australian Planning Commission on 3 October 2025. The subdivision of the land has not yet proceeded to the new Titles being issued.

PLANNING ASSESSMENT:

PLANNING FRAMEWORK	
Region Scheme	Metropolitan Region Scheme (MRS)
Region Scheme - Zone/Reserve	Central City Area zone Urban zone Other Regional Roads reservation
Local Planning Scheme	City of Stirling Local Planning Scheme No. 3 (LPS3)
Local Planning Scheme - Zone	Development zone No zone
Structure Plan/Precinct Plan	Not Applicable: the Stirling City Centre Activity Centre Plan is a draft document
Lot Size	Proposed Lot 100: 10,901m^2 Proposed Lot 105: 92m^2 Lot 12, House Number 365 Scarborough Beach Road: 2,108m^2
Existing Land Use	Proposed Lot 100: Vacant land, except for the shared vehicle access with Lot 12 and

	the high voltage power pole. Proposed Lot 105: Constructed laneway and vacant land. Lot 12, House Number 365 Scarborough Beach Road: Service Station.
Heritage Status	☒ N/A ☐ State Register of Heritage Places ☐ Local Heritage List ☐ Local Heritage Area
Bushfire Prone Area	No

LEGISLATION

The following legislation is applicable to the proposed development.

Legislation

- Planning and Development Act 2005
- Planning and Development (Development Assessment Panels) Regulations 2011
- Planning and Development (Local Planning Schemes) Regulations 2015
- Metropolitan Region Scheme (MRS)
- City of Stirling Local Planning Scheme No. 3 (LPS3)
- Draft City of Stirling Local Planning Scheme No. 4 (LPS4)

State Government Policies

- State Planning Policy 4.2 – Activity Centres (SPP 4.2)
- State Planning Policy 5.4 – Road and Rail Noise (SPP 5.4)
- State Planning Policy 7.0 – Design of the Built Environment (SPP 7.0)
- Development Control Policy 5.1 – Regional Roads (Vehicular Access) (DC 5.1)

Local Planning Strategy

- City of Stirling Local Planning Strategy

Structure Plans/Activity Centre Plans

No approved Structure Plans apply to the subject site. The previous Stirling City Centre Structure Plan did not proceed beyond draft form, as although Council approved that document in December 2014, it did not obtain the final approval required from the Western Australian Planning Commission (WAPC).

Local Policies

- Local Planning Policy 4.2 – Mixed Use Design Guidelines (LPP 4.2)
- Local Planning Policy 5.8 – Stirling City Centre Parking (LPP 5.8)
- Local Planning Policy 6.1 – Advertising Signs (LPP 6.1)
- Local Planning Policy 6.3 – Bin Storage Areas (LPP 6.3)

- Local Planning Policy 6.5 – Developments and Subdivisions Abutting Rights of Way (LPP 6.5)
- Local Planning Policy 6.6 – Trees and Landscaping – Non-Residential (LPP 6.6)
- Local Planning Policy 6.7 – Parking and Access (LPP 6.7)
- Local Planning Policy 6.12 – Public Art on Private Land (LPP 6.12)
- Local Planning Policy 6.18 – Public Consultation (LPP 6.18)
- Stirling City Centre Southern Precinct Local Development Plan (LDP)

KEY CONSIDERATIONS

The following matters have been identified as key considerations in the assessment of this application:

1. Proposed Land Uses
2. Provision of Residential Development
3. Primary Planning Controls (Built Form)
4. Parking, Traffic and Access

1. Proposed Land Uses

LPS3 Clauses 6.11.9 and 6.11.10 - Land Use Permissibility		
LAND USE	**USE CLASS**	
Recreation - Private	P	The use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme.
Restaurant	P	The use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme.
Shop	P and P*	The use is permitted by the Scheme only providing the use complies with the relevant development standards and the requirements of the Scheme. The single asterisk (*) refers to the following note under the zoning table: Maximum net lettable area of 1,000m^2.
Service Station	The Service Station is an existing use / development.	

The Stirling City Centre Special Control Area has distinct land use permissibility controls. Each sub-precinct in the Special Control Area is assigned one or more supported Land Use Categories in LPS3, in a three-dimensional configuration, by distinguishing between the ground floor of the development (Ground Building Storey) and all storeys above the ground storey (Upper Building Storey). A Land Use Category is the equivalent of zoning within the Special Control Area.

On the ground floor level of the development, LPS3 assigns the subject site the Business and Mixed Use Land Use Categories. The proposed Recreation - Private and Restaurant uses are ‘P’ uses in both Land Use categories, and the proposed Shop use is a ‘P’ use in the Business Land Use Category and a ‘P*’ use in the Mixed Use Land Use Category. The ‘P’ uses are permitted by LPS3 on the subject site.

The proposed Recreation - Private use, located in the 'T10' tenancy, and Restaurant use, located in the 'T05' and 'T06' tenancies, are permitted uses and the development complies with LPS3, and accordingly are recommended for approval.

The proposed development has eight Shop tenancies, that being 'T00', 'T01', 'T02', 'T03', 'T04', 'T07', 'T08' and 'T09'. LPS3 contemplates Shop as a permissible use on the subject site, subject to the accompanying note underneath Table 6.11.9. The note permits the Shop use in the Mixed Use Land Use Category subject to a maximum 1,000m^2 net lettable area.

The 'T00' Shop tenancy exceeds 1,000m^2 net lettable area, at 3,776m^2 prior to the fit-out of the tenancy. No other individual Shop tenancies exceed 1,000m^2. Based upon the corresponding zoning table in the draft Structure Plan, the note should be applied to each individual Shop tenancy rather than the cumulative Shop use area on the subject site.

The adopted LPS3 and LDP does not articulate the purpose of the 1,000m^2 net lettable area note, though its intent can be derived from the draft Structure Plan prepared for the Stirling City Centre. In the draft Structure Plan, the major roads such as Scarborough Beach Road, Ellen Stirling Boulevard and Stephenson Avenue are identified as "active streets". One of the objectives of the Mixed Use Land Use Category areas is to facilitate smaller retail establishments outside of the "active streets", in which the 1,000m^2 net lettable area note on land use permissibility provides a pathway to focus the location of the large-format retail stores such as supermarkets and department stores on the "active streets", whilst still permitting smaller retail tenancies in other areas.

The development is not undermining the purpose of the 1,000m^2 net lettable area note. The development provides direct pedestrian and vehicle access from its Scarborough Beach Road frontage and accordingly the provision of a large-format Shop tenancy is contributing towards the desired activation of Scarborough Beach Road.

The provision of a large-format Shop tenancy on the subject site does not detract from the amenity or integrity of the area and demonstrates consistency with the objectives of the Development zone applicable under LPS3. The provision of a large-format Shop tenancy on the subject site aligns with the objectives of the Stirling City Centre Special Control Area under LPS3, as it provides economic development and the location is use coordinated with the transit corridor on Scarborough Beach Road.

The approval of a large-format Shop tenancy on the subject site can be contemplated within the application of Clauses 6.11.9 and 6.11.10 of LPS3, on the following basis:

- The Shop use is both a 'P' and a "P*' use on the subject site, due to two Land Use categories being assigned to this land. Clause 6.11.9 bA) of LPS3 addresses multiple Land Use Categories applying on a particular storey and the use class permissibility contradicting each other. Of relevance to this application, the 'P' use of the Business Land Use Category will prevail as "*"P" uses shall prevail over all other permissibility*".

- Based upon the LDP, which provides further detail of the intended boundaries of each Land Use Category in a three-dimensional configuration in Figures 4A and 20-22, while the 'T00' Shop tenancy is partially within the minimum 8.0 metres deep

Mixed Use Land Use Category area shown in the LDP, the floor area within this portion of the site does not 1,000m^2.

The approval of a large-format Shop tenancy on the subject site is consistent with orderly and proper planning. The development is in an Activity Centre and on an activity corridor. Various commercial developments including some large-format retail stores already front this section of Scarborough Beach Road, Innaloo that incorporates the subject site.

Despite the Shop use exceeding the nominated net lettable area size restriction, the proposal advances the role of the Stirling City Centre and therefore warrants approval on planning merits.

2. Provision of Residential Development

Clause 6.11.11 of LPS3 requires land identified as Mandatory Residential to provide a residential component. Subclause a) states as follows:

"a) An application for planning approval for a new development for land that is identified as requiring Mandatory Residential in a WAPC approved Activity Centre Plan and/or an approved Local Development Plan shall contain a residential component to the satisfaction of the City of Stirling."

In accordance with Clause 6.11.3 b) of LPS3, the power conferred by Clause 5.5.1 of LPS3, which provides the City, or Metro Inner DAP in this instance, an ability to approve a development that does not comply with a standard or requirement of LPS3, shall not apply to Clause 6.11.11 a) for substantial development.

There is no map in LPS3 that identifies Mandatory Residential areas. There is no approved Structure Plan or Activity Centre Plan in operation for the Stirling City Centre. The approved LDP effectively has a Mandatory Residential requirement but uses different terminology.

Clause 2.1.2.3 Minimum Number of Dwellings of the LDP identifies a minimum number of dwellings for each street block and provides a formula to calculate the minimum requirement for each lot. For the subject site, the LDP requires a minimum of 61 dwellings, using the combined area of proposed Lots 100 and 105. The stated objective of this provision is "*To achieve the dwelling targets outlined in the Stirling City Centre Structure Plan*".

The proposed development does not contain a residential component and has not been accommodated on another lot via Clause 6.11.11 c) of LPS3. The development does not comply with the LDP requirement. Accordingly, the proposal could be perceived to conflict with the Mandatory Residential requirement of LPS3, though the development is capable of being approved without the provision of a residential component.

Notwithstanding Clauses 6.11.3 and 6.11.11 of LPS3 above, there is an ability to approve this development without a residential component, as LPS3 is not consistent with the deemed provisions for local planning schemes in this instance. As per section 257B(3) of the *Planning and Development Act 2005*, if a deemed provision that has effect as part of a local planning scheme is inconsistent with another provision of the

scheme, the deemed provision prevails and the other provision is to the extent of the inconsistency of no effect. As per Schedule 2 Clause 56(1) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the decision-maker must have due regard to, but is not bound by, the approved local development plan when deciding the application.

Accordingly, the LDP provisions cannot be applied as part of LPS3 and be subject to the strict limitations of the exercise of discretion imposed by Clause 6.11.3 b) of LPS3. The minimum number of dwellings required needs to be assessed in the same manner as any other LDP provision.

The Metro Inner DAP should have due regard to the LDP in determining whether a residential component should be required and accordingly whether the application should be approved without the provision of a residential component.

The City supports the proposed development without the inclusion of residential component in this instance, for the following reasons:

- Draft LPS4 is not retaining the existing LPS3 Clause 6.11 Stirling City Centre Special Control Area provisions, including the Mandatory Residential requirement. Draft LPS4 would therefore permit a commercial only proposal on the subject site. Draft LPS4 is a seriously entertained planning proposal, and some weight can be given to the new scheme provisions when determining the application.

- The existing context of this section of Scarborough Beach Road is acknowledged to pose amenity impacts that affect the desirability of this location for residential purposes. The traffic noise level from Scarborough Beach Road is Exposure Category D under State Planning Policy 5.4 Road and Rail Noise, which could affect the desirability of balconies and the utilisation of natural ventilation. The subject site is located on a busy intersection, and the road design, including the six lanes width of Scarborough Beach Road, and volume of traffic, presents a physical barrier for pedestrian walkability. The adjacent 24-hour operating Service Station poses potential impacts such as excessive fuel fumes, and light and noise impacts at night.

- The proposed development provides additional commercial uses in the Stirling Activity Centre and the activation of the subject site, providing enhanced amenity to the precinct and for the community. The development is providing active uses at ground level including retail and hospitality tenancies, and provides enhancements to the pedestrian environment on Scarborough Beach Road adjacent to the subject site, such through additional passive surveillance of the street and weather protection of the footpath. The subject site is a large parcel on land on a main road and a commercial strip, and has remained as a vacant sandy site providing no amenity, since Scarborough Beach Road was realigned in the late 1990s, the previous buildings were demolished in 2009, and Ewen Street was realigned in 2013.

- The prepared Stirling City Centre planning framework, including LPS3, is representative of a desired long-term outcome for the development of this Strategic Metropolitan Centre. There are ample opportunities on other properties in the Stirling City Centre area to provide additional residential dwellings, through both the existing residential and commercial areas. It is acknowledged that the strategic

planning work undertaken for the Stirling City Centre predates the Council's adoption of the draft Structure Plan in December 2014 and the ongoing inclusion of mandatory residential provisions requires further review by City. The absence of residential development on the subject site does not affect the ability for the Stirling City Centre to accommodate population growth and consolidate housing over time within this Strategic Metropolitan Centre.

- Single Houses and Grouped Dwellings are 'X' prohibited uses on the Ground Floor level under Clauses 6.11.9 and 6.111.10 of LPS3, effectively requiring residential uses to be provided in Multiple Dwelling form. The City acknowledges there are financial feasibility restrictions such as the higher construction costs for apartments that are unlikely to result in an apartment building being built on the subject site for the foreseeable future.

Accordingly, it is recommended that the Minimum Number of Dwellings provision of the LDP be waived, the Mandatory Residential requirement not be triggered, and the development be approved without the provision of a residential component.

3. Primary Planning Controls (Built Form)

The table below provides a summary of the City's assessment of the key elements relevant to design aspects:

Element	Provisions	Proposed
Building Height	LDP: • Between zero and eight storeys permitted, varying across the site in accordance with Figure 12 of the LDP.	• Proposed building height of one storey, plus the roof-top parking level. o Maximum 12.9m building height above ground level (the highest point of the roof-top plant deck). o Includes construction of the building and roof-top parking level within the 3m depth 0 storeys area from the southern boundary to Ewen Street. **Discretion Sought**
Street Setbacks	LDP: • The minimum setbacks vary across the site based upon the height of the development and the location, in accordance with Figure 12 of the LDP, including: o Nil setbacks permitted to Scarborough Beach Road and the eastern boundary to Ewen	• Proposed nil setback to Scarborough Beach Road. • Proposed nil setback to the eastern boundary to Ewen Street. • Proposed minimum nil setback to the southern boundary to Ewen Street. • Proposed minimum 9.7m setback to proposed Lakides Lane boundary.

Element	Provisions	Proposed
	Street, up to two storeys in height. o Minimum 3m setback required to the southern boundaries to Ewen Street, up to two storeys in height. LPP6.5: • Setbacks from Lakides Lane: o Minimum 2m at ground floor level. o Minimum 3m at upper storey level.	**Discretion Sought**
Side and Rear Setbacks	LDP: • Minimum 6m setback to the western lot boundaries permitted.	• Proposed minimum 5.5m setback to the western lot boundaries. **Discretion Sought**

The proposed development satisfies the primary planning controls of the City's planning framework, except where the building is proposed within the 3m street setback area to the southern boundary to Ewen Street and within 6m of the western lot boundary. Comments on variations to the provisions relating to the City's planning framework are provided within Attachment 6 to this RAR.

4. Parking, Traffic and Access

4a. Car Parking

The table below provides a summary of the city's car parking assessment in relation to the car parking provisions of LPS3 and LPP5.8 applicable to this proposal:

LPS3 Table 6.11.7		
Scheme Rate	**Non-Residential Floorspace**	**Bays Required**
• Maximum 2.5 bays per 100m^2 of non-residential floorspace. • Minimum 1.25 Public Parking bays per 100m^2 of non-residential floorspace. • Minimum Short Stay Parking: 60%.	6,963m^2	• Maximum 174 car parking bays. • Minimum 87 Public Parking bays with 60% Short Stay Parking bays.
	Total Provided Onsite:	165

LPS3 Table 6.11.7		
Scheme Rate	**Non-Residential Floorspace**	**Bays Required**
		All bays are capable of being Public Parking bays.
	Total Excess / Shortfall:	Nil – Compliant
* All parking requirements for non-residential development are to be calculated by rounding to the nearest whole number. in the case of exactly 0.5, the requirement for non-residential development shall be rounded down. (Clause 4.1 of LPP 5.8)		

The proposed number of car parking bays is compliant with LPS3. A condition is recommended to ensure the car park includes the minimum number of Public Parking and Short Stay Parking bays as defined by LPS3.

4b. Traffic and Access

The submitted Transport Impact Assessment (TIA) estimates the proposed development will generate a total of 3,843 vehicle trips per day, with 422 vehicle trips (211 trips in and out) in the weekday peak hour between 4.00pm and 5.00pm and 474 vehicle trips (237 trips in and out) in the weekend peak hour between 12noon and 1.00pm.

The TIA estimates that 54% of trips are related to people specifically driving to and from the development ("primary trips") while the remaining 46% of trips are related to people that would have already been driving past the subject site ("passing trade"). The TIA estimates that the net increase, accounting for the primary trade trips only, is a total of 2,075 vehicle trips per day, with 228 vehicle trips (114 trips in and out) in the weekday peak hour between 4.00pm and 5.00pm and 256 vehicle trips (128 trips in and out) in the weekend peak hour between 12noon and 1.00pm.

The TIA estimates that 52% of vehicles will enter and exit the site from the Scarborough Beach Road crossover in the in the weekday peak hour between 4.00pm and 5.00pm and the weekend peak hour between 12noon and 1.00pm. The remaining 48% of vehicles would enter and exit from Ewen Street during these peak hours.

The Department of Planning, Lands and Heritage (DPLH) did not raise any traffic volume concerns from a regional roads context (Scarborough Beach Road).

The City is satisfied that the road network is capable of accommodating the additional traffic generated by the proposal.

Since the application was originally submitted, the applicant revised the design of the vehicle access to and from Scarborough Beach Road, including the inclusion of a deceleration lane into the site, to address safety concerns identified with the original design. The City and DPLH are satisfied the current proposal is appropriately designed to mitigate vehicle collisions, and provide refuge for pedestrians crossing to access point.

A Road Safety Audit dated 25 May 2026 has been submitted with the application, contained in Attachment 6d, which assesses potential road safety risks and suggests measures to eliminate or mitigate risks. The Road Safety Audit has identified some hazards with the existing road conditions adjacent to the subject site and identified

some matters for further review in the detailed design of the access for the development. The matters identified in the Road Safety Audit can be adequately addressed through condition setting.

The proposed configuration of the vehicle access to the proposed commercial development from Scarborough Beach Road has necessitated the application to include the installation of a new eastern crossover for the Service Station and related minor works to remove a retaining wall and reposition a fuel signage board. Hence, Lot 12 House Number 365 Scarborough Beach Road forms part of this application. The new Service Station crossover maintains suitably designed vehicle access and movements to and within the Service Station site by vehicle and fuel tankers. The works on the Service Station site are recommended for approval, subject to the conditions contained in the Responsible Authority Recommendation.

CONSULTATION:

PUBLIC CONSULTATION

The proposed development was advertised for a period of 28 days in accordance with the 'Complex Application' requirements of Schedule 2 Clause 64(3) and (6)(a) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

The consultation period commenced on 31 October 2025 and concluded on 29 November 2025. During the consultation period a total of 39 submissions were received comprising 16 objections, 14 in support and nine requesting changes. The submissions received during the consultation period and their relative locations are tabled below.

Public Consultation Submissions Received				
	Within 100m Radius of Proposed Site (Proposed Lot 100)	**Within 200m Radius of Proposed Site (Proposed Lot 100)**	**Within the City of Stirling**	**Outside the City of Stirling**
Support	0 (0.0%)	4 (10.3%)	10 (25.6%)	0 (0.0%)
Object	1 (2.6%)	3 (7.7%)	12 (30.8%)	0 (0.0%)
Changes Requested	1 (2.6%)	1 (2.6%)	7 (17.9%)	0 (0.0%)
Other (Comment)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

All matters raised in submissions received during the advertising period have been summarised in the table below. Also provided is the number of submissions in which the matter was raised, and the City's response to the matter.

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
16	The subject site has been vacant and visually unattractive for many years. The development will be a visual improvement to the area. Some of these submissions also referred to the subject site having a useful purpose will provide amenity to the community.	Aerial mapping indicates the bulk of the site has remained vacant since Scarborough Beach Road was realigned in the late 1990s, with the previous buildings on the site demolished in 2009. The City supports vacant sites being developed, particularly with Activity Centres, subject to the proposal satisfying the applicable planning framework.
15	The proposed development will cause additional traffic congestion in the surrounding streets.	The traffic impacts of the development are discussed further in the Planning Assessment section.
12	The development does not include any residential component. Seven submissions identified this matter as a negative outcome, including reference to housing affordability and availability in the area and conflicts with the City's planning framework. Five submissions identified this matter as a positive outcome, including reference to being an unsuitable location on a busy road, greater long-term redevelopment flexibility, reduced traffic impacts and avoiding adverse impacts from a potential apartment building such as height, privacy and overshadowing.	The LPS3 and LDP provisions relating to the provision of a residential component are discussed further in the Planning Assessment section. The City had received a mixed-use proposal including two apartment towers on the subject site in 2022. That application was advertised for public comment, though was withdrawn by the Applicant before a decision was made. This application is required to be assessed on its own merits and not in comparison to the previous proposal.
10	The provision of additional retail and hospitality businesses is not needed, as the local area has sufficient business. This includes reference to the neighbouring commercial sites in Innaloo and other centres, the	The proposed uses are all permitted on the subject site by LPS3. This site is within a Strategic Metropolitan Centre, the second tier in the Activity Centres hierarchy for the Perth metropolitan area. The proposal

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
	viability of the existing and new businesses due to increased competition and the presence of existing vacant and underutilised spaces in the area.	does not meet the minimum 10,000m^2 floorspace threshold to require a Net Benefit Test under SPP4.2. The purpose behind the Shop net lettable area restriction in LPS3 relates to locating large-format tenancies on specific busier streets within the centre, rather than a restriction of the development of the Shop use within the Stirling City Centre overall. The potential loss of any community service or benefit that may result from economic competition between new and existing businesses is not a consideration for development applications, as per Schedule 2 Clause 67(2)(v) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.
8	The provision of additional retail and hospitality businesses improves the amenity of the local area. This includes addressing local needs and increasing the capacity of and access to shopping options in a busy commercial area.	The proposed uses are all permitted on the subject site by LPS3. The development presents an opportunity for new businesses to operate in the local area.
7	The proposed landscape design is not supported. This includes three objections to the proposal based upon the inadequate provision of landscaping and tree canopy on the site. Three submissions generally supportive towards the development have requested the proposal incorporate changes to the landscaping including additional landscaping and tree canopy to improve the	The proposal provides landscaping through the outdoor pedestrian space between Scarborough Beach Road and Ewen Street, in the provided street setback area to the southern boundary to Ewen Street and adjacent to the south western lot boundary. The proposal has been considered against the LDP and LPP6.6 provisions and objectives, and the proposal is considered to demonstrate compliance.

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
	appearance, amenity and customer experience of the development and the streetscape, changes to the hardscape surfaces to address mobility concerns, such as for older people, and ensuring ongoing maintenance of the landscaping by the operator. One objecting submission supported inclusion of trees in the proposal.	
6	Some submitters support the design of the building as proposed, some submitters have requested changes and a submitter opposes the development on design grounds. Requested changes include modifications to the material finishes for aesthetic reasons, barriers to prevent access when businesses are closed and reductions to the building bulk. Objectives refer to planning provisions in LPS3, the LDP and draft Structure Plan including streetscape activation.	The design and appearance of the building has been considered against relevant provisions such as the Design Principles of SPP7.0. The proposal obtained supportive comments when last reviewed by the City's Design Review Panel. The City is satisfied the proposal is an acceptable design outcome in its context.
6	The proposed development will cause additional traffic safety risks to vehicles and pedestrians in the surrounding streets, due to increased traffic volumes and new access points. Some submitters have suggested changes to the roads and intersections near the site to reduce risks.	The traffic impacts of the development are discussed further in the Planning Assessment section.
5	Concerns about and objections to development due to the risks of the proposal facilitating anti-	The proposed land uses are all permitted on the subject site, the development is proposed within an existing commercial

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
	social behaviour on site and in surrounding areas. This includes reference to potential late night trading of the restaurants, public access to the car park at night, public use of the outdoor pedestrian laneway, an increased use of the pedestrian access way between Ewen Street and Hakea Road and gaps in the passive surveillance of the public areas in and around the development.	area, and these uses are already present on this section of Scarborough Beach Road on other sites. The development is not directly abutting existing residential uses, with the nearest residential properties located on the opposite side of Ewen Street, separated by a busy District Distributor B road. Notwithstanding, the operation of the tenancies and other spaces are subject to maximum noise requirements under other legislation. The development provides passive surveillance to Scarborough Beach Road and parts of Ewen Street, and within the outdoor pedestrian space on site. The presence of many passing vehicles and the car park access on the section of Ewen Street without direct outlook from the building will adequately compensate to provide passive surveillance.
4	Support the proposed height of the building, being single storey plus the roof top parking level, and not a high-rise proposal.	The development is largely compliant with the maximum heights permitted by the LDP, except where buildings are proposed within the zero storey / landscaping area within 3m of the southern boundary to Ewen Street. A minimum two storeys building height applies to this site in the LDP.
4	Objections based upon the noise impacts to surrounding residents from the use of the development and additional activity in the area, such as from	The subject site is in an existing commercial area and neighbouring residential properties should accordingly expect relatively more noise

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
	people, music, vehicles and mechanical equipment.	than those properties located further away. The development proposed is not directly abutting an existing residential use and is consistent with the existing context of this section of Scarborough Beach Road in terms of the proposed uses and intensity of commercial uses. Notwithstanding, the operation of the tenancies and other spaces are subject to maximum noise requirements under other legislation.
3	The development does not provide enough car parking bays to service the likely demand for car parking. This includes a concern regarding customers parking on residential verges on nearby streets.	Minimum and maximum car parking rates are prescribed by LPS3, as well as LPP5.8. The development is compliant. A maximum of 174 car parking bays are permitted and 165 on-site car parking bays are proposed as publicly accessible bays on the roof-top parking level. LPS3 does not permit discretion to be exercised to permit more car parking bays for non-residential uses to be provided than the maximum requirement.
2	A submission supporting the development being consistent with the development of the Stirling City Centre and a submission opposing the development due to conflicts with the strategic planning for the Stirling City Centre.	The City has assessed the proposal against the planning framework and is satisfied it demonstrates compliance with those requirements. The City has considered the proposal in the context of strategic planning undertaken for the Stirling City Centre and is satisfied it sufficiently aligns to recommend approval.

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
2	Request further details of the lighting of the street, the development and advertisements and light spill impacts on neighbouring residential properties.	The detailed lighting design is typically prepared as part of the building permit submission. The City is satisfied the details are not necessary at this stage of the development approval, and this matter can be appropriately addressed by condition setting.
2	The development should incorporate more sustainable design features. One submission states the proposal has not committed to, or clearly shown, any sustainability measures. Changes to improve the sustainability of the proposal are suggested. This includes the inclusion of solar panels, such as replacing the shade sails on the roof top car park with photovoltaic cells and provide free charging infrastructure to customers during daylight hours, and on-site water capture and re-use such as for landscaping, toilets or cleaning of pavements.	There are no requirements in place that require specific sustainable design elements to be provided or sustainability rating to be achieved, beyond standard practice such as the Building Codes. At a high-level, the City has had regard to the relevant Design Principles of SPP7.0 and is satisfied the development adequately addresses the policy.
2	A submission supports vehicle access for trucks being limited to Scarborough Beach Road. A submission does not support the vehicle access on Scarborough Beach Road due to proximity to the traffic lights and Service Station vehicle access.	The Scarborough Beach Road access provides truck access to the 'T00' Shop tenancy, while delivery vehicles for the smaller sized tenancies can utilise the loading areas on Ewen Street. Since the proposal was advertised, the plans have been revised to include the deceleration lane on Scarborough Beach Road for access into the carpark and 'T00' tenancy's service area, to

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
		address safety concerns raised from the original submission.
1	Insufficient public consultation time provided to review the documents given the scale and potential impact of the proposal.	The proposal has been advertised for 28 days in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*.
1	Supports the development as it will create additional employment opportunities during construction and operation and support the local economy.	The development is consistent with objective g) of the Stirling City Centre Special Control Area that states: "To ensure the development of a range of commercial uses that will contribute towards economic development, local employment and the viability of the area as a commercial centre servicing residents, visitors and the local workforce".
1	Concerns that infrastructure such as sewerage, stormwater and waste collection can accommodate the demands of the development.	The Water Corporation has provided advice regarding their servicing of the development. Stormwater will need to be disposed on site. Waste disposal will need to operate in line with the Waste Management Plan.
1	An approval should be conditional on the site being amalgamated and the current alignment of Ewen Street being a public road.	The subject site has been part of a subdivision proposal that consolidated land and realigned Ewen Street, though the associated Deposited Plan has not yet obtained final registration from Landgate. The proposal does not align with the existing lot boundaries and land tenure, and this matter will need to be resolved. This matter is appropriate to be addressed as a planning condition.
1	The T00 Shop tenancy conflicts with the land use permissibility in LPS3, as its net lettable area exceeds 1,000m^2, in reference to Table 6.11.9.	This matter is discussed further in the discussed further in the Planning Assessment section.

Public Consultation Submissions		
Number of Submissions to Raise Matter	**Submission Comment**	**Officer Comment**
1	Suggests the inclusion of an open food court style licensed area, to provide a hub for people to connect, and better use of the roof-top, such as sporting activities.	Noted.
1	Further consideration to how pedestrians will access the site from Scarborough Beach Road, noting traffic presents difficulties crossing from the northern side of the side.	The Scarborough Beach Road and Ewen Street / Odin Road intersection is adjacent to the subject site and has traffic light signals and three pedestrian crossings. Pedestrians can directly enter the outdoor space to reach the commercial tenancies from the Scarborough Beach Road southern side footpath.
1	Does not support the provision of on-street parking on Ewen Street.	The development provides three on-street parking bays on Ewen Street, plus the loading bay (which potentially could be sign posted to allow car parking at specific times). The on-street parking is beneficial for the development, it does not adversely affect the amenity of the streetscape and would have little traffic impact to Ewen Street.
1	Request to provide quality retail and hospitality businesses to complement existing businesses and refrain from including fast food and drive through outlets.	The proposed uses are permitted on the subject site. Any business that aligns with the approved use of a site/tenancy is permitted to operate in that location.

At the conclusion of public consultation, the City provided the Applicant with copies of submissions received during public consultation, to provide the Applicant an opportunity to address the matters raised. The Applicant's response to the submissions is contained in Attachment 6b.

REFERRALS/CONSULTATION WITH GOVERNMENT/SERVICE AGENCIES

The proposed development was referred to the following:

- Department of Planning, Lands and Heritage;
- Department of Water and Environmental Regulation;
- Water Corporation; and
- Western Power.

Following the revised submission including technical documents, in principle, no objections to the development proposal were received by the City, with the relevant responses incorporated into the recommended conditions of approval and advice notes. A summary of the responses is contained below.

Department of Planning, Lands and Heritage (DPLH)

The application was referred to DPLH for comment as the subject site abuts and is affected by the Other Regional Roads reservation for Scarborough Beach Road under the Metropolitan Region Scheme.

The initial responses identified safety concerns with the vehicle access arrangements on Scarborough Beach Road.

Revised plans were subsequently submitted by the applicant, including a redesign of the vehicle access to and from Scarborough Beach Road and the introduction of a deceleration lane. The final response, which relates to latest set of plans, raised no objection to the proposal.

The referral responses provided by DPLH is in Attachment 8a.

Department of Water and Environmental Regulation (DWER)

The application was referred to DWER for comment as Lots 66 (Lakides Lane) and 12 (House Number 365 Scarborough Beach Road) are registered as contaminated sites in accordance with the *Contaminated Sites Act 2003*.

DWER advises that the contamination relates to a hydrocarbon plume beneath Lot 12 that extends in a south-westerly direction. Petroleum hydrocarbons are present in the groundwater at concentrations exceeding the relevant guidelines values for non-potable uses (refers to non-drinking water that is not for human consumption).

DWER advises that the site is considered suitable for the proposed commercial development and has no objection to the proposed development.

DWER has recommended that the following advice note be applied to any approval granted:

> Due to the nature and extent of groundwater contamination beneath Lots 12 and 66, the abstraction of groundwater for any purpose is not recommended. Lots 12 and 66 are to be managed in accordance with the Ongoing Site Management Plan as detailed in the document Ongoing Site Management Plan at the Caltex Doubleview Service Station (55486), 365 Scarborough Beach Road, Doubleview, WA 6108 (AECOM, October 2017).

The referral response provided by DWER is in Attachment 8b.

Water Corporation

The application was referred to the Water Corporation for comment as requested by the Water Corporation for DAP applications.

The Water Corporation advises that reticulated water and reticulated sewerage is available to the subject area, and that as their drainage system can only take predevelopment flows, the developer will need to compensate any additional flows on their own land.

The Water Corporation also provided advice regarding further approvals and construction works near their infrastructure.

The referral response provided by the Water Corporation is in Attachment 8c.

Western Power

The application was referred to Western Power for comment as there is existing Western Power infrastructure on the subject site.

Western Power advised that the existing transmission and distribution assets must remain accessible and compliant with clearance standards and cannot be enclosed within private property or obstructed by structures.

Western Power also provided advice regarding obtaining approval for relocation of assets.

The referral response provided by Western Power is in Attachment 8d.

DESIGN REVIEW PANEL ADVICE

The City's Design Review Panel (DRP) reviewed the proposed development on two occasions prior to the submission of the application, on 18 July 2024 and 24 October 2024. The DRP provided the following recommendation on the second pre-lodgement review:

> "The Panel is aware of the site's complex planning context and has advised that, despite the proposal's use and modest scale relative to the ambitions of relevant planning documents, it is reviewing the proposal on the basis that it is approvable.
>
> The Panel remains generally supportive of the proposal's design direction. The high-quality retail laneway in this location will serve the community well and is supported. The eastern half of the proposal considers the user and community member experience through the inclusion of sleeved speciality retail, good amenity for pedestrians along the north boundary, and the opening up of the supermarket to the public realm through extensive clear glazing, although some design mitigation is required to manage the removal of the deceleration lane.
>
> For the Southeastern corner, the Panel recommended further architectural integration to reduce reliance on fencing and strengthen its urban presence. The

Southwestern service zone could benefit from intensified landscaping to balance the limited activation.

The sustainability strategies presented are promising, though the Panel encouraged clearer commitments. In terms of aesthetics, the Panel advised a restrained approach to artwork and articulation to complement the architecture's sophistication."

The amended plans received on 29 April 2026 address the majority of the items raised by the DRP, in response to the relevant planning framework. As such, further consideration of the proposed development by the DRP was not undertaken. A summary of the revised submission against the 10 Design Principles is provided within Attachment 10.

OTHER ADVICE

Relevant advice has been obtained from within the City to formulate the assessment of this application and recommendation. This includes advice relating to the design of the vehicle access and movements, landscaping of the subject site and verges, waste collection and relevant environmental health legislation.

ALTERNATIVE TO RESPONSIBLE AUTHORITY RECOMMENDATION

The proposal is capable of being determined differently to the Responsible Authority Recommendation, should the Metro Inner DAP resolve to not support granting the discretion being sought, or otherwise disagree with the City's assessment.

The Metro Inner DAP should assess the application against the relevant considerations if an alternative resolution to the City's Responsible Authority Recommendation is being contemplated.

The relevant considerations when considering an alternative resolution include:

- The matters listed under Schedule 2 Clause 67 of the Planning and Development (Local Planning Schemes) Regulations 2015;
- The provisions of Clause 5.5 Variations to Site and Development Standards and Requirements of LPS3, when a part of the application that does not does not comply with a standard or requirement prescribed under LPS3, and the exercising of the power to approve the application despite the non-compliance, is being contemplated. Though, this power cannot be used to vary the Clause 6.11 Stirling City Centre Special Control Area provisions listed under Clause 6.11.3 b) of LPS3.
- Whether the relevant objectives of the relevant local development plan or local planning policy have been satisfied.

In the event the Metro Inner DAP disagreed with the City's assessment of:

- Clause 6.11.11 a) relating to the provision of a residential component, if the Metro Inner DAP determines this land is identified as requiring Mandatory Residential under LPS3; or
- The "* Maximum net lettable area of 1000m^2" note underneath Table 6.11.9, if the Metro Inner DAP determines the Shop use is not permitted;

A Without Prejudice Alternate to the Responsible Authority Recommendation is provided in Attachment 11.

CONCLUSION:

The proposed development has been assessed against the City's planning framework and is considered appropriate within its context. The City is satisfied the proposal addresses the planning framework applicable to this site and the discretionary aspects can be supported having regard to the relevant considerations, including the protection of amenity, safety considerations, and the objectives of the Stirling City Centre Special Control Area and the relevant LDP.

The proposal involves converting a large, underutilised parcel of land within a Strategic Metropolitan Activity Centre and on an Activity Corridor into an active commercial development, contributing to an improved amenity to the precinct through the use of the site and the built form, and presenting local employment and enhanced economic activity opportunities. The proposed development is of high-quality design fitting within its context, and it does not compromise traffic safety or parking supply.

The alterations to the Service Station site ensure the proposed commercial development can provide an appropriately design vehicle access arrangement from Scarborough Beach Road, whilst concurrently ensuring safe vehicle movements to the Service Station are retained.

The application is recommended for approved, subject to conditions.

ATTACHMENTS

1. Development Plans
2. Aerial Imagery
3. Metropolitan Region Scheme Zoning Map
4. City of Stirling Local Planning Scheme No. 3 Zoning Map
5. Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)
    a. Draft Deposited Plan 64022 approved by Western Australian Planning Commission
    b. Landscaping Plan
    c. Planning Control Area No. 166 Plan Number 1.7995
    d. Road Safety Assessment
    e. Waste Management Plan
6. Other Technical Documents (not listed in the Responsible Authority Recommendation)
    a. Additional Development Plans
    b. Applicant's Planning Report
    c. Acoustic Report
    d. Sustainability Strategy
    e. Swept Path Diagrams
    f. Transport Impact Assessment
7. Schedule of Public Submissions
8. External Referral Responses
    a. Department of Planning, Lands and Heritage
    b. Department of Water and Environmental Regulation

   c. Water Corporation
   d. Western Power
9. Design Review Panel Report
   a. 18 July 2024
   b. 24 October 2024
10. City of Stirling Planning Assessment
11. Without Prejudice Alternative to the Responsible Authority Recommendation

Attachment 1

Development Plans

City of Stirling
29 April 2026
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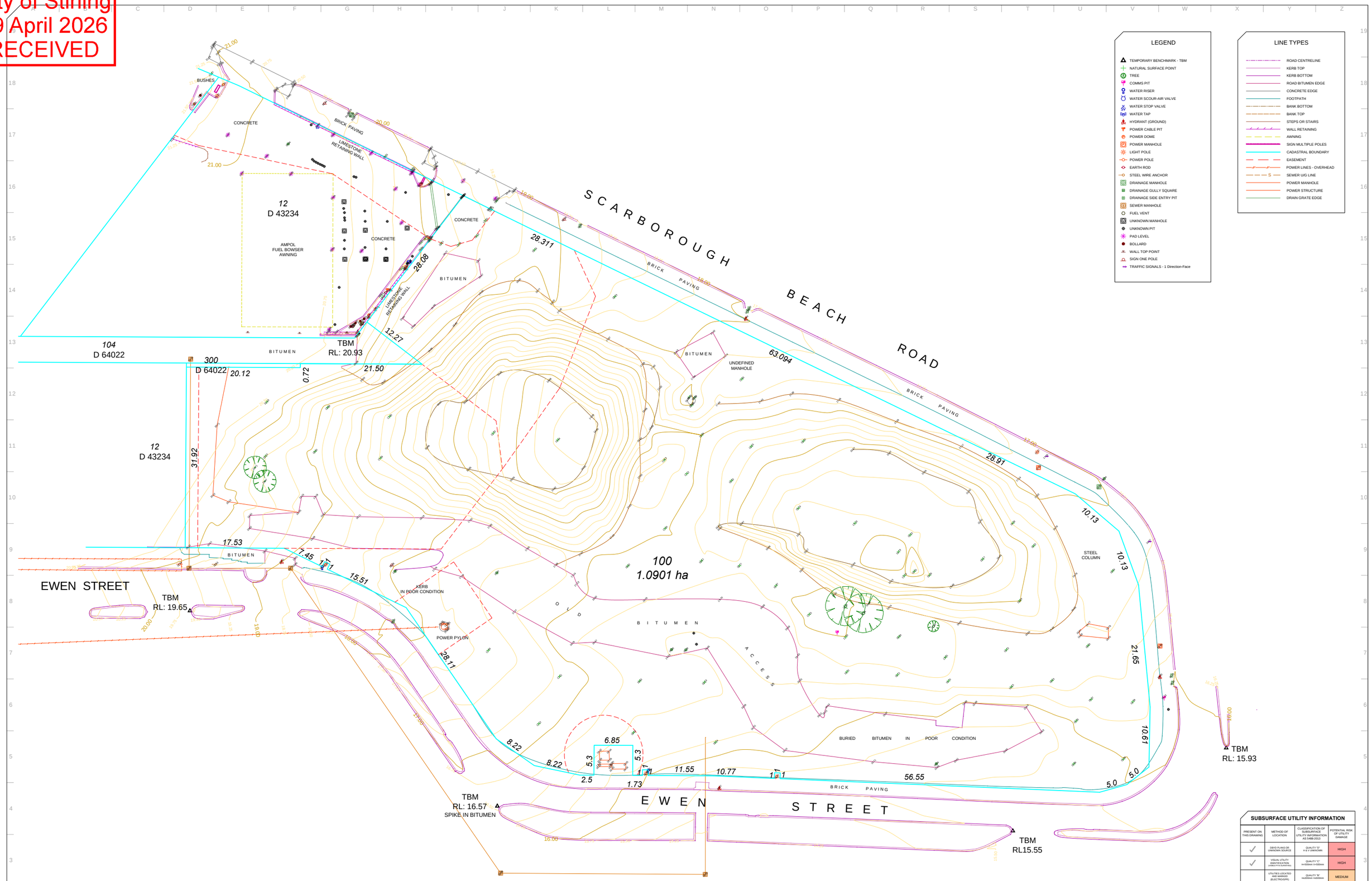

LEGEND

- TEMPORARY BENCHMARK - TBM
- NATURAL SURFACE POINT
- TREE
- COMMS PIT
- WATER RISER
- WATER SCOUR-AIR VALVE
- WATER STOP VALVE
- WATER TAP
- HYDRANT (GROUND)
- POWER CABLE PIT
- POWER DOME
- POWER MANHOLE
- LIGHT POLE
- POWER POLE
- EARTH ROD
- STEEL WIRE ANCHOR
- DRAINAGE MANHOLE
- DRAINAGE GULLY SQUARE
- DRAINAGE SIDE ENTRY PIT
- SEWER MANHOLE
- FUEL VENT
- UNKNOWN MANHOLE
- UNKNOWN PIT
- PAD LEVEL
- BOLLARD
- WALL TOP POINT
- SIGN ONE POLE
- TRAFFIC SIGNALS - 1 Direction-Face

LINE TYPES

- ROAD CENTRELINE
- KERB TOP
- KERB BOTTOM
- ROAD BITUMEN EDGE
- CONCRETE EDGE
- FOOTPATH
- BANK BOTTOM
- BANK TOP
- STEPS OR STAIRS
- WALL RETAINING
- AWNING
- SIGN MULTIPLE POLES
- CADASTRAL BOUNDARY
- EASEMENT
- POWER LINES - OVERHEAD
- SEWER U/G LINE
- POWER MANHOLE
- POWER STRUCTURE
- DRAIN GRATE EDGE

SUBSURFACE UTILITY INFORMATION

PRESENT ON THIS DRAWING	METHOD OF LOCATION	CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION AS 5488-2013	POTENTIAL RISK OF UTILITY DAMAGE
✓	DBYD PLANS OR UNKNOWN SOURCE	QUALITY "D" H & V UNKNOWN	HIGH
✓	VISUAL UTILITY IDENTIFICATION (VISIBLE PITS SURVEYED)	QUALITY "C" H=±500mm V=500mm	HIGH
	UTILITIES LOCATED BY ELECTROMAGNETIC (EM) TRACING	QUALITY "B" H=±250mm V=±250mm	MEDIUM
	UTILITIES POTHOLED, TRACED/SIGHTED OR SURVEYED AT INSTALLATION	QUALITY "A" H=±25mm V=±25mm	LOW

NOTE:
THIS DRAWING DOES NOT SHOW ALL SUBSURFACE UTILITIES. CURRENT DIAL BEFORE YOU DIG (DBYD) INFORMATION SHOULD BE OBTAINED AND DUE DILIGENCE EXCERCISED BEFORE COMMENCING ANY EXCAVATION WORKS.

NOTE:
THE BOUNDARIES SHOWN ON THIS PLAN WERE RE-ESTABLISHED AS PART OF THIS SURVEY.

RM SURVEYS
PHONE: 08 9457 7900
EMAIL: INFO@RMSURVEYS.COM.AU
WEBSITE: RMSURVEYS.COM.AU

Endorsed by

0 2 4 6 8 10 12 14 16 18 20 22 24
SCALE 1:300
ALL DISTANCES IN METRES
PAPER SIZE A1

SURVEYOR	VERTICAL DATUM
JT	AHD
SURVEY DATE	HORIZONTAL DATUM
27/06/2025	PCG94

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CLIENT:
WINDSOR KNIGHT PROPERTIES

REV	DESCRIPTION	DRN	CKD	APP	DATE
1	ADDITIONAL SURVEY - LOT 12 D43234	AC	JT	ZH	09/07/2025
0	INITIAL ISSUE	TL	KB	KB	16/09/2022

FEATURE AND CONTOUR SURVEY

LOT 100 on DP 64022
365 SCARBOROUGH BEACH ROAD
INNALOO

JOB No.	DRAWING No.	REV
WIND-EWEN	WIND-EWEN-DW-001	1

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Scale 1:1000 @ A3

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Boundary Information

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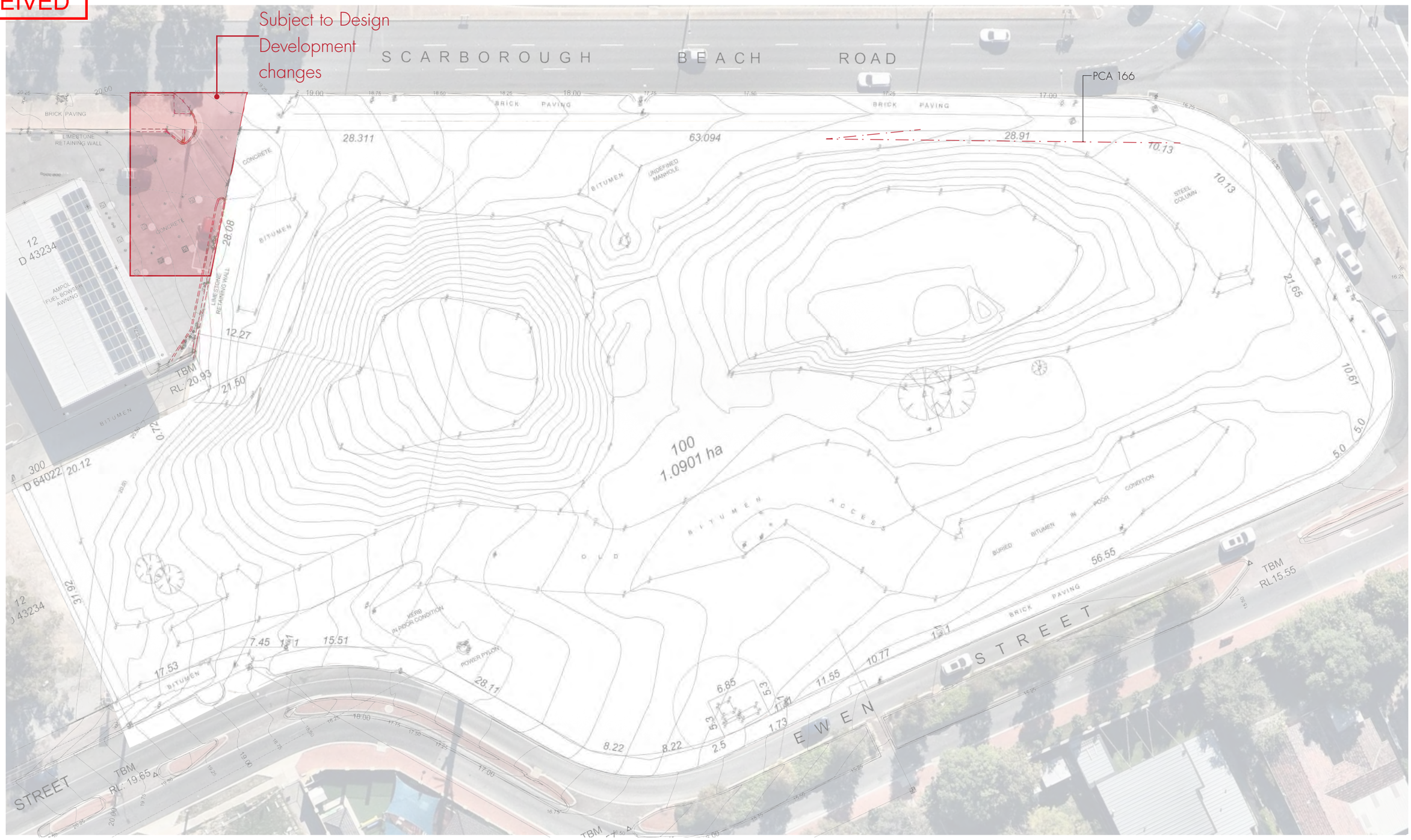

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Demolition Plan

Pg 5 Rev F

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Site Plan

Pg 6 Rev F

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Tenancies Site Plan

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Level 1 Plan

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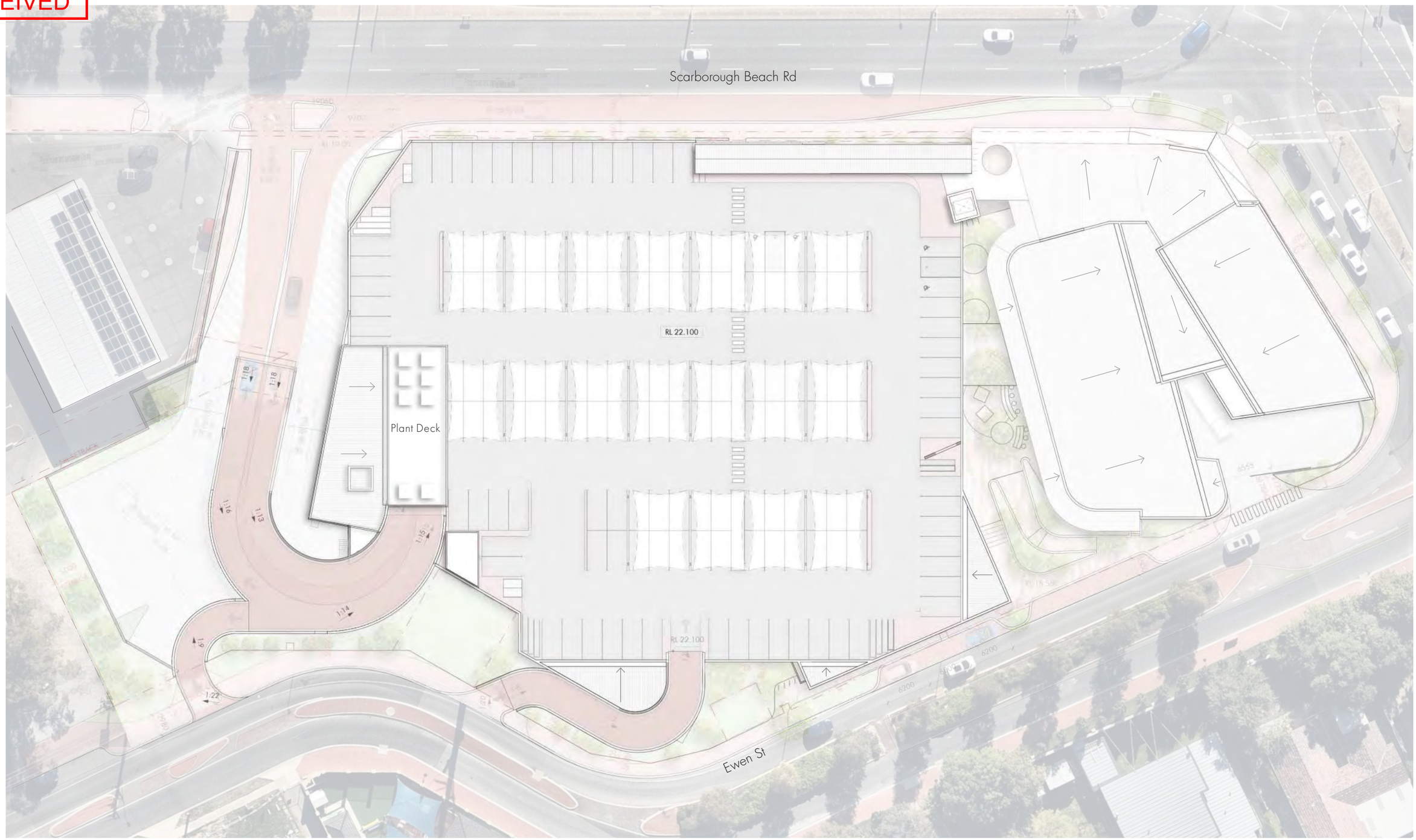

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Roof Plan

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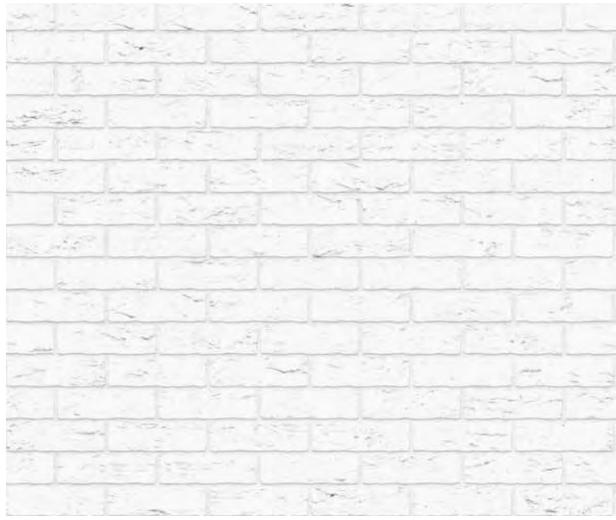

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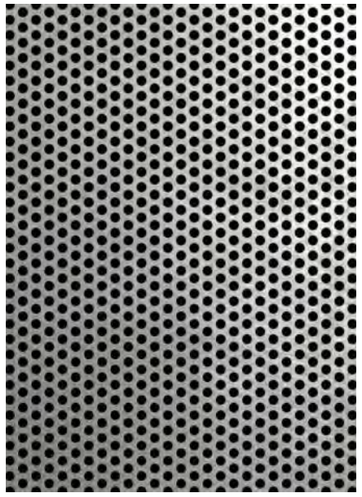

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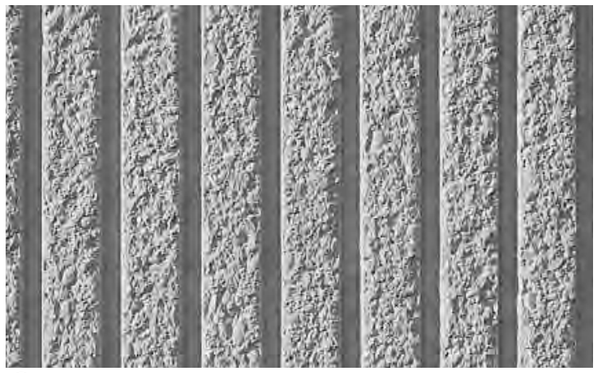

5.

6.

7.

Material Legend

1. Bronze Look Treatment
2. Textured concrete/Masonry
3. Substitute Timber Cladding
4. Perforated Metal
5. Patterned Concrete
6. Vertical Cladding
7. Featured Concrete Masonary

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North Elevation - A

North Elevation - B

North Elevation - C

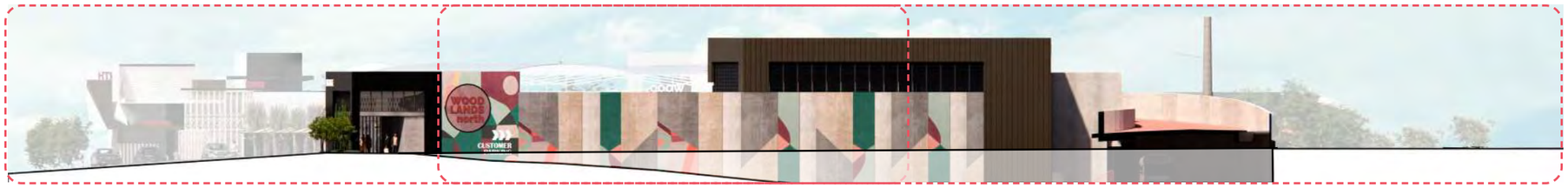
South Elevation - A

South Elevation - B

South Elevation - C

East Elevation - A

East Elevation - B



West Elevation - A

West Elevation - B

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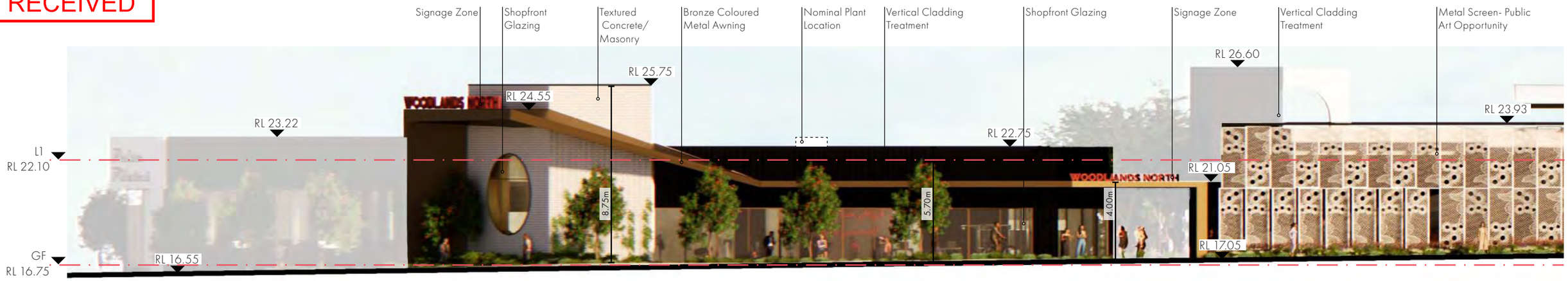
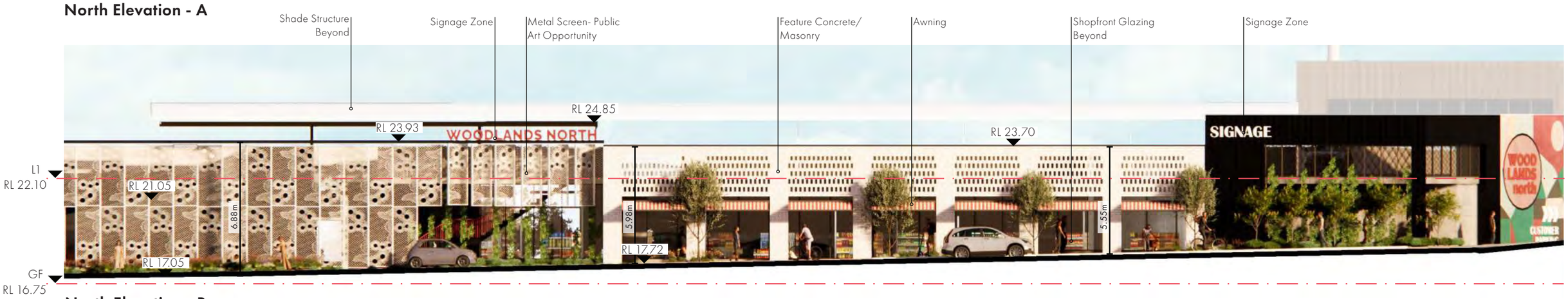
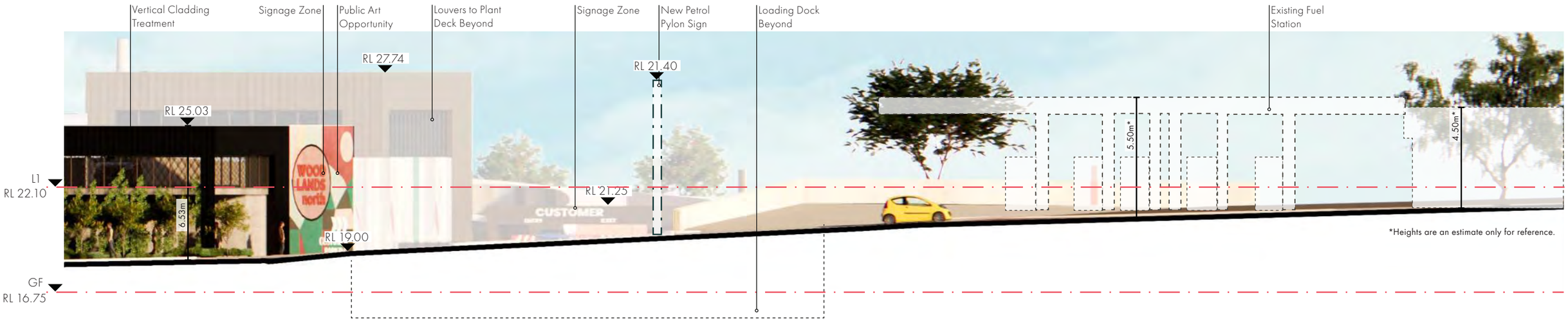


North Elevation - A



North Elevation - B



*Heights are an estimate only for reference.

North Elevation - C

Scale 1:200 @ A3

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North Elevations

Pg 14 Rev F

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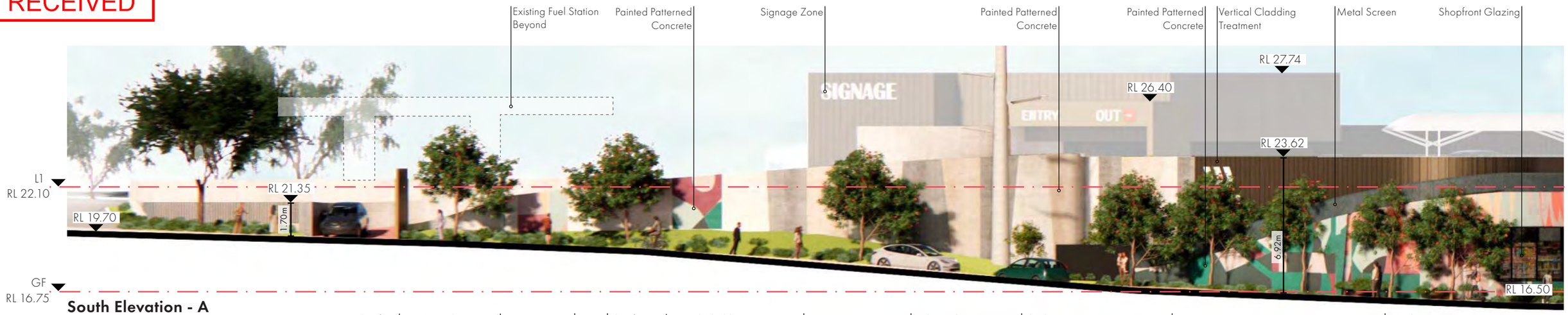
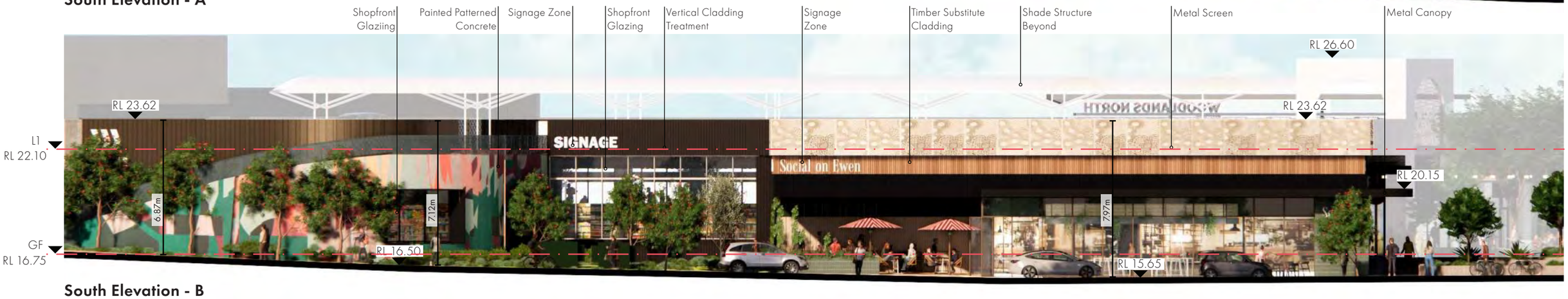
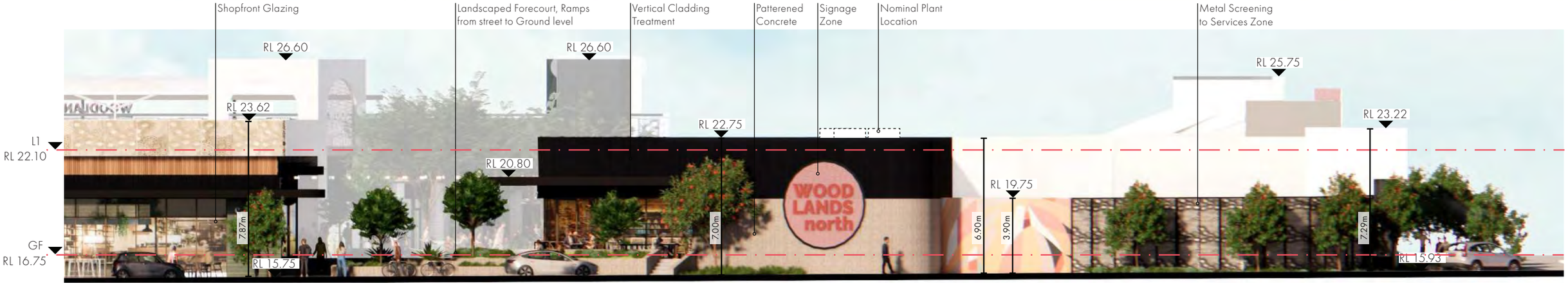


South Elevation - A



South Elevation - B



South Elevation - C

Scale 1:200 @ A3

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South Elevations

Pg 15 Rev F

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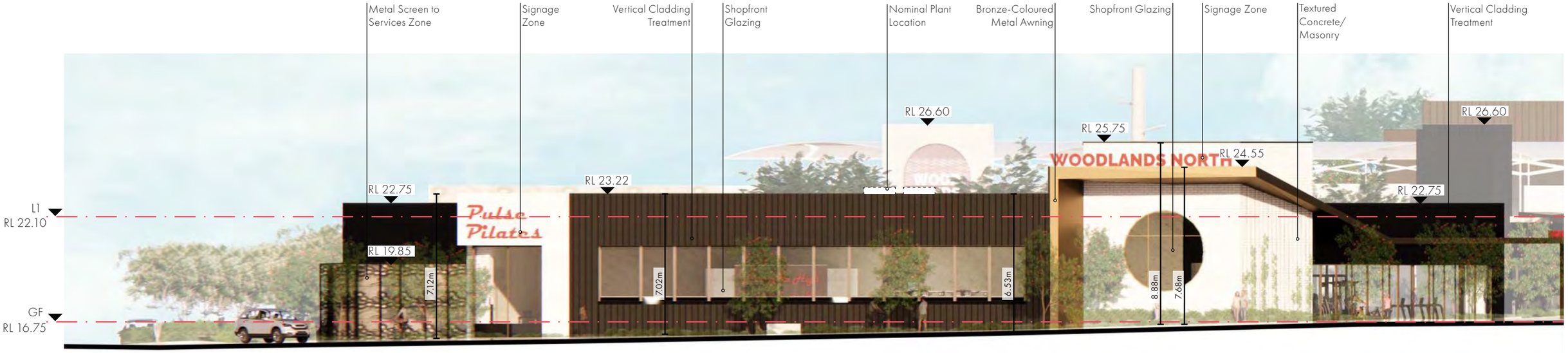
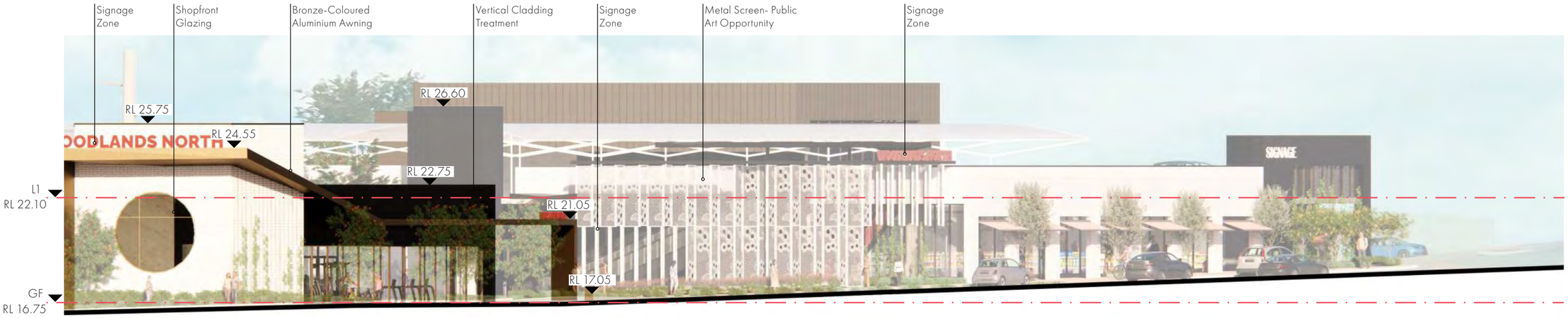


East Elevation - A



East Elevation - B

Scale 1:200 @ A3

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East Elevations

Pg 16 Rev F

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29 April 2026
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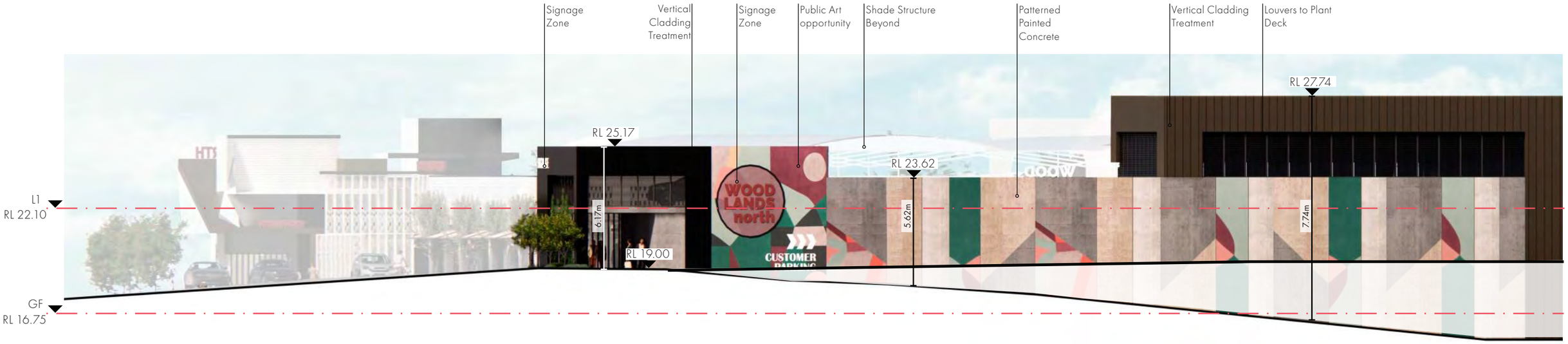
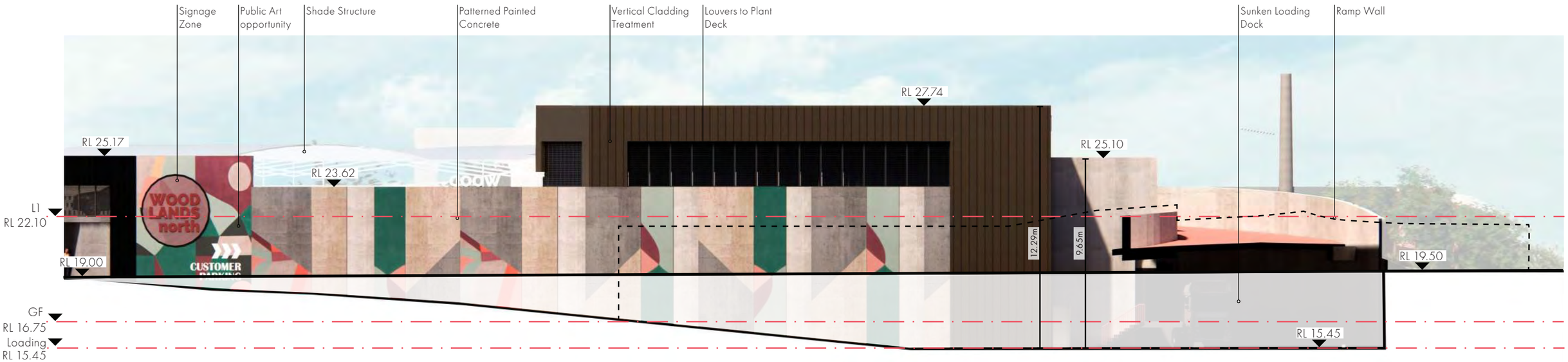


West Elevation - A



West Elevation - B

Scale 1:200 @ A3

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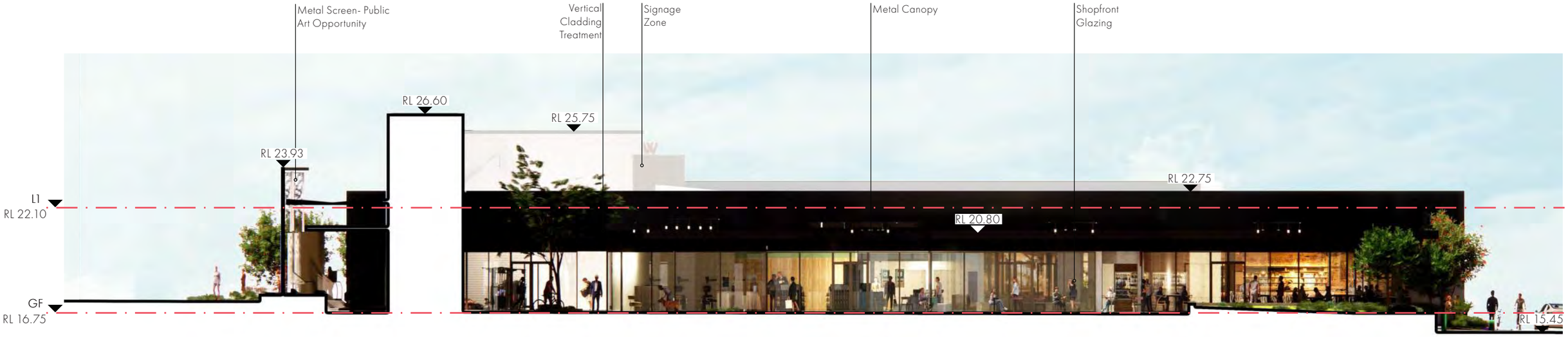
West Elevations

Pg 17 Rev F

Woodlands North Development Application 04 2026

place fabric.

City of Stirling
29 April 2026
RECEIVED



East Laneway Elevation

West Laneway Elevation

Scale 1:200 @ A3

0 1 2 3 4 5 10

Laneway Elevations

Pg 18 Rev F

Woodlands North Development Application 04 2026

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29 April 2026
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2305 Woodlands North

Total Site Development (For Reference Only)

USE			Revised DA GLAR (m²)	DA GLAR (m²)
	T00	Shop	3745	3826
	T01	Shop	240	240
	T02	Shop	240	266
	T03	Shop	110	111
	T04	Shop	100	100
	T05	Restaurant	220	228
	T06	Restaurant	230	237
	T07	Shop	130	130
	T08	Shop	125	129
	T09	Shop	115	118
	T10	Recreation - Private	665	672
		Mall	234	234
		Casual mall seating	17	17
		Corridors	75	75
		TOTAL	6246	6383

On-Site Public Bays	162	156
Major Retail Pick Up Bays	4	4
TOTAL ON-SITE BAYS	166	160
Parking Ratio	2.7	2.5

On-Street Bays	3	7
TOTAL BAYS AVAILABLE	169	167

TOTAL MOTORBIKE BAYS	4	4

NOTES:

All areas are preliminary only and approximate.

Final lease area calculations and calculations for any legal purposes should be undertaken by a qualified surveyor from the as-constructed conditions.

Areas are likely to adjust during the design development and documentation processes.

PLEASE NOTE: ALL AREAS IN SQUARE METRES

Landscape Breakdown

- Landscaped Area Within Site
- Landscaped Area Outside Site

Area Breakdown

	DA	Revised DA
Area Within Site	628m²	628m²
Area Outside Site	412m²	337m²
Percentage Landscape	9.6%	10.03%
Total Area Landscaped	**1,040m²**	**1,103m²**

Attachment 2

Aerial Imagery

City of Stirling
City of Choice

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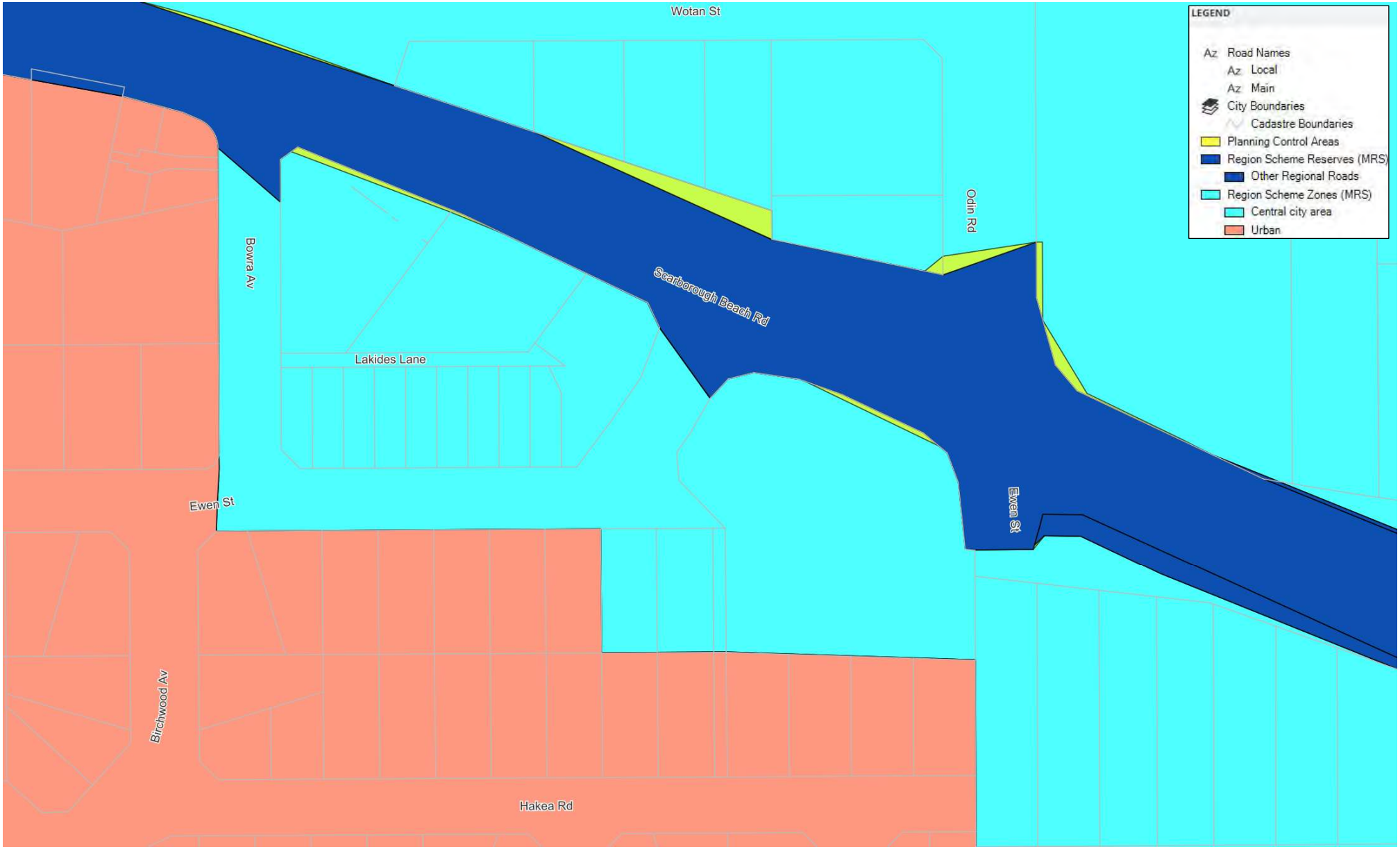
Aerial Imagery – April 2026

N

Attachment 3

Metropolitan Region Scheme Zoning Map



City of Stirling
City of Choice

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Metropolitan Region Scheme Zoning

N

Attachment 4

City of Stirling Local Planning Scheme No. 3 Zoning Map

City of Stirling
City of Choice

City of Stirling does not warrant the accuracy of this information and any person using, or relying upon, such information does so on the basis that the City shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

City of Stirling Local Planning Scheme No. 3 Zoning

N

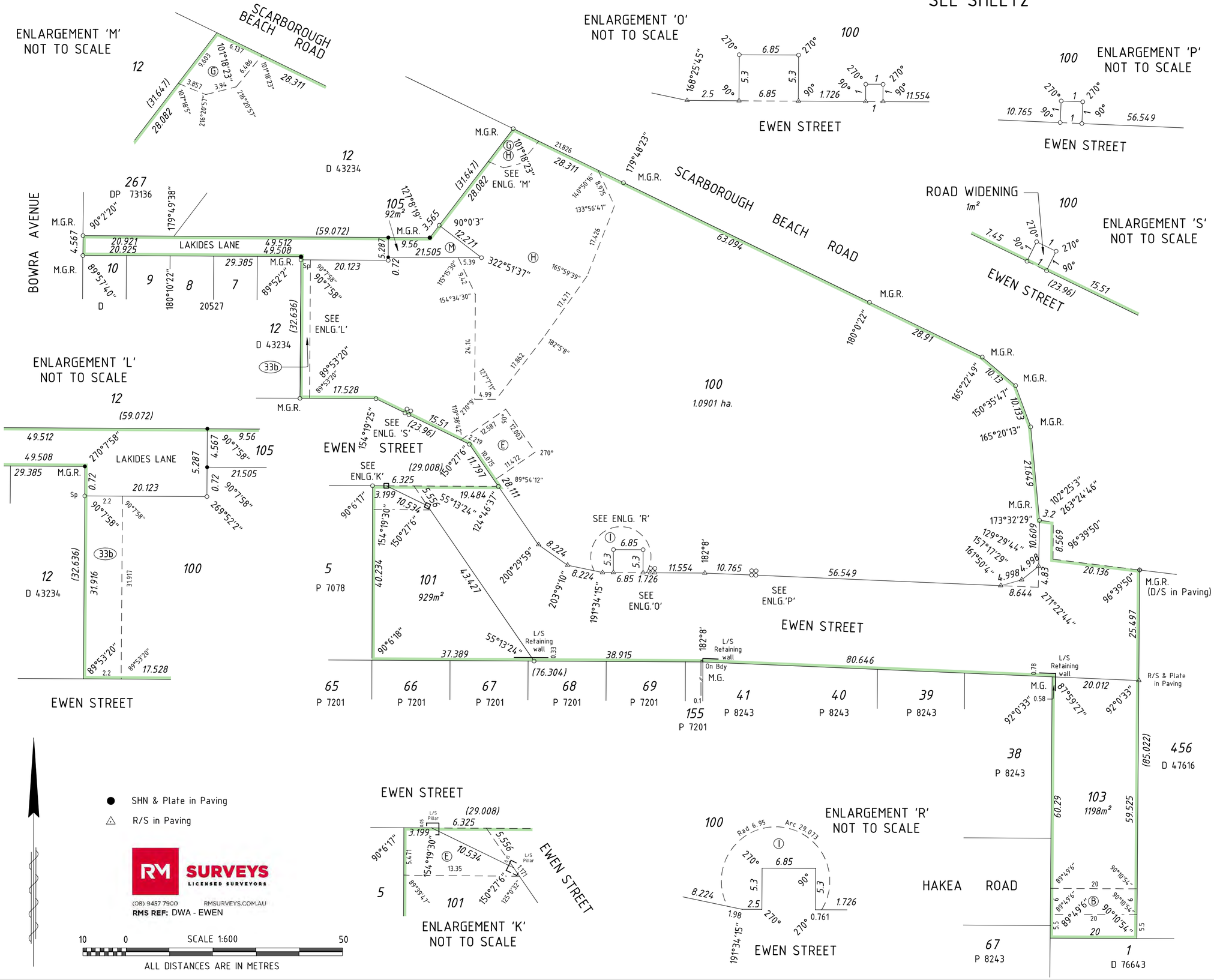
Attachment 5a

Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)

Draft Deposited Plan 64022 approved by Western Australian Planning Commission

VER.	AMENDMENT	AUTHORISED BY	DATE
7	Convert Lots 104 & 300 to Road Add Lot 105	K. BOWYER	17/4/2023

FOR ROAD CLOSURE INSET
FORMER TENURE & INTERESTS AND NOTIFICATIONS
SEE SHEET2



TYPE	FREEHOLD	S.S.A. NO
PURPOSE	SUBDIVISION	

PLAN OF **LOTS 100, 101, 103, 105, ROADS, ROAD WIDENING AND EASEMENTS**

FORMER TENURE
SEE FORMER TENURE TABLE

LOCAL AUTHORITY
CITY OF STIRLING

LOCALITY
INNALOO / WOODLANDS

D.O.L. FILE 50397 / 2005 V2

FIELD RECORD 110330

SURVEYOR'S CERTIFICATE - REG 54

I, Keith L. BOWYER
hereby certify that this plan is accurate and is a correct representation of the -
(a) *survey; and/or
(b) *calculations from measurements recorded in the field records,
[* delete if inapplicable]
undertaken for the purposes of this plan and that it complies with the relevant written law(s) in relation to which it is lodged.

19-Oct-15

LICENSED SURVEYOR DATE

LODGED

DATE FEE PAID ASSESS No.

I.S.C.

EXAMINED

SG 16.5.2025
DATE

WESTERN AUSTRALIAN PLANNING COMMISSION
FILE 159887

Delegated under S.16 P&D Act 2005 DATE 03-Oct-2025

IN ORDER FOR DEALINGS

SUBJECT TO
Two owners; Prior approval DPs 419546,65569 & 65584
Road Closure; Sec87 LAA Amalgamation
Sec 152,167 & 168(1)(2)(3) P&D Act
Energy Operators (Powers) Act 1979
Sec 129BA TLA

INSPECTOR OF PLANS AND SURVEYS DATE

APPROVED

INSPECTOR OF PLANS AND SURVEYS DATE
(S. 18 Licensed Surveyors Act 1909)

GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN
64022

SHEET 1 OF 2 SHEETS
VERSION 7

A2 ORIGINAL

HELD BY LANDGATE IN DIGITAL FORMAT ONLY

FORMER TENURE TABLE

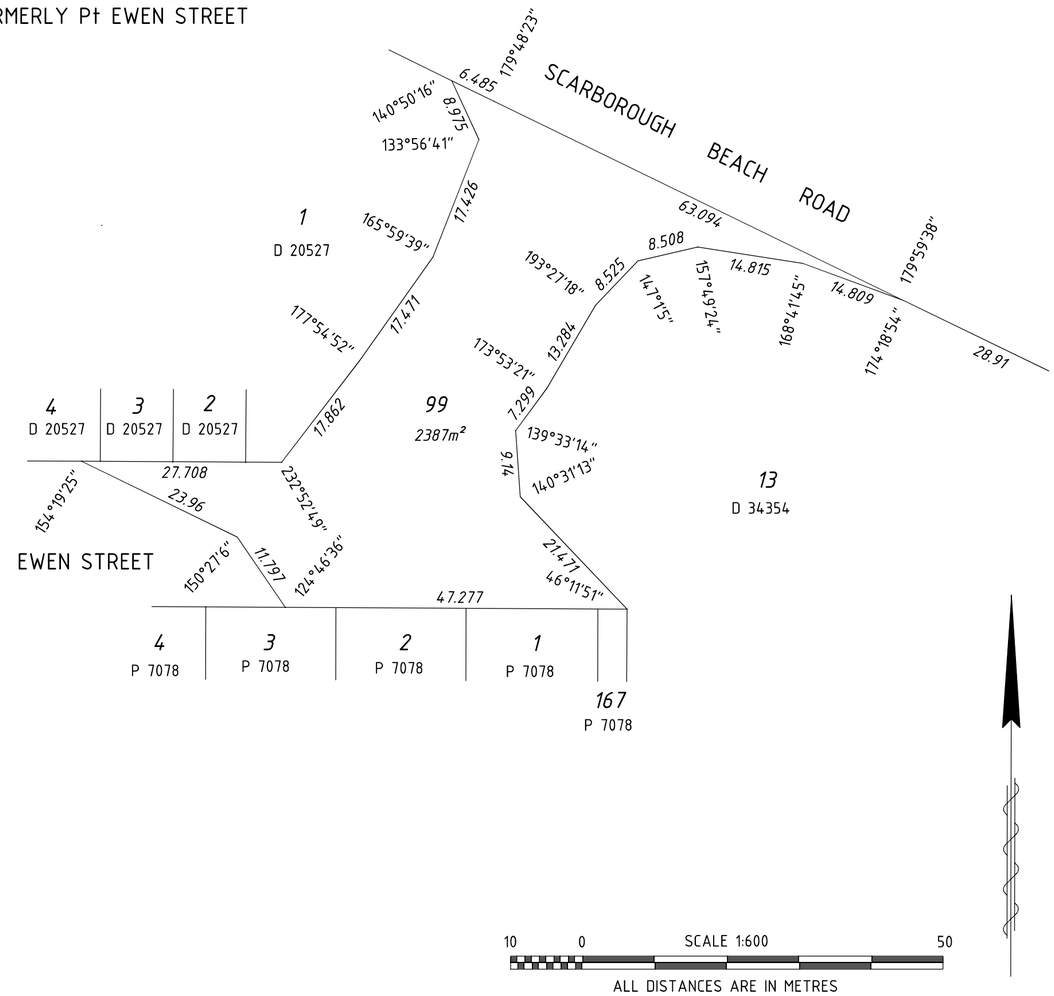
LOT	FORMER TENURE	ON PLAN / DIAGRAM	TITLE
LOT 100	LOT 99	INSET - THIS PLAN	
	Pt. LOT 50	DP 419546	
	Pt. LOT 1	P 7078	1286 / 171
	Pt. LOT 2	P 7078	1242 / 243
	Pt. LOT 3	P 7078	1266 / 231
	LOT 1	D 20527	1748 / 876
	LOT 2	D 20527	1748 / 876
	LOT 3	D 20527	1748 / 876
	Pt. LOT 4	D 20527	1615 / 879
	Pt. LOT 5	D 20527	1615 / 880
	Pt. LOT 167	P 7078	LR 3160 / 46
LOT 101	Pt. LOT 2	P 7078	1242 / 243
	Pt. LOT 3	P 7078	1266 / 231
	Pt. LOT 4	P 7078	1235 / 823
LOT 103	Pt. LOT 457	D 47616	1573 / 623
LOT 105	Pt. LOT 66	D 20527	1817 / 933

INTERESTS AND NOTIFICATIONS

SUBJECT	PURPOSE	STATUTORY REFERENCE	ORIGIN	LAND BURDENED	BENEFIT TO	COMMENTS
Ⓑ	EASEMENT (Right of Carriageway)		Doc B352260 Doc B352565 Doc B354480 Doc B394490 Doc B991681	LOT 103	SEE DOCUMENT SEE DOCUMENT SEE DOCUMENT SEE DOCUMENT SEE DOCUMENT	
Ⓖ	EASEMENT		Doc	LOT 100	SEE DOCUMENT	RIGHT OF ACCESS
	EASEMENT		Doc	SEE DOCUMENT	LOT 100 Ⓗ	RIGHT OF ACCESS (SEE DP 65569)
Ⓜ	MEMORIAL	CONTAMINATED SITES ACT 2003	Doc K969972	LOT 105	Dept of ENVIRONMENT REGULATION	
33b	EASEMENT (Sewerage)	Sec 167 P & D Act, Reg 33(B)	THIS PLAN	LOT 100	WATER CORPORATION	
Ⓔ	EASEMENT	ENERGY OPERATORS (POWERS) ACT 1979	Doc	LOTS 100 & 101	ELECTRICITY NETWORKS CORPORATION	
Ⓘ	RESTRICTIVE COVENANT	Sec 129BA of the T.L.A.	Doc	LOT 100	ELECTRICITY NETWORKS CORPORATION	
	EASEMENT	Sec 136C of the T.L.A.	Doc	LOT 105	LOT 100	RIGHT OF ACCESS
	RESTRICTIVE COVENANT	Sec 136D of the T.L.A.	Doc	LOT 105	LOT 100	
	NOTIFICATION	Sec 165 of the P & D Act	Doc	LOT 105	LOT 100	UN-SERVICED LOT

INSET
SCALE : 1: 600 @ A2

LOT 99 (ROAD CLOSURE) BEING
CROWN LAND FOR AMALGAMATION
FORMERLY Pt EWEN STREET



19-Oct-15
LICENSED SURVEYOR DATE

RM SURVEYS
LICENSED SURVEYORS
(08) 9457 7900 RMSURVEYS.COM.AU
RMS REF: DWA - EWEN

GOVERNMENT OF WESTERN AUSTRALIA
Landgate

DEPOSITED PLAN
64022
SHEET 2 OF 2 SHEETS
VERSION 7

Attachment 5b

Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)

Landscaping Plan

WOODLANDS NORTH

LANDSCAPE DEVELOPMENT APPLICATION

UDLA

TABLE 1 EDITION DETAILS

PROJECT NAME	
Title	Woodlands North Landscape Development Application
Production Date	4th September 2025
Prepared By	UDLA
Author	Theo Valentine
Status	DA ISSUE
UDLA Project Code	WOODA

TABLE 2 DOCUMENT REGISTER

DOCUMENT REGISTER

Version	Date	Amendments	Prepared By
A	18/06/24	DRAFT	TV
B	25/06/24	DRAFT	TV
C	27/06/24	DRP ISSUE	TV
D	27/06/24	DRP ISSUE 1	TV
E	20/08/24	DRP ISSUE 2	TV
F	03/10/24	DRP ISSUE 3	TV
G	21/11/24	DA ISSUE	TV
H	04/09/25	DA ISSUE	TV

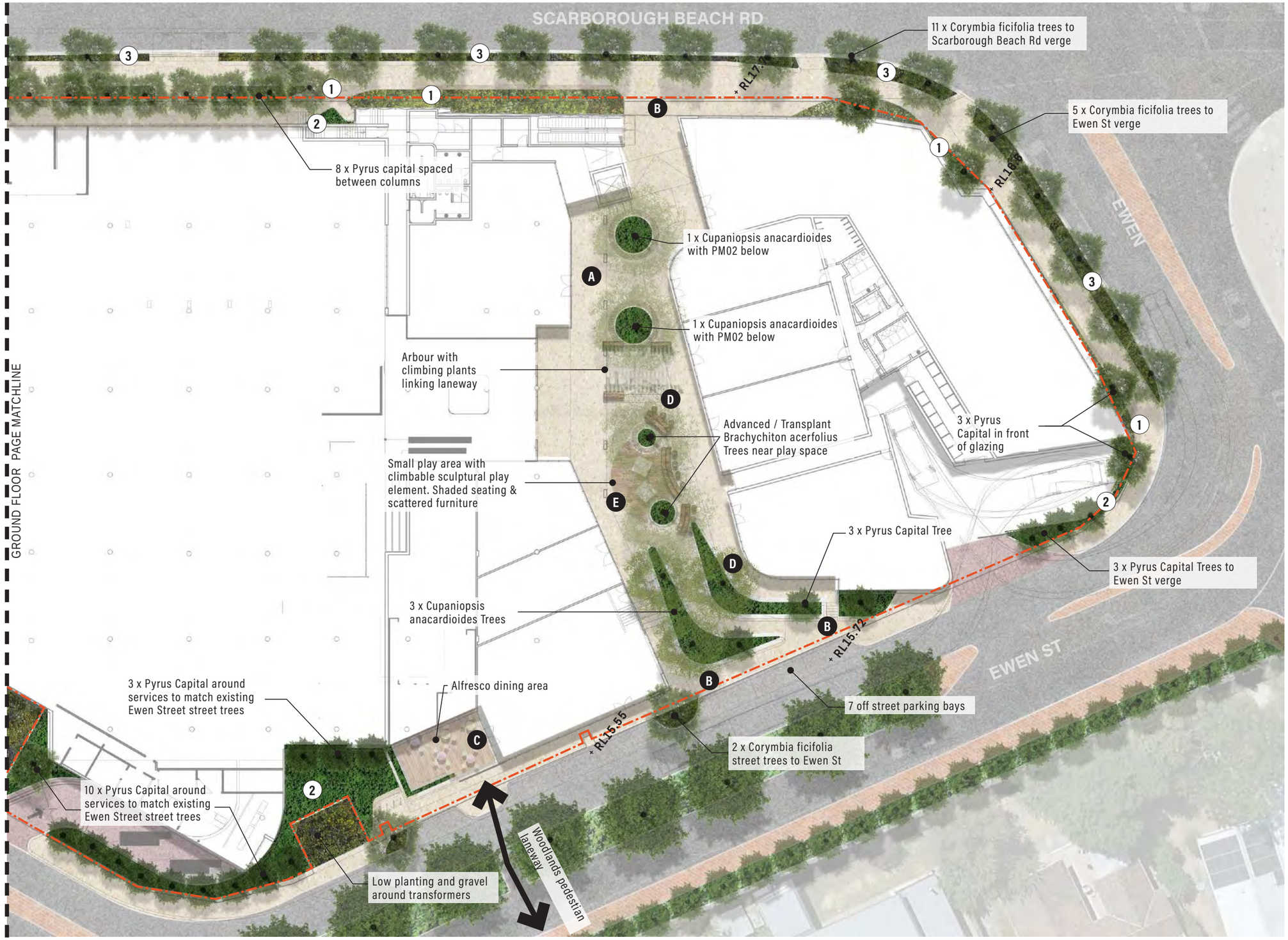
Prepared for: Windsor Knight / Place Fabric

Prepared by: UDLA

Contact: Scott Lang
Position: UDLA Director
Phone: (08) 9336 7577
Email: scott@udla.com.au

LEVEL 1A, 3-5 JOSEPHSON STREET
FREMANTLE, 6160 WA
HELLO@UDLA.COM.AU | (08) 9336 7577

1.1 GROUND FLOOR PLAN



KEY

- Lot Boundary
- A The Laneway
- B Pedestrian entrance
- C Alfresco
- D Bike Parking
- E informal play area with sculptural play element
- 1 Plant Mix 1. Low Sunny Feature Planting
- 2 Plant Mix 2. Low Shady Feature Planting
- 3 Plant Mix 3. Low Verge Mix

General Notes:

All planting is in deep soil.

All landscape areas to be fully irrigated. Street tree irrigation may be switched off or reduced beyond the two year maintenance period.

Tree Location indicative pending service locations and sight-line analysis.

Suggested species list included on Pages 7-10.

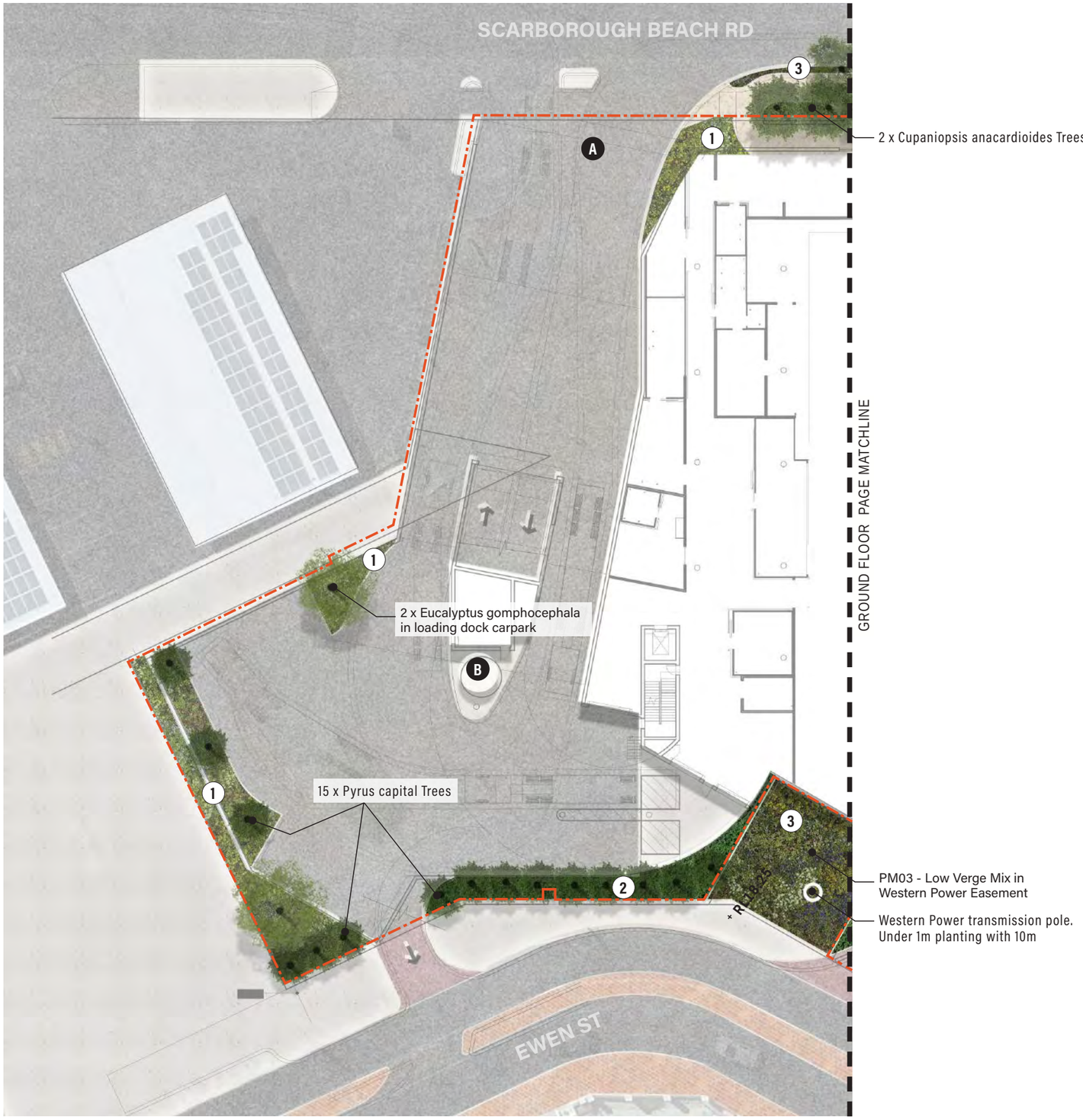
All garden beds to have 75mm depth pine bark mulch.

1:600 @ A3

0m 2m 10m 20m

UDLA³

1.2 GROUND FLOOR PLAN



KEY

- Lot Boundary
- A Vehicle entry
- B Fire tanks
- 1 Plant Mix 1. Low Sunny Feature Planting
- 2 Plant Mix 2. Low Shady Feature Planting
- 3 Plant Mix 3. Low Verge Mix

General Notes:

All planting is in deep soil.

All landscape areas to be fully irrigated. Street tree irrigation may be switched off or reduced beyond the two year maintenance period.

Tree Location indicative pending service locations and sight-line analysis.

Suggested species list included on Pages 7-10.

All garden beds to have 75mm depth pine bark mulch.

1:600 @ A3

0m 2m 10m 20m

2.1 INDICATIVE IMAGERY

3.1 INDICATIVE MATERIALS LIST

SURFACE FINISHES

URBANSTONE SHOTBLAST PAVING MIX
GROUND FLOOR

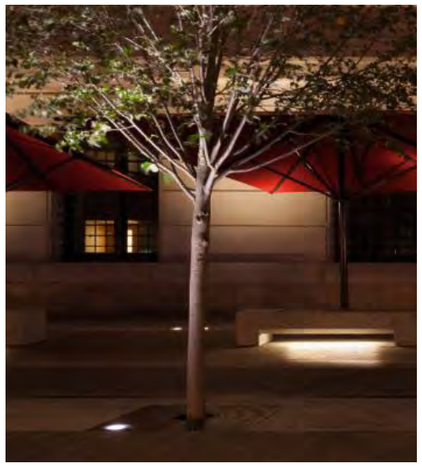
EXPOSED AGGREGATE
GROUND FLOOR

GRANITE SETT FEATURE PAVING

SOUTH WEST RIVER STONE - ATRIUM

CIRCULAR TREE GRATE CLASS A

FURNITURE & FIXTURE MATERIALS



IN-GROUND UPLIGHTING

LINEA RANGEBENCH SEATING

LINEA DDA BAR TABLE

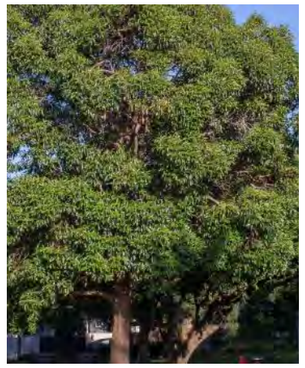
LINEA RANGE BIKE STANDS

STAINLESS STEEL ROPE WIRE TRELLIS

4.1 TREES

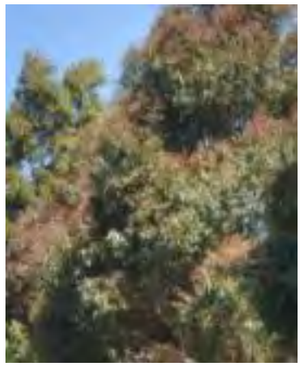
EXISTING STREET TREES

Agonis flexuosa
Peppermint Tree
Size: 15m (h) x 10m (w)
Location: Scarborough Beach



Lophestemon conferta
Queensland Box Tree
Size: 8-12m (h) x 8m (w)
Location: Ewen St

Pyrus Capital
Ornamental Pear
Size: 6m (h) x 3m (w)
Location: Ewen St



Corymbia maculata
Spotted Gum
Size: 10m (h) x 5m (w)
Location: Ewen & S. Bch Rd

PROPOSED TREES

Cupaniopsis anacardioides
Tuckeroo
5m wide x 8m high
Use: Feature Tree

Corymbia ficifolia
Red Flowering Gum
4m wide x 6m high
Location: Street Tree S. Bch Rd & Ewen St

Pyrus Capital
Ornamental Pear
Size: 6m (h) x 3m (w)
Location: Ewen St

Brachychiton acerfolius
'Illawarra Flame Tree',
Mature size: 8m wide x 8m high.
Use: Laneway Tree

5.1 PLANTING PALETTE

MIX 1. LOW SUNNY FEATURE PLANTING 3 PLANTS PER SQ M

Westringia fruiticosa
'Coastal Rosemary',
Mature size: 0.6m x 1.2m

Hibbertia scandens
'Snake Vine',
Mature size: .3m x 1.5m

Lomandra longifolia
'Tanika',
Mature size: 0.6m x 0.6m

Rosmarinus officianalis
'Prostrate Rosemary',
Mature size: 0.6m x 1.2m

Euonymus japonicus
Tom Thumb
0.5m H x 04m W

Chamelaucium uncinatum
'Wax Flower',
Mature size: 1.5m x 2m

Olearia axillaris,
Coastal Daisybush
Height: 1m x Width: 1-1.5m

Casuarina glauca
'Cousin It',
Mature size: 0.3m x 1.2m

Raphiolepis indica
Snow Maiden
Mature size: 1m x 1m

Rosemary officianalis
Tuscan Blue
Mature size: 1m x 1.2m

Grevilllea 'Gin Gin Gem'
'Grevillea',
Mature size: 0.2m x 1.2m

Hemiandra pungens
Snake Bush
H: 0.2m x W: 1m

Ficinia nodosa,
Knotted Club Rush
H: 0.8m x W: 1m

Grevillea crithmifolia,
Grevillea
H: 0.2m-0.6M x W: 1m

Calothamnus quadrifidus,
One-sided Bottelbrush
H: 0.5m x W: 1m

Carpobrotus virescens,
Pigface
H: 0.2m x W: 2m

Billardiera fusiformis,
Australian Bluebell
H: 1m x W: 0.5m

Leucophyta brownii,
Cushion Bush
H: 0.7m x W: 1m

PLANTING PALETTE

MIX 2. LOW SHADY FEATURE PLANTING 3 PLANTS PER SQ M

Westringia fruiticosa
'Coastal Rosemary',
Mature size: 0.6m x 1.2m

Liriope Muscari
'Evergreen Giant'
H:0.4m x W:0.5m

Hibbertia scandens
'Snake Vine',
Mature size: .3m x 1.5m

Billardiera fusiformis,
Australian Bluebell
H: 1m x W: 0.5m

Juniperus conferta
Shore juniper
H:.4m x W:1m

Carpobrotus virescens,
Pigface
H: 0.2m x W: 2m

Dichondra argentea
Silver Falls
H:0.5m x W:0.8m

Arthropodium cirratum
'NZ Rock Lilly'
H:0.6m x W:.5m

Hardenburgia comptoniana
'White Out"
H:0.6m x W:0.9m

Correa alba
'White Correa',
Mature size: 1.5m x 1.2m

CLIMBING TRELLIS

Trachelospermum jasminoides
'Star Jasmine'
H:0.4m x W:0.5m

Hardenburgia comptoniana
Native Whisteria
H:0.4m x W:0.5m

Billardiera fusiformis,
Australian Bluebell
H: 1m x W: 0.5m

PLANTING PALETTE

MIX 3. VERGE PLANTING MIX 3 PLANTS PER SQ M

Hibbertia scandens
'Snake Vine',
Mature size: .3m x 1.5m

Grevillea crithmifolia,
Grevillea
H: 0.2m-0.6M x W: 1m

Lomandra longifolia
'Tanika',
Mature size: 0.6m x 0.6m

Grevilllea 'Gin Gin Gem'
'Grevillea',
Mature size: 0.2m x 1.2m

Carpobrotus virescens,
Pigface
H: 0.2m x W: 2m

Eremophila glabra,
Kalbarri Carpet
H: 0.2m x W: 2m

6.1 DEEP SOIL ZONE & TREE CANOPY REQUIREMENTS

Site Area	Minimum deep soil area	Minimum Req for trees	Proposed trees
10, 772m2	Minmimum required DSA = 10% total area = **1,077m2** This proposal provides **628m2** DSA on ground	**2 x large** trees and **small and medium trees** to suit area.	**2 x large** trees, **2 x medium** trees and **69 x small** trees in deep soil

	Deep soil area (DSA) within lot	DSA Outside lot	Total
Ground	628m2	412m2	1040m2
Total	**628m2**	**412m2**	**1040m2**

	PM01 Low Sunny Feature Planting	PM02 Low Shady Feature Planting	PM03 Verge Mix	Total
Ground	379m2	414m2	348m2	1145m2
Total area	**379m2**	**414m2**	**348m2**	**1145m2**
Total plant qty	1137	1242	1044	3435

6.2 PLANT SCHEDULE

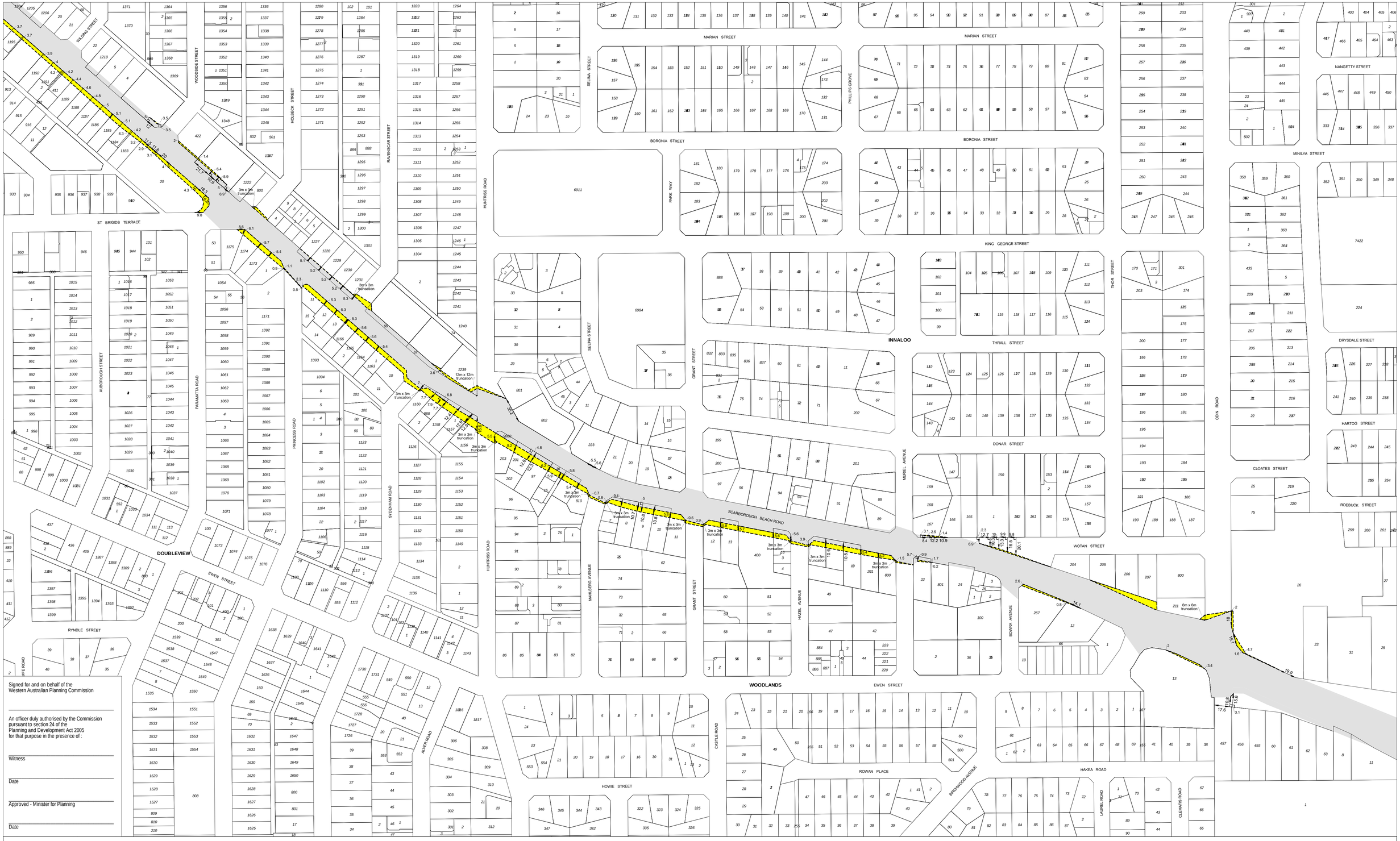
Botanical Name	Common Name	Native / Exotic	Use	Stock Sizes	QTY
Trees					
Corymbia ficifolia	Red Flowering Gum	Native	In ground	100lt	18
Pyrus capital	Ornamental Pear	Exotic	In ground	100lt	42
Brachychiton acerfolius	Illawarra Flame Tree	Native	In ground	Transplant	2
Cupaniopsis anacardioides	Tuckeroo	Native	In ground	100lt	7
Eucalyptus gomphocephala	Tuart	Native	In ground	200lt	2
				Total	71
PM01 - Low Sunny Feature Planting - 3 plants per sq m					
Billardiera fusiformis	Australian Bluebell	Native	Rambling	140mm	66
Calothamnus quadrifidus	One-sided Bottelbrush	Native	Shrub	140mm	66
Carpobrotus virescens	Pigface	Native	Groundcover	140mm	66
Casuarina glauca	Cousin It	Native	Rambling	140mm	66
Chamelaucium uncinatum	Wax Flower	Native	Shrub	140mm	66
Euonymus japonicus	Tom Thumb	Exotic	Low Shrub	140mm	66
Ficinia nodosa	Knotted Club Rush	Native	Rush	140mm	66
Grevillea crithmifolia	Grevillea	Native	Groundcover	140mm	66
Grevilllea 'Gin Gin Gem'	Gin Gin Gem'	Native	Groundcover	140mm	66
Hemiandra pungens	Snake Bush	Native	Groundcover	140mm	66
Hibbertia scandens	Snake Vine	Native	Rambling	140mm	66
Leucophyta brownii	Cushion Bush	Native	Low Shrub	140mm	66
Lomandra longifolia	Tanika	Native	Rush	140mm	66
Olearia axillaris	Coastal Daisybush	Native	Shrub	140mm	66
Raphiolepis indica	Snow Maiden	Exotic	Shrub	140mm	66
Rosmarinus officianalis	Prostrate Rosemary	Exotic	Rambling	140mm	66
Westringia fruiticosa	Coastal Rosemary	Native	Shrub	140mm	66
				Total	1137

PM02 Low Shady Feature Planting - 3 plants per sq m					
Arthropodium cirratum	NZ Rock Lilly	Exotic	Rush	140mm	124
Billardiera fusiformis	Australian Bluebell	Native	Rambling	140mm	124
Carpobrotus virescens	Pigface	Native	Groundcover	140mm	124
Correa alba	White Correa	Native	Shrub	140mm	124
Dichondra argentea	Silver Falls	Exotic	Groundcover	140mm	124
Hibbertia scandens	Snake Vine	Native	Groundcover	140mm	124
Hardenburgia comptoniana	White Out	Native	Rambling	140mm	124
Juniperus conferta	Shore juniper	Exotic	Low Shrub	140mm	124
Liriope Muscari	Evergreen Giant	Exotic	Rush	140mm	124
Westringia fruiticosa	Coastal Rosemary	Native	Shrub	140mm	124
				Total	1242
PM03 Low Verge Mix - 3 plants per sq m					
Carpobrotus virescens	Pigface	Native	Groundcover	140mm	149
Eremophila glabra	Kalbarri Carpet	Exotic	Groundcover	140mm	149
Grevillea crithmifolia	Ground Cover Banksia	Native	Groundcover	140mm	149
Grevilllea 'Gin Gin Gem'	Gin Gin Gem	Native	Groundcover	140mm	149
Grevillea crithmifolia	Grevillea	Exotic	Groundcover	140mm	149
Hibbertia scandens	Snake Vine	Exotic	Groundcover	140mm	149
Lomandra longifolia	Lime Tuff	Native	Shrub	140mm	149

Attachment 5c

Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)

Planning Control Area No. 166 Plan Number 1.7995



Signed for and on behalf of the
Western Australian Planning Commission

An officer duly authorised by the Commission
pursuant to section 24 of the
Planning and Development Act 2005
for that purpose in the presence of :

Witness

Date

Approved - Minister for Planning

Date

Planning control area
No. 166

PLANNING CONTROL AREA NO. 166 - SCARBOROUGH BEACH ROAD - HINDERWELL STREET TO ODIN ROAD AND KING EDWARD ROAD TO MAIN STREET

Created on date: Friday, 27 August 2021
Produced by Data Analytics, Department of Planning, Lands and Heritage, Perth WA
Base information supplied by Western Australian Land Information Authority SLIP 1180-2020-1

Legend

Planning control area — Existing MRS road reserves

Program Manager: S. Haine
Geospatial Officer: J. Ballarotta
Examined: A. Power
Revised:
Version No: 1
Date: WAPC / 307.9.1
25 August 2021

N

0 25 50 75 100
metres

Plan Number
1.7995

3487 Sheet 2 of 4

File number: 835/02/01/0035
Plan reference:
Metropolitan Region Scheme
1:25,000 sheet 15

Amending plans:
1.7994 - 1.7997

Attachment 5d

Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)

Road Safety Assessment

WOODLANDS NORTH SHOPPING CENTRE

ROAD UPGRADE

Road Safety Audit

Stage 2 - Preliminary Design

Audit Ref: 2605018-RSA-001

Prepared for:

Windsor Knight

By:

Shawmac Traffic & Safety

Report Issue Date: **25/05/2026**

Safety Audit Document Control Sheet

Project Location:	Woodlands North Shopping Centre
Project Proposal:	Road Upgrade
Audit Stage:	Preliminary Design
Prepared for:	Windsor Knight
Prepared by 1:	Anthony Anastas
Prepared by 2:	Shawmac Traffic & Safety
Audit Team Leader:	Anthony Anastas
Audit Team Leader Organisation:	Shawmac Traffic & Safety
Audit Reference:	2605018-RSA-001
Report Issue Date:	25/05/2026

The Safety Audit Document Control Sheet Above Should be Completed Prior to Editing Any Other Part of the Report Template

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1.3 Specialist Advisors 5
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1.5 Previous Safety Audits 6
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2.2 Finding – Pedestrian Crossing Facilities 9
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1. INTRODUCTION

1.1 Scope of Audit

A Road Safety Audit is a formal, systematic, assessment of the potential road safety risks associated with a new road project or road improvement project conducted by an independent qualified audit team. The assessment considers all road users and suggests measures to eliminate or mitigate any risks identified by the audit team.

This Road Safety Audit has been conducted following the general principles detailed in *Austroads Guide to Road Safety Part 6: Road Safety Audit* and in accordance with the requirements contained in the Main Roads Western Australia Policy and Guidelines for Road Safety Audit.

This report results from a Preliminary Design carried on the proposed Woodlands North Shopping Centre that is located on the corner of Ewen Street and Scarborough Beach Road in Woodlands.

The background and objective of the proposed project is to identify any impediments to road safety and where these are identified to recommend initiatives to improve these to allow for safe passage for all road users.

The Audit was undertaken by Richard Jois and Anthony Anastas of Shawmac Traffic & Safety and Russell Jackson from City of Stirling with reference to the details provided in the Audit Brief.

The audit comprised an examination of the site and other information supplied as listed in Appendix D.

All the findings described in Section 2 of this report are considered by the audit team to require action in order to improve the safety of the proposed project and to minimise the risk of crash occurrence and reduce potential crash severity.

The audit team has examined and reported only on the road safety implications of the project as presented and has not examined or verified the compliance of the design to any other criteria.

1.2 The Audit Team

Auditor No.	Name	Role	Organisation
942(S)	Anthony Anastas	Inspection Team Leader	Shawmac Traffic & Safety
143(S)	Richard Jois	Inspection Team Member	Shawmac Traffic & Safety
323(A)	Russell Jackson	Inspection Team Member	City of Stirling

The audit team visited the site on 13/05/2026 at 4:00pm. At the time of the site visit the weather was fine and the existing road surface was dry.

A night audit was undertaken at 6:30pm.

1.3 Specialist Advisors

There were no Specialist Advisors.

1.4 Risk Assessment

1.4.1 Safe System Findings

The aim of Safe System Findings is to focus the Road Safety Audit process on considering safe speeds and by providing forgiving roads and roadsides. This is to be delivered through the Road Safety Audit process by accepting that people will always make mistakes and by considering the known limits to crash forces the human body can tolerate. This is to be achieved by focusing the Road Safety Audit on particular crash types that are known to result in higher severity outcomes at relatively lower speed environments to reduce the risk of Fatal and Serious Injury (FSI) crashes.

The additional annotation "**FSI CRASH RISK**" displayed using red text shall be used to provide emphasis to any road safety audit finding that has the potential to result in Fatal or Serious Injury (FSI) or findings that are likely to result in the following crash types above the related speed environment: head-on (>70 km/h), right angle (>50 km/h), run off road impact object (>40 km/h), and crashes involving vulnerable road users (>30 km/h), as these crash types are known to result in higher severity outcomes at relatively lower speed environments.

The exposure and likelihood of crash occurrence shall then be considered for all findings deemed to pose "**FSI CRASH RISK**" and be evaluated based on an auditors professional judgement. Auditors should consider factors such as, traffic volumes and movements, speed environment, crash history and the road environment, and apply road safety engineering and crash investigation experience to determine the likelihood of crash occurrence. The likelihood of crash occurrence shall be considered either "**VERY HIGH**", "**HIGH**", "**MODERATE**" or "**LOW**" and this annotation shall be displayed using red text following the "**FSI CRASH RISK**" annotation on applicable findings.

1.4.2 All Other Findings

All other findings shall have the annotation "**CRASH RISK**" displayed using black text.

The exposure and likelihood of crash occurrence shall then be considered for all other findings and be evaluated based on an auditors professional judgement. Auditors should consider factors such as, traffic volumes and movements, speed environment, crash history and the road environment, and apply road safety engineering and crash investigation experience to determine the likelihood of crash occurrence. The likelihood of crash occurrence shall be considered either "**VERY HIGH**", "**HIGH**", "**MODERATE**" or "**LOW**" and this annotation shall be displayed using black text following the "**CRASH RISK**" annotation on applicable findings.

1.5 Previous Safety Audits

There was a previous design audit undertaken on this site prior to the design change.

1.6 Background Data

1.6.1 Crash History

A study of the recent crash history has been conducted in the vicinity of the site along the mid-block section in vicinity of proposed accesses along Scarborough Beach Road and Ewen Street, with the crash history at the intersection for the five-year period to the end of December 2025. This showed that there were the following crashes:

Scarborough Beach Road :

- 1 sideswipe crash that resulted in a PDO Minor.

Ewen Street :

- 2 rear end crashes,
- 1 right angle crash,
- 1 hit object crash.

These crashes resulted in the following:

- 2 PDO Major,
- 1 requiring medical attention,
- 1 PDO Minor.

Scarborough Beach Road and Ewen Street Intersection:

- 32 rear end crashes,
- 12 sideswipe crash,
- 3 right angle crash,
- 1 right turn thru crash,
- 1 other / unknown crash.

These crashes resulted in the following:

- 23 PDO Major,
- 17 PDO Minor.
- 9 requiring medical attention,

1.6.2 Traffic Data

A summary of recent traffic data is provided below:

Location	VPD	% HV	Date	Source
Scarborough Beach Road - East of Odin Road (Site 5139)	32,168	7.8	2025/26	MRWA Trafficmap
Ewen Street - East of Weaponess Road (Site 4126)	6,134	5.6	2020/21	MRWA Trafficmap

1.6.3 Speed Data

Location	Posted Speed	85th percentile speed	Average speed	Date
Scarborough Beach Road - East of Odin Road (Site 5139)	60	52.5	44.3	2025/26
Ewen Street - East of Weaponess Road (Site 4126)	60	63.2	56.3	2020/21

1.6.4 Appendices

Appendix A – Audit Findings Location Plan
Appendix B – Audit Photographs
Appendix C – Crash Reports
Appendix D – List of Documents Provided for the Audit
Appendix E – Corrective Action Report (CAR)

2. ITEMS RAISED IN THIS AUDIT

2.1 Finding – Lighting

Due to the early stage of the design, there were no lighting drawings included.

Additionally, there were some existing lights that were not working along Scarborough Beach Road and Ewen Street.

Justification of the finding:

If lighting does not meet the requirements of AS1158 there is the potential for poorly lit sections at the intersection. This could increase the potential for night-time pedestrian hit crashes along the road.

Australian Standard AS 1158 sets out performance and design requirements for Category V lighting schemes, having regard to the presence, volume and speed of both pedestrians and vehicles. Category V lighting is acknowledged to be an effective accident countermeasure. It has been demonstrated that Category V lighting can provide significant community benefits and that the costs involved in providing the lighting can be offset by the financial returns from the reduction in road accidents. Studies in Australia and New Zealand, and in other countries, have led to the conclusion that Category V traffic route lighting is likely to reduce night-time casualty accidents by about 30%, taken over the road network.

Recommendation:

Lighting to be assessed to ensure that it meets AS1158 and provide lighting accordingly.

Additionally, existing damaged lighting to be repaired.

[FSI CRASH RISK | LOW]

2.2 Finding – Pedestrian Crossing Facilities

It was noted that there were no kerb ramps and Tactile Ground Surface Indicators (TGSIs) proposed at the pedestrian crossings across the accesses and with existing path network. (Drawing Page 8)

Justification of the finding:

Missing kerb ramps increases the potential for tripping hazard for pedestrians utilising the pedestrian crossings, resulting in injury.

People with limited or no vision have difficulty identifying where to cross without TGSIs. This increases the risk of conflict with vehicles and could result in hit pedestrian crash.

Kerb ramps should be designed in accordance with MRWA standard drawing 9831-5649 for Type A kerb ramps and standard drawing 9831-5649 for type B ramps.

Tactile Ground Surface Indicators (TGSIs) are essential in assisting people with vision impairment to safely crossroads. It is a DDA requirement for all pedestrian kerb ramps to be provided with TGSIs installed in accordance with the Department of Transport's Planning and Designing for Pedestrians: Guidelines, MRWA Standard Drawings 9831-5649 and 200931-0089, and Australian Standard AS 1428.4.

Recommendation

Kerb ramps and TGSIs to be proposed at the pedestrian crossings in accordance with recommendations from MRWA and Australian Standards.

[FSI CRASH RISK| LOW]

2.3 Finding – Obstructed Sight Line

It was noted that there are trees and vegetation in the median along Ewen Street obstruct the sight distance at the Ewen Street access.

Justification of the finding

Obstructed sight lines hinders the road user from noticing on-coming vehicles along Cornwall Road, resulting in right-angle and rear-end crashes.

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections indicates that Safe Intersection Sight Distance (SISD) is the minimum distance which should be provided on the major road at any intersection.

Recommendation

Ensure that the trees and vegetation are removed / trimmed to provide adequate sight distance

[FSI CRASH RISK| MODERATE]

2.4 Finding – Swept Paths

It was noted that the swept paths do not show vehicles manoeuvring through the accesses on / out along Ewen Street. (Drawing Page 7)

Justification of the finding:

Should the swept paths in / out of the development along Ewen Street is inadequate, this would result in vehicle damage and rear-end crashes.

Austroads Guide to Road Design Part 4: Intersections indicates that turning paths of design vehicles form the basis of the turning widths required at intersections. All

intersection layouts must be checked to ensure that they can accommodate the turning path envelope (swept path) for the design vehicle plus necessary clearances. The swept path is the dynamic envelope traversed by the outer extremities of the vehicle. Vehicle swept paths can be checked by using a turning path template or a computer program. As the risk event involves low speed conflict the finding is not classed as a safe system finding.

Recommendation

Ensure that all vehicle movements can be made lane correct for all required vehicles and if deficiencies are identified amend the accesses to provide compliant geometry.

[CRASH RISK | LOW]

2.5 Finding – Indicative Proposed Accesses

Due to the early stage of the design, there is only indicative proposed accesses shown, with the accesses still to be detailed. (Drawing Page 8)

Justification of the finding

Inadequate or inappropriately designed signs and road alignment may adversely impact on a driver's ability to safely interpret the road environment and drive in a safe manner. This may increase the risk of road crashes and injury to vehicle occupants.

Austroads Guide to Road Design Part 3: Geometric Design indicates that a fundamental aim of road design is to provide a road system and environment that contributes to the prevention of vehicle crashes, particularly those involving fatalities and serious injuries, as well as satisfying the expectation of and need for efficient transportation. It should be noted that speed is a contributing factor to the severity of the crash. Consequently, a basic requirement of geometric road design is to provide geometry that is suitable for the speeds at which drivers choose to operate vehicles on roads or sections of roads. Designers should also consider vehicle speeds on the approaches to intersections, and it is important that speeds are managed to reduce the impacts of a crash, should one occur.

The actual operating speeds (refer to Section 3.2) of vehicles can vary with time due to changes in traffic conditions, and from point to point due to changes in the road environment, road characteristics, speed limits, driver behaviour and vehicle types. One of the first requirements in developing a new geometric design is to establish the appropriate operating speed or speeds to use for design. The speed to be adopted, which typically provides some margin over the proposed posted speed limit, directly influences the principal parameters used in road design which include:

- sight distance
- stopping distance
- horizontal curve radii
- pavement superelevation

- traffic lane width.

Recommendation

Ensure that the accesses are designed in accordance with Australian Standard AS 1742, Austroads Guidelines and MRWA guidelines and are detailed in subsequent design drawings.

[CRASH RISK | MODERATE]

2.6 Finding – Unprotected Hazards in Clear Zone

Several unprotected non-frangible trees and non-frangible power poles located along the verges and medians of Scarborough Beach Road and Ewen Street that appear to be within the clear zone.

Additionally, there is a large non-frangible pole that might be located within the proposed access.

Justification of the finding:

Unprotected hazards located within the clear zone pose a risk to vehicle occupants. In the event that an errant vehicle leaves the road, hazards in the clear zone would increase the injury severity of the vehicle occupant and result in a run off-road and hit object crash.

In accordance with the *MRWA supplement to Austroads Guide to Road Design Part 6 (GRD 6)* the required clear zone width for a road with the design speed of 110km/h varies between 5m to 10.5m depending on the traffic volumes.

Recommendation

Hazards to be relocated or removed. Otherwise, install safety barriers in accordance with AGRD Part 6 and manufacturer's recommendations to protect road users from hazards.

Location of the access with regards to the large non-frangible pole to be assessed and adjusted accordingly.

[FSI CRASH RISK| MODERATE]

2.7 Finding – Discontinuous Footpath

It was noted that the proposed footpath along Scarborough Beach Road does not connect with existing footpath. (Drawing Page 8)

Justification of the finding:

The lack of a continuous footpath forces path users to cross at unexpected locations, increasing the risk of being hit by passing vehicles that does not expect any pedestrians. This results in serious injury or fatal consequences.

Austroads Guide to Road Design Part 6: Paths for Walking and Cycling indicates that path networks should:

- provide surfaces that provide good surface grip, are free of tripping hazards, smooth, clear of obstructions and are well maintained (e.g. no broken paving);
- have well design landscaping that does not encroach sight lines or operating space;
- minimise conflicts between path users taking into consideration path widths or the provision of separated paths;
- have information signs reminding users of appropriate behaviours in using the path;
- have continuous routes and travel paths as short as possible;
- provide crossings that are appropriate for the traffic volume and traffic speed environment; and
- provide good access to key destinations.

Recommendation

Provide an adequate connection onto existing footpath.

[FSI CRASH RISK| LOW]

3. AUDIT TEAM STATEMENT

I hereby certify that the audit team have examined the documents listed in Appendix D and have inspected the site in undertaking this Road Safety Audit. I also confirm that this audit has been carried out independently of the design team following the general principles detailed in *Austroads Guide to Road Safety Part 6: Road Safety Audit* and in accordance with Main Roads Policy and Guidelines for Road Safety Audit.

The audit has been carried out for the sole purpose of identifying any features of the design which could be altered or removed to improve the safety of the proposal. The identified issues have been noted in this report. The accompanying findings and recommendations are put forward for consideration by the Client for implementation.

Audit Team Leader

Anthony Anastas Shawmac Traffic & Safety		Signature
	25/05/2026	Date

Disclaimer

This report contains findings and recommendations based on examination of the site and/or relevant documentation. The report is based on the conditions viewed on the day of inspection and is relevant at the time of production of the report. Information and data contained within this report is prepared with due care by the Road Safety Audit Team. While the Road Safety Audit Team seeks to ensure accuracy of the data, it cannot guarantee its accuracy.

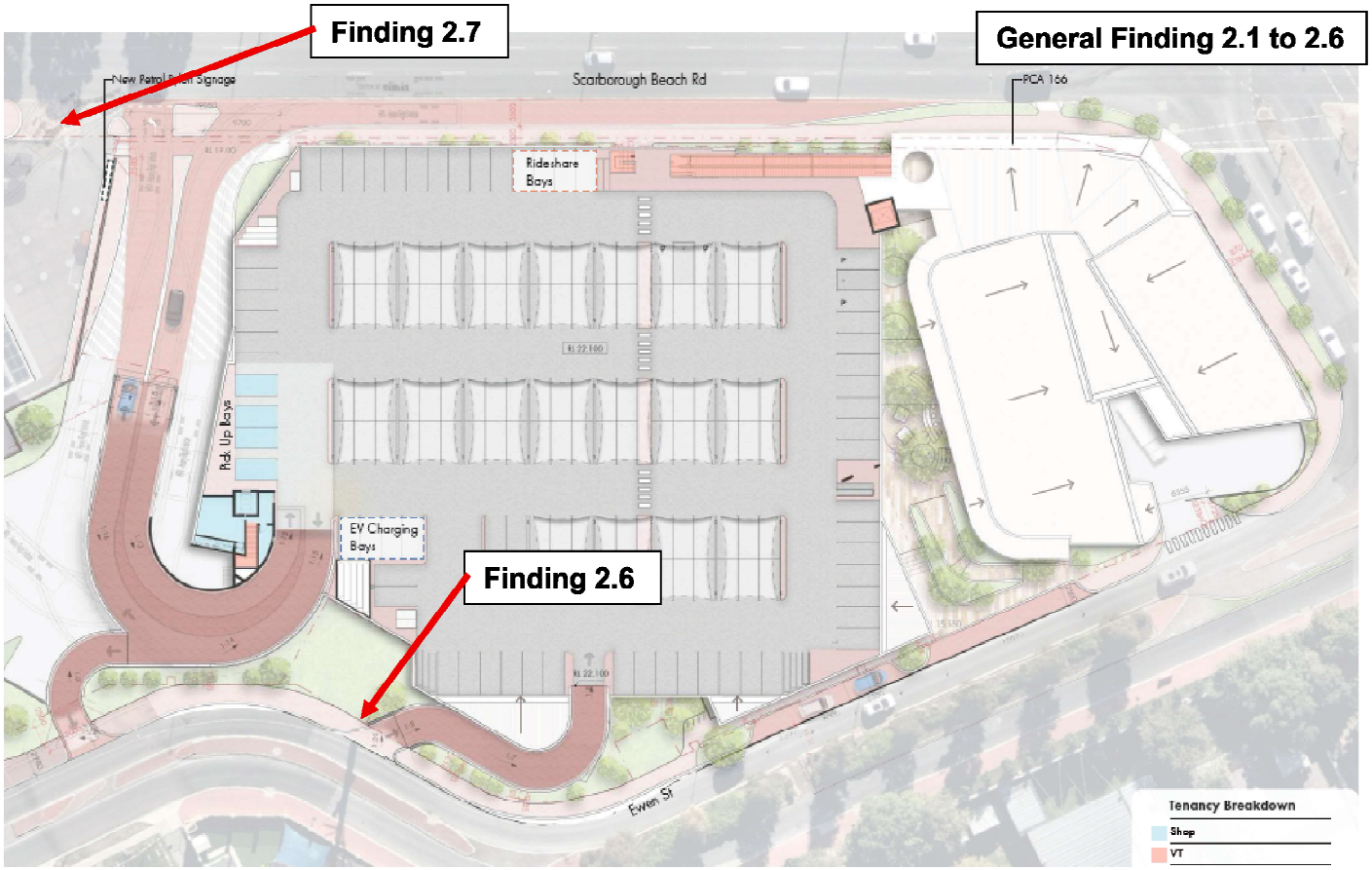
Readers should not solely rely on the contents of this report or draw inferences to other sites. Users must seek appropriate expert advice in relation to their own particular circumstances.

The Road Safety Audit Team does not warrant, guarantee or represent that this report is free from errors or omissions or that the information is exhaustive. Information contained within may become inaccurate without notice and may be wholly or partly incomplete or incorrect. Before relying on the information in this report, users should carefully evaluate the accuracy, completeness, and relevance of the data for their purposes.

Subject to any responsibilities implied in law which cannot be excluded, the Road Safety Audit Team is not liable to any party for any losses, expenses, damages, liabilities or claims whatsoever, whether direct, indirect or consequential, arising out of or referrable to the use of this report, howsoever caused whether in contract, tort, statute or otherwise.

APPENDIX A

AUDIT FINDINGS LOCATION PLAN



Audit Findings Location Plan

APPENDIX B

AUDIT PHOTOGRAPHS

Finding 2.3 and 2.6

Finding 2.6

Finding 2.6

Finding 2.6

Finding 2.1

Finding 2.1

Finding 2.1

Finding 2.1

APPENDIX C

CRASH REPORTS

Summary Crash History

Selection Criteria	Value
Road	SCARBOROUGH BEACH RD (1250069)
Date	01/01/2021 to 31/12/2025
Road SLK	3.81 to 3.88

Severity	Count	Percentage
Fatal	0	0.0%
Hospital	0	0.0%
Medical	0	0.0%
PDO Major	0	0.0%
PDO Minor	1	100.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

MR Type	Count	Percentage
Involving Overtaking	0	0.0%
Involving Parking	0	0.0%
Involving Animal	0	0.0%
Involving Pedestrian	0	0.0%
Entering / Leaving Driveway	0	0.0%
Other / Unknown	1	100.0%
Total:	**1**	**100.0%**

Light Conditions	Count	Percentage
Daylight	1	100.0%
Dawn Or Dusk	0	0.0%
Dark - Street Lights On	0	0.0%
Dark - Street Lights Off	0	0.0%
Dark - Street Lights Not Provided	0	0.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

Object Hit	Count	Percentage
SEC Pole		
Traffic Light Post		
Traffic Sign		
Commercial Sign Post		
Tree		
Other		
Total:		

Road Grade	Count	Percentage
Level	0	0.0%
Crest Of Hill	0	0.0%
Slope	1	100.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

Road Alignment	Count	Percentage
Curve	0	0.0%
Straight	1	100.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

Speed a Factor	Count	Percentage
Yes	0	0.0%
No	0	0.0%
Other / Unknown	1	100.0%
Total:	**1**	**100.0%**

Road Condition	Count	Percentage
Wet	0	0.0%
Dry	1	100.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

MR Nature	Count	Percentage
Rear End	0	0.0%
Head On	0	0.0%
Sideswipe Opposite Dim	0	0.0%
Sideswipe Same Dim	1	100.0%
Right Angle	0	0.0%
Right Turn Thru	0	0.0%
Hit Pedestrian	0	0.0%
Hit Animal	0	0.0%
Hit Object	0	0.0%
Non Collision	0	0.0%
Other / Unknown	0	0.0%
Total:	**1**	**100.0%**

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Summary Crash History

Selection Criteria	Value
Road	EWEN ST (1250111)
Date	01/01/2021 to 31/12/2025
Road SLK	0.04 to 0.27

Severity	Count	Percentage
Fatal	0	0.0%
Hospital	0	0.0%
Medical	1	25.0%
PDO Major	2	50.0%
PDO Minor	1	25.0%
Other / Unknown	0	0.0%
Total:	**4**	**100.0%**

MR Type	Count	Percentage
Involving Overtaking	0	0.0%
Involving Parking	0	0.0%
Involving Animal	0	0.0%
Involving Pedestrian	0	0.0%
Entering / Leaving Driveway	1	25.0%
Other / Unknown	3	75.0%
Total:	**4**	**100.0%**

Light Conditions	Count	Percentage
Daylight	2	50.0%
Dawn Or Dusk	0	0.0%
Dark - Street Lights On	0	0.0%
Dark - Street Lights Off	0	0.0%
Dark - Street Lights Not Provided	0	0.0%
Other / Unknown	2	50.0%
Total:	**4**	**100.0%**

Object Hit	Count	Percentage
SEC Pole	0	0.0%
Traffic Light Post	0	0.0%
Traffic Sign	0	0.0%
Commercial Sign Post	0	0.0%
Tree	0	0.0%
Other	1	100.0%
Total:	**1**	**100.0%**

Road Grade	Count	Percentage
Level	0	0.0%
Crest Of Hill	0	0.0%
Slope	0	0.0%
Other / Unknown	4	100.0%
Total:	**4**	**100.0%**

Road Alignment	Count	Percentage
Curve	0	0.0%
Straight	0	0.0%
Other / Unknown	4	100.0%
Total:	**4**	**100.0%**

Speed a Factor	Count	Percentage
Yes	0	0.0%
No	0	0.0%
Other / Unknown	4	100.0%
Total:	**4**	**100.0%**

Road Condition	Count	Percentage
Wet	1	25.0%
Dry	3	75.0%
Other / Unknown	0	0.0%
Total:	**4**	**100.0%**

MR Nature	Count	Percentage
Rear End	2	50.0%
Head On	0	0.0%
Sideswipe Opposite Dirn	0	0.0%
Sideswipe Same Dirn	0	0.0%
Right Angle	1	25.0%
Right Turn Thru	0	0.0%
Hit Pedestrian	0	0.0%
Hit Animal	0	0.0%
Hit Object	1	25.0%
Non Collision	0	0.0%
Other / Unknown	0	0.0%
Total:	**4**	**100.0%**

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Summary Crash History

Selection Criteria	Value
Intersection	SCARBOROUGH BEACH RD & ODIN RD & EWEN ST (055429)
Date	01/01/2021 to 31/12/2025

Severity	Count	Percentage
Fatal	0	0.0%
Hospital	0	0.0%
Medical	9	18.4%
PDO Major	23	46.9%
PDO Minor	17	34.7%
Other / Unknown	0	0.0%
Total:	**49**	**100.0%**

MR Type	Count	Percentage
Involving Overtaking	6	12.2%
Involving Parking	0	0.0%
Involving Animal	0	0.0%
Involving Pedestrian	1	2.0%
Entering / Leaving Driveway	0	0.0%
Other / Unknown	42	85.7%
Total:	**49**	**100.0%**

Light Conditions	Count	Percentage
Daylight	38	77.6%
Dawn Or Dusk	2	4.1%
Dark - Street Lights On	0	0.0%
Dark - Street Lights Off	0	0.0%
Dark - Street Lights Not Provided	0	0.0%
Other / Unknown	9	18.4%
Total:	**49**	**100.0%**

Object Hit	Count	Percentage
SEC Pole		
Traffic Light Post		
Traffic Sign		
Commercial Sign Post		
Tree		
Other		
Total:		

Road Grade	Count	Percentage
Level	15	30.6%
Crest Of Hill	0	0.0%
Slope	2	4.1%
Other / Unknown	32	65.3%
Total:	**49**	**100.0%**

Road Alignment	Count	Percentage
Curve	6	12.2%
Straight	11	22.4%
Other / Unknown	32	65.3%
Total:	**49**	**100.0%**

Speed a Factor	Count	Percentage
Yes	0	0.0%
No	0	0.0%
Other / Unknown	49	100.0%
Total:	**49**	**100.0%**

Road Condition	Count	Percentage
Wet	3	6.1%
Dry	44	89.8%
Other / Unknown	2	4.1%
Total:	**49**	**100.0%**

MR Nature	Count	Percentage
Rear End	32	65.3%
Head On	0	0.0%
Sideswipe Opposite Dim	0	0.0%
Sideswipe Same Dim	12	24.5%
Right Angle	3	6.1%
Right Turn Thru	1	2.0%
Hit Pedestrian	0	0.0%
Hit Animal	0	0.0%
Hit Object	0	0.0%
Non Collision	0	0.0%
Other / Unknown	1	2.0%
Total:	**49**	**100.0%**

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APPENDIX D

LIST OF DOCUMENTS PROVIDED FOR THE AUDIT

Document Number
Woodlands North – Development Application Rev F

APPENDIX E

CORRECTIVE ACTION REPORT

Findings and Recommendations	Project Manager		
	Agree / Disagree	Reason for Disagreeing	Proposed Action and Comments
2.1 Finding – Lighting Due to the early stage of the design, there were no lighting drawings included. Additionally, there were some existing lights that were not working along Scarborough Beach Road and Ewen Street.	Choose an item.		This finding regarding existing light is forwarded to the asset owner for their consideration.
Recommendation Lighting to be assessed to ensure that it meets AS1158 and provide lighting accordingly. Additionally, existing damaged lighting to be repaired. [FSI CRASH RISK | LOW]	Agree		Lighting plans submitted for the building permit will comply with AS1158.

2.2 Finding – Pedestrian Crossing Facilities It was noted that there were no kerb ramps and Tactile Ground Surface Indicators (TGSIs) proposed at the pedestrian crossings across the accesses and with existing path network. (Drawing Page 8)	Choose an item.		
Recommendation Kerb ramps and TGSIs to be proposed at the pedestrian crossings in accordance with recommendations from MRWA and Australian Standards. [FSI CRASH RISK| LOW]	Agree		Kerb ramps and Tactile Ground Surface Indicators to be provided at all crossings. Whilst noted on plans, this will be progressed as part of detailed design.
2.3 Finding – Obstructed Sight Line It was noted that there are trees and vegetation in the median along Ewen Street obstruct the sight distance at the Ewen Street access.	Choose an item.		
Recommendation Ensure that the trees and vegetation are removed / trimmed to provide adequate sight distance [FSI CRASH RISK| MODERATE]	Agree		Whilst within Crown land, the applicant will work with the City to trim vegetation as required. It is noted that minor works to the median to close the existing opening will be undertaken following approval. Modifications to vegetation can also be undertaken during this process

2.4 Finding – Swept Paths It was noted that the swept paths do not show vehicles manoeuvring through the accesses on / out along Ewen Street. (Drawing Page 7)	Choose an item.		
Recommendation Ensure that all vehicle movements can be made lane correct for all required vehicles and if deficiencies are identified amend the accesses to provide compliant geometry. [CRASH RISK | LOW]	Agree		Whilst the development plans have been reviewed and designed accordingly, this will be reviewed during detailed design.
2.5 Finding – Indicative Proposed Accesses Due to the early stage of the design, there is only indicative proposed accesses shown, with the accesses still to be detailed. (Drawing Page 8)			
Recommendation Ensure that the accesses are designed in accordance with Australian Standard AS 1742, Austroads Guidelines and MRWA guidelines and are detailed in subsequent design drawings. [CRASH RISK | MODERATE]	Agree		Whilst the development plans have been reviewed and designed accordingly, this will be reviewed during detailed design.

2.6 Finding – Unprotected Hazards in Clear Zone Several unprotected non-frangible trees and non-frangible power poles located along the verges and medians of Scarborough Beach Road and Ewen Street that appear to be within the clear zone. Additionally, there is a large non-frangible pole that might be located within the proposed access.	Choose an item.		
Recommendation Hazards to be relocated or removed. Otherwise, install safety barriers in accordance with AGRD Part 6 and manufacturer's recommendations to protect road users from hazards. Location of the access with regards to the large non-frangible pole to be assessed and adjusted accordingly. [FSI CRASH RISK| MODERATE]	Choose an item.		These are assets of Western Power and City of Stirling. This finding is forwarded to the asset owner for their consideration.
2.7 Finding – Discontinuous Footpath It was noted that the proposed footpath along Scarborough Beach Road does not connect with existing footpath.	Choose an item.		

Recommendation Provide an adequate connection onto existing footpath. [FSI CRASH RISK| LOW]	Agree		This will be reviewed and designed during detailed design.

Corrective Action Report – Woodlands North Shopping Centre

Preliminary Design

NOTE:

- This Corrective Action Report is to be read in conjunction with the full Road Safety Audit Report and its findings and recommendations.
- The asset owners (MRWA and/or LGA) **must** be informed of these findings, recommendations and proposed actions.
- Items not under the responsibility of this project representative must be forwarded to the persons / agencies who are responsible.

These findings and recommendations have been considered, and the actions listed will be taken accordingly.

Tarryn Stain	Windsor knight	General Manager	29 May 2026
Responsible Project Representative	**Company / Agency / Division**	**Position**	**Date**

Asset Owner Representative	**Company / Agency / Division**	**Position**	**Date**

Attachment 5e

Technical Documents that form part of the approval (as listed in the Responsible Authority Recommendation)

Waste Management Plan

Waste Management Plan

Woodlands North Development

Prepared for Windsor Knight Pty Ltd

25 August 2025

Project Number: TW22146

DOCUMENT CONTROL

Version	Description	Date	Author	Reviewer	Approver
1.0	First Approved Release	9/11/2022	AB	RH	DP
2.0	Second Approved Release	9/03/2023	AB	RH	DP
3.0	Third Approved Release	2/09/2024	DP	RH	DP
4.0	Fourth Approved Release	6/11/2024	DP	RH	DP
5.0	Fifth Approved Release	15/11/2024	DP	RH	DP
6.0	Sixth Approved Release	25/08/2025	DP	AB	DP

Approval for Release

Name	Position	File Reference
Dilan Patel	Project Manager – Senior Waste Strategy Consultant	TW22146-02_Waste Management Plan_6.0
Signature		

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Executive Summary

Windsor Knight Pty Ltd is seeking development approval for the proposed commercial development located on the corner of Scarborough Beach Road and Ewen Street, Scarborough (the Proposal).

To satisfy the conditions of the development application the City of Stirling (the City) requires the submission of a Waste Management Plan (WMP) that will identify how waste is to be stored and collected from the Proposal. Talis Consultants has been engaged to prepare this WMP to satisfy the City's requirements.

A summary of the bin size, numbers, collection frequency and collection method is provided in the below table.

Proposed Waste Collection Summary

Waste Type	Generation (L/week)	Bin Size (L)	Number of Bins	Collection Frequency	Collection
Refuse	24,502	1,100	Twelve	Two times each week	Private Contractor
Recycling	7,585	1,100	Four	Two times each week	Private Contractor

A private contractors will service the Proposal onsite, directly from the Bin Storage Area. The private contractor's rear loader collection vehicle will enter and exit the Proposal in forward gear via Ewen Street.

A building manager will oversee the relevant aspects of waste management at the Proposal.

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1 Introduction

Windsor Knight Pty Ltd is seeking development approval for the proposed commercial development located on the corner of Scarborough Beach Road and Ewen Street, Scarborough (the Proposal).

To satisfy the conditions of the development application the City of Stirling (the City) requires the submission of a Waste Management Plan (WMP) that will identify how waste is to be stored and collected from the Proposal. Talis Consultants has been engaged to prepare this WMP to satisfy the City's requirements.

The Proposal is bordered by Scarborough Beach Road to the north, Ewen Street to the east and south and commercial properties to the west, as shown in Figure 1.

1.1 Objectives and Scope

The objective of this WMP is to outline the equipment and procedures that will be adopted to manage waste (refuse and recyclables) at the Proposal. Specifically, the WMP demonstrates that the Proposal is designed to:

- Adequately cater for the anticipated volume of waste to be generated;
- Provide an adequately sized Bin Storage Area, including appropriate bins; and
- Allow for efficient collection of bins by appropriate waste collection vehicles.

To achieve the objective, the scope of the WMP comprises:

- Section 2: Waste Generation;
- Section 3: Internal Transfer of Waste;
- Section 4: Waste Storage;
- Section 5: Waste Collection;
- Section 6: Waste Management; and
- Section 7: Conclusion.

2 Waste Generation

The following section shows the waste generation rates used and the estimated waste volumes to be generated at the Proposal.

2.1 Proposed Tenancies

The anticipated volume of refuse and recyclables is based on the floor area (m^2) of the commercial tenancies at the Proposal. The Proposal consists of the following:

- T00 – Supermarket – 3,826m^2;
- T01 – Liquor – 240m^2;
- T02 – Speciality – 257m^2;
- T03 – Speciality – 111m^2;
- T04 – Speciality – 100m^2;
- T05 – F&B – 219m^2;
- T06 – F&B – 237m^2;
- T07 – Speciality – 130m^2;
- T08 – Speciality – 129m^2;
- T09 – Speciality – 118m^2; and
- T10 – Health/Fitness – 680m^2.

Note, the Supermarket and associated Liquor tenancy has their own back of house and manages waste through their own internal processes governed by national waste collections contracts, and therefore has not been included as part of this report. The Supermarket will have their own internal bins for the collection of refuse and recyclables. Staff will transfer the contents of these bins to their dedicated Bin Storage Area as required outside of normal operational hours to minimise disturbance to customers and visitors at the Proposal. Waste collection from the Supermarket and associated Liquor tenancy will be completed by private contractors utilising the dedicated loading area/dock.

2.2 Waste Generation Rates

In order to achieve an accurate projection of waste volumes for the Proposal, consideration was given to the City of Perth's *Waste Guidelines for New Developments* (Revision 5, effective from June 2019), the Western Australian Local Government Association's (WALGA) *Commercial and Industrial Waste Management Guidelines* (2014) and the City of Melbourne's *Guidelines for Waste Management Plans* (2021).

Table 2-1 shows the waste generation rates which have been applied to the Proposal.

Table 2-1: Waste Generation Rates

Tenancy Use Type	Guideline Reference	Refuse Generation Rate	Recycling Generation Rate
T02-T04 and T07-T09 – Speciality	Perth – Retail Shops (>100m^2)	50L/100m^2/day	50L/100m^2/day
T05 and 06 – F&B	WALGA – Restaurants	660L/100m^2/day	130L/100m^2/day
T10 – Health/Fitness	Melbourne - Gym	10L/100m^2/day	10L/100m^2/day

2.3 Waste Generation Volumes

Waste generation is estimated by volume in litres (L) as this is generally the influencing factor when considering bin size, numbers and storage space required.

Waste generation volumes in litres per week (L/week) adopted for this waste assessment are shown in Table 2-2. It is estimated that the commercial tenancies at the Proposal will generate 24,502L of refuse and 7,585L of recyclables each week.

Table 2-2: Estimated Waste Generation

Tenancy Use Type	Floor Area (m^2)	Waste Generation Rate	Waste Generation (L/week)
Refuse			
T02 – Speciality	257	50L/100m^2/day	900
T03 – Speciality	111	50L/100m^2/day	389
T04 – Speciality	100	50L/100m^2/day	350
T05 – F&B	219	660L/100m^2/day	10,118
T06 – F&B	237	660L/100m^2/day	10,949
T07 – Speciality	130	50L/100m^2/day	455
T08 – Speciality	129	50L/100m^2/day	452
T09 – Speciality	118	50L/100m^2/day	413
T10 – Health/Fitness	680	10L/100m^2/day	476
		Total	**24,502**
Recyclables			
T02 – Speciality	257	50L/100m^2/day	900
T03 – Speciality	111	50L/100m^2/day	389
T04 – Speciality	100	50L/100m^2/day	350
T05 – F&B	219	660L/100m^2/day	1,993
T06 – F&B	237	660L/100m^2/day	2,157
T07 – Speciality	130	50L/100m^2/day	455
T08 – Speciality	129	50L/100m^2/day	452
T09 – Speciality	118	50L/100m^2/day	413
T10 – Health/Fitness	680	10L/100m^2/day	476
		Total	**7,585**

3 Waste Storage

Waste materials generated within the Proposal will be collected in the bins located in the Bin Storage Area, as shown in Diagram 1, and discussed in the following sub-sections.

3.1 Internal Transfer of Waste

To ensure that waste is managed appropriately at the Proposal, it is important to allow for sufficient space to accommodate the required quantity of bins within the Bin Storage Area.

The commercial tenancies will have a minimum of two bins to facilitate the separate disposal of refuse and recycling. The bins will be transferred by staff/cleaners, or their authorised representative, to the Bin Storage Area and be deposited into the bins during appropriate hours as determined by building management, as required.

All bins will be colour coded and labelled in accordance with Australian Standards (AS 4123.7) to assist the tenants, staff and cleaners to dispose of their separate waste materials in the correct bins.

3.2 Bin Sizes

Table 3-1 gives the typical dimensions of standard bins sizes that may be utilised at the Proposal. It should be noted that these bin dimensions are approximate and can vary slightly between suppliers.

Table 3-1: Typical Bin Dimensions

Dimensions	Bin Sizes			
	240L	360L	660L	1,100L
Depth (mm)	730	848	780	1,070
Width (mm)	585	680	1,260	1,240
Height (mm)	1,060	1,100	1,200	1,300
Area (mm^2)	427	577	983	1,327

Reference: SULO Bin Specification Data Sheets

3.3 Bin Storage Area Size

To ensure sufficient area is available for storage of the commercial bins, the amount of bins required for the Bin Storage Area was modelled utilising the estimated waste generation in Table 2-2, bin sizes in Table 3-1 and based on collection of refuse and recyclables twice each week.

Based on the results shown in Table 3-2 the Bin Storage Area has been sized to accommodate:

- Twelve 1,100L refuse bins; and
- Four 1,100L recycling bins.

Table 3-2: Bin Requirements for Bin Storage Area

Waste Stream	Waste Generation (L/week)	Number of Bins Required			
		240L	360L	660L	1,100L
Refuse	24,502	52	-	19	12
Recycling	7,585	16	11	6	4

The configuration of these bins within the Bin Storage Area is shown in Diagram 1. It is worth noting that the number of bins and corresponding placement of bins shown in Diagram 1 represents the maximum requirements assuming two collections each week of refuse and recyclables.

Diagram 1: Bin Storage Area

3.4 Bin Storage Area Design

The design of the Bin Storage Area will take into consideration:

- Smooth impervious floor sloped to a drain connected to the sewer system;
- Taps for washing of bins and Bin Storage Area;
- Adequate aisle width for easy manoeuvring of bins;
- Doors to the Bin Storage Area self-closing and vermin proof;
- Doors to the Bin Storage Area wide enough to fit bins through;
- Ventilated to a suitable standard;
- Appropriate signage;
- Undercover where possible and be designed to not permit stormwater to enter into the drain;
- Located behind the building setback line;
- Bins not to be visible from the property boundary or areas trafficable by the public; and
- Bins are reasonably secured from theft and vandalism.

Bin numbers and storage space within the Bin Storage Area will be monitored by the building manager during the operation of the Proposal to ensure that the number of bins and collection frequency is sufficient.

4 Waste Collection

A private contractor will service the Proposal and provide the following:

- Twelve 1,100L refuse bins, collected twice each week; and
- Four 1,100L recycling bins, collected twice each week.

The private contractor's rear loader waste collection vehicle will then service the bins onsite, directly from the Bin Storage Area. The private contractor's rear loader waste collection vehicle will travel with left hand lane traffic flow on Ewen Street, turn into the Proposal in forward gear, and reverse up directly opposite the Bin Storage Area for servicing, as shown in Diagram 1.

The private contractor's waste collection staff will ferry bins to and from the rear loader waste collection vehicle and the Bin Storage Area for servicing. The private contractor's waste collection will be provided with key/PIN code access to the Bin Storage Area and security access gates to facilitate servicing, if required.

Once servicing is complete the private contractor's rear loader waste collection vehicle will exit in a forward motion, turning left onto Ewen Street moving with traffic flow.

The above servicing method will preserve the amenity of the area by removing the requirement for bins to be presented to the street on collection days. In addition, servicing of bins onsite will reduce the noise generated in the area during collection. Noise from waste vehicles must comply with the Environmental Protection (Noise) Regulations and such vehicles should not service the site before 7.00am or after 7.00pm Monday to Saturday, or before 9.00am or after 7.00pm on Sundays and Public Holidays. Refer to the acoustic report for further information regarding gate operation.

The ability for an 8.8m Medium Rigid Vehicle to access the Proposal in a safe manner has been assessed by Urbii. Refer to their traffic impact statement for further information.

4.1 Bulk and Speciality Waste

Bulk and speciality waste materials will be removed from the Proposal as they are generated on an 'as required' basis.

Adequate space will be allocated throughout the Proposal for placement of cabinets/containers for collection and storage of bulk and specialty wastes that are unable to be disposed of within the bins in the Bin Storage Area.

These materials will be removed from the Proposal once sufficient volumes have been accumulated to warrant disposal. A temporary skip bin could be utilised for collections, if required. Bulk and specialty waste collection will be monitored by the building manager who will organise their transport to the appropriate waste facility, as required.

5 Waste Management

A building manager will be engaged and responsible for the following:

- Monitoring and maintenance of bins and the Bin Storage Area;
- Monitoring and maintenance of waste systems and equipment;
- Cleaning of bins and the Bin Storage Area, when required;
- Ensure all staff, tenants and cleaners at the Proposal are made aware of this WMP and their responsibilities thereunder;
- Monitor staff, tenants and cleaners and identify requirements for further education and/or signage;
- Monitor bulk and speciality waste accumulation and assist with its removal, as required;
- Regularly engage with staff, tenants and cleaners to develop opportunities to reduce waste volumes and increase resource recovery; and
- Regularly engage with the private contractor to ensure efficient and effective waste service is maintained.

6 Conclusion

As demonstrated within this WMP, the Proposal provides sufficiently sized Bin Storage Area for storage of refuse and recyclables, based on the estimated waste generation volumes and suitable configuration of bins. This indicates that an adequately designed Bin Storage Area has been provided, and collection of refuse and recyclables can be completed from the Proposal.

The above is achieved using:

- Twelve 1,100L refuse bins, collected twice each week; and
- Four 1,100L recycling bins, collected twice each week.

A private contractors will service the Proposal onsite, directly from the Bin Storage Area. The private contractor's rear loader collection vehicle will enter and exit the Proposal in forward gear via Ewen Street.

A building manager will oversee the relevant aspects of waste management at the Proposal.

Figures

Figure 1: Locality Plan

P: PO Box 454, Leederville WA 6903 | A: 604 Newcastle St, Leederville WA 6007 | T: 1300 251 070 | W: www.talisconsultants.com.au

LEGEND

- Site Boundary

Cadastre

- Freehold
- Road
- Strata Plan or Lot
- Easement

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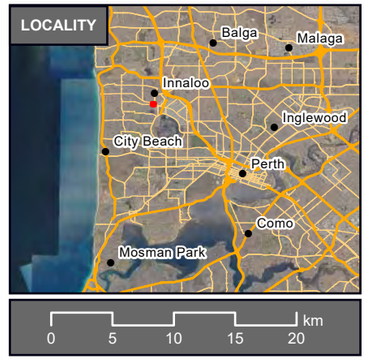


LOCALITY

367 Scarborough Beach Rd
Innaloo WA 6018

Scarborough Beach Road Project Pty Ltd

N
0 5 10 15 20 m

Coordinate System: GDA2020 MGA Zone 50
Scale @ A3: 1:600

Prepared: T Baskerville	Date: 28/10/2022
Reviewed: A Brouwer	Revision: A
Project: TW22146	

talis consultants

Figure 01

Assets | Engineering | Environment | Noise | Spatial | Waste

Talis Consultants

Head Office
Level 1, 604 Newcastle Street,
Leederville
Western Australia 6007

PO Box 454,
Leederville
Western Australia 6903

NSW Office
5/62 North Street, Nowra
New South Wales, 2541

PO Box 1189, Nowra
New South Wales, 2541

P: 1300 251 070
E: info@talisconsultants.com.au

Attachment 6a

Other Technical Documents (not listed in the Responsible Authority Recommendation)

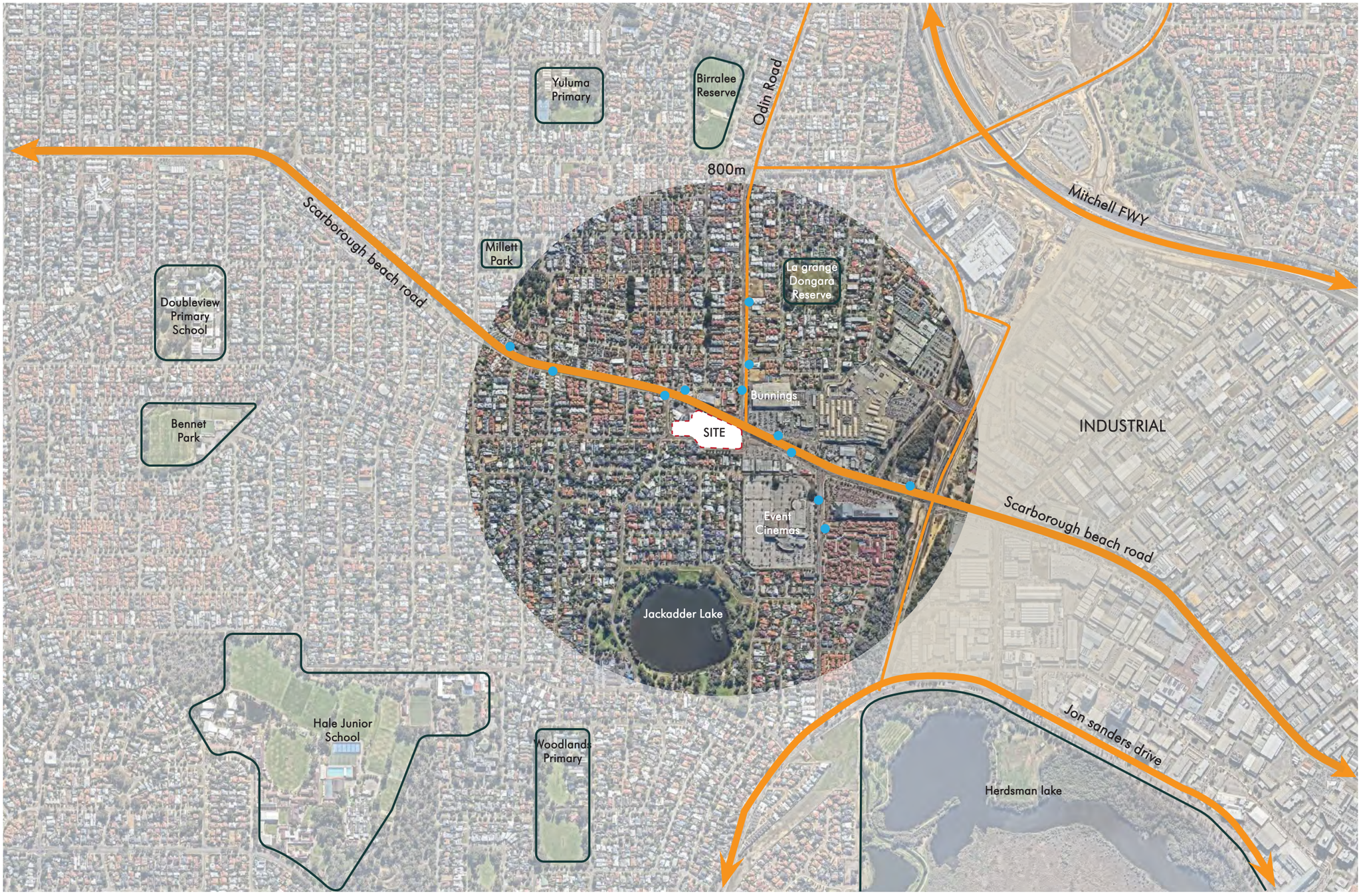
Additional Development Plans

Woodlands North

Development Application

Rev F

04 2026



LEGEND

Key Roads

Bus stops

Broad context plan

Pg 2 Rev F

Woodlands North Development Application 04 2026

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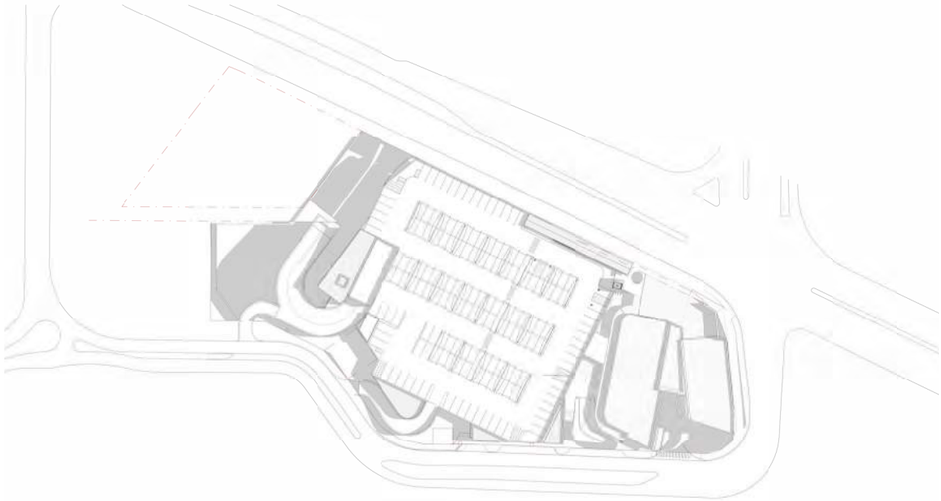

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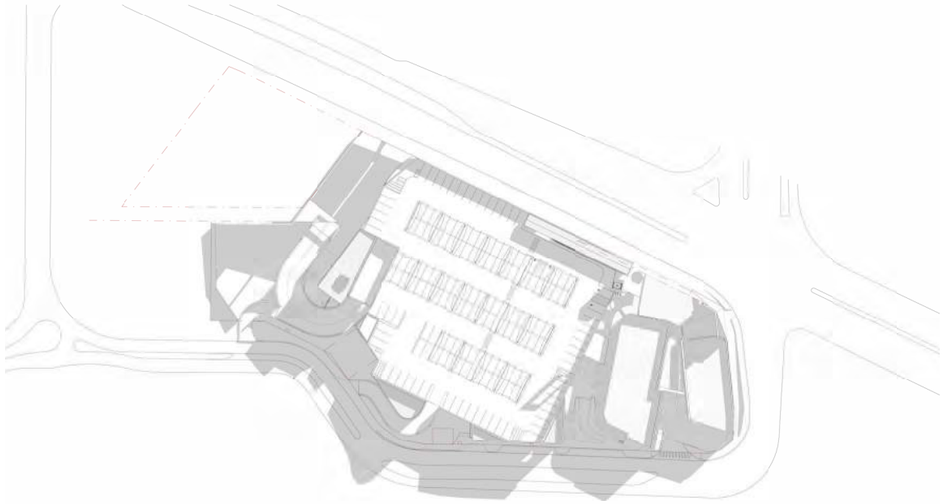

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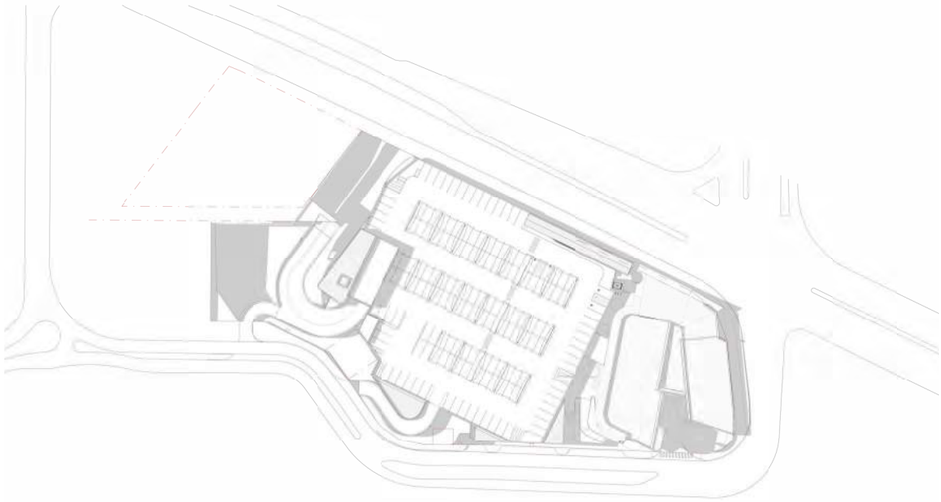

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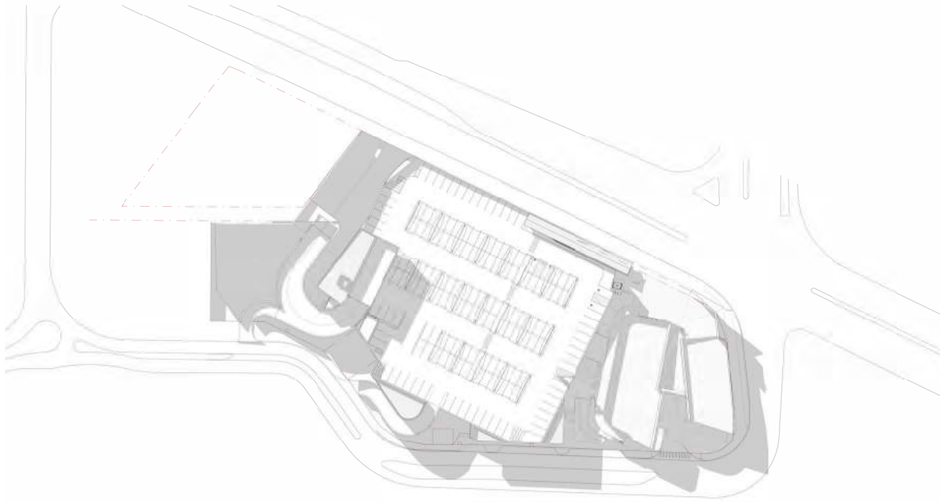

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Sun Shading Diagrams

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Woodlands North Development Application 04 2026

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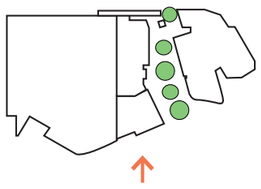
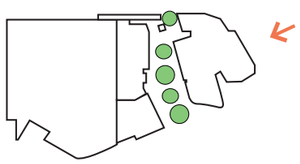
Social on Ewen
SIGNAGE





3D Render

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Woodlands North Development Application 04 2026

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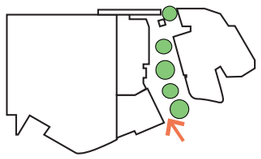

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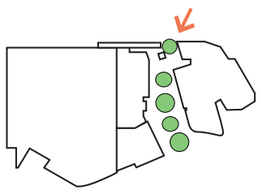

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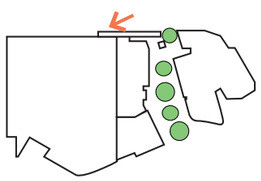

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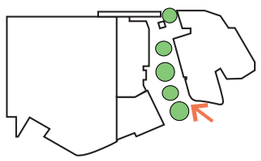

3D Render

Pg 26 Rev F

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Attachment 6b

Other Technical Documents (not listed in the Responsible Authority Recommendation)

Applicant’s Planning Report

City of Stirling
9 September 2025
RECEIVED

PLANNING SOLUTIONS
URBAN & REGIONAL PLANNING
PS

Development Application Report

Woodlands North Neighbourhood Centre

Prepared for

Deltaview (WA) Pty Ltd c/o Windsor Knight

September 2025

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Direct all enquiries to:

Planning Solutions
Level 1, 251 St Georges Terrace
Perth WA 6000

All correspondence to:
Planning Solutions
GPO Box 2709
CLOISTERS SQUARE PO WA 6850

Phone: 08 9227 7970
Fax: 08 9227 7971
Email: admin@planningsolutions.com.au
Web: planningsolutions.com.au

Project Details

Job number	8859	
Client	Deltaview (WA) Pty Ltd c/o Windsor Knight	
Prepared by	Planning Solutions	
Consultant Team	Town Planning Architecture Transport / Road Safety Landscape Waste Acoustic Sustainability	Planning Solutions Place Fabric Urbii UDLA Talis E-Lab Consulting Summation

Document Control

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1 PRELIMINARY

1.1 Introduction

Planning Solutions acts on behalf of Deltaview (WA) Pty Ltd c/o Windsor Knight, the proponent of the proposed neighbourhood centre on the land identified as Lots 1-5 and 66 (278, 276, 274, 272, 270) Ewan Street, Lots 1-8 and 167 (367) Scarborough Beach Road, Lot 12 (365) Scarborough Beach Road, Lots 1-3 on Plan 7078, as well as portions of adjoining road reserves, Woodlands (**subject site**). Planning Solutions has prepared the following report in support of an Application for Development Approval for the proposed development.

The proposal will discuss various issues pertinent to the proposal, including:

- Background
- Site details.
- Proposed development.
- Statutory planning framework.

The application seeks approval for a 6,383m^2 neighbourhood centre comprising 11 tenancies as well as associated parking, landscaping, access, and signage on the subject site. The centre will comprise a mix of retail, speciality, health, and food and beverage tenancies, as well as a central public laneway, which will form the heart of the centre and connect Ewan Street with the Stirling city centre.

The proposed centre has been designed in a contextual and site-responsive manner, referencing the emerging urban character of the area. This is emphasised by a built form and materiality that responds to the prominent landmark location and neighbouring patterns of development, whilst providing a sensitive transition to adjacent land uses and activities.

The development is located within a growing activity centre and will provide additional commercial and civic uses in an area close to public transit, amenities, and the Perth city centre.

Overall, the proposed development is demonstrated to have an exceptional design, providing contemporary, sustainable, and liveable commercial and public spaces. The development will positively contribute to the amenity of the surrounding area, with environmental noise, transport, sustainability, and waste management matters appropriately addressed.

Accordingly, Planning Solutions respectfully requests the Metro Inner Development Assessment Panel (**DAP**) consider the application on its merits and grant approval for the proposed development.

2 PROJECT BACKGROUND

2.1 Pre-Lodgement Engagement

Consultation and pre-lodgement engagement has occurred with the City of Stirling (**City**) with respect to the proposed development, including pre-lodgement meetings, Design Review Panel presentations, and ongoing dialogue. A summary of these meetings is provided below.

2.1.1 Pre-Lodgement Meetings with the City of Stirling

On 14 December 2021, representatives of Planning Solutions attended a pre-lodgement meeting with senior officer of the City to seek preliminary feedback on the proposed development. It is noted that the meeting considered an earlier version of the development concept, incorporating a residential component.

The City's officers provided their 'in-principle' support for the development and outlined the planning framework for the site and locality, as well as the key considerations for development of the site. In particular, the officers identified access and parking, the interface with the adjoining residential area, and frontage treatments as important considerations. This initial development discussion included provision for residential towers as well as the commercial development elements.

On 20 October 2022 the project team (including traffic engineer and architect) met with senior officers of the City's Engineering Business Unit. The discussion focused on potential options for designing functional and safe access to Scarborough Beach Road, noting the requirement for shared access with the adjoining Ampol service station. The officers also provided advice regarding a secondary service area accessed via Ewen Street.

Following refinement of the plans, additional discussions were undertaken in 2023 and 2024, with the revised development proposal being considered. This included provision of pre-application written advice from the City, meeting with the City's Engineers, as well as two reviews from the City's Design Review Panel. Refer outcomes of the DRP discussions below.

Refer **Appendix 1**, Pre-Lodgement Advice.

2.1.2 Design Review Panel Meeting 1

The proposal was presented to the City's Design Review Panel (**DRP**) on 18 July 2024. Broadly, the DRP provided its support for the development, concluding that there was significant merit in the approach being taken with the development of the site. A number of recommendations for further improvement were made.

The comments of the DRP were taken into consideration, with refined plans being presented to the panel 24 October 2024.

2.1.3 Design Review Panel Meeting 2

The revised plans were considered by the DRP on 24 October 2024.

The DRP remained supportive of the proposal, noting that the high-quality retail laneway will serve the community well. The DRP was supportive of the site layout, sustainability attributes, and built form outcomes (including the sleeved retail and the opening of the supermarket).

Minor recommendations for architectural integration to reduce the reliance on fencing were made, as well as some additional landscaping treatments, ramping improvements, and signage refinement. These have been noted, with the development plans being refined further.

Refer **Appendix 2**, DRP 1 and 2 Reports, **Appendix 3** DRP1 and DRP2 Design Packs, and **Appendix 4**, Design Report.

2.1.4 Post-Lodgement Meetings with the City of Stirling and DPLH

Following lodgement on 6 June 2025, the City issued a stop-the-clock notice for the application, seeking additional detail and clarification on the operation and plans.

In response, Planning Solutions met with senior officers of the Department of Planning, Lands and Heritage and the City to discuss the matters raised.

Further to a formal response to the matters raised, this report has been updated to reflect minor revisions to the development plans.

3 SITE DETAILS

3.1 Land Description

The subject site comprises several lots, identified as Lots 1-5 and 66 (278, 276, 274, 272, 270) Ewan Street, Lots 1-8 and 167 (367) Scarborough Beach Road, Lot 12 (365) Scarborough Beach Road, Lots 1-3 on Plan 7078, as well as portions of adjoining road reserves, Woodlands.

Refer to **Table 1** and **Table 2** below for a cadastral summary.

Table 1: Lot Details

Address	Lot	Diagram/Plan	Volume	Folio	Landowner Entity
278 Ewen Street	1	Diagram 20527	1748	876	Deltaview
276 Ewen Street	2				
274 Ewen Street	3				
272 Ewen Street	4		1615	879	
270 Ewen Street	5			880	
-	66		1817	933	
-	1	Plan 7078	1286	171	
-	2		1242	243	
-	3		1266	231	
367 Scarborough Beach Road	1	Strata Plan 9013 / Diagram 34354	1592	162	
	2			163	
	3			164	
	4			165	
	5			166	
	6			167	
	7			168	
	8			169	
-	167	7078	LR3160	46	State of Western Australia
365 Scarborough Beach Road	12	43234	1322	288	One Fund Services Ltd ATF Ampol Property Trust

Table 2: Reserve Land Parcel Identification Numbers

Address	Parcel Identification Number	Landowner Entity
367 Scarborough Beach Road	11785750	State of Western Australia (care of Department of Planning, Lands and Heritage)
	1282926	
	11785751	

Refer **Figure 1**, existing cadastral plan.

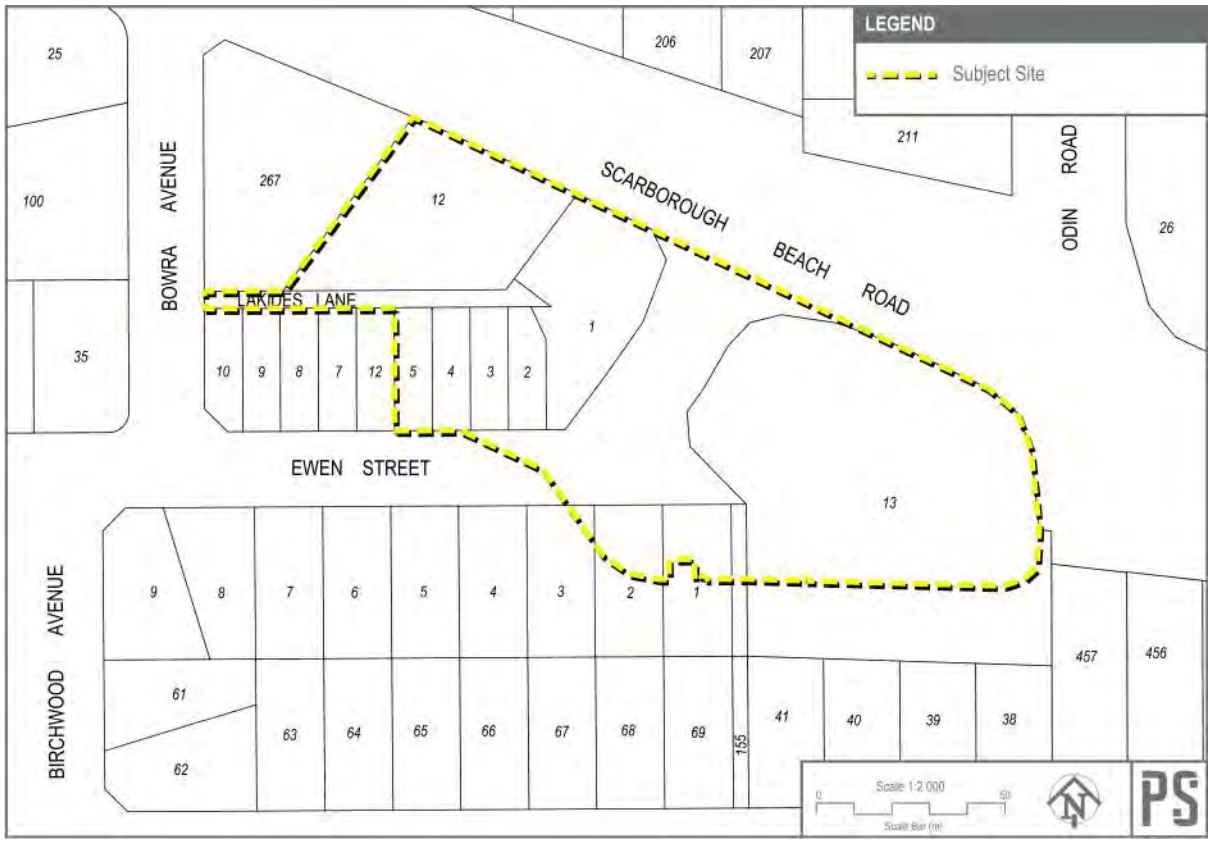

Figure 1: Existing Cadastral Plan

Refer **Table 3** below for a summary of the notifications and encumbrances listed on the Certificates of Title relevant to the proposed development.

Table 3: Notifications and Encumbrances

Land Description	Notification on Title
Lots 1, 2 & 3 on Diagram 20527	Easement benefit for right of way carriageway purposes. **K995451** Caveat by City of Stirling as to Lot 1 on Diagram 20527

This easement is currently in the process of being changed as the vehicle access between Lot 12 and 1 will be modified to respond to the proposed development. In addition, a Right of Way (**ROW**) and 'implied easement' is identified adjoining the western boundary of the subject site. No development is proposed to occur within this portion of the site.

Refer **Appendix 5**, Certificates of Title, Deposited Plans, and Easement Documentation.

It is proposed to amalgamate the subject site into a single freehold lot. The lot is proposed to be identified as Lot 100 on Deposited Plan 64022. The amalgamation will be submitted in due course and be implemented prior to the occupation of the proposed development. Refer **Appendix 6**, draft Deposited Plan.

Refer **Figure 2**, proposed cadastral map.

Figure 2: Proposed Cadastral Plan

3.2 Location

3.2.1 Existing Site Conditions

The majority of the subject site is cleared and vacant, forming a development site following the clearing and reorganisation of the land site. The area has evolved over the years, with a modified layout and street network. Historically, the site has been utilised for a mix of residential and commercial purposes. Refer **Figures 3-5** below.

Figure 3: Landgate Historic Aerial, 1953.

Figure 4: Landgate Historic Aerial, 1977.

Figure 5: Landgate Historic Aerial, 2003.

By circa 2014, the current lot layout and street network was formed. Refer **Figure 6**.

Figure 6: Landgate Historic Aerial, 2003.

Minor portions of Lots 103 along the southern boundary comprise a public road, identified as Ewen Street. The north western portion of the site comprises a service station. No modifications to the service station are proposed as part of this development.

The site slopes from east to west. Refer **Appendix 7**, site feature survey.

3.2.2 Context

The development site is within the municipality of the City of Stirling (**City**), approximately 11kms northwest of the Perth city centre and 4km west of Scarborough Beach. The site is located within the locality of Woodlands and forms part of the broader Stirling city centre.

The subject site is immediately bound by Scarborough Beach Road to the north, a service station to the west, and Ewen Street to the east and south. A mix of residential dwellings and commercial development surround the subject site. Scarborough Beach Road links the subject site to the Mitchell Freeway and West Coast Highway, which provides connection to the Perth city centre and broader metropolitan area.

Broadly, the subject site is surrounded by a wide diversity of commercial, civic, and residential uses and activities of varying typologies, as well as the following key land uses and attractions:

- Westfield Innaloo, located approximately 250m north east of the subject site (on the opposite side of Scarborough Beach Road).
- Jackadder Lake Reserve, located approximately 450m south of the subject site.
- Woodlands Primary School, located approximately 2km south west of the subject site.
- Hale School and Churchlands Senior Highschool, located approximately 3km south west of the subject site.
- Edith Cowan University Mount Lawley Campus, located approximately 8km north east of the subject site.
- Scarborough Beach, located approximately 4km west of the subject site.

The subject site is accessible by public transport with bus stops located along Scarborough Beach Road. Stirling Train Station is also located 2.7km northeast of the subject site. The subject site is highly accessible by foot or bike, with several pathways linking the site to the surrounding neighbourhood.

Refer **Photographs 1-6** and **Figure 7,** depicting the subject site and surrounds.

Photograph 1: View of the development site looking east toward the intersection of Ewen Street and Scarborough Beach Road.

Photograph 2: View of the development site looking south towards Ewen Street.

Photograph 3: View of the development site looking north east towards Scarborough Beach Road.

Photograph 4: The Child Care Centre adjoining Ewen Street from the southern boundary of the development site.

Photograph 5: View from the southern boundary of the development site facing southeast looking towards the Ewen Street.

Photograph 6: View of the Ampol Service Station from the southern boundary looking north towards Scarborough Beach Road.

Figure 7: Context Map

4 PROPOSED DEVELOPMENT

The application seeks approval for a 6,383m^2 neighbourhood centre comprising 11 tenancies as well as associated parking, landscaping, access, and signage on the subject site. The centre will comprise a mix of retail, speciality, health, and food and beverage tenancies, as well as a central public laneway, which will form the heart of the centre and connect Ewan Street with the Stirling city centre.

4.1 Development Summary

A detailed summary of the proposed development is provided in **Tables 4** and **5** below.

Table 4: Development Summary

Particulars	Proposed
Height	10.99m / two stories
Setback	• West: Nil-5.2m • East: Nil-2.4m. • South: Nil-0.87m
Commercial Floorspace	6,383m^2
Car Bays	156 bays on site and an additional 7 on street bays. Four motorcycle bays.
Bicycle Bays	16 visitor/public bays and 14 staff bays.
Landscaping	1,040m^2 (9.6%), comprising 628m^2 on site and 412m^2 off site. All landscaping is deep soil. 71 trees.
Land Use	'Shop', 'Recreation Private', 'Fast Food Outlet', and 'Restaurant'.

Table 5: Development Particulars

Level	Development Particulars
Ground Floor	• Northern retail building, comprising six retail tenancies, internal amenities and stores, back of house areas, and travelator/lift to upper floor parking area. • Southern retail building, comprising six tenancies, internal amenities and stores, end of trip facility and back of house areas. • Central public laneway, comprising landscaping, alfresco areas, seating, bicycle parking, and building entrances. • 1,040m^2 of landscaping. • Upgraded external pathway network, including new landscaping and alfresco areas. • Seven vehicle bays along Ewen Street. • One 18.37m wide crossover to Scarborough Beach Road, providing access to the western loading dock and ramp to first floor parking area. • One service crossover to Ewen Street, providing access to the eastern loading dock. • Two additional crossovers to Ewen Street providing access to the ramp to first floor parking area. • Western loading dock, including bin store, tank, and service areas.

Level	Development Particulars
	• Eastern loading dock, comprising bin store and service areas.
Level 1	• 156 vehicle parking bays, with shade sails. • Travelator and lift to ground floor. • Services.
Roof	• Services and plant. • Lift overrun. • PV cells.

Refer **Appendix 8**, development plans, including the retail tenancy plan.

4.2 Design and Sustainability

The proposed development has been designed in a site-responsive and contextual manner, referencing the emerging urban character of the area. This is emphasised by a built form and materiality that responds to the prominent landmark location and neighbouring patterns of development, whilst providing a sensitive transition to adjacent land uses and activities.

The development will create a lasting contribution to the growing Stirling city centre, with a high quality and crafted precinct setting the benchmark for design and sustainability excellence in the locality. Specifically, the development has the following key design and sustainability attributes:

- The development is designed to reference surrounding residential textures and patterns, including the use of curves and arches, face brick and wooden detailing, use of breezeways, extensive vegetation, and vertical articulation.
- The use of warm tones, sharp black and gold framing, painted patterned concrete finishes, perforated screening with indigenous artwork/patterns, feature tiling, and wood panelling gently complement the surrounding architectural identity, albeit in a contemporary manner, consistent with the evolving character of the locality.
- The development comprises two buildings, with a central community laneway / public space. The building mass has been concentrated to the boundaries of the site, ensuring activation to all surrounding streets. With a maximum height of two storeys, the development does not overshadow neighbouring development nor introduce any privacy concerns.
- The development is sensitive to its surrounds with a unique response to each respective frontage. Appropriate setbacks and a concentration of landscaping to the southern boundary ensure a soft transition and adequate separation from neighbouring residential dwellings. Extensive glazing, alfresco, awnings, and minimal setbacks to the eastern and northern boundaries ensure passive surveillance, engagement, and street activation.
- Notwithstanding, the development is designed in a prominent manner to create a distinct landmark for the locality. Through the establishment of a central laneway/town square and introduction of new retail, health, and food and beverage uses and activities, the proposed centre will form the civic and commercial heart for the community and broader city centre. The development seeks to create a true urban village, corresponding with its neighbourhood centre status and act as a landmark feature when travelling through the city centre to the coast.
- Access and servicing are considered in a holistic manner with the car park positioned on the roof. Various crossovers to Scarborough Beach Road and Ewen Street have been designed to minimise impact to surrounding pedestrian and vehicle paths. All loading and servicing are internal to the building and sleeved from public review. Refer further analysis in the following sections.

- Significant on-structure planting and deep soil zones soften the perceived bulk and scale whilst providing a strong biophilic response. Generous open spaces are proposed, namely through the provision of a new laneway and town square. This space comprises alfresco, seating areas, as well as generous landscaping.
- The proponent is committed to achieving a sustainable outcome, with the development aiming to ensure strong environmental performance. This will be achieved through inclusion of varying sustainability measures including use of sustainable materials, electrification of building services, water wise native landscaping, bike racks, renewable energy, and PV cells.

Refer **Figures 8-10**, perspectives, **Appendix 4**, design report, and **Appendix 9**, sustainability assessment.

Figure 8: Perspective view of proposal from Ewen Street.

Figure 9: Perspective view of proposal from Scarborough Beach Road.

Figure 10: Perspective view of proposed internal community laneway.

4.3 Landscaping and Public Realm

The development proposes 1,040m^2 (9.6%) of landscaping, comprising 628m^2 on site and 412m^2 off site. All landscaping will be deep soil. Combined, the landscaping creates a significant biophilic response, enhancing the public realm and internal amenity, as well as integrating the development into the surrounding community.

The proposed landscaping comprises:

- The provision of a new central community laneway, comprising landscaped areas, seating, alfresco, and building entrances. The laneway will connect Ewen Street to the city centre and provide a new civic heart for the surrounding community.
- Enhancements to the surrounding streets, including new planting areas, parking bays, upgraded paths, and bike racks. Alfresco is proposed along Ewen Street and Scarborough Beach Road.
- Deep soil areas have been concentrated along the southern boundary, being the most sensitive interface. This deep soil zone provides an additional buffer and assists to integrate the development into its setting with a green frame and soft edges.
- Vegetation includes a number of native and exotic plantings, specific to the needs of the site. Overall, species have been chosen for functionality, as well as its integration into the overall architecture of the development. Overall, the development proposes a substantial number of trees (71).

Refer **Appendix 10**, landscaping plan.

4.4 Access, Parking, and Servicing

4.4.1 Access

<u>Pedestrian Access</u>

Public pedestrian and cycling access for the development is proposed via building entrances along the central laneway. The laneway is accessed via Scarborough Beach Road/Ewen Street, as well as travellators/lifts from the upper floor parking area. Several tenancies are also directly accessed via the street/laneway.

The central laneway will be accessible to pedestrians and cyclists only. Staff entrances are available via the two loading docks.

Vehicle Access

Vehicle access is consolidated into three access points, specifically:

- One 18.37 wide crossover to Scarborough Beach Road, providing access to the western loading dock and ramp to first floor parking area.
- One services only crossover to Ewen Street, providing access to the eastern loading dock.
- Two additional crossovers to Ewen Street, providing access to the ramp to first floor parking area.

4.4.2 Vehicle and Bicycle Parking

30 bicycle bays are proposed within the site. 14 of the bicycle bays and an end of trip facility area is provided for commercial staff within the eastern retail building. 163 vehicle parking bays are proposed for the development, comprising 156 bays on the upper floor as well as seven street bays along Ewen Street. The upper floor parking areas is accessed via ramps from the Scarbrough Beach Road and Ewen Street crossovers.

4.4.3 Loading

Two loading areas are proposed on the ground floor, one for each respective retail building. Each loading area comprises bin stores, services, and commercial loading areas. This ensures all loading and servicing occurs within the site and is screened from the public realm.

Refer **Appendix 11**, Transport Impact Assessment.

4.5 Environmental Noise

An Environmental Noise Assessment (**ENA**) was prepared in accordance with the *Environmental Protection (Noise) Regulations 1997* (**Regulations**). The assessment notes the proposed development is only at the development application stage and much of the detailed design is yet to occur. The assessment addresses the acoustic considerations in relation to noise emissions, noise separation, and noise intrusion.

Further noise assessment and modelling will need to be undertaken as the detailed design progresses to confirm compliance, as outlined in the assessment. Refer **Appendix 12,** Environmental Noise Assessment.

4.6 Waste

A Waste Management Plan (**WMP**) has been prepared in support of the proposed development. The WMP considers estimation of general waste volumes and recommendations for appropriate collection, storage, handling and management of waste and recycling for the development.

The development proposes two dedicated bin stores, within each loading area. Commercial tenants will be responsible for taking their waste to the respective commercial bin stores.

A private contractor will service the bin stores via rear loader waste collection vehicle. The ability for the private contractor's rear loader waste collection vehicle to adequately access the proposed development has been assessed within the TIA (refer **Appendix 11**).

As detailed in the WMP, Building Management will be responsible for implementing the WMP and maintaining the bin storage rooms, bin presentation area and monitoring the overall waste collection of the proposed development, and will regularly engage with commercial tenants and the private contractor, as required. Refer **Appendix 13,** Waste Management Plan.

5 STRATEGIC PLANNING FRAMEWORK

5.1 Perth and Peel @ 3.5 Million

Perth and Peel at 3.5 Million is the overarching spatial planning framework applicable to the Perth and Peel regions. The document provides guidance on where development should occur to ensure sustainable urban growth, protect the environment and heritage, and make the most effective use of existing infrastructure. The *Perth and Peel @ 3.5 Million* documents set the context for four draft sub-regional planning frameworks, including the *Central Sub Regional Planning Framework* relevant to the subject site (refer **section 5.2** below). This framework guides infill development, with the aim to deliver a compact and connected city.

The proposed development involves the development of a landmark site within the identified Stirling city centre with a mixed-use neighbourhood centre. The proposed centre provides further retail, civic and community infrastructure for the city centre, consistent with the intent of *Perth and Peel @ 3.5 million*.

5.2 Central Sub-Regional Framework

The Perth and *Peel @ 3.5 Million Central Sub-Regional Planning Framework* (**framework**) is a key instrument for achieving a more consolidated urban form that will reduce dependence on new urban greenfield developments. The framework provides the spatial framework which will guide local governments in achieving optimal urban consolidation over the long term and supports the orderly and proper development of infill through the region by encouraging development adjacent to activity centres, station precincts, and urban corridors.

The framework identifies the Stirling city centre as an 'Activity Centre', described as:

> *Activity Centres are hubs that attract people for a variety of activities, such as shopping, working, studying and living. These centres mainly consist of a concentration of commercial uses combined with a varying proportion of other land uses such as residential, schools and open space. The role and function of these centres and the diversity of activities within them depending on their catchment.*

The proposed development will support the growth of the centre through the provision of new retail, health, and community uses, as well as the provision of new public space (community laneway). In particular, the development will provide a 'neighbourhood' level of service for the surrounding locality, rather than the broader metropolitan attractor of the wider city centre.

The centre is appropriately situated adjacent to excellent public transport access and provides the catalyst for the ongoing redevelopment, diversification, and densification of the immediate locality. The development will utilise a site long left vacant, increasing the activity of the area. The centre will also provide construction and ongoing employment opportunities.

The development is entirely consistent with the role and function of the centre, as well as the broader intent and objectives of the framework.

5.3 City of Stirling Local Planning Strategy

The *City of Stirling's Local Planning Strategy* (**strategy**) was endorsed by the Western Australian Planning Commission in 2019 and provides the strategic direction and spatial framework for the long-term growth and development of the municipality. The vision of the strategy is to:

> *Focus investment, jobs and growth on corridors and centres around transit; improve the quality of suburbs and centres and the overall liveability of the City.*

The strategy identifies the site as located within the Strategic Metropolitan Centre and abuts a Class 1 Corridor. Refer **Figure 11** below.

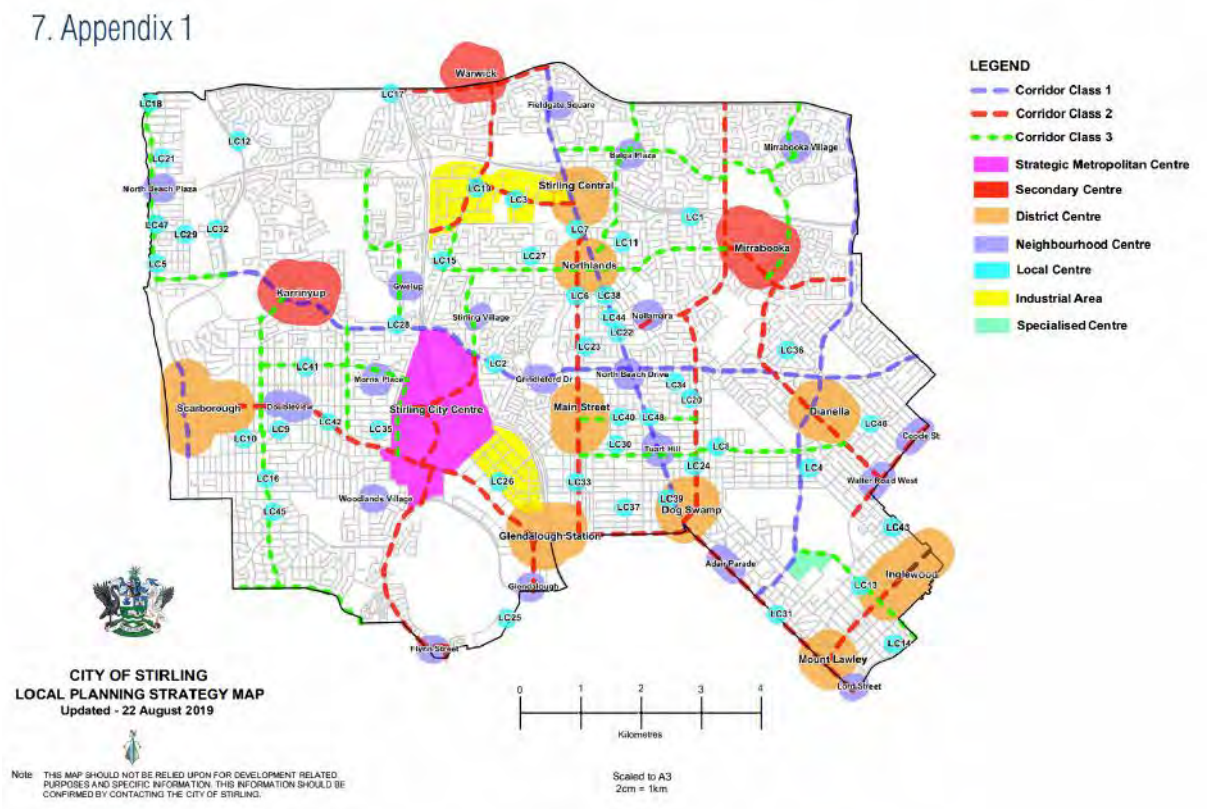

Figure 11: Local Planning Strategy Map

Both Activity Corridors and Activity Centres are generally referred to throughout the document being the focus of increased development to capitalise on public transport, whilst decreasing pressure on surrounding suburban areas.

The strategy sets four main objectives:

1. Prioritise growth and investment in Activity Centres and Corridors;
2. Keep the jobs we have now and grow them;
3. Transport and land use will be coordinated and integrated;
4. Improving the quality and liveability of the City.

As noted above, the development provides a neighbourhood level of service for the immediate locality, diversifying the role of the centre. The centre will provide additional health retail, and community uses, as well as new public space.

The centre is appropriately situated adjacent to excellent public transport access and provides the catalyst for the ongoing redevelopment, diversification, and densification of the immediate locality. The development will utilise a site long left vacant, increasing the activity of the area. The centre will also provide construction and ongoing employment opportunities.

6 STATUTORY PLANNING FRAMEWORK

6.1 Planning and Development Act 2005

6.1.1 Planning Control Area 166

The subject site is identified as being within *Planning Control Area 166: Scarborough Beach Road – Hinderwell Street to Odin Road and King Edward Road to Main Street* (**PCA166**), made under the provisions of the *Planning and Development Act 2005* (**act**).

The purpose of the PCA166 is to protect land for the future widening and improvement of the Scarborough Beach Road Other Regional Road reservation corridor by ensuring no development occurs on this land which might prejudice this purpose until it may be reserved for Other Regional Roads in the Metropolitan Region Scheme.

As demonstrated in **Figure 12** below, a minor slither of the subject site is impacted by PCA166 along the Scarborough Beach Road frontage. The proposed development has been setback along this frontage, with only landscaping proposed.

Figure 12: PCA166 Map Extract

In accordance with section 115 of the act, the local government is required to forward this application to the WAPC for determination.

6.2 Metropolitan Region Scheme

The subject site is predominately zoned 'Central City Area' under the provisions of the Metropolitan Region Scheme (**MRS**).

The site abuts Scarborough Beach Road along the northern boundary, which is reserved 'Other Regional Road' under the MRS. A small portion of this reservation encroaches on the site in its north-western corner. This portion is also identified as part of PCA166 (refer **section 6.1**). Refer **Figure 13** below.

Figure 13: MRS Zoning Map Extract

The proposed development has been setback from the reservation, with only landscaping proposed. The portion of Other Regional Roads reservation that encroaches the subject site corresponded to the old Ewen Street connection with Scarborough Beach Road, which is no longer in place.

The subject site is also identified as being within the 'Stirling and Glendalough Station Precinct' made under the MRS clause 32 RES2021/01 resolution.

Pursuant to the resolution, the WAPC is the decision maker for the development under the MRS.

6.3 State Planning Policies

6.3.1 State Planning Policy 4.2 Activity Centres

State Planning Policy 4.2 – Activity Centres (**SPP4.2**) specifies the broad planning requirements for the planning of new activity centres and the redevelopment and renewal of existing centres in Perth and Peel. SPP4.2 includes objectives for a range of activity centres, including Perth capital city, strategic metropolitan, secondary, specialised, district, and neighbourhood centres.

The subject site is identified as being within the Stirling 'Strategic Centre'. Pursuant to Appendix 1 of SPP4.2, a Strategic Metropolitan Centre is described as follows:

> *Strategic centres are the main regional and sub-regional activity centres. They are multi-purpose centres that provide a diversity of uses and are the main focus for housing and employment growth outside the Capital City. These centres provide the full range of economic and community services necessary for the communities in their catchments and wider region. These centres are expected to service substantial populations, providing health, community and social services, be well-served by public transport and provide opportunities for business agglomeration.*

The desired land uses are:

> *The centre core or cores should contain district centre land uses and office – large. Local and neighbourhood centre land uses should be scattered throughout the strategic centre to ensure walkable access to daily and weekly goods and services for residents, visitors and workers*

The proposed development will support the growth of the centre through the provision of new retail, health, and community uses, as well as the provision of new public space (community laneway). In particular, the development will provide a 'neighbourhood' level of service for the surrounding locality, rather than the broader metropolitan attractor of the wider city centre.

The centre is appropriately situated adjacent to excellent public transport access and provides the catalyst for the ongoing redevelopment, diversification, and densification of the immediate locality. The development will utilise a site long left vacant, increasing the activity of the area. The centre will also provide construction and ongoing employment opportunities.

The development is entirely consistent with the role and function of the centre, as well as the broader intent and objectives of SPP4.2.

Pursuant to Clause 7.8(g), a Net Benefit Test is not needed in support of the development.

6.3.2 State Planning Policy 7.0 – Design of the Built Environment

State Planning Policy 7.0 – Design of the Built Environment (**SPP 7.0**) is the lead policy that elevates the importance of design quality, and sets out the principles, processes and considerations which apply to the design of the built environment in Western Australia, across all levels of planning and development.

SPP 7.0 establishes a set of ten 'Design Principles', providing a consistent framework to guide the design, review and decision-making process for planning proposals.

Refer **Appendix 3**, DRP1 and DRP2 Design Packs, **Appendix 4**, Design Report, and **Appendix 8**, Development Plans. The DRP1 and DRP2 Design Packs outlines the design intent for the development, demonstrate how the proposal has developed in response to Design Review Panel comments, and provides high level commentary against SPP7.0. The SPP7.0 commentary is furthered by the DRP2 panel comments and applicant responses provided in **Appendix 4**.

6.3.1 Development Control Policy 5.1 – Regional Roads (Vehicular Access)

Development Control Policy 5.1 – Regional Roads (**DC 5.1**) sets out the principles to be applied when considering proposals for vehicle access to or from developments abutting regional roads. Scarborough Beach Road is classified as a 'Primary Road' road under the Main Roads WA hierarchy.

An assessment against the provisions of DC 5.1 is provided in **Table 6** below.

Table 6: DP5.1 Assessment

Provision / Requirement	Proposed	Complies
3.3.1 In considering applications for access on regional roads, the effects of the proposals on traffic flow and road safety will be the primary consideration. *The more important the regional road, the greater the importance attached to these factors. In general, the Commission will seek to minimise the creation of new driveways on regional roads and rationalise existing access arrangements*	The development proposes a reconfiguration of the existing access arrangements. Specifically: • One 18.37 wide crossover to Scarborough Beach Road, providing access to the western loading dock and ramp to first floor parking area. • One services only crossover to Ewen Street, providing access to the eastern loading dock. • Two additional crossovers to Ewen Street, providing access to the ramp to first floor parking area. A TIA has been prepared in support of the development. The TIA confirms the suitability of the proposed access arrangements. Refer **Attachment 10,** Transport Impact Assessment.	✓
3.3.4 The types of development that would be allowed access to a regional road include large traffic generators such as major shopping, recreation or community centres. These would justify either a local distributor or access road, leading from a junction with the regional road to car parks servicing the centre.	The proposed development comprises a new commercial centre and by virtue warrants access from Scarbrough Beach Road. Notwithstanding, access has been rationalised and distributed via egress to Ewan Street. A TIA has been prepared in support of the development. The TIA confirms the development will not result in any undue impact to the surrounding road network. Refer **Attachment 10,** Transport Impact Assessment.	✓
3.3.5 In determining applications for development involving the formation, laying out or alteration of a means of access to regional roads, the following must be considered: *- the effects of the development on traffic flow and safety, the character and function of the road, the volume and speed of traffic, the width of the carriageway and visibility; and* *- the volume and type of traffic generated by the development.*		

As demonstrated in **Table 6** above, the proposed development is compliant with the provisions of DC5.1 and warrants approval accordingly.

6.4 City of Stirling Local Planning Scheme No. 3

6.4.1 Zoning

The subject site is subject to the provisions of the City of Stirling Local Planning Scheme No.3 (**LPS3**). Pursuant to LPS3, the subject site is predominately zoned 'Development', with portions reserved 'Other Regional Road' and 'No Zone'. The site is also within the Stirling City Centre Special Control Area (**SCA**) and Development Contribution Area 5 (**DCA5**).

The site is not subject to any other overlay.

Refer **Figure 14,** LPS3 Map Extract.

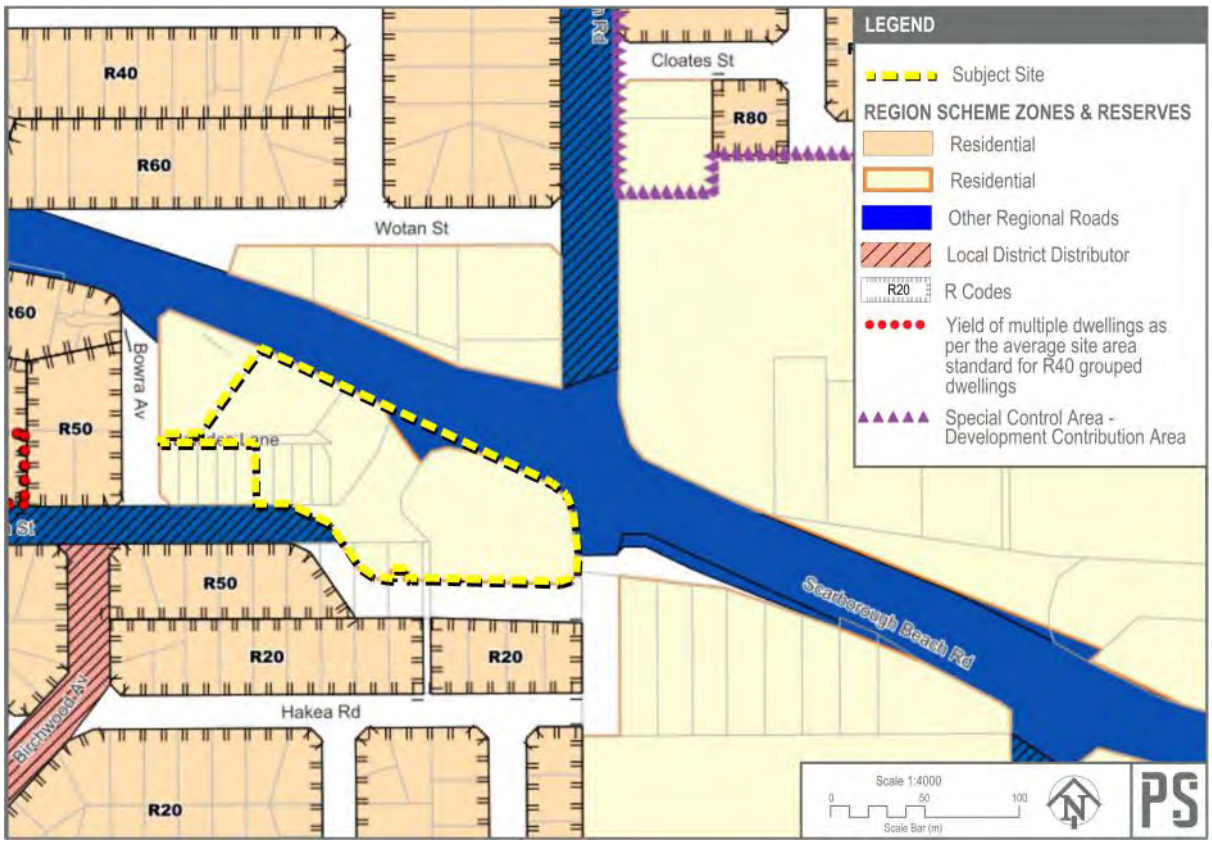

Figure 14: PS3 Zoning Map Extract

Development Zone

Pursuant to Clause 4.2.3, the objectives of the Development Zone are:

a) *To provide for coordinated development through the application of a comprehensive structure plan to guide subdivision and development.*

b) *To avoid the development of land for purposes likely to compromise its future development for purposes, or in a manner likely to detract from the amenity or integrity of the area.*

The draft Stirling City Centre Structure Plan (**SCCSP**) is the appliable structure plan for the subject site. Whilst it has not been adopted by the WAPC, as it has been advertised for public comment and adopted by Council, it is considered to be a 'seriously entertained' planning instrument and has been given due regard.

A number of provisions of the SCCSP has been normalised into the LPS3 and form part of the SCA provisions. Refer below.

ORR Reservation

The portion of the site reserved 'Other Regional Road' is in accordance with the corresponding MRS reservation.

Refer **section 6.2** above.

No Zone

A portion of the site has no zone, forming part of a historic road reserve. For the purpose of assessment, this portion of the site will be considered to be within the 'Development' zone, pursuant to Clause 4.13.

It is anticipated that this portion of the site will be rezoned as part of the future Local Planning Scheme No. 4. Refer **section 6.6** below.

Stirling City Centre Special Control Area

Pursuant to Clause 6.11.1 of LPS2, the objectives of the SCA are:

> *a) To facilitate the development of the Stirling City Centre in a coordinated manner, recognising its significance as a Strategic Metropolitan Centre;*
>
> *b) to provide a strategy for the integrated development of public and private land to facilitate the creation of a safe, vibrant mixed-use centre;*
>
> *c) to ensure the provision of an effective, efficient, integrated and safe transport network which is accessible to pedestrians, cyclists and public transport users and motorists;*
>
> *d) to facilitate funding mechanisms for the provision of light rail and other alternative transport infrastructure.*
>
> *e) to ensure the development of a diverse range of housing types (including affordable housing) in unique precincts that have high levels of amenity;*
>
> *f) to ensure the development of a convenient network of public open space (including an urban stream) offering a wide range of high quality facilities tailored to the requirements of the local community;*
>
> *g) to ensure the development of a range of commercial uses that will contribute towards economic development, local employment and the viability of the area as a commercial centre servicing residents, visitors and the local workforce;*
>
> *h) to ensure the development of a range of community facilities that will service residents, visitors and the local workforce and contribute towards community wellbeing; and*
>
> *i) to ensure the conservation and appropriate use of natural resources including (but not limited to) energy, water and land to enhance the sustainable management of finite resources.*

Pursuant to Clause 6.11.2, the subject site is identified as being with the 'Southern Precinct'.

Pursuant to Clause 6.11.3, development within the SCA area shall have due regard to any Activity Centre Plan, Local Development Plan, and the relevant clauses of the Scheme.

As noted above, the SCCSP is the applicable structure plan. The City of Stirling Southern Precinct Local Development Plan (**LDP**) is the relevant local development plan. Refer **section 6.7** below.

Clauses 6.11.7 – 6.11.10 (and including Tables 6.11.9 and 6.11.10(d)) set out the land use permissibility within the SCA and Southern Precinct. Refer **section 6.4.2** below.

Development Contribution Area 5

The site is adjacent to Development Contribution Area 5 – Right of Way Improvement Works.

Refer **section 6.8.3** below.

6.4.2 Land Use Permissibility

The proposed development comprises a variety of commercial tenancies. These tenancies are best classified as 'Shop', 'Recreation Private', 'Fast Food Outlet', and 'Restaurant'.

Pursuant to clause 6.11.7 and 6.11.8 of LPS3, land within the SCA is to be classified by land use sectors and categories as provided by the relevant LDP.

The City of Stirling Southern Precinct Local Development Plan (**LDP**) is the relevant LDP for the Southern Precinct of the Stirling City Centre, including the subject site.

Pursuant to the LDP, the subject site is within Sub Precinct A and is assigned 'Business' to the ground level frontage along Scarborough Beach Road and 'Mixed Use' to the remainder of the ground level.

Refer **Table 7** below for a summary of the land permissibility.

Table 7: Land Use Permissibility

Use Class	Land Use Category	
	Mixed Use	**Business**
Fast Food Outlet	Permitted	Permitted
Recreation Private	Permitted	Permitted
Restaurant	Permitted	Permitted
Shop	Permitted*	Permitted

* Maximum net lettable area of 1,000m^2

As demonstrated above, all proposed uses are identified as 'permitted' within the corresponding land use category area of the building, and therefore capable of approval.

Notwithstanding, a notation accompanying the land use permissibility table restricts a 'Shop' tenancy in the 'Mixed Use' land use category to a maximum 1,000m^2 net lettable area. The proposed retail tenancies are split over both land use sectors and comprise a gross floor area greater than 1,000m^2.

Fundamentally, the land use categories and plans are diagrams contained within the LDP are subordinate to provisions contained in LPS3 or the *Deemed Provisions*. As such, while Tables 6.11.9 and 6.11.10 are contained in LPS3 and have the appearance of a standard Zoning Table, the source of the land use categories and their spatial arrangement is the LDP, which is a 'due regard' instrument in accordance with clause 56(1) of the *Deemed Provisions*.

In accordance with the principle of statutory interpretation that "*a stream cannot rise higher than its source*", the land use permissibility tables (Tables 6.11.9 and 6.11.10 of LPS3) are therefore also 'due regard' instruments, and a decision-maker is <u>not bound by the land use permissibility tables or the associated annotations</u>. As such, it is open to the decision-maker to approve the shop tenancy with a floorspace exceeding 1,000m^2 NLA.

The locality, and particularly the Scarborough Beach Road corridor, is characterised by predominantly large 'highway commercial' type uses, capitalising on the high traffic volumes along the arterial road. Scarborough Beach Road presents a relatively hostile environment for pedestrians, and is therefore a particularly challenging environment for small format shop retail uses. Despite being planned for more intensive retail uses for more than 25 years, the area has seen minimal redevelopment, and the subject site has remained vacant for a similar period. The history of the site suggests that small format retail uses are unlikely to be viable in the absence of a major anchor tenant.

In light of the above, the proposed uses are therefore capable of being approved as proposed, including the major retail tenancy. The proposed development is reliant on a major anchor tenant to support the small format retail and food & beverage tenancies, which would likely be unviable as stand-alone businesses in the context of the subject site. The stated objectives of the SCA include recognising the area's significance as a Strategic Metropolitan Centre and ensuring the development of "*a range of commercial uses that will contribute towards economic development, local employment and the viability of the area as a commercial centre servicing residents, visitors and the local workforce*". As such, the proposed uses are entirely consistent with the objectives of the SCA and warrant approval.

6.4.3 Development Standards

As assessment against the relevant development standards of LPS3 is provided below.

Mandatory Residential

Clause 6.11.11 of LPS3 sets out the requirements for minimum residential dwelling yield for development within the SCCSP area. Figures 3 and 4 of the LDP stipulate that a minimum yield of 100 dwellings is required for development on the street block bounded by Ewen and Bowra Streets and Scarborough Beach Road (including the subject site). The proposed development does not incorporate any dwellings and seeks a variation to the requirements of Clause 6.11.11.

As noted above, in accordance with the principle of statutory interpretation that "*a stream cannot rise higher than its source*" which was detailed above for land use, the mandatory residential component detailed by this clause is related to an approved Local Development Plan which is a 'due regard' instrument, and a decision-maker is not bound by the mandatory residential component. As such, it is open to the decision-maker to approve the proposed development without the residential component in accordance with Clause 5.5 of LPS3. It is considered the proposed development warrants approval without the residential component for the following reasons:

1. A previous development application was submitted for the subject site which incorporated 122 dwellings. This development application was ultimately withdrawn due to the feasibility of the residential component of the proposed development. The commercial component of the proposed development is still feasible and will enable the longstanding undeveloped and eyesore of a site to be developed.
2. Notwithstanding, the development does not fetter the ability of the site to accommodate residential development in the future through the addition to or redevelopment of the centre. Nor does the development fetter the ability of neighbouring sites to be developed for residential purposes.
3. By allowing residential development to be pursued at a time when it is deemed commercially feasible, it provides the ability for greater yields then what may have been pursued in the previous scheme.
4. The proposed commercial only development has been subsequently reviewed by the City's Design Review Panel on two occasions with the most recent meeting confirming a continued level of support. A number of the points identified by the DRP have been resolved as part of the finalised design and or by way of further detailed design and condition setting which will come later on the in project.
5. The proposed development is largely consistent with the remainder of the planning framework, which includes LPS3 and more specifically the objectives of the Stirling City Centre, State Planning Policies, Local Development Plan and Local Planning Policies which have been addressed within this planning report.
6. The proposed development is supported by the necessary technical assessments which demonstrate the proposal has been considered from a traffic, acoustic, sustainability and landscaping perspective to ensure the proposed provides a high-quality built form and functional development for the locality.
7. The proposal will incorporate commercial uses and development which will support the wide locality. The introduction of the community laneway with active uses will ensure this development will set a high-quality standard for development along the Scarborough Beach Road corridor and for the wider Stirling City centre precinct.
8. Ultimately, the provision of a commercial centre on a site which has remained undeveloped for over 25 years is considered a superior outcome over allowing the site to remain vacant until such a time residential development is feasible.

For the reasons outlined above, we consider the proposed development should be considered on its merits and the mandatory residential requirements should be varied in accordance with Clause 5.5 of LPS3.

Non-Residential Floorspace Requirements

Pursuant to Clause 6.11.12 of LPS3, a decision-maker shall have due regard to the minimum floorspace requirements of an Activity Centre Plan in determining an application. Clause 5.1.2 of the SCCSP sets a 'land use target' of 173,497m^2 of commercial net lettable area within the Southern Precinct.

Neither the SCCSP nor LDP detail how the commercial floorspace is to be distributed throughout the Southern Precinct. The application proposes 6,383m^2 of non-residential floorspace.

Pursuant to SPP4.2, as the site is within a strategic activity centre, no retail/economic reporting is required.

Active Frontage Streets

Clause 6.11.14 sets out the requirement to consider relevant provisions of the SCCSP/LDP relating to 'Active Frontage Streets'. Pursuant to the SCCSP, Scarborough Beach Road is identified as an Active Street.

The proposed development features extensive glazing to the Scarborough Beach Road elevation, creating visual interest and activity. A landscape strip along the building frontage enhances the amenity and appearance of the building for any pedestrians. It is noted that Scarborough Beach Road is a hostile environment for pedestrians and sees only very limited foot traffic. It is not considered feasible to require development to incorporate small format retail uses with primary frontage to the arterial road, which comprises 8 lanes of free-flowing traffic adjacent to the site. The proposed design, which creates a pedestrian-friendly link through the site between the residential area of Woodlands to the south and Innaloo to the north, is considered an appropriate response to the challenging site context.

Additionally, requiring the development to achieve a continuous active frontage to Scarborough Beach Road would necessitate access, service and loading areas being provided at the rear, accessed via Ewen Street. Such an arrangement would clearly have a significant impact on the residential area to the south of Ewen Street, in terms of traffic and associated amenity impacts. The proposed design, which incorporates the major tenant loading area and basement parking access via Scarborough Beach Road, is an appropriate compromise solution that balances the desire to generate visual interest and activity to Scarborough Beach Road while minimising amenity impacts on the existing residents.

Parking for Non-Residential Uses

Clause 6.11.17 of LPS3 provides the non-residential parking rates for developments within the SCA.

Pursuant to Table 6.11.17, parking rates are split for developments with a plot ratio below or above 1.0.

The development area (comprising the site without the service station and planning control area) results in a site area of 1,032ha. As the service station is only incorporated for means of access, it is considered entirely reasonable to be excluded from the calculation.

The development proposes a plot ratio area of 12,785.31m^2, resulting in a in a plot ratio of 1.27. The plot ratio area comprises the ground floor and rooftop parking area, in accordance with the definition of plot ratio as provided for by LPS3.

The development incorporates 156 bays on site and an additional 7 on street bays.

An assessment against the relevant provisions is provided in **Table 8** below.

Table 8: Non-Residential Vehicle Parking Assessment

	Maximum total on-site parking	Minimum public parking	Minimum short-stay parking

Required	2.5 bays / 100m² of non-residential floorspace = 2.5 x (6,383 / 100) = 160 bays	1.25 bays per 100m² of non-residential floorspace = 1.25 (6,383 / 100) = 80 bays	60% = 48-96 bays
Proposed	156 bays	163 bays	

As demonstrated in **Table 8** above, the development is compliant with the maximum and minimum parking requirements provided by clause 6.11.17 of LPS3.

6.5 Matters to be considered

Clause 67(2) of the Deemed Provisions sets out the matters for which due regard is to be given when considering a development application. Refer **Table 9** below for an assessment of the relevant matters.

Table 9: Matters to be considered

Matter to be considered	Provided
(a) the aims and provisions of this Scheme and any other local planning scheme operating within the Scheme area;	The aims and provisions of LPS3 are considered and addressed throughout this report.
(b) the requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Schemes) Regulations 2015 or any other proposed planning instrument that the local government is seriously considering adopting or approving;	The City of Stirling is progressing with Draft Local Planning Scheme No.4 (**Draft LPS4**). Draft LPS4 does not propose to change the applicable zoning on the subject site, with consideration for amended development requirements completed in section 6.6 of this report.
(c) any approved State planning policy	Refer to Section 6.3 of this report.
(g) any local planning policy for the Scheme area;	Refer to section 6.8 of this report for an assessment against the City's Local Planning Polices.
(l) the effect of the proposal on the cultural heritage significance of the area in which the development is located;	The development site is not included on the City's Register of Places of Cultural Heritage Significance.
(m) the compatibility of the development with its setting including the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development;	The proposed development remains compatible with the setting for the following reasons: • The proposed development is appropriately located withing a Strategic Metropolitan Centre. Strategic Activity Centers and Activity Corridors are envisioned to be the locations for future growth and infill. • The proposed development is consistent with the desired future commercial character of the area. • This proposal ensures sufficient setbacks are provided to the surrounding suburban development to avoid negatively impacting upon amenity and will significantly enhance the amenity of Scarborough Beach Road.

Matter to be considered	Provided
(n) the amenity of the locality including the following – *(i) environmental impacts of the development;* *(ii) the character of the locality;* *(iii) social impacts of the development;*	The proposed development will have a positive impact on the environment. Despite its prominent location the development site has remained vacant for over 25 years. The proposed development will work to activate the corner site and improve the character of the locality by providing an attractive gateway to the Stirling City Centre. The increase in landscaping along the verges and pedestrian links through the development will activate the street frontages along Scarborough beach Road and Ewen Street, seamlessly integrating the development with its local context. The creation of a successful, vibrant and active retail precinct will generate local employment and investment, and provide convenient access to shops and services for existing residents.
(p) whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved;	A substantial amount of deep soil landscaping is proposed, and the planting schemes are consistent with the local vegetation within Woodlands, Innaloo and surrounds. Deep Soil zones and extensive landscaping, enhance the ground plane and particularly the interface with surrounding streets.
(s) the adequacy of – *(i) the proposed means of access to and egress from the site; and* *(ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles;*	As demonstrated in the TIA prepared by Urbii (**Appendix 11**), the proposed means of access to and from the site is satisfactory, including service vehicles. Vehicle access to the site is dispersed between Scarborough Beach Road and Ewen Street, minimizing the impact on local roads.
(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety;	A TIA has been prepared, demonstrating the proposed development is satisfactory from a traffic and access point of view – refer **Appendix 11**.
(u) the availability and adequacy for the development of the following – *(i) public transport services;* *(ii) public utility services;* *(iii) storage, management and collection of waste;* *(iv) access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities);* *(v) access by older people and people with disability;*	The subject site is within close proximity to public transport. Bus stops are located within 200m of the development site, providing public transport options to the Perth CBD and Scarborough Beach. Stirling Train station is also located within proximity of the subject site, connecting the subject site to the wider metropolitan region and further access to public transport. The proposed development is connected to all required public utility services. Refer **Appendix 13** for the Waste Management Plan prepared by Talis Consultants, demonstrating the proposed development is satisfactory from a waste storage and management perspective. The proposed development is well connected with the surrounding pedestrian realm. It is also proposed to ensure the development provides further improvements to the public realm, ensuring safety and accessibility is maximized.
(v) the potential loss of any community service or benefit resulting from the development other than potential loss that may result from economic competition between new and existing businesses;	The development will not result in the loss of community service. On the contrary, the proposed development will provide substantial community benefit and create an important entry statement to the Stirling City Centre, enhancing the frontage along Scarborough Beach Road and bringing employment and economic activity to a site that has remained vacant for decades.
(w) the history of the site where the development is to be located;	The subject site is currently vacant, and has been vacant for more than 25 years. The subject site has had a negative impact on the amenity and vitality of the area for a long time, and redevelopment will provide significant benefits for the local community.

Matter to be considered	Provided
(x) the impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals;	As outlined above, the development provides substantial community benefits, including landscaping and open space, employment opportunities, upgrades to adjacent pedestrian realm, and a mix of shopping and entertainment uses. The design process utilized extensive community engagement to obtain the views and opinions of local residents and the wider community. This heavily influenced the design of the proposal and ensured that the community was satisfied with the proposed development.

In light of the above, the proposed development achieves the aims and objectives of LPS3 and the Stirling City Centre Special Control Area. The City has engaged in extensive planning over more than 30 years with the objective of encouraging redevelopment of the Stirling City Centre. This proposed development will see a long vacant site redeveloped to expand on the centre area and services available in the area, providing increased activation and engagement opportunities for the local community and visitors to the area.

6.6 City of Stirling Draft Local Planning Scheme No. 4

The City is currently progressing draft Local Planning Scheme No. 4 (**LPS4**), which is intended to replace LPS3. At the time of lodgement, the City is currently reviewing submissions on draft LPS4, with the submission period closing 24 January 2025.

As draft LPS4 has been adopted for the purpose of advertising, it is considered a seriously entertained planning instrument and its provisions contemplated below.

Pursuant to the provisions of daft LPS4, the subject site remains predominately zoned 'Urban Development' with a small portion reserved 'Other Regional Road', in accordance with LPS3. No overlay is proposed over the subject site.

Refer **Figure 15, D**raft LPS4 Map Extract.

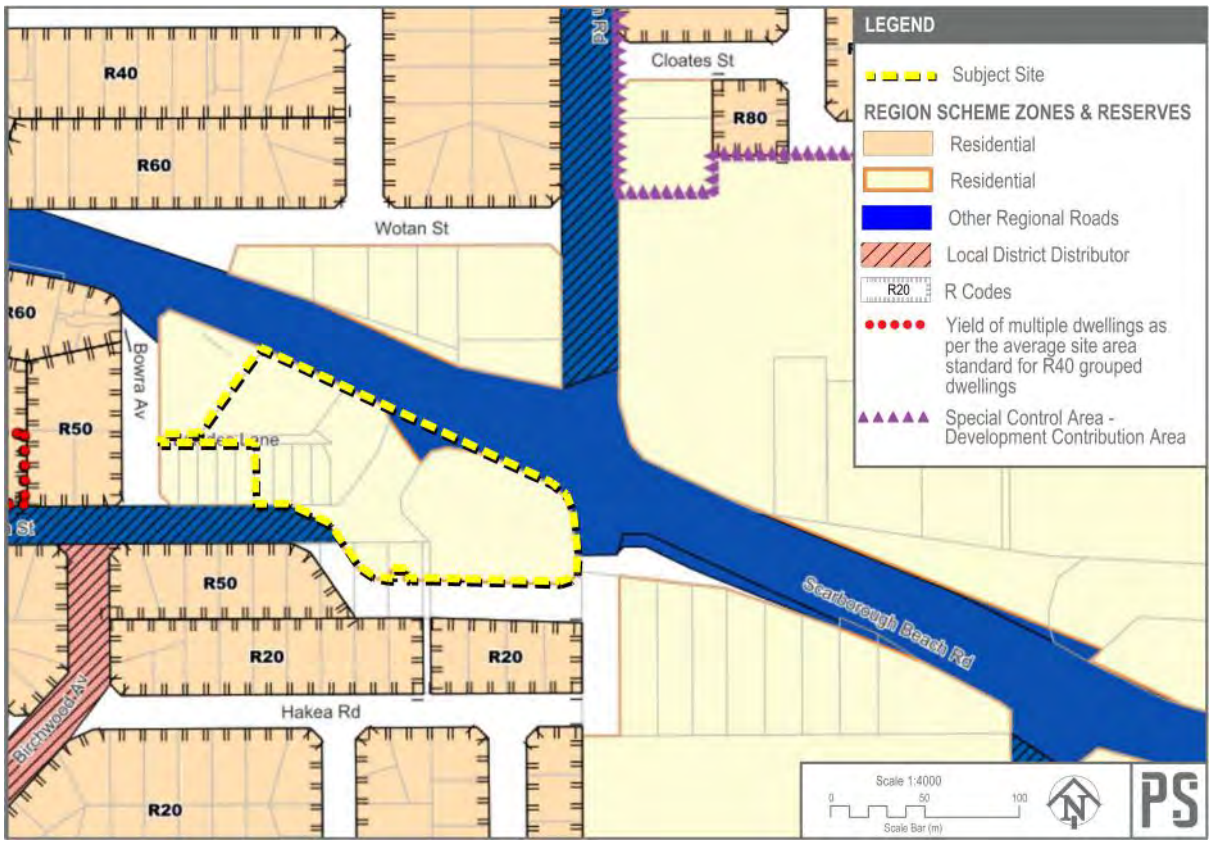

Figure 15: Draft LPS4 Zoning Map Extract

Pursuant to Clase 18(6) of LPS4, development is to have due regard to an applicable structure plan(s). Refer **section 6.7** below.

6.6.1 Land Use and Permissibility

The proposed development comprises a neighbourhood centre with a variety of commercial tenancies. These tenancies continue to be best classified as 'as 'Shop', 'Recreation Private', 'Fast Food Outlet/Lunch Bar' 'Liquor Store – Small', and 'Restaurant/Cafe'.

Pursuant to clause 18(6) of draft LPS4, land use permissibility is to be in accordance with the applicable structure plan. Refer **section 6.4.2** above for an assessment of the land use permissibility.

6.6.2 Development Standards

There are no further development standards proposed within draft LPS4 that are relevant to the application.

6.7 Local Development Plan

The City of Stirling's *Southern Precinct Local Development Plan* (**LDP**) is made in accordance with the provisions of the draft *Stirling City Centre Structure Plan* and provides the detailed development and design standards for the Southern Precinct of the Stirling City Centre. Whilst adopted by Council in 2018, the LDP has not been endorsed by the WAPC.

Pursuant to the LDP, the subject site is identified as being within Sub Precinct Area A. The precinct is outlined as the western gateway to the Stirling City Centre and is intended to establish a sense of arrival along Scarborough Beach Road. An assessment against the relevant provisions of the LDP is provided below.

6.7.1 General Provisions

Part 2 of the LDP provides the general provisions applicable to subdivision and development throughout the Southern Precinct. An assessment against the relevant provisions is provided in **Table 10** below.

Table 10: General Provisions Assessment

Clause	Provisions	Proposed	Compliance
2.1.7.1 Podium facades and walls	No walls >10m without indentation	The podium is articulated and broken up at regular intervals, with various windows/glazing and architectural treatments.	✓
2.1.7.3 External fixtures	Service meters and related infrastructure are to be screened from the street.	Service meters are contained within the building or enclosures screened from the street.	✓
2.2.2.1 Non-residential ground floor frontages	Minimum 80% clear glazing.	Substantial glazing is provided to both Scarborough Beach Road and Ewen Street. This does not reach the required 80%. The façade is broken up with a mixture of materials and active / non active spaces. These facades have been reviewed by the City's DRP and generally supported. In addition, back of house areas are required for these tenancies, so they have been integrated into the non-glazed portions to ensure this development is function and operational.	✓
	Non-residential uses on the ground floor facing the street.	The development comprises no residential component.	✓
2.2.2.2 Non-residential entry points	Entry points directly facing the street. Entry points at ground level Include at least 2 of the following: • Signage above entry door. • Indented entry point. • Different materials to highlight entry. • Increased awning height above entry.	The inclusion of the new pedestrian laneway provides a direct link for people from the street into the site. Each tenancy is provided within direct access from the street or from this laneway. Entry points will include signage and distinct materials to clearly identify entries.	✓
2.2.2.6 Weather protection	• Minimum awning depth 2.5m • Maximum vertical clearance of 3.5m • Awnings shall be opaque and non-reflective. • New awnings to match with existing awnings.	Awnings are provided at regular points. All awnings meet minimum specifications.	✓
2.2.4.3 Levels	Ground level to match footpath level	The ground level is proposed to meet the street level where possible. Accessible access is maintained.	✓
	Basement parking structures between street frontage and main front elevation <1.2m above natural ground level.	No basement is proposed.	N/A

Clause	Provisions	Proposed	Compliance
2.2.4.4 Landscaping	Landscaping Plan shall be submitted for all developments.	Refer **Appendix 10.**	✓
	Landscaping strips shall include large trees (45L) to reach 8-10m height.	A range of trees (100-500L) growing to 15m in height are proposed.	✓
	Trees planted at 5m spacings	Trees are planted at a variety of spacings appropriate to species and landscape design.	✓
	All developments shall make provision for deep planting zones in rear landscape strip and other areas.	The development proposes 1,040m^2 (9.6%) of landscaping, comprising 628m^2 on site and 412m^2 off site. All landscaping is deep soil.	✓
	Street trees shall be planted at 7.0m intervals where possible.	Street trees will be provided to Ewen Street at approximately 10m intervals.	✓
2.2.4.5 Lighting, safety and security	Lighting in accordance with the City's Local Planning Policies.	Lighting to be addressed as a condition of planning approval.	N/A
2.3.1 Parking provisions	• Non-residential parking in accordance with the Parking Policy. • Residential parking as per Residential Design Codes.	Refer assessment above.	✓
2.3.2 Design and location of car parking bays	Basement parking is permitted in all situations.	No basement is proposed.	N/A
2.3.4 Crossovers	Lots with <50m frontage shall have maximum 1 crossover.	The subject site has an approximate 150m frontage to Scarborough Beach Road and 180m frontage to Ewen Street. A total of four crossovers are proposed. The eastern crossover to Ewen Street is used solely for service vehicle access.	✓
	Maximum crossover width 6.0m	Crossovers comprise a range of widths, exceeding 6m. This is necessary to provide safe, efficient ingress and egress of vehicles.	Variation

6.7.2 Specific Provisions

Part 3 of the LDP provides the provisions applicable to specific sub-precinct areas within the Southern Precinct. Section 3.1 contains the development standards for Sub-Precinct Area A.

An assessment against the relevant provisions of Part 3 is provided in **Table 11** below.

Table 11: LDP Part 3 Assessment

	Requirement	Proposed	Complies
Ground Floor Heights	Minimum Ground Level Floor to ceiling: • 3.2m residential; and • 3.6 non-residential	5.35m	✓
Setbacks	Setbacks as per Figures 12, 24 of LDP.	• West: Nil-5.2m	**Variation**

	Requirement	Proposed	Complies
		• East: Nil-2.4m. • South: Nil-0.87m	
Location Land Use Category	Land use categories as per Figures 13-22 of LDP.	Refer assessment above.	✓
Building Heights	Minimum 2 storeys	Two stories (including rooftop carpark).	**Variation**
	Maximum 8 storeys (equivalent 10 storeys including southern split level plus roof form)	Built form typology proposes variations to LDP envelope.	
Lots	Minimum area 700m^2	11,329m^2	✓
	Minimum street frontage 18m	Approximately 150m	✓
Awnings and Activation	Continuous awnings and activated frontages along Scarborough Beach Road and Odin Road.	Refer assessment above.	✓
Landscaping	All areas identified with 0 storeys max height shall be landscaped.	Refer assessment above.	✓

As demonstrated above, with the exception of minor variations to crossover width and the building envelope contemplated (building height and setback), the proposed development is consistent with the intent and provisions of the LDP.

Fundamentally, the variations to the LDP are the result of the proposed development redistributing the building floorspace to improve the appearance, function and viability of the development. Put simply, the built form typology specified in the LDP has been demonstrated to be unviable, and it would be effectively impossible for a development that is consistent with the LDP to also achieve the principles of good design outlined in SPP7.0.

The built form contemplated by the LDP is bulky, and offers poor amenity. Specifically, the following elements of the building envelope in the LDP (Figures 12, and 20-22) are either undesirable or practically unachievable:

Continuous commercial frontage to Scarborough Beach Road

Scarborough Beach Road is a wide, busy arterial road carrying large volumes of traffic including heavy vehicles. It is a hostile environment for pedestrians, and this is reflected in the minimal pedestrian traffic observed at all times. The nature of Scarborough Beach Road is entirely unsuited to small format retail tenancies fronting the main road.

Further, requiring a continuous frontage to Scarborough Beach Road necessitates all customer, service and residential traffic to access the site via Ewen Street or the access leg to Bowra Street. Neither of these options is considered desirable, due to the capacity of the road network, the complexity of the intersections, and the likely impacts on the amenity of the residential area to the south.

Ewen Street interface

The LDP provides for a 4-5 storey interface along the full length of Ewen Street to the south of the site. This is likely to result in a 4-5 storey 'wall' with many south-facing dwellings and their balconies compromising the amenity and visual privacy of dwellings fronting Hakea Road with their backyards adjoining Ewen Street.

The LDP also requires non-residential uses at ground level to have entry points directly facing streets. As part of the realignment of Ewen Street, the City of Stirling constructed a high solid wall along the full length of the south side of the street, such that there is no activity on the opposite side of the street. Experience has shown that a one-sided commercial street, removed from passing trade, is likely to be extremely difficult to activate, and any business with its primary frontage to Ewen Street would most likely struggle to attract customers due to its low visibility.

In addition to the key points above, Refer **section 4.2** for an analysis on the developments built form and urban design principles.

6.8 Local Planning Policies

6.8.1 Local Planning Policy 5.8 Stirling City Centre Parking

Local Planning Policy 5.8 – Stirling City Centre Parking (**LPP5.8**) sets out the provision of parking within the whole of the Scheme area.

An assessment against the relevant vehicle parking provisions is provided in **section 6.4.3** above.

An assessment against the bicycle parking provisions is provided in **Table 12** below.

Table 12: Non-Residential Bicycle Parking Assessment

	Employee's Bays	Customer Bays
Required	0.25 bays / 100m^2 of non-residential floorspace = 0.25 x (6,383/ 100) = 16 bays	0.1 bays per 100m^2 of non-residential floorspace = 0.1 (6,383/ 100) = 7 bays
Proposed	14 employee bays and 16 visitor bays	
Surplus/Shortfall	+7 bays	

As provided in **Table 12** above, the proposed bicycle parking is compliant with the provisions of LPP5.8. Bicycle parking has been provided adjacent to the lift within the laneway area and adjacent to the food and beverage tenancy outdoor seating area fronting Ewen Street. Windsor Knight are an experienced shopping centre operator and through this design have ensured the optimal placement of bike parking for usability and density in the context of this development. The proposed bicycle parking is also supported with end of trip facilities for staff within the back of the specialty tenancies.

6.8.2 Local Planning Policy 6.3 Bin Storage Areas

Local Planning Policy 6.3 – Bin Storage Areas (**LPP6.3**) provides provisions relating to waste management for non-residential development. The proposed bin storage areas are located in the proposed service areas on the ground floor and will accommodate the developments commercial waste. An assessment against the provisions of LPP6.3 is provided in **Table 13** below.

Table 13: LPP6.3 Assessment

Required	Proposed	Complies
Bin Storage Area Size		
Non-residential zones; *Size: 10m^2* *Width: 3.5m^2*	The proposed bin storage areas are significantly sized and adequate for the proposed development.	✓
Location of Bin Storage Area		

• *Shall be located behind the building setback line.* • *Shall ensure that adequate space is available for the bulk refuse truck to access the bin area and maneuver.*	The bin storage areas are located within on the ground floor and are adequately screened from view. Adequate space is provided for the waste truck to access the waste storage area. A bulk store is located on the ground floor with access and a loading block provided on the south east portion of the subject site.	✓
Design of Bin Storage Area		
• *Shall be screened from view to a minimum height of 1.8m so that it is not be visible from the street;* • *Materials shall match with the building;* • *Shall be sealed and regularly cleaned and maintained; and* • *Stormwater and effluent drainage facilities shall be contained within this area.*	The proposed bin storage areas are adequately screened from view.	✓

Refer **Appendix 13,** Waste Management Plan.

6.8.3 Local Planning Policy 6.5 Developments and Subdivisions Abutting Rights of Way

Local Planning Policy 6.5 – Developments and Subdivisions Abutting Rights of Way (**LPP6.5**) applies to all developments and subdivisions abutting a ROW, a Crown Reserve for ROW purposes or a dedicated road which was originally created as a ROW.

The site is bound by a Right of Way (**ROW**) on the western boundary (identified as ROW 18005). The Right of Way (**ROW**) located on the southern boundary of the development site, adjoining the service station boundary is identified as ROW 18005. Construction of the widening area is not required as the proposed development does not propose access via the ROW. No development is proposed for the ROW, with the owner of the land already paying the ROW lighting contribution as required by LPS3.

As no access is proposed to be obtained from the ROW the provisions of this policy do not apply.

6.8.4 Local Planning Policy 6.6 Landscaping

Local Planning Policy No. 6.6 – Landscaping (**LPP6.6**) sets out various standards and requirements for the provision and promotion of landscaping through the City and applies to all non-residential development. The objectives of LPP6.6 are to improve landscaping provision and design, to improve the visual appeal of development, and to screen service areas and provide buffers to boundaries. LPP6.6 requires a landscaping plan to be submitted with the development application. Refer to **Appendix 10**, landscaping report.

An assessment of the proposed development against the relevant requirements of LPP6.6 is provided in **Table 14** below.

Table 14: LPP6.6 Assessment

Required	Proposed	Complies
Landscaping Areas		
All individual planting areas, excluding those in or adjacent to public *car parks, must have a minimum width in any direction of 500mm and a minimum plantable area of two square metres.* The inclusion of verge areas (abutting the site) in the overall landscaping design is required.	All landscaped areas are generally wider than 500mm within the development site. All verges are proposed to be landscaped as part of the proposed development.	✓

Required	Proposed	Complies
Plant Numbers and Types		
All landscaped areas (beds) are required to be planted with a suitable number of plants that satisfy the objectives of this policy (plant numbers will be assessed with due regard to the eventual size of the species selected). S*pecies should be chosen to suit the climate, environment, location and required function whilst taking into consideration surrounding landscapes.* The use of native species is encouraged to reduce water and fertiliser use.	The development proposes a mix of endemic and low water species, to compliment the character of the locality.	✓
Street Trees		
The provision of new street tree(s) are required where no street tree(s) currently exist. Species must be approved by the City's Parks Department.	Street trees are proposed to be planted along all street frontages of the development site. The proposed species of trees is included in the Landscape Plans (refer **Appendix 10**).	✓
Retention of Existing Vegetation		
Council encourages the retention of existing vegetation and will consider the exercise of discretion in its application of scheme requirements and adopted local policies where such a variation would allow for the retention of significant existing vegetation on a site. (Note: Concessions cannot apply to non-discretionary provisions such as residential density).	The proposal includes the retention of existing trees on the development site. One large tree on the development site will be transplanted into deep soil area.	✓
Reticulation and Mulching		
All landscaped areas shall be reticulated unless the applicant can provide satisfactory evidence that reticulation is not necessary. A minimum of 75mm of mulch (gravel not permitted) is to be applied to all landscaping beds.	Noted.	✓
Parking areas		
A minimum of 1 tree per 6 bays (Minimum 45 litre for exotics and 11 litre for natives) is required in open parking areas. Shrubs are generally not permitted as they may interfere with sight lines in and around parking areas and driveways. Acceptable examples of tree planting patterns within car parking areas are shown in the following illustrations.	The majority of the parking area is contained on the building, and is included in the plot ratio area for the development. Accordingly, no shade trees are required.	✓

6.8.5 Local Planning Policy 6.11 Trees on Development

Local Planning Policy 6.11 – Trees and Development (**LPP6.11**) applies to all development valued over $100,000 on land zoned under LPS3. LPP6.11 aims to minimise the removal of significant trees on zoned land as a consequence of development and ensure appropriate advanced trees are planted which are suitable to their environment and location.

Pursuant to Clause 5.1, site areas over 2,000m^2 require 1 advanced tree to be planted for every 500m^2 (or part thereof). The subject site has a total area of 11227m^2, meaning 22.45. (22) trees are required to be planted. The development proposes to plant a total of 71 trees.

6.8.6 Local Planning Policy 6.12 Public Art on Private Land

Local Planning Policy 6.12 Public Art on Private Land (**LPP6.12**) applies to applications for commercial developments with an estimated cost of development greater than $2million. The provisions of LPP6.12 apply to the proposed development.

The provision of public art within the development will occur at the detailed design stage of the project, where the proponent and future artist will engage and consult with the City with regards to the preparation of a public art proposal.

7 CONCLUSION

The application seeks approval for a 6,383m^2 neighbourhood centre comprising 11 tenancies as well as associated parking, landscaping, access, and signage on the subject site. The centre will comprise a mix of retail, speciality, health, and food and beverage tenancies, as well as a central public laneway, which will form the heart of the centre and connect Ewan Street with the Stirling city centre.

The proposed centre has been designed in a contextual and site-responsive manner, referencing the emerging urban character of the area. This is emphasised by a built form and materiality that responds to the prominent landmark location and neighbouring patterns of development, whilst providing a sensitive transition to adjacent land uses and activities.

The development is located within a growing activity centre and will provide additional commercial and civic uses in an area close to public transit, amenities, and the Perth city centre.

Any variations to the local planning framework have been demonstrated to be acceptable and consistent with the overarching planning objectives. The proposed development is demonstrated to have an exceptional design, providing contemporary, sustainable, and liveable commercial and public spaces. The development will positively contribute to the amenity of the surrounding area, with environmental noise, transport, sustainability, and waste management matters appropriately addressed.

Accordingly, Planning Solutions respectfully requests the Metro North Development Assessment Panel (**DAP**) consider the application on its merits and grant approval for the proposed development.

PS ref: 8859
City ref: DA25/0807

29 May 2026

City of Striling
Via Electronic Correspondence

Attention: Cameron Howell, Senior Planning Officer

Dear Cameron,

367 SCARBOROUGH BEACH ROAD, INNALOO
APPLICATION FOR DEVELOPMENT APPROVAL – PROPOSED NEIGHBOURHOOD CENTRE
RESPONSE TO REQUEST FOR FURTHER INFORMATION, PUBLIC SUBMISSIONS, REFERRAL COMMENTS

Planning Solutions acts on behalf of Deltaview (WA) Pty Ltd c/o Windsor Knight, the proponent of the proposed neighbourhood centre on the land identified as 367 Scarborough Beach Road, Innaloo (**subject site**). An Application for Development Approval was lodged with the City of Stirling (**City**) on 9 June 2025.

We refer to the Requests for Further Information (**RFI**), referral comments, as well as the summary of public submissions received from the City in respect to the application. In response to the matters raised, meetings held with the City and DPLH officers on 2 December 2025 and 20 January 2026, as well as feedback received during pre-lodgement of the revised development plans and engineering drawings, we are pleased to provide the following additional information in support of the development application:

1. Written response to the City's comments (refer submission below).
2. Written response to public submissions (refer submission below).
3. Amended development plans (refer **Attachment 1**).
4. Vehicle swept path plans (refer **Attachment 2**).
5. Revised Road Safety Audit (refer **Attachment 3**).

INTENT AND PURPOSE

The purpose and intent of this submission is to provide a single collated response to all matters raised following lodgement of the original application and City subsequent reviews of revised plans and drawings. The submission also responds to the outcomes of the meetings and discussions with City and DPLH officers, as well as proposed changes to the planning framework and surrounding road network.

Whilst largely transport related, the final revised plans and updated Road Safety Audit reflect significant collaboration with the City's planning and engineering teams and ensure a more refined proposal.

SUMMARY OF AMENDMENTS TO DEVELOPMENT PLANS

A summary of the amendments to the development plans is provided below.

1. The introduction of a 3.5m wide deacceleration lane and subsequent amendment and refinement to the Scarborough Beach Road crossover. Specifically:
    a. Inclusion of a splinter islands at a 2.5m width, maintaining safe pedestrian movements.

PLANNING SOLUTIONS
URBAN & REGIONAL PLANNING
PS
Level 1, 251 St Georges Tce, Perth WA
(08) 9227 7970
GPO Box 2709
Cloisters Square PO 6850
admin@planningsolutions.com.au
www.planningsolutions.com.au
ACN 143 573 184 ABN 23 143 573 184
Planning Solutions (Aust) Pty Ltd

   b. Refinement of driveway and inclusion of traffic control lights for trucks.

   c. Refinement of turning paths.

   d. Retention of the 2.5m shared path along Scarborough Beach Road.

   e. Relocation of the pylon sign within the Ampol service station, outside vehicle sightlines.

   The revised crossover ensures appropriate separation between all movements and is supported by swept paths. This western loading area will only be serviced by 12.5m heavy rigid vehicles.

2. Minor amendments to the building footprint, including increasing the setback to Scarborough Beach Road, and pulling in the corner of T6 to improve the sightlines to the eastern loading dock. All built form remains outside the Planning Control Area, which is marked on the plans.

3. Increasing the Lot 12 setback to 5m, adjacent to the western loading dock.

4. Revising the alignment of the boundary wall to Lot 105, between the service station and loading area access.

5. Amending the Ewen Street on-street parking bays to a width of 2.5m and length of 6.3m. The bays will be amended to red bitumen. The eastern bays have been marked for loading purposes only, to be utilised by trucks up to 12m long for the smaller tenancies.

6. The Ewen Street footpath has been updated to have a minimum 2m width. The shared path on all other boundaries maintains a width of 2.5m.

7. Click and collect, EV, bicycle, and rideshare bays are now marked. Minor amendments to the upper floor parking area vehicle aisle adjacent to the ramp to ensure permitted vehicle manoeuvring.

8. As a result of the amendments, the development now proposes:

   a. A Gross Lettable Area of 6,246m^2.

   b. A total landscaping area of 1,103m^2.

   c. 169 car bays (comprising 162 on-site bays, four on-site pick up bays, and three on-street bays). Four motorcycle bays remain. Six bays will continue to be available for the childcare centre, in accordance with the Caveat over the site.

   d. 16 bicycle bays.

9. No amendments to the building height, land use, or materiality are proposed.

Refer **Attachment 1,** amended development plans and **Attachment 2**, swept paths.

RESPONSE TO MATTERS RAISED

In support of the amended plans, please refer to a written response to the matters raised by the City in their letters dated 14 November (planning related), 12 December 2025 (engineering related), and 16 April (further engineering comments), as well as referral comments received from DPLH below. We understand that the City also referred the application to the Department and Water and Environmental Regulation, Water Corp, and Western Power, but no concerns were raised.

In the interest of brevity and clarity, substantial matters raised have been combined into key themes below, with remaining minor matters addressed in **Table 3**.

Scarborough Beach Road

The City and DPLH respectively raised concerns with the design of the proposed crossover to Scarborough Beach Road, including prospective conflict points between left-in and left-out movements, impact to the median trees along Scarborough Beach Road, as well as pedestrian safety (introduction of splinter islands).

Despite original advice to the contrary, during engagement with City and DPLH officers, it has been advised that the PTA is no longer pursuing bus priority lanes along the Scarborough Beach Road frontage. As such, the opportunity to utilise it as a deacceleration lane for vehicles is no longer possible.

Refer **Table 1** below for a response to the matters raised.

Table 1 – Response to Scarborough Beach Road matters

Comment	Response
Crossover design and pedestrian paths	The design of the crossover has been refined to remove identified conflict points between the service station and proposed development, introduce a deacceleration lane, and provide splinter islands at a 2.5m width for pedestrian safety. The pedestrian splinter islands have been designed in a manner to ensure trucks do not overhang. The proposed crossover design has been revied and supported by the revised Road Safety Audit (with a minor recommendation for the connection to the footpath in front of the existing service station).
Truck movement and impact to Scarborough Beach Road median	All vehicle and pedestrian movements, including tankers entering the service station have been reviewed and supported by revised swept path analysis. In addition, as the development will no longer be serviced by 19m trucks (excluding existing service station tankers), egressing vehicles will be lane correct with no impact to median trees.
Deacceleration lane	Due to the removal of the proposed bus lane along Scarborough Beach Road, a deacceleration lane has now been provided. As a result of the change, minor amendments to the built form are proposed.
Pylon sign	The proposed relocated service station pylon sign has been setback further into the site to ensure compliance with vehicle sightline requirements.

Refer **Attachment 1**, revised development plans and **Attachment 2**, swept paths.

Road Safety Audit

A Road Safety Audit (**RSA**) of the proposed development and surrounding road network was provided to the City in 2024/2025. Due to the time passed since the RSA was originally prepared and amendments to the development plans and surrounding road network, the City and DPLH have requested that the RSA be updated, with input from the City.

The auditors and City officers met on site 13 May 2026.

The collective action report identifies a number of recommendations for the City's assets and infrastructure and applicant. Whilst the RSA confirms the development plans to be largely satisfactory, the following minor recommendations are noted:

- Kerb ramps and Tactile Ground Surface Indicators to be provided at all crossings. Whilst noted on plans, this will be progressed as part of detailed design.
- Vegetation within the Ewen Street median. Whilst within Crown land, the applicant will work with the City to trim vegetation as required. It is noted that minor works to the median to close the existing opening will be undertaken following approval. Modifications to vegetation can also be undertaken during this process.
- Ensure all accesses and designed in accordance with Australian Standards and hazards within clear zones be identified and rectified. Whilst the development plans have been reviewed and designed accordingly, this will be reviewed during detailed design. Also refer **Attachment 2**, swept paths.
- Scarborough Beach Road footpath connecting to the existing network. This will be reviewed and designed during detailed design.

Refer **Attachment 3,** revised Road Safety Audit.

Ewen Street Matters

The City has sought clarifications or updates to the development plans in respect to various matters relating to Ewen Street.

Refer **Table 2** below for a response to the matters raised.

Table 2 – Response to Ewen Street matters

Comment	Response
Ewen Street median opening	The development plans have been amended to close the existing Ewen Street median opening and subsequently introduce an extended northbound turn pocket. As this is outside the subject site, we are agreeable to this forming a condition of approval.
Eastern loading dock	The eastern loading dock is proposed to continue to be serviced by 8.8m service vehicles only. This is a commercial decision and will be conveyed during lease agreements as per other developments of this nature. Notwithstanding, in accordance with the discussions with the City, the southern car bays have been amended to a width of 2.5m to allow the unloading of service vehicles. In addition, we confirm the crossover has a width of 6.55m.
Ewen Street parking bays and footpath	The Ewen Street on-street bays have been amended to have a width of 2.5m and length of 6.3m, in accordance with the request of the City. The footpath along Ewen Street has been subsequently reduced to a minimum of 2m. The footpath on the remainder of the site maintains a width of 2.5m. The eastern bays are marked for loading only.

Exit ramp	The design and sightlines of the exit ramp, including the height of the parapet and trees was reviewed as part of the RSA. Whilst the development plans have been reviewed and designed in accordance with the Australian Standards, this will be reviewed and confirmed during detailed design.
Entry ramp	It is proposed to retain the Ewen Street entry ramp perpendicular to the road. Whilst comments are noted, we have investigated alternative options to amend the ramp, but it cannot be accommodated due to the location of the built form. Any amendment would also result in steep gradients and tight curves. As part of detailed design, traffic calming measures can be introduced.

Residential Component

Whilst the City agrees that the development is not bound by the mandatory residential component under the LDP as it is a due regard document only, the City has requested further justification. Specifically:

> *Clause 2.1.2.3 of the LDP requires proposed Lots 100 and 105, as per the draft Deposited Plan submitted with the application, to provide a minimum of 61 dwellings. The development does not provide a residential component, there is no space set aside for a residential component, and it is not evident that the residential component is being transferred to another site. Clause 6.11.11 a) of LPS3 implies reference to the abovementioned LDP requirement. The discretionary power under Clause 5.5 of LPS3 does not apply to Clause 6.11.11 a) and Clause 6.11.11 can only disregarded to the extent it is inconsistent with the Deemed Provisions.*
>
> *The applicant's justification is* ***requested outline why the provision of a residential component should be waived****[emphasis added]*

It is considered that the residential component should be waived for the following reasons:

1. As explored within our planning report and discussed in further detail in this submission below, residential development (and other requirements of the LPD read into LPS3) is **not mandatory**, being a requirement of a due regard document only.
2. A previous development application was submitted for the subject site which incorporated 122 dwellings. This development application was ultimately withdrawn due to the feasibility of the residential component of the proposed development. The commercial component of the proposed development is still feasible and will enable the longstanding undeveloped and eyesore of a site to be developed.
3. Notwithstanding, the development does not fetter the ability of the site to accommodate residential development in the future through the addition to or redevelopment of the centre. Nor does the development fetter the ability of neighbouring sites to be developed for residential purposes.
4. By allowing residential development to be pursued at a time when it is deemed commercially feasible, it provides the ability for greater yields then what may have been pursued in the previous scheme.
5. The proposed commercial only development has been subsequently reviewed by the City's Design Review Panel on two occasions with the most recent meeting confirming a continued level of support. A number of the points identified by the DRP have been resolved as part of the finalised design and or by way of further detailed design and condition setting which will come later on the in project.

6. The proposed development is largely consistent with the remainder of the planning framework, which includes LPS3 and more specifically the objectives of the Stirling City Centre, State Planning Policies, Local Development Plan and Local Planning Policies which have been addressed within the Planning Report submitted as part of this application. It is further noted that the proposed development entirely aligns with the intent of the LDP, which calls for ground floor commercial on the subject site.

7. The proposed development is also supported by the necessary technical assessments which demonstrate the proposal has been considered from a traffic, acoustic, sustainability, and landscaping perspectives to ensure the proposed provides a high-quality built form and functional development for the locality. This has been further strengthened and refined as part of the extensive collaboration with the City, with all matters addressed and resolved.

8. The proposal will incorporate commercial uses and development which will support the wider locality. The introduction of the community laneway with active uses will ensure this development will set a high-quality standard for development along the Scarborough Beach Road corridor and for the wider Stirling City centre precinct.

9. On review of the advertised version, we understand that the City's draft Local Planning Scheme No. 4 is proposed to remove the mandatory residential component. Refer comments below.

Ultimately, the provision of a commercial centre on a site which has remained undeveloped for over 25 years is considered a **superior outcome** over allowing the site to remain **vacant** until such a time residential development is feasible.

Landscaping

The City has sought additional justification on the developments landscaping provision, stating that the deep soil area and tree size provision does not meet the minimum requirements of *Local Planning Policy 6*.6. In addition, the City has suggested on-structure landscaping be proposed.

As agreed during post-lodgement discussions, it is not proposed to introduce on-structure planting.

Notwithstanding, following amendments to the setbacks, additional landscaping areas are proposed. As a result, the proposed landscaping has increased from 1,040 m^2 to 1,103m^2 (9.6% to 10.3% of the site area).

Overall, the development continues to provide a strong landscape response, with a mix of soft and hard landscaping throughout. This includes landscaping within the setback to the southern and eastern boundaries to transition the centre to neighbouring residential uses, hard landscaping to the central laneway, creating new public space for the neighbourhood, as well as urban tree plantings along the street frontages, improving the streetscape.

The landscape response enjoyed the full support of the DRP, with the revised landscape schedule further strengthening the design outcomes.

Other Matters

Refer **Table 3** for a response to the remaining matters raised.

Table 3 – Response to remaining matters

City Comment	Response
Land tenure	The City has sought clarification on land tenure. We confirm the development forms have been signed by all landowners, including the City and state, where required. Six bays for the use of the child care centre remain available on site.

PCA Road widening area	The City has requested that the closure of Ewen Street must align with the PCA widening boundary. During discussions with DPLH, it was confirmed that the boundary of the site should align with the ORR reservation and not the PCA boundary. Correspondence on this matter was provided to the City under separate cover. Notwithstanding, we note that the development plans have been amended to set the building footprint back further, outside of the PCA.
Right of Way	The City has raised various matters in respect to the RoW. In response, we confirm that a 5m setback has been provided along the boundary wall alongside neighbouring Lot 12. In addition, a restrictive covenant over Lot 105 to the benefit of Lot 100 is currently in order. We are also agreeable to a palisade type style fence.
Bicycle parking	The City has requested confirmation that the development plans provide space for six bicycle bays. We confirm that the development plans identify a total of 16 bicycle bays, eight bays situated on the south side of the lift within the central laneway and eight bays adjacent to T5.
DFES fire services details	We have been advised by the projects fire consultant that line markings are not required to designate the hardstand. Subject to the location of the booster, the road will be utilsied by fire vehicles as hardstand.
Click and collect bays	We confirm that the click and collect bays have been marked on the development plans (marked as 'pick up bays'). The plans have also been amended to identify EV and rideshare bays.
Stormwater collected on site	As discussed and agreed with the City during post-lodgement discussions, the requirement for a Stormwater Management Plan will form part of the conditions of approval.
Car park design	The design of the upper floor parking area vehicle aisle (adjacent to the ramp) has been amended to ensure compliant vehicle manoeuvring under the Australian Standards.

RESPONSE TO PUBLIC SUBMISSIONS

During the period of public advertising, we understand that the City received several submissions, including two substantive submissions.

In the interest of brevity and clarity, the submissions have been collated into key themes. A response to these themes is provided below.

LDP - Shop Land Use and Residential Component

The application received a number of submissions both for and against the residential and retail components. Some submissions sought confirmation that residential development would not be pursued in the future whilst a substantive submission was of the opinion that the residential component was required. This was mirrored with the proposed retail with support received for the proposed shop tenancy, whilst a substantive submission stating it is not capable of approval.

Refer comments on the residential component provided above.

In respect to proposed retail uses, it is noted that proposed development comprises a neighbourhood-level centre and will provide the daily and weekly needs for the surrounding community only.

Notwithstanding, as per comments received on the mandatory residential component of the LDP, a substantive submission was received in respect to the land use permissibility of the 'Shop' use and the activation of the Scarborough Beach Road frontage.

It is clear that the submission on behalf of Westfield Innaloo, is a clear attempt to stymie legitimate commercial competition, under a thin veneer of language that mimics planning argument. The submission expends considerable effort to outline an argument that the submitter contends explains why the LDP should be given the statutory weight of a town planning scheme and suggests that somehow this particular LDP is entitled to greater status than 'due regard'.

The extensive examination of the LDP in the submission is, ultimately, moot.

Clause 56(1) of the Deemed Provisions states:

> *A decision-maker for an application for development approval in an area that is covered by a local development plan that has been approved by the local government must have due regard to, but is not bound by, the local development plan when deciding the application.*

Regulation 10(4) Note 2 states:

> *If a deemed provision is inconsistent with another provision of a local planning scheme to which the deemed provision applies, the deemed provision prevails and the other provision, to the extent of the inconsistency, is of no effect.*

As stated in the development report submitted with the application, fundamentally, the land use categories and Land Use Plans depicted within the LDP are subordinate to provisions contained in LPS3 or the *Deemed Provisions*. As such, while Tables 6.11.9 and 6.11.10 are contained in LPS3 and have the appearance of a standard Zoning Table, the source of the land use categories and their spatial arrangement is the LDP, which is a 'due regard' instrument in accordance with clause 56(1) of the Deemed Provisions. In accordance with the principle of statutory interpretation that "*a stream cannot rise higher than its source*", the land use permissibility tables (Tables 6.11.9 and 6.11.10 of LPS3) are therefore also 'due regard' instruments, and a decision-maker is not bound by the land use permissibility tables or the associated annotations.

As such, it is open to the decision-maker to approve the shop tenancy with a floorspace exceeding 1,000m^2 NLA.

The substantive submission puts forward the lack of need for the supermarket and its impacts to surrounding centres but does not contend that a retail sustainability assessment is required for the proposal, nor does it contend that the retail floorspace proposed exceeds any prescribed limit. The subject site is within the Stirling City Centre, identified as a Strategic Metropolitan Centre. It is not pursuant on the applicant to demonstrate that there is a 'need' for the proposed retail tenancies within the Activity Centre (although the applicant contends that a need clearly does exist). We submit it is clearly not the intention of the SCCSP to confer on Westfield a virtual monopoly on supermarket retail, despite that entity's understandable commercial desire for that to be the case.

In light of the above, we reaffirm that proposed uses are capable of being approved as proposed and warrants approval for the following reasons:

- The proposed development is reliant on a major anchor tenant to support the small format retail and food & beverage tenancies, which would likely be unviable as stand-alone businesses in the context of the subject site. The stated objectives of the SCA include recognising the area's significance as a Strategic Metropolitan Centre and ensuring the development of "*a range of commercial uses that will contribute towards economic development, local employment and the viability of the area as a commercial centre servicing residents, visitors and the local workforce*".

- The locality, and particularly the Scarborough Beach Road corridor, is characterised by predominantly large 'highway commercial' type uses, capitalising on the high traffic volumes along the arterial road. Scarborough Beach Road presents a relatively hostile environment for pedestrians and is therefore a particularly challenging environment for small format shop retail uses. Despite being planned for more intensive retail uses for more than 25 years, the area has seen minimal redevelopment, and the subject site has remained vacant for a similar period. The history of the site suggests that small format retail uses are unlikely to be viable in the absence of a major anchor tenant.
- The subject site is one of the largest sites within the activity centre area and is of a scale and size to allow this type of development.
- The proposed development will support the growth of the centre through the provision of new retail, health, and community uses, as well as the provision of new public space (community laneway). In particular, the development will provide a 'neighbourhood' level of service for the surrounding locality, rather than the broader metropolitan attractor of the wider city centre.

In respect to the Scarborough Beach Road frontage, the proposed development features extensive glazing to this elevation, creating visual interest and activity. A landscape strip along the building frontage enhances the amenity and appearance of the building for any pedestrians. It is noted that Scarborough Beach Road is a hostile environment for pedestrians and sees only very limited foot traffic. It is not considered feasible to require development to incorporate small format retail uses with primary frontage to the arterial road, which comprises several lanes of free-flowing traffic adjacent to the site. The proposed design, which creates a pedestrian-friendly link through the site between the residential area of Woodlands to the south and Innaloo to the north, is considered an appropriate response to the challenging site context.

Additionally, requiring the development to achieve a continuous active frontage to Scarborough Beach Road would necessitate access, service and loading areas being provided at the rear, accessed via Ewen Street. Such an arrangement would clearly have a significant impact on the residential area to the south of Ewen Street, in terms of traffic and associated amenity impacts. The proposed design, which incorporates the major tenant loading area and basement parking access via Scarborough Beach Road, is an appropriate compromise solution that balances the desire to generate visual interest and activity to Scarborough Beach Road while minimising amenity impacts on the existing residents.

Transport Impact and RSA Updates

The proposed development is supported by a Transport Impact Assessment, demonstrating that the proposed access, parking, and internal manoeuvrability is acceptable and that there is no undue impact to the surrounding road network. A revised Road Safety Audit was also prepared as part of this submission which confirms the acceptability of the proposed access and impact to the surrounding road network.

The development plans have also been refined to improve the Scarbrough Beach Road crossover, Ewen Street footpath and parking bays, as well as the Ewen Street median, further strengthening the design. It is also noted that the proposed bus only lane along Scarbrough Beach Road is no longer being pursued, allowing a deacceleration lane to be proposed.

Notwithstanding the above, the development continues to comprise the following design attributes:

- The development has two loading areas and two public vehicle access points, ensuring public and service/loading vehicle traffic is split between different crossovers. This includes from Scarborough Beach Road, reducing perceived traffic utilising Ewen Street.
- With the exception of three street bays, vehicle parking is internalised on the upper floors, with no ground floor parking proposed. This includes short term, EV, and pick up bays.

- The development encourages pedestrian and cycling mobility, with a centralised mall and bike parking. As a neighbourhood-level centre, the development prioritises local or weekly shopping trips, health-related visits, or dining/entertainment. Vehicle access is relegated secondary, with parking provided on the upper floor.
- All loading and servicing are internal to the building and sleeved from public view. Loading areas are supported by transport and acoustic reporting.

Noise and other Amenity Impacts

The proposed development is supported by a range of technical reporting, including an Environmental Noise Assessment, Waste Management Plan and Transport Impact Assessment, confirming that the proposed development is satisfactory from a noise, waste, and transport perspective, respectively.

Lighting will be designed in accordance with the requirements of the relevant Australian Standards and is anticipated to be conditioned as part of the development approval.

Broadly, the development has been designed in a site-responsive and contextual manner, with built form, landscaping, and materiality that responds to neighbouring patterns of development and providing a sensitive transition to adjacent land uses and activities. This includes the following design attributes:

- With the exception of three street bays, vehicle parking is internalised on the upper floors, with no ground floor parking proposed. This includes short term, EV, and pick up bays.
- All loading and servicing are internal to the building and sleeved from public view. Loading areas are supported by transport and acoustic reporting.
- Deep soil zones soften the perceived bulk and scale whilst providing a strong biophilic response. Generous open spaces are proposed, namely through the provision of a new laneway and town square. This space comprises alfresco, seating areas, as well as generous landscaping.

Economic Impacts and Strategic Alignment

Pursuant to *State Planning Policy 4.2 – Activity Centres,* the subject site is identified as being within the Stirling 'Strategic Centre'. Pursuant to Appendix 1, a Strategic Metropolitan Centre is described as follows:

> *Strategic centres are the main regional and sub-regional activity centres. They are multi-purpose centres that provide a diversity of uses and are the main focus for housing and employment growth outside the Capital City. These centres provide the full range of economic and community services necessary for the communities in their catchments and wider region. These centres are expected to service substantial populations, providing health, community and social services, be well-served by public transport and provide opportunities for business agglomeration.*

The desired land uses are:

> *The centre core or cores should contain district centre land uses and office – large. Local and neighbourhood centre land uses should be scattered throughout the strategic centre to ensure walkable access to daily and weekly goods and services for residents, visitors and workers*

The proposed development will support the growth of the centre through the provision of new retail, health, and community uses, as well as the provision of new public space (community laneway). In particular, the development will provide a 'neighbourhood' level of service for the surrounding locality, rather than the broader metropolitan attractor of the wider city centre.

The centre is appropriately situated adjacent to excellent public transport access and provides the catalyst for the ongoing redevelopment, diversification, and densification of the immediate locality. The development will utilise a site long left vacant, increasing the activity of the area. The centre will also provide construction and ongoing employment opportunities.

Importantly, SPP4.2 does not split centres up into sub-centres, with the site forming part of the singular larger strategic centre designation. It is not reasonable to state that the proposed development cannot form part of the broader centre or is 'strategically misaligned' because it is perceived to compete with neighbouring centres. That is not how SPP4.2 is applied.

The development is entirely consistent with the role and function of the whole centre, as well as the broader intent and objectives of SPP4.2.

Further, it is reaffirmed that pursuant to Clause 7.8(g) of SPP4.2:

> *Perth Capital City and strategic centres are exempt from the requirement for a NB Test.*

Accordingly, references to surrounding centres are not a valid consideration.

Future Framework

The City is currently progressing draft *Local Planning Scheme No. 4* (**LPS4**), which at time of lodgement, is with the WAPC for final review before referral to the Minister for Planning for final determination. We anticipate gazettal within 2026.

Pursuant to the advertised version of draft LPS4, development (including land use permissibility) is proposed to have due regard to the relevant structure plan. This further strengthens our position above that the mandatory residential, shop floorspace, and active frontage provisions are due regard only and the proposed development outcomes should be considered on merit.

As part of the future planning framework, we understand that the currently draft *Stirling City Centre Structure Plan* will be replaced by a new structure plan and is under consideration by the WAPC. Until released for public consultation, this document is not seriously entertained.

CONCLUSION

We trust the information provided above, and enclosed, addresses the City's request for further information, referral comments, as well as the comments received during public advertising. The amendments to the development plans and revised transport materials are in line with the feedback provided and is considered to refine the proposed development further.

Following confirmation of acceptance of the amended plans, a formal response to the matters raised and submissions, as well as the revised Road Safety Audit will be provided.

Should you have any queries or require further clarification in regard to the above matter please do not hesitate to contact the writer.

Yours faithfully,

JOSH WATSON
PRINCIPAL

260528 8859 Response to RFI and Submissions.docx

Attachment 6c

Other Technical Documents (not listed in the Responsible Authority Recommendation)

Acoustic Report

Woodlands North

Acoustic Report – Development Application

Project No.	P01447
Revision	004
Issued	25 August 2025
Client	Deltaview Pty Ltd.

E-LAB Consulting

Where science and engineering inspire design.

Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	28/10/2024	Draft Issue	Imran Khan	Teresa D Ngyuen
2	18/11/2024	Final Issue	Imran Khan	Teresa D Ngyuen
3	19/11/2024	Final Issue	Imran Khan	Teresa D Ngyuen
4	25/08/2025	Final Issue	Imran Khan	Teresa D Ngyuen

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Authorised by:

Engineering Lab NSW Pty Ltd

Imran Khan | National Technical Director

Acoustics & Vibration

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1 INTRODUCTION

1.1 DOCUMENT PURPOSE

E-Lab Consulting have been appointed by Delta view Pty Ltd to undertake acoustic assessment for the proposed retail project Woodlands North. The project consists of a supermarket, speciality stores, F&B tenancies and a Health / Wellness tenancy.

This Acoustic report has been prepared as part of Development Application for the proposed development at 367 Scarborough Beach Road, Innaloo WA 6018. This report addresses potential noise impacts from the development affecting nearby noise sensitive receivers and provides recommendations to maintain compliance to WA Environmental Protection (Noise) Regulations 1997.

1.2 PROJECT DESCRIPTION

1.2.1 Site Location

The project is located at the corner of Scarborough Beach Road and Ewen Street in Innaloo WA. The project site is located within the City of Stirling. Figure 1 shows the project location and the nearest noise sensitive receivers.

The site is surrounded by areas zoned for mixed-use developments under the Local Development Plans for Stirling City Centre – Woodlands (2015) and Southern (2018) Precincts. Figure 2 shows the future development zoning around the project area. There are existing commercial developments to the north, east and west of the site (including a petrol station adjacent), with existing residences to the immediate south across Ewen Street.

The nearest receivers have been identified as compliance with the noise regulations at the nearest receivers is accepted to imply compliance at receivers located further away.

Figure 1: Project Location and the nearest noise-sensitive receivers

Source – City of Stirling Intramaps

Figure 2: City of Stirling, Local Development Plan – Southern Precinct (20 March 2018)

2 ACOUSTIC CRITERIA

2.1 WA ENVIRONMENTAL PROTECTION(NOISE) REGULATIONS 1997

Environmental noise emissions resulting from the development are addressed through the *Environmental Protection Act 1986* with the prescribed standards detailed in the *Environmental Protection (Noise) Regulations 1997* (WA EPNR). The regulations are based on maximum allowable noise levels termed the 'assigned noise level".

According to the EPNR, noise emissions from any premises are deemed not to significantly impact the receiver if the emissions are 5 dB or less below the assigned levels. In summary, assigned noise levels are set by evaluating the presence of commercial and industrial zones, major transport routes, and sporting venues around noise-sensitive premises.

The assigned levels apply at premises receiving the noise (noise sensitive receiver) and not to areas within the project site or lot. In addition, the Environmental Protection (Noise) Regulations 1997 identify the following in Schedule 3, clause 2A.

- *"If the land within either of the circles is categorised on the land use map as land in respect of which mixed uses are permitted, the use of that land that results in the highest influencing factor is to be used in the determination of the influencing factor."*

City of Stirling's online mapping system (Local Planning Scheme 3 and Metropolitan Regional Scheme) have been used to ascertain land use. Zoning of mixed-use development within the Stirling City Centre Development Area were taken from Local Development Plans for Stirling City Centre – Woodlands (2015) and Southern (2018) Precincts. Based on these maps the influencing factor at the nearest noise sensitive receivers has been calculated,

The nearest noise sensitive receivers have been identified as detailed below and shown in Figure 2.

- 22 Hakea Road Woodlands WA
- 365 Scarborough Beach Road Innaloo – Future mixed-use development, site currently being used as a Petrol Station.

Traffic data for roads surrounding the nearest noise sensitive receiver were obtained from Main Roads Western Australia (MRWA). Table 1 presents the traffic data of the nearby roads.

Table 1: Traffic Data (Main Roads WA)

ROAD	WA EPNR CLASSIFICATION	ANNUAL AVERAGE DAILY TRAFFIC VOLUMES / YEAR
Scarborough Beach Rd (East of Odin Rd)	Major Road	31,336 (2020 -21)
Odin Rd (North of Scarb Bch Rd)	Major Road	18,992 (2018- 19)
Liege St	Secondary Rd	12,468 (2018-20)
Ewen St (East of Weaponess Rd)	Secondary Rd	6,134 (2020-21)

2.1.1 Influencing Factor

The influencing factor for results from identifying major roads, commercial and industrial areas for the nearest noise sensitive receivers is detailed in Table 2. The zoning maps used for the calculation of influencing factor showing the land use types has been presented in Figure 3 .

Figure 3: Zoning map for the project and surrounding areas

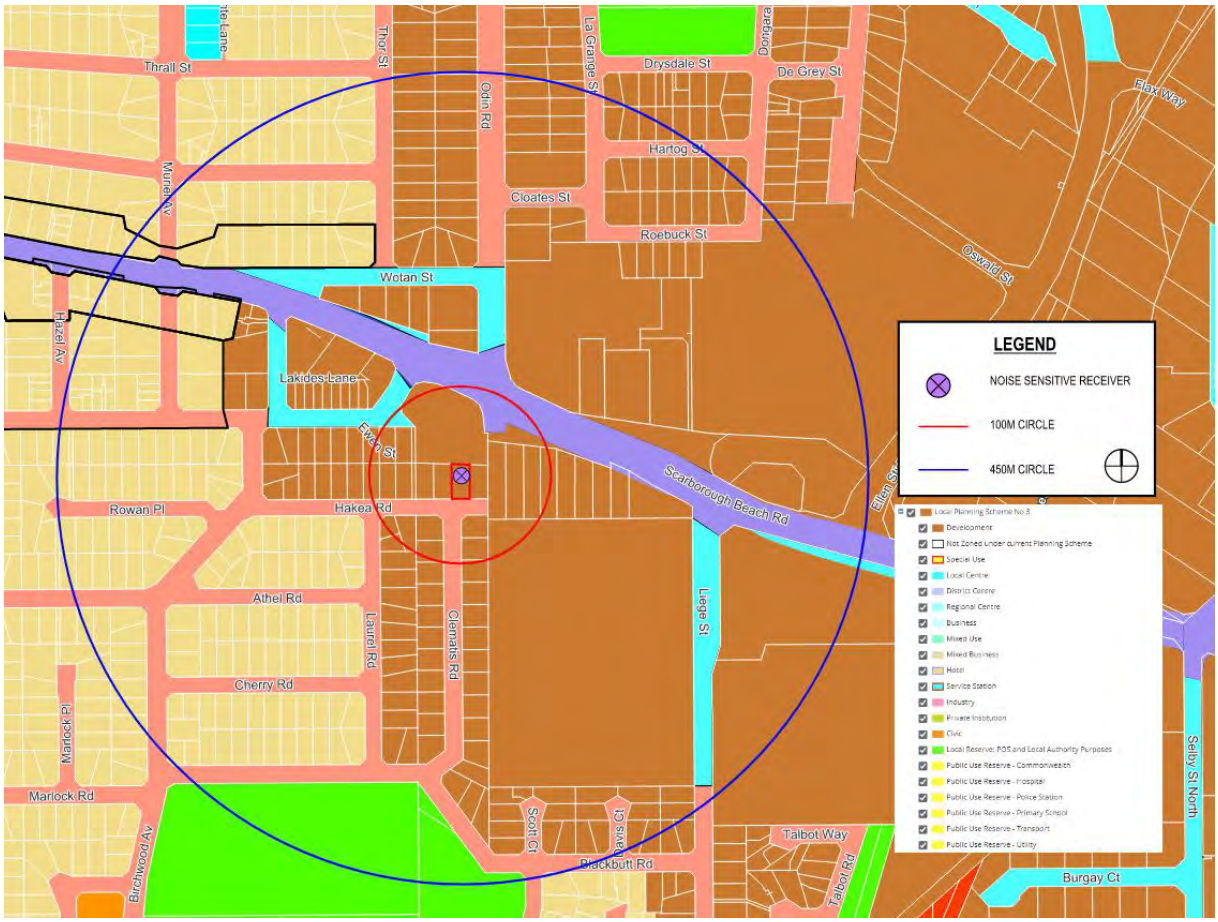


Table 2: Influencing factor (IF) noise sensitive receiver

NOISE SENSITIVE RECIEVERS	COMMERCIAL	INDUSTRIAL	ROAD	INFLUENCING FACTOR
22 Hakea Road Woodlands (Current)	45 % within 100m radius 26 % within 450m radius	0 % within 100m radius 0 % within 450m radius	Scarborough Beach Road within 100m radius	10 dB
365 Scarborough Beach Road Innaloo (Future)	45 % within 100m radius 26 % within 450m radius	0 % within 100m radius 0 % within 450m radius	Scarborough Beach Road within 100m radius	10 dB

2.1.2 Assigned Noise Levels – Noise Sensitive Receivers

Table 3 summarises the assigned levels at the nearest noise sensitive receivers. All noise emissions from the development are below the assigned level criteria for all defined periods of the day and at the lot boundary of the receiver or 15m from any associated building.

Table 3: Assigned levels – 22 Hakea Rd. & 365 Scarborough Beach Rd(Future)

TYPE OF PREMISES RECEIVING NOISE	TIME OF DAY	ASSIGNED LEVEL (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: Highly sensitive area	0700 to 1900 hours Monday to Saturday	55	65	75
	0900 to 1900 hours Sunday & public holidays	50	60	75
	1900 to 2200 hours all days	50	60	65
	2200 hours on any day to 0700 hours Monday to Saturday, and 0900 hours Sunday & public holidays	45	55	65
Noise sensitive premises: any area other than highly sensitive areas	All Hours	60	75	80
Commercial premises	All Hours	60	75	80
Industrial and utility premises	All Hours	65	80	90

2.1.3 Noise Character Adjustments

Regulation 7 states that the noise character must be "free" of annoying characteristics, namely —

- Tonality, e.g. whining, droning;
- Modulation, e.g. like a siren; and
- Impulsiveness, e.g. banging, thumping.

Regulation 9 (1) establishes the methodology for determining noise characteristics. If these characteristics cannot be reasonably and practicably removed, a series of adjustments to the measured levels are required, indicated in Table 4.

Table 4: Noise character adjustment

ADJUSTMENT WHERE NOISE EMISSION IS NOT MUSIC THESE ADJUSTMENTS ARE CUMULATIVE TO A MAXIMUM OF 15 dB			ADJUSTMENT WHERE NOISE EMISSION IS MUSIC	
Where tonality is present	Where modulation is present	Where impulsiveness is present	Where impulsiveness is not present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Should music noise from the project become audible at the receiving locations, a +10/15 dB adjustment will be required, likely resulting in non-compliance to the EPNR.

2.1.4 Mechanical Services Noise Emissions

Mechanical equipment serving the project is required to meet the assigned levels of the EPNR at the nearest sensitive receivers. It is important that noise emissions from the site do not present any form of tonality, modulation or impulsiveness (as defined by the EPNR).

3 NOISE EMISSIONS

The noise emitting sources from a development of this type are typically loading docks, mechanical plant used to service the supermarket and operational noise from the tenancies.

Noise emissions from the project site have been assessed for the following two scenarios:

- Current Scenario – Receivers surrounding the project site with their current heights
- Future Scenario – Receivers being developed to have multi storey buildings with heights in accordance with City of Stirling City Centre Local Development Plan

3.1.1 Modelling Parameters

Sound Plan9.0 has been used to develop a 3D model of the project site and the surrounding receivers to predict noise emissions from the project. Latest architectural drawings provided by Place Fabric were used to ascertain the layout and built form of the project in developing the acoustic model.

3.1.2 Algorithm and Meteorological Conditions

ISO 9613 - *Acoustics – Attenuation of sound during propagation outdoors* algorithm has been used for the noise model predictions with a reflection order of 3. The noise model has considered noise source levels, distance from the source to receivers, and screening effects due to existing, proposed buildings and ground topology.

3.1.3 Topography

Terrain contours were sourced from *Geoscience Australia, Digital Elevation Model (DEM) 1 Metre Grid of Australia derived from LiDAR, 2015.*

A reflective ground condition (0.6) was used as the areas surrounding the project are vegetated areas.

3.2 Loading Docks

Noise emissions from loading docks are required to be compliant to the assigned levels outlined in the EPNR. The project has two loading docks located towards the Southwest and Southeast of the project to service the Supermarket and Specialist tenancies as shown in Figure 4.

Figure 4: Architectural plan showing loading docks and truck paths

Source – Place Fabric

3.2.1 Assessment Criteria

Assessment of each noise source against the WA EPNR criteria (L_{A10}, L_{A1}, or L_{Amax}) is proportional to the period of the day, and the combined frequency and duration of each noise event. Noise levels from trucks using the loading bay is mainly truck manoeuvring and unloading / loading of the trucks. Truck's engine and refrigeration plant are switched off during unloading process therefore the duration of noise truck using the loading bay is quite limited for each delivery. Noise emissions from truck is present for less than 10 % of a representative measurement period, and therefore, assessment is conducted against the L_{A1} criteria.

3.2.2 Operating times and Truck Volumes

The delivery schedules of the truck for the supermarket and the specialist tenancies are yet to be confirmed, operating times listed below have been assumed for the assessment.

- Supermarket Loading Dock – Monday to Sunday: 24 hours
- Specialist Tenancies Loading Dock – Monday to Sunday: 24 hours

It assumed that only one truck would be present at any time in each loading dock.

3.2.3 Sound Level Data

Noise generated by truck movements and related operations in these areas typically consists of a mix of continuous and intermittent noise events, including:

- Engine noise (such as ignition, idling, acceleration, and deceleration), reversing alarms, brake squeals, and compression release noises.
- Unloading activities involving forklifts and pallet trucks.
- Noise from hydraulic lifts.

Sound power level of trucks within loading dock for varying truck sizes are presented in Table 5.

Table 5: Sound power level of loading dock activities

NOISE SOURCE	SOUND POWER LEVEL
19 m Articulated trucks driving and reversing	102 dB(A)
19m Truck unloading activities (pallet trucks etc.)	90 dB(A)
Small (< 9m) trucks – arrival or departure movements	96 dB(A)
Small (< 9m) truck unloading / waste loading activities	85 dB(A)

3.2.4 Loading Dock Screening

The loading docks as per the architectural drawings are screened and the screening has been considered in the noise model for the assessment.

Figure 5: Screening to loading docks

The screening provided to loading docks should be solid without any perforations or gaps and should have a minimum surface mass of 15kg/m^2.

3.2.5 Loading Docks - Predicted Noise Emissions

Predicted noise levels due to operation of restaurant daytime and evening / nighttime has been presented in Table 6. Coloured noise maps are presented in Appendix A.

Table 6: Predicted noise emissions – Loading Docks

	NOISE SENSITIVE RECEIVER	HIGHEST PREDICTED NOISE EMISSION L_{A1} dBA	CRITERIA L_{A1} dBA			COMPLIANCE
			DAY	EVENING	NIGHT	
Current	Residential Receivers Hakea Road	47 *(24 Hakea Rd)*	65	60	55	Yes
	Residential Receivers Ewen Street	45 *(252 Ewen St.)*	65	60	55	Yes
Future	Mixed use	59 (365 Scarborough Beach Road)	65	60	55	4 dB Exceedance for Nighttime
	Residential Receivers	45 (267 Ewen Street)	65	60	55	Yes

3.2.6 Discussion

Current Scenario

Predicted noise emissions from the operations of both the loading docks are predicted to be compliant at all times to WA EPNR for the current scenario.

Future Scenario

A marginal exceedance of 4dB has been predicted at 365 Scarborough Beach Road, currently Ampol Petrol, if this gets developed into a mixed use of residential development then the predicted noise emissions exceed the nighttime criteria.

When the adjoining lot gets developed to multi storey residential apartments, following recommendations are made for future scenarios:

- Trucks to be unloaded one at a time. Trucks should not be permitted to idle while unloading is occurring.
- It is recommended that trucks are fitted with broadband type reversing alarms (sometimes referred to as quackers or croakers), rather than single tone alarms (beepers) which may contribute to tonal characteristics at the receiver locations
- Unloading activities are usually characterized by the sound of pallets hitting the truck bed or the loading dock floor. During nighttime unloading, it is important to take measures to minimize this noise.

3.3 Noise Emissions - F&B Outlets

F&B outlets depending on the use may generate noise, however at this stage of the project specific details would not be available. Noise emissions from outdoor alfresco areas has been assessed to demonstrate compliance with WA EPNR. Seating areas outside of the tenancies to the Southeast and Southwest have been modelled as indicated in Figure 6 has been modelled.

Specific noise emissions from within the tenancies are required to be managed by the respective tenants under the provision of an operational noise management plan.

Figure 6: Alfresco areas for the F&B tenancies

Source – Place Fabric

3.3.1 Sound Level Data

Patron Sound Power Levels were predicted using the formula 66 dB(A)/m^2 presented by VDI Standard 3770:2012, "Emissionskennwerte von Schallquellen - Sport und Freizeitanlagen". Predicted Sound Power Levels were benchmarked against the local document "*Licenced Premises Noise Assessment Technical Guideline*". Version 1.0, Association of Australian Acoustical Consultants, AAAC, 2019 and found to be within the range of predictions used by Acoustical Consultants in Australia.

F&B Outlets shall not play music that would become audible at the nearest noise sensitive receivers. Music Level must be set such as not to become audible over patron noise and attract adjustments to the received level per the EPNR criteria.

3.3.2 Assessment Criteria

Assessment of each noise source against the WA EPNR criteria (L_{A10}, L_{A1}, or L_{Amax}) is proportional to the period of the day, and the combined frequency and duration of each noise event.

As patron noise is expected to be present for more than 10 % of a representative measurement period assessment of patron noise is conducted against the L_{A10} criteria.

3.3.3 Operating times

The operators of the tenancies have not been finalised therefore following operational hours for the tenancies has been assumed:

- Monday – Saturday – 0700- 2200 hours
- Sunday – 0900- 1900 hours

3.4 Predicted Noise Emissions

Predicted noise levels due to operations of the F&B tenancies are presented in Table 7. Coloured noise maps are presented in Appendix A.

Table 7: Predicted noise emissions – Patron noise

	NOISE SENSITIVE RECEIVER	HIGHEST PREDICTED NOISE EMISSION L_{A10} dBA	CRITERIA L_{A10} dBA			COMPLIANCE
			DAY	EVENING	NIGHT	
Current	Residential Receivers Hakea Road	50 *(14 Hakea Rd)*	55	50	NA	Yes
	Residential Receivers Ewen Street	49 *(273 Ewen St.)*	55	50	NA	Yes
Future	Residential Receivers Hakea Road	51 *(14 Hakea Rd)*	55	50	NA	1dB For evening time / Sunday day time
	Residential Receivers Ewen Street	51 *(273 Ewen St.)*	55	50	NA	1dB For evening time /Sunday day time

3.4.1 Discussion

Current Scenario

Predicted noise emissions from the operations F&B tenancies are predicted to achieve compliance to all nominated operating times.

Future Scenario

A marginal exceedance of 1dB has been predicted at residential receivers along Hakea Rd and Ewen Street. As the exceedance is marginal(1dB), it would not have any adverse impacts on the receivers when developed in future.

Operators to consider as part of their operational noise management plan limiting the number of user of the alfresco areas during evening / Sunday for full compliance to WA EPNR.

3.5 Mechanical Services – Noise Emissions

Noise produced by the mechanical services of the proposed development must meet the EPNR criteria at all nearby sensitive receptors. Currently, information about the mechanical equipment is not available. As the design advances, specific acoustic treatments will be implemented to ensure compliance with the relevant EPNR noise level standards at the closest noise-sensitive receivers.

The plant most relevant to environmental noise emissions are:

- Super Market rooftop plant and smoke exhaust fans
- F&B tenancy kitchen extract fans
- Fire pumps

At this stage, a reverse brief or limiting Sound Power Level has been established for the Supermarket plant deck:

- Cumulative Sound Power Level of 80 dB(A) (day and evening times as defined by the WA EPNR)
- Reducing to a cumulative Sound Power Level of 75 dBA at night-time, however the equipment is expected to be at a lower load

4 CONCLUSION

E-Lab Consulting were appointed by Delta view Pty Ltd to provide an acoustic assessment report for the Woodlands North project located at 367 Scarborough Beach Road, Innaloo WA 6018.

Acoustic assessment of the operational noise from loading docks has been undertaken to assess compliance with WA Environmental Protection (Noise) Regulations 1997. A 3D noise model using Sound PLAN9.0 was built to assess noise emissions from project.

Noise emissions from the below three sources were assessed:

- Loading Docks
- F&B Outlets
- Mechanical Plant

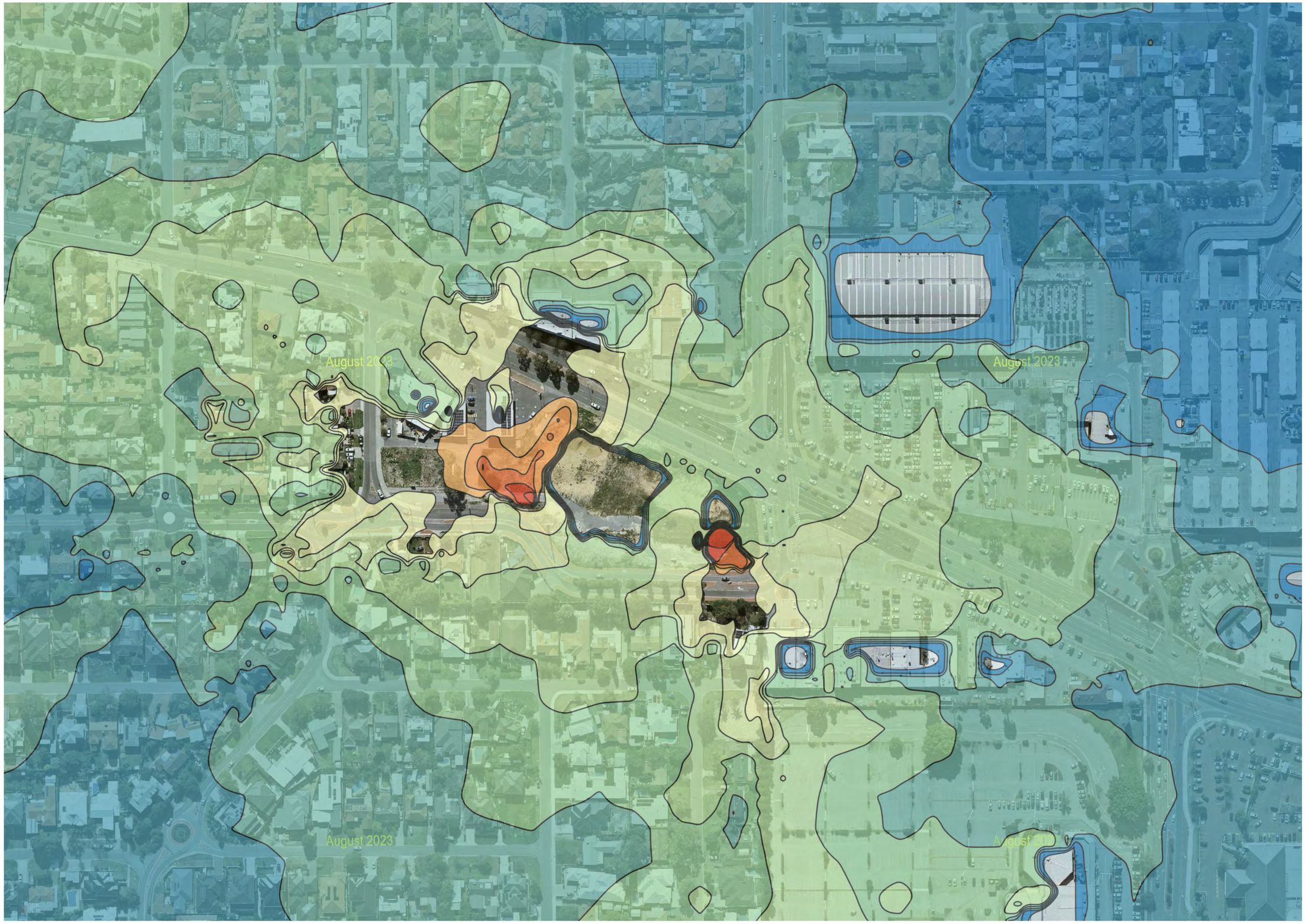
Predicted noise levels were assessed for the current and future scenarios. Noise emissions from the project are predicted to comply with WA EPNR for the current scenario.

Noise emissions for future scenarios were also predicted to comply with WA EPNR for most of the time with exception to marginal exceedances for certain periods of the day. The predicted exceedances would only impact where the receivers are developed in future to be a residential use. It is noted the marginal exceedances are unlikely to have any adverse impacts due to the project's proximity to Scarborough Beach Road and presence of higher noise level from the road traffic.

Mechanical services noise emissions shall be assessed to the environmental noise regulations (EPNR) in the next stages of design, with recommendations provided as necessary to ensure compliance.

In summary, in view of the available information, we consider that the development will be able to comply with the WA EPNR.

Appendix A **Noise Contours**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	18/11/2024	For Information

LEGEND

Noise Level - L_{eq} dB(A)

- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

NOTES

PROJECT
WOODLANDS NORTH

PROJECT NO.
P01447

ARCHITECT
PLACE FABRIC

CLIENT
DELTAVIEW PTY LTD

SCALE
NTS

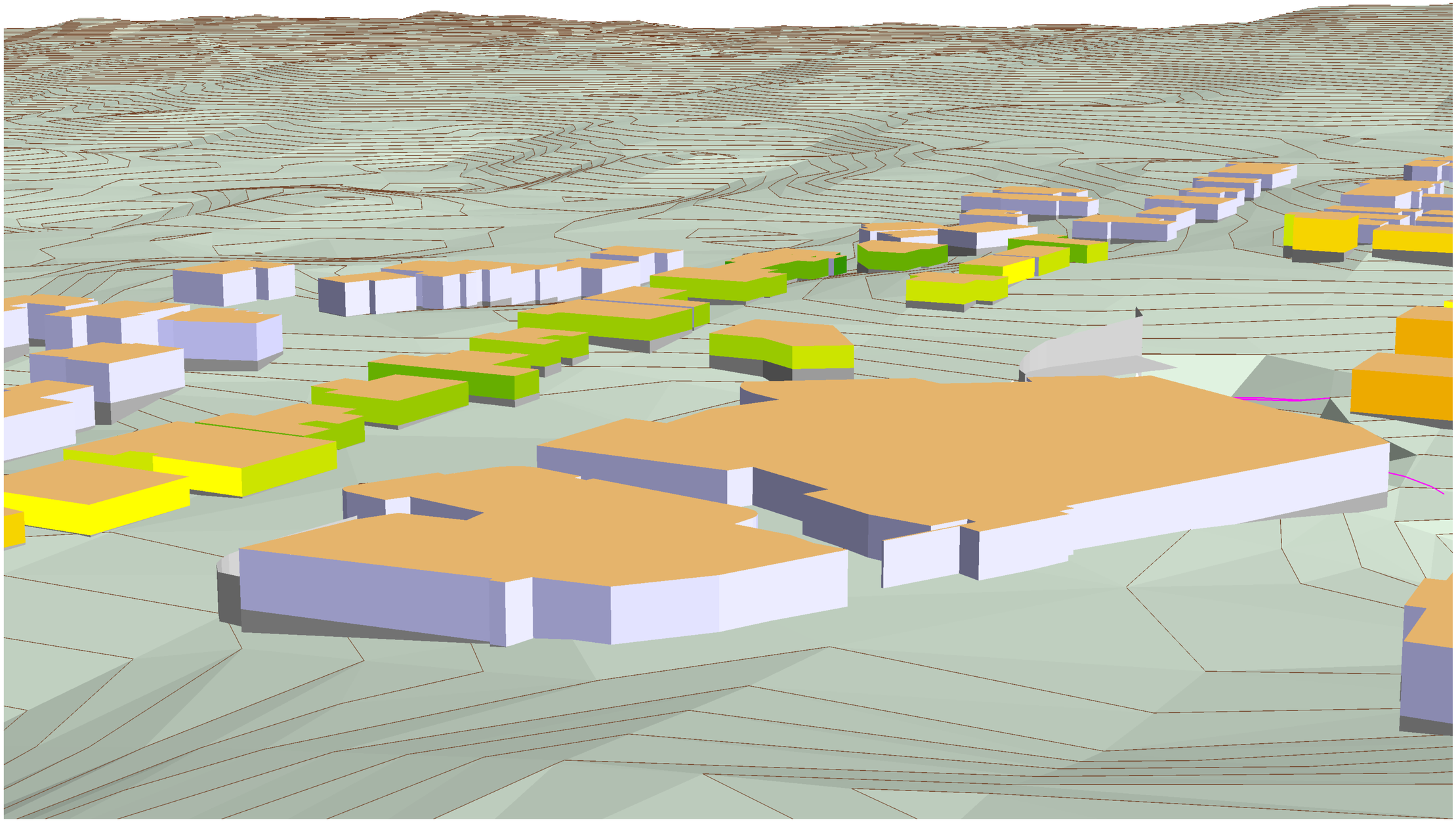
STATUS
ISSUE FOR SSDA

DRAWING
GRID NOISE MAP - LOADING DOCKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-100-01-01

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	18/11/2024	For Information

LEGEND

Noise Level - L_{eq} dB(A)

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35 <	<= 40
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45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

NOTES

PROJECT
WOODLANDS NORTH

PROJECT NO.
P01447

ARCHITECT
PLACE FABRIC

CLIENT
DELTAVIEW PTY LTD

SCALE
NTS

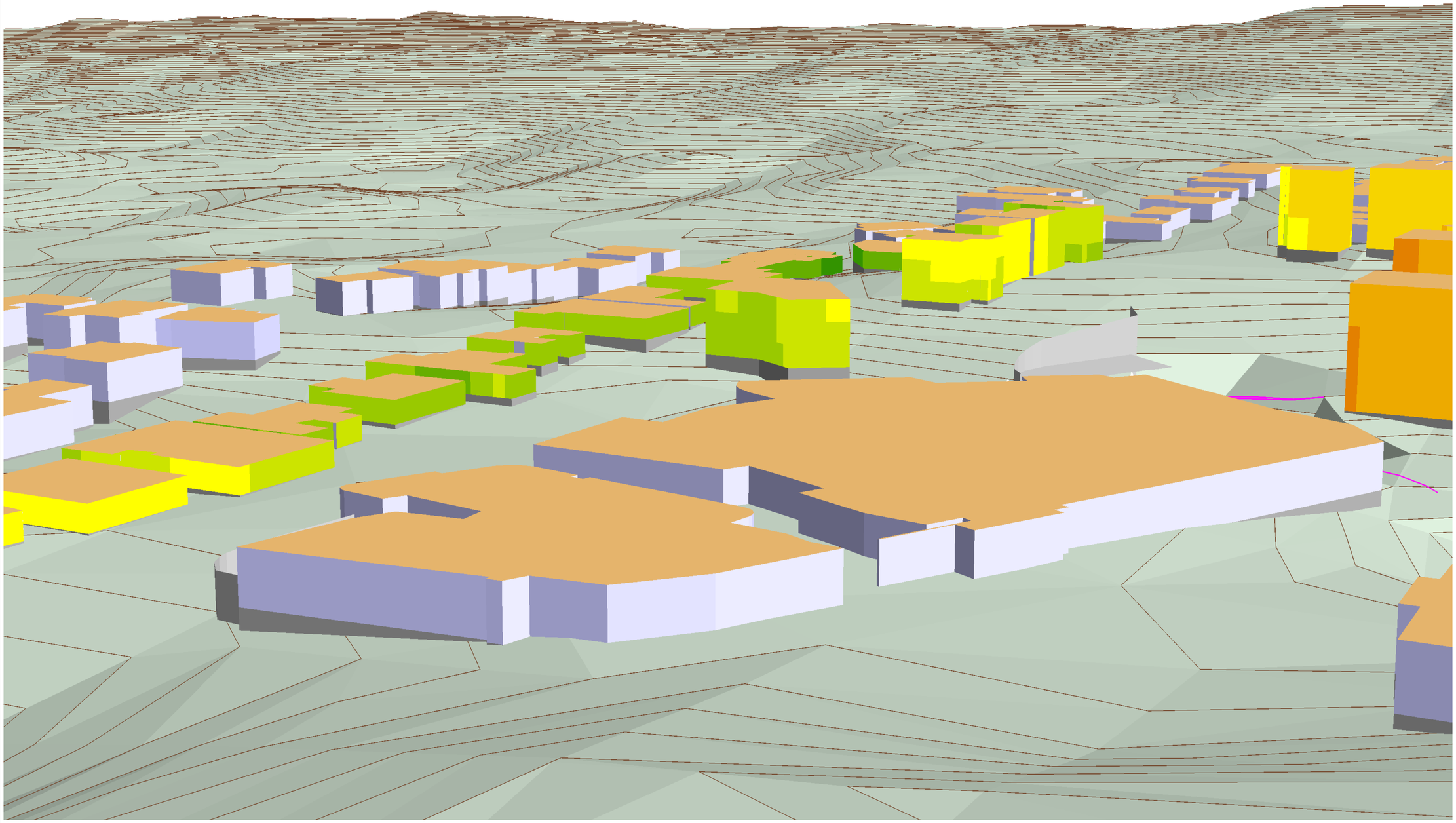
STATUS
ISSUE FOR SSDA

DRAWING
FACADE NOISE MAP - LOADING DOCKS

CURRENT

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-200-01-01	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	18/11/2024	For Information

LEGEND

Noise Level - L_{eq} dB(A)

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25 <	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
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NOTES

PROJECT
WOODLANDS NORTH

PROJECT NO.
P01447

ARCHITECT
PLACE FABRIC

CLIENT
DELTAVIEW PTY LTD

SCALE
NTS

STATUS
ISSUE FOR SSDA

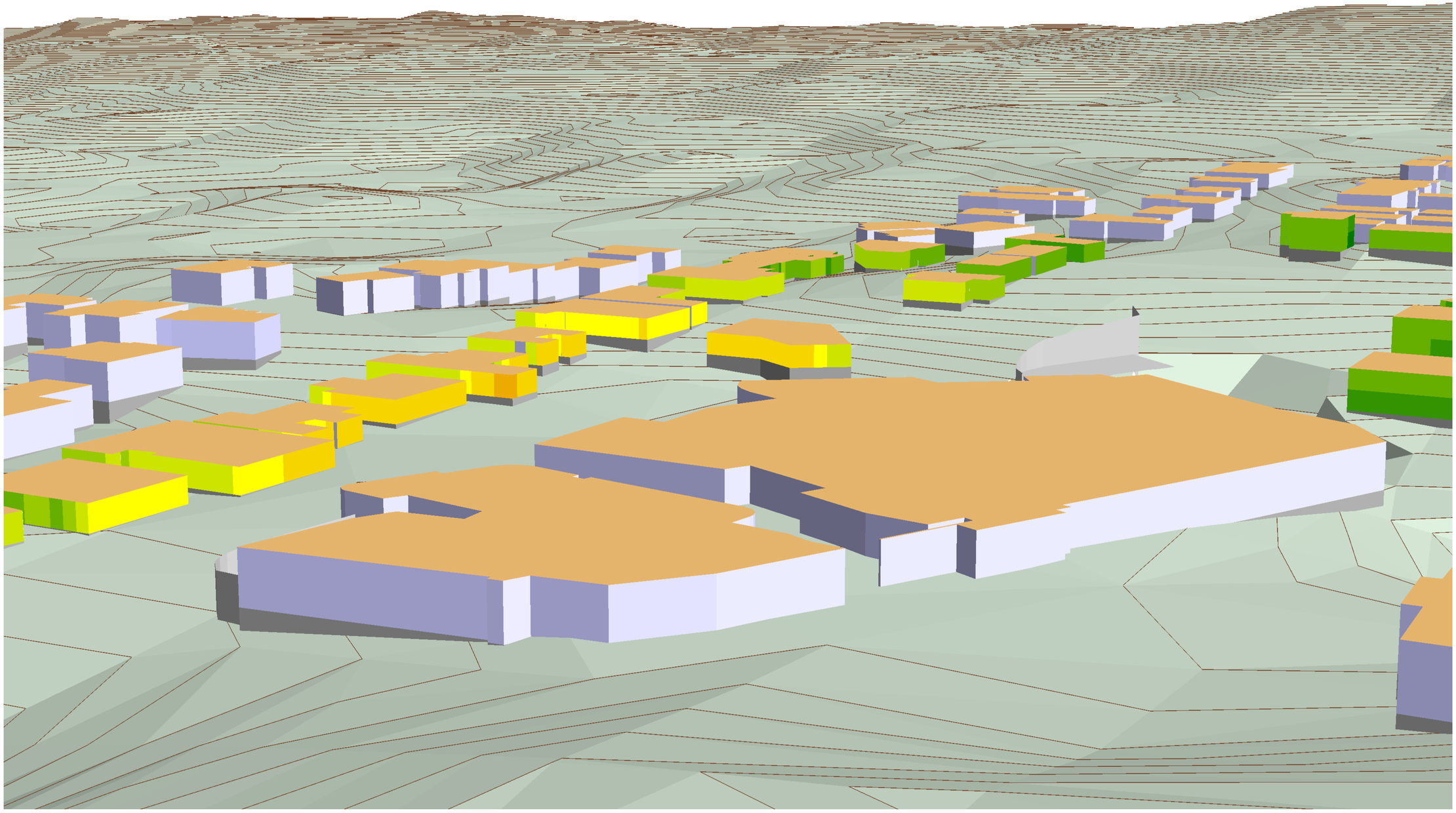
DRAWING
FACADE NOISE MAP - LOADING DOCKS

FUTURE

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-200-01-02

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	18/11/2024	For Information

LEGEND

Noise Level - L_{eq3} dB(A)

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45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

NOTES

PROJECT
WOODLANDS NORTH

PROJECT NO.
P01447

ARCHITECT
PLACE FABRIC

CLIENT
DELTAVIEW PTY LTD

SCALE
NTS

STATUS
ISSUE FOR SSDA

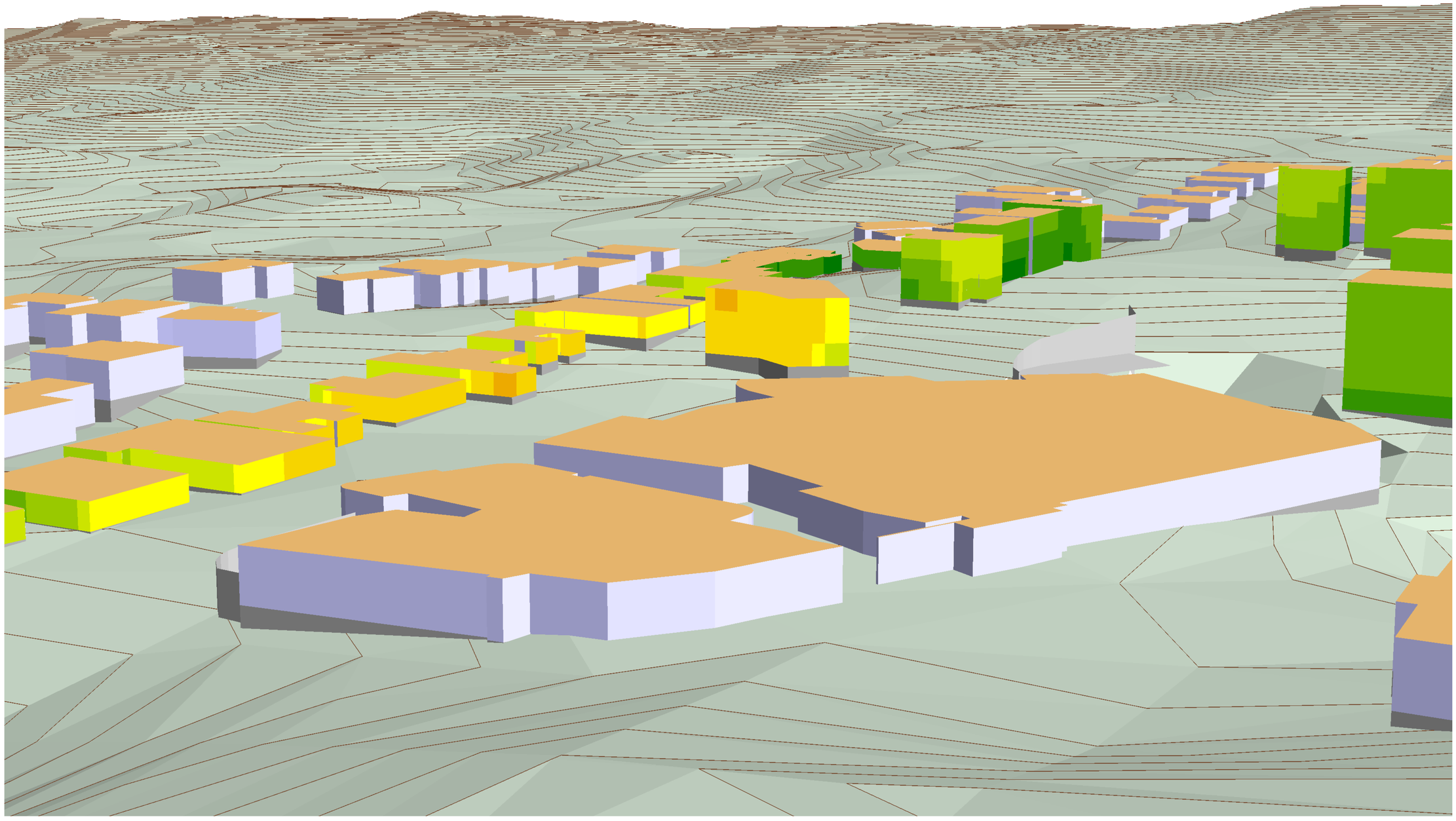
DRAWING
FACADE NOISE MAP - F&B

CURRENT

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-200-02-02

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	18/11/2024	For Information

LEGEND

Noise Level - L_{eq} dB(A)

	<= 20
20 <	<= 25
25 <	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

NOTES

PROJECT
WOODLANDS NORTH

PROJECT NO.
P01447

ARCHITECT
PLACE FABRIC

CLIENT
DELTAVIEW PTY LTD

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NTS

STATUS
ISSUE FOR SSDA

DRAWING
FACADE NOISE MAP - F&B

FUTURE

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-200-02-02	001

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Attachment 6d

Other Technical Documents (not listed in the Responsible Authority Recommendation)

Sustainability Strategy

SUMMATION

Woodlands North

Sustainability Strategy

Prepared for: Windsor Knight Pty Ltd

Prepared by: Prasanna Suraweera

Date: 21/10/2024

Revision: 001
Project Ref: SUPER24045

Executive Summary

This Sustainability Strategy has been prepared to outline the initiatives that are being incorporated in the Woodlands North Development located in Innaloo, WA.

Summation Pty Ltd has been engaged as the sustainability consultants for the project and will be responsible for the delivery of the sustainability objectives. The sustainability team for this project will be led by Prasanna Suraweera, who is a Director with Summation and a Green Star Accredited Professional with over 20 years of experience in delivery of sustainable developments. It is confirmed that Summation has been engaged during the planning stage.

The following guidelines are acknowledged as applicable to the site and this strategy addresses Principal 5 – Sustainability of the Design Quality Evaluation requirements:

- WA State Planning Policy 7.0 – Design of the Built Environment

"Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes."

Summary of the key sustainability initiatives targeted for the project are outlined below:

- Passive Design Features
- Energy Efficiency and Operational Carbon
- Water Sensitive Design
- Waste Minimisation

Refer to Section 2 for further discussion of the proposed initiatives.

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Abbreviations/Glossary

Abbreviation	Description
ESD	Environmentally Sustainable Design
GBCA	Green Building Council of Australia
GSAP	Green Star Accredited Professional
KPI	Key Performance Indicators
EOT	End of Trip
NCC	National Construction Code
BMS	Building Management System

1 Introduction

1.1 Project Background

The proposed Woodlands North project is located on Lot 100 on Ewen Street Innaloo, WA. The site location is shown in Figure 1 below.

Figure 1 - Site Location and Context

1.2 Disclaimer

This report provides high level guidance regarding the sustainability commitments targeted for this project and the preliminary strategies and initiatives to be adopted therein.

The purpose of this report is to articulate the sustainability initiatives being committed by the project. Due care has been taken to ensure the initiatives are coordinated and achievable for the project, however, note that the specific strategies mentioned in this report are indicative and may evolve throughout the futures stages of design.

1.3 WA State Planning Policy 7.0 – Design of the Built Environment

Refer below for extract of the State Planning Policy as it relates to the sustainability requirements therein. The initiatives outlined in this report is in response to this criterion.

5. Sustainability

Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.

Sustainable landscape and urban design adheres to established water-sensitive urban design principles, minimises negative impacts on existing natural features and ecological processes and facilitates green infrastructure at all project scales.

Sustainable built environments use passive environmental design measures at various scales, responding to local climate and site conditions by providing optimal orientation, shading, thermal performance and natural ventilation. Reducing reliance on technology for heating and cooling minimises energy use, resource consumption and operating costs over the life-cycle of the project.

Sustainable design also includes the use of sustainable construction materials, recycling, good waste management practices, re-use of materials and existing structures, harnessing of renewable energy sources, and total water cycle management.

Figure 2 – SPP7.0 Sustainability Extract

2 Proposed Initiatives

2.1 Summary of Initiatives

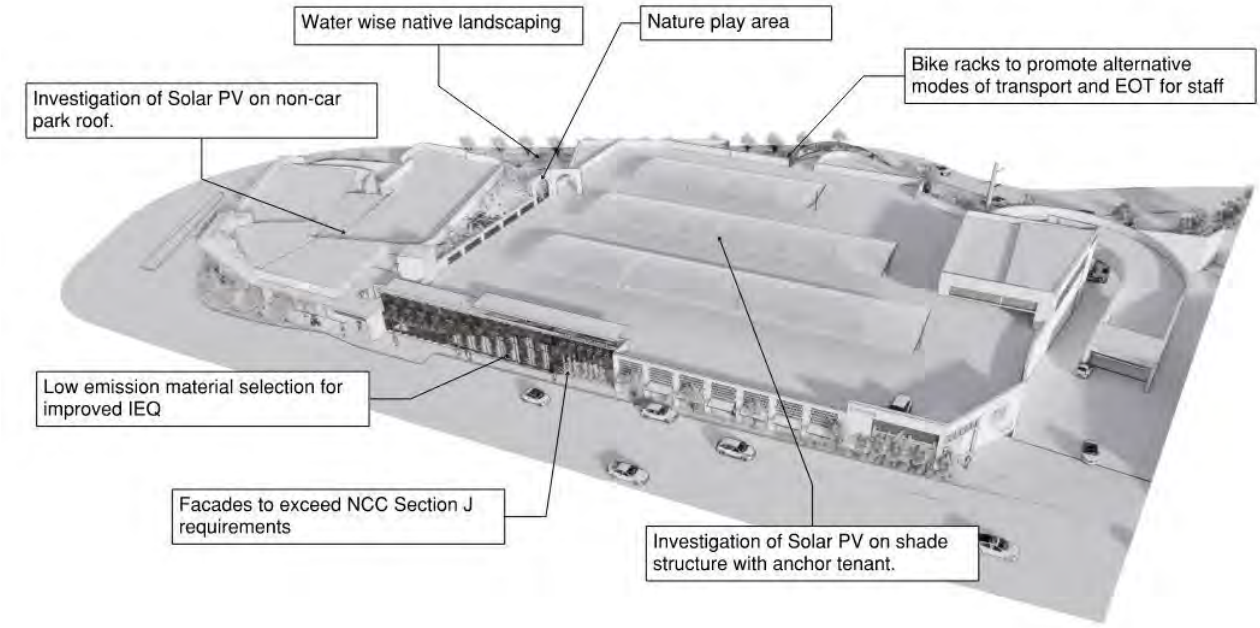

Figure 3 – Key initiatives Considered

A summary and discussion of the key initiatives proposed are outlined below:

- Passive Design Features
- Energy Efficiency and Operational Carbon
- Water Sensitive Design
- Waste Minimisation

2.2 Passive Design Features

Passive design features provide the ideal mechanism for improving energy efficiency. With retail centres, this approach must be cognisant of the functional requirements for shop front glazing. Therefore the project will target high performance glazing systems together with external shading to provide suitable protection.

Key passive design outcomes achieved for this project include:

- Balance of window-to-wall ratio.
- Facades to exceed NCC Section J requirements.
- External shading to exposed glazing.

2.3 Energy Efficiency and Operational Carbon

Energy efficiency requires combination of high-performance building envelope together with efficient servicing strategy. The following fundamental concepts will be considered in the design of this development:

- Efficient HVAC Services – Reverse cycle AC systems.
- High efficiency LED light fittings.
- 30kW Solar PV System to non-car park roof.

2.4 Solar PV

Provision of renewables is critical to the sustainability performance of buildings. It is a key initiative for reducing carbon emissions and will also provide operating cost benefits. Refer below for details of the proposed Solar PV system.

- 30kW Solar PV (~200sqm of roof space)
    - ~48,000 kWh per annum
    - ~24,000 kgCO2e saving per annum

2.5 Water Sensitive Design

Water efficiency will be targeted through careful consideration of end uses for the development. The following initiatives will be targeted:

- Waterwise landscaping to minimise dependence on potable water.
- High efficiency fittings and fixtures – High Water Efficiency Labelling and Standards (WELS) rated fittings:
    - Taps – 5 Star
    - Toilets – 4 Star
    - Showers – 3 Star (7.5 l/min)

2.6 Waste Minimisation

The waste storage areas have sufficient allowance to enable effective waste separation and recycling to occur. Appropriate waste sorting area has been determined based on the expected throughput of each waste streams, these have been located with safe efficient access by staff and waste vehicles. Specific waste streams targeted include the following:

- General
- Comingled Recycling

SUMMATION

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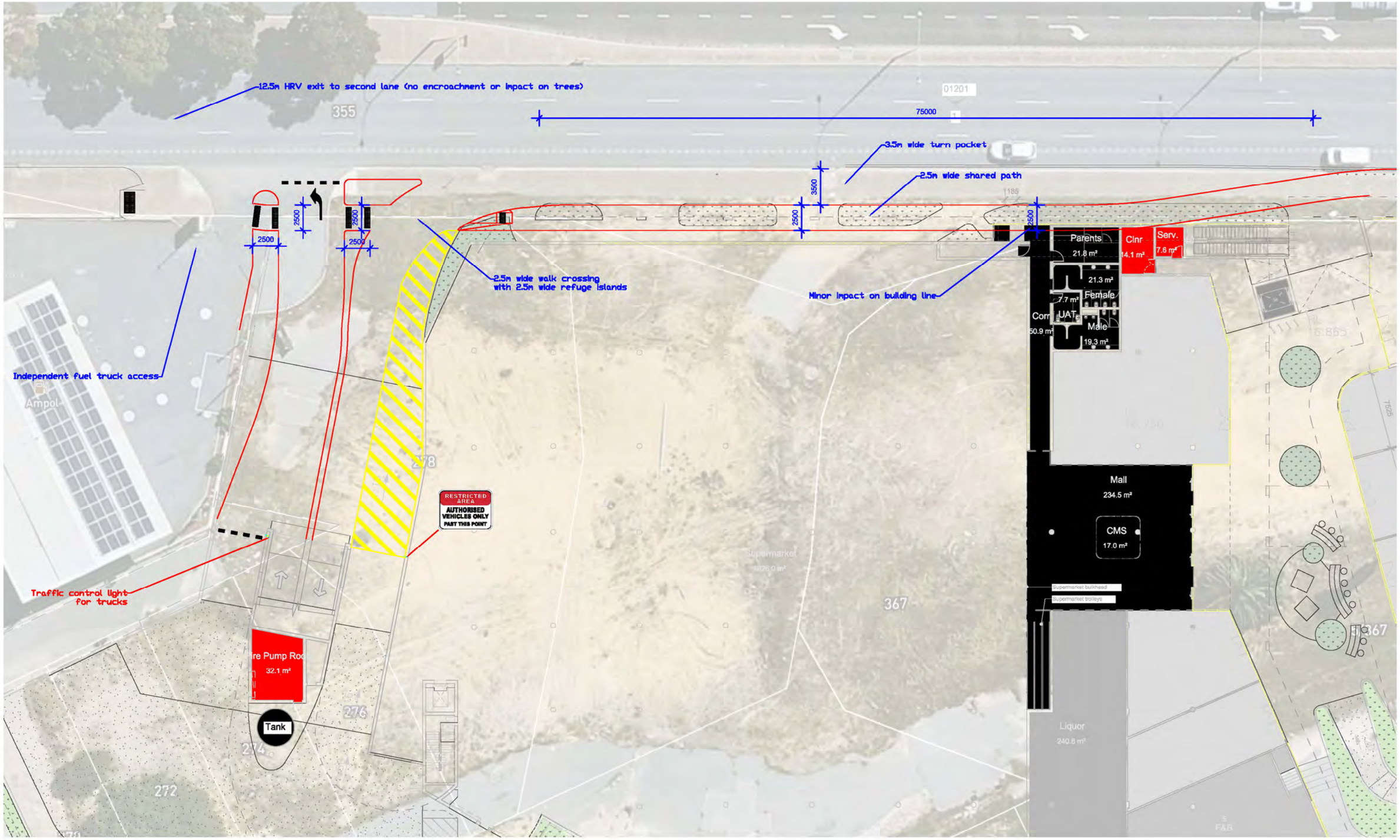
Other Technical Documents (not listed in the Responsible Authority Recommendation)

Swept Path Diagrams



Revision notes:

Rev:	Date:	Notes:
1	11/01/2026	Concept plan only. Subject to feature survey, services investigation and detailed design.

Drawn by: Paul Ghantous

Client: Windsor Knight Pty Ltd

Project: U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development

Drawing Title: Traffic Management Concept Plan

Date: 11/01/2026

Scale @ A3: 1:350

Revision: sk15

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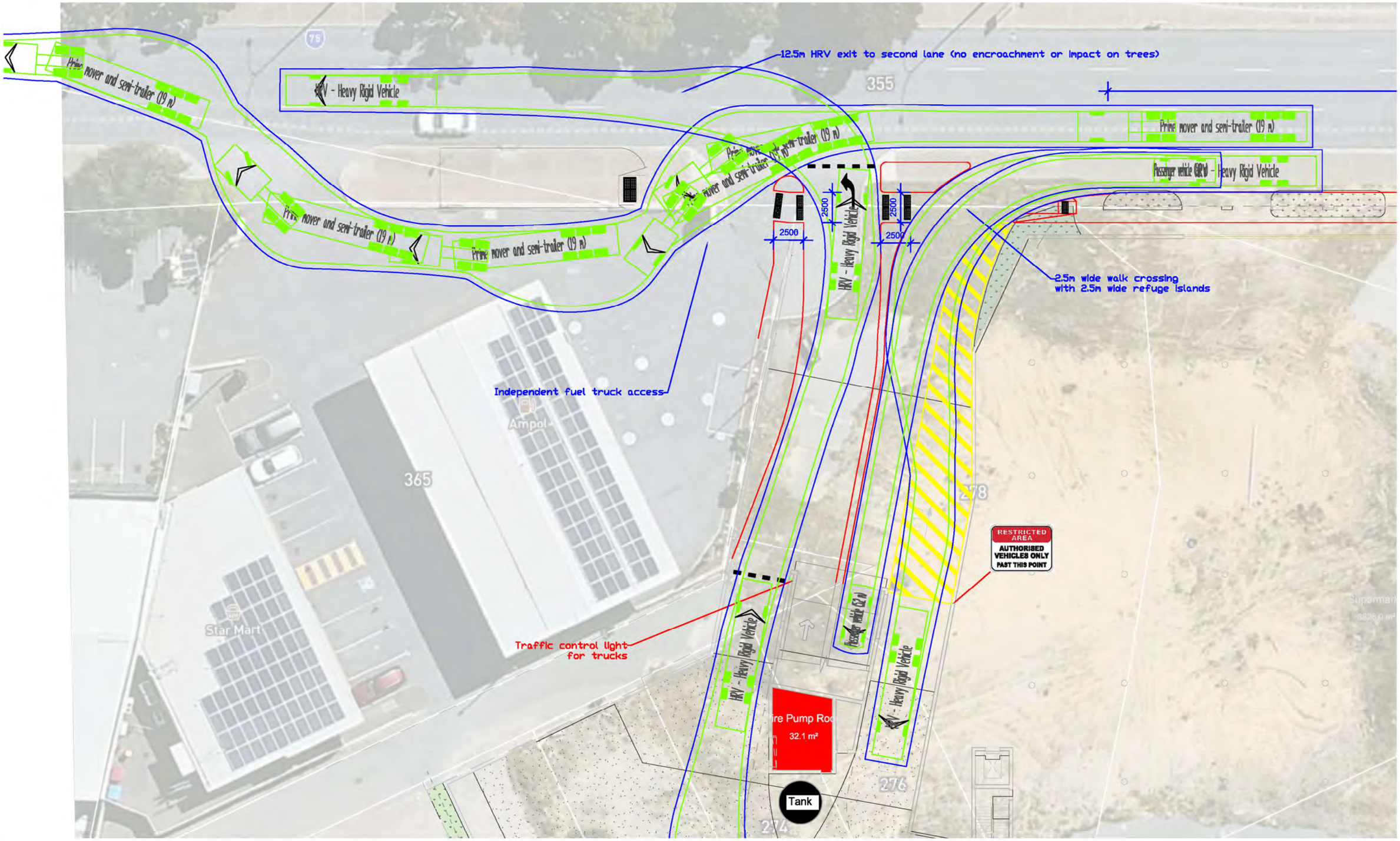
customer@urbii.com.au
0433858164



Revision notes:

Rev:	Date:	Notes:
1	11/01/2026	Blue swept path line represents a 500mm clearance buffer. - Austroads 2013 - 19m Articulated Vehicle (AV) - AS2890.2 - 12.5m Heavy Rigid Vehicle (HRV) - Austroads 2013 - 5.2m Passenger Car

Drawn by: Paul Ghantous

Client: Windsor Knight Pty Ltd

Project: U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development

Drawing Title: Swept path analysis

Date: 11/01/2026

Scale @ A3: 1:300

Revision: sk16

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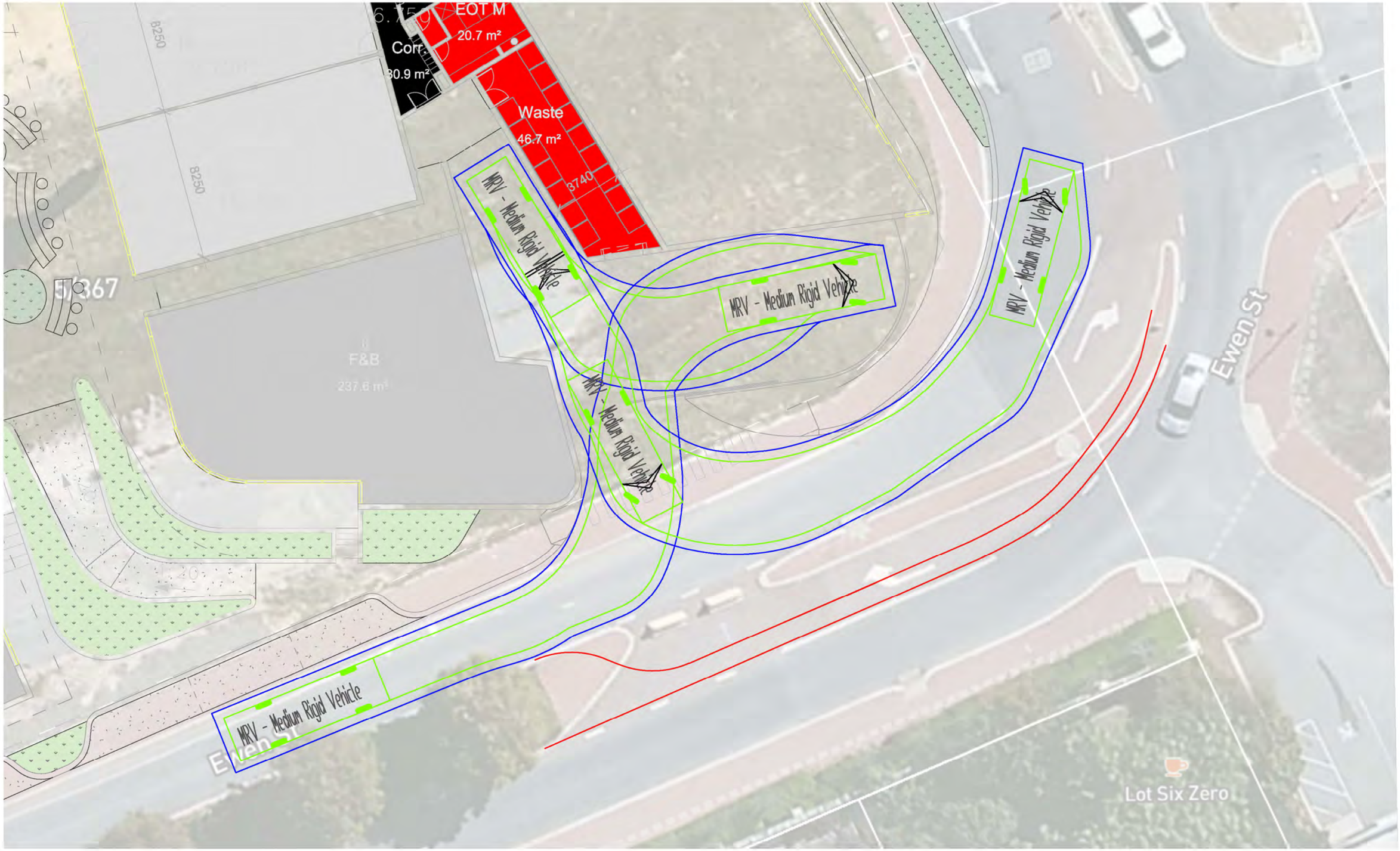

Revision notes:

Rev:	Date:	Notes:
1	11/01/2026	Concept plan only. Subject to feature survey, services investigation and detailed design.

Drawn by: Paul Ghantous

Client: Windsor Knight Pty Ltd

Project: U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development

Drawing Title: Right turn pocket modification

Date: 11/01/2026

Scale @ A3: 1:200

Revision: sk17

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Attachment 6f

Other Technical Documents (not listed in the Responsible Authority Recommendation)

Transport Impact Assessment

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Sustainable Transport. Safe Solutions

367 Scarborough Beach Road, Woodlands
Proposed Commercial Development

TRANSPORT IMPACT ASSESSMENT

Prepared for:
Windsor Knight Pty Ltd

September 2025

367 Scarborough Beach Road, Woodlands

Prepared for: Windsor Knight Pty Ltd
Prepared by: Paul Ghantous
Date: 3 September 2025
Project number: U22.035

Version control

Version No.	Date	Prepared by	Revision description	Issued to
U22.035.r02	02/11/24	Paul Ghantous	DRAFT	Windsor Knight Pty Ltd
U22.035.r02a	06/06/25	Paul Ghantous	FINAL	Windsor Knight Pty Ltd
U22.035.r02b	03/09/25	Paul Ghantous	REVISED FINAL	Windsor Knight Pty Ltd

Scan me

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

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1 Introduction

This Transport Impact Assessment has been prepared by Urbii on behalf of Windsor Knight Pty Ltd with regards to the proposed commercial development, located at 367 Scarborough Beach Road, Woodlands.

The subject site is situated on the south-west corner of the signalised intersection of Scarborough Beach Road (SBR), Odin Road and Ewen Street, as shown in Figure 1.

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

Figure 1: Subject site

2 Existing situation

2.1 Existing site use, access and parking

The subject site is presently vacant. There is an existing service station abutting the western boundary of the site, with a shared access easement between the adjoining properties.

Several commercial/retail businesses are operating nearby to the south-east, including the Innaloo Megaplex Cinemas. Westfield Innaloo Shopping Centre and Bunnings are operating nearby to the north-east. Refer to Figure 2 for a context plan showing surrounding land use. The site is located within the *Southern Precinct* of the Stirling City Centre Structure Plan (Figure 3).

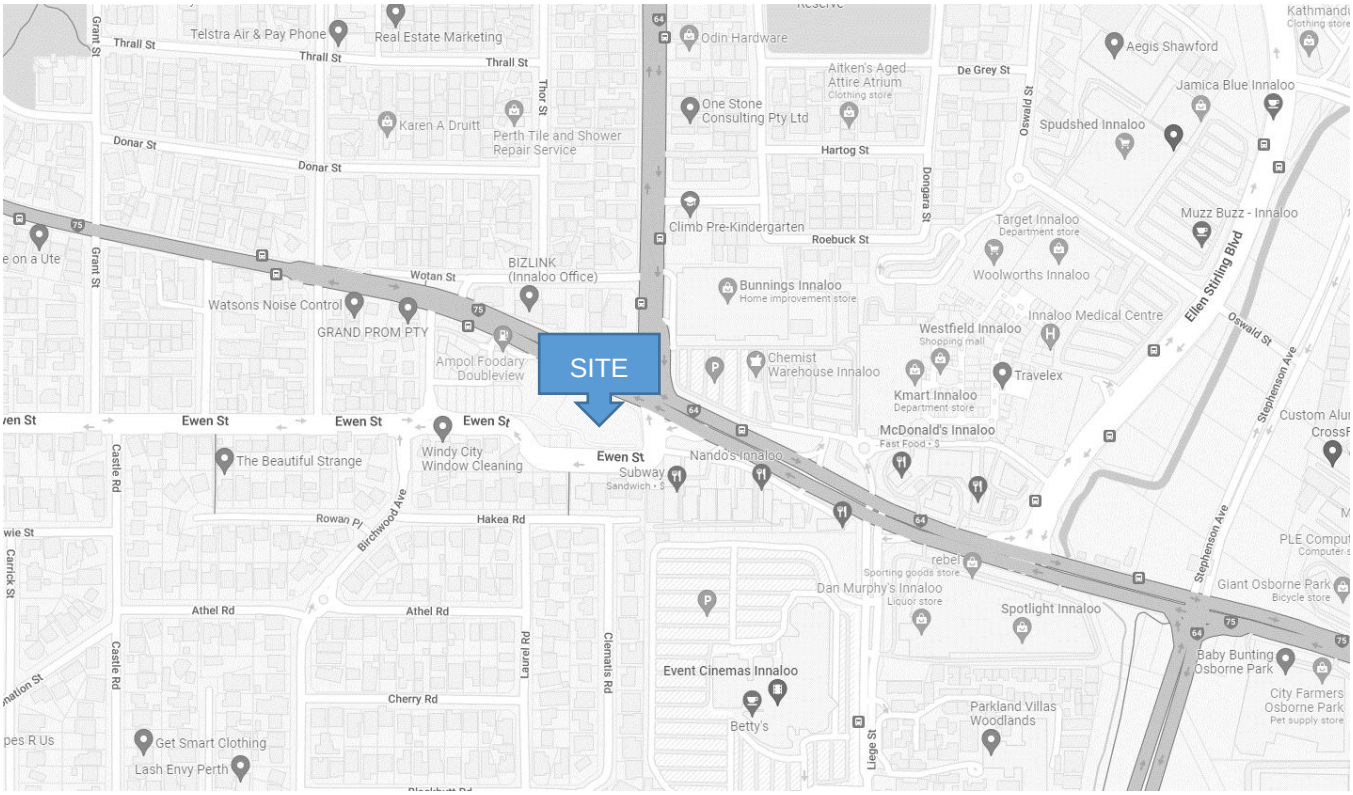


Figure 2: Location context plan

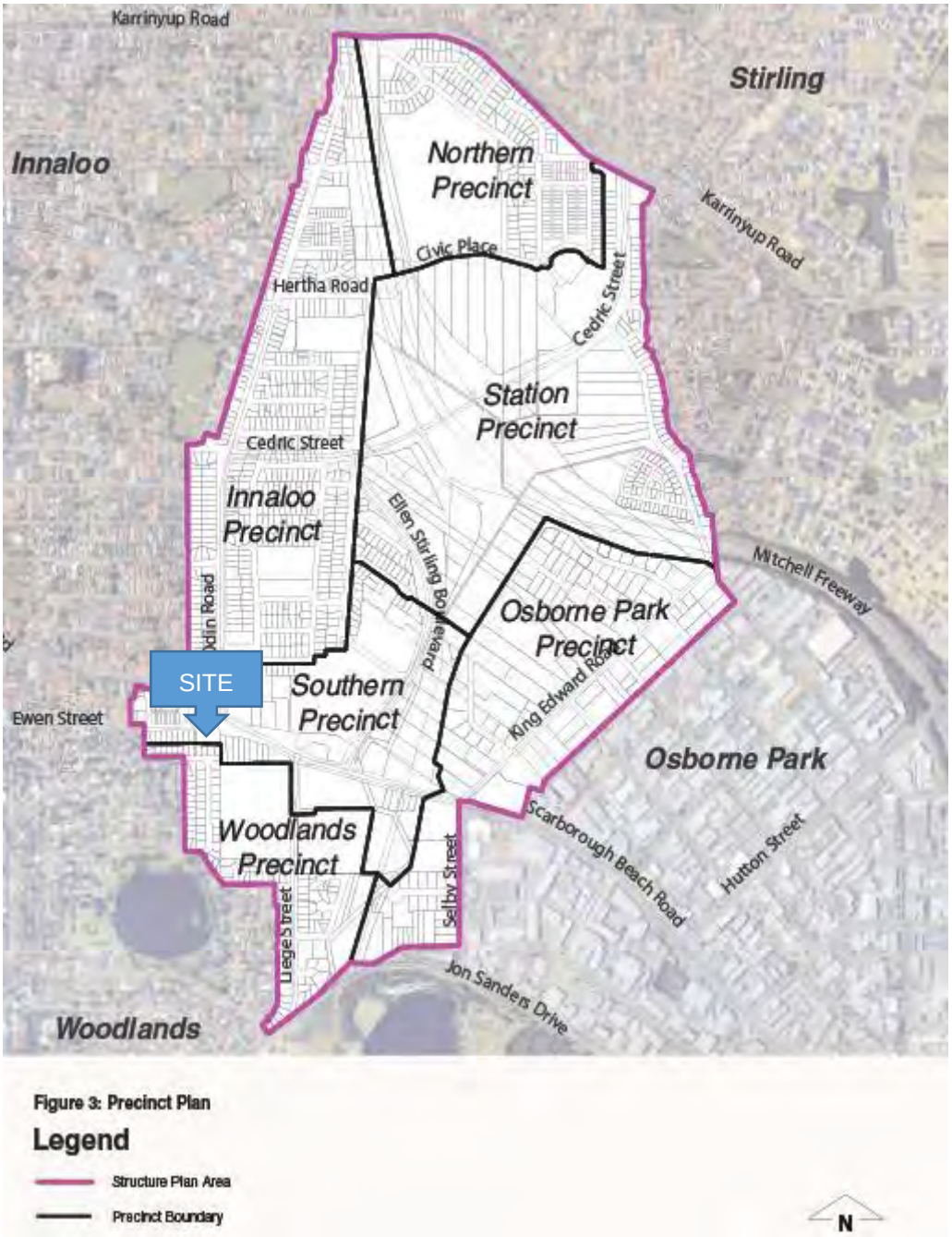


Figure 3: Stirling City Centre *Structure Plan*

2.2 Surrounding road network and traffic management on roads

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

2.2.1 Scarborough Beach Road

Scarborough Beach Road (SBR) near the subject site is an approximately 16m wide, four-lane dual carriageway road. It features a wide, kerbed and landscaped median with lighting and tree planting. Approaching the signalised intersection with Odin Road/Ewen Street, SBR widens to five lanes in the eastbound direction (three through lanes with left and right turn pockets approaching the signals). SBR is three lanes wide in the westbound direction adjacent to the site, which then merge to two lanes approaching Bowra Avenue.

A path for walking and cycling is provided on both sides of the road (adjacent to the subject site). It is presently classified as a *Distributor A* road in the Main Roads WA road hierarchy (Figure 5) and operates under a posted speed limit of 60km/h (Figure 6). *Distributor A* roads are normally the responsibility of Local Government. They are predominantly for high-capacity movements between industrial, commercial and residential areas (Figure 7).

Scarborough Beach Road is designated as an "Other Regional Road" (ORR) in the MRS (Figure 4). Scarborough Beach Road is a Category 3 road which means "*Road reservation not accurately defined or under review*". There is a Planning Control Area (PCA) and Clause 32 resolution on this site and a portion of the lot fronting SBR is reserved for future road reservation widening. Refer to Appendix A for more details.

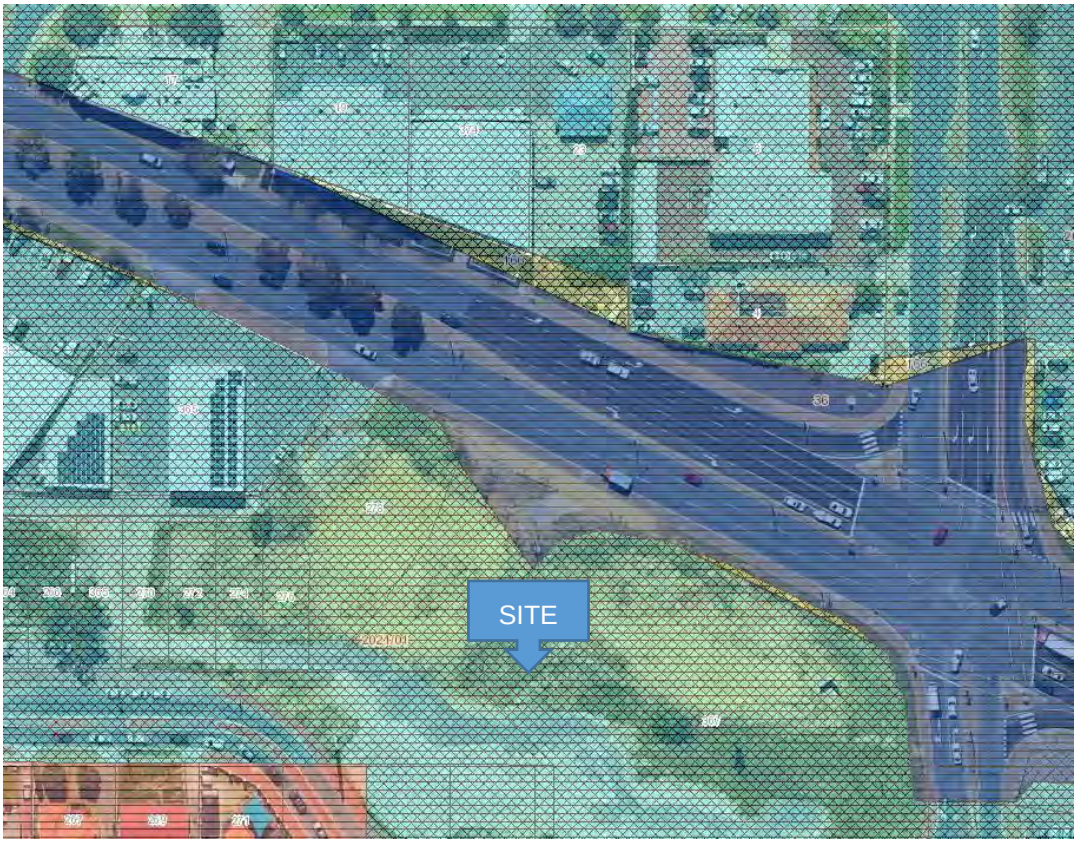


Figure 4: MRS status of Scarborough Beach Road

2.2.2 Ewen Street

Ewen Street near the subject site is an approximately 13m wide, two-lane divided boulevard style road. It features a wide, kerbed and landscaped median with tree planting. Footpaths are provided on both sides of the road. It is classified as a *Distributor B* road in the Main Roads WA road hierarchy (Figure 5) and currently operates under a default speed limit of 50km/h (Figure 6). *Distributor B* roads are normally the responsibility of Local Government. They are predominantly for reduced capacity but high traffic volumes travelling between industrial, commercial and residential areas (Figure 7).

2.2.3 Bowra Avenue

Bowra Avenue is an approximately 110m long road which runs north-south between SBR and Ewen Street.

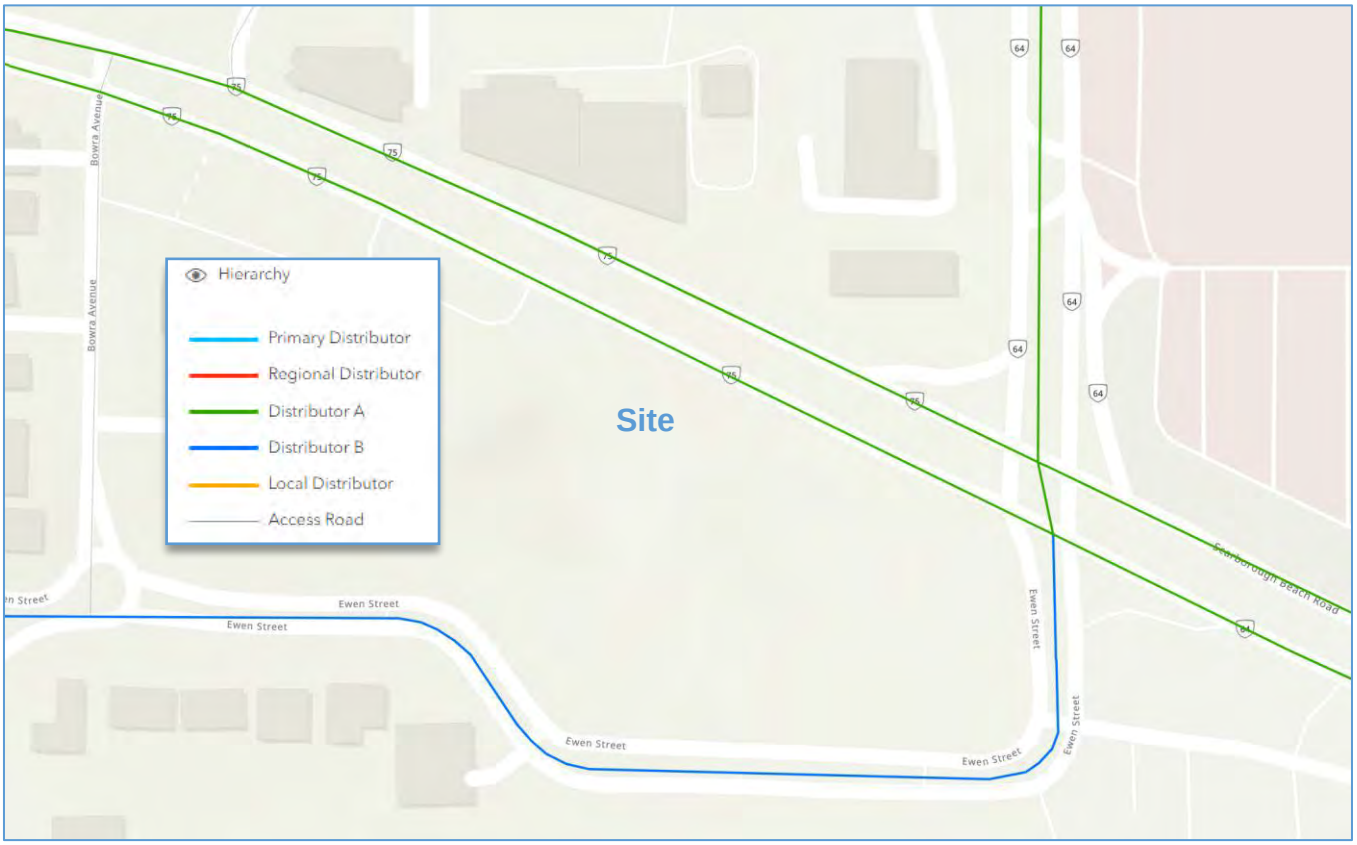


Figure 5: Main Roads WA road hierarchy plan

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

Figure 6: Main Roads WA road speed zoning plan

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

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

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

Figure 7: Road types and criteria for Western Australia

Source: Main Roads Western Australia D10#10992

2.3 Existing traffic volumes on roads and major intersections

Traffic volume and speed data obtained from Main Roads WA indicates Scarborough Beach Road carried average weekday traffic flows of around 31,500 vehicles per day (east of Odin Road) in 2021. The weekday peak hours occur from 8am to 9am and from 4pm to 5pm, as detailed in Figure 8. Traffic is directionally biased with higher eastbound traffic in the mornings and higher westbound traffic in the afternoons.

On weekends, the peak traffic hour occurs between 12pm and 1pm.

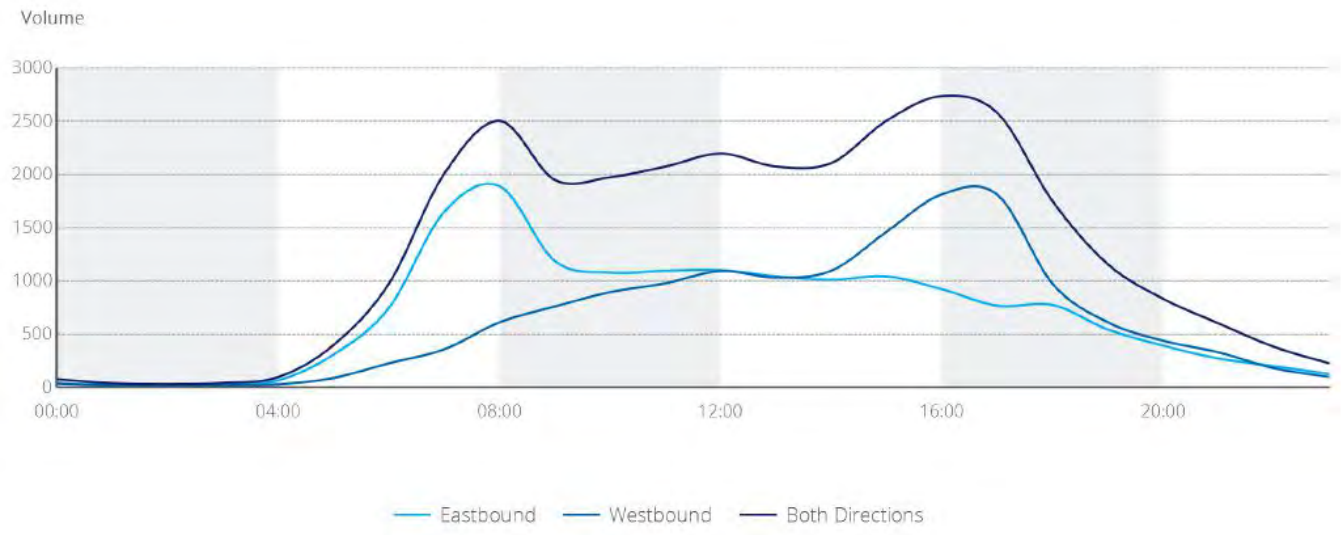


Figure 8: Weekday traffic profile (Scarborough Beach Road east of Odin Road)

To establish existing base traffic flows on the surrounding road network and nearby intersections, Urbii undertook an aerial drone traffic count survey of turning movements at the key intersections in the study area. The traffic count survey was undertaken for a standard Weekday PM peak hour and Weekend midday peak hour in October. Data from various sources was combined to prepare turning movements at various intersections:

- SCATS traffic signal data was collected for Scarborough Beach Road / Odin Road / Ewen Street.
- Midblock traffic counts for Scarborough Beach Road.
- Traffic counts extracted from aerial drone surveys.

The base peak hour traffic flows derived for analysis are detailed in Appendix D.

2.4 Existing operation of surrounding intersections

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

2.5 Heavy vehicles

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

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

The largest HV to service the development will be a 19m Articulated Vehicle (AV), which is permitted to use surrounding roads and intersections.

2.6 Public transport access

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

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

- Route 990: Perth - Scarborough Beach Bus Stn via Glendalough Stn (Figure 9).
- Route 410: Stirling Stn - Scarborough Beach Bus Stn (Figure 10).

Bus services provide a viable alternative mode of transport for residents and visitors of the proposed development. Bus route 990 operates as a High Frequency Service. Bus stops are accessible on Scarborough Beach Road adjacent to the subject site. Bus services also connect to the rail network at Perth, Glendalough and Stirling train stations for longer trips.

Figure 9: Transperth bus route 990 map

Source: Transperth

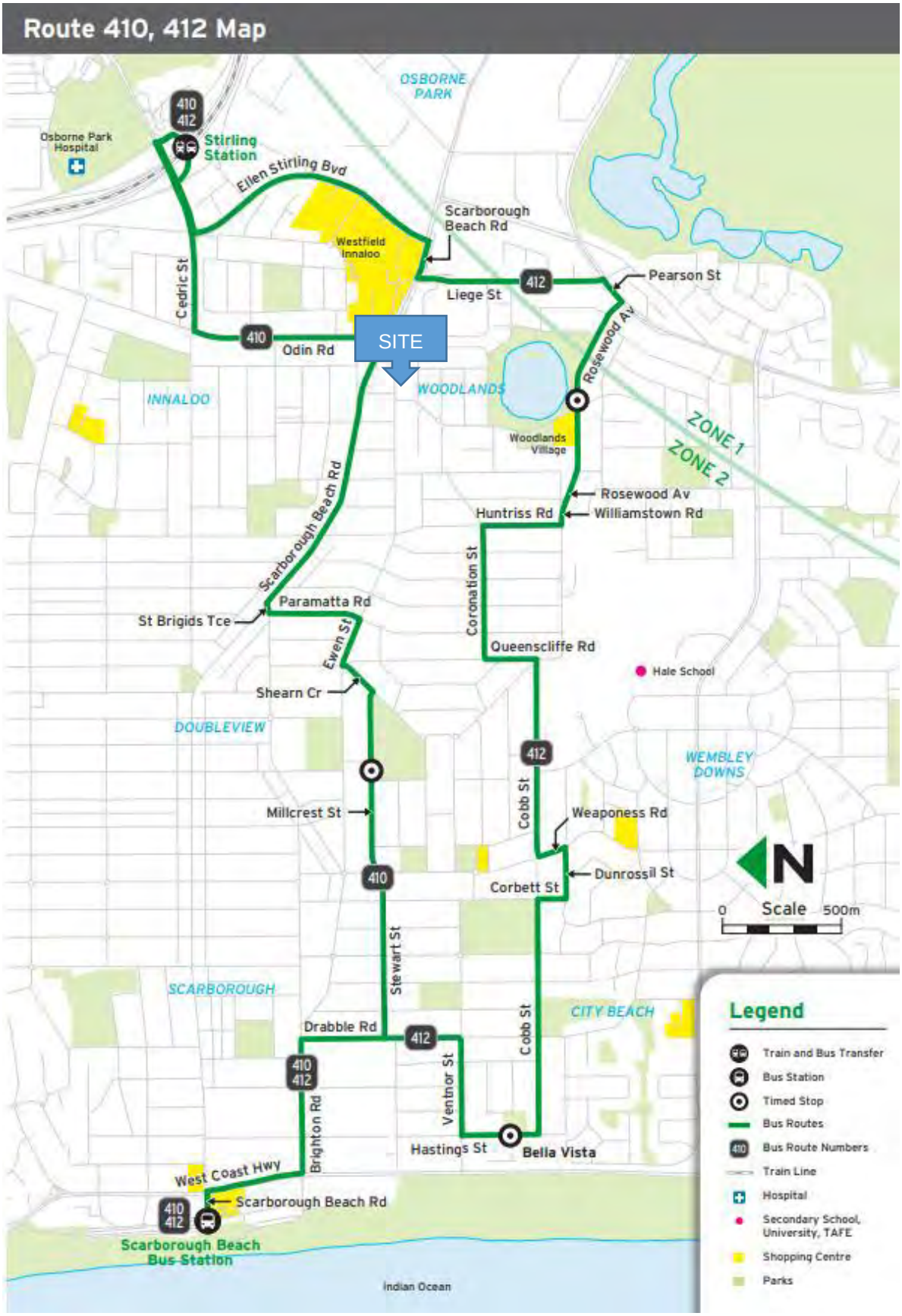


Figure 10: Transperth bus route 410 map

Source: Transperth

2.7 Pedestrian access

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

Footpaths are provided around the perimeter of the subject site. Signalised crossings are provided at the intersection of Scarborough Beach Road / Ewen St / Odin Rd. Kerb ramps and median refuge islands are provided at various points along Ewen Street and Scarborough Beach Road, which promotes improved access for bicycles, wheelchairs and prams.

2.8 Bicycle access

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

The Department of Transport Perth Bicycle Network Map (see Figure 11) shows the existing cycling connectivity to the subject site. Shared paths are provided on Scarborough Beach Road and connect to the broader cycling network.

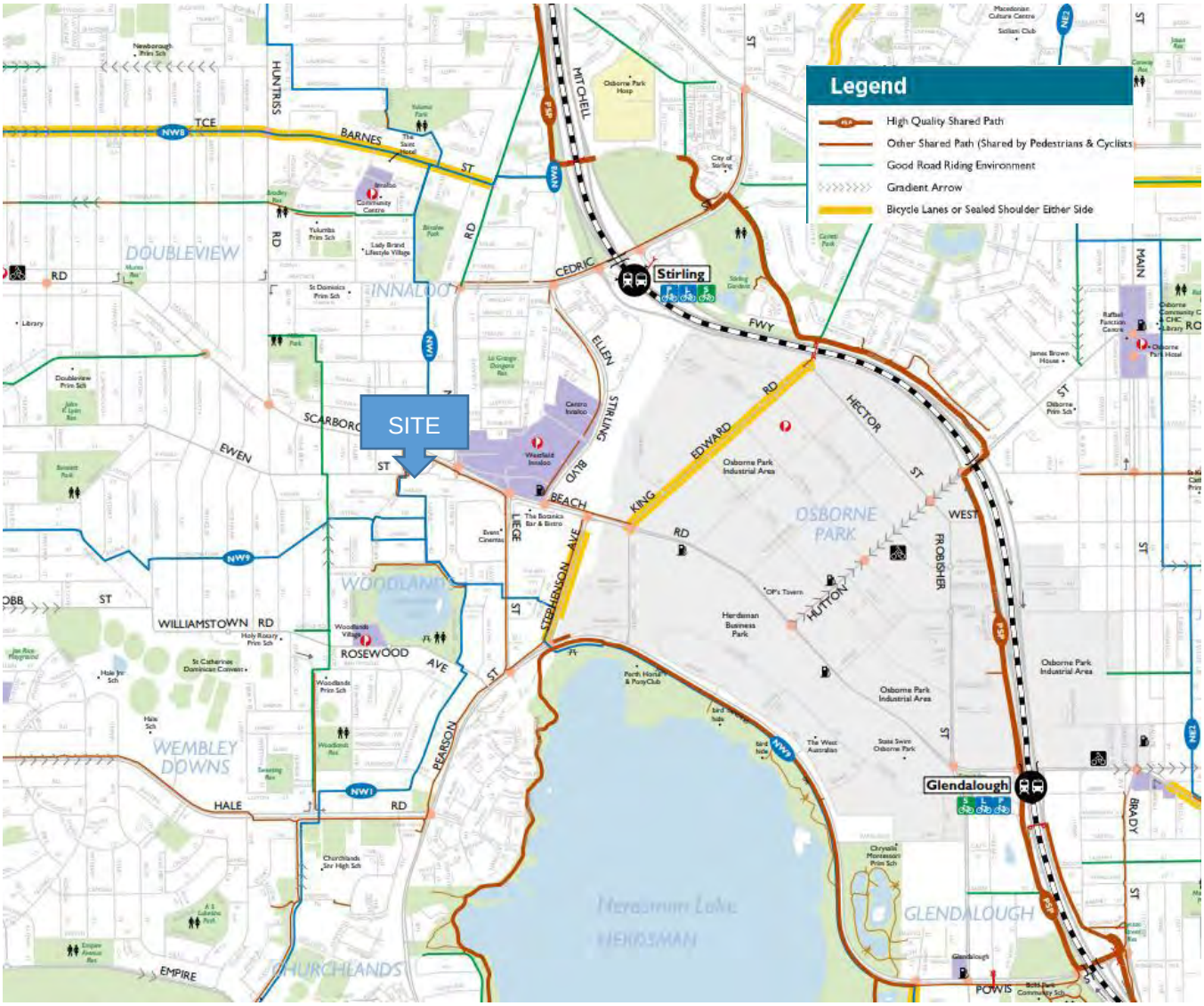


Figure 11: Perth bicycle network plan

2.9 Crash data and safety

The five-year crash history in the vicinity of the site was obtained from Main Roads WA. As detailed in Table 1, 93 crashes were recorded in the locality, which reflects the high traffic volumes along Scarborough Beach Road. The crash map is presented in Figure 12.

No fatal crashes were recorded. Two hospital crashes and 9 medical crashes were recorded, which represent around 12% of crashes. Most crashes were property damage only in severity. The colour of the symbols in Figure 12 crossmatch with the severity of crashes in Table 1.

Figure 12: 5-year crash map in the locality (2019-2023)

Source: MRWA crash mapping tool.

Table 1: 5-year crash history in the locality (2019-2023)

Severity	No.	%
Fatal	0	0
Hospital	2	2.15
Medical	9	9.68
PDO Major	41	44.09
PDO Minor	41	44.09

Year	No.	%
2019	18	19.35
2020	21	22.58
2021	16	17.20
2022	16	17.20
2023	22	23.66

Nature	No.	%
Head On	1	1.08
Hit Animal	0	0
Hit Object	1	1.08
Hit Pedestrian	0	0
Non Collision	0	0
Not Known	0	0
Other / Unknown	4	4.30
Rear End	49	52.69
Right Angle	19	20.43
Right Turn Thru	2	2.15
Sideswipe Opposite Dirn	0	0
Sideswipe Same Dirn	17	18.28

Light	No.	%
Dark - Street Lights Not Provided	0	0
Dark - Street Lights Off	0	0
Dark - Street Lights On	6	6.45
Dawn Or Dusk	4	4.30
Daylight	75	80.65
Not Known	0	0
Other / Unknown	8	8.60

Conditions	No.	%
Dry	80	86.02
Not Known	0	0
Other / Unknown	5	5.38
Wet	8	8.60

Alignment	No.	%
Curve	20	21.51
Not Known	0	0
Other / Unknown	25	26.88
Straight	48	51.61

Total		93

3 Development proposal

A commercial development is proposed for the subject site, which will combine the complementary uses of retail, food and beverage and other specialty tenancies. The proposed commercial uses are detailed in Table 2. Some minor variations in floor area may take place as further plan amendments are made. The floor area excluding corridors is around 6,300m2.

Table 2: Proposed commercial uses

USE			GLAR (m²)
	T00	Major Retail	3826
	T01	Liquor Store	240
	T02	Specialty	257
	T03	Specialty	111
	T04	Specialty	100
	T05	F&B	228
	T06	F&B	237
	T07	Specialty	130
	T08	Specialty	129
	T09	Specialty	118
	T10	Health/ Wellness	681
		Mall	234
		Casual mall seating	17
		Corridors	75
		TOTAL	6383

The proposed development plans are included in Appendix B.

4 Vehicle access

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

The proposed access arrangements are summarised in Figure 13. The development proposes a left turn entry and exit (with separator island refuge) off Scarborough Beach Road for direct access into the upper-level car park and the major tenant service area.

One loading dock crossover is proposed on Ewen Street and separate entry and exit crossovers are proposed on Ewen Street to provide secondary access to the upper car park level.

A raised separator island is proposed between the subject site and adjoining service station site crossover on Scarborough Beach Road. The existing service station crossover will be widened to accommodate independent access of fuel delivery trucks to the service station.

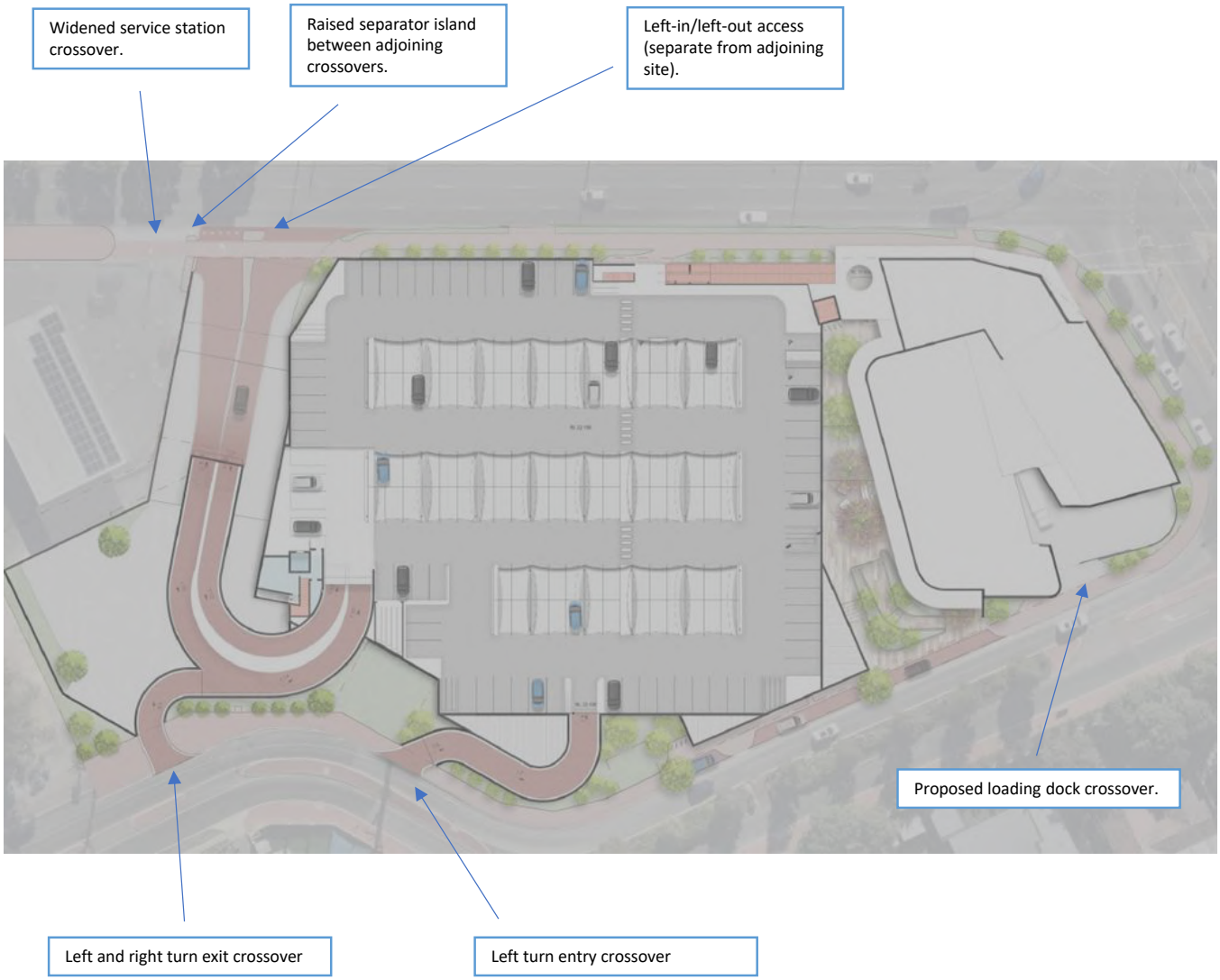


Figure 13: Proposed vehicle access

4.1 Proposed access traffic management

Urbii has developed a traffic management plan for guiding safe and legible access of light vehicles and delivery vehicles. The concept is detailed in Appendix C and in Figure 14.

The following features are noted:

- Development traffic entering from Scarborough Beach Road will utilise the kerbside westbound lane for uninterrupted entry into the site. It is noted this lane will be designated as a bus lane in the future. Vehicles are permitted to utilise the bus lane to turn left into the site. No right turn entry will be allowed.
- All development traffic exiting the site to Scarborough Beach Road will utilise a separate left turn exit.
- A separator island with pedestrian refuge is provided for people using the footpath to shelter between the inbound and outbound development traffic on Scarborough Beach Road. This makes it easier for people to cross in two stages.
- There is a separator island proposed between the subject site exit and the adjoining service station crossover. The separator island includes a refuge for footpath users crossing between the two adjacent sites. The service station driveway will be widened to accommodate independent vehicle entry to their site.
- Yellow pavement marking and signage will be used to separate cars and delivery trucks which enter and exit the development from Scarborough Beach Road. This creates legible access for customers, who are guided away from the rear service area and into the access ramp leading to the upper-level car park.
- Exiting delivery trucks will be stopped at a hold line prior to merging with outbound cars and a traffic signal system will signal a green light when it is safe for trucks to exit. If the system detects an outbound car exiting from the car park, then a red light will inform the delivery truck driver to wait at the hold line.

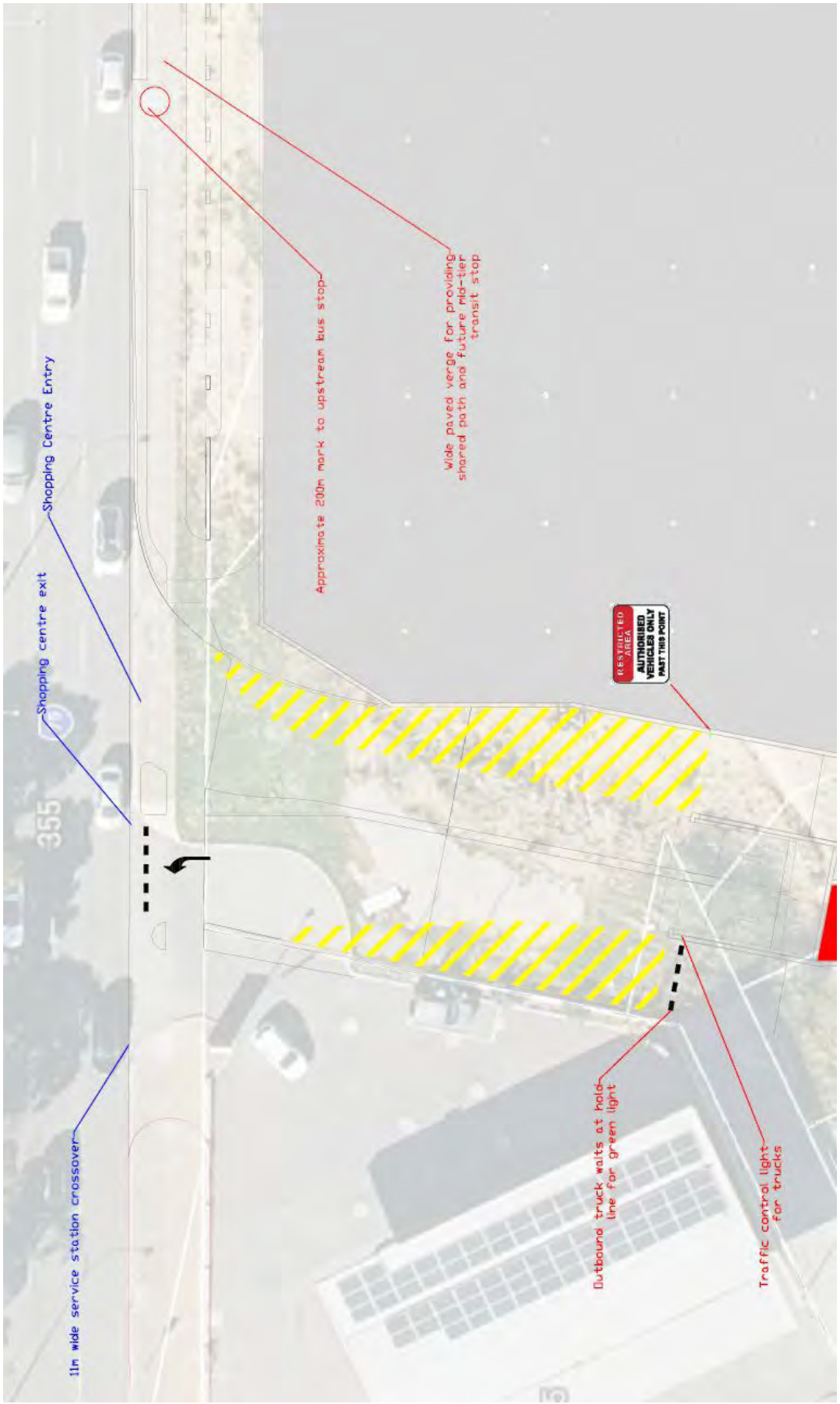


Figure 14: Proposed access traffic management

4.2 Ewen Street crossover sightline assessment

A site visit was undertaken and sightlines were checked for the proposed exit crossovers on Ewen Street. As demonstrated in the below photographs, sufficient sightlines were observed in both directions of traffic flow.

Figure 15: Proposed Ewen St crossover sightline looking right

Figure 16: Proposed Ewen St crossover sightline looking left

5 Changes to surrounding transport networks

5.1 Stephenson Avenue extension

The Stephenson Avenue extension project is currently under construction. The project involves the extension of Stephenson Avenue from Scarborough Beach Road to eventually connect to a new Freeway Interchange. The existing interchange at Cedric Street will be modified as a result and the Stirling Station bus interchange will be upgraded. This project is around 50% complete at the time of preparation of this report.

Figure 17: Stephenson Avenue extension concept

5.2 City of Stirling transport planning

The Stephenson Avenue project is part of a broader scheme to support future intensification of the Stirling City Centre. The structure plan boundary is shown in Figure 18 and the subject site is within the City Centre Sector.

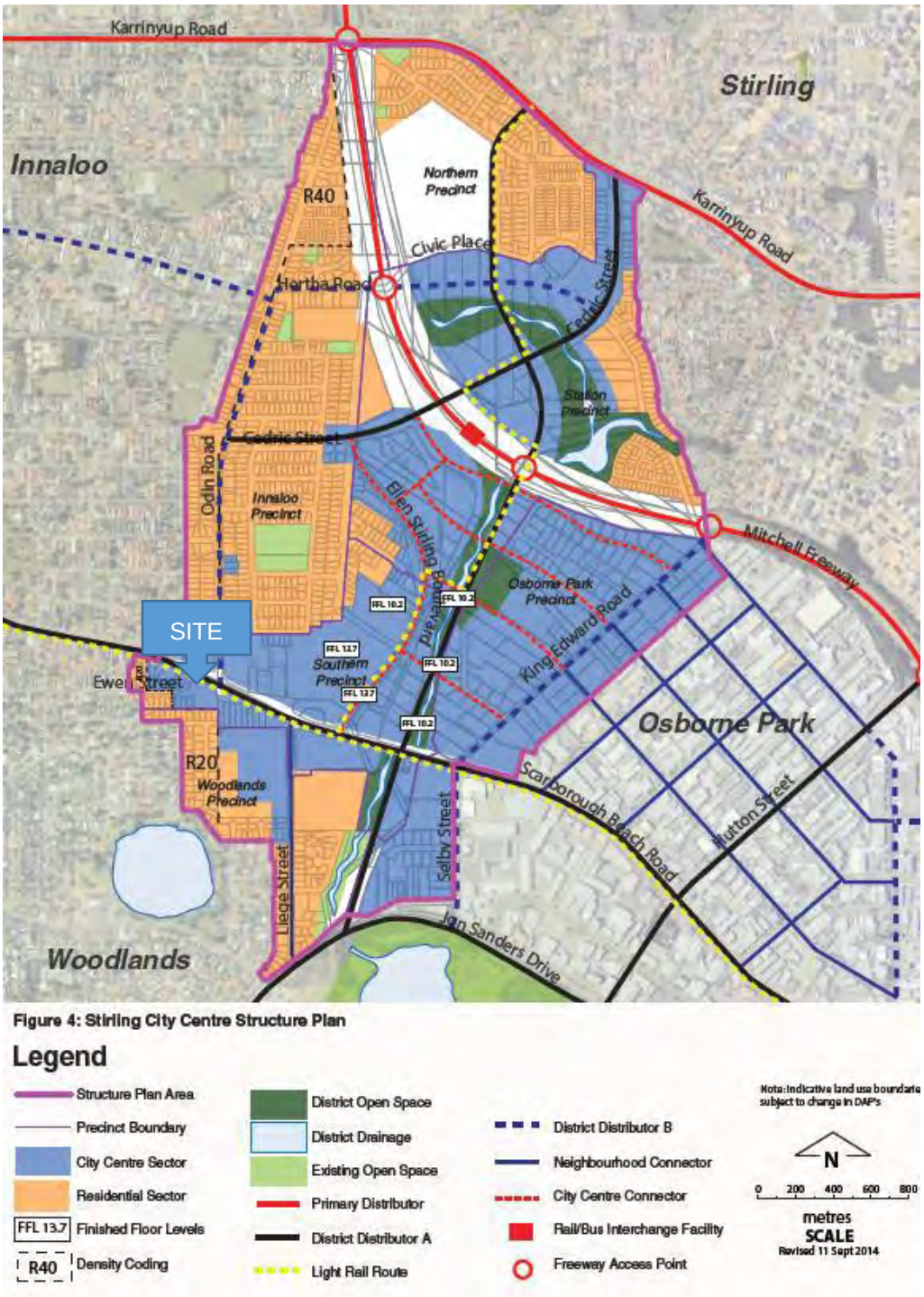


Figure 18: Stirling City Centre Structure Plan

The draft *Stirling City Centre Structure Plan* report (2014) includes transport planning and land use targets. The structure plan proposes an ambitious population growth rate, from the current 3,800 residents to 25,000 residents (Table 3).

Table 3: Stirling City Centre population targets

Current Population:	3,800 residents
Current Dwellings:	1,625 dwellings (comprised of large, single detached houses and grouped housing)
Current Average Occupancy:	2.37 people per household
Current Density:	6 dwellings per hectare
Future Population:	25,000
Future Dwelling:	19,900
Future Average Occupancy:	1.8
Future Density:	45 dwellings per hectare

The structure plan seeks to tie transport with land use planning, as part of an integrated transport planning strategy. The idea is that people will live local and work local. Also, people in the north west corridor may travel by freeway or train and work in Stirling, which will ease traffic congestion on the transport network between Stirling and Perth CBD:

"The road network of the Mitchell Freeway and Scarborough Beach Road is presently close to capacity in peak periods, as too is rail capacity at Stirling Station during peak periods. The northern suburbs railway can grow to 150,000 passengers per day based on a 6-car set with a 3-minute frequency. This highlights the need to focus on a high level of employment around Stirling Station to encourage people to alight and create more capacity between Stirling Station and the City. Stirling is currently the fifth busiest non-CBD station in the network. The bus feeder patronage grew by approximately 20% between 2007 and 2009. Bus access to Stirling Station is over 50% of the mode share. Residential development within the walkable catchment of this station may exacerbate the existing problem and promote increased commuter trips to Perth. Therefore, it is important to develop strategies to encourage local employment opportunities when detailed precinct planning is undertaken. In 2009, the City of Stirling adopted an Integrated Transport Strategy that seeks to tie land use with transport. In respect to Stirling City Centre, the Strategy proposed the following transport elements."

The commercial land use targets, intended to support the integrated transport strategy of self-sufficiency, are detailed in Table 4.

Table 4: Stirling City Centre – commercial land use targets

Precinct	Office Floor Space (NLAm²)	Health/ Welfare/ Community Floorspace (NLAm²)	Shop/ Reatail & Other Retail Floorspace (NLAm²)	Entertainment/ Recreation/ Culture Floorspace (NLAm²)	Min Commercial Floorspace (NLAm²)	Total Commercial Floorspace (NLAm²)
Southern	40,896	6,956	196,901	16,762	173,497	262,875
Station	290,994	4,091	67,814	4,051	244,110	369,864
Northen	16,351	27,516	500	0	29,752	45,079
Osborne Park	77,231	5,455	182,775	2,559	177,961	269,639
Innaloo	0	2,660	369	0	3,067	4,648
Woodlands	12,652	2,012	13,065	0	18,813	28,506
TOTALS	438,124	48,690	461,451	23,372	639,525	968,978

To enable the population and employment targets to be met within the Stirling City Centre, increase in alternative transport modes is required. The aspirational mode share targets are detailed in Table 5. By 2041, the aspiration is for 50% of all trips to be undertaken by means alternative to a private motor car.

Table 5: Stirling City Centre – mode share targets

Mode	2021	2031	2041
Car Driver	50%	42.5%	35%
Car Passenger	20%	17.5%	15%
Public Transport	10%	14%	18%
Walking	4.5%	7.5%	10%
Cycling	15.5%	18.5%	22%

The City has also developed a long-term transport plan to help support achievement of the transport mode share targets (Figure 19). The long -term transport plan proposes a staged mass-transit / light rail system. The first stage will connect from Glendalough Train Station to Stirling Train Station by 2031. Future stages could see transit routes extended:

- North past the Osborne Park Hospital to Karrinyup Rd (possible future extension to Karrinyup Shopping Centre);
- West along Scarborough Beach Road to Scarborough Beach;
- South along Harborne Street to Subiaco; and
- East along Scarborough Beach Road to connect to the Metro Area Express (MAX) system.

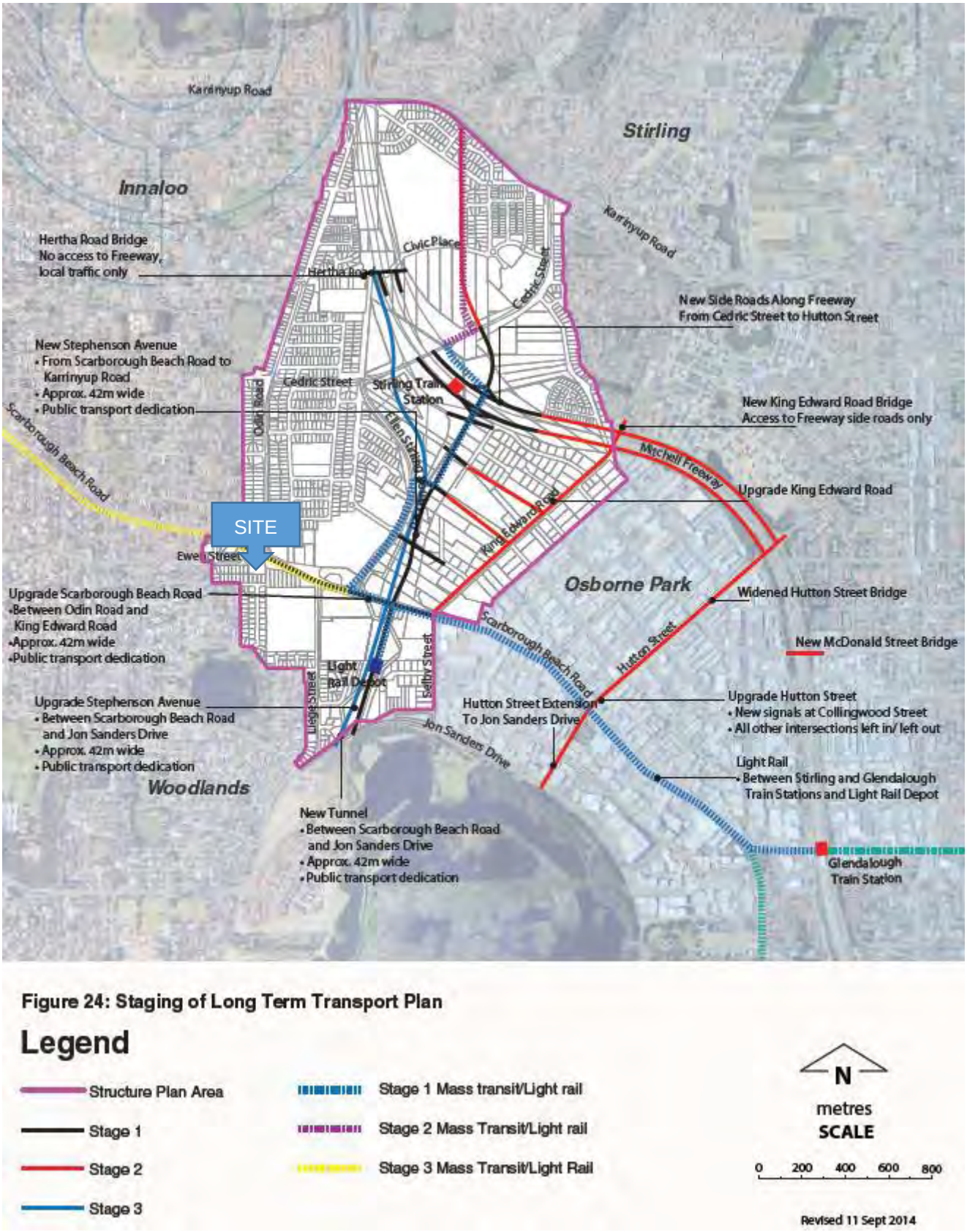


Figure 19: Stirling City Centre – long term transport plan

5.3 Mid-tier public transport planning

The City of Stirling is part of a 15 Local Government Consortium in support of a Mid-Tier Transit Strategy in Perth. Local councils are working with the state transport portfolio to develop a 'high level' Network Plan.

The consortium is seeking State Government support to prioritise the planning for Mid-Tier Transit for Perth so that it can be implemented post Metronet completion.

Perth to Scarborough Beach is one of the 15 corridors which have been short listed for Mid-Tier transit.

The State and Local Government authorities are progressing with a planned high frequency transit route on Scarborough Beach Road. Based on high-level information provided to Urbii, the transit route will likely involve the conversion of the kerbside lanes on Scarborough Beach Road into full-time priority bus lanes. High frequency bus services will then be run along the route in both directions of travel.

An example of similar bus lanes can be seen on Great Eastern Highway (Figure 20).

Figure 20: Example bus lanes on Great Eastern Highway, Redcliffe

6 Integration with surrounding area

The proposed development integrates well with the surrounding area. A mix of commercial uses are proposed. This assists the City with achieving development targets which increase retail floor space and employment self-sufficiency within the Stirling City Centre.

The proposed development provides local amenities including retail and food and beverage, to be accessible for residents within the City Centre. Customers and employees will be able to travel to the site via mid-tier transit or walking and cycling.

7 Traffic assessment

7.1 Assessment period

Two time periods are considered in the traffic assessment:

- Weekday PM peak hour: 4pm to 5pm.
- Weekend midday peak hour: 12pm to 1pm.

The analysis was undertaken for the following scenarios:

- Existing situation (without proposed development traffic).
- Existing situation with development traffic.
- 10yr post-development situation (10 years in the future with development traffic included).

7.2 Traffic generation

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

- RTA NSW Guide to traffic generating developments;
- RTA NSW Technical direction TDT 2013/4A; and,
- RTA NSW *Trip Generation and Parking Demand Surveys of Shopping Centre* Analysis Report, September 2011.

The trip generation rates adopted are detailed in Table 6. *Shopping Centres* in the RTA guide include a wide range of land uses integrated in one centre, this includes supermarkets, slow and fast trade retail, food and beverage, medical and other offices. Therefore, the trip rate for *Shopping Centre* was applied to the entire site for commercial traffic.

Table 6: Adopted trip rates for traffic generation

Land use	Trip rate source	Daily rate	Weekday Peak Hour	Weekend Peak Hour	IN	OUT
Shopping Centre (0 - 20,000m2)	RTA NSW	61 trips per 100m2	6.7 trips per 100m2	7.5 trips per 100m2	50%	50%

The estimated traffic generation of the proposed development is detailed in Table 7. The proposed development is estimated to generate a total of 3,843 vehicles per day (vpd), 422 vehicles in the weekday peak hour and 474 vehicles in the weekend peak hour. The net increase in traffic is **+2,075vpd**, **+228vph** (weekday) and **+256vph** (weekend).

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

Surveys presented in the RTA Shopping Centre Analysis Report recorded an average passing trade rate of 46%, which was adopted in the analysis.

Table 7: Daily and peak hour traffic generation

Shopping Centre Trips	GLFA (m2)	Daily Trips	Weekday Peak	Weekend Peak	WD Peak		WE Peak	
					IN	OUT	IN	OUT
Primary Trips (54%)	-	2075	228	256	114	114	128	128
Passing Trade (46%)	-	1768	194	218	97	97	109	109
Total Shopping Centre Trips	**6300**	**3843**	**422**	**474**	**211**	**211**	**237**	**237**

7.3 Trip distribution and assignment

The trip distribution for passing trade was assumed to be 90% left-in/left-out on SBR and 10% left-in-left-out on Ewen Street.

The primary trip distribution was based on mapping analysis of competing shopping centres in the locality. There are at least nine competing shopping centres within close distance of the subject site, which are displayed in Figure 21 and listed in Table 8.

Due to the density of competing shopping centres in nearby suburbs, the primary trips are likely to operate on a local attraction scale, and not attract trips based on long distance journeys.

Table 8: Existing shopping centres considered in trip distribution analysis

Shopping Centre	Driving distance from site (km)	Driving time from site (min)
Innaloo Mega centre	1.6	5
Westfield Innaloo	1.4	4
Morris Place	1.6	4
Woodlands	1.2	3
Hilltop	1.3	2
Karrinyup	3.8	7
Primewest Gwelup	4.4	7
Stirling Village	3.9	8
The Downs	3.9	7

The assumed trip distribution and assignment for passing trade and primary trips is detailed in the traffic volume diagrams in Appendix D.

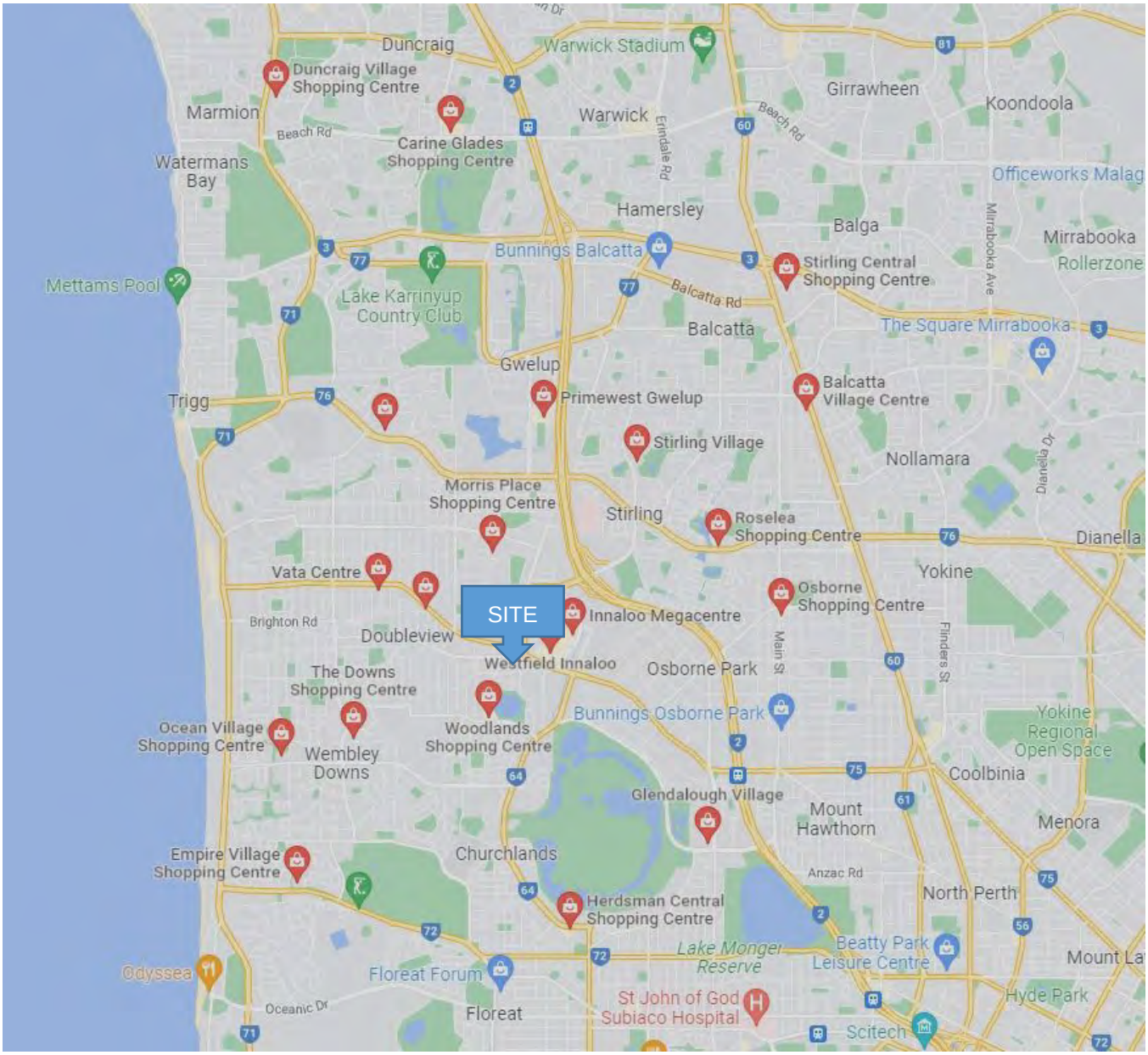


Figure 21: Mapping analysis of competing shopping centres

7.4 10-year post development forecasting

As documented in Section 10 of this report, the proposed bus priority lanes on Scarborough Beach Road will replace the kerbside general traffic lanes, which will reduce general traffic capacity from 3 to 2 lanes in each direction. As there is a reduction in general traffic lane capacity proposed on Scarborough Beach Road, a successful program will need to achieve a significant mode shift from private car to public transportation along the route. This should result in a corresponding reduction in existing traffic volumes on Scarborough Beach Road.

It is assumed that the Scarborough Beach Road priority bus lane project will achieve a 40% reduction in peak hour traffic volumes on Scarborough Beach Road. Traffic on Ewen Street running past the subject site was assumed to be the same as in the existing base case situation, with no reduction in traffic applied.

7.5 Analysis of intersections and development access

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

A network model was developed with multiple connected intersections. The same network was assumed for existing and post development analysis. The 10-year post development analysis assumed the introduction of bus priority lanes. Proposed development access crossovers were included in the existing network as 'dummy' intersections, so that the same coded network was consistently applied for all analysis scenarios. The network sites are listed in Table 9.

Table 9: SIDRA network sites

SITES IN NETWORK		
Site ID	CCG ID	Site Name
101	NA	Scarborough Beach Rd / Odin Rd / Ewen St
102	NA	Site Crossover / Scarborough Beach Rd
103	NA	Service Station (E) / Scarborough Beach Rd
104	NA	Service Station (W) / Scarborough Beach Rd
105.S1	NA	Scarborough Beach Rd / Bowra Av - Stage 1
105.S2	NA	Scarborough Beach Rd / Bowra Av - Stage 2
106.2	NA	Bowra Av / Ewen St (West)
106.1	NA	Bowra Av / Ewen St (East)
108	NA	Site Crossover (W) / Ewen St
107	NA	Site Crossover (E) / Ewen St

Signal phasing was based on SCATS data which reported an average cycle time of around 120-130 seconds during peak hours. The operation of the existing traffic signals was checked against observations captured via the aerial drone survey. During the weekday PM and Saturday midday peak hours, the longest queues were observed for westbound traffic (on the eastern approach) at the traffic signals. The right turn queue on Scarborough Beach Road turning into Odin Road was regularly observed to extend out of the turn pocket. The SIDRA outputs were checked and matched the observed characteristics on the surrounding network.

Two network models were developed for analysis:

- Existing road and intersection geometry (Figure 22).
- Future road and intersection geometry with bus lanes (Figure 23).

A summary of the analysis results is presented in Table 10. Overall, the SIDRA results indicate that the proposed development will have minimal impact on the road network. Detailed SIDRA outputs for each intersection are provided in Appendix E.

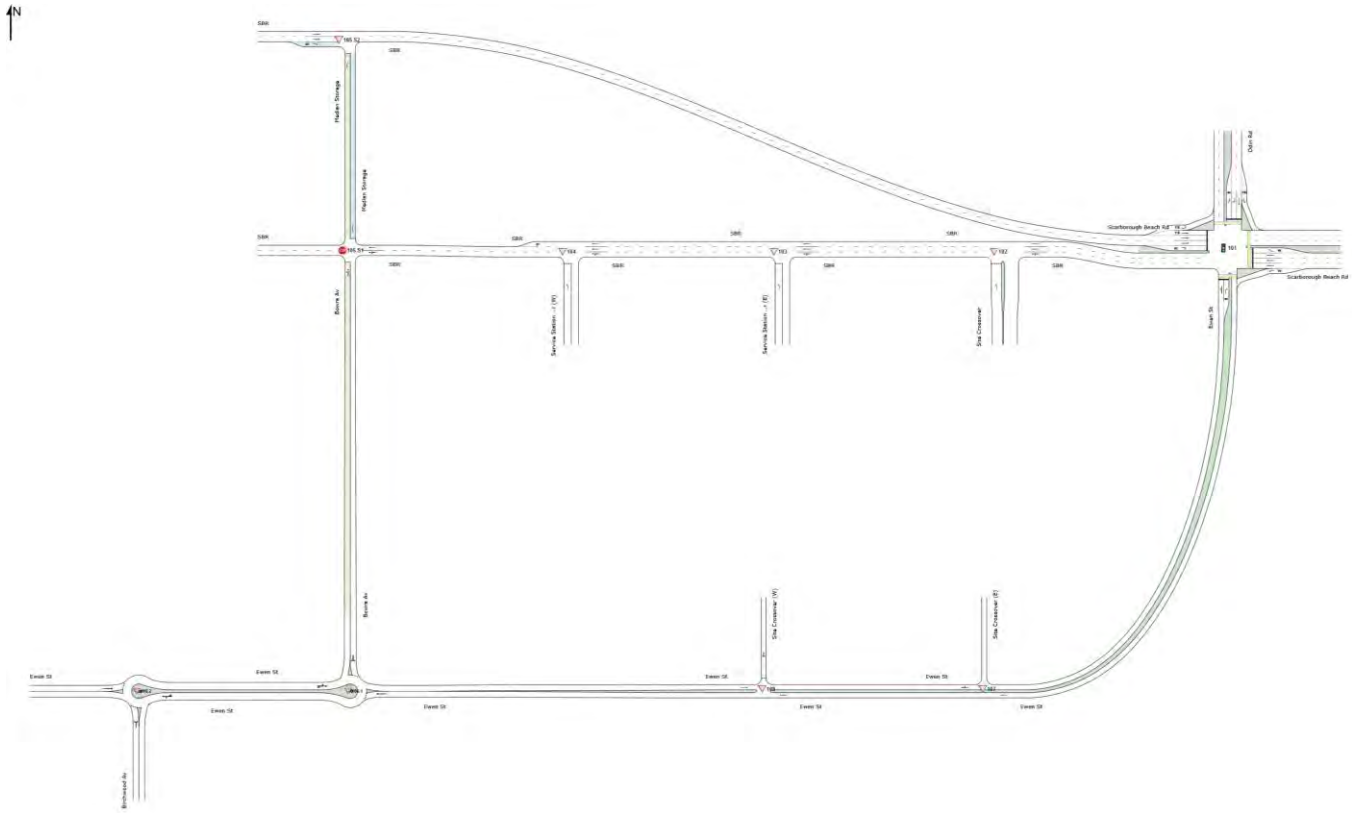


Figure 22: Network model – existing geometry

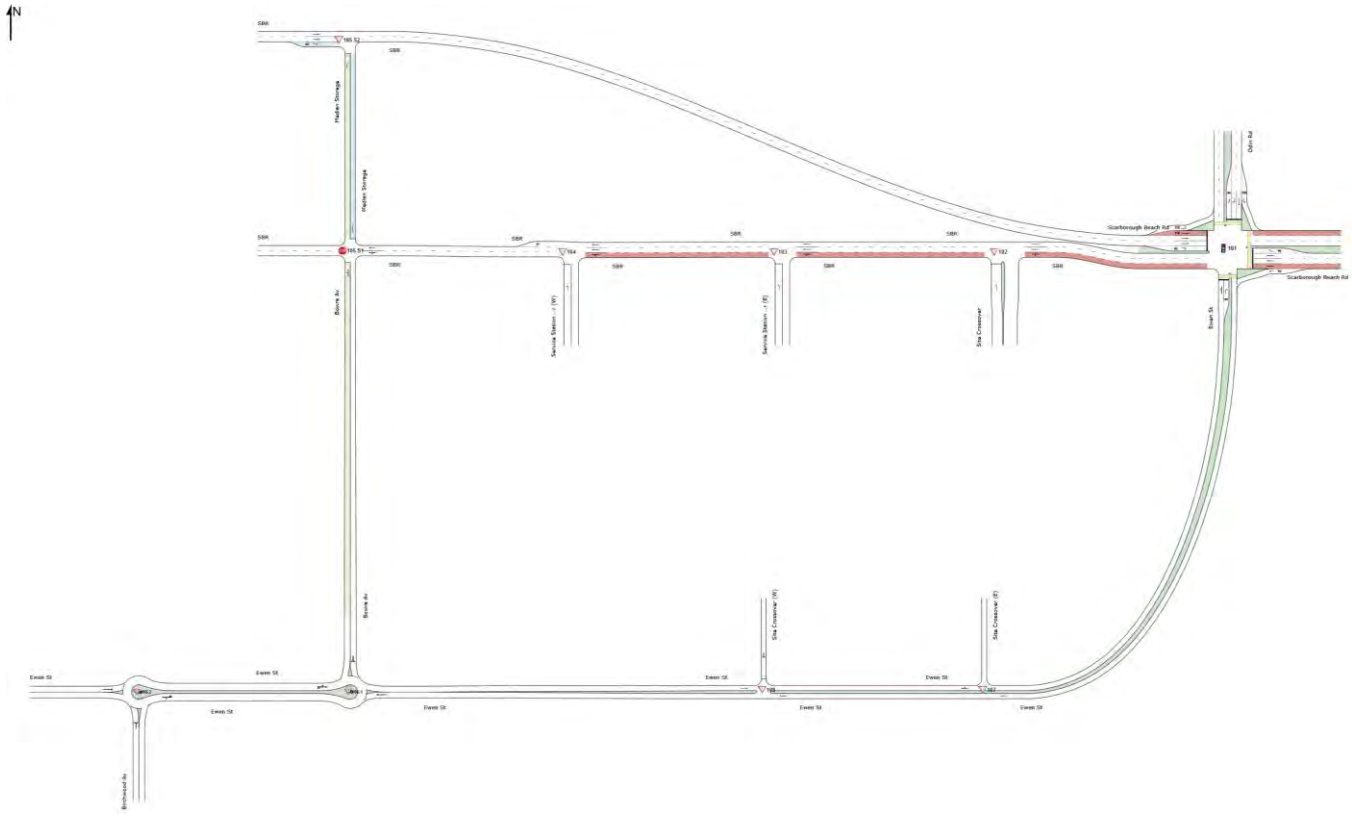


Figure 23: Network model – future geometry with bus lanes

Table 10: Summary of SIDRA analysis results

Site 101 - Scarborough Beach Rd / Odin Rd / Ewen St - Traffic Signals				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.783	36.2	D	128.9
Post Development Weekday	0.783	36.7	D	128.9
10-year Post Development Weekday	0.506	34.4	C	101
Existing Weekend	0.839	36.7	D	127.8
Post Development Weekend	0.839	37	D	127.8
10-year Post Development Weekend	0.598	34.4	C	86.4

Site 102 - Proposed Development Crossover/ Scarborough Beach Road				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday				
Post Development Weekday	0.265	0.5	A	3.1
10-year Post Development Weekday	0.202	0.6	A	2.4
Existing Weekend				
Post Development Weekend	0.197	0.7	A	3.2
10-year Post Development Weekend	0.141	0.9	A	2.7

Site 103 - Service Station (east) / Scarborough Beach Road				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.261	0	A	0.1
Post Development Weekday	0.265	0	A	0.1
10-year Post Development Weekday	0.222	0.1	A	0
Existing Weekend	0.193	0	A	0.2
Post Development Weekend	0.197	0	A	0.2
10-year Post Development Weekend	0.169	0	A	0.1

Site 104 - Service Station (west) / Scarborough Beach Road				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.339	0.3	A	1
Post Development Weekday	0.345	0.3	A	1
10-year Post Development Weekday	0.352	0.2	A	0.8
Existing Weekend	0.255	0.1	A	0.2
Post Development Weekend	0.261	0.2	A	0.2
10-year Post Development Weekend	0.269	0.1	A	0.1

Site 105 - Scarborough Beach Road / Bowra Av (south approach)				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.645	47.5	E	21.9
Post Development Weekday	0.706	57.7	F	25.1
10-year Post Development Weekday	0.242	11	B	3.6
Existing Weekend	0.411	22.4	C	13.2
Post Development Weekend	0.449	25.2	D	14.6
10-year Post Development Weekend	0.123	9.7	A	3.5

Site 106.1 - Bowra Av / Ewen St (east)				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.107	3.5	A	4
Post Development Weekday	0.156	3.5	A	6.2
10-year Post Development Weekday	0.156	3.5	A	6.2
Existing Weekend	0.143	3.7	A	5.5
Post Development Weekend	0.199	3.7	A	8.2
10-year Post Development Weekend	0.199	3.7	A	8.2

Site 106.2 - Bowra Av / Ewen St (west)				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday	0.126	3.6	A	4.8
Post Development Weekday	0.166	3.8	A	6.7
10-year Post Development Weekday	0.166	3.8	A	6.7
Existing Weekend	0.124	3.7	A	4
Post Development Weekend	0.162	3.9	A	6
10-year Post Development Weekend	0.162	3.9	A	6

Site 108 - Development Crossover (W) / Ewen St				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday				
Post Development Weekday	0.129	0.4	A	2.5
10-year Post Development Weekday	0.129	0.4	A	2.5
Existing Weekend				
Post Development Weekend	0.12	0.5	A	2.8
10-year Post Development Weekend	0.12	0.5	A	2.8

Site 107- Development Crossover (E) / Ewen St				
Scenario	v/c	Ave Delay (sec)	LoS	95% Queue (m)
Existing Weekday				
Post Development Weekday	0.146	0.7	A	0
10-year Post Development Weekday	0.146	0.7	A	0
Existing Weekend				
Post Development Weekend	0.14	0.8	A	0
10-year Post Development Weekend	0.14	0.8	A	0

7.6 Development crossover sensitivity analysis

The SIDRA analysis presented in Section 7.5 assumes a substantial reduction (40%) in existing traffic travelling along Scarborough Beach Road past the subject site. It also assumes no growth in traffic travelling past the site on Ewen Street. This assumption is made on the basis that a general traffic lane is being removed from Scarborough Beach Road and being replaced with a Bus Rapid Transit lane. For this proposal to be successful, it will require a substantial mode shift from private motor vehicle to public transport along the route.

However, to ensure that the proposed development crossovers will operate successfully in the future. A sensitivity analysis has been undertaken with higher traffic volumes travelling past the site crossovers. The sensitivity analysis assumes double the traffic volumes (200% increase) in comparison to the assumed 10 year post development traffic analysed in Section 7.5.

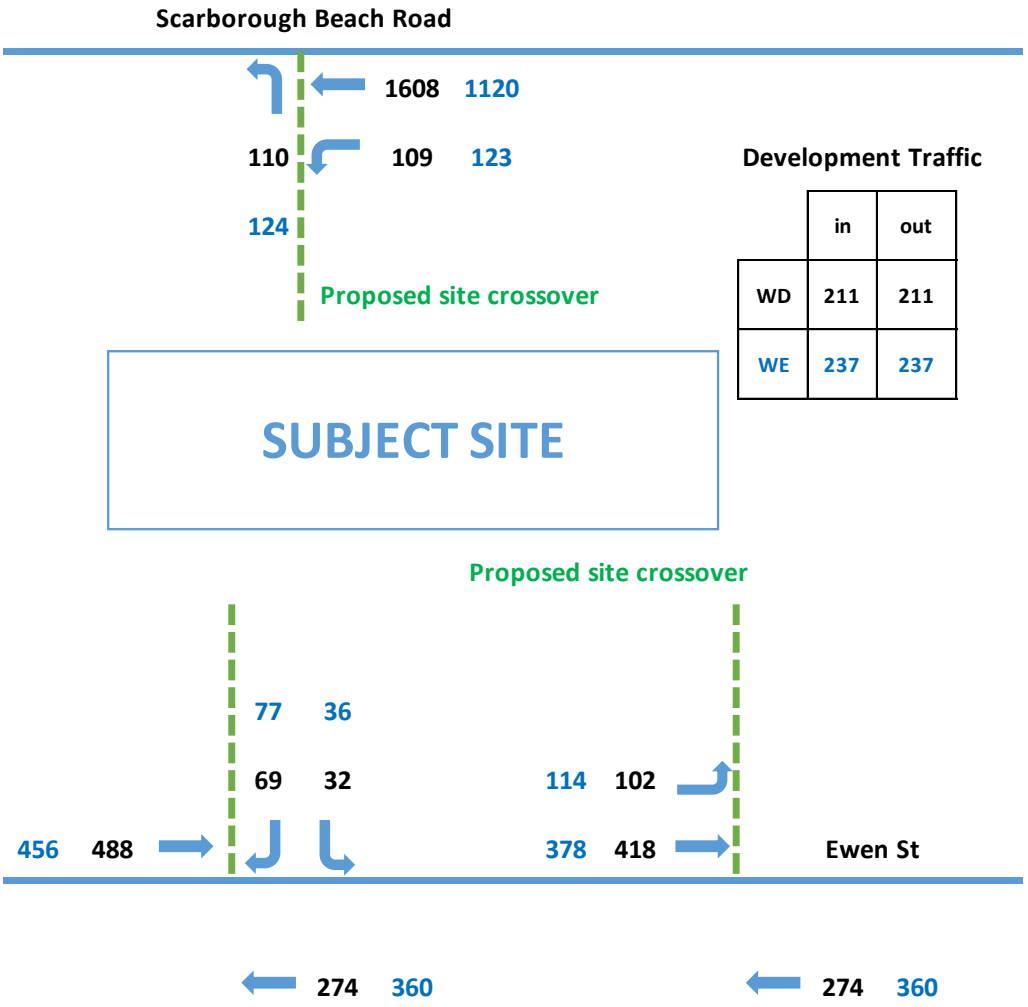


Figure 24: Sensitivity analysis traffic volumes

The sensitivity analysis indicates the development crossovers will still operate at a level of service A, with no delays or queuing, even if double the traffic volumes are passing the site on Scarborough Beach Road and Ewen Street. Detailed SIDRA outputs for each intersection are provided in Appendix E.

7.7 Impact on neighbouring areas

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

7.8 Traffic noise and vibration

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

8 Parking

8.1 Parking supply

A total of 156 onsite bays are provided, which includes 4 x click and collect bays and 2 x ACROD bays. 7 on-street bays and 4 motorcycle bays are also provided. Advice from the project town planners indicates that the parking provision is compliant.

8.2 Parking layout

The parking layout has been reviewed and input was provided to the architect, to help refine the plans through an iterative process. Car park bays, aisles and circulation areas are compliant with AS2890.1. The ramp dimensions and grades are also compliant with AS2890.1.

Swept path analysis for selected movements is included in Appendix F. The car park layout will continue to be refined at subsequent design stages.

9 Provision for service vehicles

The proposed service areas are indicated in Figure 25. The major tenant service area is accessed from Scarborough Beach Road and will be serviced by a 19m AV as the largest permitted vehicle. The other tenancies will be serviced by a shared area at the south east corner of the site. This service area will be accessed from Ewen Street, with a maximum permitted vehicle size equivalent to an 8.8m Medium Rigid Vehicle (MRV).

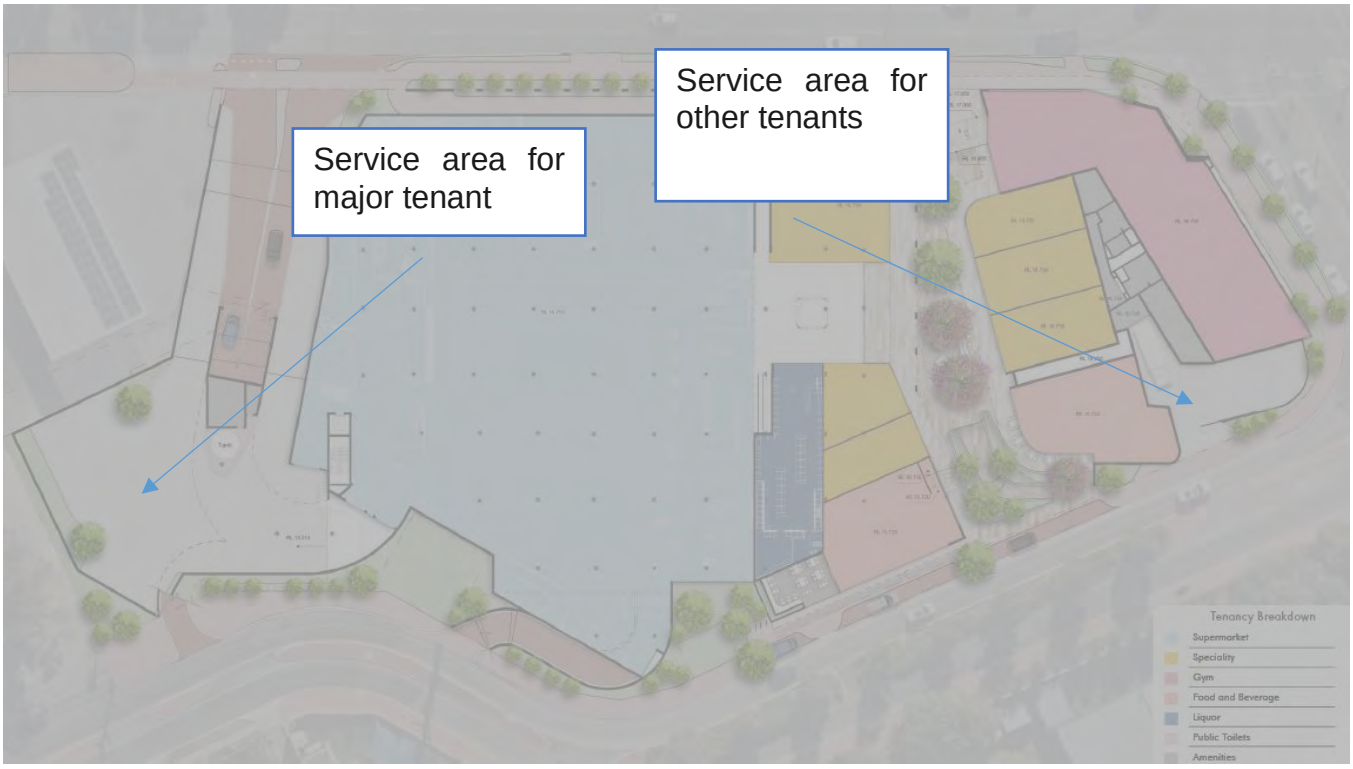


Figure 25: Proposed service areas

Swept path analysis was undertaken by Urbii to help inform the DA plans. Internally, truck movements were checked and the design was developed to accommodate truck swept paths. All service vehicle movements are forward entry and forward exit to and from the road network.

A selection of swept path sketches is included in Appendix F.

10 Public transport assessment

The State and Local Government authorities are progressing with a planned high frequency transit route on Scarborough Beach Road. Based on high-level information provided to Urbii, the transit route will likely involve the conversion of the kerbside lanes on Scarborough Beach Road into full-time priority bus lanes. High frequency bus services will then be run along the route in both directions of travel.

As detailed in Figure 21, vehicles can travel within the future bus lane for up to 100m to enter and exit the proposed development.

MYTH	FACT
Cars are not allowed in peak period bus lanes	All vehicles are legally allowed to drive in the priority bus lanes during off-peak times and during peak times for 100m before entering or exiting side streets. Any driver caught using the bus lane illegally during signposted times risks being fined and losing demerit points.
Taxis/bikes/motorbikes are not allowed to use bus lanes during peak hour	Drivers or riders of these vehicles can use bus lanes where it is signed.
Bus lanes will create more congestion	The average Transperth bus can carry between 60 and 100 passengers depending on its size. With buses running more efficiently in the peak period lanes there is the potential to take hundreds of cars off the road. Other drivers may decide to use alternative routes or travel at different times.
Bus priority negatively impacts local businesses and parking	As shown along Beaufort and Fitzgerald streets, local businesses continue to operate where bus priority measures are put in place. In these areas the Clearway parking was converted into bus lanes (peak period), which returns to street parking outside of the peak period.

Figure 26: PTA advice on the use of priority bus lanes

The proposed development plans make allowance for the provision of a public transit stop on Scarborough Beach Road in front of the site. The indicative location of the public transit stop as indicated in Figure 27 is approximately 200m downstream of the planned stop to the east of the traffic signals.

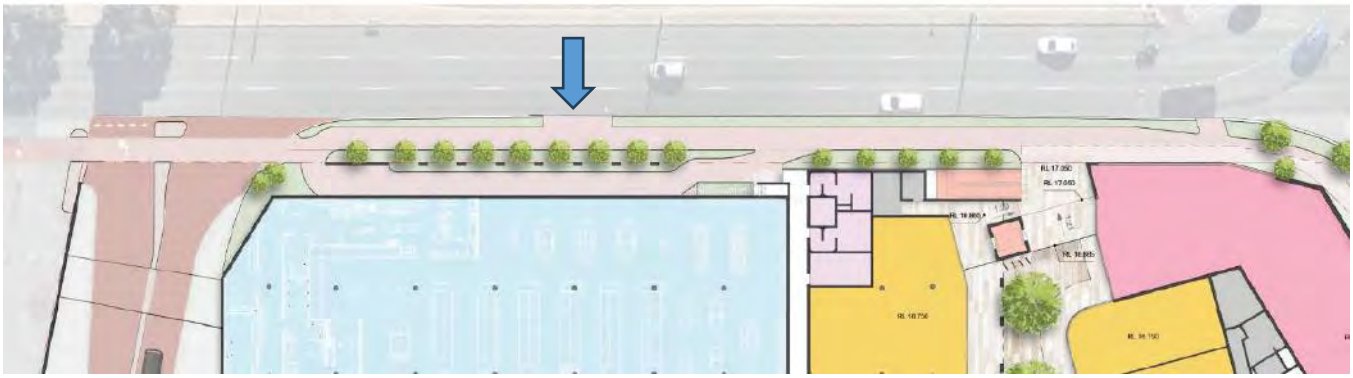


Figure 27: Indicative future public transit stop

The proposed bus priority lane will replace the kerbside general traffic lane, which will reduce general traffic capacity from 3 to 2 lanes in each direction. As there is a reduction in general traffic lane capacity proposed on Scarborough Beach Road, a successful program will need to achieve a significant mode shift from private car to public transportation along the route. This should result in a reduction in traffic volumes which are presently observed on Scarborough Beach Road.

Review of literature indicates that ridership increases of 10-40% are often reported by Bus Rapid Transit programs[1]

The PTA *Bus Planning and Design Guidelines for Efficient People Movement* provides guidelines for implementing bus lanes in Western Australia. The Beaufort Street bus lanes are presented as a case study in the guidelines. As detailed in Figure 28, the Beaufort Street transit route recorded at 40 percent increase in total patronage in the first year of operation, and patronage continues to increase.

Up to 18,000 people travel by bus on Beaufort Street every day, buses carry 40% of people on the route and only represent 3.2% of vehicles.

Guided by these statistics, it is assumed that the Scarborough Beach Road priority bus lane project will achieve a 40% reduction in peak hour traffic volumes on Scarborough Beach Road.

[1] **A Business Case for Improving Interregional Bus Services** *Why and How to Provide Efficient and Affordable Long-Distance Transit Services* **9 October 2024** Todd Litman *Victoria Transport Policy Institute.*

Corridor Improvement: Beaufort Street Peak Period Bus Priority Lane

The Beaufort Street Bus Priority Lane Project is the culmination of ten years of holistic bus planning between PTA and the cities of Perth, Vincent and Stirling to make bus journeys more reliable.

Planning and design by the PTA and its local government partners saw Clearway zones used for bus only priority lanes during the peak periods (ie to the CBD in the AM peak and from the CBD in the PM peak). Not only did this improve bus running time by up to 15 per cent at peak times, but also retained on street parking to serve shops and businesses along the route at other times.

Each State-Local Government arrangement along this route saw the PTA undertake different levels of work for this project. In one instance the PTA assisted with the undergrounding of power, drainage network upgrade and streetscape upgrades as part of the project to ensure the works were coordinated to minimise disruption to the travelling public while delivering a safe and efficient public transport corridor.

Upon completion of the peak period direction bus lanes along the whole length of Beaufort Street from Roe Street in Perth to the City of Bayswater boundary, four bus services (services 21, 22, 78 and 79) were combined to create the high frequency 950, connecting Morley to UWA and QEII Hospital through the CBD.

Since the 950 was introduced it has achieved a 40 per cent increase in total patronage in the first year of operation and patronage continues to increase.

The statistics:

- Buses carry about **40 per cent** of people on Beaufort Street but only represent **3.2 per cent** of vehicles on that section of road.
- About **18000** people travel via bus along Beaufort Street every day.
- Over the course of a year, more than **1.5 million passengers** will travel this busy route during bus priority times.
- This equates to **a significant savings** now priority lanes are available for the majority of the trip between Morley and the CBD.
- The 950 service operates every **four minutes** during peak periods, **seven to eight minutes** during the day and **every ten minutes** on weekends.
- The new 950 service has recorded one of the **highest satisfaction** scores ever for a bus service across the entire Transperth network.

Figure 28: Bus lanes case study – Beaufort Street

Source: *Bus Planning and Design Guidelines for Efficient People Movement*, PTA.

11 Walking assessment

11.1 Internal provision for walking and active transport

The proposed development provides a high quality walking and cycling link through the site, linking Scarborough Beach Road and Ewen Street (Figure 29). This improves walking and cycling permeability, as people can cut through the link instead of travelling all the way around the site.

The walking link promotes healthy streets principles, providing people with things to see and do, a place to stop and rest, shade and shelter and other sustainable transport benefits.

The proposed development crossover will accommodate a refuge island to assist people crossing.

11.2 Walking catchment

A geospatial analysis was undertaken to estimate the walking catchment within 5 and 10 minutes of the subject site (Figure 30). There is a substantial residential catchment where people living can walk to the development for shopping, dining, entertainment or employment.

Figure 29: Proposed walking link through the site

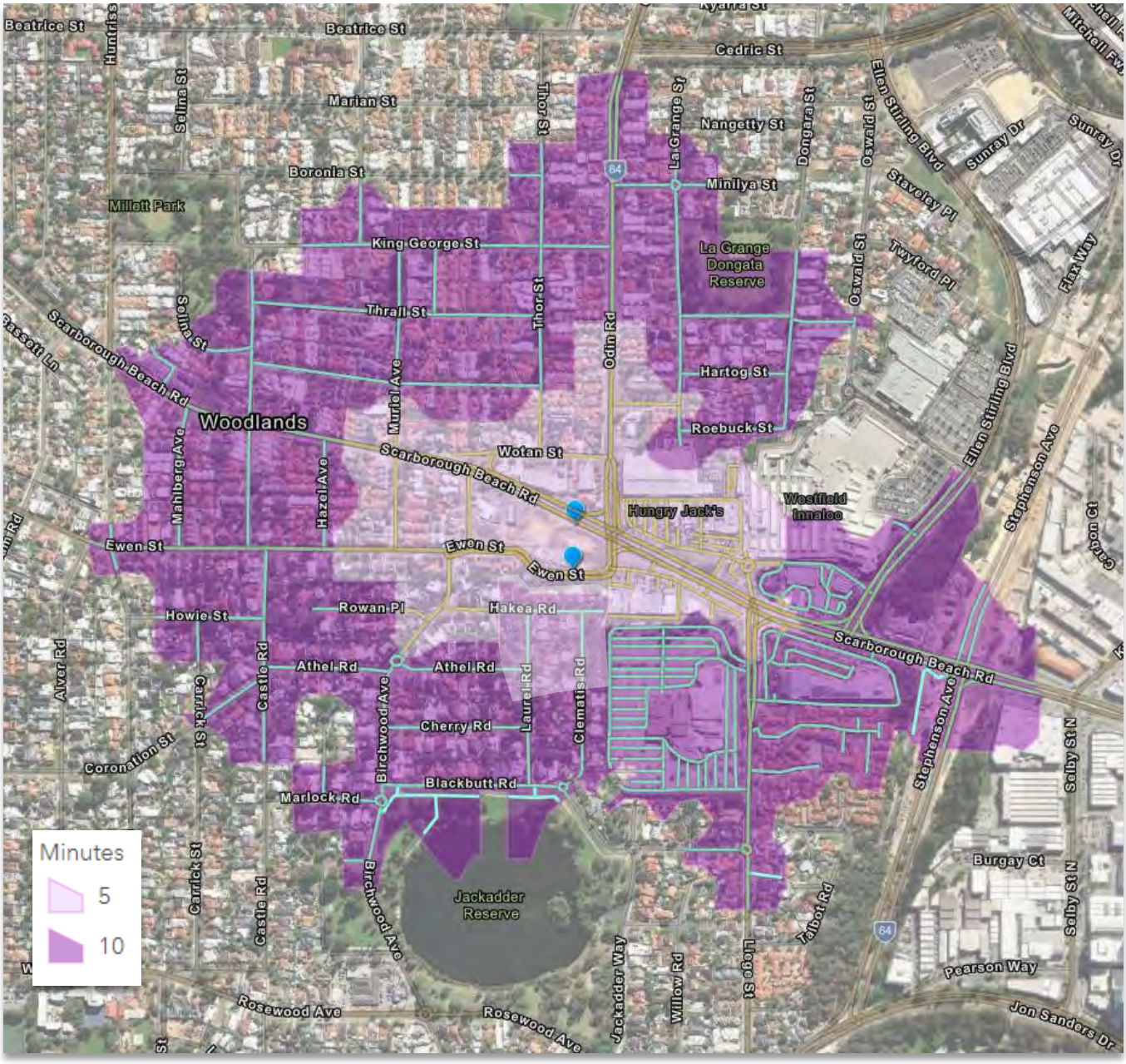


Figure 30: Subject site walking catchment isochrones

12 Cycling assessment

12.1 Bicycle parking and end of trip facilities

A total of 16 bicycle parking spaces are distributed through the development for visitors. A total of 14 bicycle parking spaces are provided for staff in a secure parking facility.

End of Trip facilities, including showers, changing rooms and lockers, are provided in a secure area on the ground level (Figure 31).

Figure 31: Bicycle parking and end of trip facilities – location plan

12.2 Sustainable transport catchment

As detailed in Figure 32, the subject site is well placed for staff and visitors to travel by sustainable modes of transport. A comfortable 8km or 20-25min cycle will provide the development with a large catchment including Subiaco, Nedlands/UWA, Scarborough, Karrinyup and parts of Perth CBD.

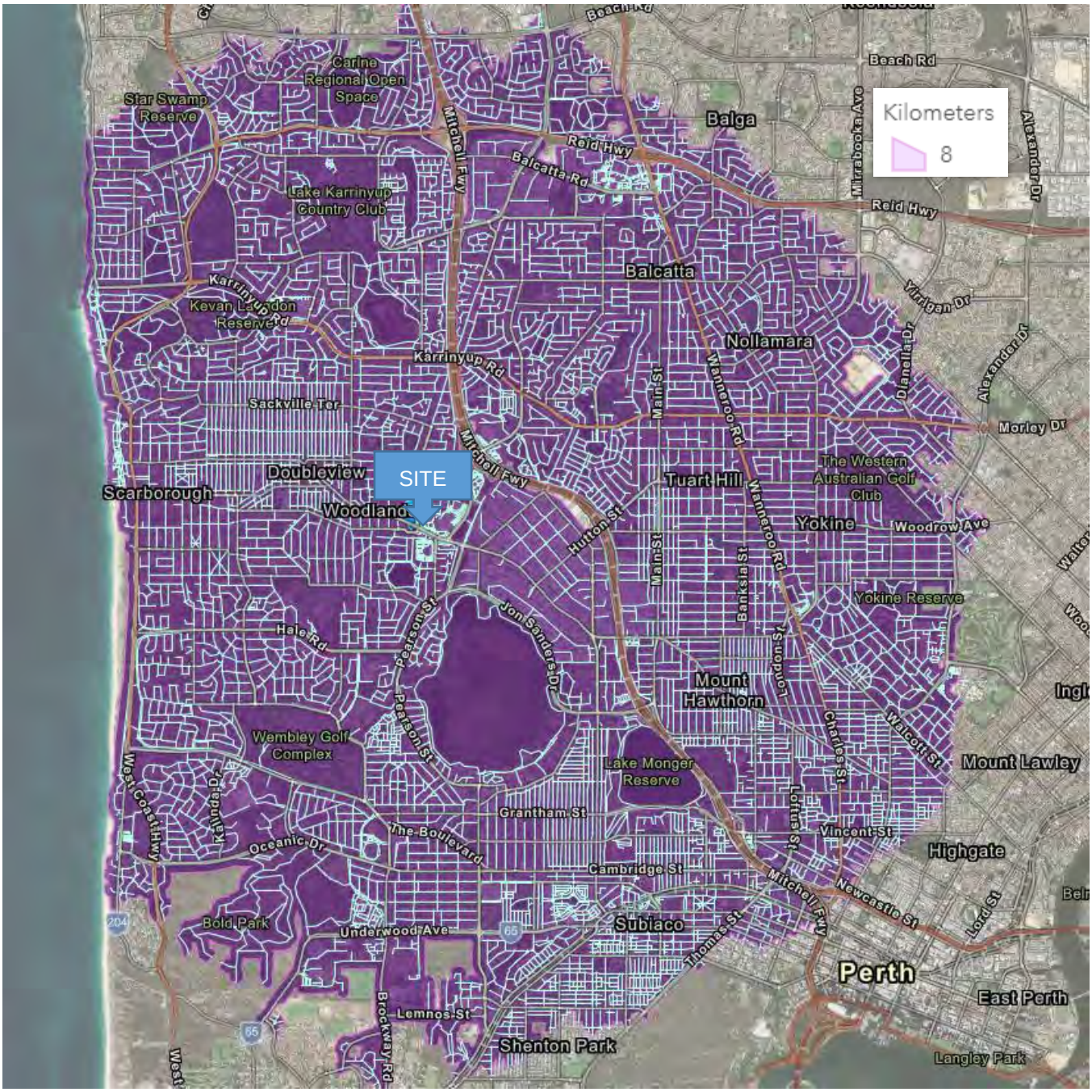


Figure 32: Cycling and micro-mobility catchment

13 Conclusion

This Transport Impact Assessment has been prepared by Urbii on behalf of Windsor Knight Pty Ltd with regards to the proposed commercial development, located at 367 Scarborough Beach Road, Woodlands.

The subject site is situated on the south-west corner of the signalised intersection of Scarborough Beach Road (SBR), Odin Road and Ewen Street.

The site promotes good connectivity with the existing and planned road, cycling and pedestrian network. Consideration has been given to the planned mid-tier public transport route on Scarborough Beach Road. The proposed development integrates well with the planned future transport network.

The traffic analysis undertaken in this report shows that the traffic generation of the proposed development can be accommodated by the surrounding roads and intersections.

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

Appendices

Appendix A: Planning Control Area extracts

PCA 166 - Scarborough Beach Road - Hinderwell Street to Odin Road, King Edward Road to Main Street (Cities of Stirling and Vincent)

General description

The Minister for Planning has granted approval to the declaration of a planning control area over portions of Scarborough Beach Road (from Hinderwell Street to Odin Road and from King Edward Road to Main Street) as shown on Western Australian Planning Commission (WAPC) plan numbers 1.7994, 1.7995, 1.7996 and 1.7997.

Purpose

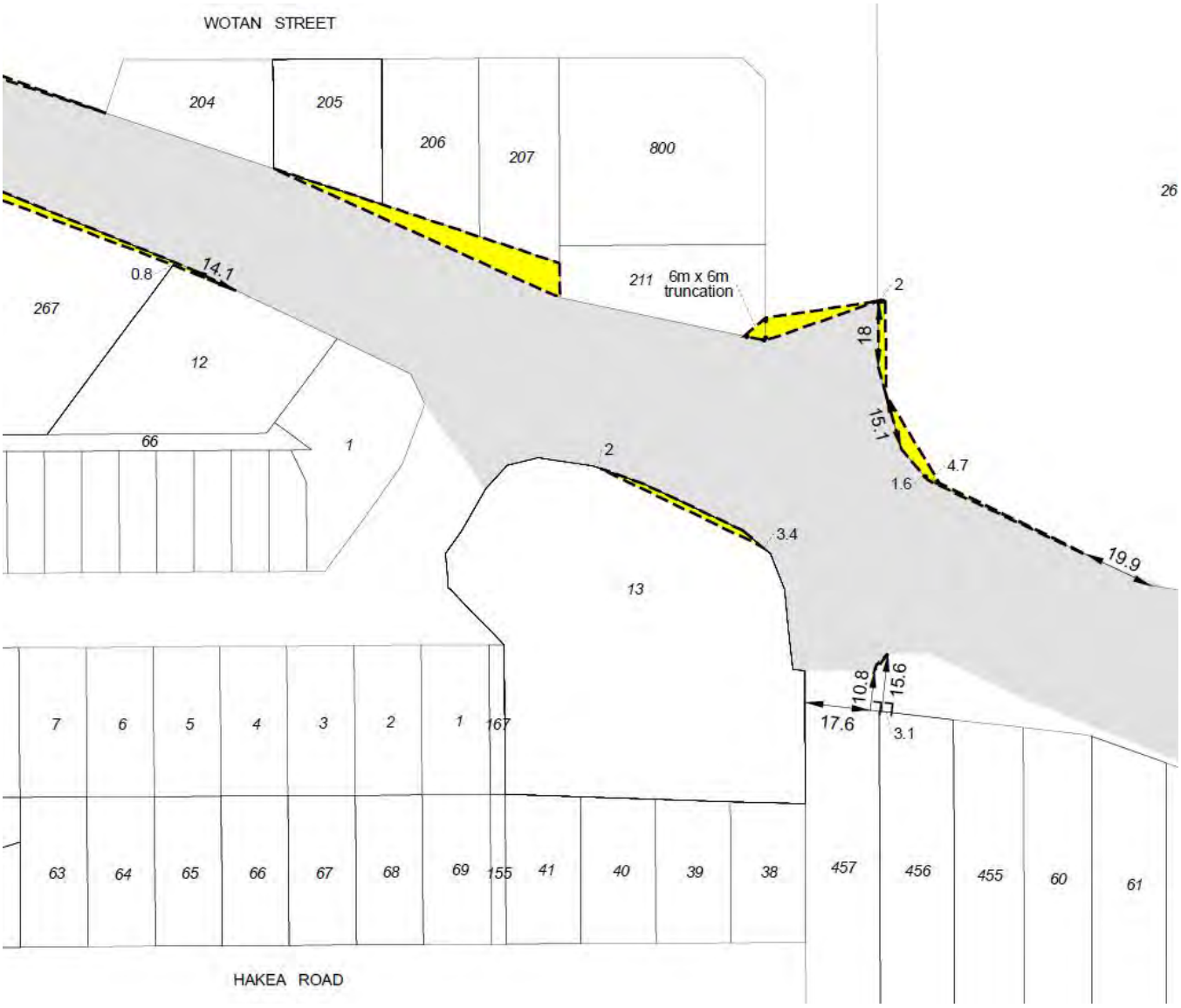
The purpose of the planning control area is to protect land for the future widening and improvement of the Scarborough Beach Road Other Regional Road reservation. The WAPC considers that the planning control area is required over the property to ensure that no development occurs on this land which might prejudice this purpose until it may be reserved for Other Regional Roads in the Metropolitan Region Scheme.

Duration and effects

The declaration remains in effect for a period of five years from the date of publication of this notice in the Government Gazette or until revoked by the WAPC with approval by the Minister, whichever is the sooner.

A person shall not commence and carry out development in a planning control area without the prior approval of the WAPC. The penalty for failure to comply with this requirement is $200,000 and, in the case of a continuing offence, a further fine of $25,000 for each day during which the offence continues.

Compensation is payable in respect of land injuriously affected by this declaration, and land so affected may be acquired by the WAPC in the same circumstances and in the same manner as if the land had been reserved in the Metropolitan Region Scheme for a public purpose.


WOTAN STREET
204
205
206
207
800
26
211
6m x 6m
truncation
2
18
15.1
4.7
1.6
19.9
0.8
14.1
267
12
66
1
2
3.4
13
10.8
15.6
17.6
3.1
7
6
5
4
3
2
1
167
63
64
65
66
67
68
69
155
41
40
39
38
457
456
455
60
61
HAKEA ROAD

Appendix B: Proposed development plans

Scale 1:500 @ A3

0 5 10 15 20 25

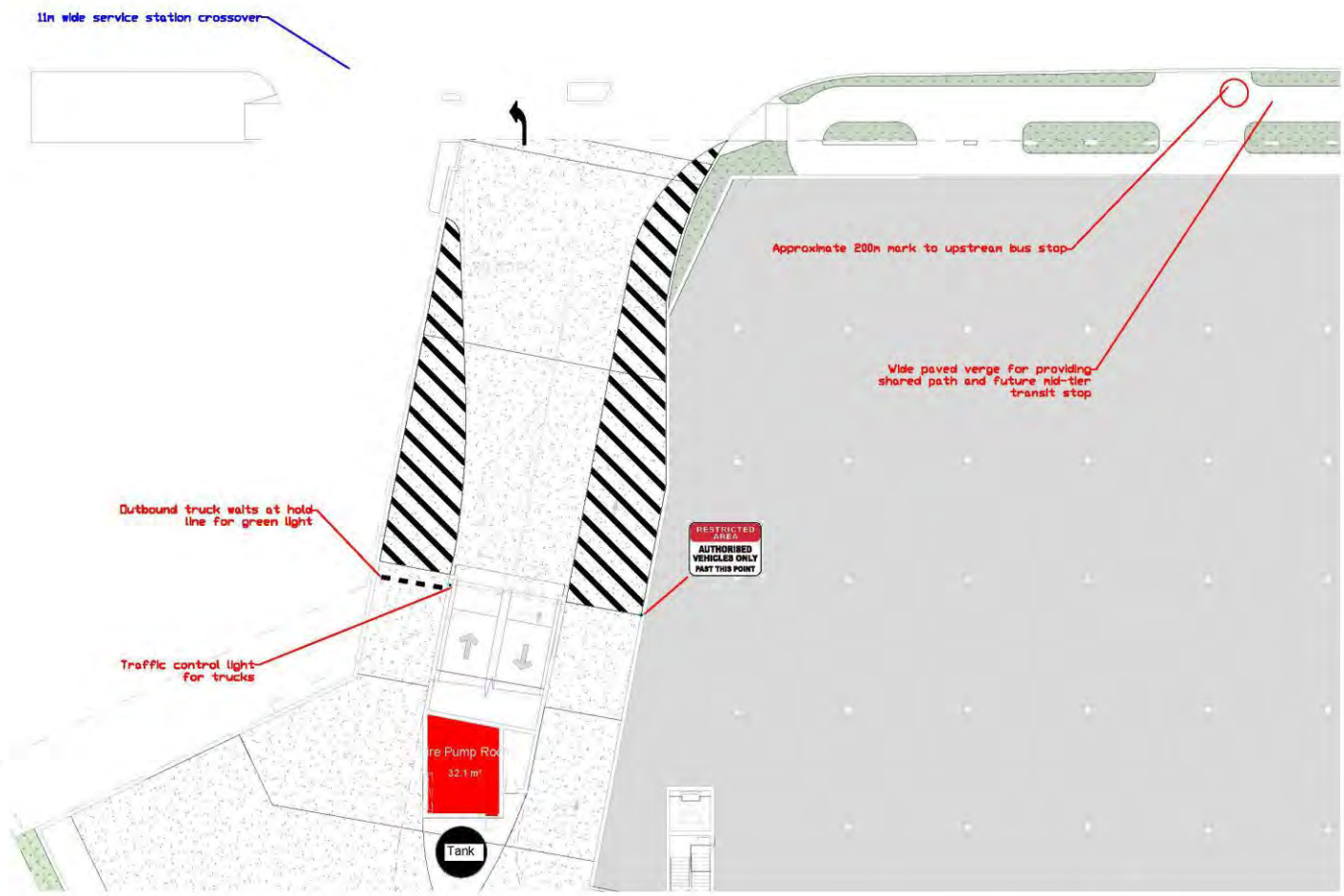
Level 1 Plan

Pg 7 Rev C

Woodlands North Development Application 08 2025

place fabric

Appendix C: Proposed vehicle access traffic management



Revision notes:

Rev:	Date:	Notes:
1	09/03/2023	Concept plan only. Subject to feature survey, services investigation and detailed design.

Drawn by:	Paul Ghantous
Client:	Windsor Knight Pty Ltd
Project:	U22.035 - Woodlands Staged Development Proposed Mixed-Use Development
Drawing Title:	Traffic Management Concept Plan
Date:	31/05/2025
Scale@A3:	1:300
Revision:	sk10c

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customer@urbii.com.au
0433658164

Appendix D: Traffic volume diagrams

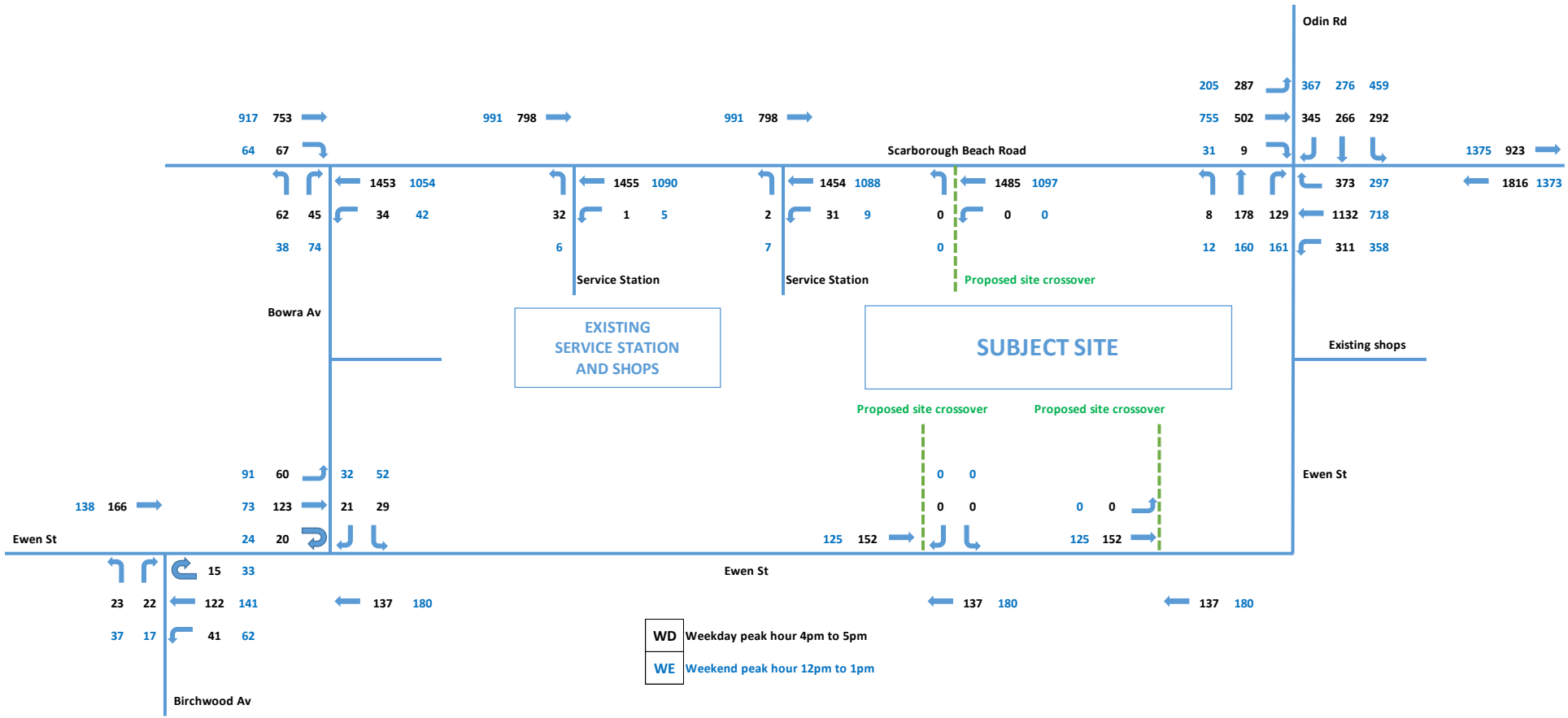
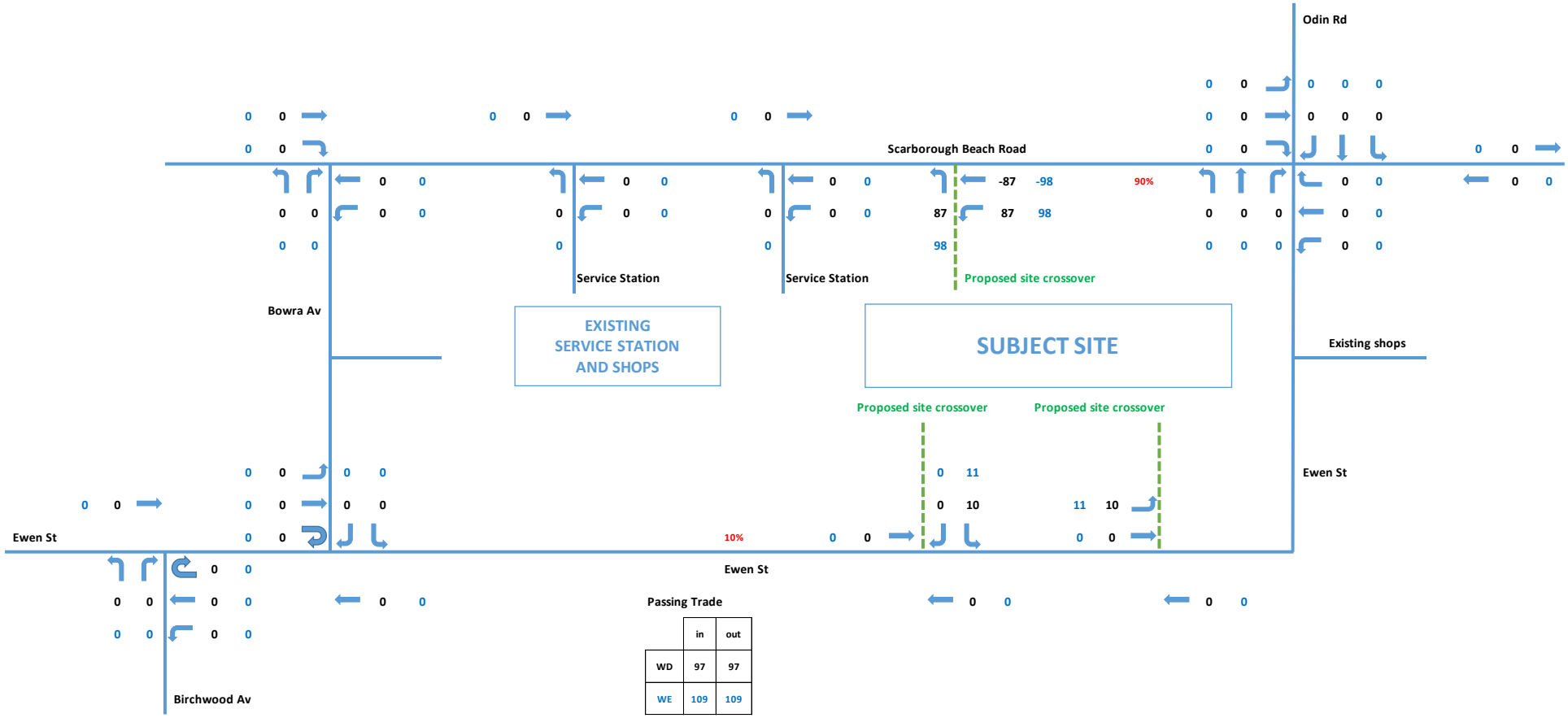
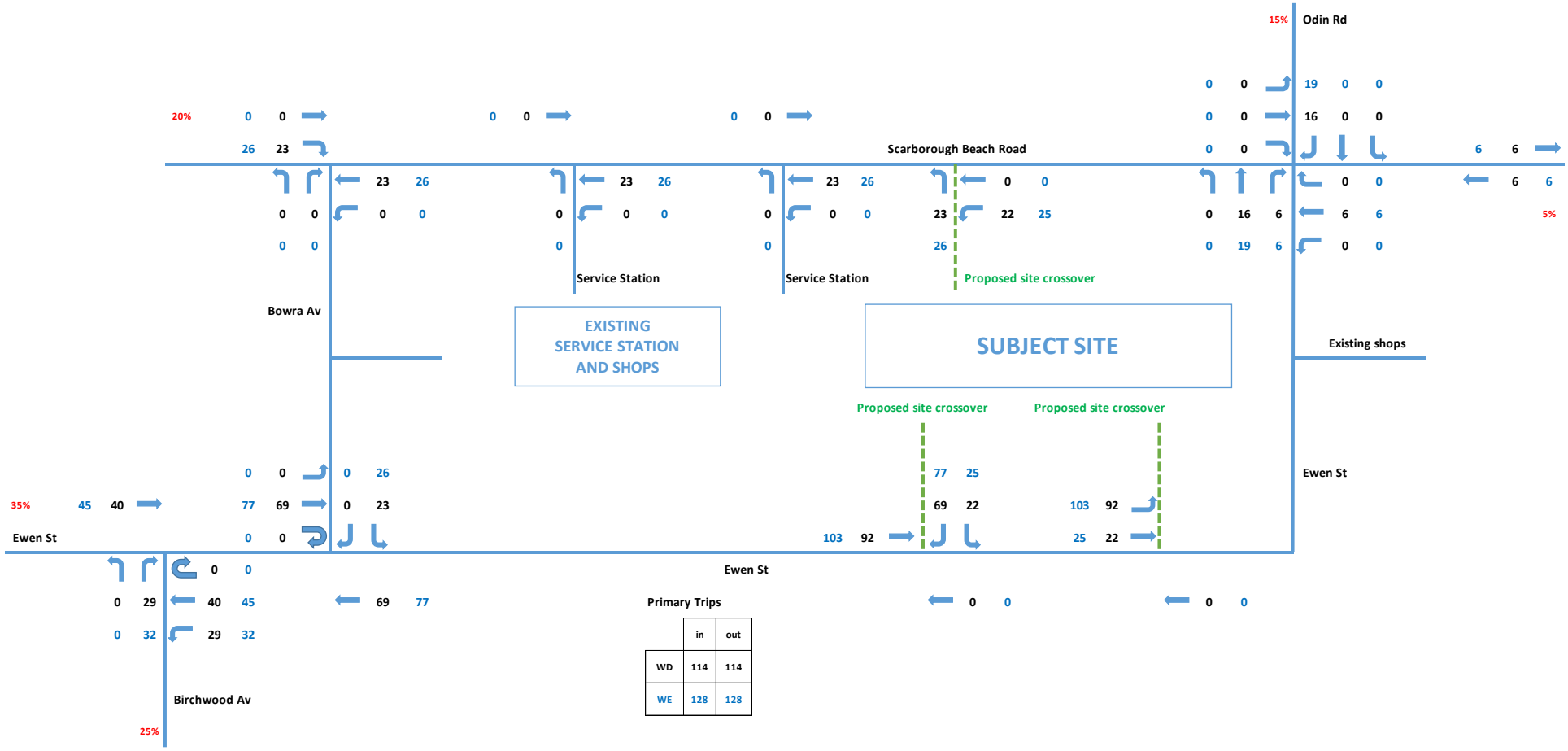


Figure 33: Surveyed existing traffic flows weekday and weekend peak hours



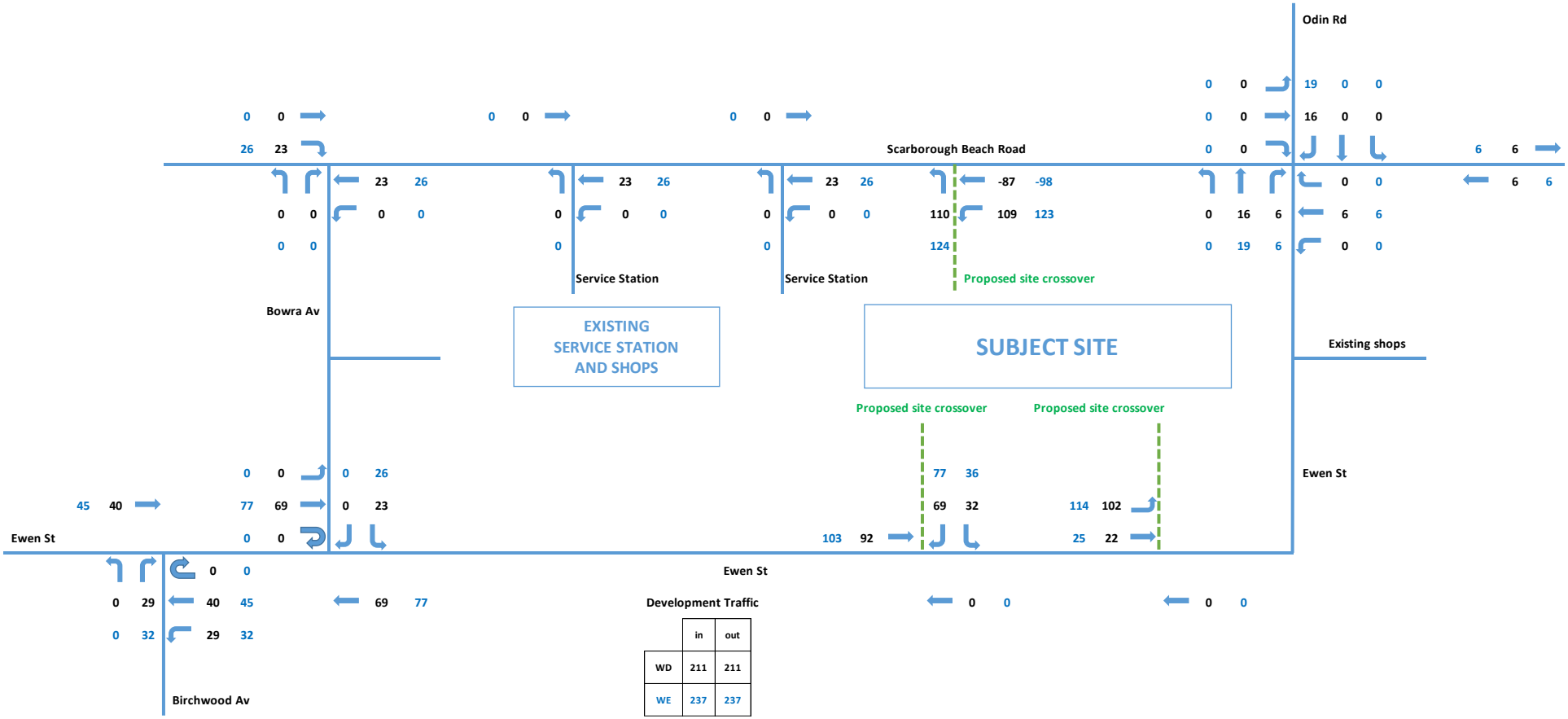
	in	out
WD	97	97
WE	109	109

Figure 34: Development traffic distribution – passing trade



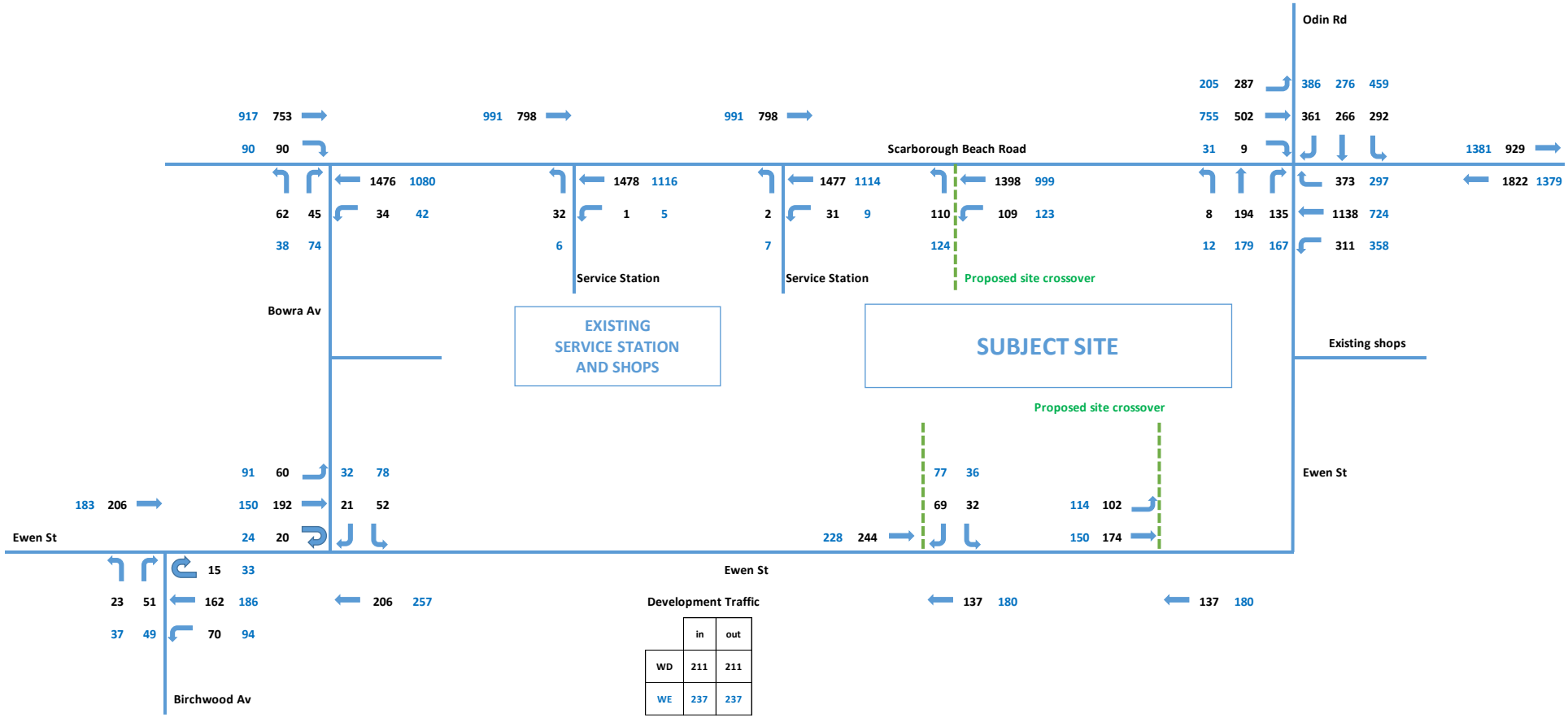
	in	out
WD	114	114
WE	128	128

Figure 35: Development traffic distribution – primary trips



	in	out
WD	211	211
WE	237	237

Figure 36: Development traffic – all trips



Development Traffic

	in	out
WD	211	211
WE	237	237

Figure 37: Post-development traffic volumes

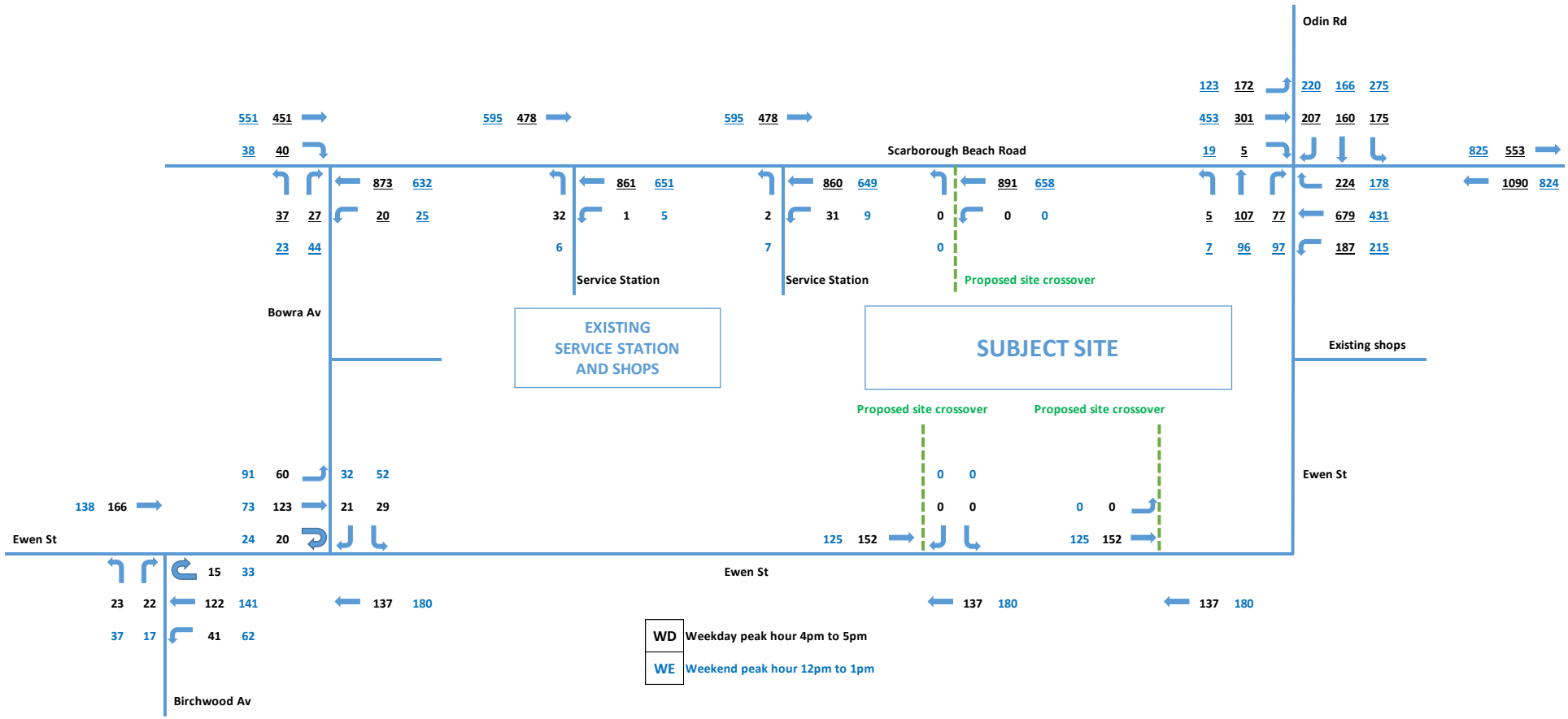
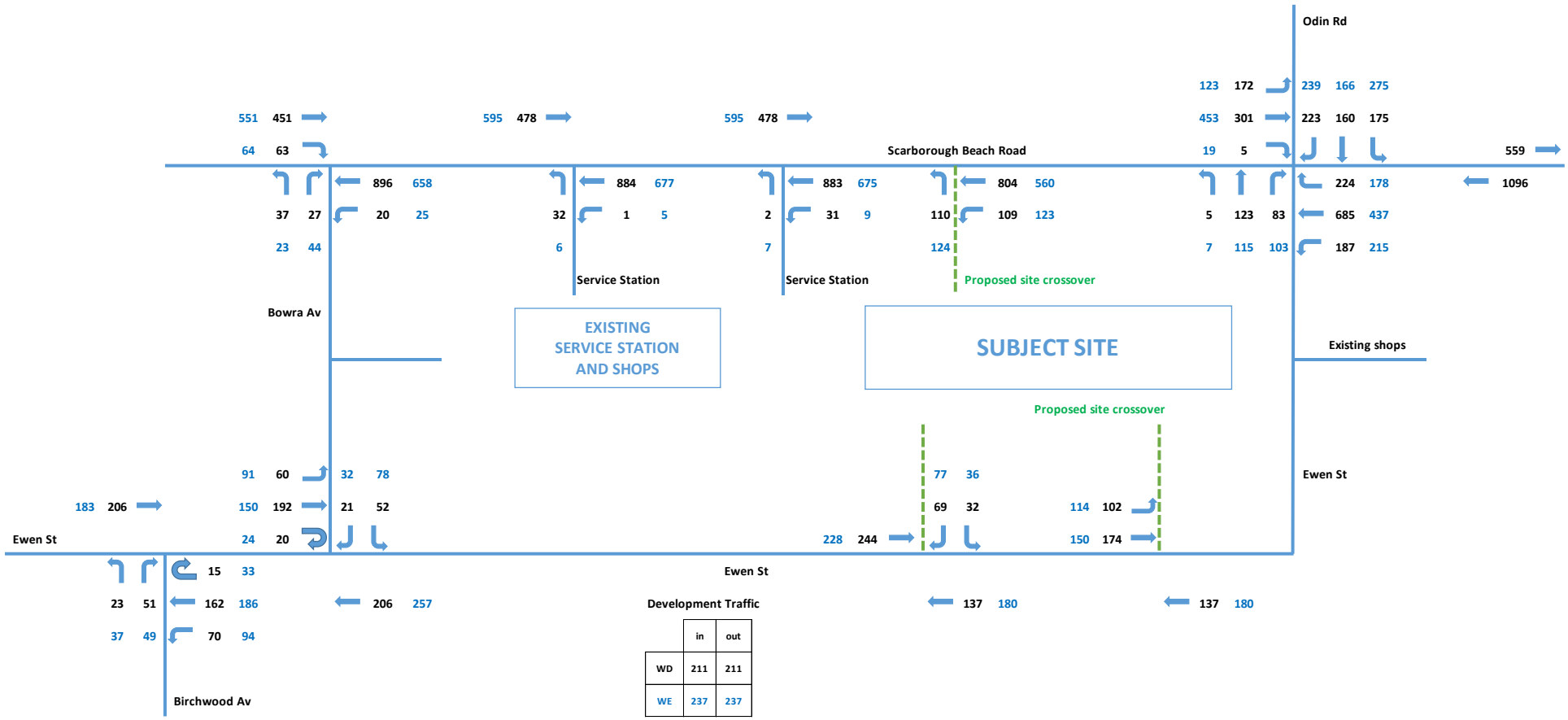


Figure 38: 10-year post-development traffic volumes (base)

Note: Underlined numbers have been reduced by 40% from existing traffic flows. This is to account for a mode shift resulting from a reduction in general traffic lanes and the provision of a mid-tier public transport service on Scarborough Beach Road.



Development Traffic

	in	out
WD	211	211
WE	237	237

Figure 39: 10-year post-development traffic volumes (including development traffic)

Appendix E: SIDRA analysis outputs

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

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

Existing weekday PM peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

Network: N101 [Existing Weekday PM Peak (Network Folder: General)]

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 134 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	8	6.0	8	6.0	0.549	59.2	LOS E	11.2	82.5	0.96	0.79	0.96	11.2
2	T1	178	6.0	178	6.0	0.549	54.5	LOS D	11.2	82.5	0.96	0.79	0.96	26.2
3	R2	129	6.0	129	6.0	0.506	63.0	LOS E	8.0	58.6	0.97	0.80	0.97	23.5
Approach		315	6.0	315	6.0	0.549	58.1	LOS E	11.2	82.5	0.97	0.79	0.97	24.8
East: Scarborough Beach Rd														
4	L2	311	6.0	311	6.0	0.223	8.9	LOS A	4.8	35.1	0.29	0.63	0.29	46.7
5	T1	1132	6.0	1132	6.0	0.437	26.3	LOS C	16.5	121.6	0.73	0.64	0.73	32.7
6	R2	373	6.0	373	6.0	* 0.731	32.3	LOS C	14.9	109.6	0.96	0.85	0.97	39.0
Approach		1816	6.0	1816	6.0	0.731	24.6	LOS C	16.5	121.6	0.70	0.68	0.70	36.2
North: Odin Rd														
7	L2	292	6.0	292	6.0	0.229	9.2	LOS A	4.5	33.4	0.32	0.65	0.32	51.3
8	T1	266	6.0	266	6.0	* 0.783	60.3	LOS E	17.5	128.9	1.00	0.91	1.10	20.7
9	R2	345	6.0	345	6.0	* 0.676	66.5	LOS E	11.1	81.4	1.00	0.83	1.03	19.3
Approach		903	6.0	903	6.0	0.783	46.1	LOS D	17.5	128.9	0.78	0.80	0.82	28.2
West: Scarborough Beach Rd														
10	L2	287	6.0	287	6.0	0.276	14.4	LOS B	7.1	52.1	0.47	0.70	0.47	44.6
11	T1	502	6.0	502	6.0	* 0.591	58.3	LOS E	10.4	76.6	0.98	0.80	0.98	26.2
12	R2	9	6.0	9	6.0	0.134	77.3	LOS E	0.6	4.5	0.99	0.67	0.99	9.7
Approach		798	6.0	798	6.0	0.591	42.8	LOS D	10.4	76.6	0.80	0.76	0.80	30.6
All Vehicles		3832	6.0	3832	6.0	0.783	36.2	LOS D	17.5	128.9	0.76	0.73	0.77	31.5

MOVEMENT SUMMARY

Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Existing Weekday PM Peak (Network Folder: General)]

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	2	0.0	2	0.0	0.002	1.6	LOS A	0.0	0.1	0.45	0.25	0.45	17.3
Approach		2	0.0	2	0.0	0.002	1.6	LOS A	0.0	0.1	0.45	0.25	0.45	17.3
East: SBR														
4	L2	31	0.0	31	0.0	0.261	2.1	LOS A	0.0	0.0	0.00	0.03	0.00	37.0
5	T1	1454	6.0	1454	6.0	0.261	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	57.5
Approach		1485	5.9	1485	5.9	0.261	0.0	NA	0.0	0.0	0.00	0.01	0.00	55.1
All Vehicles		1487	5.9	1487	5.9	0.261	0.0	NA	0.0	0.1	0.00	0.01	0.00	54.6

MOVEMENT SUMMARY

Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)] **Network: N101 [Existing Weekday PM Peak (Network Folder: General)]**

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	32	0.0	32	0.0	0.039	2.9	LOS A	0.1	1.0	0.54	0.46	0.54	16.0
Approach		32	0.0	32	0.0	0.039	2.9	LOS A	0.1	1.0	0.54	0.46	0.54	16.0
East: SBR														
4	L2	1	0.0	1	0.0	0.339	3.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.5
5	T1	1455	6.0	1455	6.0	0.339	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1456	6.0	1456	6.0	0.339	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		1488	5.9	1488	5.9	0.339	0.3	NA	0.1	1.0	0.01	0.01	0.01	54.5

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)] **Network: N101 [Existing Weekday PM Peak (Network Folder: General)]**

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	62	6.0	62	6.0	0.645	28.0	LOS D	3.0	21.9	0.91	1.18	1.57	25.4
2	T1	45	6.0	45	6.0	0.645	74.4	LOS F	3.0	21.9	0.91	1.18	1.57	7.9
Approach		107	6.0	107	6.0	0.645	47.5	LOS E	3.0	21.9	0.91	1.18	1.57	19.9
East: SBR														
3	L2	34	6.0	34	6.0	0.393	4.5	LOS A	0.0	0.0	0.00	0.03	0.00	57.1
4	T1	1453	6.0	1453	6.0	0.393	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		1487	6.0	1487	6.0	0.393	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Median Storage														
5	T1	67	6.0	67	6.0	0.306	18.4	LOS C	1.0	7.4	0.89	0.98	1.03	2.9
Approach		67	6.0	67	6.0	0.306	18.4	LOS C	1.0	7.4	0.89	0.98	1.03	2.9
All Vehicles		1661	6.0	1661	6.0	0.645	3.9	NA	3.0	21.9	0.09	0.13	0.14	52.9

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)] **Network: N101 [Existing Weekday PM Peak (Network Folder: General)]**

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	45	6.0	45	6.0	0.065	3.9	LOS A	0.2	1.5	0.52	0.59	0.52	8.8
Approach		45	6.0	45	6.0	0.065	3.9	LOS A	0.2	1.5	0.52	0.59	0.52	8.8
West: SBR														
2	T1	753	6.0	753	6.0	0.199	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	67	6.0	67	6.0	0.040	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		820	6.0	820	6.0	0.199	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.0
All Vehicles		865	6.0	865	6.0	0.199	0.7	NA	0.2	1.5	0.03	0.08	0.03	58.4

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)] **Network: N101 [Existing Weekday PM Peak (Network Folder: General)]**

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	137	6.0	137	6.0	0.107	3.5	LOS A	0.5	4.0	0.16	0.40	0.16	29.5
Approach		137	6.0	137	6.0	0.107	3.5	LOS A	0.5	4.0	0.16	0.40	0.16	29.5
North: Bowra Av														
7	L2	29	6.0	29	6.0	0.046	4.5	LOS A	0.2	1.5	0.30	0.55	0.30	30.2
9	R2	21	6.0	21	6.0	0.046	7.6	LOS A	0.2	1.5	0.30	0.55	0.30	30.2
Approach		50	6.0	50	6.0	0.046	5.8	LOS A	0.2	1.5	0.30	0.55	0.30	30.2
West: Ewen St														
10	L2	60	6.0	60	6.0	0.105	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
11	T1	123	6.0	123	6.0	0.105	2.4	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
12u	U	20	6.0	20	6.0	0.105	6.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
Approach		203	6.0	203	6.0	0.105	2.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
All Vehicles		390	6.0	390	6.0	0.107	3.5	LOS A	0.5	4.0	0.09	0.45	0.09	29.3

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

Network: N101 [Existing Weekday PM Peak (Network Folder: General)]

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver Speed km/h
South: Birchwood Av														
7	L2	23	6.0	23	6.0	0.041	4.5	LOS A	0.2	1.4	0.29	0.55	0.29	45.5
9	R2	22	6.0	22	6.0	0.041	7.6	LOS A	0.2	1.4	0.29	0.55	0.29	42.8
Approach		45	6.0	45	6.0	0.041	6.0	LOS A	0.2	1.4	0.29	0.55	0.29	44.6
East: Ewen St														
10	L2	41	6.0	41	6.0	0.091	2.5	LOS A	0.0	0.0	0.00	0.45	0.00	45.4
11	T1	122	6.0	122	6.0	0.091	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	46.9
12u	U	15	6.0	15	6.0	0.091	6.9	LOS A	0.0	0.0	0.00	0.45	0.00	29.1
Approach		178	6.0	178	6.0	0.091	2.8	LOS A	0.0	0.0	0.00	0.45	0.00	46.2
West: Ewen St														
5	T1	166	6.0	166	6.0	0.126	3.8	LOS A	0.7	4.8	0.15	0.41	0.15	44.8
Approach		166	6.0	166	6.0	0.126	3.8	LOS A	0.7	4.8	0.15	0.41	0.15	44.8
All Vehicles		389	6.0	389	6.0	0.126	3.6	LOS A	0.7	4.8	0.10	0.44	0.10	45.4

Existing weekend midday peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 121 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	12	6.0	12	6.0	0.525	54.4	LOS D	9.4	69.1	0.96	0.79	0.96	12.0
2	T1	160	6.0	160	6.0	0.525	49.8	LOS D	9.4	69.1	0.96	0.79	0.96	27.5
3	R2	161	6.0	161	6.0	0.541	55.4	LOS E	8.9	65.5	0.97	0.80	0.97	25.3
Approach		333	6.0	333	6.0	0.541	52.7	LOS D	9.4	69.1	0.96	0.79	0.96	26.0
East: Scarborough Beach Rd														
4	L2	358	6.0	358	6.0	0.265	9.7	LOS A	5.9	43.2	0.34	0.64	0.34	45.8
5	T1	718	6.0	718	6.0	0.299	24.6	LOS C	9.2	68.0	0.70	0.60	0.70	33.7
6	R2	297	6.0	297	6.0	* 0.644	49.2	LOS D	15.7	115.9	0.95	0.84	0.95	33.1
Approach		1373	6.0	1373	6.0	0.644	26.0	LOS C	15.7	115.9	0.66	0.66	0.66	35.5
North: Odin Rd														
7	L2	459	6.0	459	6.0	0.403	12.6	LOS B	10.9	79.9	0.50	0.71	0.50	49.0
8	T1	276	6.0	276	6.0	* 0.839	59.2	LOS E	17.4	127.8	1.00	0.97	1.19	21.0
9	R2	367	6.0	367	6.0	* 0.617	57.3	LOS E	10.3	75.8	0.98	0.82	0.98	21.3
Approach		1102	6.0	1102	6.0	0.839	39.2	LOS D	17.4	127.8	0.78	0.81	0.83	31.6
West: Scarborough Beach Rd														
10	L2	205	6.0	205	6.0	0.186	12.0	LOS B	4.0	29.7	0.42	0.67	0.42	46.5
11	T1	755	6.0	755	6.0	* 0.698	50.7	LOS D	14.2	104.9	0.99	0.85	1.02	28.3
12	R2	31	6.0	31	6.0	0.417	71.8	LOS E	1.9	14.3	1.00	0.72	1.00	10.4
Approach		991	6.0	991	6.0	0.698	43.3	LOS D	14.2	104.9	0.87	0.81	0.89	30.2
All Vehicles		3799	6.0	3799	6.0	0.839	36.7	LOS D	17.4	127.8	0.78	0.75	0.80	31.7

MOVEMENT SUMMARY

Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	7	0.0	7	0.0	0.006	1.2	LOS A	0.0	0.2	0.39	0.21	0.39	17.6
Approach		7	0.0	7	0.0	0.006	1.2	LOS A	0.0	0.2	0.39	0.21	0.39	17.6
East: SBR														
4	L2	9	0.0	9	0.0	0.193	2.1	LOS A	0.0	0.0	0.00	0.01	0.00	37.5
5	T1	1088	6.0	1088	6.0	0.193	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	58.9
Approach		1097	6.0	1097	6.0	0.193	0.0	NA	0.0	0.0	0.00	0.00	0.00	57.9
All Vehicles		1104	5.9	1104	5.9	0.193	0.0	NA	0.0	0.2	0.00	0.01	0.00	55.0

MOVEMENT SUMMARY

Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	6	0.0	6	0.0	0.006	1.8	LOS A	0.0	0.2	0.46	0.28	0.46	17.3
Approach		6	0.0	6	0.0	0.006	1.8	LOS A	0.0	0.2	0.46	0.28	0.46	17.3
East: SBR														
4	L2	5	0.0	5	0.0	0.255	3.0	LOS A	0.0	0.0	0.00	0.01	0.00	41.4
5	T1	1090	6.0	1090	6.0	0.255	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		1095	6.0	1095	6.0	0.255	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.2
All Vehicles		1101	5.9	1101	5.9	0.255	0.1	NA	0.0	0.2	0.00	0.00	0.00	58.0

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	38	6.0	38	6.0	0.411	10.8	LOS B	1.8	13.2	0.82	1.01	1.11	35.5
2	T1	74	6.0	74	6.0	0.411	28.4	LOS D	1.8	13.2	0.82	1.01	1.11	14.1
Approach		112	6.0	112	6.0	0.411	22.4	LOS C	1.8	13.2	0.82	1.01	1.11	25.0
East: SBR														
3	L2	42	6.0	42	6.0	0.290	4.5	LOS A	0.0	0.0	0.00	0.04	0.00	55.6
4	T1	1054	6.0	1054	6.0	0.290	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		1096	6.0	1096	6.0	0.290	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
North: Median Storage														
5	T1	64	6.0	64	6.0	0.150	7.5	LOS A	0.5	3.6	0.74	0.74	0.74	5.9
Approach		64	6.0	64	6.0	0.150	7.5	LOS A	0.5	3.6	0.74	0.74	0.74	5.9
All Vehicles		1272	6.0	1272	6.0	0.411	2.5	NA	1.8	13.2	0.11	0.15	0.13	54.8

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	74	6.0	74	6.0	0.130	5.3	LOS A	0.4	3.0	0.62	0.70	0.62	7.3
Approach		74	6.0	74	6.0	0.130	5.3	LOS A	0.4	3.0	0.62	0.70	0.62	7.3
West: SBR														
2	T1	917	6.0	917	6.0	0.242	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	64	6.0	64	6.0	0.036	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		981	6.0	981	6.0	0.242	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.2
All Vehicles		1055	6.0	1055	6.0	0.242	0.8	NA	0.4	3.0	0.04	0.09	0.04	58.1

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	180	6.0	180	6.0	0.143	3.6	LOS A	0.7	5.5	0.20	0.41	0.20	29.0
Approach		180	6.0	180	6.0	0.143	3.6	LOS A	0.7	5.5	0.20	0.41	0.20	29.0
North: Bowra Av														
7	L2	52	6.0	52	6.0	0.074	4.3	LOS A	0.3	2.5	0.25	0.54	0.25	30.7
9	R2	32	6.0	32	6.0	0.074	7.4	LOS A	0.3	2.5	0.25	0.54	0.25	30.7
Approach		84	6.0	84	6.0	0.074	5.5	LOS A	0.3	2.5	0.25	0.54	0.25	30.7
West: Ewen St														
10	L2	91	6.0	91	6.0	0.099	2.5	LOS A	0.0	0.0	0.00	0.49	0.00	27.9
11	T1	73	6.0	73	6.0	0.099	2.4	LOS A	0.0	0.0	0.00	0.49	0.00	27.9
12u	U	24	6.0	24	6.0	0.099	6.9	LOS A	0.0	0.0	0.00	0.49	0.00	27.9
Approach		188	6.0	188	6.0	0.099	3.0	LOS A	0.0	0.0	0.00	0.49	0.00	27.9
All Vehicles		452	6.0	452	6.0	0.143	3.7	LOS A	0.7	5.5	0.12	0.47	0.12	29.1

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

Network: N101 [Existing Weekend Midday Peak (Network Folder: General)]

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchwood Av														
7	L2	37	6.0	37	6.0	0.051	4.7	LOS A	0.2	1.7	0.33	0.55	0.33	45.7
9	R2	17	6.0	17	6.0	0.051	7.8	LOS A	0.2	1.7	0.33	0.55	0.33	43.2
Approach		54	6.0	54	6.0	0.051	5.7	LOS A	0.2	1.7	0.33	0.55	0.33	45.2
East: Ewen St														
10	L2	62	6.0	62	6.0	0.124	2.5	LOS A	0.0	0.0	0.00	0.48	0.00	45.2
11	T1	141	6.0	141	6.0	0.124	2.4	LOS A	0.0	0.0	0.00	0.48	0.00	46.6
12u	U	33	6.0	33	6.0	0.124	6.9	LOS A	0.0	0.0	0.00	0.48	0.00	28.2
Approach		236	6.0	236	6.0	0.124	3.1	LOS A	0.0	0.0	0.00	0.48	0.00	45.7
West: Ewen St														
5	T1	138	6.0	138	6.0	0.110	3.9	LOS A	0.5	4.0	0.18	0.41	0.18	44.7
Approach		138	6.0	138	6.0	0.110	3.9	LOS A	0.5	4.0	0.18	0.41	0.18	44.7
All Vehicles		428	6.0	428	6.0	0.124	3.7	LOS A	0.5	4.0	0.10	0.46	0.10	45.3

Post development weekday PM peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

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

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 134 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	8	6.0	8	6.0	0.596	59.7	LOS E	12.3	90.5	0.97	0.81	0.97	11.2
2	T1	194	6.0	194	6.0	0.596	55.1	LOS E	12.3	90.5	0.97	0.81	0.97	26.1
3	R2	135	6.0	135	6.0	0.529	63.2	LOS E	8.4	61.6	0.98	0.80	0.98	23.5
Approach		337	6.0	337	6.0	0.596	58.5	LOS E	12.3	90.5	0.97	0.80	0.97	24.7
East: Scarborough Beach Rd														
4	L2	311	6.0	311	6.0	0.223	8.9	LOS A	4.8	35.1	0.29	0.63	0.29	46.7
5	T1	1138	6.0	1138	6.0	0.439	26.3	LOS C	16.6	122.4	0.73	0.64	0.73	32.7
6	R2	373	6.0	373	6.0	* 0.731	32.3	LOS C	14.9	109.6	0.96	0.85	0.97	39.0
Approach		1822	6.0	1822	6.0	0.731	24.6	LOS C	16.6	122.4	0.70	0.68	0.70	36.2
North: Odin Rd														
7	L2	292	6.0	292	6.0	0.230	9.5	LOS A	4.7	34.6	0.33	0.65	0.33	51.1
8	T1	266	6.0	266	6.0	* 0.783	60.3	LOS E	17.5	128.9	1.00	0.91	1.10	20.7
9	R2	361	6.0	361	6.0	* 0.744	68.3	LOS E	11.9	87.3	1.00	0.87	1.10	19.0
Approach		919	6.0	919	6.0	0.783	47.3	LOS D	17.5	128.9	0.79	0.81	0.85	27.8
West: Scarborough Beach Rd														
10	L2	287	6.0	287	6.0	0.279	14.9	LOS B	7.3	53.4	0.48	0.70	0.48	44.3
11	T1	502	6.0	502	6.0	* 0.591	58.3	LOS E	10.4	76.6	0.98	0.80	0.98	26.2
12	R2	9	6.0	9	6.0	0.134	77.3	LOS E	0.6	4.5	0.99	0.67	0.99	9.7
Approach		798	6.0	798	6.0	0.591	42.9	LOS D	10.4	76.6	0.80	0.76	0.80	30.5
All Vehicles		3876	6.0	3876	6.0	0.783	36.7	LOS D	17.5	128.9	0.77	0.74	0.78	31.2

MOVEMENT SUMMARY

Site: 102 [Site Crossover / Scarborough Beach Rd (Site Folder: General)]

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

Proposed development crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	110	0.0	110	0.0	0.094	1.5	LOS A	0.4	3.1	0.44	0.30	0.44	17.4
Approach		110	0.0	110	0.0	0.094	1.5	LOS A	0.4	3.1	0.44	0.30	0.44	17.4
East: SBR														
4	L2	109	0.0	109	0.0	0.265	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	44.0
5	T1	1398	6.0	1398	6.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	57.0
Approach		1507	5.6	1507	5.6	0.265	0.4	NA	0.0	0.0	0.00	0.04	0.00	55.4
All Vehicles		1617	5.2	1617	5.2	0.265	0.5	NA	0.4	3.1	0.03	0.06	0.03	51.1

MOVEMENT SUMMARY

Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

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

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	2	0.0	2	0.0	0.002	1.7	LOS A	0.0	0.1	0.45	0.25	0.45	17.3
Approach		2	0.0	2	0.0	0.002	1.7	LOS A	0.0	0.1	0.45	0.25	0.45	17.3
East: SBR														
4	L2	31	0.0	31	0.0	0.265	2.1	LOS A	0.0	0.0	0.00	0.03	0.00	37.0
5	T1	1477	6.0	1477	6.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	57.5
Approach		1508	5.9	1508	5.9	0.265	0.0	NA	0.0	0.0	0.00	0.01	0.00	55.2
All Vehicles		1510	5.9	1510	5.9	0.265	0.0	NA	0.0	0.1	0.00	0.01	0.00	54.6

MOVEMENT SUMMARY

Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)]

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

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	32	0.0	32	0.0	0.040	3.0	LOS A	0.1	1.0	0.55	0.46	0.55	16.0
Approach		32	0.0	32	0.0	0.040	3.0	LOS A	0.1	1.0	0.55	0.46	0.55	16.0
East: SBR														
4	L2	1	0.0	1	0.0	0.345	3.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.5
5	T1	1478	6.0	1478	6.0	0.345	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1479	6.0	1479	6.0	0.345	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		1511	5.9	1511	5.9	0.345	0.3	NA	0.1	1.0	0.01	0.01	0.01	54.5

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)]

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

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	62	6.0	62	6.0	0.706	36.0	LOS E	3.4	25.1	0.93	1.23	1.74	22.8
2	T1	45	6.0	45	6.0	0.706	87.6	LOS F	3.4	25.1	0.93	1.23	1.74	6.7
Approach		107	6.0	107	6.0	0.706	57.7	LOS F	3.4	25.1	0.93	1.23	1.74	17.5
East: SBR														
3	L2	34	6.0	34	6.0	0.399	4.5	LOS A	0.0	0.0	0.00	0.03	0.00	57.1
4	T1	1476	6.0	1476	6.0	0.399	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		1510	6.0	1510	6.0	0.399	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
North: Median Storage														
5	T1	90	6.0	90	6.0	0.429	21.8	LOS C	1.5	11.1	0.91	1.07	1.17	2.5
Approach		90	6.0	90	6.0	0.429	21.8	LOS C	1.5	11.1	0.91	1.07	1.17	2.5
All Vehicles		1707	6.0	1707	6.0	0.706	4.9	NA	3.4	25.1	0.11	0.15	0.17	51.4

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)]

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

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	45	6.0	45	6.0	0.065	3.9	LOS A	0.2	1.5	0.52	0.59	0.52	8.8
Approach		45	6.0	45	6.0	0.065	3.9	LOS A	0.2	1.5	0.52	0.59	0.52	8.8
West: SBR														
2	T1	753	6.0	753	6.0	0.199	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	90	6.0	90	6.0	0.063	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		843	6.0	843	6.0	0.199	0.7	NA	0.0	0.0	0.00	0.07	0.00	58.7
All Vehicles		888	6.0	888	6.0	0.199	0.8	NA	0.2	1.5	0.03	0.09	0.03	58.2

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)]

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

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	206	6.0	206	6.0	0.156	3.5	LOS A	0.8	6.2	0.17	0.40	0.17	29.4
Approach		206	6.0	206	6.0	0.156	3.5	LOS A	0.8	6.2	0.17	0.40	0.17	29.4
North: Bowra Av														
7	L2	52	6.0	52	6.0	0.071	4.9	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
9	R2	21	6.0	21	6.0	0.071	8.1	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
Approach		73	6.0	73	6.0	0.071	5.8	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
West: Ewen St														
10	L2	60	6.0	60	6.0	0.139	2.5	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
11	T1	192	6.0	192	6.0	0.139	2.4	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
12u	U	20	6.0	20	6.0	0.139	6.9	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
Approach		272	6.0	272	6.0	0.139	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
All Vehicles		551	6.0	551	6.0	0.156	3.5	LOS A	0.8	6.2	0.11	0.45	0.11	29.5

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

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

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchwood Av														
7	L2	23	6.0	23	6.0	0.070	4.7	LOS A	0.3	2.4	0.34	0.59	0.34	45.0
9	R2	51	6.0	51	6.0	0.070	7.9	LOS A	0.3	2.4	0.34	0.59	0.34	42.1
Approach		74	6.0	74	6.0	0.070	6.9	LOS A	0.3	2.4	0.34	0.59	0.34	43.4
East: Ewen St														
10	L2	70	6.0	70	6.0	0.126	2.5	LOS A	0.0	0.0	0.00	0.44	0.00	45.5
11	T1	162	6.0	162	6.0	0.126	2.4	LOS A	0.0	0.0	0.00	0.44	0.00	47.0
12u	U	15	6.0	15	6.0	0.126	6.9	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
Approach		247	6.0	247	6.0	0.126	2.7	LOS A	0.0	0.0	0.00	0.44	0.00	46.3
West: Ewen St														
5	T1	206	6.0	206	6.0	0.166	4.0	LOS A	0.9	6.7	0.23	0.42	0.23	44.4
Approach		206	6.0	206	6.0	0.166	4.0	LOS A	0.9	6.7	0.23	0.42	0.23	44.4
All Vehicles		527	6.0	527	6.0	0.166	3.8	LOS A	0.9	6.7	0.14	0.46	0.14	45.1

MOVEMENT SUMMARY

▽ Site: 108 [Site Crossover (W) / Ewen St (Site Folder: General)]

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

Western car park exit crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	137	6.0	137	6.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		137	6.0	137	6.0	0.072	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Site Crossover (W)														
7	L2	32	0.0	32	0.0	0.101	0.8	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
9	R2	69	0.0	69	0.0	0.101	2.6	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
Approach		101	0.0	101	0.0	0.101	2.1	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
West: Ewen St														
11	T1	244	6.0	244	6.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		244	6.0	244	6.0	0.129	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		482	4.7	482	4.7	0.129	0.4	NA	0.4	2.5	0.08	0.08	0.08	35.0

MOVEMENT SUMMARY

▽ Site: 107 [Site Crossover (E) / Ewen St (Site Folder: General)]

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

Eastern car park entry crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	137	6.0	137	6.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		137	6.0	137	6.0	0.072	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Ewen St														
10	L2	102	0.0	102	0.0	0.146	3.0	LOS A	0.0	0.0	0.00	0.19	0.00	14.2
11	T1	174	6.0	174	6.0	0.146	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	36.2
Approach		276	3.8	276	3.8	0.146	1.1	NA	0.0	0.0	0.00	0.19	0.00	19.4
All Vehicles		413	4.5	413	4.5	0.146	0.7	NA	0.0	0.0	0.00	0.13	0.00	31.3

Post development weekend midday peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 121 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	12	6.0	12	6.0	0.582	55.0	LOS D	10.6	77.7	0.97	0.80	0.97	11.9
2	T1	179	6.0	179	6.0	0.582	50.4	LOS D	10.6	77.7	0.97	0.80	0.97	27.3
3	R2	167	6.0	167	6.0	0.561	55.6	LOS E	9.3	68.2	0.97	0.81	0.97	25.2
Approach		358	6.0	358	6.0	0.582	53.0	LOS D	10.6	77.7	0.97	0.80	0.97	25.9
East: Scarborough Beach Rd														
4	L2	358	6.0	358	6.0	0.265	9.7	LOS A	5.9	43.2	0.34	0.64	0.34	45.8
5	T1	724	6.0	724	6.0	0.302	24.7	LOS C	9.3	68.6	0.71	0.60	0.71	33.6
6	R2	297	6.0	297	6.0	* 0.644	49.2	LOS D	15.7	115.9	0.95	0.84	0.95	33.1
Approach		1379	6.0	1379	6.0	0.644	26.1	LOS C	15.7	115.9	0.66	0.66	0.66	35.4
North: Odin Rd														
7	L2	459	6.0	459	6.0	0.405	13.0	LOS B	11.1	81.6	0.51	0.72	0.51	48.7
8	T1	276	6.0	276	6.0	* 0.839	59.2	LOS E	17.4	127.8	1.00	0.97	1.19	21.0
9	R2	386	6.0	386	6.0	* 0.649	57.8	LOS E	10.9	80.5	0.99	0.83	1.00	21.2
Approach		1121	6.0	1121	6.0	0.839	39.8	LOS D	17.4	127.8	0.79	0.82	0.84	31.3
West: Scarborough Beach Rd														
10	L2	205	6.0	205	6.0	0.188	12.4	LOS B	4.2	30.6	0.43	0.67	0.43	46.2
11	T1	755	6.0	755	6.0	* 0.698	50.7	LOS D	14.2	104.9	0.99	0.85	1.02	28.3
12	R2	31	6.0	31	6.0	0.417	71.8	LOS E	1.9	14.3	1.00	0.72	1.00	10.4
Approach		991	6.0	991	6.0	0.698	43.4	LOS D	14.2	104.9	0.87	0.81	0.89	30.2
All Vehicles		3849	6.0	3849	6.0	0.839	37.0	LOS D	17.4	127.8	0.78	0.76	0.80	31.6

MOVEMENT SUMMARY

Site: 102 [Site Crossover / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Proposed development crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	124	0.0	124	0.0	0.093	0.9	LOS A	0.5	3.2	0.34	0.19	0.34	17.9
Approach		124	0.0	124	0.0	0.093	0.9	LOS A	0.5	3.2	0.34	0.19	0.34	17.9
East: SBR														
4	L2	123	0.0	123	0.0	0.197	5.6	LOS A	0.0	0.0	0.00	0.20	0.00	42.0
5	T1	999	6.0	999	6.0	0.197	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	56.1
Approach		1122	5.3	1122	5.3	0.197	0.6	NA	0.0	0.0	0.00	0.07	0.00	53.4
All Vehicles		1246	4.8	1246	4.8	0.197	0.7	NA	0.5	3.2	0.03	0.08	0.03	48.1

MOVEMENT SUMMARY

Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	7	0.0	7	0.0	0.006	1.2	LOS A	0.0	0.2	0.40	0.22	0.40	17.6
Approach		7	0.0	7	0.0	0.006	1.2	LOS A	0.0	0.2	0.40	0.22	0.40	17.6
East: SBR														
4	L2	9	0.0	9	0.0	0.197	2.1	LOS A	0.0	0.0	0.00	0.01	0.00	37.5
5	T1	1114	6.0	1114	6.0	0.197	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	58.9
Approach		1123	6.0	1123	6.0	0.197	0.0	NA	0.0	0.0	0.00	0.00	0.00	57.9
All Vehicles		1130	5.9	1130	5.9	0.197	0.0	NA	0.0	0.2	0.00	0.01	0.00	55.1

MOVEMENT SUMMARY

Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	6	0.0	6	0.0	0.006	1.8	LOS A	0.0	0.2	0.47	0.29	0.47	17.2
Approach		6	0.0	6	0.0	0.006	1.8	LOS A	0.0	0.2	0.47	0.29	0.47	17.2
East: SBR														
4	L2	5	0.0	5	0.0	0.261	3.0	LOS A	0.0	0.0	0.00	0.01	0.00	41.4
5	T1	1116	6.0	1116	6.0	0.261	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		1121	6.0	1121	6.0	0.261	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.3
All Vehicles		1127	5.9	1127	5.9	0.261	0.2	NA	0.0	0.2	0.00	0.00	0.00	58.0

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	38	6.0	38	6.0	0.449	12.2	LOS B	2.0	14.6	0.84	1.04	1.18	33.9
2	T1	74	6.0	74	6.0	0.449	32.0	LOS D	2.0	14.6	0.84	1.04	1.18	12.9
Approach		112	6.0	112	6.0	0.449	25.2	LOS D	2.0	14.6	0.84	1.04	1.18	23.4
East: SBR														
3	L2	42	6.0	42	6.0	0.296	4.5	LOS A	0.0	0.0	0.00	0.04	0.00	55.7
4	T1	1080	6.0	1080	6.0	0.296	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		1122	6.0	1122	6.0	0.296	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
North: Median Storage														
5	T1	90	6.0	90	6.0	0.220	8.4	LOS A	0.8	5.6	0.77	0.81	0.82	5.4
Approach		90	6.0	90	6.0	0.220	8.4	LOS A	0.8	5.6	0.77	0.81	0.82	5.4
All Vehicles		1324	6.0	1324	6.0	0.449	2.9	NA	2.0	14.6	0.12	0.16	0.16	54.1

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	74	6.0	74	6.0	0.130	5.3	LOS A	0.4	3.0	0.62	0.70	0.62	7.3
Approach		74	6.0	74	6.0	0.130	5.3	LOS A	0.4	3.0	0.62	0.70	0.62	7.3
West: SBR														
2	T1	917	6.0	917	6.0	0.242	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	90	6.0	90	6.0	0.050	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		1007	6.0	1007	6.0	0.242	0.6	NA	0.0	0.0	0.00	0.06	0.00	58.9
All Vehicles		1081	6.0	1081	6.0	0.242	0.9	NA	0.4	3.0	0.04	0.10	0.04	57.9

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	257	6.0	257	6.0	0.199	3.6	LOS A	1.1	8.2	0.21	0.41	0.21	28.8
Approach		257	6.0	257	6.0	0.199	3.6	LOS A	1.1	8.2	0.21	0.41	0.21	28.8
North: Bowra Av														
7	L2	78	6.0	78	6.0	0.103	4.8	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
9	R2	32	6.0	32	6.0	0.103	7.9	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
Approach		110	6.0	110	6.0	0.103	5.7	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
West: Ewen St														
10	L2	91	6.0	91	6.0	0.137	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
11	T1	150	6.0	150	6.0	0.137	2.4	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
12u	U	24	6.0	24	6.0	0.137	6.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
Approach		265	6.0	265	6.0	0.137	2.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
All Vehicles		632	6.0	632	6.0	0.199	3.7	LOS A	1.1	8.2	0.15	0.46	0.15	29.2

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchwood Av														
7	L2	37	6.0	37	6.0	0.084	5.0	LOS A	0.4	2.9	0.38	0.60	0.38	45.1
9	R2	49	6.0	49	6.0	0.084	8.1	LOS A	0.4	2.9	0.38	0.60	0.38	42.3
Approach		86	6.0	86	6.0	0.084	6.8	LOS A	0.4	2.9	0.38	0.60	0.38	44.0
East: Ewen St														
10	L2	94	6.0	94	6.0	0.162	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	45.3
11	T1	186	6.0	186	6.0	0.162	2.4	LOS A	0.0	0.0	0.00	0.46	0.00	46.7
12u	U	33	6.0	33	6.0	0.162	6.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.6
Approach		313	6.0	313	6.0	0.162	2.9	LOS A	0.0	0.0	0.00	0.46	0.00	45.9
West: Ewen St														
5	T1	183	6.0	183	6.0	0.152	4.1	LOS A	0.8	6.0	0.25	0.43	0.25	44.3
Approach		183	6.0	183	6.0	0.152	4.1	LOS A	0.8	6.0	0.25	0.43	0.25	44.3
All Vehicles		582	6.0	582	6.0	0.162	3.9	LOS A	0.8	6.0	0.14	0.47	0.14	45.0

MOVEMENT SUMMARY

Site: 108 [Site Crossover (W) / Ewen St (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Western car park exit crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	180	6.0	180	6.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		180	6.0	180	6.0	0.095	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Site Crossover (W)														
7	L2	36	0.0	36	0.0	0.115	0.8	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
9	R2	77	0.0	77	0.0	0.115	2.8	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
Approach		113	0.0	113	0.0	0.115	2.1	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
West: Ewen St														
11	T1	228	6.0	228	6.0	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		228	6.0	228	6.0	0.120	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		521	4.7	521	4.7	0.120	0.5	NA	0.4	2.8	0.08	0.08	0.08	34.2

MOVEMENT SUMMARY

Site: 107 [Site Crossover (E) / Ewen St (Site Folder: General)]

Network: N101 [Post Development Weekend Midday Peak (Network Folder: General)]

Eastern car park entry crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	180	6.0	180	6.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		180	6.0	180	6.0	0.095	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Ewen St														
10	L2	114	0.0	114	0.0	0.140	3.0	LOS A	0.0	0.0	0.00	0.23	0.00	14.1
11	T1	150	6.0	150	6.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	34.7
Approach		264	3.4	264	3.4	0.140	1.3	NA	0.0	0.0	0.00	0.23	0.00	18.2
All Vehicles		444	4.5	444	4.5	0.140	0.8	NA	0.0	0.0	0.00	0.13	0.00	32.1

10-year post development weekday PM peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

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

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 134 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	5	6.0	5	6.0	0.378	57.2	LOS E	7.4	54.7	0.93	0.75	0.93	11.6
2	T1	123	6.0	123	6.0	0.378	52.6	LOS D	7.4	54.7	0.93	0.75	0.93	26.7
3	R2	83	6.0	83	6.0	0.325	61.2	LOS E	5.0	36.6	0.94	0.77	0.94	23.9
Approach		211	6.0	211	6.0	0.378	56.1	LOS E	7.4	54.7	0.93	0.76	0.93	25.3
East: Scarborough Beach Rd														
4	L2	187	6.0	187	6.0	0.126	7.1	LOS A	1.8	13.1	0.20	0.60	0.20	48.9
5	T1	685	6.0	685	6.0	0.378	25.7	LOS C	14.1	101.0	0.70	0.61	0.70	33.0
6	R2	224	6.0	224	6.0	* 0.439	29.4	LOS C	8.0	58.9	0.87	0.79	0.87	40.2
Approach		1096	6.0	1096	6.0	0.439	23.3	LOS C	14.1	101.0	0.65	0.65	0.65	36.9
North: Odin Rd														
7	L2	175	6.0	175	6.0	0.131	7.9	LOS A	2.0	14.7	0.25	0.62	0.25	52.3
8	T1	160	6.0	160	6.0	* 0.471	53.6	LOS D	9.5	69.6	0.95	0.77	0.95	22.4
9	R2	223	6.0	223	6.0	* 0.437	63.5	LOS E	6.8	50.1	0.96	0.79	0.96	19.9
Approach		558	6.0	558	6.0	0.471	43.2	LOS D	9.5	69.6	0.73	0.73	0.73	29.1
West: Scarborough Beach Rd														
10	L2	172	6.0	172	6.0	0.143	9.1	LOS A	2.5	18.3	0.30	0.64	0.30	48.9
11	T1	301	6.0	301	6.0	* 0.506	57.3	LOS E	8.9	64.2	0.97	0.78	0.97	26.5
12	R2	5	6.0	5	6.0	0.074	76.7	LOS E	0.3	2.5	0.99	0.64	0.99	9.6
Approach		478	6.0	478	6.0	0.506	40.2	LOS D	8.9	64.2	0.73	0.73	0.73	31.5
All Vehicles		2343	6.0	2343	6.0	0.506	34.4	LOS C	14.1	101.0	0.71	0.69	0.71	32.2

MOVEMENT SUMMARY

Site: 102 [Site Crossover / Scarborough Beach Rd (Site Folder: General)]

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

Proposed development crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	110	0.0	110	0.0	0.070	0.1	LOS A	0.3	2.4	0.13	0.04	0.13	19.2
Approach		110	0.0	110	0.0	0.070	0.1	LOS A	0.3	2.4	0.13	0.04	0.13	19.2
East: SBR														
4	L2	109	0.0	109	0.0	0.078	5.6	LOS A	0.0	0.0	0.00	0.48	0.00	35.4
5	T1	804	6.0	804	6.0	0.202	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach		913	5.3	913	5.3	0.202	0.7	NA	0.0	0.0	0.00	0.07	0.00	53.1
All Vehicles		1023	4.7	1023	4.7	0.202	0.6	NA	0.3	2.4	0.01	0.07	0.01	48.0

MOVEMENT SUMMARY

▽ Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

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

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	2	0.0	2	0.0	0.001	0.1	LOS A	0.0	0.0	0.13	0.03	0.13	19.2
Approach		2	0.0	2	0.0	0.001	0.1	LOS A	0.0	0.0	0.13	0.03	0.13	19.2
East: SBR														
4	L2	31	0.0	31	0.0	0.039	2.1	LOS A	0.0	0.0	0.00	0.28	0.00	32.5
5	T1	883	6.0	883	6.0	0.222	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.0
Approach		914	5.8	914	5.8	0.222	0.1	NA	0.0	0.0	0.00	0.02	0.00	53.0
All Vehicles		916	5.8	916	5.8	0.222	0.1	NA	0.0	0.0	0.00	0.02	0.00	52.3

MOVEMENT SUMMARY

▽ Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)]

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

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	32	0.0	32	0.0	0.028	1.4	LOS A	0.1	0.8	0.41	0.27	0.41	17.5
Approach		32	0.0	32	0.0	0.028	1.4	LOS A	0.1	0.8	0.41	0.27	0.41	17.5
East: SBR														
4	L2	1	0.0	1	0.0	0.023	3.0	LOS A	0.0	0.0	0.00	0.02	0.00	41.0
5	T1	884	6.0	884	6.0	0.352	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		885	6.0	885	6.0	0.352	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		917	5.8	917	5.8	0.352	0.2	NA	0.1	0.8	0.01	0.01	0.01	52.5

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)]

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

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	37	6.0	37	6.0	0.133	6.4	LOS A	0.5	3.6	0.62	0.76	0.62	43.3
2	T1	27	6.0	27	6.0	0.133	17.2	LOS C	0.5	3.6	0.62	0.76	0.62	22.4
Approach		64	6.0	64	6.0	0.133	11.0	LOS B	0.5	3.6	0.62	0.76	0.62	38.7
East: SBR														
3	L2	20	6.0	20	6.0	0.242	4.5	LOS A	0.0	0.0	0.00	0.03	0.00	57.4
4	T1	896	6.0	896	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach		916	6.0	916	6.0	0.242	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Median Storage														
5	T1	63	6.0	63	6.0	0.115	5.2	LOS A	0.4	2.8	0.65	0.65	0.65	7.5
Approach		63	6.0	63	6.0	0.115	5.2	LOS A	0.4	2.8	0.65	0.65	0.65	7.5
All Vehicles		1043	6.0	1043	6.0	0.242	1.1	NA	0.5	3.6	0.08	0.10	0.08	57.4

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)]

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

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	27	6.0	27	6.0	0.028	2.2	LOS A	0.1	0.7	0.39	0.40	0.39	11.7
Approach		27	6.0	27	6.0	0.028	2.2	LOS A	0.1	0.7	0.39	0.40	0.39	11.7
West: SBR														
2	T1	451	6.0	451	6.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	63	6.0	63	6.0	0.035	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		514	6.0	514	6.0	0.119	0.7	NA	0.0	0.0	0.00	0.08	0.00	58.6
All Vehicles		541	6.0	541	6.0	0.119	0.8	NA	0.1	0.7	0.02	0.09	0.02	58.2

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)]

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

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	206	6.0	206	6.0	0.156	3.5	LOS A	0.8	6.2	0.17	0.40	0.17	29.4
Approach		206	6.0	206	6.0	0.156	3.5	LOS A	0.8	6.2	0.17	0.40	0.17	29.4
North: Bowra Av														
7	L2	52	6.0	52	6.0	0.071	4.9	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
9	R2	21	6.0	21	6.0	0.071	8.1	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
Approach		73	6.0	73	6.0	0.071	5.8	LOS A	0.3	2.5	0.37	0.57	0.37	30.2
West: Ewen St														
10	L2	60	6.0	60	6.0	0.139	2.5	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
11	T1	192	6.0	192	6.0	0.139	2.4	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
12u	U	20	6.0	20	6.0	0.139	6.9	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
Approach		272	6.0	272	6.0	0.139	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
All Vehicles		551	6.0	551	6.0	0.156	3.5	LOS A	0.8	6.2	0.11	0.45	0.11	29.5

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

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

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchwood Av														
7	L2	23	6.0	23	6.0	0.070	4.7	LOS A	0.3	2.4	0.34	0.59	0.34	45.0
9	R2	51	6.0	51	6.0	0.070	7.9	LOS A	0.3	2.4	0.34	0.59	0.34	42.1
Approach		74	6.0	74	6.0	0.070	6.9	LOS A	0.3	2.4	0.34	0.59	0.34	43.4
East: Ewen St														
10	L2	70	6.0	70	6.0	0.126	2.5	LOS A	0.0	0.0	0.00	0.44	0.00	45.5
11	T1	162	6.0	162	6.0	0.126	2.4	LOS A	0.0	0.0	0.00	0.44	0.00	47.0
12u	U	15	6.0	15	6.0	0.126	6.9	LOS A	0.0	0.0	0.00	0.44	0.00	29.3
Approach		247	6.0	247	6.0	0.126	2.7	LOS A	0.0	0.0	0.00	0.44	0.00	46.3
West: Ewen St														
5	T1	206	6.0	206	6.0	0.166	4.0	LOS A	0.9	6.7	0.23	0.42	0.23	44.4
Approach		206	6.0	206	6.0	0.166	4.0	LOS A	0.9	6.7	0.23	0.42	0.23	44.4
All Vehicles		527	6.0	527	6.0	0.166	3.8	LOS A	0.9	6.7	0.14	0.46	0.14	45.1

MOVEMENT SUMMARY

Site: 108 [Site Crossover (W) / Ewen St (Site Folder: General)]

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

Western car park exit crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	137	6.0	137	6.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		137	6.0	137	6.0	0.072	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Site Crossover (W)														
7	L2	32	0.0	32	0.0	0.101	0.8	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
9	R2	69	0.0	69	0.0	0.101	2.6	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
Approach		101	0.0	101	0.0	0.101	2.1	LOS A	0.4	2.5	0.37	0.37	0.37	16.8
West: Ewen St														
11	T1	244	6.0	244	6.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		244	6.0	244	6.0	0.129	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		482	4.7	482	4.7	0.129	0.4	NA	0.4	2.5	0.08	0.08	0.08	35.0

MOVEMENT SUMMARY

Site: 107 [Site Crossover (E) / Ewen St (Site Folder: General)]

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

Eastern car park entry crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	137	6.0	137	6.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		137	6.0	137	6.0	0.072	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Ewen St														
10	L2	102	0.0	102	0.0	0.146	3.0	LOS A	0.0	0.0	0.00	0.19	0.00	14.2
11	T1	174	6.0	174	6.0	0.146	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	36.2
Approach		276	3.8	276	3.8	0.146	1.1	NA	0.0	0.0	0.00	0.19	0.00	19.4
All Vehicles		413	4.5	413	4.5	0.146	0.7	NA	0.0	0.0	0.00	0.13	0.00	31.3

10-year post development weekend midday peak hour

MOVEMENT SUMMARY

Site: 101 [Scarborough Beach Rd / Odin Rd / Ewen St (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Signalised Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 121 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ewen St														
1	L2	7	6.0	7	6.0	0.372	52.8	LOS D	6.5	47.5	0.93	0.75	0.93	12.3
2	T1	115	6.0	115	6.0	0.372	48.2	LOS D	6.5	47.5	0.93	0.75	0.93	28.0
3	R2	103	6.0	103	6.0	0.346	53.5	LOS D	5.5	40.3	0.93	0.77	0.93	25.7
Approach		225	6.0	225	6.0	0.372	50.8	LOS D	6.5	47.5	0.93	0.76	0.93	26.6
East: Scarborough Beach Rd														
4	L2	215	6.0	215	6.0	0.148	7.3	LOS A	2.1	15.4	0.22	0.61	0.22	48.6
5	T1	437	6.0	437	6.0	0.260	24.1	LOS C	8.0	57.6	0.69	0.58	0.69	34.0
6	R2	178	6.0	178	6.0	* 0.386	45.8	LOS D	8.7	64.1	0.87	0.79	0.87	34.1
Approach		830	6.0	830	6.0	0.386	24.4	LOS C	8.7	64.1	0.61	0.63	0.61	36.4
North: Odin Rd														
7	L2	275	6.0	275	6.0	0.225	9.4	LOS A	4.2	31.2	0.35	0.65	0.35	51.2
8	T1	166	6.0	166	6.0	* 0.504	49.6	LOS D	9.0	66.4	0.96	0.78	0.96	23.5
9	R2	239	6.0	239	6.0	* 0.402	55.2	LOS E	6.4	47.3	0.94	0.79	0.94	21.8
Approach		680	6.0	680	6.0	0.504	35.3	LOS D	9.0	66.4	0.70	0.73	0.70	33.0
West: Scarborough Beach Rd														
10	L2	123	6.0	123	6.0	0.100	8.5	LOS A	1.5	11.1	0.29	0.62	0.29	49.5
11	T1	453	6.0	453	6.0	* 0.598	48.7	LOS D	12.0	86.4	0.96	0.80	0.96	28.9
12	R2	19	6.0	19	6.0	0.256	70.9	LOS E	1.2	8.6	1.00	0.70	1.00	10.5
Approach		595	6.0	595	6.0	0.598	41.1	LOS D	12.0	86.4	0.82	0.76	0.82	31.0
All Vehicles		2330	6.0	2330	6.0	0.598	34.4	LOS C	12.0	86.4	0.72	0.71	0.72	32.6

MOVEMENT SUMMARY

Site: 102 [Site Crossover / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Proposed development crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	124	0.0	124	0.0	0.078	0.1	LOS A	0.4	2.7	0.10	0.03	0.10	19.3
Approach		124	0.0	124	0.0	0.078	0.1	LOS A	0.4	2.7	0.10	0.03	0.10	19.3
East: SBR														
4	L2	123	0.0	123	0.0	0.080	5.6	LOS A	0.0	0.0	0.00	0.51	0.00	34.7
5	T1	560	6.0	560	6.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.2
Approach		683	4.9	683	4.9	0.141	1.0	NA	0.0	0.0	0.00	0.11	0.00	50.5
All Vehicles		807	4.2	807	4.2	0.141	0.9	NA	0.4	2.7	0.02	0.09	0.02	44.3

MOVEMENT SUMMARY

▽ Site: 103 [Service Station (E) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Modified Eastern Service Station Crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (E)														
1	L2	7	0.0	7	0.0	0.004	0.1	LOS A	0.0	0.1	0.11	0.02	0.11	19.3
Approach		7	0.0	7	0.0	0.004	0.1	LOS A	0.0	0.1	0.11	0.02	0.11	19.3
East: SBR														
4	L2	9	0.0	9	0.0	0.022	2.1	LOS A	0.0	0.0	0.00	0.16	0.00	34.5
5	T1	675	6.0	675	6.0	0.169	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.3
Approach		684	5.9	684	5.9	0.169	0.0	NA	0.0	0.0	0.00	0.01	0.00	56.9
All Vehicles		691	5.9	691	5.9	0.169	0.0	NA	0.0	0.1	0.00	0.01	0.00	53.1

MOVEMENT SUMMARY

▽ Site: 104 [Service Station (W) / Scarborough Beach Rd (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Western service station crossover on Scarborough Beach Road
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Service Station Crossover (W)														
1	L2	6	0.0	6	0.0	0.005	0.9	LOS A	0.0	0.1	0.35	0.17	0.35	17.8
Approach		6	0.0	6	0.0	0.005	0.9	LOS A	0.0	0.1	0.35	0.17	0.35	17.8
East: SBR														
4	L2	5	0.0	5	0.0	0.020	3.0	LOS A	0.0	0.0	0.00	0.11	0.00	38.7
5	T1	677	6.0	677	6.0	0.269	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		682	6.0	682	6.0	0.269	0.1	NA	0.0	0.0	0.00	0.00	0.00	58.9
All Vehicles		688	5.9	688	5.9	0.269	0.1	NA	0.0	0.1	0.00	0.01	0.00	57.0

MOVEMENT SUMMARY

Site: 105.S1 [Scarborough Beach Rd / Bowra Av - Stage 1 (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Stage 1 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bowra Av														
1	L2	23	6.0	23	6.0	0.123	5.8	LOS A	0.5	3.5	0.58	0.74	0.58	44.4
2	T1	44	6.0	44	6.0	0.123	11.8	LOS B	0.5	3.5	0.58	0.74	0.58	23.8
Approach		67	6.0	67	6.0	0.123	9.7	LOS A	0.5	3.5	0.58	0.74	0.58	35.9
East: SBR														
3	L2	25	6.0	25	6.0	0.180	4.5	LOS A	0.0	0.0	0.00	0.04	0.00	55.8
4	T1	658	6.0	658	6.0	0.180	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		683	6.0	683	6.0	0.180	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
North: Median Storage														
5	T1	64	6.0	64	6.0	0.087	3.2	LOS A	0.3	2.2	0.53	0.50	0.53	9.9
Approach		64	6.0	64	6.0	0.087	3.2	LOS A	0.3	2.2	0.53	0.50	0.53	9.9
All Vehicles		814	6.0	814	6.0	0.180	1.2	NA	0.5	3.5	0.09	0.12	0.09	57.0

MOVEMENT SUMMARY

Site: 105.S2 [Scarborough Beach Rd / Bowra Av - Stage 2 (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Stage 2 crossing at the intersection of SBR and Bowra Av
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Median Storage														
1	R2	44	6.0	44	6.0	0.051	2.7	LOS A	0.2	1.2	0.44	0.47	0.44	10.6
Approach		44	6.0	44	6.0	0.051	2.7	LOS A	0.2	1.2	0.44	0.47	0.44	10.6
West: SBR														
2	T1	551	6.0	551	6.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	64	6.0	64	6.0	0.036	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		615	6.0	615	6.0	0.145	0.6	NA	0.0	0.0	0.00	0.07	0.00	58.8
All Vehicles		659	6.0	659	6.0	0.145	0.8	NA	0.2	1.2	0.03	0.09	0.03	58.2

MOVEMENT SUMMARY

Site: 106.1 [Bowra Av / Ewen St (East) (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Eastern roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	257	6.0	257	6.0	0.199	3.6	LOS A	1.1	8.2	0.21	0.41	0.21	28.8
Approach		257	6.0	257	6.0	0.199	3.6	LOS A	1.1	8.2	0.21	0.41	0.21	28.8
North: Bowra Av														
7	L2	78	6.0	78	6.0	0.103	4.8	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
9	R2	32	6.0	32	6.0	0.103	7.9	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
Approach		110	6.0	110	6.0	0.103	5.7	LOS A	0.5	3.7	0.35	0.56	0.35	30.4
West: Ewen St														
10	L2	91	6.0	91	6.0	0.137	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
11	T1	150	6.0	150	6.0	0.137	2.4	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
12u	U	24	6.0	24	6.0	0.137	6.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
Approach		265	6.0	265	6.0	0.137	2.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.7
All Vehicles		632	6.0	632	6.0	0.199	3.7	LOS A	1.1	8.2	0.15	0.46	0.15	29.2

MOVEMENT SUMMARY

Site: 106.2 [Bowra Av / Ewen St (West) (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Western roundabout at Bowra Av / Ewen St / Birchwood Av
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchwood Av														
7	L2	37	6.0	37	6.0	0.084	5.0	LOS A	0.4	2.9	0.38	0.60	0.38	45.1
9	R2	49	6.0	49	6.0	0.084	8.1	LOS A	0.4	2.9	0.38	0.60	0.38	42.3
Approach		86	6.0	86	6.0	0.084	6.8	LOS A	0.4	2.9	0.38	0.60	0.38	44.0
East: Ewen St														
10	L2	94	6.0	94	6.0	0.162	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	45.3
11	T1	186	6.0	186	6.0	0.162	2.4	LOS A	0.0	0.0	0.00	0.46	0.00	46.7
12u	U	33	6.0	33	6.0	0.162	6.9	LOS A	0.0	0.0	0.00	0.46	0.00	28.6
Approach		313	6.0	313	6.0	0.162	2.9	LOS A	0.0	0.0	0.00	0.46	0.00	45.9
West: Ewen St														
5	T1	183	6.0	183	6.0	0.152	4.1	LOS A	0.8	6.0	0.25	0.43	0.25	44.3
Approach		183	6.0	183	6.0	0.152	4.1	LOS A	0.8	6.0	0.25	0.43	0.25	44.3
All Vehicles		582	6.0	582	6.0	0.162	3.9	LOS A	0.8	6.0	0.14	0.47	0.14	45.0

MOVEMENT SUMMARY

▽ Site: 108 [Site Crossover (W) / Ewen St (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Western car park exit crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	180	6.0	180	6.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		180	6.0	180	6.0	0.095	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Site Crossover (W)														
7	L2	36	0.0	36	0.0	0.115	0.8	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
9	R2	77	0.0	77	0.0	0.115	2.8	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
Approach		113	0.0	113	0.0	0.115	2.1	LOS A	0.4	2.8	0.37	0.38	0.37	16.7
West: Ewen St														
11	T1	228	6.0	228	6.0	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		228	6.0	228	6.0	0.120	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		521	4.7	521	4.7	0.120	0.5	NA	0.4	2.8	0.08	0.08	0.08	34.2

MOVEMENT SUMMARY

▽ Site: 107 [Site Crossover (E) / Ewen St (Site Folder: General)]

Network: N101 [2036 Post Development Weekend Midday Peak (Network Folder: General)]

Eastern car park entry crossover
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	180	6.0	180	6.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		180	6.0	180	6.0	0.095	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Ewen St														
10	L2	114	0.0	114	0.0	0.140	3.0	LOS A	0.0	0.0	0.00	0.23	0.00	14.1
11	T1	150	6.0	150	6.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	34.7
Approach		264	3.4	264	3.4	0.140	1.3	NA	0.0	0.0	0.00	0.23	0.00	18.2
All Vehicles		444	4.5	444	4.5	0.140	0.8	NA	0.0	0.0	0.00	0.13	0.00	32.1

Development crossover sensitivity analysis (10-year post development)

MOVEMENT SUMMARY

Site: 102 [Site Crossover / Scarborough Beach Rd - WD (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekday
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	110	0.0	110	0.0	0.073	0.3	LOS A	0.3	2.1	0.19	0.07	0.19	18.9
Approach		110	0.0	110	0.0	0.073	0.3	LOS A	0.3	2.1	0.19	0.07	0.19	18.9
East: SBR														
4	L2	109	0.0	109	0.0	0.098	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	36.9
5	T1	1608	6.0	1608	6.0	0.404	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.1
Approach		1717	5.6	1717	5.6	0.404	0.4	NA	0.0	0.0	0.00	0.04	0.00	56.0
All Vehicles		1827	5.3	1827	5.3	0.404	0.4	NA	0.3	2.1	0.01	0.04	0.01	52.5

MOVEMENT SUMMARY

Site: 108 [Site Crossover (W) / Ewen St - WD (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekday
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	274	6.0	274	6.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		274	6.0	274	6.0	0.144	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Site Crossover (W)														
7	L2	32	0.0	32	0.0	0.153	2.1	LOS A	0.5	3.6	0.55	0.59	0.55	17.1
9	R2	69	0.0	69	0.0	0.153	5.6	LOS A	0.5	3.6	0.55	0.59	0.55	19.7
Approach		101	0.0	101	0.0	0.153	4.5	LOS A	0.5	3.6	0.55	0.59	0.55	19.0
West: Ewen St														
11	T1	488	6.0	488	6.0	0.257	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		488	6.0	488	6.0	0.257	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		863	5.3	863	5.3	0.257	0.5	NA	0.5	3.6	0.06	0.07	0.06	41.2

MOVEMENT SUMMARY

▽ Site: 107 [Site Crossover (E) / Ewen St - WD (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekday
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	274	6.0	274	6.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		274	6.0	274	6.0	0.144	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
West: Ewen St														
10	L2	102	0.0	102	0.0	0.275	3.0	LOS A	0.0	0.0	0.00	0.10	0.00	14.4
11	T1	418	6.0	418	6.0	0.275	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	48.1
Approach		520	4.8	520	4.8	0.275	0.6	NA	0.0	0.0	0.00	0.10	0.00	39.9
All Vehicles		794	5.2	794	5.2	0.275	0.4	NA	0.0	0.0	0.00	0.07	0.00	43.1

MOVEMENT SUMMARY

▽ Site: 102 [Site Crossover / Scarborough Beach Rd - WE (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekend
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Crossover														
1	L2	124	0.0	124	0.0	0.080	0.2	LOS A	0.3	2.3	0.15	0.05	0.15	19.1
Approach		124	0.0	124	0.0	0.080	0.2	LOS A	0.3	2.3	0.15	0.05	0.15	19.1
East: SBR														
4	L2	123	0.0	123	0.0	0.094	5.6	LOS A	0.0	0.0	0.00	0.46	0.00	35.8
5	T1	1120	6.0	1120	6.0	0.281	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach		1243	5.4	1243	5.4	0.281	0.6	NA	0.0	0.0	0.00	0.06	0.00	54.3
All Vehicles		1367	4.9	1367	4.9	0.281	0.5	NA	0.3	2.3	0.01	0.06	0.01	49.5

MOVEMENT SUMMARY

▽ Site: 108 [Site Crossover (W) / Ewen St - WE (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekend
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	360	6.0	360	6.0	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		360	6.0	360	6.0	0.190	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Site Crossover (W)														
7	L2	36	0.0	36	0.0	0.178	1.9	LOS A	0.6	4.2	0.56	0.60	0.56	16.9
9	R2	77	0.0	77	0.0	0.178	6.1	LOS A	0.6	4.2	0.56	0.60	0.56	19.4
Approach		113	0.0	113	0.0	0.178	4.8	LOS A	0.6	4.2	0.56	0.60	0.56	18.7
West: Ewen St														
11	T1	456	6.0	456	6.0	0.240	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		456	6.0	456	6.0	0.240	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		929	5.3	929	5.3	0.240	0.6	NA	0.6	4.2	0.07	0.07	0.07	40.7

MOVEMENT SUMMARY

▽ Site: 107 [Site Crossover (E) / Ewen St - WE (Site Folder: General)]

Proposed development crossover
2036 Sensitivity Analysis - weekend
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Ewen St														
5	T1	360	6.0	360	6.0	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		360	6.0	360	6.0	0.190	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
West: Ewen St														
10	L2	114	0.0	114	0.0	0.260	3.0	LOS A	0.0	0.0	0.00	0.12	0.00	14.4
11	T1	378	6.0	378	6.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	47.8
Approach		492	4.6	492	4.6	0.260	0.7	NA	0.0	0.0	0.00	0.12	0.00	38.3
All Vehicles		852	5.2	852	5.2	0.260	0.4	NA	0.0	0.0	0.00	0.07	0.00	42.9

Appendix F: Swept path diagrams

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

Cyan represents the wheel path of the vehicle

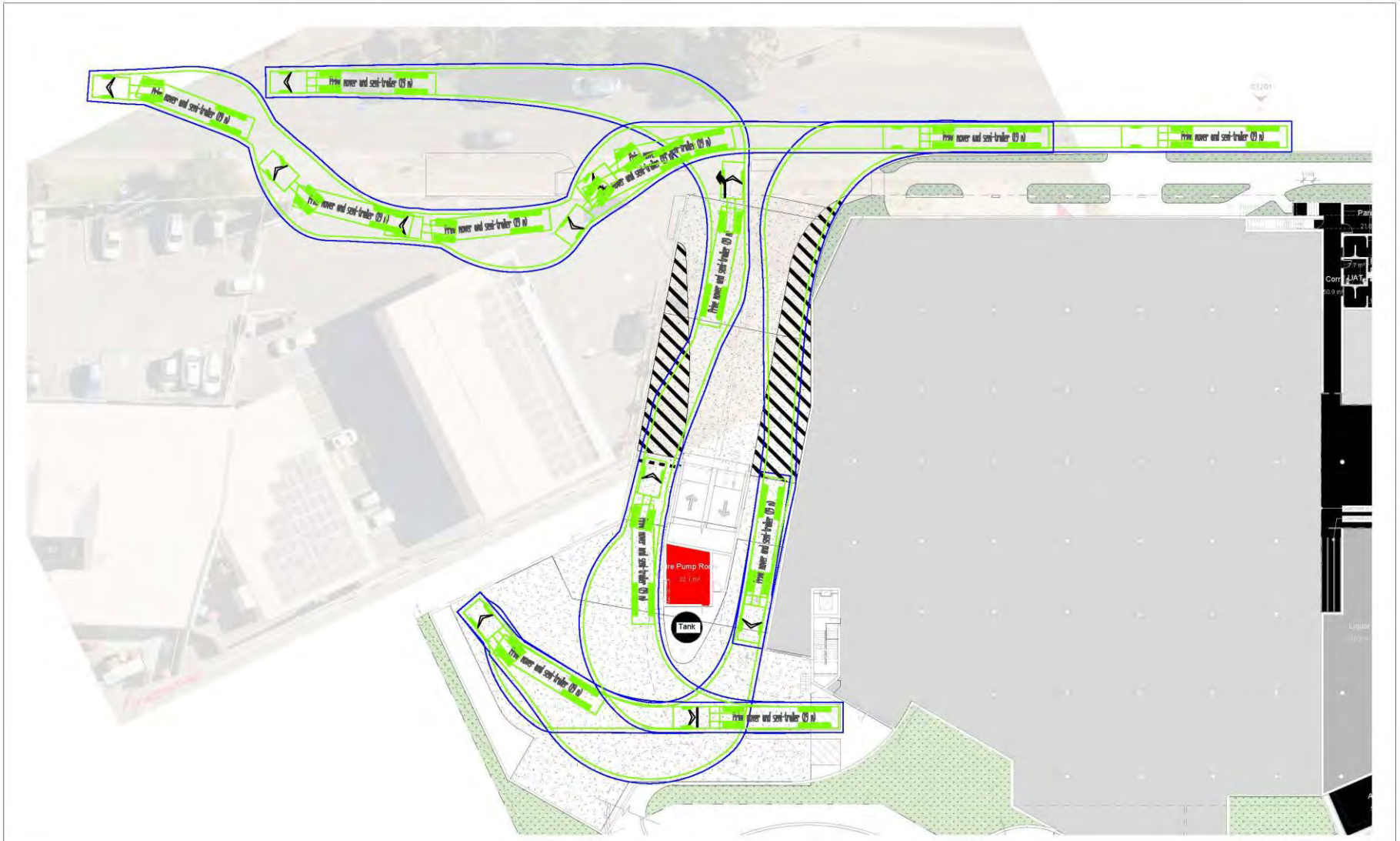
Green represents the vehicle body envelope

Blue represents a buffer line, offset from the vehicle swept path

Design vehicles tested include:

- AS2890.1: B99 Car
- AS2890.2: 19m Articulated Vehicles (AVs)
- AS2890.2: 8.8m Medium Rigid Vehicles (MRVs)

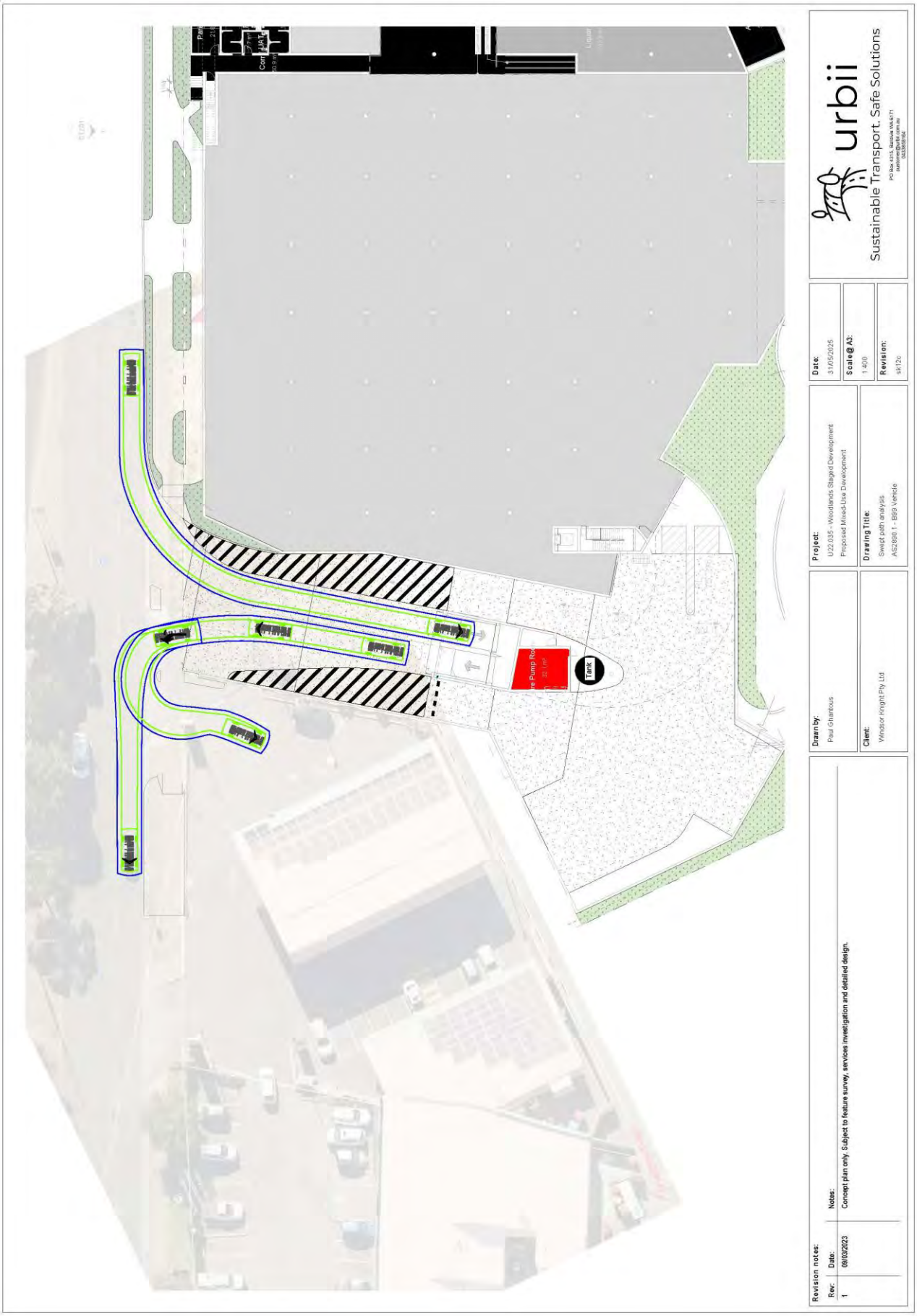
The swept path diagrams are also provided separately in high-quality, A3 PDF format.

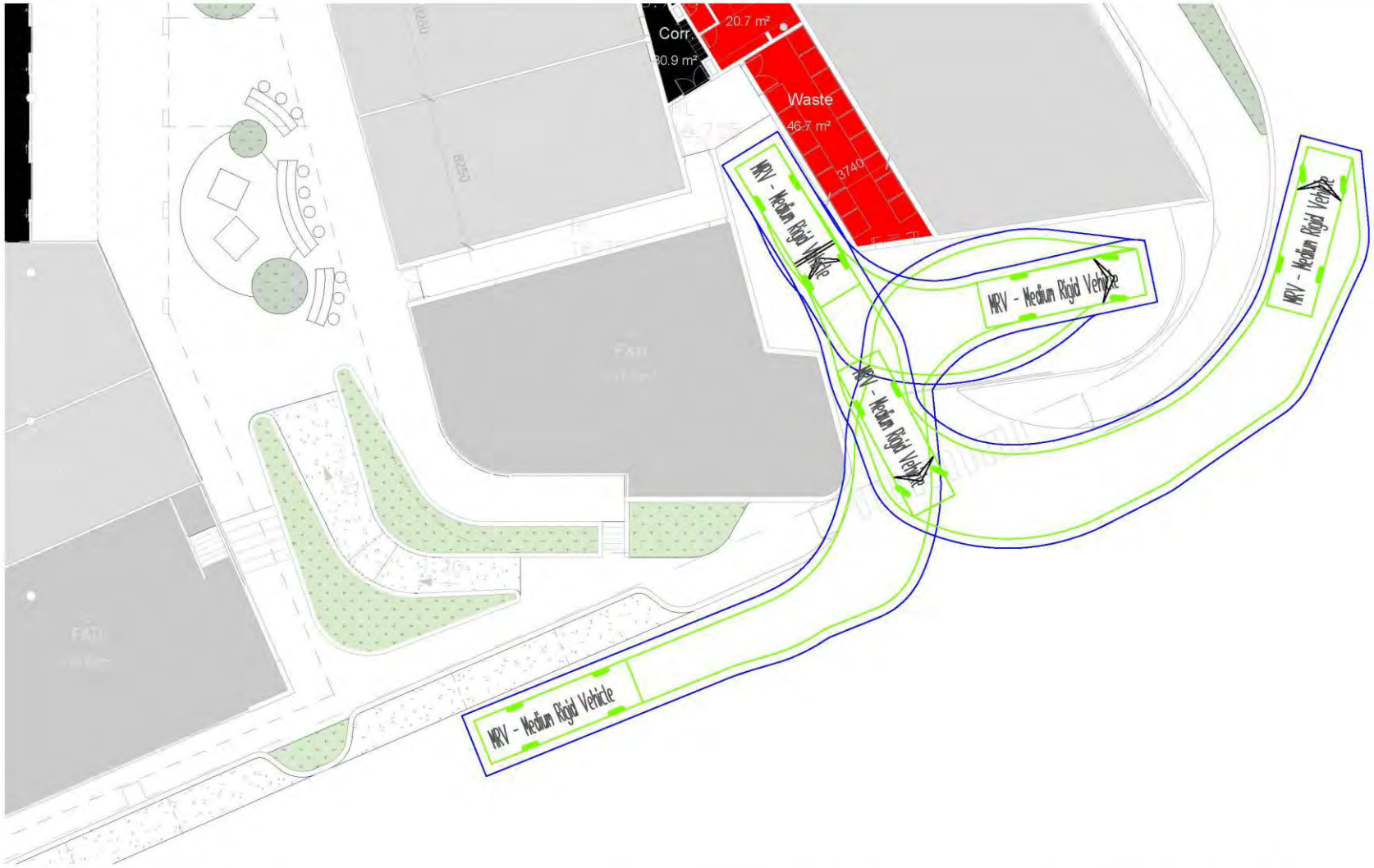


Revision notes:

Rev:	Date:	Notes:
1	09/03/2023	Concept plan only. Subject to feature survey, services investigation and detailed design.

Drawn by: Paul Ghantous	**Project:** U22.035 - Woodlands Staged Development Proposed Mixed-Use Development	**Date:** 31/05/2025	urbii Sustainable Transport. Safe Solutions
Client: Windsor Knight Pty Ltd	**Drawing Title:** Swept path analysis AS2890.2 - 19m Articulated Vehicle (AV)	**Scale@A3:** 1:400 **Revision:** sk11c	PO Box 4315, Baldivis WA 6171 customer@urbii.com.au 0433858184


Tank
Revision notes:
Rev: Date: Notes:
1 08/03/2023 Concept plan only. Subject to feature survey, services investigation and detailed design.
Drawn by:
Paul Ghantous
Client:
Windsor Knight Pty Ltd
Project:
U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development
Drawing Title:
Swept path analysis
AS2890.1 - B99 Vehicle
Date:
31/05/2025
Scale@A3:
1:400
Revision:
sk12c
urbii
Sustainable Transport. Safe Solutions



Revision notes:

Rev:	Date:	Notes:
1	09/03/2023	Concept plan only. Subject to feature survey, services investigation and detailed design.

Drawn by: Paul Ghantous

Client: Windsor Knight Pty Ltd

Project: U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development

Drawing Title: Swept path analysis
AS2890.2 - 8.8m Medium Rigid Vehicle (MRV)

Date: 31/05/2025

Scale @ A3: 1:200

Revision: sk13b

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Sustainable Transport. Safe Solutions

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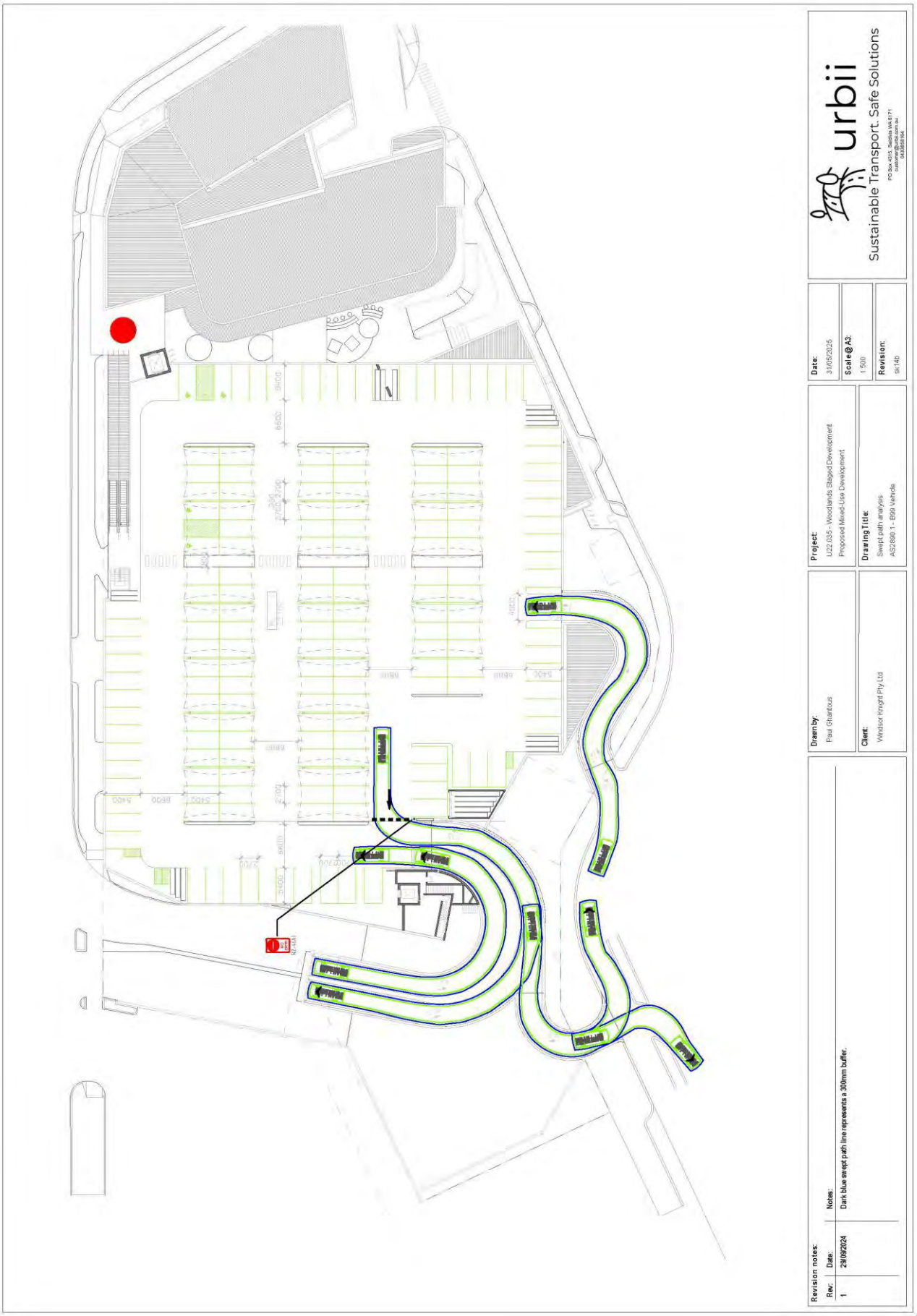
customer@urbii.com.au
0433858164


urbii
Sustainable Transport. Safe Solutions
Date:
31/05/2025
Scale @ A3:
1:500
Revision:
Project:
U22.035 - Woodlands Staged Development
Proposed Mixed-Use Development
Drawing Title:
Swept path analysis
AS2890.1 - B99 Vehicle
Drawn by:
Paul Ghantous
Client:
Windsor Knight Pty Ltd
Revision notes:
Rev:
Date:
Notes:
1
29/09/2024
Dark blue swept path line represents a 300mm buffer.

Attachment 7

Schedule of Public Submissions

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Friday, 31 October 2025 5:41:17 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Winthrop

Did you receive a notification letter from the City about the development application? Yes

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Object to the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Noise and heavy traffic

Please action accordingly.

Kind Regards,

RMS Team

From: [redacted]
To: Development
Subject: Application No. DA25/0807
Date: Saturday, 1 November 2025 3:55:09 PM
Importance: High

Cameron Howell
Senior Planning Officer
City of Stirling

Dear Mr Howell,

Submission to Object to Proposed Commercial Development – DA25/0807

I am writing as a local resident and homeowner to formally object to the proposed development (DA25/0807) involving the construction of a single-storey shopping centre with rooftop car parking on Scarborough Beach Road and Ewen Street, Innaloo/Woodlands (the **Proposed Development**). I have serious concerns about the proposal's impact on traffic, noise, residential amenity, and community character.

My specific concerns are outlined below.

1. **Traffic Volume, Road Safety, and Access Concerns**

   Traffic is the single greatest concern arising from this proposal. The recent development of a roundabout at the intersection of Ewen Street and Muriel Avenue has already made entering and exiting residential driveways extremely difficult and dangerous. It is unfair to impose a second risk on the residents in this particular block. The additional traffic, that the Proposed Development will attract, will significantly worsen the situation and lead to a higher likelihood of traffic accidents around the Ewen–Muriel intersection.

   Ewen Street already experiences heavy congestion and frequent blockages during morning and afternoon peak periods, particularly near intersections with Scarborough Beach Road. Vehicles are often queued well beyond side streets, making access difficult for residents and creating safety issues for pedestrians and cyclists.

   Scarborough Beach Road, while a key arterial route, is a fast, consistently busy road that already carries high traffic volumes throughout the day. Introducing multiple new vehicle access points for shoppers, delivery vehicles, and service vehicles will exacerbate congestion and increase the likelihood of accidents.

   The planned vehicle access from both Scarborough Beach Road and Ewen Street raises concerns about turning conflicts, queuing, and reduced visibility. This will place additional pressure on an already strained local road network.

In addition, the proposal will likely lead to increased heavy vehicle movements due to deliveries and waste collection. Delivery trucks servicing the commercial precinct will need to manoeuvre through local streets not designed for frequent large-vehicle traffic, creating noise, safety risks, and obstruction for residents. No clear delivery management plan appears to have been provided to show how such impacts will be minimised.

2. **Noise and Amenity Impacts**

The operation of the centre, particularly the rooftop car park, will generate ongoing noise from vehicle movements, trolleys, alarms, and car doors at all hours. If restaurants operate late into the evening, the outdoor dining areas may contribute to further disturbance from patrons, amplified music, and general activity.

These cumulative effects will erode the quiet residential character that local residents value, especially during night-time hours and weekends. No information has been made available regarding acoustic screening, noise mitigation, or limits on operating hours.

3. **Social and Community Impacts**

This Proposed Development would represent an encroachment of commercial activity to the residential areas of Woodlands. As a local resident, I am concerned the proposed complex, including late-night restaurants and a large rooftop car park, could attract antisocial behaviour, increase late-night noise, and reduce the sense of community safety. The centre's size and design also risk eroding the local character and small-scale charm of the existing area, replacing it with a high-traffic, high-turnover commercial environment.

4. **Infrastructure and Servicing**

It is unclear whether the existing local infrastructure, including sewerage, stormwater systems, and waste collection, can accommodate the demands of the Proposed Development.

The delivery vehicle and waste collection routes have not been clearly articulated, and their likely use of Ewen Street is a serious concern. The narrowness and residential nature of the surrounding streets make them unsuitable for regular heavy vehicle access.

5. **Consultation and Transparency**

Given the scale and potential impact of the Proposed Development, the consultation period appears too brief for residents to properly review technical documents such as traffic impact assessments, noise studies, or environmental reports. These documents should be made publicly available before the City of Stirling finalises its Responsible Authority Report.

I respectfully request that the City of Stirling seek further information from the proponent, including a detailed Traffic Impact Assessment, Delivery Management Plan, and Acoustic Report, and that community consultation be extended to allow meaningful public input.

For the reasons outlined above, particularly the unacceptable traffic and road safety impacts, compounded by concerns around noise, environmental quality, and servicing arrangements, I strongly object to the Proposed Development.

I urge the City of Stirling to recommend refusal of this application to the Development Assessment Panel unless substantial redesign and mitigation measures are provided to address these community concerns.

Thank you for the opportunity to provide feedback. I would appreciate being informed of any updates or future community meetings regarding this Proposed Development.

Yours sincerely,

[redacted]

Resident – Innaloo/Woodlands

From: [redacted]
To: Development
Subject: Comment on DA 25/0807
Date: Tuesday, 4 November 2025 9:31:57 AM
Attachments: image001.png
image002.png

Hi There,

I'd like to submit a comment on the DA lodged for Scarborough beach road/Ewen st, number DA 25/0807.

I live with my family on the corner of [redacted] Road's, Woodlands. S such we are only a couple of hundred metres to the proposed development.

We are IN SUPPORT of the development for the following reaons;

1. We like the single storey nature of the development with rooftop car parking. We don't consider that it will infringe on the visual aspect from our property.
2. We support further urban development and the provision of another supermarket and retail shops, as well as restaurants. We think this will revitalise and renew an area of land that has been barron for decades.
3. It supports the concept of Stirling developing into a city centre.
4. Current shops in the area are overburdened and too busy. Additional capacity is welcomed.

Thank you.

[redacted]
[redacted], Woodlands.

Regards

[redacted]
[redacted]

M [redacted]
E [redacted]
W [redacted]

[redacted]

Perth
[redacted]
Leederville WA, 6007

Melbourne
[redacted]
Dandenong South Vic, 3175

Registered Address
[redacted]
Woodlands WA, 6018

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Tuesday, 4 November 2025 4:04:32 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Innaloo

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal My husband and i were part of the focus group for Woodlands North and we are therefore excited to see this project reaching the next stage. This will be such a much needed addition to lift the profile of the area.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Wednesday, 5 November 2025 6:42:46 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Woodlands

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Object to the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal The Ewen St intersection stretch is very risky considering factors like
The downhill road coming from Doubleview is a blind spot, with so many near misses/ accidents.
Secondly, there is a child care centre close by and a shopping centre close by poses a risk to children and carers.
Next, the road is very narrow.
In case the development goes ahead a proposal to widen the road near the intersection/round about is crucial to make it safe for road users.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Wednesday, 5 November 2025 7:56:48 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Woodlands

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal I like shops

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Wednesday, 5 November 2025 1:47:48 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Scarborough

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Object to the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Whilst it is great news that something is being developed in this longstanding wasted land - however it is very disappointing to see there's no residential being built, given the current housing crisis. This shows profits override residents' wellfare?

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Thursday, 6 November 2025 6:38:35 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Woodlands

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal This is a great initiative to replace the current eye-sore and provide more amenities, facilities and recreation in the area for the young families in Doubleview, Woodlands and Innaloo

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Thursday, 6 November 2025 8:37:09 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Scarborough

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal I look forward to the empty site being developed into a useful and attractive amenity for the local community.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Thursday, 6 November 2025 9:47:57 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA 25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Woodlands

Did you receive a notification letter from the City about the development application? Yes

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal I support the proposal in general as I feel that the area has been an eyesore for an extended period of time. I am particularly pleased that the development is not high rise and is only one storey high. I am however concerned with the increasing traffic flow on Ewen Street, especially where it meets Scarborough Beach Road at the traffic lights. Currently exiting Woodlands through this way is very congested and often takes multiple cycles of lights to exit Ewen Street. I am already impacted in this way as I frequently use this intersection and am delayed at this bottleneck. Further the connection at this end of Ewen street to the existing shops (eg Catalina Reginal Council, FitStop, Subway, etc is problematic and the new development would further increase the issues in this area. I would like to see the plan modified to lessen the impact of traffic in this area and a better traffic flow. I am also concerned about the laneway that connects Ewen Street to Hakea Road. The impact of unsocial elements using this laneway to access Jackadder Lake and also Woodlands generally would personally impact me. We already have issues with unsocial behaviour using the laneway, passing our house and disturbing both the quiet and also causing damage and littering on our property on their way through to the Lake. I would like the plan to include the City with the developer contributing to increasing the aesthetics in the laneway and also security with lighting , cameras etc.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Friday, 7 November 2025 5:51:03 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Doubleview

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Fully support the proposal. The local area lacks quality and easily accessible local services and amenities and this provides a good mix including supermarket which is much needed to avoid box box centres which are unappealing.

Design appears responsive to harsh site context and creates a mini Main Street environment which is open, sufficiently sized, includes some landscaping and is supported.

Support this being commercial only as this is a low amenity highway location and provides the landowner with greater flexibility to redevelop or adapt the site in the future.

Landscaping and trees look light on in the Ewan street verge / street setback areas and suggest including additional planting at every opportunity to improve amenity contributing further to the quality landscaping in the Ewan central median.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Saturday, 8 November 2025 9:44:10 PM
Attachments: 4. Painted pattern concrete.png
1. Laneway.png
2. Feature concrete masonry.png
3. Metal screen art opportunity.png

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

First name [redacted]

Last name [redacted]

Email [redacted]

Daytime contact number [redacted]

Address [redacted] WOODLANDS WA 6018

Suburb Woodlands

Did you receive a notification letter from the City about the development application? Yes

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Thank you for the opportunity to comment on the development application DA25/0807.

The below items are considered very positive:
• No residential development included. The increased traffic at Ewen street and crossover with Scarborough Beach road would have created issues. Great to see that the development is limited to commercial purposes.
• Positive to see that truck access will be limited to access from Scarborough Beach road.
• Great selection of materials and overall elevation design (except for items mentioned in the constructive feedback below).

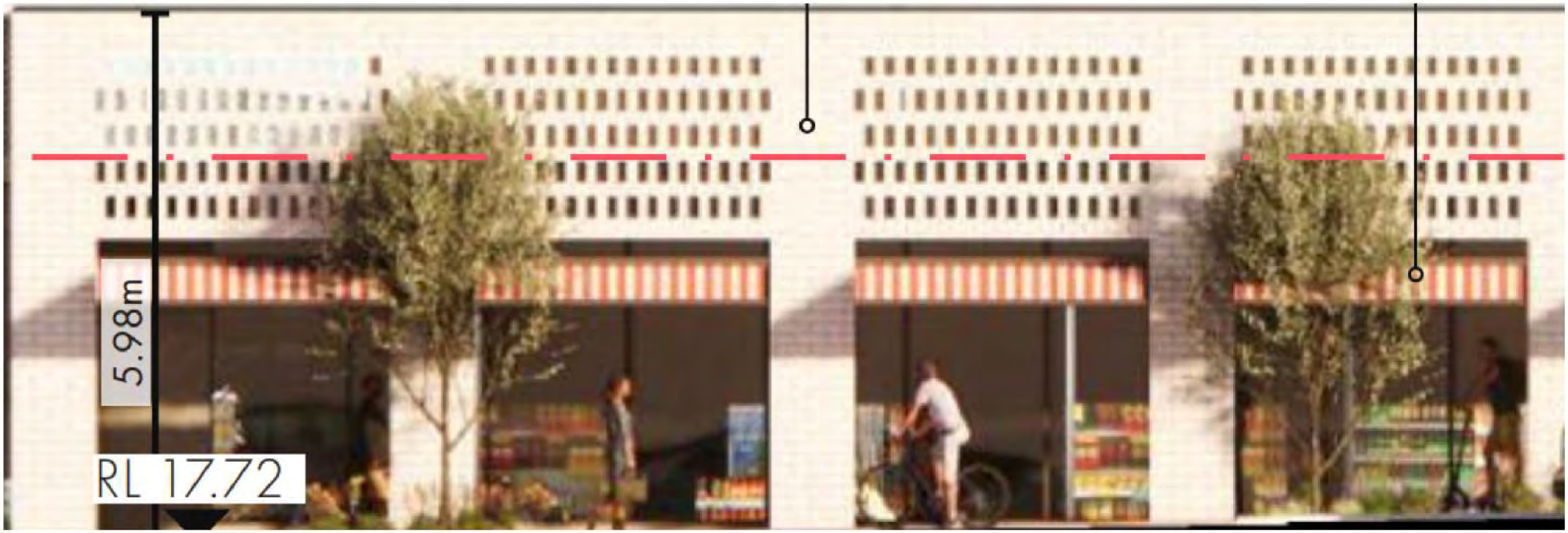
Please consider the below constructive feedback:
• Security. The Laneway (which is a wonderful initiative) seems to be open at both entrances (refer to attachment 1). Please conduct a security assessment as the area could be used for unsocial behaviour at night time. I'm not convinced that CCTV cameras themselves would be a deterrent. Is there an option to close gates at both ends?
• Security. The open car park on the first level should not be accessible at night time to prevent unsocial behaviour. Please conduct a security assessment to ensure that protective controls are in place to protect the area from unauthorised access.
• Feature concrete/mansory (refer to attachment 2). I acknowledge that the proposed render may not be the final design but may I suggest considering a design with more character. The current proposal looks a bit bland.
• Metal screen art opportunity (refer to attachment 3). Similar to the above comment, this design seems to be out of place compared with the other materials and components (which are excellent in my opinion). Also, consider that metal structures do not age well.
• Painted pattern concrete (refer to attachment 4). Similar to above, the shapes and colours don't seem to go well with the rest of materials.
• May I suggest that all parties involved take this opportunity to create a landmark in Woodlands by providing quality shops, cafes and restaurants. Please refrain from including fast food restaurants or drive-through shops. This development, considering the extraordinary location that will be located, should create a unique experience and, at the same time, complement (not replicate) shops, restaurants and services already in place in the Innaloo shopping centre and surroundings.

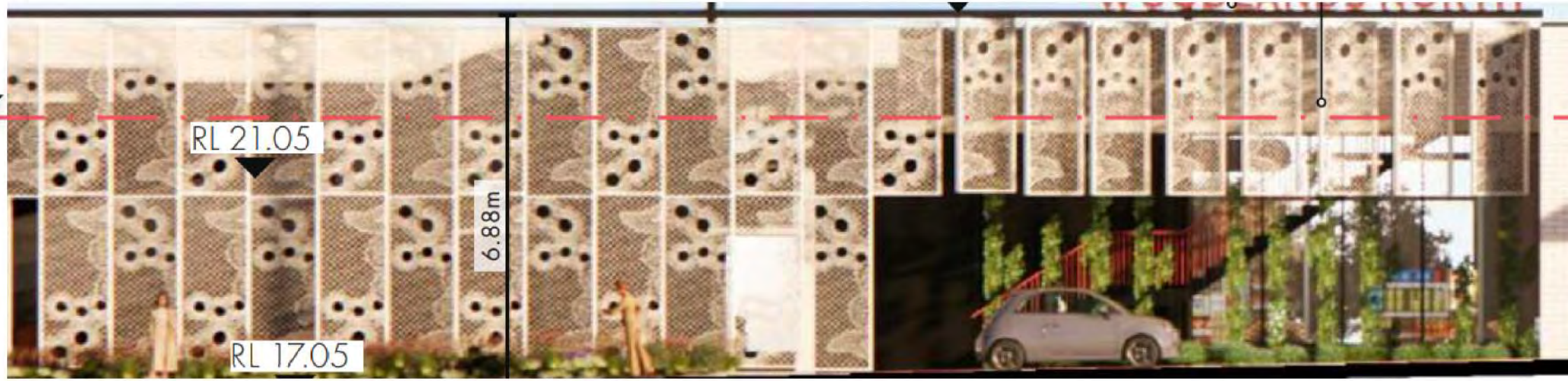
Many thanks

[redacted]

Please action accordingly.

Social
on
Ewen


5.98m
RL 17.72


RL 21.05
6.88m
RL 17.05

Signage Zone
Public Art opportunity
Shade Structure Beyond
Patterned Painted Concrete
Vertical Cladding Treatment
Louvers to Plant Deck
RL 27.74
RL 23.62
5.62m
7.74m
WOOD LANDS north
CUSTOMER

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Sunday, 9 November 2025 1:43:41 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Woodlands

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Please consider replacing the shade sails in the car park with PV cells, directly supplying a local EV charging micro-grid across all shaded car parking bays.

The opening hours of the retail tenancies is predominantly daylight hours, and so it makes sense for the car parking area to provide free charging infrastructure for the maximum number of customers visiting those businesses.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Monday, 10 November 2025 5:13 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name** [redacted]
- **Last name** [redacted]
- **Email** [redacted]
- **Daytime contact number** [redacted]
- **Address** [redacted]
- **Suburb** Woodlands
- **Did you receive a notification letter from the City about the development application?** Yes
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Looks great! No huge apartment building is a win. That spot is such an eyesore.

From: noreply-rms@stirling.wa.gov.au
Sent: Monday, 10 November 2025 7:12 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Doubleview
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** The streets in this area are already significantly conjested and the road layout inadequate for the volume of traffic. This development

will only further increase traffic in area. Without signifant improvements to road infrastructure the safety of road users and pedestrians is at risk.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Monday, 10 November 2025 7:48 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Scarborough
- **Did you receive a notification letter from the City about the development application?** Yes
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Dear Development Approval Officer,

  Whilst there is no doubt that this Site has been an eyesore for several years and being prime trap estate requires work to be done. This proposal however is

completely inappropriate as this interaction of Scarborough Beach Rd is already overly congested and does not need more traffic at the traffic lights and entering into a busy road way. This will only make this stretch of road even worse to navigate.

The area already has many retail outlets including Bunnings, Westfield Shopping Center and further east towards Glendalough. Whilst competition is good for consumers, it also risks the established business from being forced out of business. Given we have a housing crisis, maybe the City could consider some low cost housing instead which would boost the residents within the city, ultimately better supporting the local economy

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Monday, 10 November 2025 8:47 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Scarborough
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** We do not need more shops and more traffic. There are already 2 supermarkets across the road from the proposal. Too much concrete. Make it a green zone with trees.

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 5:44 AM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Karrinyup
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** The area has been an eyesore for many years. Addressing this and adding some new retail in the area would be a major boost to that part of Scarborough Beach Road.

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 7:13 AM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Woodlands
- **Did you receive a notification letter from the City about the development application?** Yes
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Ewen Street already has traffic backed up to the roundabout at Bowra Ave. This proposal will only create much more.
  We do not need anymore shops in the innaloo area. It is saturated with shops.

That area should contain some housing with some greenery. Why is City of Stirling so unconcerned about greenery and tree canopy.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 1:20 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Woodlands
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** We would love to finally see the vacant eye-sore block of sand be developed and put to use!

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 2:26 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA 25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Woodlands
- **Did you receive a notification letter from the City about the development application?** Yes
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Substantially. Noise level of addl vehicles, additional people, additional activity in the area, additional vehicles.
  NO DESIRE TO SEE STREET PARKING ON EWEN ST. REMOVE THIS IDEA. !!
  NO DESIRE TO SEE ANY RESIDENTIAL DEVELOPMENT ON THIS SITE.

SUGGEST ALL PLANNING STAFF ARE ON EWEN ST EAST FROM 8.30 - 9.10 & 4.45 - 5.40.. TRAFFIC "FLOW " IS LIKE A SLOW DRIPPING TAP

Privacy, height of building overlooking Ewen st premises a concern for many. Street lighting, security l, advertising l, need details.

Lighting, security, advertising lighting

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 5:29 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Doubleview
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Please consider how pedestrians will access this from Scarborough Beach Road. At the moment it is difficult for someone on foot to get to this location from the northern side in traffic.

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 6:13 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Innaloo
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** There is literally a shopping centre across the road. I don't want to be in the same situation as the people living around Karrinyup

Shopping Centre with congested roads around my home and people parking on my verge.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 6:15 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Innaloo
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** Hard to get to area. Limited space. Waste of money. Plenty of shops and restaurants in the surrounding areas we don't need more.

From: noreply-rms@stirling.wa.gov.au
Sent: Tuesday, 11 November 2025 7:01 PM
To: Development
Subject: Development Application general submission form

Categories: planning

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Doubleview
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Support the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** The site has been an eyesore for years. It's time it was developed

From: [redacted]
Sent: Tuesday, 11 November 2025 7:06 PM
To: Development
Subject: Development Feedback & Shop Space Enquiry

Categories: planning

Dear Mr. Howell,

I have been made aware of the development notice for:

367 Scarborough Beach Road, Innaloo – Development Assessment Panel - Form 1 - Commercial - Shop, Restaurant and Recreation

I hereby would like to share my feedback for what it is worth, but also express my interest in open opportunities. I am a Scarborough resident with extensive hospitality experience in Perth, running business such as [redacted], [redacted] in Raine Square and also [redacted] as well as [redacted] in the Fremantle Markets.

- I would argue that 156 car bays is not enough. Being a very high car traffic area, with actually not that much walk by traffic, I am sure that most visitors will come by car. By only having 156 bays, it barely allows for sufficient parking during peak hours, such as lunch rush or dinner time. Considering a supermarket will consume 50 bays at the time, it will only leave 10 clients per tenancies based on parking availability. I strongly suggest a focus on increasing parking capacity in order to provide enough customers for strong retail & hospitality performance
- Being in a very low vegetation surrounding, I suggest the centre itself must feel lush, like an Oasis. Generous landscaping allowance has been made, but based on the visualisation, a lack of shading seems apparent. Often witnessed in Perth, as a Australian with European heritage I often struggle to understand why many developments in Perth lack natural or artificial shading in order to cool down and provide a relaxing and well tempered atmosphere, especially during hot summer days. The effect on business on those hot days can be experienced in non - air-conditioned venues such as the Fremantle Markets. Whereas, neighbouring venues such as Emily Tailor have implemented a well shaded and plant rich backyard which invites for good times and business during hot summer nights. Hopefully this can be take into consideration. Especially as most other venues along Scarborough Beach Road are simple shop by shop setups with very little lush open space that invites to spend time, enjoy food & drinks
- Depending on the layout, an open food - court style licensed area would be amazing. Similar to maybe Wembley Forum, which enjoys strong local traffic, despite lack of strong vendors. Simply to be able to come, share and enjoy food & drinks in an open food - court style environment would be fantastic, really set the project apart from anything in the are and also provide a real local space and hub to connect with people, sharing food and enjoying a wine or beer.

- A use of the often neglected roof space area would be fantastic, for well loved activities such as badminton. It is a very social, easy to learn and inclusive activity, great for young and old. We would be interested in operating a space like that if available.

I would also be curious who will be operating and leasing out the tenancies and when and who to speak with the right person. Please advise.

Thank you very much

Kind regards,

From: noreply-rms@stirling.wa.gov.au
Sent: Wednesday, 12 November 2025 1:30 PM
To: Development
Subject: Development Application general submission form

City of Stirling
City of Choice

Hi Team,

You have a new Development applications submission form.

DA reference number

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** Doubleview
- **Did you receive a notification letter from the City about the development application?** No
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** I think that more retail outlets and restaurants at that point on Scarborough beach road will add too much traffic to an area that from my experince is already very congested.
  It's too close to the Odin Rd traffic lights for another entrance off Scarborough beach Rd, especially so close the the service station entry,

There are a lot of restaurants near that location, also enought retail outlets nearby.
A development that includes some residential housing and much reduced number of retail/restaurants would be a better option.
The proposed inclusion of trees in the current plan is a positive.

Please action accordingly.

Kind Regards,

RMS Team

From:
Sent: Thursday, 13 November 2025 12:33 PM
To: Development
Subject: Ref: DA25/0807

Categories: planning

Hello Cameron

I would like to submit some questions/ concerns regarding the above development at Scarborough Beach Road and Ewen Street. I appreciate progress is always a controversial issue but development of the unsightly block is a welcomed improvement for the area. My husband and I have lived in since 1979 and enjoy the quietness of the streets south of Ewen Street.

1. We hope the development would not have more traffic diverted through this area.
2. Would the existing dog bone at Bowra/Ewen/Birchwood Road be modified to make easier fluid access to the precinct. There are many near miss events here now, trucks that can't move around the dog bone easily and this would be worsened with more traffic to a shopping area. Possibly not ideal but could traffic lights be a possibility?
3. Are there plans for traffic lights at Bowra and Scarborough Beach Road as that exit is also busy as it is and with a shopping precinct it would be busier with possibly more car accidents.
4. If entry and exits to the precinct are into Ewen Street, does it impact the Cuddly Bear daycare area and traffic leading into Scarborough Beach Road change.

Kind regards

Get Outlook for iOS

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form
Date: Monday, 17 November 2025 10:06:14 PM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Doubleview

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Object to the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal I strongly object to the proposal to build additional retail shops in this area. The neighbourhood already has an abundance of commercial spaces, many of which remain vacant or underutilised, such as the Spudshed complex that is largely empty.

In the midst of a significant housing crisis, it is both impractical and short-sighted to prioritise more retail development over much-needed residential projects. The focus should instead be on constructing low to medium-density housing that provides attainable options for families and young people who are struggling to secure a home.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form - DA25/0807 - 367 Scarborough Beach Road INNALOO
Date: Wednesday, 19 November 2025 9:50:55 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Scarborough

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal I strongly support this development. This is a great use of a space that has sat vacant for many years, and activating it will bring real value to the community. It is a high-traffic area, and the proposed commercial use is well-suited to the location.
The development will revitalise an under-utilised site and contribute to a more vibrant streetscape along Scarborough Beach Road.
The project will create jobs during construction and future operation, supporting the local economy. Its land use is consistent with the character of the surrounding precinct and will help modernise the area without adding unnecessary congestion.
Overall, this is a sensible, positive and long-overdue improvement for the site, and I encourage approval of the application.

Please action accordingly.

Kind Regards,

RMS Team

From: [redacted]
To: Development
Subject: DA 25/0807 - 367 Scarborough Beach Road INNALOO
Date: Saturday, 22 November 2025 2:38:22 PM

Hi

Writing in strong support of this proposed development. That spot has been empty and ugly as long as I can remember. Shops, cafes etc are the best thing they could bring there.

My husband and I own a house around the corner from the proposed site (just in Woodlands, near the lake) and could not be happier with the proposal.

Thanks
[redacted]

From: [redacted]
To: Development
Subject: Ref DA25/0807 - 367 Scarborough Beach Road INNALOO
Date: Sunday, 23 November 2025 12:06:41 PM

I'm writing in support of application DA25/0807 to please pass through to the DAP.

I own on [redacted], near the proposed site. For over 20 years those Lots have been an eyesore, and we welcome this development wholeheartedly.

Woodlands sorely needs improved Cafè, shops areas.

Please contact me should you wish to have more information.

[redacted]

From: [redacted]
To: Development
Subject: DA25/0807 - 367 Scarborough Beach Road INNALOO
Date: Sunday, 23 November 2025 8:52:23 PM

Dear City of Stirling

I am in support of the development application (ref DA 25/0807).

Please keep me updated on future DAP meetings for this application.

Kind regards,
[redacted]
[redacted], Woodlands WA 6018

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form - 367 Scarborough Beach Road INNALOO
Date: Monday, 24 November 2025 6:42:55 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Yokine

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Object to the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal Proposal should be amended with consideration for
- western 7 carbays prevent pedestrian connections to Scarborough beach road and risk a superblock. Better would be a green link through that also connects into the road right of way dividing the blocks. Potentially green space/kiosk.
Area in desperate need of shaded streets. Larger trees should be allowed for on the property in particular along street edges. Outdoor mall is mostly covered by wave and would prevent any meaningful tree canopy.
Dark materials to roof and facade should be substituted for lighter materials of no maintenance. Any Paint finishes to facades should be limited and protected by waves.
Very little deep soil areas proposed if any.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form - 367 Scarborough Beach Road INNALOO
Date: Monday, 24 November 2025 11:57:27 AM

Hi Team,

You have a new Development applications submission form.

DA reference number DA24/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted]
Suburb Innaloo

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal It would be a great outcome for the site to be activated, and the proponent's application appears considered, delivering additional amenity to the surrounding area.

Please action accordingly.

Kind Regards,

RMS Team

From: noreply-rms@stirling.wa.gov.au
To: Development
Subject: Development Application general submission form - 367 Scarborough Beach Road INNALOO
Date: Thursday, 27 November 2025 7:47:47 AM
Attachments: Innaloo Community Association Submission_DA25-087_V2-25 November 2025.docx

Hi Team,

You have a new Development applications submission form.

DA reference number DA/25/0807
First name [redacted]
Last name [redacted]
Email [redacted]
Daytime contact number [redacted]
Address [redacted] Innaloo 6018 WA

Suburb Innaloo

Did you receive a notification letter from the City about the development application? No

After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal Support the proposal

Please supply your feedback and make sure to include how you will be impacted by the proposal The attached submission from the Innaloo Community Association outlines conditional support for the proposal and details matters of concern to Innaloo and Woodlands residents that are required to be addressed.

Please action accordingly.

Kind Regards,

RMS Team

INNALOO community assoc.

Cameron Howell

Senior Planning Officer

City of Stirling

Via: City of Stirling website

DEVELOPMENT APPLICATION - DA/25/0807 - WOODLANDS NORTH – 367 SCARBOROUGH BEACH ROAD, INNALOO – COMMERCIAL, SHOP, RESTAURANT AND RECREATION - PRIVATE

Introduction

The Innaloo Community Association welcome the opportunity to provide a submission on the proposed development and thank City of Stirling staff, City of Stirling Ward Councillors and residents for their consultation in the assessment of the proposal.

It is noted that the centre is within near proximity to a similar centre at Woodlands (450m to the south opposite Jackadder Lake), adjacent to existing businesses / food and beverage venues and diagonally opposite Westfield Innaloo shopping centre (250m). There are also a variety of liquor stores within a 3km distance therefore it is highly questionable that there needs to be another one included within this development – unless it is a relocated license.

Overall, the community is pleased to see that a strategic and prominent site that has laid barren for many years is proposed for development. It should be noted that the previous Development Application, inclusive of 122 apartments, was opposed by the community. Whilst this development is broadly supported, this submission will address concerns which it is believed should be given attention by the Development Assessment Panel to encourage minor design changes and appropriate conditions of approval that could alleviate community concerns regarding outstanding concerns including strong concerns regarding parking and traffic management.

Design & Character

The proposed height of the development – proposed at 11m – is considered reasonable for the context, however, there is community concern related to the applicant's commentary regarding a future proofing of the site for potential future residential. The applicant's response to design review recommendations (refer Recommendations Summary: DR2 – Applicants response to DRP meeting

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18/7/2024) suggest demolition of the proposed health and wellness pod to accommodate residential development. While noting the community recognise there is a housing shortage, appropriate density should be encouraged and understanding that a future development application would be required for such a change, there is significant concern that local road networks and access/egress from the site would be overwhelmed therefore this must be rigorously tested at this stage of development to ensure local roads can accommodate what appear to be the landowner's future vision for the site.

There is nothing within the applicants reports that allude to the proposed heights of an amended carpark or future residential.

The visual bulk of the building must be minimised, particularly for neighbours that look out onto the development and importantly, to respect existing residential neighbours from overshadowing and impacts on private open space (privacy) to the south (Ewen St and Hakea St).

The applicant states that 'with a maximum of two storeys the development does not overshadow neighbouring development nor introduce privacy concerns' however this is to some degree, dismissive of neighbours' concerns and should not go unchallenged, especially given the applicants comments about potential residential development and increased carpark height.

The community, rightly, expects that these issues are not put off to some future point, when the applicant may consider them a fait accompli, because the lack of transparency now, impacts the community's ability to apply rigour to assessment of the proposal.

The character of the proposed development is broadly supported, noting the prominence of the site. The inclusion of a central laneway/town square is a positive inclusion; however, an assessment against crime prevention through environmental design (CPTED) principles should be considered by the City of Stirling and the Development Assessment Panel in their review of the applicant's design to ensure the area's lack of passive surveillance does not create an area for anti-social behaviour.

The design is modern, inclusive of façade treatments and materials that are generally aesthetically pleasing and whilst the required amount of clear glazing to the street, providing visibility into the supermarket may not have been achieved, we believe the design element is fit-for-purpose.

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Parking & Traffic

Access and Egress

Development on this site requires careful consideration of traffic and parking impacts, noting there is already concerns by the communities of Woodlands and Innaloo regarding Ewen Street and Scarborough Beach Road traffic congestion.

The applicants own submission includes photographic evidence of the long queues that build up from the signalised intersection of Odin/Scarborough Beach Rd and Ewen Street. These queues, especially in peak periods, extend from the lights back to the roundabout of Ewen Street and Bowra Avenue.

This is not an insignificant traffic problem to address, particularly with the adjacent Child Care centre, and it is considered that the applicant has not adequately addressed this matter. Traffic arriving from the south can only enter the rooftop carpark from the Ewen Street ramp unless they drive all the way around the building to the ramp on Scarborough Beach Road, which is impractical and will not occur. Thus, vehicles may be waiting on Ewen Street to access the carpark for some time in peak periods which will contribute to traffic queuing issues on Ewen Street.

There appear to be inconsistencies across the applicant's reports with regards imagery and description. Egress to Ewen Street should be prevented (note that Applicant Report – Part 2; Legibility on P48 appears to show two separate ramps on Ewen Street – an exit ramp and an entry ramp) which is reinforced by the Passive Surveillance image on P51 of the same report. These do not appear to be consistent with images in the Part 1 report (for example P9 -12). See below except images from Part 2.

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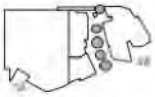
Ewen Street- Car Entry

Legibility



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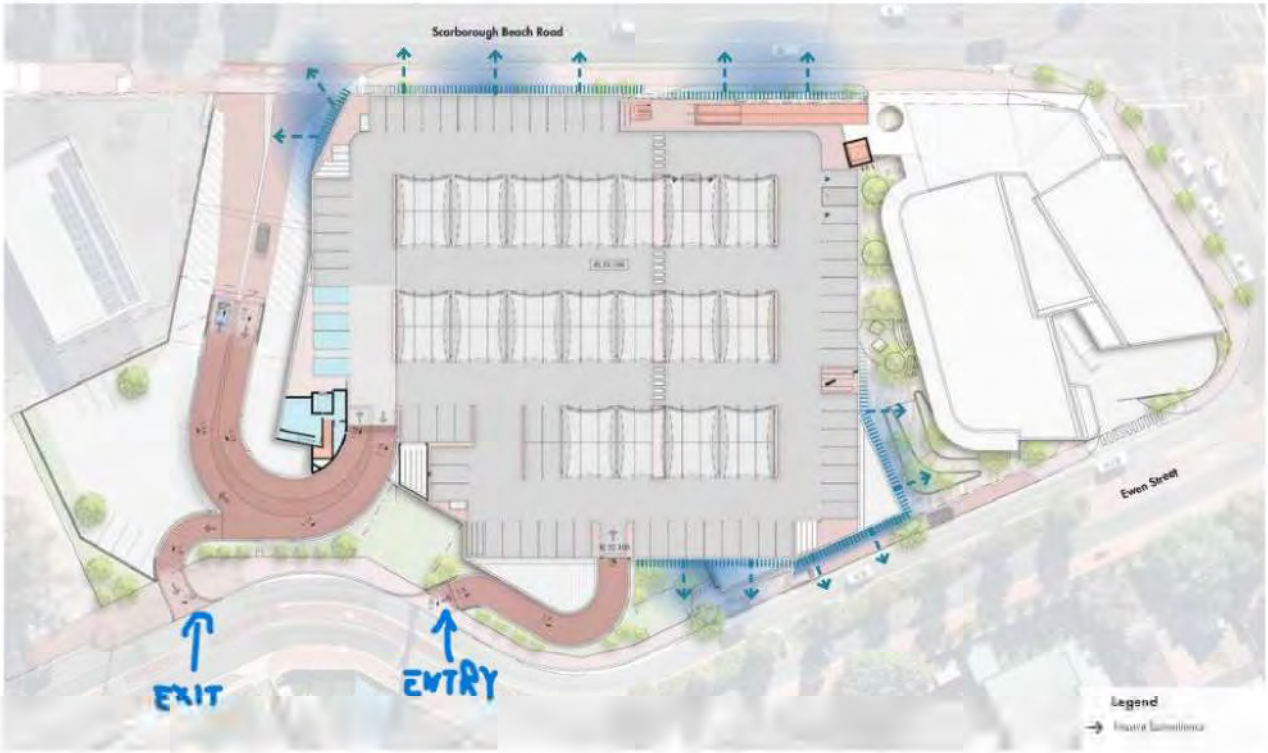
Passive Surveillance - Level 1

Safety



Woodlands North DA Design Report

Notwithstanding the suggestion to remove the existing right-turn pocket on Ewen Street at the eastern end, allowing egress to Ewen street will exacerbate the existing traffic issues and could only be considered permissible if some form of ramp control was instituted, for example with bollards on a timer preventing egress during peak periods. Traffic management to local roads is a significant existing issue across retail developments in the area and the mistakes of larger centres like Karrinyup and Innaloo should be avoided by applying rigorous traffic management considerations to this proposed development.

The City's belief that the change to this pocket, facilitating a short extension to the current right-turn lane into Scarborough Beach Road will be adequate is considered unrealistic.

The inclusion of a loading ramp on the southeast side of the building is of significant concern and should only be considered permissible if extremely strict delivery timeframes, outside of peak periods are mandated through a condition on the development approval. Its location near the curve is likely to present safety and access/egress risks, coupled with traffic delays.

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Light Spill

Carparking located on the roof of the building (and the site elevations/application being a little unclear on edge barrier treatments and heights) highlights a potential light-spill issue for adjacent residents on Hakea Street which must be adequately addressed by the applicant. The perimeter wall of the roof must be a minimum of 1.5m and non-permeable to prevent headlight spill in the direction of adjacent residential properties.

Rooftop carpark lighting, compliant with Australian Standards, is expected to vary in lux level between 20 and 100 lux, factoring in vehicle and pedestrian illumination requirements. The design of lighting, and its operating hours, needs to prevent light spill from the site to adjacent properties however it is unclear from the application how this is achieved (i.e. pole heights, fixture type, directionality). This includes lighting to the Ewen Street ramp.

Parking bay provision

The allotted number of parking bays appears grossly insufficient to support the uses of the site, and we question whether it is compliant with the City of Stirling Policy 6.7 – Parking and Access. Despite the applicant's reference to LPS3 (now outdated) little credible evidence is provided by the applicant to justify its adequacy for the proposed uses – restaurants, supermarket and fitness studio coupled with staff parking which is not independently provided.

In undertaking an analysis of other comparative centres within the City of Stirling, we believe that the applicant has not provided parking compliant with Table 1 – Activity Centre Car Parking ratios that, at minimum should in our view be applied.

By way of example, the smaller Morris Place shopping centre is defined as 1 bay per 33sqm of gross floor area. Working on the applicant's report of a complex with commercial space of 6,383sqm this would require a parking allocation of 193 parking bays, whereas the applicant only proposes 163 bays (156 on roof and 7 street bays).

Further, we are unsure how application of the requirements of Table 2 will be undertaken give the proposed uses – restaurants, food outlets, alfresco area, medical, retail and whether the City is inclined to permit and car parking reductions.

Given the uses of this site, as compared to say Morris Place shopping centre, we consider it highly likely that users will need to park on adjacent land to the east, potentially belonging to other property owners and thus, detrimentally impacting the businesses in this area unless there is an agreed reciprocal parking agreement in place. If such an agreement is in place, evidence of it should be provided in the applicant's development application package.

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Removal Of Residential Component

The inclusion of residential as previously proposed would have:

- been significant overdevelopment of the site
- heavily compounded existing traffic issues
- been out of character with the area
- been excessive visual building bulk
- caused loss of amenity and privacy to surrounding residents

The removal of residential from the proposal is completely supported, we encourage Council and the DAP to support its removal and to prevent future addition of residential – **not kick the can down the road.**

However, it remains of significant concern that references to future multi-storey residential development is still flagged as a likelihood within the reports, for example in Part 2 – Noise emissions and in the Recommendations summary. Multi-storey residential development on the site or the adjacent Ampol petrol station / shopping sites should not be contemplated at any time.

Landscaping & Pavement Treatments

The landscaping strategy is broadly supported however we do have concerns with the indicative materials list, notably the pavement surface finishes.

Given the age demographic of the area, we remain unconvinced that granite set paving finishes, whilst aesthetically pleasing, will be conducive to a safe environment for those members of the community with different accessibility needs such as those with disabilities or the elderly.

A wide body of research literature has documented the generic physical and psychological characteristics of an ageing population, and it is widely accepted in social design circles that a physical environment that supports the requirements of older people is likely to support the needs of a much wider segment of the population.

We recognise that, when we refer to older people, this is not a homogenous group and that they have a range of needs, capabilities and preferences however - there are a range of common general attributes such as possible sensory and perceptual/visual acuity changes, potential decrease in physical mobility/muscular efficiency and coordination.

An ageing population is more likely to see people using walking sticks, walkers, mobility scooters, and wheelchairs. Uneven surfaces present a higher risk of pedestrian falls and, concerns about the risk of falls can limit a person's mobility.

Further, it is noted that the landscape irrigation is proposed to have a two-year maintenance period and may then be turned off (at least to street trees). This is not considered acceptable, as the likely effect will be a diminution in the quality of the landscape.

Noise Mitigation

It is observed that noise emissions from a development such as this are typically loading docks, mechanical equipment, and operational noise from the tenancies however, it is also possible that music played in the Laneway will impact adjoining properties, notably those on Hakea Lane.

Given the likely amenity impacts, it is considered appropriate that some form of noise control timing (e.g. no later than 7pm) is implemented for the development within an

Operational Noise Management Plan (ONMP) and that containment of noise from rooftop mechanical plant be contained within acoustic barriers and strictly managed.

Sustainability

The potential sustainability initiatives outlined on slide 57 in Applicants Part 1 report are noted, however we remain concerned that there is no clear commitment to those which have the greatest potential to contribute positively to environmental and economic sustainability. The developments plans do not include any clear sustainability measures and as one of the ten design principles listed in SPP7.0 Design of the Built Environment, the City of Stirling in their recommendation and the Development Assessment Panel in their assessment should consider the applicant has failed on this element of good design.

The report only states that Solar PV will be investigated, rather than a clear commitment to install it – the applicant should be strongly encouraged to work with a local provider, such as Osborne Park based PLICO Energy, to design and install appropriate Solar PV and, potentially batteries. Whether or not the complex can join the PLICO Virtual Power Plant would need to examined but that is a worthy objective.

Given the amount of exposed rooftop pavement, it is surprising, and disappointing, that there appears to be no mention in the applicants reports of on-site water capture and re-use as a sustainability initiative – whether that be for re-use in landscape irrigation, toilets or cleaning of pavement in the laneway. The applicant should be strongly encouraged to install water capture and re-use as a basic sustainability initiative in a drying climate.

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Land Tenure / Gazettal Of Ewen Street

Given the length of time site development has been proposed, it is surprising the application has reached this point without the surrounding land tenure / amalgamation and the gazettal of Ewen Street as a public road being resolved. This should be a priority for the City and the applicant, and development approval should be conditioned on this being achieved prior to the landowner being issued with an occupancy permit for the site. Such conditions have been placed by Development Assessment Panels in developments across the Perth metropolitan region.

SUMMARY

The Innaloo Community Association Incorporated (ICA) broadly supports development of this strategic site which has been vacant for a long time. The support is conditional on residential no longer being proposed on the site and whilst not an element of this development application, the ICA would like to be clear that future contemplation of residential development would not be supported.

We believe that the development, in its current form. will add to the public realm and commend the applicant for seeking a solution that can proceed.

Whilst we offer that support, it is important to reflect on the issues that we have highlighted and which are of high community interest / concern.

We request that the City, the Development Assessment Panel, and the Applicant carefully consider and act upon this feedback with a view to achieving an outcome that is welcomed by the community going forward.

If you should wish to clarify any of the matters raised in this submission I may be contacted via

Yours sincerely

Innaloo Community Association Incorporated

thriving together

From: [redacted]
To: Cameron Howell
Cc: Shaun Wheatland; [redacted]; [redacted]; Development
Subject: Scentre Group Submission RE 367 Scarborough Beach Road, Innaloo – Development Assessment Panel - Form 1 - Commercial - Shop, Restaurant and Recreation - Private
Date: Friday, 28 November 2025 1:57:14 PM
Attachments: image001.png
Proposed Ewen Street Retail Centre and New Classified Neighbourhood Centres - Economic Assessment.pdf
Scentre Group Submission 28 November 2025.pdf

Hi Cameron,

Please find attached our submission on the above development application currently being advertised by the City.

Please let me know if you have any issues accessing the attached documents.

All the best,

[redacted] he/him/his
Associate Director

d. +61 8 [redacted]
m. +61 [redacted]
e. [redacted]

We are an urban consultancy.
Inspiring and creating solutions
for a changing world.

URBIS

Level 8, 1 William Street
Perth WA 6000 Australia (Whadjuk Noongar Country)
Direct. +61 8 [redacted]

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Urbis recognises the traditional owners of the land on which we work.
Learn more about our **Reconciliation Action Plan.**

Nominated architects: Kate Paterson – NSW reg 8582, QLD reg 6148, TAS reg 1929,Vic reg VIC00200, and Caroline Stokes – WA reg 1520

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28 November 2025

Cameron Howell
City of Stirling
25 Cedric Street
Stirling WA 6021

Dear Cameron,

Submission - Proposed Development 270, 272, 274, 276, and 278 Ewen Street, Woodlands 365 and 367 Scarborough Beach Road, Innaloo

Urbis has been engaged by Scentre Group to review and provide technical planning commentary on the advertised Development Application for the above properties.

The proposal seeks approval for eleven tenancies, including retail, speciality, health, and food and beverage uses, serviced by a central pedestrian laneway.

Key elements of the proposal include:

- A full-line supermarket ('Shop') tenancy of 3,826m².
- Total floor area of 6,383m².
- Approval sought for 'Shop', 'Recreation Private', 'Fast Food Outlet', and 'Restaurant'.
- Primary vehicle access directly from Scarborough Beach Road.
- No residential component as required under the local and recommended by state planning framework.

This submission assesses the proposal against the City of Stirling's (the City) statutory and strategic planning framework. In our view, a supermarket ('Shop') tenancy exceeding 1,000m² is not capable of approval under LPS3. While a contrary interpretation suggests that exceeding the 1,000m² limit could simply make the use discretionary, any exercise of discretion requires the determining authority to have due regard to the matters listed in Clause 67(2) of the Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* (LPS Regulations). This submission addresses those matters in detail.

When the application is assessed on its merits — in the context of the applicable statutory and strategic framework and with full consideration of Clause 67(2) — we are firmly of the view that the City and the Development Assessment Panel (DAP) should not support the proposal.

We seek the City's consideration of these matters in preparing its responsible authority report as detailed in this submission and summarised below.

Matter for consideration	Summary of issues	Consideration under Clause 67(2) Regulations
Residential Requirement	The proposal fails to meet the City's minimum residential requirement of 61 dwellings for its site under the SCCSP and LDP, delivering none and providing no mechanism to address the shortfall, contrary to the City's objective for integrated mixed-use development in the Stirling City Centre.	Clause 67(2)(a) – Inconsistent with the aims and provisions of the local planning scheme. Clause 67(2)(b) – Not in accordance with orderly and proper planning. Clause 67(2)(m) – Incompatible with the desired future character of the locality. Clause 67(2)(x) – Other relevant planning considerations, including failure to meet strategic mixed-use objectives.
Local Planning Scheme and LDP - Land Use and Floor Space Limits	The proposed 3,826m² supermarket exceeds the 1,000m² maximum permitted for 'Shop' uses in the Mixed-Use category under the LDP and LPS3, making it an 'X' use in that portion of the site and therefore not capable of approval. In the event that the City considers the application a discretionary land use, then the City is bound to consider the application on its merits, and, for the reasons outlined in this letter, the DAP should refuse the application.	Clause 67(2)(a) – Contravenes the provisions of LPS3. Clause 67(2)(b) – Not in accordance with orderly and proper planning. Clause 67(2)(h) – Inconsistent with the applicable Local Development Plan. Clause 67(2)(x) – Other relevant planning considerations, including statutory non-permissibility.
Inconsistency with draft SCCSP	By locating a large, regionally-attracting supermarket in the Mixed-Use Lifestyle zone — intended for smaller-scale retail integrated with residential uses — the proposal undermines the SCCSP's vision for a vibrant, transit-oriented precinct with active ground-floor uses along Scarborough Beach Road.	Clause 67(2)(h) – Inconsistent with the structure plan and local development plan Clause 67(2)(m) – Incompatible with the desired future character of its setting. Clause 67(2)(x) – Other relevant planning considerations, including strategic misalignment.
Conflict with Local Planning Strategy and Draft LPS4	The proposal undermines the planned neighbourhood centres, including the nearby Woodlands centre, compromising the City's long-term objective to	Clause 67(2)(b) – Not in accordance with orderly and proper planning

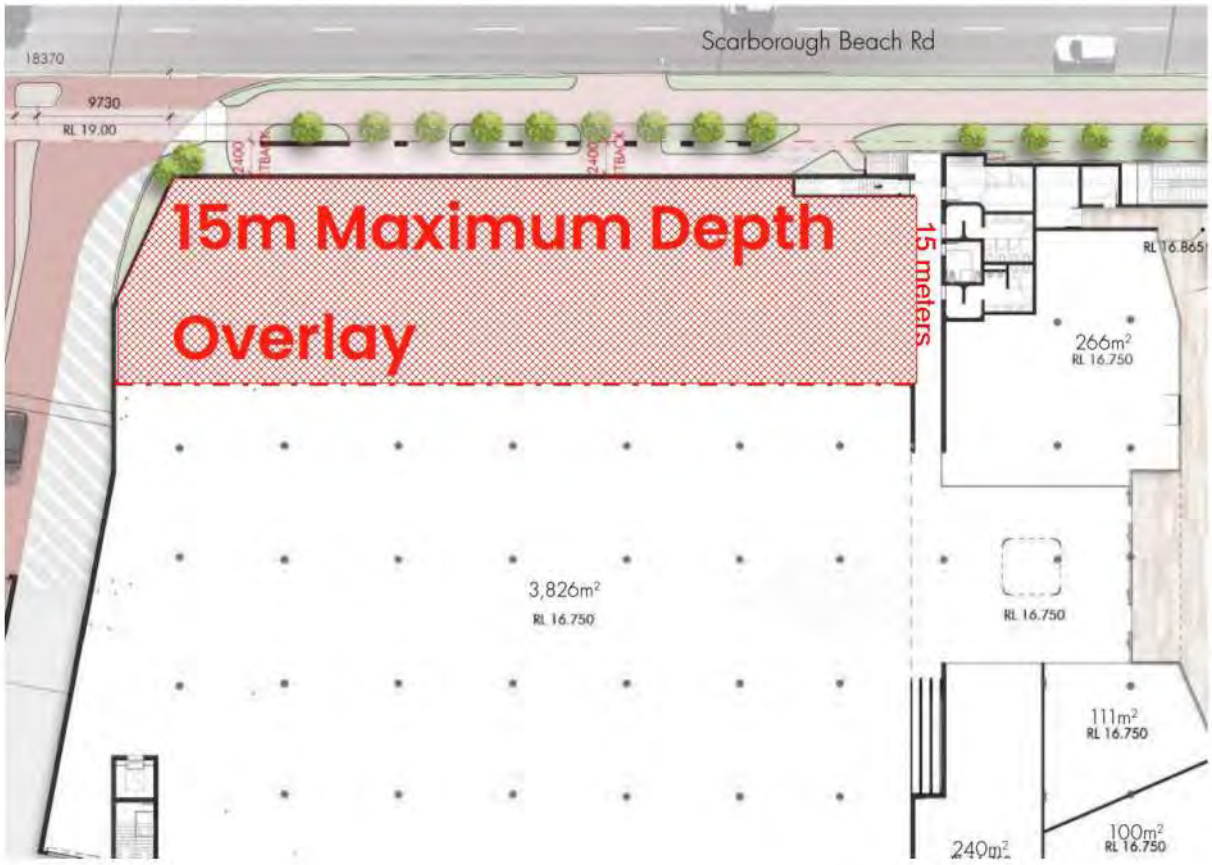
	strengthen the existing activity centre network.	including proposed Local Planning Scheme 4. Clause 67(2)(fa) – Inconsistent with the Local Planning Strategy. Clause 67(2)(i) – Inconsistent with draft Local Planning Scheme 4 report
Traffic and Access Impacts	The scale of the development will generate traffic volumes and circulation demands beyond those anticipated in the LDP, creating congestion directly on Scarborough Beach Road, safety concerns, and inadequate integration with public transport.	Clause 67(2)(m) – Inadequate access and egress for vehicles, pedestrians, and cyclists. Clause 67(2)(s) – Inadequate service vehicle access. Clause 67(2)(t) – Adverse effect on traffic and pedestrian safety and convenience.
Loss of Activation and Built Form Outcomes	The supermarket's internalised layout and dominance of the Scarborough Beach Road frontage will limit street activation, reduce pedestrian amenity, and fail to deliver the multi-storey, mixed-use built form envisaged in the LDP and SPP 4.2.	Clause 67(2)(m) – Inconsistent with desired building height, bulk, scale, orientation, and appearance. Clause 67(2)(n) – Incompatible with the desired future character of the locality. Clause 67(2)(t) – Parking layout does not support pedestrian activation. Clause 67(2)(x) – Other relevant planning considerations, including failure to meet activation objectives.

Statutory Context – LPS3 and Southern Precinct Local Development Plan

The site is located within the Stirling City Centre Special Control Area under Clause 6.11 of LPS3 and is subject to the Southern Precinct Local Development Plan (LDP).

In this context key matters to consider include;

- The LDP assigns 'Business' and 'Mixed Use' land use categories to the site.
- 'Shop' is a permitted ('P') use in the 'Business' category, but in the 'Mixed Use' category it is limited to 1,000m² NLA.
- The LDP prescribes a maximum 15m depth for the 'Business' category along Scarborough Beach Road. Beyond this depth, the land is 'Mixed Use' and subject to the 1,000m² limit.
- The proposed supermarket extends well beyond the 15m 'Business' depth and into the 'Mixed Use' category, making it an 'X' use in that portion of the site.
- Under LPS3, a 'Shop' use above 1,000m² NLA in the 'Mixed Use' category is not permitted and cannot be approved.
- In the event the City does not consider the application an X use, then it has to be assessed as a discretionary 'D' land use and considered against the principles of orderly and proper planning and the matters to be considered by local government outlined under Clause 67(2) of the Deemed Provisions of the LPS Regulations.



Strategic Context – Draft Stirling City Centre Structure Plan and Policy Framework

The City, together with the former Stirling City Centre Alliance, prepared the Draft Stirling City Centre Structure Plan (SCCSP) to guide development across the entire Stirling City Centre (SCC) area.

The SCCSP has been adopted in draft form by the City but is yet to be endorsed by the Western Australian Planning Commission (WAPC). While it remains a draft document, planning precedent recognises it as a seriously entertained document, meaning the City must have due regard to the SCCSP in assessing development proposals.

Part 1, Section 4 of the SCCSP introduces Character Zones, which set the intended urban form and development intensity. The five zones are:

- Residential Gardens
- Residential Communal
- **Mixed-Use Lifestyle**
- City Centre Heart
- Civic Identity

The subject site is within the **Mixed-Use Lifestyle zone** (refer to figure 1 below), not the City Centre Heart. The City Centre Heart correlates with the Retail Core — the highest-intensity retail area in the SCC. The Mixed-Use Lifestyle zone sits on the periphery of the Heart, with a lower order and expected lower intensity of land uses.

Part II, Section 4.3.1.3 of the SCCSP explains that the Mixed-Use Lifestyle zone:

- Links residential areas with the city centre.
- Provides high-level activation while respecting the scale of adjacent residential areas.
- Accommodates medium-density mixed-use types, such as shop-top housing suitable for smaller, non-amalgamated lots.

The **Mixed-Use Lifestyle** zone is designed to deliver a mix of residential and commercial uses that contribute to the design principles for Scarborough Beach Road — one that supports future light rail, offers a high-quality pedestrian environment, and is lined with active ground-floor uses within mid-rise, mixed-use buildings.

The Southern Precinct Local Development Plan (LDP) reinforces this vision by promoting a multi-storey built form with **Mixed Use** on the ground floor and a narrow strip of **Business** zone fronting Scarborough Beach Road to encourage street activation.

The current proposal undermines this intended outcome. The large supermarket tenancy would dominate the frontage, reducing opportunities for active street-level uses along most of Scarborough Beach Road. In addition, the absence of a residential component means the development would fail to deliver a genuine mixed-use outcome that could leverage the site's strategic location near the future light rail corridor and existing high-frequency bus services.

Figure 1: SCCSP Character Zone Map

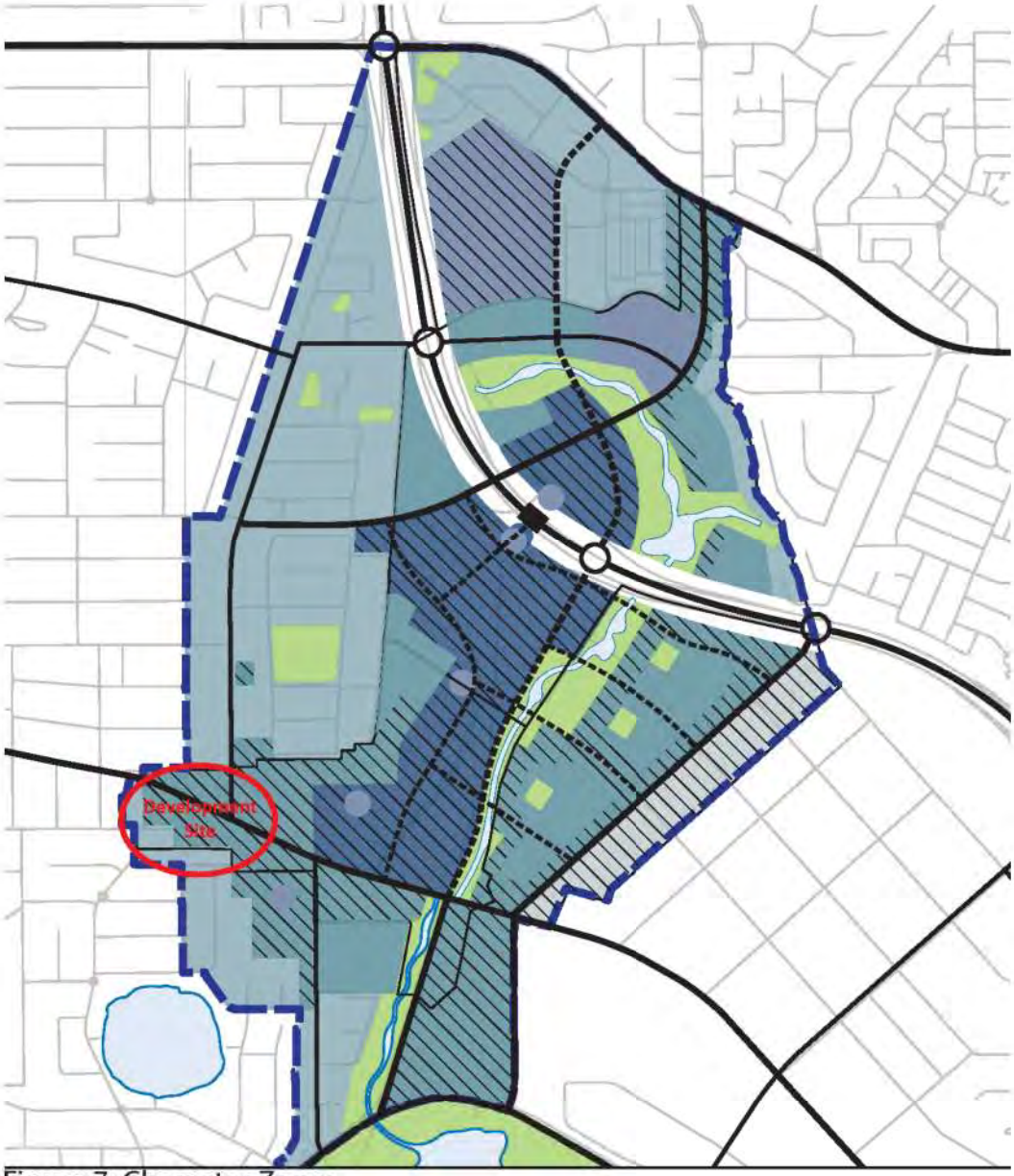


Figure 7: Character Zones

- 1. RESIDENTIAL GARDENS
- 2. RESIDENTIAL COMMUNAL
- 3. MIXED-USE LIFESTYLE
- 4. CITY CENTRE HEART
- 5. CIVIC IDENTITY
- PUBLIC (HOSPITAL)
- COMMERCIAL

The proposed development is inconsistent with the Draft SCCSP as it places a large, full-line supermarket within the **Mixed-Use Lifestyle** zone, which is intended for smaller-scale retail integrated with residential uses to activate the street and support a high-quality, transit-oriented environment along Scarborough Beach Road. This zone sits on the periphery of the City Centre Heart, with lower-intensity land uses, while the Structure Plan directs high-intensity retail such as supermarkets to the Retail Core. By dominating the frontage and omitting any residential component, the proposal undermines the Structure Plan's vision for a vibrant, mixed-use precinct with active ground-floor uses, strong pedestrian amenity, and integration with future light rail.

Local Planning Strategy and Draft Local Planning Scheme No.4

The City's Local Planning Strategy was endorsed by the Western Australian Planning Commission on 28 October 2019. The Local Planning Strategy sets out the long-term planning directions for the City. In particular it sets out planning objectives, policy statements and recommended actions associated with housing, commercial property, recreation, transport, environmental and heritage issues over the next 10 to 15 years. The Local Planning Strategy demonstrates an integrated approach to planning, including consideration of social, environmental, cultural and economic aspects.

The Local Planning Strategy provides the strategic basis for the current and future Local Planning Schemes, as well as guide and manage future development in the City. It is a strategic document and provides a link between State and regional strategic planning policies and local interests. It also provides the rationale for the zones and provisions in the draft Local Planning Scheme No. 4 (draft LPS4) which will be the principal mechanism for implementation of the Local Planning Strategy.

With respect to retail development the focus is on the growth of existing Activity Centres to grow as per the extracts from the Local Planning Strategy below.

5.4 Retail and Commercial

Key Issue 4.1 Many of the City's residents do not have non-car access to convenience shopping.			
Response	Actions	Delivery Timeframe	Lead Delivery Department
Identify existing centres and their walkable catchments within the City, and allow for the growth of existing Activity Centres and potential new Activity Centres in areas that are under-represented.	Allow for rezoning of land to Local Centre in areas where the acceptable criteria can be met.	Ongoing	CoS (City Planning)
	Allow existing Activity Centres to grow and move up the Centres hierarchy where the acceptable criteria can be met.	Ongoing	CoS (City Planning)
	Develop Activity Centre Plans for regional and district centres, along with Local Development Plans for neighbourhood centres through place based planning.	Ongoing	CoS (City Planning)

Key Issue 7.2 The City's centres and corridors are poorly designed and lack a mixture of uses.			
Response	Actions	Delivery Timeframe	Lead Delivery Department
Support street block sizes that promote the use of public transport, cycling and walking.	Ensure Activity Centre and Corridor plans, along with place based planning projects such as the "Better Suburbs" program. Promote smaller street block sizes and incorporation of 'main street's' to improve walking, cycling and public transport use.	Medium	CoS (City Planning)
Ensure buildings address and activate the street.	Require suitably located non residential development to have an active frontage to the street through Activity Centre and Corridor plans or place based planning projects such as the "Better Suburbs" program.	Ongoing	CoS (City Planning)
	Include provisions within the City's Planning Framework to avoid non-residential car parking fronting and dominating the street.	Medium	CoS (City Planning)
Increase public spaces in centres.	Require new, or upgraded public spaces to be provided as part of Activity Centre and Corridor Plans or place based planning projects such as the "Better Suburbs" program.	Ongoing	CoS (City Planning)
Ensure a mixture of uses.	Ensure that a mixture of residential, non-retail, community and recreational uses are mandatory requirements in the planning framework of Activity Centres and Corridors or place based planning projects such as the "Better Suburbs" program.	Ongoing	CoS (City Planning)

The On 10 June 2025 the City Council resolved to approve the draft LPS 4 and forwarded the scheme to the WAPC for approval by the Hon Minister for Planning.

The draft LPS4 aims to simplify the current planning framework and align it with updated State Government statutory and strategic planning directions. It was advertised from 18 October 2024 to 24 January 2025. Draft LPS4 implements the recommendations of the Local Planning Strategy. In this regard draft Local Planning Scheme No.4 includes the reclassification of a number of local centres to neighbourhood centres including;

- **Morris Place Activity Centre.** This centre is currently classified as a Local Centre under LPS3 and includes a 1,500m²Tucker Fresh IGA. This store could service weekly and top-up grocery shopping needs. The activity centre also includes a range of services and convenience retail as well as The Morris tavern.
- **Woodlands Activity Centre.** This Local Centre is anchored by a 1,100m² Farmer Jacks supermarket and includes complementary convenience-based retailers and services.
- **Stirling Activity Centre.** This Local Centre includes a 900m² IGA supermarket and a range of retail shops and services serving everyday essentials needs. The centre also includes residential apartments.

The City's Local Planning Strategy did not include a needs assessment to inform the planning and assessment of activity centres, despite State Planning Policy 4.2 requiring such assessments at the strategic stage to guide future development. Under SPP 4.2, needs assessments are not required for development applications on the assumption that the retail need and distribution of centres have been contemplated and

assessed strategically. Critically, the site's designation as a strategic centre removes the requirement for a net benefit test for development applications. As a result, the Ewen Street proposal sits in a gap between the lack of needs assessment to inform the Local Planning Strategy and the policy requirements of SPP 4.2. For this reason, the development provisions of the SCCSP and the LDP are critical to understand the intended development outcome of the development site, which would be a mixed-use precinct that specifically restricts large format supermarkets on the ground floor.

Urbis has assessed the potential impact of the proposed Ewen Street development on planned neighbourhood centres (**refer Attachment**) and concludes it is unlikely the City will achieve the objectives of its Local Planning Strategy and draft Local Planning Scheme No. 4, on the basis that:

- Given the importance of supermarkets in anchoring Neighbourhood Activity Centres, the limitations on the market capacity for supermarkets could have negative impacts on the draft LPS4 achieving a key objective of having the nominated Local Centres elevate to the intended role of Neighbourhood Centres.
- The case for the Ewen Street Retail Centre is also weakened when considering that the Stirling City Centre and nearby Woodlands activity centre (less than 1 km distance) already provide residents with access to five of the key supermarket brands in the Perth market, e.g. Woolworths, Coles, Aldi, Farmer Jack's and Spudshed. There is negligible need for another supermarket on the Ewen Street site and a likely outcome, if this development proceeds, would be that it would include a supermarket brand that is already provided in the local area.
- The proposed major retail tenancy does not align with the intent of the Local Planning Strategy which seeks to encourage diverse, mixed-use development along corridors that provide an active frontage to the street.
- In the absence of a needs assessment at the strategic level, the proposal's scale and function raise questions about its consistency with the broader planning objectives for the area.

The proposed Ewen Street development is inconsistent with the City's Local Planning Strategy and draft LPS4 as it undermines the strategic objective to strengthen and elevate existing local centres into vibrant neighbourhood centres anchored by appropriately scaled supermarkets. The Strategy and draft Scheme focus retail growth within established activity centres such as Morris Place, Woodlands, and Stirling, where supermarket capacity is intended to support localised, mixed-use hubs. It also seeks to develop active mixed-use development along urban corridors.

The Local Planning Strategy rationale for transit-oriented development in activity centres and along corridors such as Scarborough Beach Road is to integrate improvements with surrounding residential areas, enhance public transport use through higher-intensity and diverse housing, provide supporting infrastructure at transit stops (including integrated commercial uses), upgrade streets for pedestrians and cyclists, create a highly connected and legible movement network, and ensure active street frontages to promote safety and surveillance.

Introducing a large supermarket at Ewen Street — in close proximity to Woodlands and the Stirling City Centre, both already serviced by multiple major supermarket brands — would compromise the City's ability to achieve its long-term planning objectives for a balanced and sustainable activity centre network.

Technical Matters

Residential Dwelling Targets

Clause 2.5 of the SCCSP sets out the residential requirements for development, including a formula to calculate the minimum number of dwellings that must be provided within the Stirling City Centre and provisions allowing these dwelling targets to be transferred to other sites within the same street block. Under Clause 2.1.2.3 of the LDP, a minimum of 100 dwellings is required for a street block area of 1.8 hectares. Given the proposal's site area of 1.0901 hectares, it is required to deliver 61 dwellings. The current design includes no residential dwellings and provides no opportunity to incorporate them. Responsibility for meeting this shortfall cannot be transferred to other landowners in the block unless a formal legal agreement is established between the landowner and the City.

The proposal fails to meet the City's minimum residential requirement of 61 dwellings for its site under the SCCSP and LDP (delivering none) and provides no mechanism to address the shortfall, contrary to the City's objective for integrated mixed-use development in the Stirling City Centre.

Built form

The proposal departs significantly from the Character Statement for the site as per the approved LDP, particularly in how it addresses Scarborough Beach Road, and risks undermining the City's vision for this corridor as an 'Urban Boulevard'.

Under the LDP, the Scarborough Beach Road frontage is intended to be an active edge, with direct pedestrian access to tenancies and a narrow 15-metre strip of Business-zoned land to encourage street-level activation. In contrast, the proposed design is dominated by glazing and an internalised pedestrian laneway, with no direct entry points from Scarborough Beach Road into the supermarket or other tenancies. This effectively turns the development's back on the Scarborough Beach Road and the wider Stirling City Centre, contradicting the cohesive, pedestrian-friendly vision for the Activity Centre.

Scarborough Beach Road is planned to become a key movement corridor, integrating future light rail and high-quality pedestrian spaces. The lack of active frontage in the proposal is inconsistent with this intent and removes opportunities for street interaction along most of the site's northern edge.

By limiting access from Scarborough Beach Road, the proposal shifts commercial activity and public realm to the southern side of the site, increasing traffic and pedestrian pressure on neighbouring residential areas. These southern areas have been carefully planned to protect their residential character, and the proposed layout undermines that planning by placing higher-intensity activity at this sensitive interface.

These non-compliances stem from the over-development of the site with large-format retail floor space. The LDP envisaged finer-grained, mixed-use development, not a full-line supermarket of 3,826m². The 1,000m² supermarket limit in the LDP was designed to ensure active frontages along Scarborough Beach Road — an outcome the current proposal cannot deliver due to its scale and internalised design.

Figure 2 - Proposed Ground Floor Plan from Lodged Development Application

Traffic and Access

A review of the urbii Transport Impact Assessment (TIA) indicates that the proposed development will create several significant traffic and access issues.

The design places heavy reliance on Scarborough Beach Road for vehicle access and egress with Ewen Street providing secondary access to the site. The scale of the proposed supermarket and associated tenancies will generate traffic volumes well beyond what was anticipated in the LDP. This is a direct result of the over-development of the site with large-format retail, rather than the finer-grained, mixed-use development envisaged in the LDP. The short-term future upgrades of Scarborough Beach Road include the provision of a dedicated bus lane, with a proposed bus stop approximately 200m upstream from the main vehicle access point of the development. This two-way crossover include access for visitors as well as the major tenancy service vehicles that include up to 19m Access Vehicle. Section 7.6 of the TIA assumes the following:

'The SIDRA analysis presented in Section 7.5 assumes a substantial reduction (40%) in existing traffic travelling along Scarborough Beach Road past the subject site. It also assumes no growth in traffic travelling past the site on Ewen Street. This assumption is made on the basis that a general traffic lane is being removed from Scarborough Beach Road and being replaced with a Bus Rapid Transit lane. ***For this proposal to be successful, it will require a substantial mode shift from private motor vehicle to public transport along the route.****'*

The proposed development is based on an overreliance on the modal shift from cars to public transport that is unverified and cannot be relied upon to inform the assessment of the traffic impact. It is recommended that further detailed analysis be undertaken to verify the traffic impact on Scarborough Beach Road.

The development of a major supermarket, a significant traffic generator, and does not align with the intended development outcome for the site nor the transit orientated street that is intended for Scarborough Beach Road. The report confirms that the western traffic lane will in the future be designated as a bus lane. The proposed development is therefore in conflict with this proposed traffic initiative in that it concentrates vehicle access and supermarket service delivery vehicles in the location of the proposed bus lanes. The development does not address how vehicle access arrangements will occur upon the introduction of bus lanes in this location.

The Scarborough Beach Road entry to the proposed development requires its own decelerating and accelerating lane to ensure the free flow of traffic along this busy arterial road and minimise traffic accidents, particularly rear end crashes. Furthermore, the swept path analysis included in the TIA shows service vehicles encroaching into the righthand lane of the Scarborough Beach Road further impact road safety and function.

SLR, on behalf of Scentre Group, reviewed the Scarborough Beach Road access arrangements and advised:

- *The proposed access via Scarborough Beach Road is inconsistent with the MRWA road hierarchy outcomes.*
- *The sight distance and legibility of the arrangement is limited and it is highly likely that cars and trucks will queue across the intersection, blocking other movements.*
- *The submitted crash reporting indicates that there is an elevated crash risk near the proposed site that should be considered.*
- *The pedestrian crossing distance across the entry lane is significant (~15m) which represents 12-15sec of time where a pedestrian would be at risk of collision.*
- *The successive left turn entries to subject site and the adjacent Service Station will complicate legibility for pedestrians trying to observing and select a safe crossing gap.*

The Shawmac Road Safety Audit identifies several risks with the proposed development that the Applicant has not demonstrated can be overcome:

- *A clear zone is required to "number of trees, on frangible power poles and infrastructure"* on Scarborough Beach Road and Ewen Street. These are third party assets and the ability to relocate or protect with barrier has not been demonstrated;
- *"There are some trees, power poles and infrastructure that might potentially hinder the sight distance at the exits."* These are third party assets and the ability to relocate or modify has not been demonstrated.
- *Should there be a large number of vehicles entering the facility it would result in vehicles queuing into the roundabout. This would increase the risk of rear-end crashes and the injuring to vehicle occupants.*
- *Additionally, should there be insufficient gap for vehicles entering Ewen Street. This might result in vehicles merging into traffic in an unsafe manner resulting in a sideswipe or right angle crash.*

The layout presents challenges for safe and efficient circulation within the site, with potential conflicts between customer vehicles, service vehicles, and pedestrians. These issues stem from the supermarket's size and the extensive parking areas required to support it.

In summary;

- Over development of the site – large format retail generates traffic volumes far beyond those anticipated in the Local Development Plan (LDP), conflicting with the finer grained, mixed-use vision.
- Heavy reliance on Scarborough Beach Road for access – primary vehicle and service vehicle entry concentrated at a location earmarked for future bus lanes, creating conflict with planned public transport upgrades.
- Unverified traffic assumptions – reliance on a substantial mode shift from private vehicles to public transport (40% reduction in traffic) is unsupported and cannot be relied upon for impact assessment.
- Road safety risks – service vehicle movements encroach into traffic lanes; inadequate deceleration/acceleration lanes; elevated crash risk already present in the area.
- Access design conflicts – proposed Scarborough Beach Road access inconsistent with Main Roads WA road hierarchy; limited sight distance; potential for vehicle queues blocking intersections.
- Pedestrian safety concerns – long crossing distances, complex entry arrangements, and reduced legibility increase collision risk.
- Third party asset constraints – trees, power poles, and other infrastructure may hinder sight lines; relocation or protection measures not demonstrated.
- Internal circulation challenges – potential conflicts between customer vehicles, service vehicles, and pedestrians due to site layout and supermarket scale.

Conclusion

Having assessed the proposal against the City's statutory and strategic planning framework, including Local Planning Scheme No.3 (LPS3), the Southern Precinct Local Development Plan (LDP), the Stirling City Centre Structure Plan (SCCSP), the Local Planning Strategy, the draft Local Planning Scheme No.4 (LPS4), and the relevant provisions of Clause 67(2) of the Planning and Development (Local Planning Schemes) Regulations 2015, our position is clear: the application should not be supported.

The proposal is fundamentally inconsistent with the planning intent for the site and the broader Stirling City Centre. Key reasons include:

Statutory non-compliance: The proposed 3,826m² supermarket exceeds the 1,000m² maximum permitted for 'Shop' uses in the Mixed-Use category under the LDP and LPS3, making it an 'X' use in that portion of the site and therefore not capable of approval. Where t

Failure to meet residential requirements: The proposal delivers none of the 61 dwellings required under the SCCSP and LDP, with no mechanism to address the shortfall, undermining the City's objective for integrated mixed-use development.

Strategic misalignment: The location and scale of the supermarket are inconsistent with the SCCSP's Mixed-Use Lifestyle zone, which is intended for smaller-scale retail integrated with residential uses.

Conflict with the Local Planning Strategy and draft LPS4: The proposal diverts supermarket investment away from existing and planned neighbourhood centres, reducing their viability and compromising the City's long-term objective to strengthen the activity centre network.

Traffic and access impacts: The development's large-format retail scale will generate traffic well beyond LDP expectations, relying heavily on Scarborough Beach Road for access in conflict with planned bus lanes and

based on unverified public transport shift assumptions. The design raises safety and efficiency concerns, including inadequate lane provision, vehicle encroachment, elevated crash risks, poor sight distances, long pedestrian crossings, and potential intersection blockages. Existing roadside assets may further hinder visibility, and internal circulation risks conflicts between vehicles and pedestrians.

Loss of activation and poor built form outcomes: The internalised layout and dominance of the Scarborough Beach Road frontage will limit street activation, reduce pedestrian amenity, and fail to deliver the multi-storey, mixed-use built form envisaged in the LDP.

When considered in the context of Clause 67, there are no reasonable grounds on which to recommend approval. The proposal conflicts with multiple sub-clauses, including (a), (b), (c), (e), (f), (g), (m), (o)–(r), (t), (v), and (w), and fails to deliver the outcomes sought in the City's adopted and draft strategic planning documents.

Scentre Group does not object to a small-format supermarket consistent with the definition of 'Shop – small' (≤1,000m² NLA). However, the current proposal represents an over-development of the site, is incompatible with its setting, and undermines the long-term planning vision for the Stirling City Centre.

On this basis, the City Responsible Authority Report must recommend refusal to the DAP.

Yours faithfully,

Partner
+61 8

Attached: Proposed Ewen Street Retail Centre and New Classified Neighbourhood Centres - Economic Assessment

URBIS

Proposed Ewen Street Retail Centre and New Classified Neighbourhood Centres With Draft LPS4

Assessment of Market Need and Demand

November 2025

Prepared for: Scentre Group

Urbis staff responsible for this report were:

Director	
Research Analyst	
Project Code	P0064787

Acknowledgment of Country

Urbis acknowledges the Traditional Custodians of the lands we operate on.
We recognise that First Nations sovereignty was never ceded and respect First Nations peoples continuing connection to these lands, waterways and ecosystems for over 60,000 years.
We pay our respects to First Nations Elders, past and present.

Urbis is committed to incorporating our respect for First Nations cultures, peoples and storytelling in our work across the Country. We are proud to have partnered with Darug Nation artist, **Hayley Pigram**, and to profile her artwork - **Sacred River Dreaming**.

The river is the symbol of the Dreaming and the journey of life. The circles and lines represent people meeting and connections across time and space. When we are working in different places, we can still be connected and work towards the same goal.

All information supplied to Urbis in order to conduct this research has been treated in the strictest confidence.
It shall only be used in this context and shall not be made available to third parties without client authorisation.
Confidential information has been stored securely and data provided by respondents, as well as their identity, has been treated in the strictest confidence and all assurance given to respondents have been and shall be fulfilled.

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Introduction

Urbis has been commissioned by Scentre Group to provide an independent assessment of the market need and demand of the following proposals:

- The **Ewen Street Retail Centre development** which is located approximately 200 metres from Westfield Innaloo shopping centre, on a site at 270 – 278 Ewen Street / 367 Scarborough Beach Road in the suburb of Innaloo. This development is proposed to include a new retail centre providing around 6,380 sq.m of floorspace with a circa 3,810 sq.m full-line supermarket, which will form part of a mixed use development incorporating 122 residential apartments).
- The **re-classification of a number of Local Centres to Neighbourhood Centres within the City of Stirling** which are proposed in the new draft Local Planning Scheme No. 4 (LPS4). The analysis outlined in this report focuses on three activity centres, namely Morris Place, Woodlands and Stirling, which are generally within 1 – 2 km and the primary trade area of the Stirling City Centre. The elevated classification to a Neighbourhood Centre effectively provides support for a greater provision of retail and associated floorspace within these activity centres and in particular the inclusion of full-line supermarkets. This change in classification supports these centres serving broader catchments. Further details on the existing offer in the three centres are provided below:
  - **Morris Place Activity Centre**. This centre is currently classified as a Local Centre under LPS3 and includes a ~900 sq.m Tucker Fresh IGA. This store could service weekly and top-up grocery shopping needs. The activity centre also includes a range of services and convenience retail as well as The Morris tavern.
  - **Woodlands Activity Centre**. This Local Centre is anchored by a ~1,100 sq.m Farmer Jacks supermarket and includes complementary convenience-based retailers and services.
  - **Stirling Activity Centre**. This Local Centre includes a ~900 sq.m IGA supermarket and a range of retail shops and services serving everyday essentials needs. The centre also includes residential apartments.

The key considerations in reviewing the implications of the proposed changes to the retail landscape in the City of Stirling are as follows:

- Is there a market need for additional supermarkets, notably full-line stores, within the Stirling City Centre and surrounding area?
- What are the likely implications for achieving the objectives of LPS4 with the Ewen Street proposal?

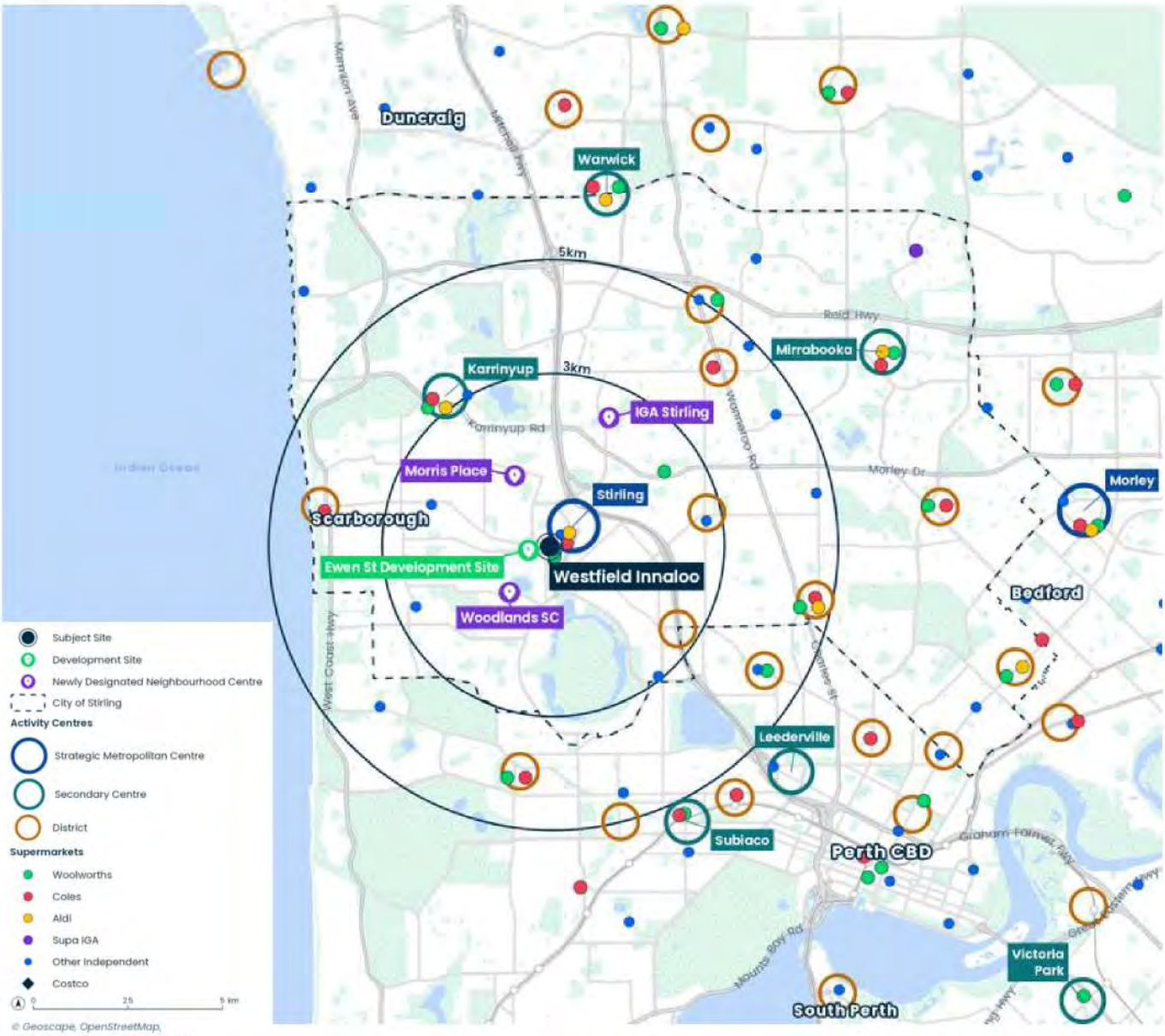
1 Need and Demand Analysis and Implications for the Retail Hierarchy

1.1 Existing Centre Hierarchy and Supermarket Supply

In the inner to middle north-western suburbs of Perth, residents have access to a full complement of activity centres catering to discretionary and convenience shopping needs. The Stirling City Centre, which is classified as a Strategic Metropolitan Centre, is the highest order centre in this region, followed by the Secondary Centre at Karrinyup. Both of these centres have important roles in providing residents access to non-food and food & grocery retailing.

As shown in Map 1, there is also an extensive range of neighbourhood and local centres in this region. For example, within 5 km of the Stirling City Centre, there are 20 neighbourhood / local centres. Residents in this area are therefore well served by a broad range of conveniently located shopping centres that enable easy access to shops and services catering to essential daily shopping needs.

Map 1 – Centre Hierarchy



Given the importance of supermarket anchors for the performance and sustainability of neighbourhood centres it is relevant to consider the supply of supermarkets and capacity of the market to accommodate additional stores.

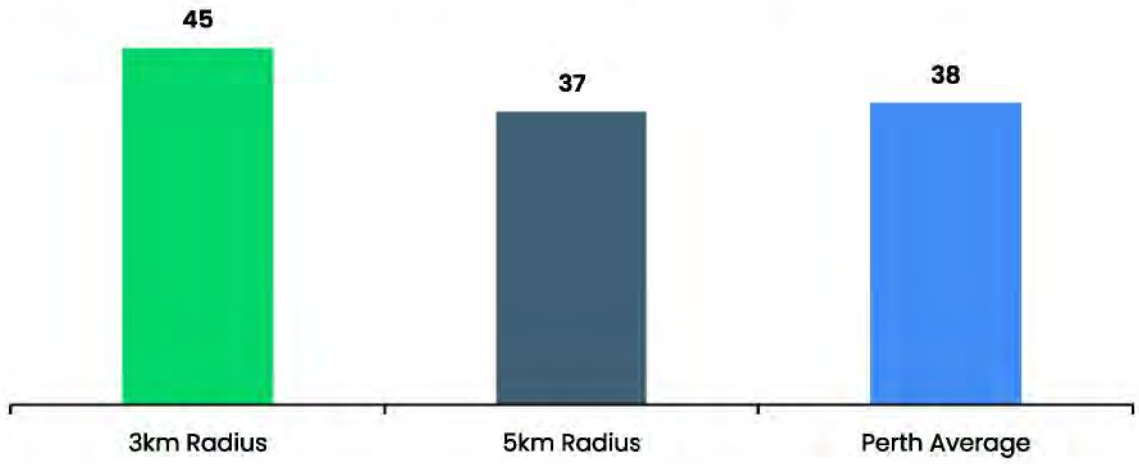
Urbis has undertaken analysis of the accessibility of supermarkets in terms of the amount of supermarket floorspace households have access to within 3 km of their place of residence, which largely mirrors the typical extent of the catchment for supermarkets. This measure, which is estimated on a per capita basis to account for the size of the available market, has been assessed for 5 km and 3 km radial catchments from Stirling City Centre in order to provide an understanding the level of supermarket supply in a broader and more local context.

This analysis for the current supply is summarised in Chart 1 and Map 1 and highlights the following:

- Within 5 km the accessibility of supermarkets (amount of floorspace) is similar to the Perth average, i.e. 37 sq.m per 100 residents vs 38 sq.m per 100 residents.
- However, within the more local area of 3 km, which is the area of most relevance to the proposed Ewen Street Retail Centre and three centres proposed to be elevated to neighbourhood centre status, the accessibility of supermarket is well above the Perth, i.e. 45 sq.m vs 38 sq.m or +18%.

It is evident that currently residents living within 3 km of the Stirling City Centre, which is the area where a significant amount of new supermarket floorspace is proposed to be added, already have access to a greater than typical supply of supermarkets.

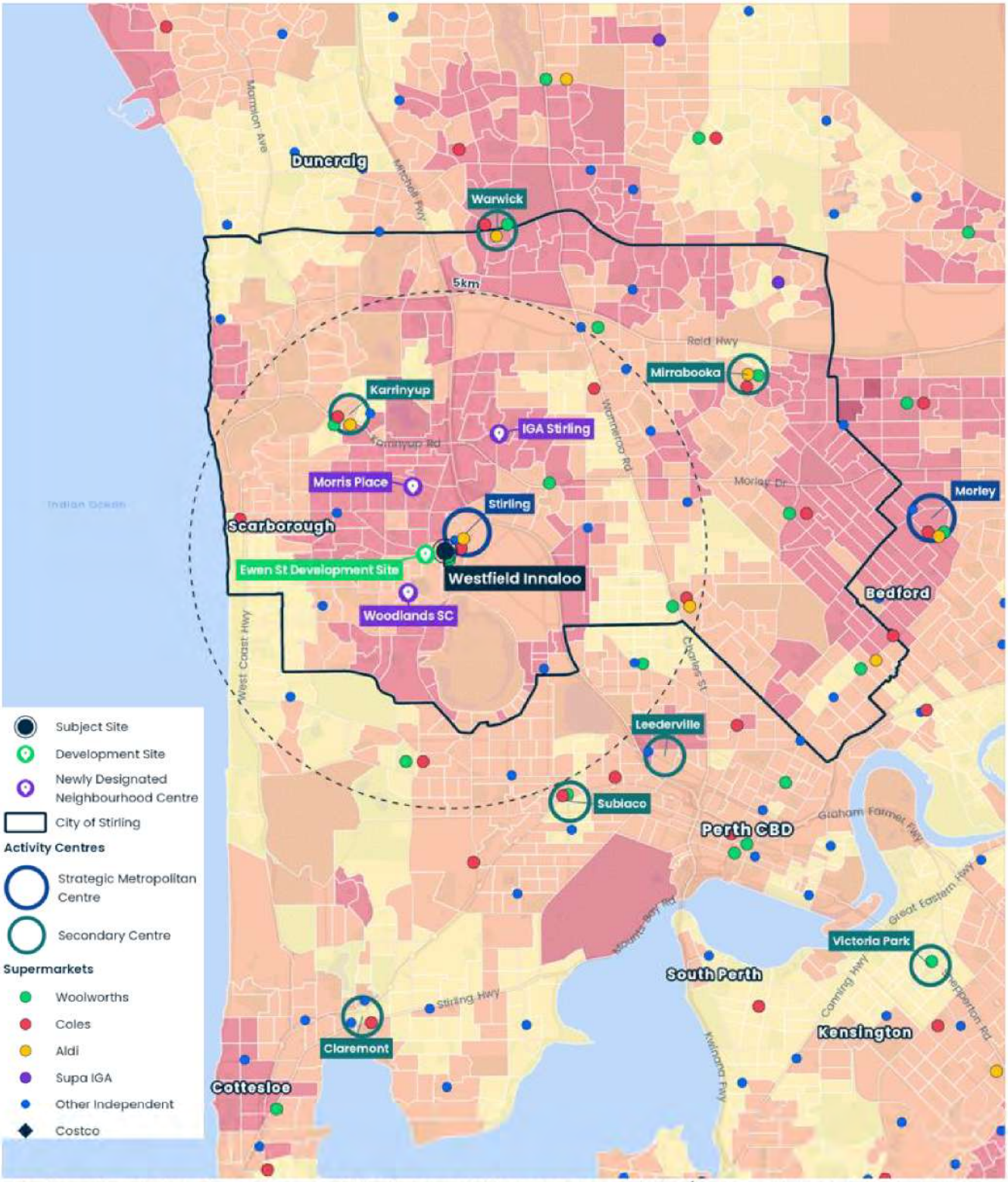
Chart 1 – Existing Accessibility of Supermarket Floorspace



Note: 'Accessibility' represents the population-weighted average supermarket floorspace available within 3 km of where residents in the catchment live, expressed per 100 residents

Source: Urbis

Map 2 – Existing Accessibility of Supermarket Floorspace by SA1



Note: Thematic map shows the relative accessibility of supermarket floorspace across quintiles (e.g. deep red depicts the highest level of supply per capita)
Source: Urbis

1.2 Future Need and Demand for Supermarket Floorspace

The proposed Ewen Street Retail Centre and proposed elevation of three Local Centres to Neighbourhood Centres in the vicinity of Stirling City Centre, could potentially add four new full-line supermarkets to the market. The additional supermarket floorspace could be in the order of +11,700 sq.m which allows for the following:

- A new 3,810 sq.m store at the proposed Ewen Street Retail Centre.
- Assumed 3,500 sq.m full-line stores at the three Local Centres near Stirling City Centre (or 10,500 sq.m). With these centres currently providing around 2,900 sq.m of supermarket floorspace across three stores the net increase in floorspace would be around 7,600 sq.m.

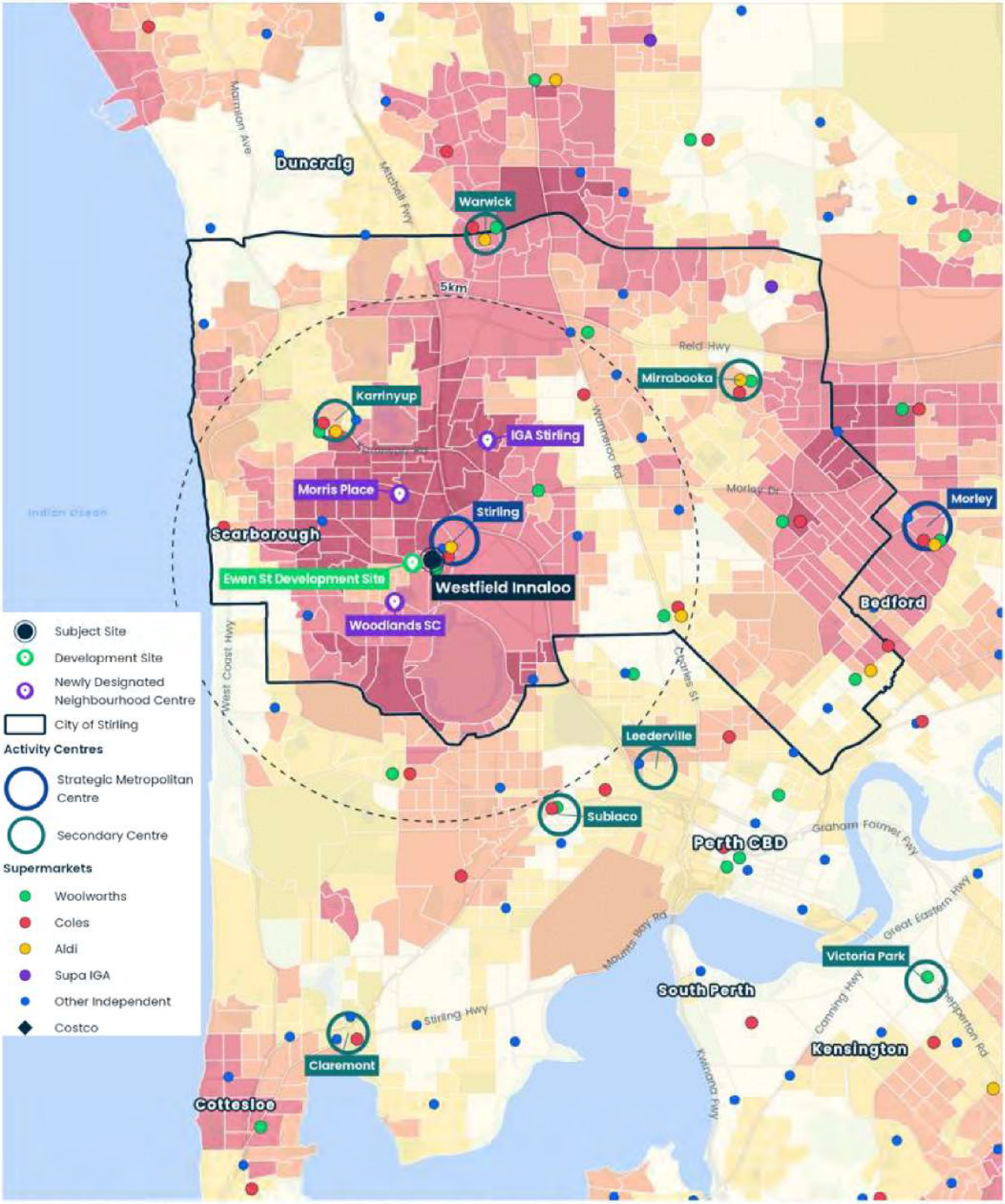
Allowing for the additional supermarket floorspace and future population growth to 2035, the accessibility of supermarket floorspace for residents within 3 km radius of the Stirling City Centre has been estimated to understand the potential capacity of the market to support this quantum of new supermarket floorspace and implications for other centres and the objectives of the draft LPS4 being achieved in terms of selected Local Centres functioning under their upgraded Neighbourhood Centre classification.

This analysis indicates that the accessibility of supermarket floorspace would increase to 51 sq.m per 100 residents (refer to Chart 2), a very high provision of floorspace (+34% to the Perth average). This level of supply would exceed available demand by a significant margin which could have implications for the overall sustainability of existing and new stores and the centres in which they are located.

Chart 2 – Future Accessibility of Supermarket Floorspace (2035)

Note: Relative to the current provision, the additional supermarket floorspace consists of the proposed Ewen Street Retail Centre store (3,810 sq.m) and an additional 7,600 sq.m across three centres in the vicinity of Stirling City Centre (i.e. Morris Place, Woodlands and Stirling)
Source: Urbis

Map 3 – Future Accessibility of Supermarket Floorspace by SA1 (2035)



Note: Thematic map shows the relative accessibility of supermarket floorspace across quintiles (e.g. deep red depicts the highest level of supply per capita)
Source: Urbis

1.3 Implications for Draft LPS4

Other considerations in terms of implications for Draft LPS4 are as follows:

- Given the importance of supermarkets in anchoring Neighbourhood Activity Centres, the limitations on the market capacity for supermarkets could have negative impacts on the draft LPS4 achieving a key objective of having the nominated Local Centres elevate to the intended role of Neighbourhood Centres.
- In this regard and the limitations on capacity for new supply, the existing activity centres should have priority over proposed new centres (e.g. Ewen Street Retail Centre) in terms of accommodating new demand for supermarket floorspace.
- The case for the Ewen Street Retail Centre is also weakened when considering that the Stirling City Centre (200 metres distance) and nearby Woodlands activity centre (less than 1 km distance) already provide residents with access to five of the key supermarket brands in the Perth market, e.g. Woolworths, Coles, Aldi, Farmer Jack's and Spudshed. There is negligible need for another supermarket on the Ewen Street site and a likely outcome, if this development proceeds, would be duplication of a supermarket brand that is already provided in the local area.

Disclaimer

This report is dated November 2025 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 Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Scentre Group **(Instructing Party)** for the purpose of Need and Demand Assessment **(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).

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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.

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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.

URBIS

Shaping cities
and communities
for a better future.

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From: noreply-rms@stirling.wa.gov.au
Sent: Friday, 28 November 2025 2:43 PM
To: Development
Subject: Development Application general submission form

Categories: planning

Hi Team,

You have a new Development applications submission form.

DA reference number DA25/0807

- **First name**
- **Last name**
- **Email**
- **Daytime contact number**
- **Address**
- **Suburb** INNALOO
- **Did you receive a notification letter from the City about the development application?** Yes
- **After considering the likely impact this proposal has on your property or suburb please advise whether your support the proposal or object to the proposal** Object to the proposal
- **Please supply your feedback and make sure to include how you will be impacted by the proposal** the additional traffic generated by the construction taking place followed by tenant occupancy and increased public attendance would have a significant impact on the already extreme traffic congestion encountered on

a daily basis in particular on the corner of Scarborough Beach Road & Odin Road. Innaloo.

Please action accordingly.

Kind Regards,

RMS Team

From: [redacted]
Sent: Saturday, 29 November 2025 10:27 AM
To: Development
Subject: DA25/0807

Categories: planning

Hello Cameron,
I would like to express my concerns regarding this development.
1.Housing is a priority at present due to a shortage in availability, this development should include a percentage of housing/units. All future developments should include housing. If this is a zoning issue then the zoning should be reviewed.
2.Previous shops in this location have failed in the past.
3.There is already a surplus of shops/restaurants close by, we don't need more of these.
I would like these concerns to be considered before approval.
Regards
[redacted]

Attachment 8a

External Referral Responses

Department of Planning, Lands and Heritage

From: Road Planning < @dplh.wa.gov.au>
Sent: Wednesday, 17 June 2026 8:03 AM
To: Cameron Howell
Subject: RE: Referral for Comment: Woodlands North Neighbourhood Centre, 365 - 367 Scarborough Beach Road and 270 - 278 Ewen Street, Innaloo and Woodlands

OFFICIAL

Thanks Cameron,

The Road Planning Team within the Department has reviewed the submitted information and supports provision of a left-turning deceleration lane into the site constructed to Main Roads / Austroads standards (length of deceleration, diverge taper, lane width, exit curve). The Department has no objection to the modified access arrangements within the site which clearly separate entering and exiting vehicles.

As advised on 6 November 2025, it is recommended that the latest submitted swept path drawings be checked / verified by the City.

Regards,

Simon Luscombe
Principal Planning Officer | Strategy and Engagement
Department of Planning, Lands and Heritage
Boorloo (Perth)
140 William Street, Perth WA 6000
W: dplh.wa.gov.au | P: 6551

Department of Planning, Lands and Heritage
SOLUTIONS FOCUSED FOR A VIBRANT WESTERN AUSTRALIA

The Department of Planning, Lands and Heritage acknowledges Aboriginal people as the traditional custodians of Western Australia.
We pay our respects to the Ancestors and Elders, both past and present, and the ongoing connection between people, land, waters and community. We acknowledge those who continue to share knowledge, their traditions and culture to support our journey for reconciliation. In particular, we recognise land and cultural heritage as places that hold great significance for Aboriginal people.
Learn more about our Stretch Reconciliation Action Plan.

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From: Cameron Howell < @stirling.wa.gov.au>
Sent: Tuesday, 16 June 2026 10:03 AM
To: Simon Luscombe < @dplh.wa.gov.au>
Cc: Tanvir Asgar < @dplh.wa.gov.au>; Shaun Wheatland < @stirling.wa.gov.au>
Subject: Referral for Comment: Woodlands North Neighbourhood Centre, 365 - 367 Scarborough Beach Road and 270 - 278 Ewen Street, Innaloo and Woodlands

Dear Simon,

We have previously had discussions on the vehicle access arrangements proposed in the development application for the *Woodlands North Neighbourhood Centre* commercial development located on multiple lots on Scarborough Beach Road and Ewen Street in Innaloo and Woodlands – references DA25/0807, DAP/25/02974, DP/11/012191.

The Applicant has recently provided a revised submission for this development application, in response to the City's requests for further information. This includes a new Road Safety Audit document. The latest development plans now propose a deceleration lane on Scarborough Beach Road for the vehicle access into the shopping centre car park and the tenancy T00 (Shop) service area.

The last written comments listed a range of safety and other concerns with the development application as originally submitted, as per your last email sent on 3 December 2025.

I have attached the following documents to this email:

- The Road Safety Audit prepared by Shawmac dated 25 May 2026.
- The swept path diagrams prepared by Urbii dated 11 January 2026.
- The Site Plan prepared by Place Fabric dated April 2026.
- The other revised development plans, though I have shrunk the page sizes to reduce the file size of the document.
- Your previous comments dated 3 December 2025.

I am seeking your feedback on the revised documentation, and whether the Department has any recommendation on this revised proposal.

Please let me know if you require any further information.

Thank you.

Kind regards,

Cameron Howell
Senior Planning Officer
Development Services

Administration Centre 25 Cedric Street Stirling WA 6021
Phone (08) 9205
Email @stirling.wa.gov.au | **Website** www.stirling.wa.gov.au

City of Stirling kaadatj Nyoongar moort Nyoongar boodjak Wadjak boodjak. Ngalak kaadatj Nyoongar nedingar wer birdiya koora koora wer yeyi. Baalabang koondarm, malayin wer nakolak baalap yang ngalany-al. Ngalak dandjoo barn wer kaaratj bandang boodja-k.

The City of Stirling acknowledges the Traditional Custodians of this land, the Wadjak people of the Nyoongar nation, and pays respect to the Elders past, present and future for they hold the memories, the traditions, the culture and hopes of Aboriginal Australia.

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This notice should not be removed.

Attachment 8b

External Referral Responses

Department of Water and Environmental Regulation

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Your ref: DA25/0807
Our ref: DMO 9056, 3763 and 4250
Enquiries: Maries Elliott, Ph 6364
Email: @dwer.wa.gov.au

Cameron Howell
Senior Planning Officer, Development Services
City of Stirling
25 Cedric Street
STIRLING WA 6021

By email stirling@stirling.wa.gov.au & @stirling.wa.gov.au

Dear Cameron

DEVELOPMENT APPLICATION REFERENCE DA25/0807 – LOTS 1-5 AND 66 EWAN STREET, AND LOT 12 AND STRATA LOTS 1-8 SCARBOROUGH BEACH ROAD, WOODLANDS/INNALOO

I refer to your email dated 3 November 2025 to the Department of Water and Environmental Regulation (the department) regarding an application to the City of Stirling for the proposed development of the above-mentioned lots.

As per the requirements under section 58(6)(b) of the *Contaminated Sites Act 2003* (CS Act), advice is required as to the suitability of the land for the proposed development. The department understands that the proposed commercial development comprises a one-storey shopping centre with associated access roads, landscaping and roof-top car parking.

Lot 12

Land at Lot 12 on Diagram 43234, which comprises a fuel station, was classified under the CS Act as *remediated for restricted use* on 7 March 2018 and a memorial (O166271 ML) was placed on the certificate of title.

Lot 66

Land at Lot 66 on Diagram 20527, which comprises an un-named lane way running east from Bowra Avenue, was classified under the CS Act as *remediated for restricted use* on 7 March 2018 and a memorial (O170851 ML) was placed on the certificate of title.

The department understands that a hydrocarbon plume is present beneath Lot 12 that extends in a south-westerly direction to several affected parcels including Lot 66. The most recent classifications of Lots 12 and 66 are based on a Mandatory Auditor's Report (MAR) which reviewed investigations undertaken between 2010 and 2017. The MAR concluded that petroleum hydrocarbons are present in groundwater beneath Lots 12 and 66 at concentrations exceeding the relevant guideline values at the time for non-potable uses. The MAR concluded that Lots 12 and 66 are suitable for their current land uses (i.e. a fuel station and right-of-way), subject to groundwater restrictions and implementation of the Ongoing Site Management Plan (AECOM, October 2017).

The department understands that the proposed works on Lot 12 include relocation of an existing crossover and resultant removal of a retaining wall and fuel price board, and proposed works on Lot 66 include construction of retaining walls and a vehicle ramp. The department considers that while ground disturbing works are required, deep excavation intersecting groundwater is not necessary.

Based on supplied plans, the eastern portion of Lot 66 is proposed to be developed into a road reserve, which the department does not consider to be a change in land use.

Land at Lots 1-5 on Diagram 20527 and Lots 1-8 on Strata Plan 9013 have not been reported as known or suspected contaminated sites and the department holds no records relating to contamination for these lots.

A review of historical aerial imagery indicates that Lots 1-5 and Strata Lots 1-8 have been used for commercial/industrial land uses, including for roads, commercial buildings and a footpath. The review does not provide any indications of potentially contaminating activities having occurred previously. Supplied plans also indicate that no basement levels are proposed and there will be minimal soil access once developed.

Based on the above, and consistent with historical advice from the department, the site is considered suitable for the proposed commercial development. Therefore, the department has no objection to the proposed development of the site and recommends that the approval should not include a contamination condition.

However, the department recommends that the following advice note be applied to any approval granted by the City of Stirling:

Advice

Due to the nature and extent of groundwater contamination beneath Lots 12 and 66, the abstraction of groundwater for any purpose is not recommended.

Lots 12 and 66 are to be managed in accordance with the Ongoing Site Management Plan as detailed in the document *Ongoing Site Management Plan at the Caltex Doubleview Service Station (55486), 365 Scarborough Beach Road, Doubleview, WA 6108* (AECOM, October 2017).

If you have any queries in relation to the above, please contact Environmental Officer, Mariesa Elliott, on 6364 [redacted].

Yours sincerely

Andrew Miller
SENIOR MANAGER
CONTAMINATED SITES
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

4 December 2025

Attachment 8c

External Referral Responses

Water Corporation

Development Services
629 Newcastle Street Leederville WA 6007
PO Box 100 Leederville WA 6902
T (08) 9420 2099
F (08) 9420 3193

Your Ref: DA25/0807
Our Ref: 204111536 - DAP428683
Enquiries: Donna Mcdermott
Direct Tel: 9420 2099
Email: land.planning@watercorporation.com.au

17 November 2025

Senior Planning Officer
City Of Stirling
PO BOX 130
OSBORNE PARK WA 6017

Attention of: Cameron Howell

Re: Multiple Lots Ewen, Scarborough Beach, Bowra Ave, Innaloo

Thank you for your letter dated 3rd November 2025. We offer the following comments regarding this proposal.

Water
Reticulated water is currently available to the subject area.

Wastewater
Reticulated sewerage is currently available to the subject area.

Drainage
The subject area falls within the Herdman Catchment.

Our drainage system can only take predevelopment flows. So, the developer will need to compensate any additional flows on their own land.

Approval for works
Any works carried out in proximity to our Assets must receive prior approval by applying for an Asset Protection Risk Assessment (APRA) To assess whether the proposed development will require and APRA details of the Prescribed Proximities and relevant legislation are available in our guidelines.

General Comments
This proposal will require approval by our Building Services section prior to commencement of works. Infrastructure contributions and fees may be required to be paid prior to approval being issued. Attachments required for approval will include;

- Final construction site & architectural floor plans
- Structural engineers pile details
- Hydraulics Plan/s
- Trade Waste Application
- Trade Waste Supplement Application
- Fire Service Application/Agreement

Sewer is located on the property. Any portion of the proposed development which is in close proximity to the reticulated sewer mains may require structural piles to protect the sewer main in accordance with our technical guidelines. Piling design for sewer main protection shall be designed by a suitably qualified practicing professional engineer who has appropriate structural engineering experience and is a holder of our current design standards.

For further information about building applications, the developer should follow this link:
https://www.watercorporation.com.au/home/builders-and-developers/building/lodging-a-building-application

If the application is retrospective, approval by our Building Services section is still required.

The developer may be required to fund new works or the upgrading of existing works and protection of all works associated with the Water Corporation.

The information provided above is subject to review and may change. If the proposal has not proceeded within the next 6 months, please contact us to confirm that this information is still valid.

Please provide the above comments to the landowner, developer and/or their representative.

Should you have any queries or require further clarification on any of the above issues, please do not hesitate to contact the Enquiries Officer.

Kind Regards

Donna McDermott
Advisor – Land Use Planning
Development Services

Attachment 8d

External Referral Responses

Western Power

Pre-application enquiry

Pre-application enquiry details

Cameron Howell
03/11/2025

Reference no.

WS-P-9827V5R3

Requested in service date

01/01/2030

Customer project name

DA25/0807 - Commercial (Woodlands North Neighbourhood Centre)

Site address

367 Scarborough Beach Road, Innaloo, 6018, WA

Additional requestor name

Cameron Howell

Additional requestor email

[redacted]@stirling.wa.gov.au

Enquiry description

The City of Stirling is assessing a Development Assessment Panel Form 1 development application for a commercial development on multiple lots on Scarborough Beach Road, Innaloo and Woodlands. Existing Western Power assets are located on the site, including a transmission pole and electrical transformers / electrical enclosure. Please advise of any recommendation, advice or comments on the proposal.

Enquiry history

Cameron Howell
03/11/2025

Referral Copy - DA25.0807 - Scarborough Beach Road & Ewen Street, Innaloo & Woodlands.pdf

Service executive
08/01/2026

Thank you for your enquiry regarding the proposed commercial development on multiple lots along Scarborough Beach Road, Innaloo and Woodlands, where existing Western Power assets, including a transmission pole and electrical transformers/electrical enclosure, are located on the site.

Western Power acknowledges the presence of these critical network assets and provides the following advice:

- **Asset Management and Compliance**
  Existing transmission and distribution assets must remain accessible and compliant with clearance standards. They cannot be enclosed within private property or obstructed by structures.

- **Relocation Options**
  For projects of this scale, Western Power recommends utilizing our **Large-Scale Relocation Service**, which is specifically designed for developments requiring significant infrastructure changes. This service includes:

  - Comprehensive project management for complex relocations
  - Detailed design and planning to maintain network integrity and safety
  - Costing and timeframes tailored to large-scale works

  Further information and application details can be found at: https://www.westernpower.com.au/products-services/change-something-existing/move-or-remove-equipment/large-scale-relocation/?_sqt=large%20scale%20reloc

- **Next Steps**
  Please submit a formal application via the above link, including:

  - Detailed site plans showing proposed building footprints and existing asset locations
  - Please mark the proposed locations for relocations and new assets as well
  - Any relevant development approvals or supporting documentation

Our team will review the application and charge the design fee to provide a tailored design solution including Quote.

Comments

What would you like to tell us?*

Please attach any file(s) that may assist us

Upload files

Allowed file types: png, pdf, docx, dwg, zip, dgn

Maximum upload size: 15MB

Upload

Cancel Submit

Accessibility
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Sitemap

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Attachment 9a

Design Review Panel Report

18 July 2024

Design Review Report – Item 1

Local government:	City of Stirling	
Item no.:	Item 1 - PDA24/0045 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment	
Acting Chairperson:	Philip Gresley	
Panel members:	Munira Mackay Tony Blackwell Jackson Liew	
Local government officers:	Dean Williams Karina Bowater Cameron Howell Simone Palmer	Acting Service Lead Planning Acting Coordinator Planning Senior Planning Officer DRP Support Officer
Observers	Olivia Abbonizio Gareth Glanville	Senior Strategic Planning Officer (City Future) Coordinator City Future Projects
Date:	18 July 2024	Time: 2pm
Venue:	City of Stirling – Challenger Room	

Proponent/s		
	Isabelle How	Planning Solutions *(Applicant) (not in attendance)*
	Ben Doyle	Planning Solutions
	Graham Taylor	Place Fabric
	Theo Valentine	UDLA
	Stephanie Voon	Place Fabric
	Finnbar Ingram	Place Fabric
	Greg Pearce	Windsor Knight
	Owners	Deltaview Pty Ltd
Observer/s		

Briefings		
Development assessment overview	Cameron Howell	Senior Planning Officer
Technical issues	Cameron Howell	Senior Planning Officer

Design Review	
Proposed development	Item 1 – PDA24/0045 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retain Establishment
Property address	367 Scarborough Beach Road, Innaloo
Background	
Proposal	

Applicant or applicant's representative address to the design review panel	Greg Pearce Graham Taylor Theo Valentine	Windsor Knight Place Fabric UDLA
Key issues / recommendations	This is the first review of the proposal. The Panel is aware of the complex planning context for this site and advised that it's review would be, notwithstanding its use and modest scale compared to the ambition of the various relevant planning documents, based on the proposal being seen as approvable. The Panel is generally supportive of the proposal's design direction. The introduction of a high-quality retail laneway in this location will serve the community well and is supported. Notwithstanding some detailed commentary for improvements, the eastern half of the proposal considers the user and community member experience through the inclusion of sleeved speciality retail, good amenity for pedestrians along the north boundary, and the opening up of the supermarket to the public realm through extensive clear glazing. More design work is required in the design of the western half of the site to better create a sense of place and connectivity to the context around the site. The Panel looks forward to seeing progress on the design at a second review Refer to attached Design Quality Evaluation Report.	
Chairperson signature		

Design quality evaluation **Item 1 – PDA24/0045 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment** **DRP Meeting – Thursday 18 July 2024**		
	S	*Design Principle satisfied*
	P	*Design Principle pending further attention*
	N	*Design Principle not satisfied*
Principle 1 **Context and character**		*Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*
	P	1a. The Panel is aware of the complex planning context for this site and advised that it's review would be, notwithstanding its use and modest scale compared to the ambition of the various relevant planning documents, based on the proposal being seen as approvable. 1b. The Panel noted that the provided functional context analysis was successful in guiding the design response and in demonstrating how the proposal will integrate into the context, in plan. 1c. The proposal will benefit from the generation of section drawings which will describe the relationship between the proposal and the public realm in more detail. These sections should also extend across roads and into various lots to show the connectivity and topographical relationship to the broader context. 1d. The Applicant was urged to further interrogate how the design fits into the context of the location with relation to cultural and aesthetic considerations to further explore the future and existing sense of place. 1e. The Panel commended the intent for future proofing the proposal by considering future residential development. The Panel expressed concern about the complexity of delivering this in the future and seeks additional information demonstrating how this will be, in principle, delivered. There are concerns about an array of issues including carparking numbers, legible entry spaces, escape paths, and suitable structural grids. 1f. The Panel is generally supportive of the eastern end of the development and its integration into context but recommends reducing the extent of the service area on the south east corner and increasing activation to this corner with additional small retail offerings.
Principle 2 **Landscape quality**		*Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*
	P	2a. The Applicant was commended on the mature tree transplants included in the proposal. 2b. The Panel stated the selection of trees is good although the Applicant was encouraged to look for alternatives which are not on the Polyphagous shot-hole borer list. 2c. The comment was made by the Panel there could be opportunity to improve the street trees and landscaping in this area. 2d. The Applicant was encouraged to further consider how additional landscaping (and possibly additional large trees) can be brought to the western half of the site. It was suggested that a paving audit be conducted as there appears to be an excess of hard surface area on this side.
Principle 3 **Built form and scale**		*Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*
	P	3a. Notwithsthanding its modesty in scale, the size of this single level structure has been designed to generally optimize the built form relationship to its context, especially to the eastern half of the site. 3b. The Panel commented the colonnade addressing Scarborough Beach Road, with clear glazing to reveal the inside of the supermarket, works well and provides the

		external pedestrian spaces with good amenity. 3c. It was noted the screen on the north works well with the envelope and would be a good outcome to dedicate this space for signage and an art component. 3d. The Panel suggests that additional work is required to improve the relationship of the built form of the western half of the site with the character of the area. It is noted that this area is a service area, however more design work is required to provide an appropriate level of quality to the form, material selection, landscaping, and general appearance. The opportunity for integrated public art could be considered. 3e. There is an opportunity to bring the southern carpark ramp access inside the development to conceal it which may enable additional landscaping or other more positive treatments to this elevation. 3f. Additional small retail tenancies along the south-eastern corner facing Ewen Street would be an excellent outcome.
Principle 4 **Functionality and build quality**		*Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*
	P	4a. The introduction of street parking is supported and a great outcome. 4b. It was noted by the Panel the supermarket is sleeved or addresses the street which is a good outcome. 4c. There was some concern about carpark layouts and whether vehicular barrier protection and wheel stops have been considered. 4d. The Panel queried the location and functional methodologies for mechanical (and other) servicing elements such as A/C and refrigeration. 4e. It was mentioned by the Panel the pedestrian accessway to the northern end of the laneway may be too tight. The lift and public toilet area feels congested and could be opened up.
Principle 5 **Sustainability**		*Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*
	N	5a. The sustainability principle has not been addressed at this stage of the proposal. 5b. The Applicant was strongly encouraged by the Panel to explore sustainability initiatives and engage the services of a sustainability consultant. A commitment to sustainability initiatives is essential to enable a successful outcome.
Principle 6 **Amenity**		*Good design optimises internal and external amenity for occupants, visitors and neighbours providing environments that are comfortable, productive and healthy.*
	P	6a. Comment was made by the Panel the pedestrian laneway is a strong point of the design and provides excellent amenity and is well connected into the surrounding context. 6b. It was recommended the Applicant interrogate the acoustics on the carpark deck. 6c. It was suggested the public toilets could be relocated. 6d. It could be beneficial for the liquor outlet to have direct access to the street which would assist with improving amenity and street activation. 6e. The Panel expressed some concern about the south facing alfresco area and the lack of winter sunlight. 6f. The proponent should clarify how bike parking is integrated into the proposal.
Principle 7 **Legibility**		*Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*

	S	7a. The Panel is satisfied with the legibility of the proposal and stated it works well. 7b. The Panel noted that although the legibility of the car park entries is strong, additional work could be done (under other principles) to improve the quality of these elements.
Principle 8 **Safety**		*Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*
	P	8a. Some concern about children's safety around the play areas was noted.
Principle 9 **Community**		*Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*
	S	9a. This project is a good outcome for the community in this location and is supported by the Panel.
Principle 10 **Aesthetics**		*Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*
	P	10a. The aesthetics of the eastern half of the proposal are progressing well including considered articulation, variation, colour, and façade treatments to enhance the local precinct generally. 10b. The inclusion of breeze blocks is successful. 10c. The Panel mentioned the Pilates studio could connect more to public realm through its formal connection to the pedestrian pathway. It is acknowledged that the proposed use does not require direct connectivity or full height glazing, but perhaps future adaptability should be considered to enable a different outcome in the future. 10d. It was stated by the Panel clear glazing is critical for pedestrian activation. 10e. The western half of the design requires considerable design attention for aesthetics and the applicant is encouraged to seek opportunities to improve this area generally and how it presents to the public realm.

Design Review progress

Item 1 – PDA24/0045 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment

DRP Meeting – Thursday 18 July 2024

S	*Design Principle satisfied*
P	*Design Principle pending further attention*
N	*Design Principle not satisfied*

	DR1 18/7/24		
Principle 1 - **Context and character**	P		
Principle 2 - **Landscape quality**	P		
Principle 3 - **Built form and scale**	P		
Principle 4 - **Functionality and build quality**	P		
Principle 5 - **Sustainability**	N		
Principle 6 - **Amenity**	P		
Principle 7 - **Legibility**	S		
Principle 8 - **Safety**	P		
Principle 9 - **Community**	S		
Principle 10 - **Aesthetics**	P		

Recommendations Summary Item 1 – PDA24/0045 – 367 Scarborough Beach Road, Innaloo			
DR1 – DRP Recommendations DRP Meeting – 18/7/2024	DR2 – Applicant Response DRP Meeting – 18/7/2024	DR2 - DRP Recommendations DRP Meeting –	DR2 – Applicant Response DRP Meeting –
1c. The proposal will benefit from the generation of section drawings which will describe the relationship between the proposal and the public realm in more detail. These sections should also extend across roads and into various lots to show the connectivity and topographical relationship to the broader context. 1d. The Applicant was urged to further interrogate how the design fits into the context of the location with relation to cultural and aesthetic considerations to further explore the future and existing sense of place. 1e. The Panel commended the intent for future proofing the proposal by considering future residential development. The Panel expressed concern about the complexity of delivering this in the future and seeks additional information demonstrating how this will be, in principle, delivered. There are concerns about an array of issues including carparking numbers, legible entry spaces, escape paths, and suitable structural grids. 1f. The Panel is generally supportive of the eastern end of the development and its integration into context but recommends reducing the extent of the service area on the south east corner and increasing activation to this corner with additional small			

	retail offerings.			
2b. 2c. 2d.	The Panel stated the selection of trees is good although the Applicant was encouraged to look for alternatives which are not on the Polyphagous shot-hole borer list. The comment was made by the Panel there could be opportunity to improve the street trees and landscaping in this area. The Applicant was encouraged to further consider how additional landscaping (and possibly additional large trees) can be brought to the western half of the site. It was suggested that a paving audit be conducted as there appears to be an excess of hard surface area on this side.			
3c. 3d. 3e.	It was noted the screen on the north works well with the envelope and would be a good outcome to dedicate this space for signage and an art component. The Panel suggests that additional work is required to improve the relationship of the built form of the western half of the site with the character of the area. It is noted that this area is a service area, however more design work is required to provide an appropriate level of quality to the form, material selection, landscaping, and general appearance. The opportunity for integrated public art could be considered. There is an opportunity to bring the southern carpark ramp access inside the development to conceal it which may enable additional landscaping or other more positive			

	treatments to this elevation. 3f. Additional small retail tenancies along the south-eastern corner facing Ewen Street would be an excellent outcome.			
4e.	It was mentioned by the Panel the pedestrian accessway to the northern end of the laneway may be too tight. The lift and public toilet area feels congested and could be opened up.			
5a. 5b.	The sustainability principle has not been addressed at this stage of the proposal. The Applicant was strongly encouraged by the Panel to explore sustainability initiatives and engage the services of a sustainability consultant. A commitment to sustainability initiatives is essential to enable a successful outcome.			
6b. 6c. 6d. 6f.	It was recommended the Applicant interrogate the acoustics on the carpark deck. It was suggested the public toilets could be relocated. It could be beneficial for the liquor outlet to have direct access to the street which would assist with improving amenity and street activation. The proponent should clarify how bike parking is integrated into the proposal.			
7b.	The Panel noted that although the legibility of the car park entries is strong, additional work could be done (under other principles) to improve the quality of these elements.			
10c.	The Panel mentioned the Pilates studio could connect more to public realm through its formal			

connection to the pedestrian pathway. It is acknowledged that the proposed use does not require direct connectivity or full height glazing, but perhaps future adaptability should be considered to enable a different outcome in the future. 10d. It was stated by the Panel clear glazing is critical for pedestrian activation. 10e. The western half of the design requires considerable design attention for aesthetics and the applicant is encouraged to seek opportunities to improve this area generally and how it presents to the public realm.			

Attachment 9b

Design Review Panel Report

24 October 2024

Design Review Report – Item 2

Local government:	City of Stirling	
Item no.:	Item 2 - PDA24/0070 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment	
Chairperson:	Philip Gresley	
Panel members:	Lisa Shine Jackson Liew Tony Blackwell (comments only)	
Local government officers:	Peter Prendergast Dean Williams Karina Bowater Shaun Wheatland Simone Palmer	Service Lead Planning Coordinator Planning Senior Planning Officer Senior Planning Officer DRP Support Officer
Observers	Vicky Dimitriou David Jack Kymba Fennessy	Senior Planning Officer Specialist Strategic Planner – City Future Project Officer - Trees
Date:	24 October 2024	Time: 2pm
Venue:	City of Stirling – Challenger Room	

Proponent/s		
	Isabelle How Greg Pearce Tarryn Stain Graham Taylor Stephanie Voon Prasanna Suraweera Josh Watson	Planning Solutions *(Applicant) (not in attendance)* Windsor Knight Windsor Knight Place Fabric Place Fabric Summation Planning Solutions
	Owners	Deltaview Pty Ltd
Observer/s		

Briefings		
Development assessment overview	Karina Bowater	Senior Planning Officer
Technical issues	Karina Bowater	Senior Planning Officer
Design Review		
Proposed development	Item 2 – PDA24/0070 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retain Establishment	
Property address	367 Scarborough Beach Road, Innaloo	
Background		
Proposal		

Applicant or applicant's representative address to the design review panel	Graham Taylor Prasanna Suraweera	Place Fabric Summation
Key issues / recommendations	The Panel is aware of the site's complex planning context and has advised that, despite the proposal's use and modest scale relative to the ambitions of relevant planning documents, it is reviewing the proposal on the basis that it is approvable. The Panel remains generally supportive of the proposal's design direction. The high-quality retail laneway in this location will serve the community well and is supported. The eastern half of the proposal considers the user and community member experience through the inclusion of sleeved speciality retail, good amenity for pedestrians along the north boundary, and the opening up of the supermarket to the public realm through extensive clear glazing, although some design mitigation is required to manage the removal of the deceleration lane. For the southeastern corner, the Panel recommended further architectural integration to reduce reliance on fencing and strengthen its urban presence. The southwestern service zone could benefit from intensified landscaping to balance the limited activation. The sustainability strategies presented are promising, though the Panel encouraged clearer commitments. In terms of aesthetics, the Panel advised a restrained approach to artwork and articulation to complement the architecture's sophistication. The Panel looks forward to seeing progress on the design at the next review. Refer to attached Design Quality Evaluation Report.	
Chairperson signature		

Design quality evaluation **Item 2 – PDA24/0070 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment** **DRP Meeting – Thursday 24 October 2024**		
	S	*Design Principle satisfied*
	P	*Design Principle pending further attention*
	N	*Design Principle not satisfied*
Principle 1 **Context and character**		*Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*
	P	1a. The Panel is aware of the complex planning context for this site and advised that it's review would be, notwithstanding its use and modest scale compared to the ambition of the various relevant planning documents, based on the proposal being seen as approvable. 1b. The Panel noted that the provided functional context analysis was successful in guiding the design response and in demonstrating how the proposal will integrate into the context, in plan. 1c. The Panel stated the materiality, and connectivity is successful and sophisticated in relation to other commercial properties in the surrounding area. 1d. Comment was made by the Panel the signage on the east end works well. There is opportunity to improve the signage on the western end where the signage is bolder and to find a balance. It would be beneficial for the Panel to understand the intent of the signage strategy, particularly with relation to large format signage likely proposed for the major retailer(s). 1e. The panel recommends reviewing the appearance and visibility of the roof elements from the Ewen St hill to the west and to use this analysis to inform the design of roof and services screening. The Panel was pleased to hear that the carpark shade structures will be lit at nighttime and will provide a feature element.
Principle 2 **Landscape quality**		*Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*
	P	2a. The Applicant was commended on the mature tree transplants included in the proposal. 2b. The Panel stated the revised selection of trees is supported with the choice of lower risk trees which are not on the Polyphagous shot-hole borer list. 2c. Comment was made by the Panel the reduction of paving is supported and a better outcome. 2d. Comment was made by the Panel the deep soil zone (DSZ) requirement has not been met. There was a suggestion by the Applicant that this proposal should be considered "urban" with associated reduction in DSZ. The Panel does not agree and seeks justification for this discretion being sought and or more details on how planting will be introduced to meet the requirements.
Principle 3 **Built form and scale**		*Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*
		3a. Notwithstanding its modesty in scale, the size of this single level structure has been designed to generally optimize the built form relationship to its context, especially to the eastern half of the site. 3b. In DRP1 the Panel commented the colonnade addressing Scarborough Beach Road, with clear glazing to reveal the inside of the supermarket, works well and provides the external pedestrian spaces with good amenity. However, the removal of the turning lane on Scarborough Beach Road has resulted in a second footpath. The Panel recommends further investigation of this new double pathway near the supermarket colonnade from an urban design perspective, as the added roadside footpath may reduce the colonnade's effectiveness. Additional landscaping could encourage users to favour the colonnade,

	P	enhancing its functionality and appeal. 3c. It was suggested by the Panel there is opportunity to reduce the excess of car parking and rationalise the ramping system into one crossover with both the exit and entry combined to one ramp and move the current ramp from Scarborough Beach Road which would create additional space on the south. 3d. Since DRP1, improvements have been made to the south-eastern corner of the development, including a feature architectural element at the southern end of the Pilates/gym tenancy. The Applicant also noted during the meeting that reducing truck size has allowed for a smaller service yard in this area. However, the Panel believes the visual impact of this corner would benefit from further refinement. While the Applicant indicated that a small tenancy (such as a "hole-in-the-wall" café) is not financially feasible, the Panel suggests enhancing the corner's presence by integrating it more fully into the architectural form, minimizing reliance on fencing to define the space. 3e. The Panel received additional information around the south-western service zone which now has an additional vehicle ramp further reducing the opportunity for any activation in this area. In lieu of a lack of activated uses to this area, additional and more intensive landscaping could be provided, including on verge, to benefit the community.
Principle 4 **Functionality and build quality**		*Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*
	S	4a. The introduction of street parking is supported and a great outcome. 4b. It was noted by the Panel the supermarket is sleeved or addresses the street which is a good outcome. 4c. Comment was made the slip lane removal is a good outcome.
Principle 5 **Sustainability**		*Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*
	P	5a. The Panel thanked the Applicant for engaging a sustainability consultant. 5b. The Panel stated the proposed sustainability strategies are encouraging but currently lack commitment. The Applicant is recommended to provide additional information and commitments.
Principle 6 **Amenity**		*Good design optimises internal and external amenity for occupants, visitors and neighbours providing environments that are comfortable, productive and healthy.*
	P	6a. It was noted by the Panel bike parking has been integrated into the proposal and is supported. 6b. Comment was made by the Panel the pedestrian laneway is a strong point of the design and provides excellent amenity and is well connected into the surrounding context. 6c. The Panel noted that the open-air design of the central arcade is a positive outcome but raised concerns about wind flow and mitigation strategies. The Applicant responded in the meeting, explaining that the building's low scale and the careful orientation of the space to manage prevailing breezes—drawing on insights from similar projects—address these concerns, which satisfied the Panel. 6d. The Panel recommends incorporating design elements that break up the glazing along the northern façade facing the supermarket colonnade. This approach could include varied fenestration patterns, recessed sills, or alternative materials to avoid a continuous, unarticulated stretch of floor-to-ceiling glass, creating a more engaging and visually dynamic frontage whilst maintaining the high levels of visual connection. 6e. The Panel suggests incorporating a window at the northern end of the north-south service corridor to the west of the supermarket.

Principle 7 **Legibility**		*Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*
	S	7a. The Panel is satisfied with the legibility of the proposal and stated it works well.
Principle 8 **Safety**		*Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*
	S	8a. This principle is supported on the condition the play space is not going to be formalised as a children's play space.
Principle 9 **Community**		*Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*
	S	9a. This project is a good outcome for the community in this location and is supported by the Panel.
Principle 10 **Aesthetics**		*Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*
	P	10a. The aesthetics of the eastern half of the proposal are progressing well including considered articulation, variation, colour, and façade treatments to enhance the local precinct generally. 10b. The inclusion of breeze blocks is successful. 10c. The Panel are supportive of the additional elements to the southeastern corner of the health and wellness tenancy which now provides some pedestrian activation. 10d. The Panel suggests enhancing the south-east corner's presence by integrating it more fully into the architectural form, minimizing reliance on fencing to define the space. 10e. The Panel suggested that the approach to artwork and articulation should be more restrained to complement the building's delicate and sophisticated architecture. Overly bold treatments may detract from the elegance of the design, whilst a lack of any treatment will deliver unwelcome blank facades. 10f. The panel note the important opportunity for passive nighttime lighting in the proposal.

Design Review progress

Item 2 – PDA24/0070 – 367 Scarborough Beach Road, Innaloo – Pre Development Application – Commercial / Retail Establishment

DRP Meeting – Thursday 24 October 2024 and 18 July 2024

S	*Design Principle satisfied*
P	*Design Principle pending further attention*
N	*Design Principle not satisfied*

	DR1 18/7/24	***DR2 24/10/24***	
Principle 1 - **Context and character**	P	P	
Principle 2 - **Landscape quality**	P	P	
Principle 3 - **Built form and scale**	P	P	
Principle 4 - **Functionality and build quality**	P	S	
Principle 5 - **Sustainability**	N	P	
Principle 6 - **Amenity**	P	P	
Principle 7 - **Legibility**	S	S	
Principle 8 - **Safety**	P	S	
Principle 9 - **Community**	S	S	
Principle 10 - **Aesthetics**	P	P	

Recommendations Summary Item 2 – PDA24/0070 and PDA24/0045 – 367 Scarborough Beach Road, Innaloo			
DR1 – DRP Recommendations DRP Meeting – 18/7/2024	DR2 – Applicant Response DRP Meeting – 18/7/2024	DR2 - DRP Recommendations DRP Meeting – 24/10/2024	DR2 – Applicant Response DRP Meeting –
1c. The proposal will benefit from the generation of section drawings which will describe the relationship between the proposal and the public realm in more detail. These sections should also extend across roads and into various lots to show the connectivity and topographical relationship to the broader context. 1d. The Applicant was urged to further interrogate how the design fits into the context of the location with relation to cultural and aesthetic considerations to further explore the future and existing sense of place. 1e. The Panel commended the intent for future proofing the proposal by considering future residential development. The Panel expressed concern about the complexity of delivering this in the future and seeks additional information demonstrating how this will be, in principle, delivered. There are concerns about an array of issues including carparking numbers, legible entry spaces, escape paths, and suitable structural grids. 1f. The Panel is generally supportive of the eastern end of the development and its integration into context but recommends reducing the extent of the service area on the south east corner and increasing activation to this corner with additional small retail	1. The applicant's design team has updated the drawings pack – and this pack now includes some simple explanatory site sections. The updated pack also contains some photographic imagery which offers cues for both design and materiality. In relation to 'future-proofing' for residential, the design team see the prospect of the 'health and wellness' pod being wholly or partly demolished. The format of this portion of built form (of circa 20m 'deep') is such that any future residential could sit over the top of and abutting the eastern boundary, without greatly affecting the lane or the retail F+B uses. The loading zone can still exist at the south eastern corner to deal with the combination of uses requiring to be serviced. If (in, say, 15 years' time) parking is needed for a 'build to rent' type offer, the retail parking deck is likely to be designed to have inbuilt capacity for a further (partial) level, where a ramp circulating up may be located on the south edge, over the (currently shown) remnant centre 'roof area' (alongside the proposed 'up' ramp). It would be reasonable to assume	1d. Comment was made by the Panel the signage on the east end works well. There is opportunity to improve the signage on the western end where the signage is bolder and to find a balance. It would be beneficial for the Panel to understand the intent of the signage strategy, particularly with relation to large format signage likely proposed for the major retailer(s). 1e. The panel recommends reviewing the appearance and visibility of the roof elements from the Ewen St hill to the west and to use this analysis to inform the design of roof and services screening. The Panel was pleased to hear that the carpark shade structures will be lit at nighttime and will provide a feature element.	

offerings.	that residents (per above) could use the currently proposed VT to access to 'ground' and across the laneway to a residential lobby. The applicant and the design team believe that the south eastern dock should be screened/enclosed and not 'on the street'.		
2b. The Panel stated the selection of trees is good although the Applicant was encouraged to look for alternatives which are not on the Polyphagous shot-hole borer list. 2c. The comment was made by the Panel there could be opportunity to improve the street trees and landscaping in this area. 2d. The Applicant was encouraged to further consider how additional landscaping (and possibly additional large trees) can be brought to the western half of the site. It was suggested that a paving audit be conducted as there appears to be an excess of hard surface area on this side.	2b. Refer to the updated Landscape pack, the selection has been revised to lower risk species. 2c. The design team has reduced the amount paving in the laneway (via various means), simplified the pedestrian ramp and added landscaped area. 2d. In the main dock area, the compactor has been relocated and the dock capacity is reduced such that any 'space' not applied to large vehicle movements or services may been landscaped.	2d. Comment was made by the Panel the deep soil zone (DSZ) requirement has not been met. There was a suggestion by the Applicant that this proposal should be considered "urban" with associated reduction in DSZ. The Panel does not agree and seeks justification for this discretion being sought and or more details on how planting will be introduced to meet the requirements.	
3c. It was noted the screen on the north works well with the envelope and would be a good outcome to dedicate this space for signage and an art component. 3d. The Panel suggests that additional work is required to improve the relationship of the built form of the western half of the site with the character of the area. It is noted that this area is a service area, however more design work is required to provide an appropriate level of quality to the form, material selection, landscaping, and general appearance. The opportunity for	3. There is intention to apply public art to areas of this south western side of the development (as shown indicatively on the drawings). Further, the entire layout of the major 'fresh tenant' has been rotated at 90 degrees to what had been previously envisaged. This has meant that all of the north facing glazing (off of Scarborough Beach Road) is now 'looking into' fresh produce.	3a. Notwithstanding its modesty in scale, the size of this single level structure has been designed to generally optimize the built form relationship to its context, especially to the eastern half of the site. 3b. In DRP1 the Panel commented the colonnade addressing Scarborough Beach Road, with clear glazing to reveal the inside of the supermarket, works well and provides the external pedestrian spaces with good amenity. However, the removal of	

integrated public art could be considered. 3e. There is an opportunity to bring the southern carpark ramp access inside the development to conceal it which may enable additional landscaping or other more positive treatments to this elevation. 3f. Additional small retail tenancies along the south-eastern corner facing Ewen Street would be an excellent outcome.	Similarly, the checkouts are now at the south east of the tenancy and the 'movement' of customers within this zone will assist in activation of the south facing glass – ie it will not suffer from being obscured at low level. The design team has also 'encouraged' the major tenant to locate their staff areas to the south edge under the aforementioned car ramp – and installed glazing into this zone. The loading area has been redesigned (and reduced in size) and the single lane entry for the deck car park has been moved northwards. With both outcomes there is a greater amount of 'in ground' landscape. In conjunction with the City, the design team (including the traffic engineer) has modified generally how car and truck access and egress occurs to the north and south. How this now works will be outlined at DRP2. The applicant and the design team do not believe that any 'micro-tenancies' facing south (west of the café) are commercially sustainable, now or into the foreseeable future.	the turning lane on Scarborough Beach Road has resulted in a second footpath. The Panel recommends further investigation of this new double pathway near the supermarket colonnade from an urban design perspective, as the added roadside footpath may reduce the colonnade's effectiveness. Additional landscaping could encourage users to favour the colonnade, enhancing its functionality and appeal. 3c. It was suggested by the Panel there is opportunity to reduce the excess of car parking and rationalise the ramping system into one crossover with both the exit and entry combined to one ramp and move the current ramp from Scarborough Beach Road which would create additional space on the south. 3d. Since DRP1, improvements have been made to the south-eastern corner of the development, including a feature architectural element at the southern end of the Pilates/gym tenancy. The Applicant also noted during the meeting that reducing truck size has allowed for a smaller service yard in this area. However, the Panel believes the visual impact of this corner would benefit from further refinement. While the Applicant indicated that a small tenancy (such as a "hole-in-the-wall" café) is not financially feasible, the Panel suggests enhancing the corner's presence by integrating it more fully into the	

		architectural form, minimizing reliance on fencing to define the space. 3e. The Panel received additional information around the south-western service zone which now has an additional vehicle ramp further reducing the opportunity for any activation in this area. In lieu of a lack of activated uses to this area, additional and more intensive landscaping could be provided, including on verge, to benefit the community.	
4e. It was mentioned by the Panel the pedestrian accessway to the northern end of the laneway may be too tight. The lift and public toilet area feels congested and could be opened up.	4. All appropriate measures for safety and functionality within the carpark will be put in place as the design evolves. There is a main plant room over the 'grocery pick up' area. Refer to the updated drawings. The design team has relocated the access into the public amenities (and the way they are arranged) to enhance safety and legibility. All other aspects of the 'VT' have been determined by the design team to be 'working well'.	4a. The introduction of street parking is supported and a great outcome. 4b. It was noted by the Panel the supermarket is sleeved or addresses the street which is a good outcome. 4c. Comment was made the slip lane removal is a good outcome.	
5a. The sustainability principle has not been addressed at this stage of the proposal. 5b. The Applicant was strongly encouraged by the Panel to explore sustainability initiatives and engage the services of a sustainability consultant. A commitment to sustainability initiatives is essential to enable a successful outcome.	5. New information on sustainability will be made available, via the applicant's sustainability consultant - Prasanna Suraweera from Summation.	5b. The Panel stated the proposed sustainability strategies are encouraging but currently lack commitment. The Applicant is recommended to provide additional information and commitments.	

6b. It was recommended the Applicant interrogate the acoustics on the carpark deck. 6c. It was suggested the public toilets could be relocated. 6d. It could be beneficial for the liquor outlet to have direct access to the street which would assist with improving amenity and street activation. 6f. The proponent should clarify how bike parking is integrated into the proposal.	6. Information on acoustics will be offered at lodgement of a DA (by requirement). The public amenities have been redesigned. By necessity (and in accordance with their brief) the liquor store has only one access (for safety/security reasons). According to reliable modelling, the south western alfresco area does get both morning and afternoon sun at all times of the year. Refer to the drawings for bike parking.	6d. The Panel recommends incorporating design elements that break up the glazing along the northern façade facing the supermarket colonnade. This approach could include varied fenestration patterns, recessed sills, or alternative materials to avoid a continuous, unarticulated stretch of floor-to-ceiling glass, creating a more engaging and visually dynamic frontage whilst maintaining the high levels of visual connection. 6e. The Panel suggests incorporating a window at the northern end of the north-south service corridor to the west of the supermarket.	
7b. The Panel noted that although the legibility of the car park entries is strong, additional work could be done (under other principles) to improve the quality of these elements.	7. The various measures for wayfinding and signage will be clarified and illustrated in the DA. The design team will ensure these are 'integrated' rather than 'applied later'. In conjunction with the City, the design team (including the traffic engineer) has modified how car and truck access and egress occurs. How this now works will be outlined at DRP2.	7a. The Panel is satisfied with the legibility of the proposal and stated it works well.	
10c. The Panel mentioned the Pilates studio could connect more to public realm through its formal connection to the pedestrian pathway. It is acknowledged that the proposed use does not require direct connectivity or full height glazing, but perhaps future adaptability should be considered to enable a different outcome in the future.	10. The design has now introduced full height glazing to the south eastern corner of the health and wellness tenancy (shown notionally as a pilates studio) to allow for future potential access. The design team seeks (in this proposal) to maintain a circa 1200mm cill height to this east facing glazing, given the intended function – ie to offer privacy, and to conceal	10d. The Panel suggests enhancing the south-east corner's presence by integrating it more fully into the architectural form, minimizing reliance on fencing to define the space. 10e. The Panel suggested that the approach to artwork and articulation should be more restrained to complement the building's delicate and sophisticated architecture. Overly	

10d. It was stated by the Panel clear glazing is critical for pedestrian activation. 10e. The western half of the design requires considerable design attention for aesthetics and the applicant is encouraged to seek opportunities to improve this area generally and how it presents to the public realm.	the low level furnishings or equipment that are almost inevitable as part of the fitout. The glazing types will be 'as required' to suit various codes (including those governing thermal performance). It is the design team's usual approach to specify glazing that is as 'see thru' as the codes allow. In relation to the western dock, note all of the comments above and refer to updated drawings.	bold treatments may detract from the elegance of the design, whilst a lack of any treatment will deliver unwelcome blank facades. 10f. The panel note the important opportunity for passive nighttime lighting in the proposal.	

Attachment 10

City of Stirling Planning Assessment

PLANNING ASSESSMENT

The Responsible Authority Report identifies the key considerations for this application. This attachment outlines the other planning considerations relevant to the assessment of this application.

PLANNING SCHEMES

Local Planning Scheme No. 3 (LPS3)

The below list identifies where discretion is sought to the development standards of Clause 6.11 Stirling City Centre Special Control Area of LPS3.

- Clause 6.11.13 Urban Design – The street block is greater than 150 metres in length between intersecting streets, at approximately 250 metres between Ewen Street at Scarborough Beach Road and Bowra Street.

The decision-maker has discretion under Clause 5.5 of LPS3 to approve a development does not comply with a standard or requirement prescribed under Clause 6.11 of LPS3, excluding those provisions listed in Clause 6.11.3 b).

The exercise of discretion to Clause 6.11.13 of LPS3 using LPS3 Clause 5.5.1 is permissible and is supported. The planning intent for this provision is to provide more connectivity through the Stirling City Centre, particularly for areas such as between Stephenson Avenue and King Edward Street. Having regard to the existing connectivity of the street network in the immediate area and the built form outcomes shown in the LDP for this street block, which shows a building envelope across the whole street block, the City does not require a street to be built through the subject site.

Planning and Development (Local Planning Schemes) Regulations 2015

The proposed development is required to be considered against the relevant matters listed under Clause 67 (2) of the Schedule 2 Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Commentary on the relevant considerations is provided below:

Deemed Provisions Clause 67(2) – Consideration of application by local government	
Provision	**Officer Comment**
(a) the aims and provisions of this Scheme (including any planning codes that are read, with or without modifications, into this Scheme) and any other local planning scheme operating within the Scheme area;	The City's assessment concludes that the approval of this applicant is consistent with the aims of provisions of Local Planning Scheme No. 3. There are no planning codes that apply to the assessment of this application.
(b) the requirements of orderly and proper planning including scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Schemes) Regulations 2015 or any other proposed planning instrument that the local	The City's assessment concludes that the approval of this applicant is consistent with orderly and proper planning principles. Comments on draft Local Planning Scheme No. 4. are outlined in this Attachment.

government is seriously considering adopting or approving;	
(c) any approved State planning policy;	The City's assessment has had due regard to State planning policies applicable to this development, that being SPP4.2, SPP5.4 and SPP7.0, as outlined in the Responsible Authority Report and its attachments.
(e) any policy of the Commission;	The City's assessment has had due regard to Policy DC5.1, as outlined in the Responsible Authority Report and its attachments.
(fa) any local planning strategy for this Scheme endorsed by the Commission;	The City's Local Planning Strategy identifies that the subject site is located within the Stirling City Centre Strategic Metropolitan Centre and abuts a Corridor Class 2 road – Scarborough Beach Road.
(g) any local planning policy for the Scheme area;	The City's assessment has had due regard to the City's local planning policies applicable to this development, as outlined in this Responsible Authority Report and its attachments.
(h) any structure plan or local development plan that relates to the development;	The City's assessment has had due regard to the Stirling City Centre Southern Precinct Local Development Plan. The Stirling City Centre Structure Plan is in draft form – the Structure Plan approved by Council in December 2014 did not obtain the necessary final approval from the Western Australian Planning Commission to become operational.
(i) any report of the review of the local planning scheme that has been published under the Planning and Development (Local Planning Schemes) Regulations 2015;	Given the City had prepared and advertised draft LPS4, the City's 2024 Report of Review was prepared primarily as a 'health check' of the City's Local Planning Strategy. The report compliments the preparation of the draft LPS4 and identifies the changes required to the City's local planning framework to align with LPS4 once it is gazetted.
(m) the compatibility of the development with its setting, including – *(i) the compatibility of the development with the desired future character of its setting; and* *(ii) the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development.*	The subject site is in a commercial area, and the built form of the development is complimentary to the existing streetscape. The subject site is separated from the lower density residential area to the South by the width of Ewen Street. The built form of the development does not pose adverse amenity impacts to neighbouring properties.
(n) the amenity of the locality including the following – *(i) environmental impacts of the development;*	The proposed development offers enhanced amenity to the locality by activation of a large vacant parcel of land in a Strategic Metropolitan Activity Centre and

(ii) the character of the locality; *(iii) social impacts of the development;*	on an Activity Corridor with the provision of retail and hospitability tenancies. The development results in a net increase to the landscaping of the site relative to existing site conditions.
(o) the likely effect of the development on the natural environment or water resources and any means that are proposed to protect or to mitigate impacts on the natural environment or the water resource;	The development does not adversely affect the natural environment or water resources. The existing groundwater contamination in the area is not enhanced by the development.
(p) whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved;	The proposed landscaping is shown in the submitted landscaping The City has assessed the application using the City's landscaping policy, LPP6.6 – the provision of landscaping is supported, being consistent with the objectives of LPP6.6. There is one palm tree and minimal other existing vegetation on the subject site – the existing tree and vegetation is not high quality and its removal is supported.
(q) the suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bush fire, soil erosion, land degradation or any other risk;	The site is suitable to construct this development. The existing groundwater contamination in the area does not affect the development.
(r) the suitability of the land for the development taking into account the possible risk to human health or safety;	The site is suitable to construct this development. The existing groundwater contamination in the area does not affect the development. The owner can avoid abstracting groundwater within the affected portion of the subject site.
(s) the adequacy of – *(i) the proposed means of access to and egress from the site; and* *(ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles;*	The location of the vehicle access points is suitable. The design of the vehicle access points is broadly suitable, though some matters will need to be addressed further through detailed design. The development provides adequate on-site parking consistent with the planning provisions. The development provides servicing areas for deliveries and waste collection.
(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety;	The City's assessment has had due regard to the traffic and safety impacts, as outlined in the Responsible Authority Report.
(u) the availability and adequacy for the development of the following – *(i) public transport services;* *(ii) public utility services;*	Scarborough Beach Road is a high-frequency bus route, and bus stops are located within 200 metres of the entrance – this includes the 990 route between Perth and Scarborough Beach via Glendalough.

(iii) storage, management and collection of waste; *(iv) access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities);* *(v) access by older people and people with disability;*	Public utility services are available for the development. A Waste Management Plan has been prepared for this development. This plan is suitable for implementation. Pedestrian access is provided from Scarborough Beach Road and Ewen Street. The provision of bicycle parking and facilities complies with the relevant provisions of LPP5.8 and LPP6.7 subject to the recommended conditions. Step free access is available from Scarborough Beach Road, Ewen Street and the roof-top carpark to all commercial tenancies. The car park includes the provision of accessible bays.
(v) the potential loss of any community service or benefit resulting from the development other than potential loss that may result from economic competition between new and existing businesses;	The subject site is located within a Strategic Metropolitan Centre. This development does not require a net benefit test to be provided under SPP4.2.
(y) any submissions received on the application;	The proposed development was advertised for a period of 28 days in accordance with the 'Complex Application' requirements of Schedule 2 Clause 64(3) and (6)(a) of the *Planning and Development (Local Planning Schemes) Regulations 2015*. The City's assessment has had due regard to the submissions received.
(za) the comments or submissions received from any authority consulted under clause 66;	The City's assessment has had due regard to the submissions received from external agencies, as outlined in the Responsible Authority Report.

<u>Metropolitan Region Scheme (MRS)</u>

The below list identifies where discretion is sought to the zoning of the MRS.

- The development is built within the Other Regional Road reservation.

The Other Regional Road reservation for Scarborough Beach Road includes a section of the original alignment of Ewen Street. Ewen Street has been realigned, and the original intersection with Scarborough Beach Road has been decommissioned, though the reservation alignment has not been revised. The approval of the development within this section of the Other Regional Road reserve does not affect the intent of the reserve. The construction of the development within the portion of the subject site reserved as Other Regional Road is supported.

<u>Draft Local Planning Scheme No. 4 (LPS4)</u>

The City has prepared new Local Planning Scheme No.4 (LPS4) to replace Local Planning Scheme No.3 (LPS3). On 10 June 2025 at its Ordinary Meeting, Council considered a report on the outcomes of advertising of draft LPS4 and resolved to support it, subject to modifications. On 18 June 2025, draft LPS4 has been accepted by the Department of Planning, Lands and Heritage for final assessment and determination. Draft LPS4 was considered by the Statutory Planning Committee of the Western Australian Planning Commission on 27 May 2026. The resolution is confidential.

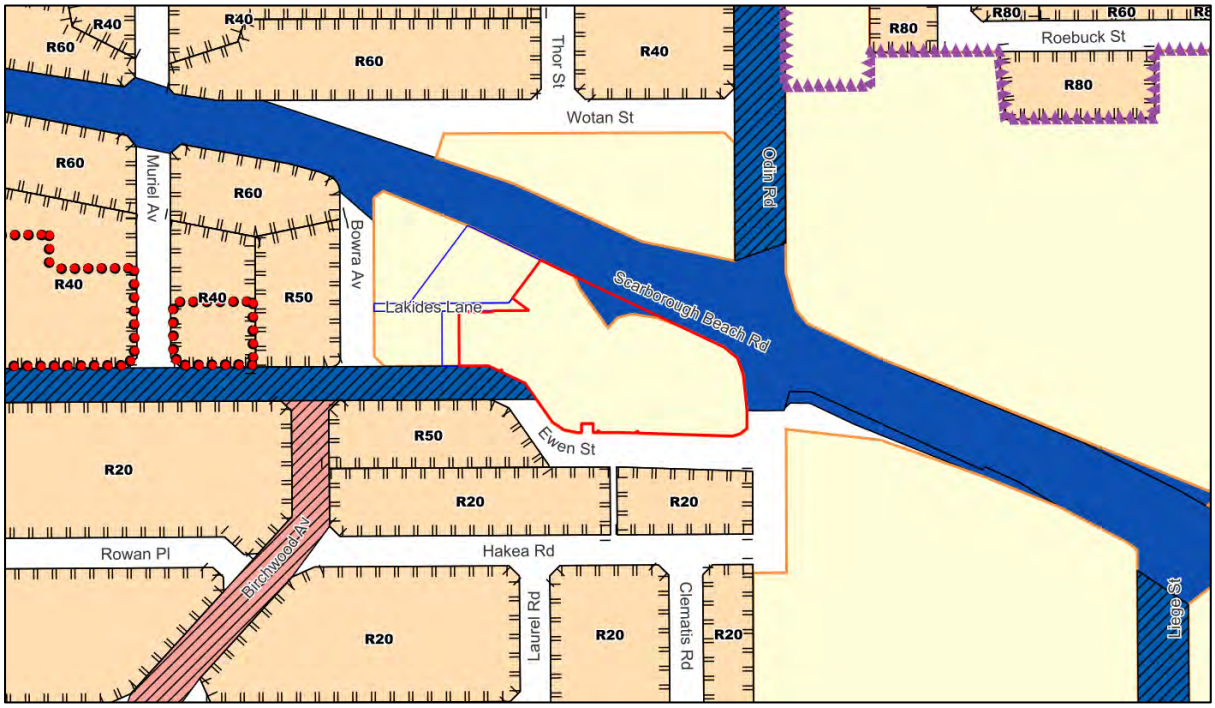
In relation to draft LPS4, a decision-maker can give due regard to a seriously entertained planning proposal when determining an application, in accordance with Schedule 2 Clause 67(2)(b) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

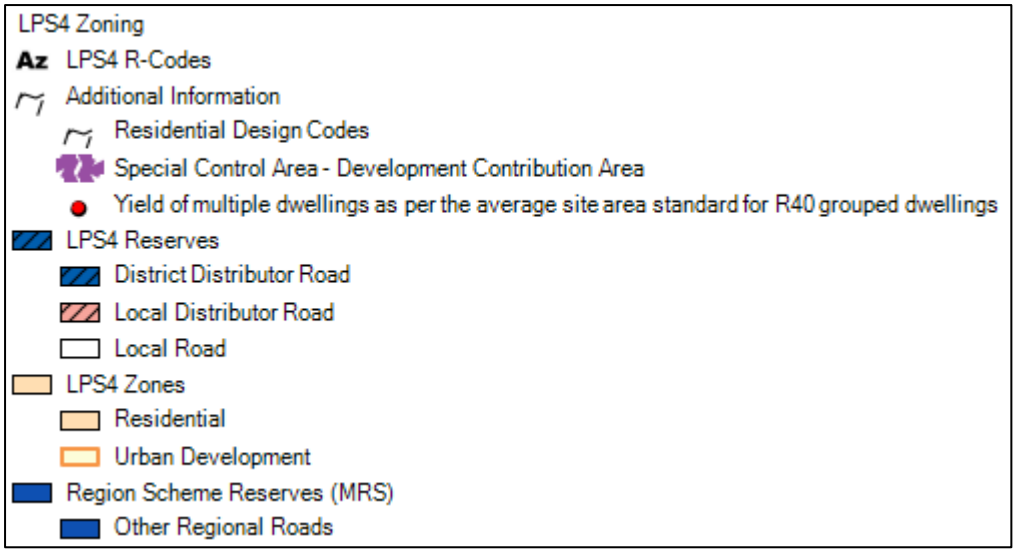
For contextual purposes, in summary under draft LPS4, the development site is proposed to be in the Urban Development zone. The surrounding properties to the east, north and west, which form part of the existing Stirling City Centre Strategic Metropolitan Centre, are also proposed to be zoned Urban Development. The properties to the south of the site are proposed to be zoned Residential, with a residential density coding of R20 to the south and R50 to the south west.

The Clause 6.11 Stirling City Centre Special Control Area provisions of LPS3 are not included in draft LPS4.

The objectives of the Urban Development zone are proposed to be:

- To provide an intention of future land use and a basis for more detailed structure planning in accordance with the provisions of this Scheme.
- To provide for a range of residential densities to encourage a variety of residential accommodation.
- 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.
- To provide an intermediate transitional zone following the lifting of an urban deferred zoning within the Metropolitan Region Scheme.





STATE PLANNING POLICIES

State Planning Policy 4.2 – Activity Centres (SPP4.2)

The subject site is within the Stirling Strategic Centre, which is the second tier in the Activity Centres Hierarchy, one tier below the Capital City (Perth). The proposed development is not classified as a 'major development' under the policy. A 'Net Benefit Test' is not required for the proposed development under the policy.

State Planning Policy 5.4 – Road and Rail Noise (SPP 5.4)

The subject site abuts Scarborough Beach Road which is identified as a 'Other Significant Freight/Traffic Route' in accordance with State Planning Policy 5.4 – Road and Rail Noise (SPP 5.4). As no noise sensitive land uses are proposed, the requirements of SPP 5.4 do not apply to the proposed development.

State Planning Policy 7.0 – Design of the Built Environment (SPP 7.0)

SPP 7.0 applies to all development in Western Australia. The purpose of SPP 7.0 is to inform and guide landowners, proponents, designers, reviewers and decision-makers to achieve good design outcomes in the built environment.

The City's summary of the proposed development against SPP 7.0 is as follow:

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
1. Context and Character *Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*	The proposal has identified the characteristics of the locality and designed a development that is consistent with and enhances the local character.
2. Landscape Quality *Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*	The proposal provides landscaped areas at ground level around the building where not built up to the street, and within the outdoor pedestrian space.

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
	The landscape design compliments the built form and enhances the visual and environmental amenity of the subject site.
3. Built form and scale *Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*	The massing and scale design of the development is consistent with the existing commercial setting of the subject site, with a variety of finishes and articulation to avoid an overly bulky appearance from the street.
4. Functionality and build quality *Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life cycle.*	The development accommodates the practical needs of the future tenancies and their customers with the high-quality urban planning outcomes sought for the subject site.
5. Sustainability *Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*	The development accommodates sustainability principles, such as the provision of an outdoor pedestrian space for access to the commercial tenancies utilising canopies and tree cover for weather protection, solar power generation and water sensitive design. The commercial development will enhance the local community from an economic and social perspective, by providing opportunities for employment and commercial retail and hospitability services.
6. Amenity *Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*	The development is designed to accommodate various commercial uses and a shared community space through the outdoor pedestrian space. The development provide good levels of amenity for staff and customers, and enhances the visual appearance of the existing streetscape.
7. Legibility *Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*	The pedestrian and vehicle entry points are clearly evident with logical wayfinding provides through the proposed layout of the development.
8. Safety *Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*	The development has accommodated safety considerations in its design. The built form provides passive surveillance to the streetscape and within the outdoor pedestrian space. The car parking is provided in a consolidated location and the turnover of customers will minimise risks to

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
	safety. The design avoids creating entrapment areas.
9. Community *Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*	The development is expected to function as a community meeting point noting the type of businesses expected to operate from the subject site. The development compliments the existing commercial offerings within the Stirling City Centre.
10. Aesthetics *Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*	The development is designed to provide an attractive aesthetic appearance.

Policy DC 5.1 Regional Roads (Vehicular Access) (DC 5.1)

DC 5.1 is relevant to the application, as vehicular access from a regional road, Scarborough Beach Road, is proposed.

The development addresses the Objectives of DC 5.1 and is supported. An assessment against the Objectives of DC 5.1 is provided below.

Policy Objectives – Clause 2 of DC 5.1	
Policy Objectives	**Officer Comment**
• *To outline planning principles to be applied in the determination of proposals for vehicle access to regional roads.*	The key considerations are traffic flow and road safety. The proposed vehicle access arrangements have been reviewed, having regard to the context of Scarborough Beach Road and the development. The proposed vehicle access design is seen to align with the planning principles for vehicle access onto a regional road.
• *To ensure that vehicle access to regional roads and the type of abutting developments is controlled and conforms with sound town planning principles.*	The provision of direct access has been accepted having regard to context of the surrounding area and the traffic generation of the development. The proposed vehicle access design is seen to align with the planning principles for managing vehicle access onto a regional road.
• *To improve traffic flow and safety on all regional roads, either new or existing, by minimising the number of junctions or driveways.*	The vehicle entrance into the site from Scarborough Beach Road provides a deceleration lane to avoid congestion between slowing vehicles turning into the development and passing regional traffic. For vehicles exiting the site, the turning lane physically distinguishes between traffic turning into this development and the adjacent Service Station, reducing the risk

Policy Objectives – Clause 2 of DC 5.1	
Policy Objectives	**Officer Comment**
	of collisions. The new vehicle access points are broadly located in the same area as the existing Service Station crossover.

LOCAL DEVELOPMENT PLANS AND LOCAL PLANNING POLICIES

Stirling City Centre Southern Precinct Local Development Plan (LDP)

The below list identifies where discretion is sought to the development standards of the LDP.

- Clause 1.4 – Discretion is being sought to provisions where variations are not permitted by the LDP.
- Clause 2.1.2.3 – The minimum number of dwellings required is 61 dwellings. No residential component is proposed.
- Clauses 2.1.3, 2.1.4.1 and 3.1.2 – The maximum building height permitted, and minimum setbacks required, are as shown in Figure 12 of the LDP. The proposed building height and minimum setbacks are not compliant within the 0 storeys maximum area, that being the portion of the building located within 3.0 metres of the southern boundary to Ewen Street. The rest of the proposed development is compliant with the maximum number of storeys permitted and minimum street setbacks required across the site.
- Clauses 2.1.4.3 and 2.1.4.4 – A minimum setback of 12.0 metres is required between the eastern and western buildings, with up to 0.75 metres of minor projections permitted. A 12 metre separation is not provided for the full length of the outdoor pedestrian space and the roof eaves project by more than 0.75 metres into the internal setback area.
- Clause 2.1.4.5 and 2.3.2 – All car bays not located in a basement are required to be setback a minimum of 8.0 metres from the street and sleeved behind the building façade. There are car parking bays proposed on the roof top within 8.0 metres of the Scarborough Beach Road boundary and within the back-of-house area within 8.0 metres of the southern boundary to Ewen Street.
- Clause 2.1.7.1 – No walls are permitted to be longer than 10.0 metres in length without an indentation of at least 1.0 metre depth and 2.0 metres width. The proposed development consists of multiple walls greater than 10.0 metres in length without an indentation.
- Clause 2.2.2.1 – This provision includes a requirement for a minimum of 80% clear glazing on the ground floor frontages. The proposed development provides approximately 40% clear glazing to Scarborough Beach Road, approximately 60% clear glazing to the eastern boundary to Ewen Street and approximately 20% clear glazing to the southern boundary to Ewen Street.
- Clause 2.2.2.4 – This provision includes a requirement for buildings to have courtyards and balconies facing all streets. No courtyards or balconies are proposed.
- Clause 2.2.2.6 – This provision includes a requirement for awnings with a minimum depth of 2.5 metres. The proposed development does not provide awnings projecting beyond the lot boundaries. A 2.4 metre depth awning is provided in front of the T00 Shop tenancy to Scarborough Beach Road.
- Clause 2.2.3 – Walls and fences within the street setback areas are required to be visually permeable above 1.2 metres in height, to a maximum of 1.8 metres. The T00 Shop tenancy back-of-house perimeter wall is 2.4 metres high to Ewen Street. The communal back-of-house perimeter screen wall is 3.9 metres high to Ewen Street.
- Clauses 2.2.4.1, 2.2.4.2 and 2.2.4.3 – The site works provisions include a maximum of 0.5 metres of fill, a maximum of 0.5 metres retaining above natural ground level and for the ground floor level to match the footpath level. The maximum level of fill and retaining above natural ground level exceeds 0.5 metres. This includes up to 0.6 metres fill height and up to 0.8 metres retaining height at the southern end of the outdoor pedestrian space, and up to 2.0 fill in the middle of the outdoor pedestrian space. The proposed floor levels generally

align with the footpath levels adjacent to an entry point, with internal ramping to accommodate level changes. However, the floor levels do not align where there is no entry point, including the T00 Shop tenancy adjacent to Scarborough Beach Road, and the T06 Restaurant and T10 Recreation - Private tenancies adjacent to Ewen Street.

- Clause 2.2.4.4 – The required landscaped area shown in Figure 12, that being within 3.0 metres of the southern boundary to Ewen Street, is not fully provided, and trees are planted on site, but their spacing is at greater than 5.0 metres intervals. The discretion sought to Local Planning Policy 6.6 (LPP 6.6) applies to this provision.
- Clause 2.2.4.5 – The discretion sought to the applicable provisions of Local Planning Policy 4.2 (LPP 4.2) applies to this provision.
- Clause 2.3.1 – The discretion sought to Local Planning Policy 5.8 (LPP 5.8) applies to this provision.
- Clauses 2.3.3 and 2.3.4 – Sightlines. The maximum crossover width permitted is 6.0 metres. The proposed crossover to Scarborough Beach Road is 15.6 metres in width combined, the proposed crossover for the communal back-of-house servicing area to Ewen Street is 9.7 metres in width and the relocated Service Station crossover is 11.9 metres in width.
- Clause 2.4.1 – The discretion sought to Local Planning Policy 6.1 (LPP 6.1) applies to this provision.
- Clause 3.1.2 – In addition to the discretion sought to the maximum building height, minimum setbacks and required landscaping area identified above:
  - A minimum two storeys building height applies. The proposed development is single storey, plus the roof-top parking level above.
  - Continuous awnings are required along Scarborough Beach Road. The proposed awning is to portion of the Scarborough Beach Road frontage.
- Clause 3.1.3 – The development is constructed in the road widening area shown in Figure 23.

The development addresses the Objectives of the LDP and is supported. An assessment against the Objectives of LDP is provided below.

Objectives – Clause 1.1 of the LDP	
LDP Objectives	**Officer Comment**
The key objectives of this Local Development Plan are to:	
• *Facilitate mixed use development with an emphasis on retail and other active uses;*	This development provides retail and other active uses.
• *Enable a main street-based retail environment with future light rail along a narrowed Ellen Stirling Boulevard;*	The subject site does not abut Ellen Stirling Boulevard. The proposed development does not prevent this objective being achieved.
• *Allow Scarborough Beach Road to incorporate a light rail with a high-quality pedestrian environment with on-street parking and active ground floor uses;*	The proposed development provides passive surveillance to Scarborough Beach Road through the provision of clear glazing to the façade of the T00 Shop and T10 Recreation - Private tenancies, and direct connection to the outdoor pedestrian space within the development. The Scarborough Beach Road frontage provides some shelter to pedestrians and landscaping. The proposed development does not prevent the future provision of a light rail or on-street parking on Scarborough Beach Road.

Objectives – Clause 1.1 of the LDP	
LDP Objectives	**Officer Comment**
• *Provide a Town Square, Market Square and a linear open space and open urban stream; and*	The subject site does not contain or abut the locations identified as the Town Square, Market Square or the linear open space with open urban stream, in the LDP or the draft Stirling City Centre Structure Plan. The proposed development does not prevent this objective being achieved.
• *Ensure there is a "stepping down" of heights between buildings to the residential areas to reduce impacts on residential amenity.*	The subject site is on the fringe of the Stirling City Centre area and its proposed height, being single storey plus the roof-top parking level, assists in stepping down of heights between the core areas of Stirling City Centre where the greatest height is intended and the residential areas with lower heights on the periphery.

An assessment against the corresponding objectives of LDP where variations to the provisions of Clause 2 are sought is provided below. Clauses 3.1.2 and 3.1.3 of the LDP do not have corresponding objectives.

Objectives – Clause 2.0 of the LDP	
LDP Objectives	**Officer Comment**
2.1.2.3 Minimum Number of Dwellings • *To achieve the dwelling targets outlined in the Stirling City Centre Structure Plan.*	Comments on the provision of a residential component are provided in the Responsible Authority Report.
2.1.3 Building Heights *2.1.3.1 Wall Height* • *To protect habitable rooms and outdoor living areas of existing landowners and reduce bulk of buildings.* *2.1.3.2 Architectural features above Building Wall Height* • *To add architectural interest to the street façade which contributes to the streetscape.* *2.1.3.3 Roof Height* • *To limit the impact of bulk and scale on adjoining neighbours.* *2.1.3.4 Bonus Height* • *To allow bonus heights in return for improvement in building design and community facilities.*	The proposed development is largely compliant with the maximum heights permitted by the LDP. The site is surrounding by streets on three sides, and undeveloped land and a Service Station fuel canopy on the other boundaries. The building design includes variations to setbacks, material finishes and external colours to reduce the bulk and scale impacts of the building.
2.1.4.1 Street Setbacks • *To ensure that buildings provide a consistent frontage to the street; and* • *To provide visually accessible areas of open space on privately owned land.*	The proposed development provides variations to the building frontages across the site. In this instance, the subject site has wide frontages to both streets, and these variations assist in minimise adverse building bulk and scale impacts to the street. The provided landscaped areas between the building and the street boundary and the outdoor pedestrian

Objectives – Clause 2.0 of the LDP	
LDP Objectives	**Officer Comment**
	space within the site are visible from the street.
2.1.4.3 Setbacks between Buildings • *To provide sufficient space for light, cross ventilation, outlook, landscaping and trees between buildings; and* • *To reduce building bulk* *2.1.4.4 Minor Projections into Setback Area* • *To allow for architectural features to have minor projections into the setback area whilst providing sufficient space for light, cross ventilation, outlook, landscaping and trees between buildings.*	The outdoor pedestrian space is partially open to the sky and this space incorporates landscaping and trees between the buildings. The outdoor pedestrian space is also open at both ends to facilitate ventilation breezes. The provision of wider eaves provides more protection from the weather, considering this is expected to be a highly trafficable space when the commercial businesses are operational.
2.1.4.5 Setback of Garages, Carports and Parking Areas • *To ensure that car parking and car parking structures are not visible from the street.* • *To allow on-street residential visitor bays in accordance with the Stirling City Centre Urban Design and Landscape Strategy.* *2.3.2 Design and Location of Car Parking Bays* • *To ensure that car parking areas do not disrupt the continuity of building frontages;* • *To ensure that onsite parking is not visible from any street; and* • *To ensure parking is sleeved with residential and non-residential buildings.*	The bulk of the car parking is provided on the roof-top of the building. The solid perimeter walls around the car park assists in minimise views of parked vehicles from the street. The remaining car bays are in the back-of-house area and are screened from view by its perimeter walls. The proposed development accommodates the provision of on-street parking on Ewen Street and the resultant displacement of the public footpath with hardstand within the subject site.
2.1.7.1 Podium Facades and Walls (Ground Storey to 3rd Storey) • *To ensure that podium facades are articulated, indented with openings and use different materials and colours.*	The proposed development provides variations to the building frontages across the site, including setbacks, material finishes and external colours. These variations assist in minimise adverse building bulk and scale impacts to the street.
2.2.2.1 Non-Residential Ground Floor Frontages • *To ensure that active non-residential frontages face the street and portray an attractive and inviting frontage.*	The proposed development provides active non-residential frontages to the street, with the inclusion of clear glazing to the commercial tenancies. The entry points to the outdoor pedestrian space provide a connection between the development and the street. The façade design is considered to provide an attractive and inviting frontage.
2.2.2.4 Surveillance of Streets, Public Open Space & Public Access Ways • *To ensure there is passive surveillance of public open space areas and public access ways for safety; and* • *To ensure buildings address streets, public open space and public access ways with*	The proposed development provides passive surveillance to the street and the internal outdoor pedestrian space through the provision of clear glazing from the commercial tenancies. The activity within the outdoor pedestrian space will also provide passive surveillance opportunities to the street near the entry points.

Objectives – Clause 2.0 of the LDP	
LDP Objectives	**Officer Comment**
balconies and major openings to habitable rooms.	
2.2.2.6 Weather Protection • *To support a comfortable external environment for pedestrians.*	Some permanent shelter is provided over the footpaths and to the outdoor pedestrian space. This assists in providing a comfortable environment for pedestrians on the street.
2.2.3 Street Walls and Fences • *To promote surveillance of the street.*	The proposed street walls and fence do not block passive surveillance between the buildings and the street. The discretion sought, to the street fence and wall height, relates to the provision of screening of the back-of-house areas.
2.2.4.1 Excavation or Fill • *To ensure that development follows the topography of the land.* *2.2.4.2 Retaining Walls* • *To ensure development considers and responds to the natural features of the site and requires minimal excavation/fill.* • *Where excavation/fill is necessary, all finished levels respecting the natural ground level at the lot boundary of the site as viewed from the street.* *2.2.4.3 Levels* • *To ensure that there is equitable access for pedestrians and that excessive differences will not have a negative impact on the amenity of the area.*	Some degree of site works is reasonable having regard to the large size of the subject site and the sloping topography across the site. The finished levels integrate with the primary pedestrian entrance point, from Scarborough Beach Road. The extent and height of raised levels on the southern side of the site is not overly excessive and will not adversely affect the Ewen Street streetscape. Step free access is provided from both streets to the commercial tenancies. The excavation works are consistent with the LDP requirements and are screened from the view of the street.
2.2.4.4 Landscaping • *To improve the visual appeal of development, screen service areas and provide shade and green relief in built up areas.*	The development incorporates an acceptable provision of landscaping to soften the built form, provide shading particularly within the outdoor pedestrian space and enhance the amenity of the development.
2.2.4.5 Lighting, Safety and Security • *To ensure appropriate lighting to improve safety.*	The development is expected to have adequate lighting to promote safety. The development addresses the Objectives of LPP 4.2 and is supported.
2.3.3 Vehicle Access • *To ensure vehicle access ways are safe and easily traversed;* • *To limit the number of, and width of crossovers, reducing the impact on pedestrians, traffic, movement and safety; and* • *To minimise the amount of land used for driveways.* *2.3.4 Crossovers* • *To limit the number of crossovers, reducing the impact on pedestrians and traffic*	The development is generally designed to provide vehicle access in a safe manner. The subject site has a large frontage to both Scarborough Beach Road and Ewen Street and the proposed total width of the access points is not a dominant component of the streetscape in this instance.

Objectives – Clause 2.0 of the LDP	
LDP Objectives	**Officer Comment**
2.4.1 Signage • *To ensure there is not a proliferation of signage within the streetscape.*	The development does not propose a proliferation of signage as viewed from the street. The development addresses the Objectives of LPP 6.1 and is supported.

<u>Local Planning Policy 4.2 – Mixed Use Design Guidelines (LPP 4.2)</u>

LPP 4.2 only applies to the extent the City's "Mixed Use and Commercial Centre Design Guidelines" is referenced in the LDP. The below list identifies where discretion is sought to the applicable development standards of LPP 4.2.

- Clause 4.4 – The design of the service/loading areas do not achieve the specific provision of passive surveillance and avoidance of a potential entrapment area provisions.
- Clause 4.4 – The submission does not detail the external lighting layout and accordingly it cannot be confirmed the provision of lighting requirement is achieved from the information provided, though this matter can be suitable addressed by condition setting.

The development addresses the Objectives of LPP 4.2 and is supported. An assessment against the Objectives of LPP 4.2 is provided below.

Policy Objectives – Clause 2 of LPP 4.2	
Policy Objectives	**Officer Comment**
Objective 1: Building Setbacks - *To ensure that building setbacks provide streetscape continuity and a suitable transition between land uses.*	Building setbacks are assessed in accordance with the provisions of the LDP.
Objective 2: Landscaping and Fencing - *To improve the visual appeal of development and provide landscaping to increase tree canopy cover.*	Landscaping is assessed in accordance with the provisions of the LDP and LPP 6.6.
Objective 3: Building Height - *To ensure the height of buildings does not adversely impact on the street-scape and amenity of adjoining residents by minimising building bulk and maintaining daylight and solar access.*	Building height is assessed in accordance with the provisions of the LDP.
Objective 4: Car Parking (Design, Location and Screening) - *To ensure car parking areas do not detract from the amenity of the streetscape.*	Car parking design, location and screening are assessed in accordance with the provisions of the LDP.
Objective 5: Service Access and Waste Facilities - *To ensure sufficient space is provided for the delivery of goods and the removal of waste materials. These areas are to be located to minimise the impacts of service and waste areas on residential properties.*	The development provides adequately designed service areas for deliveries and collections. The on-street loading on Ewen Street is provided, for longer trucks that cannot manoeuvre within the eastern service area. The services areas are separated from the neighbouring residential properties by the width of Ewen Street and the external screening.
Objective 6: Safety and Lighting - *To ensure outdoor public spaces are safe, secure and enable community interaction*	Passive surveillance opportunities are provided between the building, the streetscape and the outdoor pedestrian space. The development facilitates

Policy Objectives – Clause 2 of LPP 4.2	
Policy Objectives	**Officer Comment**
and reduce opportunities for concealment or entrapment.	community interaction, noting the uses proposed and resultant number of people estimated to attend the development. It is expected that the outdoor spaces will be lit at night. The design of the public areas avoids opportunities for concealment or entrapment by having no substantive visual obstructions to passive surveillance sightlines and by avoiding the creation of dead ends.
Objective 7: Ground Floor Frontage, Activity and Weather Protection - *To ensure that buildings provide an active, safe and sheltered frontage / facade.*	The development provides good levels of clear glazing to the public streets and the outdoor pedestrian space to provide passive surveillance opportunities. Some permanent shelter is provided over the footpaths and to the outdoor pedestrian space.
Objective 8: Building Façade, Parapets and Balconies - *To ensure buildings provide architectural interest and positively contribute to streetscapes.*	The variation in setbacks, heights, external materials and colours and the inclusion of clear glazing presenting to the street provides architectural interest and a positive contribution to the streetscape.

Design Intent – Clause 4.4 of LPP 4.2	
Design Intent	**Officer Comment**
To ensure that service areas, access ways and visitor car parking areas are safe, through design, lighting and passive surveillance.	All visitor parking is located on the roof top. It is expected that the car park will be lit at night. There are no substantive visual obstructions to passive surveillance sightlines within the car park.

<u>Local Planning Policy 5.8 – Stirling City Centre Parking (LPP 5.8)</u>

The below list identifies where discretion is sought to the development standards of LPP 5.8.

- Clauses 6.2 and 6.3 – Submission of a Parking Management Plan.
- Clause 9 – Minimum provision of motorcycle / scooter parking bays.

The development addresses the Objectives of LPP 5.8 and is supported. An assessment against the Objectives of LPP 5.8 is provided below.

Policy Objectives – LPP 5.8	
Policy Objectives	**Officer Comment**
• *To facilitate the provision of adequate car, bicycle and motorcycle parking facilities within the policy area.*	The provision of car and bicycle parking and end of journey facilities is compliant. There are spaces set aside for motorcycle and scooter parking on the roof-top car parking and is sufficient to accommodate the likely demand. There are no complex issues with the proposed design and provision of parking that necessitate the provision of a parking management plan.

Policy Objectives – LPP 5.8	
Policy Objectives	**Officer Comment**
• *To prioritise access to the city centre by public transport, walking and cycling.*	The provision of car parking is compliant with minimum and maximum requirements. The provision of bicycle parking and end of journey facilities is compliant.
• *To ensure that parking is provided for various services, facilities and developments at a rate that is appropriate for an inner city environment, and to efficiently manage parking supply and demand.*	Clause 6.11 of LPS3 specifies minimum and maximum parking rates and the provision of car parking is compliant.
• *To ensure that the number of parking bays and the resultant traffic does not exceed the capacity of the road network.*	The provision of car parking bays does not exceed the maximum permitted by LPP 5.8 and by Clause 6.11 of LPS3.
• *To assist in the funding of the necessary upgrade of the parking facilities and public transport network associated with the redevelopment of Stirling City Centre*	The required car parking is provided on the subject site and cash-in-lieu payments for off-site public parking is not required.

<u>Local Planning Policy 6.1 – Advertising Signs (LPP 6.1)</u>

The development proposes various 'Wall Signs' on the exterior of the building, three 'Projecting Signs' on top of the walls of the building and an external 'Pylon Sign'. The content of the signage is generic, noting no tenants are identified in the application – future changes to the content only of an approved advertising sign will not require further development approval.

The below list identifies where discretion is sought to the development standards of LPP 6.1.

- Clause 4.3.3.2 a) – The three projecting signs project above the top of the wall.

The development addresses the Objectives of LPP 6.1 and is supported. An assessment against the Objectives of LPP 6.1 is provided below.

Policy Objectives – Clause 2 of LPP 6.1	
Policy Objectives	**Officer Comment**
The objectives of this Policy are:	
a) To ensure advertising signs do not pose a safety threat and do not prevent passive surveillance;	The proposed signage does not interfere with pedestrian movements on the street. The proposed signage does not cause a visual distraction for drivers or present confusion the traffic lights. The location of the signage does not prevent passive surveillance between the building and the street.
b) To ensure businesses can display advertising signs without, in certain circumstances, the need to obtain development approval;	This objective is not relevant for a development application assessment.
c) To ensure that the display of advertising signs does not adversely impact on the amenity of surrounding land and streetscapes;	The provision of advertising signs does not adversely affect the amenity of the locality.

Policy Objectives – Clause 2 of LPP 6.1	
Policy Objectives	**Officer Comment**
d) To ensure advertising signs are appropriately scaled for their setting;	The size of the signage is considered appropriate in the context of the proposed building, having regard to the extent of the building frontage to the street.
e) To avoid the proliferation of advertising signs on individual sites and buildings to minimise visual clutter;	The number of signs proposed is not considered to be a proliferation of signage or cause visual clutter, having regard to the extent of the building frontage to the street.
f) To encourage the incorporation of advertising signs into the design consideration of buildings and avoid obscuring or detracting from prominent architectural features;	The advertising signs are incorporated into the design of the building and do not interfere with the aesthetics of the architecture of the building.
g) To ensure advertising signs only relate to services and products available on the site; and	The signage is intended to relate to the services and products made available by the future tenants on the site.
h) To ensure the content of advertising signs meets community expectations and is not discriminatory or offensive.	The signage shown is not discriminatory or offensive.

Conditions are required to ensure ongoing compliance with the general standards of LPP 6.1 relating to advertising content and illumination.

<u>Local Planning Policy 6.3 – Bin Storage Areas (LPP 6.3)</u>

No discretion is sought to the development standards of LPP 6.3.

<u>Local Planning Policy 6.5 – Developments and Subdivisions Abutting Rights of Way (LPP 6.5)</u>

The below list identifies where discretion is sought to the development standards of LPP 6.5.

- Clause 7.1.2 – The development does not orientate and use the right-of-way, Lakides Lane, for primary access. All vehicle access is from Scarborough Beach road and Ewen Street.

The development addresses the Objectives of LPP 6.5 and is supported. An assessment against the Objectives of LPP 6.5 is provided below.

Policy Objectives – Clause 2 of LPP 6.5	
Policy Objectives	**Officer Comment**
2.1. To facilitate the improved management of Rights of Way ('ROW');	The proposed development does not affect the management of Lakides Lane
2.2. To promote better urban design by encouraging the use of ROW for vehicle access;	The proposed commercial development does not use Lakides Lane for vehicle access. The subject site has wide frontages to Scarborough Beach Road and Ewen Street and the vehicle access points are not a dominant characteristic of the development.
2.3. More efficient use of individual sites;	Lakides Lane is not being used to provide access to the proposed development. The provision of direct access to Scarborough Beach Road and Ewen Street is an efficient

Policy Objectives – Clause 2 of LPP 6.5	
Policy Objectives	**Officer Comment**
	use of the site in this instance, based upon the higher number of traffic movements expected due to the number and scale of retail businesses present.
2.4. Create unique streetscapes along the ROW through sympathetic building orientation and design;	The proposed development does not address the Lakides Lane streetscape. Lakides Lane is just functioning as vehicle access and no existing development along the laneway presents to the laneway as a frontage.
2.5. Maintain existing streetscapes, by minimising the need for and impact of additional garages/carports and paved areas within the street setback area, and better allowing the retention of existing buildings and landscaping;	The development does not include garages and carports and the bulk of car parking provided is located on the roof top. The extent of paving required for crossover is a minor component of the overall streetscape on Scarborough Beach Road and Ewen Street.
2.6. Support the objectives of the City's Rights of Way Management Strategy; and	The subject site accommodates its share of land ceding required for the widening of Lakides Lane and has previously paid its share of the development contribution required for the upgrading of Lakides Lane.
2.7 To facilitate future widening of ROW.	The proposal accommodates 0.72 metres of widening on the southern side of Lakides Lane. This widening equates to a half share of the total widening required to increase the laneway to 6.0 metres in width.

<u>Local Planning Policy 6.6 – Trees and Landscaping – Non-Residential (LPP 6.6)</u>

The below list identifies where discretion is sought to the development standards of LPP 6.6.

- Clause 4.1 a) – Minimum provision of landscaped area.
- Clause 4.1 c) – Minimum provision of 'medium' and 'large' trees and associated deep soil area.

The development addresses the Objectives of LPP 6.6 and is supported. An assessment against the Objectives of LPP 6.6 is provided below.

Policy Objectives – Clause 2 of LPP 6.6	
Policy Objectives	**Officer Comment**
The objectives of this Policy are:	
a) To improve the amenity of areas by providing suitable landscaping for development sites;	The development incorporates an acceptable provision of landscaping to enhance the amenity of the development, such as the visual appearance from public areas.
b) To protect existing trees, and ensure new trees are planted to contribute to tree canopy coverage;	There is one existing palm tree on the subject site. This tree is not considered to be a high-quality specimen and its removal is supported. New trees are being planted and there will be a net increase in tree canopy coverage.

Policy Objectives – Clause 2 of LPP 6.6	
Policy Objectives	**Officer Comment**
c) To provide shade coverage to car parking areas;	Trees are provided adjacent to the car bays provided at grade. Most of the car parking is provided on the roof top and is not a suitable location for trees to be planted for shade.
d) To ensure development provides optimal growing conditions to enable existing trees, new trees and landscape planting to reach maturity;	There are no existing trees worthy of retention. All landscaping is provided in a deep soil area.
e) To provide a diversity of plant and tree species that are resilient to climatic, soil and site conditions; and	The proposed species are suitable for the subject site.
f) To encourage waterwise landscaping through appropriate species selection, reduced water demand, and improved stormwater utilisation.	The landscaping proposal is considerate to water conservation.

<u>Local Planning Policy 6.7 – Parking and Access (LPP 6.7)</u>

The below list identifies where discretion is sought to the development standards of LPP 6.7.

- Clause 9.2 a) – Maximum number of vehicle access points.
- Clause 9.2 b) – Maximum width of vehicle access points
- Clause 9.2 d) – Vehicle access point not at a right angle to the street.

The development addresses the Objectives of LPP 6.7 and is supported. An assessment against the Objectives of LPP 6.7 is provided below.

Policy Objectives – Clause 2 of LPP 6.7	
Policy Objectives	**Officer Comment**
The objectives of Local Planning Policy 6.7 are:	
a) To ensure development provides an appropriate level of car parking, reflecting supply and demand so that a major parking problem is unlikely to occur;	The provision of car parking is compliant with minimum and maximum requirements.
b) To ensure safe, convenient, and efficient access for pedestrians, cyclists, and motorists;	The parking areas and associated access points are designed to facilitate easy and safe access for staff and customers and the wider public.
c) To prioritise access by public transport, walking and cycling;	This objective has been addressed in the assessment of LPP 5.8.
d) To facilitate the provision of adequate bicycle parking and end of trip facilities;	This objective has been addressed in the assessment of LPP 5.8.
e) To provide a balanced parking supply that does not exceed the capacity of the road network, with sufficient publicly accessible parking;	This objective has been addressed in the assessment of LPP 5.8.
f) To ensure that an oversupply of parking does not occur that discourages alternative forms of transport; and	This objective has been addressed in the assessment of LPP 5.8.

Policy Objectives – Clause 2 of LPP 6.7	
Policy Objectives	**Officer Comment**
g) To ensure the amount of parking is not detrimental to the urban design and character of the locality.	This objective has been addressed in the assessment of LPP 5.8.

Local Planning Policy 6.12 – Public Art on Private Land (LPP 6.12)

LPP 6.12 applies to all development with a cost of $2 million and above. The minimum contribution cost provided as public art is 1% up to $50 million development cost and an additional 0.5% of the development cost exceeding $50 million thereafter. The cost of the development is $70 million which will result in a $600,000 public art contribution.

The applicant has indicated the public art proposal will be incorporated into a metal screen to the escalator fronting Scarborough Beach Road and the exterior finish to the western wall of the building fronting the driveway to the roof-top car park, partially visible from Scarborough Beach Road.

Compliance with the policy provisions and objectives can adequately addressed via condition setting.

Attachment 11

Without Prejudice Alternative to the Responsible Authority Recommendation

WITHOUT PREJUDICE ALTERNATIVE RECOMMENDATION

That the Metro Inner DAP resolves to **REFUSE** DAP Application reference DAP/25/02974 for the proposed "Woodlands North" commercial development at Strata Lots 1-8 and common property, House Numbers 1-8/367 Scarborough Beach Road, Lots 1-5 and 1-3, House Numbers 278-270 and 277-273 Ewen Street, Lot 66, House Number 6 Bowra Avenue (Lakides Lane), Public Road (Ewen Street) Reserve PIN1282926 / Land ID Number 3159135, Public Road (Scarborough Beach Road) Reserve PIN11785750 / Land ID Number 3815884, Public Road (Ewen Street) Reserve PIN11785751 / Land ID Number 3815885 and Pedestrian Access Way Lot 167 (Ewen Street), Innaloo and Woodlands, and the proposed alterations to the existing Service Station at Lot 12, House Number 365 Scarborough Beach Road, Innaloo, in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the Planning and Development (Local Planning Schemes) Regulations 2015, and the provisions of the City of Stirling Local Planning Scheme No. 3, for the following reasons:

1. Pursuant to Schedule 2, Part 9, Clause 67 (2)(a) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development does satisfy the following provisions of Local Planning Scheme No. 3:

    a. The Shop use is not permitted on the subject site as it exceeds 1,000m^2 net lettable area within the Mixed Use Land Use Category, conflicting with Table 6.11.9 Stirling City Centre Land Use Permissibility Table.

    b. The subject site is located within a Mandatory Residential area, and the development does not provide a residential component, conflicting with Clause 6.11.11 Mandatory Residential.

Advice Notes

1. If an Applicant is aggrieved by this determination there is a right of appeal under Part 14 of the *Planning and Development Act 2005*. An appeal must be lodged within 28 days of the determination with the State Administrative Tribunal.

The following template is provided should the Metro Inner DAP propose alternative reasons:

1. Pursuant to Schedule 2, Part 9, Clause 67 (2) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development …

2. Pursuant to Schedule 2, Part 9, Clause 67 (2)(b) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development is not consistent with orderly and proper planning as …

3. Pursuant to Schedule 2, Part 9, Clause 67 (2)(a) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development does not satisfy the following provisions of Local Planning Scheme No. 3:

   a. …
   b. …
   c. …
   …

4. Pursuant to Schedule 2, Part 9, Clause 67 (2)(g) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development does not satisfy the following local planning policy provisions and objectives:

   a. …
   b. …
   c. …
   …

5. Pursuant to Schedule 2, Part 9, Clause 67 (2)(h) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the proposed development does not satisfy the following local development plan provisions and objectives:

   a. …
   b. …
   c. …
   …

Part B – Item 3.2
Lot 66 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No.200) Karrinyup Road, Karrinyup

RESPONSIBLE AUTHORITY REPORT – FORM 1	
DAP Name:	Metro Inner Development Assessment Panel
DAP File No:	DAP/24/02809
LG Reference:	DA24/1311
Proposed Development:	Modifications to Access Arrangements and Additional Parking
Value of Development:	$27 million
Owner:	GPT Platform Pty Limited
Applicant:	Rowe Group
Local Government Area:	City of Stirling
Responsible Authority:	City of Stirling
Authorising Officer:	Giovanna Lumbaca, Acting Director Planning and Development
Application Acceptance Date:	4 December 2024

LOCATION PLAN

Figure 1: Location Plan

RESPONSIBLE AUTHORITY RECOMMENDATION

RECOMMENDATION FOR APPROVAL

That the Metro Inner DAP resolves to **APPROVE** DAP Application reference DAP/24/02809 for Modifications to Access Arrangements and Additional Parking at Lot 66 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No.200) Karrinyup Road, Karrinyup in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the Planning and Development (Local Planning Schemes) Regulations 2015, and the provisions of the City of Stirling Local Planning Scheme No. 3, subject to the following conditions:

1. The development is to be undertaken in accordance with the approved plans and documents attached to this approval, as listed below, except where amended by subsequent conditions:

Plan/ Document Name	Reference	Date
Level B01 Plan Karrinyup Shopping Centre	DA5	10.09.2024
Level 02 Plan Karrinyup Shopping Centre	DA6	10.09.2024
Level 03 Plan Karrinyup Shopping Centre	DA7	10.09.2024
Level 04 Plan Karrinyup Shopping Centre	DA8	10.09.2024
Elevations Karrinyup Shopping Centre	DA9	10.09.2024
Elevations Karrinyup Shopping Centre	DA10	10.09.2024
Sections Karrinyup Shopping Centre	DA11	10.09.2024
Illustrative View SE Karrinyup Shopping Centre	DA13	10.09.2024
Illustrative View SE Karrinyup Shopping Centre	DA14	10.09.2024

2. This decision constitutes planning approval only and is valid for a period of four years from the date of approval. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect.

3. A maximum of 4,950 car parking bays shall be provided and reserved as public parking bays, to the satisfaction of the City of Stirling

4. Prior to the commencement of development, a Construction Management Plan to be submitted to the City of Stirling for its approval. The Site Management Plan shall address dust, noise, waste management, parking, storage of materials, traffic, site safety/security, staging of the development and any other relevant matters to the satisfaction of the City. The Site Management Plan as approved by the City shall be complied with for the duration of the construction of the development.

5. No goods or materials being stored, either temporarily or permanently, in the parking or landscape areas or within access driveways. All goods and materials are to be stored within the buildings or storage yards, where provided.

6. Vehicular parking manoeuvring and circulation areas (including all internal roads and driveways) indicated on the approved plan shall be sealed and drained, the parking spaces marked out and maintained in good repair.

7. Prior to the occupation of the development, the car parking areas as shown on the approved plans shall be line-marked and made available for use. The car parking shall thereafter be retained and available for the life of the development, to the satisfaction of the City of Stirling.

8. All stormwater discharge shall be collected and contained on site. Stormwater must not affect or be allowed to flow onto or into any other property or road reserve.

Advice Notes

1. Where an approval has so lapsed, no development shall be carried out without the further approval of the Development Assessment Panel or City of Stirling having first been sought and obtained.

2. If an applicant is aggrieved by this determination there is a right of appeal under Part 14 of the Planning and Development Act 2005. An appeal must be lodged within 28 days of the determination with the State Administrative Tribunal.

3. This is a Development Approval under the City of Stirling Local Planning Scheme and related policies. It is not a Building Permit or an approval to commence or carry out development under any other law. It is the responsibility of the applicant to obtain any other necessary approvals, consents and licenses required under any other law, and to commence and carry out development in accordance with all relevant laws.

4. This approval is not an authority to ignore any constraint to development on the land, which may exist through statute, regulation, contract or on title, such as an easement or restrictive covenant. It is the responsibility of the applicant and not the Development Assessment Panel or City of Stirling to investigate any such constraints before commencing development. This approval will not necessarily have regard to any such constraint to development, regardless of whether or not it has been drawn to the Development Assessment Panel or City of Stirling's attention.

5. Noisy Construction Work outside the period 7.00am to 7.00pm Monday to Saturday and at any time on Sundays and Public Holidays is not permitted unless a Noise Management Plan for the construction site has been approved in writing by the City of Stirling.

6. The applicant is responsible for ensuring that all lot boundaries as shown on the approved plans are correct.

7. Development is to comply in all respects with the attached approved plans which have been stamped accordingly.

8. All construction works to comply with the requirements of the Environmental Protection Act 1986 and the Environmental Protection (Noise) Regulations 1997. Noisy construction work outside the period 7:00am to 7:00pm Monday to Saturday and at any time on Sundays and Public Holidays is not permitted

unless an approved Noise Management Plan for the construction site has been issued

9. Compliance of all mechanical services to the Australian Standard AS1668.2 including a certificate of compliance for all installations. This is also to include the undercroft carpark ventilation.

PROPOSAL:

The key components of the proposed development are summarised as follows:

- An additional two storeys of car parking on the existing multi-storey parking structure fronting Francis Avenue providing for an additional 267 car parking bays for a total of 4,950 car parking bays across the site.
- Internal modifications to the existing car parking configuration including the installation of a new valet lobby facilities on Level 2 of the northern car park
- Installation of a new roof structure over the existing car bays on Level 2 of the northern car park.
- Retention of existing access and egress to the Karrinyup Shopping Centre site.

SUBJECT SITE AND SURROUNDS:

The subject site comprises Lot 66 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No. 200) Karrinyup Road, Karrinyup. The site is zoned 'Urban' under the Metropolitan Region Scheme (MRS) (Attachment 3) and 'Regional Centre' under the City of Stirling Local Planning Scheme No. 3 (LPS3) (Attachment 4).

The proposed development is located on the eastern portion of the subject site (Karrinyup Shopping Centre) fronting Francis Avenue (Attachment 2). The subject site is located within the Karrinyup Activity Centre, which is identified as a Secondary Centre under State Planning Policy 4.2 – Activity Centres for Perth and Peel. The activity centre boundary is reflected within the City's Local Planning Strategy, endorsed by the Western Australian Planning Commission in October 2019, and is also recognised within the State Government's Perth and Peel @ 3.5 Million planning framework.

Land within the activity centre boundary (Figure 2) is zoned Regional Centre, Civic, or Residential with density coding of R20, R30 and R60 under LPS3, with a range of additional uses permitted through the scheme. Collectively, these properties form the Karrinyup Regional Centre, which is subject to the specific planning provisions of LPS3 and the detailed design and development guidance contained within Local Planning Policy 5.7 – Karrinyup Regional Centre Guidelines.

In terms of the road network hierarchy, Karrinyup Road is reserved as a Primary Regional Road under the MRS. Burroughs Road and Francis Avenue are classified as Local Distributor Roads, while Davenport Street is classified as a Local Road under the City's Functional Road Hierarchy.

Figure 2: Karrinyup Activity Centre

BACKGROUND:

Since the 1970s the subject site has been occupied by the Karrinyup Shopping Centre. The shopping centre has been subject to numerous expansions and refurbishments over the intervening years. A development application for a major expansion of Karrinyup Shopping Centre was submitted to the City on 5 March 2015 and approved subject to conditions by the Metro North-West Joint Development Assessment Panel (JDAP) On 14 August 2015. Following a number of applications for minor amendment considered under the Form 2 pathway, a Form 1 application was lodged on 10 November 2016 for substantial amendments to the approved development. The application was approved, subject to conditions, at the JDAP meeting on 13 April 2017. Condition 43 of the planning approval stated;

> "*A maximum of 4,880 car parking bays shall be provided and reserved as public parking bays, to the satisfaction of the City of Stirling.*"

The major expansion to the shopping centre opened in 2021 and has been operational since with a number of subsequent applications on the development site and within the Karrinyup Activity Centre.

In December 2024, a Development Assessment Panel (DAP) Form 1 application was received by the City seeking approval for modifications to access arrangements and additional car parking at Karrinyup Shopping Centre. The application was referred to relevant internal and external stakeholders for comment. During the City's assessment and through referral to relevant stakeholders, concerns were raised regarding the potential impacts of the proposed access modifications, which sought to convert an existing entry from Karrinyup Road into an exit via Ramp 14. These concerns related primarily to pedestrian safety, impacts on road users, and the operation of the adjoining public transport infrastructure. Following consultation with relevant stakeholders, the

applicant submitted amended plans removing the proposed modifications to Ramp 14, with these amended plans forming the basis of this assessment.

PLANNING ASSESSMENT:

PLANNING FRAMEWORK	
Region Scheme	Metropolitan Region Scheme
Region Scheme - Zone/Reserve	Urban
Local Planning Scheme	City of Stirling Local Planning Scheme
Local Planning Scheme - Zone	Regional Centre
Lot Size	129,784m²
Existing Land Use	Shopping Centre
Heritage Status	☒ N/A ☐ State Register of Heritage Places ☐ Local Heritage List ☐ Local Heritage Area
Bushfire Prone Area	Yes

Legislation and Policy:

Legislation

- *Planning and Development Act 2005*
- *Planning and Development (Development Assessment Panels) Regulations 2011*
- *Planning and Development (Local Planning Schemes) Regulations 2015*
- *Metropolitan Region Scheme (MRS)*
- *City of Stirling Local Planning Scheme No. 3 (LPS3)*

State Planning Policies

- State Planning Policy 4.2 – Activity Centres (SPP4.2)
- State Planning Policy 5.4 – Road and Rail Noise (SPP 5.4)
- State Planning Policy 7.0 – Design of the Built Environment (SPP7.0)

Local Planning Policies

- Local Planning Policy 5.7 – Karrinyup Regional Centre Guidelines (LPP5.7)
- Local Planning Policy 6.7 – Parking and Access (LPP6.7)
- Local Planning Policy 6.12 – Public Art on Private Land (LPP6.12)
- Local Planning Policy 6.18 – Public Consultation (LPP6.18)

Planning Assessment:

The development has been assessed against the relevant planning framework including LPS3, State Planning Policies and Local Planning Policies. The following matters have been identified as the relevant key considerations in the assessment of this application:

- Karrinyup Civic Centre Special Control Area

- Built Form
- Car Parking and Access
- Public Art

Karrinyup Civic Centre Special Control Area

The proposal has been assessed against the objectives of the Karrinyup Civic Centre Special Control Area (Clause 6.14 of LPS3) and is considered to generally satisfy the intent of the framework.

The proposal supports the ongoing operation and function of the Karrinyup Regional Centre, which forms a key component of the Karrinyup Town Centre. The additional parking provision supports the existing mix of retail, commercial, entertainment and community uses within the centre and assists in accommodating demand generated by the continued development of the precinct. The proposal utilises existing parking infrastructure and does not alter the approved land use mix, ensuring the centre continues to operate as an integrated mixed-use destination.

The application is supported by an updated Traffic Impact Assessment which concludes that the minor increase in car parking bays would not detrimentally impact the surrounding road network. The proposed additional parking is not expected to result in a material increase in patronage and is intended to improve the management of existing parking demand. The proposal also includes operational improvements to the existing parking network which seek to improve the efficiency of vehicle circulation within the centre and reduce internal congestion.

The proposal does not alter the approved residential, commercial or community land uses within the Special Control Area and is not considered to prejudice the future delivery of these outcomes. Rather, the proposal supports the ongoing operation of the regional centre, which remains a significant employment and service destination within the City.

The additional parking levels are located above an existing multi-storey parking structure on the western side of the shopping centre site. The proposal maintains the established building footprint and utilises the existing built form, reducing the extent of additional bulk and visual mass that would otherwise arise from a standalone structure elsewhere on the site. The scale of the development is considered consistent with the broader built form of the Karrinyup Regional Centre, including the adjoining multiple dwelling development located to the north and the broader shopping centre.

Built Form

A summary of the proposed development in relation to the primary built form controls of LPP5.7 is provided below.

Built Form Controls			
Provision	**Requirement**	**Proposal**	**Discretion Sought**
Building Height	Buildings of 2 to 3 storeys facing the periphery roads (Burroughs Road, Francis Avenue and Davenport Street) with higher buildings setback 15.0m from the boundary;	7 Storeys / 57m – The proposal is for an additional 2 storeys / 9.4m	Yes
Multi Storey Car Parks	Multi Storey Car Parks included within the main building shall be screened / treated so as to provide a seamless appearance between the car park levels and other levels	The proposal continues the existing screening for a seamless appearance of the existing development	No
Setbacks	Buildings shall be built from side boundary to side boundary	The proposal is situated atop the existing built form	No

Building Height

The proposal includes the construction of two additional parking levels to the existing multi-storey car park on the eastern portion of the Karrinyup Shopping Centre site, resulting in a total of seven levels of parking above natural ground level. The proposal will increase the car parking structure from 62.8 AHD to 72.2 AHD at its highest point, which is below the highest point of the overall shopping centre at 76.67 AHD. The additional levels are proposed above an existing parking structure. They incorporate the continuation of the pre-existing screening and utilise the established built form of the shopping centre development, minimising the extent of additional bulk and visual mass that would otherwise result from a standalone structure elsewhere on the site.

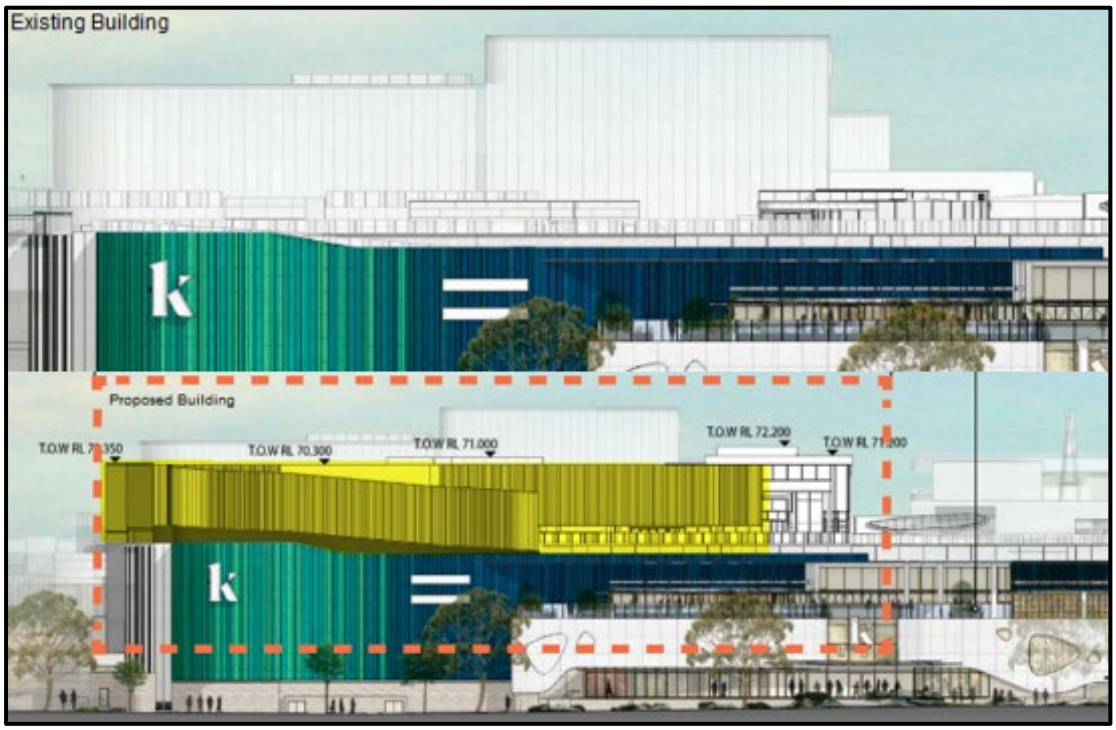


Figure 3: representation of existing and proposed additions to the Karrinyup Shopping Centre car parking structure as viewed from Francis Avenue

The objective of LPP 5.7 seeks to ensure that building height and scale is appropriate to its site and context. In this regard, the proposed addition is considered to respond appropriately to both the existing and intended built form character of the Karrinyup Regional Centre. The shopping centre is identified as a Secondary Centre in accordance with SPP4.2 which is designed for a medium and high-density urban area within the centre core characterised by mid to high-rise buildings that provide contiguous, activated and pedestrian-friendly street frontages and public spaces.

The proposed increase in height is confined to the existing parking structure on the eastern side of the site fronting Francis Avenue and maintains the established footprint of the building. By integrating the additional parking levels into the existing structure, the development avoids the need for additional site coverage or expansion of built form at ground level and limits the perception of additional bulk when viewed from surrounding land. The proposal capitalises on the substantial scale of the existing shopping centre development, ensuring that the additional height reads as part of the overall centre rather than as a separate or dominant element.

Importantly, the additional height is consistent with the scale of development already approved and constructed within the Karrinyup Regional Centre. The parking structure adjoins the taller Multiple Dwelling development located on the northern portion of the site and sits within a precinct characterised by significant built form outcomes. The development is separated by a 24m road reservation and is adjacent to a three-storey mixed use development located at No.1 Smith Street and No.86 Francis Avenue, Karrinyup and a Child Care Premises at No.80 Francis Avenue, Karrinyup in this context, the additional two levels is considered appropriate to broader shopping centre

complex and surrounding mixed-use development whilst still maintaining the façade treatment as presented to the public realm.

The proposal has been designed to limit overshadowing and access to natural sunlight for adjoining properties. Shadow diagrams submitted in support of the application indicate that overshadowing generated by the additional levels is primarily contained within the subject site and the adjoining Karrinyup Road road reserve. Accordingly, the proposal does not result in material overshadowing impacts on adjoining residential properties or public spaces. Given the location of the structure within the shopping centre complex and the absence of substantial additional amenity impacts. The City considers that the proposed design has been developed to minimise the adverse impacts associated with the increase in building height on the surrounding locality.

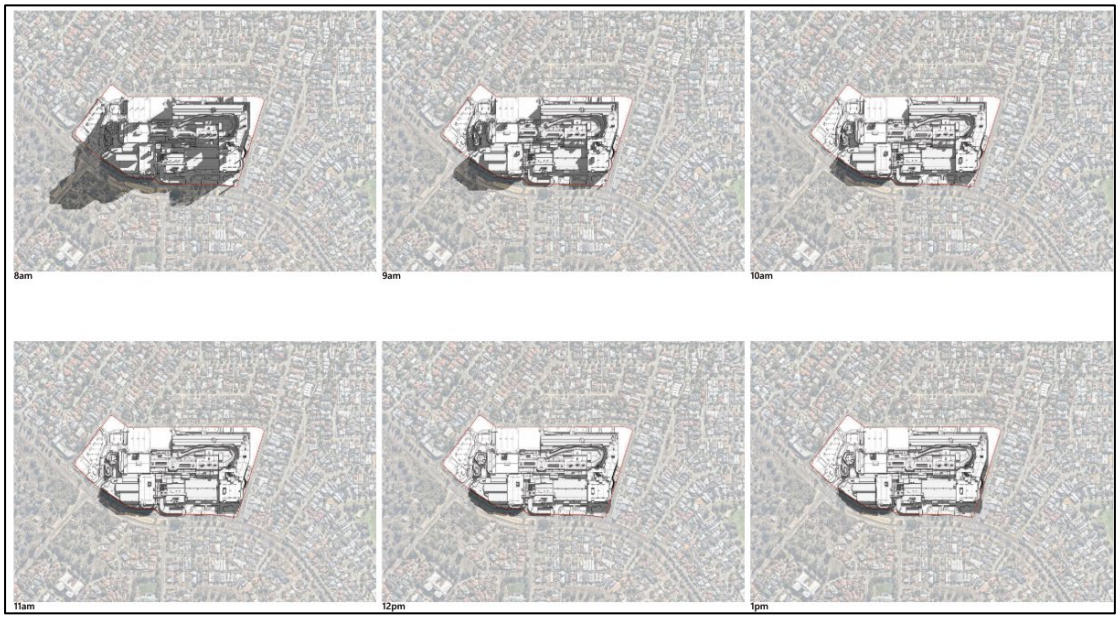


Figure 4: Applicants' submission demonstrating revised overshadowing diagrams

Overall, the additional two parking levels are considered to achieve the objectives of LPP5.7. The proposal responds appropriately to the scale and function of the Karrinyup Regional Centre, integrates with the existing built form of the shopping centre, maintains an appropriate relationship with surrounding development, and does not result in significant adverse visual or amenity impacts to adjoining properties or the streetscape. The additional height is therefore considered appropriate to the site's context and consistent with the intended urban character of the centre

<u>Car Parking and Access</u>

The proposal seeks to increase the total parking supply across the Karrinyup Shopping Centre site from 4,683 bays to 4,950 bays through the addition of 267 car parking bays. This equates to a 1.45% increase of car parking bays within two additional levels constructed above the existing multi-storey car park. The proposal does not seek approval for any increase in retail floor area, with the retail floor area remaining unchanged at 116,819m².

Clause 3.1 of the WA Planning Manual: Non-Residential Car Parking Rates in Perth and Peel provides guidance for the assessment of car parking within district, secondary

and strategic activity centres identified by SPP4.2. The guidance recommends the application of a minimum parking rate of one bay per 100m² of floor area and a maximum parking rate of one bay per 25m² of floor area.

The existing approved parking supply of 4,683 bays already exceeds the contemporary maximum rate by a marginal amount, while the proposed parking supply of 4,950 bays would equate to approximately 4.24 bays per 100m² of retail floor area (or 1.06 bays per 25m^2 of floor area).

WA Planning Manual: Non-Residential Car Parking Rates		
Floor Area	**Provision**	**Bays Required**
Karrinyup Shopping Centre 116,819m²	minimum parking rate of one bay per 100m² of floor area	1,168 bays
	maximum parking rate of one bay per 25m² of floor area	4,672.76 bays
Total Car Parking Provided:		4,950 bays
Total Parking Rate:		4.24 bays per 100m² of retail floor area

Notwithstanding this, the City notes that the WA Planning Manual: Non-Residential Car Parking Rates in Perth and Peel is intended to provide guidance to support the review and preparation of local planning frameworks and parking standards across Perth and Peel. The guidance establishes broad minimum and maximum rates applicable across activity centres and recognises the need for rates to be considered having regard to the specific circumstances of individual developments.

In this instance, the proposal relates to an established regional shopping centre that services a substantial trade catchment and accommodates a broad mix of retail, entertainment, dining, commercial and community uses. The application is not seeking to facilitate additional retail floor area but rather responds to operational parking demand associated with the existing approved development. The applicant has provided supporting transport information which identifies parking constraints occurring during peak trading periods and concludes that additional parking supply is required to accommodate existing demand and improve the functioning of the centre.

The resulting parking rate is not considered excessive in the context of a metropolitan-scale regional shopping centre and reflects the operational characteristics of the centre, its regional catchment and demonstrated parking demand.

On balance, having regard to the absence of any increase in approved retail floor area, the demonstrated demand for additional parking, the findings of the supporting transport assessments conclusion that the proposal is not expected to materially increase trip generation, with the additional parking intended to address existing parking demand and improve internal traffic circulation within the shopping centre and the role of Karrinyup Shopping Centre as a Strategic Secondary Centre, the proposed increase to 4,950 parking bays is considered acceptable.

A condition is recommended to replace condition 43 of the original shopping centre expansion to reflect the 4,950 parking bays.

Public Art

Whilst the proposal is of a value that would ordinarily trigger a public art contribution in accordance with Local Planning Policy 6.12 (LPP6.12), the City considers that a public art contribution is not warranted in this instance having regard to the nature and scope of the proposed works.

The development comprises the addition of two parking levels to an existing multi-storey car park and does not involve the creation of new public spaces, active frontages or areas of public interaction where public art would meaningfully contribute to the development outcome.

The proposal represents a minor extension in the scale of the overall Karrinyup Shopping Centre and will maintain the established architectural treatment and screening elements of the approved development, ensuring a consistent built form outcome. Given the nature of the works, it is considered that a public art contribution would not materially advance the objectives of the policy relating to place-making, urban amenity, vibrancy or enhancement of the public and private realm.

Additionally, Karrinyup Shopping Centre has been comprehensively redeveloped in recent years and incorporates a high-quality built environment, public realm and hospitality precincts that contribute significantly to the amenity, vibrancy and sense of place of the centre. Furthermore, public art contributions have not previously been required as part of approvals for the shopping centre, and the City considers the nature of the proposed works does not justify imposing such a requirement in this instance.

Accordingly, the City considers the requirement for a public art contribution may be appropriately waived in this instance, as the proposal does not present a reasonable or practical opportunity for the delivery of public art outcomes consistent with the intent of LPP6.12.

CONSULTATION:

Public Consultation

The proposed development was advertised for a period of 28 days in accordance with the 'Complex Application' requirements of *Local Planning Policy 6.18* (LPP6.18) and *Clause 64(3)* and *(6)(a)* of *the Planning and Development (Local Planning Schemes) Regulations 2015*. The consultation period commenced on 10 January 2025 and concluded on 7 February 2025. In response, a total of 15 submissions were received, comprising seven objections, four letters of support and four 'other'. The submissions received during the consultation period and their relative locations are tabled below.

Submissions Received	Within 100m Radius of Proposed Site	Within 200m Radius of Proposed Site	Within the City of Stirling	Outside of the City of Stirling
SUPPORT	2 (13%)	0 (0%)	2 (13%)	0 (0%)
OBJECT	4 (27%)	1 (7%)	2 (13%)	0 (0%)
CHANGES REQUESTED	0 (0%)	0 (0%)	0 (0%)	0 (0%)
OTHER (Comment)	4 (27%)	0 (0%)	0 (0%)	0 (0%)

All matters raised in submissions received during the advertising period have been summarised in the table below, also provided is the number of submissions in which the matter was raised, and the City's response to the matter.

Public Consultation Submissions		
Number of Submission to Raise Matters	**Summary of Matters Raised**	**Officer Response**
7	Concerns relating to increased traffic congestion and road capacity in the locality.	The Parking Management and Travel Plan, Traffic Impact Assessment (TIA) provided and additional addendum in support of the proposed development (refer to attachment 7) includes reference to traffic volumes, safety and congestion and concludes that traffic associated with the proposed development use can be accommodated within the existing road network without any resulting adverse road safety impacts. The TIA has been reviewed by the City and is generally supported subject to the recommended conditions of approval proposed by the City.
7	Concerns relating to residential amenity and local impacts on daily access, delays, road safety, emergency access, convenience and the cumulative effect of ongoing	The City has recommended a condition of approval requiring a Construction Management Plan be provided prior to the lodgement of a building permit which provides details on how the impacts of the construction

Public Consultation Submissions		
Number of Submission to Raise Matters	**Summary of Matters Raised**	**Officer Response**
	development on nearby residents.	phase of the development will be managed and mitigated.
6	Opposition to the additional parking supply.	Parking supply is discussed in this report.
4	Issues included difficulty navigating the application material, requests for key drawings, concerns about notification, and requests to be advised of future DAP meeting details.	The material advertised included applicants submission including the full TIA. All submitters will be notified of the time, date and location of the DAP meeting, at least 7 days before the day of the DAP meeting, in accordance with regulation 39 (1A) of the *Planning and Development (Development Assessment Panels) Regulations 2011*.
4	General support for additional parking supply.	Noted.
3	Active Transport/Mode Shift.	As part of the Karrinyup Shopping Centre expansion, the development contributed to the provision of high frequency public transport, high quality end of trip facilities, bike racks and surrounding footpaths.
3	Concerns relating to reliance on developer provided data.	The applicant's submission, including the TIA, has been reviewed by the City and is generally supported subject to the imposition of the recommended conditions of approval proposed by the City. The details of the City's assessment forms part of the RAR.
2	Concerns relating to pedestrian safety.	Amended plans have been provided removing the works associated with Ramp 14, the proposed works do not impede on the existing footpath network.
1	Support for proposed traffic management measures.	Noted.

REFERRALS/CONSULTATION WITH GOVERNMENT/SERVICE AGENCIES

The application was referred to the Transport Portfolio on 11 December 2024. The City received separate referral responses from the Department of Transport on 10 January 2025,the Public Transport Authority on 8 January 2025 and Main Roads WA on 5 February 2025. The comments form part of the City's consideration and are provided below.

Main Roads Western Australia

Main Roads Western Australia (Main Roads WA) in response to the original proposal stated whilst having regard to Schedule 2 Clause 67 (r) (public safety) and (za) (submission from a public authority) of the *Planning and Development (Local Planning Schemes) Regulations 2015* the proposed modifications to Ramp 14 were not supported due to:

a) The proposed conversion of Ramp 14 'Exit Only' from 'Entry Only' poses an unacceptable safety impact to pedestrians and cyclists using the pedestrian crossing. This risk arises due to the following:
    - Proximity – The pedestrian crossing is only 1m away from the shopping centre building wall.
    - Ramp Design – The ramp ascends from Basement 1 to Karrinyup Road with internal lane curvature (see Figure 1 and 2).
    - Visibility and Breaking – Vehicles accelerating up Ramp 14 have poor sightlines (due to proximity pedestrian crossing to wall and the ramp design). Vehicles will be unable to see pedestrians crossing and the required braking distance to avoid collisions is not available

    Additionally, the pedestrian crossing direction connects to the Karrinyup Bus Station to the east, which operates as a high frequency bus route.
b) The proposed conversion of Ramp 14 'Exit Only' from 'Entry Only' presents significant issues with sightlines for a left-out movement onto Karrinyup Road. The sightline assessment detailed in Section 5.7 and Figure 5-2 of the Transport Impact Assessmetn (TIA) prepared by Aurecon (reference 526467, revision 3 dated 9 November 2024) lacks an onsite evaluation. The sightlines for vehicles turning left-out onto Karrinyup Road, looking west towards eastbound traffic are obstructed by existing/proposed wayfinding pylon sign, three existing trees and the road curve (see Figure 3).

Following the submission of amended plans removing the proposed modifications to Ramp 14, Main Roads WA confirmed it had no objection to the updated development proposal being the additional two levels of parking only. Matters raised through the referral process have been addressed through the recommended conditions of approval and advice notes.

Public Transport Authority

The Public Transport Authority (PTA) did not support the proposed increase in parking provision. PTA advised that additional parking is likely to increase private vehicle dependency, exacerbate existing congestion on surrounding roads and impact bus service reliability. PTA supported improvements to internal car park circulation but

recommended that future growth be accommodated through enhanced public transport services, noting the ongoing expansion of Stirling Bus Interchange and existing bus connections to the centre. PTA also advised that aspects of the public transport information contained within the application were outdated.

The City's assessment concludes that additional parking supply is appropriate to accommodate existing demand and improve the functioning of the centre whilst not having detrimental effect on travel behaviour change and mode shift opportunities.

Department of Transport

The Department of Transport (DoT) did not support the proposed increase in parking provision within the shopping centre. In its referral response, DoT referenced proposed Condition 44 of RAR from the 2021 shopping centre expansion approval and advised that the 4,880-bay parking cap reflected a parking rate of 4.2 bays per 100m² of retail floor area. DoT noted that this rate has historically been applied to major shopping centre developments within metropolitan Perth as a mechanism to encourage alternative transport modes and reduce reliance on private vehicle travel.

The proposed parking provision and applicable parking rates have been assessed within this report. Notwithstanding DoT's position, the City considers the proposed increase in parking supply acceptable having regard to the operational demands of the Secondary Centre, the supporting technical information submitted with the application, and the retention of measures that continue to support travel behaviour change and mode shift opportunities.

DESIGN REVIEW PANEL ADVICE

The City's Design Review Panel (DRP) provides design advice that is supplementary to the City's planning assessment. Based on the proposal's scale, its location within the existing Shopping Centre commercial setting, and the various built form controls within the planning framework, a formal design review was considered unnecessary.

CONCLUSION:

The proposed development seeks approval for extensions and modifications to the existing car parking infrastructure at Karrinyup Shopping Centre, including the addition of two levels to the existing Francis Avenue parking structure, internal parking reconfigurations, and the installation of a roof structure over part of the Northern Car Park. The proposal is located within the Karrinyup Regional Centre, a strategic Secondary Centre identified under SPP 4.2 and LPS 3.

Having regard to the Metropolitan Region Scheme, SPP4.2,LPS3, LPP5.7 and other relevant planning considerations, the proposal is considered to appropriately support the ongoing operation of Karrinyup Shopping Centre and the strategic role of the Karrinyup Regional Centre. The development is not expected to result in significant adverse impacts on the surrounding locality and is recommended for approval, subject to the recommended conditions.

ATTACHMENTS

1. Development Plans as listed in Condition No.1
2. Aerial Location plan
3. Metropolitan Region Scheme Zoning Map
4. City of Stirling Local Planning Scheme Map
5. Applicants Original Report Accepted 4 December 2024
6. City of Stirling Planning Assessment
7. Applicants Final Submission
    a. Architectural Plans prepared 10 September 2024
    b. Parking Management & Travel Plan by Aurecon prepared 14 November 2024
    c. Traffic Impact Assessment Update Aurecon prepared 11 November 2024

gpt

Level B01 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

DATE: 10.09.2024
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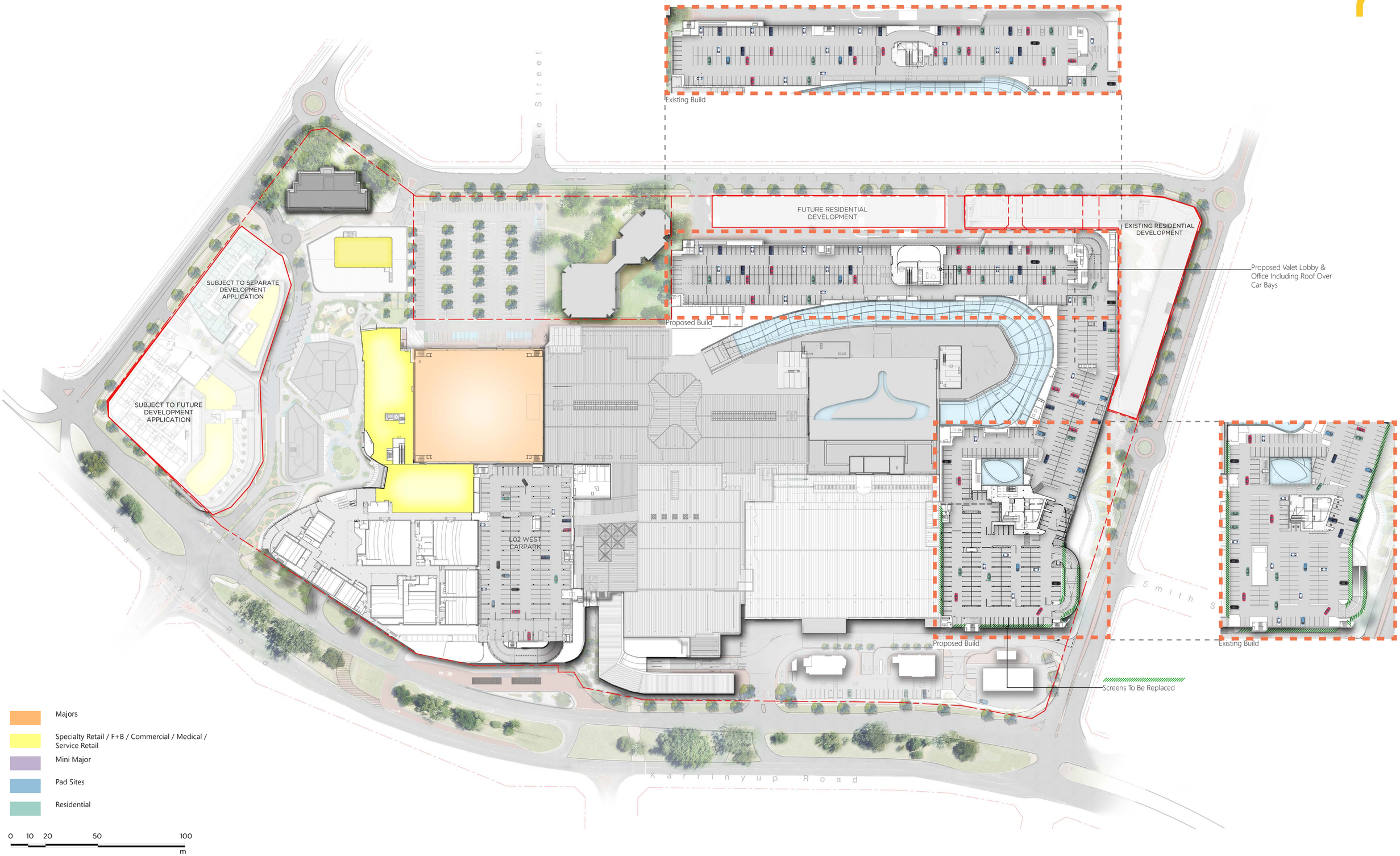
DA5



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Level 02 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

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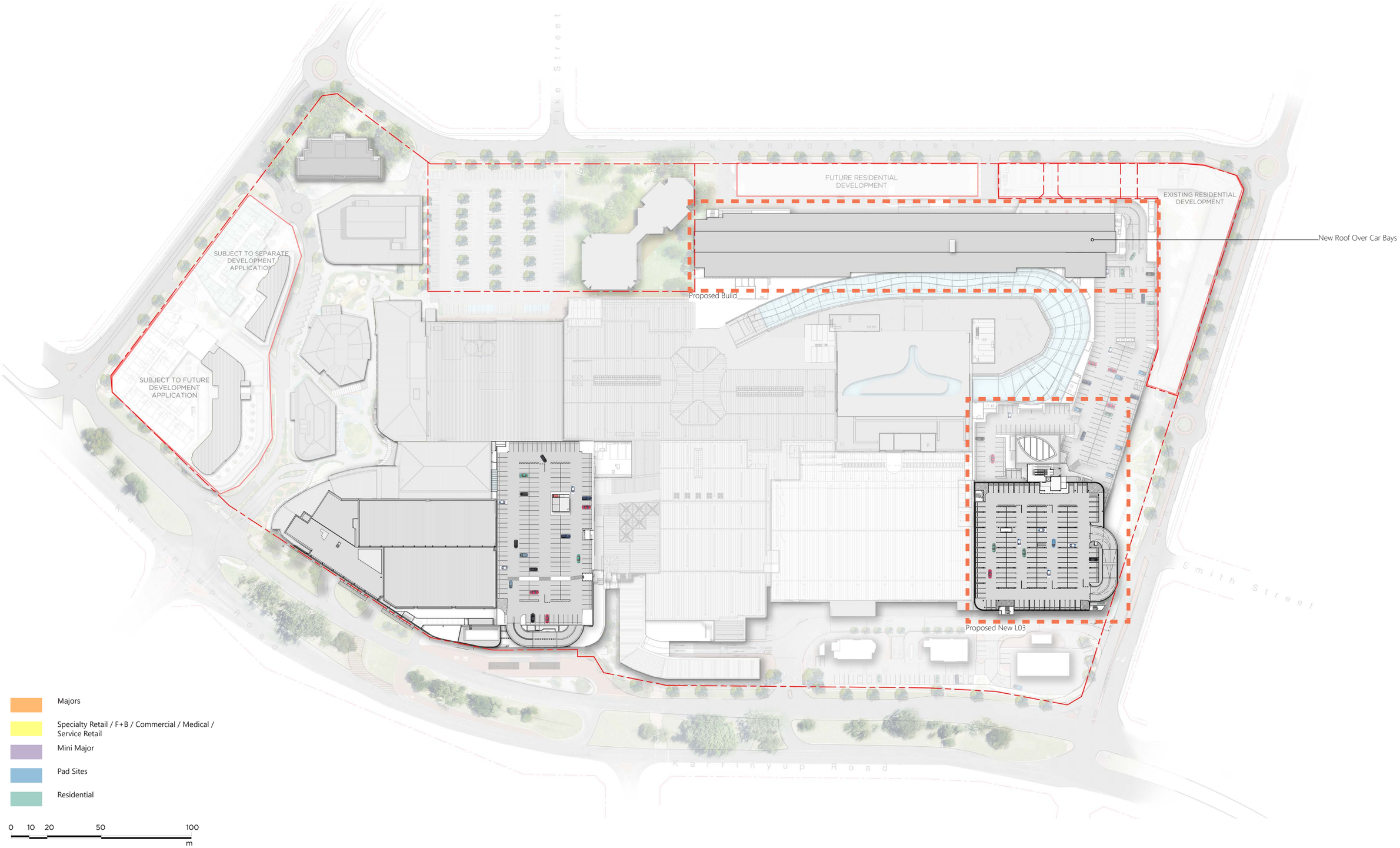

Level 03 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

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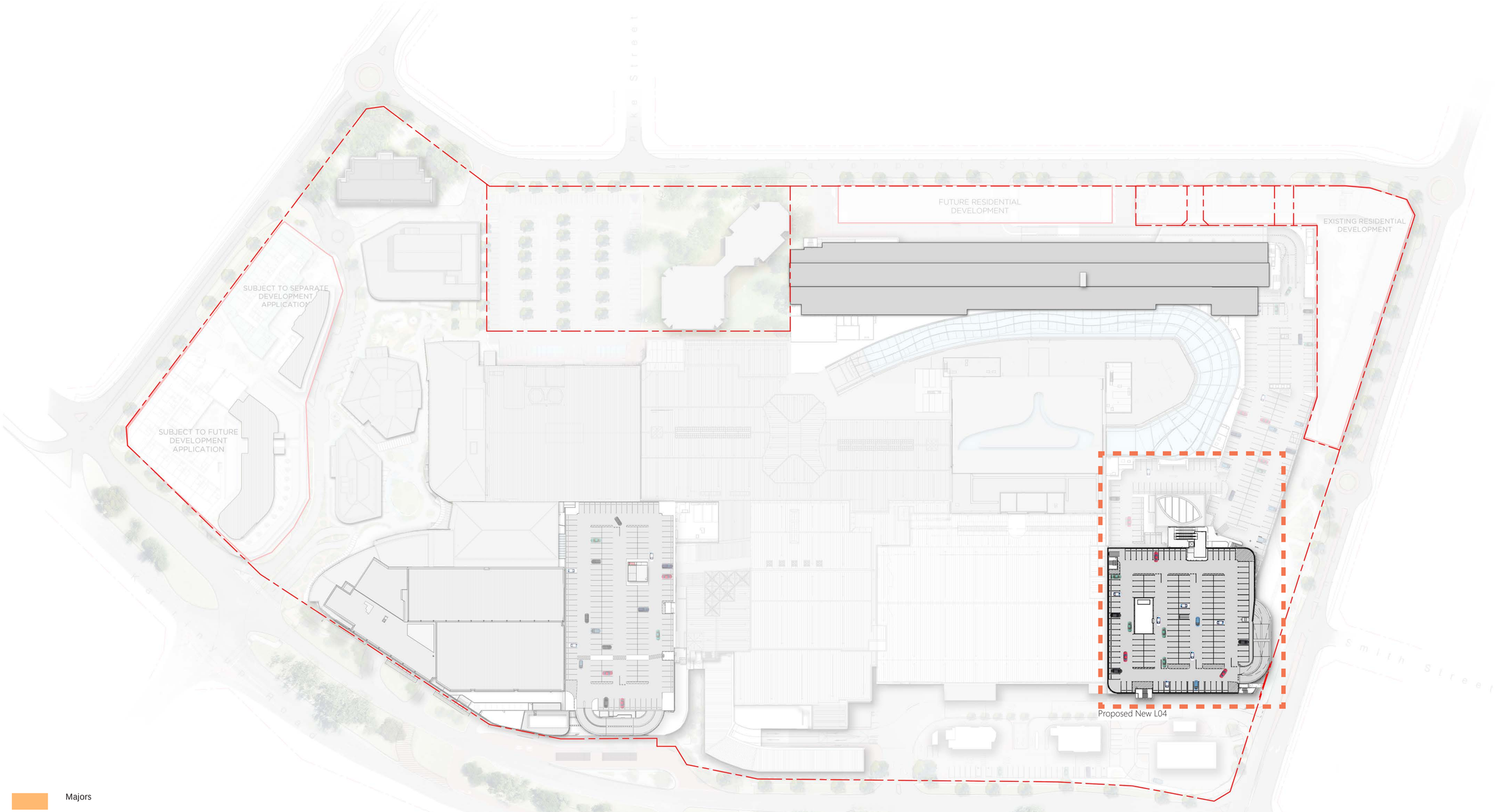

Majors

Specialty Retail / F+B / Commercial / Medical / Service Retail

Mini Major

Pad Sites

Residential

0 10 20 50 100
m

gpt

Level 04 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

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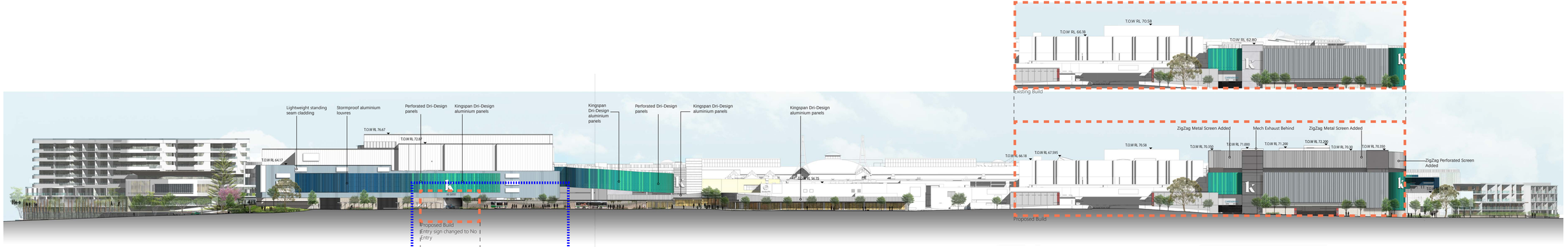
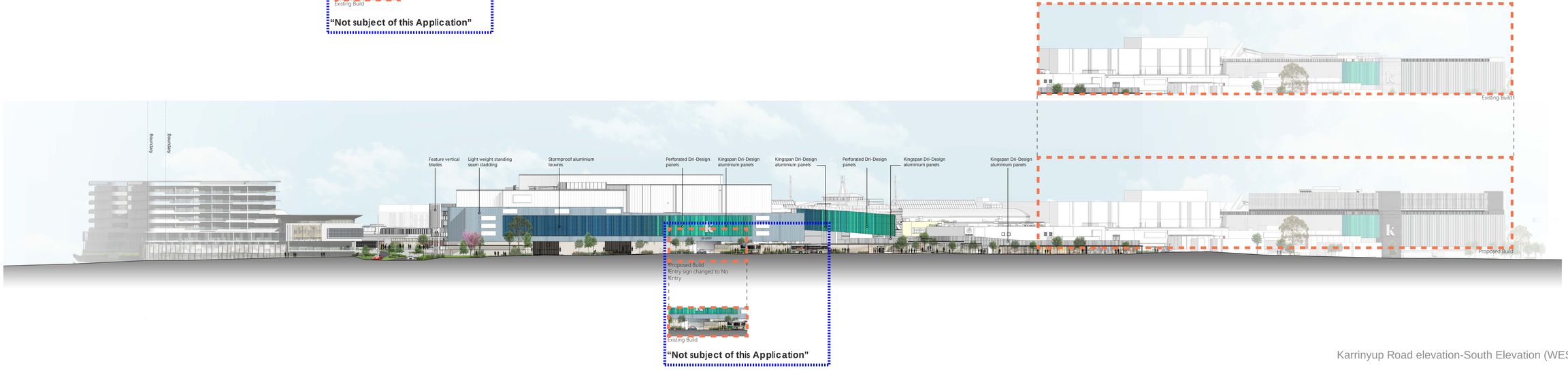


Karrinyup Road elevation-South Elevation (EAST)



Karrinyup Road elevation-South Elevation (WEST)

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Elevations

KARRINYUP SHOPPING CENTRE

Development Application - Rev a

SCALE: 1:1000 @A3/ 1:500 @A1 DATE: 10.09.2024

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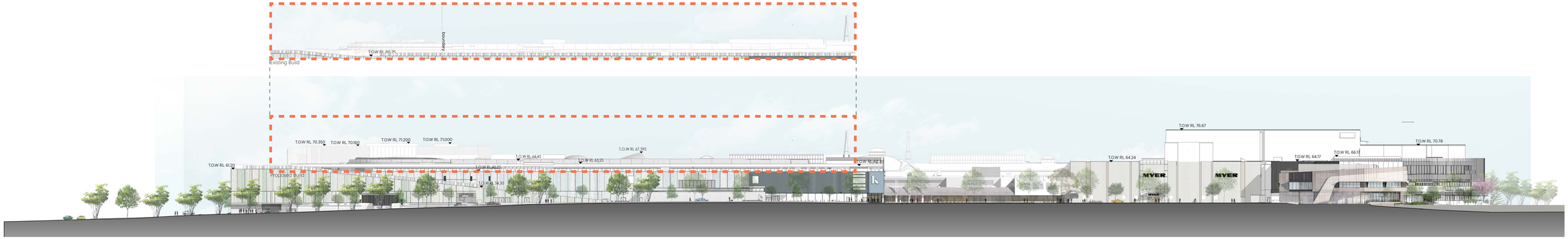
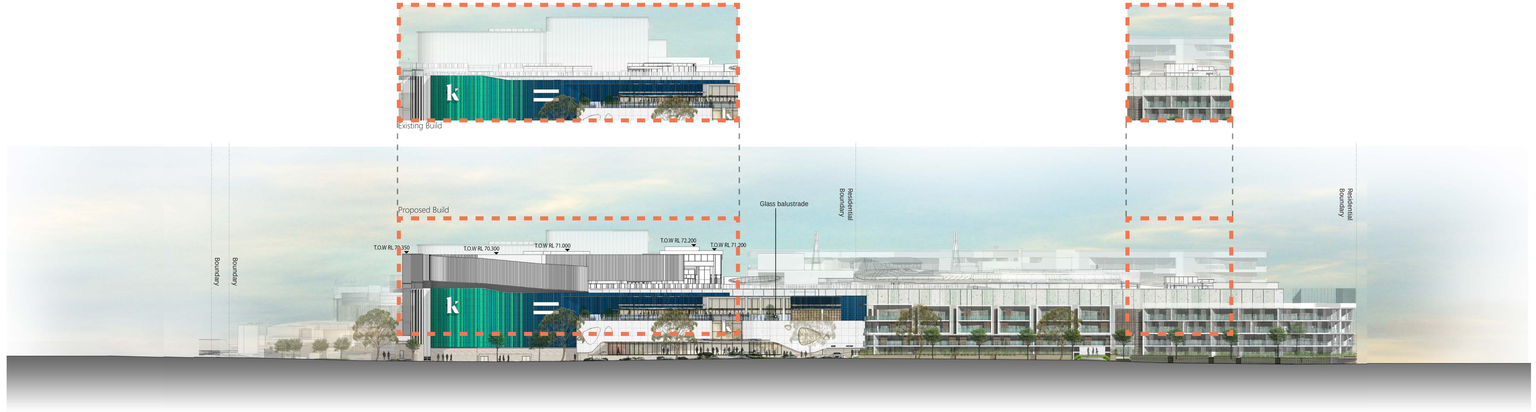


Davenport Street - North Elevation



Francis Avenue elevation - East Elevation

gpt

Elevations
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

SCALE: 1:1000 @A3/ 1:500 @A1 DATE: 10.09.2024
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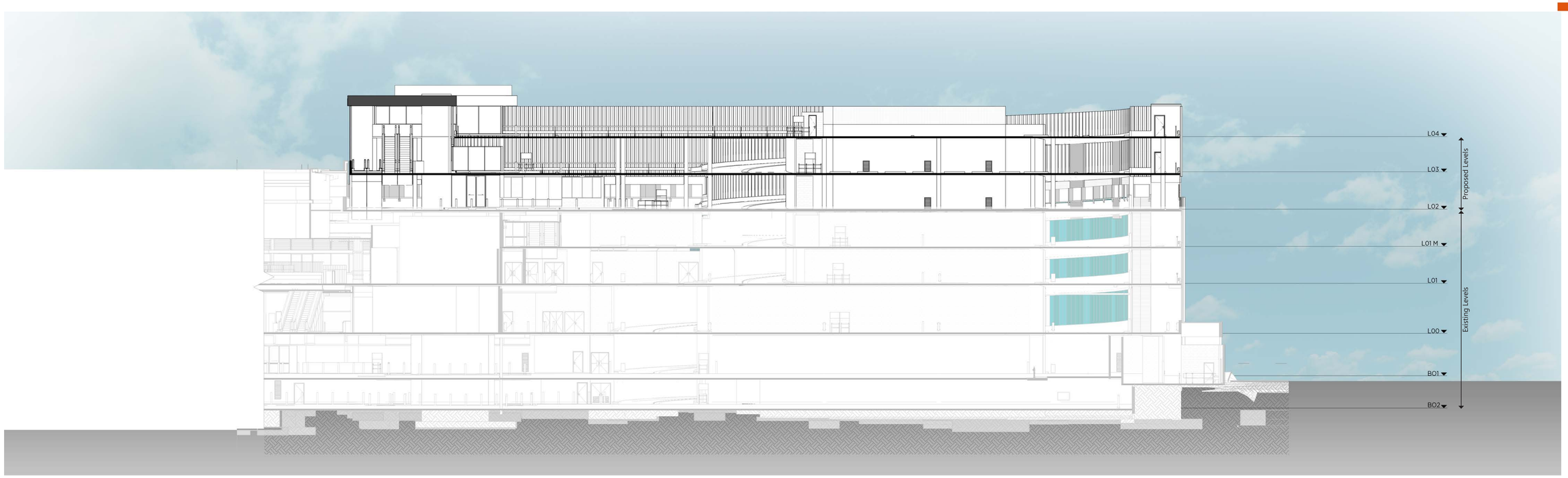

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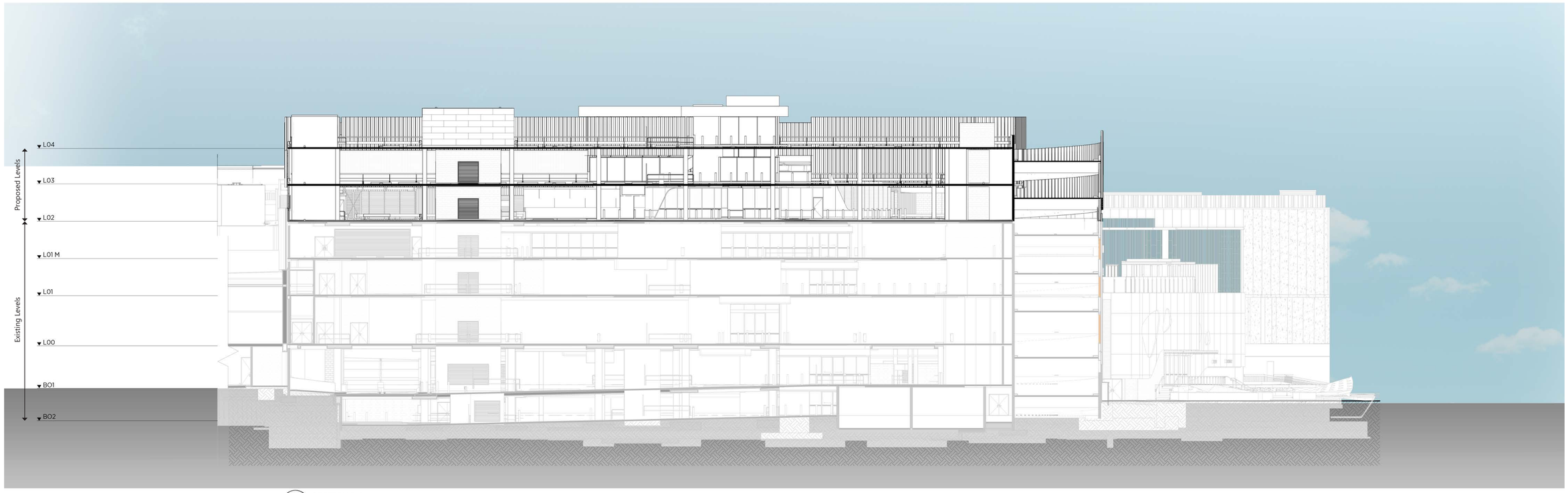

2 / 201 SECTION B-B
1 : 200

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Sections

KARRINYUP SHOPPING CENTRE

development application - Rev B

NORTH

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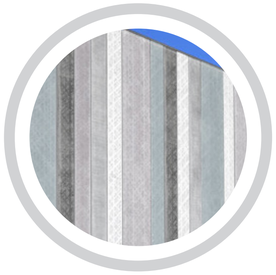
DA11

light weight cladding
(Karrinyup Road - South elevation)

alternating perforated and solid feature screening
(Karrinyup Road - South elevation)



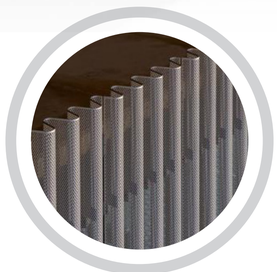
precast concrete panels
(Karrinyup Road - South elevation)

painted precast
(Karrinyup Road - South elevation)

aramax freespan screen
(Karrinyup Road - South elevation)

perforated metal cladding screen added

perforated metal cladding screen added



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Illustratrative View - SE Carpark
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

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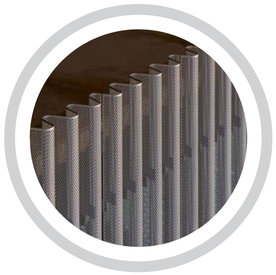


perforated metal cladding screen added

pergola structure
(Francis Avenue - East elevation)

light weight cladding
(Karrinyup Road - South elevation)

Screen added

jesmonite composite panels
(Francis Avenue - East elevation)

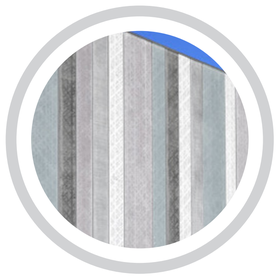
Subject to separate development application

blockwork wall
(Francis Avenue - East elevation)

shopfront glazing
(Francis Avenue - East elevation)

laminated patterned glass
(Francis Avenue - East elevation)

precast concrete panels
(Francis Avenue - East elevation)



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Illustratrative View - SE Carpark
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Development Application - Rev a

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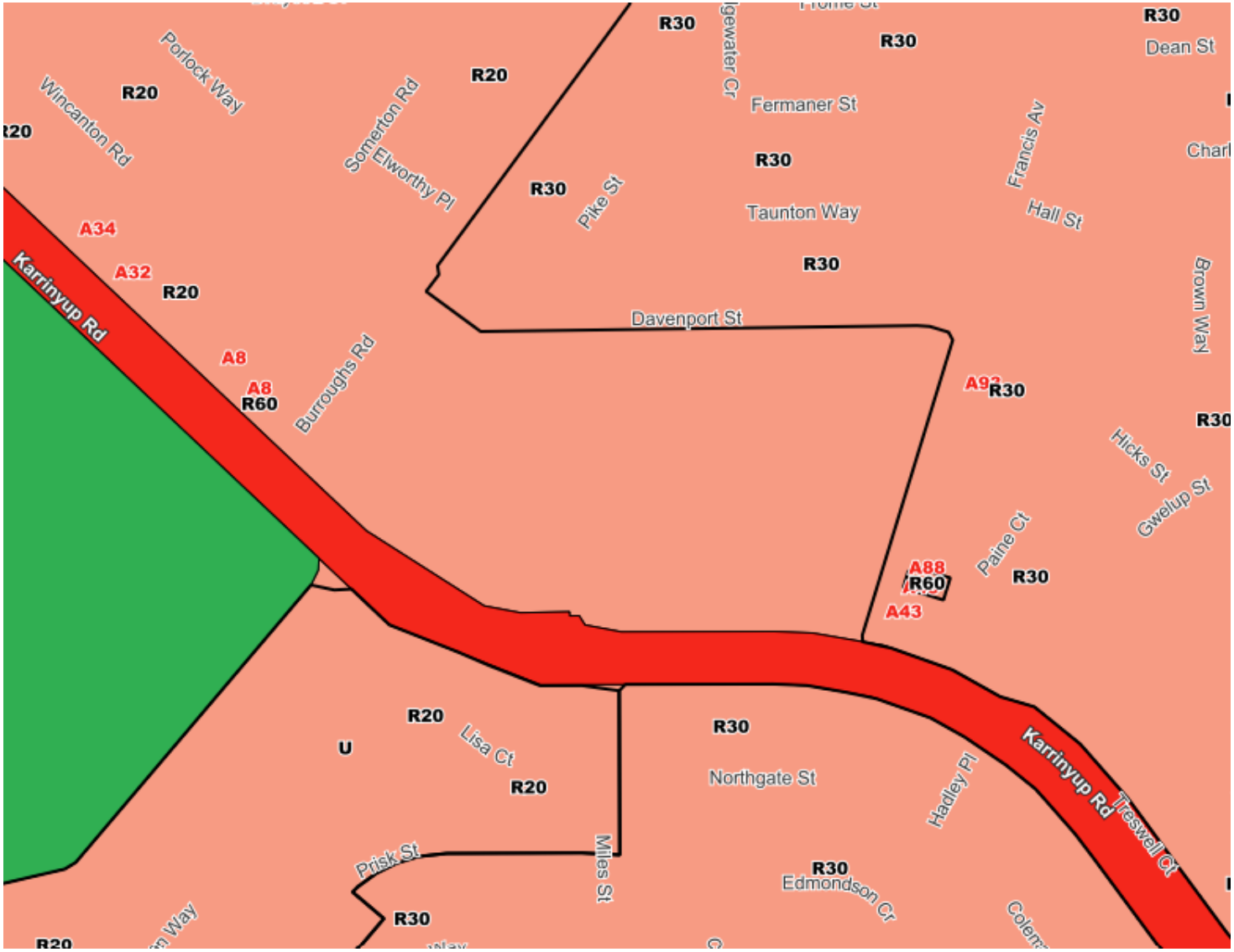
DA14

Attachment 2 – Aerial Location Plan

Attachment 3 – Metropolitan Regional Scheme Zoning Map



Attachment 4 - City of Stirling Local Planning Scheme Map

Attachment 5 - Applicants Original
Report Accepted 4 December 2024

City of Stirling
11 Sept 2024
RECEIVED

Development Application – Access Modifications and Additional Parking

Lot 166 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12
(No. 200) Karrinyup Road
Karrinyup

ROWE GROUP

Document Set ID: 11098738
Version: 1, Version Date: 13/09/2024

Document Control

Printed 11 September 2024 9682_20240905_DA_CoS_v1_ns

Version	File Name	Prepared	Approved	Date
1	9682_20240905_DA_CoS_v1_ns	Declan Allcock	Nathan Stewart	10/09/2024

This report has been authorised by;

Nathan Stewart
Principal Town Planner

Declan Allcock
Assistant Town Planner

Jamie Baxter
Quality Control

CONTACT ROWE GROUP

p 9221 1991 **e** info@rowegroup.com.au **w** rowegroup.com.au
a 3/369 Newcastle Street, Northbridge 6003

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4. Traffic Impact Assessment

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2. Ten Design Principles
3. Matters to be Considered
4. Assessment Against LPP5.7

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1. Introduction

Rowe Group acts on behalf of the landowner of the Karrinyup Shopping Centre located at Lot 166 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No. 200) Karrinyup Road, Karrinyup (**the subject site**).

As part of the ongoing management of Karrinyup Shopping Centre, our Client has investigating ways to improve efficiencies with accessing and egressing the Centre from Karrinyup Road. Aurecon has been engaged to test access/egress modifications to help resolve immediate problems that the Centre faces, including delays for visitors accessing and egressing the site. Additionally, there is a need for additional car parking to meet current demand levels.

This report has been prepared in support of an Application for Development Approval for converting the existing Ramp 14 at Karrinyup Road from entry only to exit only, installation of a new valet parking area in Level 2 of the northern car park and an additional two (2) storeys of car parking above the existing multi-deck parking structure in the south eastern corner of the subject site which will increase the current supply of parking from 4,683 to 4,950 bays.

This report includes a description of the following matters:

- The location of the subject site.
- A description of the existing site characteristics.
- A detailed explanation of the proposed development.
- An overview of the relevant planning issues.
- Justification of the proposed development.

This Development Application has been prepared by a multi-disciplinary project team, made up of the following consultants:

Discipline	Consultant
Architecture and Design	Taylor Robinson Chaney Broderick and Hames Sharley
Town Planning	Rowe Group
Traffic	Aurecon
Project Management	ARIA Projects

Table 1: Project Team

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2. Description of Site

2.1 Location

The subject site is located in the Municipality of the City of Stirling (**the City**), approximately 11km northeast of the Perth Central Area.

The subject site is situated in the suburb of Karrinyup and bound by Karrinyup Road to the south, Francis Avenue to the east, Davenport Street to the north and Burroughs Road to the west. All of the aforementioned roads are sealed, gazetted roads. The subject site abuts Lot 7 (No. 190) Karrinyup Road, Karrinyup which was formerly occupied by a service station. Lot 7 is currently vacant.

The subject site also abuts Lots 2 (No. 13) Davenport Street, Karrinyup which is occupied by the Karrinyup Public Library and car park.

2.2 Cadastral Information

The subject site comprises one land parcel, being:

- Lot 166 on Diagram 67516, Certificate of Title Volume 1701 Folio 331.
- Lot 66 on Plan 10178, Certificate of Title Volume 1715 Folio 110.
- Lot 12 on Deposited Plan 415683, Certificate of Title Volume 2997 Folio 489.

Refer **Attachment 1 – Certificates of Title**.

The subject site has a total land area of 13.02ha with frontages of approximately 536m to Karrinyup Road, 160m to Burroughs Road, 220m to Davenport Street and 142m to Francis Avenue.

Refer **Figure 1 – Site Plan**.

2.3 Existing Improvements

The subject site is occupied by the Karrinyup Shopping Centre. The Shopping Centre was originally developed in the early 1970s. Since then, it has maintained its role as a key retail site within the Perth Metropolitan Region (**Perth**). On 14 August 2015, the (former) Metro North-West Joint Development Assessment Panel (**JDAP**) approved a major expansion to the Shopping Centre (ref: DAP/18/01418). Condition 45 of the August 2015 Approval imposed a maximum provision of 4,880 car parking bays on-site, as follows:

> *45. A maximum of 4,880 car parking bays shall be provided and reserved as public parking bays, to the satisfaction of the City of Stirling.*

Circa 2016, the Shopping Centre underwent a significant redevelopment, which included substantial retail/commercial floorspace increases as well as numerous hospitality and entertainment offerings. This transformed the site into a true 'mixed use' destination, reflecting its 'Activity Centre' designation within the State's planning framework. This redevelopment elevated its status within the Perth retail landscape to cement its role as an important employment node and significant economic and activity generator.

In 2018 and 2022, development approvals were obtained for multi-storey apartments, up to 23-storeys ('Karrinyup East' and 'Karrinyup West' developments) respectively.

The Centre has approximately 116,819m^2 of retail floorspace and a total of 4,683 car parking spaces.

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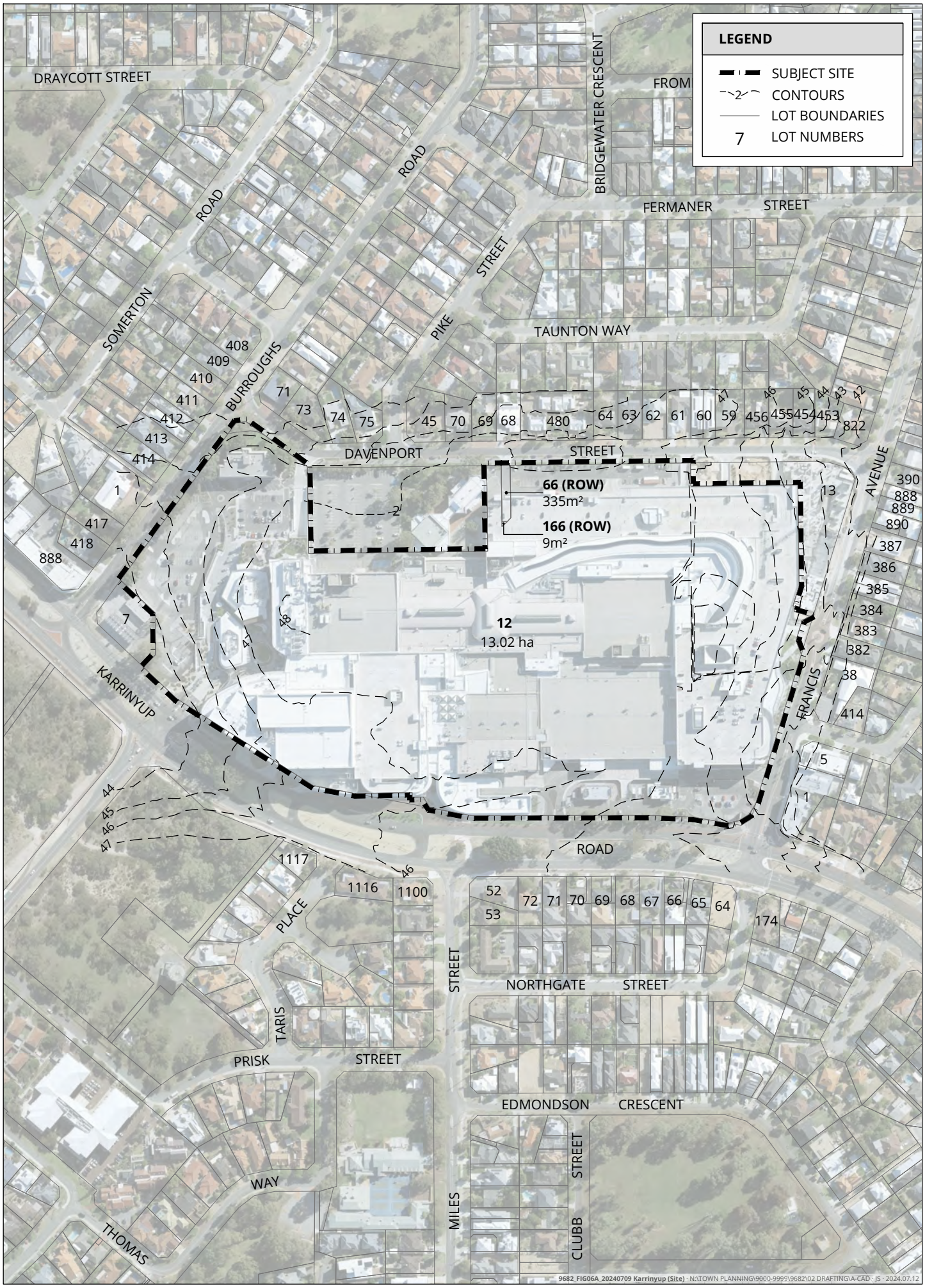

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FIGURE 1

SITE PLAN

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3. Description of Proposed Development

This Application seeks Development Approval for Development Approval for converting the existing Ramp 14 at Karrinyup Road from entry only to exit only, installation of a new valet parking area in Level 2 of the northern car park and an additional two (2) storeys of car parking above the existing multi-deck parking structure in the southeastern corner of the subject site which will increase the current supply of parking from 4,683 to 4,950 bays. It is requested that any approval issued is valid for a minimum of four (4) years).

Refer **Attachment 2 – Architectural Drawings.**

These changes will improve the experience of vehicle access and parking for customers. The Proponent has received feedback form customers in relation to exiting the Centre from the western car park area to Karrinyup Road during peak periods.

The current number of parking bays at the Centre is fewer than the approved number under the current Development Approval. During peak shopping hours, the demand for parking bays gets close to exceeding supply, resulting in drivers circulating the Centre looking for a car bay. Therefore, the proposed solution is to convert Ramp 14 from an entry only to exit only, install a new supplementary valet car park within Level 2 of the northern car park and increase the parking supply by adding two additional levels of parking atop the eastern car park structure. This will increase the total number of parking bays available from 4,683 to 4,950, 70 more than the current Development Approval. These proposals are explained in greater detail below.

3.1 Ramp 14 Direction Reversal

The Proponent has received feedback that exiting the Centre is a point of frustration for customers. In order to mitigate this issue, it is proposed to reverse the direction of a single lane, entry only ramp (Ramp 14) on Karrinyup Road. The ramp is located immediately west of the Karrinyup bus station.

Ramp 14 currently provides a means of vehicle access to the Centre from Karrinyup Road east of Jeanes Road. This proposal will convert the existing access ramp to an exit ramp.

The purpose of the conversion of Ramp 14 to be a left out, exit only ramp is to attract some vehicles to use this as an exit route instead of the Karrinyup Road / Jeanes Road signalised intersection or the access road adjacent to Hungry Jacks. As the existing number of vehicles using this entrance is relatively low at 100 vehicles during a Saturday peak hour (approximately 4% of all entry movements into the Centre during the Saturday peak hour), it is expected these trips will be redistributed to other in entry points, with only a minor change in operational efficiency. This will have a minimal impact on entry movements while significantly improving the ability of customers to exit the parking structure by using the new exit option.

The conversion of Ramp 14 will require clear signposting to minimise customer confusion. Installation of sufficient “No Entry” or “Exit Only” signage and pavement markings will be required to make drivers aware of the change. There will be no changes to the public transport access at the Centre. There will also be some minor internal modifications to the layout of the car parking in Basement Level 01 as a result of the proposed ramp conversion.

Based on the traffic investigations undertaken by Aurecon, this proposed access modification will improve efficiencies for exiting vehicles and traffic distribution around the Centre. This will make the Basement Level 01 car park more attractive to visitors and will reduce the reliance on other access locations that are currently carrying more traffic, improving the overall movement of traffic within and around the Centre.

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3.2 New Supplementary Valet Parking Area

This proposal also includes the installation of a new valet car park within Level 2 of the northern car park. The new valet parking area will supplement the existing valet parking service at the Centre. A new roof will be constructed on the northern car park as part of this proposal. The existing valet parking area is mostly full, generally consistent with the occupancy of the rest of the parking at the Centre. This demonstrates that the existing valet parking service has been well received by visitors. It has been successful at the Centre so much that a larger valet parking area is required to supplement the existing service. It is intended that the existing valet car park will be used on an as needed basis, with the new proposed valet car park to become the primary valet car park location. When (and if) the new valet car park is full, the existing valet car park will be used.

The expected benefits of an additional valet car park are:

- To provide a service to people who may not be familiar with parking at the Centre.
- To get visitors into a parking bay quicker, possibly resulting in fewer cars circulating within the car parks.

3.3 Additional Car Parking

The current demand for parking at the Development is at capacity of the available car park spaces. During peak hours, it is estimated that vehicles can experience circulation times of up to 20 minutes to find an available space. This then leads to issues with circulation within the car park areas, and to customers having difficulty exiting the facility. This often results in queuing out onto the main road and local streets and also parking in the surrounding local streets.

This proposal will increase the current parking supply at the Centre from 4,683 to 4,950 bays (inclusive of the 209 bays under the Karrinyup West Residential Development once constructed), 70 more than the current Development Approval. The additional bays will be provided in the eastern car park by constructing two additional levels on the structure. These levels will be accessed by extending the existing podium D-handle ramp structure upwards.

The additional levels of parking will increase the building height of the car park structure from 62.8m AHD to 72.2m AHD (at its highest point). This sits under the height of the existing centre, which is 76.67m AHD.

The increase of parking supply at the Centre will occur in increments with other developments causing the loss of existing bays and the staging of the additional levels of parking until the total parking supply reaches 4,950 bays. The modifications of parking at the Centre over the next several years is summarised as follows:

- The Karrinyup West Residential Development is expected to commence shortly which will cause the loss of 170 at-grade parking bays on the western portion of the subject site. This is expected to commence in 2024. This will bring the total parking supply to 4,513 bays.
- The internal modifications to the Basement Level 01 car park caused by the reversal of the direction of Ramp 14 will result in the loss of 18 parking bays. The ramp reversal is anticipated to be completed in mid-2025. This will bring the total parking supply to 4,495 bays.
- The proposed valet parking in the northern car park will result in the loss of 12 parking bays. The valet parking is anticipated to be completed in mid-2026. This will bring the total parking supply to 4,483 bays.
- The construction of the two additional levels of parking in the southeast multi-deck structure will be implemented in two phases. Phase one will introduce 177 parking bays in approximately early

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2026, bringing the parking supply to 4,660 bays. Phase two will introduce 81 parking bays in approximately mid-2026, bringing the parking supply to 4,741 bays.

- The Karrinyup West Residential Development will introduce circa 209 new car parking bays allocated to the Centre. This is anticipated to be introduced in mid-2027. This will bring the total parking supply to 4,950 bays.

The proposed additional car parking should be supported for the following reasons:

- The Centre is a unique facility with a wide catchment due to the variety of stores available. Additionally, it was understood that other centres would redevelop. Subsequently, there is a greater than expected level of sustained demand for the Centre, with the expected 'dip' in trip generation after the initial surge, not being realised. The proposed additional parking spaces is to meet current demand for parking at the Centre.

- The proposal represents a minor increase to the number of parking spaces at the subject site – an approximate 1.45% increase.

- The Development Approval for the major redevelopment of the Centre included a Condition limiting the number of parking spaces to 4,880, which is derived from a parking ratio of 4.2 bays per 100m^2 of retail floorspace. With approximately 116,819m^2 of retail floorspace and 4,950 parking spaces, this equates to approximately 4.23 bays per 100m^2 of retail floorspace. This is a very minor variation to the 4.2 bays per 100m^2 rate.

- This proposal is supported by a Traffic Impact Assessment which demonstrates that the proposal (both the Ramp 14 direction reversal and the additional parking) will improve traffic distribution on the roads around the Centre and access and egress efficiencies and will reduce queuing out onto the main road and local streets and also parking in the surrounding local streets.

- The original major redevelopment was supported by a *Travel Behaviour and Parking Management Plan* (**TBPMP**) which included strategies that were proposed to be adopted to manage parking within and surrounding the Centre and promote alternative modes of transport. The Proponent has implemented all but one of these strategies, however, there is still a demonstrated demand for additional parking spaces within the Centre.

- The one strategy from the TBPMP that has not been implemented is the paid parking system. Whilst the Proponent has made provision for the system, it has not been implemented. The Proponent does intend to implement the system in the future, at the appropriate time.

  As mentioned above, it was understood that other centres would redevelop. Subsequently, there is a greater than expected level of sustained demand for the Centre, likely from visitors coming to Centre from further than anticipated. Such visitors would not have easy access to the Centre by public transport. As a result, there is a higher demand for parking. If we restrict parking with paid parking, it will likely impact the surrounding streets and exacerbate existing parking and access problems that the Centre currently faces.

  Additionally, we do not think that imposing an additional cost on the community for parking is appropriately at this time due to the well documented cost of living crisis.

  The Proponent remains committed to implementing this system, however, for the above reason, the system has not been implemented yet. The Proponent will review this in in the future to see if the situation has improved to a reasonable level and once it does, the paid parking system will be implemented.

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4. Strategic Planning Considerations

4.1 State Planning Strategy 2050

The *State Planning Strategy 2050* (**State Strategy**) was endorsed by the Western Australian Planning Commission (**WAPC**) in 2014 to ensure a strategic-led vision for future planning for Western Australia (WA) is achieved. This vision encompasses a range of strategic considerations, including the sustainable development of activity centres as well as the comprehensive provision of supporting infrastructure.

The State Strategy states:

> *Health and wellbeing (Figure 36) result from active living, the provision of material needs, good community services, a strong local economy, interaction with the natural environment and a safe built environment.*

Figure 36 of the State Strategy states that one of the factors for health and wellbeing is public transport that reduces the need for cars and parking.

As previously mentioned, the original major redevelopment was supported by a TBPMP which included a number of strategies to improve public transport infrastructure and encourage alternative modes of transport. Despite these efforts there is a demand for additional parking at the Centre, as demonstrated by the parking data. The current demand for parking at the Centre is close to the capacity of the available car park spaces. Therefore, additional parking is required.

4.2 Perth and Peel @ 3.5 Million (and Central Sub-Regional Framework)

Perth and Peel @ 3.5 Million and its associated '*Central Sub-Regional Framework*' (collectively, the **Sub-regional Framework**) provides an overarching planning and infrastructure framework for the Perth and Peel regions. The Sub-regional Framework synchronises with the State Strategy in that it defines the urban form up to 2050 in a manner that limits sprawl, whilst also diversifying available housing stock within these regions to meet affordability requirements.

The Sub-regional Framework identifies the location of new houses and job creation. In doing so, it promotes infill development to deliver a more compact and connected city to maximise efficient use of infrastructure, whilst protecting important environmental assets.

In regard to transportation, Perth and Peel @ 3.5 Million states:

> *The development of the METRONET public transport system will define the future of the movement network in the sub-region. Key transport corridors will be required to transition into multi-functional corridors to achieve a more compact and diverse urban form. Areas around train stations and other major public transport infrastructure have been identified as having the potential to accommodate increased development. A balanced transport/land use approach will be required to accommodate all transport modes, parking and utilities as well as a people-friendly urban environment.*

The Central Sub-Regional Framework states:

> *Activity centres will match quality infill with amenity by creating a village-style mix of open space, housing, workplaces and entertainment venues. Activity centres play a crucial role in the provision of employment where people live and have access to good quality public transport.*

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The aim is to provide a range of innovative housing options and the creation of a sense of place by providing social and business activities and services. These activity centres would build on existing infrastructure and be linked to a co-ordinated and integrated transport network to significantly reduce congestions.

For this reason, the framework builds on the State Planning Policy 4.2: Activity centres (SPP 4.2) in Perth and Peel objectives that place a focus on increasing residential, commercial and mixed-use development in and surrounding activity centres linked by a robust movement network. While the CBD will always have primacy, the framework supports an increased distribution of employment in proximity to where people live across Perth and Peel.

The Proponent has, through the TBPMP, implemented a number of strategies to manage parking within and surrounding the Centre and promote alternative modes of transport to encourage mode shift. The majority of these strategies have been implemented to date and the Centre has seen an improvement in the patronage of public transport on the back of significant financial contributions and infrastructure improvements made by the Proponent. However, the current demand for parking at the Centre is close to the capacity of the available car park spaces. Therefore, additional parking is required.

4.3 City of Stirling Local Planning Strategy

The City's *Local Planning Strategy* (**LPS**) was endorsed by the WAPC in October 2019 and provides strategic direction to guide future planning and development, including the preparation of a new local planning scheme.

Consistent with the matters addressed in the Sub-regional Framework, the preparation of the Local Strategy considered a range of interrelated issues including housing, transport and infrastructure, commercial activity and employment as well as community facilities.

The LPS states the following in relation to activity centres:

The City considers high quality urban design of Activity Centres and Activity Corridors to be crucial to ensuring successful infill development is achieved. The physical layout of an Activity Centre can influence how people travel to and through a centre. Activity Centres and Corridors that are less designed around private vehicles, with emphasis on walking, cycling and public transport, will encourage people to be more physically active. The design of the Activity Centre and Activity Corridors, as well as planning for a mix of land uses, support a shift to healthier and more sustainable transport options.

As mentioned previously, the Proponent has implemented strategies to manage parking within and surrounding the Centre and promote alternative modes of transport to encourage mode shift. The majority of these strategies have been implemented to date and the Centre has seen an improvement in the patronage of public transport on the back of significant financial contributions and infrastructure improvements made by the Proponent. However, the current demand for parking at the Centre is close to the capacity of the available car park spaces. Therefore, additional parking is required.

4.4 State Planning Policies

4.4.1 State Planning Policy No. 3.7 – Planning in Bushfire Prone Areas

The purpose of *State Planning Policy No. 3.7 - Planning in Bushfire Prone Areas* (**SPP3.7**) is to implement effective, risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. A desktop review of the Department of Fire and Emergency Services (**DFES**) map for Bushfire Prone Area indicates that the southwestern corner of the subject site identified as 'Bushfire Prone

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Area'. The proposed development is located over 100m from the portion of the subject site that is identified as 'Bushfire Prone Area'. Therefore, a Bushfire Attack Level (**BAL**) Assessment (Basic) has been undertaken to address the provisions of SPP3.7.

Refer to **Attachment 3 – BAL Assessment (Basic).**

4.4.2 State Planning Policy No. 4.2 – Activity Centres for Perth and Peel

State Planning Policy No. 4.2 – Activity Centres (**SPP4.2**) provides directions for the planning and development of activity centres throughout Perth and Peel.

The provisions of SPP4.2 intend to minimise dependency on private vehicle trips to and within activity centres, reducing the demand for parking. To demonstrate this, major development within activity centres is required to accompanied by travel plans and parking management plans. As mentioned previously, the Development Application for the recent major expansion of the Centre was supported by the TBPMP. The TBPMP included a number of strategies to manage parking within and surrounding the Centre and promote alternative modes of transport to encourage mode shift. The majority of these strategies have been implemented to date and the Centre has seen an improvement in the patronage of public transport on the back of significant financial contributions and infrastructure improvements made by the Proponent.

However, the current demand for parking at the Centre is close to the capacity of the available car park spaces. Therefore, additional parking is required. This Application is supported by a Traffic Impact Assessment which demonstrates there is a demand for additional parking at the Centre.

Refer **Attachment 4 – Traffic Impact Assessment**.

The major redevelopment was approved with a parking cap of 4,880 bays to constrain private vehicle trip generation and promote mode shift. This parking cap was calculated on the basis of 4.2 bays per 100m^2 of retail floorspace. The Centre has operated in accordance with this cap since opening. However, as demonstrated in the TIA, parking demand is frequently exceeding supply within the Centre causing congestion in and around the Centre. This proposal seeks only a minor exceedance of the parking cap of approximately 1.45% and improvements to access and egress efficiencies as a means to address these immediate issues. This proposal will increase the parking supply ratio to approximately 4.23 bays per 100m^2 of retail floorspace – again only a minor increase.

As the Centre has improved public transport and alternative modes of transport (pedestrian and cyclist infrastructure) but is continuing to experience demand for parking, it is therefore appropriate that the existing parking cap is increased to meet that demand. A minor increase of the parking supply will not be at the detriment of promoting a shift to other modes of transport.

4.4.3 State Planning Policy No. 7.0 – Design of the Built Environment

State Planning Policy No. 7.0 - Design of the Built Environment (**SPP7.0**) provides the broad framework for the design of the built environment across Western Australia. The design of the proposed development has been considered against the ten (10) design principles. The project architect has prepared a Design Principles Statement addressing the ten (10) design principles of SPP7.0. Refer **Attachment 2 – Architectural Drawings**.

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DESIGN PRINCIPLES	RESPONSE
Context & Character	Karrinyup Shopping centre sits within a coastal suburb 12km north of Perth's CBD. It's uniquely positioned with Perth's beautiful beaches to the west, lake Gwelup to the east and a biodiverse bush forever zone across the road, to the south. The original 2,000sq m shopping centre was built in the late 1950's and the centre has undergone several significant expansions and upgrades over the decades. The centre's popularity has surpassed expectations, therefore, the proposed modifications: - Extension of the SE car park – adding Level 03 + Level 04 - Changing ramp 14 from and entry to an exit - Modifications to the L02 north car park to provide valet services, are primarily born out of a need to address traffic congestion that occurs when the centre is busy. External factors influencing the context are many and varied: client brief, authority requirements, program needs, and last and by no means least budget constraints. The design context for this package of modifications was determined by factors both internal and external to the site. Drawing on strategies from the most recent development, these proposed modifications include organic forms, natural textures and coastal colours across the exterior and interior. Some design decisions have been made based on the need and ability to work around the existing car parks, to provide reasonable access, and to maintain services and provide sufficient parking.
Landscape Quality	The proposed modifications only touch the ground plane east of the bus port. The intent is that the works have minimal impact on the existing high quality landscaped areas.
Built Form and Scale	The extension of height in the southeast corner is an appropriate one as we are adding to the existing multideck car park that is a landmark element at the prominent corner. The form of the proposed car park extension in the southeast draws upon the cues from the existing big bold sweeping facades and textural qualities noted earlier. To help break down the overall form of the building at the southeast corner the cladding at Level 02 is purposefully different - it is intended to be darker and act as an oversized shadowline – a visual break between new and existing. The proposed modifications to the Level 2 north car park do slightly increase the building height but provides additional amenity to the customer by providing cover to the car parking area. The built form of the proposed roof has been chosen for three main reasons: - To reduce the height of the overall roof as much as possible, - Allow for cross ventilation at high level - alleviating the need for mechanical ventilation to the whole area; and - Future proofed for installation of solar array - PV cells in future.
Functionality and Built Quality	As noted previously, the proposed works are primarily a functional requirement, responding to the congestion that occurs when the centre is busy, to ensure the centre can function better. The conversion of Ramp 14 from an entry to an exit and the associated proposed modification to the internal layout alleviates traffic congestion upon existing by providing more direct access from the upper-level ramps to the exit point and Karrinyup Road, heading east. The layout changes also provide an

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DESIGN PRINCIPLES	RESPONSE
	alternative exit from B02 to Karrinyup Road, without having to loop around to the Jeans Road intersection. The additional bays in the extension of the southeast multideck car park provide additional amenity and opportunity to park during peak trading times. A high-level build quality is expected here. The proximity to the coast is a driver behind the selection of durable and fit for purpose façade materials. Refer our traffic engineer's report for more information on traffic movements.
Sustainability	The proposed extensions to the car park areas will be naturally ventilated. The roof areas will be designed so that they have capacity to take a solar array of PV cells in future.
Amenity	The modifications will create improved access and exit to an already diverse activity and community centre. There will also be improved amenity through the addition of a valet service at L02 and shaded car parking.
Legibility	As these works are related to the car park wayfinding will be an innate inclusion in the works. The works reinforce the existing landmark corner at the southeast of the site and improve the fine grain connection routes within the centre and its context.
Safety	All areas of the car park and centre will be well lit and secure spaces. The upper levels of the car parks will include a screen that projects 2400mm above the crash barriers to discourage climbing.
Community	The modifications will benefit the community who use visit the centre and use the surrounding roads – particularly on busy days – as the primary intent is to alleviate congestion, provide more parking and therefore provide an elevated experience.
Aesthetics	The overall narrative for the design of the previous Karrinyup Shopping centre development drew on inspiration from the local context – primarily the natural coastal context, but also the surrounding bush and lake contexts. The proposed modifications will draw on that and add to it. The Karrinyup Road façade is primarily viewed from some distance and is typically seen by moving traffic rather than by pedestrians or from local residences. The architecture of the façade responds to this being made up of large strong forms and geometries designed to be read at a distance and in motion. The intent is to provide an elegant and coherent outcome by utilizing a cladding material for the southeast car park upper levels (L03 + L04) that references the vertical cladding treatments and big bold facades that populate the south and east elevations today. The intent is for this refined perforated screen to encapsulate the new car park, and sit atop the existing, giving it a crown-like quality.

Table 2: Ten Design Principles

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5. Statutory Planning Considerations

5.1 Metropolitan Region Scheme

Under the provisions of the *Metropolitan Region Scheme* (**MRS**), the subject site is zoned 'Urban'. The proposed development is consistent with the types of development appropriate within the 'Urban' zone.

Refer **Figure 2 – Metropolitan Region Scheme Zoning.**

5.2 City of Stirling Local Planning Scheme No. 3

5.2.1 Zoning

Under the provisions of *Local Planning Scheme No. 3* (**LPS3**), the subject site is zoned 'Regional Centre'. Clause 4.2.11 of LPS3 states the 'Regional Centre' zone objectives to be:

a) *To provide for the full range of shopping, office, administrative, social, recreation, entertainment and community services, consistent with the region-servicing role of the centre.*
b) *To facilitate the creation of employment within the centre so as to reduce the demand for travel and enhance the level of self-sufficiency within the sub-region.*
c) *To promote a high degree of accessibility to and within the centre, for users of all modes of transport (bus, rail, private car, cycle and pedestrian) and to avoid fragmentation of commercial development.*
d) *To enhance pedestrian connectivity within the centre, so as to facilitate movement between sites and from public and private transport nodes.*

This proposal seeks to improve the access and egress to the Centre and address an existing demand for additional parking. Therefore, the proposal is consistent with the relevant 'Regional Centre' Zone objectives.

Refer **Figure 3 – City of Stirling Local Planning Scheme No. 3 Zoning.**

5.2.2 Land Use Permissibility

This Application does not propose any land uses and seeks approval for works only.

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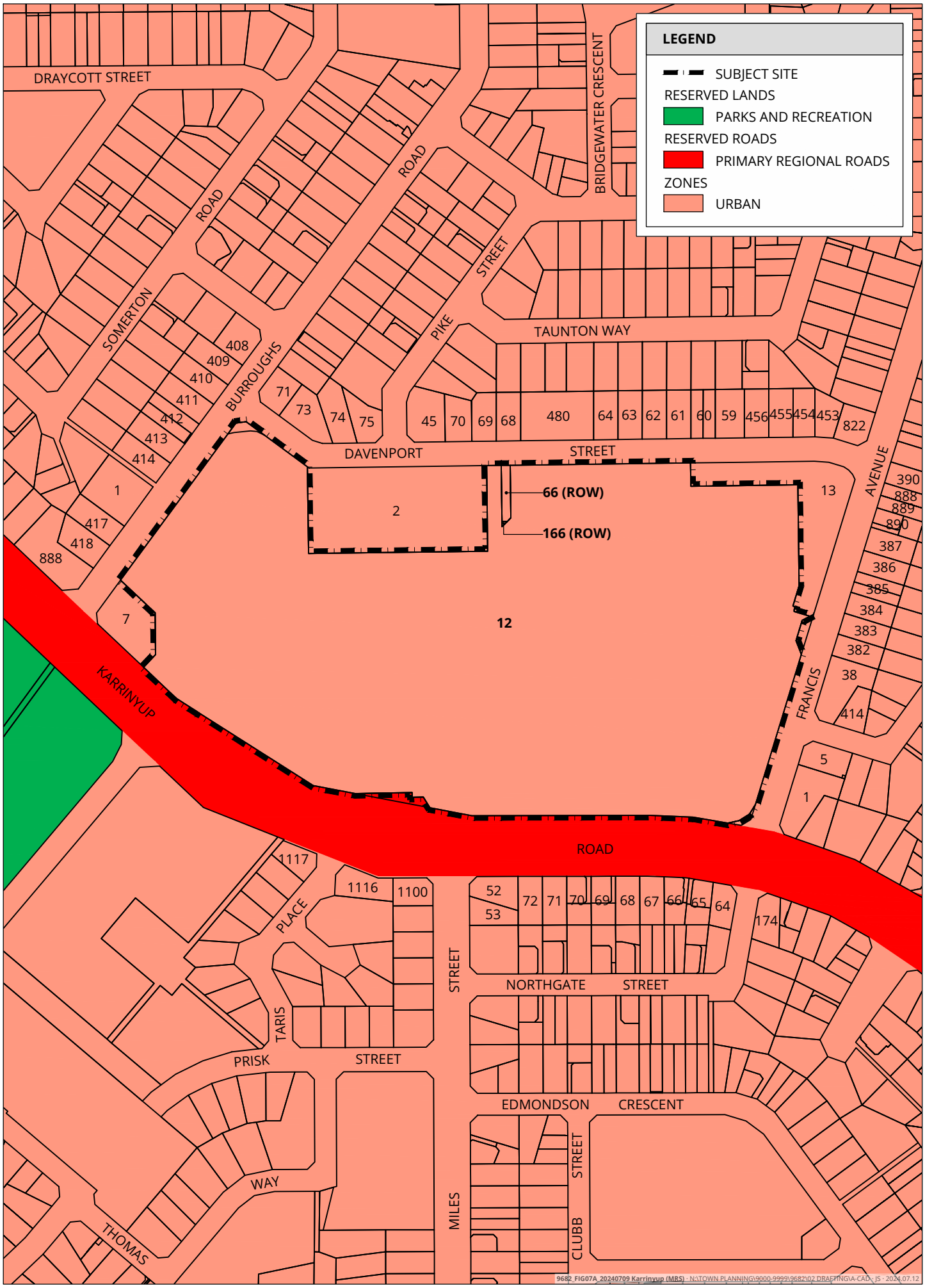

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FIGURE 2

METROPOLITAN REGION SCHEME ZONING

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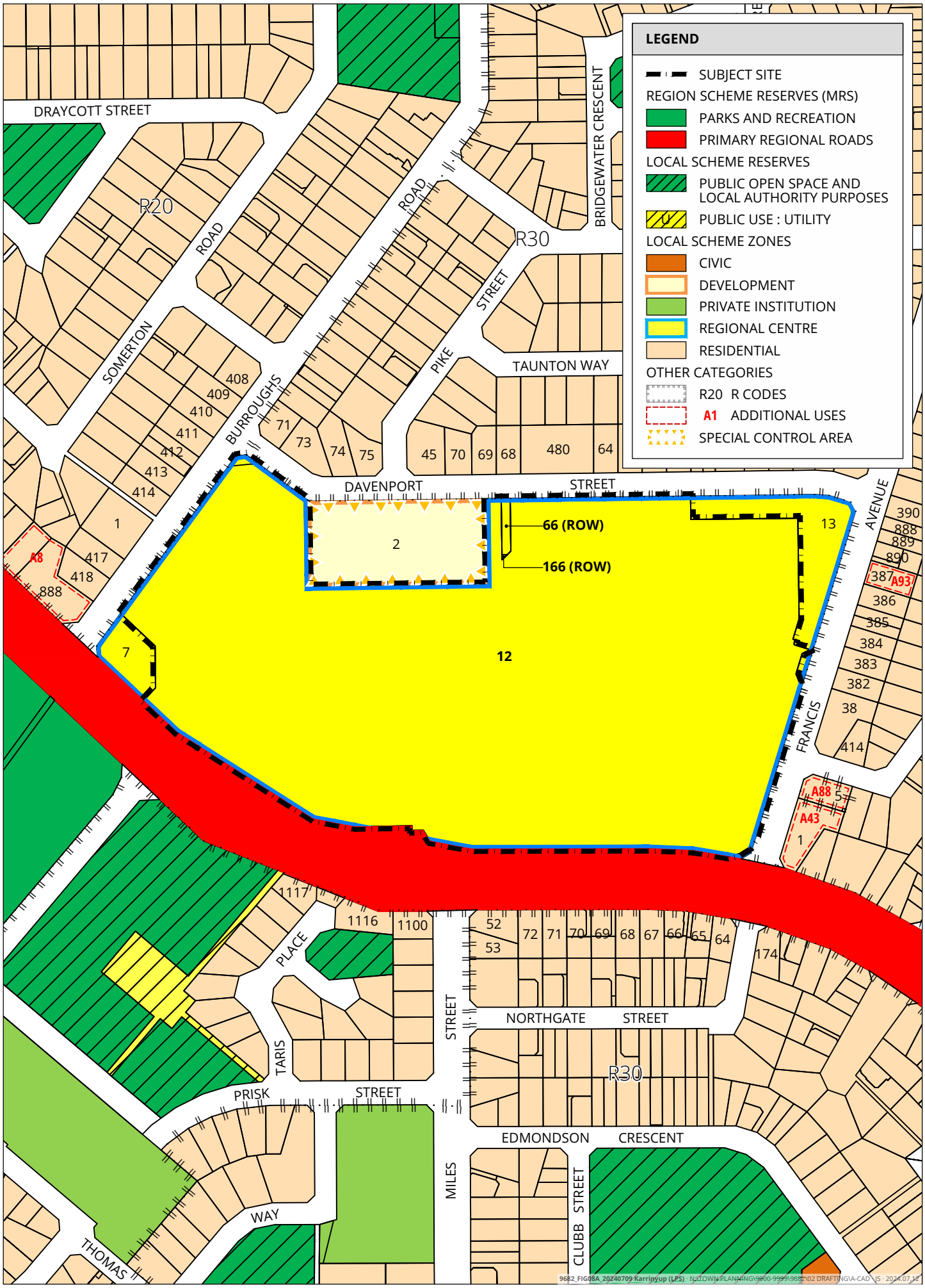

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FIGURE 3

CITY OF STIRLING LOCAL PLANNING SCHEME No.3 ZONING

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5.2.3 Matters to be Considered

Clause 67 (2) of Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* (**Planning Regulations**) sets out the matters that a decision-maker must consider in determining a development application. The following table assess the proposed development against the relevant matters to be considered.

RELEVANT MATTERS FOR CONSIDERATION	RESPONSE
(a) the aims and provisions of this Scheme and any other local planning scheme operating within the Scheme area	Refer to Section 5.2 of this Report.
(c) any approved State planning policy	Refer to Section 4.4 of this Report.
(fa) any local planning strategy for this Scheme endorsed by the Commission	Refer to Section 4.3 of this Report.
(g) any local planning policy for the Scheme area	Refer to Section 5.3 of this Report.
(m) the compatibility of the development with its setting, including — *(i) the compatibility of the development with the desired future character of its setting; and* *(ii) the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development*	The proposed building has been designed and orientated to address the street frontages. The proposal is consistent with the existing development, and therefore compatible with the desired character of the area. Further information is contained in the Design Statement prepared by the project architect. Refer **Attachment 2 – Architectural Drawings**.
(n) the amenity of the locality including the following — *(i) environmental impacts of the development;* *(ii) the character of the locality;* *(iii) social impacts of the development*	The proposal will not have an adverse environmental impact. The building incorporates the same design features to the existing Centre. The proposed development will not have an adverse social impact. The proposal will provide additional bays for the Centre to meet the current demand for parking.
(p) whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved	No additional landscaping is proposed.
(s) the adequacy of — *(i) the proposed means of access to and egress from the site; and* *(ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles*	The proposal is supported by a Transport Impact Assessment which demonstrates that the proposal will not have an adverse impact on the surrounding road network and that the Centre is supplied with sufficient parking. Refer **Attachment 4 – Traffic Impact Assessment**.
(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety	The proposed development will not generate any additional traffic to and from the Centre. The purpose of this proposal is to provide additional parking to address the current demand and improve access / egress to and from the Centre.
(u) the availability and adequacy for the development of the following — *(i) public transport services;* *(ii) public utility services;*	The subject site is service by bus public transport services, including, Routes 422, 423, 424 and 425. These services provide connections to the wider public transport network.

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RELEVANT MATTERS FOR CONSIDERATION	RESPONSE
(iii) storage, management and collection of waste; *(iv) access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities);* *(v) access by older people and people with disability*	The proposed development will have no implications on utility services. The Centre currently provides significant bicycle parking and end of trip infrastructure, including 160 public bicycle parking spaces and a large staff end of trip facility including 200 bicycle spaces, 200 lockers and showers.
(x) the impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals	The proposal will reduce traffic congestion on the surround road network and within the Centre.

Table 3: Matters to be Considered

5.3 Local Planning Policies

5.3.1 Local Planning Policy 5.7 – Karrinyup Regional Centre Guidelines

The intent of *Local Planning Policy 5.7 - Karrinyup Regional Centre Guidelines* (**LPP5.7**) is to establish built form controls for development in and around the Karrinyup Shopping Centre. The following table provides an assessment of the proposed development against the relevant built form controls.

RELEVANT CONTROLS	RESPONSE
<u>Heights</u> *Objective* *To ensure that building height and scale is appropriate to its site and context.* • *New buildings shall be between 2 and 3 storeys;* • *Higher buildings on landmark sites / corner sites and sites larger than 5000m² may be permitted subject to the following:* - *Not have a significant detrimental impact on the amenity of the area;* - *Have podium buildings of 2 to 3 storeys on facing the periphery roads (Burroughs Road, Francis Street and Davenport Street) with higher buildings setback 15.0m from the boundary; and* - *- Living areas on the affected site are afforded at least three hours of solar access between the hours of 9 am and 3 pm on the shortest day of the year.*	The proposed two levels of parking are additions to an existing structure. The additional storeys of parking will increase the building height of the multi-storey car park from 62.8m AHD to 72.2m AHD (at its highest point). This sits under the height of the existing centre, which is 76.67m AHD. The scale of the proposed additional levels in the context of overall centre is minor in nature. The design of the proposal is intended to complement the materiality and colours of the existing Centre. Therefore, the additional height will not have a detrimental impact on the amenity of the area and is compliant with this requirement.
<u>Setbacks</u> *Objective* *To strengthen the continuity of the streetscapes and provide continual weather protection for pedestrians* *Street Setbacks* • *Commercial buildings shall have a nil setback to both primary and secondary streets;*	The setbacks of the proposed development to Karrinyup Road, Francis Avenue and Davenport Street will not change.

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RELEVANT CONTROLS	RESPONSE
<u>*Corner Sites*</u> *Objective* *To ensure that buildings give additional prominence to the street corner by using landmark features.* *Buildings located on corner sites shall include:* • *Architectural roof features that protrude above the normal roof line;* • *Increased parapet heights with additional detail, colour and textures; and* • *Increase the number of storeys at the street corner.*	The additional levels on the existing parking structure are located to the north of the corner of Karrinyup Road and Francis Avenue. The design of the proposal is intended to complement the materiality and colours of the existing Centre. The proposal is compliant with this requirement.
<u>*Multi Storey Car Parks*</u> *Objective* *To ensure that multi storey car parks are not visible from the street and do not have a detrimental impact on the streetscape.* • *Standalone Multi Storey Car Parks shall not be visible from the street and shall be located behind buildings.* • *Multi Storey Car Parks included within the main building shall be screened / treated so as to provide a seamless appearance between the car park levels and other levels.*	The design complements the existing centre through the use of similar colours and materiality and parking is not visible from the adjoining streets. Therefore, the design of the proposal is not detrimental to the streetscape and the proposal is compliant with this requirement.
<u>*Facades*</u> *Objective* *To ensure that building facades are architecturally interesting.* • *Maximum 75% glazing on any façade; and* • *The second level and subsequent levels above, of facades shall be articulated to break-up straight plain facades through the use of at least four of the following:* - *Openings;* - *Protruding balconies;* - *Awnings over windows;* - *Use of different colours and textures; and* - *Indentations and extrusions with details to break the building into individual elements.*	The design of the proposal is intended to complement the materiality and colours of the existing Centre. The façades incorporate indentations and extrusions to break up the building bulk. The proposal is compliant with this requirement.
<u>*Colours and Materials*</u> *Objective* *To ensure the use of appropriate colours and quality materials.* • *New colour schemes shall take into consideration the colour scheme of existing buildings and shall not be in sharp contrast;* • *Fluorescent and intense colours shall not be used; and* • *In traditional shopping areas materials and colours sympathetic with existing buildings shall be used.*	The design of the proposal is intended to complement the materiality and colours of the existing Centre. The proposal is compliant with this requirement.
<u>*Vehicle Access*</u>	No new vehicle access points are proposed. This proposal includes the reversal of the direction of an

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RELEVANT CONTROLS	RESPONSE
Objective *To ensure that vehicle access ways are safe and easily traversed.* • *Vehicle access to sites fronting major roads shall be from side streets or rights of ways where available;* • *All vehicle movements shall be able to enter and exit the site in a forward gear; and* • *All parking areas to comply with the Australian Standard 2890.1 in relation to turning circles, gradients within the site.*	existing access location to facilitate egress for vehicles. Additionally, the proposed valet parking and additional parking storeys use existing access locations. The proposal is compliant with this requirement.
Crossovers *Objective* *To limit the number of crossovers to reduce the impact on pedestrians and traffic.* • *A maximum of two crossovers shall be permitted for sites, one for entry and one for exiting.*	Refer above.
Design and Location of Car Parking Spaces *Objective* *To ensure that car parking areas do not disrupt the continuity of commercial frontages or otherwise detract from the amenity of the streetscape.* • *Parking areas shall generally not be visible from the street and located behind the building line or in undercroft parking where appropriate.* • *Car parking areas within the front setback area shall be softened by landscaping along street frontages in accordance with the City's Landscaping Policy.* • *Multi storey car parking shall be screened from the street by dense landscaping; and* • *Parking bays shall be designed in accordance with the relevant Australian Standard and shall have 1 tree per 6 parking bays, as required by the City's Landscaping Policy.*	The proposal is compliant with this requirement for the following reasons: - The proposed additional parking levels and valet parking does not impact the ground level facades of the building. - The additional parking is not located within the front setback areas. - The additional parking levels are screened from view from the adjoining streets by perforated metal cladding. - The proposed development does not include any open car parks and therefore the requirement for additional shade trees is not applicable to this proposal.

Table 4: Assessment Against LPP5.7.

5.3.2 Local Planning Policy 6.7 – Parking and Access

Local Planning Policy 6.7 - Parking and Access (**LPP6.7**) applies to all development on land within the City of Stirling. Table 1 of LPP6.7 identifies minimum car parking for non-residential development in district, neighbourhood and local activity centres. The Table 1 parking requirements do not apply to Secondary Centres, such as Karrinyup. Therefore, the parking requirements in Table 2 of LPP6.7 applies.

The major expansion of Karrinyup Shopping Centre was designed on the basis of the car parking ratio contained within the previous revision of SPP4.2 – a requirement of between 4 to 5 bays per 100m^2. The overall parking provision complied with this requirement. The LPP6.7 requires a higher rate of parking.

This Application does not generate additional traffic but seeks approval to increase the parking supply at the Centre to meet the current demand for parking. The proposed additional parking still sits within the framework of the previous revision of SPP4.2.

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6. Traffic Considerations

A Traffic Impact Assessment (**TIA**) has been prepared by Aurecon in support of the proposed development. The TIA has been prepared to address the requirements of the Western Australian Planning Commission *Transport Impact Assessment Guidelines*.

The TIA demonstrates that the impact of the proposed development on the surrounding road network is expected to be minor. Some redistribution of traffic movements along Karrinyup Road immediately adjacent to the Centre will occur as customers adjust to the new parking availability and the new exit point.

In the short-to-medium term, there will be some minor road safety concerns regarding the conversion of Ramp 14. The TIA recommends that appropriate "No Entry" or "Exit Only" signage will be required to make customers aware of the changes to address these minor concerns.

Further information is contained within the TIA.

Refer **Attachment 4 – Traffic Impact Statement.**

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7. Conclusion

This Report has been prepared in support of the proposed development at Lot 166 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No. 200) Karrinyup Road, Karrinyup (**the subject site**). The proposed development includes modifications to the access arrangements to the Centre from Karrinyup Road (redirection of Ramp 14), installation of a new valet parking area in Level 2 of the northern car park and an additional two (2) storeys of car parking above the existing multi-deck parking structure in the southeastern corner of the subject site.

This Development Application and accompanying technical reports demonstrate the appropriateness of the development for the following reasons:

- The proposed development is appropriate within the 'Urban' Zone under the *Metropolitan Region Scheme* and within the 'Regional Centre' Zone under the City of Stirling *Local Planning Scheme No. 3*.
- The proposed development is compliant with the relevant matters to be considered under Clause 67 (2) of Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*.
- The proposed development satisfies the design principles of *State Planning Policy No. 7.0 – Design of the Built Environment*.
- The proposed development is consistent with the provisions of *State Planning Policy No. 4.2 – Activity Centres*.
- The proposed development is compliant with the relevant built form controls under *Local Planning Policy No. 5.7 – Karrinyup Regional Centre Guidelines*.
- Based on the traffic investigations undertaken by Aurecon, this proposed access modification will improve efficiencies for exiting vehicles and traffic distribution around the Centre. This will make the Basement Level 01 car park more attractive to visitors and will reduce the reliance on other access locations that are currently carrying more traffic, improving the overall movement of traffic within and around the Centre.
- The original major redevelopment was supported by a *Travel Behaviour and Parking Management Plan* which included strategies that were proposed to be adopted to manage parking within and surrounding the Centre and promote alternative modes of transport. The Proponent has implemented most of these strategies, however, there is still a demonstrated demand for additional parking spaces within the Centre.
- The proposed additional car parking bays are required to meet the current parking demand.
- The proposed increase of the parking supply represents a minor increase of approximately 1.45% above the current parking cap.
- This proposal is supported by a Traffic Impact Assessment which demonstrates that the impact of the proposed development on the surrounding road network is expected to be minor.

On the basis of the above, we request that the City of Stirling recommend the Metro Inner Development Assessment Panel approve this Application.

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Attachment 6 – City of Stirling Planning Assessment

Application Details	
Proposed development	**Modifications to Access Arrangements and Additional Parking**
Street address	Lot 66 on Diagram 67516, Lot 66 on Plan 10178 and Lot 12 (No.200) Karrinyup Road, Karrinyup
Lot Area	129,784 m^2
Applicant	Rowe Group
Owner	GPT Group
Scheme	City of Stirling Local Planning Scheme 3

- Local Planning Scheme No.3
  - Development
  - Not Zoned under current Planning Scheme
  - Special Use
  - Local Centre
  - District Centre
  - Regional Centre
  - Business
  - Mixed Use
  - Mixed Business
  - Hotel
  - Service Station
  - Industry
  - Private Institution
  - Civic
  - Local Reserve: POS and Local Authority Purposes
  - Public Use Reserve - Commonwealth
  - Public Use Reserve - Hospital
  - Public Use Reserve - Police Station
  - Public Use Reserve - Primary School
  - Public Use Reserve - Transport

1. **State Planning Policy 7.0 - Design of the Built Environment (SPP7.0)**

Attachment 6 – City of Stirling Planning Assessment

SPP 7.0 applies to all development in Western Australia. The purpose of SPP 7.0 is to inform and guide landowners, proponents, designers, reviewers and decision-makers to achieve good design outcomes in the built environment. The City's summary of the proposed development against SPP7.0 is as follows:

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
1.Context and Character *Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*	The proposal demonstrates an appropriate response to the existing and emerging character of the Karrinyup Regional Centre. The additional parking levels are integrated within an existing multi-storey parking structure and build upon the established built form of the shopping centre, ensuring the development remains consistent with the scale and function of the surrounding activity centre. The proposal responds to the urban form character of the locality, which comprises large-format retail, commercial, residential and mixed-use development associated with the continued evolution of the Karrinyup Regional Centre. By locating the additional parking within the existing structure, the proposal avoids unnecessary expansion of built form across the site and maintains an orderly and cohesive development outcome. The development contributes to the efficient operation of the shopping centre whilst remaining reflective of the substantial scale and built form already established within the centre. Accordingly, the proposal is considered to respond to and reinforce the distinctive characteristics of the locality and support the ongoing development of Karrinyup as a strategic regional activity centre, contributing positively to the area's sense of place.
2.Landscape Quality *Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*	While no additional landscaping is proposed, the works are limited to the addition of two parking levels above an existing multi-storey car park and do not remove existing landscaping or reduce landscaped areas within the site.

Attachment 6 – City of Stirling Planning Assessment

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
	The broader Karrinyup Shopping Centre has been developed in accordance with a comprehensive landscape strategy that integrates landscaping throughout the centre. Given the proposal is contained within an existing parking structure that does not currently incorporate landscaping, and does not alter the established landscape outcomes across the site, the absence of additional landscaping is considered appropriate in the context of the scale and nature of the development.
3. Built form and scale *Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*	The additional two levels are integrated within an existing multi-storey car park and utilise the established footprint and built form of the shopping centre, minimising additional bulk and visual prominence. The scale of the development is appropriate within the context of the Karrinyup Regional Centre, which is characterised by substantial retail, commercial and residential buildings. The proposal maintains consistency with the existing and intended future character of the centre and is compatible with the scale of surrounding development, including the adjoining multiple dwelling buildings. Accordingly, the proposed massing and height are considered appropriate to the site and its strategic activity centre setting.
4. Functionality and build quality *Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life cycle.*	The additional parking levels will enhance the operational performance of the shopping centre by increasing parking supply within an existing purpose-built structure and responding to demonstrated parking demand. The proposal utilises existing access arrangements and parking infrastructure, resulting in an efficient and functional outcome that supports the ongoing operation of the centre. The development improves the capacity and usability of the

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
	parking network while maintaining safe and legible vehicle circulation, contributing to the long-term functionality of the Karrinyup Regional Centre.
5. Sustainability *Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*	The development considers the built form elements required to further cater for the existing use of the Secondary Centre.
6. Amenity *Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*	The additional parking levels are located within an existing multi-storey car park and are not expected to result in significant adverse impacts on the amenity of adjoining properties or the broader locality. The development improves the functionality and convenience of the shopping centre for visitors and employees through the provision of additional parking supply, while maintaining acceptable amenity outcomes for surrounding land uses. The submitted shadow modelling demonstrates that additional overshadowing is largely contained within the subject site and adjoining road reserve, and the proposal is integrated within the established built form of the centre, minimising visual and amenity impacts on neighbouring properties.
7. Legibility *Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*	The additional parking levels are incorporated within an existing multi-storey car park and utilise the established access, circulation and wayfinding arrangements of the shopping centre. The development does not alter the existing movement network or create complexity in the operation of the centre. The additional parking supply is integrated into the existing parking structure, maintaining clear and intuitive vehicle and pedestrian circulation and supporting the efficient operation of the Karrinyup Shopping Centre.
8. Safety	The additional parking levels are integrated within an existing multi-storey

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.	car park and utilise established access and circulation arrangements designed to safely accommodate vehicle and pedestrian movements. The proposal does not introduce new access points to the road network and is supported by upgrades to parking circulation within the centre. Vehicle movements remain contained within a purpose-built parking structure, with clear internal circulation and wayfinding assisting in minimising potential conflicts between users. Subject to the recommended conditions and the findings of the supporting transport assessments, the proposal is not considered to result in any significant safety concerns and will maintain the safe operation of the shopping centre and surrounding transport network.
9. Community *Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*	The additional parking provision supports the ongoing operation of Karrinyup Shopping Centre as a strategic regional activity centre, facilitating access to the retail, commercial, entertainment and community services provided within the centre. By improving the availability of parking and supporting the continued functionality of the centre, the proposal assists in meeting the needs of the growing community and wider catchment. The development does not prejudice existing community facilities or public spaces and supports the role of the Karrinyup Regional Centre as an important destination for employment, services and social interaction within the locality.

SPP7.0 Design of the Built Environment	
Design Principle	**Officer Comment**
10. Aesthetics *Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*	The additional parking levels are integrated with the existing multi-storey car park and maintain a consistent architectural expression with the broader Karrinyup Shopping Centre development. The proposed works build upon an established built form and are designed to read as a cohesive extension of the existing structure, reducing the perception of additional bulk and reinforcing the contemporary character of the regional centre.

2. Planning and Development (Local Planning Schemes) Regulations 2015

The proposed development is required to be considered against the relevant matters listed under *Clause 67 (2)* of the *Deemed Provisions* of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Commentary on the relevant considerations is provided below:

Deemed Provisions Clause 67 – Consideration of application by local government	
Provision	**Officer Comment**
(a) *the aims and provisions of this Scheme and Scheme and any other local planning scheme operating within the Scheme area;*	The proposal is consistent with the aims and provisions of Local Planning Scheme No. 3. The development supports the ongoing operation of the Karrinyup Regional Centre and is discussed within the report.
(b) the requirements of orderly and proper planning including scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Schemes) Regulations 2015 or any other proposed planning instrument that the local government is seriously considering adopting or approving;	The City's assessment concludes that the development is consistent with LPS3, and the relevant SPPs and LPPs. Under the City's Draft LPS4 the subject site is proposed to be Centre zone.
(c) any approved State planning policy;	The development is consistent with SPP 7.0. This assessment is contained in this report. The development is impacted by SPP 5.4 and SPP3.7.
(g) any local planning policy for the Scheme area;	The development is generally consistent with the requirements of the City's Local Planning Policies.

Attachment 6 – City of Stirling Planning Assessment

Deemed Provisions Clause 67 – Consideration of application by local government	
Provision	**Officer Comment**
(m) the compatibility of the development with its setting, including – *(i) the compatibility of the development with the desired future character of its setting; and* *(ii) the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development.*	The massing and scale of the development are considered appropriate for its context. The proposal is limited to an additional two storeys on an existing building. The built form is well articulated and proportioned, ensuring compatibility with both the existing and intended future character of the area.
(n) the amenity of the locality including the following – *(i) environmental impacts of the development;* *(ii) the character of the locality;* *(iii) social impacts of the development;*	The proposed development will not have a significant undue adverse impact on the character of the locality as the built form is in keeping with emerging character of the locality. Building height and bulk is discussed within the Responsible Authority Report The proposed development is appropriate within its setting and positively contributes to the area.
(s) the adequacy of – *(i) the proposed means of access to and egress from the site; and* *(ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles;*	The proposal does not introduce new access points to the road network and is supported by upgrades to parking circulation within the centre. Vehicle movements remain contained within a purpose-built parking structure, with clear internal circulation and wayfinding assisting in minimising potential conflicts between users
(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety;	The development comprises of two additional floors of car parking and internal modifications, the development is not considered to increase the popularity of the site instead assist with existing parking demand. The Applicants TIA the proposed changes are not expected to increase the trip generation of the development, but to manage the discrepancy between existing demand, supply of parking, and ease internal traffic congestion. The proposal is considered acceptable.
u. *the availability and adequacy for the development of the following –* i. *public transport services;* ii. *public utility services;* iii. *storage, management and collection of waste;*	The proposed development is accessible via a high frequency public transport bus routes on Karrinyup Road, with the closest bus stop located at the subject site. Utility services are available to the development.

Attachment 6 – City of Stirling Planning Assessment

Deemed Provisions Clause 67 – Consideration of application by local government	
Provision	**Officer Comment**
iv. *access for pedestrians and cyclists (including end of trip* v. *access by older people and people with disability;*	No change to the existing Waste Management Plan The development provides pedestrian access from the entrance of the site. The development accommodates access. The development provides 'at grade' car parking and universal access design features throughout the site.
(y) any submissions received on the application;	public consultation was contained within the Responsible Authority Report
(za) the comments or submissions received from any authority consulted under clause 66;	Consultation to relevant authorities such as Main Roads Western Australia, Department of Transport and Public Transport Authority has been undertaken as detailed earlier in the report under 'External Referral Agencies'.

3. Local Planning Policy 5.7 Karrinyup Regional Centre Guidelines

The proposed development is required to be considered against the objectives of LPP5.7.

Commentary on the relevant considerations is provided below:

Local Planning Policy 5.7 KARRINYUP REGIONAL CENTRE GUIDELINES	
Provision	**Officer Comment**
To create vibrant and active mixed use centre by locating facilities such as housing, employment places and retail activities together;	The proposal is considered to support this objective. Karrinyup Shopping Centre forms a key component of the Karrinyup Regional Centre, accommodating a mix of retail, commercial, entertainment, residential and community uses within an integrated activity centre environment. The additional parking provision supports the ongoing operation and accessibility of these land uses, contributing to the function of the centre as a vibrant mixed-use destination that co-locates employment, services, housing and retail activities.
To create main street frontages to the existing roads surrounding Karrinyup Shopping Centre;	The proposal is not inconsistent with this objective. The additional parking levels are contained within an existing multi-storey car park and do not alter or diminish the established main street frontages surrounding Karrinyup Shopping Centre. The development maintains the existing built form interface with surrounding roads and supports the ongoing function and activation of the

Attachment 6 – City of Stirling Planning Assessment

Local Planning Policy 5.7 KARRINYUP REGIONAL CENTRE GUIDELINES	
Provision	**Officer Comment**
	centre by improving accessibility to the retail, commercial and hospitality uses that contribute to the activity and vitality of adjoining streets.
To create a high level of pedestrian amenity through the provision of continuous streetscapes, interactive frontages and weather shelter;	The additional parking levels are contained within an existing multi-storey car park and do not adversely affect the established pedestrian environment, streetscape treatments or weather protection measures provided throughout Karrinyup Shopping Centre.
To promote a high quality built form that creates a distinctive urban form and enables safety and security through passive surveillance; and	The additional parking levels are integrated within an existing multi-storey car park and maintain a built form that is consistent with the scale, function and architectural character of the broader Karrinyup Shopping Centre. The development contributes to the ongoing operation of the regional centre while retaining established passive surveillance opportunities associated with the active retail, hospitality and commercial uses throughout the centre. The proposal does not introduce any design elements that would adversely affect safety, security or the quality of the existing urban form.
To create public and private spaces that are safe, attractive and surrounded by active vibrant uses that will become the focal / meeting point of the centres.	The additional parking levels are contained within an existing multi-storey car park and do not impact the public and private spaces established throughout Karrinyup Shopping Centre. The development supports the accessibility and ongoing function of the centre, which provides a range of active retail, hospitality and entertainment uses that contribute to the creation of attractive, vibrant and well-utilised gathering spaces within the Karrinyup Regional Centre.

DEVELOPMENT APPLICATION

KARRINYUP SHOPPING CENTRE
STAGE 2
SOUTHEAST CARPARK

ARCHITECTURAL					
DISCIPLINE	**TYPE**	**PACKAGE**	**SHEET NO.**	**LEVEL**	**SHEET TITLE**
AR	DWG	CP	DA00	ALL	DRAWING LIST & COVER PAGE
AR	DWG	CP	DA01	ALL	DEMOLITION FLOOR PLAN - LEVEL L02 & ROOF
AR	DWG	CP	DA02	ALL	PROPOSED FLOOR PLAN - CARPARK LEVEL L02
AR	DWG	CP	DA03	ALL	PROPOSED FLOOR PLAN - CARPARK LEVEL L03
AR	DWG	CP	DA04	ALL	PROPOSED FLOOR PLAN - CARPARK LEVEL L04 & ROOF
AR	DWG	CP	DA05	ALL	OVERALL ELEVATIONS - EAST & SOUTH
AR	DWG	CP	DA06	ALL	OVERALL ELEVATIONS - NORTH & WEST

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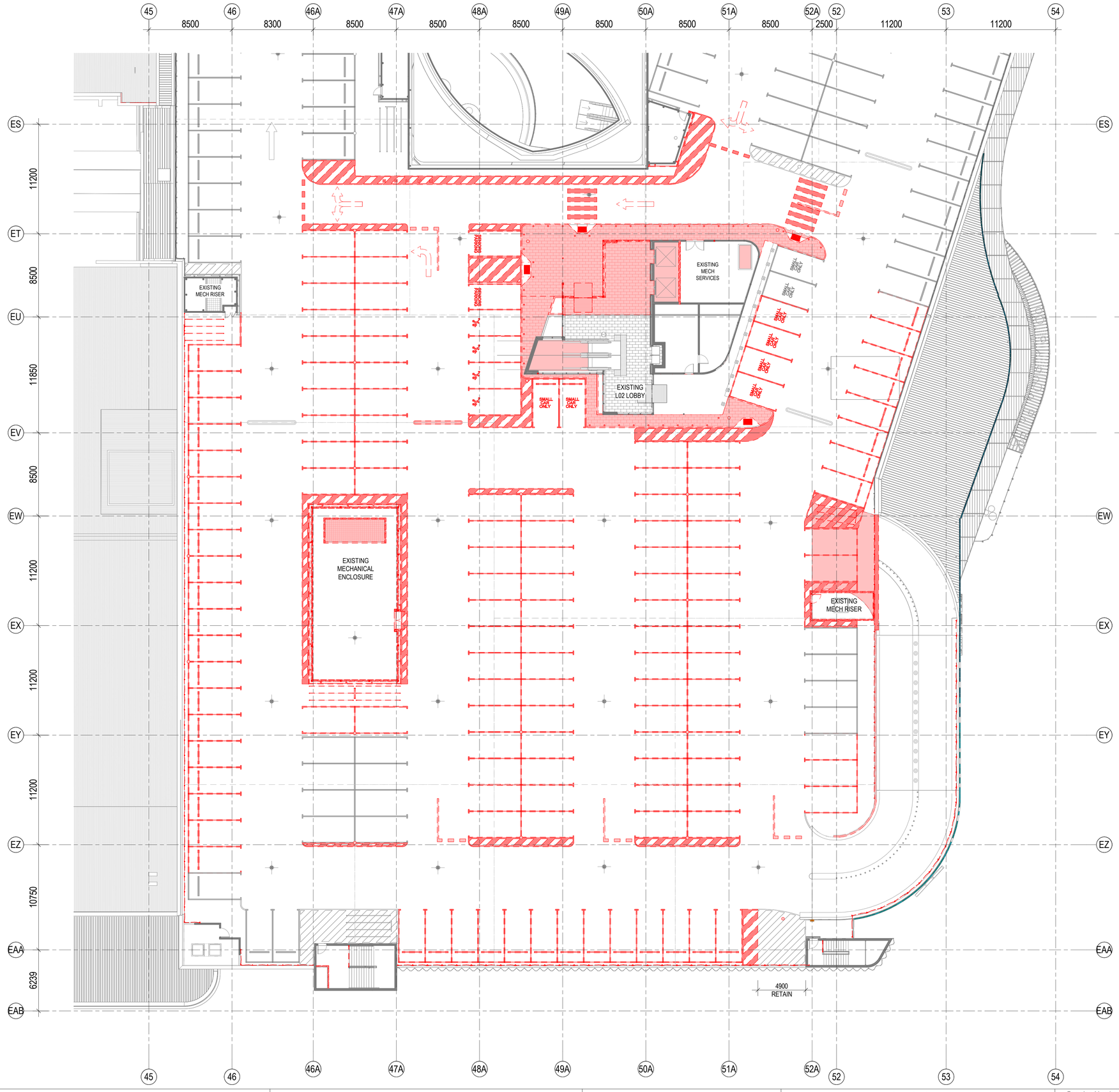

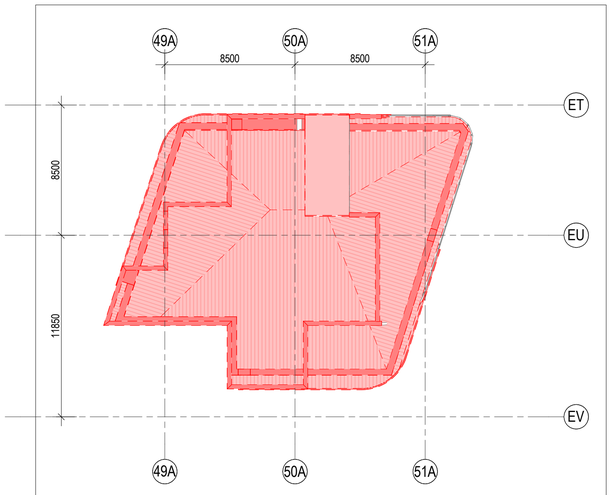

DEMOLITION ROOF PLAN - L02
1 : 200

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

DEMOLITION FLOOR PLAN - LEVEL L02 & ROOF

Rev	Date	Initial	Description
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

Scale @ A1: 1 : 200
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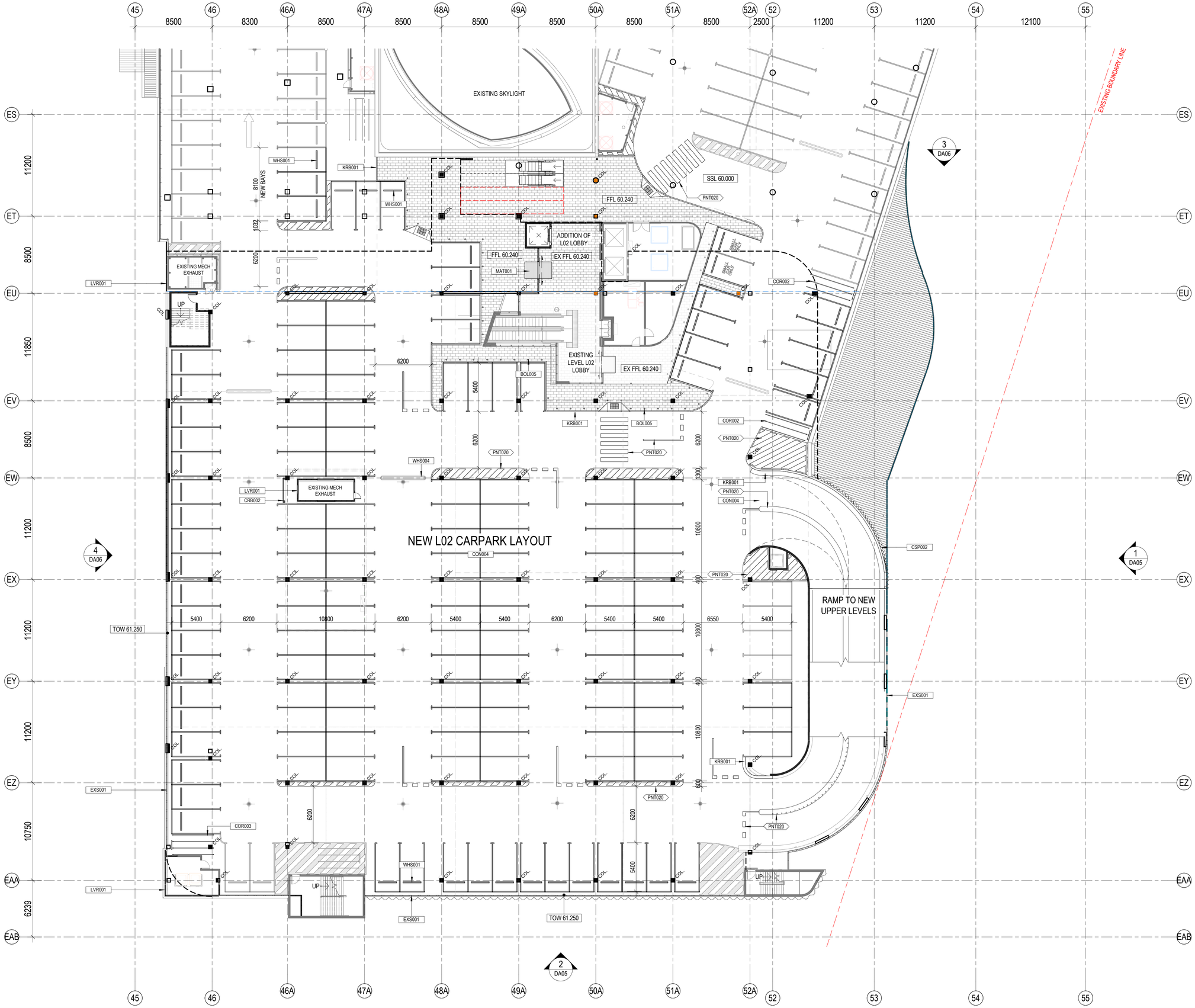
Drawing Number: AR-DWG-CP-DA01-ALL
Revision: A
Date: 19.09.2024
Status: ISSUE FOR DA



KEYNOTES

LEGEND

CWT001	ELEMENT / ITEM - REFER SCHEDULE
PNT001	FINISH / MATERIAL - REFER SCHEDULE

Keynote Legend

Key Value	Keynote Text
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CON004	SUSPENDED CONCRETE SLAB - REFER TO S.ENG DETAILS
COR002	DOUBLE TROLLEY CORRAL
COR003	TRIPLE TROLLEY CORRAL
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
CSP002	COMPOSITE ALUMINIUM CLADDING
EXS001	CHAIN LINK FENCE
KRB001	BARRIER KERBING
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MAT001	MATWELLS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
WHS001	RUBBER WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

gpt

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

PROPOSED FLOOR PLAN - CARPARK LEVEL L02

Rev	Date	Initial	Description
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

Scale @ A1: 1 : 200

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Drawing Number: AR-DWG-CP-DA02-ALL
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Date: 19.09.2024
Status: ISSUE FOR DA

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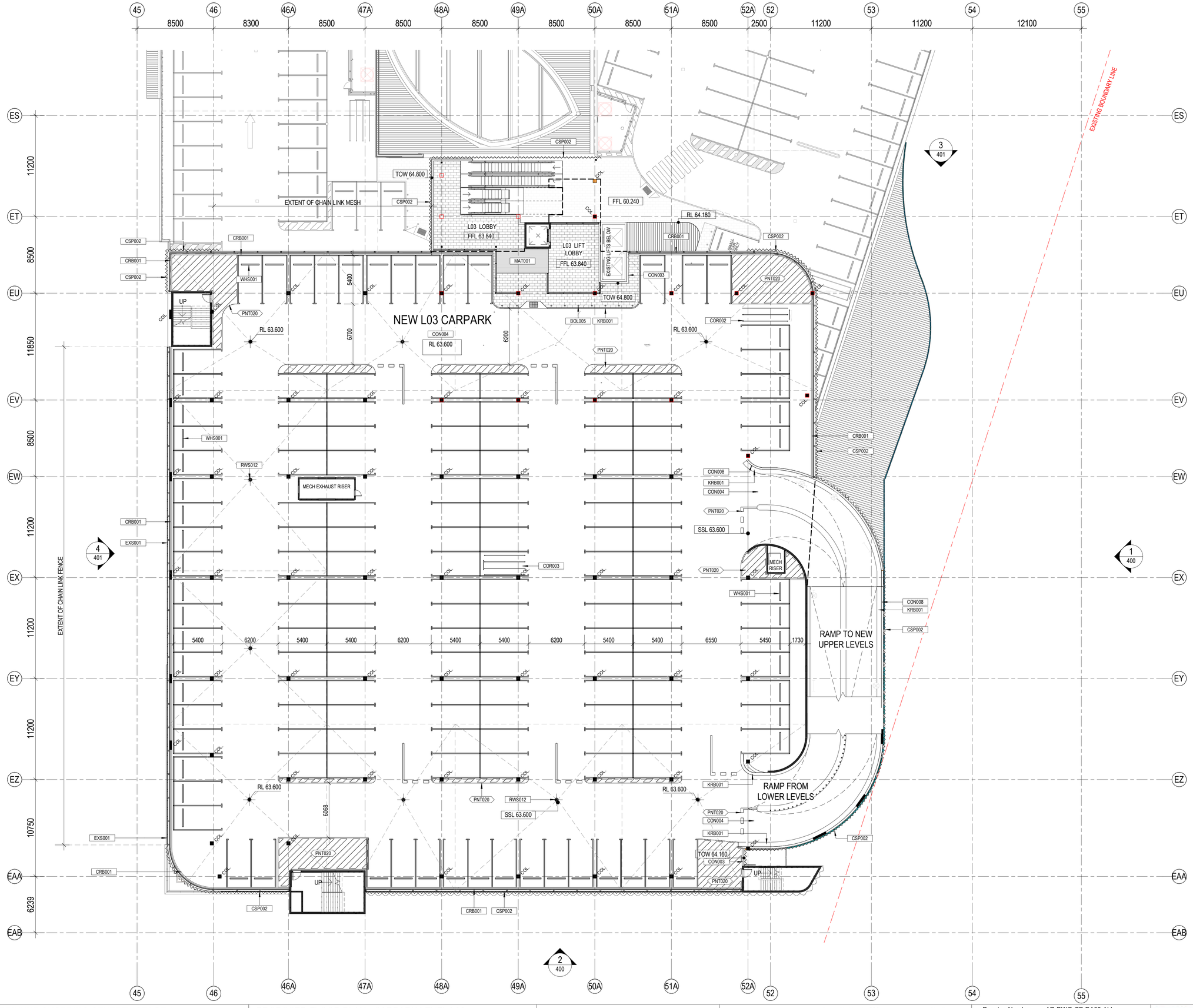

KEYNOTES

LEGEND

CWT001	ELEMENT / ITEM - REFER SCHEDULE
PNT001	FINISH / MATERIAL - REFER SCHEDULE

Keynote Legend

Key Value	Keynote Text
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CON003	IN-SITU CONCRETE WALLS
CON004	SUSPENDED CONCRETE SLAB - REFER TO S.ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR002	DOUBLE TROLLEY CORRAL
COR003	TRIPLE TROLLEY CORRAL
CRB001	CARPARK PERIMETER CRASH RAIL WITH BALUSTRADE
CSP002	COMPOSITE ALUMINIUM CLADDING
EXS001	CHAIN LINK FENCE
KRB001	BARRIER KERBING
MAT001	MATWELLS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
RWS012	STORMWATER GRATE
WHS001	RUBBER WHEELSTOP (TO COMPLY WITH AS 2890.1)

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

PROPOSED FLOOR PLAN - CARPARK LEVEL L03

Rev	Date	Initial	Description
B	26.09.2024	TRHS	AR-DWG-CP-DA06-ALL_DRAFT
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

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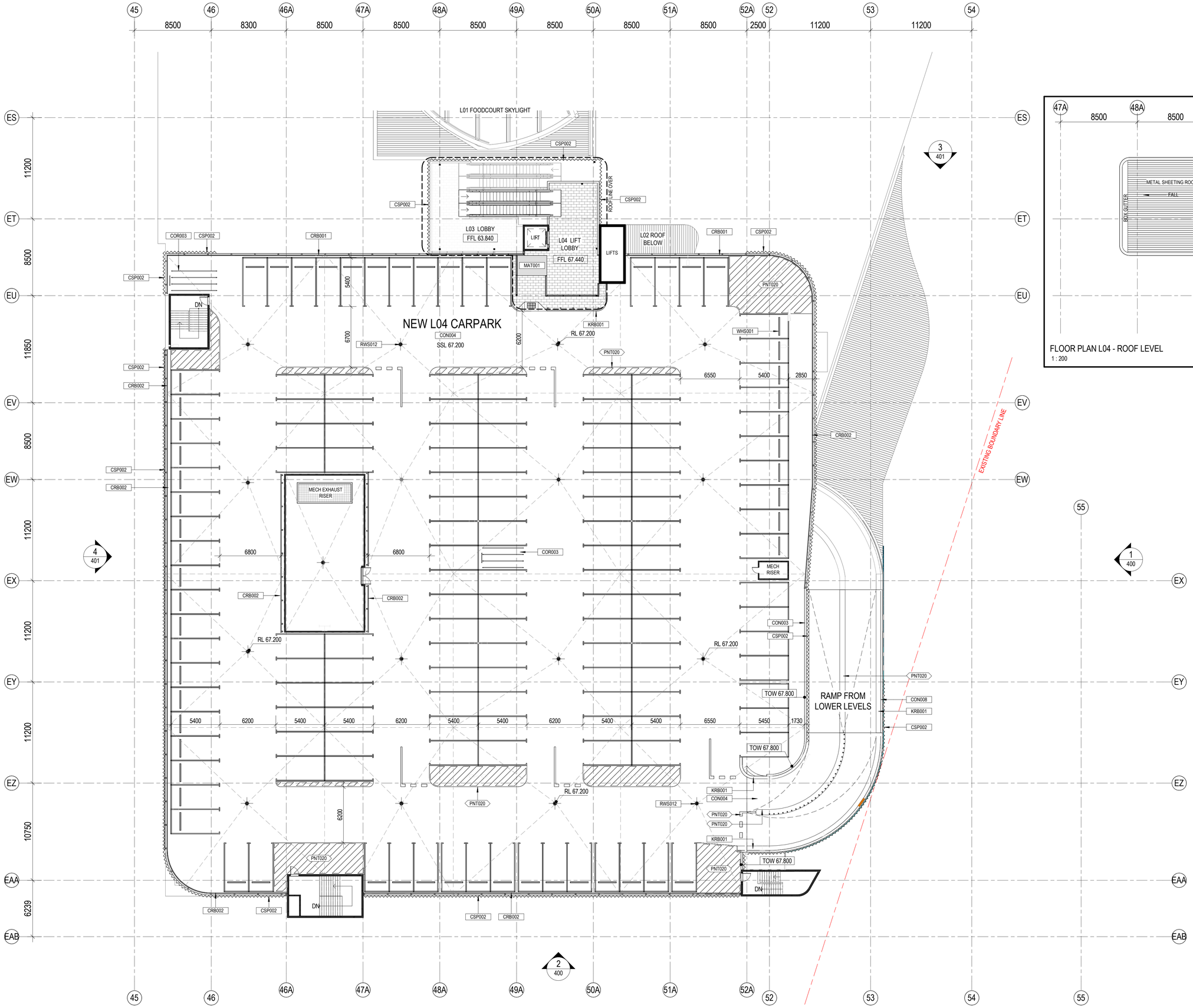

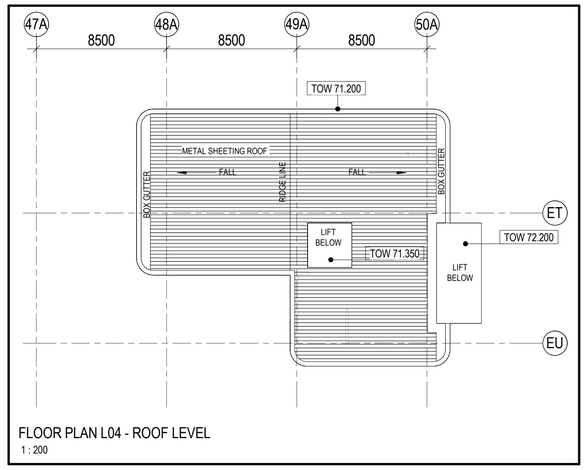

FLOOR PLAN L04 - ROOF LEVEL
1 : 200

KEYNOTES

LEGEND

CWT001	ELEMENT / ITEM - REFER SCHEDULE
PNT001	FINISH / MATERIAL - REFER SCHEDULE

Keynote Legend

Key Value	Keynote Text
CON003	IN-SITU CONCRETE WALLS
CON004	SUSPENDED CONCRETE SLAB - REFER TO S.ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR003	TRIPLE TROLLEY CORRAL
CRB001	CARPARK PERIMETER CRASH RAIL WITH BALUSTRADE
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
CSP002	COMPOSITE ALUMINIUM CLADDING
KRB001	BARRIER KERBING
MAT001	MATWELLS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
RWS012	STORMWATER GRATE
WHS001	RUBBER WHEELSTOP (TO COMPLY WITH AS 2890.1)

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

PROPOSED FLOOR PLAN - CARPARK LEVEL L04 & ROOF

Rev	Date	Initial	Description
B	26.09.2024	TRHS	AR-DWG-CP-DA06-ALL_DRAFT
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

Scale @ A1: 1 : 200
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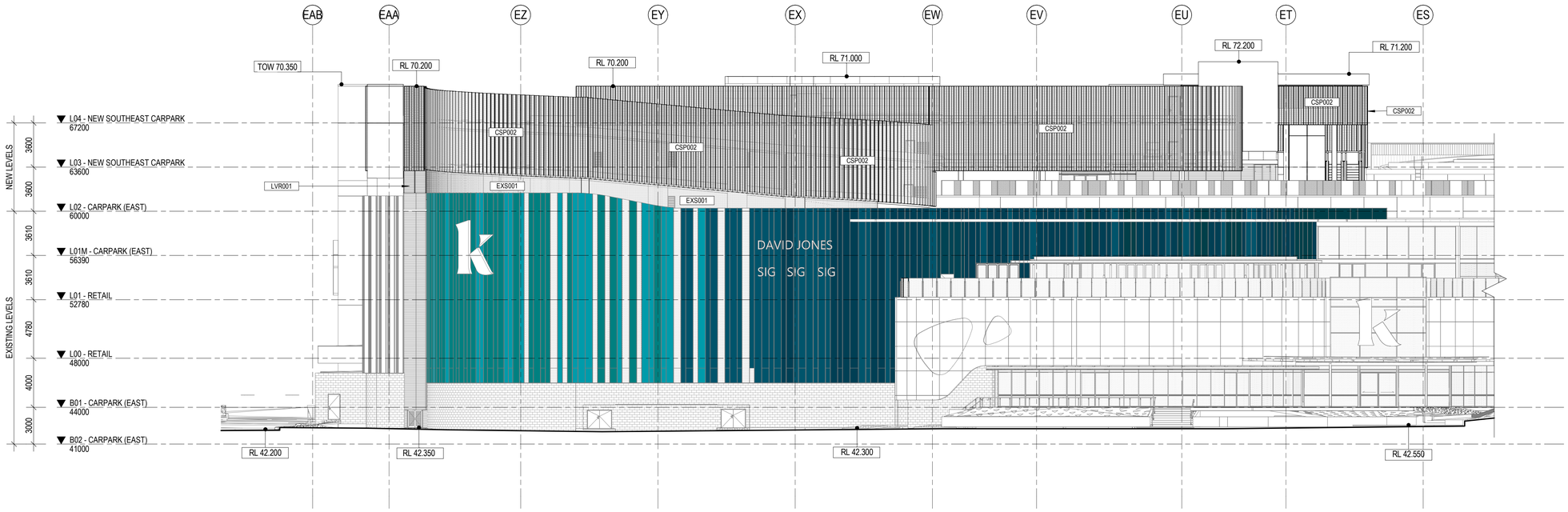
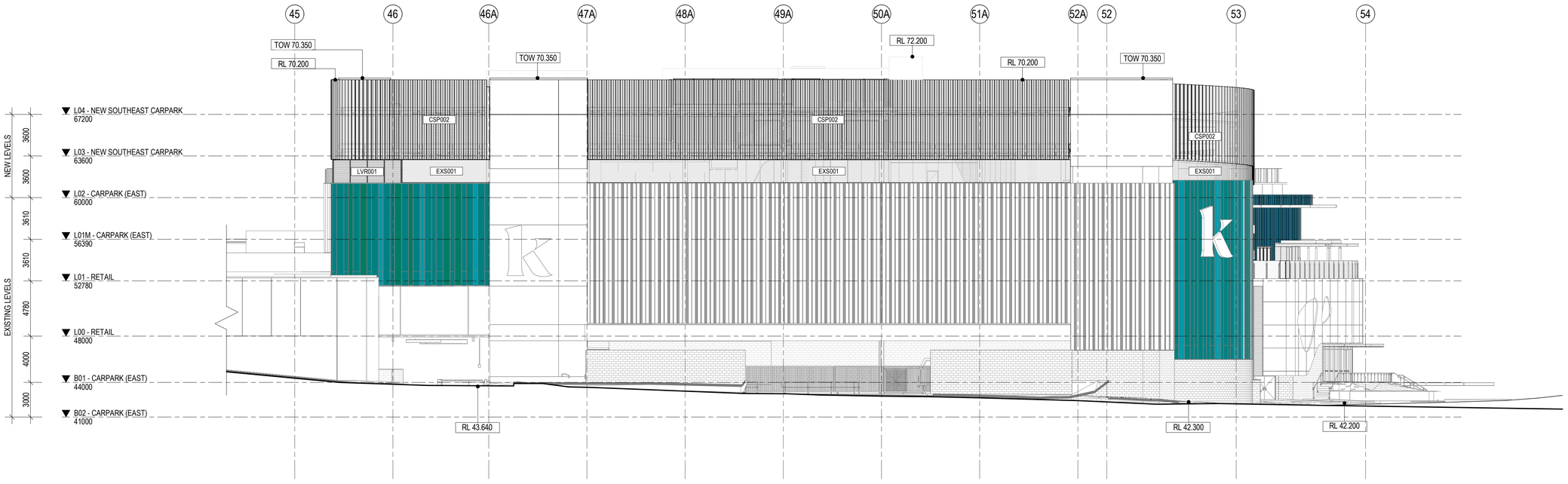
North:

Drawing Number: AR-DWG-CP-DA04-ALL
Revision: B
Date: 26.09.2024
Status: ISSUE FOR DA



1 DA02 ELEVATION - EAST
1 : 200



2 DA02 ELEVATION - SOUTH
1 : 200

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

OVERALL ELEVATIONS - EAST & SOUTH

Rev	Date	Initial	Description
B	26.09.2024	TRHS	AR-DWG-CP-DA06-ALL_DRAFT
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

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0 16

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Revision: B
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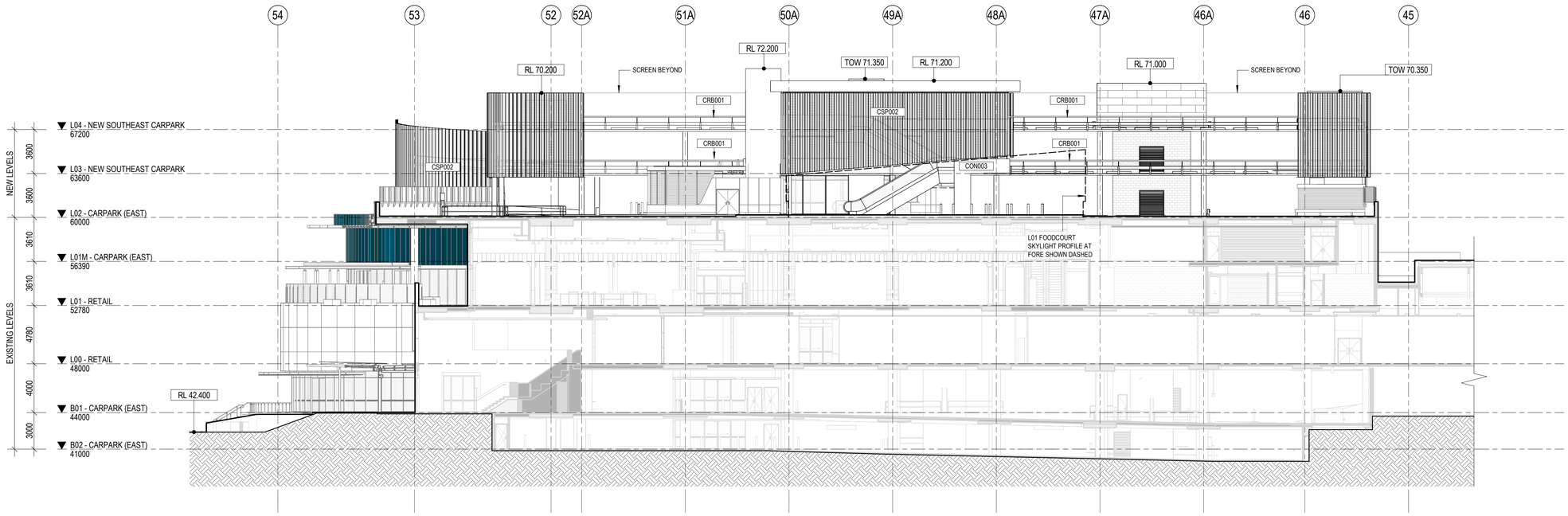
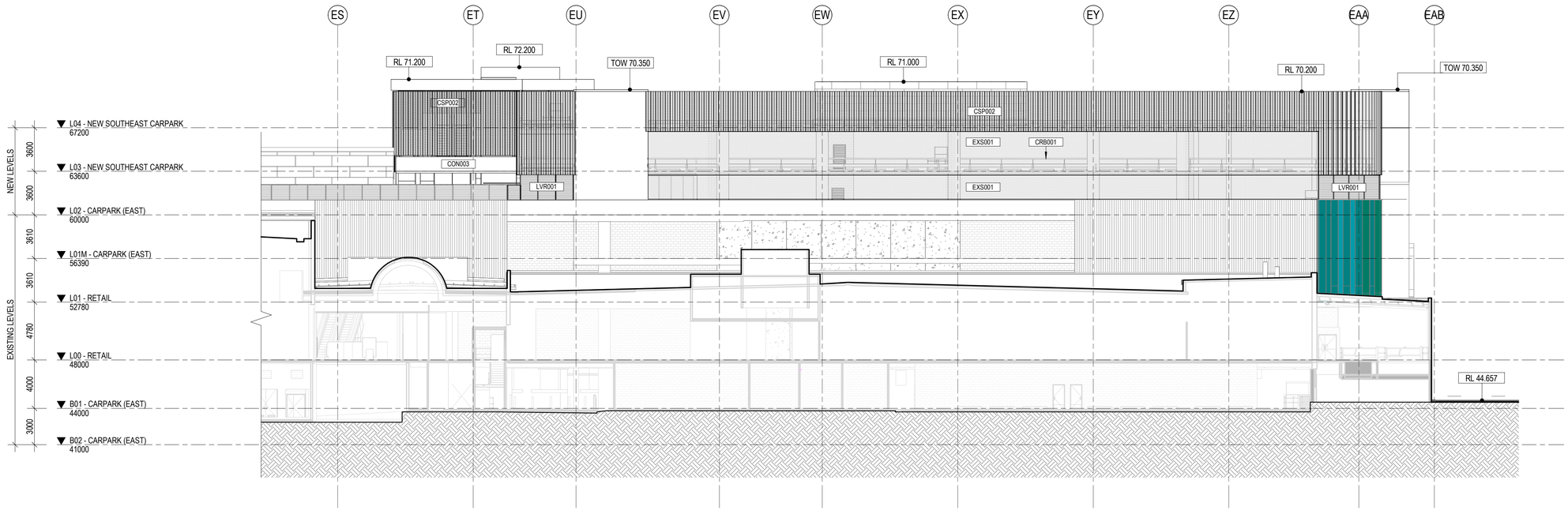


3 DA02 SECTIONAL ELEVATION - NORTH
1 : 200



4 DA02 SECTIONAL ELEVATION - WEST
1 : 200

KARRINYUP SHOPPING CENTRE - STAGE 2
SOUTHEAST CARPARK

OVERALL ELEVATIONS - NORTH & WEST

Rev	Date	Initial	Description
B	26.09.2024	TRHS	AR-DWG-CP-DA06-ALL_DRAFT
A	19.09.2024	TRHS	ISSUE FOR DEVELOPMENT APPLICATION

Scale @ A1: 1 : 200
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Revision: B
Date: 26.09.2024
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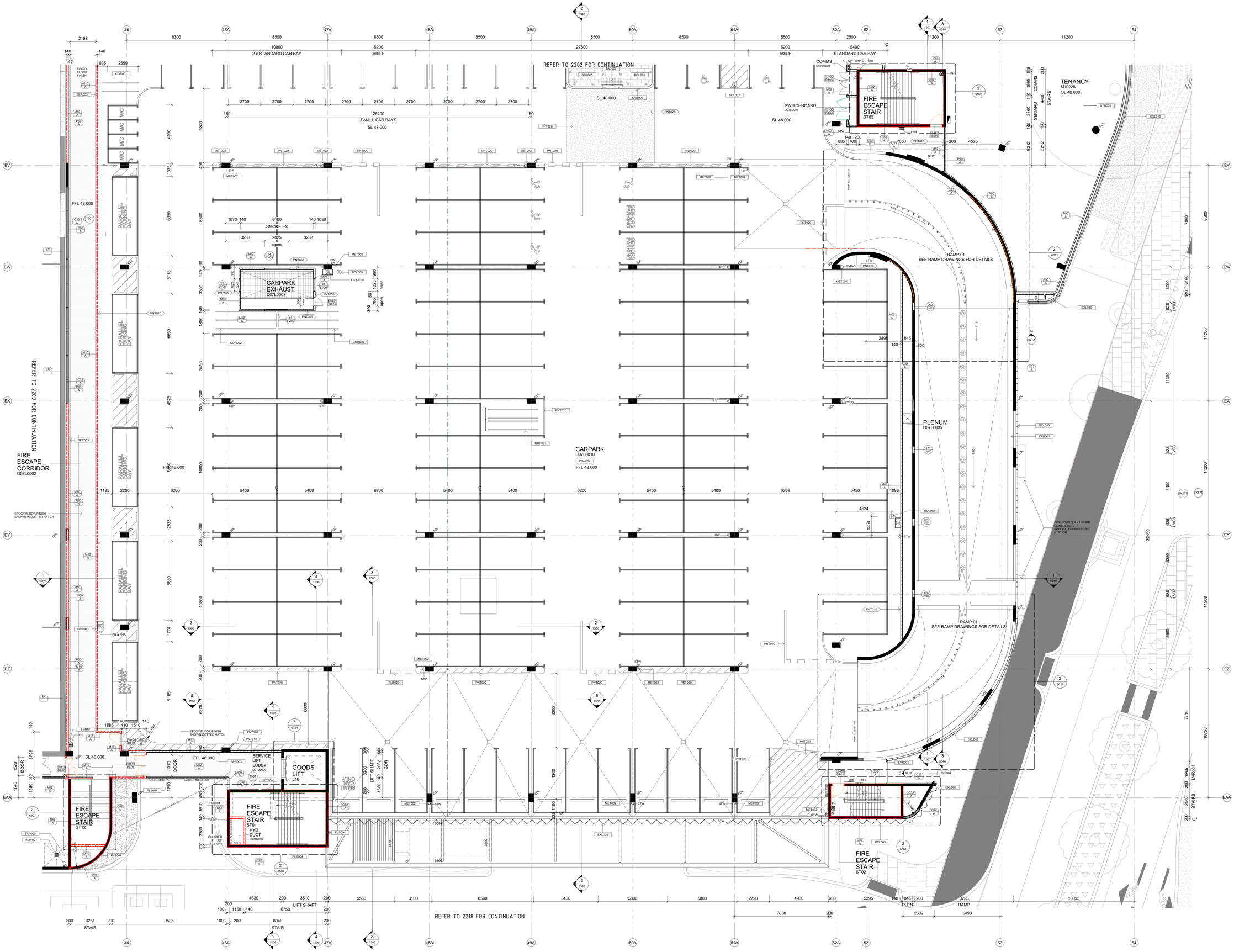

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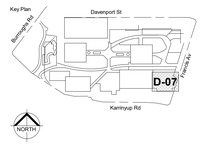
Key Plan



General Notes

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3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTOR SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
H - HOLLOW CORE DOOR
M - MESH GATE
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
G	GAS PIPE
HW	HOT WATER PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT028	SPRAY-ON NON-SLIP PEDESTRIAN LINEMARKING
PNT055	WEATHERSHIELD / MASONRY MATT

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
BPR003	TIMBER BUMP RAIL (SELECT ITEM OR REFER TO DETAIL)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
COR001	SINGLE TROLLEY CORRAL
COR002	DOUBLE TROLLEY CORRAL
EXL005	FREESPAN STEEL CLADDING (PERFORATED)
EXL010	CEMENTITIOUS COMPOSITE WALL CLADDING PANELS - SMOOTH WITH LIGHT SAND-BLASTED FINISH
EXL043	DRI-DESIGN SYSTEM
FLW001	FLOOR WASTE REFER TO HYDRAULIC SPEC
KRB001	BARRIER KERBING
KRB002	SEMI-MOUNTABLE KERBING
LDS12	NOTICE - AUTHORISED PERSONNEL ONLY - LARGE
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MET002	SERVICE PIPE GUARDS
PLS004	SMOOTH RENDER WITH PAINT FINISH
STR005	STRUCTURAL STEEL PURLINS / GRITS (TO ENG. DETAILS)
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TAP009	THREADED HOSE TAP

Rev.	Date	Initial	Description
13	06/12/21	TRHS	RECORD SET
12	12/11/20	TRHS	ISSUED FOR CONSTRUCTION
11	22/05/20	TRHS	ISSUED FOR CONSTRUCTION
10	20/11/19	TRHS	ISSUED FOR CONSTRUCTION
9	03/09/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TRHS | TAYLOR ROBINSON HAMES SHARLEY

Project
Karrinyup Shopping Centre

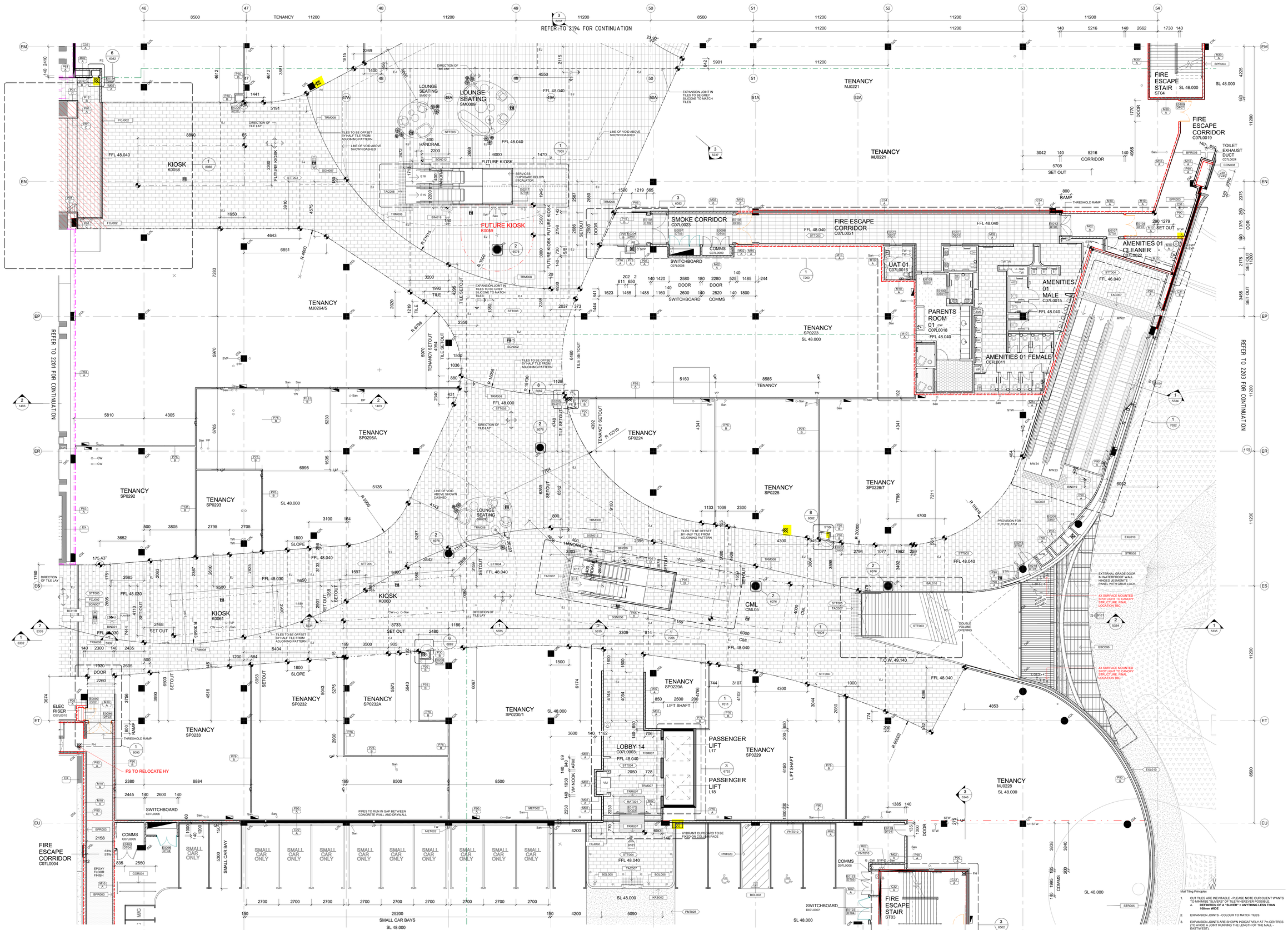
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 00 GA Plan - Zone D07

Drawn By	Checked By	Scale @ A0
TRHS	DB	1 : 100

Drawing No. AR-DWG-L00-D07-2210
Revision 13
Status RECORD SET

5/06/2022 8:45:52 PM



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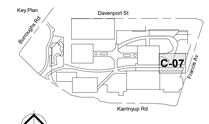
Key Plan



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- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING, REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER
- DRAWING SERIES NUMBER
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T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
G	GAS PIPE
RP	RAINWATER PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Abbreviations - Mall Items

APM	AUTOPAY MACHINE
ATM	AUTOMATED TELLER MACHINE
DT	DIRECTIONAL TOTEM
DW	DIGITAL WAYFINDING
VM	VENDING MACHINE

Joints Legend

- PERMANENT MOVEMENT JOINT
- TEMPORARY MOVEMENT JOINT
- CJ — CONSTRUCTION JOINT
- EJ — EXPANSION JOINT

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT028	SPRAY-ON NON-SLIP PEDESTRIAN LINEMARKING

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL016	CANTILEVERED GLASS BALUSTRADE
BCH18	
BIN019	
BIN021	
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
BPR003	TIMBER BUMP RAIL (SELECT ITEM OR REFER TO DETAIL)
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR001	SINGLE TROLLEY CORRAL
EXL010	CEMENTITIOUS COMPOSITE WALL CLADDING PANELS - SMOOTH WITH LIGHT SAND-BLASTED FINISH
FCJ002	TILE FLOOR CONTROL JOINT
GSC006	TOUGHENED FRAMELESS GLASS - FRITTED
KRB002	SEMI-MOUNTABLE KERBING
MAT001	MATWELLS
MET002	SERVICE PIPE GUARDS
SGN002	INTERNAL WAYFINDING SIGNAGE
SGN006	FLOOR MOUNTED SIGNAGE TYPE A - ONE SIDED
SGN007	FLOOR MOUNTED SIGNAGE TYPE B - TWO SIDED
SGN012	INTERNAL DIRECTIONAL FREESTANDING TOTEM
STR005	STRUCTURAL STEEL PURLINS / GRITS (TO ENG. DETAILS)
STT003	STONE FLOOR TILE
STT004	STONE FLOOR TILE
STT005	STONE FLOOR TILE
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TAC008	BLACK PVD BUTTON TACTILE INDICATORS
TRM007	TRIM
TRM008	CURVED TRIM

Rev.	Date	Initial	Description
41	24/03/22	TRHS	RECORD SET
40	22/03/22	TRHS	MALL UPDATES
39	03/09/21	TRHS	ISSUED FOR CONSTRUCTION
38	24/08/21	TRHS	ISSUED FOR CONSTRUCTION
37	19/08/21	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TRHS TAYLOR ROBINSON HAMES SHARLEY

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 00 GA Plan - Zone C07

Mall Tiling Principles

1. CUT TILES ARE INEVITABLE - PLEASE NOTE OUR CLIENT WANTS TO MINIMISE "SLIVERS" OF TILE WHEREVER POSSIBLE.
   A. **DEFINITION OF A "SLIVER" = ANYTHING LESS THAN 100mm WIDE**
2. EXPANSION JOINTS - COLOUR TO MATCH TILES.
3. EXPANSION JOINTS ARE SHOWN INDICATIVELY AT 7m CENTRES (TO AVOID A JOINT RUNNING THE LENGTH OF THE MALL - EAST/WEST).
4. EXPANSION JOINTS SHOULD NOT CREATE "SLIVERS" OF TILES BUT BE SHIFTED SLIGHTLY EAST/WEST TO NEXT ADJACENT FULL/HALF TILE JOINT.
5. ALERT TRHS TO ANY SET OUT ISSUE PRIOR LAYING TILES.
6. WHEN TILING LAY CHANGES DIRECTION 90 DEGREES AT TRIM JOINT, ENSURE TILE JOINTS ARE OFFSET BY 100mm MIN. (150mm PREFERRED).

Drawn By	Checked By	Scale @ A0
TRHS	DB	1 : 100

Drawing No. AR-DWG-L00-C07-2202
Revision 41
Status RECORD SET

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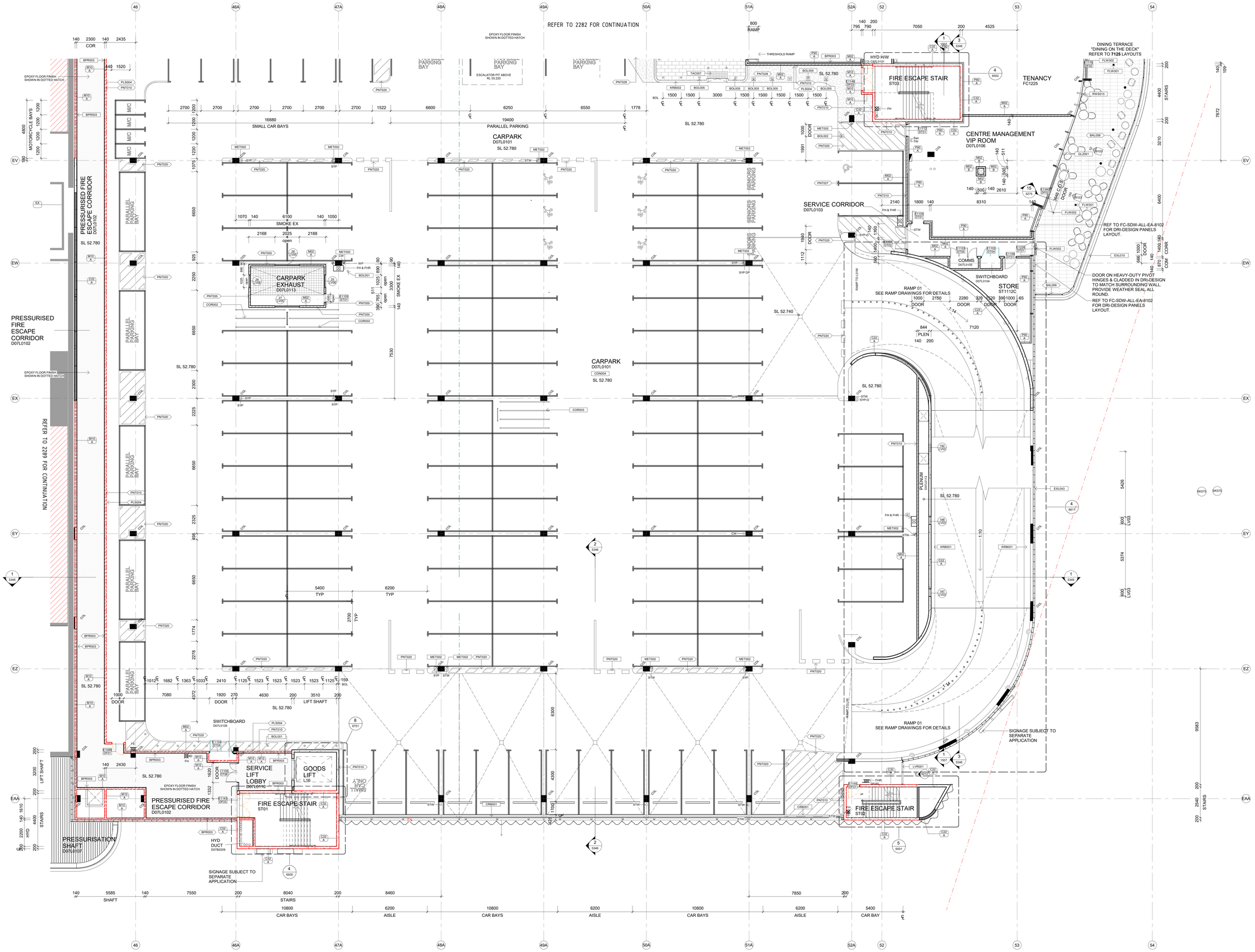

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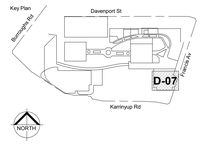

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Legend

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- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
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E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COURJOON INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH GATE
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
OF	OVERFLOW
OP	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT027	EXTERNAL LINEMARKING
PNT028	SPRAY-ON NON-SLIP PEDESTRIAN LINEMARKING
PNT055	WEATHERSHIELD / MASONRY MATT

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL006	EXTERNAL 1800mm HIGH GLASS BALUSTRADE
BOL001	150mm DIA GALV STEEL TUBE CONCRETE FILLED (DOMED TOP) WITH BASEPLATE
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
BPR003	TIMBER BUMP RAIL (SELECT ITEM OR REFER TO DETAIL)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
COR002	DOUBLE TROLLEY CORRAL
COR003	TRIPLE TROLLEY CORRAL
CRB001	CARPARK PERIMETER CRASH RAIL WITH BALUSTRADE
EXL010	CEMENTITIOUS COMPOSITE WALL CLADDING PANELS - SMOOTH WITH LIGHT SAND-BLASTED FINISH
EXL043	DRI-DESIGN SYSTEM
FLW001	FLOOR WASTE REFER TO HYDRAULIC SPEC
FLW002	BRICKSLOT DRAIN
GLZ001	ALUMINIUM BOX SECTION FRAMED GLAZING
KRB001	BARRIER KERBING
KRB002	SEMI-MOUNTABLE KERBING
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MET002	SERVICE PIPE GUARDS
PLS004	SMOOTH RENDER WITH PAINT FINISH
RWS015	STAINLESS STEEL RAINWATER DOWNPIPE
TAC007	WHITE TOP S8 BUTTON TACTILE INDICATORS

Rev	Date	Initial	Description
19	06/12/21	TRHS	RECORD SET
18	14/09/21	TRHS	ISSUED FOR CONSTRUCTION
17	09/08/21	TRHS	ISSUED FOR CONSTRUCTION
16	24/06/21	TRHS	ISSUED FOR CONSTRUCTION
15	12/11/20	TRHS	ISSUED FOR CONSTRUCTION

Client
AMP CAPITAL
UniSuper

TRHS | TAYLOR ROBINSON / HAMES SHARLEY

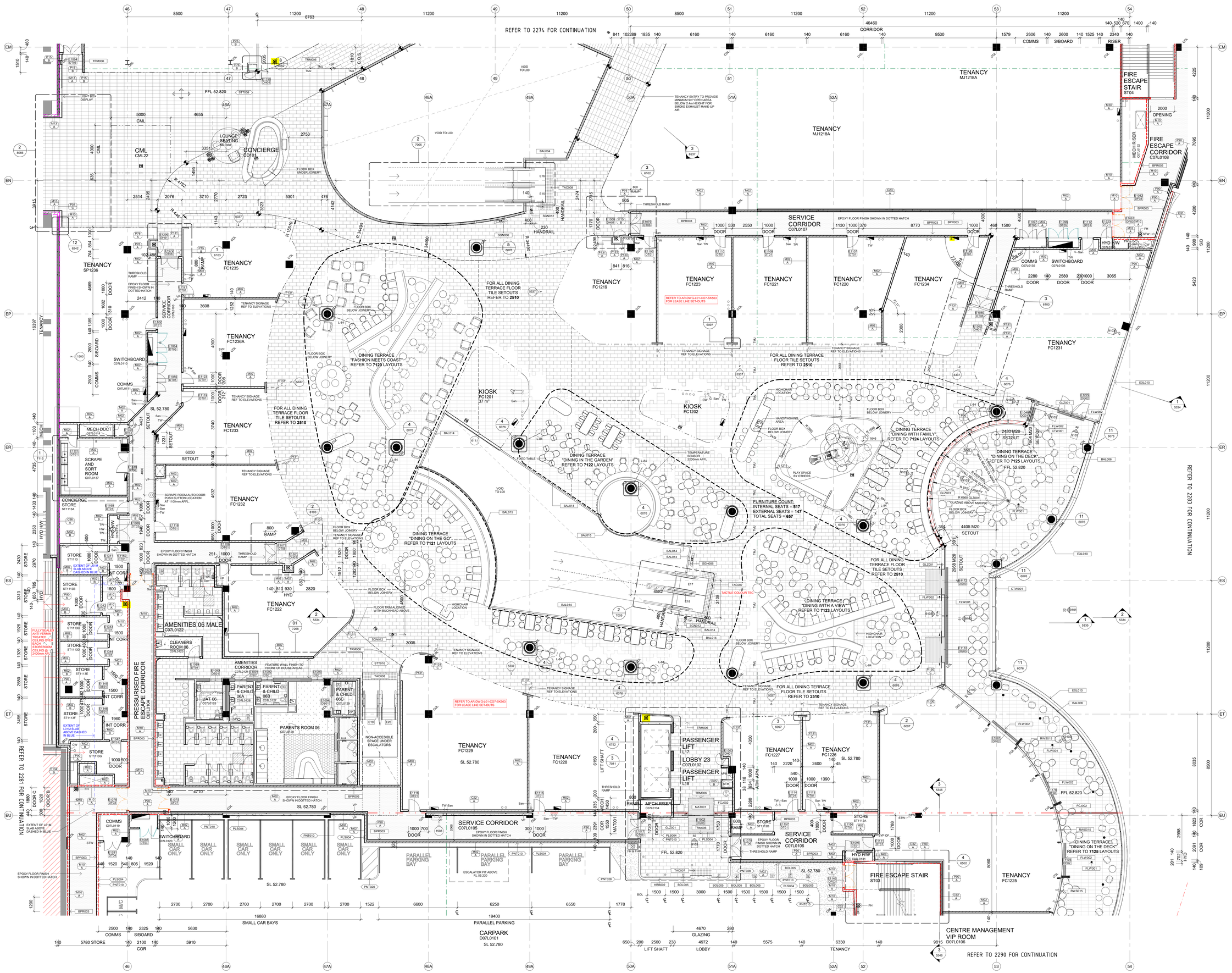
Project
Karrinyup Shopping Centre
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 01 GA Plan - Zone D07

Drawn By	Checked By	Scale @ A0
TRHS	DB	1 : 100

Drawing No. AR-DWG-L01-D07-2290
Revision 19
Status RECORD SET

5/06/2022 9:04:52 PM



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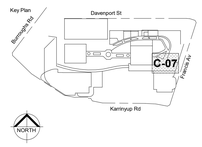
Key Plan



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Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING, REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT
  - A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
  - B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
  - C - WALL TO UNDERSIDE OF CEILING
  - D - REFER TO NOMINATED DETAIL
  - E - REFER TO ELEVATIONS
- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE
  - C - COOLROOM INSULATED PANEL
  - F - FIRE RATED
  - G - GLAZED DOOR
  - L - LOUVRED DOOR
  - M - MESH GATE
  - P - PARTITION PANEL
  - S - SLIDING DOOR
  - T - SOLID CORE DOOR
- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER TO HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
G	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Abbreviations - Mall Items

APM	AUTOPAY MACHINE
ATM	AUTOMATED TELLER MACHINE
DT	DIRECTIONAL TOTEM
DW	DIGITAL WAYFINDING
VM	VENDING MACHINE

Joints Legend

- PERMANENT MOVEMENT JOINT
- TEMPORARY MOVEMENT JOINT
- CJ — CONSTRUCTION JOINT
- EJ — EXPANSION JOINT

Legend

- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL004	CANTILEVERED GLASS BALUSTRADE
BAL006	EXTERNAL 1800mm HIGH GLASS BALUSTRADE
BAL014	GLASS BALUSTRADE WITH STAINLESS STEEL POSTS AND FIXINGS
BAL015	POWDER COAT STEEL RAILING
BOL005	150MM DIA.FINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
BPR003	TIMBER BUMP RAIL (SELECT ITEM OR REFER TO DETAIL)
CTW001	UNITISED CURTAIN WALL SYSTEM- VISION PANEL PORTION
EXL010	CEMENTITIOUS COMPOSITE WALL CLADDING PANELS - SMOOTH WITH LIGHT SAND-BLASTED FINISH
FCJ002	TILE FLOOR CONTROL JOINT
FLW001	FLOOR WASTE REFER TO HYDRAULIC SPEC
FLW002	BROOKLOT DRAIN
GLZ001	ALUMINIUM BOX SECTION FRAMED GLAZING
KRB002	SEMI-MOUNTABLE KERBING
MAT001	MATWELLS
PLS004	SMOOTH RENDER WITH PAINT FINISH
RWS015	STAINLESS STEEL RAINWATER DOWNPIPE
SGN006	FLOOR MOUNTED SIGNAGE TYPE A - ONE SIDED
SGN012	INTERNAL DIRECTIONAL FREESTANDING TOTEM
STT008	STONE FEATURE FLOOR TILE
STT016	STONE FLOOR TILE
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TAC008	BLACK PVD BUTTON TACTILE INDICATORS
TRM006	TRIM

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT028	SPRAY-ON NON-SLIP PEDESTRIAN LINEMARKING

Rev.	Date	Initial	Description
33	24/03/22	TRHS	RECORD SET
32	22/03/22	TRHS	MALL UPDATES
31	03/08/21	TRHS	ISSUED FOR CONSTRUCTION
30	24/08/21	TRHS	ISSUED FOR CONSTRUCTION
29	12/08/21	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TRHS TAYLOR ROBINSON HAMES SHARLEY

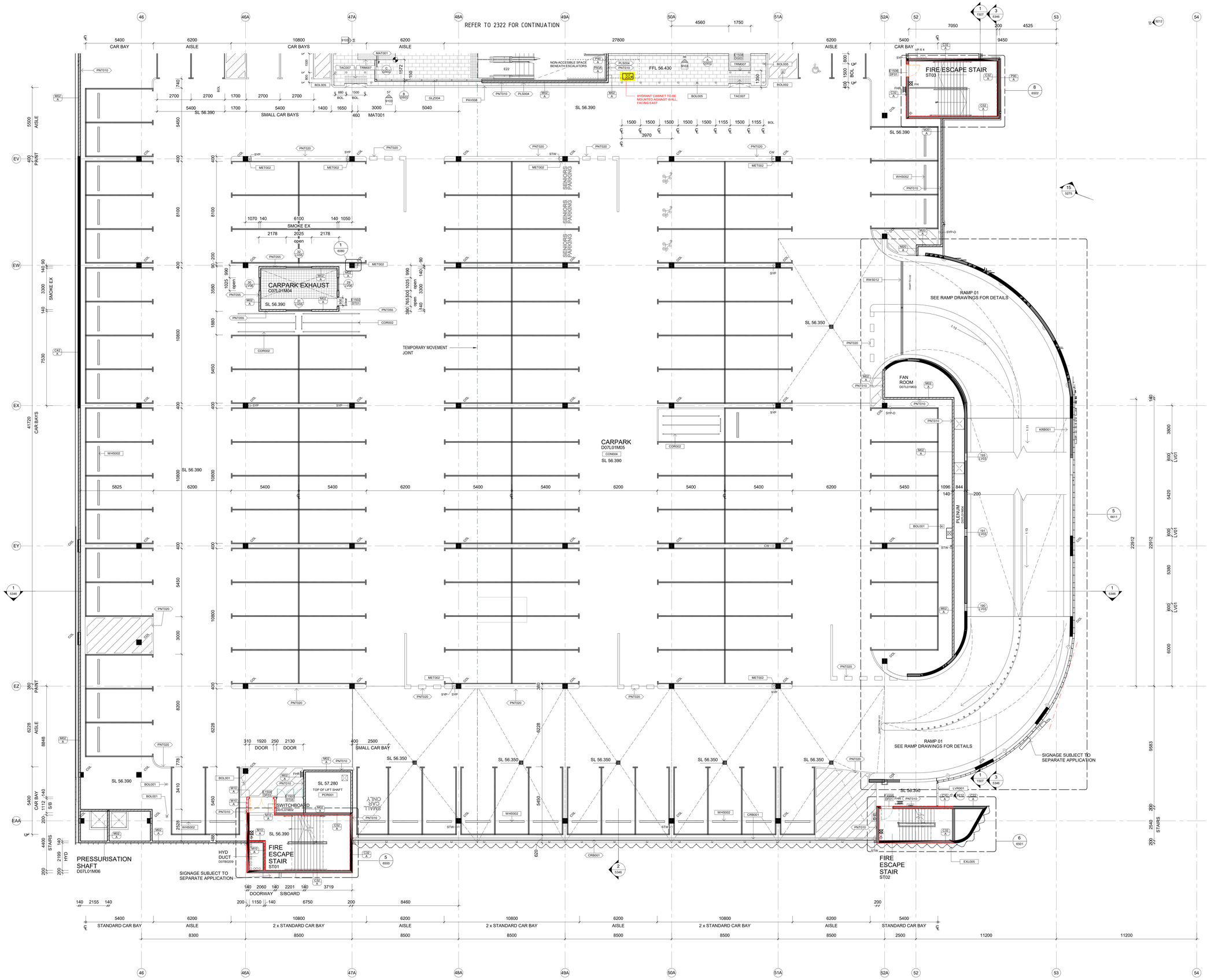
Project
Karrinyup Shopping Centre
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 01 GA Plan - Zone C07

Drawn By	Checked By	Scale @ A0
TRHS	DB	1 : 100

Drawing No. AR-DWG-L01-C07-2282
Revision 33
Status RECORD SET

20/03/2022 9:45:05 PM



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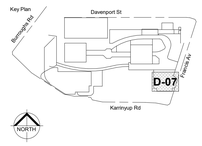
Key Plan



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- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT055	WEATHERSHIELD / MASONRY MATT

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BOL001	150mm DIA GALV STEEL TUBE CONCRETE FILLED DOMED TOP WITH BASEPLATE
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
COR002	DOUBLE TROLLEY CORRAL
CRB001	CARPARK PERIMETER CRASH RAIL WITH BALUSTRADE
EXL005	FREESPAN STEEL CLADDING (PERFORATED)
GLZ004	UNITIZED GLAZING SYSTEM
LVR001	WEATHER RESISTANT LOUVRES (STO SINGLE BANK)
MAT001	MATWELLS
MET002	SERVICE PIPE GUARDS
PAV008	150MM SEMI-MOUNTABLE BLOCK KERBING
PCR001	PRECAST CONCRETE SLAB - REF. TO S.ENG DETAILS
PLS004	SMOOTH RENDER WITH PAINT FINISH
RWS012	STORMWATER GRATE
TAC007	WHITE TOP S/S BUTTON TACTILE INDICATORS
TRM007	TRIM
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WATER
G	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
V	VENT PIPE
WP	WATER PIPE

Rev	Date	Initial	Description
15	06/12/21	TRHS	RECORD SET
14	12/11/20	TRHS	ISSUED FOR CONSTRUCTION
13	22/05/20	TRHS	ISSUED FOR CONSTRUCTION
12	20/11/19	TRHS	ISSUED FOR CONSTRUCTION
11	12/11/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS TAYLOR ROBINSON HAMES SHARLEY

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 01 Mezzanine GA Plan - Zone D07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L01M-D07-2330
Revision 15
Status RECORD SET

5/06/2022 9:07:09 PM

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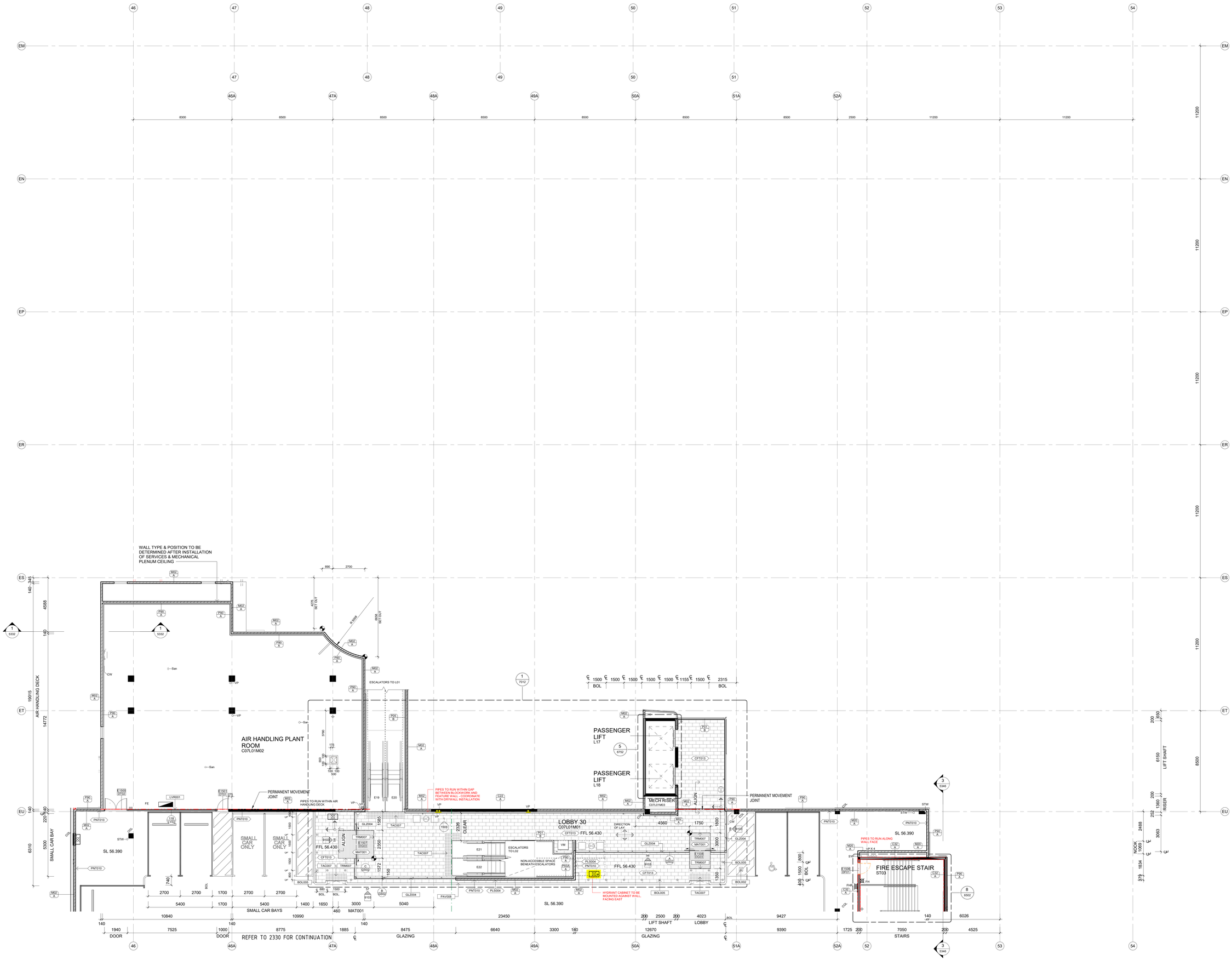
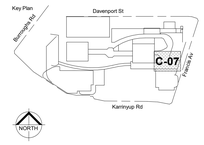


Key Plan



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Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

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GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Abbreviations - Mall Items

APM	AUTOPAY MACHINE
ATM	AUTOMATED TELLER MACHINE
DT	DIRECTIONAL TOTEM
DW	DIGITAL WAYFINDING
VM	VENDING MACHINE

CWT000 ← MATERIAL / ITEM - REFER LEGEND

PNT000 ← SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT010	WEATHERSHIELD SEMI GLOSS

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CFT013	PAVER
GLZ004	UNITIZED GLAZING SYSTEM
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MAT001	MATWELLS
PAV008	150MM SEMI-MOUNTABLE BLOCK KERBING
PLS004	SMOOTH RENDER WITH PAINT FINISH
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TRM007	TRIM

Rev.	Date	Initial	Description
12	06/12/21	TRHS	RECORD SET
11	22/05/20	TRHS	ISSUED FOR CONSTRUCTION
10	17/01/20	TRHS	ISSUED FOR CONSTRUCTION
9	10/10/19	TRHS	ISSUED FOR CONSTRUCTION
8	20/09/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TR+HS TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

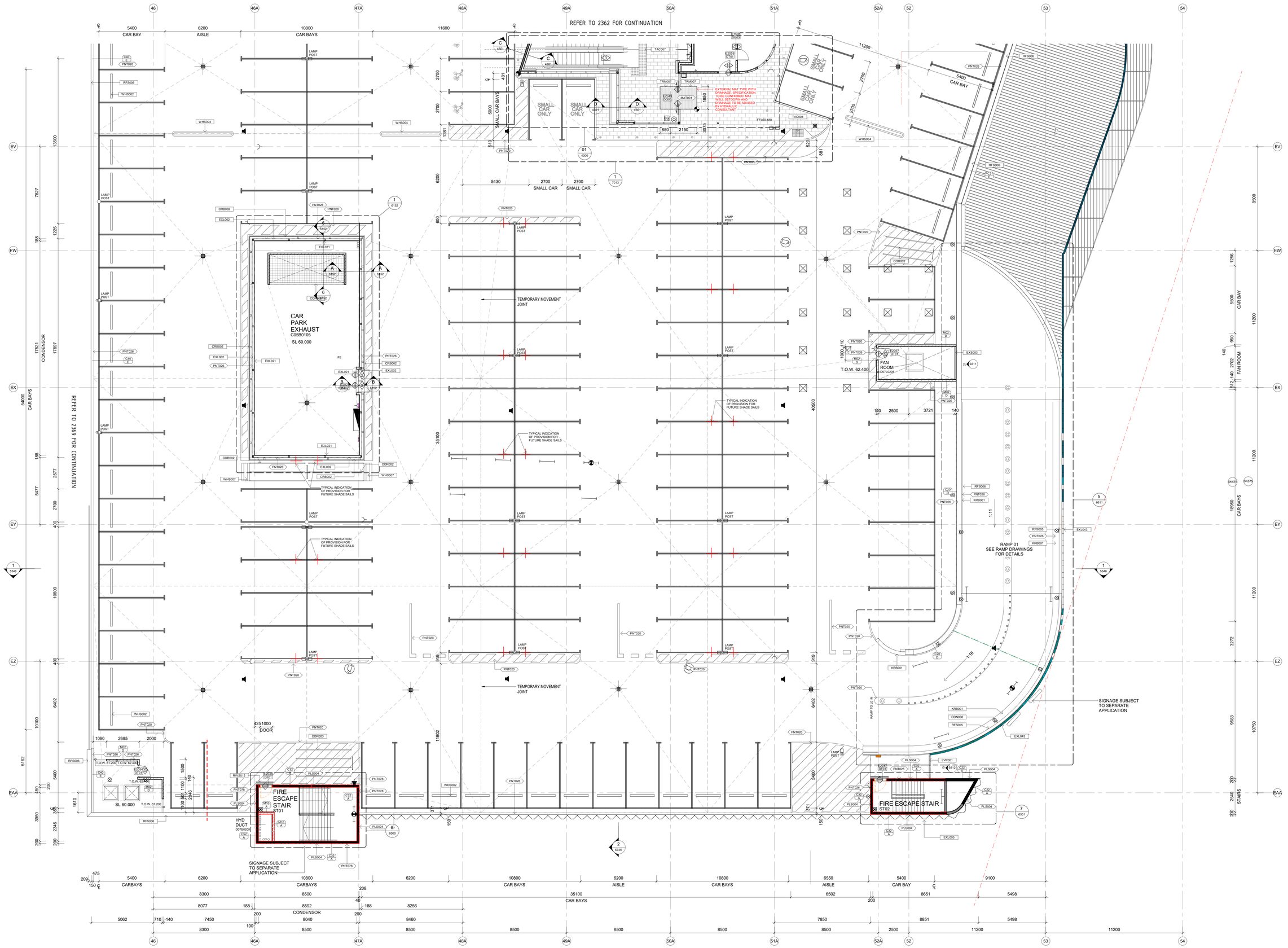
Drawing Title
Level 01 Mezzanine GA Plan - Zone C07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L01M-C07-2322 — Revision 12

Status RECORD SET

5/06/2022 9:06:16 PM



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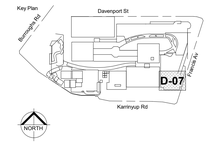
Key Plan



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- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

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F - FIRE RATED
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- HOSE HYDRANT AND CABINET
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- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

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FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOOD WASTE
G	GAS PIPE
OF	OVERFLOW PIPE
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TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)
PNT078	ACRATEX - TEXTURED PAINT FINISH

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON006	CONCRETE BEAM: REFER TO S ENG DETAILS
CON008	CONCRETE INSITU UPSTAND: REFER STRUCTURAL ENGINEER
COR002	DOUBLE TROLLEY CORRAL
COR003	TRIPLE TROLLEY CORRAL
CRB002	CARPARK PERIMETER CRB CRASH RAIL WITHOUT BALUSTRADE
EXL002	CFC CLADDING PAINT FINISH
EXL005	FREESPAN STEEL CLADDING (PERFORATED)
EXL021	VERTICAL METAL CLADDING
EXL043	DRI-DESIGN SYSTEM
EX0003	VISUAL SCREENING TO PLANT EQUIPMENT
KRB001	BARRIER KERBING
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MAT001	MATWELLS
PLS004	SMOOTH RENDER WITH PAINT FINISH
RFS005	FLASHINGS AND CAPPINGS GENERALLY
RFS006	CAPPINGS GENERALLY
RWS012	STORMWATER GRATE
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TAC008	BLACK PVD BUTTON TACTILE INDICATORS
TRM007	TRIM
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS
WHS007	

Rev	Date	Initial	Description
13	06/12/21	TRHS	RECORD SET
12	29/10/19	TRHS	ISSUED FOR CONSTRUCTION
11	22/08/19	TRHS	ISSUED FOR CONSTRUCTION
10	19/09/19	TRHS	ISSUED FOR CONSTRUCTION
9	03/08/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR HS TAYLOR ROBINSON Hames Sharley

Project
Karrinyup Shopping Centre
200 Karrinyup Rd, Karrinyup WA 6018

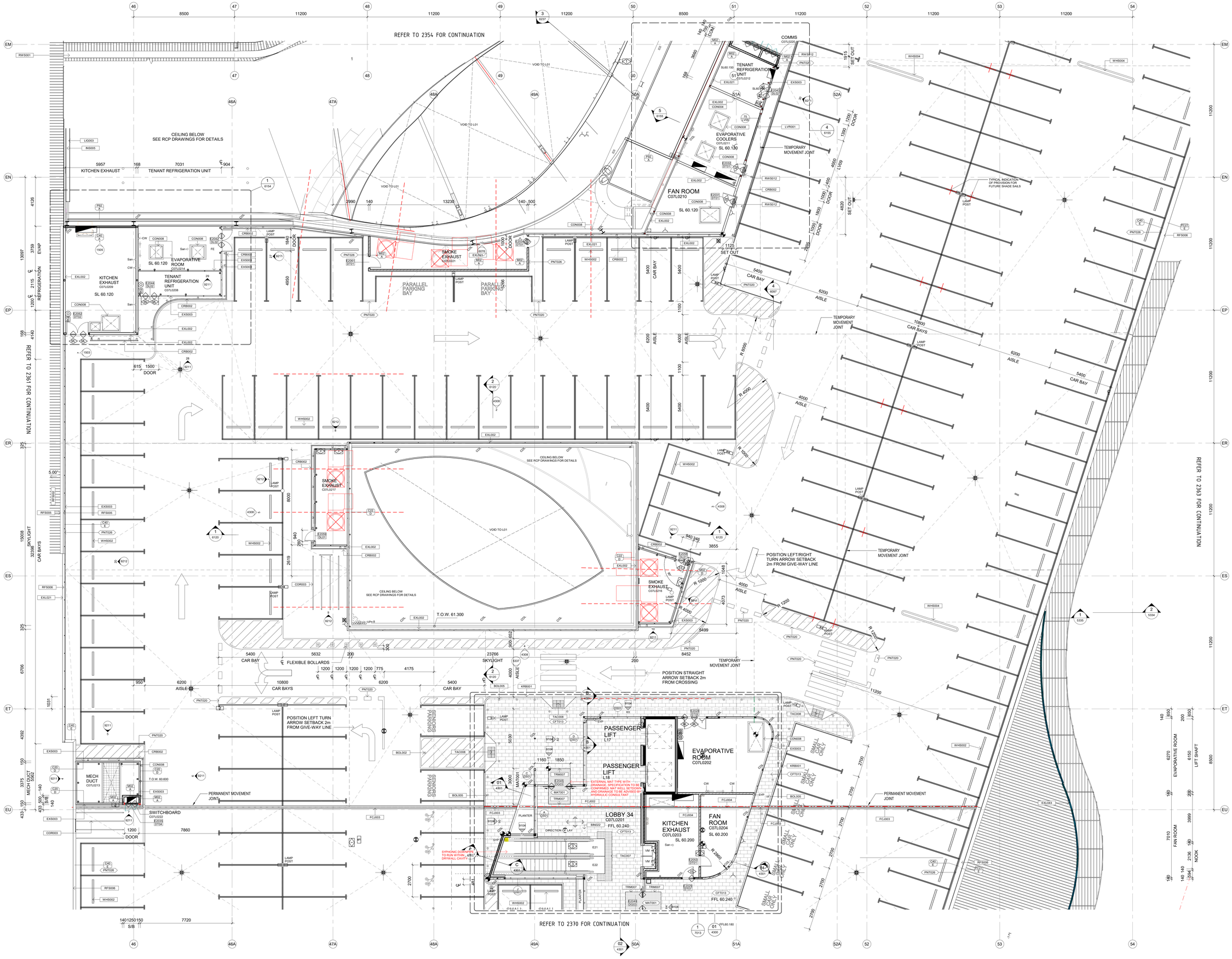
Drawing Title
Level 02 GA Plan - Zone D07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-D07-2370
Revision 13

Status
RECORD SET

5/06/2022 9:21:44 PM



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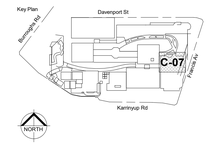
Key Plan



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- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
P - PERFORATED
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

CWT000 — MATERIAL / ITEM - REFER LEGEND
PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BIN022	
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CFT013	PAVER
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR003	TRIPLE TROLLEY CORRAL
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EXL002	CFC CLADDING PAINT FINISH
EXL021	VERTICAL METAL CLADDING
EXL043	DRI-DESIGN SYSTEM
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
FCJ002	TILE FLOOR CONTROL JOINT
FCJ003	EXTERNAL MOVEMENT JOINT
FCJ004	INTERNAL MOVEMENT JOINT
INS005	THERMAL INSULATION- UYSIDE OF FLOOR SLABS
KRB001	BARRIER KERBING
LIG003	LIGHTING TROUGH
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
MAT001	MATWELLS
RFS002	COLORBOND PROFILED METAL DECK ROOFING
RFS005	FLASHINGS AND CAPPINGS GENERALLY
RFS006	CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)
RWS012	STORMWATER GRATE
TAC007	WHITE TOP SS BUTTON TACTILE INDICATORS
TAC008	BLACK PVD BUTTON TACTILE INDICATORS
TRM007	TRIM
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Rev.	Date	Initial	Description
13	06/12/21	TRHS	RECORD SET
12	19/05/21	TRHS	ISSUED FOR CONSTRUCTION
11	12/11/20	TRHS	ISSUED FOR CONSTRUCTION
10	22/05/20	TRHS	ISSUED FOR CONSTRUCTION
9	16/01/20	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS TAYLORROBINSON hames sharley

Project
Karrinyup Shopping Centre

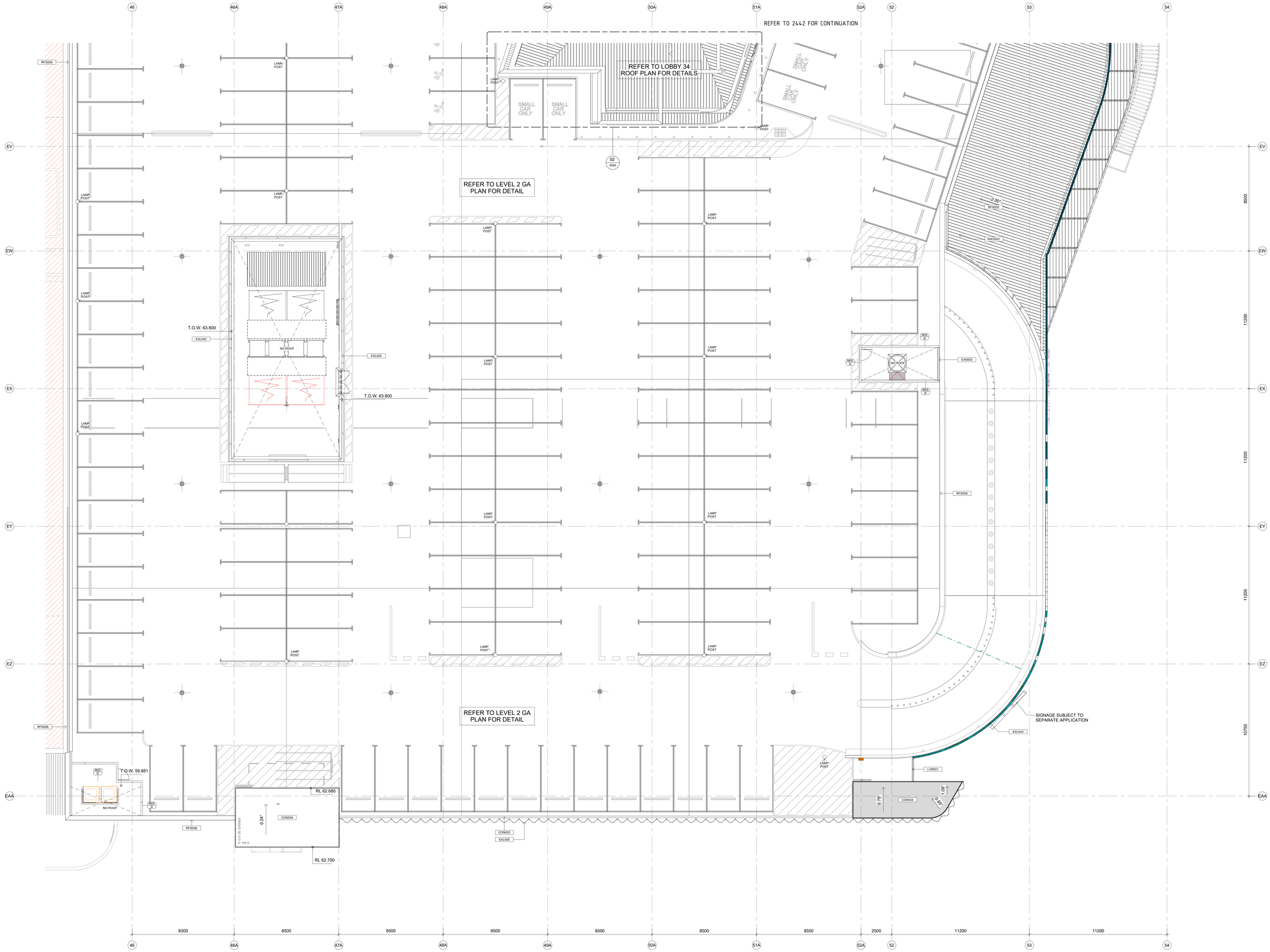
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone C07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-C07-2362
Revision 13
Status RECORD SET

5/06/2022 9:19:22 PM



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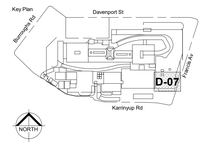
Key Plan



Roof Notes

1 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE WATER-TIGHTNESS AND STRUCTURAL INTEGRITY OF THE ROOF

2 ENSURE ROOF SYSTEM INCLUDING GUTTERS, DOWNPIPES AND FLASHINGS ARE CLEANED AND CLEAR OF DEBRIS. ENSURE THAT THE ROOF AREA IS CLEANED DOWN FREE OF DEBRIS. AT ALL TIMES EVERY PRECAUTION TO BE TAKEN TO PREVENT RUBBISH ENTERING DOWNPIPES. ROOF & GUTTERS MUST HAVE ALL DEBRIS (INCLUDING POP-RIVET SHANKS) REMOVED AND BE CLEANED ONE (1) WEEK BEFORE HAND OVER

3 ACCESS TO AND ESCAPE FROM ROOF LEVELS MUST BE PROVIDED IN FULL COMPLIANCE WITH THE B.C.A

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7 REFER TO MECHANICAL DRAWINGS FOR DETAILS OF AIR-CONDITIONING & EXHAUST UNITS

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12 LADDERS BETWEEN 45 AND 60 DEGREES WILL NOT BE ACCEPTED.

13 ANY HEIGHT OVER 300MM REQUIRES A LADDER. THE INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF AS/NZS 1657-1992 AND THE RELEVANT STATE WORK COVER REGULATIONS

14 ANY PLATFORM HEIGHT GREATER THAN 600MM HIGH MUST HAVE HANDRAIL/BALUSTRADE TO ALL SIDES

Roof Access Walkway

1 FINAL LOCATION OF WALKWAY TO BE COORDINATED WITH MECHANICAL DUCTS AND ALL OTHER EQUIPMENT ON THE ROOF

2 SPACER BETWEEN DISSIMILAR METALS TO BE USED TO FIT SUPPORT SECTIONS

3 WALKWAY SHOULD AT ALL TIMES BE INSTALLED 2M AWAY FROM ANY FALL ZONE

4 WHERE DISTANCE IS BELOW 2M HANDRAILS SHALL BE INSTALLED

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3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

3 HOUR FIRE RATED SEPARATION

2 HOUR FIRE RATED SEPARATION

1 HOUR FIRE RATED SEPARATION

A X / D701 C — DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE

W02 C / W01 C — WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE

001 C / GS01 C — GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE FOR OTHER

9000 / 01 — GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER

P01 C / A — WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

A X / D701 C / R — DOOR NUMBER / DOOR TYPE NUMBER / DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLASS DOOR
L - LOUVRED DOOR
M - MESH GATE
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON003	IN-SITU CONCRETE WALLS
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
EXL002	CFC CLADDING PAINT FINISH
EXL005	FREESPAN STEEL CLADDING (PERFORATED)
EXL043	DRI-DESIGN SYSTEM
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
RFS002	COLORBOND PROFILED METAL DECK ROOFING
RFS006	CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)

Rev.	Date	Initial	Description
3	06/12/21	TRHS	RECORD SET
2	31/05/19	TRHS	ISSUED FOR CONSTRUCTION
1	11/04/19	TRHS	ISSUED FOR CONSTRUCTION
0	22/02/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TRHS | TAYLOR ROBINSON Hames Sharley

Project
Karrinyup Shopping Centre

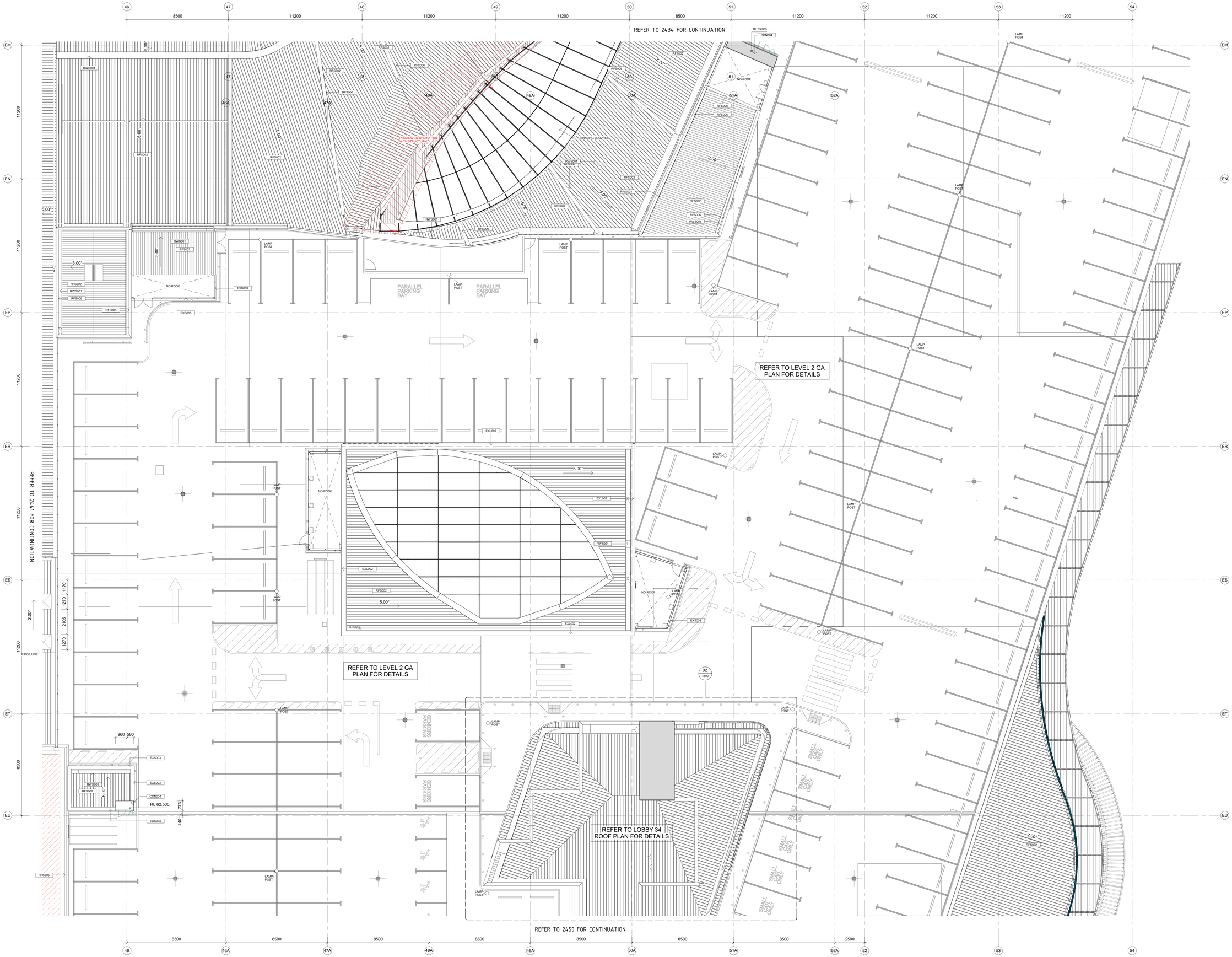
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Roof GA Plan - Zone D07

Drawn By	Checked By	Scale @ A0
LA	KB/DB	1 : 100

Drawing No. AR-DWG-RF-D07-2450
Revision 3
Status RECORD SET

5/06/2022 9:29:08 PM



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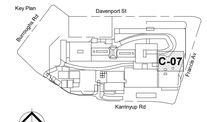
Key Plan



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Legend

3 HOUR FIRE RATED SEPARATION
2 HOUR FIRE RATED SEPARATION
1 HOUR FIRE RATED SEPARATION

A — DOOR NUMBER
DT01 — DOOR TYPE - REFER DOOR SCHEDULE

001 — WINDOW NUMBER
WT1 — WINDOW TYPE - REFER WINDOW SCHEDULE

001 — GLAZING SYSTEM NUMBER
GST1 — SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE FOR OTHER

9000 — GLAZING ELEVATION NUMBER
DRAWING SERIES NUMBER

W01 — WALL TYPE - REFER SCHEDULE
A — WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

A — DOOR NUMBER
DT01 — DOOR TYPE NUMBER
DOOR LEAF TYPE (SEE BELOW)
DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLASS DOOR
L - LOUVRED DOOR
M - MESH GATE
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
EXL002	CFC CLADDING PAINT FINISH
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
RFS002	COLORBOND PROFILED METAL DECK ROOFING
RFS006	CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)

Rev.	Date	Initial	Description
2	06/12/21	TRHS	RECORD SET
1	31/05/19	TRHS	ISSUED FOR CONSTRUCTION
0	11/04/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS | TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Roof GA Plan - Zone C07

Drawn By	Checked By	Scale @ A0
LA	KB/DB	1:100

Drawing No.	Revision
AR-DWG-RF-C07-2442	2

Status
RECORD SET

5/06/2022 9:28:37 PM

KARRINYUP SHOPPING CENTRE

DEVELOPMENT APPLICATION

REV B

20.09.2024

www.trcb.com.au / www.hamessharley.com.au

1. CONTEXT + CHARACTER

Karrinyup Shopping centre sits within a coastal suburb 12km north of Perth's CBD. It's uniquely positioned with Perth's beautiful beaches to the west, lake Gwelup to the east and a biodiverse bush forever zone across the road, to the south.

The original 2,000sq m shopping centre was built in the late 1950's and the centre has undergone several significant expansions and upgrades over the decades.

The centre's popularity has surpassed expectations, therefore, the proposed modifications;

- Extension of the SE car park – adding Level 03 + Level 04
- Changing ramp 14 from and entry to an exit
- Modifications to the L02 north car park to provide valet services

are primarily born out of a need to address traffic congestion that occurs when the centre is busy. External factors influencing the context are many and varied: client brief, authority requirements, program needs, and last and by no means least budget constraints.

The design context for this package of modifications was determined by factors both internal and external to the site. Drawing on strategies from the most recent development, these proposed modifications include organic forms, natural textures and coastal colours across the exterior and interior. Some design decisions have been made based on the need and ability to work around the existing car parks, to provide reasonable access, and to maintain services and provide sufficient parking.

2. LANDSCAPE QUALITY

The proposed modifications only touch the ground plane east of the bus port. The intent is that the works have minimal impact on the existing high quality landscaped areas.

3. BUILT FORM AND SCALE

The extension of height in the southeast corner is an appropriate one as we are adding to the existing multideck car park that is a landmark element at the prominent corner. The form of the proposed car park extension in the southeast draws upon the cues from the existing big bold sweeping facades and textural qualities noted earlier.

To help break down the overall form of the building at the southeast corner the cladding at Level 02 is purposefully different - it is intended to be darker and act as an oversized shadowline – a visual break between new and existing.

The proposed modifications to the Level 2 north car park does slightly increase the building height, but provides additional amenity to the customer by providing cover to the car parking area. The built form of the proposed roof has been chosen for three main reasons;

• To reduce the height of the overall roof as much as possible
• Allow for cross ventilation at high level - alleviating the need for mechanical ventilation to the whole area.
• Future proofed for installation of solar array - PV cells in future.

4. FUNCTIONALITY AND BUILD QUALITY

As noted previously, the proposed works are primarily a functional requirement, responding to the congestion that occurs when the center is busy, to ensure the centre can function better.

The conversion of Ramp 14 from an entry to an exit and the associated proposed modifications to the internal layout alleviates traffic congestion upon existing by providing more direct access from the upper level ramps to the exit point and Karrinyup rd, heading east. The layout changes also provide an alternative exit from B02 to Karrinyup rd, without having to loop around to the Jeans rd intersection.

The additional bays in the extension of the south east multideck car park provide additional amenity and opportunity to park during peak trading times.

A high level build quality is expected here. The proximity to the coast is a driver behind the selection of durable and fit for purpose façade materials.

Refer our traffic engineer's report for more information on traffic movements.

5. SUSTAINABILITY

The proposed extensions to the car park areas will be naturally ventilated. The roof areas will be designed so that they have capacity to take a solar array of PV cells in future.

6. AMENITY

The modifications will create improved access and exit to an already diverse activity and community centre. There will also be improved amenity through the addition of a valet service at L02 and shaded car parking.

7. LEGIBILITY

As these works are related to the car park wayfinding will be an innate inclusion in the works. The works reinforce the existing landmark corner at the south east of the site and improve the fine grain connection routes within the center and its context.

8. SAFETY

All areas of the car park and centre will be well lit and secure spaces. The upper levels of the car parks will include a screen that projects 2400mm above the crash barriers to discourage climbing.

9. COMMUNITY

The modifications will benefit the community who use visit the centre and use the surrounding roads – particularly on busy days – as the primary intent is to alleviate congestion, provide more parking and therefore provide an elevated experience.

10. AESTHETICS

The overall narrative for the design of the previous Karrinyup Shopping centre development drew on inspiration from the local context – primarily the natural coastal context, but also the surrounding bush and lake contexts. The proposed modifications will draw on that and add to it.

The Karrinyup Road façade is primarily viewed from some distance and is typically seen by moving traffic rather than by pedestrians or from local residences. The architecture of the façade responds to this being made up of large strong forms and geometries designed to be read at a distance and in motion.

The intent is to provide an elegant and coherent outcome by utilizing a cladding material for the south east car park upper levels (L03 + L04) that references the vertical cladding treatments and big bold facades that populate the south and east elevations today. The intent is for this refined perforated screen to encapsulate the new car park, and sit atop the existing, giving it a crown-like quality.

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SURVEY BY SCANTECH

gpt

Site Survey - Existing Ramp 14 Entry

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:500@A1

DATE: 10.09.2024
DRAWN: TRHS

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DA3

gpt

Site Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:4000@A3/1:2000@A1

DATE: 10.09.2024
DRAWN: TRHS

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DA4

gpt

Level B01 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

DATE: 10.09.2024
DRAWN: TRHS

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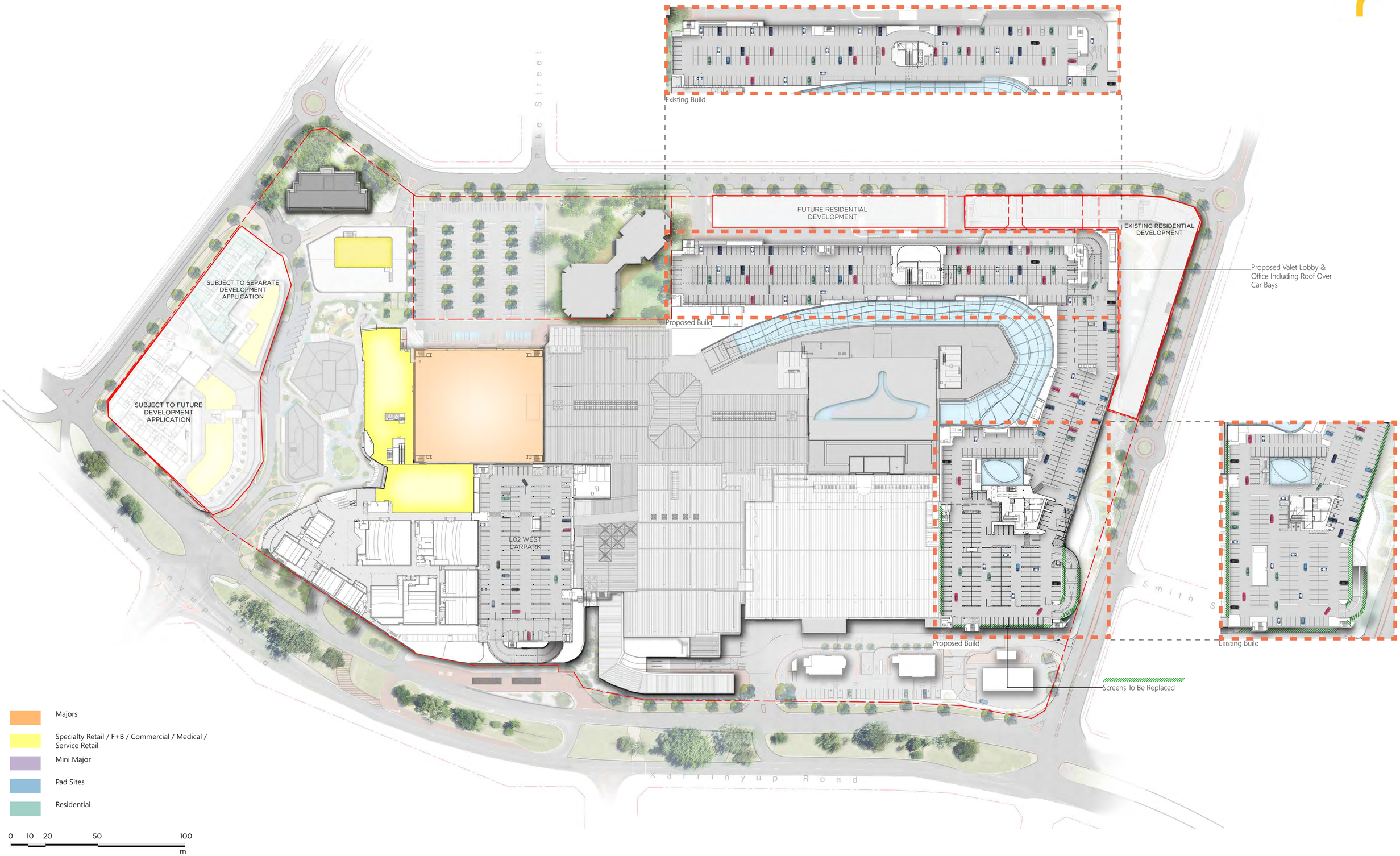
DA5



gpt

Level 02 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

DATE: 10.09.2024
DRAWN: TRHS

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DA6

gpt

Level 03 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

DATE: 10.09.2024
DRAWN: TRHS

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TRHS | TR CB. Hames Sharley

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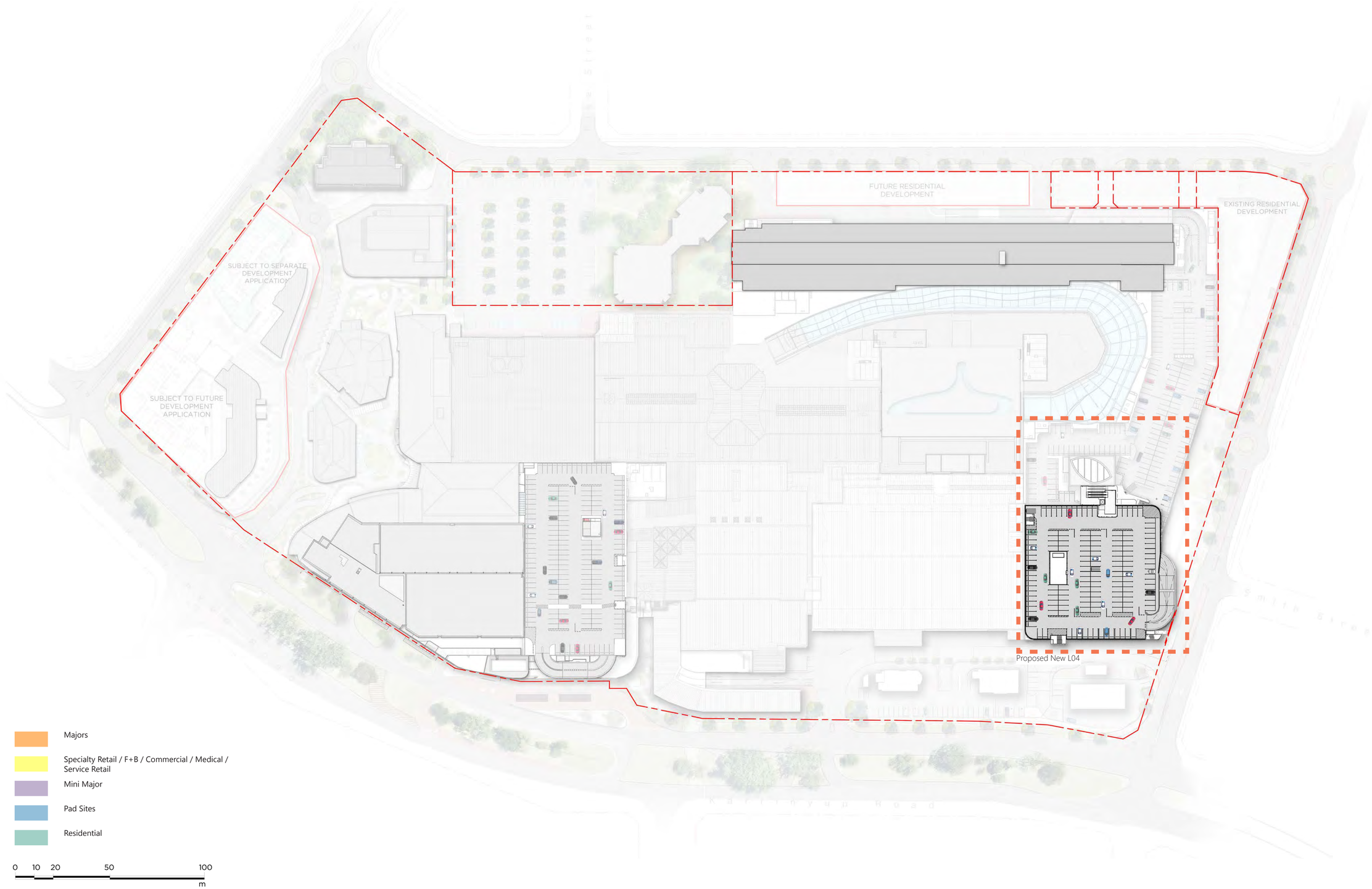
DA7



gpt

Level 04 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

DATE: 10.09.2024
DRAWN: TRHS

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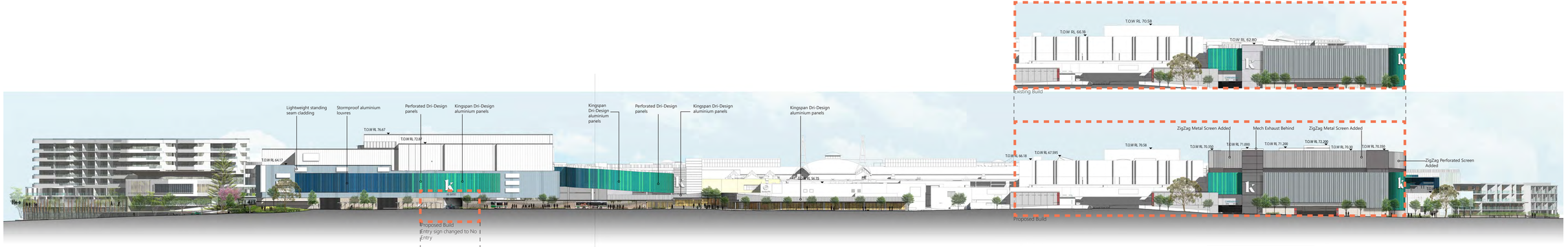
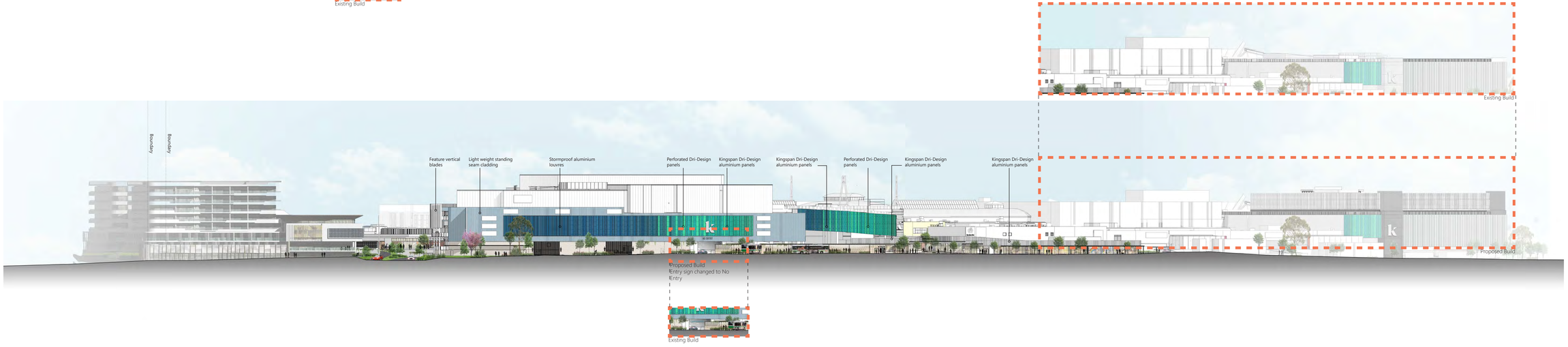
DA8



Karrinyup Road elevation-South Elevation (EAST)



Karrinyup Road elevation-South Elevation (WEST)

gpt

Elevations
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

SCALE: 1:1000 @A3/ 1:500 @A1 DATE: 10.09.2024
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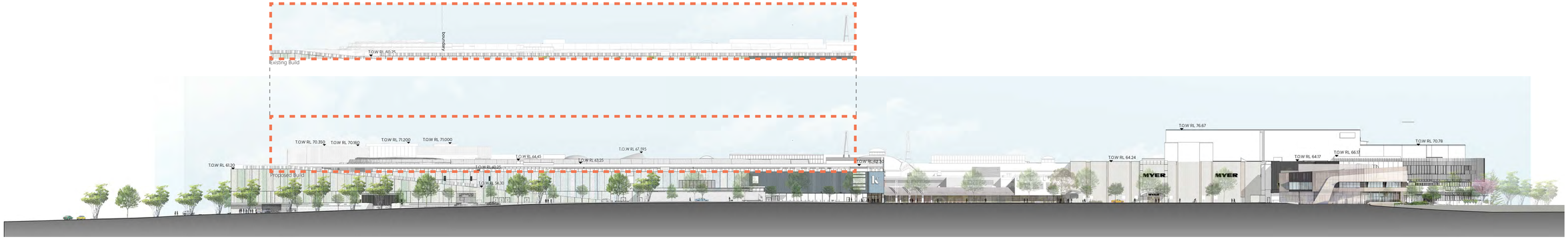
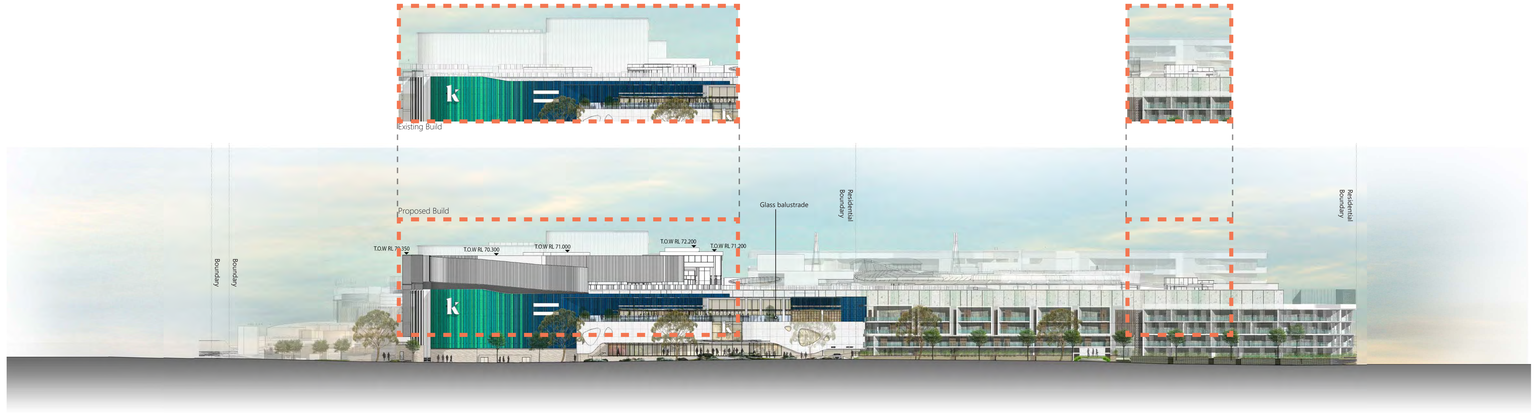
DA9



Davenport Street - North Elevation



Francis Avenue elevation - East Elevation

gpt

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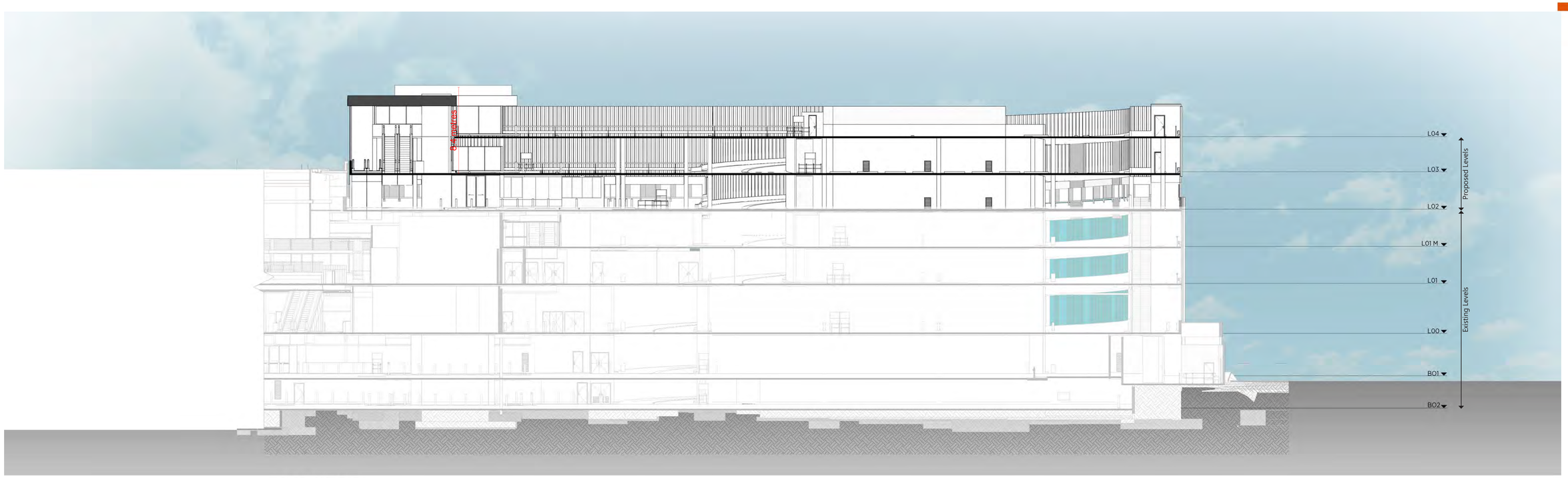

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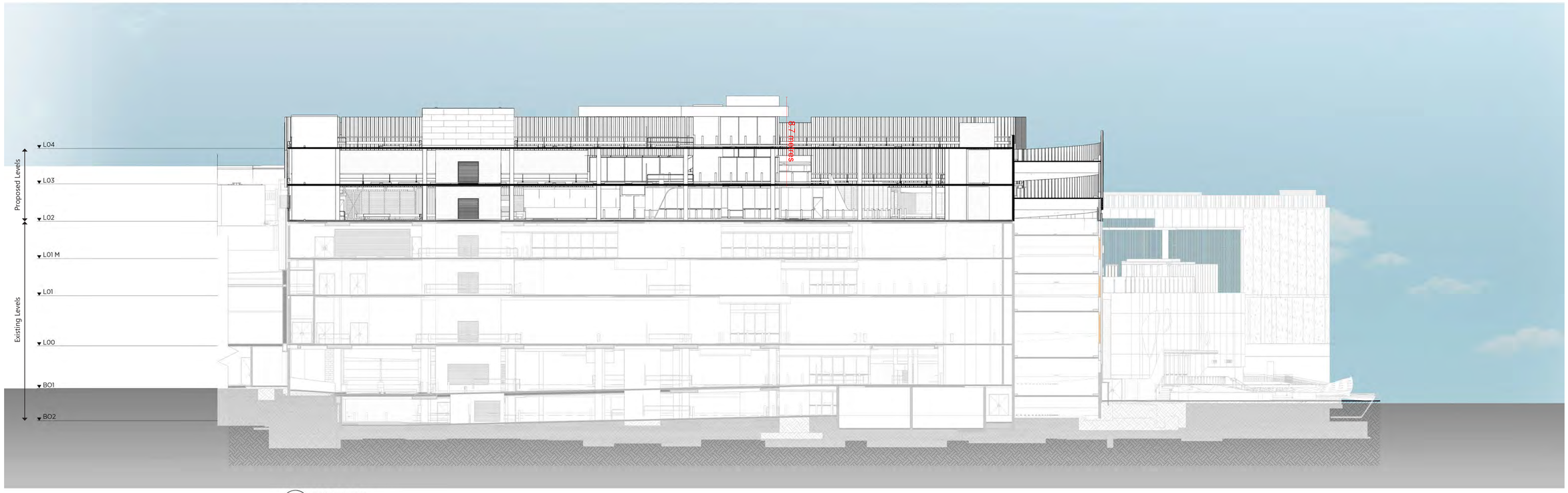

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Sections

KARRINYUP SHOPPING CENTRE

development application - Rev B

NORTH

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Illustratrative View - Ramp 14
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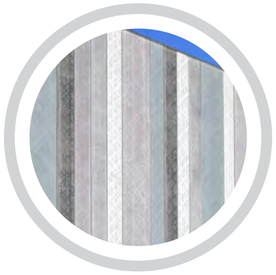
DA12

light weight cladding
(Karrinyup Road - South elevation)

alternating perforated and solid feature screening
(Karrinyup Road - South elevation)



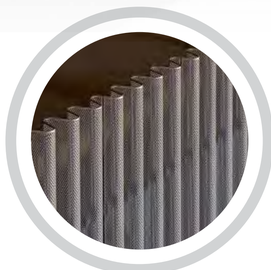
precast concrete panels
(Karrinyup Road - South elevation)

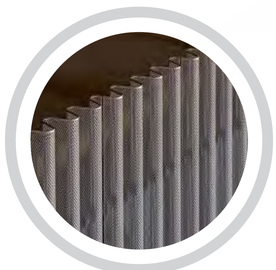
painted precast
(Karrinyup Road - South elevation)

aramax freespan screen
(Karrinyup Road - South elevation)

perforated metal cladding screen added

perforated metal cladding screen added





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Illustratrative View - SE Carpark
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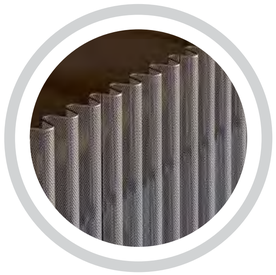


perforated metal cladding screen added

pergola structure
(Francis Avenue - East elevation)

light weight cladding
(Karrinyup Road - South elevation)

Screen added

jesmonite composite panels
(Francis Avenue - East elevation)

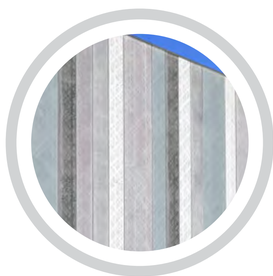
Subject to separate development application

blockwork wall
(Francis Avenue - East elevation)

shopfront glazing
(Francis Avenue - East elevation)

laminated patterned glass
(Francis Avenue - East elevation)

precast concrete panels
(Francis Avenue - East elevation)



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Illustratrative View - SE Carpark
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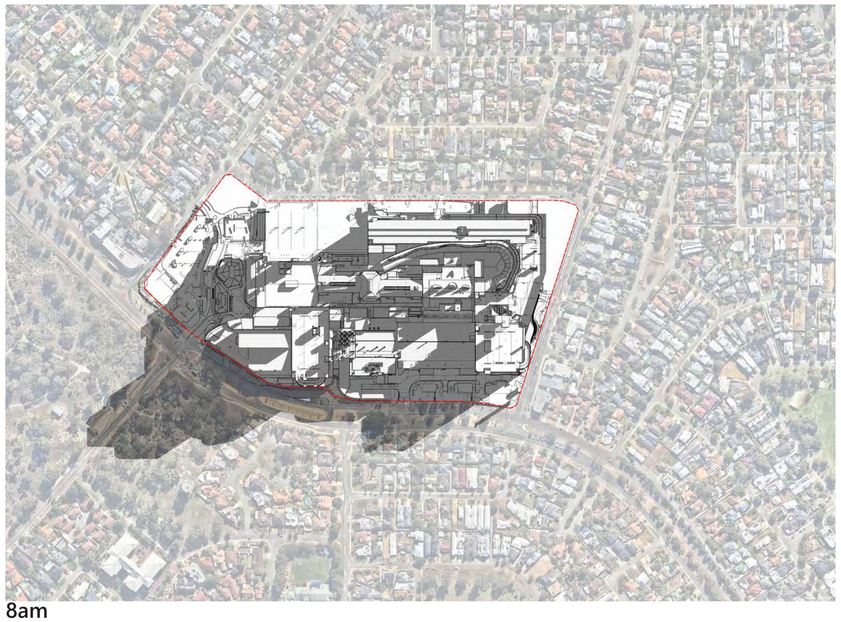
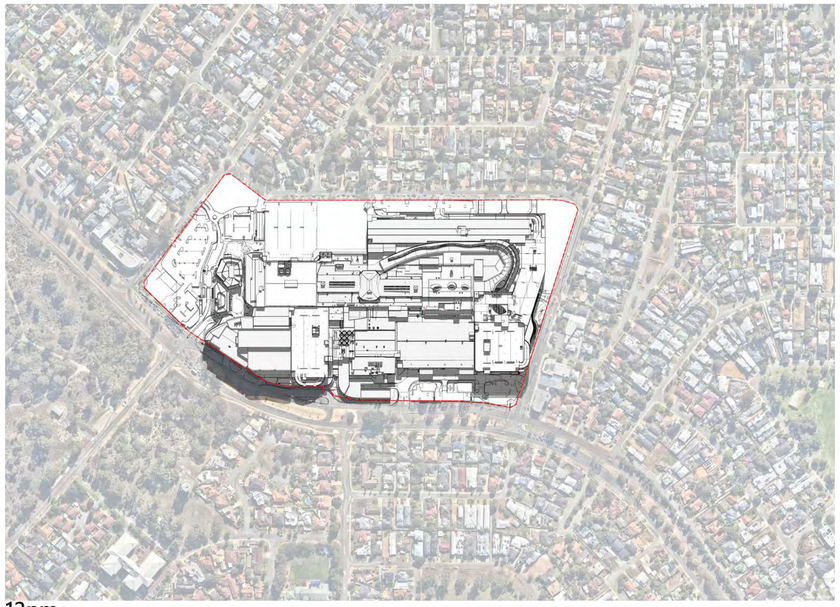


8am

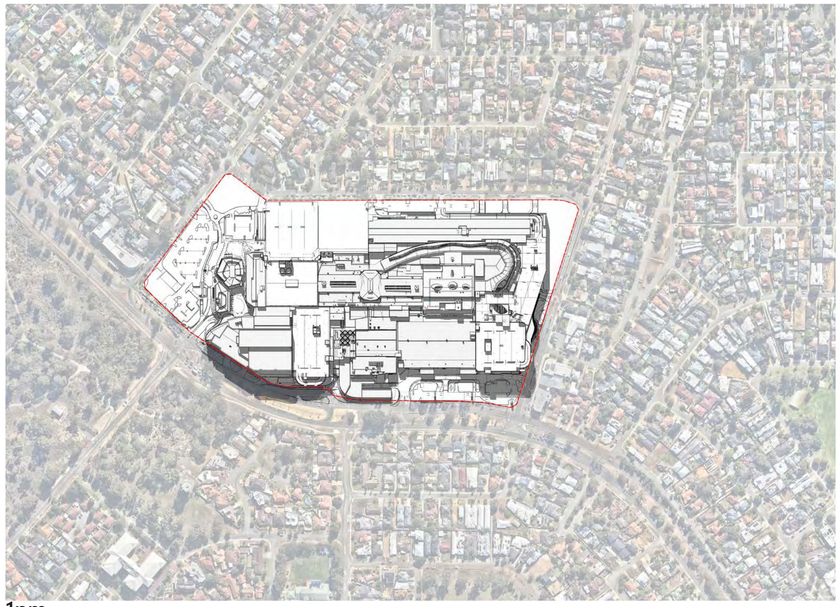
9am

10am

11am



12pm



1pm

gpt

Overshadowing Diagrams

KARRINYUP SHOPPING CENTRE

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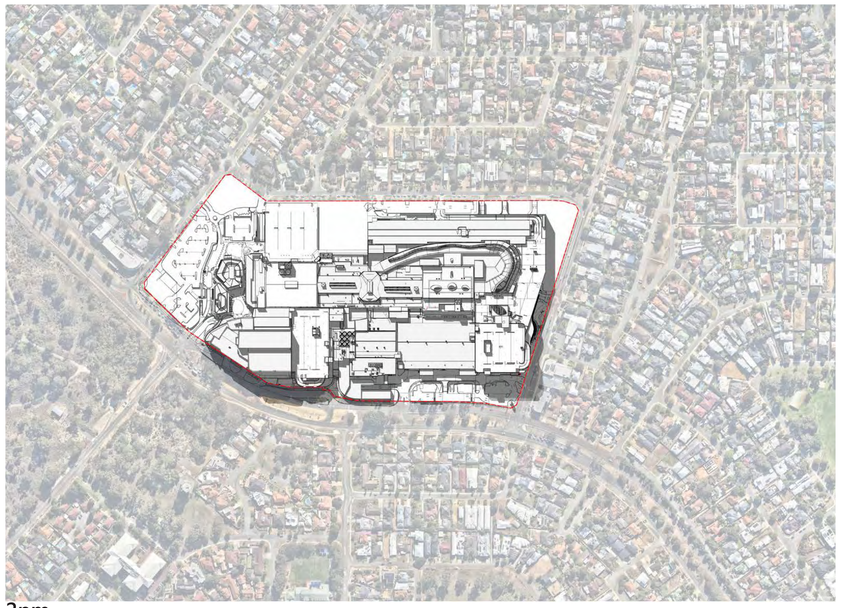

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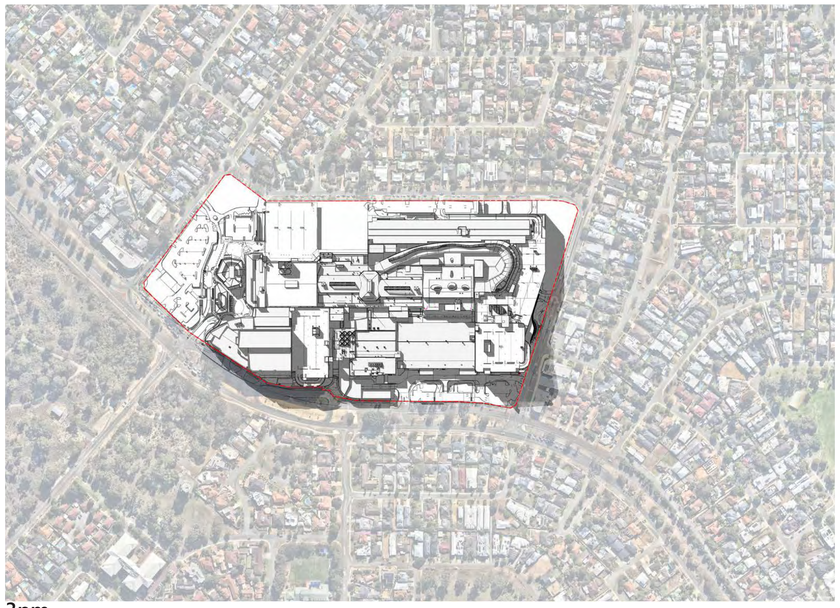

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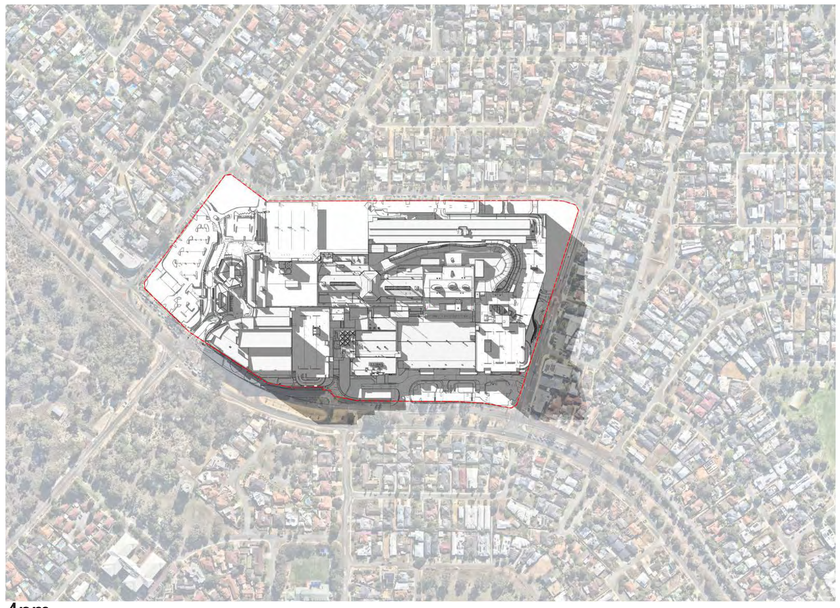

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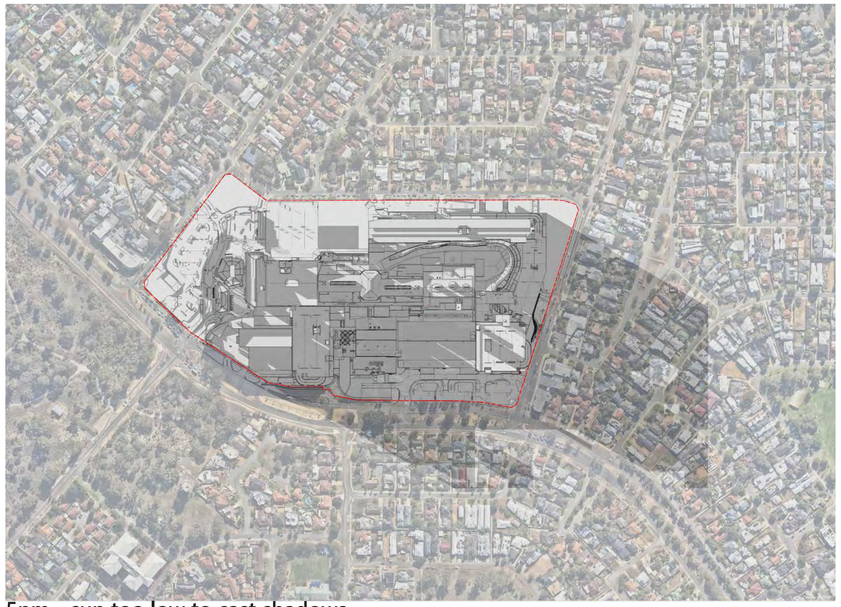

5pm - sun too low to cast shadows

gpt

Overshadowing Diagrams

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DA16

Attachment 7b Parking Management & Travel Plan by Aurecon prepared 14 November 2024

aurecon

Mixed Use Expansion at Karrinyup

Parking Management & Travel Plan

GPT Group

14 November 2024

Revision: 5

Reference: 525467

Bringing ideas to life

Document control record

Document prepared by:

Aurecon Australasia Pty Ltd
ABN 54 005 139 873
Level 5, 863 Hay Street
Perth WA 6000
Australia

T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

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Title	Engineer	Title	WA/NT Transport, Land, & Water Leader

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1 Introduction

Revision 5 2024 Update Notes

An updated Transport Plan has been issued relating to Karrinyup Shopping Centre. The Transport Plan outlines the impact of two proposed changes to the Centre's transport infrastructure:

- Construction of two additional floors of car parking atop the eastern parking structure. The existing ramp will be extended to accommodate these.
- Conversion of the existing Ramp 14 entrance from Karrinyup Road to an exit only ramp. Minor changes to internal vehicle circulation will be made to accommodate this

The Centre is proposing these two changes to improve the experience of vehicle access and car parking for customers visiting Karrinyup. The changes are not expected to increase the trip generation of the Centre, but to manage the difference between existing demand and parking supply, and ease internal congestion.

Revision 5 also provides a general update on the status of the initiatives contained in the original Parking Management & Travel Plan.

Subsequent to the development of the original document, the centre is now managed by GPT group.

1.1 Introduction

Aurecon was commissioned by AMP Capital Funds Management Ltd to undertake a Parking Management & Travel Plan (PMTP) for the Mixed-Use Expansion at Karrinyup Shopping Centre ('the Centre'). The Centre is proposed to undergo a significant redevelopment and be transformed into a 'community hub' with mixed use development within and surrounding the Centre. This includes the establishment of a main street which will be active during the day and after hours.

The development of the PMTP forms part of the conditions of the development approval and is required to be implemented with the commencement of use of the redeveloped Centre. This document is considered to be a live document and therefore is subject to ongoing review and change.

It should be noted that this document considers the fully developed Centre, with the staging of parking bays during construction addressed in the Site Management Plan. The applicant assumes all risk associated with staging delivery of the development, including implementing infrastructure that may be required to enable later stages.

1.2 Purpose of the Parking Management and Travel Plan

Like any major development, the economic, social and environmental sustainability of its transport system needs consideration. While many transport systems cannot completely satisfy these fundamental aspects, it is important that there is a targeted focus on achieving a greater balance of each aspect. Single occupancy private vehicles are typically the transport mode of choice to shopping centres, however there are a number of alternatives that can be facilitated and incentivised, including public transport, cycling and walking, which will contribute to achieving a greater transport system balance.

This document outlines a range of tools and strategies to manage parking demand and promote travel behaviour change at the redeveloped Centre, with the aim of providing efficient access and parking at the redeveloped Centre.

This document outlines the policies to be implemented and commitments regarding parking management and travel behaviour change strategies, whilst providing a mechanism to regularly review and modify the proposed strategies as necessary.

This document has been prepared in accordance with, but not limited to, the following guidelines:

- Parking Guidelines for Large Shopping Centres, Department of Transport, June 2016
- Travel Plan Guidelines for Large Shopping Centres, Department of Transport, June 2016

The successful management of parking and travel planning are closely linked as they maximise the benefits of each other. As such, this document aims to combine the requirements of the Parking Guidelines and Travel Plan Guidelines developed by the Department of Transport into a single streamlined document for simpler implementation and reference.

While the Mixed Use Expansion at Karrinyup Transport Plan outlines details regarding the 'hard' infrastructure improvements, including bus lanes along Karrinyup Road with increased peak bus frequencies, and new footpaths and cycle paths, this document aims to complement the infrastructure improvements with 'soft' measures.

1.3 Policy and Strategic Context

This section outlines the broad policy objectives that the PMTP are intended to achieve, including from both state and local government agencies. It is important the PMTP aligns with local and state government objectives to ensure consistency in the outcomes of the plan.

1.3.1 WA Transport Portfolio

The WA Transport Portfolio's Travel Demand Management Plan @3.5million (2016) identifies effective travel demand management (TDM) measures for the Perth and Peel region as it heads towards a population of 3.5 million.

The TDM identifies 'Parking Strategies' as one of the six key measures, with the following objectives:

- To improve parking management and parking use efficiencies;
- To discourage private car journeys to specific sites; and
- To encourage alternative modes and reallocate space for other uses (i.e. public space).

The TDM also identifies 'Travel Plans for New Developments' and 'Travel Behaviour Change Programs' as two of the six key measures for implementation in Perth. These measures are recommended for new major commercial developments and workplaces in major activity centres, and have the following objectives:

- Encourage voluntary changes in travel habits and patterns;
- Reduce dependence on private cars;
- Increase the share of trips by alternative modes such as cycling, walking, public transport and car-pooling;
- Increase physical activity; and
- Decrease the need for travel.

1.3.2 City of Stirling

The City of Stirling Parking and Access Policy outlines a number of objectives on a local area level. These include:

- Facilitation of adequate parking facilities;
- Safe, convenient and efficient access for pedestrians, cyclists and motorists;
- Minimised chances of major parking problems arising;
- Avoidance of impact to the character and amenity of an area; and
- Avoidance of the oversupply of parking and the corresponding effects on travel behaviour and urban character.

The City of Stirling's Integrated Transport Strategy identifies five objectives for transport planning with a view to enhance social, economic and environmental outcomes. Three of these objectives are linked to travel behaviour, which are:

- To encourage more sustainable transport of people and goods;
- To improve accessibility for pedestrians, cyclists and public transport users to a variety of destinations; and
- To encourage public transport modes over private transport modes.

2 Context

2.1 Existing Shopping Centre

2.1.1 Location

The Centre forms part of the Karrinyup Secondary Activity Centre within the Karrinyup-Gwelup locality in the City of Stirling, located approximately 12 km northwest of the Perth CBD.

2.1.2 Land Use

Referring to Figure 2-1, the Centre is bounded by Karrinyup Road, Burroughs Road, Davenport Street and Francis Avenue and is currently mixed-use consisting of commercial and civic facilities. The main retail facility is the Karrinyup Shopping Centre itself which forms the bulk of the built area, however the site also includes Karrinyup Library and Community Centre and Bankwest site between the shopping centre and Davenport Street, a service station on the corner of Burroughs Road and Karrinyup Road, fast food restaurants (drive-through) fronting Karrinyup Road and a three-storey commercial building on the corner of Burroughs Road and Davenport Street. A Transperth bus interchange operated by the Public Transport Authority (PTA) is located alongside the Centre adjacent to Karrinyup Road. Table 2-1 shows the existing land use types.

Figure 2-1 Location of the Karrinyup Centre

Table 2-1 Existing land use at the Karrinyup Centre

Land Use Type	Floor Space, m^2 (2011)
Retail	53,544
Office/Business	4,184
Eating/Entertainment/Culture	2,382
Community/Health/Welfare	706
Other Incidental Floor Space	195
Total	**61,011**

The land use currently surrounding the Centre is predominantly single-unit residential dwellings (design code R20/R30) with various public reserves, including Lake Gwelup to the east. It is noted that there is a childcare centre located to the north of Davenport Street opposite the shopping centre access point and across from the Stirling Community Centre.

2.1.3 Current Travel Behaviour

A Customer Exit Survey was conducted in 2011 which identified travel modes to the Development were 92% by car and 8% by other modes, as shown in Figure 2-2. This high rate of car use is 10% above the 82% benchmark for regional centres, indicating a significant reliance on car use. At similar regional centres, it is typical to see 6% of customers walking and 8% customers travelling by bus. The Development is slightly below the benchmark for customers walking and well below the benchmark for customers travelling by public transport (bus). This may be due to limited walking access and public transport services.

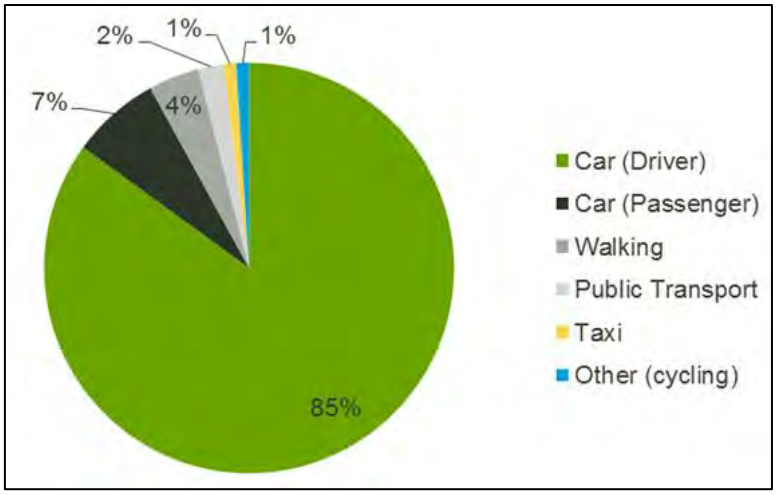

Figure 2-2 Existing travel mode share

2.1.4 Car Parking

Provision

There are currently 3,166 vehicle spaces within the Centre, located in open parking areas, undercover parking and roof parking. The parking bays are distributed within the Centre as shown in Figure 2-3 with the majority being visible and accessible from Francis Avenue and Burroughs Road.

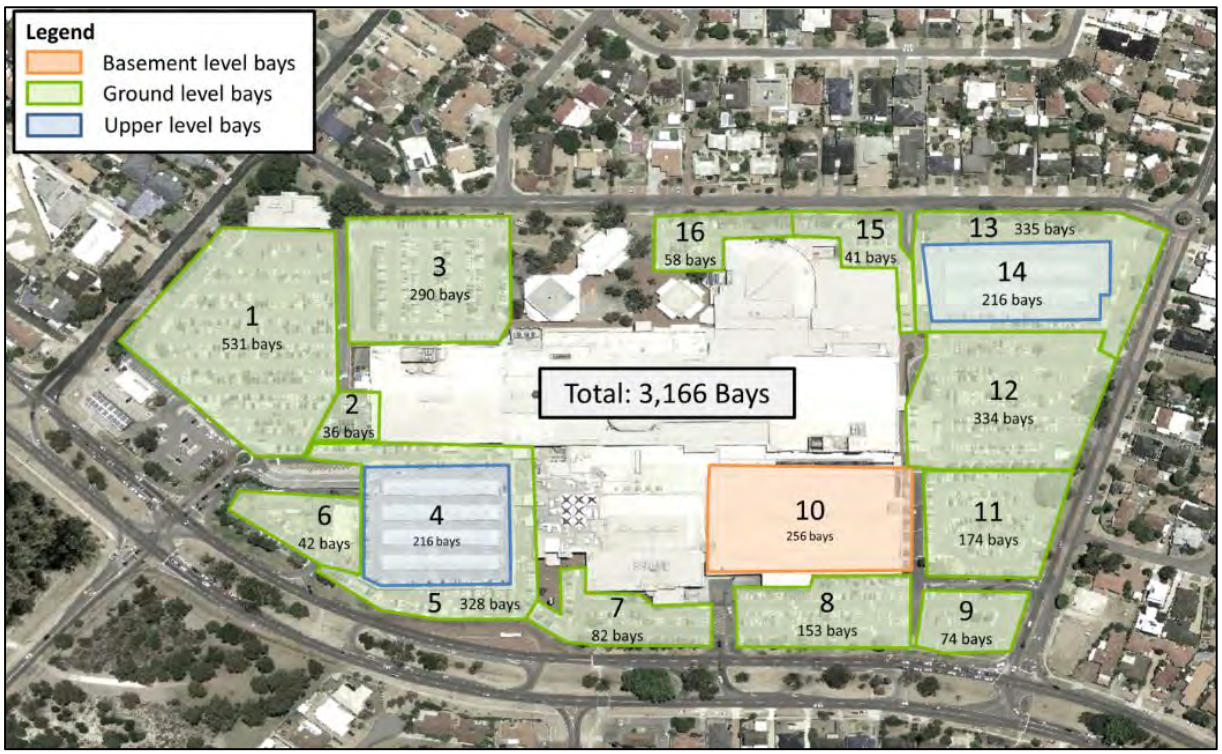

Figure 2-3 Distribution of Parking

Allocation

The existing parking allocation for various parking types is shown in Table 2-2.

Table 2-2 Parking types & hierarchy

Parking Type	Description	Allocation (% of total spaces)	Location
Accessible Parking	Accessible parking only	56 (1.8% of total)	Near pedestrian entrance points to the Centre
Parents with Prams	Parents with prams parking only	42 (1.3% of total)	Near pedestrian entrance points to the Centre
Taxi Rank	Taxi only	4 (0.1% of total)	Near the southern entrance to the Centre
Motorcycle	Motorcycles and scooters	6 (0.2% of total)	On the western side of the Centre, as shown in Figure 2-4
Emergency Vehicle	Emergency vehicles only	1 (0.03% of total)	One on both the western and eastern sides of the Centre, as shown in Figure 2-4
Short Term	15-minute parking (P15) 1 hour parking (1P) 90-minute parking (P90)	162 (5.1% of total)	At various locations throughout the Centre

Parking Type	Description	Allocation (% of total spaces)	Location
General Patron	4-hour parking (4P) Unrestricted bays	2,192 (69.2% of total)	
Staff	Allocated retail staff bays	673 (21.3% of total)	Long term staff parking is allocated within the general parking bays, as shown in Figure 2-4, to ensure that staff do not occupy more easily accessible car parks. Note that the bays are marked by a yellow dot and are not exclusive to staff.
Service Delivery	Loading zone only Service vehicles only	11 (0.4% of total)	At the existing service yards within the Centre
Other	TAB parking for customers and staff Library staff parking	19 (0.6% of total)	At the existing TAB and library sites
Total:		**3,166**	

Figure 2-4 Existing parking type allocation

Utilisation

A parking survey was conducted on Saturday 23 November 2013, Tuesday 26 November 2013 and Thursday 28 November 2013 which entailed an hourly audit of usage. Parking utilisation is illustrated in Figure 2-5. From the parking audit analysis, the maximum parking utilisation for the Tuesday was 78% of all parking bays available, between 12:00 and 13:00. Utilisation of 72% or more occurred between 11:00 and 15:00.

On the Thursday, it was found that the maximum parking utilisation was 88% between 13:00 and 14:00 and that an 80% or above utilisation occurred between 11:00 and 16:00. The maximum evening utilisation was found to be 73% between 19:00 and 20:00.

The maximum parking utilisation for the Saturday was 95% between 12:00 and 13:00 and again between 14:00 and 15:00. Utilisation of 89% or more occurred between 11:00 and 16:00.

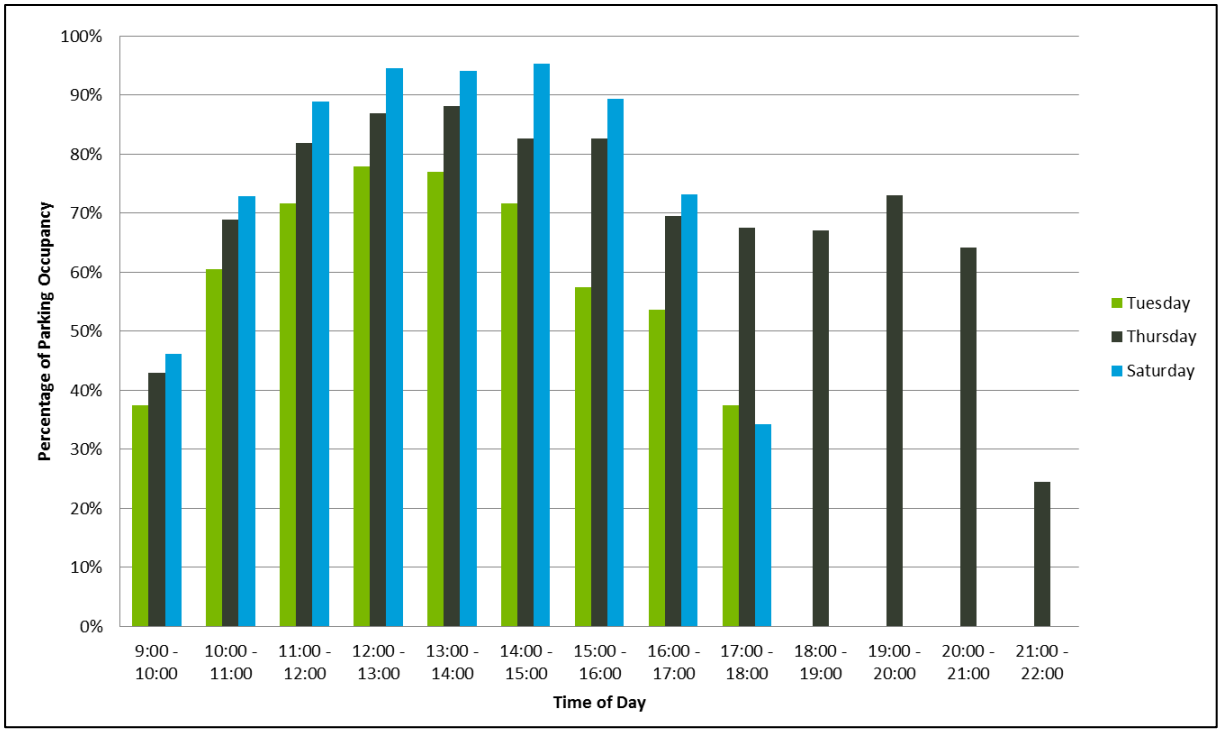

Figure 2-5 Parking utilisation

The busiest day (of those surveyed) in terms of parking utilisation was Saturday, both in terms of the average number of bays utilised and the greatest number of bays utilised.

It is generally considered that an efficient car park operates at 85% capacity with 90% occupancy considered to be the practical capacity, beyond which the difficulty in finding the remaining vacant parking spaces without guidance can impact on the operation of the facility.

The November 2013 surveys indicated that these utilisation levels are met or close to being met over a 5-hour period on a Thursday and are exceeded over a 3–5-hour period on a Saturday.

The car park currently contains no Variable Message Signs (VMS) indicating where bays are available, therefore with a utilisation of 85% plus the process of finding available bays can be time consuming and frustrating for drivers.

The 3,166 parking bays for 61,011m^2 of total floor space equates to a provision of approximately 5.2 parking bays per 100m^2 of land use. This is compared to the New South Wales Roads and Traffic Authority (RTA) Guide to Generating Traffic Developments which recommends a minimum rate of 4.1 spaces per 100m^2 for larger shopping centres (>30,000 gross leasable floor area).

2.1.5 Car Parking Controls

The car parking at the Centre is currently managed using the following strategies:

- Time Limited Parking
  - All public car parks within the Development have a 4-hour (4P) time limit. This is managed and administrated by shopping centre parking rangers who patrol the car parking areas and issue fines to cars which exceed the 4P time limit.

- On-street parking is permitted on the northern side of Davenport Street, with no time limit. Parking is not permitted on the road or verge on the Centre side of any of the other surrounding roads of the Centre (Karrinyup Road, Francis Avenue and Burroughs Road). Within 400m of the Centre, there are generally no other parking restrictions on public roads with the exception of no standing zones within the minimum required distance from intersections.

- Staff Parking
  - Car parking areas within the Centre that are in the most inconvenient location for visitors are allocated to staff for long term parking, i.e. near the existing petrol station, with each bay marked by a yellow dot. Staff parking is enforced using car number plate recognition. The number plates of all staff car parking bays are compiled from all cars parked in the staff parking bays that stay at the shopping centre for more than four hours. All areas outside the staff parking area are checked twice a day, once in the morning and again in the afternoon, representing a 4-hour time frame. If staff cars are found outside the staff parking area they receive a breach notice. The program has historically been a great success with the prime parking bays located undercover and/or outside the major stores remaining free for customer use.

- Peak Shopping Periods
  - During peak shopping periods, for example pre-Christmas week, there is a current arrangement with the City of Stirling and nearby local schools to allow staff to park at nearby reserves and school ovals. Shuttle buses are provided to transfer staff to and from the Development where these parking areas are out of walking distance range.

There is some existing static wayfinding signage throughout the Centre car parking, generally directing vehicles to major stores and undercover or decked parking areas (refer to Figure 2-6).

Figure 2-6 Examples of existing wayfinding signage

2.1.6 Bicycle Parking

A minimal amount of existing public bicycle parking is available at some of the main entrances to the Centre (refer to Figure 2-7). There are limited end of trip facilities within major tenancies and there is currently no centre wide facility.

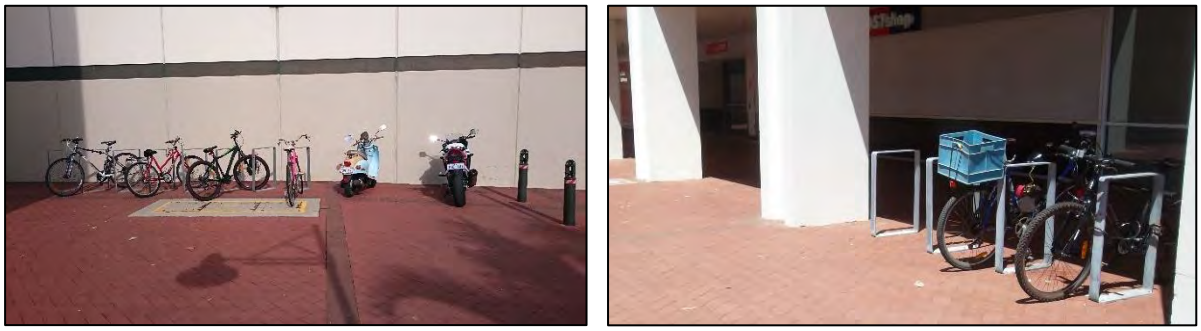

Figure 2-7 Existing bicycle parking racks at the main entrances to the Centre

2.1.7 Public Transport Access

Bus services are available direct to the Karrinyup Bus Station, primarily accessed via Karrinyup Road. Referring to Figure 2-8, the Karrinyup Bus Station currently provides standard bus shelters at each stand, consisting of a roof, seating and side panels that offer limited protection from sun, wind and rain. The provision of information at the bus station is limited to the stand specific route and timetable information on stand number signs.

A car park circulation road, with a zebra crossing, separates the bus station from the main pedestrian entrance to the Centre.

Figure 2-8 Existing bus shelter (left) and road crossing from the bus station to access the main Centre entrance (right)

The Karrinyup Bus Station is currently used by five bus services, with the routes of these services connecting to the surrounding area as shown in Figure 2-9.

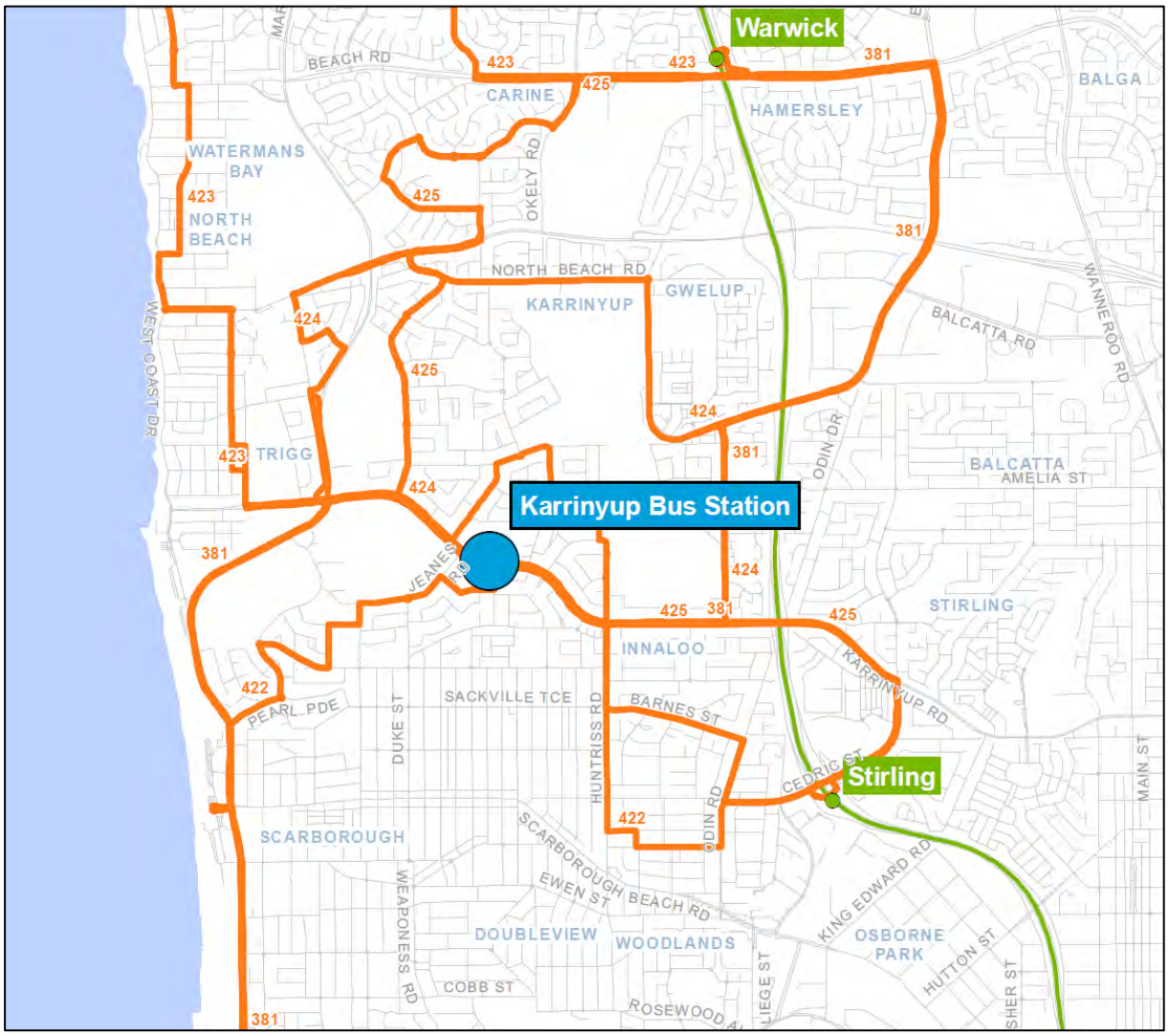

Figure 2-9 Bus routes to/from the Centre

Direct bus access from Karrinyup Bus Station is available to Scarborough Beach as well as a number of train stations including Stirling, Warwick and Fremantle. Weekday peak headways for these bus services range from 15 minutes to 2 hours, however the peak services align with the commuter peak in the early morning and late afternoon which in general does not coincide with peak customer shopping hours for the Centre.

Most off-peak weekday schedule services run hourly or twice per hour. However, the busiest times for the Centre are during weekends and in general weekend bus service frequencies are very poor, typically hourly or even none for some services.

A summary of bus services is listed below:

- **Route 423** is the most frequent route and operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. During the weekday peak periods, the service runs at headways of approximately 10 to 20 minutes, and 30 minutes during off-peak and Saturdays. During Sundays and Public Holidays, the 423 service runs hourly.

- **Route 425** operates between Stirling Station and Warwick Station via Karrinyup Bus Station at approximately 15–20-minute intervals during the weekday peak periods and 30 minutes during the off-peak. On Saturdays, Sundays and Public Holidays, the 425 operates at hourly intervals.
- **Route 422** operates between Stirling Station and Scarborough Beach via Karrinyup Bus Station every 20 to 30 minutes during the weekday morning peak period and hourly during the weekday off-peak, afternoon peak and Saturdays. The service does not run on Sunday or Public Holidays.
- **Route 424** operates between Stirling Station and Karrinyup Bus Station every 20 minutes during the weekday morning peak period and every 30 minutes during the afternoon peak period. During the weekday off-peak and Saturday, the 424 operates at hourly headways. The service does not operate on Sundays and Public Holidays.
- **Route 381** operates between Karrinyup Bus Station and Fremantle Station. This service only runs twice a day during the weekdays, departing Karrinyup Bus Station at 7:10 AM during the morning, and during the afternoon, the service departs Fremantle Station at approximately 5:10 PM.

Passenger numbers were studied as part of the Mixed Use Expansion at Karrinyup Transport Plan (Aurecon, December 2016) by obtaining SmartRider data for the Karrinyup Bus Station. The peak period for bus patronage on Saturday was similar to the weekday AM and PM peak periods which indicated that it is mainly employees that are using public transport to commute to and from work, and there is currently limited use of public transport by customers.

Overall, the current bus services seem to be aimed at commuters travelling to and from the Perth CBD via Warwick and Stirling train stations or school children, with access to the Centre not being a key focus of the services. It is apparent that there is currently minimal public transport infrastructure to support higher frequency services to Karrinyup and encourage increased patronage.

2.1.8 Cycling Access

The facilities and opportunities for direct bicycle access to the Centre are poor.

Referring to Figure 2-10, a number of existing PBN routes are located in close proximity to the Centre with connecting ‘local bicycle friendly streets’ (good road riding environment) including:

East-West Routes

- PBN Route NW7 to the north of the Centre providing an east-west connection between Marmion Avenue and the Mitchell Freeway Principal Shared Path (PSP), encompassing College Court, Axbridge Street, Pascoe Street and Porter Street
- PBN Route NW8 to the south of the Centre providing an east-west connection between West Coast Highway and the Mitchell Freeway PSP, encompassing Sackville Terrace and Barnes Street

North-South Routes

- PBN Route NW2 to the west of the Centre providing a north-south route parallel to the coastline and connecting to Marmion Avenue
- PBN Route NW1 to the east of the Centre providing a north-south route between Pascoe Street and Barnes Street, encompassing Finnerty Street, Huntriss Road, Norman Street, Decima Street, Birdwood Street, Satin Way, Langley Crescent and Crocker Road
- Mitchell Freeway PSP located approximately 1.7 kilometres to the east of the Centre

Local Bicycle Friendly Streets

- Jeanes Road between Deanmore Road and Karrinyup Road
- Newborough Street between Elliott Road and Grand Promenade
- Burroughs Road between Karrinyup Road and Pascoe Street

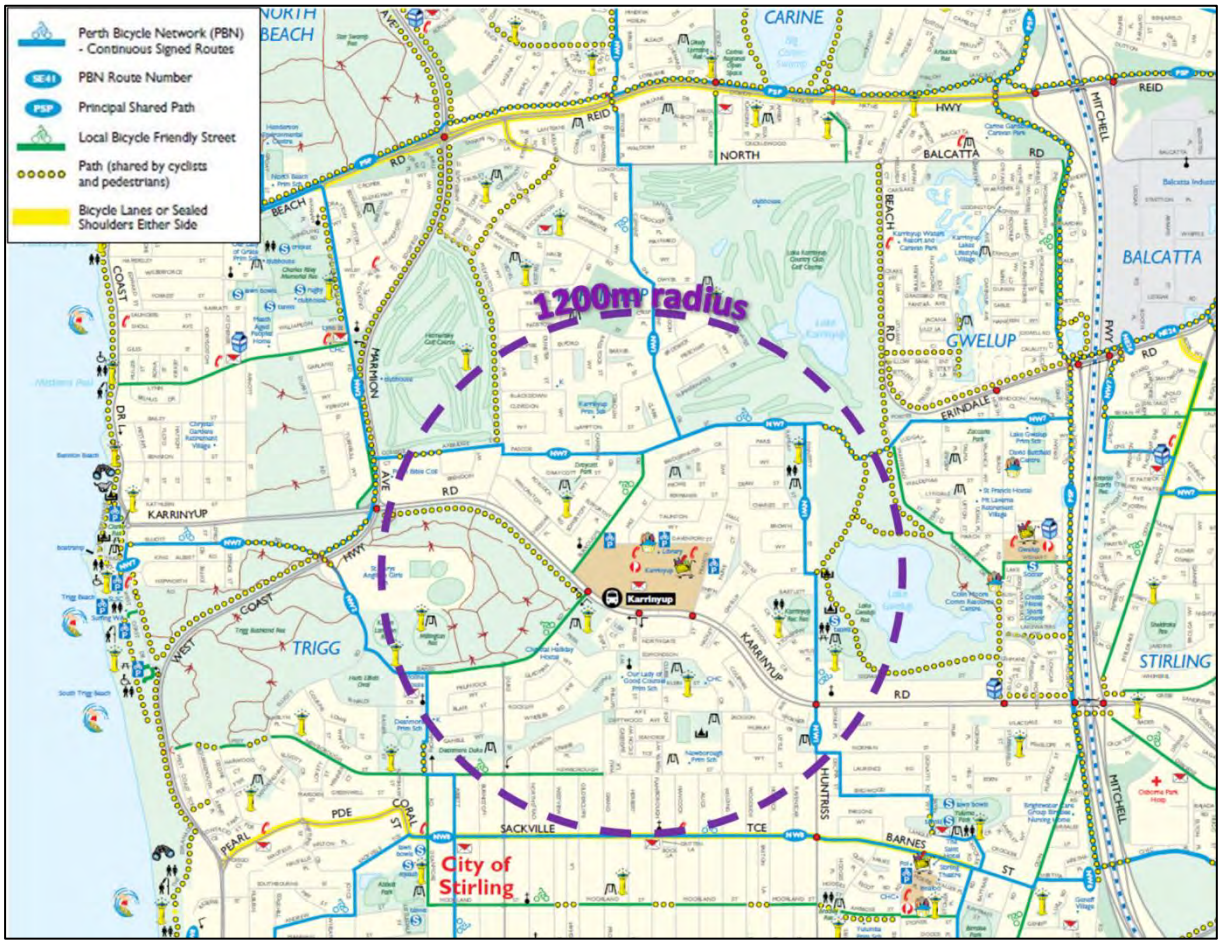

Figure 2-10 Bicycle network surrounding the Centre (Department of Transport, 2014)

In terms of the above mentioned strategic cycling routes, many are within one kilometre of the Centre and have the potential to provide good connectivity, however currently there isn't any dedicated cycling infrastructure (i.e. cycle lanes or paths) along many of these routes to support connections.

Referring to the Department of Transport TravelSmart Map (see Figure 2-10), the road network surrounding the Centre has dedicated bicycle infrastructure in the following locations:

- Shared path along West Coast Highway and Marmion Avenue
- Shared path along Karrinyup Road between West Coast Highway and Jeanes Road
- Bicycle Lane / Sealed shoulder along Pearl Parade, Coral Street, Sackville Terrace and Barnes Street (between West Coast Highway and Odin Road)
- Shared path around Lake Gwelup connecting to the principal shared path along Mitchell Freeway via North Bead Road and Karrinyup Road

From the above list, the only dedicated bicycle infrastructure providing direct access to the Centre is via the shared path along Karrinyup Road to the west of the Centre, although the width of the path is narrower than Austroads Guidelines and is not signed. From both the north and south, there is potential for the key cycling routes along West Coast Highway / Marmion Avenue and the Mitchell Freeway PSP to provide connectivity to the Karrinyup area. Direct access to the Centre from these major strategic routes is limited, and is primarily via non-dedicated cycling routes through residential areas.

2.1.9 Pedestrian Access

The Centre is situated within a large residential area, with many residents within walking distance. Walking access to the Centre is predominantly accommodated on footpaths and shared paths along the adjacent and surrounding road network. The surrounding road network has footpaths alongside the majority of directly accessible routes. The roads without footpaths tend to be lower order residential access routes, and generally do not present a safety concern for pedestrians due to low traffic volumes and generally low operating speeds. The walkable catchment (800m) is shown in Figure 2-13.

The main concerns for access on foot are the crossing of major roads, in this case Karrinyup Road, in terms of safety and time delays. There are currently three signalised crossings on Karrinyup Road giving safe and direct access to the Centre, namely at Jeanes Avenue, Francis Avenue, and the dedicated pedestrian crossing just east of Miles Street (see Figure 2-11). A continuous footpath also extends around the perimeter of the Centre, although most crossings are not Disability Discrimination Act (DDA) compliant.

Access to the pedestrian entrances to the Centre includes direct entrances into the Centre and also direct entrances into the shops themselves i.e. Myer and David Jones. Direct walking access to the entrances are provided from Karrinyup Road (via the Karrinyup Bus Station and signalised pedestrian crossing), and Francis Avenue (direct access to David Jones). Elsewhere, the customers are mostly expected to walk through car parks, whether they are walking from their cars or from the street, this increases the number of conflict points between cars and pedestrians (refer to Figure 2-12).

Figure 2-11 Signalised pedestrian crossing on Karrinyup Road

Figure 2-12 Example of poor pedestrian access from car parking

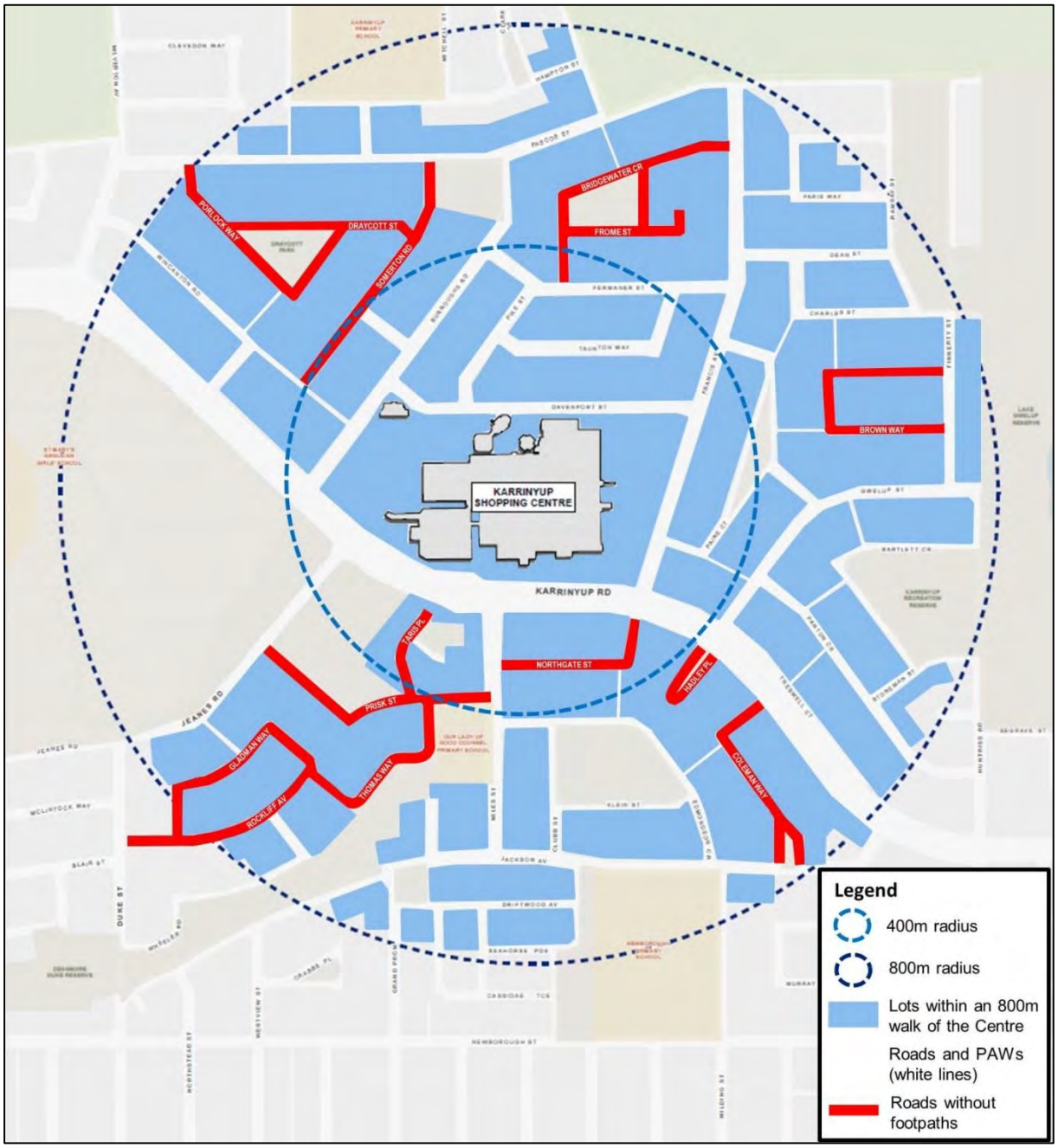

Figure 2-13 Walkable catchment

2.2 The Future Shopping Centre

2.2.1 Preamble

The mixed use expansion at Karrinyup was approved in August 2016, allowing the site to increase its retail footprint, and include additional office, community and residential floor space.

2.2.2 Land Use

The approved Centre is shown in Figure 2-14. The retail floor space of the Centre is approved to increase from approximately 54,000 m^2 in retail to 93,355 m^2 on completion. There are also proposed increases in office/business, entertainment/community and health floor space, and provision for residential dwellings within the Centre (refer to Table 2-3).

Table 2-3 Approved land use for the Karrinyup Centre

Land Use Type	Existing Floor Space, m^2 (2011)	Approved Floor Space (m^2 NLA)
Retail	53,544	93,355
Office / Business	4,184	10,394
Eating / Entertainment / Culture	2,382	3,916
Community / Health / Welfare	706	2,654
Other Incidental Floor space	195	300
Cinema	-	6,200
Total:	**61,011**	**116,819**
Residential Dwellings	**-**	**134**

The approved Centre consists of the following:

- Four (4) consolidated pedestrian access points ("gateways") to the retail core of the Karrinyup Centre; North Gate, South Gate, East Gate and West Gate.
- Establishment of a pedestrian friendly 'main street' as an extension of Jeanes Road.
- Development of the existing Bankwest site on the northern side of the Centre to include retail floor space
- Multi-level car parking with a total of up to 4,880 bays (including general vehicles and parking for the mobility impaired), split between the eastern and western sides of the Centre.
- Revised road accesses into and throughout the Centre, ensuring the road network performs adequately.
- Upgrades to numerous intersections in the wider road network surrounding the Centre to improve access.

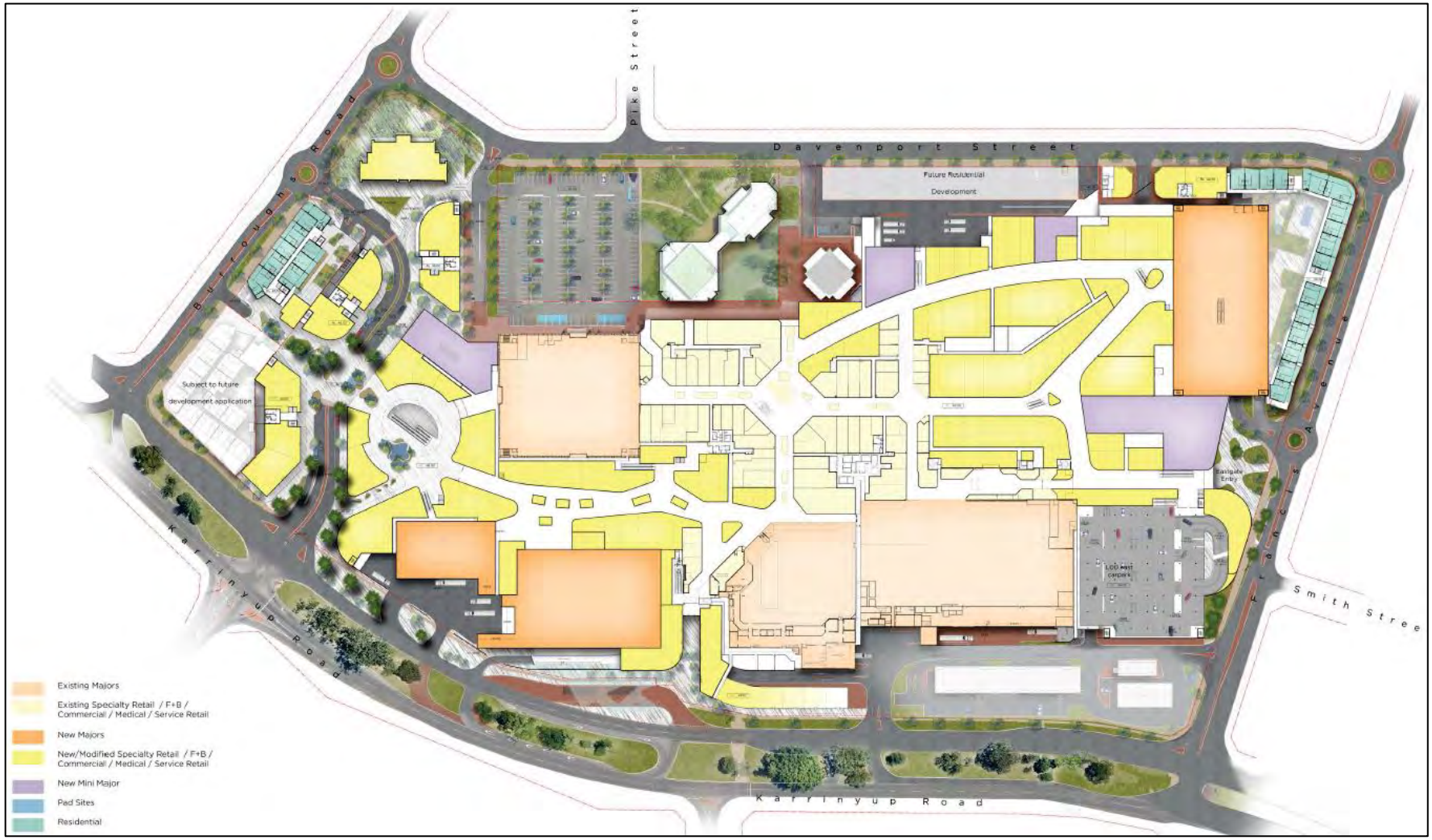

Figure 2-14 Approved Mixed Use Expansion at Karrinyup (ground floor)

2.2.3 Travel Mode Share Targets and Trip Generation

Predicting travel behaviour in the future is challenging. Travel behaviour is guided by the attractiveness of each mode of transport which in turn could be heavily impacted by multiple factors, some of these include:

- Transport technology development, i.e. connected vehicles, autonomous vehicles, electric bikes (e-bikes);
- Future fuel and battery prices;
- Time cost of travel, i.e. preference to use phones/tablets/laptops whilst travelling;
- Society trends, i.e. the perceived status in society of each mode;
- Climate change impacts on active transport;
- Transport industry disrupters such as Uber and UberEATS; and
- External and internal infrastructure future capacity.

This plan will be used to monitor travel behaviour, and as such it is important that targets related to travel behaviour are specified so that they can be tracked against collected data. Two future mode share targets are proposed:

- Customer Mode Share Split – These are aligned to the overall mode share targets proposed in the Transport Plan.
- Staff Mode Share Split – These are based on the overall mode share targets with adjustments to align to desired staff travel behaviour

The proposed mode share targets are described below, along with the associated trip generation for each mode. The relationship between the trip generation and parking demand is discussed in Sections 5.2.2 and 5.2.3 (Car Parking Controls). The success of achieving the mode share targets will be driven by parking controls to ensure that private vehicle travel is not incentivised.

2.2.1 Mode Share Targets – Customer

The assumed customer mode share targets are aligned with the targets identified in the Mixed Use Expansion at Karrinyup Development Application Transport Plan. The travel mode share goal was based on an estimate that, by 2021, 5% of people accessing the Karrinyup Shopping Centre will shift from private motor vehicle to other modes of transport and by 2031, 10% will shift to other modes. In its entirety, trips associated with all modes will increase as a result of the Centre. Modal split targets for the horizon years 2021 and 2031 are shown in Figure 2-15.

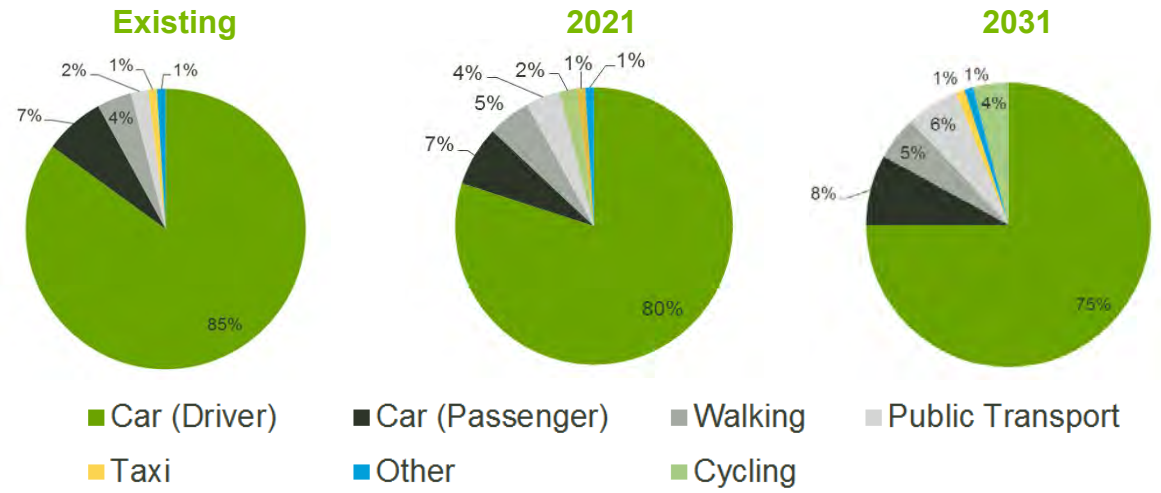

Figure 2-15 Mode share targets for the Centre

Considering the mode share targets for private vehicle access to the Centre, the number of trips for each mode was calculated using the current and target mode splits. These trip numbers are shown in the tables below for each peak hour period.

Table 2-4 Number of trips during weekdays AM and PM peak hours and Saturday peak hour - Existing situation

Existing	Target	AM Peak	PM Peak	Saturday Peak
Car Driver	85%	1,347	2,766	3,570
Car Passenger	7%	111	228	294
Public Transport	2%	32	65	84
Cycling	1%	16	33	42
Walking	4%	63	130	168
Taxi	1%	16	33	42
Other	0%	0	0	0
Total Trip Generation		**1,585**	**3,254**	**4,200**

Table 2-5 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – 2021

2021	Target	AM Peak	PM Peak	Saturday Peak
Car Driver	80%	1,533	3,448	4,212
Car Passenger	7%	134	302	369
Public Transport	4%	77	172	211
Cycling	2%	38	86	105
Walking	5%	96	215	263
Taxi	1%	19	43	53
Other	1%	19	43	53
Total Trip Generation		**1,917**	**4,309**	**5,265**

Table 2-6 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – 2031

2031	Target	AM Peak	PM Peak	Saturday Peak
Car Driver	75%	1,533	3,932	4,683
Car Passenger	8%	164	419	500
Public Transport	6%	123	315	375
Cycling	4%	82	210	250
Walking	5%	102	262	312
Taxi	1%	20	52	62
Other	1%	20	52	62
Total Trip Generation		**2,044**	**5,243**	**6,244**

From the analysis, the peak demand for the car parking is expected to occur in 2031 during a Saturday midday peak period. Comparing the expected number of vehicle trips to the availability of parking is dependent on the average duration of stay. It is anticipated that with the variable message boards displaying the parking bay availability prior to vehicles arriving to the centre, if no bays are available then drivers will move to another Centre.

The values provided in the above tables are calculated from estimated projections of current trends. Relating back to the factors which will influence travel behaviour in the future, the key aspect which is estimated to impact the parking are drop-off trips. Uber is the current example of this, where people travel to an attractor by car but are simply dropped off within the site and the vehicle leaves without ever occupying a parking bay. As the payment occurs automatically, the drop off is also informal and quick. It is anticipated that autonomous vehicles, which are estimated to be on-street by the time the Centre development is complete, will behave in the same manner as Uber vehicles but run an even cheaper drop off service, with no demand on parking bays.

2.2.1 Mode Share Targets – Staff

A strong focus of the PMTP is to encourage travel behaviour change for staff at the redeveloped Centre. By 2031 it is anticipated that the Centre may have up to 1,300 employees. There is no information available regarding the existing mode share for staff, and as such the staff mode share targets in Figure 2-16 have been estimated based on increased public and active transport mode share compared to the overall mode share targets.

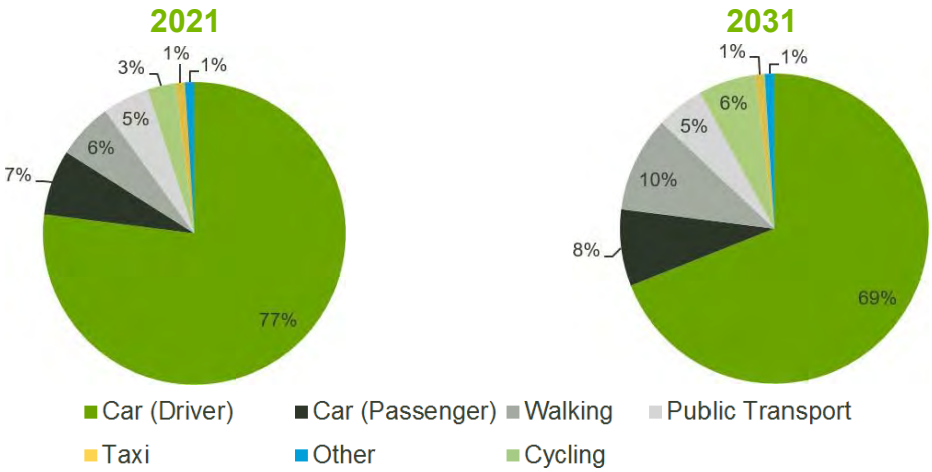

Figure 2-16 Staff mode share targets for the Centre

By applying the estimated staff mode splits to the estimated number of employees (assuming that this will be the worst case scenario), the estimated number of trips on one day for each transport mode is shown in Table 2-7.

Estimated Staff Trips

A strong focus of the PMTP is to encourage travel behaviour change for staff at the expanded Centre. By 2031 it is anticipated that the Centre may have up to 1,500 employees. By applying the Centre mode splits to the employee numbers only, the estimated mode share targets for each transport mode shown in Table 2-4.

Table 2-4 Expected staff mode share targets

Targets	Measurement		
	2011 (actual)	2021 (target)	2031 (target)
Estimated number of staff arriving by car as the driver	595	1001	897
Estimated number of staff arriving as a car passenger	56	91	104
Estimated number of staff arriving by public transport	14	65	65
Estimated number of staff arriving by walking and cycling	35	117	208

Taking into consideration the proposed mode share target of 6% for cycling in 2031, it can be assumed that at least 76 employees will use the end of trip facilities. The proposed size of end of trip is therefore more than sufficient. Additional capacity is available within the Centre facilities which can cater for the anticipated increase in popularity of e-bikes as they potentially become cheaper in the medium to long term future. Since cycling on an e-bike is easier than using a traditional bicycle, particularly on steeper gradients such as those found in the surrounding Karrinyup road network, it is possible that a significant uptake in the use of e-bikes may occur and lead to an increase in the number of cycle trips to the Centre.

With the proposed significant upgrades in public transport infrastructure and the public's changing perception of travel by public transport in WA, it is anticipated that the estimated number of staff arriving by public transport will also increase in the future.

The relationship between the trip generation and staff parking demand is discussed further discussion in Section 5.2.3 (Staff Parking Controls).

2.2.2 Mode Share - 2024 Update

A mode split survey was undertaken in October 2024 and this data is shown below. The data was aligned to vehicle counts and public transport data. For other modes in the AM and PM periods, the full day mode split was used. The 2024 mode share splits show an improvement compared to prior to the redevelopment and also compares well to the targets set in the 2019 Parking Management & Travel Plan.

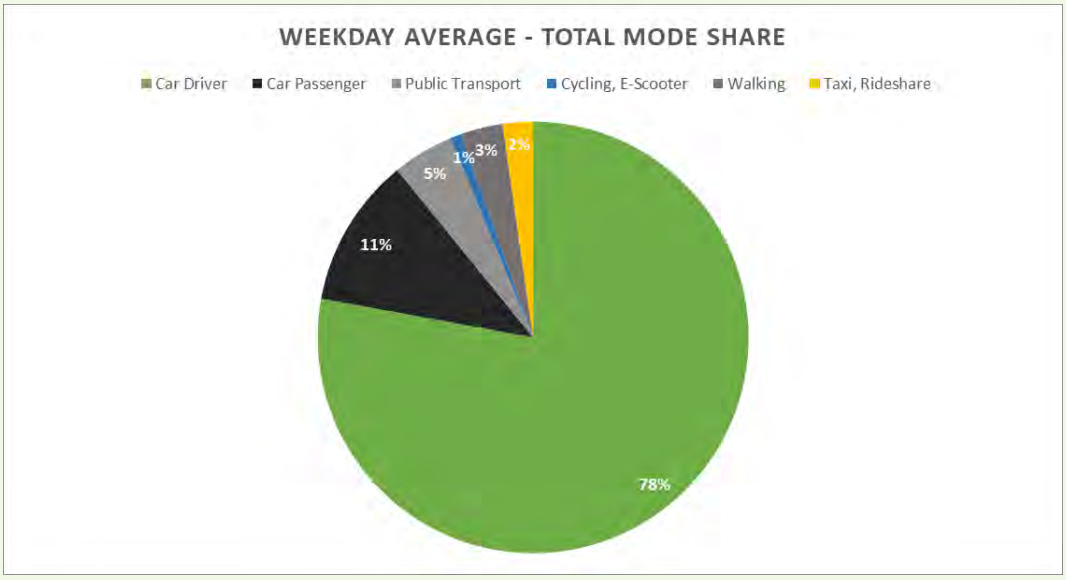

Figure 2-17 Average mode share - 2024 Thursday weekday

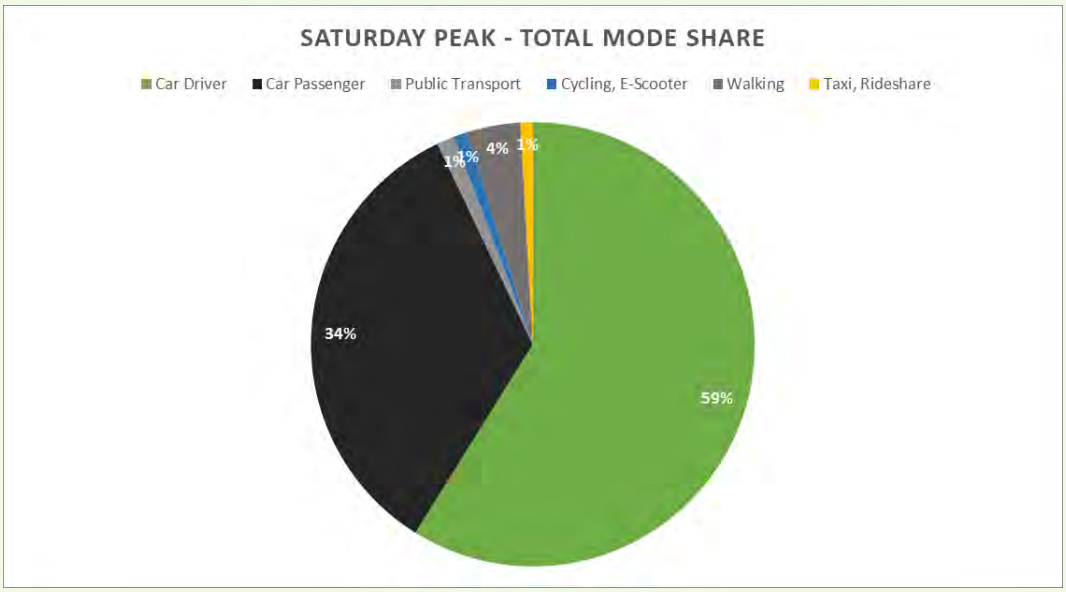

Figure 2-18 Average mode share - 2024 Saturday Peak

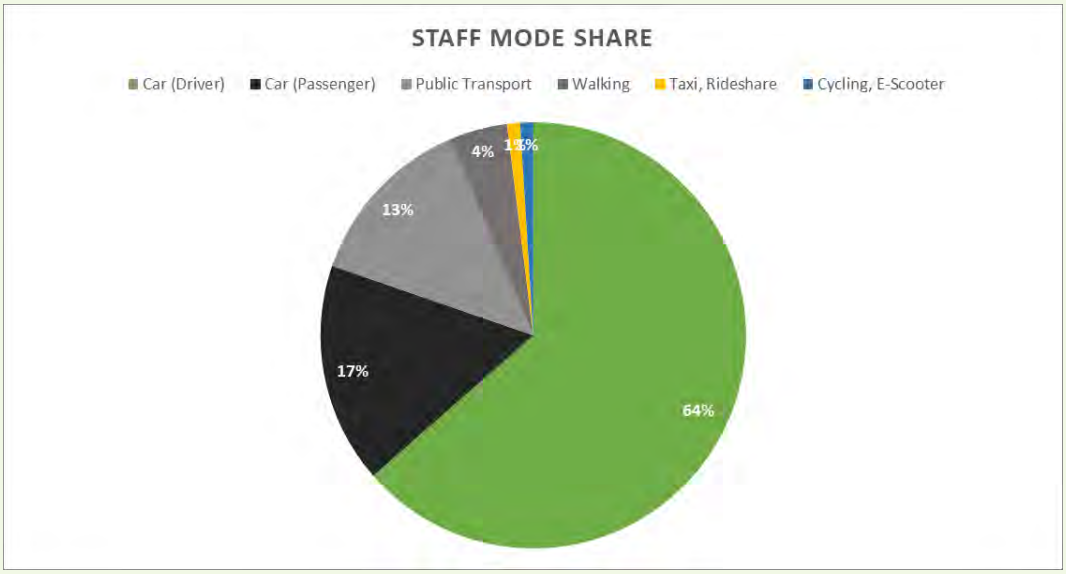

Figure 2-19 Staff Mode Share - 2024

2.2.3 DA Conditions

Table 2-5 outlines the DA conditions to be satisfied that are relevant to the PMTP.

Table 2-5 DA Conditions relevant to the PMTP

DA Condition		Relevance
3	Prior to the commencement of site works for the centre, a Parking Management Plan shall be submitted to and approved in writing by the City of Stirling, upon advice from the Department of Transport. The approved parking management plan shall be implemented with the commencement of use of the expanded retail centre.	Requires this document to be approved and relevant components implemented before the site works commence.
4	Prior to the occupation of the development, a Travel Behaviour Change Plan particularly targeting centre employees but also customers, is to be approved, implemented and reviewed as required to the satisfaction of the City of Stirling on the advice of the Department of Transport.	Requires this document to be approved and relevant components implemented before the redeveloped site can be opened.
5	End of Trip bicycle facility(s) to include a total of 200 secure and covered bike racks and lockers for staff is to be designed and supplied to the satisfaction of the City of Stirling. A total of 160 customer bike racks are to be distributed in key locations around the site including the provision for at least 30 bikes being provided at each major ground floor entrance and at least an additional 20 being provided on the main street.	This document takes into consideration Condition 5.
11	Detailed design of Francis Street and Burroughs Road is to be submitted to the City of Stirling for approval prior to the commencement of development. The design shall generally be in accordance with plans 239230-9 and 11 of the transport Plan prepared by Aurecon dated 15 June 2015, including the changes marked in red (attached) and shall generally include the following:- a. 3.0m lane widths, 2.2m wide parking bays only on the shopping centre side of the road, 2.0m cycling separator, 3.0m dual way cycling lane and 4.3m wide footpaths only on the shopping centre side of the road; b. Public access easements to be provided for all footpaths and/or paved areas abutting the road reserve within private property; c. The finish of the footpaths and/or paved areas to be seamless between public and private areas; d. The surface finish of the traffic lanes, to the satisfaction of the City; e. 40km/h design speed; f. Two priority pedestrian crossings aligning with entrances to the shopping centre; g. Platanus acerifolia (London Plain Tree) shall be planted a minimum 11m apart, with trees between every second on-street car bay in a minimum 2.0m wide planting nib; h. Pyrus calleryana cultivars (ornamental pear tree) shall be planted at 5.0m spacing on footpaths; i. All street tree plantings must be located to ensure adequate sightlines are maintained; j. All landscaped areas are to be reticulated;	This document takes into consideration the parking requirements of Condition 11.

DA Condition		Relevance
	k. Street lighting is to be upgraded to suit the new Francis Street and Burroughs Road in compliance with Australian Lighting Standards and to the satisfaction of the City; l. New or modified roads shall be drained in accordance with water sensitive urban design principles and/or the major / minor drainage philosophy; m. All signing and lining requirements are subject to Main Roads WA standards and approvals; and n. Footpaths shall be paved with rectangular pavers (600mm x 300mm) format exposed aggregate concrete unit paver with milled finish. Charcoal colour with 5mm diameter bluestone and rainbow quartz aggregate mix Urbanstone 'Golden Gunmetal' or approved equivalent. The works for Francis Street and Burroughs Road shall be undertaken in accordance with the design approved by the City.	
12	Detailed design of Davenport Road is to be submitted to the City of Stirling for approval prior to the commencement of development. The design shall generally be in accordance with plan 239230-10 (attached) including the changes marked in red and is to generally include the following:- a. 3.0m lane widths, 2.2m wide parking bays only on the shopping centre side of the road, 2.0m cycling separator, 3.0m dual way cycling lane and 4.3m wide footpaths only on the shopping centre side of the road; b. Public access easements to be provided for all footpaths and/or paved areas abutting the road reserve within private property; c. The finish of the footpaths and/or paved areas to be seamless between public and private areas; d. The surface finish of the traffic lanes, to the satisfaction of the City; e. 40km/h design speed; f. Two priority pedestrian crossings aligning with entrances to the shopping centre; g. Platanus acerifolia (London Plain Tree) shall be planted a minimum 11m apart, with trees between every second on-street car bay in a minimum 2.0m wide planting nib; h. Pyrus calleryana cultivars (ornamental pear tree) shall be planted at 5.0m spacing on footpaths; i. All street tree plantings must be located to ensure adequate sightlines are maintained; j. All landscaped areas are to be reticulated; k. Street lighting is to be upgraded to suit the new Davenport Road in compliance with Australian Lighting Standards and to the satisfaction of the City; l. Water sensitive urban design (WSUD) principles to be incorporated into street drainage and streetscapes shall include but not be limited to tree pits and/or rain gardens to reduce stormwater runoff and increase at source infiltration; m. All signing and lining requirements are subject to Main Roads WA standards and approvals; and n. Footpaths shall be paved with rectangular pavers (600mm x 300mm) format exposed aggregate concrete unit paver with milled finish. Charcoal	This document takes into consideration the parking requirements of Condition 12.

DA Condition		Relevance
	colour with 5mm diameter bluestone and rainbow quartz aggregate mix Urbanstone 'Golden Gunmetal' or approved equivalent. The works for Davenport Road shall be undertaken in accordance with the design approved by the City.	
27	A detailed design of the Main Street is to be submitted to the City of Stirling for approval prior to the commencement of development. The design shall be generally in accordance with the road typologies contained with Part 5.2 of the Transport Plan (Attachment 18), and shall include:- a. 3.0m lane widths, 2.4m wide parking bays and a pedestrian footpath; b. The finish of the footpaths and/or paved areas to be seamless between public and private areas; c. The surface finish of the traffic lanes, to the satisfaction of the City of Stirling; d. 30km/h design speed, 20km/h posted speed, with a reduced a 10km/h shared zone for the piazza; e. Accommodation of a 12.5m long Single Unit Truck; f. Landscaping, paving and street furniture in accordance with the Landscaping Plan; g. Street lighting is to be upgraded as needed in compliance with Australian Lighting Standards and to the satisfaction of the City of Stirling;	This document takes into consideration the parking requirements of Condition 27.
38	Further to Condition 5, the end of trip facilities for the non-residential development shall include a minimum of 20 showers and changing facilities. Detailed drawings identifying the location of all bicycle parking bays, lockers and showers shall be submitted to the City for its approval and be provided prior to the commencement of development in accordance with the approved detailed drawings to the City's satisfaction.	This document takes into consideration Condition 38.
44	A maximum of 4,880 car parking bays shall be provided and reserved as public parking bays, to the satisfaction of the City of Stirling.	This document takes into consideration Condition 44.
45	A minimum 50 motorbike parking bays shall be provided on site prior to occupation of the development, to the satisfaction of the City of Stirling.	This document takes into consideration Condition 45.
49	The car parking bays, driveways and access points shown on the approved plans shall be designed, constructed, drained and marked in accordance with the Australian Standard for Off-street Car Parking (AS/NZS2890.1), Off-street Parking for People with Disabilities (AS/NZS2890.6) and Off-street Commercial Vehicle Facilities (AS2890.2), prior to occupation of the development. A detailed design addressing this condition is to be submitted to the City of Stirling for approval prior to commencement of development or alternatively the applicant may provide certification from a suitably qualified engineer that compliance with this condition has been achieved. These bays are to be thereafter maintained to the satisfaction of the City of Stirling.	This document takes into consideration Condition 49.
66	A minimum of six visitors bicycle parking bays are to be provided for the eastern multiple dwelling building, and a minimum of three visitors bicycle parking bays for the western multiple dwelling building, in locations to the satisfaction of the City prior to the occupation of the development.	This document takes into consideration Condition 66.

3 Objectives

The PMTP requires clear and practical objectives to guide the proposed management and supply of parking spaces and promotion of alternative travel modes.

The objectives of the PMTP are shown below:

1. To increase the mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking;
2. To minimise local congestion and associated impacts on the community and the environment, particularly at peak times;
3. To optimise the parking operations and make efficient use of parking bays to support access for staff and customer;
4. To manage and prioritise the allocation of more convenient parking spaces to favour higher-priority customers, including people with disabilities, parents with prams and the elderly; and
5. To enhance staff health, wellbeing and productivity.

4 Strategies

This section outlines the proposed strategies to meet the objectives of the PMTP. This section also explores some of the issues and potential opportunities relating to parking management and travel behaviour at the Centre, as well as how good practice examples have been considered in the development of the strategies.

4.1 Issues and Opportunities

The following issues and opportunities applicable to the Centre have been identified.

1. **Customer Access**

   With the Centre's major function to attract and provide retail services to its customers, it is common for customers to purchase goods which require storage during their departure journeys. For this reason for some trips alternative travel modes (public transport, cycling and walking) do not provide enough flexibility and are therefore not practical.

   In addition, the current levels of parking provision on the site are relatively high compared to other shopping centres.

   As a result, the shopping centre has historically been accessed predominantly by private vehicles which is challenging to curtail. Nonetheless, with the development of the Main Street and activation of the Centre after normal trading hours, there is expected to be an increase in social and recreational trips which provides opportunities to increase mode share by alternative transport options.

2. **Staff Access**

   A considerable volume of staff the access the Centre on a daily basis. Unlike customers, the primary purpose of staff is to provide services, and so they are less likely to require storage of items during their journeys. There is therefore a distinct opportunity to target and influence the travel behaviour of staff away from single occupancy private vehicles. The provision of secure end of trip facilities should be addressed as well as improved public transport services for key commuter periods to the Centre.

   This will nonetheless remain a challenge, with major stores tending to have a higher proportion of part-time and casual staff who are typically more difficult to engage.

3. **Peak Hour Access**

   Another issue to consider is the difference between peak hour volumes (during late night shopping and weekends) and off-peak times. This can result in the Centre car parking being particularly underutilised during off-peak periods. With the development of the Main Street to including small businesses such as restaurants and other entertainment areas and possible change to the overall trading hours of the Centre, this will activate the Centre during non-peak hours and spread the parking utilisation across those times.

4. **Carpooling**

   With the redevelopment of the Centre there are opportunities to strengthen and encourage carpooling options for staff.

5. **Shared Use Bays**

   The redevelopment of the Centre will include the addition of mixed land uses, including office. As such, there is an opportunity to provide flexibility by allowing public use of these spaces where possible.

6. **Healthier Staff and Customers**

Active travel (or active transport) includes any travel mode that involves physical activity including walking, cycling, and any incidental activity associated with the use of public transport (Department of Transport TravelSmart Workplace fact sheet, 2013). Choosing to walk, cycle or catch public transport creates a multipurpose activity: travel and daily exercise. This plan this creates an opportunity to encourage staff to participate in regular physical activity, which has a range of health benefits. Poor employee health can significantly increase employer costs through a reduction in employee performance and productivity, more frequent absenteeism, higher accident and injury rates and associated rehabilitation and compensation costs (Department of Transport TravelSmart Workplace fact sheet, 2013). Increased health will also result from active travel by customers, which can enhance the general wellbeing within the community

An increase in walking and cycling also helps limit fuel emissions that impact on air quality, which can help avoid associated health effects.

7. **Community Liveability**

Physical activity helps expand social connectivity with friends and family, meet new people and have greater involvement with the local community (Department of Transport TravelSmart Workplace fact sheet, 2013). Therefore, encouragement in active travel will help activate the Centre, including the proposed main street.

Additionally, liveability is associated with the amenity of a place. High levels of vehicle traffic are attributed with visual, noise and sound pollution, which affect the amenity of a location. Replacing road traffic with active travel methods will help improve amenity of the Centre.

8. **Corporate Social Responsibility**

The PMTP aligns well with AMP Capital's corporate social responsibility values (i.e. environmental management, community investment, and people and workplace). Initiatives to encourage sustainable transport options is an important opportunity to practise these.

4.2 Consideration of Good Practice

As road congestion increases, the importance of providing alternate travel choices and influencing travel habits are becoming key areas of focus for improving the functionality of shopping centres around the world.

4.2.1 International Examples

Bluewater Shopping Centre Travel Plan

Bluewater Shopping Centre, a London centre, witnessed exceptionally low levels of staff driving to the centre (39%) because of an effective travel plan. It has a floor area of 155,700 m^2, over 13,000 parking spaces, and 75,000 to 130,000 visitors each day. It is located 35 km from London and previously was predominantly accessible by cars only.

Figure 4-1 Aerial view of Blue Water Shopping Centre, Kent, UK (source alamy.com)

The main focus of the Travel Plan was to manage parking and increase the use of Public Transport for accessing the centre. Some of the key measures undertaken are listed below:

- Public Transport Investment
  - Bluewater partnered with the bus operator to provide more services to the centre; and
  - A single simplified timetable leaflet was developed that detailed all bus routes with a series of line diagrams and information about “where from, where to, how often and how long it takes”.
- Cycling and Walking Access Improvements
  - Linkages to the cycle network and walking routes were created through all car parks; and
  - Additional cycle parking spaces were introduced, together with lockers, showers and changing facilities. There are two shops on the site that offer repairs.
- Staff Parking Management
  - Staff parking was initially separated from visitors with barriers and electronic tags to permit entry. CCTV and number plate recognition in visitor car parks made it possible to identify offenders; and
  - In 2000, this arrangement was replaced with the ‘red line rule’, whereby all staff are entitled to park, but must be ‘behind the red line’, which is six rows back from spaces closest to the buildings in the multi-storey car parks. This ensures priority for visitors.

- Information
  - A Travel Centre is located on site which provides advice and information on all travel modes; and
  - In December 2001 a 'TravelSense' newsletter was distributed to staff that provided information on all staff benefits and information such as the times of all the last buses from the site in the evening.

4.2.2 National Examples

Parking Management

A range of parking initiatives and new technologies are being implemented within shopping centres around Australia. Some examples of include:

- Chadstone Shopping Centre, Victoria – Variable message signs (VMS) have been introduced to provide guidance for drivers looking for spaces. These include real time information advising vacant spaces in different areas and green and red lights indicating where in rows vacant spaces are located.
- Macquarie Centre, NSW – Licence Plate Recognition (LPR) reads the license plate of each arriving vehicle and logs the time of entry. This is assigned with a parking ticket which is required for exit.
- Ocean Keys, WA – Park assist is used to guide customers to available bays using electronic signage.
- Rouse Hill, NSW – Allocated carpool bays are supplied in the car park. Staff can access information for carpooling via a carpooling database.
- Variable parking limits reflecting different types of customer demands, i.e. shorter time limits for parking closest to supermarkets. For example, Stud Park Shopping Centre in Victoria has branded 'Quikstop' parking allocated outside of the post office entrance, which has a five minute parking limit.
- Valet parking services are in operation at a number of centres (i.e. Macquarie Centre, Warringah Mall) which enhance the user experience, by eliminating the burden of navigating the centre for a carpark.
- Electric car charging stations are located at a number of centres.

Travel Planning

There are several examples of travel planning at shopping centres within Australia, with specific examples below.

- Rouse Hill was the first mixed use shopping centre in Australia to establish a comprehensive travel plan (commenced in 2007). Some of the measures implemented include:
  - Development of Walking and Cycling, and Transport Access guides;
  - Information Centre offers bus timetables and brochures, and its staff can provide customised information on bus times and trip planning;
  - Marketing of End of Trip Facilities (EOTF) and carpooling spaces;
  - Development of the 'Green Travel Club', a member ship group, which has a focus on educating staff as to the importance and benefits of using alternative modes of transport;
  - Promotion of events for 'healthy living' (i.e. Ride to Work Day); and
  - Advocacy and lobbying for improved sustainable travel options.

Figure 4-2 Rouse Hill Town Centre Walking and Cycling Guide (source RHTC.com.au)

- The Knox Shopping Centre Travel Plan aims to encourage a reduction in car trips and support an increase in the use of sustainable travel options to the activity centre, which comprises a shopping centre and entertainment precinct. Measures include:
  - Provision of sustainable transport information
    - Improvements to the shopping centre website;
    - Promotion to a VIP Club email list;
    - Maps and bus timetables and destination-specific information around the shopping centre;
    - Training of customer service staff to respond to travel questions;
    - Local access guides for cycling and walking;
    - Public transport campaign within the centre; and
    - Engagement with larger tenants (i.e. Myer, Coles, Kmart) to distribute information.
  - Development of an employee carpooling program
  - Targeting campaigns direct to households along the SmartBus route;
  - Installing end of trip facilities for employees;
  - Promoting Walk to Work and Ride to Work days;
  - Providing improved pedestrian and cyclist infrastructure and access through the shopping centre car parks; and
  - Partnering with Knox City Council and the Victorian Government. This was fundamental in obtaining funding which enabled the project to be implemented.

4.3 PMTP Strategies

A number of strategies are proposed to be adopted to manage the parking within and surrounding the Centre and achieve the proposed objectives of the PMTP. Of these strategies, some are designed to restrict and control where parking is permitted, while others are designed to enhance the user experience. These strategies aim to create an effective parking management system that maximises efficiency whilst promoting a mode shift towards sustainable transport options.

The strategies to be adopted to meet each proposed objective are described in the following tables.

Objective 1	To increase the travel mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking

Strategy 1 – Modify the balance of parking space numbers

- Reduce the overall parking rate from the current 5.2 bays per 100m^2 to 4.2 per 100m^2 of the proposed total floor space of the Centre. A reduction in the overall parking rate provides increased incentive for alternative transport modes.

2024 Update:

- This has been actioned in the development which was completed in late 2021

Strategy 2 – Increase attractiveness of alternative transport modes

- Improve pedestrian facilities to and within the Centre to encourage walking as a viable transport option, including the following:
  - Designing the upgraded Centre to incorporate four pedestrian gateways to the retail core of the development that are accessible from the footpath surrounding the Centre, making the Centre easier to reach from the surrounding residential catchment without needing to walk through car parking areas.
  - Upgrading the surrounding footpath on the side adjacent to the Centre to at least 2.0m and strengthening crossing points to provide safe links to the existing pedestrian network. This will facilitate walking movements to and from the Centre.
  - Contribute to the City to expand the extent of the wider local path network to provide a footpath on one side of local streets that do not currently have a footpath.
  - Contribute to the City to provide additional street trees to help shade those paths that are devoid of any street trees.
  - Providing appropriately located street furniture and trolley collection points to minimise distance goods need to be carried.
- Improve cycling facilities to and within the Centre to encourage cycling as a viable transport option, including the following:
  - Cycling infrastructure, in the form of on road/off road cycling facilities and/or development of a Safe Active Streets connecting from the Centre to the wider cycling network. This focuses on creating a legible, connected cycle network to the Centre for inexperienced cyclists who travel at speeds lower than 20km/h.
  - Introducing a large staff end of trip facility catering for 200 bicycle spaces, 200 lockers and showers. This facility will be free to use for all staff at the Centre. An additional 160 public bicycle spaces for visitors will be introduced and conveniently located at the four consolidated entrances to the Centre, including on the new main street.
- Improve public transport access to the Centre to encourage public transport as a viable transport option, including the following:

Objective 1	To increase the travel mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking

- Introducing bus priority infrastructure, in the form of bus lanes along Karrinyup Road to provide improved journey times and reliability for buses accessing the Karrinyup Bus Station. The bus lanes may also provide a visual incentive for general vehicles queued along Karrinyup Road to consider switching modes.
- Providing an increase in bus frequencies (connecting between Karrinyup Bus Station and Stirling Train Station), specifically during and on the shoulders of Centre open times on weekdays and weekends, to provide staff and visitors with a viable public transport option during peak shopping centre periods for a period of 7 years, starting during the construction stage. This will involve services relating to either or both the 423 and 425 routes with a goal of achieving 10-minute headways in the morning and evening Centre weekday peaks. During the weekends, movements will be on one route (Route 425), which will be more easily identifiable for Centre customers, with 15-minute headways on the shoulders of and during the weekend Centre opening hours. The final details of the provision of additional bus kilometres will be agreed with the Transport Portfolio.
- Providing real time information at the bus stops and within the Centre.
- Providing trolley collection points in close proximity to bus stops.

2024 Update:

- All of the above pedestrian facility improvements have been actioned as part of the recent development, completed in late 2021
- All of the above cycling facility improvements have been actioned as part of the recent development, completed in late 2021
- The changes to public transport access are as follows:
  - Bus lanes have been provided on Karrinyup Road
  - Bus frequency between Karrinyup Bus Station and Stirling Train Station has been increased
  - Physical timetable maps are provided at all concierge desks and QR codes are linked to existing digital wayfinding screens to access real time arrival and departure information
  - Trolley bays have been installed adjacent to the Karrinyup Bus Station seating area

Strategy 3 – Employ travel behaviour change initiatives to encourage sustainable transport and discourage private vehicle use

- Provide sustainable transport information as part of the physical information pack currently provided to new starters (Retail Handbook). This could include the following:
  - Active travel maps;
  - Bus timetable information;
  - Locating of bike parking and end of trip facilities; and
  - Locker application process and end of trip facility conditions of use.
  - Subsidised SmartRider cards to staff before the redeveloped centre opens.
- Organise active transport events to promote cycling and walking to work, such as:
  - Annual ‘bike to work’ and/or ‘walk to work’ days; and
  - Pedometer event or walking challenge.

Objective 1	To increase the travel mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking

- Become involved in the DoT's Your Move program, which includes:
  - Access to information relevant to travel plan initiatives for Centre Management and Tenants; and
  - Access to rewards and prizes to those staff share information regarding participation in sustainable travel related activities and events.
- Promote and advertise sustainable transport options (including walking, cycling and public transport facilities, carpooling) to the Centre via the following channels:
  - Social media and shopping centre website;
  - Live bus timetable stands at the Bus Station;
  - Digital in-centre screens with live bus timetable information and sustainable transport advertising;
  - Flyers at Customer Service desks, Taxi Lounge and free stands;
- E-newsletters to various online member databases; and Bicycle parking wayfinding signage.
- Promote and advertise sustainable transport options, targeting part time/casual staff via the following methods
  - Actively promoting sustainable transport options for part time/casual staff at tenant retail functions
  - Providing specific information useful for part time/casual workers in the Retail Handbook for new starters, i.e. student public transport focus (discount fares, routes to tertiary institutions)

2024 Update:

- The Karrinyup Retailer Handbook includes information for tenants and staff around public transport and end of trip facilities including bike parking.
- End of trip facilities and alternative access routes are frequently promoted through Retailer Newsletters and Retailer Briefings.
- Consideration is being given to a "Working at Karrinyup Guide" which will be issued to all staff working at Karrinyup. This will include comprehensive information.
- Karrinyup will join in the National Ride to Work Day starting in 2025. Participants will be rewarded with $10 "Lunch is on Us" vouchers to redeem within the centre at participating providers.
- Karrinyup will register with the DoT "Your Move" program. Consideration is being given to use surprise and delight "Lunch is on Us" vouchers for staff using public transport. This will also be promoted through targeted marketing at the Centre. DoT collateral will be requested to use throughout this marketing.
- Sustainable transport options to be featured more prominently on the centre website under "Getting Here", and included for major events to help customers plan their trip
- Abuzz bus station listing to include QR code that links to live timetable information.
- Marketing team to explore Instagram highlights to support sustainable travel

Objective 1	To increase the travel mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking

Strategy 4 – Monitor the staff and customer mode share in relation to mode share targets

- Continue to monitor customer mode share through the periodic customer surveys currently undertaken
- Periodically undertake a staff modal share survey (every two years for the first four years, and every four years thereafter) to understand change in travel behaviour and track performance against targets. This will also be used to monitor health and wellbeing for the Centre.

2024 Update:

- Questions around sustainable transport are regularly included in the GPT customer surveys of brand loyal customers who regularly visit Karrinyup
- Modal share surveys will be undertaken on an annual basis with results shared with centre staff in the centre retailer newsletter.

Strategy 5 – Introduce paid parking for staff

- Introduce paid parking for all staff to assist in managing travel demand and behaviour at the Centre.
- Futureproof the car park design to allow for paid customer parking to be introduced.
  - This includes the allowance for single lane ticketless entry and two-lane boom gate exits

2024 Update:

- Karrinyup will not be introducing paid parking for staff
- Whilst the Proponent has made provision for the paid parking system, it has not been implemented. Whilst GPT does intend to implement the system, it is not an appropriate time to do so as it will likely impact the surrounding streets and exacerbate existing parking problems that the Centre currently faces and create further challenges for the workforce given the current cost of living challenges.

Strategy 6 – Encourage Carpooling Trips

- Allocate carpooling bays within the Centre
- Promote carpooling for staff that live in close proximity to each other by providing information for carpooling via the Centre's communication channels

2024 Update:

- Consideration is being given to the trial of dedicated carpooling spaces at Karrinyup over the next 12 months
- Carpooling is being encouraged and communications around this are to be increased. Regular centre communications such as Retailer Newsletters and the upcoming Working at Karrinyup Guide will be used.

Objective 2	To minimise local congestion and associated impacts on the community and the environment, particularly at peak times

Strategy 1 – Minimise traffic congestion caused by drivers searching for car parks

- Introduce a parking detection wayfinding system to direct drivers to empty parking bays, including the following:
  - Wayfinding variable message signs (VMS) both within and surrounding the Centre;
  - Aerial parking detectors on undercover levels;
- Improve the existing shopping centre mobile phone application to provide public transport and parking information.

2024 Update:

- A parking wayfinding system has been introduced at Karrinyup
- There is no Karrinyup mobile app, however all relevant information is easily accessible via the Centre's website

Strategy 2 – Increase the attractiveness of alternative transport modes during commuter peak times

- As per the strategies outlined in Objective 1, Strategy 2, including:
  - Improving pedestrian infrastructure to and within the Centre to encourage walking as a viable transport option;
  - Improving cycling infrastructure to and within the Centre to encourage cycling as a viable transport option; and
  - Improving public transport access to the Centre with the introduction of bus priority infrastructure and increased peak bus frequencies to encourage public transport as a viable transport option.

2024 Update:

- The Retailer Handbook includes information on pedestrian and cyclist access to the Centre for all staff. The "Working at Karrinyup" guide will also include information on pedestrian access.
- The Karrinyup website is to be extended to include a digital map of footpaths and pedestrian crossings
- Cycling infrastructure and end of trip facilities have been provided. The end of trip facilities are located adjacent to Karrinyup Road with secure access to the Centre and amenities including showers and lockers. There is also a second facility behind the external dining precinct (West Deck). They are promoted through the Retailer Handbook, Retailer Newsletter and at all Retailer Briefing sessions
- Public transport access has been improved with bus priority infrastructure and increased peak bus frequencies

Strategy 3 – Effectively and safely manage demand during peak shopping periods

- Provide staff parking at nearby reserves and school ovals during peak shopping periods, in collaboration with City of Stirling and local schools.
- Provide a shuttle bus to transfer staff to and from the Centre where it is out of walking distance range.

Objective 2	To minimise local congestion and associated impacts on the community and the environment, particularly at peak times

2024 Update:

- Both of these measures have been actioned
- Two DAs have been recently lodged with the City of Stirling to continue to use school parking facilities on major key trading days

Objective 3	To optimise the parking operations and make efficient use of parking bays to support access for staff and customer

Strategy 1 – Maximise flexibility of the use of parking spaces

- Retain centre ownership of all car parking spaces to maintain ongoing control.
- Avoid designating car parks for individual tenants or staff (service delivery or special needs parking excepted)
  - Where designated office or similar parking is provided, allow public use outside of business hours by specific arrangement.

2024 Update:

- All of the above measures have been actioned

Strategy 2 – Monitor the use of car parking and effectiveness of controls

- Periodically review the parking utilisation at the Centre (especially by all-day commuters) using park assist technology to understand user trends.
- Periodically review the number of parking infringements at the Centre to monitor the success of enforcement procedures for both staff and visitors.

2024 Update:

- The above measures have been actioned
- The Centre engages TMS, an external parking company, to help enforce staff parking in staff areas. Fines are issued for any infringements

Objective 4	To manage and prioritise the allocation of more convenient parking spaces to favour higher-priority customers, including people with disabilities, parents with prams and the elderly

Strategy 1 – Prioritise the most convenient parking for customers rather than staff

- Designate parking closer to entrances as customer-only and restrict staff to parking in less central locations.
  - Disperse staff parking throughout the Centre car parks so that peak commuter traffic is distributed to various access points. This will assist in reducing the traffic impact on the surrounding road network during peak periods.
- Restrict employees from parking in customer-only spaces using enforcement strategies, such as the following step process:

Objective 4	To manage and prioritise the allocation of more convenient parking spaces to favour higher-priority customers, including people with disabilities, parents with prams and the elderly

- Compile the number plates of all cars parked in the staff parking bays that stay at the shopping centre for more than four hours.
- Check all areas outside the staff parking area twice a day, once in the morning and again in the afternoon, representing a 4-hour time frame. If staff cars are found outside the staff parking area they will then receive a breach notice.

2024 Update:

- The most convenient parking spaces are reserved for customers rather than staff
- Shopping centre staff register their number plates through centre management and are advised where they can park, with staff parking dispersed throughout the centre. A fine is issued to staff parking in the wrong areas, and a warning notice to cars that park in one location for over 4-hours across multiple days.

Strategy 2 – Provide convenient access to parking spaces for people with special needs

- Prioritise and designate the locations closest to entrances for accessible parking, and parking for parents with prams

2024 Update:

- In addition to disability spaces, senior and parent bays have been allocated within close proximity of entrances.

Strategy 3 – Provide convenient access to parking spaces for sustainable transport options

- Provide conveniently located parking spaces for electric cars with access to charge points
- Provide conveniently located bicycle parking spaces that are weather protected
- Provide conveniently located parking spaces for pick-up/drop-off, including along the Main Street, plus:
  - Futureproofing the car park design to allow retrofitting to include an increased number of pick-up/drop-off spaces (i.e. at valet service locations) recognising the predicted increase in demand for ride sharing services and introduction of autonomous vehicles.
  - Consider the potential increase in larger scale home delivery services, and therefore cater for and encourage retailers to run home delivery services which will make it easier for customers to use sustainable transport options.

2024 Update:

- Electric vehicle charging stations are available in both the east and west parking structures.
- Weather protected bicycle parking spaces have been provided.
- Pick up and drop off parking spaces have been provided at convenient locations.
- GPT continues to work with key tenants to provide click and collect services to maximise turnover of car parking spaces. Home delivery services and hands-free shopping are being explored with all retailers at Karrinyup.

Strategy 4 – Provide improved quality of the parking facilities

- Provide car and bicycle parking facilities that are secure and accessible, including:
  - Providing increased weather protection for parking spaces

Objective 4	To manage and prioritise the allocation of more convenient parking spaces to favour higher-priority customers, including people with disabilities, parents with prams and the elderly

– Providing increased CCTV coverage within car and bicycle parking areas

2024 Update:

- The above has been actioned as part of the 2021 development

Objective 5	To enhance staff health, wellbeing and productivity

Strategy 1 – Employ travel behaviour change initiatives to encourage sustainable transport and discourage private vehicle use leading to a healthier lifestyle

- As per the strategies outlined in Objective 1, Strategy 3

2024 Update:

- The Karrinyup Retailer Handbook includes information for tenants and staff around public transport and end of trip facilities including bike parking
- End of trip facilities and alternative access routes are frequently promoted through Retailer Newsletters and Retailer Briefings
- Consideration is being given to a "Working at Karrinyup Guide" which will be issued to all staff working at Karrinyup. This will include the above information.
- Karrinyup will participate in the National Ride to Work Day starting in 2025. Participants will be rewarded with $10 "Lunch is on Us" vouchers
- Karrinyup will register with the DoT "Your Move" program. Consideration is being given to use surprise "Lunch is on Us" vouchers for staff using public transport. This will also be promoted through targeted marketing at the Centre. DoT collateral will be requested to use throughout this marketing
- Sustainable transport options to be featured more prominently on the centre website under "Getting Here"
- The Marketing team is to explore Instagram highlights to support sustainable travel

Strategy 2 – Monitor staff and customer health and wellbeing

- Include health and wellbeing as part of the periodic modal share survey (at least every 2 years for the first 4 years and every 4 years after this) to understand and improve health and wellbeing initiatives

2024 Update:

- Retailer satisfaction surveys are conducted annually which include health, safety, and wellbeing questions. These questions are to be adjusted to gauge how further support could be provided
- Consideration is being given to hosting of wellbeing initiatives with retail staff

4.4 Consultation

4.4.1 Centre Users

It is important that the PMTP strategies are discussed with identified and future tenants at the Centre in order to assess the practicalities of implementation.

Actions:

The following actions will be applied by the Centre:

1. During negotiations for new tenants or the lease renewal of current tenants, the following strategies will be discussed:
    a. Provision of physical information packs to new starters i.e. travel maps, bus timetable information, bike parking locations, application for lockers.
2. Summary of negotiated outcomes recorded by the Centre and included in PMTP Progress Report (further discussed in Section 7.3.3).

Responsibility:

Centre Manager

4.4.2 Government Agencies

Consultation with multiple agencies, including the Department of Transport (DoT), Main Roads WA, the Public Transport Authority (PTA) and the City of Stirling has been undertaken as part of the development of the PMTP.

During implementation of the PMTP, should any further discussions occur with government agencies, a summary of these discussions and any negotiated outcomes should be included in the PMTP Progress Report.

Responsibility:

Centre Manager

5 Decisions Made

This section outlines how the DA conditions have been satisfied, and the decisions made in terms of parking provision, allocation and strategies to be implemented.

5.1 Car Parking

5.1.1 Provision

The proposed Centre incorporates a total of 4,880 public car parking bays which equates to a rate of 4.2 bays per 100m^2 for the proposed total floor space within the development. This is a reduced rate from the existing 5.2 bays per 100m^2, aligning with DA Condition 44 which stipulates a maximum of 4,880 car parking bays shall be provided and reserved as public parking bays.

The Centre includes multi-level car parking, split between the eastern and western sides of the Centre as shown in Figure 2-3.

5.1.2 Allocation

Various parking types have been identified for the Centre, along with the expected categories of users that will utilise these bays. The hierarchy of each user category has also been identified.

The approximate allocation of each parking type is shown in the table below.

Table 5-1 Parking types & hierarchy

Parking Type	Hierarchy	User Type	Allocation (% of total spaces)
Accessible Parking	1	People with disability	60 (1.2%)
Parents with Prams	2	People with children	60 (1.2%)
Taxi Rank	3	Taxi	7 (0.1%)
Motorcycle	4	Public (retail, cinema, dining) & staff	50 (1.0%)
Short Term	6	Public (drop-off, pick-up, post office)	16 (0.3%)
General Patron	7	Public (retail, cinema, dining) & staff	3,687 (75.5%)
Staff	8	Staff (including staff carpooling)	1,000 (20.5%)
Service Delivery	5	Service delivery staff	9 delivery yards

Accessible Parking and Parents with Prams

Accessible parking will be provided in accordance with the requirements of the Building Code of Australia for a Class 6 facility.

Accessible and pram parking is proposed to be located adjacent to all major visitor entrances on all parking levels of the Centre.

Taxi Rank

A taxi rank is proposed along the Main Street immediately adjacent to the town square/piazza entry to the Centre. This is in a central position allowing convenient access to/ from the Centre.

Short Term Parking

The proposed mix of eating/entertainment land uses along the Main Street frontage is intended to provide an area of high activity during and beyond normal trading hours.

It is anticipated that a proportion of public bays along the main street will be allocated as short term time-limited bays.

General Patron

All public bays within the multi-storey car parking will have a 4-hour time limit. Long term staff parking will be allocated to specific areas within the general parking bays. Car parking controls are discussed in Section 5.2.

Service Delivery

There are nine proposed service delivery yards at the Centre, eight of which are self-contained separate from public parking. A service delivery yard is proposed along the Main Street to service the tenancies along Main Street, and will consist of an on-street parking bay.

Further information regarding all service delivery arrangements will be available in the Freight and Servicing Plan.

5.1.3 Circulation

The western car park has a total of six car park levels including ground level (i.e. L00), three levels above ground (i.e. L01, mezzanine L01a and L02), and two levels below ground (i.e. B01 and B02). Note that the existing ground level car park owned by the City of Stirling remains. The L02 car parking level is located adjacent to the proposed Cinema. Two way ramps provide circulation between all levels of the western car park.

The eastern car park also has a total of six car park levels including ground level (i.e. L00), three levels above ground (i.e. L01, mezzanine L01a and L02), and two levels below ground (i.e. B01 and B02). Two way ramps provide circulation between all levels of the eastern car park.

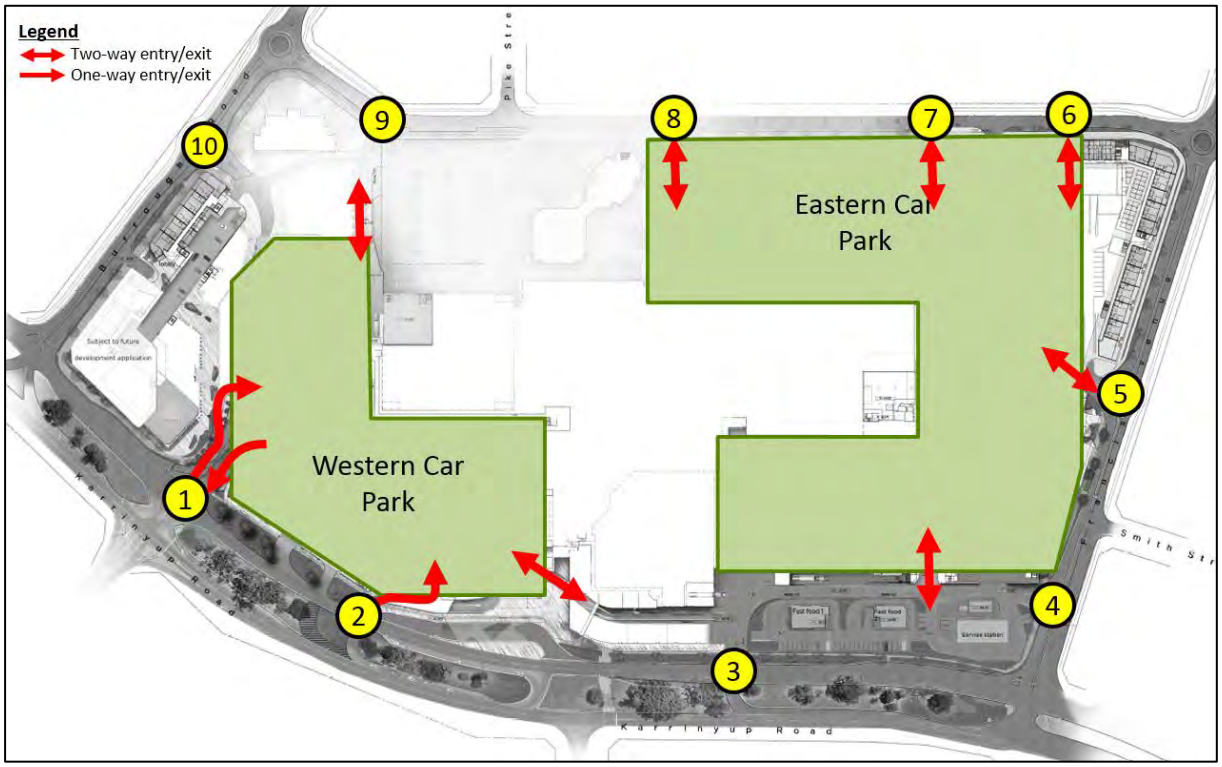

Figure 5-1 Approved car park access to the Development

The western car park can be accessed and egressed via the following access points:

- Access 1 from Karrinyup Road (traffic signal control) via the Main Street provides direct access to B02 via a ramp to the west, plus an alternative access to B01 via a one-way road at the northern end of Main Street.
- Access 2 from Karrinyup Road (priority T-intersection, entry only) provides direct access to B01
- Access 3 from Karrinyup Road (priority T-intersection) provides direct access to B01
- Access 9 from Davenport Road (priority T-intersection) provides direct access to the existing ground level car park and B01
- Access 10 from Burroughs Road (roundabout) provides direct access to B01

The eastern car park can be accessed and egressed via the following access points:

- Access 3 from Karrinyup Road (priority T-intersection) provides direct access to B01
- Access 4 from Francis Avenue (left in, left out priority) provides direct access to B01
- Access 5 from Francis Avenue (roundabout) provides direct access to B02
- Access 6 from Davenport Street (priority T-intersection) provides direct access to B02
- Access 7 from Davenport Street (priority T-intersection) provides direct access to B01
- Access 8A from Davenport Street (priority T-intersection) provides direct access to L02
- Access 8B from Davenport Street (priority T-intersection) provides one-way access into the existing car park and direct entry only access for service vehicles to Service Delivery Yard 3
- Access 11 and 12 provide access to residential car parking only.

A direct linkage between the western and eastern car parks exists on the southern side of the Centre internal to the site.

5.2 Car Parking Controls

A number of parking controls are proposed within the Centre, in line with the strategies listed in Section 4.

These include the following:

- Fully Managed Parking Detection System
- Time Limited Parking for Customers
- Paid Staff Parking
- Travel Behaviour Change Initiatives

5.2.1 Fully Managed Parking Detection System

Numerous technologies have been developed to improve parking management. Within the Centre, a key parking management priority is allowing visitors to identify parking availability and being efficiently directed to unused parking areas.

Efficient wayfinding will:

- Improve traffic flow as drivers are provided with real time information of the locations of available parking bays
- Direct vehicles to under-utilised areas
- Reduce aisle / roadway congestion and vehicle emissions as drivers are less likely to circulate in the search for an available bay
- Provide increased safety for both pedestrians and other drivers due to less vehicle circulation
- Decreases the time customers spend searching for car bays
- Alleviate driver frustration as drivers are provided with real time information of the locations of the available car parking bays
- Allow a higher practical utilisation to be managed

It is proposed that variable message signs (VMS) are installed to provide information to vehicles upon entry to the car park on the number of car bays available and where available car bays are located. VMS will be provided both internally within the various car parking levels, and externally prior to major access points to the Development.

The locations of external VMS are shown in Figure 5-2.

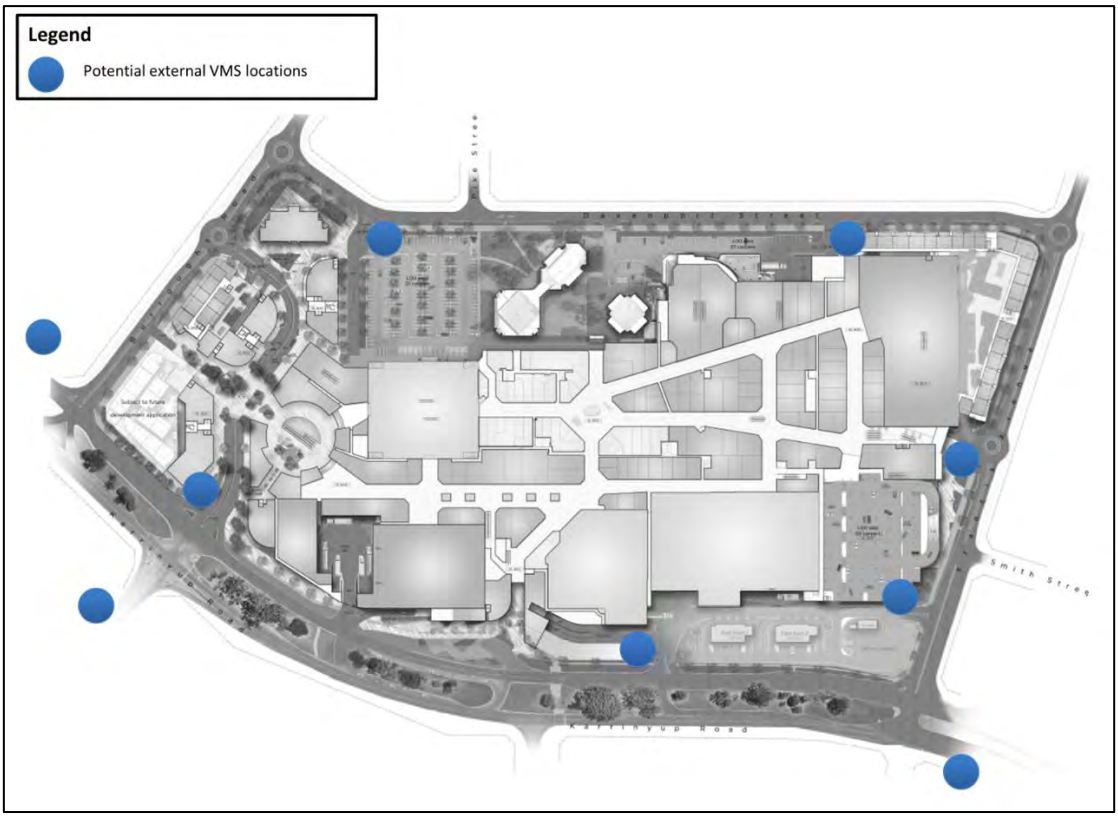

Figure 5-2 External VMS locations

Additionally, aerial parking occupancy detectors will be installed within the Centre, which are used to identify occupied and available car bays within a car park. This is achieved through the use of aerial colour coded sensors where 'red' sensors identify occupied bays, 'green' sensors identify available bays and 'blue' sensors identify disabled bays. Aerial parking occupancy detectors will indicate whether an available bay exists within the surrounding four bays.

5.2.2 Visitor parking

Visitor parking at the Centre will be time limited. Short stay planning is based on the idea of giving priority to the provision of short-stay parking that serves the Development as a whole, rather than be dedicated to serving individual developments. As a result, it is proposed that all public car parks within the Centre have a 4-hour (4P) time limit (including accessible and pram parking spaces). This will be managed and administrated by shopping centre parking rangers who will patrol the car parking areas twice a day issuing fines to cars which exceed the 4P time limit.

From the expected trip generation (shown in Section 2.2.3), the peak demand for the car parking is expected to occur in 2031 during a Saturday midday peak period. Comparing the expected number of vehicle trips to the availability of parking is dependent on the average duration of stay. With an assumed 52% of traffic being arrivals during the Saturday peak period (as per the Transport Plan), this therefore allows a maximum average stay of up to 95 minutes for visitors. It is anticipated that with the variable message boards displaying the parking bay availability prior to vehicles arriving to the centre, if no bays are available then this will help reduce the driver mode split over the long-term period of the centre's operation.

5.2.3 Staff Parking

Whatever support organisations offer for more sustainable travel, the availability of workplace car parking is likely to play a critical role in influencing travel patterns.

The proposed strategies to constrain parking at the Centre include:

- Allocation of staff parking to the least accessible bays.
  - Staff parking will be located in areas such that staff does not occupy more easily accessible car parks.
  - Staff parking will be dispersed throughout the Centre car parks so that peak commuter traffic is distributed to various access points. This will assist in reducing the traffic impact on the surrounding road network during peak periods. It is proposed that staff parking is located on portions of level B02, B01 and L02 (both west and east car parks), Level L01 mezzanine level, and the level L00 adjacent to Davenport Street. These locations are shown in the figures below, however, note that these are indicative and subject to change.
  - Upon opening of the redeveloped Centre, a total of 1,000 staff parking bays will be provided to cater for the expected demands described in Section 2.2.3. It is anticipated that the number of allocated staff parking bays can be reduced by 2031 due to decreased car mode share. Allocated bays will be marked by a yellow dot and are not exclusive to staff (i.e. general patrons can use these bays if desired). With reference to Section 2.2.3, the target number of staff arriving by car as the driver to the Centre will match the number of car parking bays available. This will drive the attractiveness to alternative mode options.
  - Within the staff parking allocation, 50 staff carpooling bays will be marked (i.e. by a blue dot). Staff will be required to register to use the carpooling bays.

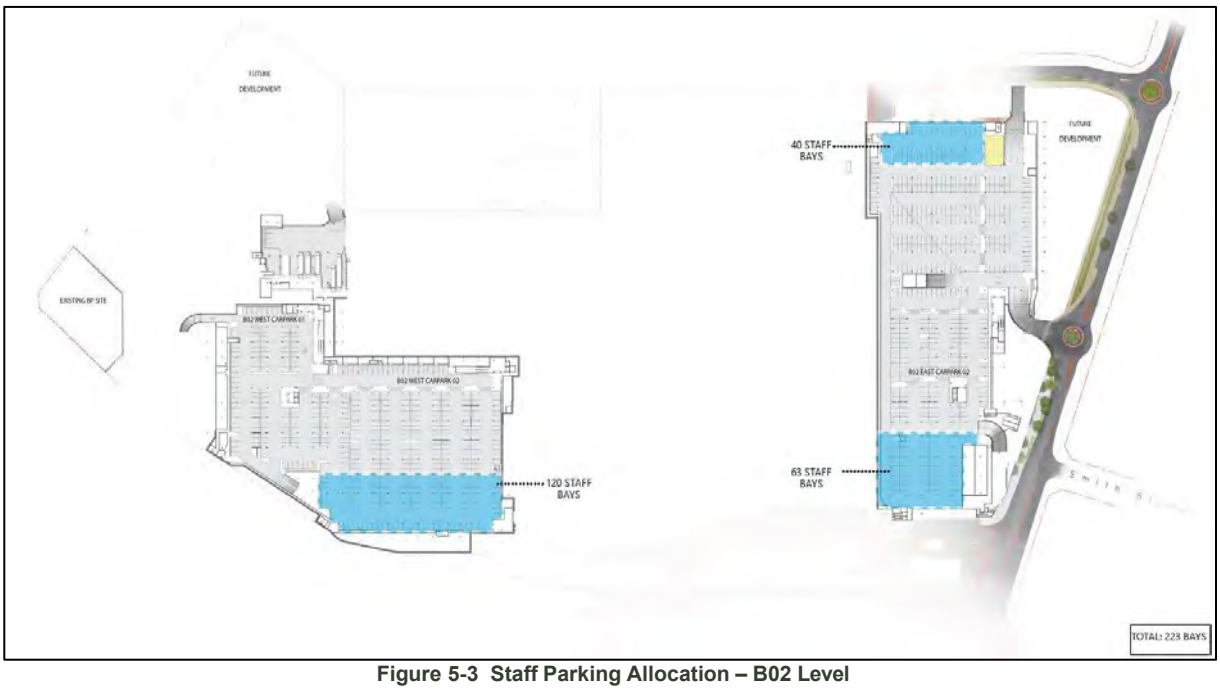

Figure 5-3 Staff Parking Allocation – B02 Level

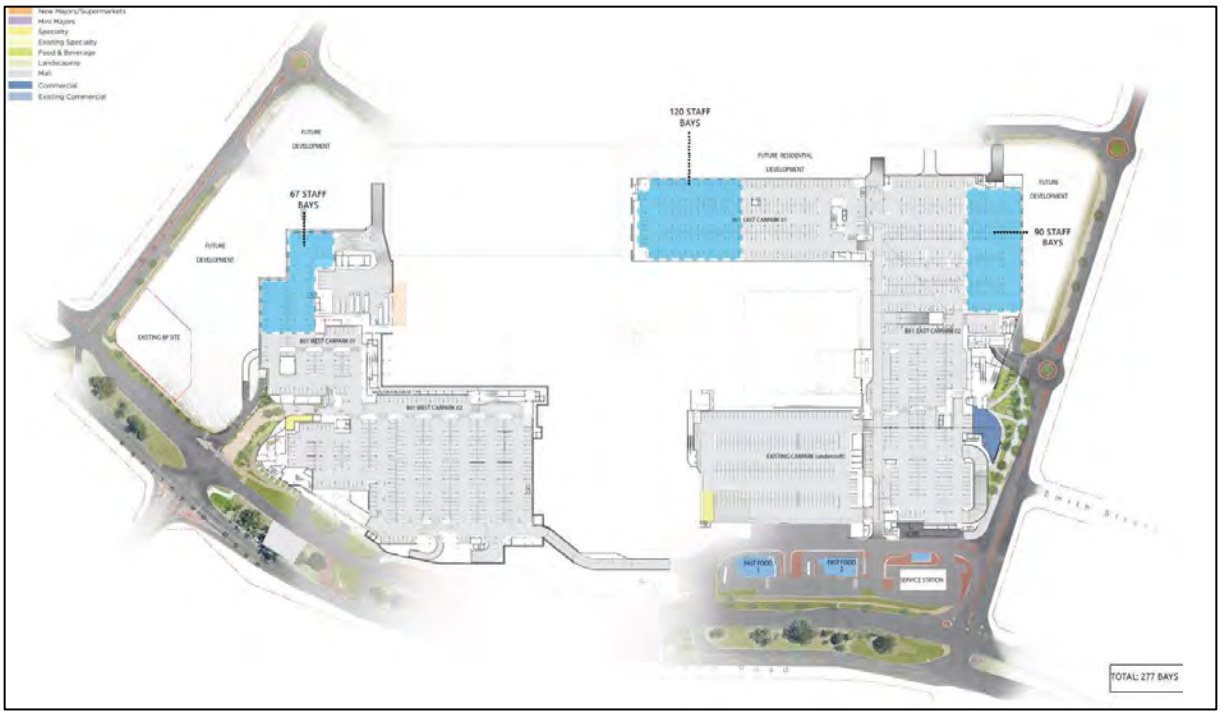

Figure 5-4 Staff Parking Allocation – B01 Level

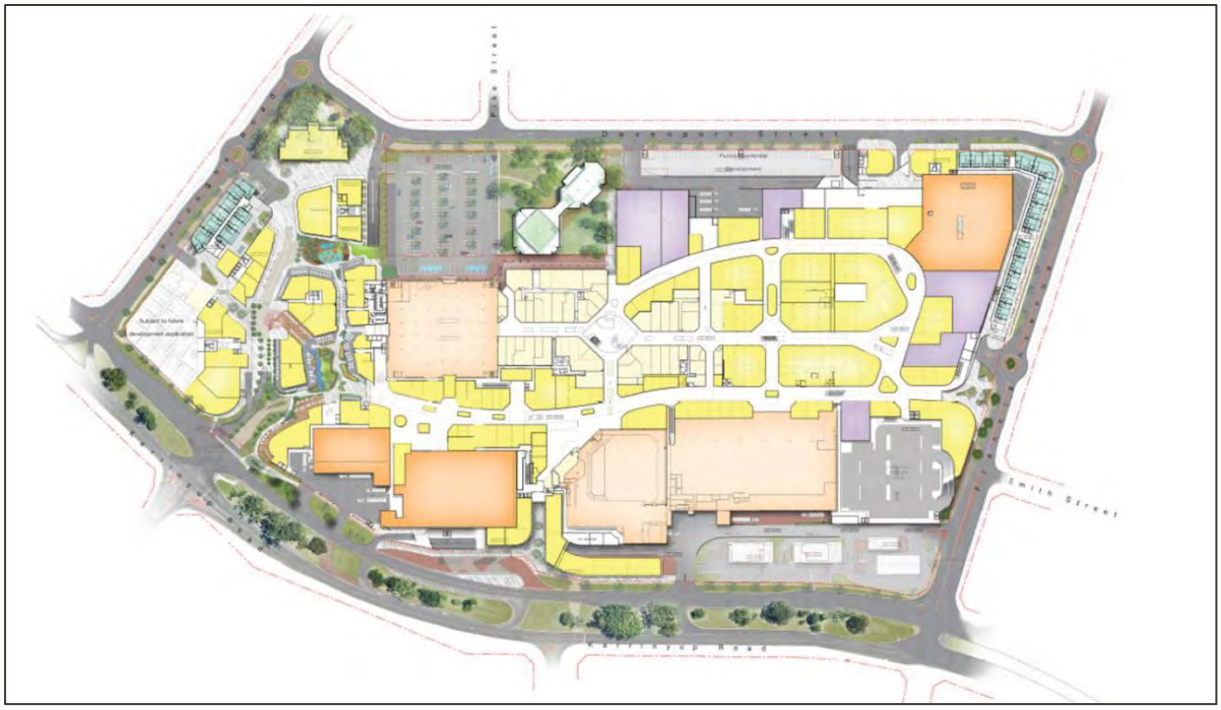

Figure 5-5 Staff Parking Allocation – Ground level (L00)

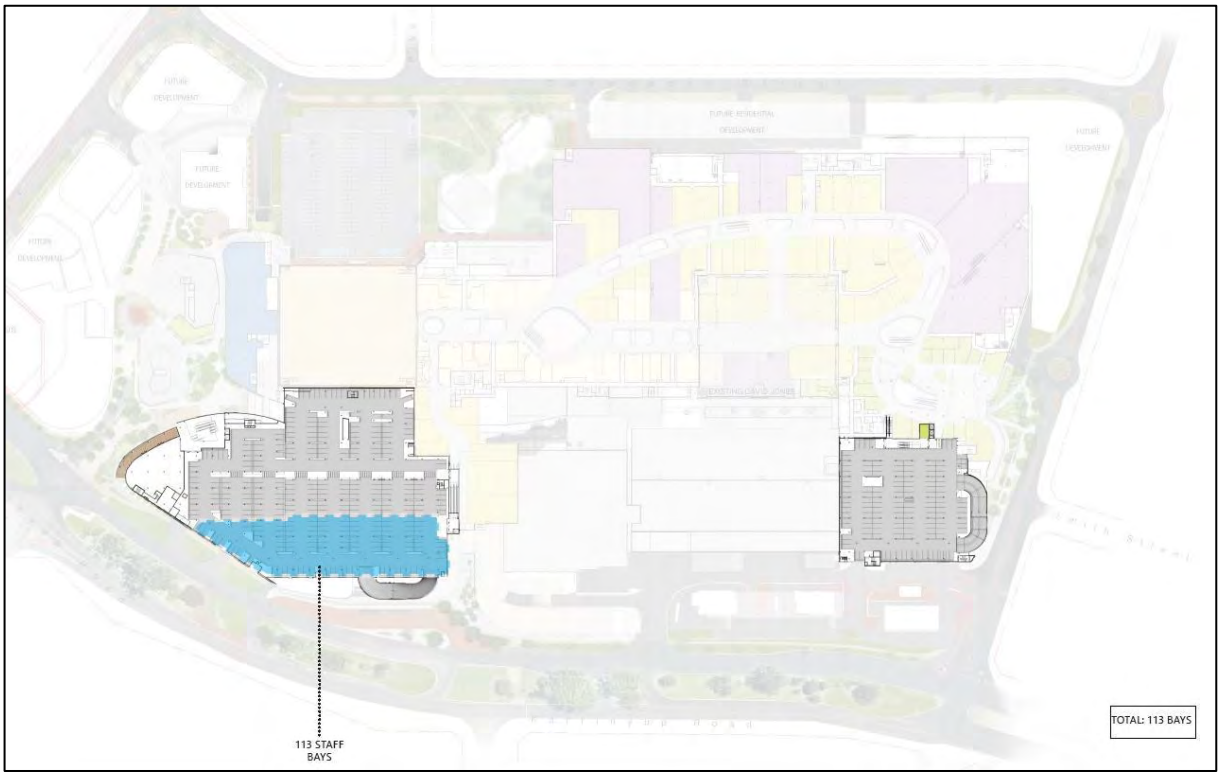

Figure 5-6 Staff Parking Allocation – Level 01 Upper Mezzanine

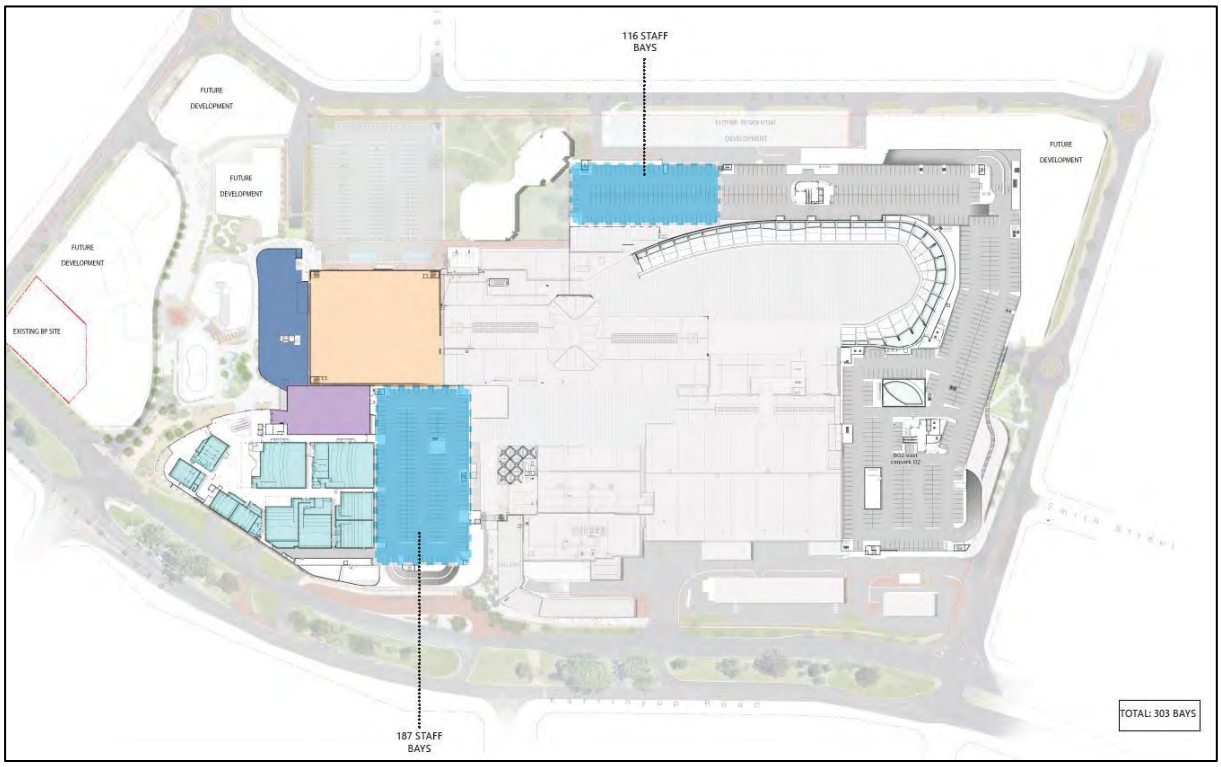

Figure 5-7 Staff Parking Allocation – L02 Level

- Paid Parking
  - It is proposed that staff will be required to pay for a parking permit to park at the developed Centre (noting this is currently not the case). This will provide incentive for staff not to drive to the Centre and encourage sustainable modes of transport.
- Enforcement of staff parking
  - Staff parking is proposed to be enforced using car number plate recognition, as per the existing situation. The number plates of all staff car parking bays are compiled from all cars parked in the staff parking bays that stay at the shopping centre for more than four hours. All areas outside the staff parking area are checked twice a day, once in the morning and again in the afternoon, representing a 4-hour time frame. If staff cars are found outside the staff parking area they receive a breach notice. This program has been found to be a great success to date with the prime parking bays remaining free for customer use.

5.2.4 Other approaches such as travel behaviour change initiatives or reciprocal use

In order to improve the flexibility of use of parking bays, there is an opportunity to allow use of specified parking bays, such as office bays, to customers outside of business hours. It is anticipated that a small portion of office bays will be located near to the Main Street on the Basement levels.

Travel behaviour change initiatives to support mode shift from private vehicle use to public transport or active transport. Travel behaviour change is considered one of the most important tools in order to help curb the car-centric nature of Karrinyup users, to not only encourage mode shift to public transport, but also to walking and cycling. The principles of behaviour change include **Inspiration**, **Enablement**, **Invitation** and **Trial and Satisfaction**, as identified by the Department of Transport (DoT) and should be considered in the introduction of behaviour change programmes.

5.3 Bicycle Parking

5.3.1 Bicycle Parking Provision and Allocation

In accordance with the DA conditions, the following bicycle parking will be provided at the Centre:

- 160 customer bicycle spaces dispersed amongst the four major entrances to the shopping centre and along the Main Street. This will include the provision for parking for at least 30 bikes at each major ground floor entrance and at least an additional 20 on the main street.
- Secure, enclosed end of trip facility for staff located at the southern major entrance to the shopping centre, near the Karrinyup Bus Station (as indicated on **Error! Reference source not found.**), c onsisting of:
  - 200 bicycle spaces
  - 200 lockers
  - Separate female and male change rooms incorporating 5 showers and 1 toilet in each

By 2031 it is anticipated that the Centre will have approximately 1500 employees. Taking into consideration the proposed mode share target of 6% for cycling in 2031, it can therefore be assumed that at least 90 employees will use the end of trip facilities. The size of the facility is therefore considered to be more than sufficient.

Whilst 160 customer bicycle parking spaces are being provided, there is capacity within the Centre to allow for the provision of extra bicycle parking spaces if there is the demand. The landowner will monitor the usage of the bike racks.

It can be noted that the State Planning Policy 4.2 states that the typical supply of motorcycles and bicycles for an activity centre is 5-10% of all bays. For this Development, 360 bicycle bays and 50 motorcycle bays in total are intended, equating to 8.3% of the total number of bays.

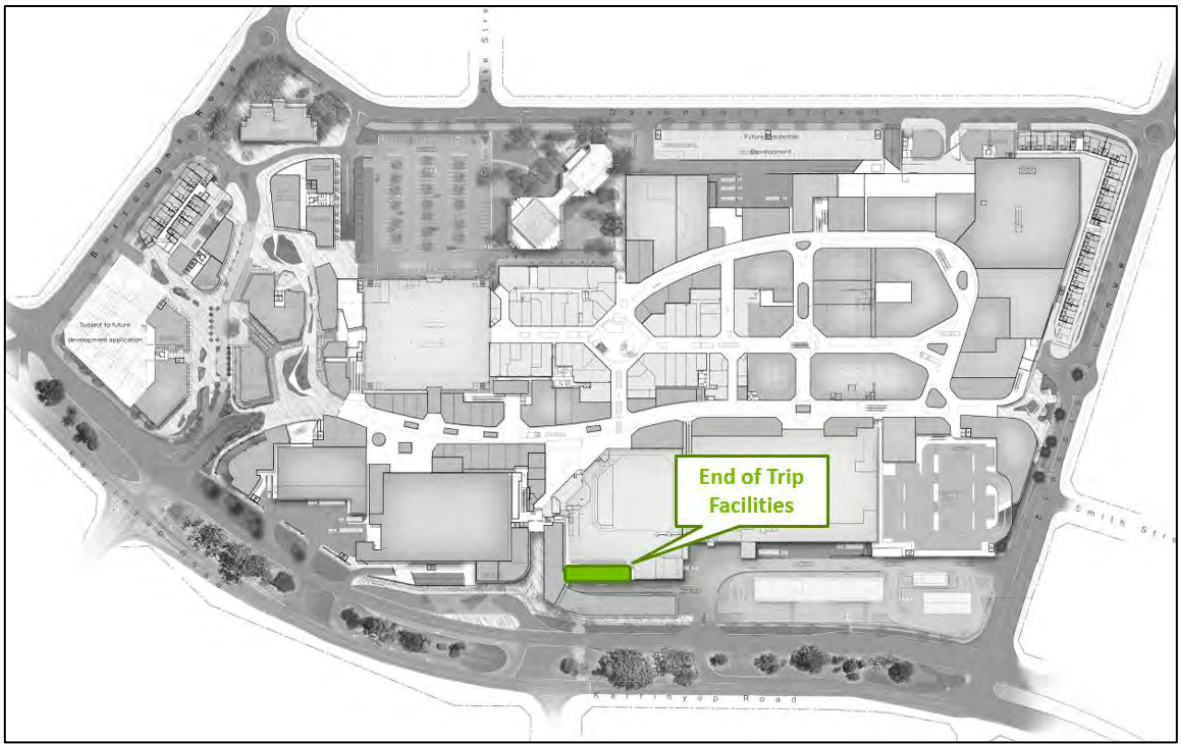

Figure 5-8 Location of bicycle end of trip facilities

5.3.2 Bicycle Parking Access

As part of the expansion of the Centre, a number of new and upgraded cycle paths are proposed in order to increase the effectiveness of the surrounding cycle network, with the aim of tying into the Perth Bicycle Network (PBN) routes particularly from the east and south. Access to the proposed bicycle parking facilities within the Centre has been carefully considered in the design, with the inclusion of four consolidated gateways providing direct entrance from the external road network into the retail core of the Centre. Bicycle parking will be available at these gateways which can be accessed from the proposed surrounding cycle network. The proposed network aims to provide cyclists with safe, direct and connected access to the parking facilities, removing the need to cycle through car parks as is currently the case.

A key attribute of the proposed design is the development of the ‘southern’ gateway as an enhanced active transport entrance to the Centre. The proposed end of trip facility will be located here, along with proposed enhancements to the existing Karrinyup Bus Station and signalised crossing on Karrinyup Road to improve general amenity and legibility.

5.3.3 Bicycle Parking Controls

Public bicycle parking spaces will be in the form of racks and rails located at the four main entrances to the Centre. No controls are proposed, with users to store and secure their bike by means of their own locking mechanisms.

The staff end of trip facilities will be secured by swipe card access which will be controlled and maintained by the building management group. It is recommended that security cameras also be fitted (where appropriate) to discourage users from misusing these facilities. Lockers may be leased by individuals or employers who will receive a locker key for the duration of their lease. Access to the locker room will also require swipe card access. Male and female change rooms will again require separate swipe card access specific to their requirements.

6 Implementation Framework

6.1 Steering Group

The implementation of the initiatives will be driven by the Centre Manager, in close consultation with AMP Centre management team and representatives, including the AMP marketing team.

6.2 Promotion and Communication Strategies

6.2.1 Prior to Opening

Prior to the opening of the expanded Centre, a number of communication strategies will be implemented, including:

- Online advertising through the Centre's website; and
- Hard copy advertising through posters and signs throughout the Centre.

The advertisements will highlight the key improvements to sustainable transport options to the Centre to create awareness to customers, including:

- Public transport infrastructure improvements and increase in frequency; and
- Pedestrian and cycling infrastructure improvements,

6.2.2 Post Opening

Advertising within the shopping centre and in parking areas will be installed, which will provide ongoing promotion of the use of sustainable transport modes to both customers and staff, including the following:

- Conveniently located interactive information points throughout the Centre
  - These information points will outline information to customers relating to parking and sustainable transport options, such as bus timetables, pedestrian and cyclist routes and the location of bicycle parking facilities. The information points will be interactive and user friendly to cater for all types of customers.
- Live bus timetable signage at Karrinyup Bus Station
  - It is proposed that live bus timetable signage is installed at Karrinyup Bus Station to provide convenient, real time information to customers and staff.
- Bicycle wayfinding signage
  - Static bicycle wayfinding signage will be installed in strategic locations surrounding the Centre. There is an opportunity to provide branded wayfinding signage to the Centre, as part of the overall wayfinding signage.

Additionally, a key aspect in the promotion of the expanded Centre will be the communication of the various travel behaviour change initiatives to staff to encourage sustainable transport options with the aim of reducing private vehicle use and local congestion, as described in Section 4.3.

6.3 Measure of Outcomes

The outcomes of the PMTP will be measured against the objectives, as outlined in the following table.

The measures include the collection of various sources of data as well as other customer related information and feedback available to Centre management. The data will be used by the Centre management team to understand whether the strategies put forward have been successful.

Table 6-1 Measures of Outcomes

	Objective	Measure	Responsibility
1	To increase the mode share from single occupancy private vehicles to alternative transport modes leading to a lower demand for parking	1. Modal share surveys 2. General and staff parking utilisation statistics 3. Public transport patronage statistics 4. End of trip facility usage 5. Rating of the effectiveness of travel behaviour change initiatives	Centre Manager
2	To minimise local congestion and associated impacts on the community and the environment, particularly at peak times	1. Rating of the effectiveness of parking detection system 2. Customer complaints received regarding ease of access to the Centre 3. Rating of the effectiveness of peak shopping period strategies	Centre Manager
3	To optimise the parking operations and make efficient use of parking bays to support access for staff and customer	1. Parking utilisation statistics (to understand parking by user type) 2. Staff and customer parking infringement statistics	Centre Manager
4	To manage and prioritise the allocation of more convenient parking spaces to favour higher-priority customers, including people with disabilities, parents with prams and the elderly	1. Staff and customer parking infringement statistics 2. Customer complaints received regarding ease of access to the Centre for people with special needs 3. Customer complaints received regarding quality of parking facilities 4. Rating of the effectiveness of end of trip facilities	Centre Manager
5	To enhance staff health, wellbeing and productivity	1. Rating of the effectiveness of travel behaviour change initiatives	Centre Manager

7 Monitoring, Review and Rectification

7.1 Usage Monitoring Regime

Monitoring the use of parking and the travel mode share at the Centre will be beneficial in understanding the effectiveness of the adopted parking management and travel planning strategies.

The data sources described below will be utilised by Centre Management to measure the success of the proposed strategies and will be captured in the PMTP Progress Report (refer to Section 7.3.3).

7.1.1 Modal Share Survey

The share of trips to the Centre by different modes of transport (mode share) can be measured by a modal share survey to understand the current travel behaviour of staff and visitors.

A travel survey involves participation from staff and visitors to the Centre and can be undertaken in a number of ways, including:

- Customer exit/intercept surveys – where staff and visitors are asked a number of questions in-person when located at the Centre. The survey can be undertaken across a range of times to sample a broad selection of people.
- Questionnaires – where staff and visitors are directed to complete a number of questions and submit it. This can take a number of forms including online surveys and hard copy surveys.
- Phone surveys – where staff and visitors are contacted by phone and are asked a number of questions. This is reliant on the availability of contact details.
- Focus groups – Discussions with particular groups are undertaken i.e. full-time staff, weekend staff, and casual staff.

The Centre currently undertakes periodic visitors' insight surveys (every 3-4 years), which incorporate questions relating to transport mode and access. These surveys will continue to be undertaken and the results monitored.

A modal share survey is proposed to be undertaken at least every 5 years in order to allow Centre Management to compare trends against the baseline travel mode shares. The survey results will provide an opportunity to understand shifts in travel behaviour and measure the success of the initiatives implemented.

7.1.2 Parking Detection System

The introduction of the fully managed parking detection system at the Centre has the capability to provide useful information to shopping centre management regarding parking usage.

The detection system uses a cloud-based platform for data storage, reporting and basic operational control, and can provide the following information:

- Occupancy reporting
  - Example output: the average occupancy measured by Day of the Week, Zone and/or by Bay Type.
- Dwell reporting
  - Example output: the average dwell time measured by Day, Zone and/or Bay Type.
- Turnover reporting (i.e. number of times a bay has been parked in)

- Example output: the average turnover by Day of the Week, Zone and/or Bay Type.

- Visitor Movement reporting (utilising licence plate recognition)
  - Example output: the frequency in which customers are using the parking facilities (i.e. how many customers are visiting weekly, fortnightly, monthly, etc.).
- Visits reporting includes the following outputs (utilising licence plate recognition)
  - Example output: Log of visits recorded in particular date ranges, zones, bay types, licence plate etc.

Review of the use of allocated staff parking and customer bays can be used to understand staff and customer usage trends, particularly during peak hour periods, and will ultimately allow for proactive actions for efficiency improvements, for example further reductions in staff parking allocation for customers if the staff bays are regularly not being fully utilised. The above data will be obtained on a regular basis and assessed by the Centre Manager for any potential actions. Any identified actions will be included in the PMTP Progress Report.

7.2 Maintenance

7.2.1 Car Parking

The car parking infrastructure at the Centre will be maintained in accordance with the Centre's current overall scheduled maintenance procedures. The proposed managed parking detection system will be maintained in line with manufacturer's specifications.

It is recommended that the Centre's maintenance procedures be updated to consider the different requirements of any new technology that is implemented, including the parking system, so that only one schedule needs to be referred to.

7.2.2 Bicycle Parking

The proposed end of trip facility (including bicycle storage, showers, and lockers) will be maintained in accordance with the Centre's current general maintenance policy. This includes tie in with the regular cleaning and security schedules of the Centre.

7.3 Procedures and Responsibilities

7.3.1 PMTP Implementation and Review

The initial PMTP implementation will be a combined approach between the development primary contractor, Brookfield Multiplex, and the Centre Manager. Brookfield Multiplex and their sub-contractors will implement the "hard" infrastructure aspects such marking of designated parking areas and the parking management systems. The Centre Manager will be responsible for ensuring that the "soft" aspects such as procedures for parking operations, monitoring, and maintenance are in place before the development is opened.

The Centre Manager will then have ongoing responsibility for the PMTP. This includes the collection of available information/data, review of this information to understand parking utilisation and trends over time, evaluation against desired outcomes, and then establishment of any actions if required.

The role of Centre Manager is considered appropriate to also be the Travel Plan Coordinator for the implementation and monitoring of the PMTP.

7.3.1 Tenant Engagement

In order to improve outcomes for staff, engagement with tenant representatives is needed. Periodic retail functions are held between Centre management and tenant representatives, and as such it is proposed that the key conclusions of the PMTP Progress Report (discussed in Section 7.3.3) are communicated at these functions.

7.3.2 Tenant/Staff/Customer Dissatisfaction

The Centre currently implements a customer complaint process where any issues by tenants, staff or customers can be reported. It is proposed that this process is maintained with the upgraded Centre.

Complaints are reviewed by the Centre Manager to determine whether they should be actioned or not. Complaints regarding safety will be prioritised over those regarding convenience and will be actioned as soon as possible if proved valid.

It should be noted that ideally the maintenance, monitoring, and security schedules are frequent enough to resolve issues before a complaint is lodged.

7.3.3 Reporting Schedule

It is proposed that a PMTP Progress Report is submitted to the City of Stirling on an annual basis. The intention of the report is to summarise the measures used to assess the success of the implementation of the PMTP strategies. The report should include a summary of any data/information collected and key actions implemented with the aim of achieving the PMTP objectives.

It is intended that this report is as concise and relevant as possible so that it can provide value for maintaining an optimal parking solution whilst not being a burden to collate and write.

The report will include the following as a base template:

- Review of modal survey data (if applicable) and any notable issues, opportunities and trends;
- Review of available parking data highlighting any notable issues, opportunities and trends;
- Review of available public transport and end of trip facility usage statistics highlighting any notable issues, opportunities and trends;
- Review of the strategies and achievements made regarding their success. This includes reviewing if each strategy is still relevant or if it needs to be revised, removed, or additional strategies added.
- A summary of tenant or customer complaints covering complaints reported frequently or complaints considered major for either safety, efficiency, or satisfaction reasons and the proposed or undertaken response;
- A review of the manufacture supplied equipment to check that it is performing as per the provided equipment specifications and guarantee;
- A summary of actions or changes undertaken since the last progress report and a statement on why the action was required. Note that any major changes should be discussed with the City prior to being implemented.

7.4 Operational Commitments

Compliance of this PMTP is required by the Planning and Development Act 2005 as per all other conditions of the development approval. However, this is also a live document, and the requirements contained within it will always be subject to change, after agreement. Any penalties relating to non-compliance are to be related to the scale of the non-conformance with a pragmatic view of the actual impact of the non-conformance and factors that may have made the requirements difficult need to also be considered.

Aurecon Australasia Pty Ltd
ABN 54 005 139 873
Level 5, 863 Hay Street
Perth WA 6000
Australia

T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, China,
GDC, Ghana, Hong Kong, Indonesia, Kenya,
Lesotho, Malaysia, Mozambique,
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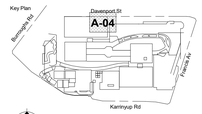
Key Plan



NORTH

General Notes

1. CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK ON SITE OR PRODUCING SHOP DRAWINGS WHICH MUST BE SUBMITTED FOR REVIEW BEFORE MANUFACTURING.
2. ASSEMBLE ALL BLOCKWORK WALLS IN ACCORDANCE WITH WALL STIFFENING AND SUPPORT DETAILS ON STRUCTURAL ENGINEER'S DRAWINGS.
3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- A — DOOR NUMBER; DT01 — DOOR TYPE - REFER DOOR SCHEDULE
- 000 — WINDOW NUMBER; WT01 — WINDOW TYPE - REFER WINDOW SCHEDULE
- 001 — GLAZING SYSTEM NUMBER; GS01 — SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- 9000 — GLAZING ELEVATION NUMBER; A — DRAWING SERIES NUMBER
- P01 — WALL TYPE - REFER SCHEDULE; A — WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- A — DOOR NUMBER; DT01 — DOOR TYPE NUMBER; F — DOOR LEAF TYPE (SEE BELOW); DP — DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

CWT000 — MATERIAL / ITEM - REFER LEGEND

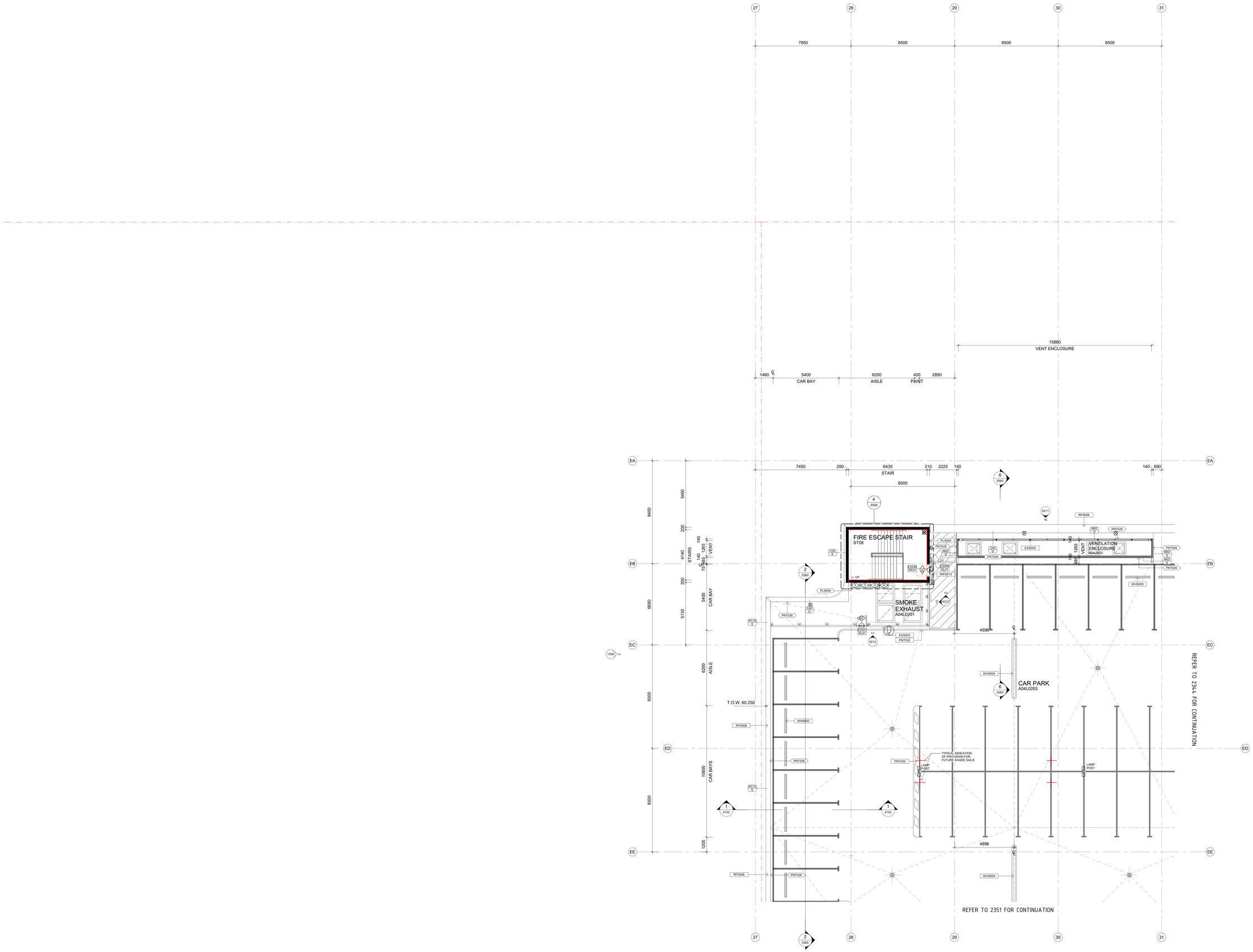
PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
PLS004	SMOOTH RENDER WITH PAINT FINISH
RFS006	CAPPINGS GENERALLY
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS



Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
G	GAS PIPE
GWP	GALVANISED PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

GENERAL NOTES:

1. HYDRAULIC SERVICES UPDATED
2. ALL DOOR TAGS UPDATED AS PER MPX-GCOR-0074

NOTES:

FRAMES TO BE FLUSHLINE 50 X 150mm

Rev.	Date	Initial	Description
10	06/12/21	TRHS	RECORD SET
9	27/02/20	TRHS	ISSUED FOR CONSTRUCTION
8	26/06/19	TRHS	ISSUED FOR CONSTRUCTION
7	01/03/19	TRHS	ISSUED FOR CONSTRUCTION
6	22/02/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TRHS TAYLOR ROBINSON Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

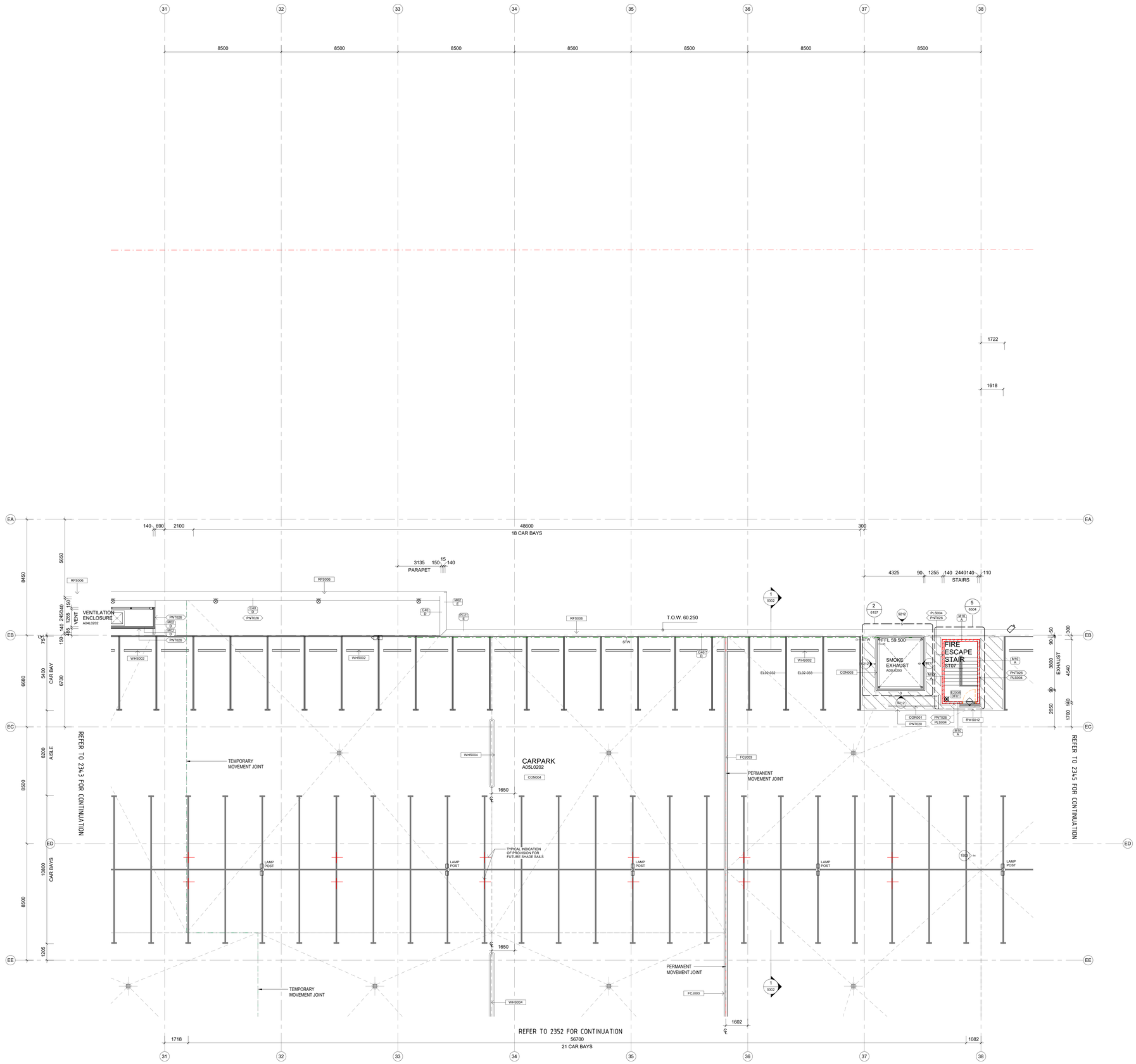
Drawing Title
Level 02 GA Plan - Zone A04

Drawn By	Checked By	Scale @ A0
LA	DB	As indicated

Drawing No.	Revision
AR-DWG-L02-A04-2343	10

Status
RECORD SET

5/06/2022 9:08:01 PM



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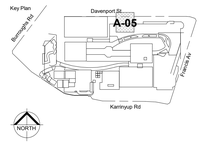
Key Plan



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2. ASSEMBLE ALL BLOCKWORK WALLS IN ACCORDANCE WITH WALL STIFFENING AND SUPPORT DETAILS ON STRUCTURAL ENGINEER'S DRAWINGS.
3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- A / D101 — DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- 000 / W01 — WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- 001 / GS01 — GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- 9000 / A — GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- P01 / A — WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- A / D101 / C — DOOR NUMBER / DOOR TYPE NUMBER / DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
P - PANEL DOOR
M - MESH/SUN PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON003	IN-SITU CONCRETE WALLS
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
COR001	SINGLE TROLLEY CORRAL
FCJ003	EXTERNAL MOVEMENT JOINT
PLS004	SMOOTH RENDER WITH PAINT FINISH
RFS006	CAPPINGS GENERALLY
RWS012	STORMWATER GRATE
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
G	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Rev	Date	Initial	Description
7	06/12/21	TRHS	RECORD SET
6	26/06/19	TRHS	ISSUED FOR CONSTRUCTION
5	01/03/19	TRHS	ISSUED FOR CONSTRUCTION
4	19/02/19	TRHS	ISSUED FOR CONSTRUCTION
3	08/02/19	TRHS	ISSUED FOR CONCTRUCTION - GA

Client

AMP CAPITAL
UniSuper

TRHS TAYLOR ROBINSON Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone A05

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-A05-2344
Revision 7
Status RECORD SET

5/06/2022 9:08:52 PM

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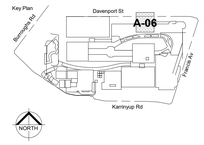
Key Plan



General Notes

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3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTOR SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
P - PANEL DOOR
M - MESH/SCRN PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FIRE WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BOL002	ACROD PARKING BOLLARD
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CFT013	PAVER
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
COR003	TRIPLE TROLLEY CORRAL
FCJ003	EXTERNAL MOVEMENT JOINT
KRB001	BARRIER KERBING
MAT001	MATWELLS
PLS004	SMOOTH RENDER WITH PAINT FINISH
RFS006	CAPPINGS GENERALLY
RWS012	STORMWATER GRATE
TAC007	WHITE TOP B5 BUTTON TACTILE INDICATORS
TAC008	BLACK PVD BUTTON TACTILE INDICATORS
TRM007	TRIM
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Rev	Date	Initial	Description
11	08/12/21	TRHS	RECORD SET
10	20/05/20	TRHS	ISSUED FOR CONSTRUCTION
9	11/10/19	TRHS	ISSUED FOR CONSTRUCTION
8	20/08/19	TRHS	ISSUED FOR CONSTRUCTION
7	03/08/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TRHS | TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone A06

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-A06-2345
Revision 11
Status RECORD SET

5/06/2022 9:09:34 PM

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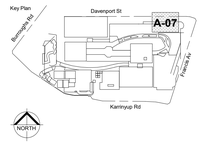
Key Plan



General Notes

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Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

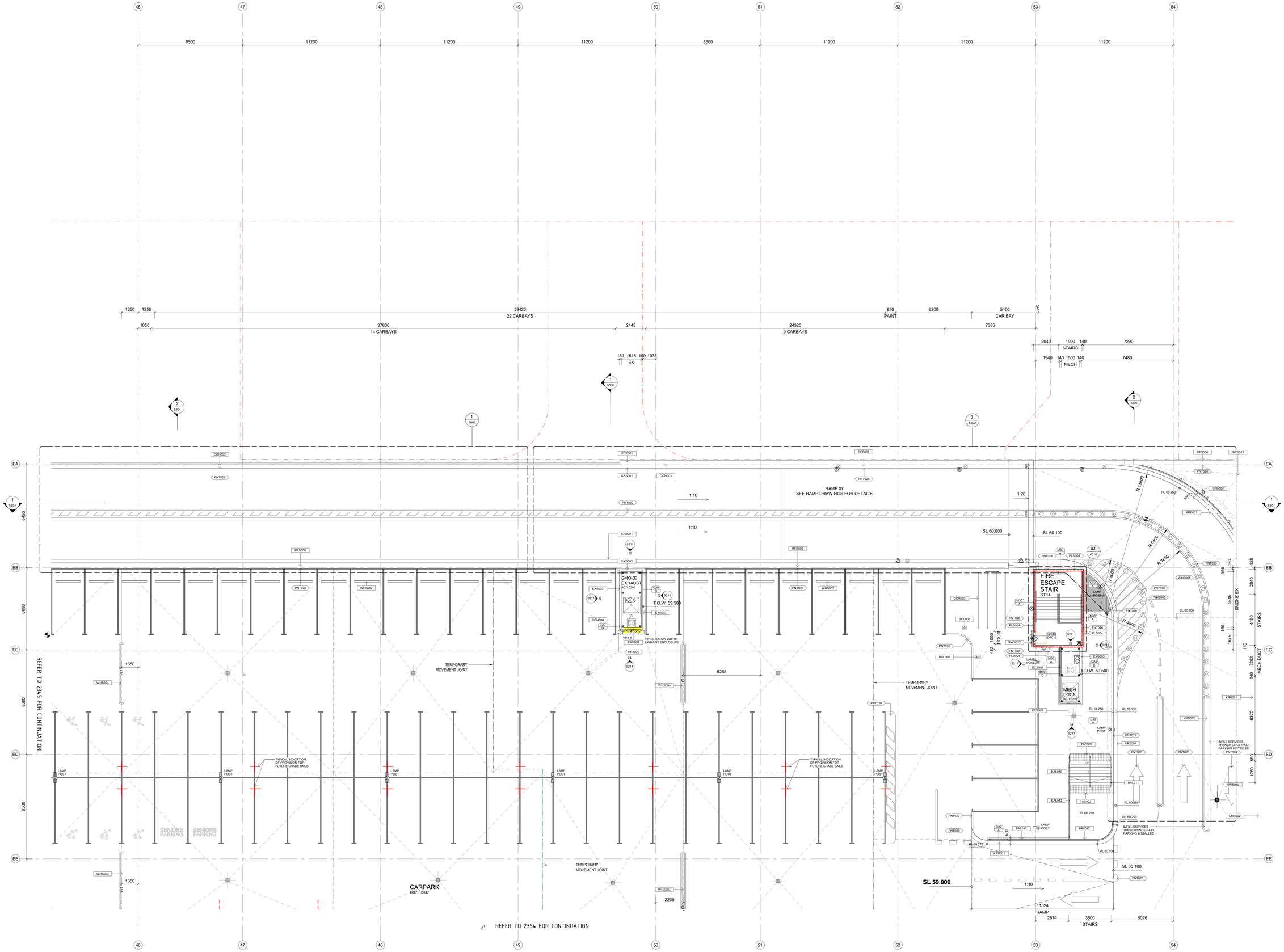
- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE



CWT000	MATERIAL / ITEM - REFER LEGEND
PNT000	SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL010	STAINLESS STEEL BAUSTRADE
BAL011	STAINLESS STEEL HANDRAIL (WALL MOUNTED TYPE)
BAL012	STAINLESS STEEL BALUSTRADES (VERTICAL BALUSTER TYPE)
BOL005	150MM DIA LINISHED STAINLESS STEEL BOLLARD WITH BASEPLATE FIXING
CON003	IN-SITU CONCRETE WALLS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR003	TRIPLE TROLLEY CORRAL
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EX3003	VISUAL SCREENING TO PLANT EQUIPMENT
KRB001	BARRIER KERBING
KRB002	SEMI-MOUNTABLE KERBING
PCP001	STANDARD CONCRETE PRECAST PANEL
PLS004	SMOOTH RENDER WITH PAINT FINISH
RFS006	CAPPINGS GENERALLY
RWS012	STORMWATER GRATE
TAC002	ADHESIVE TILE TACTILE INDICATORS
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS
WHS005	RUBBER SPEED BUMP DISCS

Rev.	Date	Initial	Description
12	06/12/21	TRHS	RECORD SET
11	12/11/20	TRHS	ISSUED FOR CONSTRUCTION
10	15/11/19	TRHS	ISSUED FOR CONSTRUCTION
9	10/10/19	TRHS	ISSUED FOR CONSTRUCTION
8	03/09/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TRHS | TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

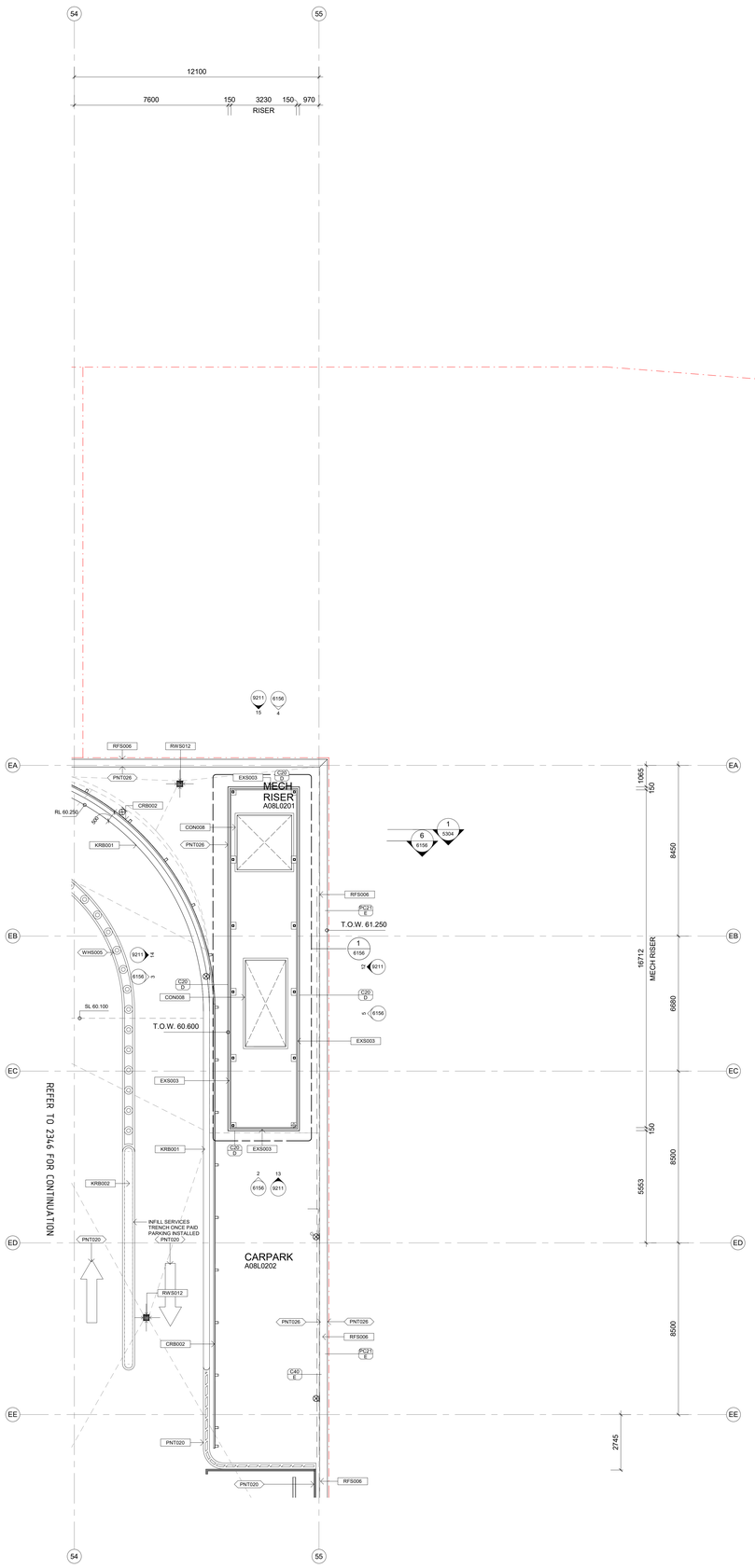
Drawing Title
Level 02 GA Plan - Zone A07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-A07-2346
Revision 12

Status
RECORD SET

5/06/2022 9:10:38 PM



REFER TO 2363 FOR CONTINUATION

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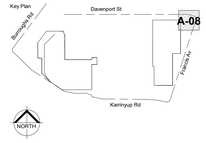
Key Plan



General Notes

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2. ASSEMBLE ALL BLOCKWORK WALLS IN ACCORDANCE WITH WALL STIFFENING AND SUPPORT DETAILS ON STRUCTURAL ENGINEER'S DRAWINGS.
3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

3 HOUR FIRE RATED SEPARATION
2 HOUR FIRE RATED SEPARATION
1 HOUR FIRE RATED SEPARATION
A X — DOOR NUMBER
D701 X — DOOR TYPE - REFER DOOR SCHEDULE
000 X — WINDOW NUMBER
W07 X — WINDOW TYPE - REFER WINDOW SCHEDULE
001 X — GLAZING SYSTEM NUMBER
9901 X — SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
9000 — GLAZING ELEVATION NUMBER
A — DRAWING SERIES NUMBER
P01 X — WALL TYPE - REFER SCHEDULE
A X — WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

A X — DOOR NUMBER
D701 X — DOOR TYPE NUMBER
F — DOOR LEAF TYPE (SEE BELOW)
DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

HOSE HYDRANT AND CABINET
PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)

CWT000 — MATERIAL / ITEM - REFER LEGEND
PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
KRB001	BARRIER KERBING
KRB002	SEMI-MOUNTABLE KERBING
RFS006	CAPPINGS GENERALLY
RWS012	STORMWATER GRATE
WHS005	RUBBER SPEED BUMP DISCS

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
G/W	GREY WATER
G	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Rev	Date	Initial	Description
8	06/12/21	TRHS	RECORD SET
7	03/09/19	TRHS	ISSUED FOR CONSTRUCTION
6	23/07/19	TRHS	ISSUED FOR CONSTRUCTION
5	26/06/19	TRHS	ISSUED FOR CONSTRUCTION
4	31/05/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS TAYLOR ROBINSON Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

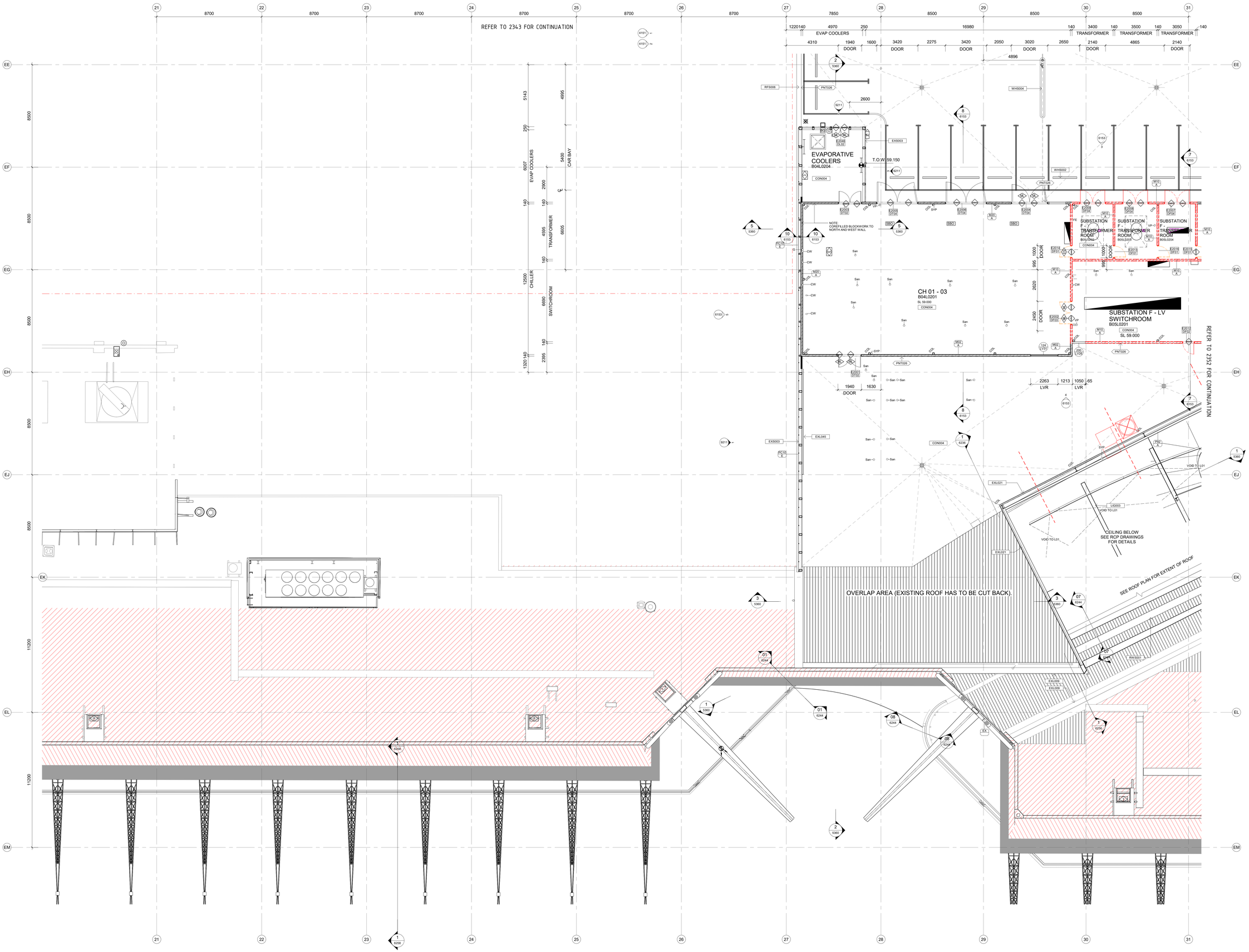
Drawing Title
Level 02 GA Plan - Zone A08

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-A08-2347
Revision 8

Status
RECORD SET

5/06/2022 9:11:33 PM



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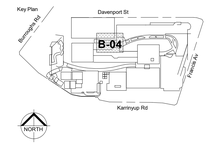
Key Plan



General Notes

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2. ASSEMBLE ALL BLOCKWORK WALLS IN ACCORDANCE WITH WALL STIFFENING AND SUPPORT DETAILS ON STRUCTURAL ENGINEER'S DRAWINGS.
3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S ENG DETAILS
EXL009	VERTICAL METAL CLADDING
EXL021	VERTICAL METAL CLADDING
EXL045	EXTERNAL ACOUSTIC WALL CLADDING
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
LIG003	LIGHTING TROUGH
RF5006	CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 3890.1)
WHS004	SPEED HUMPS

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
G	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Rev.	Date	Initial	Description
8	06/12/21	TRHS	RECORD SET
7	03/08/19	TRHS	ISSUED FOR CONSTRUCTION
6	21/06/19	TRHS	ISSUED FOR CONSTRUCTION
5	01/03/19	TRHS	ISSUED FOR CONSTRUCTION
4	20/02/219	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS | TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

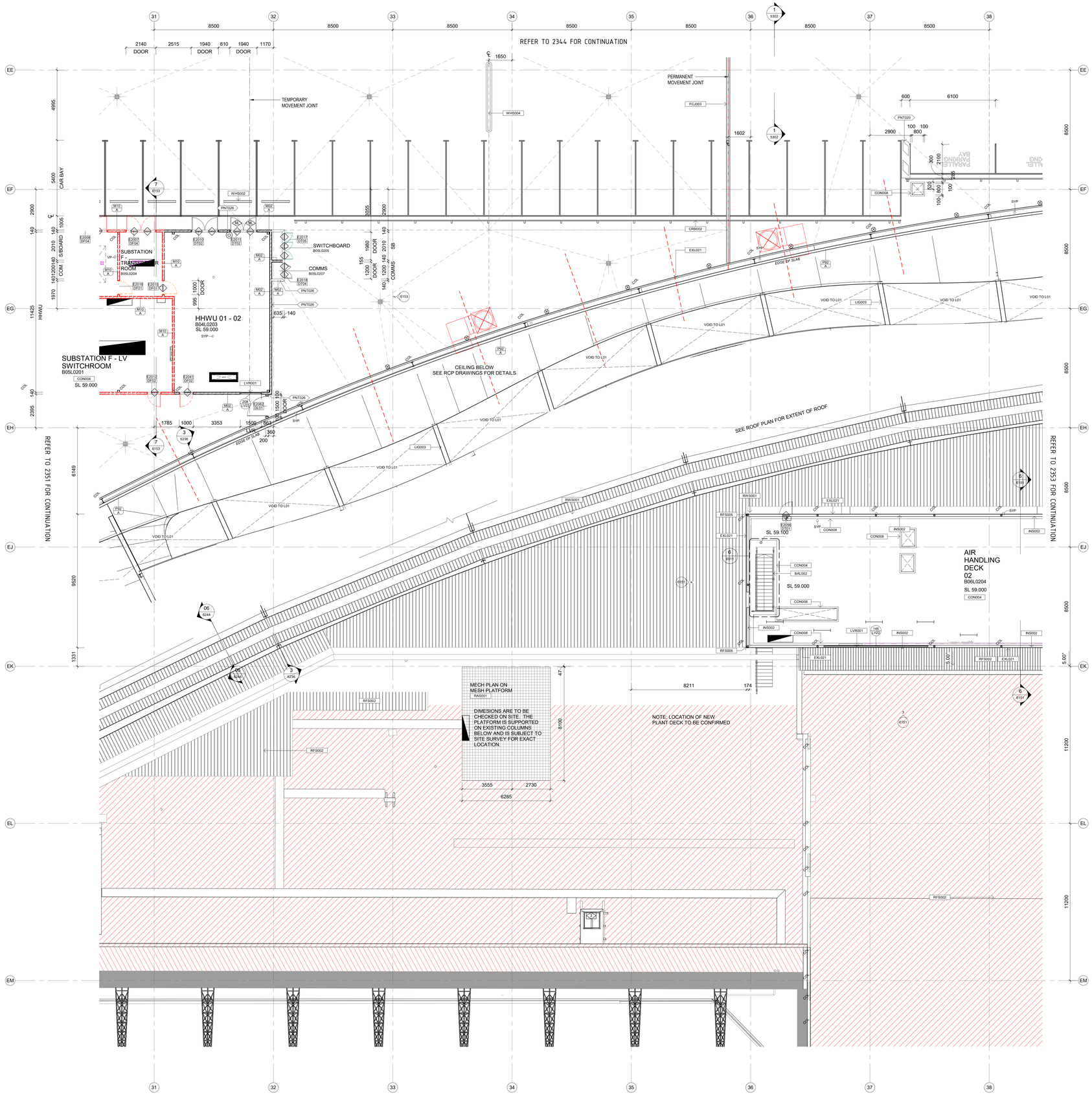
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone B04

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-B04-2351
Revision 8
Status RECORD SET

5/06/2022 9:12:35 PM



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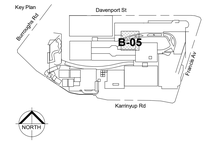
Key Plan



General Notes

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Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING, REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL002	GALV STEEL BALUSTRADES (TOP & MID RAIL TYPE)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EXL021	VERTICAL METAL CLADDING
FCJ003	EXTERNAL MOVEMENT JOINT
INS002	THERMAL INSULATION - WALLS
LIG003	LIGHTING TROUGH
LVR001	WEATHER RESISTANT LOUVRES (STD SINGLE BANK)
RAS001	ROOF ACCESS WALKWAY
RF5002	COLORBOND PROFILED METAL DECK ROOFING
RF5005	FLASHINGS AND CAPPINGS GENERALLY
RW5001	BOX GUTTER (TO ENG. DETAILS)
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE. REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FLOOR WASTE
GW	GREY WATER
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

Rev.	Date	Initial	Description
10	06/12/21		TRHS IRECORD SET
9	27/02/20		TRHS ISSUED FOR CONSTRUCTION
8	15/11/19		TRHS ISSUED FOR CONSTRUCTION
7	03/09/19		TRHS ISSUED FOR CONSTRUCTION
6	26/06/19		TRHS ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR+HS | TAYLOR ROBINSON Hames Sharley

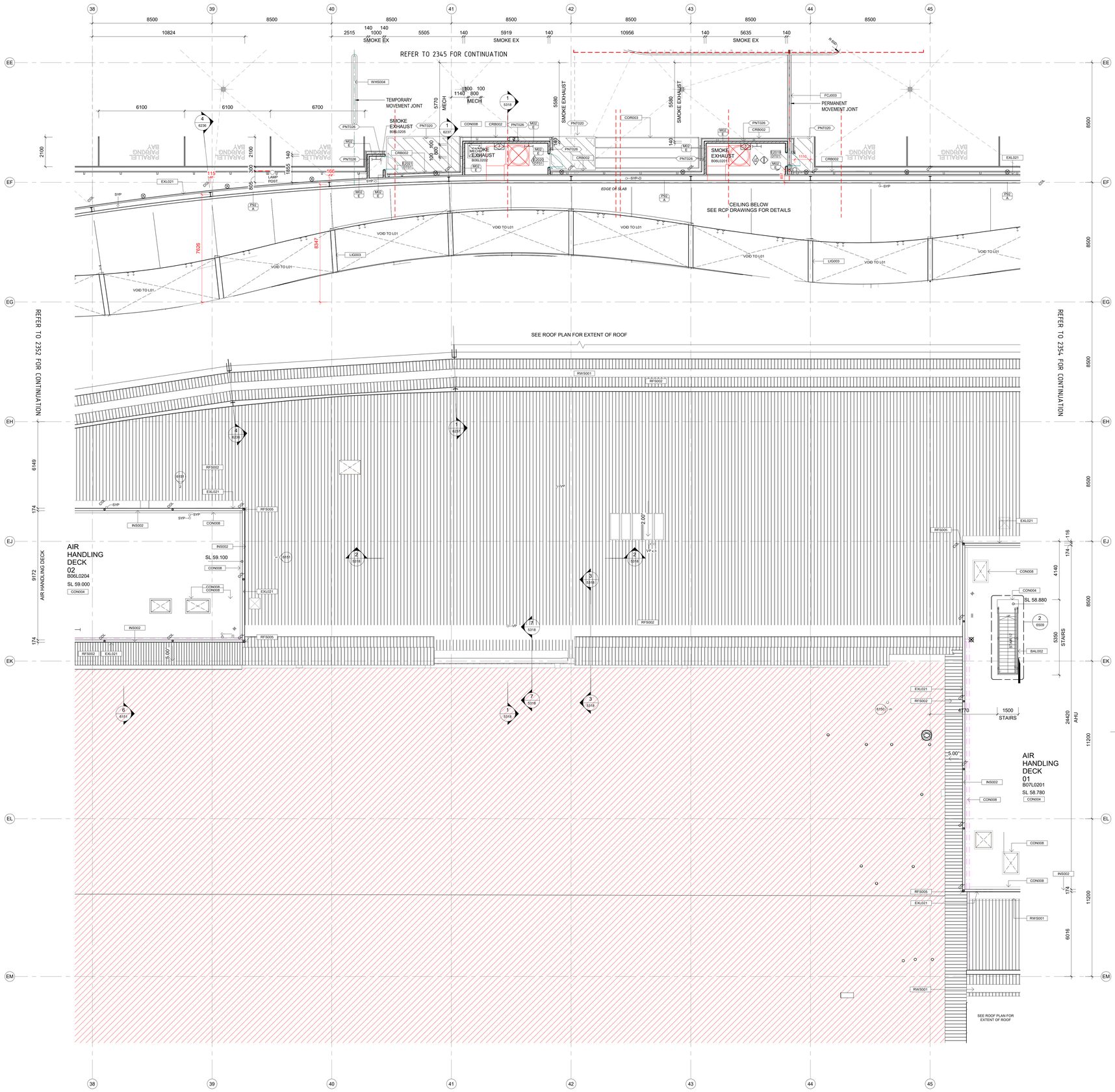
Project
Karrinyup Shopping Centre
200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone B05

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-B05-2352
Revision 10
Status RECORD SET

18/10/2022 10:22:24 PM



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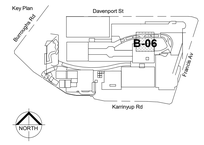
Key Plan



General Notes

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Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING, REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
P - PANEL DOOR
M - MARTISON PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL002	GALV STEEL BALUSTRADES (TOP & MID RAIL TYPE)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S.ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR003	TRIPLE TROLLEY CORRAL
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EXL021	VERTICAL METAL CLADDING
FCJ003	EXTERNAL MOVEMENT JOINT
INS002	THERMAL INSULATION - WALLS
LIG003	LIGHTING TROUGH
RFS002	COLORBOND PROFILED METAL DECK ROOFING
RFS005	FLASHINGS AND CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)
WHS004	SPEED HUMPS

Rev.	Date	Initial	Description
9	06/12/21	TRHS	RECORD SET
8	30/01/20	TRHS	ISSUED FOR CONSTRUCTION
7	10/10/19	TRHS	ISSUED FOR CONSTRUCTION
6	03/09/19	TRHS	ISSUED FOR CONSTRUCTION
5	26/06/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL UniSuper

TRHS TAYLOR ROBINSON HAMES SHARLEY

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

Drawing Title
Level 02 GA Plan - Zone B06

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No. AR-DWG-L02-B06-2353 — Revision 9

Status
RECORD SET

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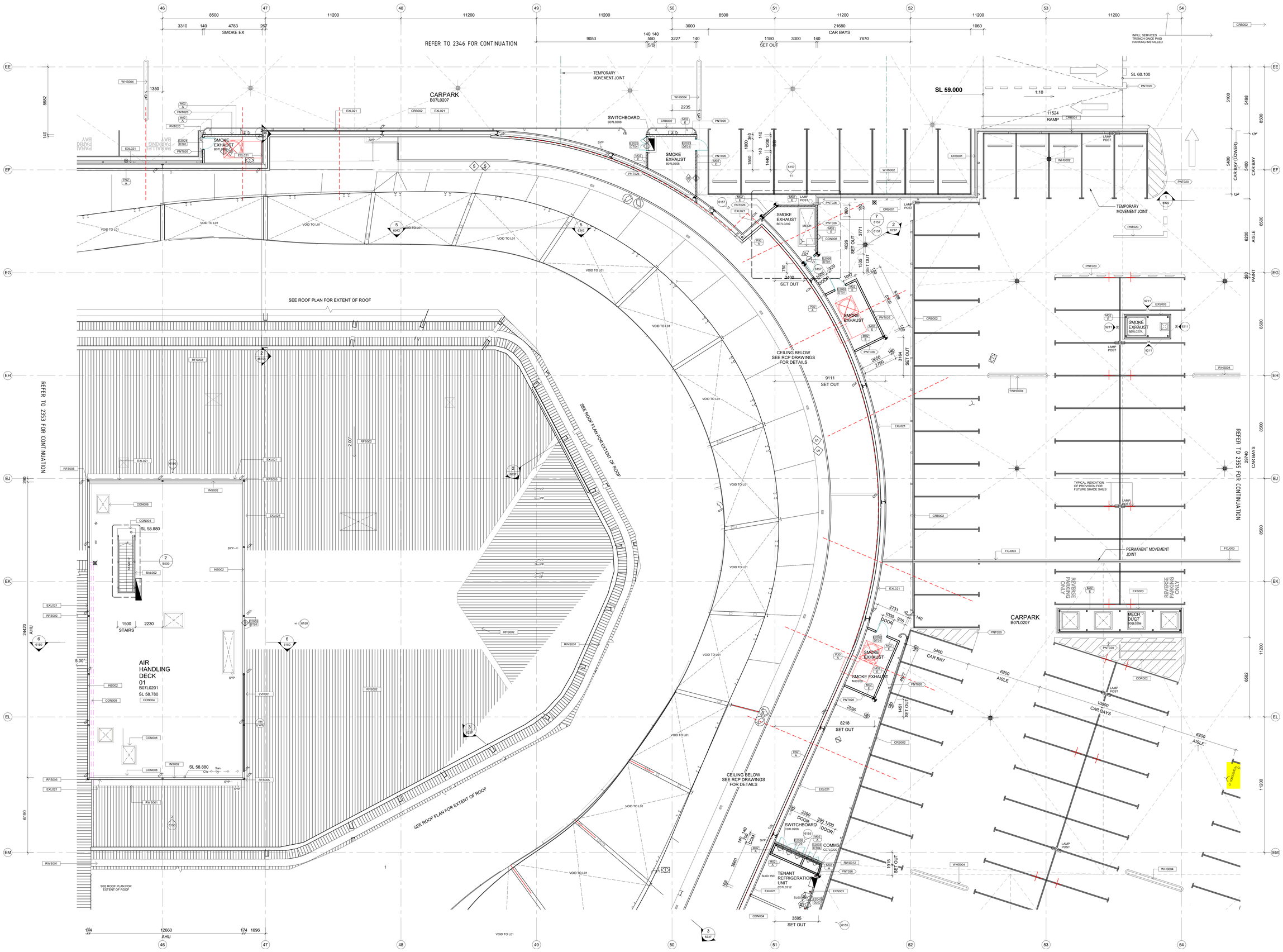

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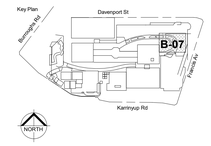
Key Plan



General Notes

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Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- DOOR NUMBER / DOOR TYPE - REFER DOOR SCHEDULE
- WINDOW NUMBER / WINDOW TYPE - REFER WINDOW SCHEDULE
- GLAZING SYSTEM NUMBER / SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- GLAZING ELEVATION NUMBER / DRAWING SERIES NUMBER
- WALL TYPE - REFER SCHEDULE / WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- DOOR NUMBER / DOOR TYPE NUMBER
- DOOR LEAF TYPE (SEE BELOW) / DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

CWT000 — MATERIAL / ITEM - REFER LEGEND

PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
BAL002	GALV STEEL BALUSTRADES (TOP & MID RAIL TYPE)
CON004	SUSPENDED CONCRETE SLAB -REFER TO S ENG DETAILS
CON008	CONCRETE INSITU UPSTAND. REFER STRUCTURAL ENGINEER
COR002	DOUBLE TROLLEY CORRAL
CRB001	CARPARK PERIMETER CRASH RAIL WITH BALUSTRADE
CRB002	CARPARK PERIMETER CRASH RAIL WITHOUT BALUSTRADE
EXL021	VERTICAL METAL CLADDING
EXS003	VISUAL SCREENING TO PLANT EQUIPMENT
FCJ003	EXTERNAL MOVEMENT JOINT
INS002	THERMAL INSULATION - WALLS
LVR001	WEATHER RESISTANT LOUVRES (STO SINGLE BANK)
RFS002	COLORBOND PROFILED METAL DECK ROOFING
RFS005	FLASHINGS AND CAPPINGS GENERALLY
RWS001	BOX GUTTER (TO ENG. DETAILS)
RWS012	STORMWATER GRATE
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Rev.	Date	Initial	Description
10	06/12/21	TRHS	RECORD SET
9	24/04/20	TRHS	ISSUED FOR CONSTRUCTION
8	19/03/20	TRHS	ISSUED FOR CONSTRUCTION
7	30/01/20	TRHS	ISSUED FOR CONSTRUCTION
6	10/10/19	TRHS	ISSUED FOR CONSTRUCTION

Client

AMP CAPITAL
UniSuper

TR HS | TAYLOR ROBINSON | Hames Sharley

Project
Karrinyup Shopping Centre

200 Karrinyup Rd, Karrinyup WA 6018

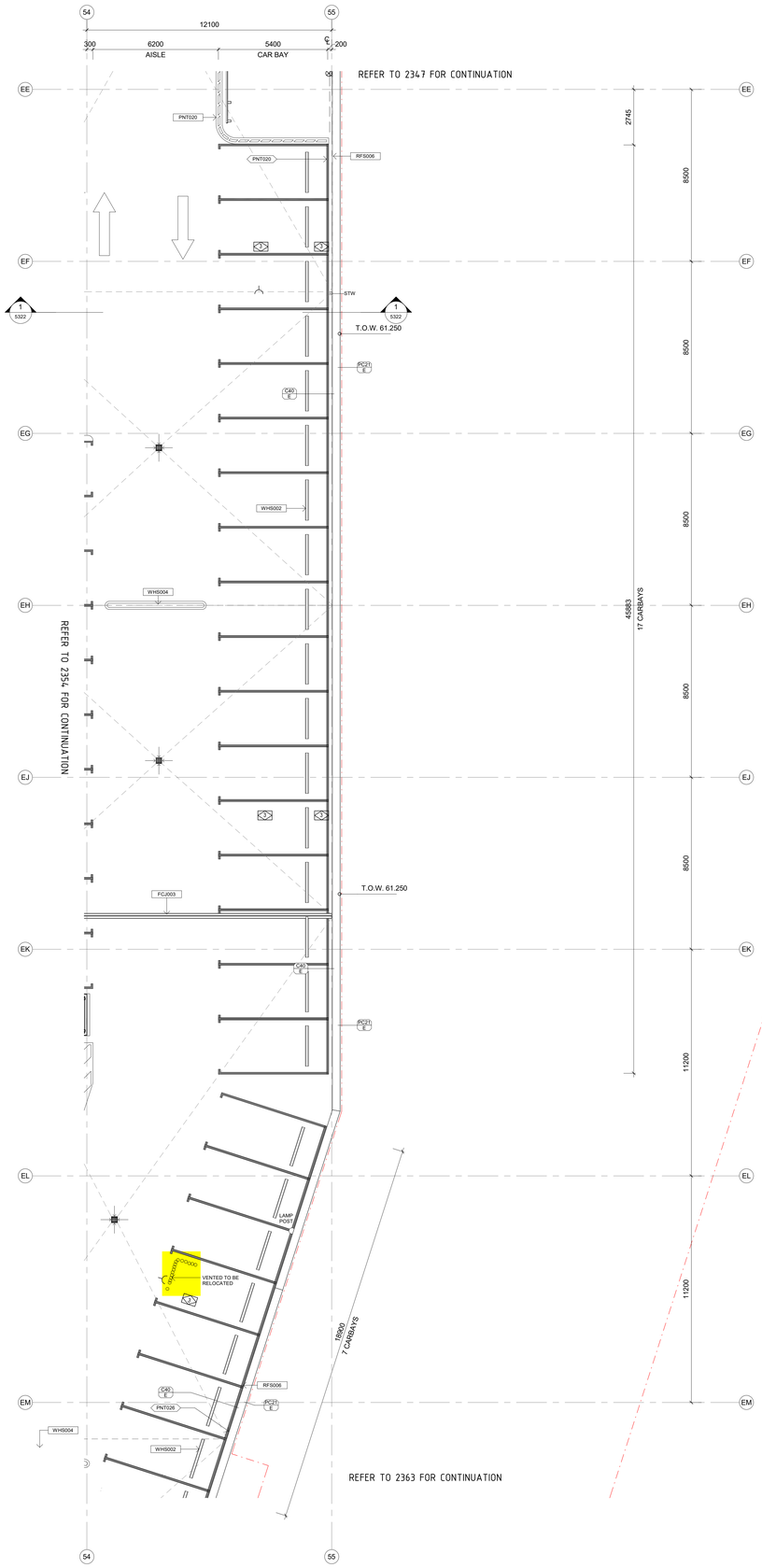
Drawing Title
Level 02 GA Plan - Zone B07

Drawn By	Checked By	Scale @ A0
LA	DB	1 : 100

Drawing No.	Revision
AR-DWG-L02-B07-2354	10

Status
RECORD SET

18/10/2022 10:23:57 PM



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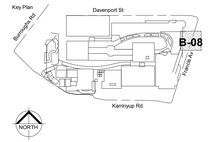
Key Plan



General Notes

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3. ENSURE CIVIL WORKS CONTRACTOR AND PLUMBING CONTRACTOR COORDINATE AND ALLOW FOR STORMWATER COLLECTION SYSTEM TO BE CONTINUOUS FROM BUILDING FACE TO STORMWATER SYSTEM.

Legend

- 3 HOUR FIRE RATED SEPARATION
- 2 HOUR FIRE RATED SEPARATION
- 1 HOUR FIRE RATED SEPARATION
- A — DOOR NUMBER; D101 — DOOR TYPE - REFER DOOR SCHEDULE
- 000 — WINDOW NUMBER; W01 — WINDOW TYPE - REFER WINDOW SCHEDULE
- 001 — GLAZING SYSTEM NUMBER; G901 — SYSTEM TYPE - REFER 9000 SERIES FOR INTERNAL GLAZING. REFER FACADE GLAZING SYSTEMS SCHEDULE -FOR OTHER
- 9000 — GLAZING ELEVATION NUMBER; A — DRAWING SERIES NUMBER
- P01 — WALL TYPE - REFER SCHEDULE; A — WALL HEIGHT

A - FULL HEIGHT TO UNDERSIDE OF STRUCTURE
B - WALL TO NOMINAL 100mm ABOVE CEILING HEIGHT
C - WALL TO UNDERSIDE OF CEILING
D - REFER TO NOMINATED DETAIL
E - REFER TO ELEVATIONS

- A — DOOR NUMBER; D101 — DOOR TYPE NUMBER; SL — DOOR LEAF TYPE (SEE BELOW); DOOR PREFIX CODE

C - COOLROOM INSULATED PANEL
F - FIRE RATED
G - GLAZED DOOR
L - LOUVRED DOOR
M - MESH DOOR
P - PARTITION PANEL
S - SLIDING DOOR
T - SOLID CORE DOOR

- HOSE HYDRANT AND CABINET
- PIPES (REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR SIZE AND LOCATION)
- INDICATES - CLASH / POTENTIAL CLASH TO BE ADDRESSED BY RELEVANT CONSULTANTS CONCERNED

Abbreviations - Consultants
(REFER TO RELEVANT ENG. DWGS FOR DETAILS)

CP	CONDENSATE PIPE
FE	FIRE EXTINGUISHER (LOCATIONS INDICATIVE, REFER FIRE FIRE HYDRANT CUPBOARD DETAIL)
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FW	FOUL WASTE
GP	GAS PIPE
OF	OVERFLOW PIPE
RWP	RAIN WATER PIPE
San	SANITARY DRAINAGE
STW	STORMWATER
SYP DP	SYPHONIC DOWNPIPE
SYP OF	SYPHONIC OVERFLOW
TW	TRADE WASTE
VP	VENT PIPE
WP	WATER PIPE

- CWT000 — MATERIAL / ITEM - REFER LEGEND
- PNT000 — SELECTED FINISH - REFER SCHEDULES

Paint Finishes

TAG	DESCRIPTION (REFER TO SCHEDULE)
PNT020	EXTERNAL LINEMARKING PAINT. COLOUR WHITE (AS 2700 REFERENCE)
PNT026	WEATHERSHIELD / MASONRY MATT (661)

Material / Item Schedule

TAG	DESCRIPTION (REFER TO SCHEDULE)
FCJ003	EXTERNAL MOVEMENT JOINT
RFS006	CAPPING3 GENERALLY
WHS002	PRECAST CONCRETE WHEELSTOP (TO COMPLY WITH AS 2890.1)
WHS004	SPEED HUMPS

Rev.	Date	Initial	Description
5	06/12/21	TRHS	RECORD SET
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Mixed Use Expansion at Karrinyup

Transport Plan for Development Application

Prepared for
The GPT Group
Karrinyup Shopping Centre
200 Karrinyup Rd, Karrinyup WA 6018

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Document prepared by:

Aurecon Australasia Pty Ltd

ABN 54 005 139 873

Level 5, 863 Hay Street
Perth WA 6000
Australia

T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

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Executive Summary

Aurecon was commissioned by AMP Capital Funds Management Ltd to undertake a Transport Plan (TP) for the Development Application for the Mixed-Use Expansion at Karrinyup ('the Development'). The Development is proposed to increase in retail floor space from approximately 54,000 m^2 to 93,355 m^2 upon completion. There are also proposed increases in office, eating/entertainment and community/health floor space, and provision for residential dwellings within the Development. The design incorporates a 'main street' as an extension of Jeanes Road, allowing for an open streetscape with pedestrian walkways, landscaping, high quality-built form and features, and mixed use development to create an area of high activity during and beyond normal trading hours. The design also includes the addition of a Cinema and the development of the existing Bankwest site.

The main aim of this TP is to address access requirements to the Development by all modes of transport. A transport model was developed for this study in order to analyse the performance of the road network with and without the redevelopment. Strategies to increase sustainable transport to the Development are included in this TP, including public transport, pedestrian and cycling access. Parking management and servicing strategies are also included in this plan.

A Traffic and Transport Assessment was previously undertaken as part of the Draft Karrinyup Secondary Centre Activity Centre Structure Plan. This TP aims to ensure that the development proposal is consistent with the overall structure planning of the area and to provide a greater level of technical detail of the Development and its immediate surrounds.

Public Transport Network

A number of measures are proposed to encourage visitors to use public transport as an option to access the Mixed-Use Expansion at Karrinyup, including:

- Better integration of the bus station with the entrance to the Development whilst including improved personal security i.e. CCTV, lighting, weather cover
- Real time bus timetable information at the bus station and throughout the Development
- Improved bus priority infrastructure including dedicated bus lanes at various locations along Karrinyup Road
- Travel behaviour change initiatives to promote mode shift

A funding contribution is proposed to increase the frequency of bus services between the Centre and Stirling Station for a period of 7 years. This will involve services relating to either or both the 423 and 425 routes with a goal of achieving 10-minute headways in the morning and evening Centre weekday peaks. During the weekends, movements will be on one route (Route 425), which will be more easily identifiable for Centre customers, with 15-minute headways on the shoulders of and during the weekend Centre open hours. The final details of the provision of additional bus kilometres will be agreed with the Transport Portfolio.

Pedestrian Network

Walking access to the Development is currently limited by the lack of dedicated pedestrian links and poor quality of crossings into and within the Development. Of high importance is perceived pedestrian safety during the crossing of main roads and parking lots. In order to improve the walkability of the existing environment and increase walking trips to the Development, the following is proposed:

- Providing a contribution to expand the extent of the local path network to provide a footpath on one side of local streets that do not currently have a footpath. This contribution will be to an amount of $400,000.
- It is also proposed to make a contribution of $50,000 to the City to provide additional street trees to help shade those paths that are devoid of any street trees
- Pedestrian entrances to the Development that link directly to the surrounding pedestrian network
- Widening of existing footpaths around the perimeter of the Development to 2.0m or a 2-way 3.5m shared path
- Providing suitable pedestrian crossings within and surrounding the Development compliant with DDA standards
- Providing way-finding signage at strategic locations to provide legibility and awareness of pedestrian links to the Development
- Improved pedestrian amenities including street furniture, lighting and weather cover

Cycling Network

There are some existing cycling facilities within the vicinity of the Development. However, in order to encourage mode shift, there is a strong need for substantial cycle infrastructure improvements to improve usability and safety for cyclists, particularly within the immediate vicinity of the Development.

Given that the Development will cater for both commuters and recreational cyclists (including staff, retail shoppers and parents with children), there is a need for infrastructure suitable for inexperienced cyclists to encourage a mode shift. Taking into consideration the type of cyclist and the available road corridor width, there are a number of opportunities to increase the effectiveness of the surrounding cycle network, particularly from the west and south, to promote bicycle access to the Development. It is proposed that a combination of shared and segregated cycle paths is installed around the perimeter of the Development, and along sections of Karrinyup Road and Jeanes Road, to promote cyclist access the Development.

A number of other measures are proposed, including:

- Ensuring that intersections surrounding and within the Development will accommodate cyclists appropriately
- Providing improved way-finding signage to direct cyclists towards the Development
- Providing improved the bicycle access, parking and end of trip facilities within the Development

Bicycle parking and end-of-trip facilities are proposed at strategic locations within the Development, as follows:

- 160 public bicycle parking spaces in the form of bicycle racks dispersed amongst the four major entrances to the Development and along the main street
- A secure, enclosed end-of-trip facility for staff located at the southern major entrance to the development, near the Karrinyup Bus Station, capable of accommodating 200 bicycle racks and lockers. This also includes separate female and male change rooms incorporating 5 showers and 1 toilet in each.

Road Network

As part of the TP, transport modelling was undertaken for a wider area to investigate the impacts of the Development on the surrounding road network. To ensure the road network surrounding the Development will operate at an acceptable level in the future, a number of upgrades have been recommended to bring connectivity and usability to the area. These are included in the transport model and include lane extensions and additional turning pockets at locations where required.

At most locations, intersection capacities are reached both now and, in the future, with or without the Mixed Use Expansion at Karrinyup.

The proposed intersection upgrades also include provisions for pedestrians and cyclists and will include some cycle traffic lanterns in the subsequent design stages. Further potential upgrades have also been raised and are to be further discussed, in line with local and state authority's plans.

Parking

It is proposed to apply a reduced rate of parking for the Mixed Use Expansion at Karrinyup. The proposed Development incorporates a total of up to 4,880 car parking bays, at a rate of up to 4.2 bays per 100m^2 of total floor space. This includes provision for parking for people with disabilities, as well as provision for motorcycle bays. In addition, localised parking is provided for the proposed residential dwellings.

A number of parking management strategies are proposed, including:

- Parking way-finding signage, including available parking numbers
- Fully managed parking detection system
- Mix of short and long term parking for visitors and staff
- Publicity for improved public transport and cycle provision

Development Approval Conditions

The following development approval conditions have been addressed in this TP:

- The schematic road upgrade drawing for Karrinyup Road/ Jeanes Road/ Main Street is included in Appendix G. The traffic modelling presented in this plan includes this design.
- Supplementary information has been provided regarding the impact of the Development on the adjacent residential road network. This information shows that while there is an increase in traffic on some of the surrounding roads, the volume of traffic is expected to still be within the designated values for the corresponding road hierarchy levels for each road

It should be noted that other conditions of the development approval have not been considered for this Amended Development Application and will be included in future works as part of the detailed design stage.

2024 Proposed Modification

The changes to the network and on-site operation have been implemented as required by the development approval conditions for the changes made since 2019.

The proposed changes to the Karrinyup Shopping Centre in 2024 are:

- Conversion of Ramp 14 from entry only to exit only at Karrinyup Road
- Addition of 267 parking spaces across two floors atop the existing eastern parking structure

The Centre is proposing these two changes to improve the experience of vehicle access and car parking for customers visiting Karrinyup. The changes are not expected to increase the trip generation of the Centre, but to manage the difference between existing demand and parking supply, and ease internal congestion.

These changes do not fundamentally alter the existing land use or trip generation potential of Karrinyup Shopping Centre. As such, any impact to the surrounding road network is expected to be minor. Some redistribution of traffic movements along Karrinyup Road immediately adjacent to the Development will occur.

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APPENDICES

Appendix A Schematic Road Upgrade Drawings

Appendix B Transport Model Details

Appendix B1 2024 Transport Model Details

Appendix C Modelling Performance – 2021 and 2031

Appendix C1 Modelling Performance – 2024 and 2034

Appendix D SIDRA Analysis Outputs

Appendix D1 SIDRA Analysis Outputs – 2024 and 2034

Appendix E Flow Density Plots

Appendix F Development Access SIDRA Analysis Outputs

Appendix F1 Development Access SIDRA Analysis Outputs – 2024 and 2034

Appendix G Karrinyup Road/ Jeanes Road/ Main Street Schematic Road Upgrade Drawing

1. Introduction and Background

1.1. Introduction and Objectives

Aurecon was commissioned by AMP Capital Funds Management Ltd to undertake a Transport Plan (TP) for the Development Application for the Mixed Use Expansion at Karrinyup ('the Development'). The Development is proposed to undergo significant redevelopment and be transformed into a 'community hub' with mixed use development within and surrounding the Development. This includes the establishment of a main street which will be active during the day and also after hours.

The main aim of the TP is to address access requirements to the Development by all modes of transport in order to sustain the land use intensification in line with the overarching vision of the Development. The transport issues specific to the Development are outlined in this report.

1.1.1. 2024 Proposed Modification

An updated Traffic Impact Assessment (TIA) relating to the Karrinyup Shopping Centre was issued in September 2024. The updates to this Transport Plan (TP) and the TIA refer to two proposed changes to the Development's transport infrastructure:

- Construction of two additional floors of car parking on top of the eastern parking structure. The existing ramp will be extended to accommodate these new floors.
- Conversion of the existing Ramp 14 entrance from Karrinyup Road to an exit only ramp. Minor changes to internal vehicle circulation will be made to accommodate the change in use.

Subsequent to the initial delivery of the TP, the Development is now managed by GPT Group.

1.2. Context

The Development forms the major activity centre within the Karrinyup-Gwelup locality in the City of Stirling, located approximately 12 km north west of the Perth CBD, as shown in Figure 1-1, and locally in Figure 1-2. The Development is identified as a secondary activity centre in the WAPC State Planning Policy 4.2.

The Development focuses on the primary access route, Karrinyup Road, and also on the connecting local distributor and access routes which also provide direct access, including Francis Avenue, Burroughs Road, and Davenport Street.

As part of the TP, transport modelling was undertaken for a wider area bounded by Reid Highway to the north, Mitchell Freeway to the east, West Coast Highway and West Coast Highway/ Marmion Avenue to the west and Pearl Parade, Sackville Terrace and Cedric Ave to the south.

1.2.1. 2024 Proposed Modification

The expansion outlined in this TP was completed in late 2021 with a total of 4,683 carparks out of the consented 4,880. It was understood that other shopping centres in Perth would have been redeveloped in recent years, but this has not occurred as at November 2024. Subsequently, there is a greater than expected level of sustained demand at the Karrinyup Shopping Centre. This sustained demand has led the Applicant to add additional parking spaces to improve the experience of those visiting the shopping centre.

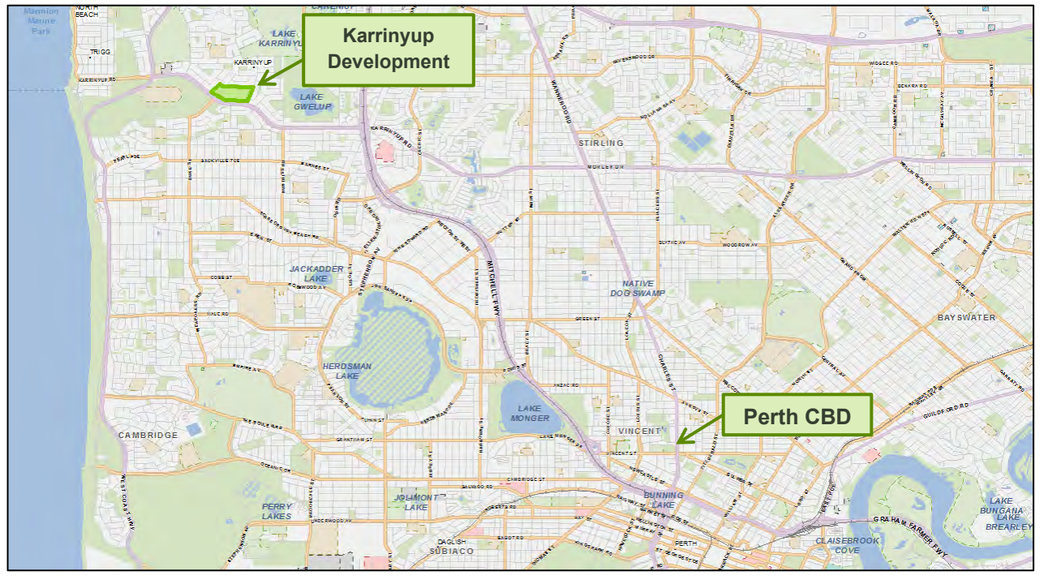


Figure 1-1 Locality map

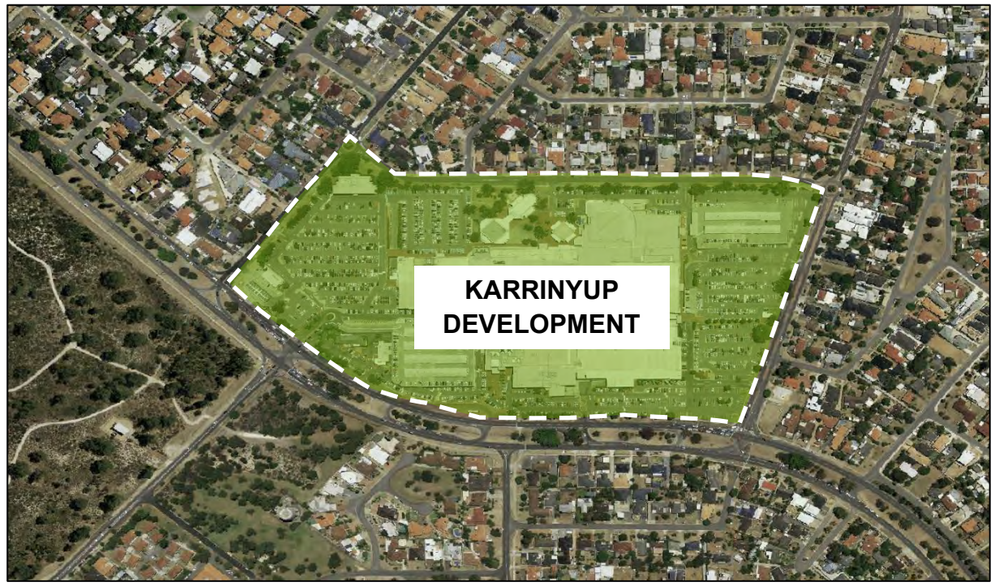


Figure 1-2 Mixed Use Expansion at Karrinyup – the Development

1.3. Prior Transport Assessment

A Traffic and Transport Assessment was previously undertaken as part of the Draft Karrinyup Secondary Centre Activity Centre Structure Plan. This TP aims to ensure that the Development proposal is consistent with the overall structure planning of the area and to provide a greater level of technical detail of the Development and its immediate surrounds.

1.4. Report Structure

This TP outlines strategies to increase sustainable transport to the Development, including public transport, pedestrian and cycling access. Having undertaken transport modelling, the TP identifies improvements to the surrounding road network to support the Development, with schematic road upgrade drawings attached in Appendix A. Parking management and servicing strategies are also included in this TP. This report is structured as per the following:

- **Section 2 –** Development Proposal
- **Section 3 –** Existing Situation
- **Section 4 –** Traffic Analysis – Background
- **Section 5 –** Traffic Analysis – Results and Discussion
- **Section 6 –** Parking
- **Section 7 –** Public Transport Access
- **Section 8 –** Pedestrian Access
- **Section 9 –** Cycling Access
- **Section 10 –** Servicing Access
- **Section 11 –** Reduced Parking Number Scenario

2. Development Proposal

The proposed Development includes the Mixed Use Expansion of the Karrinyup Shopping Centre (refer to Figure 2-1). The retail floor space of the Development is proposed to increase from approximately 54,000 m^2 in retail to 93,355 m^2 on completion of this Development. There are also proposed increases in office/business, entertainment/community and health floor space, and provision for residential dwellings within the Development (refer to Table 2-1).

Table 2-1 Proposed land use for the Karrinyup Development

Land Use Type	Proposed Floor Space (m^2 NLA)
Retail	93,355
Office / Business	10,394
Entertainment / Community	3,916
Cinema	6,200
Health	2,654
Utility	300
Total:	**116,819**
Residential Dwellings	**134**

The Development proposed consists of the following:

- Four (4) consolidated gateways to the retail core of the Karrinyup Development; North Gate, South Gate, East Gate and West Gate.
- Establishment of a single lane one-way pedestrian friendly 'main street' as an extension of Jeanes Road.
- Multi-level car parking with a total of up to 4,880 bays (including general vehicles and parking for the mobility impaired), split between the eastern and western sides of the Development.
- Reconfigured service delivery yards, catering for the increased retail syndicate.
- Revised road accesses into and throughout the Development, ensuring the road network performs adequately.
- Upgrades to numerous intersections in the wider road network surrounding the Development to improve access.
- A combination of new and upgraded pedestrian and cycling paths to support mode shift to the Development.
- The delivery of bus priority infrastructure along Karrinyup Road and travel behaviour change initiatives to support mode shift to the Development. The bus station is proposed to be retained without any layout modifications, as stipulated by the Public Transport Authority (PTA).
- The addition of a cinema and development of the existing Bankwest site on the northern side to include retail floor space.

The establishment of the main street will form a high street style shared area allowing for outdoor dining with buildings fronting both sides, and a piazza located in front of the West Gate entrance to the Development. There are opportunities for the main street to be, on occasion, cordoned off to prevent vehicle access. This will allow for community events and street festivals to take place throughout the year.

The Draft Karrinyup Secondary Centre Activity Centre Structure Plan includes additional mixed use development adjacent to this Development which may occur in the future. As such, these have not been included in this TP. It can be noted that there is capacity for increased non-retail floor space within the proposed Development.

It is expected that the expansion at Karrinyup will occur in multiple stages, as the demand for such development arises and as construction dictates. Schematic road upgrade drawings for the Development are shown in Appendix A, with concept architectural plans for the Development in the main submission report. Prior to the commencement of site works for the retail centre, a detailed Road Upgrade, Construction and Staging Plan for the Karrinyup Road works is to be prepared in consultation with the City of Stirling, Department of Planning, Department of Transport, Public Transport Authority and Main Roads WA for the proposed upgrades.

Additionally, a Travel Behaviour Change and Parking Management Plan is to be developed, after consultation with Department of Transport. Supplementary information regarding the impacts of the Development on the adjacent residential road network is shown in Section 5.6.

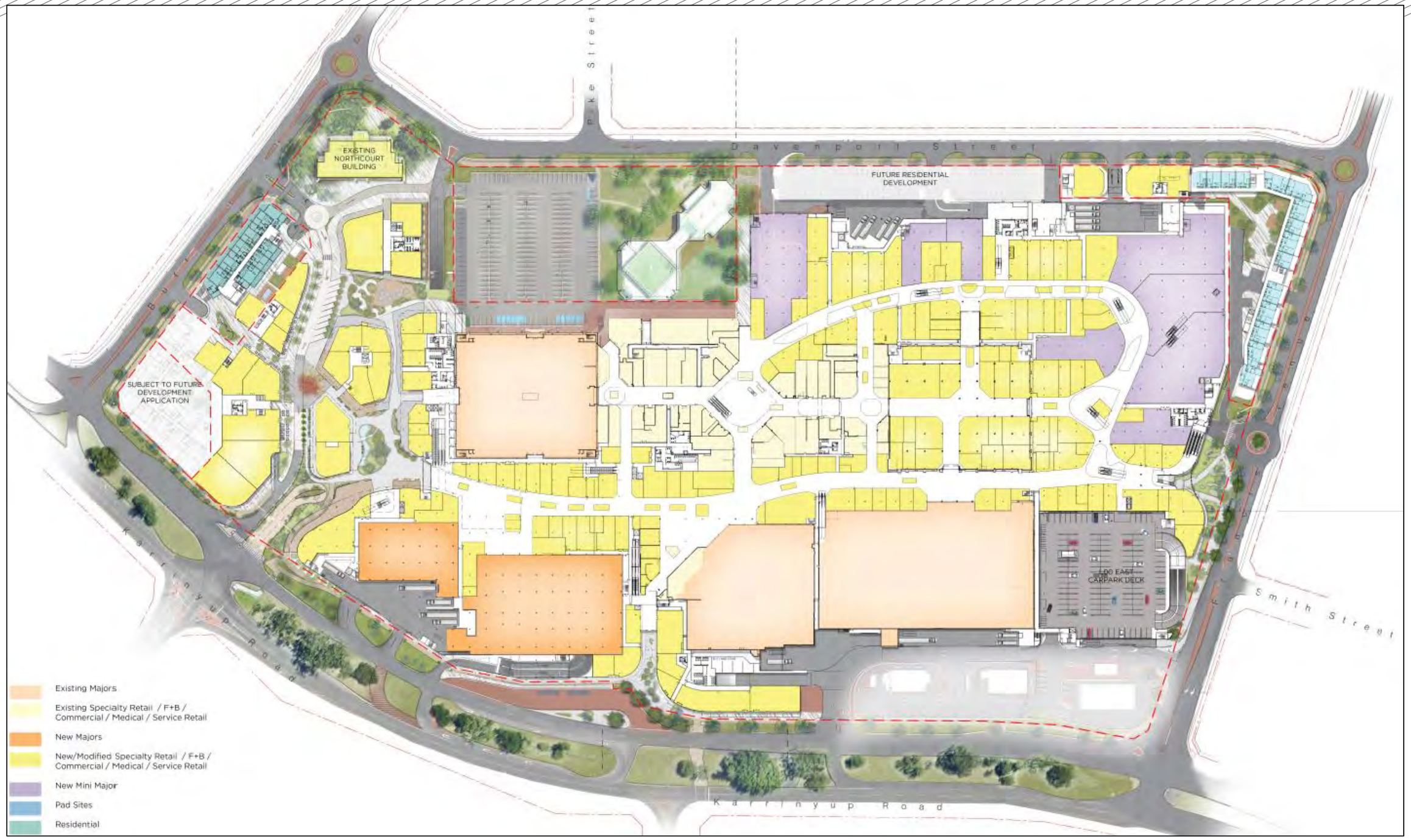


Figure 2-1 Mixed Use Expansion at Karrinyup (ground floor)

2.1. 2024 Proposed Modification

The proposed Development as outlined in Section 2 was completed in late 2021. Since then, the Applicant has noted two points of frustration for customers visiting Karrinyup Shopping Centre:

- Demand for parking spaces is approaching the capacity of the Development
- Exiting the Development is a point of frustration, particularly during peak times

To remedy the above issues, the Applicant is proposing two changes to the transport infrastructure at Karrinyup Shopping Centre.

2.1.1. Proposed Access Arrangement Change

It is proposed that the direction of a single-lane, entry-only ramp (Ramp 14, Access 2) connecting the Development to Karrinyup Road be reversed. Currently the ramp can be accessed as an entry from the west, or by using a break within the Karrinyup Road median from the east. The proposal is to convert the direction of this ramp to exit-only with a left-turn only restriction. Vehicles using this exit would travel eastbound on Karrinyup Road, noting there is also an existing nearby U-turn facility to the east. The proposed Ramp 14 access change and associated internal B01 changes, including the more direct connection from B02, are shown in Figure 2-2.

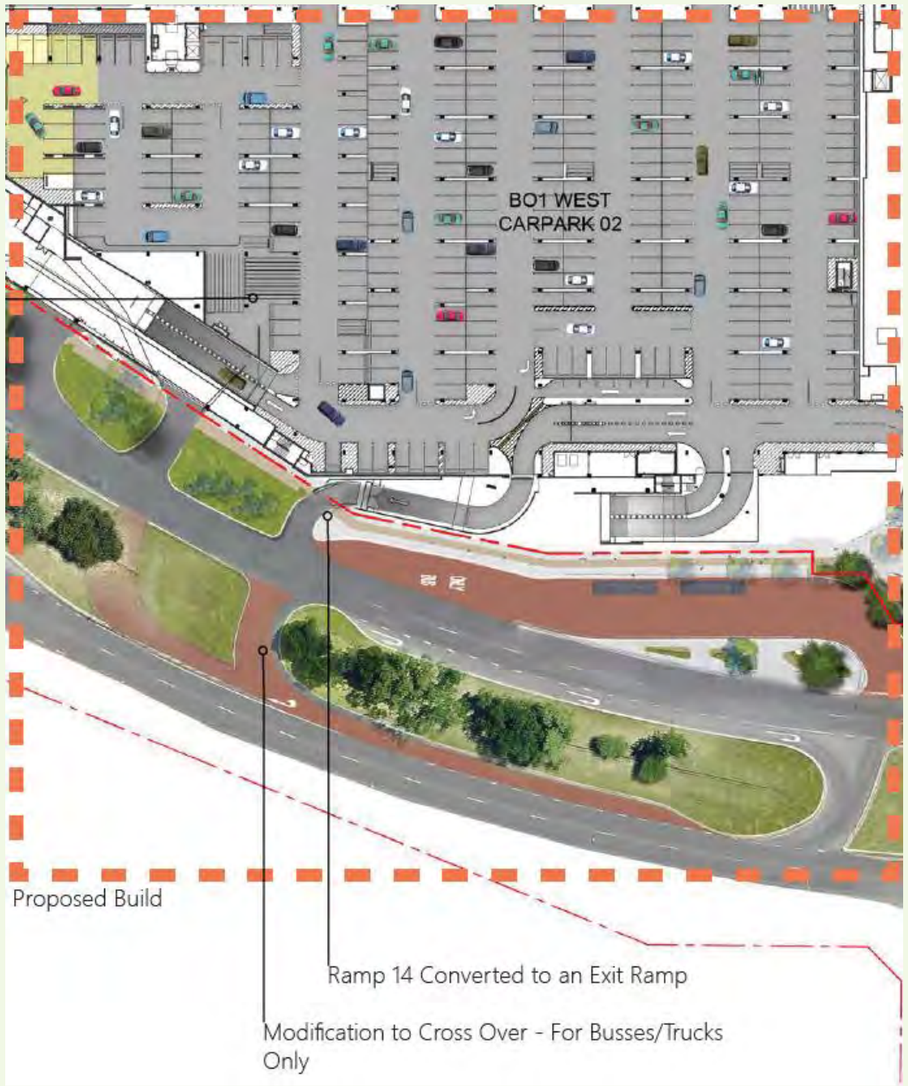


Figure 2-2 Proposed Ramp 14 Access Change

2.1.2. Parking Provision Increase Proposal

The Applicant is proposing to increase the parking provision at the Development by 267 bays, for a total of 4,950 parking spaces. This total number of car park spaces is 70 more than has been previously consented. These car parking bays will be provided in the eastern carpark by construction of two additional levels on the existing structure. These levels will be accessed by extending the existing podium D-handle ramp structure upwards. These additional bays will further satisfy existing parking demand, and support better onsite circulation. The general area of the

additional car park spaces on the eastern parking structure is highlighted in Figure 2-3, the proposed changes to Level 2 in this area are shown in Figure 2-4, and the proposed additional Levels 3 & 4 are shown in Figure 2-5.

Figure 2-3 Eastern Parking Structure Additional Car Park Spaces Location

Figure 2-4 Proposed Level 2 Change

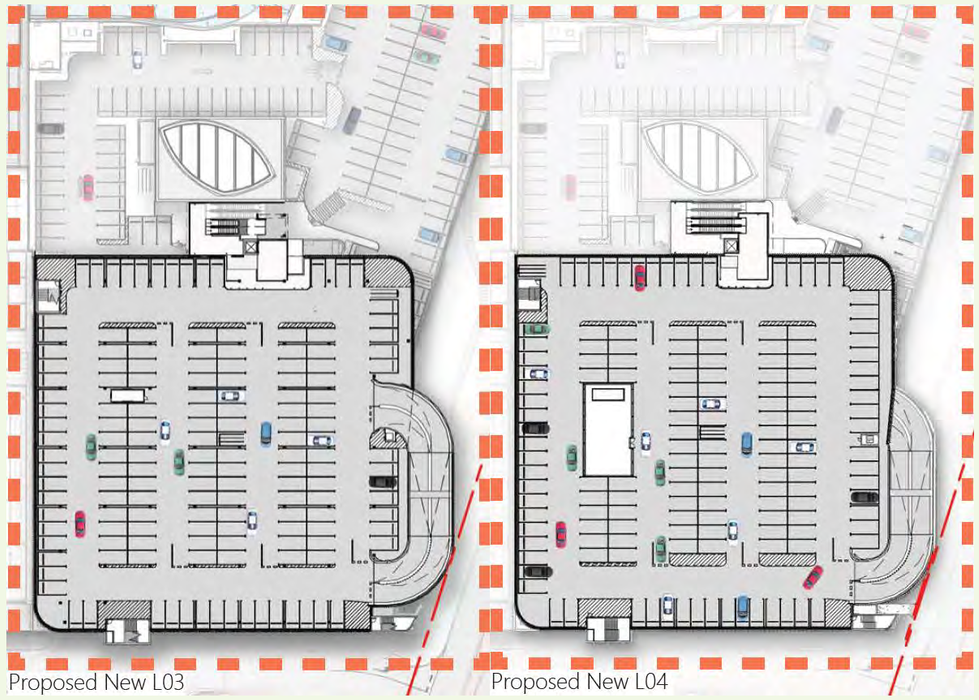


Figure 2-5 Proposed New Levels 3 and 4

The valet parking is proposed to also be relocated to the Eastern Parking Structure on level 2 in the northern section. Given that the demand profile for valet parking generally aligns with the demand profile for rest of the Centre's carparks, the impact of this change will be minimal.

3. Existing Situation

3.1. Development Uses and Surrounding Land Use

The Development is currently mixed-use consisting of commercial and civic facilities, including the Karrinyup Shopping Centre, adjacent Library and Community Centre as well as a small number of offices and professional services on land facing the centre and fronting the streets surrounding the centre. A Transperth bus station is located alongside the Development adjacent to Karrinyup Road. Table 3-1 shows the existing land use types.

Table 3-1 Existing land use for the Karrinyup Development

Land Use Type	Floor Space, m² (2011)
Retail	53,544
Office/Business	4,184
Eating/Entertainment/Culture	2,382
Community/Health/Welfare	706
Other Incidental Floor Space	195
Total	**61,011**

The land use currently surrounding the Development is predominantly single-unit residential dwellings (design code R20/R30) with various public reserves, including Lake Gwelup to the east. A number of primary schools are located within close proximity to the Development including Karrinyup Primary School, Our Lady of Good Counsel Primary School, St. Mary's Anglican Girls School and Newborough Primary School (refer to Figure 3-1).

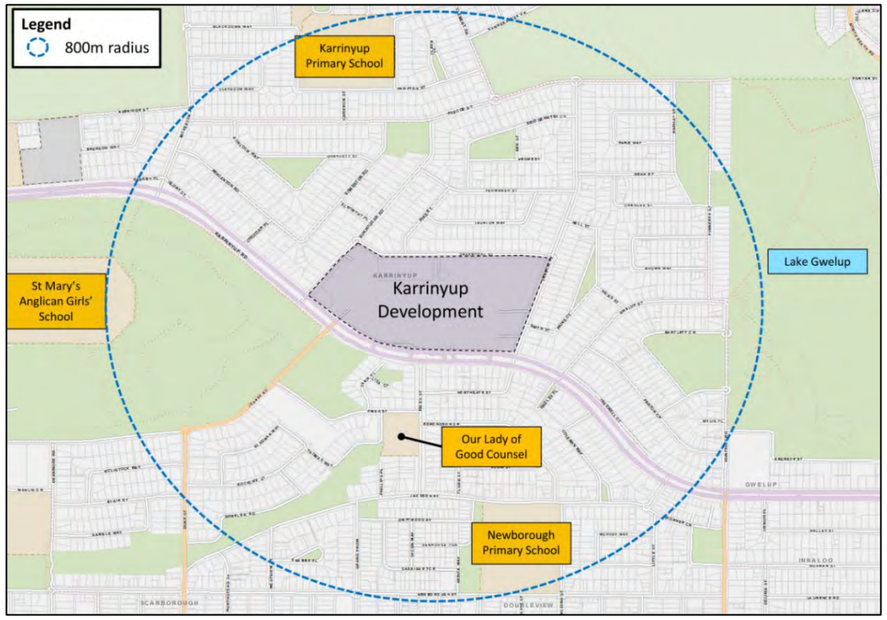


Figure 3-1 Surrounding land use

3.2. Mode Accessibility

A Customer Exit Survey was conducted by Directional Insights in 2011 which indicated travel modes to the Development were 92% by car and 8% by other modes, as shown in Figure 3-2. This high rate of car use is 10% above the 82% benchmark for regional centres, indicating a significant reliance on car use. At similar regional centres, it is typical to see 6% of customers walking and 8% customers travelling by bus. The Development is slightly below the benchmark for customers walking and well below the benchmark for customers travelling by bus. This may be due to limited walking access and public transport services, especially during peak retail times.

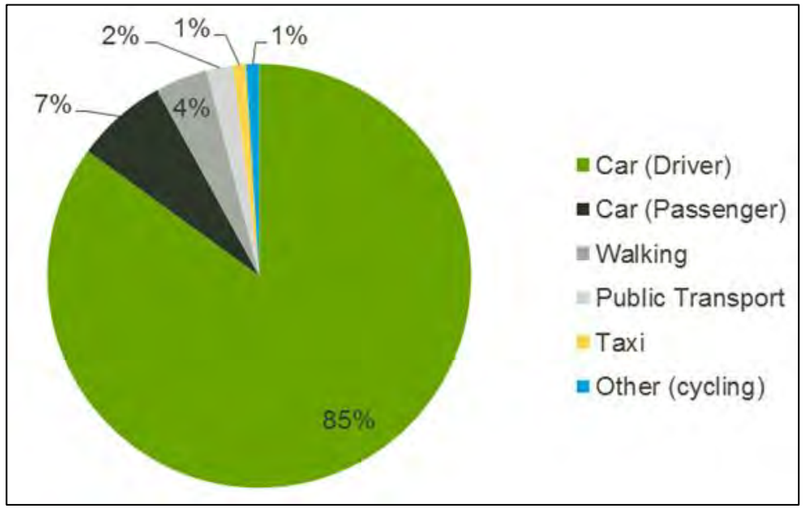


Figure 3-2 Existing travel mode share

3.3. Road Network

3.3.1. Access

Access to the Development is facilitated by a well-connected road network of various classes. The road hierarchy, as assigned by Main Roads Western Australia (MRWA), is provided in Figure 3-3. The primary distributor routes leading to the Development, either directly or indirectly, include Karrinyup Road, West Coast Highway, Marmion Avenue and Mitchell Freeway.

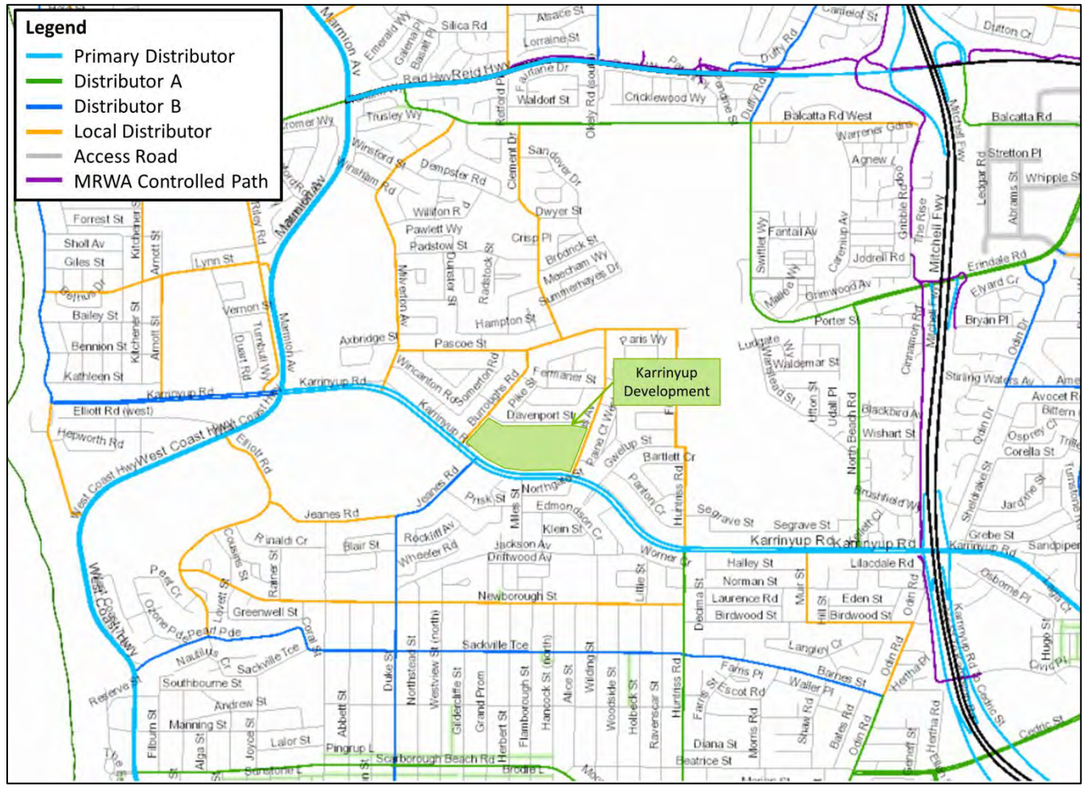


Figure 3-3 Main Roads WA road hierarchy in surrounding network

There are five key roads connecting directly to the Development, as shown in Figure 3-4, including the following:

- **Karrinyup Road**
  - A major east-west Primary Distributor road, under Main Roads WA jurisdiction, connecting from West Coast Highway to Morley Drive (east of the Mitchell Freeway)
  - Karrinyup Road is a dual carriageway road with a wide median and has a posted speed of 60km/h in the vicinity of the Development (between Burroughs Road and Gwelup Street), and 70km/h elsewhere
- **Jeanes Road**
  - A Distributor B road connecting a primarily residential catchment south west of the Development with a posted speed of 50km/h
  - Jeanes Road is a single carriageway road providing direct access to the Development via a signalised four-way intersection with Karrinyup Road
- **Francis Avenue**
  - A local distributor road connecting a primarily residential catchment north of the Development
  - Francis Avenue is a single carriageway road providing access to the Development via a signalised T-intersection with Karrinyup Road
  - Francis Avenue has a posted speed of 50km/h
- **Burroughs Road**
  - A local distributor road connecting a primarily residential catchment north of the Development with a posted speed of 50km/h
  - Burroughs Road is a single carriageway road providing access to the Development via an un-signalised T-intersection with Karrinyup Road.
- **Davenport Street**
  - A local access road running along the northern side of the Development between Burroughs Road and Francis Avenue with a posted speed of 50km/h
  - Davenport Street is a single carriageway road providing access to the Development via roundabout controls at both the Burroughs Road and Francis Avenue intersections

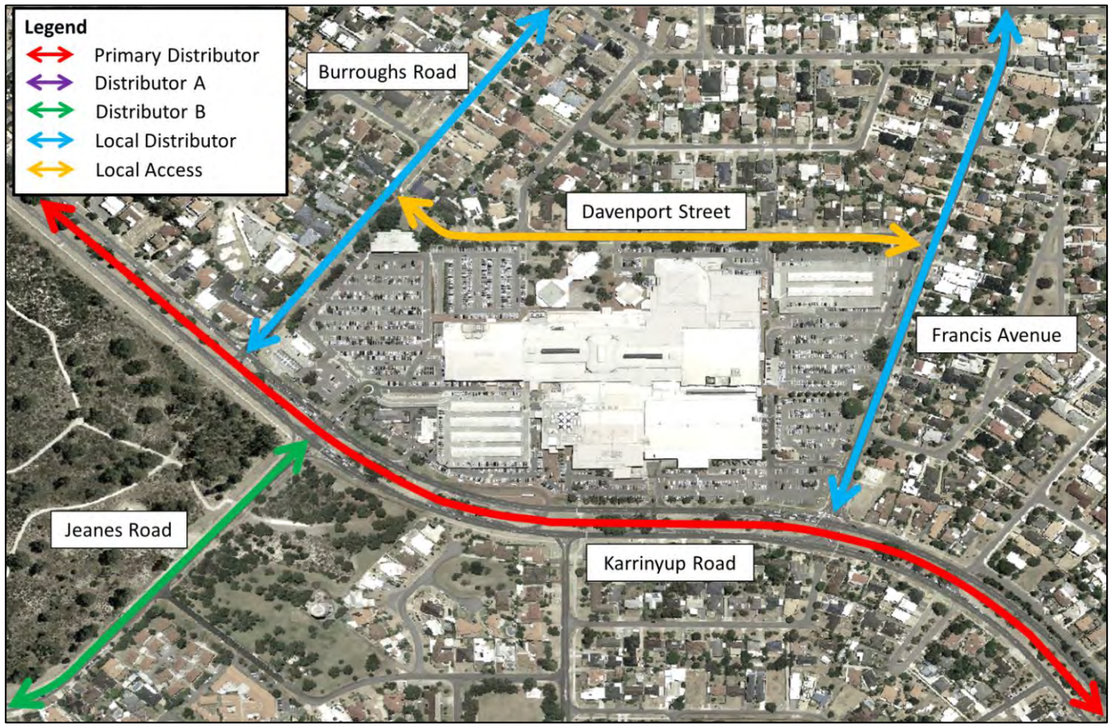


Figure 3-4 Road hierarchy within the Development

Predominant access to the Development is via Karrinyup Road, with indirect access provided via the Karrinyup Road / Burroughs Road intersection (an unsignalised T-intersection) and Karrinyup Road / Francis Avenue (signalised T-intersection). Access to the Development itself is currently provided via ten intersections, plus an entry and exit point for bus only access to the Karrinyup bus station, as shown in Figure 3-5.

Figure 3-5 Access to the Development

Access directly into the Development from Karrinyup Road is via one signalised and two unsignalised intersections as described below:

- Access 1 provides signalised access to the Development as part of the Karrinyup Road/ Jeanes Road intersection. Northbound and westbound traffic entering the Development is supported by signalised movements, while eastbound traffic enters via the priority controlled left turn slip lane.
- Access 2 provides left in, left out only access from Karrinyup Road, primarily to service existing fast food outlets.
- Access 3 provides access into the Development for both eastbound and westbound vehicles, however is left out only.

All the remaining accesses into the Development via Francis Avenue, Davenport Street and Burroughs Road provide a priority controlled T-intersections where all movements are permitted.

An existing petrol station is located on the corner of Karrinyup Road and Burroughs Road with access off both roads.

There are three U-turn facilities available along Karrinyup Road in both the eastbound and westbound directions. Access to the bus station is accommodated by the existing U-turn facilities.

3.3.2. Traffic flows

Traffic volumes were collected for existing and major intersections surrounding the Development from Austraffic surveys and SCATS detector data, with further signal files and data obtained from Main Roads WA. Austraffic volume data was collected on Saturday 6 July 2013, Thursday 21 November 2013, Saturday 23 November 2013, and Wednesday 11 June 2014. Data collected across the different days was compared to determine the peak hour traffic volumes for the Development.

The following peak hours were determined for the Development:

- **AM Peak:** 8:00 AM – 9:00 AM
- **PM Peak:** 5:00 PM – 6:00 PM
- **Saturday Peak:** 12:00 PM – 1:00 PM

Existing traffic volumes (two-way) along the roads immediately surrounding the Development for each peak period are shown in Figure 3-6.

Figure 3-6 Existing peak hour traffic volumes (two-way)

The main primary distributor routes used to access the Development, either directly or indirectly, include Karrinyup Road, West Coast Highway, Marmion Avenue and Mitchell Freeway. The peak hour volumes of these primary access roads are indicated in Table 3-2. For the intersections immediately adjacent to the Development, the Saturday midday peak period was found to carry the most traffic.

Table 3-2 Peak hour volumes for primary routes by directions

Approach	Number of lanes	Volume		
		AM weekday peak hour 08:00 – 09:00	PM weekday peak hour 17:00 – 18:00	Saturday midday peak hour 12:00 – 13:00
Karrinyup Road Eastbound, west of Burroughs Road	2	1,610	628	993
Karrinyup Road Westbound, west of Burroughs Road	2	536	1,503	978
Karrinyup Road Eastbound, east of Francis Avenue	2	1,468	1,067	1,612
Karrinyup Road Westbound, east of Francis Avenue	2	920	1,263	1,596
Marmion Avenue Northbound, north of Karrinyup Road	2	852	2,171	1,010
Marmion Avenue Southbound, north of Karrinyup Road	2	1,993	818	1,025
Mitchell Freeway Northbound, at Karrinyup Road	4	2,991	5,618	4,745
Mitchell Freeway Southbound, at Karrinyup Road	4	5,070	3,980	4,566

3.3.3. Intersection Performance

Site Observations

A number of existing network issues were identified through site observation during peak periods, as summarised below:

- Intersection of Karrinyup Road / West Coast Highway – in the PM weekday peak period the east approach right turn queue from Karrinyup Road was observed to spill back into the through lane traffic during most cycles
- Intersection of Karrinyup Road / Francis Avenue – during the Saturday midday peak period the east approach right turn queue on Karrinyup Road into Francis Avenue fills the turn bay and spills back to block one of the through lanes
- Intersection of Karrinyup Road / Huntriss Road - during the Saturday midday peak period, and sometimes during the PM weekday peak period, the east approach through movement exhibits queues lengths of approximately 500m and it generally takes 2-3 signal cycles for traffic to pass through
- Intersection of Karrinyup Road / Mitchell Freeway – in most peak periods the west approach right turn from Karrinyup Road into the Mitchell Freeway on-ramp queues back to block a through lane. During the Saturday midday peak period the north approach right turn queue from the Mitchell Freeway off-ramp into Karrinyup Road was observed to be constrained.
- Further afield, the Mitchell Freeway and West Coast Highway have slow travel times southbound during the AM period and northbound during the PM period

Aimsun Hybrid Modelling

An Aimsun Hybrid model with integrated SCATS signal control, containing both a microscopic and mesoscopic model area, was developed for this study in order to analyse the performance of the Development. A Hybrid model was chosen for this study as it allows for individual vehicles, including buses, to be modelled in the detailed micro-simulation cordon environment of Karrinyup Road with the broader model network operating as a mesoscopic model with a simplified model engine.

The mesoscopic buffer area around the micro-simulation area gave greater confidence in the dynamic routing calculation to evaluate how people access the Development in the micro-simulation area, and the impact this has on other main corridors and intersections in the surrounding network. Aimsun also has the added advantage of the integration of adaptive SCATS signal control in the micro-simulation cordon environment. This is achieved by incorporating the actual signal files that are used on-street by MRWA. This method allowed the key modelled signals to adjust to changes in traffic volumes as they would on-street.

A detailed operational base model of the current road network was first built with the 2013 and 2014 traffic volumes. The model was calibrated to count data and observed driver behaviour and validated to travel times and observed queuing patterns. Information regarding the build and calibration/ validation of the model is in Appendix B. This was used as the base case from which the future year models were developed.

The initial background distribution for the Development was taken from the Main Roads Regional Operations Model (ROM) which estimated that trips were relatively well distributed in all directions heading to and from the Development. However through the trip assignment and calibration process with the collected traffic count data, it was evident that the majority of the Development traffic approached and exited to and from Karrinyup Road, east of the Development.

Adjacent Key Intersections

The two intersections primarily controlling access to the Development are Karrinyup Road / Jeanes Road, a 4 arm signalised intersection, and Karrinyup Road / Francis Avenue, a 3 arm signalised intersection. The Karrinyup Road / Jeanes Road intersection operates with single diamond phasing which allows the Karrinyup Road right turn movements to run, followed by the through movements, and then the Jeanes Road and Development movements with filtered right turns.

Karrinyup Road/ Jeanes Road currently performs at an acceptable level of service with the highest delay period being the weekday evening period when the average delay is 20 seconds per vehicle .The layout for this intersection is shown in Figure 3-7.

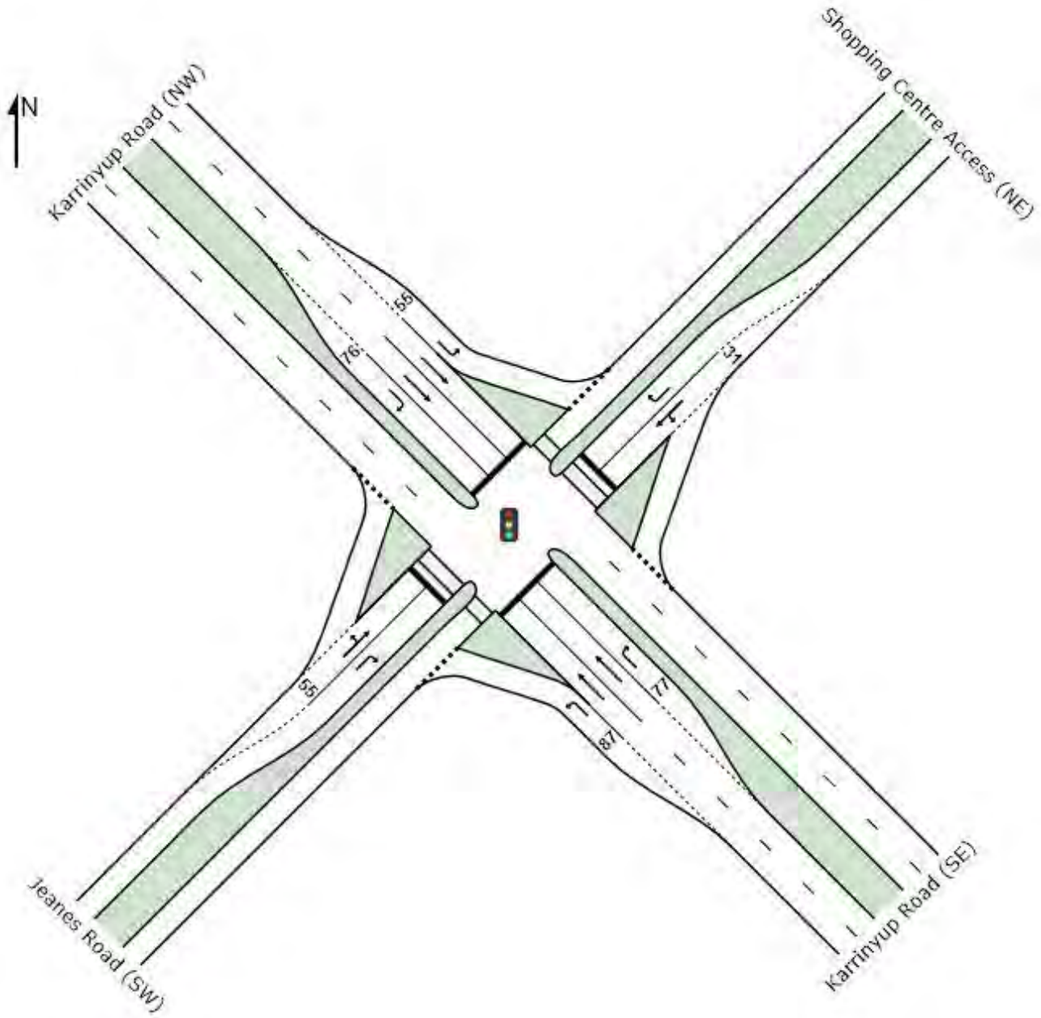


Figure 3-7 Existing Karrinyup Road / Jeanes Road intersection

The Karrinyup Road / Francis Avenue intersection is in a T-arrangement where the Karrinyup Road east approach movements run first, followed by the Karrinyup Road through movements, and lastly the right turn from Francis Avenue. This intersection currently has an average delay of 30 seconds per vehicle in the Saturday peak period however the right turn from Karrinyup Road into Francis Avenue often exhibits queues that extend past the dedicated right turn bay with an average delay of 67 seconds per vehicle. The layout for this intersection is shown in Figure 3-8.

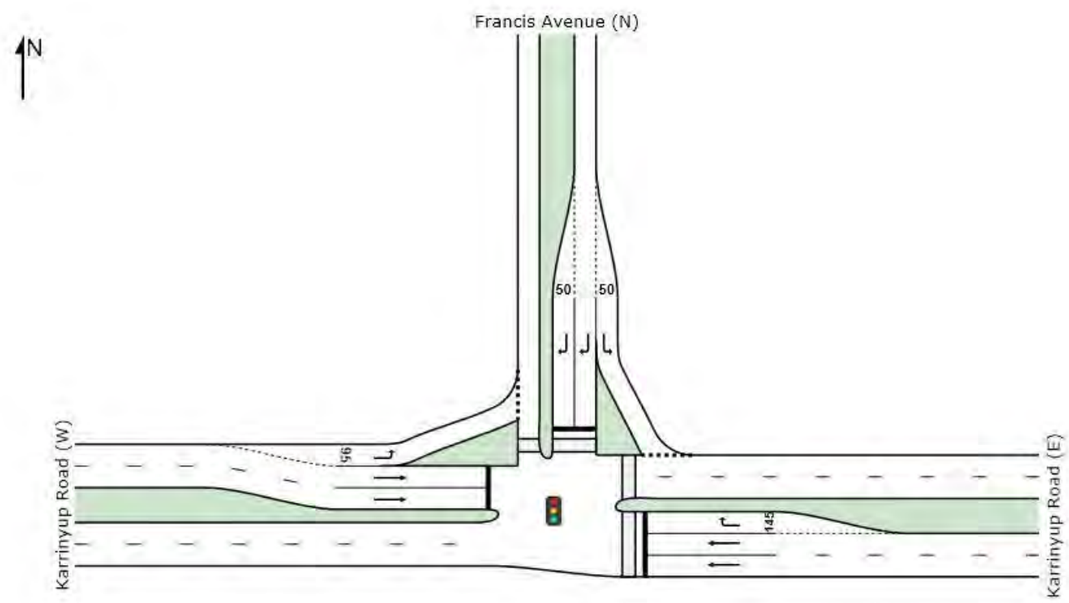


Figure 3-8 Existing Karrinyup Road / Francis Avenue intersection

A third, more minor intersection, is that of Karrinyup Road / Burroughs Road. This is a tee give way controlled intersection with space available in the Karrinyup Road median for vehicles to queue in. The delay at this intersection is currently 30 seconds per vehicle in the Saturday peak period with the highest movement delay, 57 seconds per vehicle, occurring for the Burroughs Road right turn into Karrinyup Road.

3.4. Parking

There are currently 3,166 parking spaces within the Development, including undercover parking and roof parking in several locations. A parking survey was conducted on Saturday 23 November 2013, Tuesday 26 November 2013 and Thursday 28 November 2013 which entailed an hourly audit of usage. The parking bays are distributed within the Development as shown in Figure 3-9 with the majority being visible and accessible from Francis Avenue and Burroughs Road. Parking utilisation is illustrated in Figure 3-10.

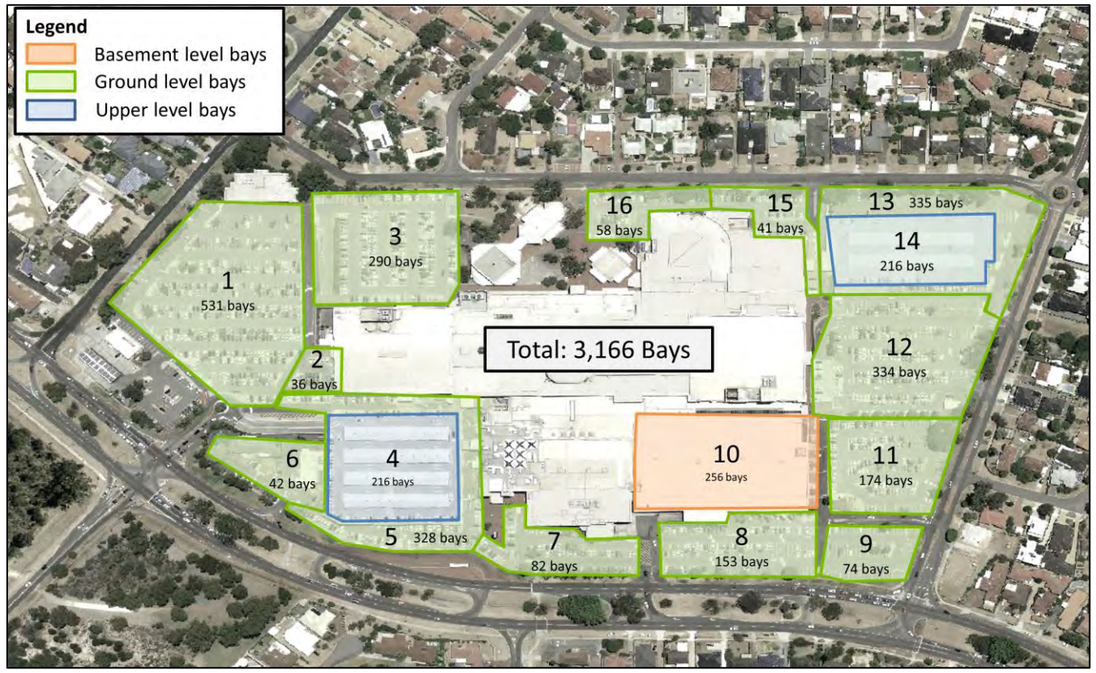


Figure 3-9 Distribution of Parking

From the parking audit analysis, the maximum parking utilisation for the Tuesday was 78% of all parking bays available, between 12:00 and 13:00. Utilisation of 72% or more occurred between 11:00 and 15:00.

On the Thursday, it was found that the maximum parking utilisation was 88% between 13:00 and 14:00 and that an 80% or above utilisation occurred between 11:00 and 16:00. The maximum evening utilisation was found to be 73% between 19:00 and 20:00.

The maximum parking utilisation for the Saturday was 95% between 12:00 and 13:00 and again between 14:00 and 15:00. Utilisation of 89% or more occurred between 11:00 and 16:00.

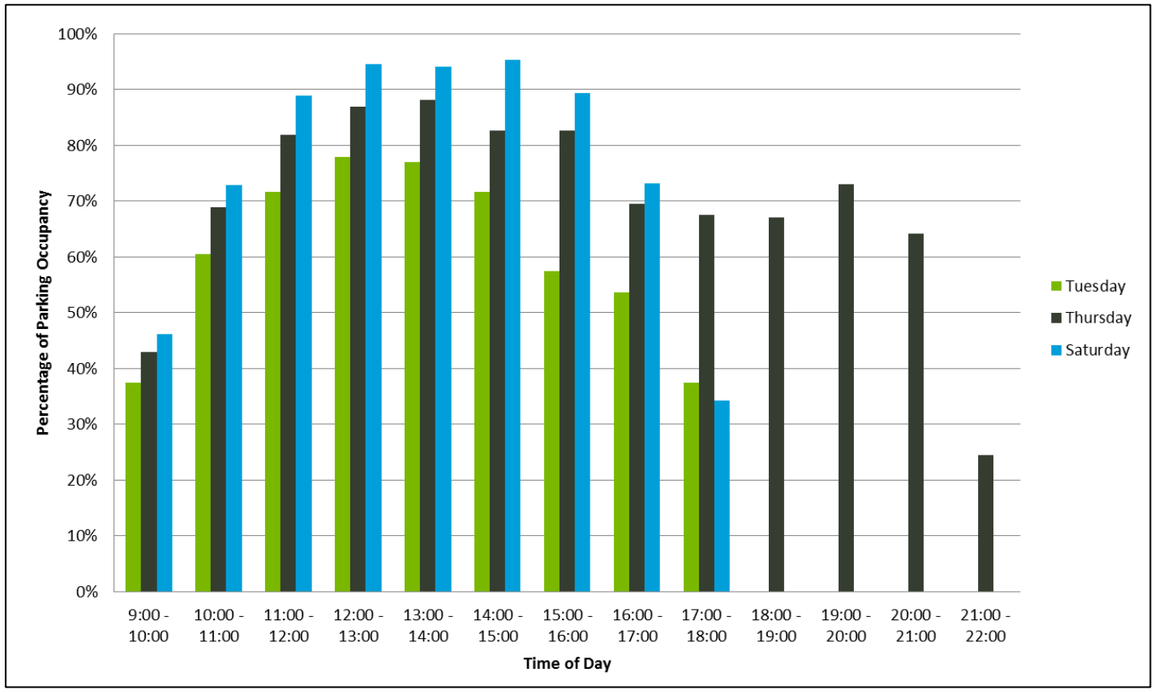


Figure 3-10 Parking utilisation

The busiest day (of those surveyed) in terms of parking utilisation was Saturday, both in terms of the average number of bays utilised and the most number of bays utilised. The high percentage of utilisation that occurs indicates that the demand is there due to the availability of parking spaces and relatively poor access by other modes of transport, particularly public transport and cycling. Considering that there are no Variable Message Signs (VMS) indicating where bays are available, the process of finding available bays under near capacity conditions can be time consuming and frustrating for drivers.

The 3,166 parking bays for 60,816m^2 of total floor space equates to a provision of approximately 5.2 parking bays per 100m^2 of land use.

3.4.1. Motorcycle Parking

Motorcycle access to the Development is very low, forming less than 1% of the existing mode share. Six motorcycle parking bays are available throughout the Development, equating to approximately 0.2% of the total number of parking bays.

Motorcycles often park in the car parking bays or in other hard-landscaped areas around the Development.

3.5. Public Transport Access

Mass Transit

According to the Public Transport 2031 Plan, rapid transit infrastructure (likely bus rapid transit) is proposed to connect Karrinyup between Scarborough and Hillarys beyond 2031 (refer to Figure 3-11).

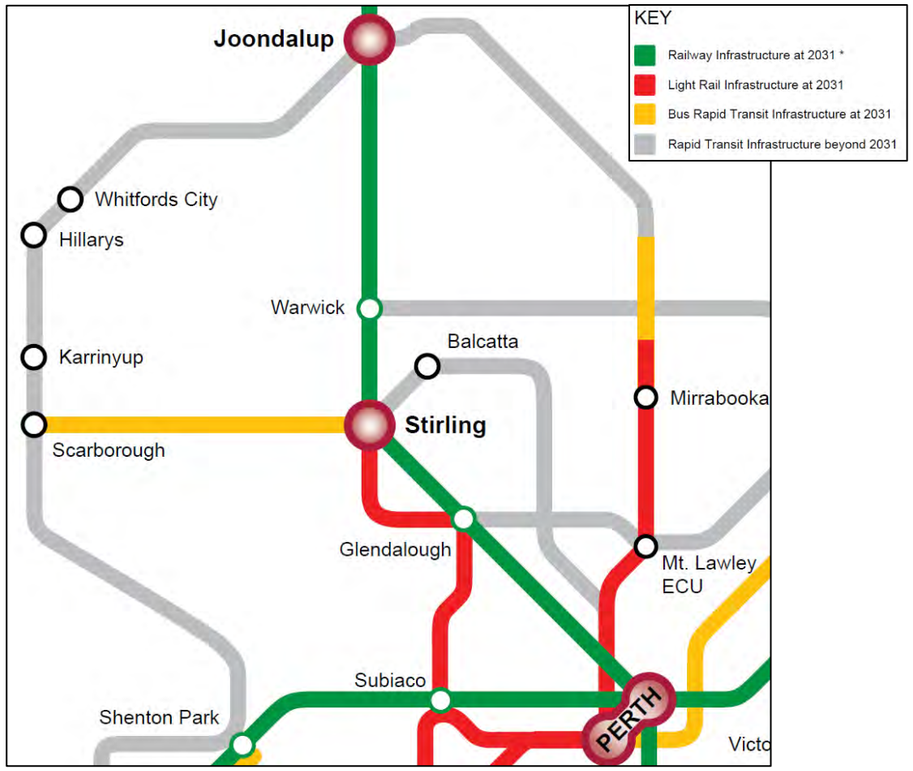


Figure 3-11 Public Transport Plan 2031, sourced from Department of Transport

Bus services are available direct to the Karrinyup Bus Station, primarily accessed via Karrinyup Road. The Karrinyup Bus Station is currently used by five bus services, with the general catchment of the services to the surrounding area shown in Figure 3-12.

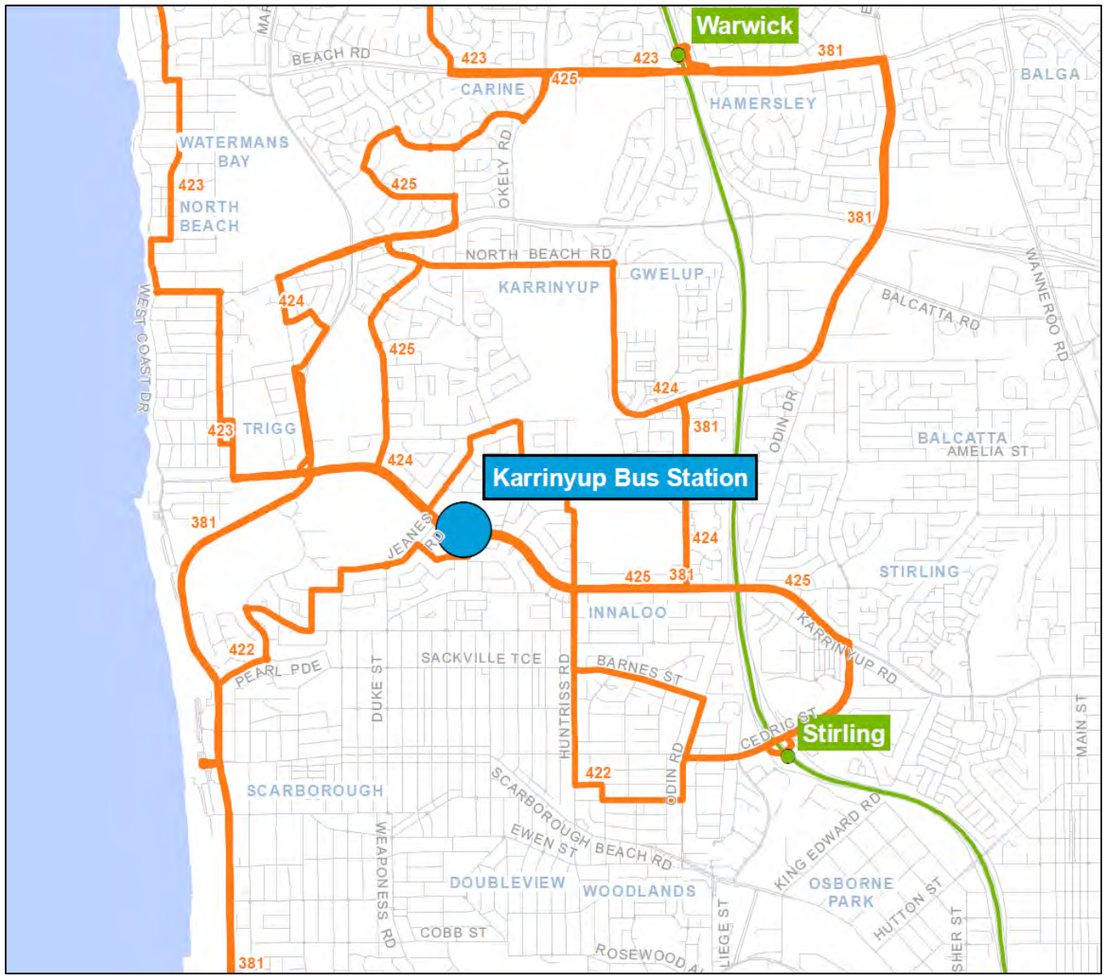


Figure 3-12 Bus routes to/from the Development

Direct bus access from Karrinyup Bus Station is available to Scarborough Beach as well as a number of train stations including Stirling, Warwick and Fremantle. Weekday peak headways for these bus services range from 15 minutes to 2 hours, however the peak services align with the commuter peak in the early morning and late afternoon which in general does not coincide with peak shopping hours for the Development.

Most off-peak weekday schedule services run hourly or twice per hour. However, the busiest times for the Development are during weekends and in general weekend bus service frequencies are very poor, typically hourly or even none for some services. A summary of bus services is listed below:

- **Route 423** is the most frequent route and operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. During the weekday peak periods, the service runs at headways of approximately 10 to 20 minutes, and 30 minutes during off-peak and Saturdays. During Sundays and Public Holidays, the 423 service runs hourly.

- **Route 425** operates between Stirling Station and Warwick Station via Karrinyup Bus Station at approximately 15-20 minute intervals during the weekday peak periods and 30 minutes during the off-peak. On Saturdays, Sundays and Public Holidays, the 425 operates at hourly intervals.
- **Route 422** operates between Stirling Station and Scarborough Beach via Karrinyup Bus Station every 20 to 30 minutes during the weekday morning peak period and hourly during the weekday off-peak, afternoon peak and Saturdays. The service does not run on Sunday or Public Holidays.
- **Route 424** operates between Stirling Station and Karrinyup Bus Station every 20 minutes during the weekday morning peak period and every 30 minutes during the afternoon peak period. During the weekday off-peak and Saturday, the 424 operates at hourly headways. The service does not operate on Sundays and Public Holidays.

In general public transport services with frequencies more than 8 to 10 minutes require users to plan their journeys to limit inconvenience caused by waiting. There is significant evidence showing a clear correlation between bus service frequencies, span of hours, and bus patronage, in that people are much more likely to use a bus if they know the service is reliable and frequent.

Passenger numbers for Karrinyup Bus Station were obtained from SmartRider data for Thursday 19th March 2015 and Saturday 21st March 2015, and have been adjusted to include cash tickets. The existing patronage is shown in Table 3-3 and is shown to be relatively quite low.

Table 3-3 Public transport patronage at Karrinyup Bus Station

AM Peak Hour: 08:00 – 09:00				
TO KARRINYUP				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**2**	21	0	21
423	**2**	2	23	25
424	**1**	0	0	0
425	**2**	3	11	14
TOTAL		**26**	**34**	**60**
FROM KARRINYUP				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**2**	0	2	2
423	**3**	19	1	20
424	**1**	0	0	0
425	**3**	11	9	20
TOTAL		**30**	**12**	**42**

Note the above lists the patronage from the Thursday 19th March 2015, sourced from Transperth

PM Peak Hour: 17:00 – 18:00				
STIRLING TO KARRINYUP				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**3**	0	0	0
423	**4**	4	6	10
424	**3**	0	1	1
425	**4**	4	10	14
TOTAL		**8**	**18**	**26**
KARRINYUP TO STIRLING				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**0**	n/a	n/a	0
423	**2**	2	0	2
424	**2**	2	0	2
425	**3**	8	0	8
TOTAL		**12**	**0**	**12**

Note the above lists the patronage from the Thursday 19th March 2015, sourced from Transperth

Saturday Peak Hour: 12:00 – 13:00				
STIRLING TO KARRINYUP				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**1**	0	0	0
423	**2**	5	12	17
424	**1**	0	3	3
425	**1**	0	3	3
TOTAL		**5**	**18**	**23**
KARRINYUP TO STIRLING				
Route	**No. of Services**	**Boardings at Karrinyup**	**Alightings at Karrinyup**	**TOTAL**
422	**0**	n/a	n/a	0
423	**2**	3	5	8
424	**1**	3	0	3
425	**1**	6	2	8
TOTAL		**12**	**7**	**19**

Note the above lists the patronage from the Saturday 21st March 2015, sourced from Transperth

The peak period for bus patronage on Saturday is similar to the weekday AM and PM peak periods. This indicates that it is mainly shop employees that are using public transport to commute to and from work, and there is currently limited use of public transport by shoppers. Spikes in patronage can be attributed to school children, for example the 422 route, which services primary schools north of Karrinyup Shopping Centre.

Overall, the current bus services seem to be aimed at commuters travelling to and from the Perth CBD via Warwick and Stirling train stations or school children, with access to the Development not being a key focus of the services. It is apparent that there is currently minimal public transport infrastructure to support higher frequency services to Karrinyup and encourage increased patronage.

Given the overall expected vehicle numbers associated with the Development, a significant increase in patronage is not required to ensure the road network is not unduly affected by the Development. However, improvements to bus patronage would offer other benefits.

Taxi Service

Taxis are available near the main entrance to the Development (refer to Figure 3-13). A feeder rank with storage for four (4) taxis is located adjacent to the lounge, allowing taxis to progress to the main rank as space becomes available (refer to Figure 3-13).

Figure 3-13 Taxi feeder rank facility

3.6. Pedestrian Access

The Development is situated within a large residential area, with many residents within walking distance. Walking access to the Development is predominantly accommodated on footpaths and shared paths along the adjacent and surrounding road network. The surrounding road network has footpaths alongside the majority of directly accessible routes. The roads without footpaths tend to be lower order residential access routes, and generally do not present a safety concern for pedestrians due to low traffic volumes and generally low operating speeds. Infrastructure upgrades in these areas are therefore not proposed. The walkable catchment (800m) is shown in Figure 3-16.

The main concerns for access on foot are the crossing of major roads, in this case Karrinyup Road, in terms of safety and time delays. There are currently three signalised crossings on Karrinyup Road giving safe and direct access to the Development, namely at Jeanes Avenue, Francis Avenue, and the dedicated pedestrian crossing just east of Miles Street (see Figure 3-14). A continuous footpath also extends around the perimeter of the Development, although most crossings are not Disability Discrimination Act (DDA) compliant.

Access to the pedestrian entrances to the Development is also very important, with the main entrances shown in Figure 3-17. These include direct entrances into the Development and also direct entrances into the shops themselves i.e. Myer and David Jones. Direct walking access to the entrances are provided from Karrinyup Road (via the Karrinyup Bus Station and signalised pedestrian crossing), and Francis Avenue (direct access to David Jones). Elsewhere, the customers are mostly expected to walk through car parks, whether they are walking from their cars or from the street, this increases the number of conflict points between cars and pedestrians (refer to Figure 3-15).

Figure 3-14 Signalised pedestrian crossing on Karrinyup Road

Figure 3-15 Example of poor pedestrian access from car parking

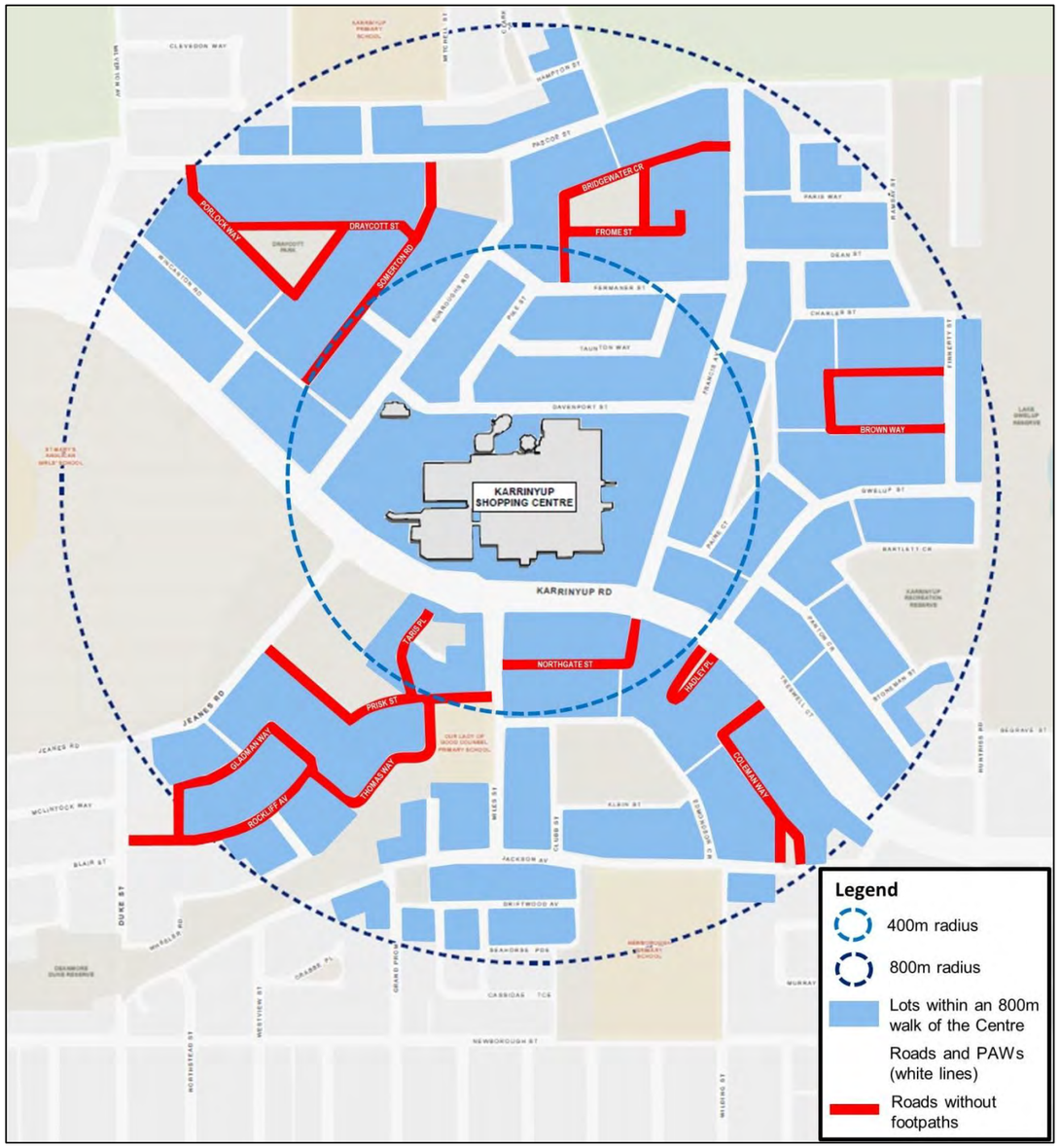


Figure 3-16 Walkable catchment

Figure 3-17 Existing Pedestrian entrances into Karrinyup Shopping Centre from all levels

An analysis of crash data for the area from 2009-2013 (discussed in Section 3.9.2), indicates that only one crash involved a pedestrian which suggests a safe walking environment for pedestrians. The crash was a result of a car losing control on the Karrinyup Road carriageway and striking a pedestrian who was within a pedestrian refuge.

3.7. Cycling Access

The facilities and opportunities for direct bicycle access to the Development are poor. Cyclist amenity is generally provided for in the form of on-road cycle lanes (sealed road shoulders), off-road paths (segregated or shared pedestrian / cyclist paths), or otherwise within general traffic lanes (given posted speeds of between 30 and 50km/h). The City of Stirling's preferred option in future cycle planning is the provision of segregated off-road paths in each direction as these present reduced conflicts with other modes. As identified in the Karrinyup and Gwelup Local Area Plan, the current poor street-connectivity within the Karrinyup area has also resulted in the creation of a generally disjointed cyclist network.

The existing Perth Bicycle Network (PBN) is a network of cycling routes comprising of on-road, path and end-of-trip infrastructure, which form part of a strategic and integrated transport network for Perth. The PBN network is currently being re-strategised, which creates opportunities to improve strategic cycling connections to the Development.

Referring to Figure 3-18, a number of existing PBN routes are located in close proximity to the Development with connecting 'local bicycle friendly streets' (good road riding environment) including:

East-West Routes

- PBN Route NW7 to the north of the Development providing an east-west connection between Marmion Avenue and the Mitchell Freeway Principal Shared Path (PSP), encompassing College Court, Axbridge Street, Pascoe Street and Porter Street
- PBN Route NW8 to the south of the Development providing an east-west connection between West Coast Highway and the Mitchell Freeway PSP, encompassing Sackville Terrace and Barnes Street

North-South Routes

- PBN Route NW2 to the west of the Development providing a north-south route parallel to the coastline and connecting to Marmion Avenue
- PBN Route NW1 to the east of the Development providing a north-south route between Pascoe Street and Barnes Street, encompassing Finnerty Street, Huntriss Road, Norman Street, Decima Street, Birdwood Street, Satin Way, Langley Crescent and Crocker Road
- Mitchell Freeway PSP located approximately 1.7 kilometres to the east of the Development

Local Bicycle Friendly Streets

- Jeanes Road between Deanmore Road and Karrinyup Road
- Newborough Street between Elliott Road and Grand Promenade
- Burroughs Road between Karrinyup Road and Pascoe Street

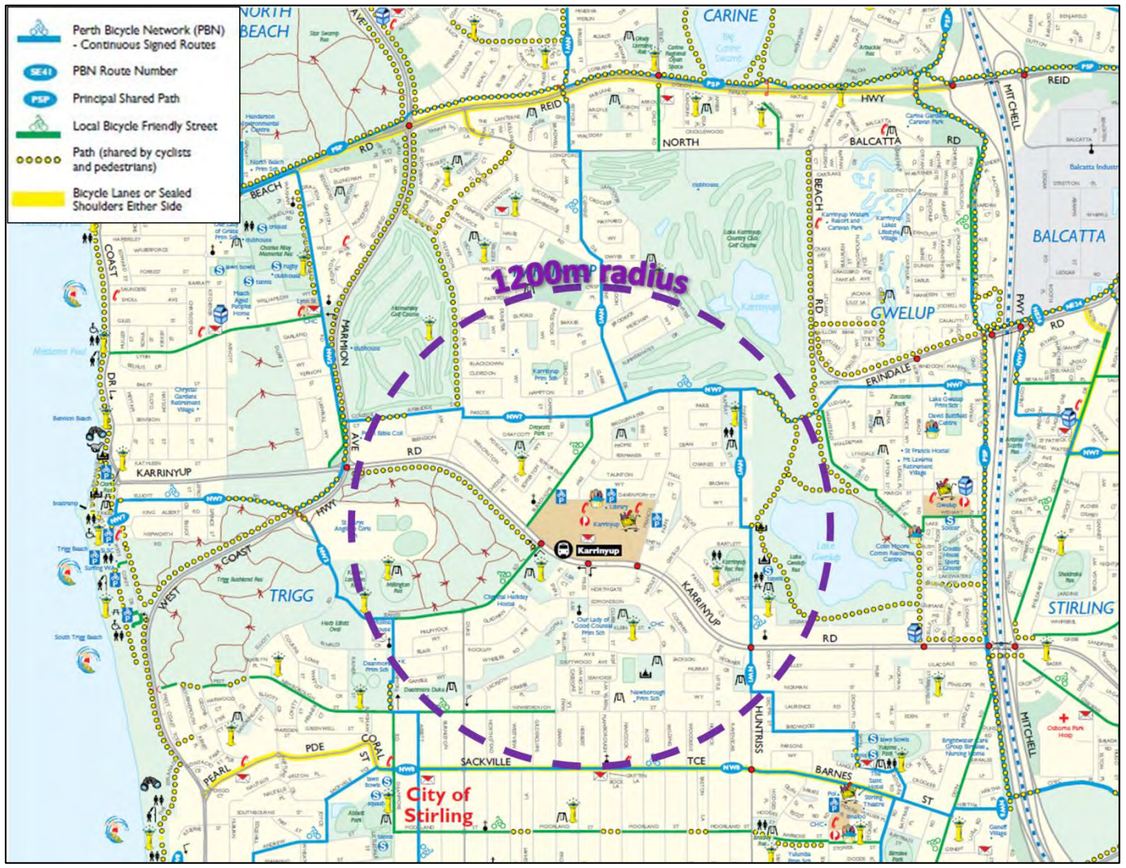


Figure 3-18 Bicycle network surrounding the Development (Department of Transport, 2014)

In terms of the above mentioned strategic cycling routes, many are within one kilometre of the Development and have the potential to provide good connectivity, however currently there isn't any dedicated cycling infrastructure (i.e. cycle lanes or paths) along many of these routes to support connections.

Referring to the Department of Transport TravelSmart Map (see Figure 3-18), the road network surrounding the Development has dedicated bicycle infrastructure in the following locations:

- Shared path along West Coast Highway and Marmion Avenue
- Shared path along Karrinyup Road between West Coast Highway and Jeanes Road
- Bicycle Lane / Sealed shoulder along Pearl Parade, Coral Street, Sackville Terrace and Barnes Street (between West Coast Highway and Odin Road)
- Shared path around Lake Gwelup connecting to the principal shared path along Mitchell Freeway via North Bead Road and Karrinyup Road

From the above list, the only dedicated bicycle infrastructure providing direct access to the Development is via the shared path along Karrinyup Road to the west of the Development, although the width of the path is narrower than Austroads Guidelines and is not signed. From both the north and south, there is potential for the key cycling routes along West Coast Highway / Marmion Avenue and the Mitchell Freeway PSP to provide connectivity to the

Karrinyup area. Direct access to the Development from these major strategic routes is limited, and is primarily via non-dedicated cycling routes through residential areas.

Some existing bicycle parking is available at several entrances to the Development, but accessing these facilities is somewhat problematic as cyclists are expected to ride through parking areas. It was observed that the bicycle parking at the main entrance was one of the few that was well utilised, indicating there is potential to increase cycling as a viable travel mode option to the Development. A significant opportunity exists to increase legibility and accessibility to and within the Development for cyclists, as well as providing improved bicycle parking and end of trip facilities.

3.8. Freight and Servicing Access

The metropolitan freight road network is identified in the Draft Statement of Planning Policy: Metropolitan Freight Network (WA Planning Commission, 2005) and shown in Figure 3-19.

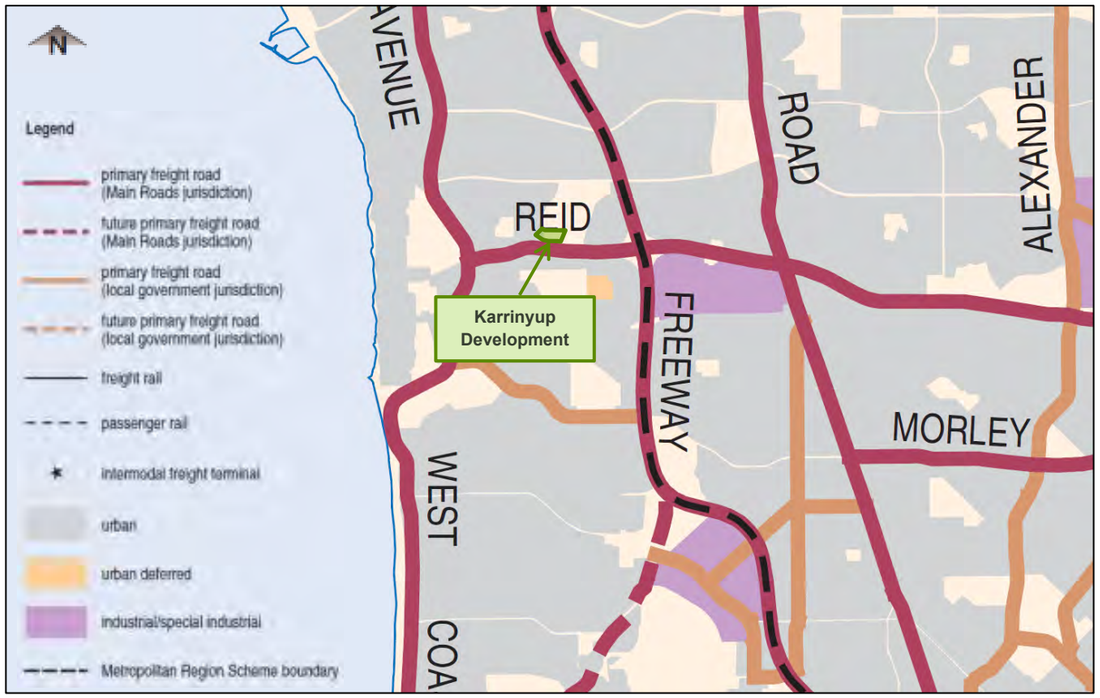


Figure 3-19 Primary freight roads and rail routes (WA Planning Commission, 2005)

Karrinyup Road is considered a primary freight road under local government jurisdiction. Heavy commercial vehicles, such as single unit trucks and semi-trailers, service the Development via Karrinyup Road. There are a number of service delivery yards (both common loading and store specific) within the Development as shown in Figure 3-20. Turnaround facilities are provided within the Development to allow for these vehicles to exit in a forward direction.

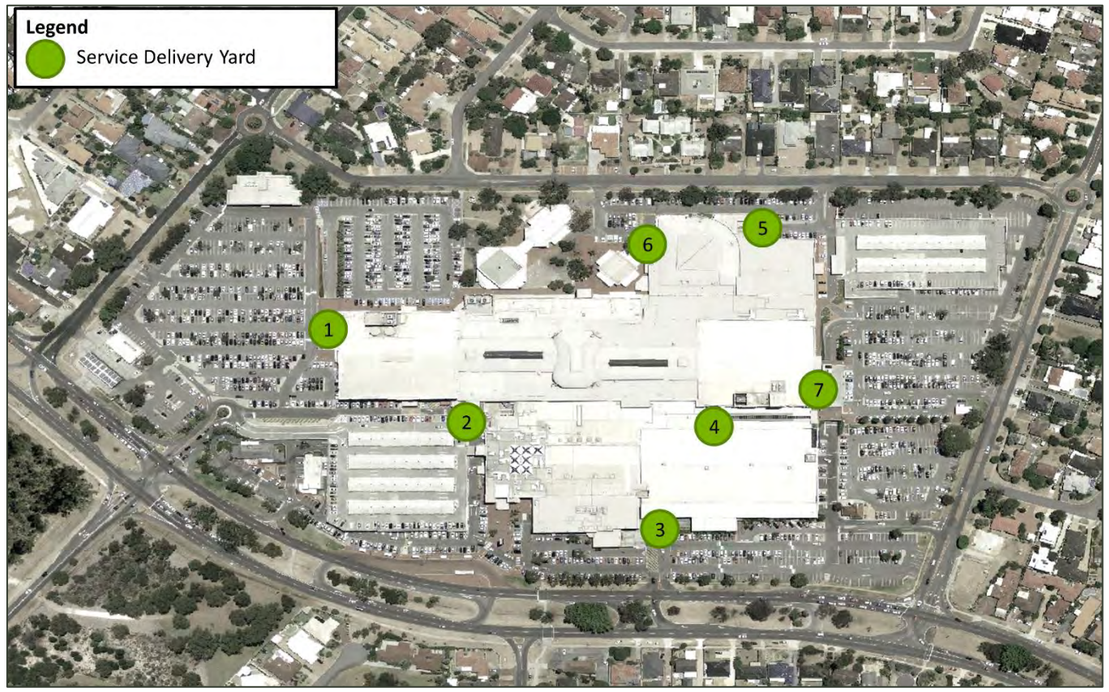
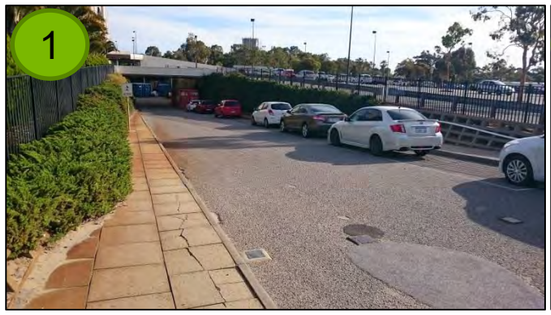
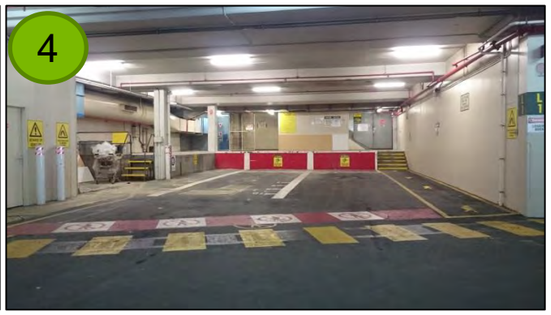


Figure 3-20 Existing freight access to the Development

The existing service delivery yards themselves are generally well separated from the general public, except for yard 6 which services the food court area. Potential conflicts exist however, at yards 1, 3 and 5 where large vehicles (either heavy rigid or articulated vehicles) are required to reverse from within car park circulation areas.





3.9. Road Safety

3.9.1. General

From observations, the various intersections within the Development did not exhibit significant safety concerns, however the following conflict points were observed:

- Poor sight distance, and potential conflict point when maximum queues were present within the westbound right turn pocket on Karrinyup Road (at the Francis Avenue intersection) and there is movement of cars wishing to enter/exit Gwelup Street and Hadley Place
- Various intersections within the Development car parks have poor sight distance and limited aisle widths (refer to Figure 3-21). Various accesses also provide conflict points for vehicles exiting.

Figure 3-21 Examples of poor sight distance within the car park

3.9.2. Crash Data

The recorded crash data from January 2009 to December 2013, sourced from Main Roads WA, was analysed to determine any significant trends within the road network surrounding the Development. The quantity, severity and nature of the crashes provide a starting point in identifying areas of concern. A summary of the 173 total crashes within the Development, broken up by crash nature and severity, is presented in Table 3-4 and shown in Figure 3-22.

Table 3-4 Crash summary within the Development

M or I[1]	Location	Total Crashes	Crash Nature	Severity
M	Karrinyup Road (between Burroughs Road and Francis Avenue)	21	8 x Rear End 7 x Right Turn Through 3 x Sideswipe Same Direction 3 x Other 1 x Hit Pedestrian	1 x Hospitalisation 2 x Medical Treatment 11 x Major Property Damage Only (PDO) 7 x Minor PDO
I	Karrinyup Road and Burroughs Road	43	25 x Right Angle 10 x Rear End 8 x Right Turn Through	5 x Medical Treatment 25 x Major PDO 13 x Minor PDO
M	Burroughs Road (between Karrinyup Road and Davenport Street)	12	7 x Right Angle 3 x Rear End 1 x Right Turn Through 1 x Sideswipe Same Direction	4 x Medical Treatment 5 x Major PDO 3 x Minor PDO
I	Karrinyup Road and Francis Avenue	29	19 x Rear End 5 x Right Turn Through 3 x Right Angle 1 x Reversing in Traffic 1 x Sideswipe Same Direction	4 x Medical Treatment 13 x Major PDO 12 x Minor PDO
M	Francis Avenue (between Karrinyup Road and Davenport Street)	16	14 x Right Angle 1 x Rear End 1 x Other	2 x Medical Treatment 9 x Major PDO 5 x Minor PDO
I	Francis Avenue and Davenport Street	1	1 x Hit Object	1 x Minor PDO
M	Davenport Street (between Burroughs Road and Francis Street)	5	2 x Leaving Driveway 1 x Parking Vehicle 1 x Hit Object 1 x Other	1 x Medical Treatment 2 x Major PDO 2 x Minor PDO
I	Jeanes Road and Karrinyup Road	46	29 x Rear End 6 x Right Turn Through 5 x Right Angle 3 x Sideswipe Same Direction 1 x Hit Object 1 x Reversing in Traffic 1 x Same Direction - Other	1 x Hospitalisation 7 x Medical Treatment 19 x Major PDO 19 x Minor PDO

[1] Indicates crashes occurring midblock (M) or at an intersection (I)

Figure 3-22 Number of crashes in the Development between 2009 and 2013

Since 2009, the total number of crashes has reduced every year, with a 27% drop between 2009 and 2010. Since 2010 the number of crashes per year has been fairly consistent.

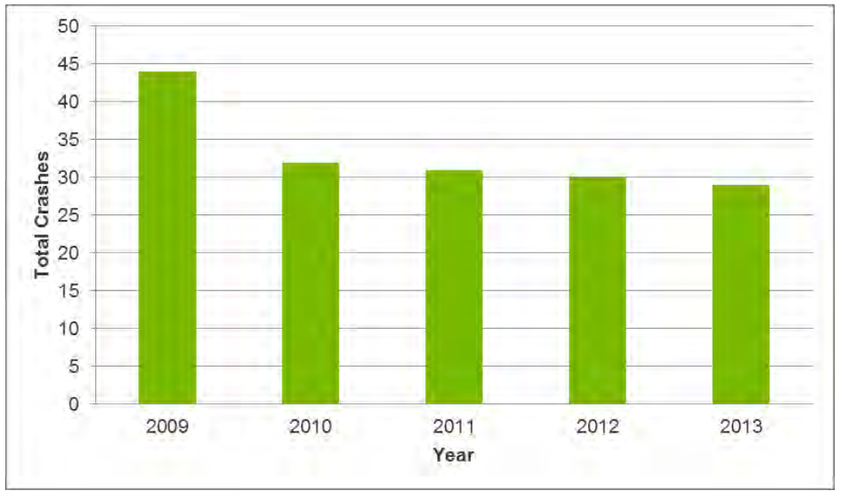


Figure 3-23 Total crashes per year in the Development

Summaries of the crash severity and nature of crashes recorded at the road network surrounding the development are presented in Figure 3-24 and Figure 3-25 respectively.

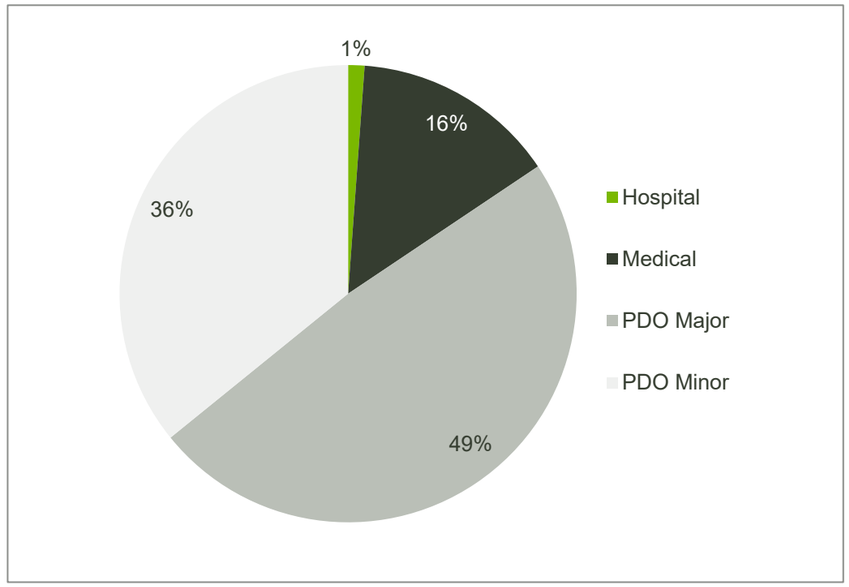


Figure 3-24 Severity of crashes recorded at the road network surrounding the development

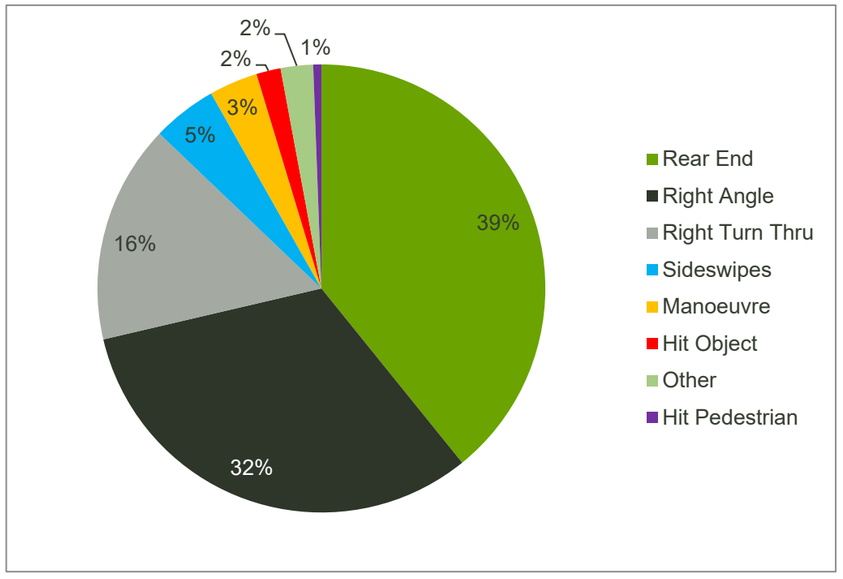


Figure 3-25 Nature of crashes recorded at the road network surrounding the edevelopment (as defined by Main Roads WA, refer to http://apps.mainroads.wa.gov.au/icr/definitions.asp)

It can be seen that there were no fatal crashes within the Development between 2009 and 2013. Of the total 173 crashes, only one involved a pedestrian being hit, (0.6% of total), and three crashes involved buses (2% of total crashes), all occurring along Karrinyup Road. There was no cyclist or heavy vehicle crashes recorded at the road network surrounding the development over the five year period.

The following key points can be summarised from the recorded crash data:

- The majority of midblock crashes along Burroughs Street and Francis Avenue occurred at the Development accesses. Of the 16 total midblock crashes that occurred along Francis Avenue, the Development access on Francis Avenue closest to the Karrinyup Road intersection was noted to have experienced a larger proportion of midblock crashes than the other two Development accesses along Francis Avenue, a total of 6 crashes (38%).
- At the Burroughs Road and Karrinyup Road intersection the majority of crashes were right angle vehicle crashes, with vehicles performing the right turn movement out of Burroughs Road on to Karrinyup Road. It was noted that one crash at this intersection involved a collision with a bus travelling along Karrinyup Road and a vehicle attempting the right turn manoeuvre out of Burroughs Road.
- A high number of rear end crashes occurred at the Frances Ave and Karrinyup Road intersection at the priority controlled left turn slip lane from Francis Ave (N) towards Karrinyup Road (E).
- The prevailing crash movement at the Jeanes and Karrinyup Road intersection was rear end crashes, including a rear end crash involving a bus. A large number of the crashes may be attributed to the vehicle queuing spillback onto Karrinyup Road further downstream at the Burroughs Road and Karrinyup Road intersection.
- Notable midblock crashes along Karrinyup Road:
  - As mentioned previously, a pedestrian was hit by an out of control car near the Jeanes Road/Karrinyup Road intersection and required hospitalisation
  - A rear end crash between two vehicles occurred at the signalised pedestrian crossing
  - A sideswipe crash between a bus and another vehicle occurred as the other vehicle attempted to change lanes near the Francis Avenue and Karrinyup Road intersection

Whilst the recorded crashes within the Development did not result in fatalities, and hospitalisations were rare, safe design should be taken into consideration for any upgrades to the road network surrounding the Development.

3.10. Updated Existing Situation in 2024

The Development proposal as outlined in Section 2 was completed in 2021. Table 2-1 is now considered the existing land use at Karrinyup Shopping Centre.

3.10.1. Parking and Demand in 2024

The Development now provides 4,683 parking spaces out of the 4,880 consented. This gives a rate of 4.2 bays per 100m^2. Observations of the existing demand for the shopping centre show that customers are circulating the centre to find an available parking space for as long as 20 minutes at peak times. This is having flow on effects, causing difficulty with internal circulation and exiting the Development.

3.10.2. Access Arrangements in 2024

There are currently twelve access points to the Development as outlined in Table 3-5.

Table 3-5 Karrinyup Access Arrangements

Road Name	Access Points	Access Point Control
Karrinyup Road	3	1 x signalised four-way intersection, 2x unsignalized T-intersections
Francis Avenue	2	2 x unsignalised T-intersections, one with northbound access only
Burroughs Road	2	2 x unsignalised T-intersections
Davenport Street	5	5 x unsignalised T-intersections

3.10.3. Site Traffic in 2024

Karrinyup Shopping Centre serves as a premier shopping centre in Perth and is classed as a secondary activity centre. As such, it generates a large volume of vehicle trips on a daily basis from the immediate City of Stirling and the wider Perth area. During peak hours, it is noted that the Development generates traffic that is close to the capacity of the current parking facilities.

3.10.4. Surrounding Land Use in 2024

Surrounding land use is similar to the existing situation described in Section 3.1. The surrounding area is predominantly single-unit residential dwellings (design code R20/R30). Various public reserves are also present, including Lake Gwelup Reserve to the east and Millington Reserve to the southwest. A number of primary schools are located within close proximity to Karrinyup, including Karrinyup Primary School, Our Lady of Good Counsel Primary School, St. Mary's Anglican Girls School, and Newborough Primary School.

3.10.5. Surrounding Road Network and Traffic Management

The existing road network and traffic management surrounding Karrinyup Shopping Centre is similar to that described in Section 3.3.

The Development is surrounded by a well-connected road network of various classes. The road hierarchy, as assigned by Main Roads Western Australia (MRWA), is provided in Figure 3-26. The primary distributor routes leading to Karrinyup, either directly or indirectly, include Karrinyup Road, Marmion Ave, West Coast Highway, Reid Highway, and Mitchell Freeway. The surrounding road hierarchy is displayed in Figure 3-26.

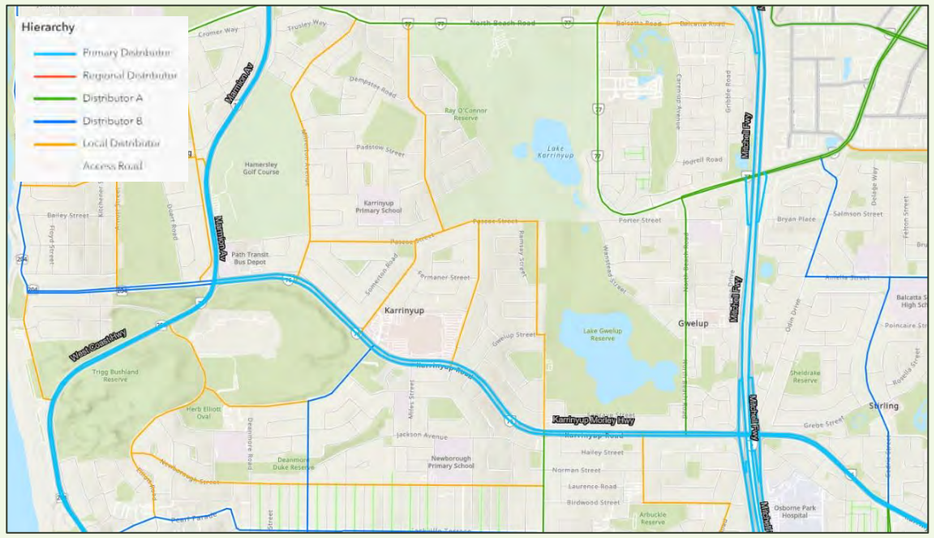


Figure 3-26 Existing Road Hierarchy (Source: Main Roads Western Australia)

There are five key frontage roads connecting directly to Karrinyup. Operational information of these roads is outlined in Table 3-6.

Table 3-6 Frontage Roads at Karrinyup

Road Name	Road Hierarchy	Lane Geometry	Posted Speed Limit (km/h)	Parking Provision	Number of Accesses to Karrinyup shopping centre	Footpaths and Cycleways
Karrinyup Road	Major east-west distributor	Dual carriageway, two lanes in each direction with a wide median	60 adjacent to Development, 70 elsewhere	No Parking on either side	Three general accesses and one freight access via T-intersections	Footpath on northern side. Bi-directional shared path on southern
Burroughs Road	Local distributor	Single carriageway with one lane in each direction	50	No Parking on either side	Two accesses via T-intersections	Footpath on both sides
Davenport Street	Local access	Single carriageway with one lane in each direction	50	Right angle parking spaces available at childcare facilities on north side. Sets of indented 2-hour parallel bays dotted along southern side	Four general accesses and one freight access via T-intersections	Footpath on southern side
Francis Avenue	Local distributor	Single carriageway with one lane in each direction	50	No Parking on either side	Two accesses via T-intersection	Footpath on both sides
Jeanes Road	Distributor B	Single carriageway with one lane in each direction	50	No Parking on either side	One through signalised intersection at Karrinyup Road	Footpath on east side, bi-directional shared path on west

3.10.6. Traffic Flows on Surrounding Roads in 2024

The current traffic flows on the roads surrounding Karrinyup Shopping Centre are shown in Table 3-7. The times used for each peak flow are:

- Weekday AM Peak: 08:00 – 09:00
- Weekday PM Peak: 17:00 – 18:00
- Weekend Peak: 12:00 – 13:00

Table 3-7 Traffic Flows on Surrounding Roads

Road Name	Weekday AM Peak (vehicles per hour)	Weekday PM Peak (vehicles per hour)	Weekend Peak (vehicles per hour)
Karrinyup Road	1,913	1,968	2,062
Francis Avenue	564	976	1,327
Burroughs Road	429	662	716
Davenport Street	359	602	816
Jeanes Road	1,144	1,137	822

3.10.7. Operation of the Surrounding Road Network

Site visits were conducted to supplement the understanding of the site during typical peak operation. The time and date of site visits aligned with the survey dates. The dates were as follows:

- Thursday 14th of March 2024, AM peak between 07:00 am and 09:00 am
- Thursday 14th of March 2024, PM peak between 03:30 pm and 05:30 pm
- Saturday 16th of March 2024, Midday peak between 11:00 am and 01:00 pm

Traffic pinch points and queuing behaviour were noted, and Main Roads live traffic maps were also used to verify the observed behaviour. Some observations are noted and presented below.

AM Peak:

- AM peak hour is associated with mostly commuter trips and school trips from the residential area and staff trips into the Centre.
- Traffic queuing was noted at Karrinyup Road/ Jeanes Road intersection.
- Jeanes Road experienced long queues during the AM peak hour. These trips are associated with the school trips to and from the nearby residential area.
- The right turn from Karrinyup Road into Burroughs Road experiences delays.
- Queuing on Burroughs Road was observed.

PM Peak:

- The PM Peak hour was inclusive of both commuter peak and the Centre peak hours.
- Queuing was generally noted in the westbound direction for both the commuter trips and Centre trips.
- Davenport Street operated with some minor delays due to on-street parking.

Saturday Peak:

- Some delays were noted during Saturday peak around the site. This was caused by the Centre traffic entering and exiting the shopping centre during the midday peak.
- Parking at the site appeared mostly occupied at all locations.
- Verge parking observed along Burroughs Road.
- Queues on Burroughs Road due to the stop control at Karrinyup Road.

3.10.8. Existing Pedestrian/Cycle Networks

Karrinyup Shopping Centre is situated within a large residential area with many residents within walking distance. Walking access to the Development is predominantly accommodated on footpaths and shared paths along the adjacent and surrounding road network. Footpaths are provided alongside all of the direct access routes to the shopping centre.

Cycle infrastructure exists around the Development primarily through a separated bi-directional shared path on the south side of Karrinyup Road. Jeanes Road has a similar bi-directional cycle path to the Development's south. Other streets in the immediate vicinity of the Development have no specific provisions for cyclists. Safe cycle crossing to the Centre is facilitated by a mid-block signalised crossing on Karrinyup Road and crossing facilities at the Karrinyup Road intersections with Francis Road and Jeanes Road. As part of the development in 2021, bike storage, lockers, and showers were constructed for end-of-trip facilities. These are capable of accommodating 200 bicycle racks and lockers, with separate female and male change rooms incorporating 5 showers and 1 toilet in each.

3.10.9. Existing Public Transport Services Surrounding the Development

Karrinyup Bus Station sits at the southern edge of the Development, adjacent to Karrinyup Road. The Station is currently serviced by five bus routes:

- Route 423, the most frequent, operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. The service runs at approximately 10–20-minute intervals during weekday peak periods, 30-minute intervals during off-peak times and on Saturdays, and hourly on Sundays and Public Holidays.
- Route 425 operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. The service runs at approximately 15–20-minute intervals during weekday peak periods, 30-minute intervals during off-peak times, and hourly on weekends and Public Holidays.
- Route 422 operates between Stirling Station and Scarborough Beach via Karrinyup Bus Station every 20 to 30 minutes during the weekday morning peak period. The service runs hourly at any other time during the week, hourly on Saturdays, and does not run on Sundays or Public Holidays.
- Route 424 operates between Stirling Station and Karrinyup Bus Station every 20 minutes during the weekday morning peak period and every 30 minutes during the afternoon peak. During weekday off-peak periods and on Saturdays the service runs hourly and does not operate on Sundays or Public Holidays.

Patronage data received from Western Australia PTA for the month of March 2023 shows an average boarding numbers of 514 passengers per day during the week, and 449 passengers during the weekend. Average number of passengers alighting the bus per day at the shopping centre are 646 during the week and 508 during the weekend. The data shows 8:00AM to 9:00AM as a consistent peak time for passengers getting off the bus at the shopping centre and 4:00PM to 6:00PM as a consistent boarding peak time. This implies that the buses are well used by staff of the centre as their means of commuting.

It was also observed that there was high usage between 3:00PM and 4:00PM during the week, which could correlate to school age students accessing the shopping centre.

Sundays have consistently lower usage, which aligns with the reduced frequency of buses on Sundays.

3.10.10. Crash Data

The recorded crash data sourced from ArcGIS via the Integrated Road Information System (IRIS) has been examined from January 2019 to August 2023. The "prior to development" period refers to being prior to October 2021 when the development was completed. The crash data is displayed in Table 3-8.

Table 3-8 Crash Data at Karrinyup Shopping Centre (Source: IRIS on ArcGIS)

Midblock (M) or Intersection (I)	Location	Total Crashes	Crash Nature	Severity
M	Karrinyup Road between Burroughs Road and Francis Avenue	24 (10 prior to development)	Rear End x 5 Right Turn Thru x 8 (4 prior to development) Right Angle x 2 (2 prior to development) Sideswipe Same Direction x 7 (3 prior to development) Hit Pedestrian x 1 (1 prior to development) Other x 1	PDO Minor x 6 (3 prior to development) PDO Major x 13 (5 prior to development) Medical x 5 (2 prior to development)
I	Karrinyup Road and Burroughs Road	51 (18 prior to development)	20 x Rear End (8 prior to development) 9 x Right Turn Thru (2 prior to development) 21 x Right Angle (7 prior to development) 1 x Sideswipe Same Direction (1 prior to development)	8 x PDO Minor (2 prior to development) 32 x PDO Major (9 prior to development) 9 x Medical (6 prior to development) 2 x Hospital (1 prior to development)
M	Burroughs Road between Karrinyup Rd and Davenport Street	3 (2 prior to development)	1 x Rear End (1 prior to development) 2 x Right Angle (1 prior to development)	2 x PDO Major (2 prior to development) 1 x Medical
M	Davenport Street between Burroughs Road and Francis Avenue	15 (3 prior to development)	Right Angle x 10 (1 prior to development) Sideswipe Same Direction x 1 (1 prior to development) Head On x 1 Other x 2 (1 prior to development)	PDO Minor x 4 PDO Major x 9 (3 prior to development) Medical x 1
I	Davenport Street and Francis Avenue	1 (1 prior to development)	Right Angle x 11 (2 prior to development) Sideswipe Same Direction x 1 (1 prior to development) Head On x 1 Other x 2 (1 prior to development)	PDO Minor x 4 PDO Major x 10 (4 prior to development) Medical x 1
M	Francis Avenue between Karrinyup Road and Davenport Street	6 (5 prior to development)	Rear End x 3 (3 prior to development) Right Angle x 2 (1 prior to development) Sideswipe in Same Direction x 1 (1 prior to development)	PDO Major x 1 (1 prior to development) PDO Major x 4 (3 prior to development) Medical x 1 (1 prior to development)
I	Karrinyup Road and Francis Avenue	34 (13 prior to development)	26 x Rear End (8 prior to development) 2 x Right Angle (1 prior to development) 6 x Sideswipe Same Direction (4 prior to development)	17 x PDO Minor (7 prior to development) 11 x PDO Major (4 prior to development) 6 x Medical (2 prior to development)
I	Karrinyup Road and Jeanes Road	19 (9 prior to development)	10 x Rear End (5 prior to development) 1 x Right Turn Thru 5 x Right Angle (2 prior to development) 3 x Other (2 prior to development)	6 x PDO Minor (4 prior to development) 9 x PDO Major (4 prior to development) 4 x Medical (1 prior to development)

It is worth noting that the traffic volumes for 2020 and 2021 were lower than other years due to the restrictions of the COVID-19 pandemic. This in turn would likely lead to reduced crash volumes for these years.

The crash data also shows that there is an ongoing high crash rate at the Karrinyup Road and Burroughs Road intersection with 51 crashes in the observed period. 18 (35%) were prior to development. In the previous DA process, it was proposed that this intersection is signalised, however that option was rejected by Main Roads.

4. Traffic Analysis – Background

4.1. Transport Model

An Aimsun Hybrid transport model with integrated SCATS signal control was developed for this study in order to analyse the performance of the road network in the vicinity of the Development. The model provides a base to which the impact of tested options could be quantitatively compared.

The first stage of the model build involved the development of a calibrated and validated base Aimsun model, which reflected existing traffic conditions at key intersections within the model area. This base model has undergone an external peer review facilitated by DoT.

Option models were then built from this base model to test the impact of the proposed Development on the surrounding road network. Within the Centre, the option models and analysis were based on the latest architectural carpark plans issued for construction.

The model area for this study is shown in Figure 4-1.

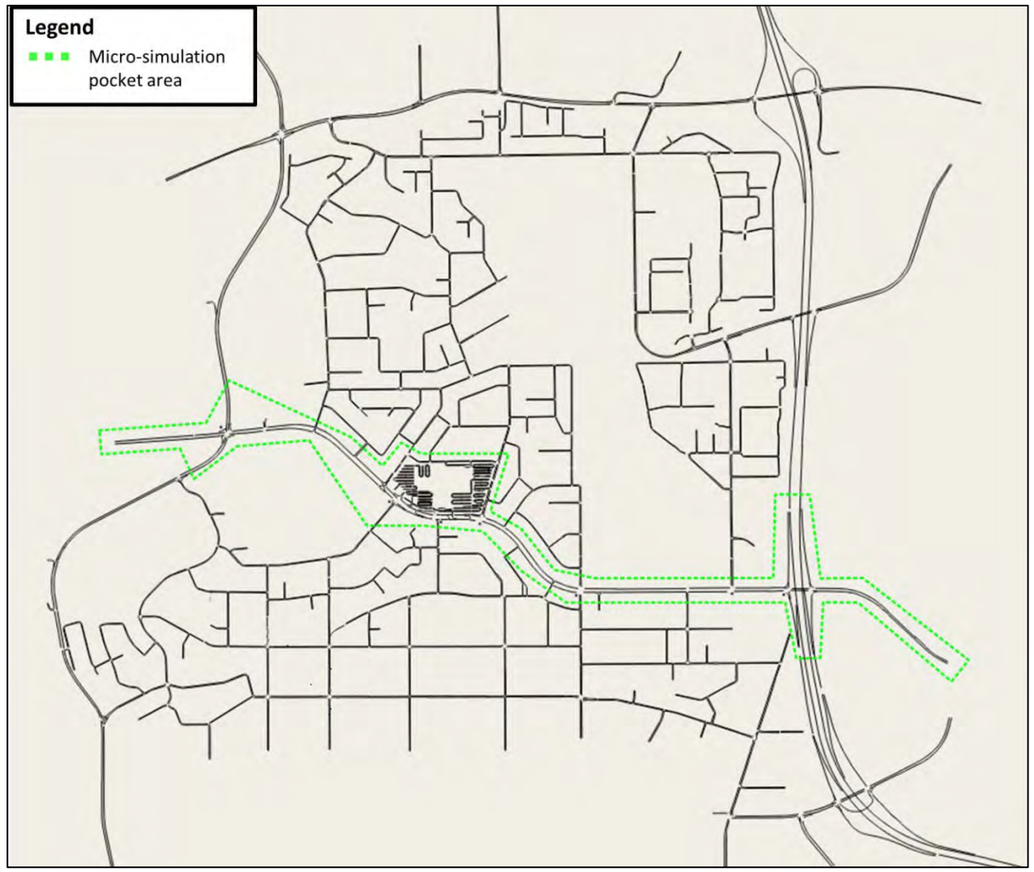


Figure 4-1 TP model area

4.2. Establishment of Timeframes

The projected traffic generation years for the road network assessment were agreed in consultation with Main Roads WA and the City of Stirling:

- **Base Case, 2013 / 2014 / 2015 –** existing conditions
- **Future year, 2021 –**approximately 2 years after the opening of the Mixed Use Expansion of Karrinyup and in line with the ROM forecasting year
- **Ultimate Year, 2031** – approximately 12 years after the approximate opening of the Mixed Use Expansion of Karrinyup and in line with the ROM forecasting year

The above mentioned years were adopted for the transport modelling component of this TP and are considered to be a **conservative approach** as 2019 and 2029 could have been used.

4.3. Future Planned Network Improvements

Table 4-1 lists the known currently planned significant network improvements within the area surrounding the Development.

Table 4-1 Planned road upgrades in the area surrounding the Development

Location	Authority	Description	Relevant Model Year
Reid Highway	MRWA	Planned upgrades to Reid Highway including an additional lane in both the east and westbound directions	2021 and 2031
Reid Highway / Mitchell Freeway Interchange	MRWA	Planned upgrades to Reid Highway / Mitchell Freeway Interchange including grade separation of most movements	2021 and 2031
Mitchell Freeway	MRWA	Additional northbound lane between the Cedric Street Off-Ramp and the Karrinyup Road Off-Ramp	2021 and 2031
Reid Highway / Duffy Road South	MRWA	Signalisation of the Reid Highway / Duffy Road South T-junction	2021 and 2031
Karrinyup Road / Mitchell Freeway southbound off-ramp	MRWA	Upgrades to the Karrinyup Road / Mitchell Freeway southbound off-ramp consisting of an additional right turn lane at the off-ramp signals	2031

4.4. 2024 Transport Model for the Proposed Modification

Transport modelling has been updated in 2024 to reflect current operations around the Centre and to test the proposed changes discussed in Section 2.1. The new model has been developed as a microsimulation model using the Aimsun modelling suite and has been calibrated to 2024 conditions. The following shows the 2024 model network extents.

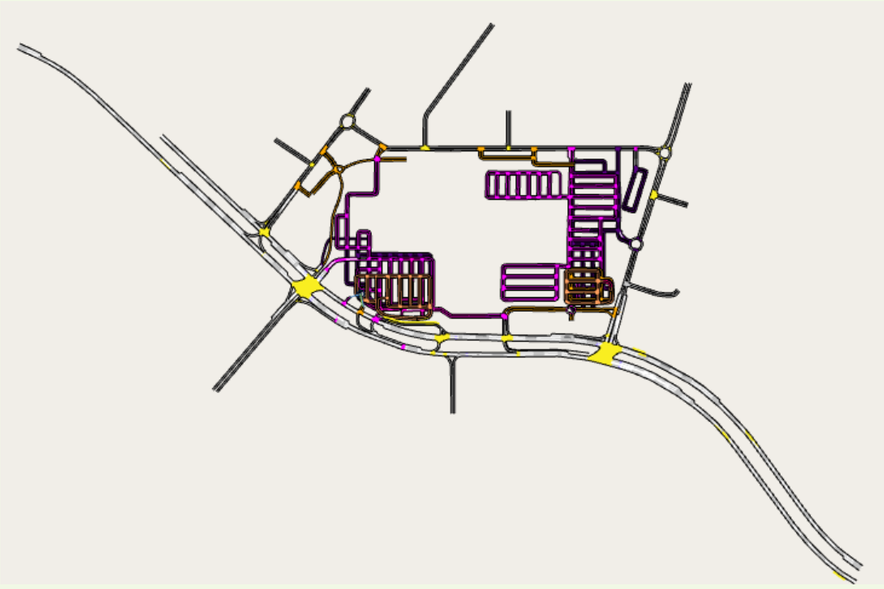


Figure 4-2 Karrinyup Centre - 2024 Model Network

The model development details including model calibration, validation and the option testing results are discussed within Appendix B1 of this document.

4.5. Mode Share Target

The mode share targets percentages that was used for the purpose of the transport modelling is shown in Figure 4-3. Whilst other modes are encouraged to proportionally increase as part of the proposed transport upgrades, due to the location of the Development in the Perth Metropolitan area, there will always be a high demand and proportion of car use, unless dramatic improvements to the public transport infrastructure network across Perth is increased. The same issues are met with many other shopping centre developments in suburban Perth. Active transport use is also limited to the local catchment area and can be particularly difficult for Karrinyup with the undulations of the surrounding terrain.

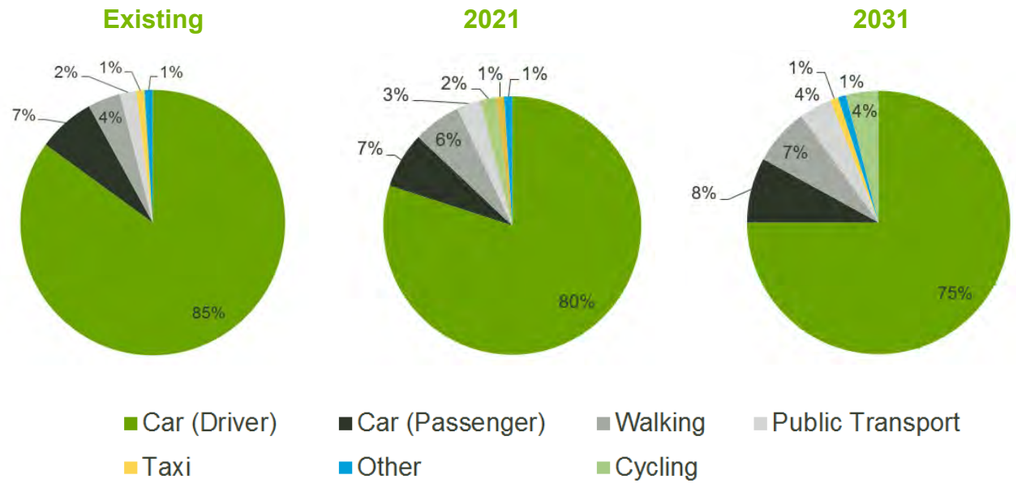


Figure 4-3 Analysed mode share targets for the Development

The Draft Karrinyup Secondary Centre Activity Centre Structure Plan identified a mode share goal for the Development. The travel mode share goal was based on an estimate that, by 2021, 5% of people will shift from private motor vehicle to other modes of transport and by 2031, 11% will shift to other modes. This was based off City of Stirling targets. In its entirety, trips associated with all modes will increase as a result of the Development.

4.6. Estimation of Traffic Growth

Background Traffic Growth

In the establishment of the 2021 and 2031 future model years, forecasting data was obtained from the Main Roads WA Regional Operations Model (ROM). This established various levels of background network traffic growth across the different time periods and future years, as indicated in Table 4-2. This background network traffic undertakes trips that are not associated with the Mixed Use Expansion of Karrinyup.

Table 4-2 Background network traffic growth for each time period

Future Year	AM growth from 2013	PM growth from 2013	Saturday growth from 2013
2021	5.21%	5.30%	5.92%
2031	22.25%	22.21%	23.98%

The ROM24 model is maintained by MRWA. Standard version 3.3 was used with Department of Planning (DoP) land use, including population and employment. For the Karrinyup Development zones, the calculated trip generation values were used to get a more accurate number than what ROM24 would estimate. For the Saturday peak period, the daily ROM matrix was scaled and used. For the AM and PM periods, the hourly matrices were used over the 06:00-10:00 and 15:00-19:00 periods, respectively.

Trip Generation

There is no fixed approach to trip generation in WA, however the following steps cover what is considered a logical and conservative approach to estimating the number of trips that are likely to be generated by the proposed development.

Existing Surveyed Trip Generation

Traffic data was collected at all centre entrances, including the petrol station, on Thursday 14 May 2015 for the AM and PM peak periods and on Saturday 23 May 2015. The total traffic generated during the peak hour of the road network was as follows.

Table 4-3 Peak hour trips for 2015

Peak Period	AM Peak	PM Peak	Sat Peak
Trip Generation Inbound	1,052	1,323	1,839
Trip Generation Outbound	295	1,443	1,731
Total Trip Generation	**1,347**	**2,766**	**3,570**

Existing Estimated Trip Generation

For the estimation of the Development trips resulting from the proposed Development, Institute of Transportation Engineers (ITE) trip rates was predominantly used. The ITE trip rates are not only suited for larger developments such as Karrinyup but are also more private vehicle focussed and are therefore in line with Perth travel characteristics.

By applying the ITE trip rates to the existing land use, the following trip generation was calculated.

Table 4-4 ITE trip breakdown for 2015 (existing)

Land Use	2015 sqm	AM Peak 08:00 - 09:00	PM Peak 17:00 - 18:00	Sat Peak 12:00 - 13:00
Retail	53,544	454	1,937	2,729
Office / Business	4,184	101	84	12
Eating / Entertainment / Culture	2,382	60	119	119
Community / Health / Welfare	706	10	13	9
Other Incidental Floor Space	195	15	45	71
Total Traffic Volumes		**640**	**2,198**	**2,940**

Table 4-5 further details how the trip breakdown was calculated. All square foot values were converted to square metres.

Table 4-5 ITE trip breakdown calculations

Land Use	Trips Formula	Reference
Retail	$e^{0.65\ln\left(area\left(\frac{ft^2}{1000}\right)\right)+3.78}$	ITE - Shopping Centre, Peak hour of adjacent street traffic, AM & PM, and Sat Peak Hour Generator
Office / Business	$0.1(2.03 \times area\left(\frac{ft^2}{1000}\right) + 31.75)$	ITE - General office building, AM, PM. Saturday day used, 10% used for peak hour
Eating / Entertainment / Culture	$5 \times \left(\frac{area(m^2)}{100}\right)$	RMS for restaurants (PM only was provided)
Community / Health / Welfare	$1.25 \times area\left(\frac{ft^2}{1000}\right)$	ITE – Recreational Community Centre
Other Incidental Floor Space	$e^{0.65\ln\left(area\left(\frac{ft^2}{1000}\right)\right)+3.78}$	ITE - Shopping Centre, Peak hour of adjacent street traffic, AM & PM, and Sat Peak Hour Generator
Dwelling (Inside DA)	$0.5 \times area(m^2)$	RMS Old Version - Medium density residential

Existing Centre Overtrading

Published information from the Shopping Centre News indicates that the majority of major shopping centres with Western Australia are more productive than the Australian average (of the floor space measured – which was the most productive). Based on the published figures Karrinyup is trading approximately 20% above the Australian average. By comparing the ITE estimated trip generation to the actual trip generation the following difference is calculated.

Table 4-6 Existing trip generation difference

Peak Period	AM Peak	PM Peak	Sat Peak
Trip Generation Difference	707	568	630

With the exception of the lower volume AM period, the comparison between the existing ITE trip generation and existing survey data shows that this 20% overtrading value is broadly in line with the increase in traffic for the Development estimated from ITE trip rates. This provides confidence in the ITE trip rate for determining the trip generation for a centre that is trading at an average rate.

Once the Development has been completed, AMP expect that the productivity of the floor space will reduce compared to existing levels. It is expected that the productivity levels will be closer to the national average.

ITE Trip Generation for the Mixed Use Expansion

Using the ITE trip rates, the trip generation was calculated for the proposed expansion of the centre, as shown in Table 4-7, which includes the draft Structure Plan area floor space.

The Cinema trip rate of 4.09 trips per 100 sqm was obtained from the ITE Trip Generation Manual for a Movie Theatre with Matinee during the Friday PM road network peak which is considered applicable for the weekday PM peak period. In the absence of other data, this same value was then applied to the Saturday midday period and 20% of its value applied to the weekday AM peak period.

Table 4-7 ITE trip breakdown for Mixed Use Expansion

Land Use	Completed Centre Floor Space sqm	AM Peak 08:00 - 09:00	PM Peak 17:00 - 18:00	Sat Peak 12:00 - 13:00
Retail	93,355	637	2,811	3,917
Office / Business	10,394	240	208	29
Entertainment / Community	3,916	98	196	196
Cinema	6,200	51	254	254
Health	2,654	38	50	36
Utility	300	19	60	94
Dwellings	134	67	67	67
Total Traffic Volumes		**1,150**	**3,646**	**4,593**
% Split In		64%	43%	49%

Overtrading Calibration

The previously calculated absolute difference between the existing surveyed and existing ITE trip generation can be used as a calibration factor as a **conservative approach** in the unlikely event that the current productivity levels continue.

By adding the difference, the following trip generation is calculated

Table 4-8 Application of the overtrading calibration trips

Peak Period	AM Peak	PM Peak	Sat Peak
ITE Trip Generation	1,150	3,646	4,592
Calibration Trips	707	568	630
Total Traffic Volumes	**1,856**	**4,214**	**5,222**

Structure Plan Trip Generation

The Draft Karrinyup Secondary Centre Activity Centre Structure Plan considered additional land uses. The updated trip breakdown for the Structure Plan Trip Generation is as follows for 2021 and 2031.

Table 4-9 Peak hour trip breakdowns for 2021

Land Use	2021 sqm	AM Peak 08:00 - 09:00	PM Peak 17:00 - 18:00	Sat Peak 12:00 - 13:00
Retail	93,355	637	2,811	3,917
Office / Business	14,716	318	294	39
Entertainment / Community	6,086	152	304	304
Cinema	6,200	51	254	254
Health	3,237	46	61	44
Utility	300	19	60	94
Dwellings	245	123	123	123
Total Traffic Volumes		**1,345**	**3,907**	**4,774**
% Split In		64%	47%	53%

The estimated 2031 breakdown is shown below.

Table 4-10 Peak hour trip breakdowns for 2031

Land Use	2031 sqm	AM Peak 08:00 - 09:00	PM Peak 17:00 - 18:00	Sat Peak 12:00 - 13:00
Retail	99,000	660	2,924	4,070
Office / Business	18,000	372	360	46
Entertainment / Community	7,300	183	365	365
Cinema	6,200	51	254	254

Land Use	2031 sqm	AM Peak 08:00 - 09:00	PM Peak 17:00 - 18:00	Sat Peak 12:00 - 13:00
Health	5,000	71	94	67
Utility	500	26	85	131
Dwellings	750	375	375	375
Total Traffic Volumes		**1,738**	**4,457**	**5,307**
% Split In		57%	48%	52%

With the estimated 2031 Structure Plan volumes being higher than the Mixed Use Expansion volumes in the PM and Saturday peak periods, it was considered a **conservative approach** to use the Structure Plan volumes for the Mixed Use Expansion assessment.

This gives the following growth in trips for the DA from the existing surveyed trip volumes.

Table 4-11 Trip Volume Growth

Trip Volume Growth	AM Peak	PM Peak	Sat Peak
2015 to 2031 DA	29.8%	57.1%	46.7%

Mode Split Adjustment

As discussed in Section 0, a 5% reduction in private vehicle drivers is targeted in 2021 and a 10% reduction in 2031. This will be achieved by the implementation of multiple instruments that promote the use of other modes of transport, as discussed in this TP. By taking into consideration these reductions in private vehicle travel, the trip volumes are adjusted to the following.

Table 4-12 Trip generation with mode split adjustment

Model Year	AM Peak	PM Peak	Sat Peak
2021 Trip Generation	1,533	3,448	4,212
2031 Trip Generation	1,533	3,932	4,683

As the 2021 AM peak period volume is lower than the existing survey value, the 2031 AM value has been used for 2021 AM period.

Final Trip Rates

After the mode split adjustment, the final trip rates for the Mixed Use Expansion DA are shown in Table 4-13 if we apply the Structure plan volumes for the DA. The NSW RMS Guide for Traffic Generating Developments is often referred to in Australia for trip generation of shopping centres and this has been compared to below.

Table 4-13 Private vehicle trip generation rates

Trip Rate Method	AM Peak	Thursday PM Peak	Sat Peak
Final trips for 116,819 sqm	1.3	3.4	4.0
NSW RTA for centres above 70,000 sqm	-	3.1	3.6

Note that all trip generation guides show a decrease in the trip rate as the size of the centre increases.

Stress Test

A stress test was undertaken on the 2031 network to ascertain the maximum number of trips that the centre can generate before the performance of the road network and accessibility to the centre is no longer satisfactory. This was done by determining when congestion from one intersection was significantly impacting on the performance of an adjacent intersection, primarily on Karrinyup Road between Huntriss Road and North Beach Road. The results of the stress test are shown in Table 4-14.

Table 4-14 Stress test results

Stress test	AM Peak	PM Peak	Sat Peak
Centre Trips	4,500	5,000	5,000

The stress tests showed that 237 trips need to change modes for the Saturday peak period only, which is equivalent to 4% of private vehicle drivers changing modes. This is expected to be achieved by the proposed internal residential land use within the Development expansion and improvements to cycling infrastructure alone.

Trip numbers for all modes

From the total vehicle trips, the number of trips for each mode was calculated using the current and target mode splits. These trip numbers are shown in the tables below for each model period.

Table 4-15 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – Existing situation

Existing	Target	AM	PM	Saturday
Car Driver	85%	1,347	2,766	3,570
Car Passenger	7%	111	228	294
Public Transport	2%	32	65	84
Cycling	1%	16	33	42
Walking	4%	63	130	168
Taxi	1%	16	33	42
Other	0%	0	0	0
Total Trip Gen		**1585**	**3254**	**4200**

Table 4-16 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – 2021

2021 (Tested)	Target	AM	PM	Saturday
Car Driver	80%	1,533	3,448	4,212
Car Passenger	7%	134	302	369
Public Transport	3%	58	129	158
Cycling	2%	38	86	105
Walking	6%	115	259	316
Taxi	1%	19	43	53
Other	1%	19	43	53
Total Trip Gen		**1,917**	**4,309**	**5,265**

Table 4-17 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – 2031

2031 (Tested)	Target	AM	PM	Saturday
Car Driver	75%	1,533	3,932	4,683
Car Passenger	8%	164	419	500
Public Transport	4%	82	210	250
Cycling	4%	82	210	250
Walking	7%	143	367	437
Taxi	1%	20	52	62
Other	1%	20	52	62
Total Trip Gen		**2,044**	**5,243**	**6,244**

Other Assumptions

The following assumptions were also made regarding these trip rates:

- 85% of trips will be primary trips (directly to the Development), 10% bypass trips (a detour to the Development from a passing adjacent road), and 5% diverted trips (a detour to the Development from a passing road further afield).
- Trips within the existing site and trips external to the site (but within the Structure Plan area), were calculated independently to each other. This generally results in slightly higher estimated volumes as well as potentially enabling more vehicles to be released on to the network.
- Public transport frequencies were increased according to Transperth estimates. Without further information, as a worst case scenario these were fully implemented in 2021, but this would have little impact on the network.

4.7. Updated Situation for 2024

In developing an updated model, Main Roads ROM24 forecast data was again used to establish the future year background demands. This growth is shown below.

Table 4-18 Background network traffic growth for each time period

Future Year	AM growth from 2024	PM growth from 2024	Saturday growth from 2024
2034	8%	14%	27%

The peak hour trips from survey counts for the Centre is shown below. With the exception of the Karrinyup Western Village, no additional land use was added for the Centre.

Table 4-19 Peak hour trips for 2024

Peak Period	AM Peak	PM Peak	Sat Peak
Trip Generation Inbound	1,329	1,755	2,586
Trip Generation Outbound	485	1,663	2,466
Total Trip Generation	**1,814**	**3,418**	**5,052**

A mode split survey was undertaken in 2024 and this data is shown below. The data was aligned to the vehicle counts and public transport data. For other modes in the AM and PM periods, the full day mode split was used. The 2024 mode share splits show an improvement compared to prior to the redevelopment and also compares well to the targets set in the 2019 Transport Plan.

Table 4-20 Number of trips during weekdays AM and PM peak hours and Saturday peak hour – 2024 situation

2024	AM Split	AM Trips	PM Split	PM Trips	SAT Split	SAT Trips
Car Driver	77%	1,814	79%	3,418	59%	5,052
Car Passenger	11%	262	11%	494	34%	2,990
Public Transport	6%	137	3%	141	1%	109
Cycling, E-Scooter	1%	19	1%	35	1%	26
Walking	3%	74	3%	140	4%	335
Taxi, Rideshare	2%	53	2%	100	1%	77
Other	0%	0	0%	0	0%	0
Total	**100%**	**2,359**	**100%**	**4,327**	**100%**	**8,589**

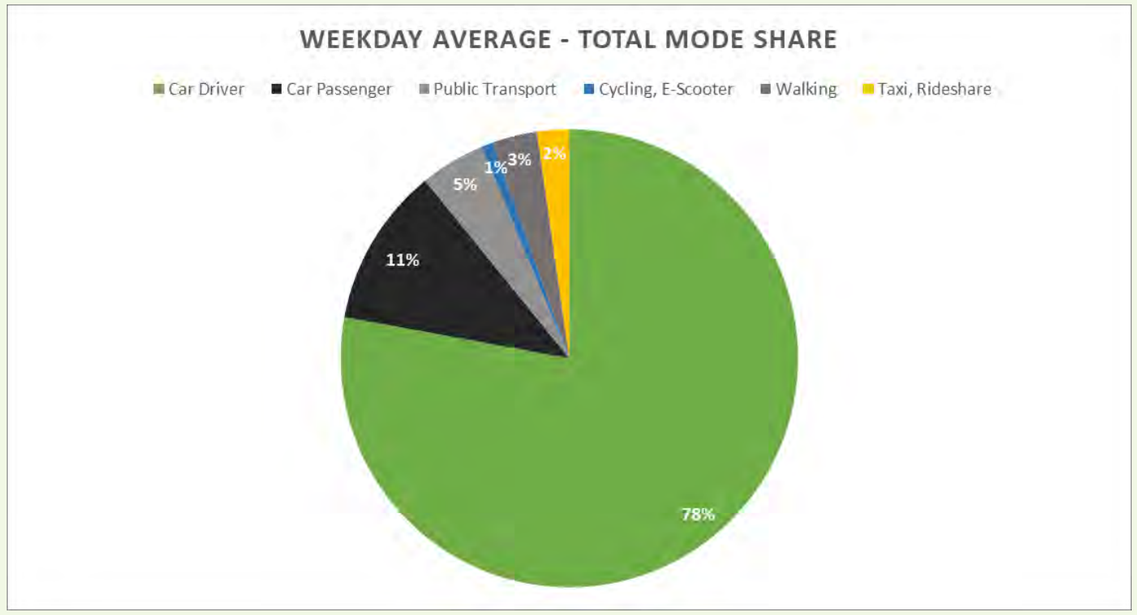


Figure 4-4 Average mode share - 2024 Thursday weekday

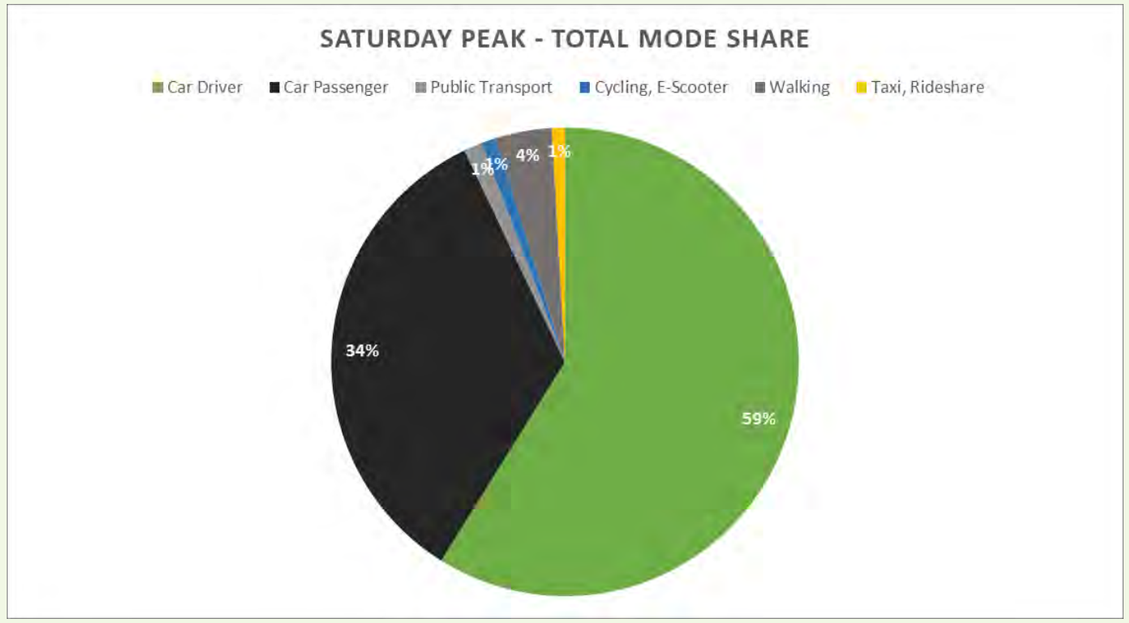
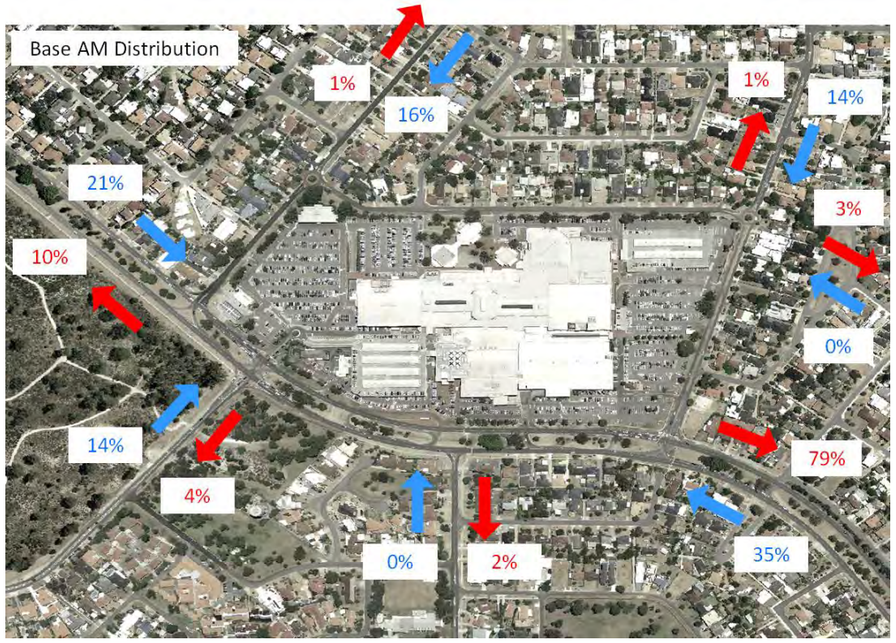


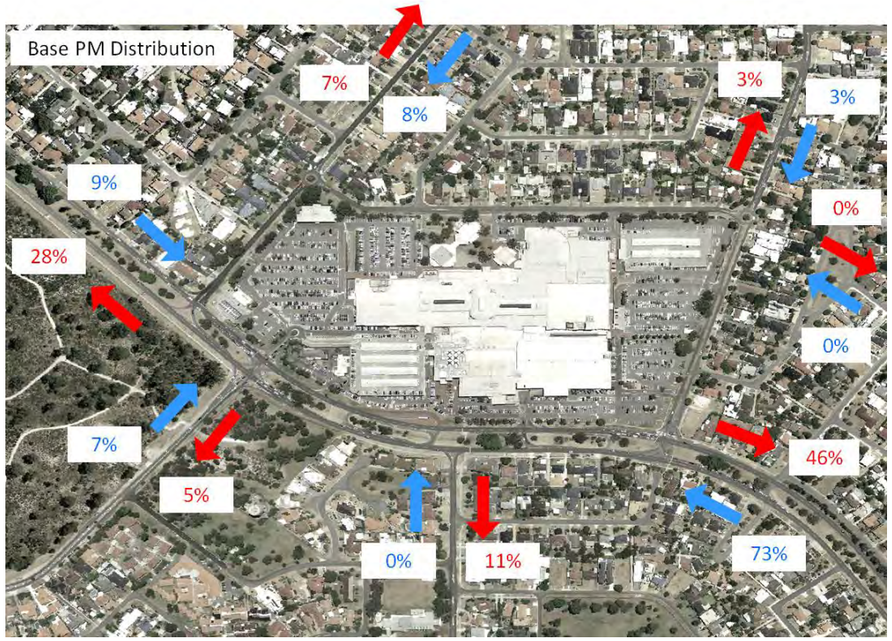
Figure 4-5 Average mode share - 2024 Saturday Peak

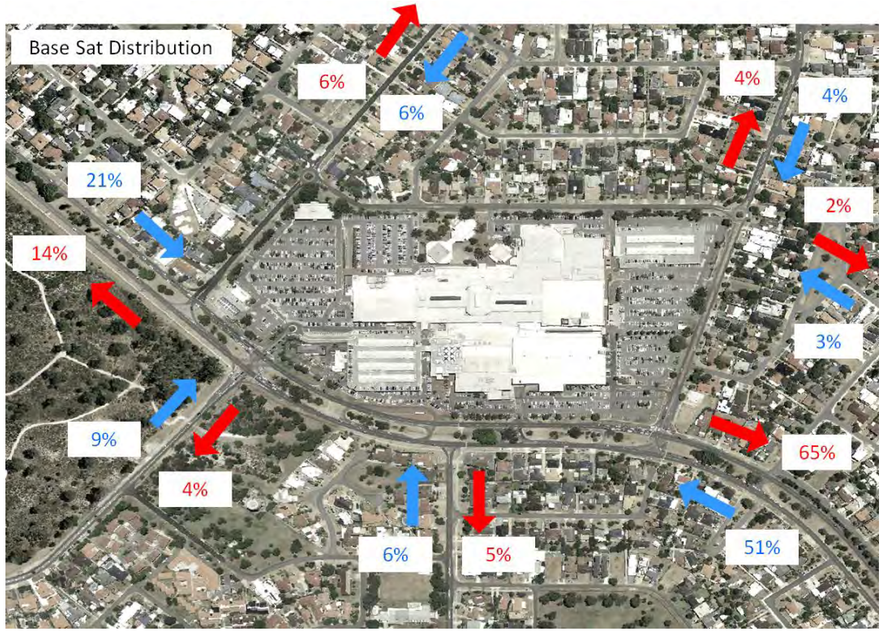
4.8. Trip Distribution

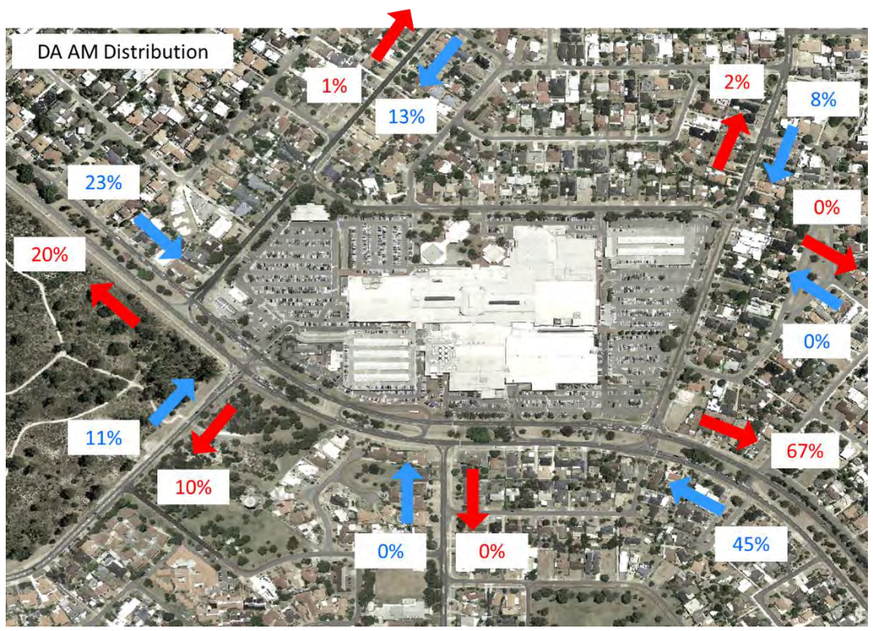
From trade information available to Aurecon, there is a high proportion of people originating from east of the Development. This is in line with indications from the traffic count data. Those originating from north or south of the Development are also likely to use Mitchell Freeway, therefore also arriving to the Development from the east.

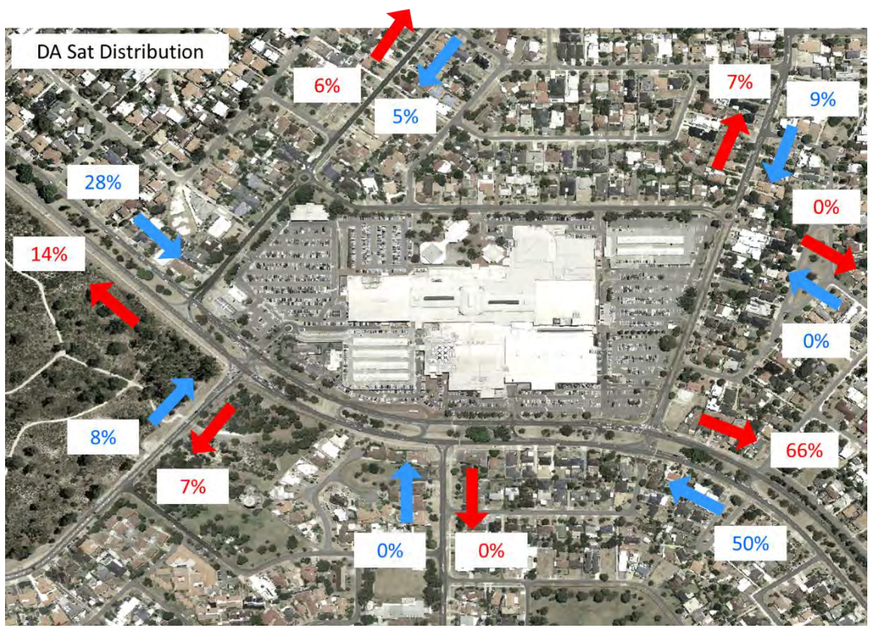
The following diagrams illustrate the trip distribution for the base year and DA scenarios.








DA AM Distribution
1%
13%
2%
8%
23%
0%
20%
0%
11%
67%
10%
0%
0%
45%


DA Sat Distribution
6%
5%
7%
9%
28%
0%
14%
0%
8%
66%
7%
0%
0%
50%

DA PM Distribution
8%
7%
10%
10%
25%
0%
26%
0%
5%
52%
4%
0%
0%
53%

4.9. Option Models

Option models were built for the assessment years to test the impact of the proposed Development on the surrounding road network. The estimated trip generation values from the Development were added to the background growth to form the option models.

The option model networks were developed from the do-minimum models by incrementally including a number of intersection improvements and modifications to accommodate the projected future year traffic increases. The final model scenarios were as follows:

- **2021 Do-Minimum Model (without the Mixed Use Expansion at Karrinyup)**
  - Existing road network
  - Increased background traffic demands
  - Main Roads WA upgrades to Reid Highway. Look ahead/ distance zones changed on the Reid Highway approach to Marmion Avenue accordingly.
  - Main Roads WA upgrades to the Reid Highway/ Mitchell Freeway Interchange
  - Additional northbound lane on Mitchell Freeway between the Cedric Street Off-Ramp and the Karrinyup Road Off-Ramp
  - Main Roads WA signalisation of Reid Highway / Duffy Road South

- **2021 Option Model (with the Mixed Use Expansion at Karrinyup)**
  - Proposed upgrades at several locations on the road network (refer to Section 5.1)
  - Increased background traffic demands
  - Mixed Use Expansion at Karrinyup included with revised trip numbers
  - Main Roads WA upgrades to Reid Highway. Look ahead/ distance zones changed on the Reid Highway approach to Marmion Avenue accordingly.
  - Main Roads WA upgrades to the Reid Highway/ Mitchell Freeway Interchange
  - Additional northbound lane on Mitchell Freeway between the Cedric Street Off-Ramp and the Karrinyup Road Off-Ramp
  - Main Roads WA signalisation of Reid Highway / Duffy Road South

- **2031 Do-Minimum Model (without the Mixed Use Expansion at Karrinyup)**
  - Main Roads WA upgrades to Reid Highway. Look ahead/ distance zones changed on the Reid Highway approach to Marmion Avenue accordingly.
  - Main Roads WA upgrades to the Reid Highway/ Mitchell Freeway Interchange
  - Additional northbound lane on Mitchell Freeway between the Cedric Street Off-Ramp and the Karrinyup Road Off-Ramp
  - Main Roads WA signalisation of Reid Highway / Duffy Road South
  - Main Roads WA upgrades to the Karrinyup Road / Mitchell Freeway southbound off-ramp
  - Increased background traffic demands

- **2031 Option Model (with the Mixed Use Expansion at Karrinyup)**
  - Main Roads WA upgrades to Reid Highway. Look ahead/ distance zones changed on the Reid Highway approach to Marmion Avenue accordingly.
  - Main Roads WA upgrades to the Reid Highway/ Mitchell Freeway Interchange
  - Additional northbound lane on Mitchell Freeway between the Cedric Street Off-Ramp and the Karrinyup Road Off-Ramp
  - Main Roads WA signalisation of Reid Highway / Duffy Road South
  - Main Roads WA upgrades to the Karrinyup Road / Mitchell Freeway southbound off-ramp
  - Increased background traffic demands
  - Upgrades at several locations on the road network as per Section 5.1
  - Mixed Use Expansion at Karrinyup included with revised trip numbers

Cycle times are assumed to remain as they are today as this is dictated by the MRWA Traffic Operations Centre, although a reduction in cycle times would be supported. The signalised pedestrian crossing by the Karrinyup Bus Station was increased in frequency of calls in the model.

4.9.1. 2024 Option Model for the Proposed Modification

The calibrated 2024 model was used for testing the network upgrades discussed in Section 2.1.

Figure 4-6 presents the location of model changes for the purpose of option testing. These have been tested for the 2034 scenario year.

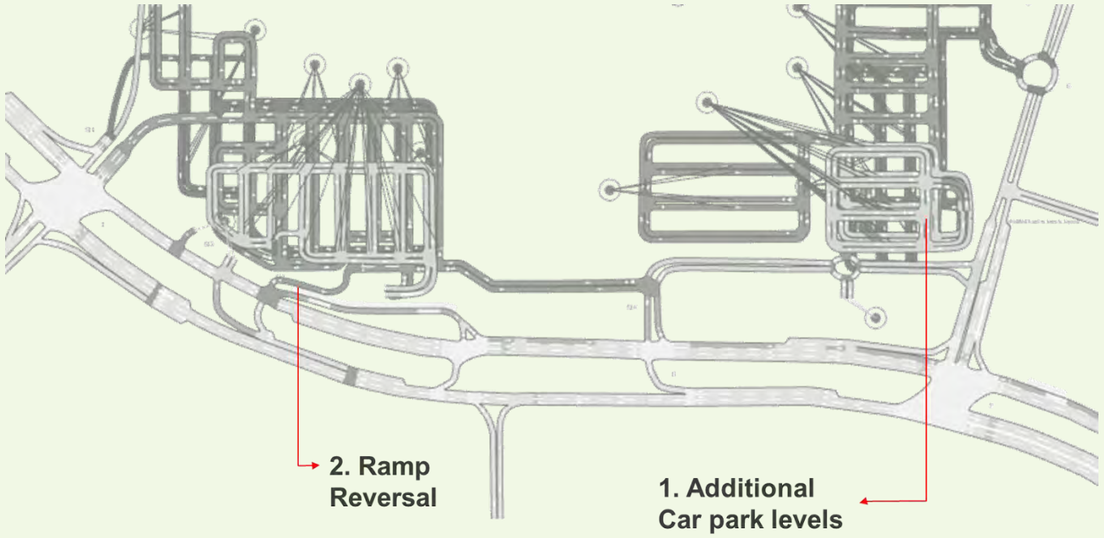


Figure 4-6 2024 Model Update: Location of model updates

5. Traffic Analysis – Results and Discussion

5.1. Proposed road upgrades

To ensure the road network surrounding the Development will operate at an acceptable level in the future with the Development in place, it is recommended that the following roads and intersections are upgraded, as shown in Figure 5-1. These road upgrades are reflected in the 2021 and 2031 transport models.

1. Karrinyup Road / West Coast Highway
2. Karrinyup Road / Burroughs Road
3. Roads immediately surrounding the Development
4. Karrinyup Road / Francis Avenue
5. Karrinyup Road / Huntriss Road
6. Karrinyup Road / Mitchell Freeway Interchange West Approach

Schematic road upgrade drawings showing these proposed changes are attached in Appendix A. Note that these designs are being refined as part of the detailed design process. In most instances where additional lanes are proposed, road widening is provided for within the median, rather than the verge. In locations where the road width is wider, it is believed that an additional road lane of road width at a signalised crossing will not deter pedestrians from walking to or from the Development. If the width of a signalised crossing is marginally increased, the allowed crossing time will also be marginally increased.

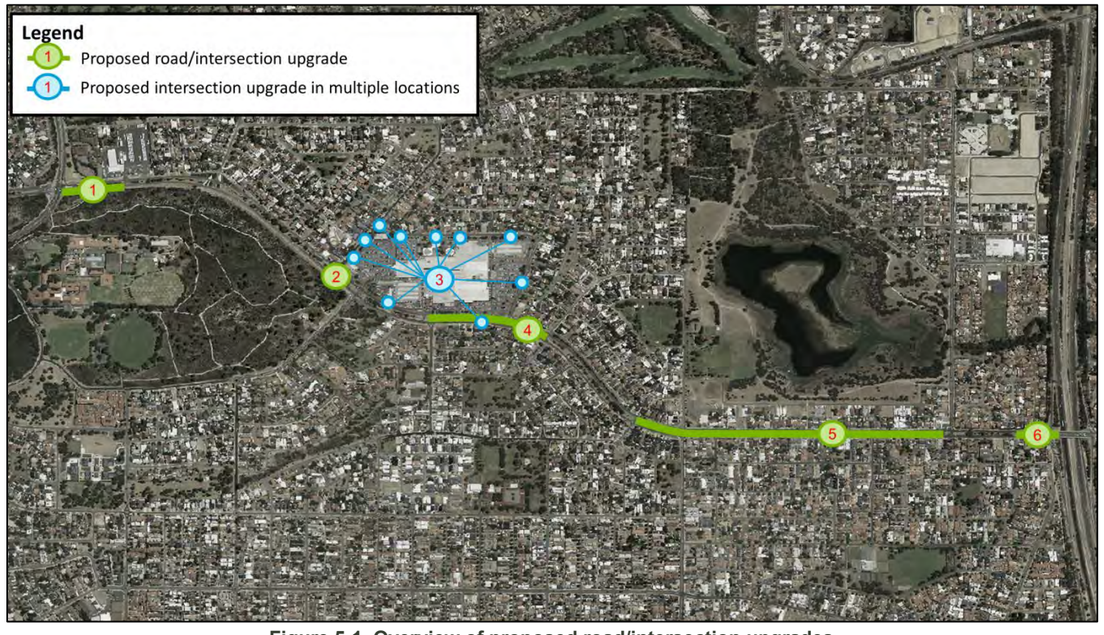


Figure 5-1 Overview of proposed road/intersection upgrades

5.1.1. West Coast Highway / Karrinyup Road

The upgrade of the West Coast Highway and Karrinyup Road intersection comprises of the extension of the right turn bay from Karrinyup Road east approach. The inside lane is proposed to be extended by approximately 90m and the middle lane by approximately 30m. The intent of such modifications is to improve the PM peak traffic movement that is currently operating at its capacity limit on-street, resulting in queuing back that blocks the through movements. This modification will be undertaken by extending into the median.

Figure 5-2 Existing West Coast Highway/ Karrinyup Road layout

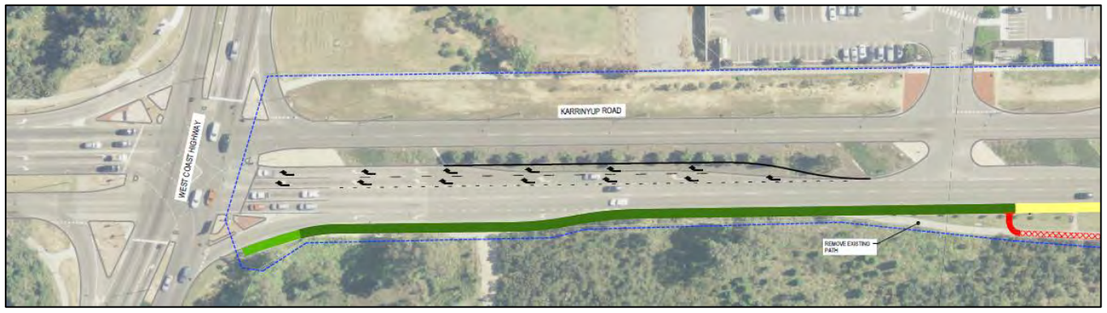


Figure 5-3 Proposed West Coast Highway/ Karrinyup Road layout

5.1.2. Karrinyup Road / Burroughs Road

Proposed modifications to the Karrinyup Road/Burroughs Road intersection, as per Figure 5-5, include:

- Extension of the Burroughs Road left turn bay by approximately 30m
- Implementation of a westbound acceleration lane, of approximately 150m length, within the Karrinyup Road median

The right turn acceleration lane will allow for an easier right turn movement from Burroughs Road and the left turn slip lane allows left turners to bypass the right turn queue. The acceleration lane ends before the curve in Karrinyup Road and before the next intersection.

An alternative option for this intersection is to convert the northern half to a signalised seagull arrangement, although Main Roads WA does not currently support this. This would provide a safer right turn movement for turning vehicles and eliminate poor gap decision making. MRWA are investigating this intersection as it is an existing safety issue. The intersection can perform at an acceptable level both with and without signalisation. In the modelled options, this intersection is coded as an unsignalised intersection.

Figure 5-4 Existing Karrinyup Road / Burroughs Road intersection

Figure 5-5 Proposed modifications to the Karrinyup Road / Burroughs Road intersection

5.1.3. Roads immediately surrounding the Development

There are a number of additional minor intersections or minor modifications to the road network surrounding the Development. A total of eleven (11) additional or modified intersections will be affected, with the removal of three other intersections within the surrounding area.

The Karrinyup Road turn bay, situated in the median to the east of Jeanes Road, is proposed to be moved to the west by approximately 30m, and will also serve bus movements into the station. The u-turn bay to the west of Francis Avenue will be removed to allow for a longer turn bay for the adjacent right turn into the Development.

Figure 5-6 Existing road network surrounding the Development

Figure 5-7 Proposed additional or modified intersections surrounding the Development

The development includes the Burroughs Road/Main Street intersection as a T-intersection (refer to Figure 5-8).

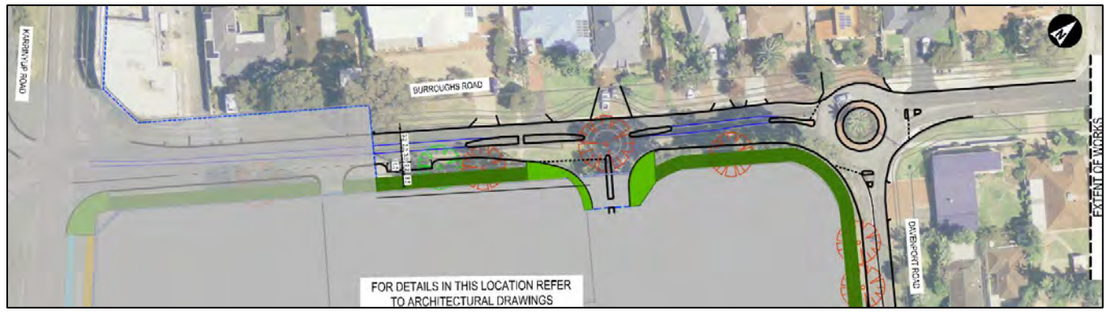


Figure 5-8 Proposed intersection at Burroughs Road/Main Street as a T-intersection

5.1.4. Karrinyup Road/ Francis Avenue

Proposed modifications to the Karrinyup Road/Francis Avenue intersection include:

- Implementation of a 245m kerbside bus queue jump lane directly from the Karrinyup bus station on the Karrinyup Road west approach plus a 115m exit lane after the intersection.
- An additional right turn lane on the Karrinyup Road east approach. There are some grade differences within this area which will need to be addressed in detailed design.
- Extension of the left turn lane from the Francis Avenue approach by 40m
- An additional northbound lane on Francis Avenue for approximately 70m to support the double right turn

The right turn into Francis Avenue is currently beyond the capacity of its turn bay and blocks traffic in the through lane. The City of Stirling perceives that increasing the number of lanes dictates, to some extent, the difficulties for pedestrians crossing here, however the road widening is proposed to occur within the median which is already of a substantial width.

A bus queue jump lane is proposed for the west approach through movement only as this is the Karrinyup Road through movement that will receive the least amount of green time, and hence most delay, due to the signal phasing arrangement.

Figure 5-9 Existing Karrinyup Road/ Francis Avenue intersection layout

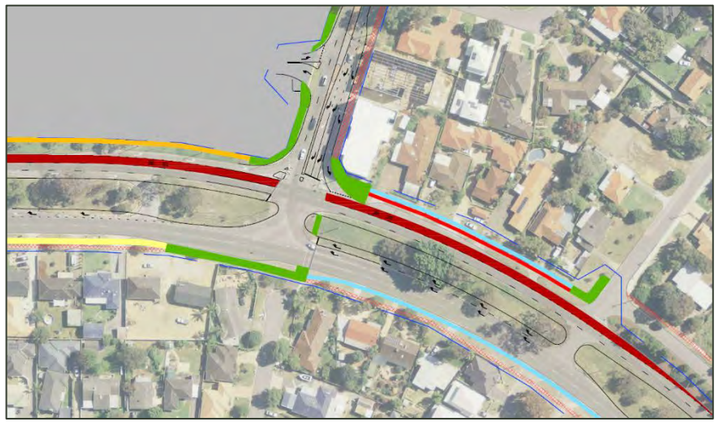


Figure 5-10 Proposed modifications to the Karrinyup Road/Francis Avenue intersection

5.1.5. Karrinyup Road / Huntriss Road

The following changes are considered for the Karrinyup Road/ Huntriss Road intersection:

- Addition of approximately 380 metre kerbside bus lane on Karrinyup Road westbound from west of the intersection of Karrinyup Road/Muir Street (total length to the signals stopline is 460m, plus tapers). This will allow buses to jump past the estimated 2031 morning and evening peak queues from the Huntriss Road intersection. This additional bus lane will be achieved by narrowing of the median.
- Addition of a second right turn lane from the Karrinyup Road west approach, 100m on the approach, 60m on the exit. Also, the conversion the underutilised left turn lane to a shared left/through lane on the west approach with 80m on the exit.

A long bus lane is proposed here as this will support high frequency bus services and benefit public transport users in accessing the Centre. Additionally, it is perceived that the bus lane will encourage private vehicle drivers to shift modes in order to avoid congestion on the general traffic lanes during peak periods. The bus lane will continue through the Huntriss Road intersection utilising the existing left turn lane, before merging with general traffic.

A large proportion of buses also turn right from Karrinyup Road into Huntriss Road south. However, in this instance, it was believed that providing an additional general traffic lane would provide similar benefits for buses as a dedicated bus lane.

Figure 5-11 Existing Karrinyup Road/ Huntriss Road intersection layout

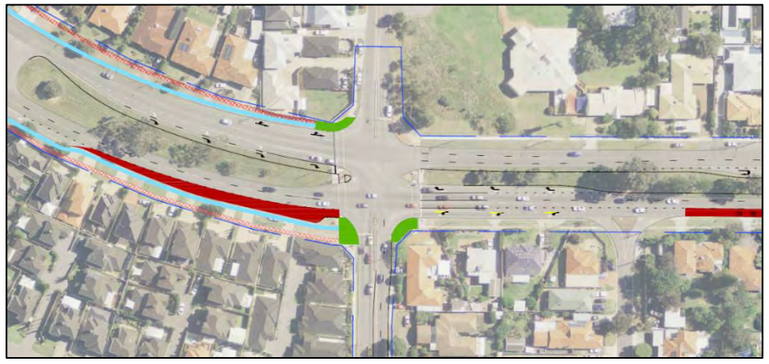


Figure 5-12 Proposed additional right turn lane at the Karrinyup Road/ Huntriss Road intersection

5.1.6. Karrinyup Road / Mitchell Freeway Interchange West Approach

The proposed measure at this intersection is the extension of the right turn bay by 80m on the Karrinyup Road west approach. Currently the west approach right turn bay on the interchange bridge queues back to block the approach through lanes. By increasing the length of the turn bay, improved performance at this intersection is expected.

Figure 5-13 Existing Karrinyup Road/ Mitchell Freeway Interchange (east approach) intersection layout

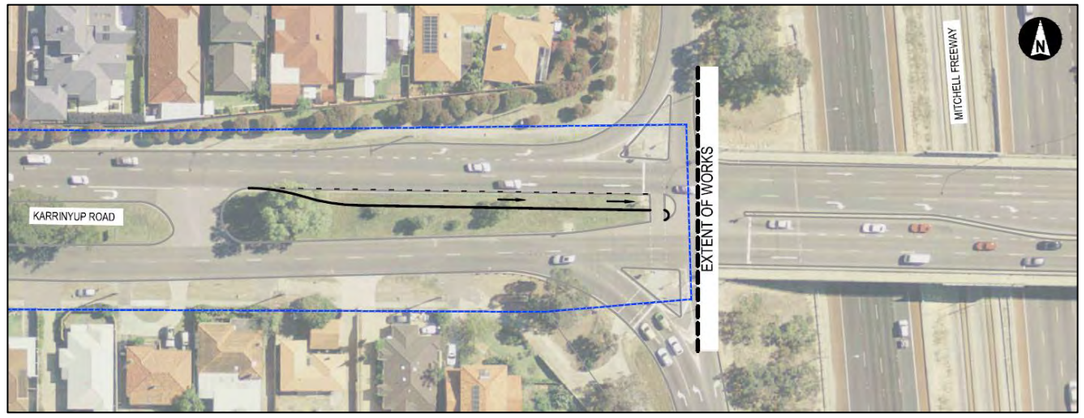


Figure 5-14 Proposed lane extension at the Karrinyup Road/ Mitchell Freeway Interchange

5.2. Road Typologies

The following sections outline the typical cross sections proposed for the roads surrounding the Development, with schematic road upgrade drawings attached in Appendix A. It is noted that a number of the conditions of approval include specifications in relation to the road typologies. These have not been updated in this report and will be addressed in the detailed design process.

5.2.1. Karrinyup Road

Karrinyup Road is classified as a Primary Distributor Road and will continue to carry large traffic volumes to the Development, as well as providing for major east-west traffic movements in the region. Karrinyup Road will also accommodate increased bus movements and service delivery vehicles who will primarily use this road to access the Development.

The existing cross section of Karrinyup Road within the Development is approximately 46m wide, consisting of two lanes in each direction and a wide median of approximately 21m. Dedicated bicycle infrastructure, in the form of either segregated 2-way paths or segregated 1-way paths on each side of the road are proposed along Karrinyup Road (between West Coast Highway and Huntriss Road), while bus queue jump lanes are also proposed at some intersections. Proposed typical cross sections along Karrinyup Road are shown in Figure 5-15, Figure 5-16 and Figure 5-17.

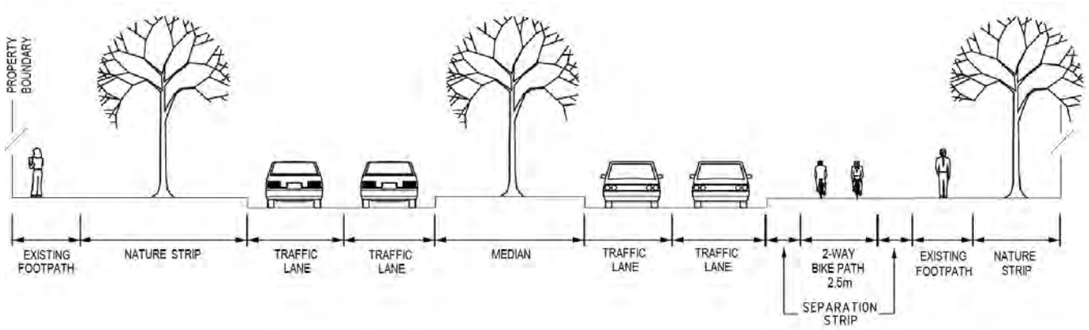


Figure 5-15 Proposed typical cross section for Karrinyup Road (west of Burroughs Street)

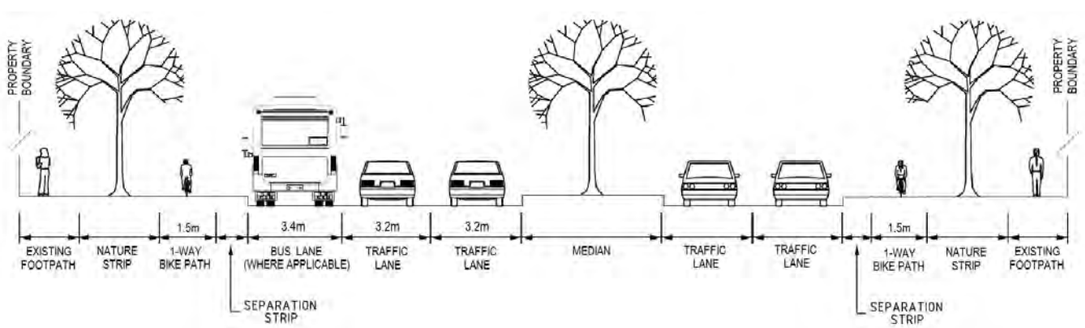


Figure 5-16 Proposed typical cross section for Karrinyup Road (between Burroughs Street and Huntriss Road)

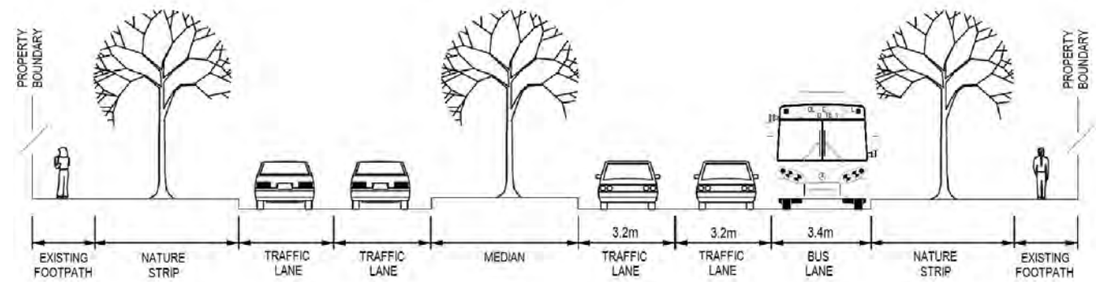


Figure 5-17 Proposed typical cross section for Karrinyup Road (east of Huntriss Road)

5.2.2. Burroughs Road and Francis Avenue

Both Burroughs Road and Francis Avenue are classified as Local Distributors. These roads are designed to discourage through traffic, and will be used to service the Development and surrounding residential catchment. Within the Development, both Burroughs Road and Francis Avenue will be required to accommodate delivery vehicles, while bus movements will only occur along Burroughs Road as per the existing situation.

Along Burroughs Road, reduced lane widths are proposed while a median is proposed to be maintained along Francis Avenue. On both Burroughs Road and Francis Avenue, two-way shared paths of 3.5m width are proposed, providing safe access for cyclists to the Development.

On the side of the street opposite the Development, on-street parking and footpath modifications may be incorporated by future developers.

The existing cross sections of both Burroughs Road and Francis Avenue are approximately 24m wide, with the proposed typical cross section for each road shown in Figure 5-18 and Figure 5-19 respectively.

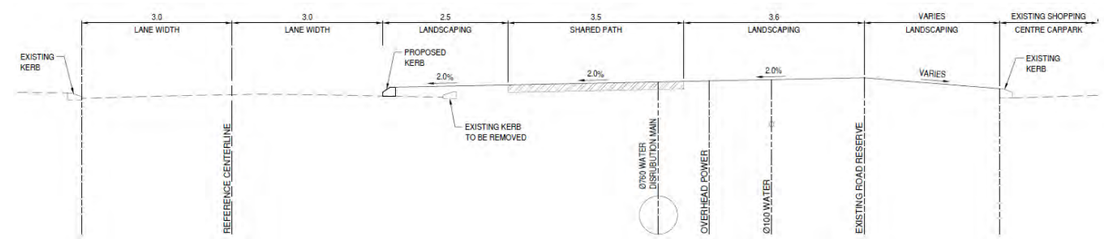


Figure 5-18 Proposed typical cross section for Burroughs Street

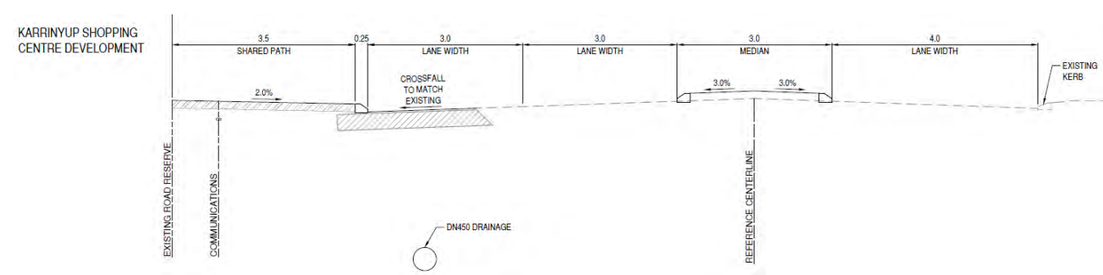


Figure 5-19 Proposed typical cross section for Francis Avenue

5.2.3. Davenport Street

Davenport Street is classified as a Local Access Road. The function of these roads is to provide access to abutting properties with safety aspects having priority over the vehicle movement function. Since Davenport Street is in an urban area, the main intent is for the road to be bicycle and pedestrian friendly, although some vehicle access to the Development will still be available. The existing cross section of Davenport Street is approximately 20m, with the proposed typical cross section shown in Figure 5-20.

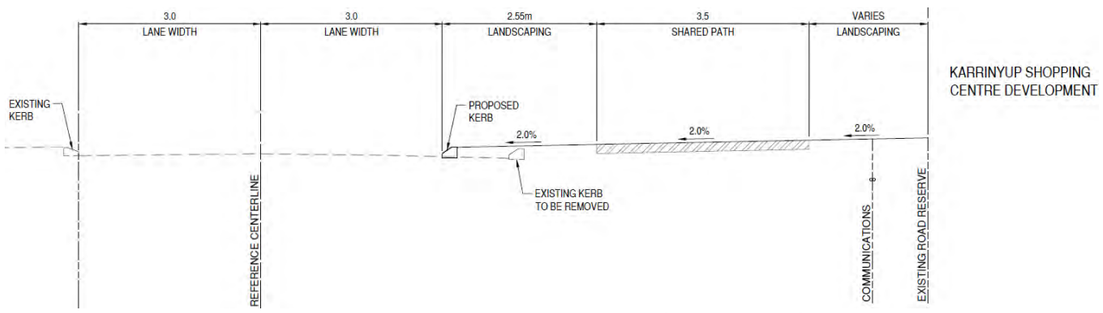


Figure 5-20 Proposed typical cross section for Davenport Street

5.2.4. Main Street

The proposed main street is aimed to form a high street style shared area allowing for outdoor dining. It should encourage reduced vehicle speed, narrow traffic lanes and wide footpaths, with the typical cross section shown in Figure 5-21.

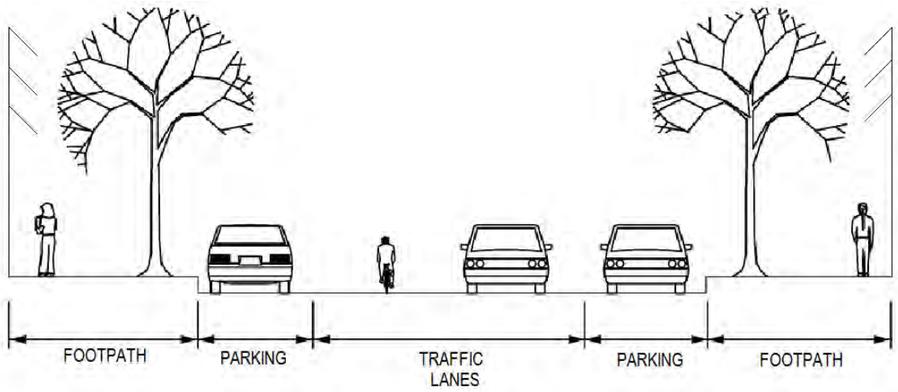


Figure 5-21 Proposed typical cross section for the main street

5.3. External Road Network Performance

The following tables show the levels of service (LOS) predicted by the Aimsun transport modelling for the scenarios described in Section 4.9. Table 5-1 illustrates the LOS legend for the average vehicle delay at signalised intersections. LOS categorises delay from A, being low levels of delay, to F, being high levels of delay greater than 80 seconds per vehicle for a signalised intersection.

Table 5-1 Level of Service (LOS) legend

Level of Service	Average Delay (seconds)
A	<10
B	10 to 20
C	20 to 35
D	35 to 55
E	55 to 80
F	>80

The network in its entirety performs at what can be deemed as an acceptable level. Further detailed outputs can be found in Appendix C with SIDRA outputs in Appendix D that also cover queue lengths. It should be noted that it is common for discrepancies between Aimsun and SIDRA LOS results, due to the difference in model type (Aimsun is an operational model that simulates the movement of each vehicle every time step, while SIDRA is a one-off analytical computation of demand versus capacity of an intersection). Both Aimsun and SIDRA results have been provided for completeness. Counter-intuitive decreases in volumes are due to delay on the wider network, such as on Reid Highway, making some routes and intersections unattractive and/or due to changes in the wider network travel patterns.

In addition, flow density plots can be found in Appendix E. It should be noted that due to the large volumes of traffic using Reid Highway in the 2031 scenario, and the subsequent delay in this area, traffic is less encouraged to rat-run through the residential area to the north of the Development.

The “Base” model is the 2014 road network with the existing Karrinyup Development trips and wider traffic volumes. The ‘Do-minimum’ models consist of the existing Karrinyup Development trips with the background traffic growth on the wider network as per the Main Roads WA traffic forecasts. The “Option” models consist of the same background traffic growth but with also the Mixed Use Expansion at Karrinyup.

In the detailed stages, individual intersection models will be built and SCATS signal settings tested. This is likely to improve the performance of the intersections for all modes of transport.

The summary table of the morning peak hour period intersection results is shown below. All of the intersections perform at a level of service of E or better in all modelled scenarios.

Table 5-2 Level of Service for the Morning weekday peak period scenarios

Morning Peak Intersection Results					
Intersection Name	Base	2021 Domin	2021 Option	2031 Domin	2031 Option
Karrinyup Road & Marmion Avenue & West Coast Highway	D	D	D	E	D
Karrinyup Road & Burroughs Road	B	B	A	B	B
Karrinyup Road & Jeanes Road	B	B	B	B	B
Karrinyup Road & Francis Ave	B	B	B	B	B
Karrinyup Road & Huntriss Road	C	C	C	C	D
Karrinyup Road & North Beach Road	C	C	C	D	D
Karrinyup Road & Mitchell Freeway NB	D	D	C	E	D
Karrinyup Road & Mitchell Freeway SB	C	D	C	D	C

The afternoon peak hour period intersection results show that most intersections perform at a satisfactory level in all modelled future year scenarios.

Table 5-3 Level of Service for the Afternoon weekday peak period scenarios

Afternoon Peak Intersection Results					
Intersection Name	Base	2021 Domin	2021 Option	2031 Domin	2031 Option
Karrinyup Road & Marmion Avenue & West Coast Highway	D	D	D	D	D
Karrinyup Road & Burroughs Road	B	A	A	A	A
Karrinyup Road & Jeanes Road	B	B	B	B	C
Karrinyup Road & Francis Ave	C	C	B	C	B
Karrinyup Road & Huntriss Road	D	D	C	C	C
Karrinyup Road & North Beach Road	C	B	B	C	C
Karrinyup Road & Mitchell Freeway NB	C	C	C	C	C
Karrinyup Road & Mitchell Freeway SB	F	E	E	D	E

For the Saturday peak hour period intersection results most intersections perform at an acceptable level. Karrinyup Road/ Huntriss Road does exhibit extensive queuing westbound in all modelled scenarios, including the existing base model, but this is hoped to encourage a mode shift to public transport due to the dedicated bus lane in this location.

Table 5-4 Level of Service for the Saturday midday peak period scenarios

Saturday Midday Peak Intersection Results					
Intersection Name	Base	2021 Domin	2021 Option	2031 Domin	2031 Option
Karrinyup Road & Marmion Avenue & West Coast Highway	C	C	C	C	C
Karrinyup Road & Burroughs Road	C	A	A	A	D
Karrinyup Road & Jeanes Road	C	B	C	C	E
Karrinyup Road & Francis Ave	D	D	B	C	C
Karrinyup Road & Huntriss Road	E	E	D	E	E
Karrinyup Road & North Beach Road	C	C	C	D	D
Karrinyup Road & Mitchell Freeway NB	C	D	D	C	D
Karrinyup Road & Mitchell Freeway SB	E	D	E	D	E

5.3.1. 2024 Modelling Update

The modelling has been updated in 2024 with the proposed changes discussed in Section 2.1. Following tables present the Karrinyup Road intersection performance for the Base and 2034 scenarios. These show that the impact of the proposed modifications on the wider road network is estimated to be minor.

Table 5-5 Level of Service for the Morning weekday peak period scenarios 2024

Morning Peak Intersection Results			
Intersection Name	Base	2034 Do Min	2034 Option
Karrinyup Road & Burroughs Road	C	D	D
Karrinyup Road & Jeanes Road	D	E	D
Karrinyup Road & Francis Avenue	B	B	C

Table 5-6 Level of Service for the Afternoon weekday peak period scenarios 2024

Afternoon Peak Intersection Results			
Intersection Name	Base	2034 Do Min	2034 Option
Karrinyup Road & Burroughs Road	A	B	A
Karrinyup Road & Jeanes Road	E	E	E
Karrinyup Road & Francis Avenue	B	C	C

Table 5-7 Level of Service for the Saturday midday peak period scenarios 2024

Saturday Peak (First Hour) Intersection Results			
Intersection Name	Base	2034 Do Min	2034 Option
Karrinyup Road & Burroughs Road	C	C	C
Karrinyup Road & Jeanes Road	D	E	E
Karrinyup Road & Francis Avenue	C	C	C

Saturday Peak (Second Hour) Intersection Results			
Intersection Name	Base	2034 Do Min	2034 Option
Karrinyup Road & Burroughs Road	B	C	C
Karrinyup Road & Jeanes Road	E	E	E
Karrinyup Road & Francis Avenue	C	C	C

5.4. Development Access Performance Summary

The performance of the vehicular accesses to the Development is vital to both the external road network and the Development operating acceptably. If vehicles cannot enter the Development in a safe and efficient manner, congestion can develop from turn bays leading to delays for other vehicles that are not associated with the Development. Likewise, if vehicles cannot exit the Development then congestion will build up within the Development car park areas and internal links. This could then spill out to the external road network, causing wider network congestion.

To mitigate any such issues, Aurecon undertook an extensive iterative process with the project team to establish a set of Development Access points to satisfactorily connect the internal Development design with the external road network. Traffic engineering inputs, however, have also been undertaken so that it was not solely the modelling that was guiding the design.

A dedicated parking management system is proposed for the Development (further detail provided in Section 6. This parking management system will consist of variable message signs both external and internal to the Development. It is thought that on-street this will guide the movements and can even be adjusted to promote less utilised entrances. Furthermore, on any approach to the Development there are multiple entry points so that drivers can make a decision on their entry point depending on those that look more utilised within their field of sight at the time.

Also due to the skewed distribution of traffic distributed to the east of the Development, the access points have been set up to be focussed more towards movements to and from the east.

The performance of the development access points are described below, with SIDRA outputs shown in Appendix F.

5.4.1. Francis Avenue

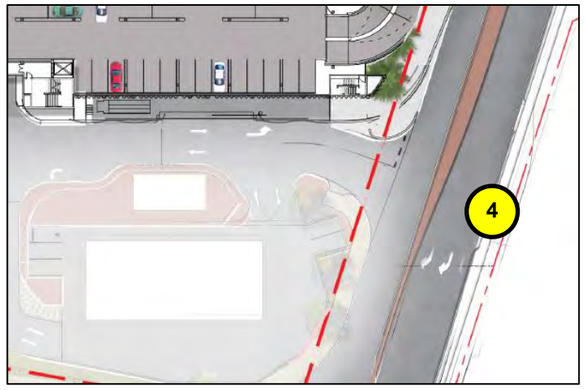


Figure 5-22 Access 4 – South-east access of the Development on Francis Avenue

The south-east access is a left in/ left out access providing connection into the east car park areas. Drivers can access this entrance from the left lane. Drivers in either the right or left lane can also access the Development at the next entrance. This is considered a secondary access point.

Due to this entrance being downstream from the Karrinyup Road/ Francis Avenue signalised intersection, vehicles tend to arrive at the intersection in platoons. They can suitably access the Development as they would only have to give way to pedestrians and can exit using gaps created due to the platooning nature of the conflicting through movement traffic.

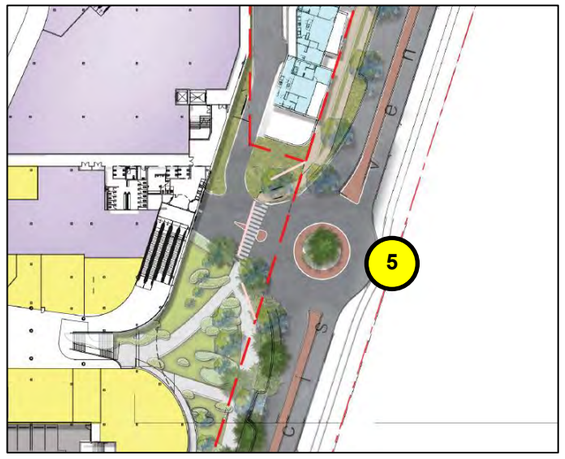


Figure 5-23 Access 5 – Eastern access to the Development on Francis Avenue

The primary eastern access consists of a roundabout leading to Basement Level 2 which has good access to the other levels. West of the entrance is a connection to a small set of residential dwellings and therefore enough width has been provided so that a queueing right turning vehicle does not block the primary Development access.

There are no performance issues at this roundabout even with some vehicles using the roundabout to perform a u-turn manoeuvre. In some rare cases, a queue for the left turn movement onto Karrinyup Road may extend towards this roundabout but this queue dissipates quickly due to the signal phasing allowing the left turn to receive ample time to clear.

5.4.2. Davenport Street

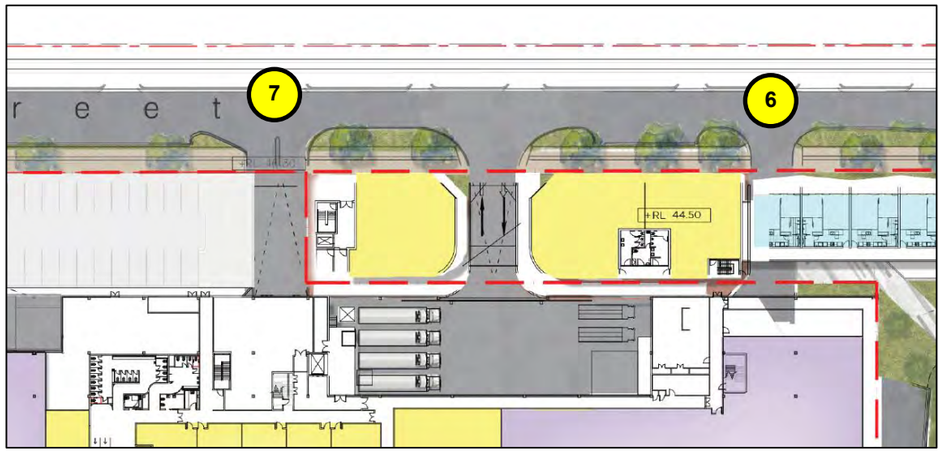


Figure 5-24 Access 6 and 7 – North-eastern accesses to the Development on Davenport Street

As per Figure 5-24, the north-eastern access to the Development on Davenport Street (Access 7) leads directly to the Basement 01 car parking level without any intersecting movements. Access 6 leads directly to the Basement 02 car parking level.

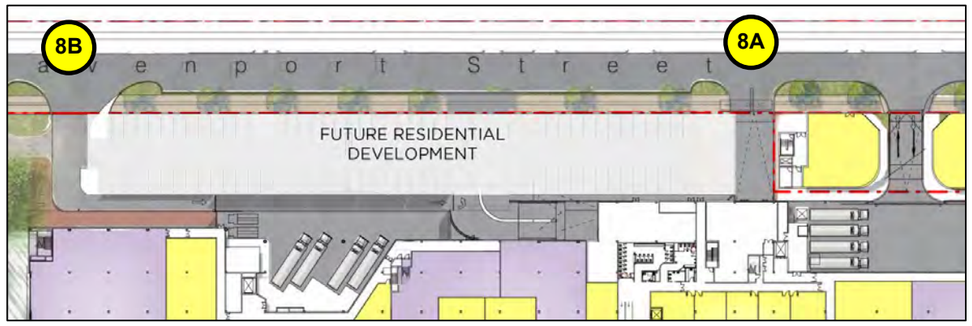


Figure 5-25 Access 8 – North access of the Development on Davenport Street (amended)

Referring to Figure 5-25, Access 8 is split into two access points, Access 8A and 8B as follows:

- Access 8A is proposed as a two-way access point that is accessible by general vehicles which allows access to the roof car park (L02). Access 8A is located approximately 90m east of Access 8B.
- Access 8B is proposed to be a one-way entry, providing access to car parking (whilst allowing for future residential development). A one-way service entry is also provided to access Service Delivery Yard 3.

The proposed separation of the service vehicle entry access removes a point of conflict between the general public and service vehicles.

There are no performance issues at these access points.

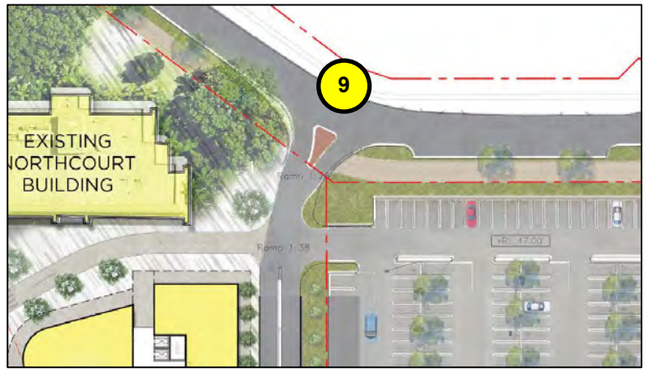


Figure 5-26 Access 9 – North-western access of the Development on Davenport Street

The secondary access on the north-western corner of the Development (Access 9) leads to three areas:

- The Ground Level car park
- Basement Level 1
- One-way southbound connection from the Main Street. The connection to Main Street will be a slow speed, paved and narrow 3.2m one way link. It is anticipated to have a negligible impact on pedestrian safety.

As with the other Davenport Street accesses there is generally a low volume of traffic attracted to Davenport Street. However for this access there are vehicles that may turn left out of the access from the Main Street northbound link.

5.4.3. Burroughs Road

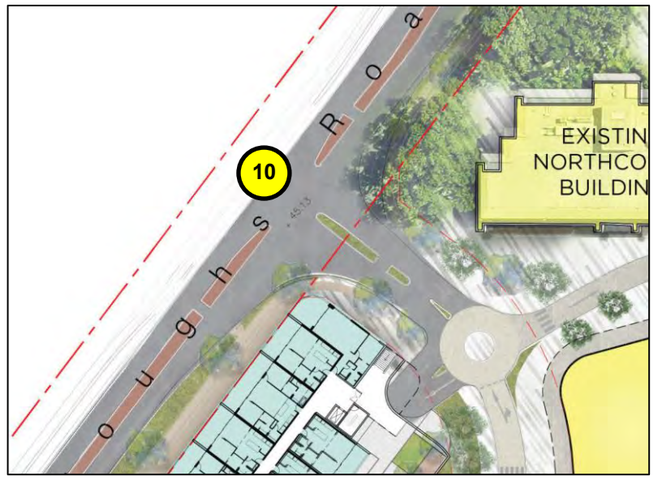


Figure 5-27 Access 10 – Western access of the Development on Burroughs Road

The western primary access on Burroughs Road is a T-intersection. With Main Street as a single lane northbound one-way road, there is reduced demand at the intersection and the intersection performs well.

5.4.4. Karrinyup Road

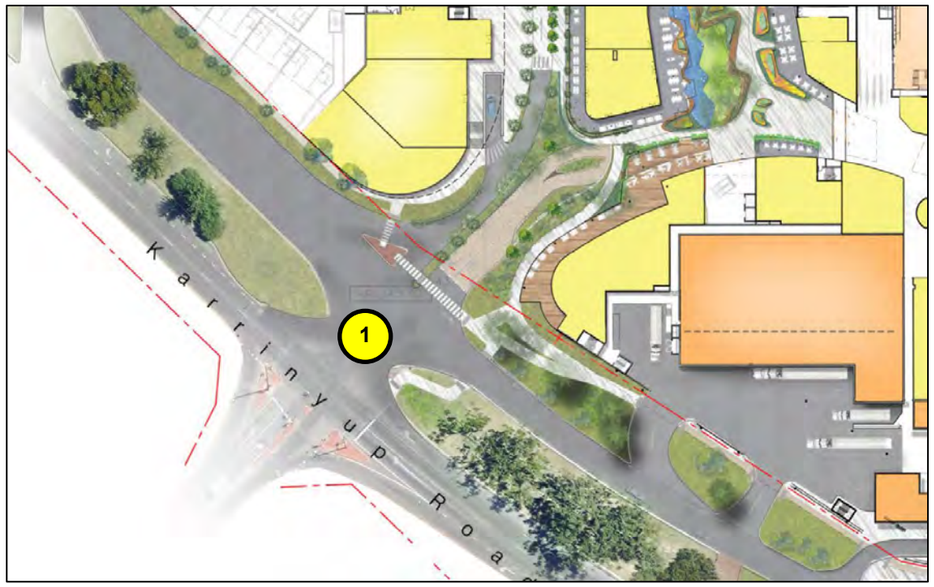


Figure 5-28 Access 1 – South-western access of the Development on Karrinyup Road

Referring to Figure 5-28, Access 1 leads to Main Street which is initially two way and then one way for the majority of its length. Main Street has a clearly legible drop-off and pick-up area for the Centre, while the one lane provides a short road cross section for pedestrians and cyclists to cross. Upon entering Main Street from Karrinyup Road there is an initial decision point for vehicles to enter the Basement 2 car park, however there is a second option for carpark access with the addition of a roundabout on the northern section of Main Street. This roundabout allows access to the western Basement 1 car park entry off Davenport Street via a one way link road. Access to the residential car park is provided via an additional leg of the roundabout to enable improved access.

Due to the one-way operation, the southern portion of Main Street allows vehicles to exit directly from the internal Basement levels on the western side of the Centre via the signalised Jeanes Road intersection without impacting Main Street. This allows vehicles to exit directly on to Karrinyup Road using the signalised intersection and reduces loading of vehicles on to the surrounding local roads, particularly Burroughs Road. Partial signalisation was originally proposed at the Karrinyup Road/ Burroughs Road intersection to assist vehicles entering and exiting Burroughs Road but any signals at this location was not supported by Main Roads WA.

With the large volumes heading west during the weekday evening period there is some queuing on the eastern approach but this clears within one cycle. During the Saturday peak period the Main Street approach does exhibit some queuing in the order of 110m but this is intermittent. The right turn into the Development is generally contained within the existing turn bay pocket. It should be noted that vehicles have three prior opportunities to enter the Development from the east before reaching this intersection.

The schematic road upgrade drawing for the Karrinyup Road/ Jeanes Road/ Main Street intersection is shown in Appendix G. Note that all traffic analysis and modelling includes this design.

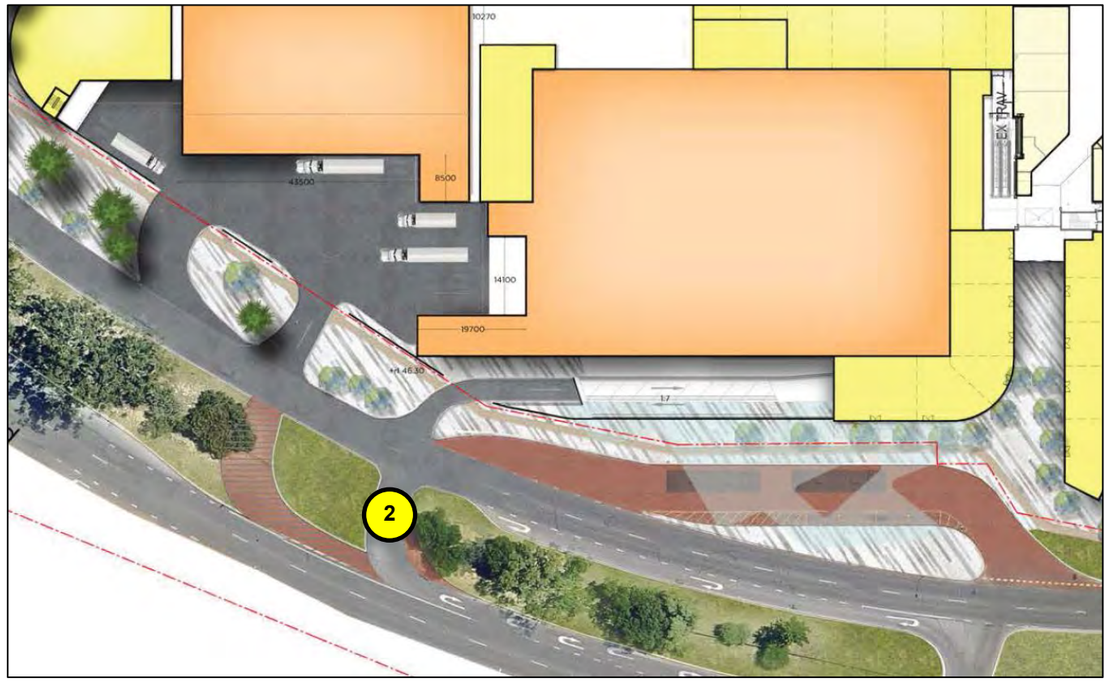


Figure 5-29 Access 2 – South access 1 of the Development on Karrinyup Road

Access point 2 leads to the Basement 1 car park area, the Karrinyup Bus Station, and the freight loading dock. The crossover for the freight loading dock has been split into separate entry and exit only crossovers. There are no performance or intersection issues at this intersection and delay turning into the access is minimal. No high landscaping is planned in this area to ensure that high visibility is maintained for service vehicles. Discussions with the Public Transport Authority indicated that a shared vehicular and bus entry was not a concern.

A suitable treatment for delineation into the loading/basement car park/bus station areas is required at this intersection. It will be important to provide a strong visual guide to assist in the decision making progress for visitors to the centre, and that vehicles are set in the right position when making the turn. Appropriate delineation will be further investigated during the detailed design stage.

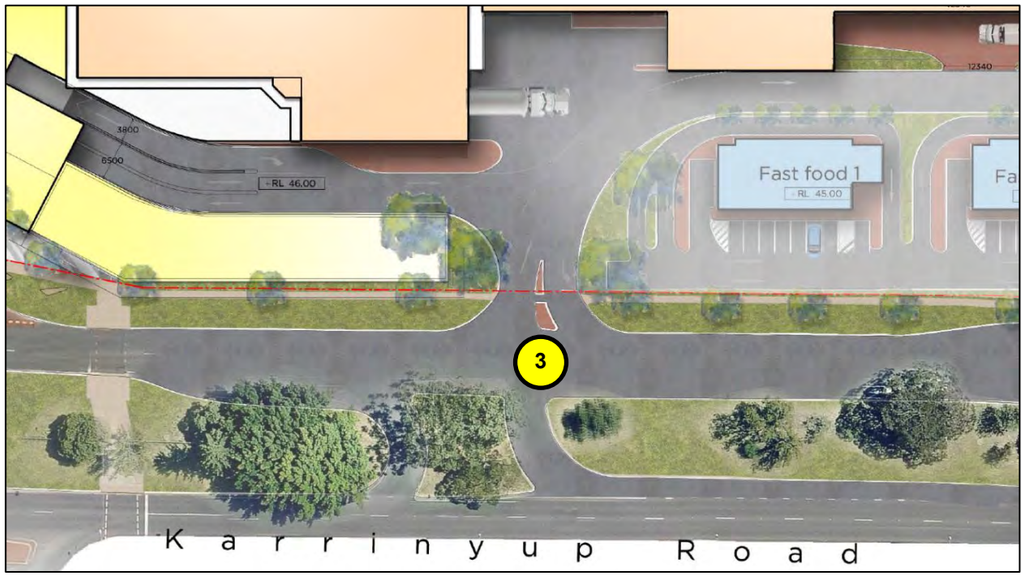


Figure 5-30 Access 3 – South access 2 of the Development on Karrinyup Road

The second access on the southern side of the Development is a primary access that is give way controlled. Vehicles can turn left and right into the Development or left out towards the east. This entrance provides access to various car park areas of the Development. It is an existing entrance to the Development, which in 2014 was underutilised by vehicles to access the Development. It is anticipated that the proposed parking management system will encourage the use of this access.

Within the model vehicles do see this access has an attractive entry and queues do fill the right turn bay at times with additional vehicles rerouting to the next access to the west. Therefore the turn bay has been extended to hold more vehicles.

5.4.5. 2024 Proposed Modification

It is proposed that the direction of Access 2 is reversed. Currently the ramp can be accessed as an entry from the west, or by using a break within the Karrinyup Road median from the east. The proposal is to convert the direction of this ramp to exit-only with a left-turn only restriction. Vehicles using this exit would travel eastbound on Karrinyup Road, noting there is also an existing nearby U-turn facility to the east. The proposed Access 2 change is shown in Figure 5-31.

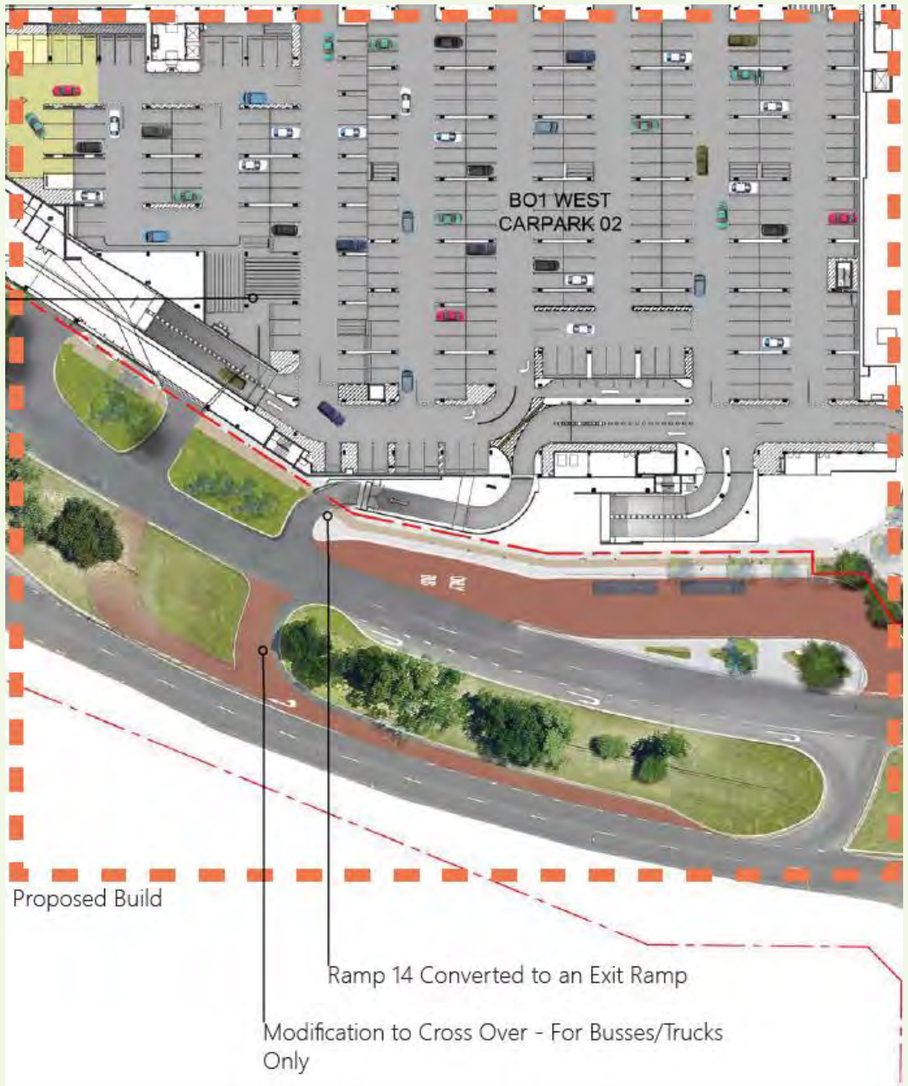


Figure 5-31 Proposed Ramp 14 Access Change

5.5. Impact on Local Road Network

Model outputs for the surrounding residential streets are shown by the flow density plots in Appendix E. These outputs for the surrounding local road network indicate minimal additional impact as a result of the Development. This is mostly due to the complex routes that are required through these areas to access the Development. These residential streets lead to other arterial roads that, due to congestion on these arterial roads in the future years, result in there being more advantage in using Karrinyup Road to enter and exit the Development.

It is also believed that any upgrades within residential area would improve the operation of these streets, which would only result in a marginal performance improvement, but might induce greater traffic onto these streets. Given the comments contained within a number of the submissions, it would be desirable to not encourage significant increases in vehicle movements within these local roads. Traffic management is already in place in many of the surrounding residential streets of concern and further management would only impact negatively on residents. Given the above there is either no need or it is not considered desirable to upgrade any of the local roads.

The modelled volumes for key residential links (as identified by the City of the Stirling) for each scenario and modelled peak hour are shown in Table 5-8. These generally show the links carry relatively low volumes of traffic and with the development any increase in traffic is also relatively small.

Table 5-8 Modelled volumes for key residential links

		AM vph		PM vph		Saturday vph	
Location	**Period**	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Milverton Ave, North of Padstow Street	Base	64	230	205	88	94	119
	2021 Do Min	100	258	215	113	147	190
	2021 Option	93	257	265	138	142	240
	2031 Do Min	183	278	210	117	191	204
	2031 Option	136	244	170	77	180	330
Clement Drive, North of Padstow Street	Base	172	393	210	152	220	268
	2021 Do Min	134	348	202	176	182	310
	2021 Option	167	299	254	173	208	303
	2031 Do Min	222	403	195	184	266	303
	2031 Option	284	403	304	336	296	421
Duke Street, south of Jeanes Road	Base	235	362	433	220	252	233
	2021 Do Min	260	372	420	272	264	198
	2021 Option	166	419	483	214	189	143
	2031 Do Min	235	432	350	253	138	200
	2031 Option	229	401	388	254	272	263

5.6. Impact on Local Road Network – Supplementary Information

The transport model presented in Section 4 covers many of the local roads surrounding the Development. From the model we are able to gain a further understanding of the impacts of the expanded centre on these surrounding roads. While an increase in traffic on the road network as a whole is likely, due to an estimated natural increase in metropolitan population and employment, this report provides further information on the changes in traffic volumes on the key local roads that carry through movement traffic to the Development.

The local road volumes have been compared to the current road network hierarchy from the MRWA Road Mapping Information System. The Metropolitan Functional Road Hierarchy - Road Types and Criteria table identifies a recommended volume of traffic per day for each hierarchy type. If the estimated volumes exceed the daily volumes for that hierarchy type then either treatments are required to reduce the volumes on those roads or the road requires an upgrade to that higher hierarchy level that meet the hierarchy requirements.

The following diagrams present the modelled daily volumes on the road network hierarchy map as well as the highest volume peak hour for each of the road links. These links have been selected as they are seen as through movement residential links for traffic heading to or away from the Development. Other links either provide no route choice advantages or are at a distance from the Development where traffic relating to the Development would be too dispersed in the network to have a notable impact.

Overall the diagrams show that the expected through movements do not exceed the hierarchy traffic volume levels for any of the road links.

Figure 5-32 Base Model Local Road Hierarchies and Volumes

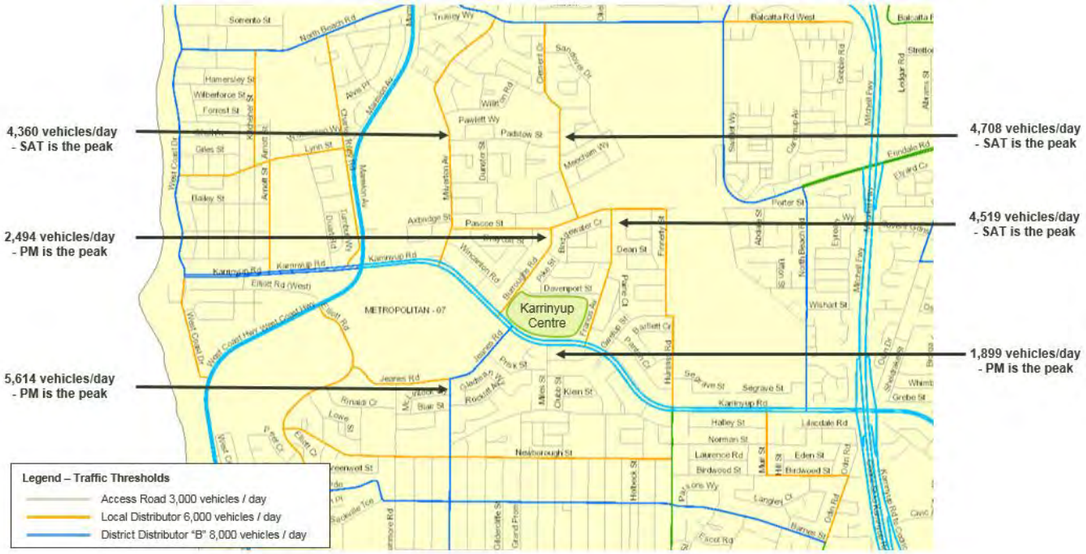


Figure 5-33 2021 Option Model Local Road Hierarchies and Volumes

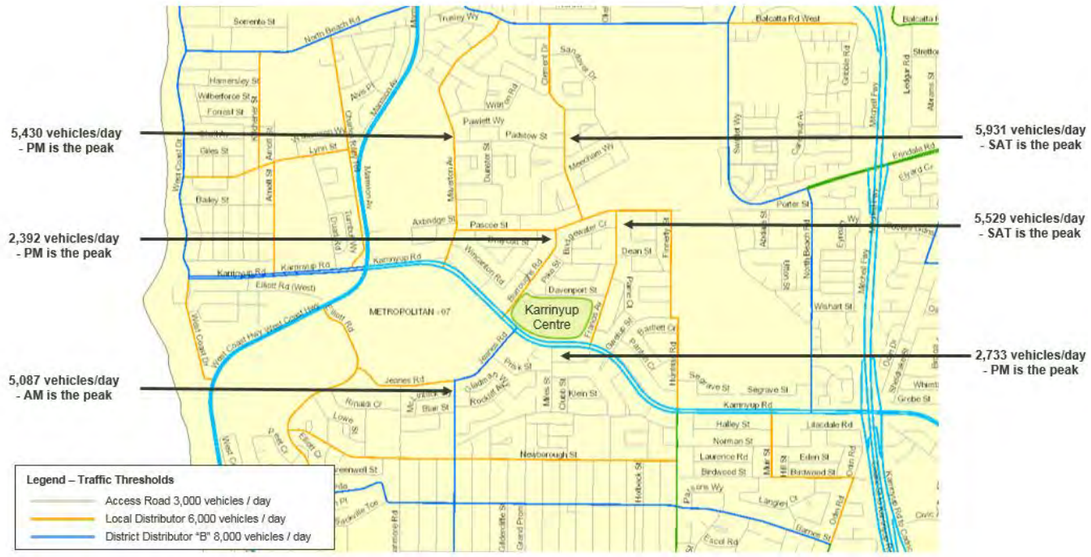


Figure 5-34 2031 Option Model Local Road Hierarchies and Volumes

The diagrams also show that as the Development parking distribution and road/access design has changed compared to the existing scenario, the movement of traffic through the surrounding road network has also changed. For example with more car bays on the eastern side of the site, it is anticipated that the distribution of trips would shift from Burroughs Road to Francis Avenue. Similarly the design of Karrinyup Road is anticipated to make Miles Street less attractive. These values are based on the maximum number of bays being provided and the current car park layout described in Section 3.4. Should the number of bays decrease, which would reduce the attractiveness of driving to the Development, or the layout of the car park changes, the traffic volumes on the local roads may reduce.

The roads to the north of the Development, primarily Milverton Avenue and Clement Drive, have been the focus of previous local road discussions. This is because in the morning peak period, congestion on Marmion Avenue could force southbound vehicles to rat run via these local roads. However the volumes relating to the Development in the morning peak period of the wider road network are relatively low. Also the most recent State Government plans include upgrading Mitchell Freeway between Cedric Street and Vincent Street, which will make the Freeway a more viable southbound route option. If, in the future, the trading hours of the Development are moved to a later opening time, it is anticipated that any morning (and evening) peak period impact would be reduced even further. Upgrades to the right turn bay from Karrinyup Road into Marmion Avenue northbound are anticipated to assist the movements in the PM and Saturday movements.

The following tables summarise the percentage distribution for Development trips. These are different to the diagrams presented in Section 4.8 as the values below are from the model simulation runs, rather than the broader initial model static assignments. These confirm the use of Francis Avenue over Burroughs Road for Development trips and the reduction in distribution of Development trips on other roads such as Miles Street and Jeanes Road.

Table 5-9 Base Simulated Distribution Values for Development Trips

	AM		PM		Saturday	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Karrinyup Road West	22%	11%	11%	32%	22%	16%
Burroughs Road	14%	1%	2%	6%	2%	5%
Francis Street	12%	3%	4%	3%	7%	5%
Hicks Street	0%	4%	0%	1%	3%	3%
Karrinyup Road East	36%	72%	79%	45%	51%	63%
Miles Street	0%	5%	1%	6%	5%	5%
Jeanes Road	16%	4%	3%	7%	10%	3%

Table 5-10 2021 Option Simulated Distribution Values for Development Trips

	AM		PM		SAT	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Karrinyup Road (West)	34%	17%	26%	24%	22%	14%
Burroughs Road	3%	2%	2%	5%	2%	2%
Francis Street	5%	3%	13%	9%	7%	10%
Hicks Street	0%	1%	0%	1%	0%	3%
Karrinyup Road (East)	55%	69%	49%	58%	64%	69%
Miles Street	0%	1%	1%	1%	1%	1%
Jeanes Road	3%	8%	9%	3%	4%	2%

Table 5-11 2031 Option Simulated Distribution Values for Development Trips

	AM		PM		SAT	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Karrinyup Road (West)	24%	8%	10%	26%	18%	14%
Burroughs Road	8%	4%	4%	9%	4%	8%
Francis Street	9%	6%	7%	5%	14%	7%
Hicks Street	1%	5%	1%	2%	4%	4%
Karrinyup Road (East)	42%	64%	72%	49%	41%	59%
Miles Street	2%	3%	2%	1%	7%	1%
Jeanes Road	13%	9%	5%	8%	11%	6%

5.7. Public Transport Performance

The on-road infrastructure improvements dedicated for buses consist of the Karrinyup Road westbound bus lane (from west of North Beach Road to west of Huntriss Road) and the Karrinyup Road eastbound bus lane (from the Karrinyup Bus Station to east of Francis Avenue) as discussed in Section 5.1.

The westbound bus lane provides approximately 30 seconds of travel time savings in 2031 for buses in the PM peak period and approximately 1 minute of travel time savings in the Saturday peak period. There is negligible travel time savings in the AM period.

The eastbound bus lane provides approximately 20 seconds of travel time saving in 2031 for buses during the AM and Saturday periods and 10 seconds during the PM period.

The shared bus station entrance with the access to the centre results in a negligible change in delay for buses accessing the station across all periods.

5.8. Unreleased Vehicles

The percentage of vehicles unreleased across the peak hours for all models is displayed below and are relatively low values for all periods.

Table 5-12 Unreleased Vehicles

Model Case	AM	PM	SAT
Base	0.3%	0.6%	0.3%
2021 Do-Minimum	0.4%	0.7%	0.3%
2021 Option	0.7%	1.4%	1.0%
2031 Do-Minimum	0.3%	0.4%	0.2%
2031 Option	0.6%	0.8%	0.5%

6. Parking

6.1. Parking Provision

In high activity areas, such as the Development, a level of car parking is essential. However, constraining car parking can encourage the use of more sustainable modes such as public transport, cycling or walking, particularly if these are supported by good quality infrastructure. A balance between parking provision and proper access by other modes of transport including public transport, cycling and walking will provide a true integrated transport network.

Results from the Development parking survey and subsequent analysis indicated that although maximum parking utilisation is high and near capacity, the average parking utilisation is lower than capacity. There is significant opportunity to promote peak use spreading to increase the efficiency of parking utilisation and ease the congestion burden on the transport network and the stores within the Development.

It is proposed to apply a reduced rate of parking for the Mixed Use Expansion at Karrinyup and the additional non-retail floor space. The proposed Development incorporates a total of up to 4,880 car parking bays which equates to a rate of up to 4.2 bays per 100m2 for the proposed total floor space within the development. Included in this total is 60 parking spaces for people with disability (in accordance with the requirements of the Building Code of Australia for a Class 6 facility).

If demand supports the construction of additional car parks, there is capacity within the Development design to add further car parks. In addition, localised parking is provided for the proposed residential dwellings. The architectural drawings and further information regarding parking provision is within the primary submission report. The car parking has been provided in accordance with Australian Standards AS2890.1 and AS2890.6, including aisle widths, parking space widths and ramps. Shopping trolley bays have been included on all car parking levels at strategic locations.

6.1.1. Parking Access

The proposed car park is separated into two key regions, the western car park and the eastern car park.

The western car park arrangement has a total of six car park levels including ground level (i.e. L00), three levels above ground (i.e. L01, mezzanine L01a and L02), and two levels below ground (i.e. B01 and B02). Note that the existing ground level car park owned by the City of Stirling remains. The L02 car parking level remains adjacent to the proposed Cinema. Two way ramps provide circulation between all levels of the western car park.

The eastern car park has a total of six car park levels including ground level (i.e. L00), three levels above ground (i.e. L01, mezzanine L01a and L02), and two levels below ground (i.e. B01 and B02). Two way ramps provide circulation between all levels of the eastern car park.

The western car park can be accessed and egressed from Karrinyup Road, Burroughs Road, and Davenport Road. The eastern car park can be accessed and egressed from Karrinyup Road, Francis Avenue, and Davenport Road. The two car park sections are connected internally to the Development on the southern side. The majority of the internal road network will be new to the Development.

A description of the car parking access points and circulation is described below, with reference to Figure 6-1.

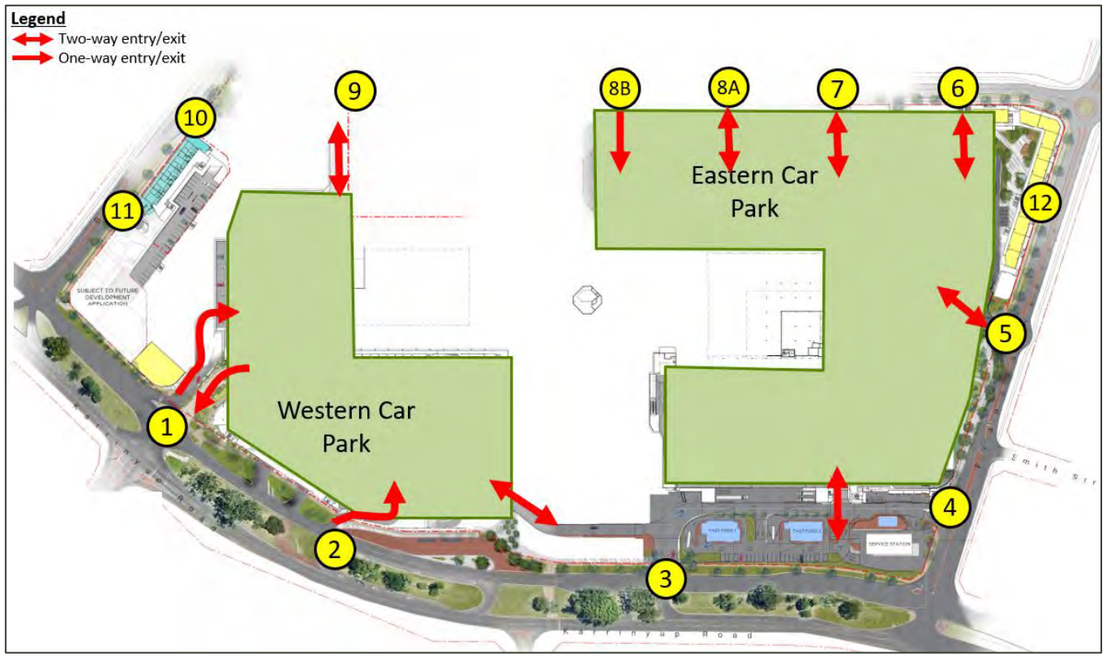


Figure 6-1 Car Park Access Points

In order to improve safety within the car parking, a number of design options are proposed to be incorporated within the proposed car parks:

- Speed humps where the parking aisle lengths exceed 100 m in length (as shown in Figure 6-2) and in the concept architectural plans.
- Stop signs at appropriate intersections throughout the car parking area.
- Pedestrian zebra crossings through each car park. This allows priority for pedestrians while also slowing down vehicles. The pedestrian crossings allow direct access for pedestrians into the Development and are indicated within the architectural drawings. Way-finding will also be incorporated in the car parks to direct pedestrians to/from the car parks.
- A 5 km/hr speed limit within the car parking area (example shown in Figure 6-3). Speed limit signs will be located throughout the car park on columns.

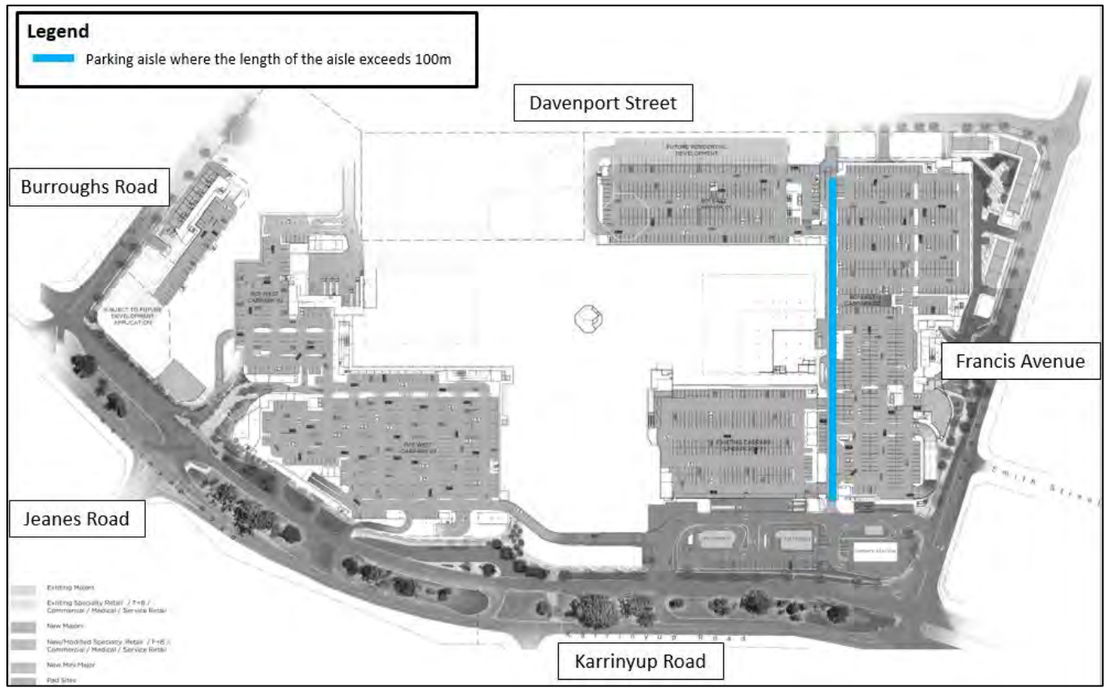


Figure 6-2 Example where parking aisles within proposed car park exceeds 100m in length (Basement 02 level)

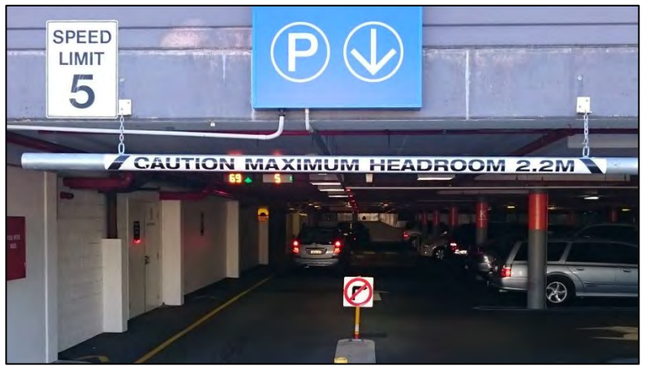


Figure 6-3 Example of a 5 km/hr speed limit sign within a shopping centre car park

The western car park can be accessed and egressed via the following access points:

- Access 1 from Karrinyup Road (traffic signal control) via the Main Street provides direct access to B02 via a ramp to the west, plus an alternative access to B01 via a one-way road at the northern end of Main Street.
- Access 2 from Karrinyup Road (priority T-intersection, entry only) provides direct access to B01
- Access 3 from Karrinyup Road (priority T-intersection) provides direct access to B01
- Access 9 from Davenport Road (priority T-intersection) provides direct access to the existing ground level car park and B01
- Access 10 from Burroughs Road (priority T-intersection) provides direct access to B01

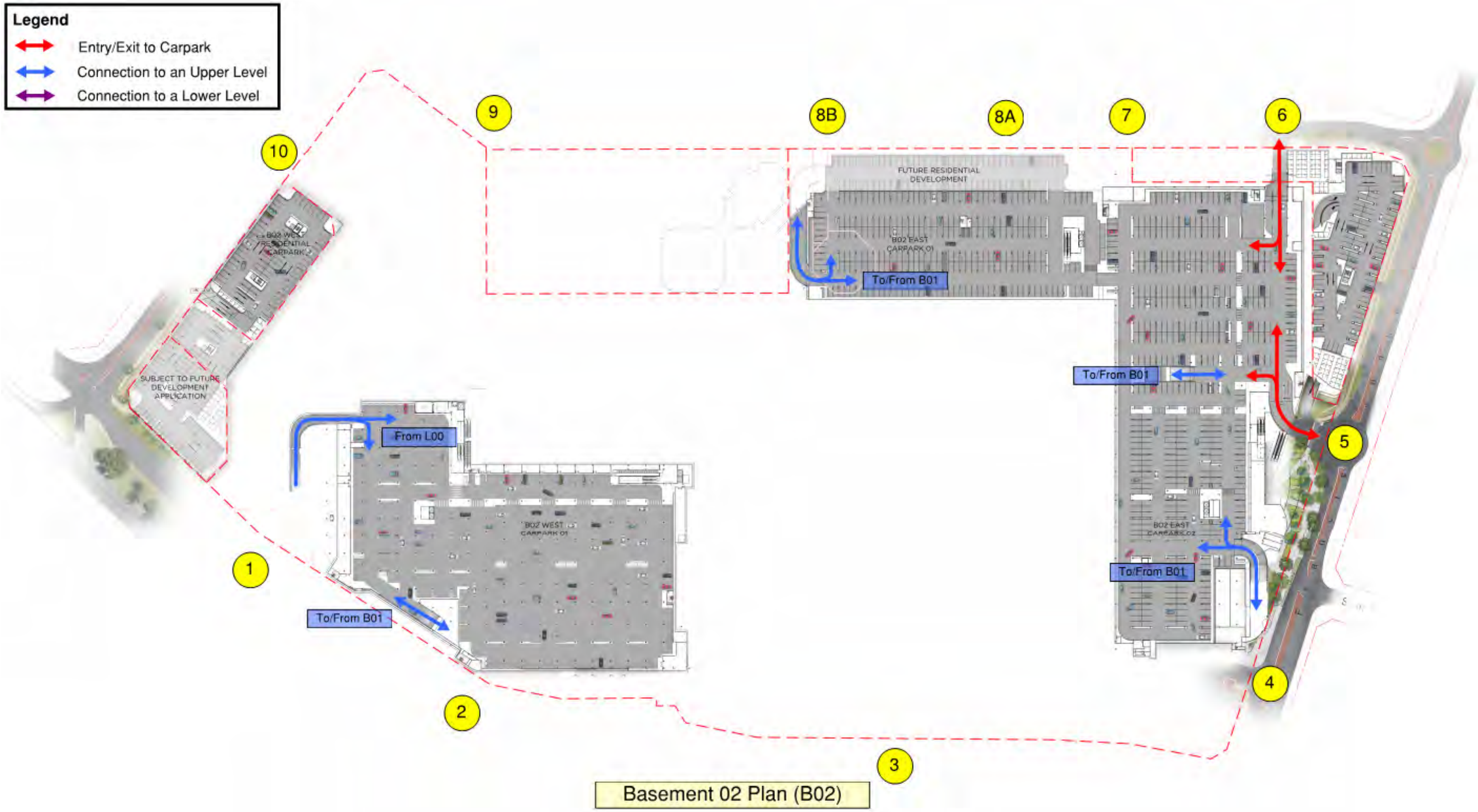
The eastern car park can be accessed and egressed via the following access points:

- Access 3 from Karrinyup Road (priority T-intersection) provides direct access to B01
- Access 4 from Francis Avenue (left in, left out priority) provides direct access to B01
- Access 5 from Francis Avenue (roundabout) provides direct access to B02
- Access 6 from Davenport Street (priority T-intersection) provides direct access to B02
- Access 7 from Davenport Street (priority T-intersection) provides direct access to B01
- Access 8A from Davenport Street (priority T-intersection) provides direct access to L02
- Access 8B from Davenport Street (priority T-intersection) provides one-way access into the existing car park and direct entry only access for service vehicles to Service Delivery Yard 3

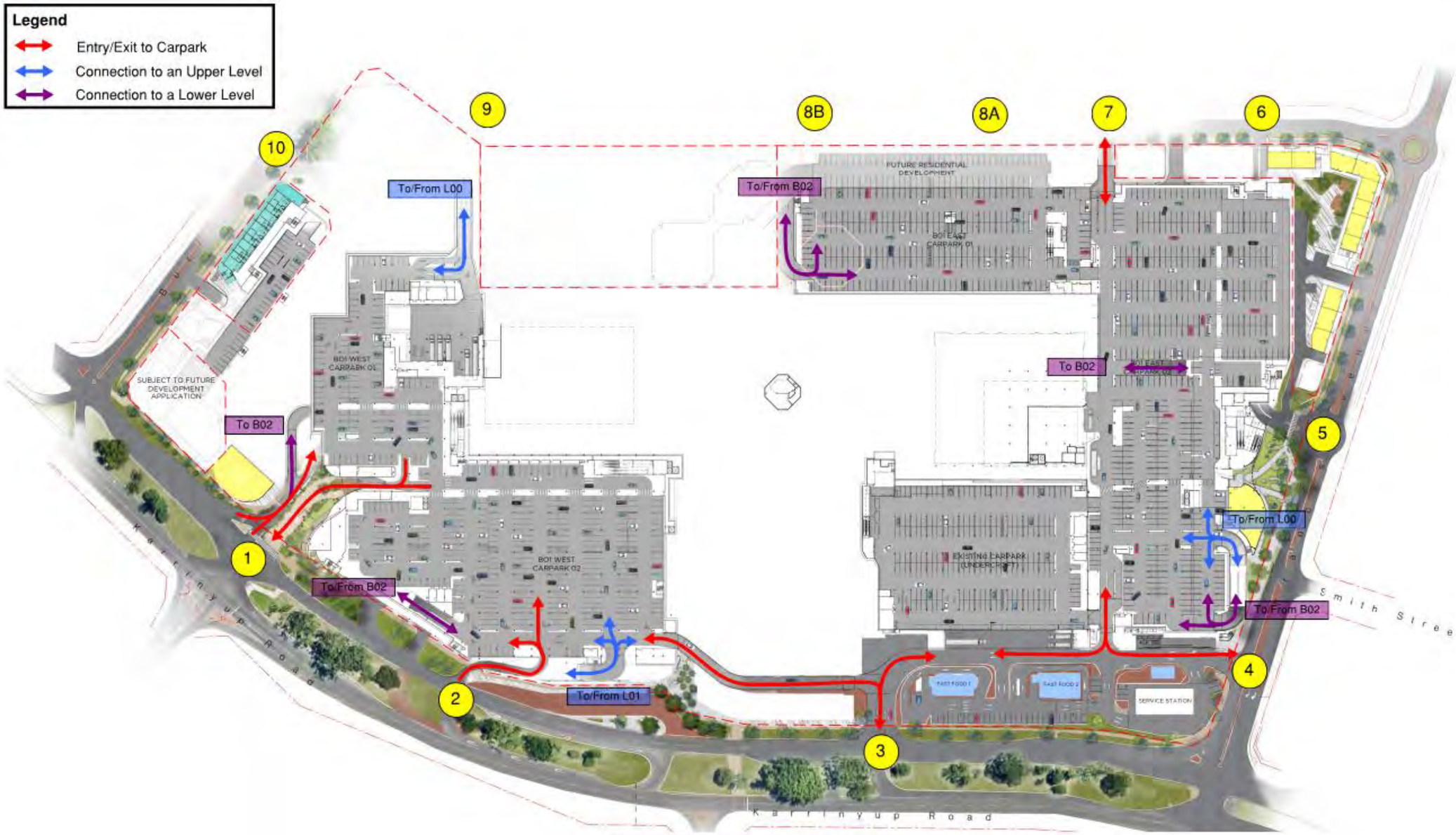
Access 11 and 12 provide access to residential car parking only

Due to the proposed increase in total floor space but consistent overall parking number, the parking rate for the Development is up to 4.2 bays per 100m^2. This is considered to be acceptable as a lower parking rate provides increased incentive for alternative transport modes.

The circulation within each level of the car park is further described in the following figures.

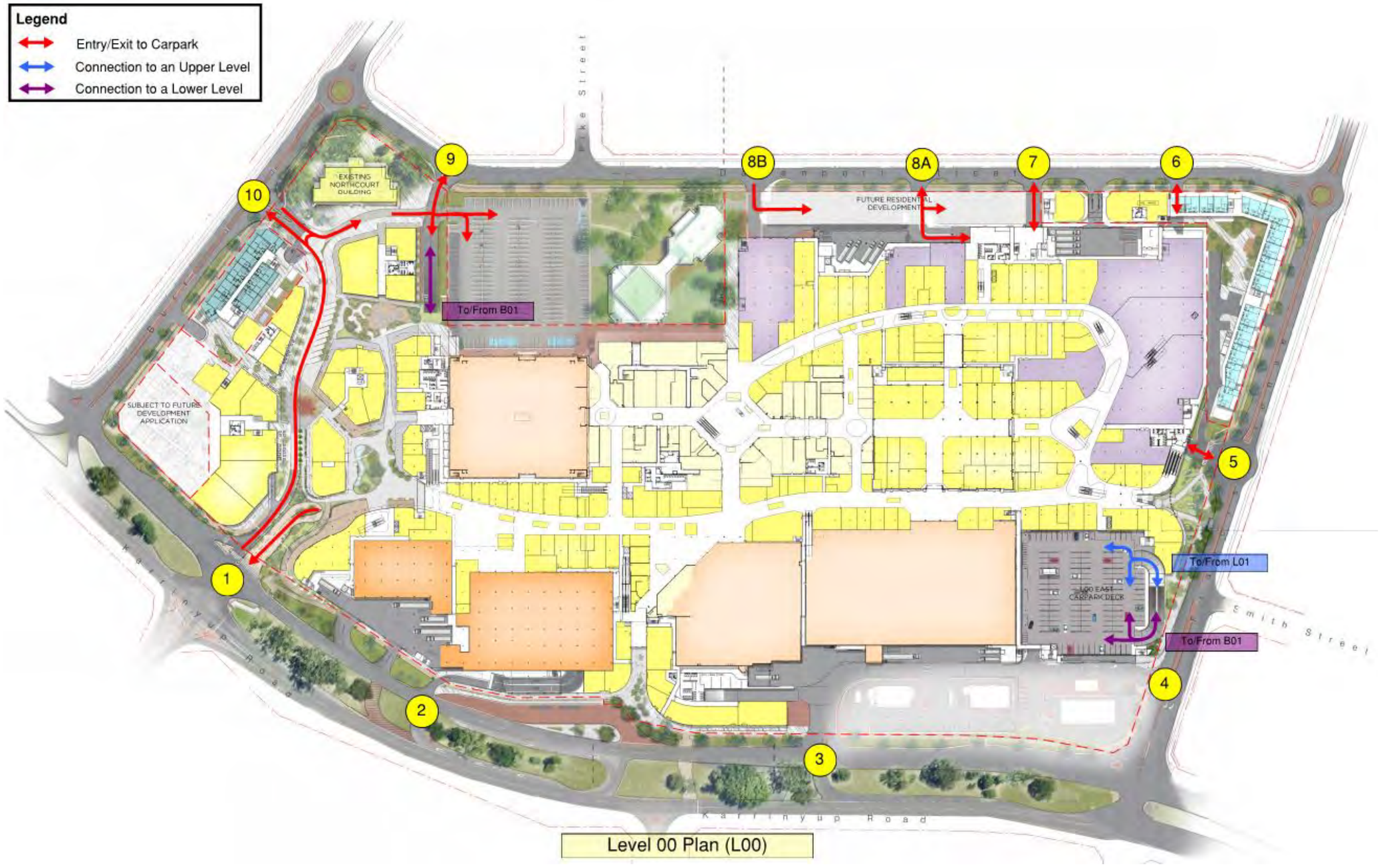


- The Basement 02 (B02) western car park can be accessed directly from the Main Street (Access 1), and also via an internal ramp from B01
- The B02 eastern car park can be accessed from both Francis Avenue and Davenport Street (Accesses 5 and 6 respectively), and via three internal ramps from B01

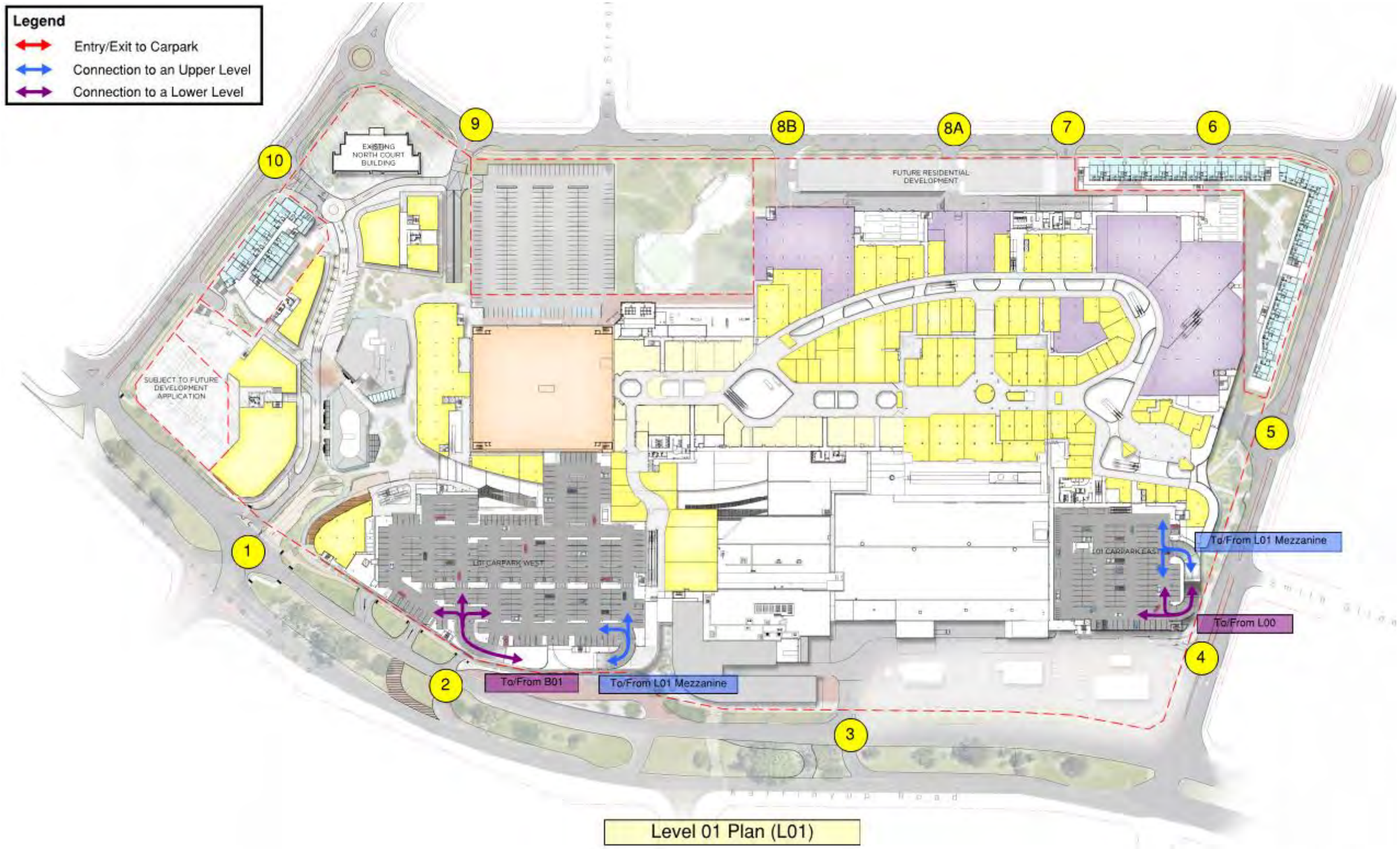


Basement 01 Plan (B01)

- The Basement 01 (B01) western car park can be accessed directly from Davenport Street (Access 9) and Karrinyup Road (Accesses 2 and 3). Within the western car park there is one ramp leading down to B02 and one ramp leading up to Level 01 (L01). Vehicles can exit directly onto Karrinyup Road from B01 via the Main Street signalised intersection (Access 1) or via Access 3.
- The B01 eastern car park can be accessed directly from Karrinyup Road (Access 3), Francis Avenue (Access 4) and Davenport Street (Access 7). Within the eastern car park there are three ramps leading down to B02 and one ramp leading up to Level 00 (L00).

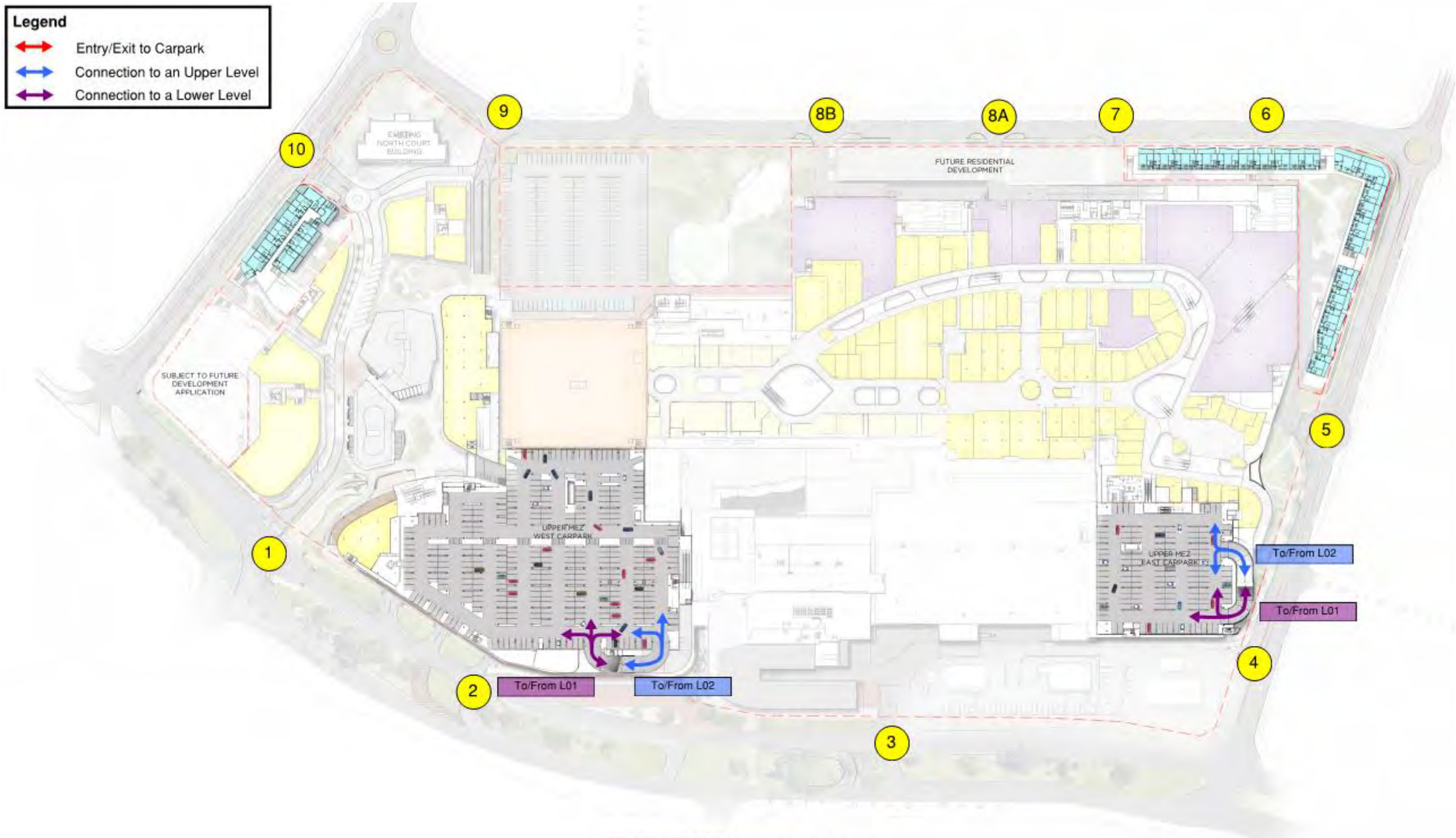


- The Level 00 eastern car park is accessed only via internal ramps, with one ramp leading down to B01 and one ramp leading up to Level 01.
- The existing ground level car park owned by the City of Stirling can be accessed via accesses 9 and 10.



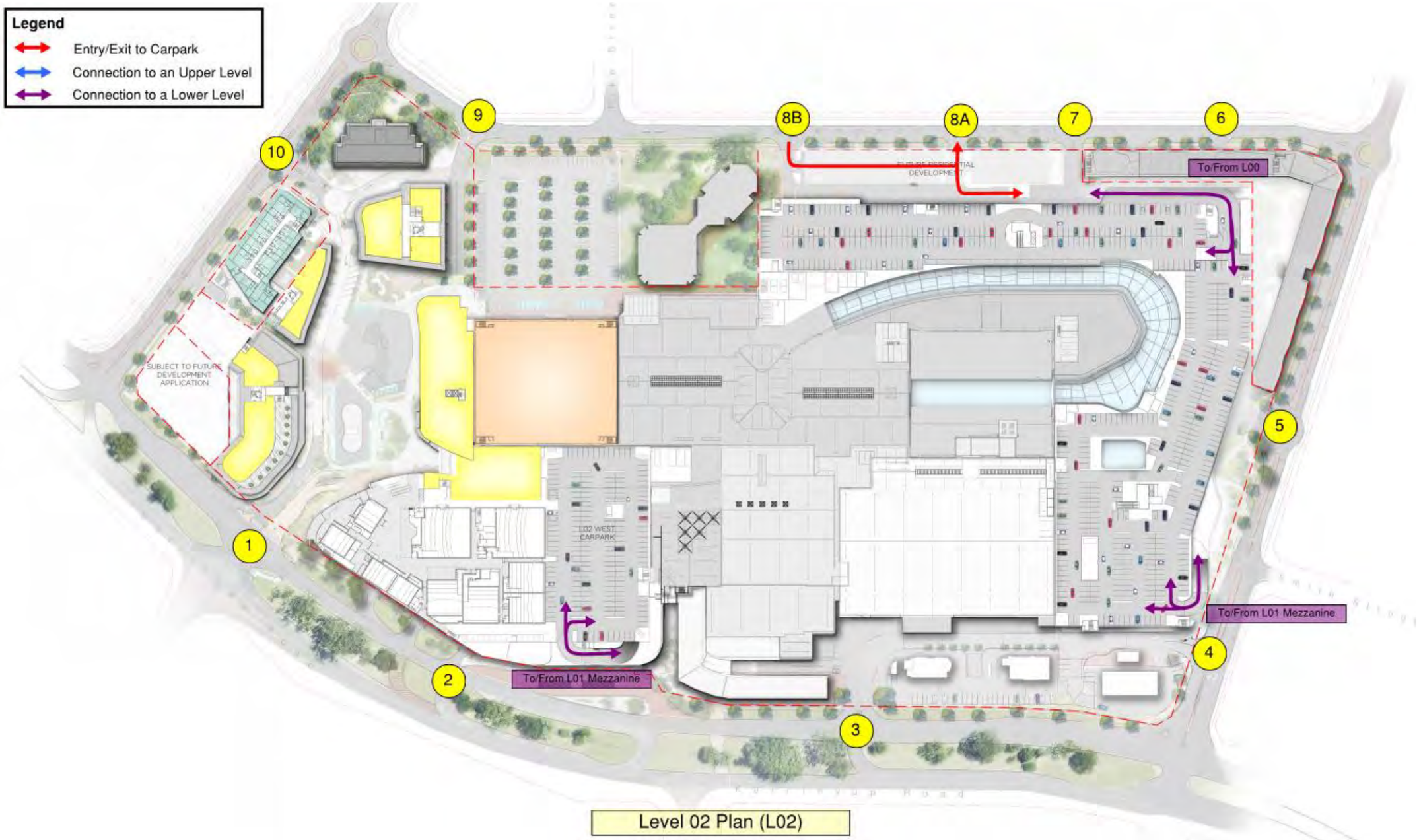
Level 01 Plan (L01)

- The Level 01 (L01) western car park can be accessed only via internal ramps, one leading down to the B01 level and one leading up to the L01 mezzanine level.
- The L01 eastern car park can be accessed only via internal ramps, one leading down to the L00 level and one leading up to the L01 mezzanine level.



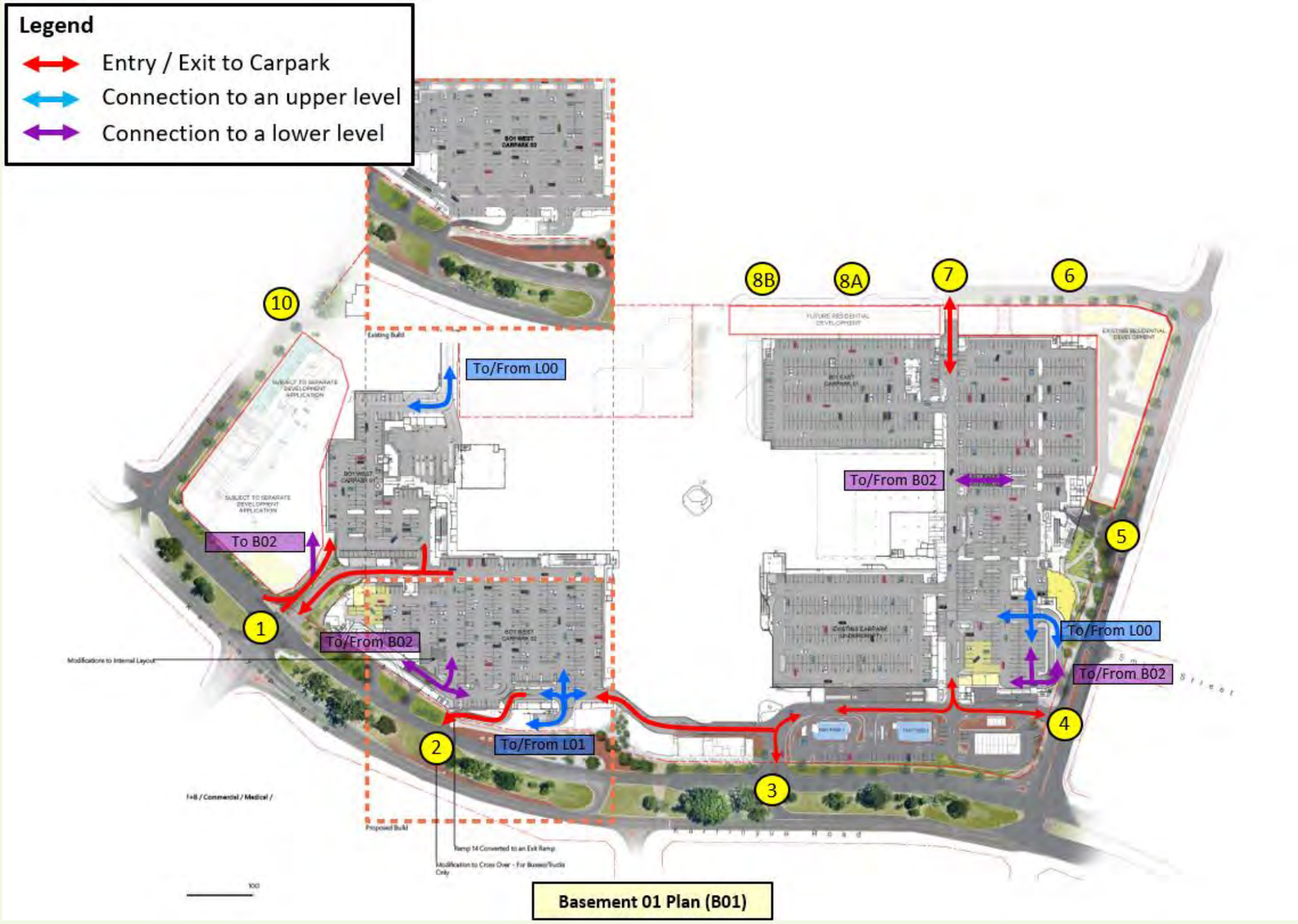
Level 01 Mezzanine Plan

- The Level 01 mezzanine western car park can be accessed only via internal ramps, one leading down to L01 and one leading up to the Level 02 (L02).
- The L01 mezzanine eastern car park can be accessed only via internal ramps, one leading down to L01 and one leading up to L02.

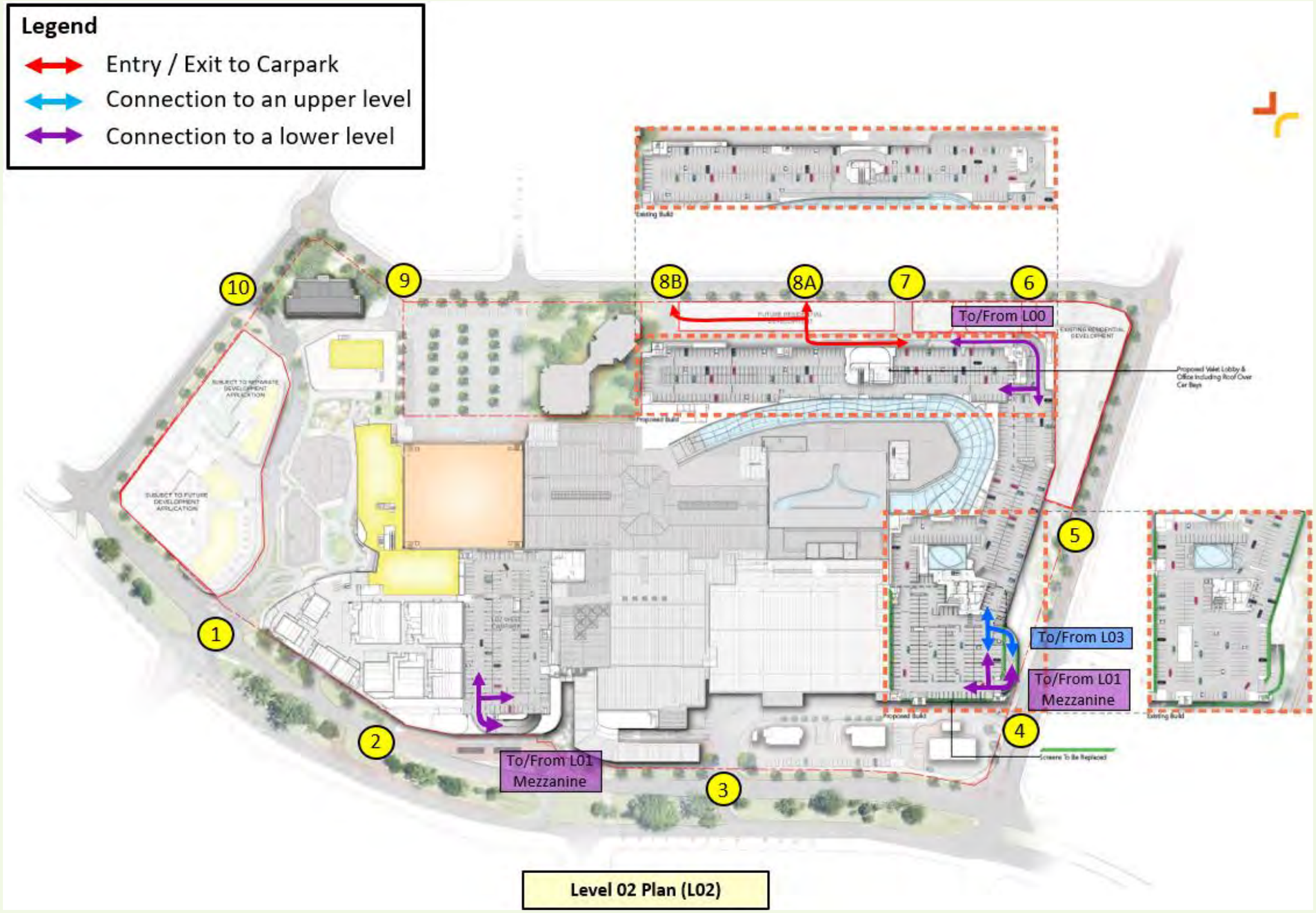


- The Level 02 western car park can be accessed only via an internal ramp, leading down to L01 mezzanine.
- The Level 02 eastern car park can be accessed directly via Davenport Street (Accesses 8A and 8B), and internally via a ramp leading down to L01 mezzanine.

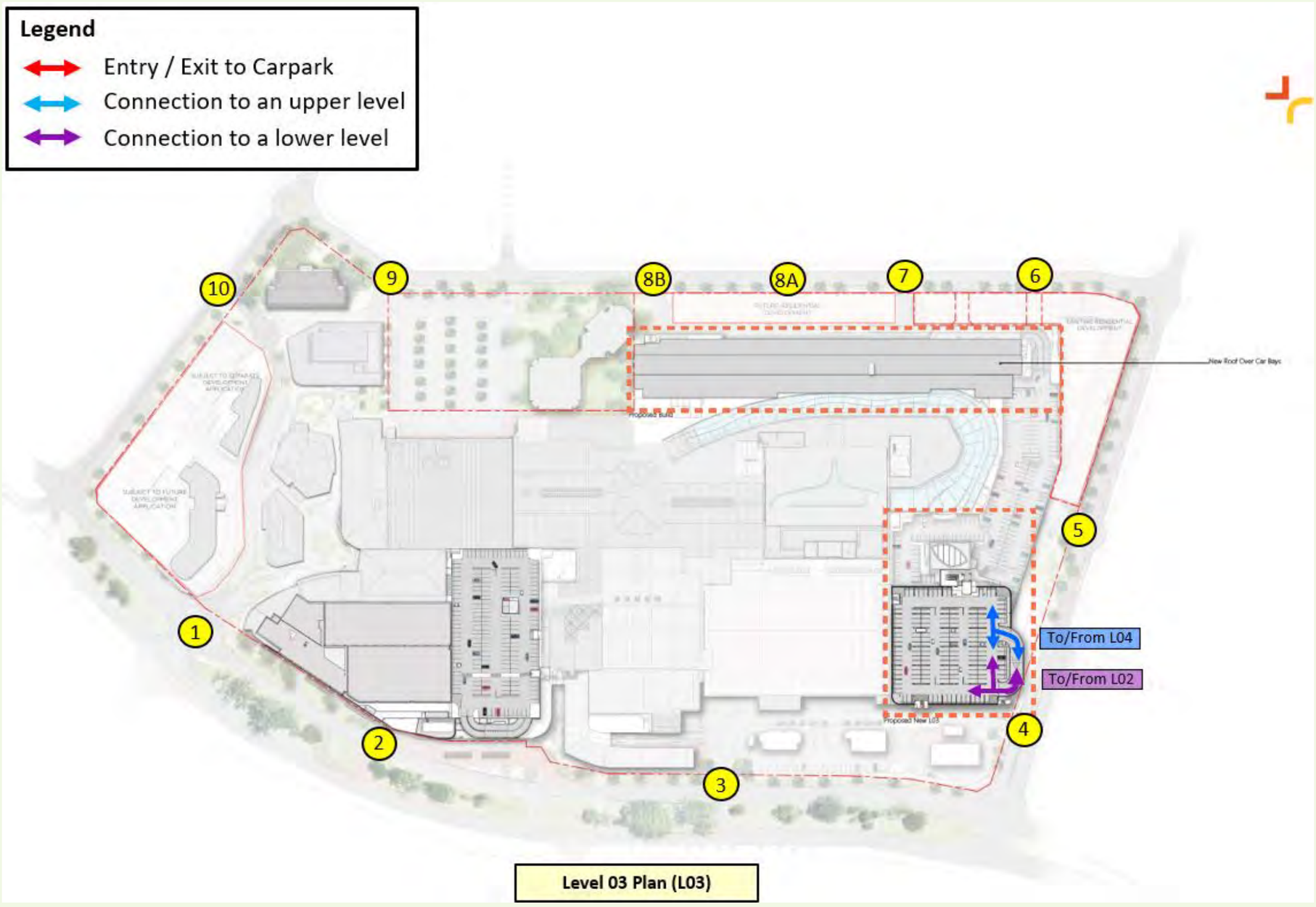
6.1.2. 2024 Proposed Modification



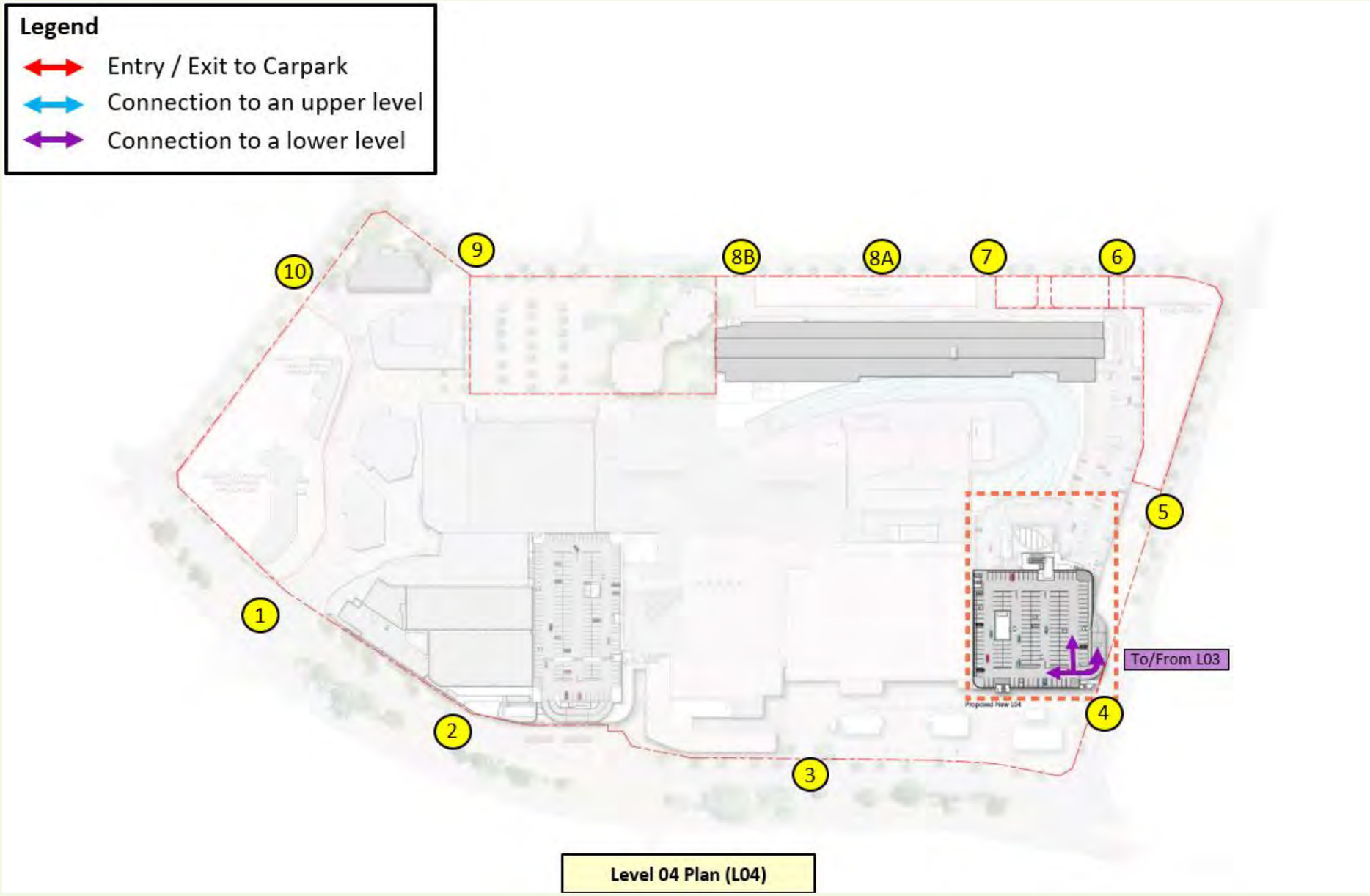
- Access 2 has been reversed and is a left only exit on to Karrinyup Road



- Addition of the connection ramp from the eastern Level 2 to Level 3



- Addition of the connection ramp from the eastern Level 2 to Level 3
- Addition of the connection ramp from the eastern Level 3 to Level 4



- Addition of the connection ramp from the eastern Level 3 to Level 4

6.1.3. Parking Management Strategies

Numerous technologies have been developed to improve parking management. Within the Development, a key parking management priority is allowing visitors to identify parking availability and being efficiently directed to unused parking areas.

Parking Way-finding

Way-finding signage is proposed within the Development, and is critical, not only to guide drivers to nearest available bay, but in improving the efficiency of the parking system. Efficient way-finding will:

- Improve traffic flow as drivers are provided with real time information of the locations of available parking bays
- Direct vehicles to under-utilised areas
- Reduce aisle / roadway congestion and vehicle emissions as drivers are less likely to circulate in the search for an available bay
- Provide increased safety for both pedestrians and other drivers due to less vehicle circulation
- Decreases the time customers spend searching for car bays
- Alleviate driver frustration as drivers are provided with real time information of the locations of the available car parking bays

Parking Detection System

It is proposed that a fully managed parking detection system is implemented within the Development. This will include a number of strategies including:

- Variable Message Signs (VMS)
- Aerial Parking Occupancy Detectors

Variable Message Signs

Variable Message Signs (VMS), provide information to vehicles upon entry to the car park on the number of car bays available and where available car bays are located. VMS could be provided both internally within the various car parking levels, and externally prior to major access points to the Development.

Potential locations of external VMS are shown in Figure 6-4, which will be worked through during detailed design. The first visible signs at the far western and eastern ends of Karrinyup Road could indicate the total number of car bays available within both the western and eastern car parks. Upon entry into each car park, VMS similar to that shown in Figure 6-5 could indicate to drivers the number of car bays available at each level of the car park they are entering (i.e. western car park or eastern car park).

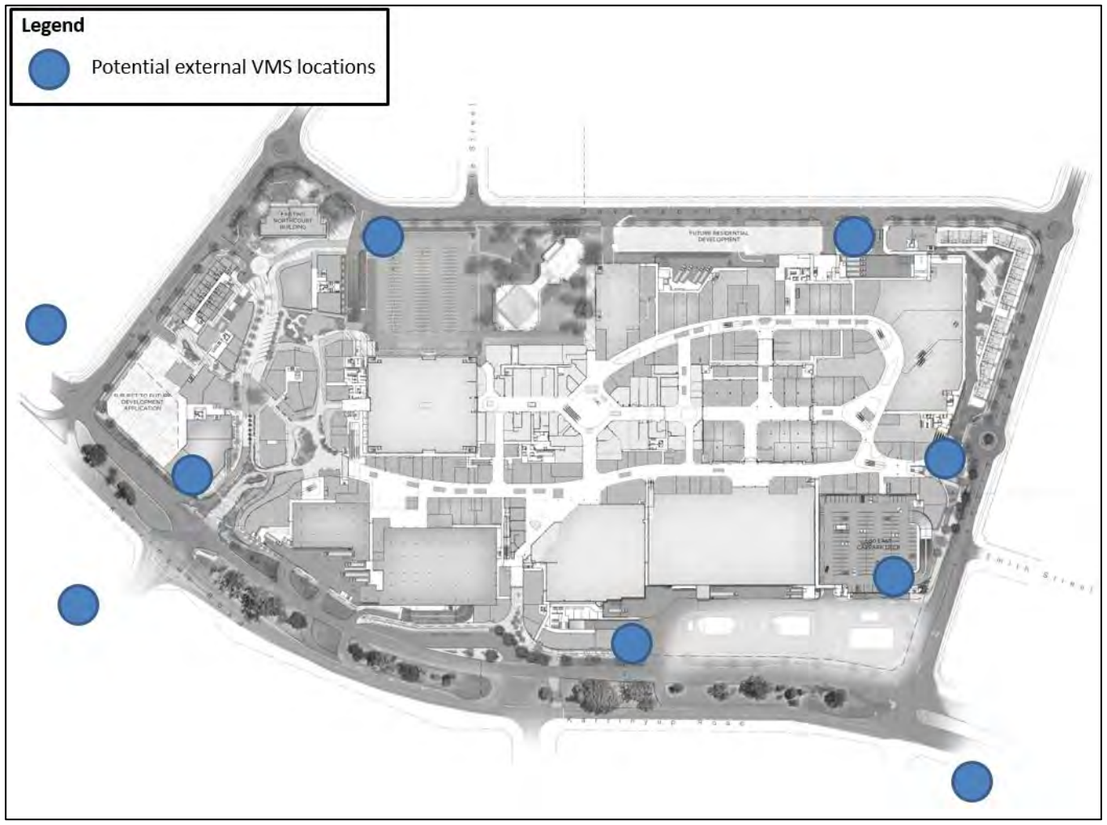


Figure 6-4 Potential external VMS locations

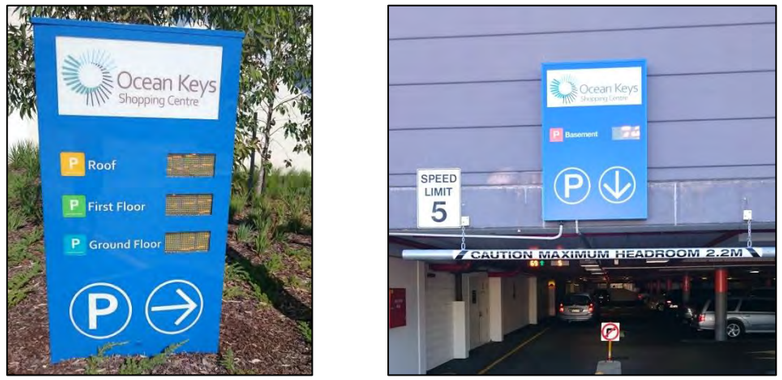


Figure 6-5 Examples of external VMS

Internal VMS are used to direct vehicles to under-utilised areas of the car parks. Examples of internal VMS are shown in Figure 6-6 and Figure 6-7.

Figure 6-6 Example of internal VMS

Figure 6-7 Example of internal VMS

Aerial Parking Occupancy Detectors

Aerial parking occupancy detectors could potentially be used within the Development, which are used to identify occupied and available car bays within a car park. This is achieved through the use of aerial colour coded sensors where 'red' sensors identify occupied bays, 'green' sensors identify available bays and 'blue' sensors identify disabled bays. Aerial parking occupancy detectors are best implemented with the abovementioned VMS strategy. An example of these used are shown in Figure 6-8. These can be implemented to indicate an available bay exists within the surrounding four bays.

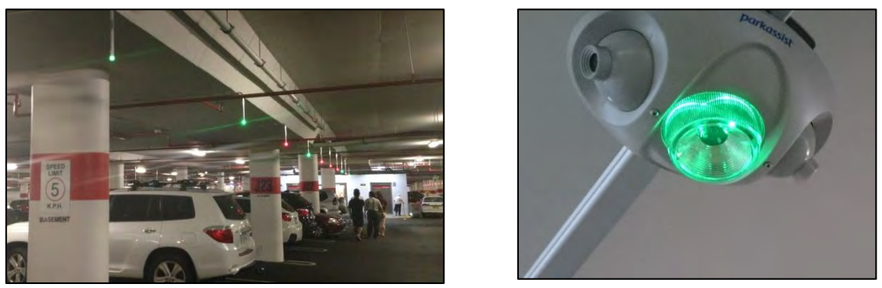


Figure 6-8 Internal VMS examples

Mix of Short and Long Stay Parking

A mixture of both short and long term parking is proposed for the Development to cater for the demands for visitor and staff parking. The locations of short and long term parking will be strategically placed throughout the Development to ensure adequate access to the Development for both staff and visitors.

Time Limited Parking

Short stay planning is based on the idea of giving priority to the provision of short-stay parking that serves the Development as a whole, rather than be dedicated to serving individual developments. As a result, it is proposed that all public car parks within the Development have a four hour (4P) time limit. This will be managed and administrated by shopping centre parking rangers who will patrol the car parking areas issuing fines to cars which exceed the 4P time limit.

Staff Parking

Long term staff parking is proposed within the Development, and will be located in areas such that staff does not occupy more easily accessible car parks. Staff parking is proposed to be dispersed throughout the Centre car parks so that peak commuter traffic is distributed to various access points. This will assist in reducing the traffic impact on the surrounding road network during peak periods. It is proposed that staff parking is located on portions of level B02, B01 and L02 (both west and east car parks), Level L01 mezzanine level, and the level L00 adjacent to Davenport Street, noting that this is subject to change during detailed design process.

Staff parking will be enforced using car number plate recognition, as per the existing situation. The number plates of all staff car parking bays are compiled from all cars parked in the staff parking bays that stay at the shopping centre for more than four hours. All areas outside the staff parking area are checked twice a day, once in the morning and again in the afternoon, representing a four hour time frame. If staff cars are found outside the staff parking area they receive a breach notice. The program has continued to be a great success with the prime parking bays undercover and outside the major stores remaining free for customer use.

It is proposed that staff will be required to pay for a parking permit to park at the developed Centre (noting this is currently not the case). This will provide incentive for staff not to drive to the Centre, and encourage sustainable modes of transport.

Publicise Public and Active Transport to the Development

A key aspect of managing parking demand will be to strongly publicise the proposed improvements to public and active transport to the Development.

In terms of public transport, it is proposed that real time information for bus services are situated throughout the Development to create awareness for shoppers (discussed further in Section 7.1.3). Additionally, flyers and online promotion of the proposed bus infrastructure and increase in bus services explaining the benefits for visitors and staff will be circulated throughout the Development.

The improvements in pedestrian infrastructure throughout the Development and the additional cycling infrastructure will be similarly promoted to encourage mode shift from visitors and staff.

Peak Shopping Periods

During peak shopping periods, for example pre-Christmas week, it is proposed to continue existing arrangements with the City of Stirling and local schools, where staff park at nearby reserves and school ovals. Shuttle buses are provided to transfer staff to and from the Development where it is out of walking distance range.

6.1.4. Motorcycle Parking

There are no formal guidelines as to how many motorcycle parking bays should be provided for developments and activity centres. The 2011 census data for WA shows that 6,532 out of 1,104,104 (0.6%) work trips are undertaken by motorcycle (profile.id.com.au).

Given that the current mode share for motorcycle trips to Karrinyup less than 1%, it is proposed to allocate 1% of the retail and office parking to motorcycles, i.e. 50 bays. Although a proportion of motorcycle bays will be provided, motorcycles will continue to park in the regular parking bays.

The variability of parking needs for residential developments does not make it conducive to providing motorcycle parking as a percentage of car parking spaces, and thus the 1% motorcycle parking is not proposed to be applied to residential buildings.

6.2. Bicycle Parking

The research and guidance on the provision of bicycle parking is fairly poor. While the residential development codes (State Planning Policy 3.1) recommend a rate of 0.43 spaces per unit for residential developments, no such guidance is available for retail, office or industrial type developments in WA.

The City of Stirling Bicycle Parking policy outlines provisions for developments in excess of 400m^2 gross floor area. The total number of bicycle parking bays required for a large centre, such as Karrinyup, is approximately 500 bays (250 for visitors, 250 for staff) which would far outstrip even the most optimistic forecasts.

Whist it is imperative to promote cycling to improve the mode share it is important to include an appropriate number of bicycle parking facilities. In this instance, the bicycle parking is proposed to be split up as follows:

- 160 customer bicycle spaces dispersed amongst the four major entrances to the shopping centre and along the main street
- Secure, enclosed end of trip facility for staff located at the southern major entrance to the shopping centre, near the Karrinyup Bus Station (as indicated on Figure 6-9), consisting of:
  - 200 bicycle spaces
  - 200 lockers
  - Separate female and male change rooms incorporating 5 showers and 1 toilet in each

By 2031 it is anticipated that the Development will have approximately 1500 employees. Taking into consideration the proposed mode share target of 6% for cycling in 2031, it can therefore be assumed that at least 90 employees will use the end of trip facilities. The proposed size of end of trip is therefore more than sufficient.

Whilst it is proposed to provide 160 customer bicycle parking spaces there is capacity within the Development to allow for the provision of extra bicycle parking spaces if there is the demand. The landowner will monitor the usage of the bike racks.

It can be noted that the State Planning Policy 4.2 states that the typical supply of motorcycles and bicycles for an activity centre is 5-10% of all bays. For this Development, 360 bicycle bays and 50 motorcycle bays are proposed, equating to 8.3% of the total number of bays.

All bicycle facilities are proposed to be accessible at ground floor level, close to main entrances to the Development and connecting with the external proposed cycle infrastructure network (discussed in Section 9).

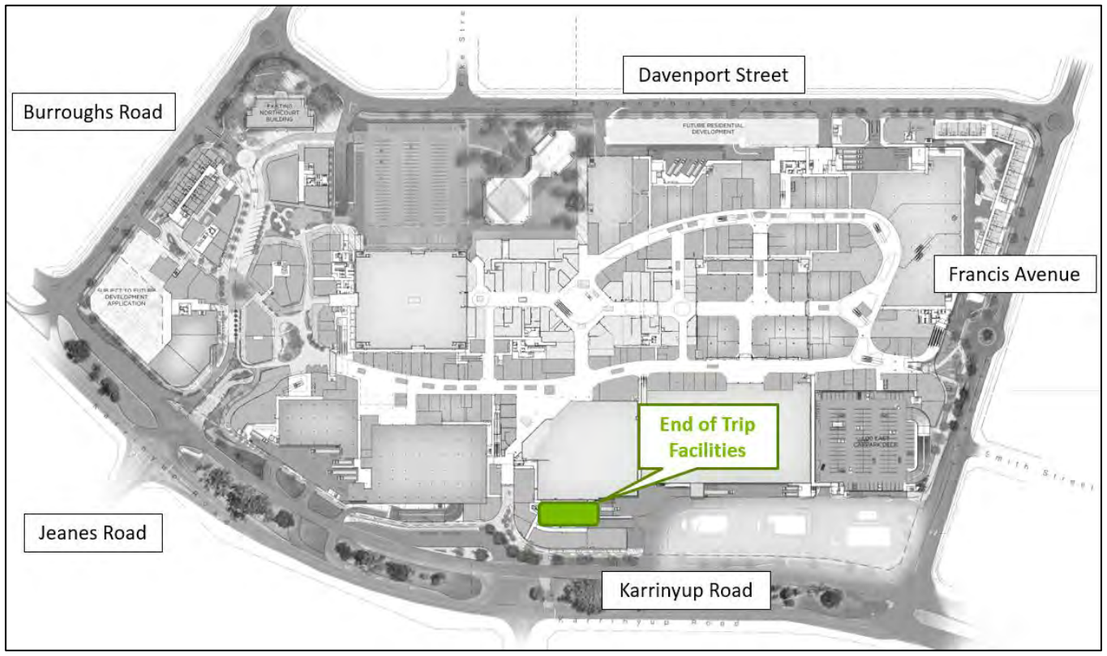


Figure 6-9 Proposed location of bicycle end of trip facilities

6.3. Parking Management Objectives

A Parking Management Plan will be used as a tool to manage parking demand by identifying the future users of the Mixed Use Expansion of Karrinyup. Prior to the commencement of site works for the centre, a Parking Management Plan is proposed to be implemented which will detail the staging of parking provision and management tools that have been described in the above sections.

The overall objective of the Parking Management Plan is to prioritise usage on the basis of specific functions or requirements. Table 6-1 lists the identified objectives and outcomes for parking management at the Mixed Use Expansion of Karrinyup.

Table 6-1 Parking management objectives and outcomes

#	Objective	Proposal	Outcomes
1	**Consumer choice –** *people should have viable parking and travel options*	• A balance between the number of parking bays and improvements in public transport, cycling and walking facilities.	• Flexibility in travel options for all users to the Development.
2	**User information –** *motorists should have information on their parking and travel options*	• Wayfinding signage. • Variable Message Signs (VMS). • Aerial Parking Occupancy Detectors.	• Efficient signage that makes it easy for users to access the Development and limiting traffic congestion in the surrounding road network.
3	**Sharing –** *Parking facilities should serve multiple users and destinations*	• A balance of general vehicle, motorcycle and bicycle parking bays amongst the key entrances to the shopping centre. • Appropriate number and location of accessible bays.	• All types of users to the Development to have an available parking space.
4	**Efficient Utilisation –** *Parking facilities should be sized and managed so spaces are frequently occupied*	• A total of up to 4,880 parking bays are proposed, equating to a parking rate of up to 4.2 bays per 100m^2 of floor area.	• 95% parking utilisation during peak periods.
5	**Flexibility –** *Parking plan should accommodate uncertainty and change*	• Constant review and monitoring of staff parking utilisation and infringements.	• Low numbers of staff infringement
6	**Prioritisation –** *The most desirable spaces should be managed to favour higher-priority uses.*	• Designated staff parking in areas away from main entrances to the shopping centre.	• Prime parking bays outside major stores and key entrances are always utilised by shoppers.
7	**Peak Management –** *special efforts should be made to deal with peak-demand*	• Parking provided at nearby school ovals during peak shopping periods, for example pre-Christmas week. Shuttle buses provided where out of walking range.	• An effective and safe method of managing demand during peak shopping periods.
8	**Quality vs. Quantity –** *Parking facility quality should be considered as important as quantity, including aesthetics, security, accessibility and user information.*	• Parking bay dimensions and aisle widths are larger than typically required. • All parking will be covered. • Appropriate number of mobility impaired parking, located near main entrances to the retail centre. • Improved CCTV within car parking areas.	• Parking facilities that are comfortable and accessible for all users.

6.3.1. Parking Management Plan 2024 Update

The Parking Management and Travel Plan has also been updated in 2024 to reflect the current operational measures and outcomes.

7. Public Transport Access

7.1. Prioritisation of Public Transport

Public transport accessibility has been recognised as a key area of improvement for the Mixed Use Expansion at Karrinyup. In order to make public transport an attractive alternative to private vehicle, a number of factors need to be taken into consideration, including:

- Directness and convenience of routes
- Time taken to get to and from bus stops and train stations
- Frequency of services
- Flexibility of services
- Personal security
- Reliability and variability
- Route (real time) information

A number of measures have been incorporated into the design of the Mixed Use Expansion at Karrinyup and are proposed to encourage customers to use public transport as a viable transport mode. These include operational improvements, improved integration with the shopping centre, real time bus timetable information, improved bus priority infrastructure surrounding the Development and travel behaviour change initiatives, as discussed in the following sections.

It is understood that the Public Transport Authority (PTA) do not have any future planned changes to bus route alignments, other than minor route adjustments and general bus frequency increases to Karrinyup Bus Station services.

7.1.1. Operational Improvements

A number of bus routes provide a reliable, direct connection between Stirling Station and Karrinyup Bus Station, for example Route 423 and Route 425. The 423 route runs as frequently as every 10 minutes during peak periods, and 30 minutes on Saturdays and during off-peak periods.

Routes between other destinations, particularly north of the Development (for example Route 424 to Warwick), are not as direct and offer uncompetitive journey times when compared to private car. This is mainly because the curvilinear road network is not conducive to providing attractive, direct bus routes to service residential areas. These routes, however, are still important in providing a public transport option for residents in those areas.

The Public Transport Plan 2031 identifies the importance of public transport for Perth and particularly the need for improved mass transit services between major centres outside of the central area.

The optimal frequency of bus routes at Karrinyup Bus Station would be between 5 and 15 minutes as this would give customers enough flexibility, promoting ‘walk-up’ patronage to the Development. For the Development, increases in frequency are particularly important during peak shopping times (Saturday). Any amendments to bus frequencies should be coordinated with train frequencies to encourage mode transfers. Increasing bus frequency to/from Stirling Station, is seen as the most valuable as it provides direct transfers to the rail network.

The Public Transport Authority (PTA) hope to achieve increased frequencies of the bus routes servicing Karrinyup Bus Station, as shown in Table 7-1, although there is currently no PTA funding commitment for this.

Table 7-1 PTA Planned 2031 bus route frequencies (sourced from Transperth)

Bus Route	Weekday Peak	Weekday Off-peak	Evening	Saturday	Sunday
422	20	30	N/A	30	60
423	10	15	30	15	30
424	20	30	N/A	15	30
425	10	30	N/A	15	30

*Note only one service is provided in the time period

Increasing bus frequencies can often be difficult to justify, from both a financial point of view and also based on current demand. The implementation of bus priority infrastructure provides an opportunity to increase the frequencies of the bus routes (particularly for contra-flow peak commuter periods and weekend peaks) in order to take advantage of the improved infrastructure. This would ultimately increase the attractiveness of public transport to the Development, and consequently increase patronage. A funding contribution is proposed to increase the frequency of bus services between the Centre and Stirling Station for a period of 7 years. This will involve services relating to either or both the 423 and 425 routes with a goal of achieving 10-minute headways in the morning and evening Centre weekday peaks. During the weekends, movements will be on one route (Route 425), which will be more easily identifiable for Centre customers, with 15-minute headways on the shoulders of and during the Centre weekend opening hours.

In terms of existing bus stop locations, these are considered appropriately spaced to capture the local catchment and changes to this would not add value.

7.1.1.1. Public Transport Operation 2024 Update

As a result of the Development, bus frequency between Karrinyup Shopping Centre and Stirling Train Station has been increased.

7.1.2. Bus Station Integration with the Development

Currently the Development does not open out into the bus station. To improve the transition between public transport and the Development, the Development aims to create a seamless, legible connection and emphasise the integration of the two.

CPTED (Crime Prevention through Environmental Design) principles are proposed in the upgrade of the Karrinyup Bus Station to improve personal security. This includes improved lighting and the introduction of CCTV (closed circuit television) cameras to provide active surveillance. Additionally, weather cover will be provided at the bus station.

Digital signage will also be provided within the Karrinyup Bus Station and Stirling Station to inform staff and customers of the next bus to and from the Centre, regardless of the route.

Improvements to pedestrian / cyclist paths to Karrinyup Bus Station will also promote public transport use, both of which are described further in Sections 8 and 9 respectively.

7.1.2.1. Bus Station Integration 2024 Update

There is now an access point for Karrinyup Shopping Centre adjacent to the bus station. Trolley bays have been installed next to the seating area at the bus stop to minimise the distance that shoppers using public transport have to carry their belongings.

7.1.3. Real Time Information

Currently the provision of information at the Karrinyup Bus Station is limited to stand specific route and timetable information on stand number signs.

It is proposed that all stands at the bus station are upgraded to show real time timetable information to indicate to customers when a bus is scheduled to arrive. Display screens are proposed to be provided throughout the Development to indicate real time information for departing buses. Additionally, interactive bus schedule planning information screens are proposed to be situated throughout the Development, with real time bus information integrated with phone applications. The global positioning system (GPS) tracking of buses is also now in effect which will significantly improve the accessibility of real time bus information to customers.

These initiatives will encourage greater awareness of public transport options for customers.

7.1.3.1. Real Time Information 2024 Update

Real Time Information (RTI) is still yet to be installed at Karrinyup. Physical bus timetables have been provided at all concierge desks within the Development. Consideration is being given to addition of QR codes to existing digital wayfinding screens to access RTI within the Development.

Transperth also have an App for iOS and Android devices which users are able to use to plan and track their journey, including live updates and alerts.

7.1.4. Bus Priority Infrastructure

In order to make public transport options competitive with private vehicle use, buses must be reliable. Transport modelling has identified some locations where bus lanes would improve bus journey times and reliability by allowing buses to bypass queued general traffic.

It is therefore proposed that the following bus priority infrastructure is implemented in the road network surrounding the Development. These conceptual upgrades are indicated on Figure 7-1 and have been further described in Section 5.

- An eastbound bus queue jump lane on Karrinyup Road, on both the approach and departure side of the Francis Avenue intersection, integrating with the Karrinyup bus station. This will ensure that buses have no delay in exiting the bus station to enter the bus lane.
- A westbound bus lane along Karrinyup Road from the west of North Beach Road to the west of the Huntriss Road intersection.
- An additional right turn traffic lane is also proposed on the Karrinyup Road west approach to the Huntriss Road intersection. Although the right turn lane is not proposed to be a bus-only lane, the additional capacity for the right turn will in effect provide better traffic flows for all vehicles through the intersection.

It is understood that the Public Transport Authority have the desire for stronger bus priority along Huntriss Road, servicing the 423 route, as this is currently the most frequent service to Karrinyup. Physical constraints along Huntriss Road, however, limit bus infrastructure improvements to this route without significant effect on adjacent properties. The additional eastbound right turn lane proposed on Karrinyup Road at Huntriss Road intersection aims to improve the capacity of the turn movement for the 423 route, therefore improving bus reliability through this intersection. If there is only one general traffic turn lane and one bus lane, buses remain queued behind general vehicles and miss the green phase.

As a result, it has therefore been proposed to improve priority for the 425 route by including bus lanes along Karrinyup Road. The transport modelling has shown a reduction in travel time of 1 minute for buses during the Saturday peak period with the introduction of these lanes. Also, not only do the lanes provide improved journey times and reliability, but it provides a visual incentive for general vehicles queued along Karrinyup Road to consider switching modes. Additionally, bus lanes along Karrinyup Road are more effective in the long term, as Karrinyup Road is a primary distributor with a wide road reserve and is better suited to moving more people.

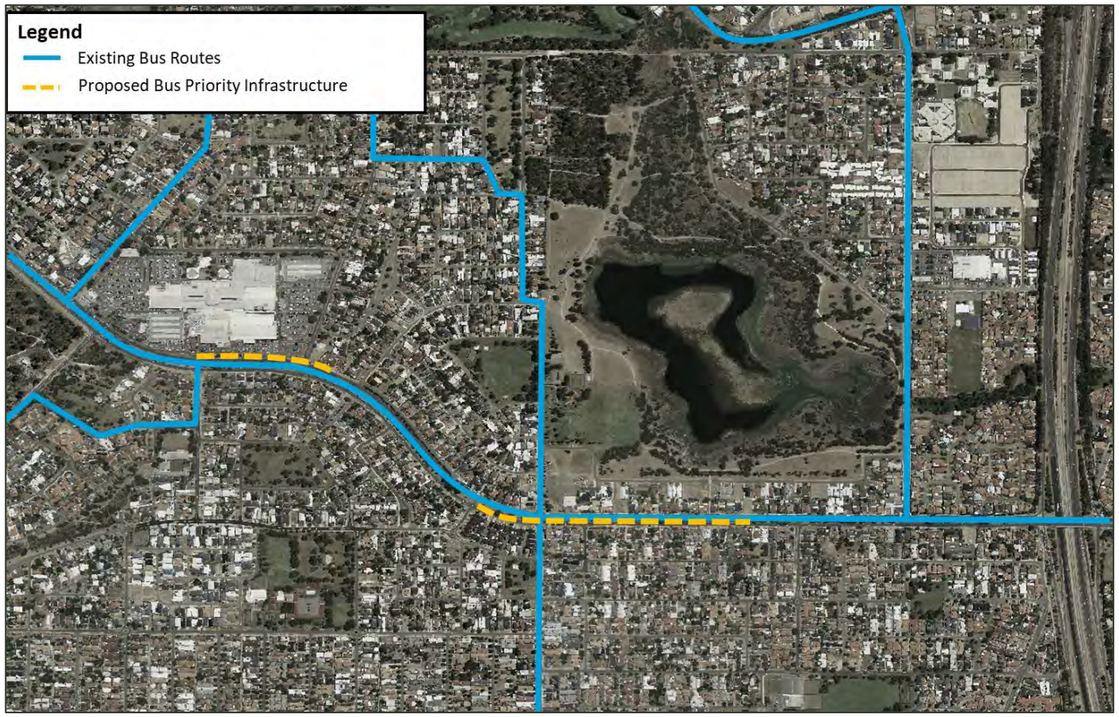


Figure 7-1 Proposed bus priority infrastructure

7.1.4.1. Bus Priority Infrastructure 2024 Update

Following the original preparation of this TP, bus lanes have been provided on Karrinyup Road adjacent to the Development.

7.1.5. Travel Behaviour Change Initiatives

Travel behaviour change is considered one of the most important tools in order to help curb the car-centric nature of Karrinyup users, to not only encourage mode shift to public transport, but also to walking and cycling. The principles of behaviour change include **Inspiration**, **Enablement**, **Invitation** and **Trial and Satisfaction**, as identified by the Department of Transport (DoT) and should be considered in the introduction of behaviour change programmes.

By providing subsidised SmartRider cars to staff, the behavioural shift to public transport is expected to occur even before the redeveloped centre opens. The Centre will also promote travel behaviour change during this period. Increased bus frequencies will be provided during construction for staff and construction employees.

A Travel Behaviour Change and Parking Management Plan will be developed, after further consultation with Department of Transport.

7.1.5.1. *Travel Behaviour Change 2024 Update*

The Parking Management & Travel Plan (PMTP) has been updated in November 2024. The key updates to the document were to reflect the actions that had been undertaken since the PMTP was first issued in 2019. This included confirmation of the physical works that had been undertaken, confirmation of the commitments that the shopping centre management have undertaken to manage demand, promote alternative modes of transport for staff and visitors. The Karrinyup Shopping Centre Management have also acknowledged that continued support for alternative modes of transport, and incentives to promote the use of Public Transport and cycling to the facility are and ongoing commitment to improve the visitor experience and staff amenity.

7.2. Taxi and Ride Share Services

Taxis and Ride share services make an important contribution to public transport at shopping centres. They enable short trips to be made in a timely and efficient manner. A taxi rank holding up to four taxis is proposed along the main street immediately adjacent to the town square/ piazza entry to the Development. This is in a central position allowing convenient access to/ from the Development.

8. Pedestrian Access

8.1. Pedestrian Priority

Walking is the most common form of transport as nearly everyone is a pedestrian at multiple times in their daily travels. As such, high importance has been given to improving pedestrian access, safety and comfort to the Karrinyup Development.

The introduction of residential dwellings as part of the Development is likely to increase the proportion of pedestrians accessing the Development. The expected future redevelopment of the draft Structure Plan area will further increase pedestrian access to the Development.

The following sections highlight the improvements proposed in order to improve walkability within and surrounding the Development, with the aim of increasing walking trips to the Development.

8.1.1. Infrastructure

Walking access to the Development is currently limited by the lack of dedicated pedestrian links. The width of the footpath around the perimeter of the Development is narrow and crossings are generally not DDA (Disability Discrimination Act) compliant. To improve access to the Development, it is proposed to provide dedicated walking access paths to the Development by upgrading the surrounding pedestrian network. This includes widening the existing footpaths around the perimeter of the Development (on the side adjacent to the Development) to at least 2.0m, or providing 3.5m shared paths as indicated in Figure 8-1, which would tie in to the surrounding footpath network. These pedestrian links provide adequate connections to the existing pedestrian network to facilitate movement to and from the Development and increase walking as a mode to the Development.

A connected shared path network has been proposed due to the limited road reserve area, with wider paved shared areas at crossing points (refer to the schematic road upgrade drawings in Appendix A). The use of shared paths is considered acceptable for this Development environment since bicycle speeds are not expected to be excessive. A 3.5m shared path width is described by Austroads Guide to Road Design Part 6A as appropriate for frequent bidirectional commuting and recreation (concurrently) with bike speeds greater than 30km/hr.

To make it more attractive to walk to and from the Centre, a contribution is proposed to expand the extent of the local path network to provide a footpath on one side of local streets that do not currently have a footpath. This contribution will be to an amount of $400,000.

In addition, there is likely to be a greater likelihood of pedestrian use of the paths if the amenity for users is improved. As such it is also proposed to make a contribution of $50,000 to the City to provide additional street trees to help shade those paths that are devoid of any street trees. It is believed that the improved infrastructure for pedestrians, combined with the increase in residential density surrounding the Centre, will increase the pedestrian mode split, particularly for customers.

Internally, the proposed design incorporates four pedestrian gateways to the retail core of the Development; North Gate, South Gate, East Gate and West Gate. The gateways will all be accessible from the footpath surrounding the Development, making the Development easier to reach from the surrounding residential catchment.

8.1.2. Crossings

Improving pedestrian safety during the crossing of main roads and parking lots has been given high priority in the proposed Development. There are three existing signalised pedestrian crossings accessible from Karrinyup Road, all of which are proposed to be maintained i.e. Jeanes Road, Francis Avenue and the signalised pedestrian crossing adjacent to Miles Street. These crossings are well spaced along the segment of Karrinyup Road adjacent to the Development, and provide safe, visible access to the Development.

Along Burroughs Road, Davenport Street and Francis Avenue, it is proposed that pedestrian refuges are provided at the locations of the main gateway entrances to the Development. This will ensure that pedestrian desire lines to the Development are met with safe crossing points. All crossings along these streets will be DDA compliant, with appropriate ramps and tactile ground surface indicators. A central median is also proposed to be provided along Burroughs Road to enable safer access for pedestrians.

In some areas within the Development, visitors are currently required to cross roads through car parks to reach the entrance to the Development, which poses potential safety concerns. A zebra crossing, the length of a parking aisle is proposed to be provided within each reconfigured car parking level to provide safe, visible access directly to shopping centre entrance points and vertical transportation. The zebra crossing facilities also provide improved safety for trolley users, parents with prams and mobility impaired users to access the shopping centre

With the above control measures, the proposed Development aims to reduce the number of conflict points between vehicles and pedestrians.

Additionally, it is proposed that the phasing at signalised intersections provide a balance between all transport modes, including pedestrians. This will be discussed with Main Roads WA during detailed design.

8.1.3. Aesthetics and Amenity

In order to help make walking a preferred mode of transport, high levels of amenity are required for all key pedestrian corridors and paths.

These gateways will be wide, landscaped areas forming a green pedestrianised environment, while dining opportunities will also be available at each. The main street component will be occupied by food and beverage uses which offer dining opportunities outside of traditional trading hours. Street furniture, lighting and weather cover will be incorporated into the detailed design for pedestrian corridors to ensure a high level of amenity. This will make walking to and within the Development more inviting and enjoyable.

Way-finding signage is proposed to direct pedestrians to the main gateways to the Development, and also to vertical transportation through car parking levels. Signage is also proposed in the local residential area, within a 10 minute walk to the Development. This will promote the legibility and visibility of the pedestrian network.

8.2. Safety

Pedestrian safety will be improved by the Development. The Development will enable pedestrian to enter the shopping centre via upgrades to the surrounding footpath network and the pedestrianised gateways. Pedestrians will be able to circulate from the main gateways to the surrounding network without needing to cross the car park road network, other than Main Street which will be a shared area. Pedestrian access and safety will also be improved within the proposed car parks with the provision of zebra crossings that connect through each car park area to the Development entries. These clearly provide a pedestrian walk way clear of traffic and will be supported with way finding signage to improve their usage.

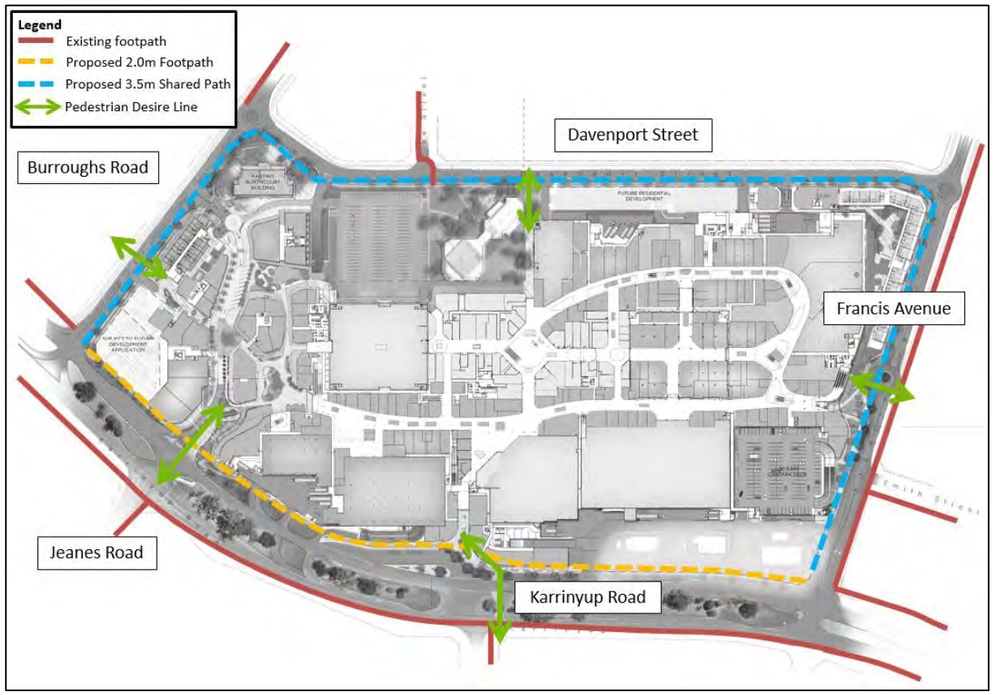


Figure 8-1 Proposed pedestrian infrastructure surrounding the Development

9. Cycling Access

There are some existing cycling facilities within the Development; however, in order to encourage mode shift there is a strong need for substantial cycle infrastructure improvements to improve useability and safety for cyclists, particularly within the immediate vicinity of the Development. A number of improvements to the cycling infrastructure surrounding the Development, as well as ways to promote cycling to the Development are described in the following sections.

9.1. Proposed Infrastructure

As one type of infrastructure cannot fulfil the same function for all cyclists in a safe and effective way, it is important that the types of cyclists that will access the Mixed Use Expansion at Karrinyup are considered. It is expected that a combination of users will access the Development, including staff, shoppers and parents with children. It is not expected that there will be high numbers of high speed cyclists commuting to the Perth CBD in areas surrounding the Development. Considering the mixed-use nature of the development and family type environment, it is proposed that the surrounding cycle network should cater for inexperienced cyclists. Inexperienced cyclists refer to bicycle users who either rely on or enjoy cycling, but are not necessarily confident or experienced enough to cycle amongst general road traffic or with other cyclists who travel at higher speeds, in a safe manner. Inexperienced cyclists tend to travel at speeds lower than 20km/h and distances less than 5km (equating to an approximate 15-20 minute journey time). It is therefore proposed that cycling infrastructure to the Development should consist primarily of continuous off-road shared/separated bicycle paths with safe crossings into the Development.

A number of cycle paths are proposed in order to increase the effectiveness of the surrounding cycle network, with the aim of tying in to the Perth Bicycle Network (PBN) routes particularly from the east and south, to promote bicycle access to the Development. The proposed infrastructure improvements are described below, as indicated on Figure 9-1, with schematic road upgrade drawings shown in Appendix A.

9.1.1. Karrinyup Road

Along Karrinyup Road, the following cycle infrastructure upgrades are proposed:

- Installation of a new segregated 2.5m two-way cycle path adjacent to the existing shared path between West Coast Highway and Francis Avenue. The existing shared path (currently of sub-standard width for a shared path) would be converted to a dedicated footpath. This path is predominantly located adjacent to parkland with minimal crossovers and interruptions for cyclists and provides a safe connection to the PBN Route NW 2 along Marmion Avenue and West Coast Highway.
- Installation of a one-way segregated 1.5m off-road cycle path in each direction of Karrinyup Road between Francis Avenue and Huntriss Road which would provide good connectivity to the Development. The PBN Route NW1 is also located east of the Development along Huntriss Road, providing an additional link between the suburbs of Innaloo and Duncraig. There is currently no existing direct link to these routes from the Development, and as such this connection would be highly beneficial in promoting cycle access to the Development. Alternatively, the development of a safe active street along a parallel route should be further considered.
- Upgrading of the existing midblock pedestrian crossing on Karrinyup Road to a combined pedestrian/cyclist crossing or ‘toucan’ crossing (including bicycle signal lantern). Although cyclists can currently use this crossing by dismounting, this would formalise the crossing and promote awareness for cyclists.

9.1.2. Burroughs Road

Along Burroughs Road, the following cycle infrastructure upgrades are proposed:

- Installation of a two-way off-road shared path to the west of the Development along the eastern side of Burroughs Road between Karrinyup Road and Davenport Street. Separation between the shared path and the traffic lanes is provided as it reduces the risk of ‘dooring’ (cyclists being hit by opening car doors). North of Davenport Street, cyclists can ride on-road. This is considered satisfactory given the reduced conflict (clear of the shopping centre area), reduced traffic volumes, 50km/h speed environment, and there is adequate road width to allow vehicles to pass cyclists. To enhance the connection to the Pascoe Street PBN Route NW7 signage directing cyclists to the Development should be provided. This, combined with the segregated path immediately adjacent to the Development, should improve cycling from the local community to the Development.

9.1.3. Davenport Street

Along Davenport Street, the following cycle infrastructure upgrades are proposed:

- Installation of a two-way off-road shared path to the north of the Development along the southern side of Davenport Street between Burroughs Road and Francis Avenue. Separation between the shared path and the traffic lanes is still provided to ensure appropriate protection from parked vehicles and other obstacles. Providing a continuous segregated shared path around the perimeter will promote cycling movement to and within the Development.

9.1.4. Francis Avenue

Along Francis Avenue, the following cycle infrastructure upgrades are proposed:

- Installation of a two-way off-road shared path to the east of the Development along the western side of Francis Avenue between Karrinyup Road and Davenport Street. Providing a segregated shared path around the perimeter will promote cycling movement to and within the Development. North of Davenport Street, cyclists can ride on-road to connect to the Pascoe Street PBN Route NW7, similarly to Burroughs Road.

9.1.5. Jeanes Road

Along Jeanes Road, the following cycle infrastructure upgrades are proposed:

- Installation of a segregated 2.5m two-way cycle path between Deanmore Road and Karrinyup Road. This path is located adjacent to a park with minimal crossovers and interruptions for cyclists, and fills a gap in the cycling network providing a safe connection to the PBN Route NW 2 that continues along Jeanes Avenue/Deanmore Road. The cycle path can be deviated to avoid existing light poles, which would require the path deviating into the adjacent land reserve.

Another important improvement for cycle friendly networks is to ensure intersections will accommodate cyclists appropriately. Given tight road width constraints, some areas (at intersections or otherwise) will require short sections of shared paths/areas, for both pedestrians and cyclists (refer to the schematic road upgrade drawings in Appendix A). This is necessary and acceptable as the area surrounding the Development will not be a high speed cycling environment, and cyclists would be required to slow down upon reaching intersections anyway, and. Shared path areas will need to be delineated and signed appropriately to advise all path users. Further detail would be incorporated into detailed intersection design and signal design.

9.1.6. Wider Cycling Network

Lake Gwelup is a significant public open space that will be used by the residents in the Development. In general, the surrounding residential roads that connect to Lake Gwelup carry low traffic volumes at low speed, and therefore cyclists can be accommodated on the road. Footpaths are provided along the majority of residential roads to the east of the Development to connect pedestrians to Lake Gwelup Reserve. From the Development, there is dedicated pedestrian and cycling infrastructure proposed to connect to these surrounding residential roads, and then once reaching Lake Gwelup Reserve, there is an existing shared path network within Lake Gwelup Reserve. Wayfinding signage details will be confirmed during detailed design stages and should include Lake Gwelup as a key cycle route.

In terms of connecting to the wider cycling network, there is a number of existing Perth Bicycle Network (PBN) routes that surround the Development, which are being revisited as part of the new Western Australian Bicycle Network Plan.

With reference to the City of Stirling Draft Integrated Cycling Strategy (January 2015), an audit of the PBN network routes in the wider cycling network surrounding Karrinyup Shopping Centre was undertaken by the City. The City suggests that with some improvements, the existing PBN network could form the basis of a familiar and functional secondary cycle network.

The proposed cycling infrastructure described above provides infrastructure where there is believed to be no future plans for infrastructure and will encourage cycling to the Development.

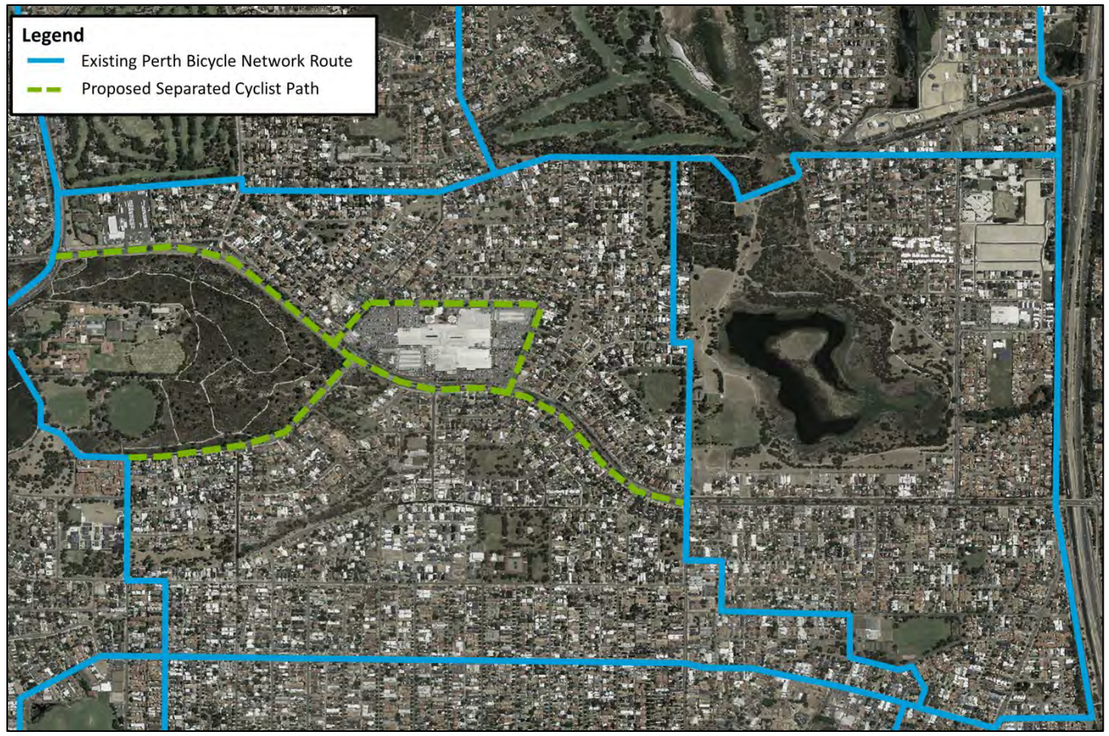


Figure 9-1 Proposed cycle infrastructure surrounding the Development

9.2. Bicycle Parking and End of Trip Facilities

Minimal bicycle parking facilities currently exist and access to these are somewhat problematic as dedicated routes from the Karrinyup access locations are not provided and bike users are expected to cycle through parking areas. As discussed in Section 6.2, it is proposed that a quantity of bicycle racks are installed at all main pedestrian entrances to the Development. A centralised end of trip facility for staff at the Development is proposed near the South Gate entrance, near the Karrinyup Bus Station. The facility will include secure, enclosed bicycle storage, lockers and change room facilities. The proposed formalising of the existing signalised pedestrian crossing on Karrinyup road to a shared toucan crossing for cyclists will provide appropriate access to the bicycle end of trip facilities.

9.3. Promotion of Cycling

In addition to infrastructure changes, it is important that cycling is promoted in other ways to initiate behaviour change and encourage cycling. It is proposed that way-finding signage is installed to direct cyclists towards the Development at major intersection points. Inappropriate and often inadequate signage along these routes and the failure to integrate with commercial centres, such as at Karrinyup, reduces the effectiveness of the cycling network. Cycling network maps are also proposed to be made available within the Centre to promote awareness of cycling.

9.4. Safety

Cycling safety will be improved with the provision of formalised cycle paths on the roads surrounding the Development and direct access into the Development. Bicycle parking will be provided at all the entries in an area with good passive surveillance. The provision of bicycle lanterns at the pedestrian crossing on Karrinyup Road will enable cyclist to easily cross from the southern side improving access for cyclists on Karrinyup Road, Jeanes Road and for those coming from West Coast Highway.

10. Servicing Access

10.1. Type of Service Vehicle

Appropriate access for heavy commercial vehicles was considered when locating servicing loading areas within the Mixed Use Expansion at Karrinyup, and to ensure that entrance and exit of service delivery vehicles can be facilitated through access points. Access to the Development is left-in left out in as much as possible in order to provide safer connections that reduce the likelihood of conflicting movements.

The typical service delivery vehicles that are anticipated to require access to and from the Development include:

- Delivery vehicles of various sizes, (ranging from small courier vans to large 19.0m articulated vehicles)
- Waste collection vehicles
- Emergency vehicles

A total of nine (9) service delivery yards are proposed within the Mixed Use Expansion at Karrinyup, as shown in Figure 10-1. The proposed service delivery yards are well separated from the general public and the reversing of all vehicles is contained within each service delivery yard.

The number of service delivery yards is believed to be sufficient for the expected number of servicing trips required for the Development.

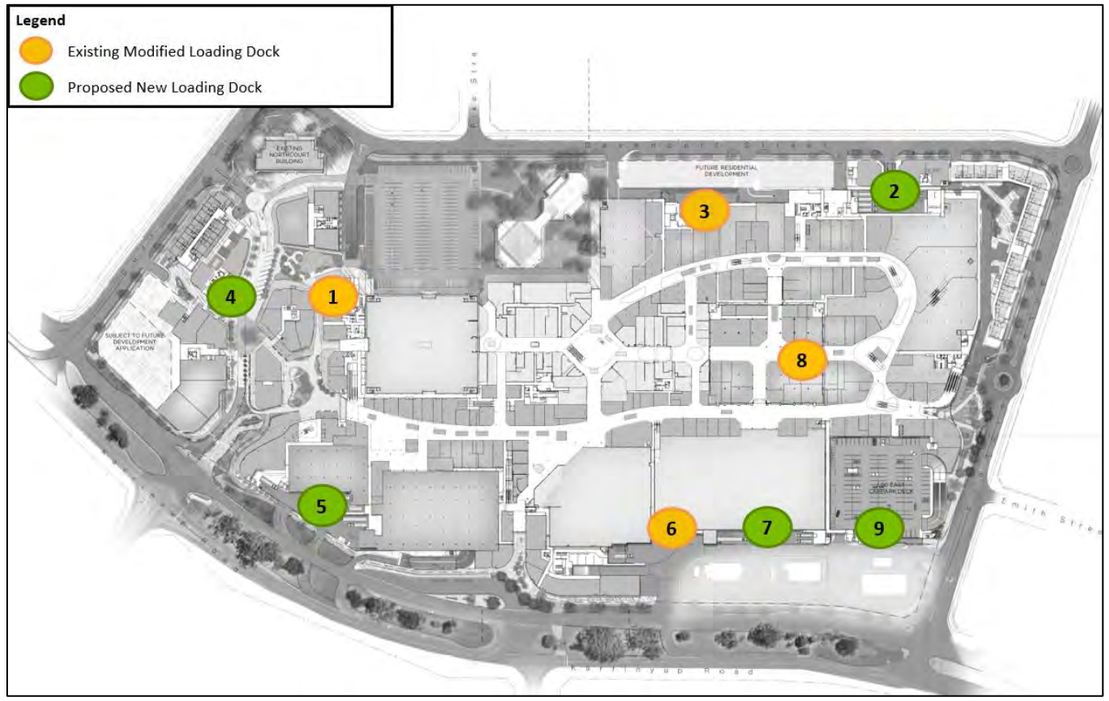


Figure 10-1 Proposed service delivery yards within the Mixed Use Expansion at Karrinyup

10.2. Vehicle Swept Path Analysis

An assessment of vehicle swept paths within the Development was undertaken using AutoTURN software (Transoft Solutions Inc.).

10.2.1. External

The schematic design of the roads surrounding the Development (Burroughs Road, Francis Avenue and Davenport Street) allows for the movement of service vehicles to access the loading docks within the Development, as shown in Figure 10-2. All the intersections immediately surrounding the Development have been designed to accommodate a 19.0m articulated vehicle (semi-trailer) circulating in an anti-clockwise direction. This provides flexibility in the movement of articulated vehicles and facilitates access for the small number of semi-trailers that may need to head west from service delivery yards 1, 5, 6 and 7. The design ensures that 12.5m heavy rigid trucks can access the service delivery yards from Davenport Street. The left and right turn movements out of both Burroughs Road on to Karrinyup Road, and also Francis Avenue from Karrinyup Road, have been designed to cater for 19.0m semi-trailers to ensure added flexibility.

At some access points into the Centre, mountable kerbing is proposed to allow for a19.0m articulated vehicle left turn movement. Any modifications to kerbing external to the site will require the relevant approvals to be obtained from the City prior to the commencement of the works'.

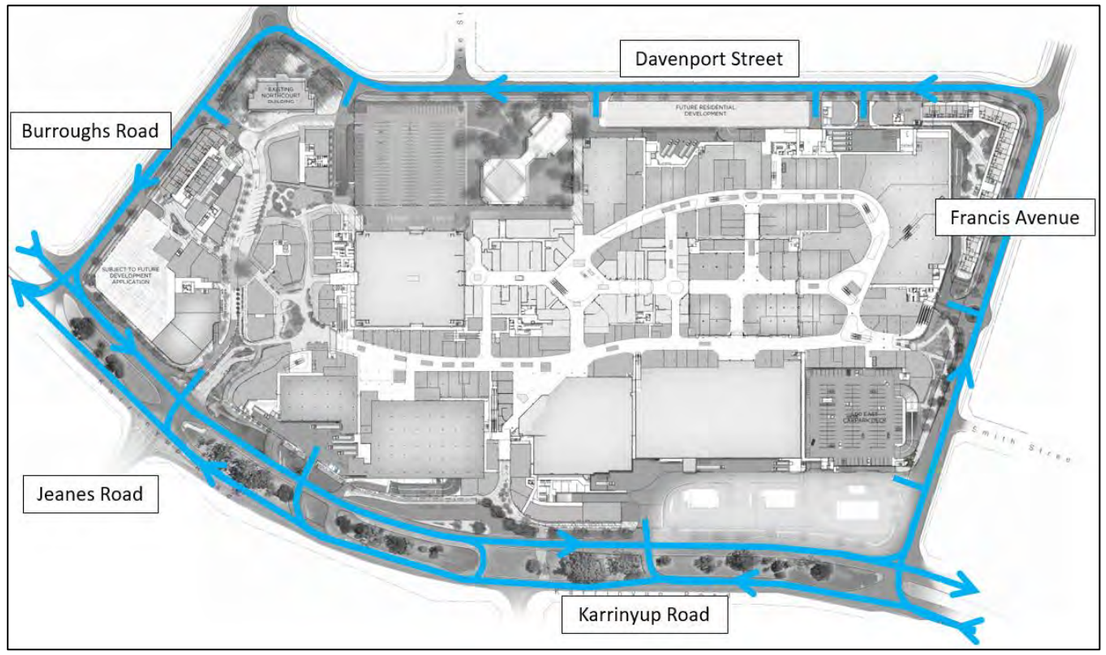


Figure 10-2 Circulation of service vehicles external to the Development

10.2.2. Internal

The appropriate vehicle swept paths for each loading bay are described below, as well as the vehicle type expected to be used. The vehicle swept paths are shown according to Figure 10-3, and indicate a vehicle clearance of 500mm. The vehicle body includes overhang and therefore represents the most conservative path.

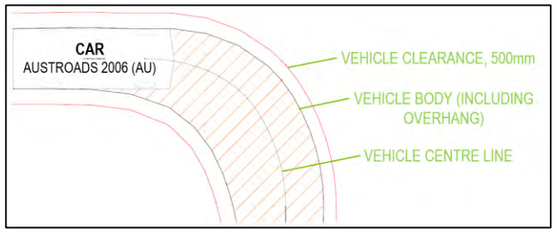


Figure 10-3 Vehicle swept path legend

Service Delivery Yard 1

This is an existing service delivery yard that is proposed to continue to service Myer in the proposed redevelopment.

The entry and exit to this delivery yard for all vehicles is via Access 9 from Davenport Street. Referring to both Figure 10-4 and Figure 10-6, the yard has been modified to allow a 19.0m articulated vehicle to enter and exit the yard from Davenport Street in a forward direction. This modification improves the safety of the manoeuvre, since the existing scenario requires a 12.5m vehicle to reverse in from the public parking circulation area for a long distance.

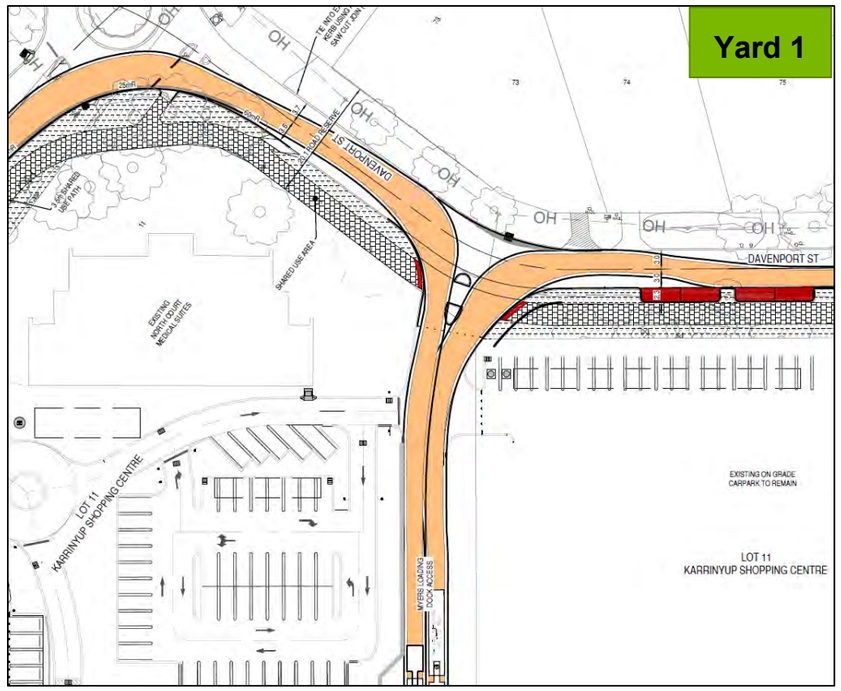


Figure 10-4 Yard 1 – Access from Davenport Street to Yard 1

The delivery yard layout has been further modified to include a total of 5 loading bays and 3 waste compactors. The modified layout showing vehicle access is shown in the following figures.

Referring to Figure 10-5 and Figure 10-6 respectively, bays 1 to 5 have been allocated as common loading to smaller tenancies, while bays 6 to 8 have been allocated to service Myer. Up to a 19.0m articulated vehicle is able to access Bay 8. There are some cases as to when bays cannot be accessed whilst certain waste compactors are in use, however it is anticipated that waste compactors will be accessed outside of business hours, and otherwise will need to be managed to suit other deliveries.

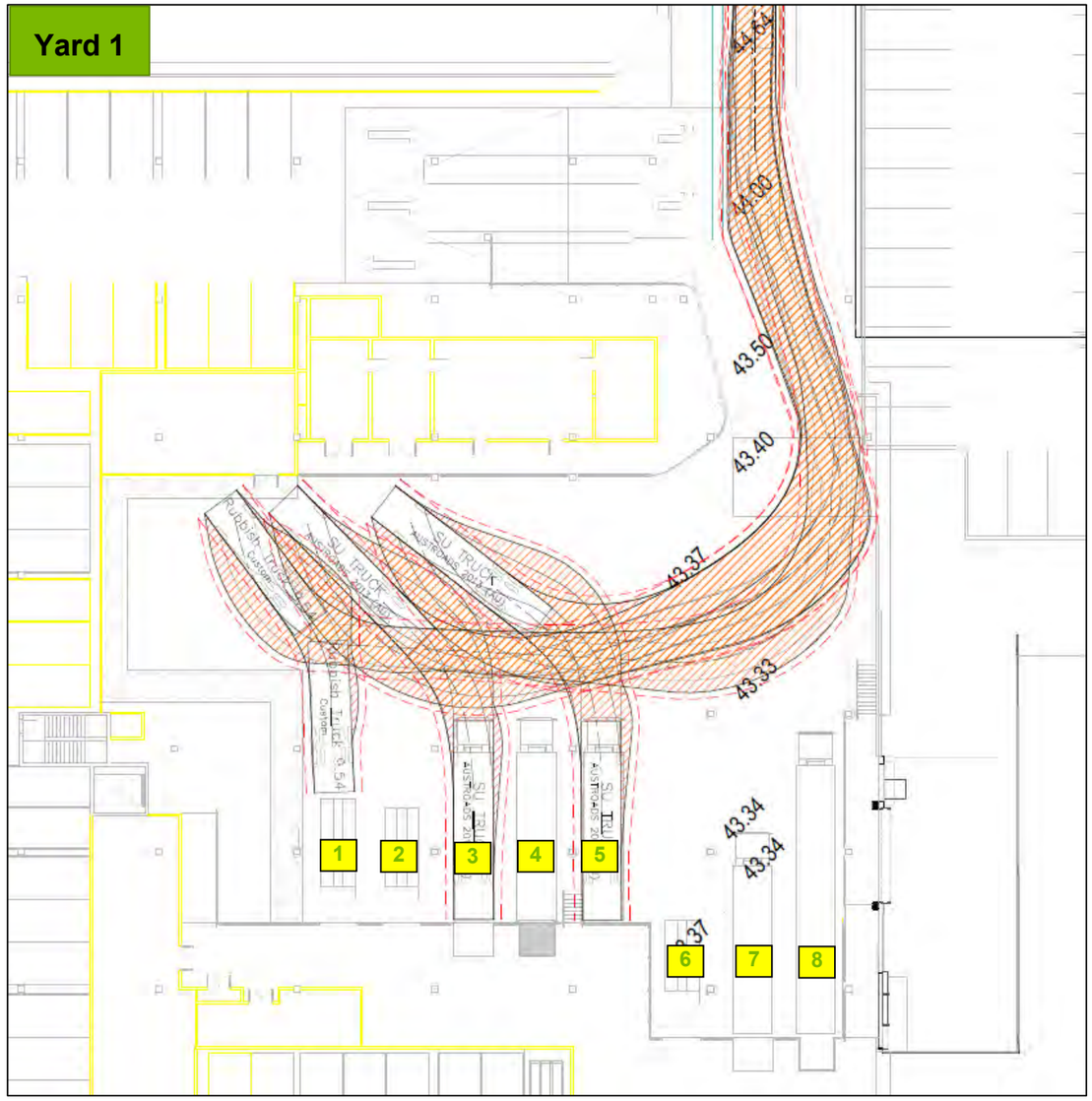


Figure 10-5 Yard 1 – Vehicle swept path for bays 1 to 5 (common loading)

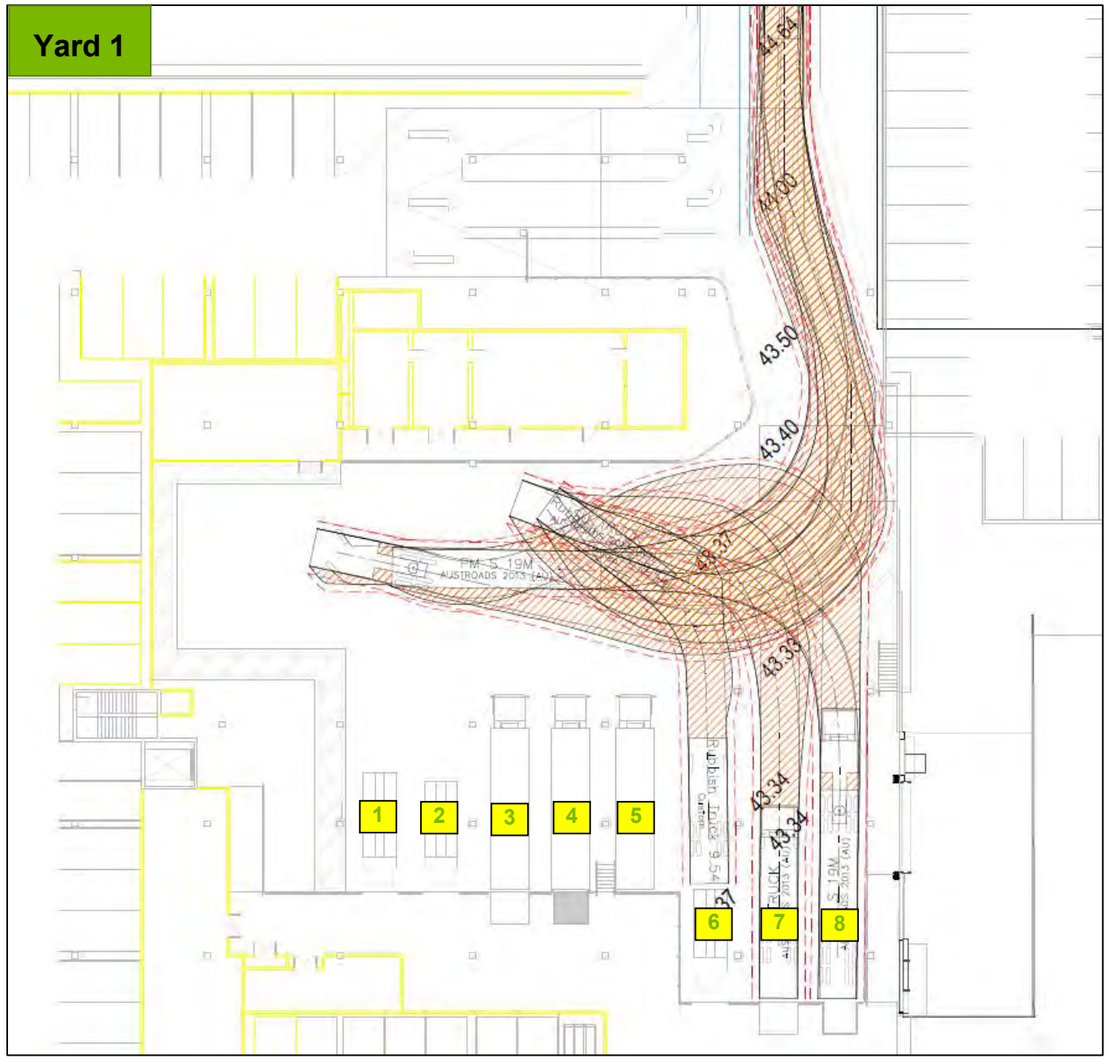


Figure 10-6 Yard 1 – Vehicle swept path for bays 6 to 8 (Myer loading)

Service Delivery Yard 2

This proposed service delivery yard allows access for 12.5m heavy rigid vehicles. This service access is sufficiently separated from the car park access, reducing the potential for confusion and allowing the loading yard to operate without conflict with car park users. The service trucks can left turn in without crossing the Davenport Street centreline and the exit onto Davenport Street has clear sightlines.

An acoustic gate is proposed to operate prior to 7:00 AM in order to mitigate any noise from reversing vehicles (please refer to the Acoustics report for further details).

The delivery yard accommodates four spaces for 12.5m heavy rigid vehicles and two spaces for 9.54m waste trucks (accessing waste compactors). Vehicle access to the delivery yard is shown in the following figures. There are some cases as to when bays cannot be accessed by heavy rigid vehicles (12.5m) whilst certain waste compactors are in use, however it is anticipated that waste compactors will be accessed outside of business hours, and otherwise will need to be managed to suit other deliveries.

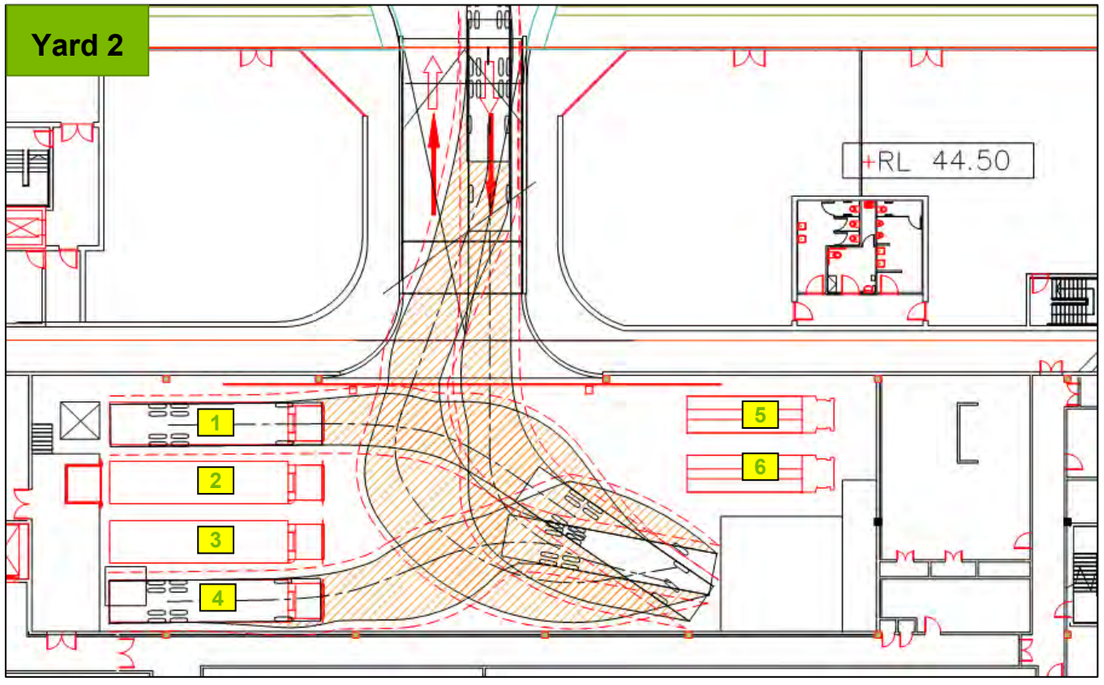


Figure 10-7 Yard 2 – Vehicle swept path movements for heavy rigid vehicles (12.5m)

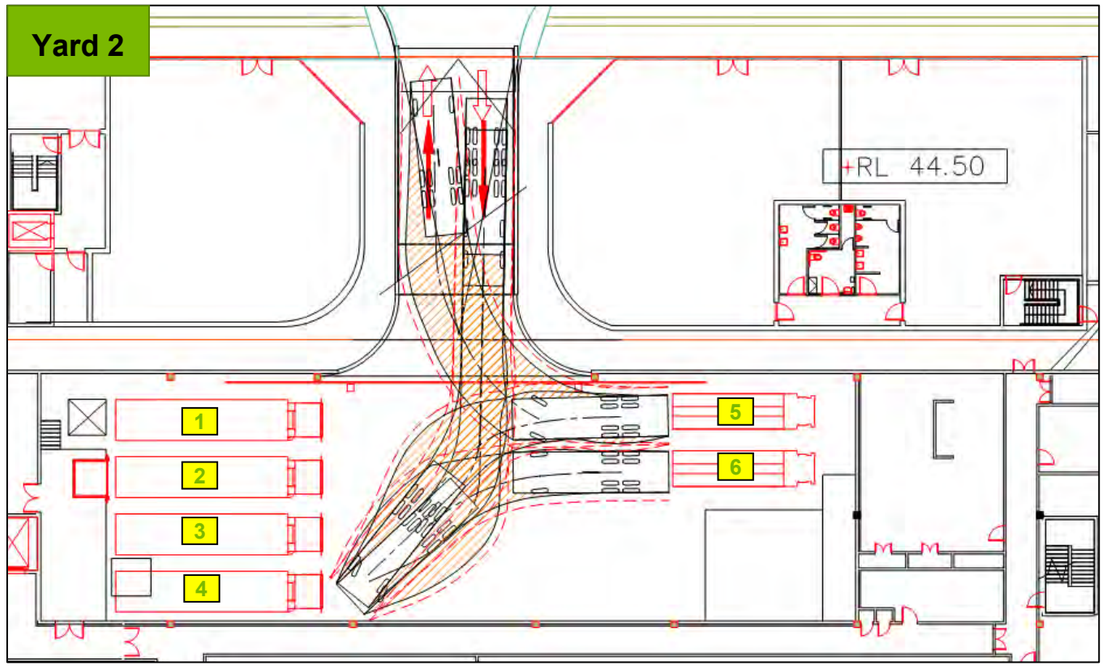


Figure 10-8 Yard 2 – Vehicle swept path movements for waste vehicles

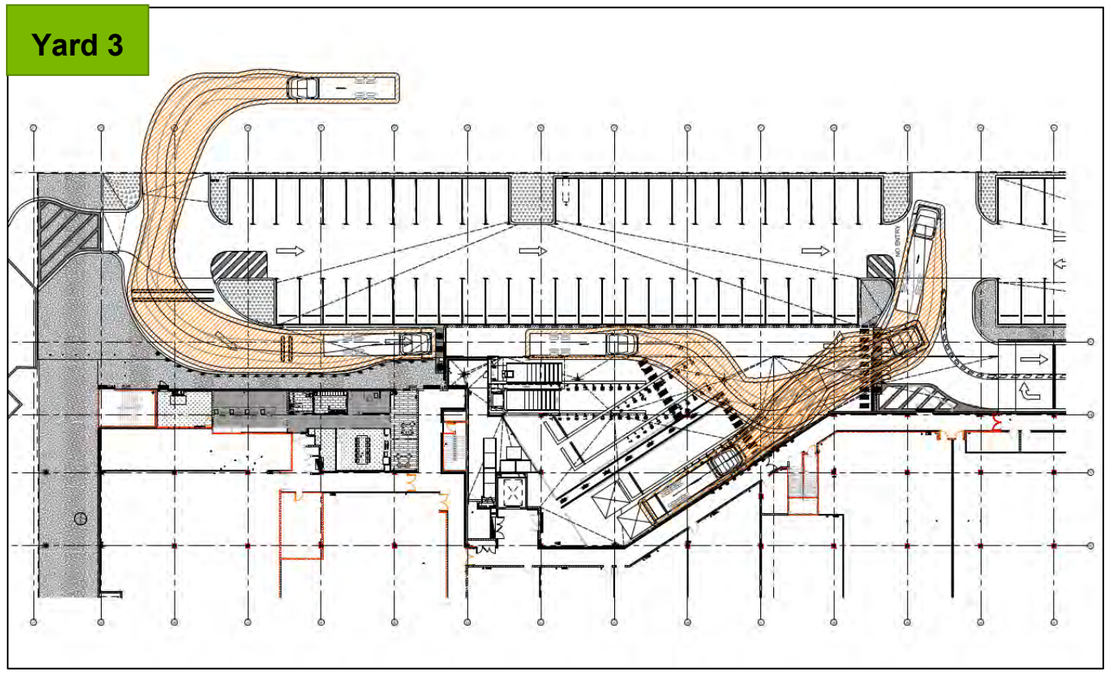


Figure 10-9 Yard 3 – Vehicle swept paths for 12.5m heavy rigid vehicle

Service Delivery Yard 3

This existing service delivery yard is located in the north east of the Development and is proposed to be modified in order to contain the reversing movement within the yard itself, as this reduces potential conflict with general public car park circulation. This delivery yard allows access for 12.5m heavy rigid vehicles, as shown in the following figures. Currently, refrigerated trucks utilise this delivery yard, however this will not occur in the proposed redevelopment.

This delivery yard has been modified to service the extended retail formed as part of the development of the Bankwest site. The service vehicles will enter via the modified Access 8B via a one-way service only entry before exiting via Access 8A, as shown in Figure 10-9. Signage and line marking will be used to indicate no access for general vehicles.

The yard includes four bays for 12.5m heavy rigid vehicles, plus two spaces to access waste compactors (refer to Figure 10-9 and Figure 10-10). The two western heavy rigid vehicle bays cannot be accessed when the waste compactors are in use, however it is anticipated that waste compactors will be accessed outside of business hours, and otherwise will need to be managed to suit other deliveries.

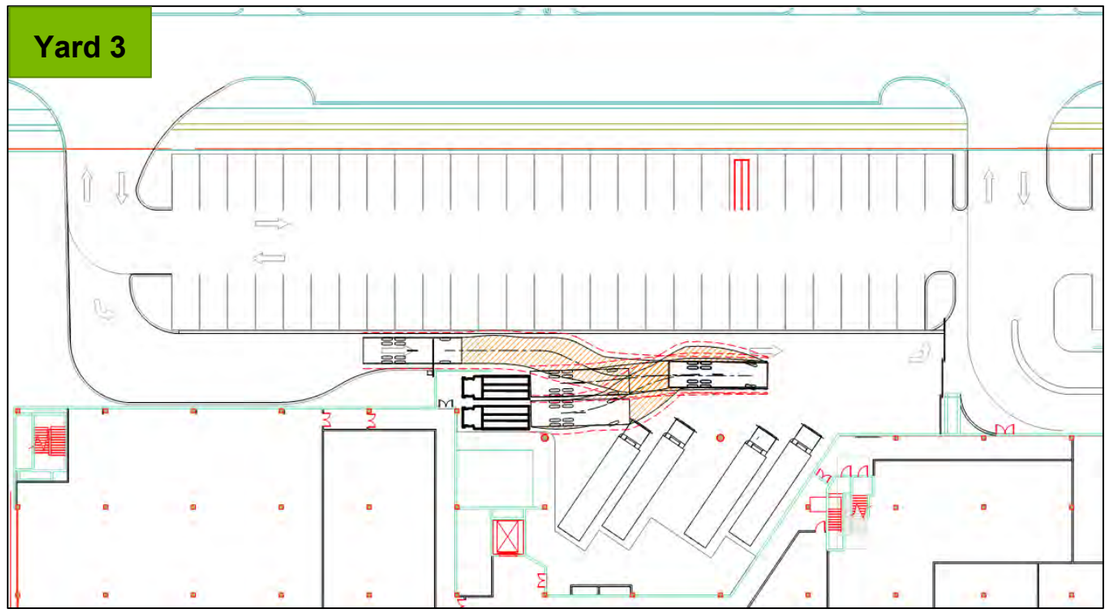


Figure 10-10 Yard 3 – Vehicle swept paths for waste vehicles

Service Delivery Yard 4

This service delivery yard is intended to be utilised for courier services and waste collection for both commercial and food and beverage stores in proximity to the main street. Delivery bays located along the west side of the main street will allow access for an 8.8m medium rigid vehicle.

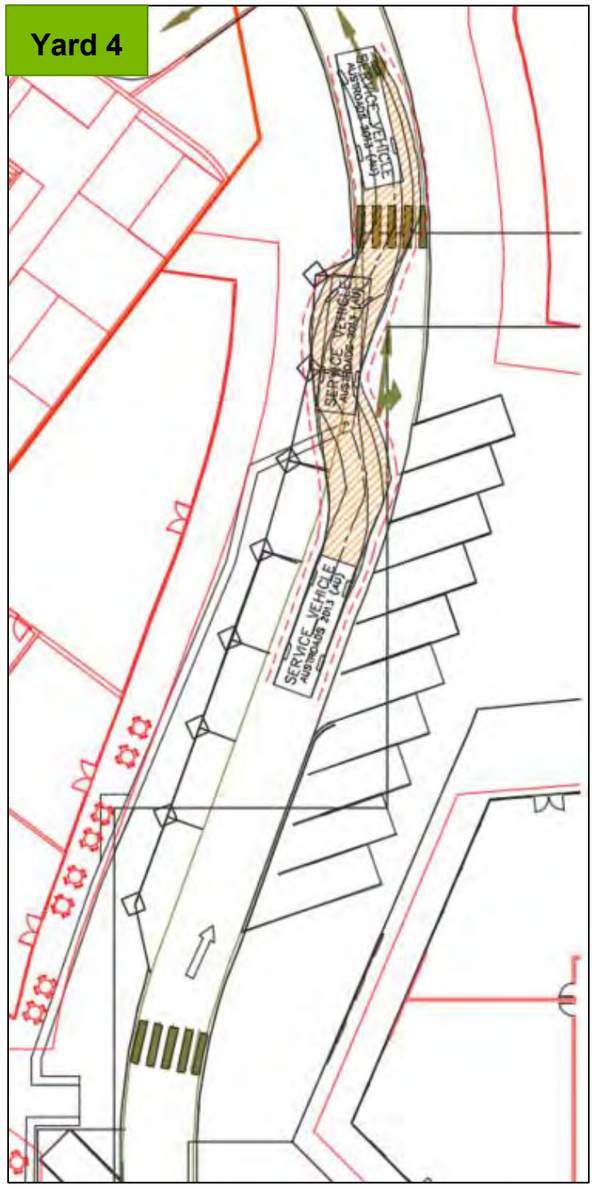


Figure 10-11 Yard 4 – Vehicle swept path for 8.8m medium rigid vehicle

Service Delivery Yard 5

This service delivery yard is intended to serve future food stores at the Development, which would require refrigerated trucks.

The crossover for the delivery yard has been split into separate entry and exit only crossovers. This delivery yard is expected to service two major tenancies as well as common loading, with a total of five spaces for vehicle delivery and access to two waste compactors. Referring to the figures below, bay 1 has been assigned to the cinema and can cater for a 12.5m heavy rigid vehicle, while bays 2 and 5 have been assigned to major tenancies and can cater for 19.0m articulated vehicles. Deliveries from articulated vehicles are expected to be infrequent, i.e. no more than once/twice daily per tenant. It should be noted that bay 2 cannot be accessed while bay 3 is in use, and bay 6 cannot be accessed while bay 7 is in use (and vice versa), therefore access will need to be managed. Other than that, all the other movements can be performed simultaneously while all other spaces are in use.

Protection for columns within the yard will also be required.

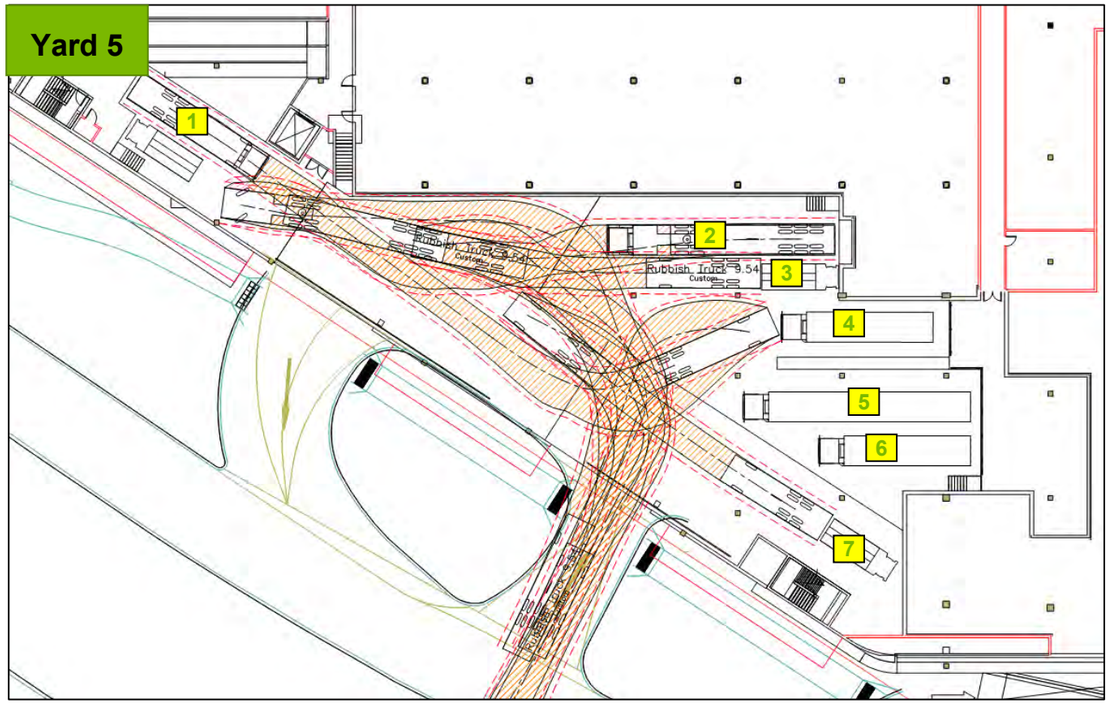


Figure 10-12 Yard 5 – Vehicle swept path movements for bays 1, 2, 3 and 7

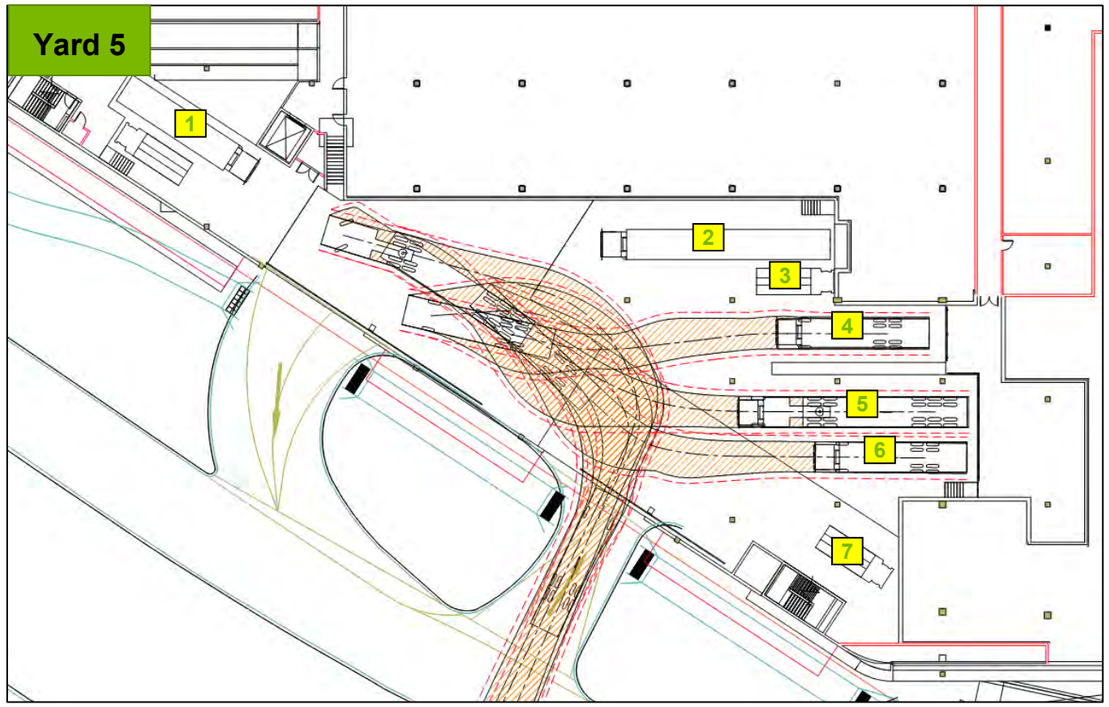


Figure 10-13 Yard 5 – Vehicle swept path movements for bays 4, 5 and 6

Access to Service Delivery Yard 5 is provided from Karrinyup Road, as per Figure 10-14, via left and right in, and left turn only out. The same access point also provides general vehicle access to a ramp up to a lower basement car park level (ingress only), and accommodates the existing bus u-turn facility into the Bus Station.

The service vehicle access point has been separated from the general vehicle access and the existing bus u-turn facility into the Bus Station. The proposed layout separates the service vehicle access in the Karrinyup Road median allowing one controlled movement out onto Karrinyup Road at both locations. The service vehicle access is proposed to be delineated in contrast to the public/bus access, with details to be confirmed during the detailed design. It is also proposed to provide alternating pavement colouring and line marking delineating the bus station entrances from the car park access. No high landscaping is planned in this area to ensure that high visibility is maintained for service vehicles. The arrangement of this access way should minimise conflict whilst ensuring clear sight lines for the trucks turning out of the delivery yard onto Karrinyup Road.

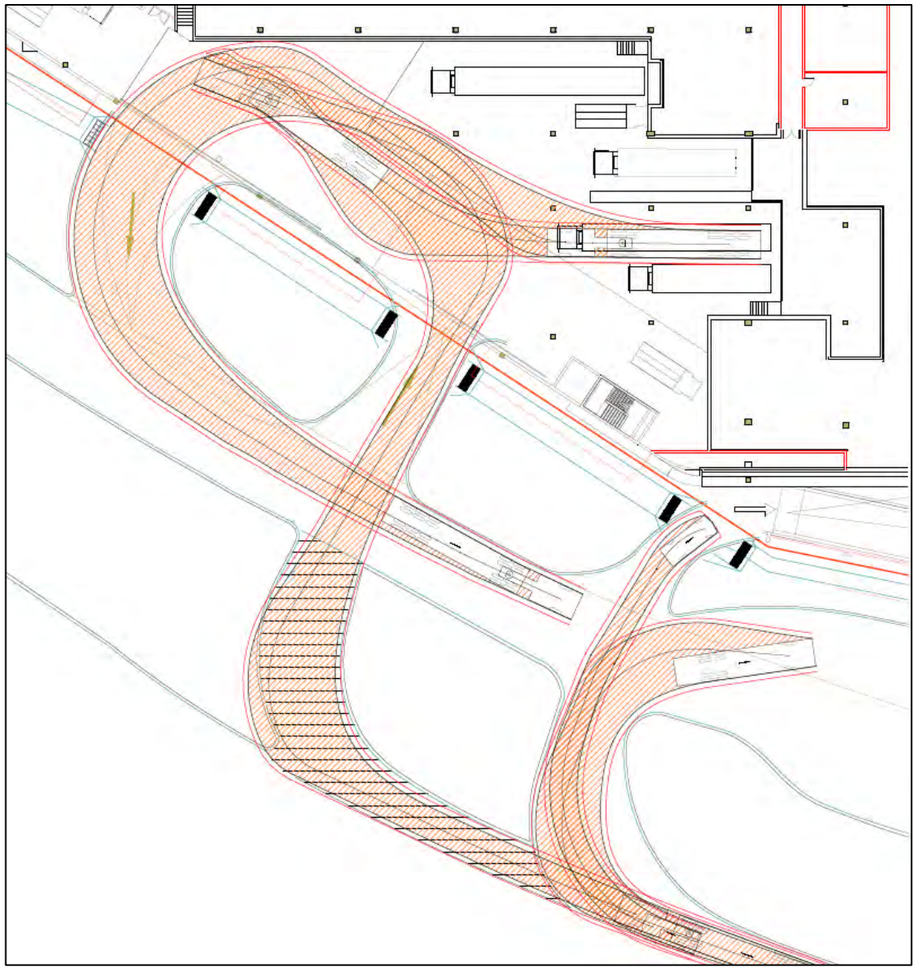


Figure 10-14 Access into the Development for cars, buses and articulated vehicles

Service Delivery Yard 6

This is an existing service delivery yard that services Big W and Woolworths. This service delivery yard is proposed to be slightly modified in order to contain the reversing movement of articulated vehicles within the yard itself. Currently, articulated vehicles reverse into the yard from the circulation roadway, causing potential safety concerns with general vehicles.

The layout of the delivery yard has been modified, with the eastern dock shifted to the western side of the yard. The modified delivery yard is proposed to cater for a 12.5m heavy rigid vehicle and a waste compactor. The road alignment leading into the dock has been modified to improve the intersection arrangement just south of the delivery yard area.

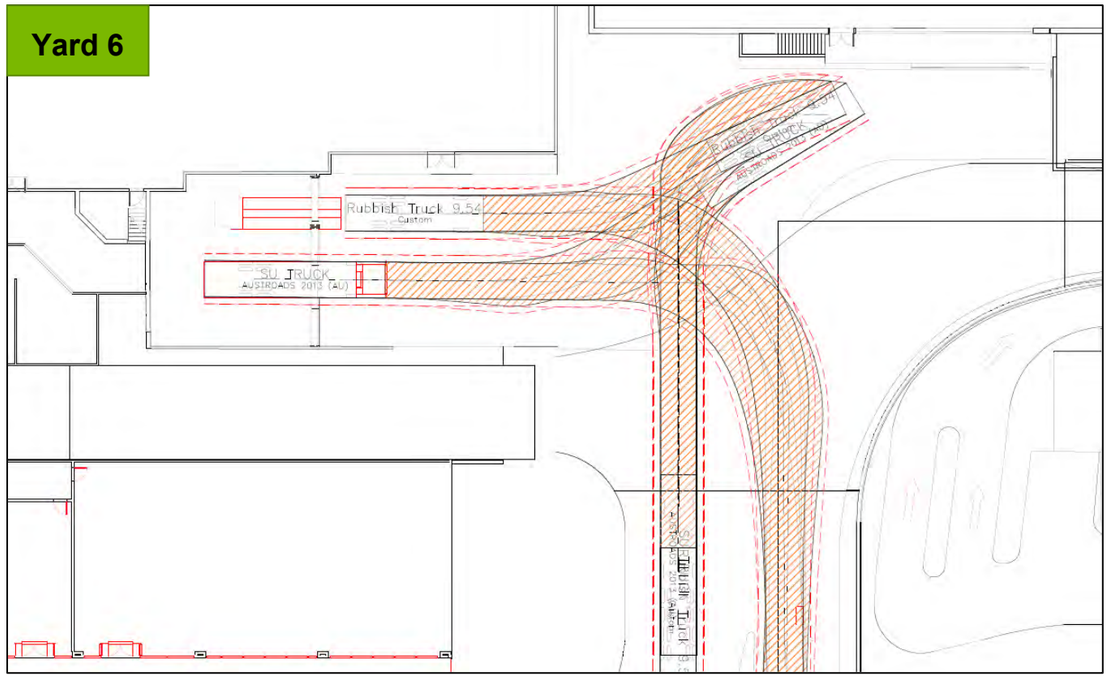


Figure 10-15 Yard 6 – Vehicle swept path movements

Service Delivery Yard 7

The layout of the delivery yard includes one delivery bay for a 19.0m articulated vehicle, and three bays to access waste compactors. The proposed vehicle movements are shown below, with vehicles entering from Karrinyup Road to access the western spaces and vehicles entering from Francis Street to access the eastern spaces. The two western bays are proposed to accommodate a 19.0m articulated vehicle and a waste compactor, while the eastern bays are proposed to accommodate 12.5m heavy rigid vehicles.

The articulated vehicle will be able to exit via Karrinyup Road circling through the service station.

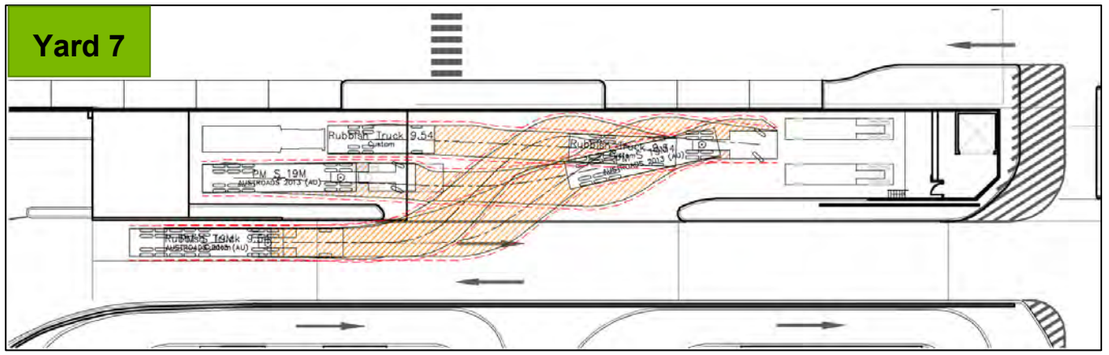


Figure 10-16 Yard 7 – Vehicle swept path movements for western bays

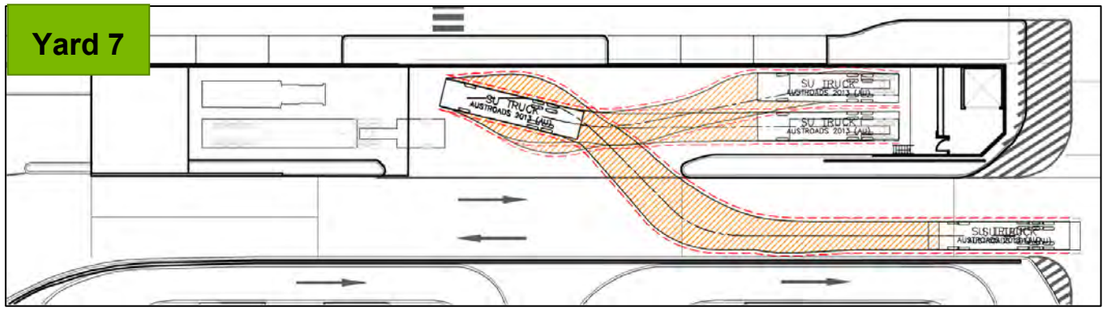


Figure 10-17 Yard 7 – Vehicle swept path movements for eastern bays

Service Delivery Yard 8

This delivery yard is an existing yard for David Jones and has been modified to cater for one space for a 12.5m heavy rigid vehicle. Vehicles are proposed to access the yard from the south via Karrinyup Road and the internal circulation road. Reversing of the vehicle is retained within the yard area and the vehicle will exit in the forward direction via Davenport Street.

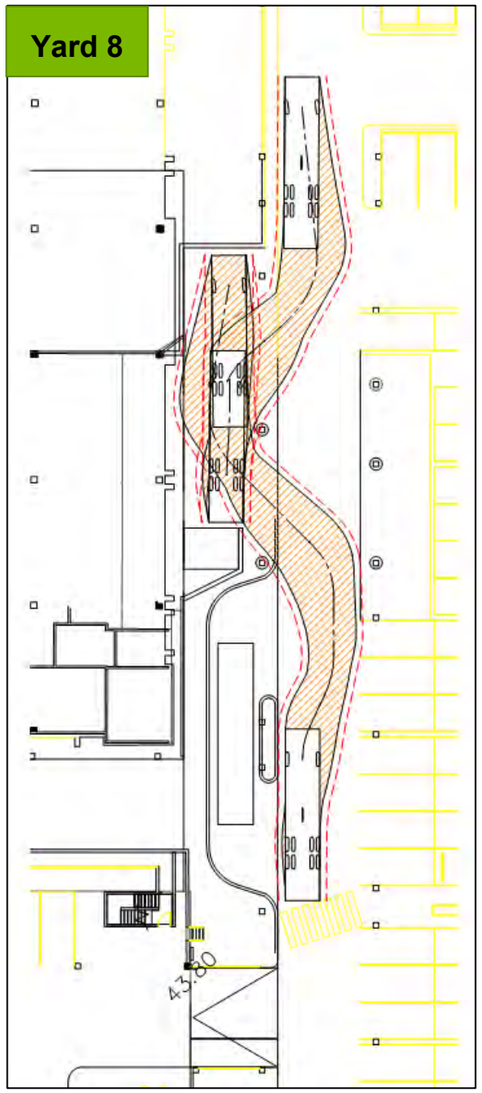


Figure 10-18 Yard 8 – Vehicle swept path movement

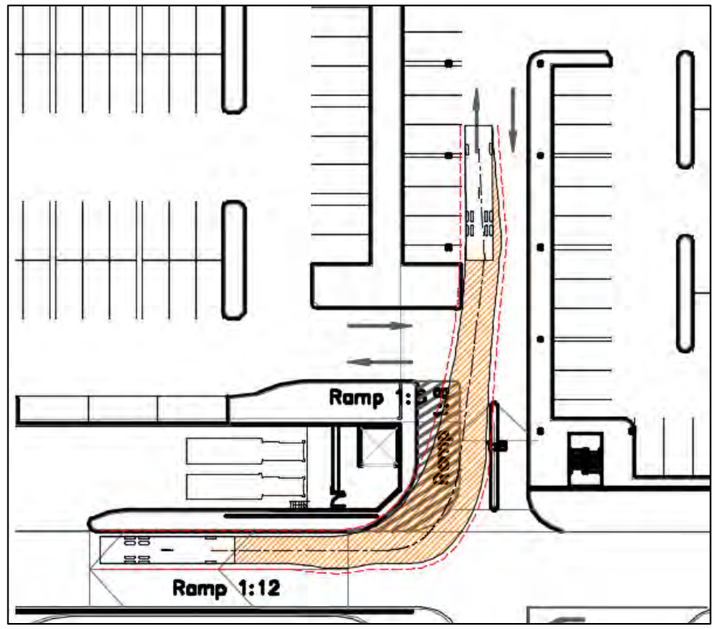


Figure 10-19 Yard 8 – Access to delivery yard via internal road

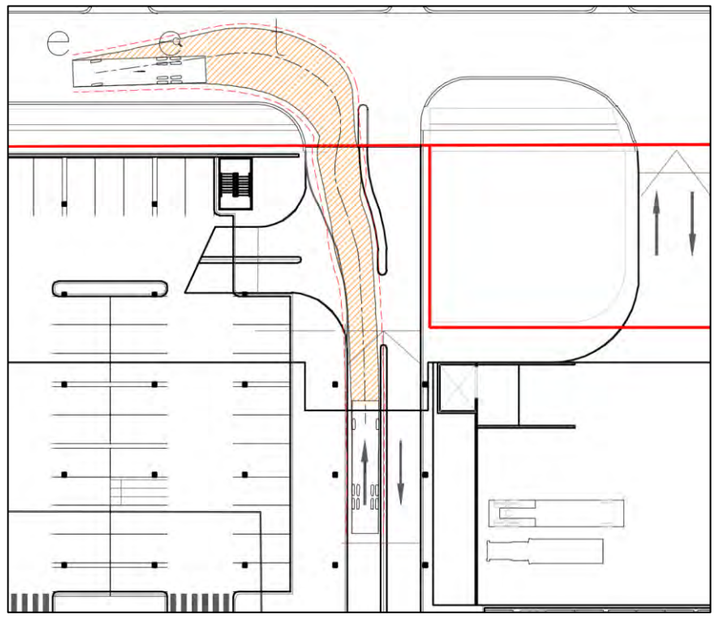


Figure 10-20 Yard 8 – Vehicle exit via Davenport Street

Service Delivery Yard 9

Yard 9 is proposed to accommodate waste compactors for common loading areas, with the vehicle movements shown in Figure 10-21. Vehicles will be required to enter via Access 3 on Karrinyup Road and exit via Francis Avenue. A waste vehicle using the northern bay will not be able to exit while the southern bay is in use.

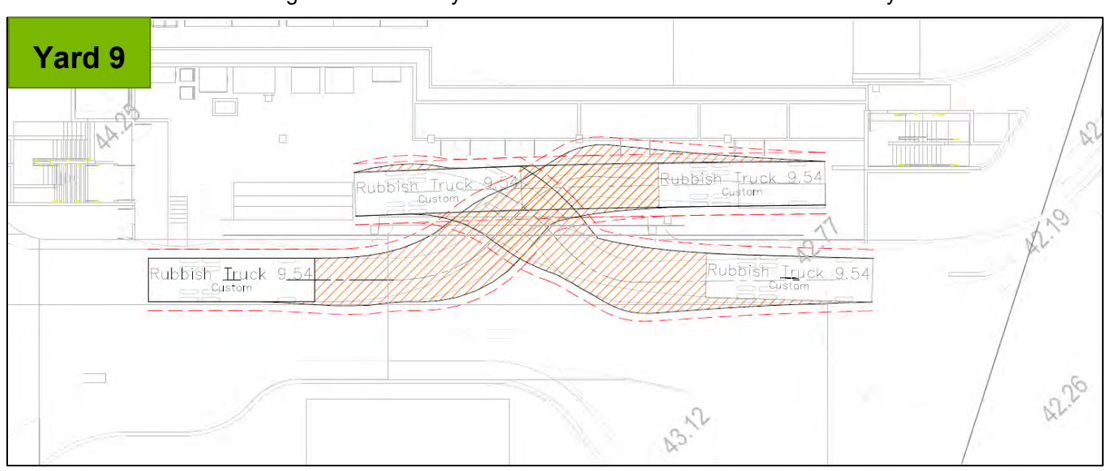


Figure 10-21 Yard 9 – Vehicle swept path movements for waste vehicles

Service Delivery Yard 10

Fast food outlets and a service station are proposed on the south east corner of the Development. The two fast food outlets have been provided with loading bays that cater for 12.5m heavy rigid vehicles (left tenancy) and 8.8m rigid vehicles (right tenancy), while the service station accommodates a 19.0m articulated vehicle as shown in Figure 10-22 and Figure 10-23 respectively. A priority controlled four-way intersection is provided between the internal road, fast food area and the Basement 01 car park.

A second two-way access point into the proposed fast food area has been included in the proposed development, as shown in Figure 10-22. This additional access point allows improved circulation through the area by allowing flexibility for vehicles entering and exiting the fast food area. The second access point is located at an appropriate distance from the Karrinyup Road intersection to minimise any impact on Karrinyup Road.

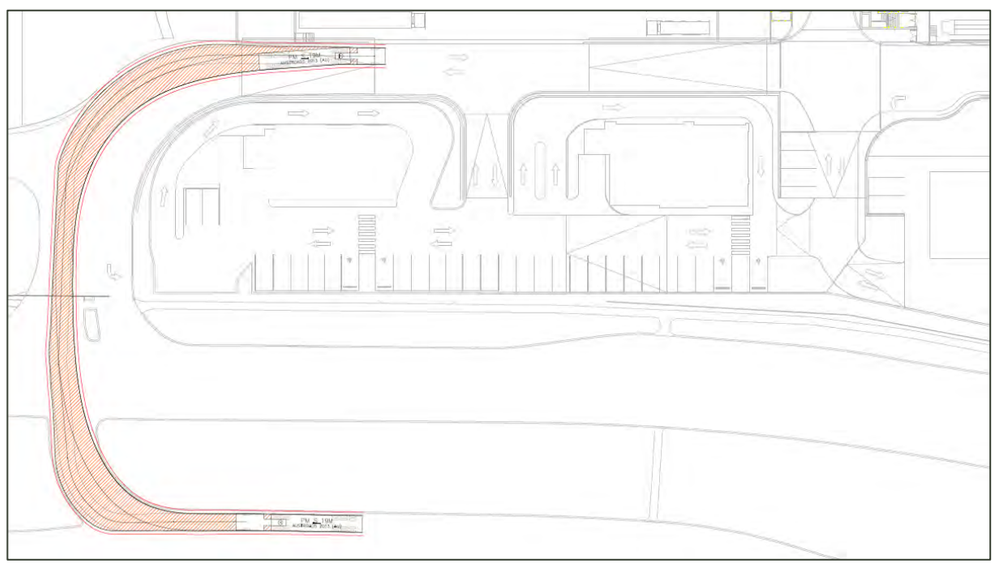


Figure 10-22 Vehicle swept path for service station access from Karrinyup Road (19.0m articulated truck)

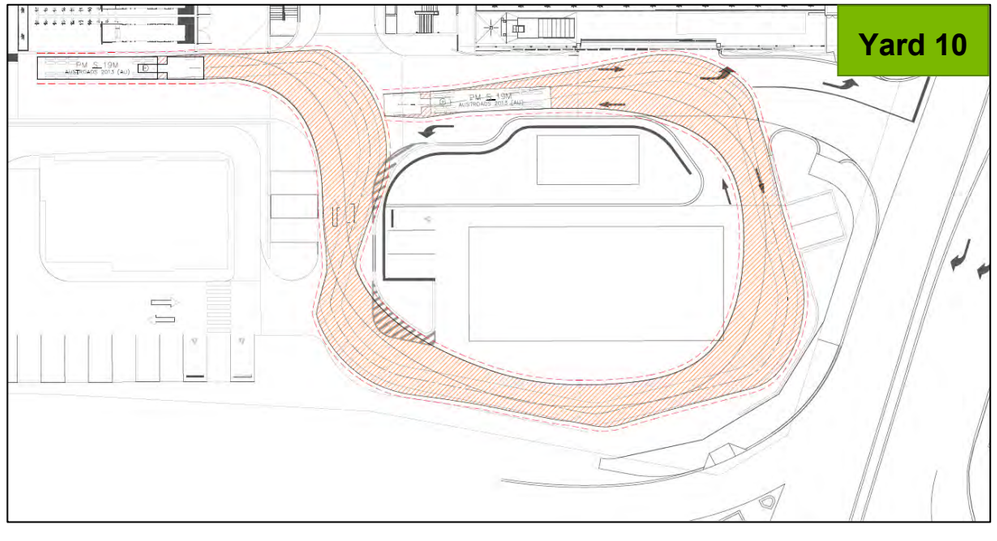


Figure 10-23 Vehicle swept path for service station access (19.0m articulated truck)

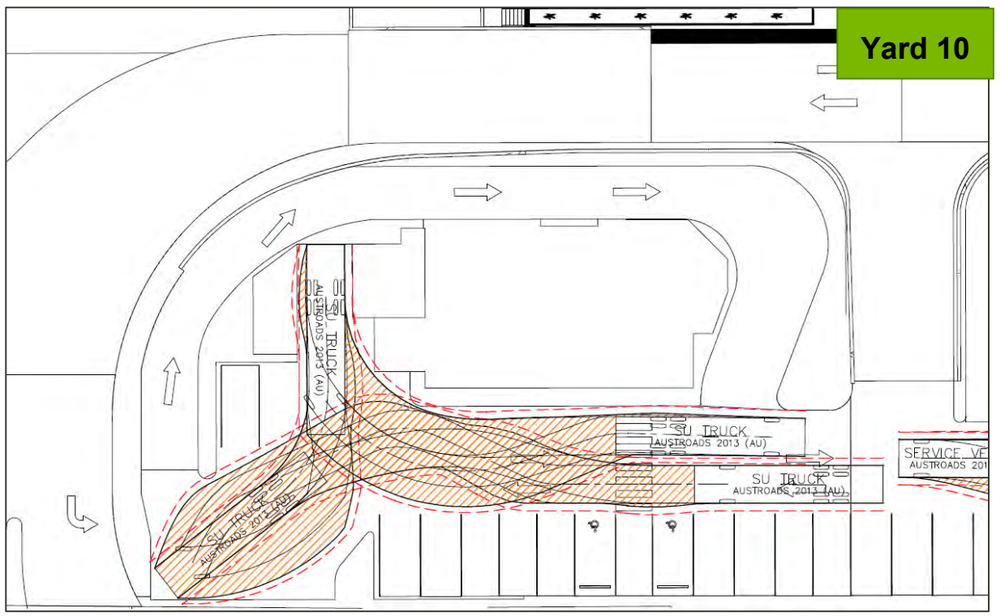


Figure 10-24 Vehicle swept paths for fast food delivery – left tenancy (12.5m rigid truck)

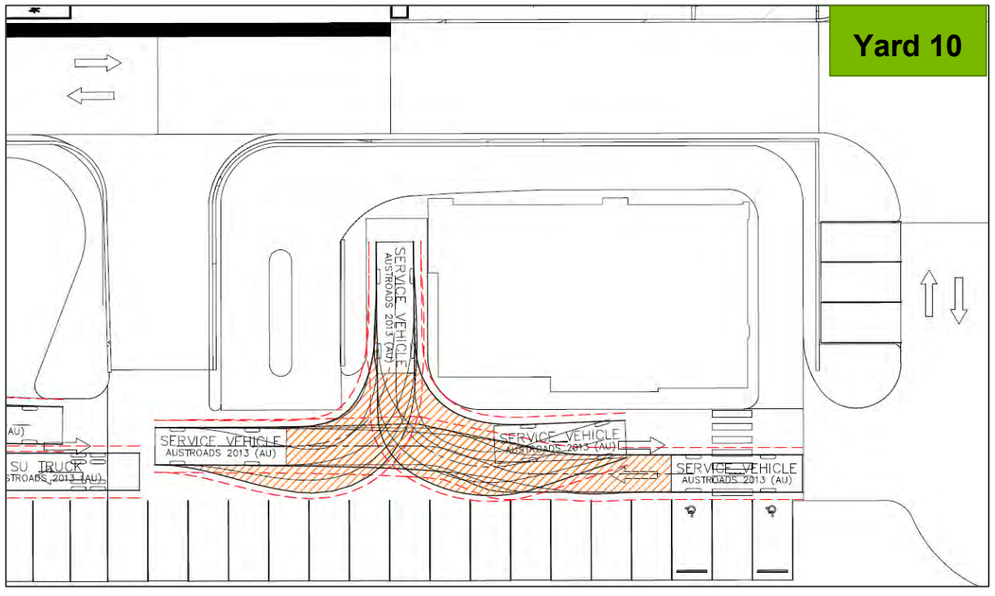


Figure 10-25 Vehicle swept paths for fast food delivery – right tenancy (8.8m rigid truck)

11. Conclusions

Aurecon was commissioned by AMP Capital Funds Management Ltd to undertake a Transport Plant (TP) for the Development Application for the Mixed Use Expansion at Karrinyup ('the Development'). Significant redevelopment is proposed with an increase in retail floor space from approximately 54,000 m^2 to 93,355 m^2 upon completion. There are also proposed increases in office, eating/entertainment and community/health floor space, and provision for residential dwellings within the Development. The design incorporates a 'main street' as an extension of Jeanes Road, allowing for an open streetscape with pedestrian walkways, landscaping, high quality-built form and features, and mixed use development that will create an area of high activity during and beyond normal trading hours

The main aim of this TP is to address access requirements to the Development by all modes of transport. A transport model was developed for this study in order to analyse the performance of the road network with and without the Development. Strategies to increase sustainable transport to the Development are included in this TP, including proposals for improved public transport, pedestrian and cycling access. Parking management and servicing strategies are also considered.

A Traffic and Transport Assessment was previously undertaken as part of the Draft Karrinyup Secondary Centre Activity Centre Structure Plan. This TP builds on this previous work to ensure that the Development proposal is consistent with the overall structure planning of the area and to provide a greater level of technical detail of the Development and its immediate surrounds.

The key objective of the TP is to promote a mode shift to increase the potential mode share of public transport, cycling and walking to help ensure that traffic congestion does not threaten the economic viability of the Development. There is a significant opportunity with this Development to create an attractive and comfortable environment for pedestrians and cyclists by upgrading preferred routes for these modes and strengthening links to the Development. Similarly public transport access should be prioritised by ensuring the integration of the existing bus station with the Development and increased bus priority infrastructure on the surrounding network to improve bus reliability and journey times and encourage use of public transport to and from the Development.

1. Public Transport

It is apparent that there is currently minimal public transport infrastructure to support higher frequency services to Karrinyup and encourage increased patronage. A number of measures are proposed to encourage visitors to use public transport as a viable mode to access the Development, including:

- Better integration of the bus station with the entrance to the Development whilst including improved personal security i.e. CCTV, lighting, weather cover
- Real time bus timetable information at the bus station and throughout the Development
- Improved infrastructure including dedicated bus lanes at various locations along Karrinyup Road
- Travel behaviour change initiatives to promote mode shift

A funding contribution is proposed to increase the frequency of bus services between the Centre and Stirling Station for a period of 7 years. This will involve services relating to either or both the 423 and 425 routes with a goal of achieving 10-minute headways in the morning and evening Centre weekday peaks. During the weekends, movements will be on one route (Route 425), which will be more easily identifiable for Centre customers, with 15-minute headways on the shoulders of and during the weekend Centre open hours. The final details of the provision of additional bus kilometres will be agreed with the Transport Portfolio.

2. Walking

In order to improve the walkability of the existing environment and increase walking trips to the Development, the following is proposed:

- Providing a contribution to expand the extent of the local path network to provide a footpath on one side of local streets that do not currently have a footpath. This contribution will be to an amount of $400,000.
- It is also proposed to make a contribution of $50,000 to the City to provide additional street trees to help shade those paths that are devoid of any street trees
- Pedestrian entrances to the Development that link directly to the surrounding pedestrian network
- Widening of existing footpaths around the perimeter of the Development to 2.0m or a 2-way 3.5m shared path
- Providing suitable pedestrian crossings within and surrounding the Development that are compliant with DDA standards
- Providing way-finding signage at strategic locations to provide legibility and awareness of pedestrian links to the Development
- Improved pedestrian amenities including street furniture, lighting and weather cover

3. Cycling

There is a strong need for substantial cycle infrastructure improvements to improve usability and safety for cyclists, particularly within the immediate vicinity of the Development. It is proposed that a combination of shared and segregated cycle paths be installed around the perimeter of the Development, and along sections of Karrinyup Road and Jeanes Road, to promote cyclist access the Development.

A number of other measures are proposed, including:

- Ensuring that intersections surrounding the Development will accommodate cyclists appropriately
- Providing improved way-finding signage to direct cyclists towards the Development
- Providing improved the bicycle access, parking and end of trip facilities within the Development

Bicycle parking and end-of-trip facilities are proposed at strategic locations, including:

- 160 public bicycle parking spaces in the form of bicycle racks dispersed amongst the four major entrances to the Development and along the main street
- A secure, enclosed end-of-trip facility for staff located at the southern major entrance to the development, near the Karrinyup Bus Station, capable of storing 200 bicycle racks and lockers. This also includes separate female and male change rooms incorporating 5 showers and 1 toilet in each.

4. Road Network

As part of the TP, transport modelling was undertaken for a wider area to investigate the impacts of the Development on the surrounding road network. To ensure the surrounding road network will operate at an acceptable level in the future with the Development in place, a number of upgrades have been proposed, and have been included in the transport model, to bring connectivity and usability to the area. These upgrades include lane extensions and additional turning pockets at locations where required. At most locations, intersection capacities are reached both now and in the future, with or without the Development.

Further potential upgrades have also been raised and are to be further discussed, in line with local and state authority's plans.

5. Parking

It is proposed to apply a reduced rate of parking for the Mixed Use Expansion at Karrinyup. The proposed Development incorporates a total of up to 4,880 car parking bays, at a rate of up to 4.2 bays per 100m2 of the total floor space. This includes provision for parking for people with disabilities, as well as provision for motorcycle bays. In addition, localised parking is provided for the proposed residential dwellings.

A number of parking management strategies are proposed, including:

- Parking way-finding signage, including available parking numbers
- Fully managed parking detection system
- Mix of short and long term parking for visitors and staff
- Publicity for improved public transport and cycling provisions

6. Servicing

A total of nine (9) service delivery yards are proposed within the Development. The proposed service delivery yards are separated from the general public and the reversing of all vehicles is contained within each service delivery yard.

7. Development Approval Conditions

The following development approval conditions have been addressed in this TP:

- The schematic road upgrade drawing for Karrinyup Road/ Jeanes Road/ Main Street is included in Appendix G. The traffic modelling presented in this plan includes this design.
- Supplementary information has been provided regarding the impact of the Development on the adjacent residential road network. This information shows that while there is an increase in traffic on some of the surrounding roads, the volume of traffic is expected to still be within the designated values for the corresponding road hierarchy levels for each road

It should be noted that other conditions of the development approval have not been considered for this Amended Development Application and will be included in future works as part of the detailed design stage.

8. 2024 Proposed Modification

The changes to the network and on-site operation have been implemented as required by the development approval conditions. The proposed changes to the Karrinyup Shopping Centre in 2024 are as follows:

- Conversion of Ramp 14 (Access 2) from entry only to exit only at Karrinyup Road
- Addition of 267 parking spaces across two floors atop the existing eastern parking structure

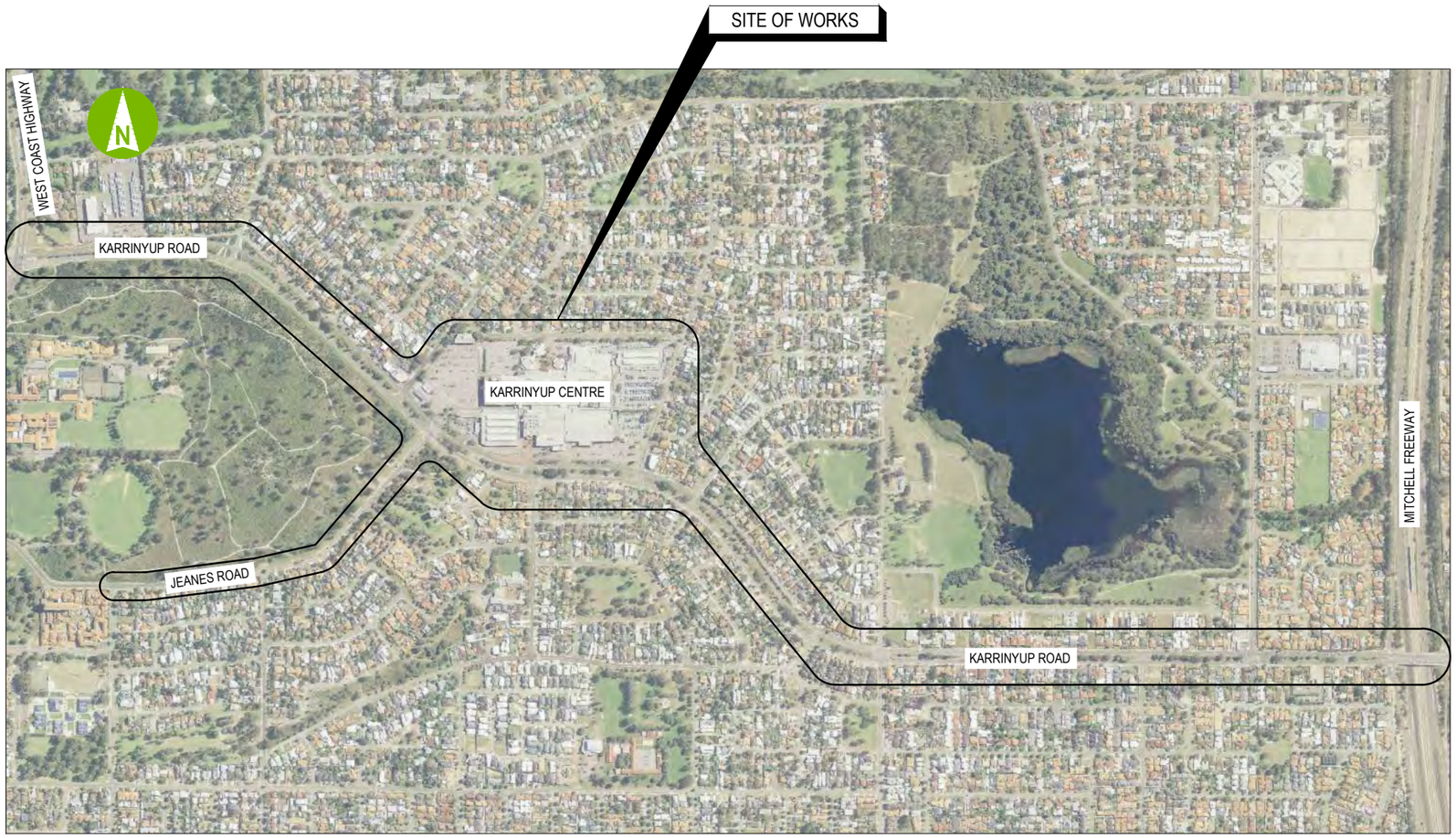
These changes do not fundamentally alter the existing land use or trip generation potential of Karrinyup Shopping Centre and the analysis shows that the impact to the surrounding road network is estimated to be minor. Some redistribution of traffic movements along Karrinyup Road immediately adjacent to the Development will occur as customers adjust to the new parking availability and the new exit point. Appropriate “No Entry” or “Exit Only” signage will be required to make customers aware of the changes.

The valet parking is proposed to also be relocated to the Eastern Parking Structure on level 2 in the northern section. Given that the demand profile for valet parking generally aligns with the demand profile for rest of the Centre’s carparks, the impact of this change will be minimal.

Appendix A

Schematic Road Upgrade Drawings

MIXED USE EXPANSION AT KARRINYUP



LOCATION PLAN

SCALE: NTS

DRAWING INDEX

239230-DRG-CC-0001-CS	DRAWING INDEX AND LOCATION PLAN
239230-DRG-CC-0002-GA	WEST COAST HIGHWAY / KARRINYUP ROAD DESIGN MODIFICATIONS
239230-DRG-CC-0003-GA	KARRINYUP ROAD DESIGN MODIFICATIONS
239230-DRG-CC-0004-GA	KARRINYUP ROAD DESIGN MODIFICATIONS
239230-DRG-CC-0005-GA	KARRINYUP ROAD DESIGN MODIFICATIONS
239230-DRG-CC-0006-GA	KARRINYUP ROAD DESIGN MODIFICATIONS
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239230-DRG-CC-0014-GA	DAVENPORT ROAD DESIGN MODIFICATIONS
239230-DRG-CC-0015-GA	FRANCIS AVENUE DESIGN MODIFICATIONS

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D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
N.T.S.	A1

DRAWN: PJH
DESIGNED: LD
CHECKED:

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE
AJ

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: DRAWING INDEX AND LOCATION PLAN

DRAWING No.: 239230 - DRG - CC - 0001 - CS - E

(PROJECT No. / DOC. TYP. / SEC / DRG NO. / DRG. TYP. / REV)

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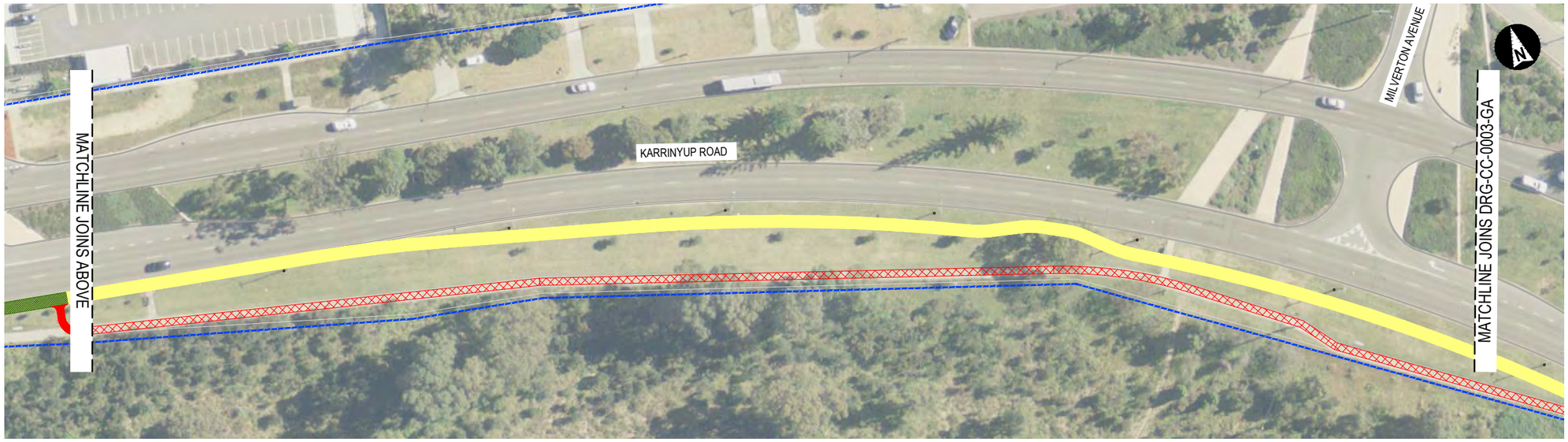

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
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7. PROPOSED 2 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
8. PROPOSED 1.5M PEDESTRIAN PATH TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
9. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.

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SCALE	SIZE
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DRAWN: PJH

DESIGNED: LD

CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

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DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: WEST COAST HIGHWAY
KARRINYUP ROAD INTERSECTION
EXTENSION OF RIGHT TURN POCKETS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
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PLAN VIEW
SCALE: 1:500

PLAN VIEW
SCALE: 1:500

LEGEND

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- PROPOSED 2 WAY SHARED PATH
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E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
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DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

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DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP
TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0003	GA	E

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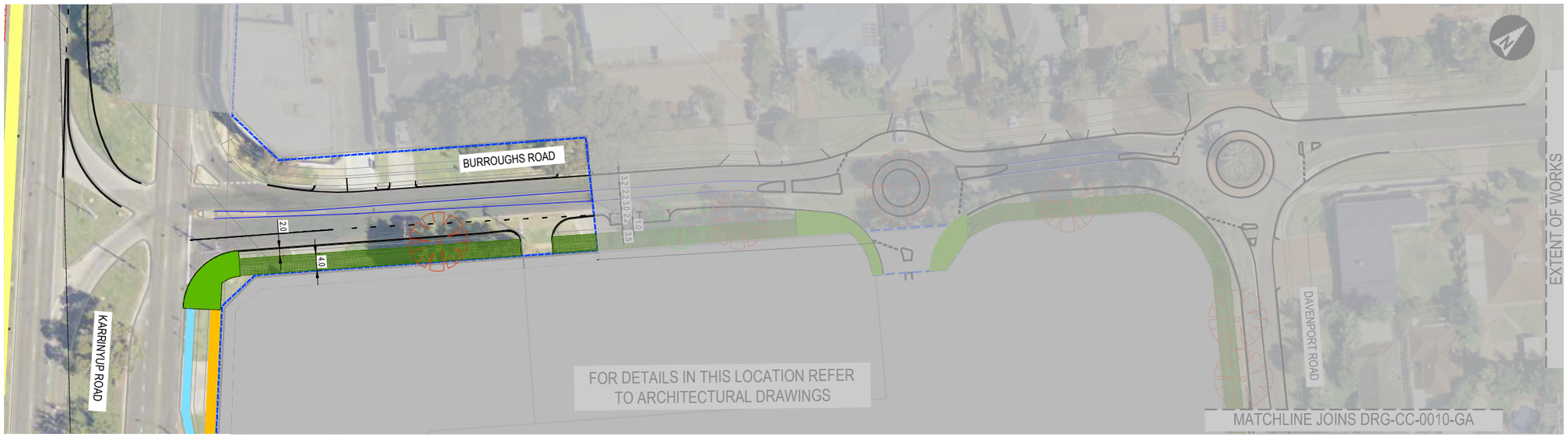

PLAN VIEW

SCALE: 1:500

LEGEND

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5. PARKING BAY TREE : TO BE PLATANUS ACERFOLIA (LONDON PLAIN TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
6. STREET TREE : TO BE PYRUS CALLERYANA CULTIVARS (ORNAMENTAL PEAR TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
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SCALE	SIZE
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DRAWN: PJH
DESIGNED: LD
CHECKED:

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APPROVED
DATE
AJ

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
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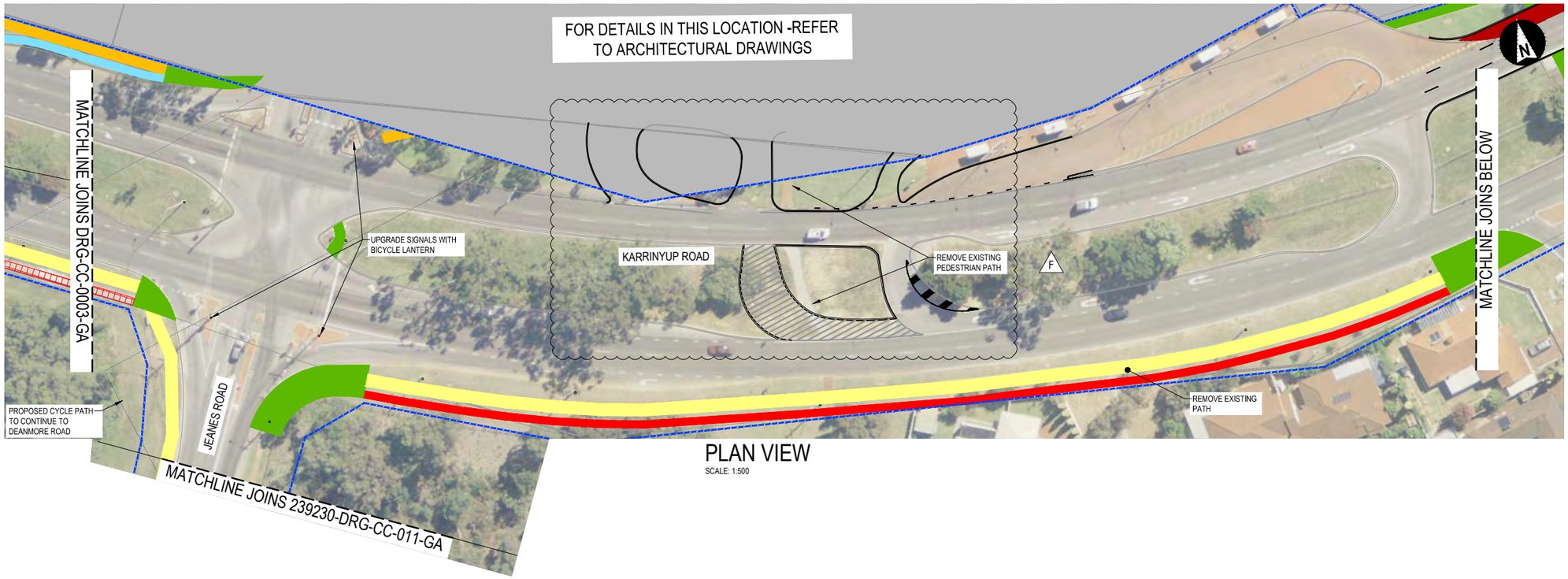

PLAN VIEW

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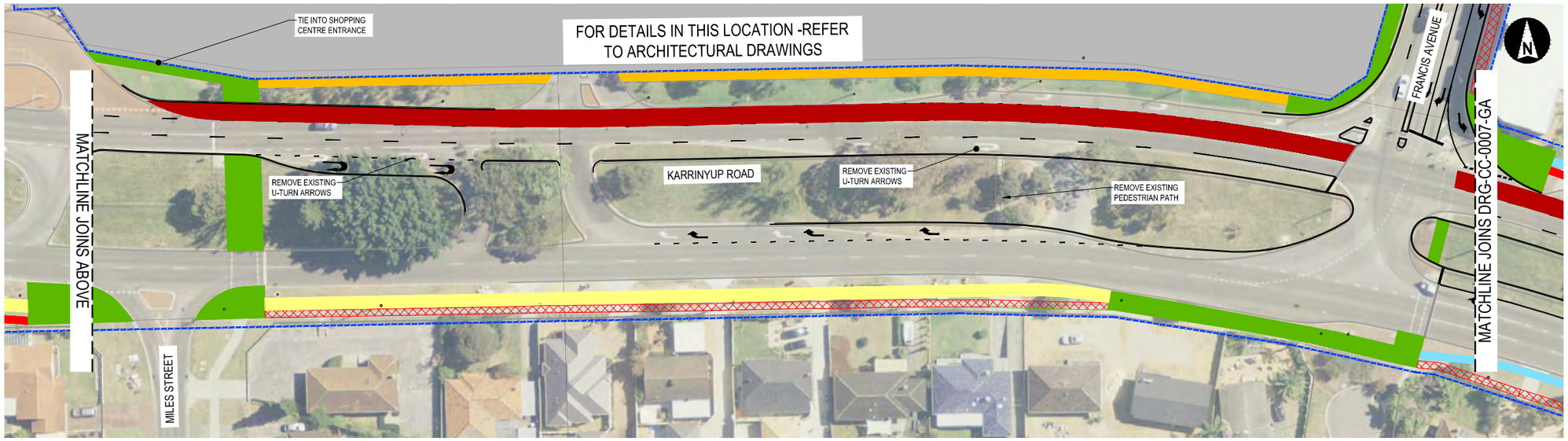

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SCALE	SIZE
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DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

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PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.: 239230 - DRG - CC - 0005 - GA - G

(PROJECT No. / DOC. TYP. / SEC / DRG NO. / DRG. TYP. / REV)

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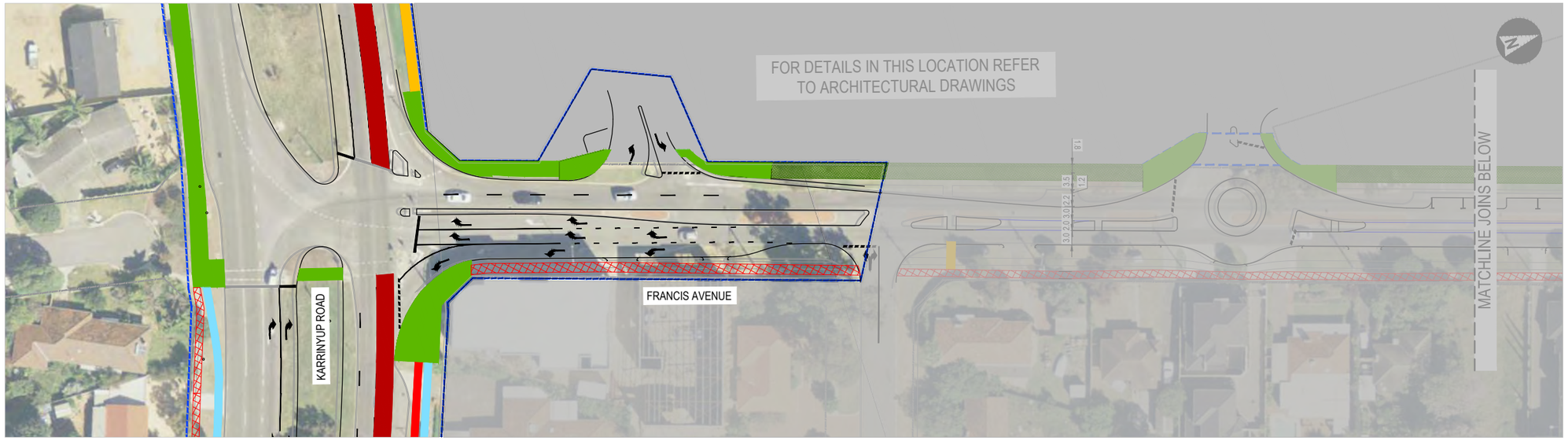
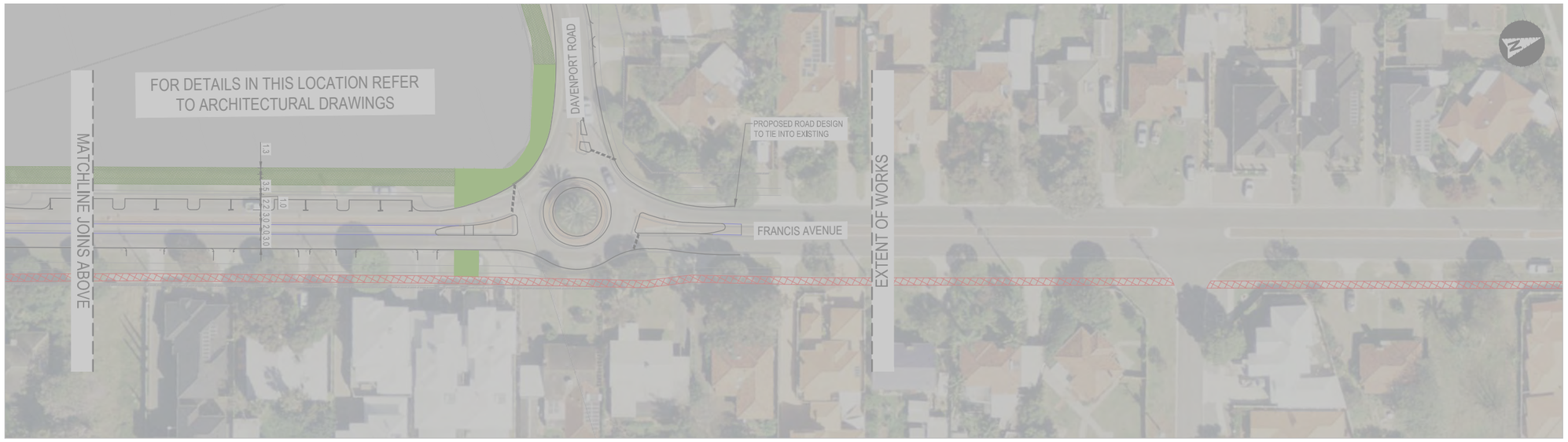


PLAN VIEW

SCALE: 1:500



PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
6. THE FINISHED LEVELS OF FOOTPATHS / PAVED AREAS TO BE COORDINATED WITH THE ROAD / KERB LEVELS AND THE FINISHED GROUND LEVELS OF THE ENTRANCES / PATHS ON THE ADJOINING LAND.
7. PROPOSED 2 WAY SHARED PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
8. PROPOSED 2 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
9. PROPOSED 2.0M PEDESTRIAN PATH TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
10. PROPOSED 1.5M PEDESTRIAN PATH TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
11. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
12. AREA UNDER CARE OF MAIN ROADS WA.

1:500

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CLIENT: AMP CAPITAL

REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED:

PRELIMINARY
NOT FOR CONSTRUCTION

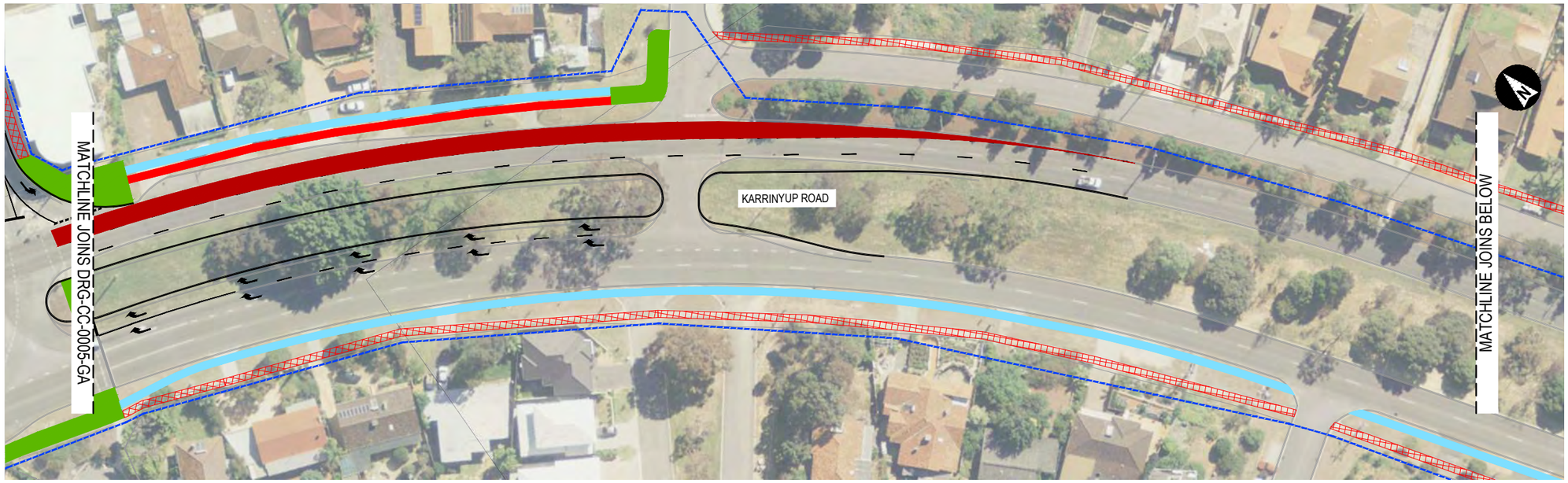
APPROVED
DATE
AJ

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0006	GA	E

CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0006-GA.dwg



PLAN VIEW

SCALE: 1:500

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
6. PROPOSED 1 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
7. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.

1:500

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH

DESIGNED: LD

CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED

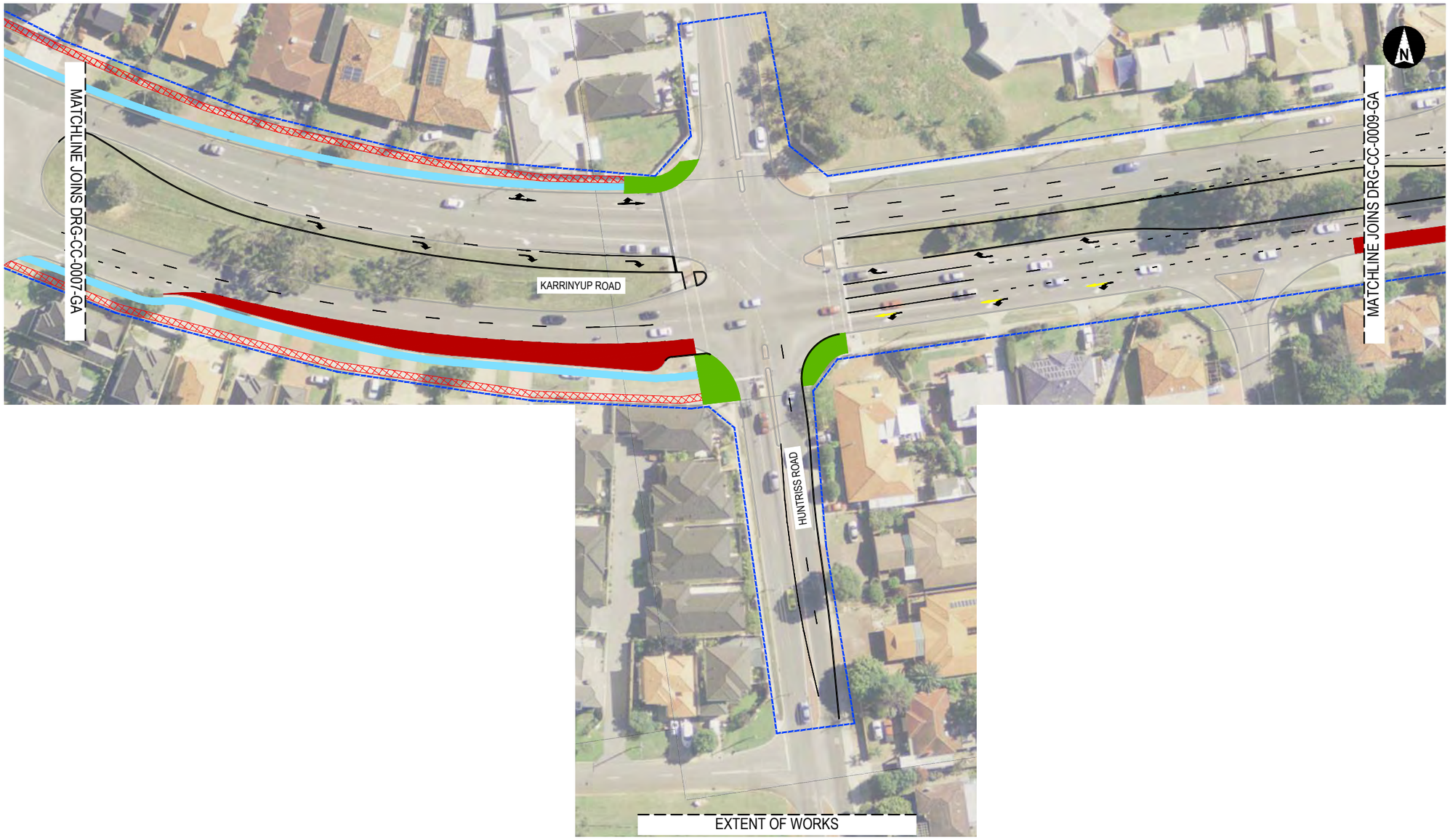
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0007	GA	E

Last saved: Wed, 10 Jul 2019 08:08 am
CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0007-GA.dwg



PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
6. PROPOSED 1 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
7. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.

1:500

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.: 239230 – DRG – CC – 0008 – GA – E

PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
239230	DRG	CC	0008	GA	E

CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0008-GA.dwg

Last saved: Wed, 10 Jul 2019 08:07 am

Last saved: Wed, 10 Jul 2019 08:07 am

PLAN VIEW

SCALE: 1:500

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).

1:500

CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0009-GA.dwg

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.: 239230 - DRG - CC - 0009 - GA - E

PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
239230	DRG	CC	0009	GA	E

PLAN VIEW

SCALE: 1:500

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).

1:500

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: KARRINYUP ROAD DESIGN MODIFICATIONS

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0010	GA	E

CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0010-GA.dwg

Last saved: Wed, 10 Jul 2019 08:04 am

PLAN VIEW

SCALE: 1:500

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. PROPOSED 2 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
4. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.

1:500

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED:

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE
AJ

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: JEANES ROAD DESIGN MODIFICATIONS CITY OF STIRLING NETWORK

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239231	DRG	CC	0011	GA	E

Last saved: Wed, 10 Jul 2019 08:03 am
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PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. PROPOSED 2 WAY SEPARATED BIKE PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
4. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.

1:500

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CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0012-GA.dwg

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REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED:

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE
AJ

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: JEANES ROAD DESIGN MODIFICATIONS CITY OF STIRLING NETWORK

DRAWING No.: PROJECT No. 239232 – DOC. TYP. DRG – SEC CC – DRG NO. 0012 – DRG. TYP. GA – REV E

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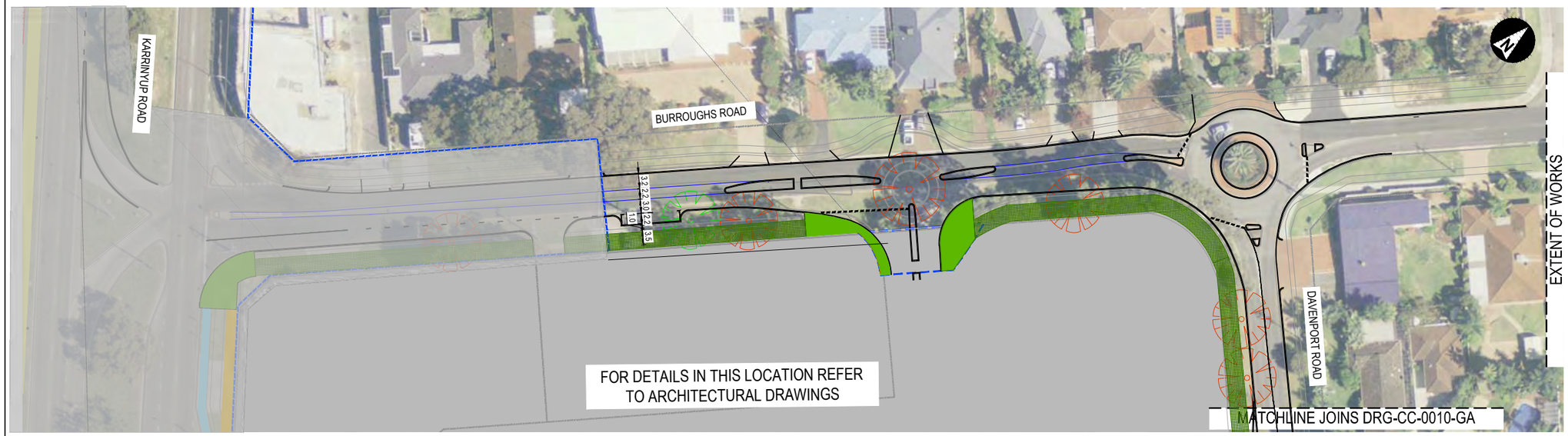

PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. PARKING BAY TREE : TO BE PLATANUS ACERFOLIA (LONDON PLAIN TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
6. STREET TREE : TO BE PYRUS CALLERYANA CULTIVARS (ORNAMENTAL PEAR TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
7. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
8. THE FINISHED LEVELS OF FOOTPATHS / PAVED AREAS TO BE COORDINATED WITH THE ROAD / KERB LEVELS AND THE FINISHED GROUND LEVELS OF THE ENTRANCES / PATHS ON THE ADJOINING LAND.
9. PROPOSED 2 WAY SHARED PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
10. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
11. AREA UNDER CARE OF CITY OF STIRLING.

1:500

CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0013-GA.dwg

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REV	DATE	REVISION DETAILS	APPROVED
A	29.09.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
B	19.05.17	RE-ISSUED FOR DEVELOPMENT APPROVAL	ML
C	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

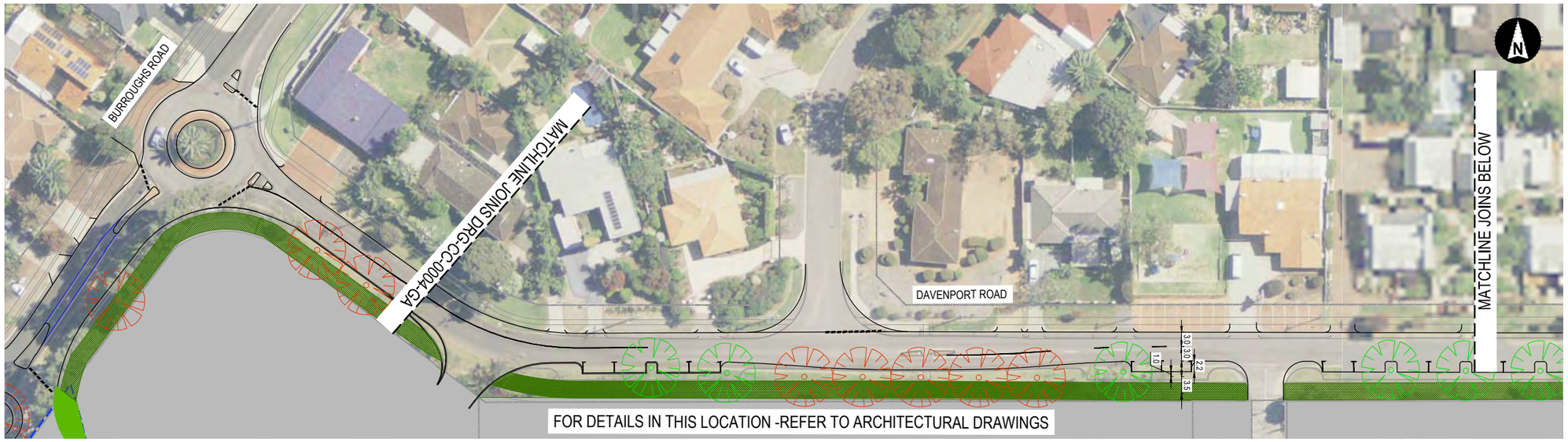
APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: BURROUGHS ROAD DESIGN MODIFICATIONS CITY OF STIRLING NETWORK

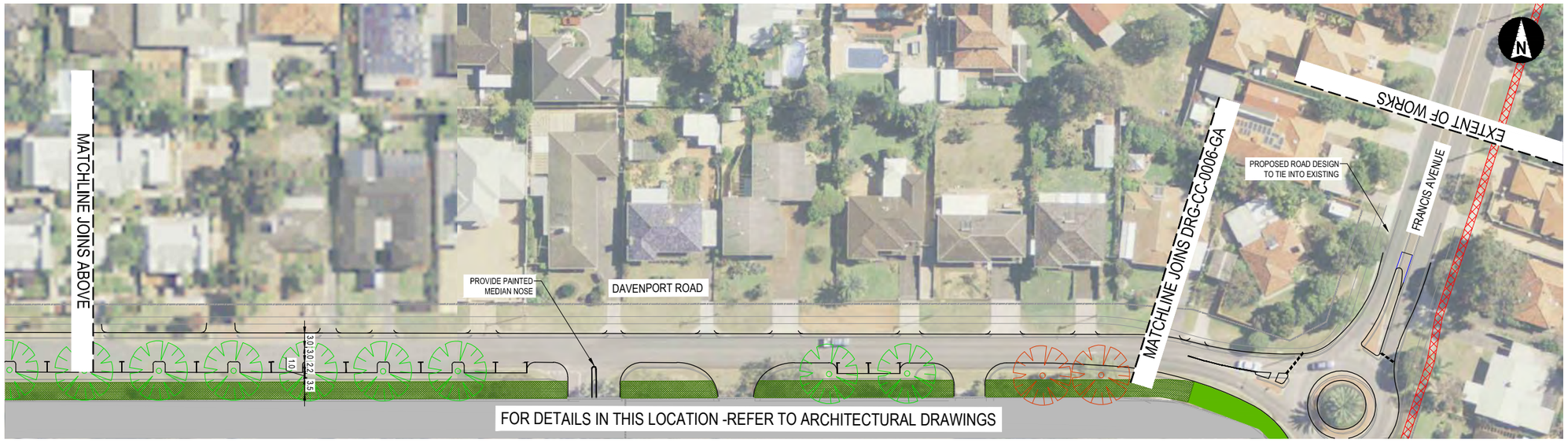
DRAWING No.: 239230 – DRG – CC – 0013 – GA – C

PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
239230	DRG	CC	0013	GA	C



PLAN VIEW

SCALE: 1:500



PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
- PROPOSED UNBROKEN SEPARATION LINE
- 450mm INTERSECTION STOP LINE (CONTINUOUS)
- 80mm CONTINUITY LINE (1.0m LINE x 3.0m GAP)
- 80mm BROKEN LANE LINE (3.0m LINE x 9.0m GAP)
- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
3. ALL SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH MAIN ROAD WA STANDARDS AND APPROVALS.
4. DRAINAGE TO BE MODIFIED AS REQUIRED IN ACCORDANCE WITH WATER SENSITIVE DESIGN PRINCIPLES.
5. PARKING BAY TREE : TO BE PLATANUS ACERFOLIA (LONDON PLAIN TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
6. STREET TREE : TO BE PYRUS CALLERYANA CULTIVARS (ORNAMENTAL PEAR TREE) OR SIMILAR WITH APPROVAL OF CITY OF STIRLING.
7. STREET LIGHTING TO BE UPGRADED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD(S).
8. THE FINISHED LEVELS OF FOOTPATHS / PAVED AREAS TO BE COORDINATED WITH THE ROAD / KERB LEVELS AND THE FINISHED GROUND LEVELS OF THE ENTRANCES / PATHS ON THE ADJOINING LAND.
9. PROPOSED 2 WAY SHARED PATH TO BE PAVED WITH RED ASPHALT OR OTHERWISE AGREED MATERIAL.
10. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
11. AREA UNDER CARE OF CITY OF STIRLING.

1:500

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CLIENT: AMP CAPITAL

REV	DATE	REVISION DETAILS	APPROVED
A	18.02.15	PRELIMINARY	LD
B	25.02.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
C	15.06.15	RE-ISSUED FOR DEVELOPMENT APPROVAL	LD
D	14.10.15	RE-ISSUED	LD
E	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

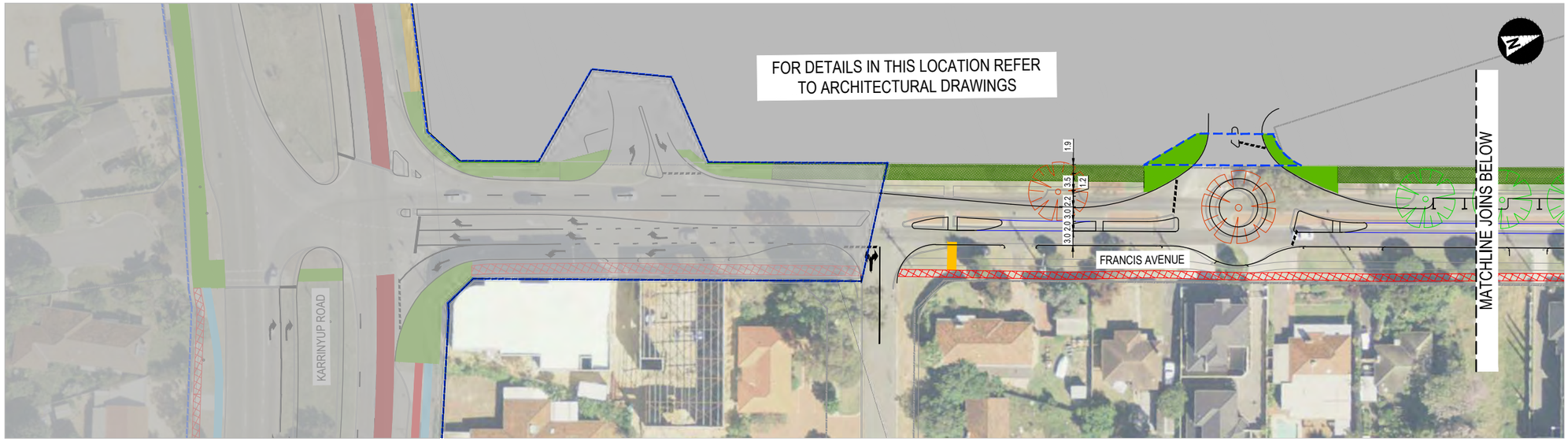
TITLE: DAVENPORT ROAD DESIGN MODIFICATIONS CITY OF STIRLING NETWORK

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0014	GA	E

Last saved: Wed, 10 Jul 2019 08:01 am

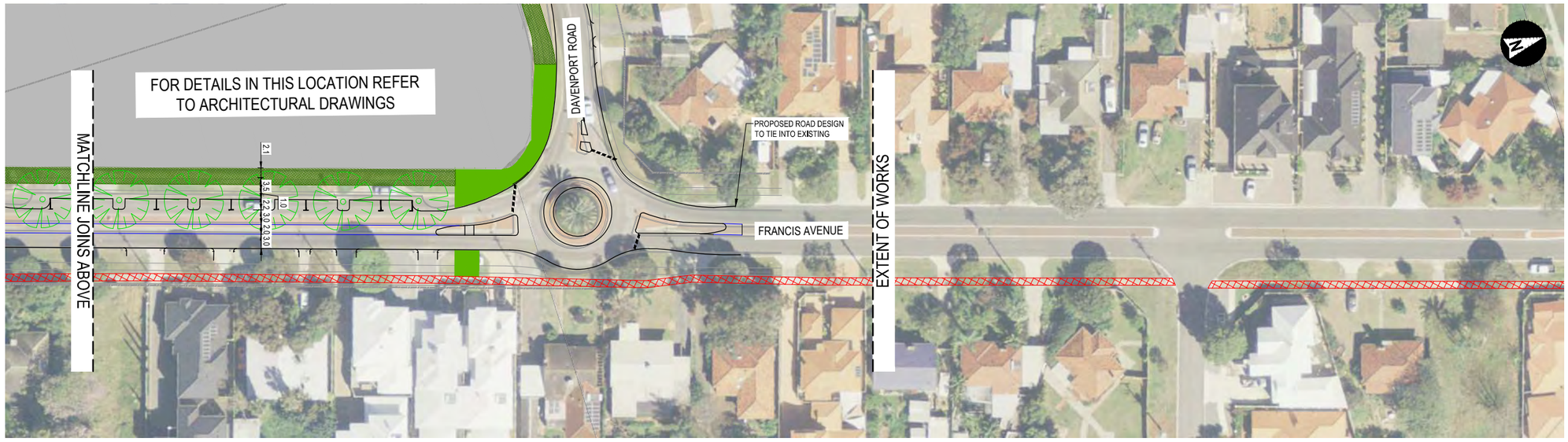
CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings\ 239230-0000-DRG-CC-0014-GA.dwg

3 AREA UNDER CARE OF CITY OF STIRLING



PLAN VIEW

SCALE: 1:500



PLAN VIEW

SCALE: 1:500

LEGEND

- PROPOSED KERBING
- PROPOSED RED BUS LANE PAVEMENT
- PROPOSED 2 WAY SHARED PATH
- PROPOSED 2 WAY SEPARATED BICYCLE PATH
- PROPOSED 1 WAY SEPARATED BICYCLE PATH
- PROPOSED 2.0m PEDESTRIAN PATH
- EXISTING PEDESTRIAN PATH
- PROPOSED 1.5m PEDESTRIAN PATH
- PROPOSED SHARED AREA
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- 450mm INTERSECTION STOP LINE (CONTINUOUS)
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- PROPOSED PAVEMENT ARROWS
- PROPOSED STREET TREE
- PROPOSED PARKING BAY TREE
- AREA UNDER CARE OF MAIN ROADS W.A AND ASSOCIATED WITH OPERATION OF KARRINYUP ROAD
- PROPOSED ROAD RESERVE WIDENING

NOTES

1. FOR DIRECTIONAL TACTILE, RAMP TYPE A DETAILS, REFER TO MRWA DRG 9831-5649-1.
2. PAVEMENT ARROWS TO BE AS PER MRWA STANDARD DETAIL DRAWING NUMBER 9531-2010-4.
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10. PROPOSED SHARED AREA TO BE PAVED WITH INSITU CONCRETE PAVING OR OTHERWISE AGREED MATERIAL.
11. AREA UNDER CARE OF CITY OF STIRLING.

1:500

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CLIENT: AMP CAPITAL

REV	DATE	REVISION DETAILS	APPROVED
A	29.09.15	ISSUED FOR DEVELOPMENT APPROVAL	LD
B	09.07.19	RE-ISSUED	LD

SCALE	SIZE
1:500	A1

DRAWN: PJH
DESIGNED: LD
CHECKED: AJ

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE

PROJECT: MIXED USE EXPANSION AT KARRINYUP

TITLE: FRANCIS AVENUE DESIGN MODIFICATIONS CITY OF STIRLING NETWORK

DRAWING No.	PROJECT No.	DOC. TYP.	SEC	DRG NO.	DRG. TYP.	REV
	239230	DRG	CC	0015	GA	B

Last saved: Wed, 10 Jul 2019 08:10 am
CAD Ref: P:\239230 - Karrinyup Shopping Centre Structure Plan\3.0 Project Delivery\CADD\Drawings_239230-0000-DRG-CC-0015-GA.dwg

Appendix B
Transport Model Details

1 Introduction

This report outlines the development, calibration and validation of the Aimsun model built on behalf of AMP Capital for the Karrinyup Regional Centre Structure Plan. The modelling focuses on a network analysis modelling methodology to test the performance of proposed measures within the study area.

The initial stage was to develop of a fully calibrated and validated base Aimsun model reflecting the existing traffic conditions. Subsequent stages involve the assessment of future probable schemes and associated traffic generation associated with the Karrinyup Regional Centre Structure Plan. The base model included three peak periods consisting of the weekday morning and afternoon peaks and Saturday midday peak.

The road network was constructed and calibrated utilising the Aimsun hybrid modelling software with integrated SCATS signal control. Detailed coding of lane and junction descriptions were developed using latest aerial photographs of the region, on-street measurements and knowledge of the network operations. During the calibration process, model parameters are adjusted to align the model to that of the existing on-street behaviour.

This report focuses on the aspects of the model development, operation and adherence to good practice and summarises the results of the model calibration and validation. A model peer review has taken place and revisions from the peer review comments have been included were possible.

2 Model Form

2.1 Aimsun

The modelling software used was Aimsun with the hybrid model experiment type and integrated adaptive SCATS signals. A hybrid model operates as a microsimulation model within user defined cordon areas, simulating individual vehicles and their interaction with other vehicles and the surrounding road environment. Outside of this cordon, a mesoscopic model environment is used to replicate the flow, delay and route choice of variables using more simplistic algorithms.

As with real traffic conditions, these interactions can vary for each model run, resulting in unique results.

The Aimsun version used for all the modelling is version 8.0.5 (R29862 x64). It is recommended that all option testing be undertaken using the same version of the software.

To obtain statistically meaningful results, the average network performance is taken from multiple simulation runs. Previous experience indicates that five model runs are sufficient to obtain stable results for a network or this size, nature and purpose.

2.2 SIDRA Intersection

To satisfy Main Roads WA requirements, SIDRA models were also developed as a secondary analysis method to provide further confidence with the Aimsun results. SIDRA is a software modelling package commonly used to analyse signalised and unsignalised intersections. The SIDRA version used is version 6.0.24.4877 and all option testing should be undertaken using the same version as stated. The SIDRA models will incorporate the same volumes and similar parameters developed in Aimsun.

2.3 Base Model Network

The base model network, as shown in Figure 2-1, is the area enclosed by Reid Highway to the north, Mitchell Freeway to the east, Cedric Avenue/ Barnes Street/ Sackville Terrace to the south and West Coast Highway to the west.

All roads considered major within this area have been integrated in the model. Driveways and roads carrying what is considered low traffic volumes which do not significantly influence traffic flow within the model have not been included.

The mesocopic model area of the hybrid model is the cordon outside the green dotted lines and covers the wider area. The key area within the network was modelled using the more detailed micro-simulation cordon environment. The micro-simulation cordon area consists of Karrinyup Centre, Karrinyup Road, and the connecting roads.

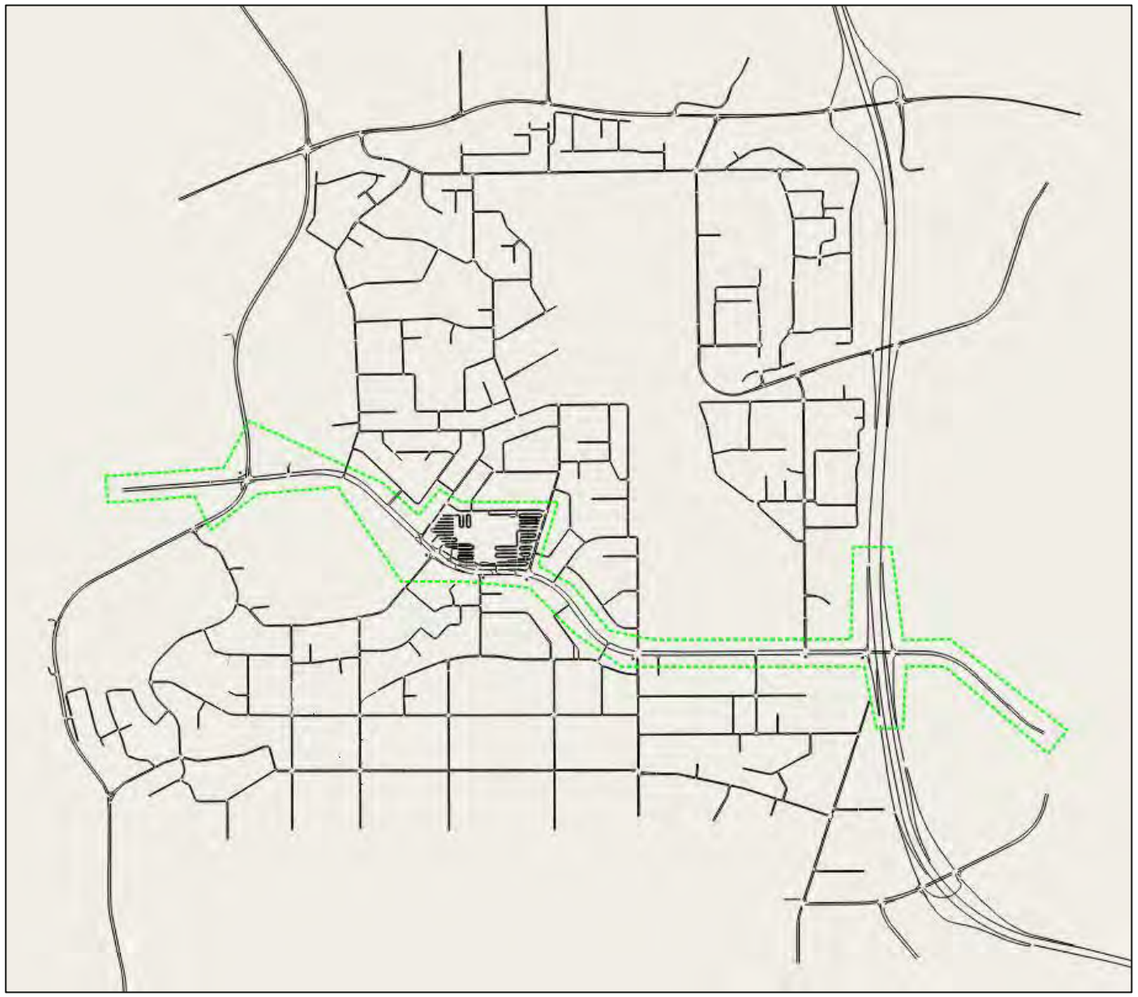


Figure 2-1 Base Network

The base model network was built using available digital aerial photography, with site visits to confirm the accuracy and operation of the modelled network. Based on the supplied data, the model was constructed to a 1:1 scale, ensuring correct vehicle operation and accurate driver behaviour.

2.4 Model Periods

All Aimsun models have been developed with a two hour peak period and analysed for the peak hour. The model duration of the two hours was used to ensure the shoulders to the peaks of the background traffic and development traffic are adequately modelled. The extended peak period also allows the model to 'warm up' before the peak hour to load traffic into the model and ensure SCATS has adjusted to the volumes. The peak traffic periods and peak traffic hours are as follows:

- Morning Peak (AM) between 07:00 – 09:30, with a peak hour period of 08:00 – 09:00
- Afternoon Peak (PM) between 16:00 – 18:30, with a peak hour period of 17:00 – 18:00
- Saturday (Sat) between 11:00 – 13:30, with a peak hour period of 12:00 – 13:00

2.5 Site Visits

Site visits were undertaken by Aurecon staff on Saturday 6 July 2013, Thursday 21 November 2013, Saturday 23 November 2013, and Wednesday 11 June 2014 to confirm the model form and ensure realistic vehicle behaviour is replicated within the model.

3 Traffic Data Collection

3.1 Survey Data

Data collection and availability is fundamental in ensuring the results, recommendations and final outcomes of the study are robust and are as accurately evaluated as possible. Therefore, the data were collected from a number of sources including Main Roads WA and the Public Transport Authority (PTA). Signalised and non-signalised intersection counts were collected by Austraffic with additional signalised counts obtained from SCATS volume files provided by Main Roads WA. The data that was used for the modelling was predominately collected on Thursday 21 November 2013, Saturday 23 November 2013, Wednesday 11 June 2014, Thursday 14 May 2015, and Saturday 23 May 2015. The following sections summaries the traffic data collection process and methodology.

3.2 Traffic Count Data

3.2.1 Turn Count Data

In total data for 17 intersections were collected for the weekday model and 36 intersections were collected for the Saturday model. These counts consisted of both full and partial turning count data. Full count refers to all movements that is both turns and through movements collected for all approaches to the intersection. Partial counts refer to the collection of turning movements only.

Those intersections counted are listed below:

- Karrinyup Road & Marmion Avenue
- Karrinyup Road & Burroughs Road
- Karrinyup Road & Jeanes Road
- Karrinyup Road & Francis Avenue
- Karrinyup Road & Huntriss Road
- Karrinyup Road & North Beach Road
- Karrinyup Road & Kwinana Northbound Ramps
- Karrinyup Road & Kwinana Southbound Ramps
- Francis Avenue & Davenport Street
- Burroughs Road & Davenport Street
- Erindale Road & Kwinana Southbound Ramp
- Cedric Road & Kwinana Northbound Ramps
- Cedric Road & Kwinana Southbound Ramps
- North Beach Road & Duffy Road
- North Beach Road & Clement Drive
- North Beach Road & Reid Highway
- Reid Highway & Marimon Avenue
- Pascoe Street & Burroughs Road
- Pascoe Street & Clement Drive
- Jeanes Road & Elliot Road
- West Coast Highway & Pearl Parade
- Sackville Terrace & Deanmore Road
- Sackville Terrace & Huntriss Road
- Barnes Street & Odin Road
- Newborough Street & Duke Street
- Wilding Street & Newborough Street
- Mitchell Freeway at Karrinyup overpass
- Reid Highway & Marion Avenue
- Reid Highway & Okely Road

In addition, count data at all access points to the centre, including the petrol station, was collected on for Thursday AM and PM peak period as well as for the Saturday peak period.

3.2.2 Tube Count Data

Tube counts are commonly used for traffic counts along the stretch of a road. A total of six tube counts were collected for the weekday peak period and nine tube counts for the Saturday peak period.

Those roads counted are listed below:

- Burroughs Road between Davenport Street and Elworthy Place
- Erindale Road between North Beach Road and Kwinana northbound ramp
- Francis Ave between Davenport Street and Hall Street
- Grand Promenade between Jackson Ave and Newborough Street
- Miles Street between Karrinyup Road and Northgate Street
- Milverton Avenue between Clevedon Way
- Milverton Avenue between Karrinyup Road and Wincanton Road
- Milverton Avenue between North Beach Road and Beckington Way
- Pike Street between Davenport Street and Taunton Way
- Deanmore Road south of Sackville Terrace
- Duke Street south of Sackville Terrace
- North Beach Road south of Balcatta Road
- Pearl Parade east of West Coast Highway
- Reid Highway east of Duffy Road
- Sackville Terrace west of Deanmore Road

3.3 Journey Time Data

To form part of the validation process travel time surveys were undertaken eastbound and westbound along Karrinyup Road between Cedric Street and Arnott Street. This survey was undertaken using a floating car method on days which the traffic data were collected.

3.4 Traffic Signal Data

SCATS traffic data and files were collated for the same days which the traffic counts were collected. The SCATS files supplied by Main Roads WA included VS, SM, IDM, LX, sft, tc, ram, and database files. These files allowed adaptive SCATS signal control to be enabled in the microsimulation area and fixed signal timings to be derived in the mesoscopic areas.

3.5 Public Transport Information

All bus route data entered into the base models was obtained from the Transperth website and consisted of routes, schedules, and stop locations. Bus stop dwell times were assumed and fixed at 20 seconds with a 5 second deviation.

Table 3-1 Bus Routes

Bus Route Number	Bus Route Description
98	Circle Route – Clockwise
99	Circle Route – Anticlockwise
402	Stirling Station – Perth via Main Street and Loftus Street
403	Stirling Station – Perth via Royal Street and Loftus Street
404	Osborne Park – Perth via Swan Street and Loftus Street
410	Stirling Station – Scarborough Beach
412	Stirling Station – Scarborough Beach via Woodlands
413	Stirling Station – Glendalough Station via Osborne Park
414	Stirling Station – Glendalough Station via Balcatta
415	Stirling Station – Mirrabooka Bus Station via Amelia Street
421	Stirling Station – Scarborough Beach via Sackville Terrace
422	Stirling Station – Scarborough Beach via Karrinyup Bus Station
423	Stirling Station – Warwick Station via Karrinyup Bus Station & Hillary's Boat Harbour
424	Stirling Station – Karrinyup Bus Station via North Beach Road and Gwelup
425	Stirling Station – Warwick Station via Karrinyup Bus Station and Carine
427	Stirling Station – Warwick Station via North Beach Road and Erindale Road
428	Stirling Station – Warwick Station via Balcatta
458	Scarborough – Whitfords Station via Hillary's Boat Harbour

4 Traffic Demand and Assignment

4.1 Zone Structure

There is a degree of interdependence between the definitions of the study area/ zoning system and the network, such that one should not define one without reference to the other.

The foremost component in defining the zoning structure for the model was the existing zone structure utilised with the Main Roads WA higher tier Regional Operations Model (ROM). Disaggregation of these ROM zones has been undertaken where considered applicable, based on the main areas of trip generation through the suburb of Karrinyup within the study area.

In total 48 zones have been applied to the model, nine of these within the Karrinyup Shopping centre and nine as internal filler zones.

4.2 Demand Matrices Development

In total 3 vehicle demand matrices have been assigned to the network. These represent cars, heavy goods vehicles (HGVs), and Karrinyup Centre traffic. These all use the ROM prior matrix as a base.

4.2.1 ROM Demand Matrices

ROM cordon matrices were extracted from the 2011 ROM model. These matrices are considered coarse in the Karrinyup Centre model area with a total of 31 zones covering the model area. It was noted that only one zone was defined for the Karrinyup Shopping Centre.

With this, the ROM matrices underwent an adjustment process to better reflect the traffic generators within the model area, as detailed below.

The ROM model was found to have a more evenly spread distribution for the Karrinyup Centre zone whereas the traffic counts indicate an origin and destination that is much more skewed to the east on Karrinyup Road.

Below are some approximate distributions based on matrix origin/ destination pairs. These are for comparative purposes only as the actual distribution is dependent on network route choice assignment.

Table 4-1 AM Distributions

ROM Distribution		Network Distribution	
From East to Centre	**From West to Centre**	**From East to Centre**	**From West to Centre**
40%	16%	29%	19%
To East from Centre	**To West from Centre**	**To East from Centre**	**To West from Centre**
36%	13%	79%	3%
Network East to West	**Network East to West**	**Network East to West**	**Network East to West**
3%	1%	3%	2%

Table 4-2 PM Distributions

ROM Distribution		Network Distribution	
From East to Centre	**From West to Centre**	**From East to Centre**	**From West to Centre**
35%	13%	75%	3%
To East from Centre	**To West from Centre**	**To East from Centre**	**To West from Centre**
36%	15%	40%	37%
Network East to West	**Network East to West**	**Network East to West**	**Network East to West**
2%	2%	2%	1%

Table 4-3 Saturday Distributions

ROM Distribution		Network Distribution	
From East to Centre	**From West to Centre**	**From East to Centre**	**From West to Centre**
38%	15%	59%	13%
To East from Centre	**To West from Centre**	**To East from Centre**	**To West from Centre**
37%	13%	71%	12%
Network East to West	**Network East to West**	**Network East to West**	**Network East to West**
2%	2%	1%	3%

4.3 Aimsun Matrix Development

The methodology for the creation of the demand matrix development is detailed below.

1. Cordon origin/ destination (O/D) demand matrices were extracted from the 2011 ROM model by Main Roads WA. These matrices were realigned to reflect the Aimsun proposed zone structure. Disaggregation was also undertaken to reflect the areas within the Aimsun model where no zones were available in the ROM model.

2. The matrices were adjusted to collected survey data using the Furness method. The Furness method of matrix updating is an iterative process to derive matrices that results in the best match to survey data. Trip end totals for each Aimsun zone were formed from external link survey data, internal link survey data, and other filler zones with values based on their survey differences, surrounding land use, and number of individual households.

3. As part of the calibration process the matrices were adjusted using the Aimsun matrix adjustment process to refine the distributions created by the ROM zone disaggregation. These were then checked to make sure large changes had not been made and further manual refinement or containment then took place where necessary.

4.4 Traffic Demand Profiles

Demand profiles have been applied to dispense traffic demands in defined time intervals over the model periods. Global release profiles have been developed for car and goods vehicles (GV). These profiles were developed based on the survey data collected by Austraffic, which were collated in 15 minute intervals. The following traffic profiles were developed from the data at signalised intersections on Karrinyup Road immediately outside of the centre and were subsequently used in the model. The figures are displayed as a percentage peak factor of the peak hour. The morning peak period profile, illustrated in Figure 4-1 shows a peak hour between 08:00 to 09:00. In Figure 4-2, the afternoon peak profile shows a peak hour between 17:00 to 18:00 and the Saturday peak period illustrated in Figure 4-3 shows that the peak hour is between 12:00 to 13:00.

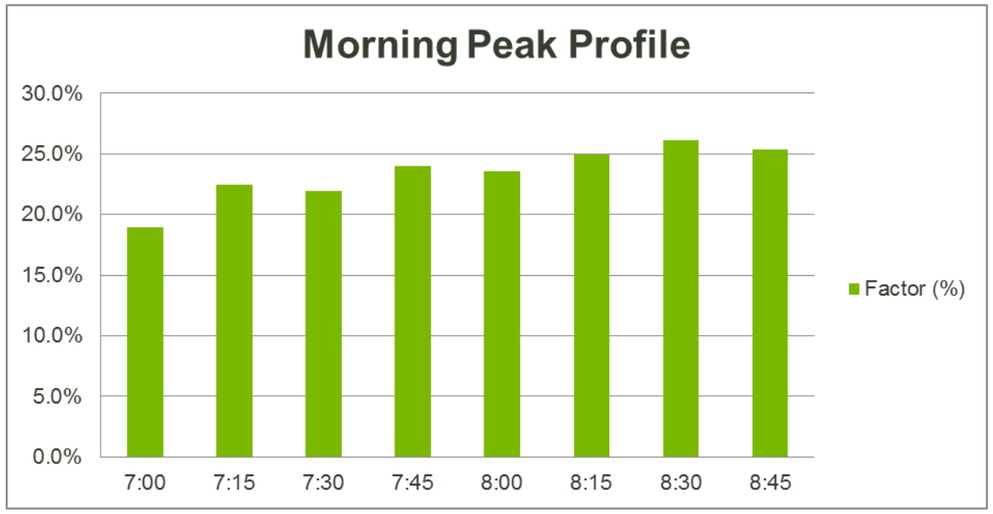


Figure 4-1 Morning Peak Profile

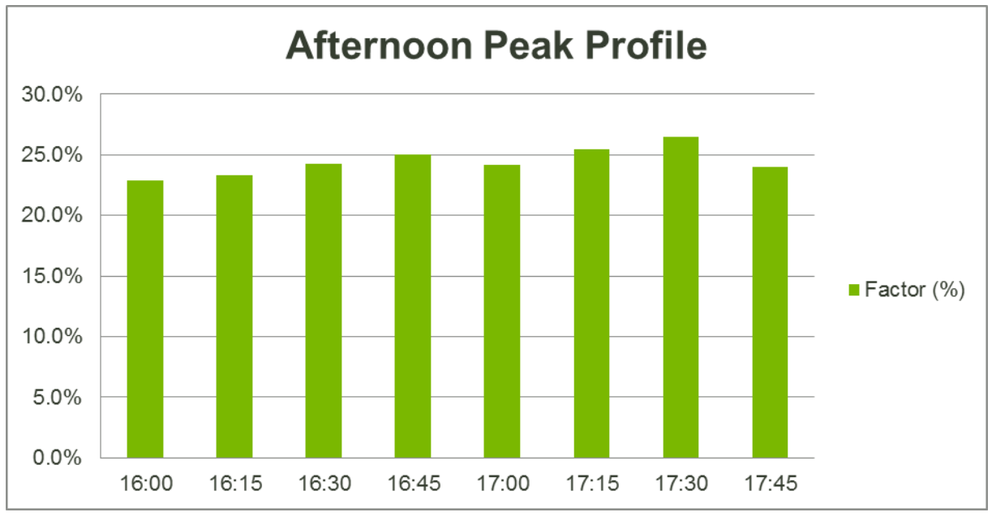


Figure 4-2 Afternoon Peak Profile

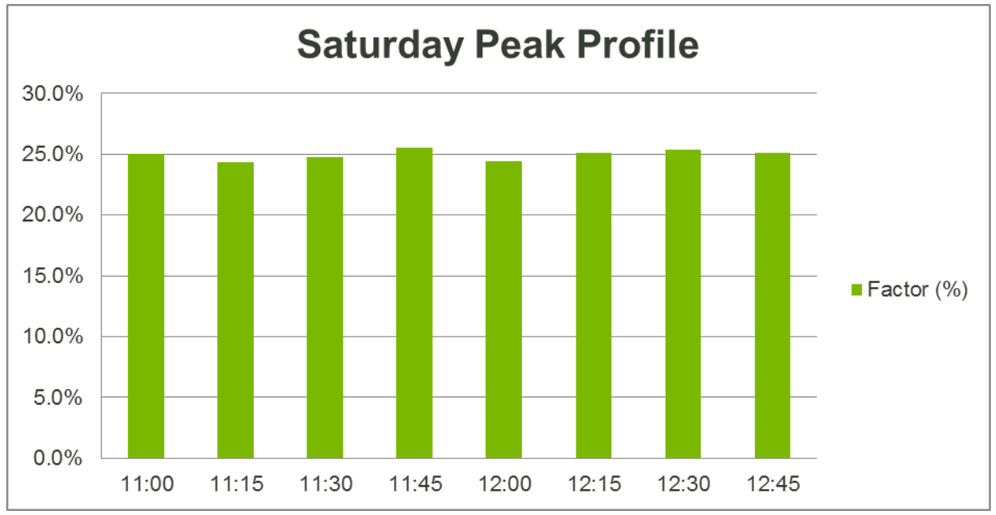


Figure 4-3 Saturday Peak Profile

The split of HGVs for the model area was based on survey data and is calculated as follows for the following peak periods. It was applied as separate matrix.

- Morning: 1.37%
- Afternoon: 0.33%
- Saturday Peak: 1.67%.

4.5 Pedestrians

Whilst individual pedestrian movements have not been modelled within the base model, the effect of pedestrian movements on traffic signals and timings has been taken into account. This has been done by including pedestrian demand captured by the SCATS signal data.

5 Traffic Alignment Calibration Process

5.1 Path Assignment

Within Aimsun, the initial static assignment route choice is calculated by cost equations by taking into consideration section capacity and section travel times. Following this the dynamic traffic assignment operates during the model run by using current section travel times for every feedback time period. The section capacities and global route choice parameters including attractiveness weighting can be modified to aid calibration. The initial path assignment file was collected as an .apa file and then loaded with each model run.

5.2 Dynamic Route Choice

Route choice parameters were chosen from experience with similar models as well as through the calibration process. The key with route choice values is to achieve a robust model that can also adjust to changes in the network or demands.

The percentage of stochastic assignment was adjusted to what is considered to be realistic for a model of this size; this is 50% of traffic through the network follow the static assignment with the remainder being dynamic.

The settings used with the modelling are listed below.

Parameter	Value
Route Choice	
Cycle	0:03:00
Number of Intervals	3
Attractiveness Waiting	8
User Defined Cost Weight	0
Use of O/D Routes and Path Assignment Results	
Car and HGV following O/D Routes	100%
Car and HGV following Path Assignment Results	50%
Route Choice Model	
Route Choice Model	C-Logit
Dynamic	Enabled
Initial K-SPs	3
Max Number to Keep	6
Max Number of Paths	3
Parameters	
Scale	8
Beta	0.15
Gamma	1

5.3 Fixed O/D Route

A fixed O/D route was applied from zone 2 to zone 23, Balcatta Road to Mitchell Freeway North because in this section of Reid Highway, extensive delay is present. A fixed path was used to ensure vehicles would not use another route which would require perfect knowledge of the network and Perth drivers would not take this route.

6 Model Coding

Through the calibration process adjustments have been made to the modelling parameters to ensure the model replicates the existing observed traffic conditions.

6.1 Behaviour

Queensland Department of Transport and Main Roads (DTMR) default values have been used in the absence of other relevant templates.

6.2 Configuration

- **Global arrivals release style**

The release style of exponential has been used.

- **Simulation Step**

The time step value of 0.45 seconds is used in the models.

- **Mean Reaction Time**

The mean reaction time of each driver, in seconds, is associated with the lag in time between a change in speed of the preceding vehicle and the following vehicles reaction to the change. The value of 0.9 seconds is utilised in this model with a reaction time at stop of 1.10 seconds.

6.3 Distance Zones

The default node zone distance has been used for most sections; however some have been modified to better replicate the lane changing behaviour on street. This was found to have more of an impact in the microsimulation area and a negligible impact in the mesoscopic area. Future year model values were maintained with the base model.

6.4 Road Types

In total 7 road types have been used in the model. The road types generally reflect the speed, capacities, and distance zones of the roads within the network.

6.5 Turn Speeds

Some turning speeds have been reduced at intersections and left slip lanes as the default turn speeds appeared unrealistic for a give-way movement.

6.6 Turn Penalties

Turn penalty functions were applied in certain locations during the matrix adjustment and calibration process to replicate turning delay on movements that may be overrepresented in the model and its network assignment. These penalties were applied in the following locations.

- Cedric Street right turn into Ellen Stirling Boulevard
- Jeanes Road right turn into Karrinyup Road
- Reid Highway right turn into Mitchell Freeway southbound onramp
- Karrinyup Road left turn into Francis Avenue
- Francis Avenue right turn into Karrinyup Road

6.7 Version

The model has been developed in version 8.0.5 R29862 x64 of Aimsun. This was the latest current version at the time of model development.

7 Model Calibration

7.1 Calibration / Validation Criteria

Model calibration/ validation is necessary to ensure that a model accurately represents an existing traffic situation and can be used with confidence to test alternatives. Model calibration for this model has been based on the following:

Vehicle Behaviour: Undertaking a visual check to confirm the observed on-street vehicle behaviour is consistent with that observed in the model
Turn Counts: Comparing observed and modelled turning movements for general traffic over the modelled peak hour periods
Link Counts: Comparing observed and modelled link counts for general traffic over the modelled peak hour periods
Journey Times: Comparing observed and modelled journey travel times for general traffic over the modelled peak hour periods
Queue Lengths: Undertaking a visual check to confirm the modelled queue operation is consistent with those observed on site
SCATS Signal Timings: Comparing observed and modelled signal timings over the modelled peak hour periods

While there are no prescribed calibration criteria for a hybrid model, the set of criteria selected to be the most appropriate is from NZTA Economic Evaluation Manual. It has been referenced to assess the acceptability of the level of calibration achieved in the model. This calibration criteria is presented in Table 3-1. It must be remembered that this is not a microsimulation model, rather it is a large hybrid model with a mesoscopic buffer area with network vehicles loaded far from the centre and given multiple route choice.

Guidelines for hybrid models are currently being developed but it is believed that these guidelines are the most suitable at this stage. WA does not have its own set of guidelines.

Model calibration/ validation is often a difficult task of balancing the model's ability to replicate existing conditions to that of its ability to adapt to the local and network impacts of option testing. If the model becomes too constrained, in an attempt to match survey data, it may not react as it should during the option testing stage. It is believed that this balance has been reached with this model calibration/ validation and other criteria would constrain the model too much. It should also be noted that there is route choice within the centre area, rather than the centre only loading traffic on to the external network.

Also as the model covers three time periods, parameters are shared across all three periods. Therefore the focus was on the PM and Saturday periods as this is when the impact from traffic on both the road and centre network is more critical.

Discussions were had with the external peer reviewer and a focus was made on volumes greater than 200 vehicles per hour (vph) as these are considered more critical. Therefore results without the very low volumes are also presented.

Table 7-1 Model Calibration Criteria

Criteria and Measures	Range
Calibration Acceptance Targets - Within 30% of Observed	< 99 vph
	100 -199 vph
	200 - 499 vph
	500 - 999 vph
	> 1,000 vph
	> 100 vph
Turn Count R^2 Measure	**Criteria**
R^2 value for modelled versus observed volumes for all individual turns	> 0.85
Turn Criteria and Measures	**Criteria**
GEH statistic < 5.0 for individual Links volumes	>60% of cases
GEH statistic < 10.0 for individual Links volumes	>95% of cases
GEH statistic < 12.0 for individual Links volumes	100% of cases
Link Count R^2 Measure	**Criteria**
R^2 value for modelled versus observed volumes for all individual Links	> 0.85
Links Criteria and Measures	**Criteria**
GEH statistic < 5.0 for individual Links volumes	>60% of cases
GEH statistic < 10.0 for individual Links volumes	>95% of cases
GEH statistic < 12.0 for individual Links volumes	100% of cases
Individual Link Volumes	+/- 20%
Criteria and Measures	**Criteria**
Percentage RMSE Turns	<30%

7.2 Model Stability

The coefficient of variation (COV) has been used to assess the variability between each run on the network statistics. The COV is a measure of the variation between model runs. Typically 5% is considered a good level of correlation. The coefficient of variance is calculated by divided the mean by the standard deviation as follows:

$$COV = \frac{SD}{\mu} \times 100$$

Where: SD = Standard Deviation

μ = Mean

The following tables illustrate output statistics and COV for the weekday morning, afternoon and Saturday peak periods.

Table 7-2 AM Model Stability Outputs

Log Run	Average Travel Time (s)	Total Number of Vehicles	Mean Speed (kph)
Mean	478	9,341	44
Std Dev	5	37	0.5
Min	472	9,310	43
Max	485	9,400	44
Range	14	90	1.4
CoV	1.1%	0.4%	1.1%

Table 7-3 PM Model Stability Outputs

Log Run	Average Travel Time (s)	Total Number of Vehicles	Mean Speed (kph)
Mean	762	9,905	44
Std Dev	18	57	0.5
Min	741	9,834	44
Max	781	9,984	45
Range	41	150	1.1
CoV	2.3%	0.6%	1.0%

Table 7-4 Saturday Model Stability Outputs

Log Run	Average Travel Time (s)	Total Number of Vehicles	Mean Speed (kph)
Mean	448	10,297	53
Std Dev	11	51	0.4
Min	437	10,214	52
Max	465	10,339	53
Range	27	125	1.2
CoV	2.4%	0.5%	0.8%

The general network statistics for all peak periods achieved a COV of less than 3%. Although the morning and afternoon peak periods achieved a 2.3% and 2.4% COV respectively, it is considerably less than the 5% acceptable limit. Overall, it is considered that the model is stable over the three peak periods.

7.3 Turn Count Calibration

This section illustrates the comparisons between observed and modelled turn counts for the peak periods, by organising the observed counts into volume ranges. This allows the data to be assessed with more emphasis placed on the higher volume movements. The comparison includes averaged modelled results from all five runs. Graphical comparisons are also presented.

The following tables present the results achieved comparing observed and modelled count data for each individual link with a survey target during the weekday peak hour periods and Saturday peak hour period. The links have been organised into ranges by their observed count.

As it is one model covering three periods, parameters within the model to provide the best calibration across all three periods. However, more parameter alignment was given to the Saturday period calibration as this is considered to be the most critical period.

Table 7-5 Morning Peak Turn Calibration Results Tabulated

Criteria and Measures	Range	Observed Total	Modelled Achieved	Achieved (%)
Calibration Acceptance Targets - Within 30% of Observed	< 99 vph	59	14	24%
	100 -199 vph	17	9	53%
	200 - 499 vph	21	16	76%
	500 - 999 vph	10	10	100%
	> 1,000 vph	8	8	100%
	> 100 vph	56	43	77%
Turn Count R^2 Measure	**Criteria**	**Modelled R2 Value**		
R^2 value for modelled versus observed volumes for all individual turns	**> 0.85**	**0.97**		
Turn Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual turn volumes	>60% of cases	115	92	80%
GEH statistic < 10.0 for individual turn volumes	>95% of cases	115	113	98%
GEH statistic < 12.0 for individual turn volumes	100% of cases	115	114	99%
Criteria and Measures	**Criteria**	**Modelled RMSE Value**		
Percentage RMSE Turns	<30%	24%		

Table 7-6 Afternoon Peak Turn Calibration Results Tabulated

Criteria and Measures	Range	Observed Total	Modelled Achieved	Achieved (%)
Calibration Acceptance Targets - Within 30% of Observed	< 99 vph	52	10	19%
	100 -199 vph	26	11	42%
	200 - 499 vph	18	16	89%
	500 - 999 vph	11	11	100%
	> 1,000 vph	8	8	100%
	> 100 vph	63	46	73%
Turn Count R^2 Measure	**Criteria**	**Modelled R2 Value**		
R^2 value for modelled versus observed volumes for all individual turns	**> 0.85**	**0.97**		
Turn Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual turn volumes	>60% of cases	115	85	74%
GEH statistic < 10.0 for individual turn volumes	>95% of cases	115	111	97%
GEH statistic < 12.0 for individual turn volumes	100% of cases	115	113	98%
Criteria and Measures	**Criteria**	**Modelled RMSE Value**		
Percentage RMSE Turns	<30%	22%		

Table 7-7 Saturday Peak Turn Calibration Results Tabulated

Criteria and Measures	Range	Observed Total	Modelled Achieved	Achieved (%)
Calibration Acceptance Targets - Within 30% of Observed	< 99 vph	47	13	28%
	100 -199 vph	30	9	30%
	200 - 499 vph	21	20	95%
	500 - 999 vph	12	12	100%
	> 1,000 vph	11	11	100%
	> 100 vph	74	52	70%
Turn Count R^2 Measure	**Criteria**	**Modelled R2 Value**		
R^2 value for modelled versus observed volumes for all individual turns	**> 0.85**	**0.97**		
Turn Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual turn volumes	>60% of cases	121	84	69%
GEH statistic < 10.0 for individual turn volumes	>95% of cases	121	115	95%
GEH statistic < 12.0 for individual turn volumes	100% of cases	121	120	99%
Criteria and Measures	**Criteria**	**Modelled RMSE Value**		
Percentage RMSE Turns	<30%	22%		

As shown in the tables above, the majority of the criteria are satisfied and those that were not met are for lower volume movements that have less of an influence on the network performance. Overall the linear regressions (R^2) turn counts, which are the key indicative statistics, are well above the criteria requirements.

A further calibration check was undertaken by examining the GEH of those turn counts that were above 200 vph. This output table is below and shows that all volumes above 200 vph have a GEH less than 10% and only the AM period, at 79%, has less than 80% of turns below a GEH of 5.

Table 7-8 Turn Calibration Results for volumes greater than 200 vph

Turn Criteria and Measures	AM	PM	SAT
GEH statistic < 5.0 for individual turn volumes >200 vph	79%	86%	86%
GEH statistic < 10.0 for individual turn volumes >200 vph	100%	100%	100%
GEH statistic < 12.0 for individual turn volumes >200 vph	100%	100%	100%

The following graphs presents a plot of observed counts against modelled counts for the peak periods.

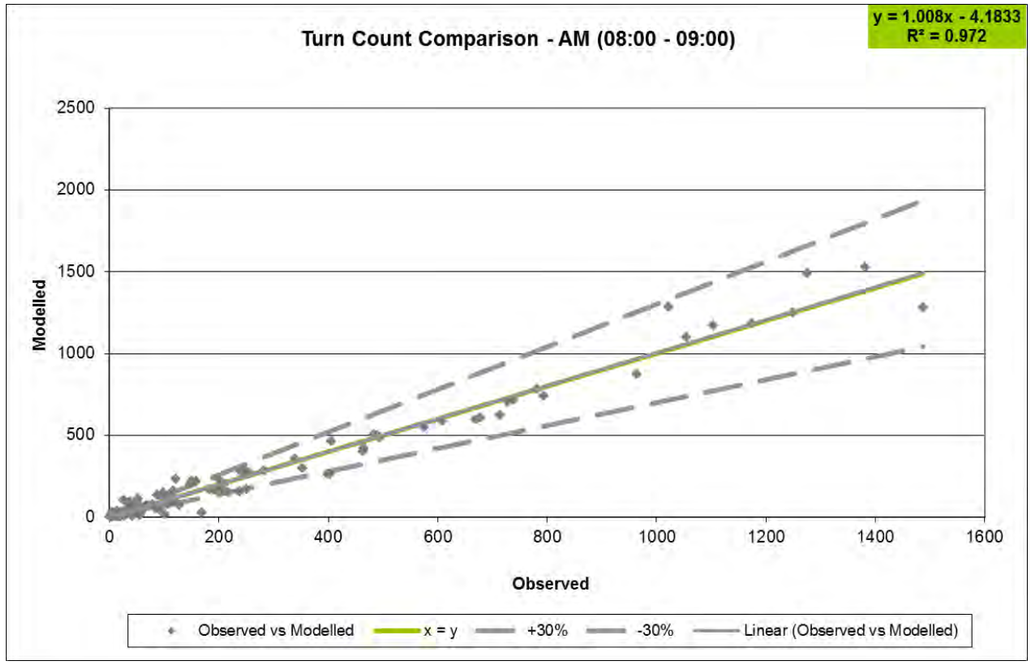


Figure 7-1 Morning Peak Turn Count Comparison

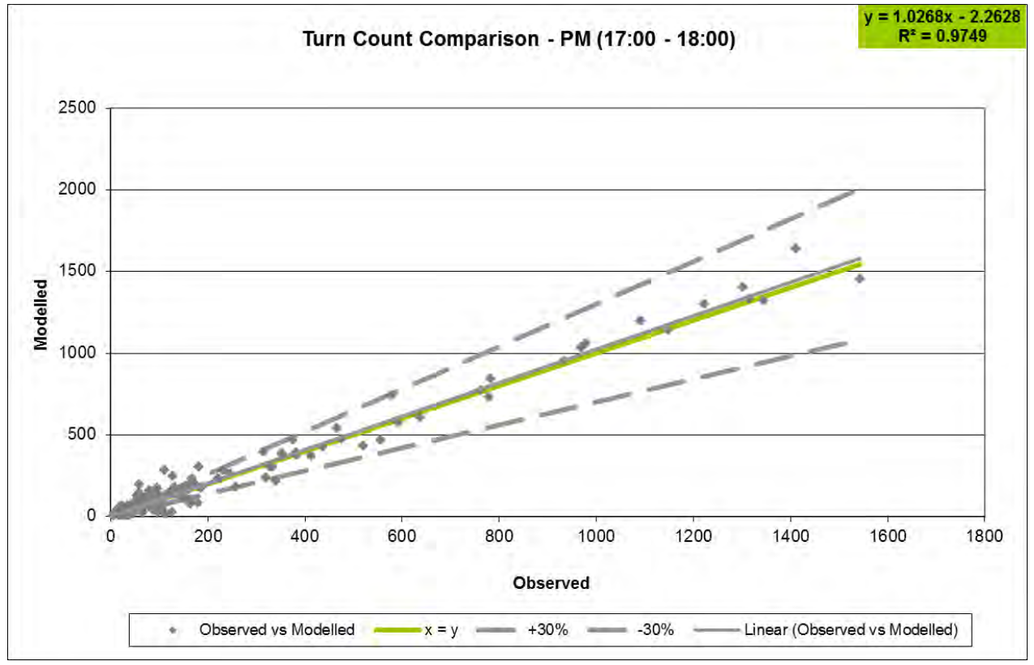


Figure 7-2 Afternoon Peak Turn Count Comparison

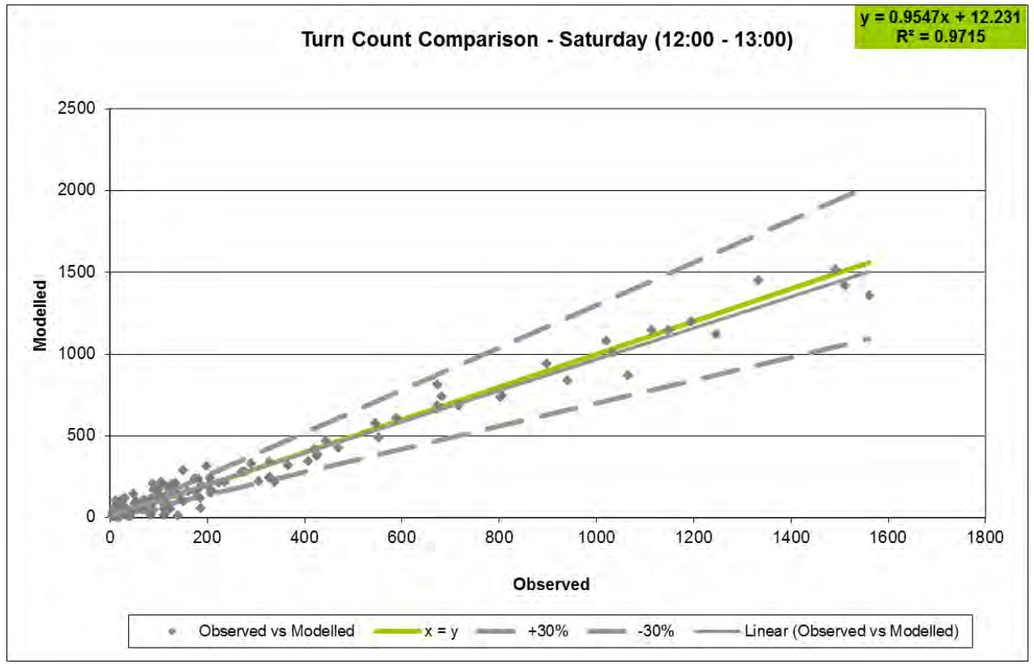


Figure 7-3 Saturday Peak Turn Count Comparison

The graphs shown above illustrate a strong correlation between observed and modelled counts. The minimal requirement to satisfy the criteria is 0.85 and all the models have achieved it.

7.4 Link Count Calibration

Link counts have been compared based on approach and exit link flows at intersections. That is, the link counts are comprised from the same set of data used for turn count comparisons.

The following sections compare the observed and modelled link counts for each peak hour period, by organising the observed counts into volume ranges. This allows the data to be assessed with more emphasis placed on the higher volume movements. The comparison includes averaged modelled results from all five runs. Graphical comparisons are also presented.

The following tables present the results achieved from comparing observed and modelled count data for each individual link with a survey target during the weekday peak hour periods and Saturday peak hour period. The links have been organised into ranges by their observed count.

Table 7-9 Tabulated Morning Peak Link Calibration Results

Link Count R^2 Measure	Criteria	Modelled R^2 Value		
R^2 value for modelled versus observed volumes for all individual Links	**> 0.85**	**0.99**		
Links Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual Links volumes	>60% of cases	191	157	82%
GEH statistic < 10.0 for individual Links volumes	>95% of cases	191	184	96%
GEH statistic < 12.0 for individual Links volumes	100% of cases	191	188	98%
Individual Link Volumes	**+/- 20%**			
	flows <99 vph	24%		
	100-199 vph	53%		
	200-499 vph	76%		
	500-999 vph	100%		
	flows >1,000 vph	100%		
	All	77%		

Table 7-10 Tabulated Afternoon Peak Link Calibration Results

Link Count R^2 Measure	Criteria	Modelled R^2 Value		
R^2 value for modelled versus observed volumes for all individual Links	**> 0.85**	**0.97**		
Links Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual Links volumes	>60% of cases	191	147	77%
GEH statistic < 10.0 for individual Links volumes	>95% of cases	191	178	93%
GEH statistic < 12.0 for individual Links volumes	100% of cases	191	185	97%
Individual Link Volumes	**+/- 20%**			
	flows <99 vph	19%		
	100-199 vph	42%		
	200-499 vph	89%		
	500-999 vph	100%		
	flows >1,000 vph	100%		
	All	73%		

Table 7-11 Tabulated Saturday Peak Link Calibration Results

Link Count R^2 Measure	Criteria	Modelled R^2 Value		
R^2 value for modelled versus observed volumes for all individual Links	**> 0.85**	**0.98**		
Links Criteria and Measures	**Criteria**	**Observed Total**	**Modelled Achieved**	**Achieved (%)**
GEH statistic < 5.0 for individual Links volumes	>60% of cases	281	209	74%
GEH statistic < 10.0 for individual Links volumes	>95% of cases	281	273	97%
GEH statistic < 12.0 for individual Links volumes	100% of cases	281	275	98%
Individual Link Volumes	**+/- 20%**			
	flows <99 vph	28%		
	100-199 vph	30%		
	200-499 vph	95%		
	500-999 vph	100%		
	flows >1,000 vph	100%		
	All	70%		

The above tables detail the link calibration results for the morning peak period. One GEH statistic requirement was not met, GEH <12.0. The individual link volume criteria show that 77% of the modelled link counts are within 20% of the actual counts. Overall the key calibration indication, the linear regression is well above the minimum requirement.

The afternoon peak period calibration results are shown in Table 7-10. Two GEH statistic requirements were not met. It should be noted that the GEH value of greater than 12, have been taken into account during the option testing stage. A linear regression value of 0.99 was achieved between the modelled and actual figures.

Similar to the afternoon peak period, the Saturday peak period results tabulated in Table 7-11 shows that the GEH statistics <12 for individual link volumes criterion was not met. However, the model achieved a linear regression figure of 0.98.

Undertaking a similar task as the turn counts, by looking at volumes above 200 vph, the following table was produced. This shows that the volumes above 200 vph and therefore more critical are much closer to or exceeding the stated criteria.

Table 7-12 Link Calibration Results for volumes greater than 200 vph

Turn Criteria and Measures	AM	PM	SAT
GEH statistic < 5.0 for individual turn volumes >200 vph	91%	87%	85%
GEH statistic < 10.0 for individual turn volumes >200 vph	99%	99%	99%
GEH statistic < 12.0 for individual turn volumes >200 vph	99%	99%	99%

The following graphs present a plot of observed counts against modelled counts for the peak periods.

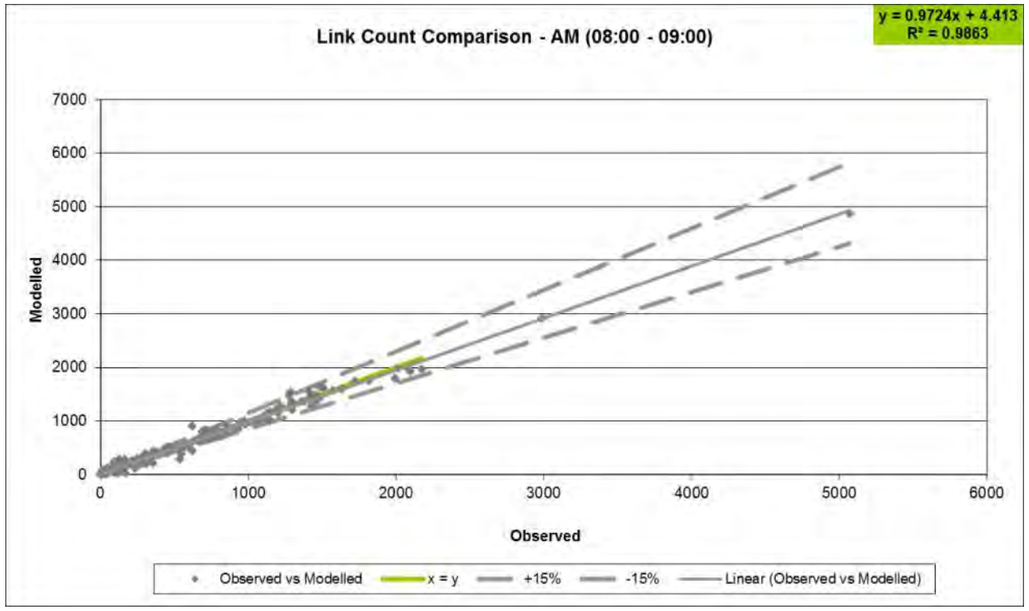


Figure 7-4 Morning Peak Turn Count Comparison

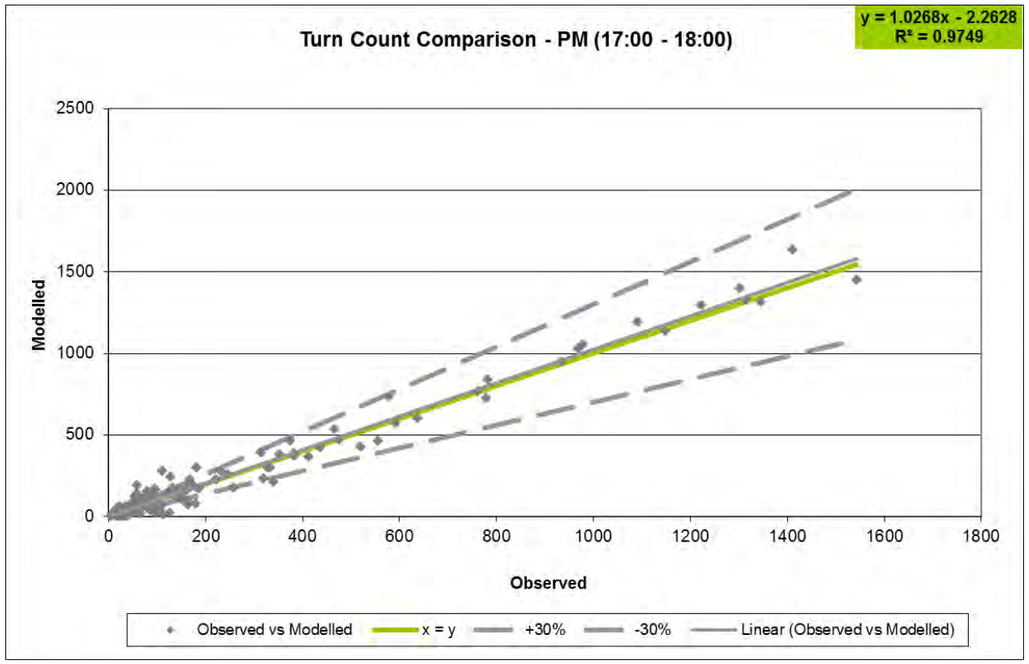


Figure 7-5 Afternoon Peak Turn Count Comparison

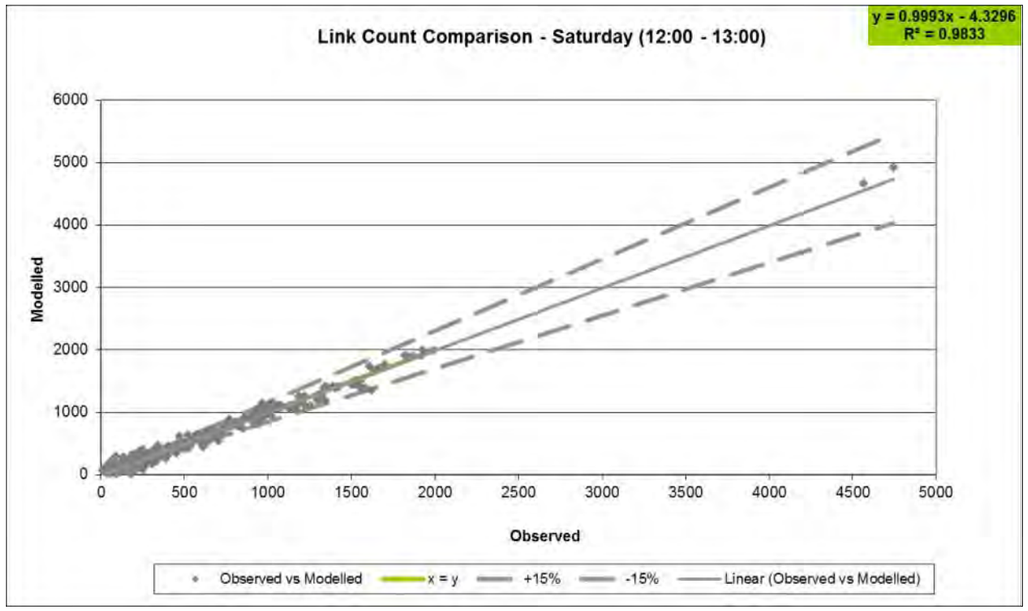


Figure 7-6 Saturday Peak Turn Count Comparison

The linear regression graphs for the peak periods illustrate a good correlation between observed and modelled counts, reinforced by a R^2 value of greater 0.97.

7.5 Travel Time Validation

Travel time comparisons have been undertaken for the peak periods along Karrinyup Road for a Wednesday and Saturday peak period. The comparison includes the average of the average model results from all five runs. It is also worth noting that the modelled travel times comprise of numerous vehicle runs over the period specified however the observed journey times comprise of a few runs undertaken sometime during this period. This should be taken into consideration when reviewing the results below.

Criteria states the journey times should be within 1 minute or within 15%, whichever is greater.

The observed and modelled travel times in minutes are presented along with the difference and percentage figures in the tables below. Based on the tables, the results illustrate a good correlation between observed and modelled journey times, with the majority of the routes having a difference of less than 1 minute or 15%. The exception to this is the AM eastbound direction where the model is over estimating the travel time. This is due to the modelled coordination between the interchange signals and the adjacent North Beach Road signals being slightly different to on-site.

Table 7-13 Morning Peak Travel Time Comparison

Route Name	Observed	Modelled	Diff	% Diff
Karrinyup Road Westbound	07:11	06:12	00:59	16%
Karrinyup Road Eastbound	05:02	06:14	01:12	24%

Table 7-14 Afternoon Peak Travel Time Comparison

Route Name	Observed	Modelled	Diff	% Diff
Karrinyup Road Westbound	06:30	06:28	00:02	0%
Karrinyup Road Eastbound	06:35	05:42	00:53	15%

Table 7-15 Saturday Peak Travel Time Comparison

Route Name	Observed	Modelled	Diff	% Diff
Karrinyup Road Westbound	08:09	07:25	00:44	10%
Karrinyup Road Eastbound	07:02	07:17	00:15	4%

Travel time graphs with 95% confidence intervals are provided below and show the time taken for vehicles as they move through the Karrinyup Road corridor.

In the AM period, the largest discrepancy between the observed and modelled data occurs on the eastbound approach to the Mitchell Freeway Interchange where the model overestimates the delay. This is due to the modelled coordination between the interchange signals and the adjacent North Beach Road signals not operating quite correctly.

In the PM period, the westbound observed data shows delay at each intersection, whereas the modelled data is a more steady average gradient through this data. There, the observed speeds appear slightly slower in some sections but this is suspected to be due to vehicles travelling slower than the posted speed limit which is modelled. Lastly, the model over-estimates the delay on the westbound approach to West Coast Highway.

In the Saturday period, the observed and modelled data are reasonably similar.

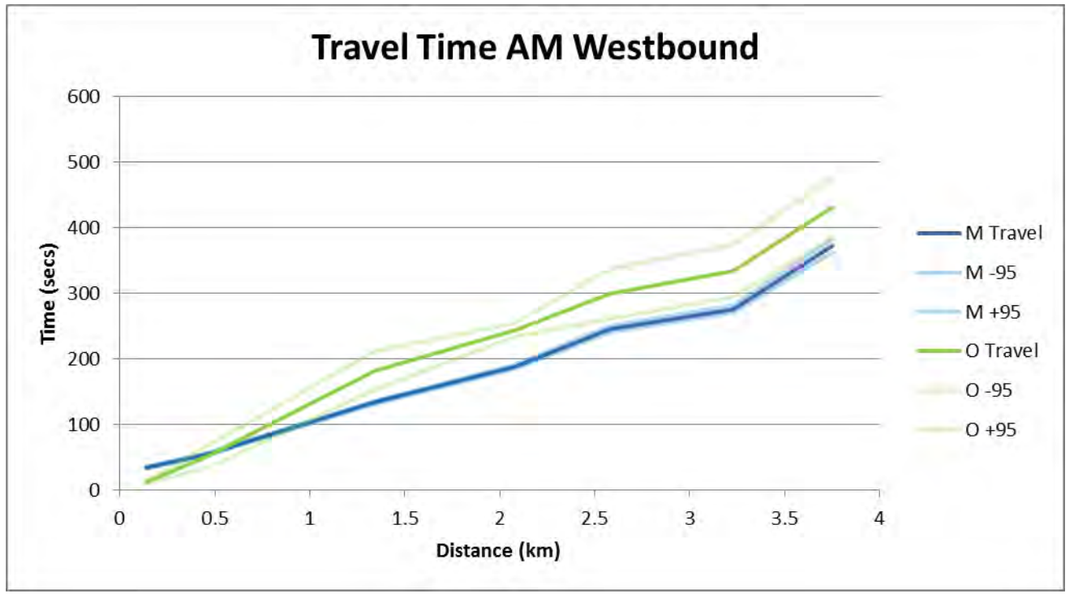


Figure 7-7 Morning Westbound Travel Time Graph

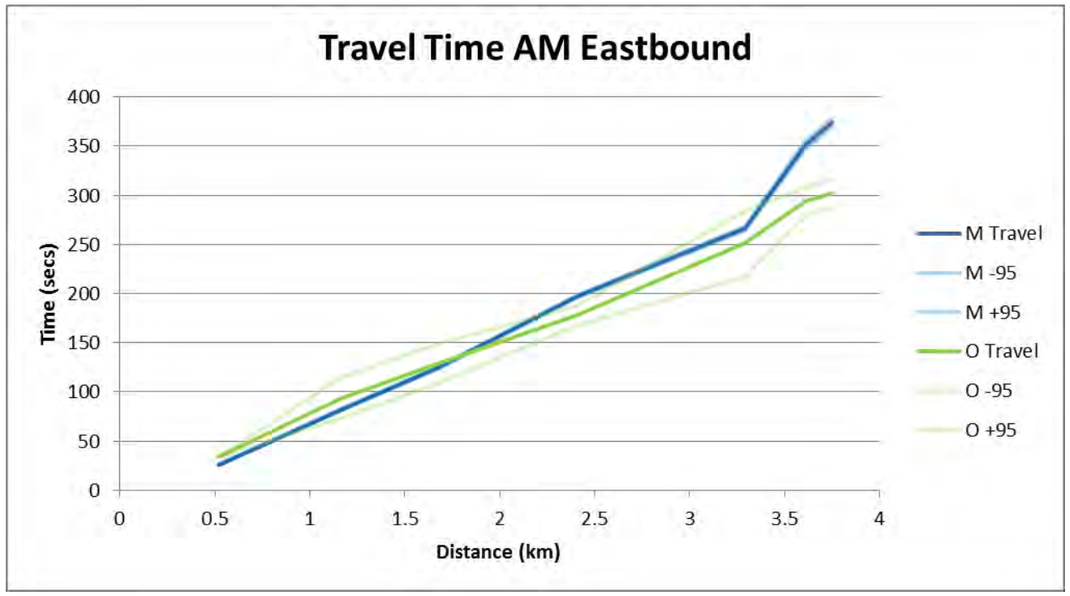


Figure 7-8 Morning Eastbound Travel Time Graph

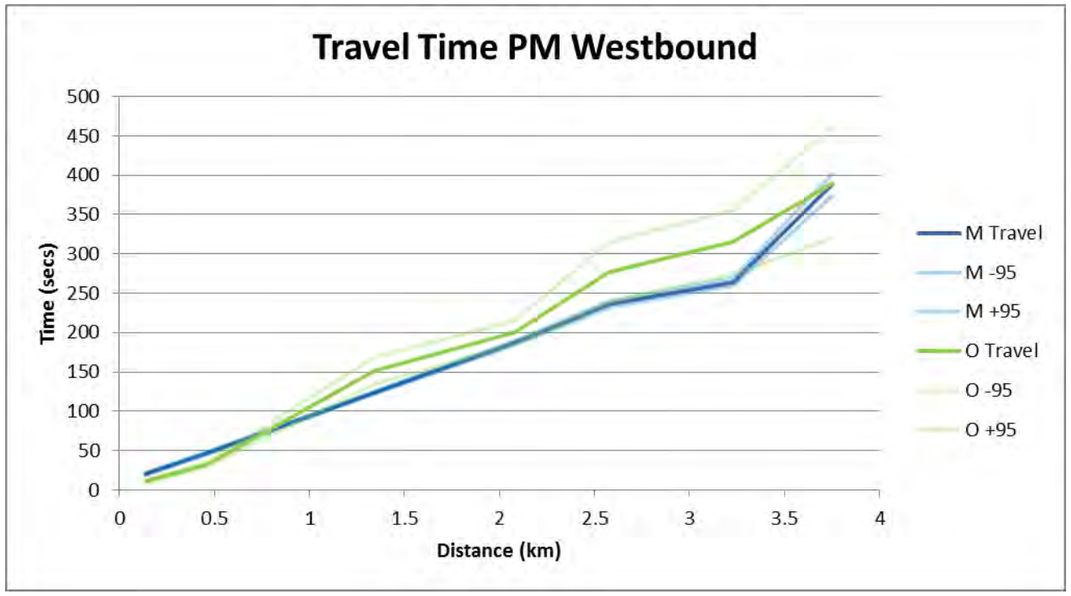


Figure 7-9 Evening Westbound Travel Time Graph

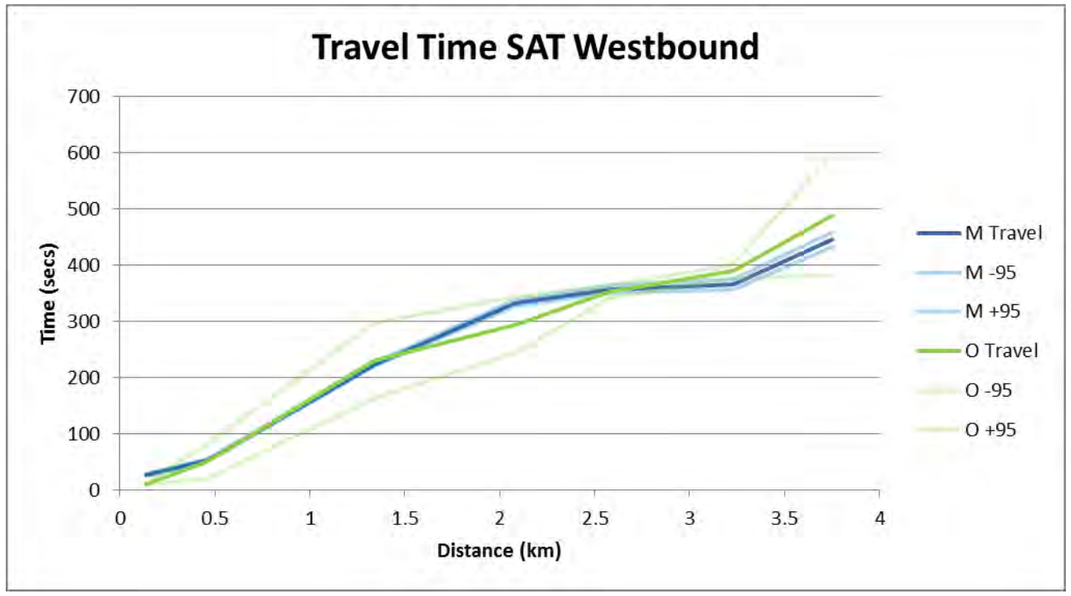


Figure 7-11 Saturday Westbound Travel Time Graph

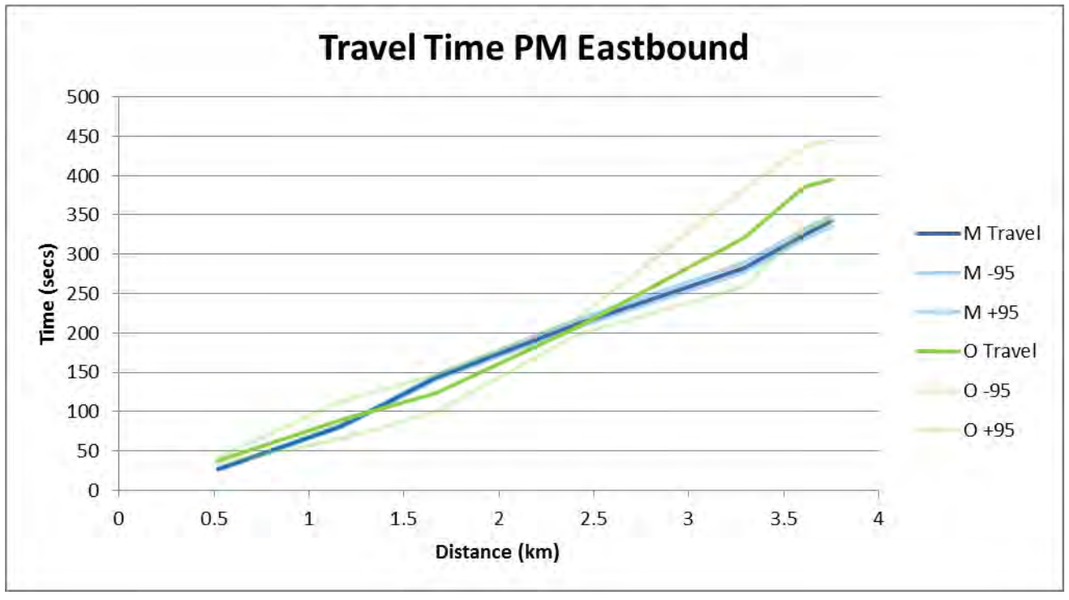


Figure 7-10 Evening Eastbound Travel Time Graph

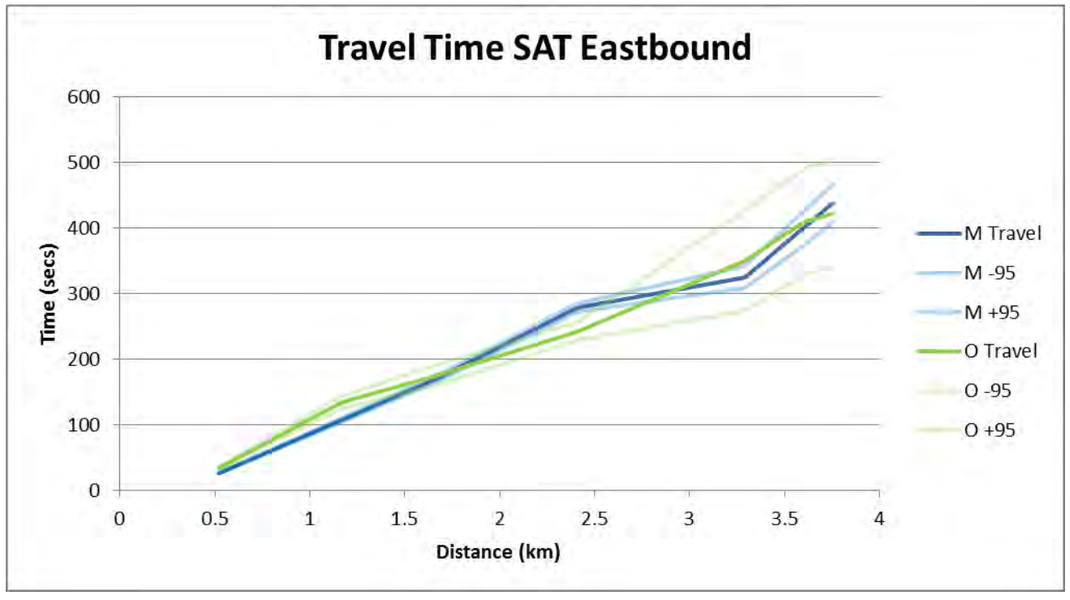


Figure 7-12 Saturday Eastbound Travel Time Graph

7.6 Queue Length Calibration

Queuing is an inherently unstable phenomenon which can vary greatly from day to day. Queue measurements can be very subjective as the definition of what vehicles count as “queued” can differ between observers and between modelling packages.

Notwithstanding the issues relating to queue variability, queue comparisons are still valuable and have been made between observed and modelled queue length data to ensure queue patterns are appropriately represented in the model. However these observed queues are reflected in the model. Particular queue lengths of interest were the Saturday queuing on the Karrinyup Road east approach to Huntriss Road and right turn from Karrinyup Road into Francis Avenue. The most notable queue in the evening period was the Karrinyup Road right turn into Marmion Avenue.

These observed and modelled comparisons are provided below.

Figure 7-13 Observed Karrinyup Road queue lengths

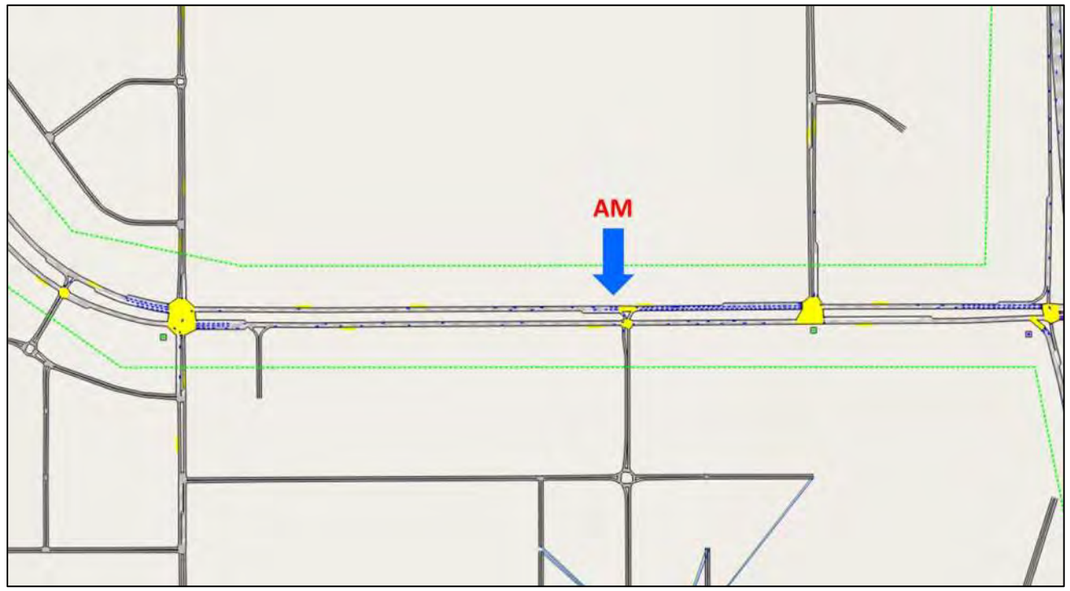


Figure 7-14 Modelled AM Eastbound Karrinyup Road queue lengths

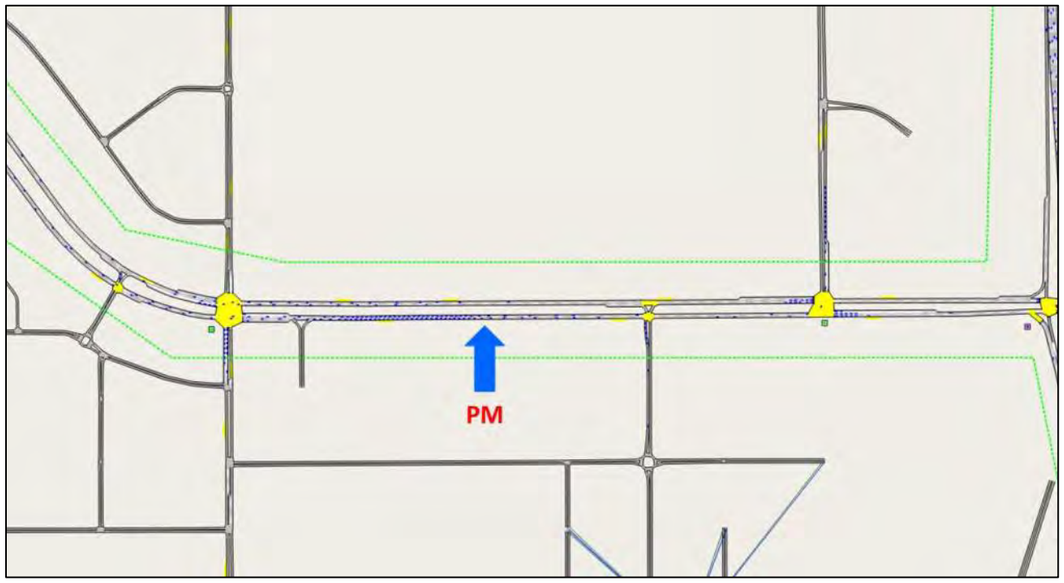


Figure 7-15 Modelled PM Westbound Karrinyup Road queue lengths

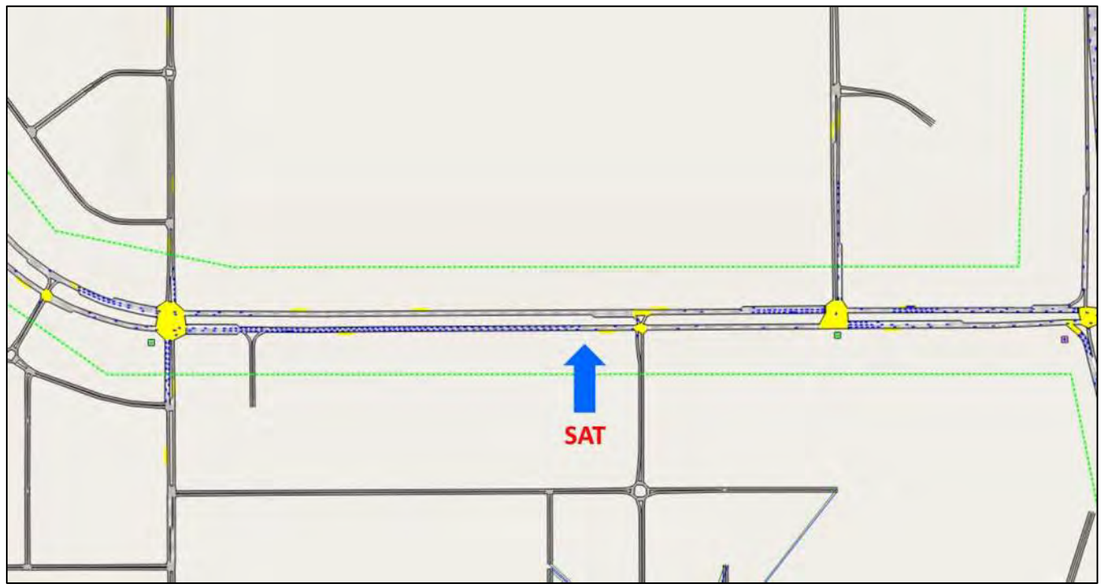


Figure 7-16 Modelled Saturday Westbound Karrinyup Road queue lengths

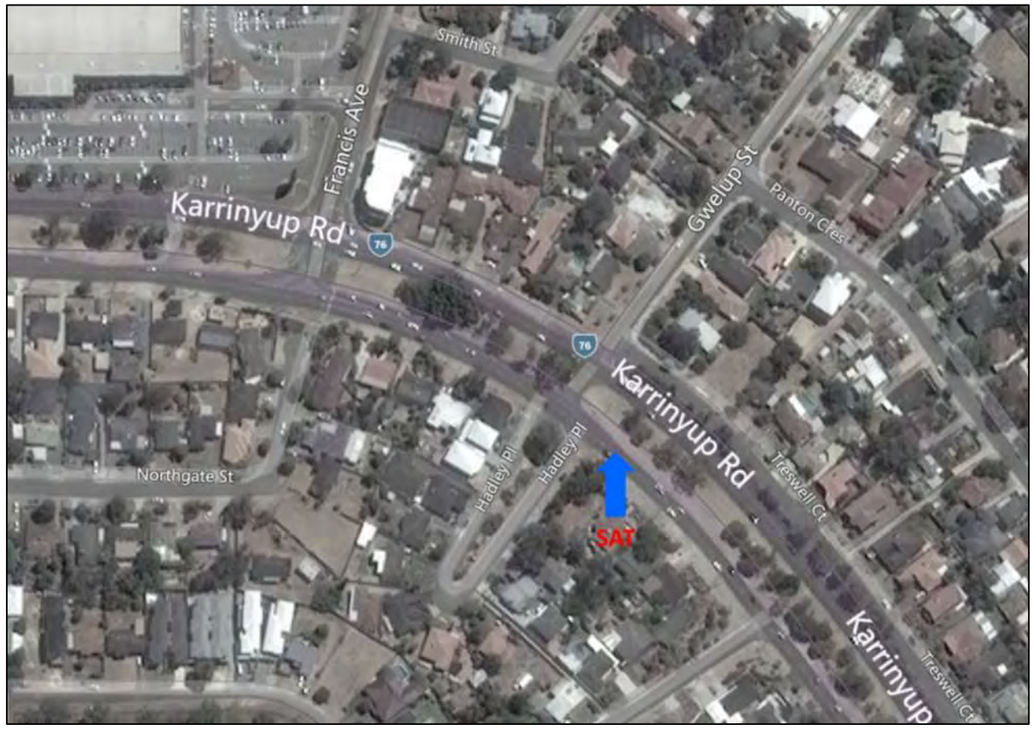


Figure 7-17 Observed Saturday Westbound Karrinyup Road right turn into Francis Avenue queue lengths

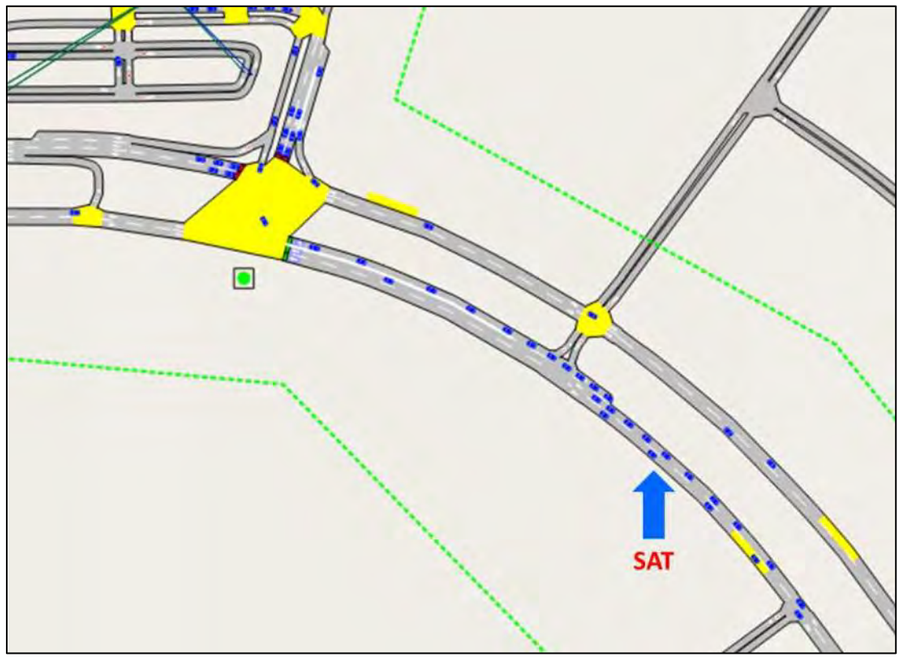


Figure 7-18 Modelled Saturday Westbound Karrinyup Road right turn into Francis Avenue queue lengths

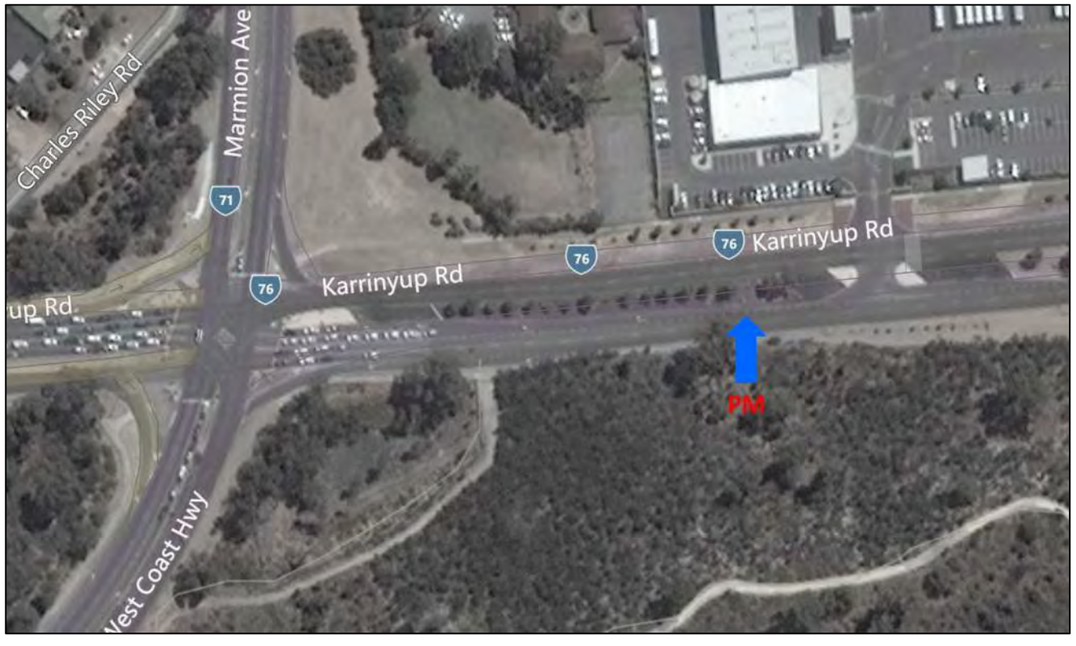


Figure 7-19 Observed Saturday Westbound Karrinyup Road right turn into Marmion Avenue queue lengths

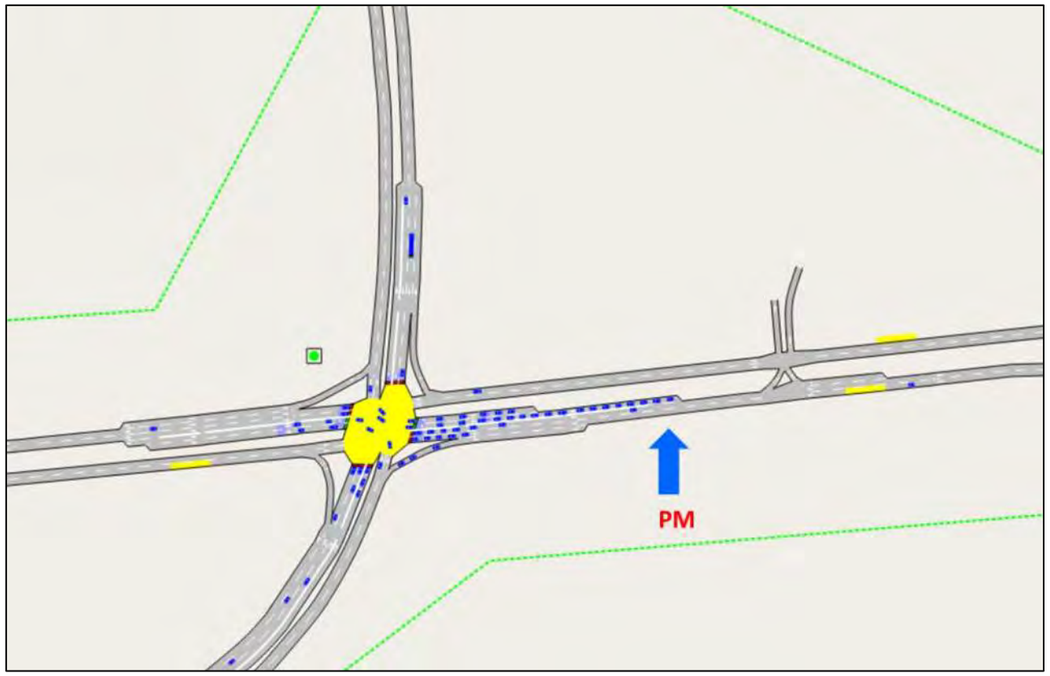
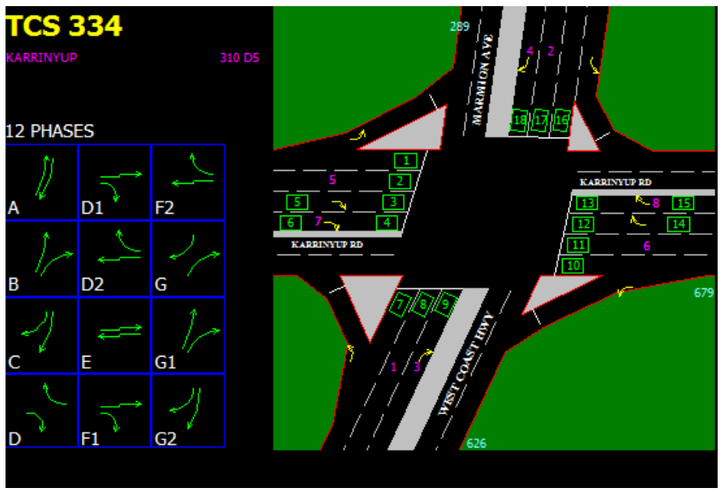


Figure 7-20 Observed Saturday Westbound Karrinyup Road right turn into Marmion Avenue queue lengths

7.7 SCATS Signal Timings

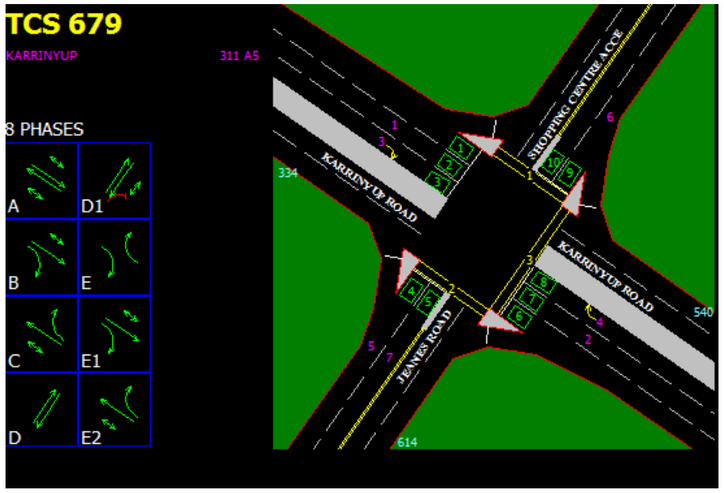
The following details the comparison of the SCATS signal timings versus the on-street recorded timings. SCATS is an adaptive signal system and is guided by loop detections. Therefore there will inevitably be some variation between the model and the on-street timings, as well as day to day variations. The following shows that whilst there are variations, they are not of a significant.

TCS 334 – Karrinyup Road/ Marmion Avenue



	AM Period			PM Period			SAT Period		
	Actual	Model	Diff	Actual	Model	Diff	Actual	Model	Diff
Start Time	08:00	08:00		17:00	17:00		12:00	12:00	
Avg Act CT	183	175	-9	187	171	-16	136	143	7
% A-Phase	44	43	-2	45	47	2	41	38	-3
% D-Phase	22	24	2	21	22	0	22	23	1
% E-Phase	19	15	-3	19	17	-2	19	19	0

TCS 679 - Karrinyup Road/ Jeanes Road

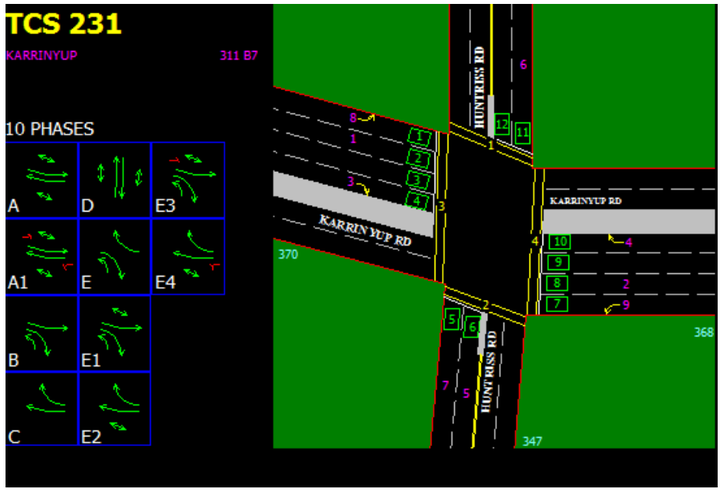


	AM Period			PM Period			SAT Period		
	Actual	Model	Diff	Actual	Model	Diff	Actual	Model	Diff
Start Time	08:00	08:00		17:00	17:00		12:00	12:00	
Avg Act CT	129	126	-3	131	115	-17	107	118	11
% A-Phase	34	46	12	46	54	8	51	48	-2
% B-Phase	17	17	0	0	0	0	0	0	0
% D-Phase	27	21	-6	33	24	-8	27	28	2
% E-Phase	22	16	-6	21	22	0	22	23	1

TCS 370 - Karrinyup Road/ Francis Avenue

	AM Period			PM Period			SAT Period		
	Actual	Model	Diff	Actual	Model	Diff	Actual	Model	Diff
Start Time	08:00	08:00		17:00	17:00		12:00	12:00	
Avg Act CT	130	126	-5	135	127	-9	121	127	6
% A-Phase	64	59	-5	54	47	-6	52	46	-6
% B-Phase	13	17	4	14	19	6	14	19	6
% C-Phase	23	24	1	32	33	1	34	35	1

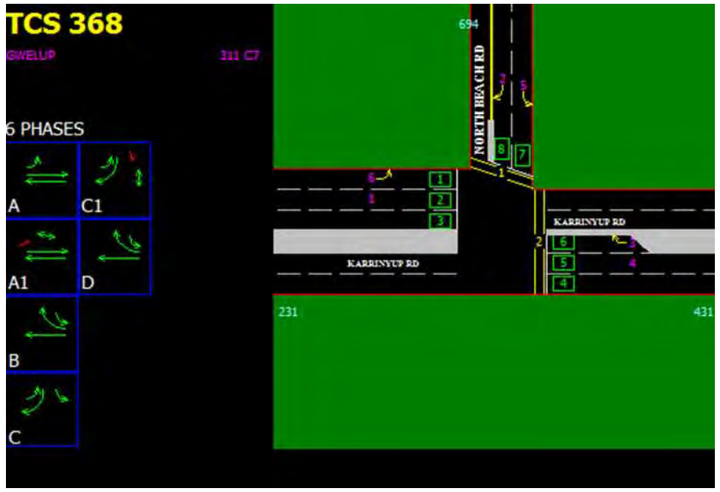
TCS 231 – Karrinyup Road/ Huntriss Road



	AM Period			PM Period			SAT Period		
	Actual	Model	Diff	Actual	Model	Diff	Actual	Model	Diff
Start Time	08:00	08:00		17:00	17:00		12:00	12:00	
Avg Act CT	112	114	1	131	129	-2	92	113	20
% A-Phase	46	47	1	40	40	0	50	47	-3
% B-Phase	0	0	0	18	20	2	0	0	0
% C-Phase	36	33	-4	29	26	-2	28	30	2
% D-Phase	18	21	3	13	14	1	22	23	1

	AM Period			PM Period			SAT Period		
	Actual	Model	Diff	Actual	Model	Diff	Actual	Model	Diff
Start Time	08:00	08:00		17:00	17:00		12:00	12:00	
Avg Act CT	134	126	-8	134	127	-8	121	136	15
% A-Phase	39	41	2	44	48	4	47	41	-5
% D-Phase	31	34	3	32	33	1	29	31	2
% E-Phase	30	26	-5	24	18	-6	25	28	3

TCS 368 – Karrinyup Road/ North Beach Road



Appendix B1

2024 Transport Model Details

1 Introduction

1.1 Project Context

Aurecon has been engaged by GPT to provide traffic and transport consultancy services for the Karrinyup Shopping Centre precinct, with a key component being a calibrated and validated traffic model to allow for option testing for the proposed Development Application.

The Karrinyup Shopping Centre is located within the suburb of Karrinyup, and locally governed by the City of Stirling. Karrinyup Road is the primary distributor serving the study area, with a number of connecting local roads, Burroughs Road, Davenport Street, Francis Avenue, and Jeanes Road. This project and model area is shown in Figure 1-1 below.

Figure 1-1: Project Area

1.1.1 Project Objectives

The key objective of this project is to develop a calibrated and validated microsimulation traffic model as a basis for comparative option testing for the proposed Development Application. Option testing will include potential changes to the shopping centre precinct (parking numbers and access) for a 2034 future year.

1.1.2 Modelling Scenarios

The existing situation is based upon the year 2024, as well as supplemented by data from 2023.The modelling scenarios are as follows:

- Typical Thursday Morning peak (AM)
- Typical Thursday Afternoon peak (PM)
- Typical Saturday Midday peak

The typical Thursday peaks is representative of the surrounding road network peak, while Saturday is the peak of the shopping centre itself.

2 Traffic Data Collection, Existing Situation and Network Set-up

Various sources of information were collected to build a holistic understanding of the current on-site conditions. A summary of data types used for this study is provided in Table 2-1.

Table 2-1: Road Network Datasets

Data Type	Source	Application
Foundation Traffic Model	Previous traffic study undertaken by Aurecon.	Provides the base network to create an updated sub-network from.
Background Map	Landgate Aerial Imagery	Model Network Coding
Posted Speed Limits and Road Hierarchy	Main Roads Road Information Mapping System (RIMS).	Model Network Coding
Video Survey Traffic Counts	Surveytech traffic counts	Model Calibration
Automatic Traffic Counter (ATC)	Surveytech traffic counts	Model Calibration
SCATS Traffic Counts	Main Roads	Model Calibration
SCATS Signalling	Main Roads	Signal Coding
Travel Times	Tom-tom travel time data	Model Validation
Queue Lengths	Site Observations	Model Validation
Public Transport Operations	PTA Transperth Route maps and Schedules, GTFS data	Model Network Coding
Zoning	ROM 24, Foundation Model zone system	Model Network Coding
OD Matrices / Trip Distribution	ROM 24 Strategic Model by Main Roads	Model Calibration
Site Observations	Site visits undertaken on survey days: 14th and 16th of March 2024. This involved driving in and around the site, understanding typical queues and behaviours.	Model Validation
Site Congestion Hotspots and Live Speeds	Site Observations, Main Roads Live traffic map	Model Validation

2.1 Road Network and Hierarchy

The Karrinyup Shopping Centre precinct consists of urban roads, with the major east-west connection being Karrinyup Road (dual carriageway), with key north-south connections being Jeanes Road and Francis Avenue.

The road hierarchy (as per Figure 2-1), from Main Roads Road Information Mapping System (RIMS), was referenced to verify the model road types coded.

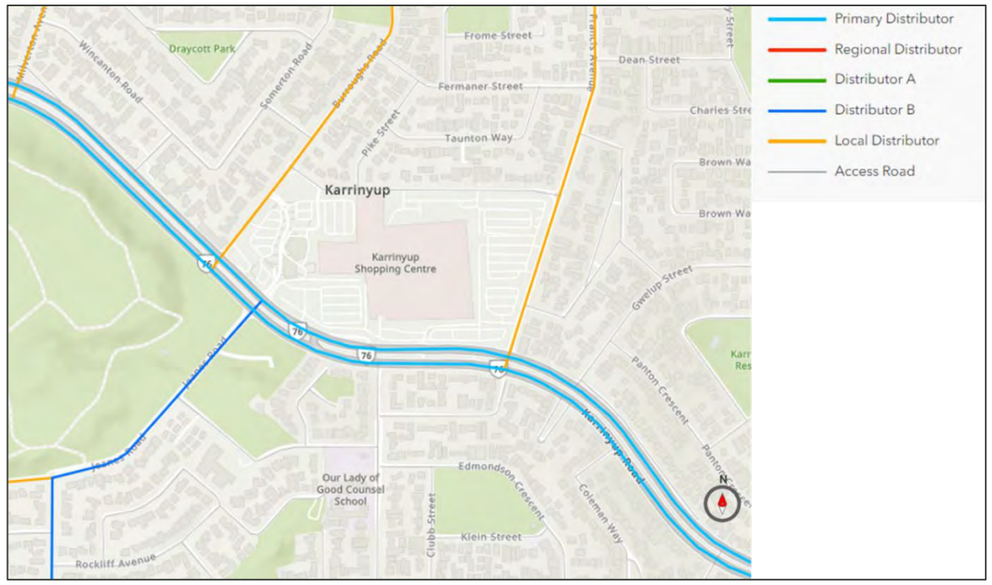


Figure 2-1: Road Network Hierarchy within Study Area

The posted speed limits and speed zones (as per Figure 2-2) were also interpreted from RIMS, to verify the speed limits applied within the model.

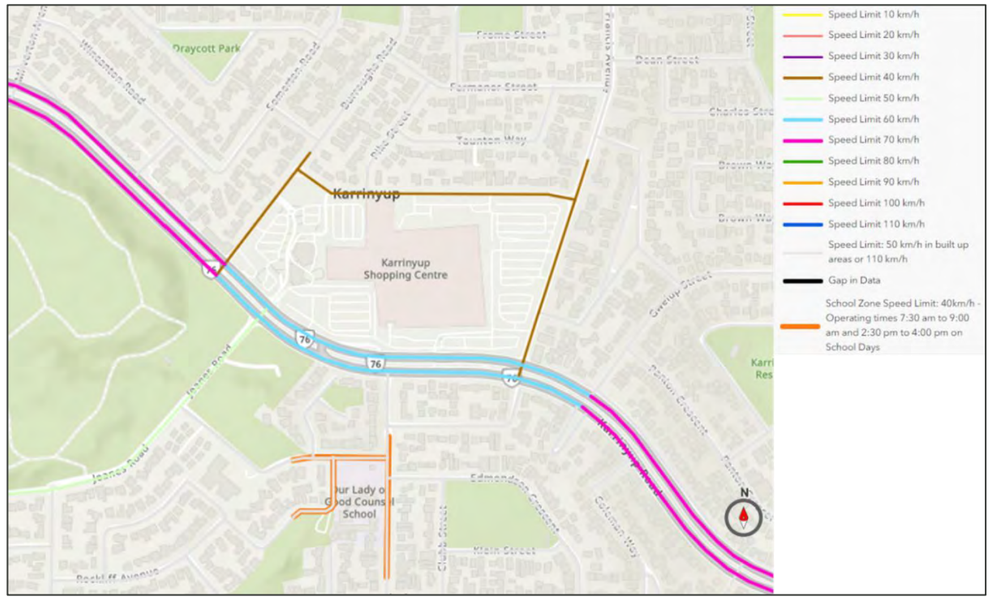


Figure 2-2: Posted Speed Limits and Speed Zones within Study Area

2.2 Traffic Count Data

Traffic counts were interpreted chiefly from video surveys and ATC data sets. The selected survey dates were 14th (Thursday) and 16th (Saturday) of March 2024 for the key intersections. The shopping centre access points were captured previously; the 9th (Thursday) and 11th (Saturday) of March 2023. To supplement the understanding of the site, SCATS detector counts were also reviewed to provide a secondary layer of checking and aligning the primary data sources.

Figure 2-3 illustrates the location and type of available traffic count data for the project.

Figure 2-3: Traffic Count Data within Study Area

2.2.1 Peak Hour Identification

The peak hour were selected based upon our current knowledge of the Karrinyup Shopping Centre precinct, informed by previous studies undertaken for GPT, as well as cross-checked from all available data sources.

- Thursday Morning (AM): 8:00 am to 9:00 am
- Thursday Afternoon (PM): 4:30 pm to 5:30 pm
- Saturday Midday period: 11:30 am to 01:30 pm

2.2.2 Traffic Flow Diagrams

Surveyed traffic counts were processed to develop traffic flow diagrams, split between light and heavy vehicle classes for 30-minute intervals of the analysis time periods. This aids in understanding the in-flow and out-flow demand of the model. The developed traffic flow was then fed into the OD matrix furnessing, matrix adjustments and model calibration.

2.3 Traffic Signals

SCATS traffic signal data for signalised intersections within the study area were collected for the survey day, sourced from Main Roads. Data such as timing settings and signal history data were analysed for replicating the signal timings and offsets in the traffic model.

Figure 2-4 presents the three signalised intersection locations along Karrinyup Road, along with their TCS number.

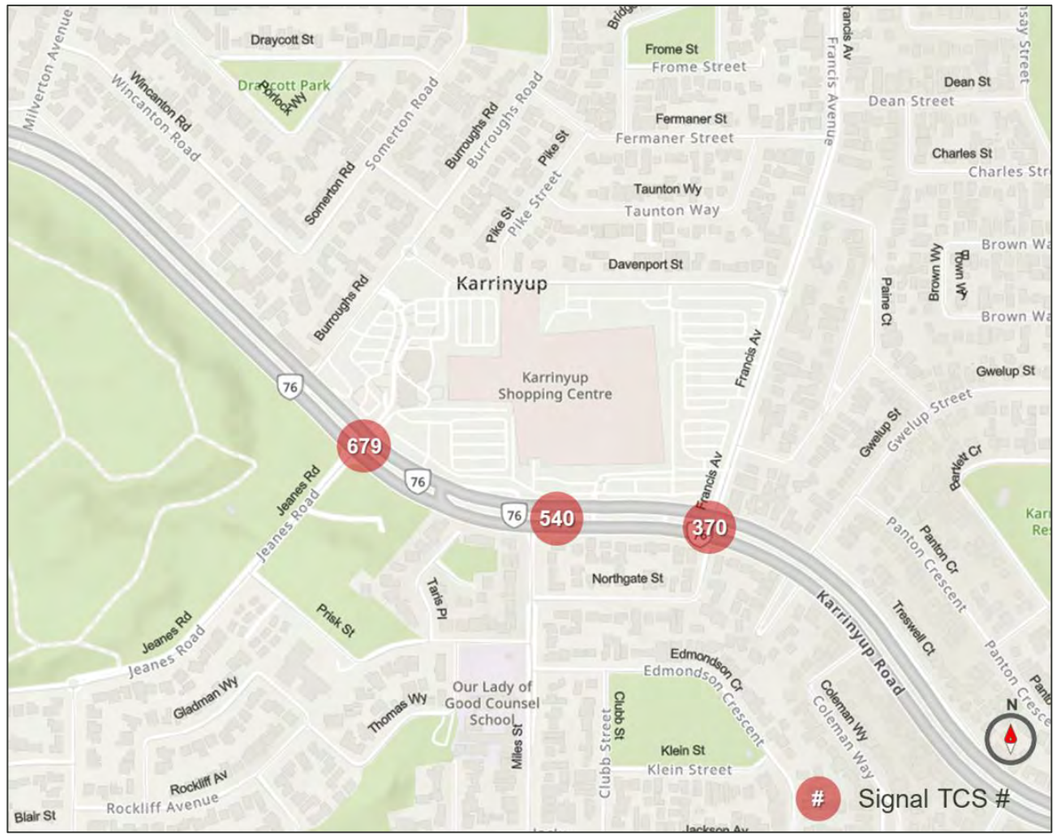


Figure 2-4: Signalised Intersections within Study Area

The model was developed with intervals of 30-minutes, for fixed time signal plans and phasing. The signal timing and phases were adopted from HIST file outputs of the relevant sites. As part of calibration, these signal times were adjusted within +-10% to replicate existing traffic conditions.

2.4 Travel Time Surveys

TomTom travel time data was collected along Karrinyup Road, as presented in Figure 2-5. The data was obtained for the 14th and 16th of March 2024, aligning to the traffic count survey. This route was broken down into subsections, capturing in-between key junction points for better accuracy. The average travel time data obtained from TomTom along these routes have been used for model validation.

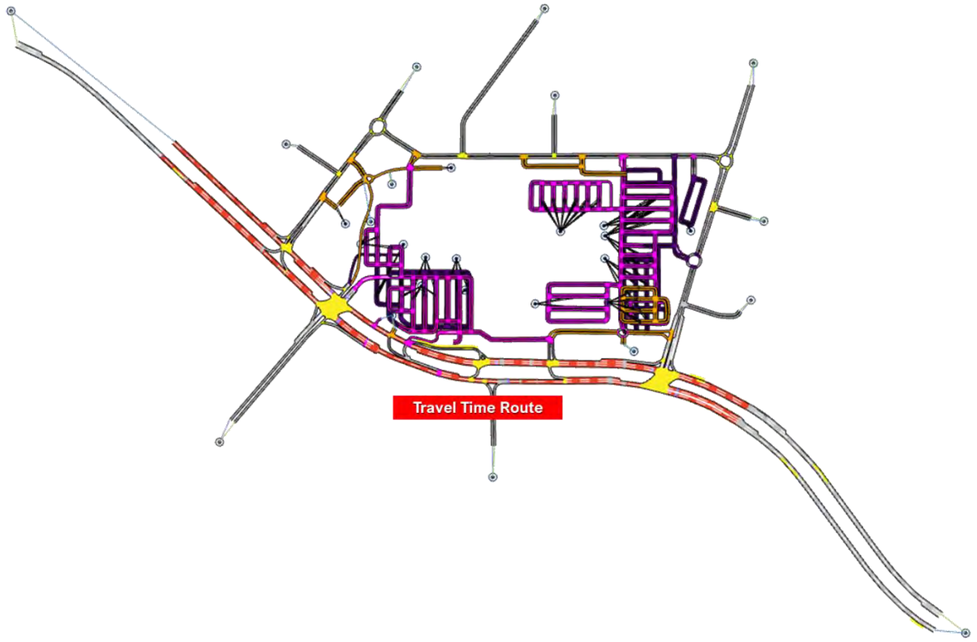


Figure 2-5: Travel Time Survey Routes within Study Area

2.5 Public Transport

Public transport data includes the bus route network map, as well as timetable data for relevant routes servicing the study area. These have been extracted from the Transperth website, as well as General Transit Feed Specification (GTFS) files. The GTFS includes bus routes, bus stops, and service frequencies. Figure 2-6 presents the bus routes and stands from Transperth, relevant to the date of model calibration. For bus dwell times, an average of 20 seconds with a deviation five seconds was assumed across all stops, as recommended in the Operational Modelling Guidelines.

The key routes that service the area, including the Karrinyup Bus Station that forms part of the shopping centre precinct:

- 422 (Stirling Station to Karrinyup Bus Station)
- 423 (Stirling Station to Warwick Station)
- 424 (Stirling Station to Karrinyup Bus Station)
- 425 (Stirling Station to Warwick Station)
- *650 (Events only to Perth Stadium) – Not included in assessment*

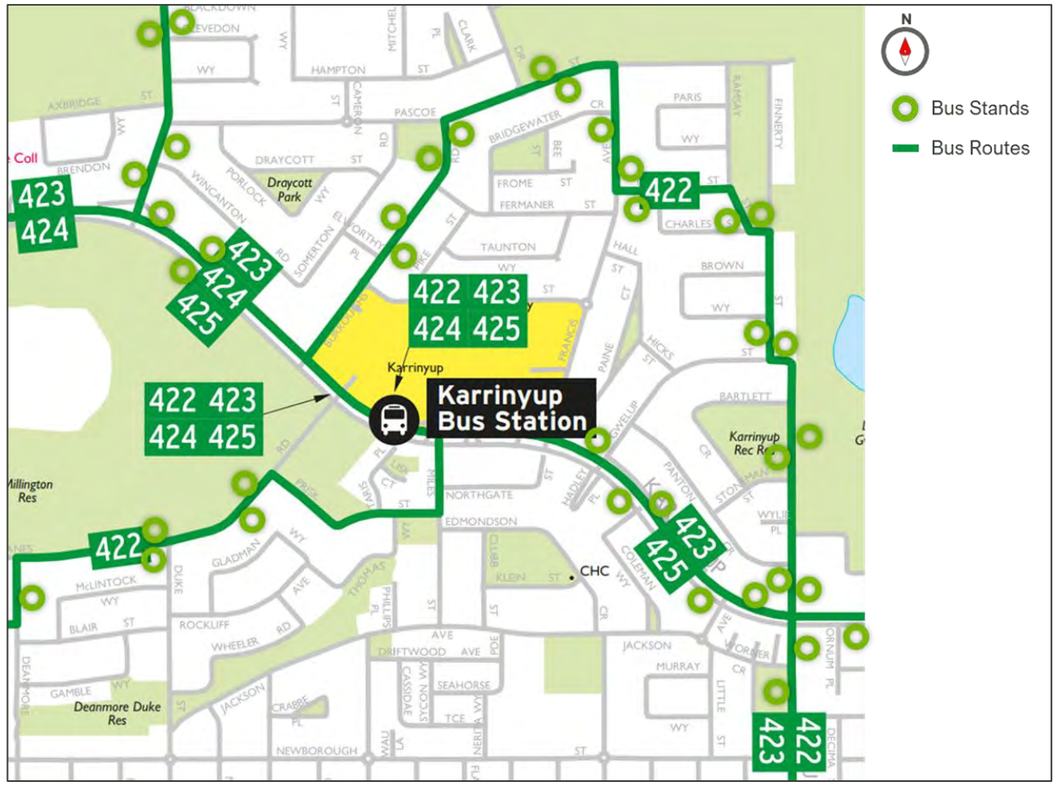


Figure 2-6: Transperth Bus Routes within Study Area

2.6 Site Observations

Site visits were conducted to supplement the understanding of the site during typical peak operation. The time and date of site visits aligned with the survey dates. The dates were as follows:

- Thursday 14th of March 2024, AM peak between 07:00 am and 09:00 am
- Thursday 14th of March 2024, PM peak between 03:30 pm and 05:30 pm
- Saturday 16th of March 2024, Midday peak between 11:00 am and 01:00 pm

Traffic pinch points and queuing behaviour were noted, and Main Roads live traffic maps were also used to verify the observed behaviour. Some observations are noted and presented below.

AM Peak:

- AM peak hour is associated with mostly commuter trips and school trips from the residential area and staff trips into the Centre.
- Traffic queuing was noted at Karrinyup Road/ Jeanes Road intersection.
- Jeanes Road experienced long queues during the AM peak hour. These trips are associated with the school trips to and from the nearby residential area.
- The right turn from Karrinyup Road into Burroughs Road experiences delays.
- Queuing on Burroughs Road was observed.

PM Peak:

- The PM Peak hour was inclusive of both commuter peak and the Centre peak hours.
- Queuing was generally noted in the westbound direction for both the commuter trips and Centre trips.
- Davenport Street operated with some minor delays due to on-street parking.

Saturday Peak:

- Some delays were noted during Saturday peak around the site. This was caused by the Centre traffic entering and exiting the shopping centre during the midday peak.
- Parking at the site appeared mostly occupied at all locations.
- Verge parking observed along Burroughs Road
- Queues on Burroughs Road due to the stop control at Karrinyup Road.

2.7 Zone Structure

There are a number of zones making up the model, with external zones for traffic entering and exiting the road network, as well as zones within the car parking areas of the shopping centre. Figure 2-7 presents the base model zone structure. Zones 1 through to 8 are for external roads, whereas 55, 56 and 57 are for surrounding land uses. All other zones are internal to the shopping centre, representing the car parking.

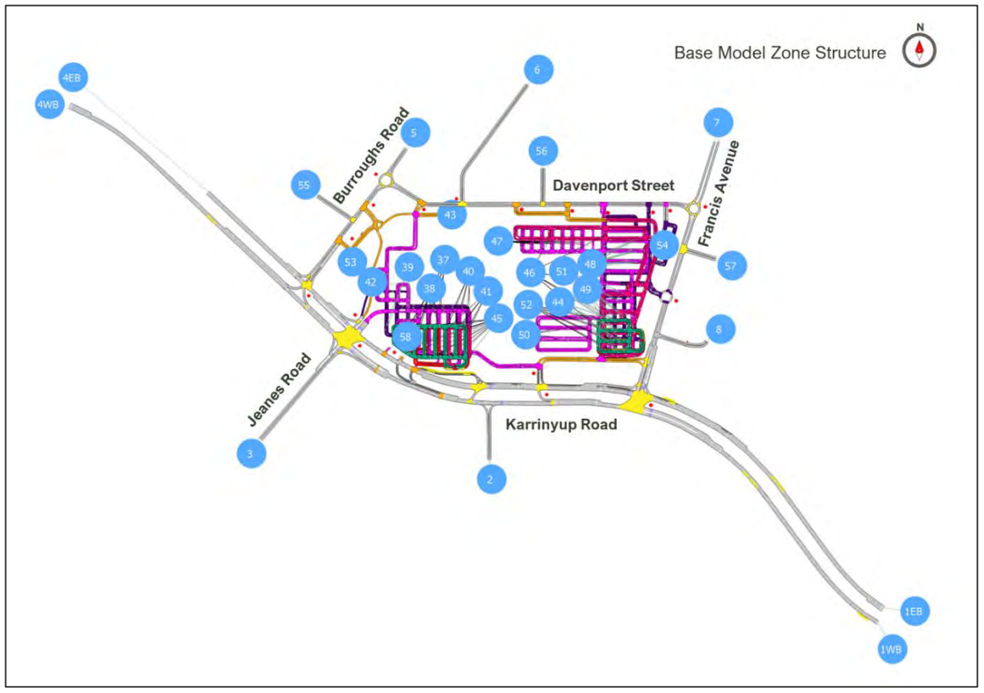


Figure 2-7: Base Model Zone Structure

3 Base Model Development

The development of the base model has been authored in Aimsun Next 23.0.0. It is recommended that the same version is used for all option testing and sensitivities, for consistency.

The key steps in the modelling process include:

- Network Refinement
- Traffic Demand Development
- Model Calibration and Validation

Throughout the calibration process, adjustments were made to some of the model parameters to so that the model replicates the observed traffic conditions. These parameters and assumptions were set to those generally used and accepted in Western Australia for such modelling applications.

The following section lays out the model development methodology, and parameters adopted.

3.1 Model Set-Up

A microsimulation model was developed, based upon the modelling previously undertaken as part of the Karrinyup Shopping Centre Traffic and Transport Planning Services, and adjusted to reflect current day conditions (2024). The model consists of the shopping centre precinct (including internal access roads) and surrounding road network, within a radius of approximately 500 metres. Figure 3-1 presents the overall model network.

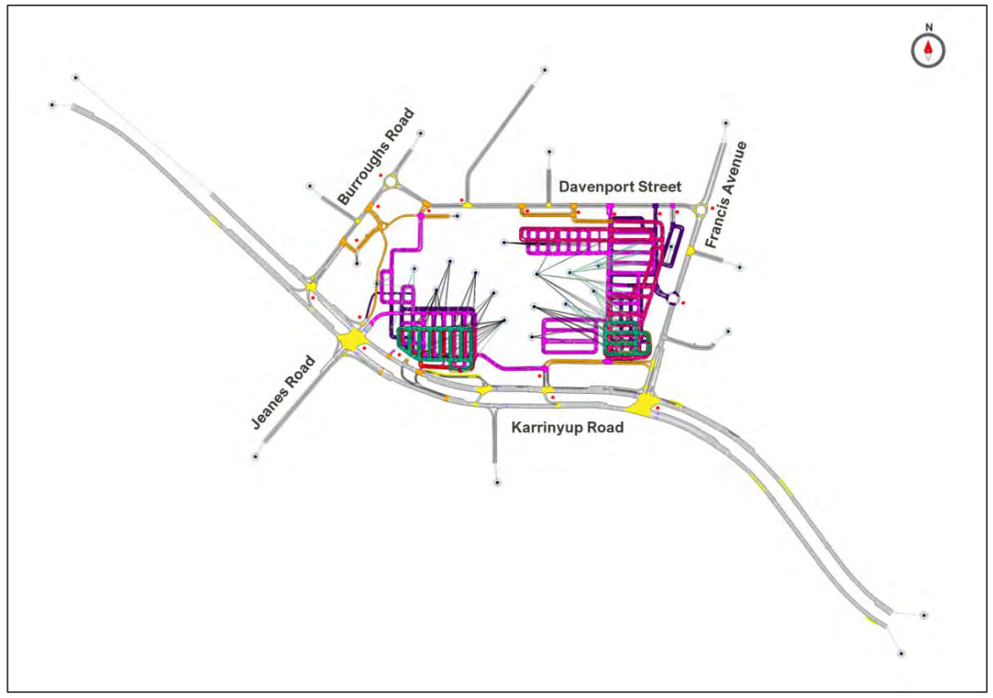


Figure 3-1: Base Model Network

3.2 Demand Estimation

The traffic demand development for the base model was undertaken with the following process:

- Prior matrices were developed using ROM24 strategic subarea matrices obtained from Main Roads. The observed survey data was used to furness the matrices. Car Mall matrices were separated from Car Background matrices to represent trips to/from the shopping centre and general background trips respectively.
- Static demand adjustment was applied to adjust the prior matrices' demand towards the turn counts
- Time slicing was applied to match the demand matrices to the surveyed movement count period (30-minute)

The subsections that follow provide further detail of what was involved under each of the above tasks.

3.2.1 Static demand adjustment

Following the development of the prior matrices, the traffic demand in the prior matrices were adjusted using the O/D Static Demand Adjustment tool in Aimsun. The tool adjusts the prior matrices' traffic demand toward the observed traffic flow, as per the turning counts specified in the RDS. This is an iterative process where static equilibrium assignment is used, at the macroscopic level, to adjust the matrices toward the turning movement counts. This results in the generation of final demand matrices for light, and truck vehicle types for each peak period.

Real Data Sets (RDS) for each vehicle type were developed for the each of the peak periods respectively. The RDS comprised of 30-minute turning counts for each movement of the intersections surveyed in the study area.

During O/D Static Demand Adjustment, movements with a large variance in observed turn counts, and assigned turn counts, required manual adjustment. The O/Ds corresponding to these turns were evaluated and trips were manually adjusted if needed.

3.2.2 Time slicing

The traffic demands obtained after the static demand adjustment process were then profiled using the O/D Static Departure Adjustment tool in Aimsun. This is an iterative process using the static equilibrium assignment at the macroscopic level to slice the matrices to a specified period of time. To match the turning movement counts, a time interval of 30-minutes was specified. During this process, a maximum deviation of 5% was specified for each cell for each vehicle type.

3.3 Traffic Assignment

Static Assignment

Static macroscopic experiment adopted the Frank-Wolfe assignment model for static equilibrium assignment, with the stopping criteria set at a relative gap (RGap) value of 0.1% and/or a maximum of 50 iterations as suggested in the Modelling Guidelines.

Static OD Adjustment

Frank-Wolfe assignment algorithm has been used to run the Static OD adjustment scenario. Matrix and trip length distribution elasticities values of 0.5 each were used for the assignment. The ROM model prior matrices were disaggregated into Aimsun zone structure as discussed in Section 2.7, and were used as input into the Static OD adjustment process. The OD adjustment process adjusts the matrices in order to match the observed data input into the model as a Real Data set file. This resulted in adjusted hourly OD matrices for each of the vehicle classes.

4 Calibration

4.1 Calibration Criteria

Model calibration is an adjustment process to assist in the development of an accurate simulation of on-street conditions. This is necessary to ensure that a model accurately represents the existing traffic situation and can be used with confidence to test alternatives. Calibration for this model has been based on the following criteria:

- **Route Choice**: Checking of the route choice within the model, ensuring that all key route choices are reasonable.
- **Turn Counts**: Comparing observed and modelled turning movements to general traffic over the modelled peak hour periods.

The calibration criteria are outlined in Table 4-1 in reference to the Operational Modelling Guidelines. This model is considered to be a Category 2 traffic model.

Table 4-1: Calibration Criteria (as per Operational Modelling Guidelines)

Calibration Measures	Category 2 Criteria
GEH statistic < 5.0 for individual turn/link volumes	> 85% of cases
GEH statistic < 10.0 for individual turn/link volumes	> 95% of cases
< 700vph within 100vph	> 90% of cases
700 – 2,700 vph within 15%	> 90% of cases
> 2,700 vph within 400 vph	> 90% of cases
R^2 value for modelled versus observed volumes for all individual links	> 0.95

**vph = vehicles per hour*

The GEH value is a commonly used performance measure based on a chi-squared statistic shown below:

$$GEH = \sqrt{\frac{2(V_o - V_m)^2}{(V_o + V_m)}}$$

Where: V_o is the observed flow in vehicles per hour

V_m is the modelled flow in vehicles per hour

A GEH of less than 5 is deemed satisfactory when assessing the compatibility between the predicted and actual hourly traffic volumes in base traffic models. GEHs in the range of 5 to 10 may warrant investigation. If the GEH is greater than 10, there is a high probability that there is a problem either with the traffic demand or with the traffic assignment results.

4.2 Calibration Parameters

As part of the calibration process, some model parameters were manually modified for specific locations to replicate existing conditions. The static parameters were adjusted using the attribute overrides which penalised certain illogical paths through the network.

During dynamic calibration, parameters such as lane changing cooperation, look ahead distance factors needed to be modified to achieve the observed traffic conditions. The range of modified parameters are tabulated in Table 4-2 below.

Table 4-2: Adopted Calibration Modelling Parameters

Calibration Parameters	Adopted Range
Lane Changing – Cooperation	60.00% – 100.00%
Signal timing	+/- 10% of averaged phasing time within peak periods

4.3 Vehicle Types

Three vehicle types (car, truck, and bus) were used in the model, which aligned with the vehicle classifications recorded in the traffic count data. Aimsun default values were adopted for the dimensions and parameters for cars, trucks and buses. The car vehicle type was further divided into two types: car and car mall, to represent car trips to and from the shopping centre and the car trips outside the shopping centre.

4.4 Road Types and Hierarchy

The network information available on Main Roads' Road Information Mapping System (RIMS) was considered in the base model and aligned to the default road types available in Aimsun. Table 4-3 below details the modelled roads, and their respective road types from the RIMS and Aimsun.

Table 4-3: Modelled Road Types

Road		Road Type (RIMS)	Aimsun Road Type	Posted Speed Limit (km/h)
Karrinyup Road	West of Burroughs Road	Primary Distributor	Primary	70
	Between Burroughs Road and Gwelup Road		Secondary	60
	East of Gwelup Road		Primary	70
Burroughs Road		Local Distributor	Tertiary	40
Francis Avenue		Local Distributor	Tertiary	40
Jeanes Road		Distributor B	Tertiary	50
Davenport Street		Access Road	Residential	40
Pike Street		Access Road	Residential	50
Miles Street		Access Road	Residential	50
Smith Street		Access Road	Residential	50

4.5 Penalty and Delay Functions

4.5.1 Turn Penalty Functions

Turn Penalty Functions (TPFs) in Aimsun are used to model the cost or associated additional time with making a turn at an intersection, crucial to accurately simulating traffic flow and behaviour. Three main TPFs have been employed in the model.

1. TPF – for Signalised Intersection. Exclusively used at signalised intersections where the cost is influenced by the signal timings, traffic volume, control plan and the delay observed by the vehicles.
2. TPF – Default. For all other intersections and turns where the cost is influenced by the control plan (e.g. stop signs) and the delay observed by the vehicles.
3. TPF – Defined User Cost. Overwrites the previous two TPFs with a manually defined cost for a particular turn.

4.6 Traffic Management

No traffic management policies are utilised in the model.

4.7 Link and Turn Counts

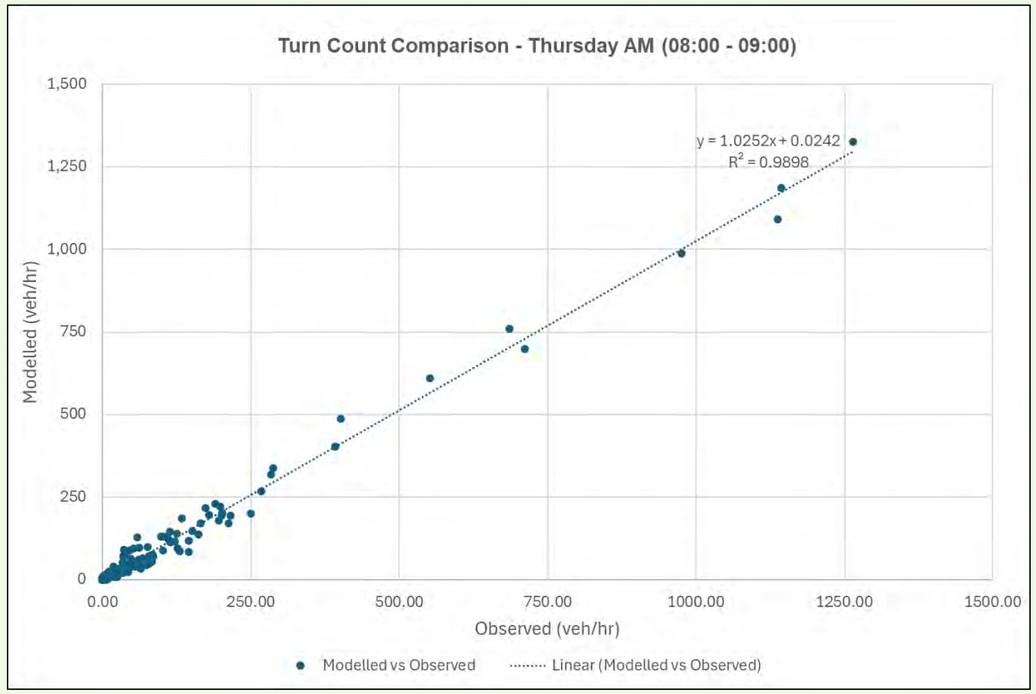
4.7.1 Thursday AM Peak Link/Turn Count Calibration

Table 4-4 shows a summary of the model calibration results for the AM peak based on the average seed for the single peak hour:

- 100 percent of modelled links/turns were within 15 percent of vehicles for all links/turns with observed counts of 700 to 2700 vehicles for both cars and trucks
- During the AM peak period, 95 percent and 100 percent of link/turn flows achieved GEH values of less than 5 (GEH < 5) for both cars and trucks respectively.
- 100 percent of modelled links/turns were within 100 vehicles for all links/turns with observed counts of 700 vehicles or less for cars and trucks
- 100 percent of modelled links/turns were within 15 percent of vehicles for all links/turns with observed counts of 700 to 2700 vehicles for both cars and trucks

Table 4-4: Thursday AM Link/Turn Count Calibration Summary

Link/Turn Count R^2 Measure	Criteria	Achieved R^2 Value
R^2 value for modelled versus observed volumes for all individual link	**> 0.95**	**0.9898**



Criteria		Observed Total	Modelled Achieved	Achieved (%)
Cars				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	106	95%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	106	106	100%
700 – 2,700 vph within 15%	> 90% of cases	5	5	100%
> 2,700 vph within 400 vph	> 90% of cases	0	0	100%
Trucks				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	111	100%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	111	111	100%
700 – 2,700 vph within 15%	> 90% of cases	0	0	100%
> 2,700 vehicles per hour within 400 vph	> 90% of cases	0	0	100%

**vph = vehicles per hour*

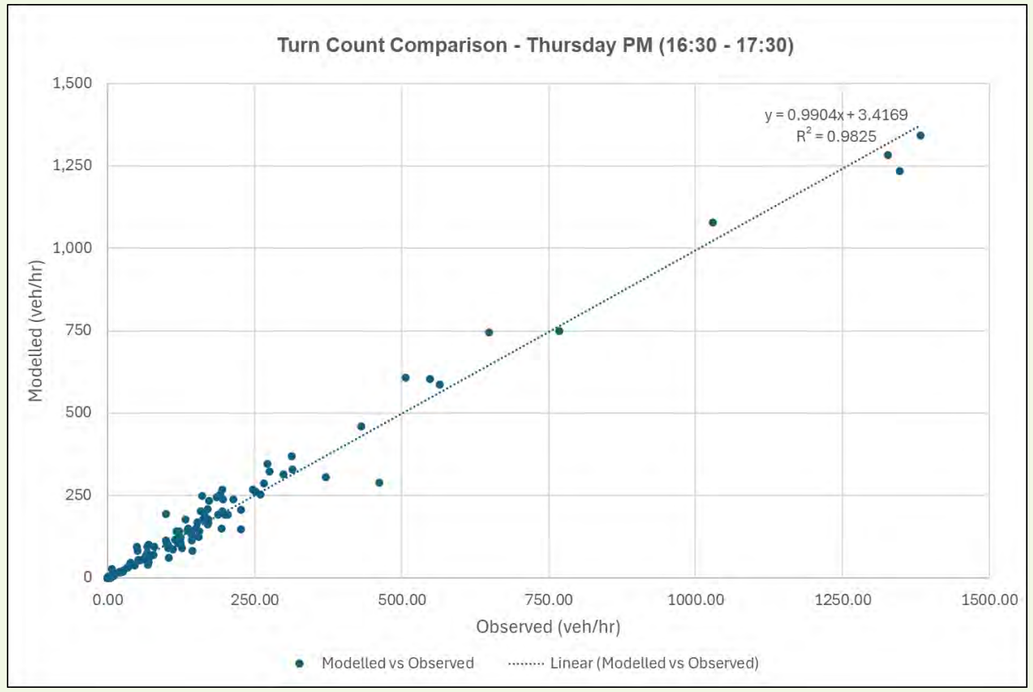
4.7.2 Thursday PM Peak Link/Turn Count Calibration

Table 4-5 show a summary of the model calibration results for the PM peak based on the average seed for the single peak hour:

- During the PM peak period, 100 percent of link/turn flows achieved GEH values of less than 10 (GEH < 10) for cars and trucks.
- For cars, 95% (105 of 111) of all movements during the PM peak achieved GEH values of less than 5 (GEH < 5)
- For trucks, 100% (111 of 111) of all movements during the PM peak achieved GEH values of less than 5 (GEH < 5)
- 98 percent of modelled links/turns were within 100 vehicles for all links/turns with observed counts of 700 vehicles or less for both cars and 100 percent achieved for trucks
- 100 percent of modelled links/turns were within 15 percent of vehicles for all links/turns with observed counts of 700 to 2700 vehicles for both cars and trucks

Table 4-5: Thursday PM Link/Turn Count Calibration Summary

Link/Turn Count R^2 Measure	Criteria	Achieved R^2 Value
R^2 value for modelled versus observed volumes for all individual link	**> 0.95**	**0.9825**



Criteria		Observed Total	Modelled Achieved	Achieved (%)
Cars				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	105	95%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	106	104	98%
700 – 2,700 vph within 15%	> 90% of cases	5	5	100%
> 2,700 vph within 400 vph	> 90% of cases	0	0	100%
Trucks				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	111	100%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	111	111	100%
700 – 2,700 vph within 15%	> 90% of cases	0	0	100%
> 2,700 vehicles per hour within 400 vph	> 90% of cases	0	0	100%

**vph = vehicles per hour*

4.7.3 Saturday Peak Link/Turn Count Calibration

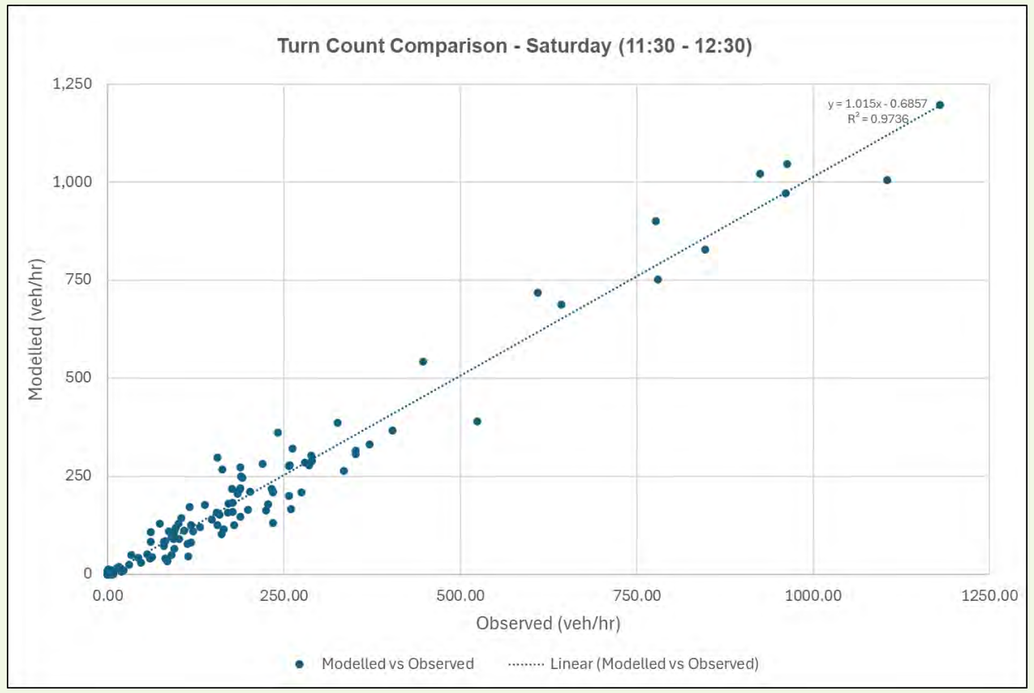
Table 4-6 and Table 4-7 show a summary of the model calibration results for the Saturday peaks based on the average seed for the two peak hours:

- For cars, 88% (98 of 111) of all movements during the first Saturday peak hour (11:30 – 12:30) achieved GEH values of less than 5 (GEH < 5). 100% of all movements had also achieved GEH values of less than 10 (GEH < 10).
- During the second Saturday peak hour (12:30 – 13:30), 92% (102 of 111) of all car movements achieved GEH values of less than 5 (GEH < 5) with 100% (111 of 111) of all car movements achieving GEH values of less than 10 (GEH < 10).
- For trucks, 100% (111 of 111) of all movements during the first and 100% for the second Saturday peak hours (11:30 – 12:30 and 12:30 – 13:30) achieved GEH values of less than 5 (GEH < 5)
- During the first Saturday peak hour (11:30 – 12:30), 94 percent of modelled links/turns were within 100 vehicles for all links/turns with observed counts of 700 vehicles or less for both cars and trucks.
- During the second Saturday peak hour (12:30 – 13:30), 96 percent of modelled links/turns were within 100 vehicles for all links/turns with observed counts of 700 vehicles or less for both cars and trucks
- During the first Saturday peak hour (11:30 – 12:30), 88 percent of modelled links/turns were within 15 percent of vehicles for all links/turns with observed counts of 700 to 2700 vehicles for both cars and trucks. Under the calibration criteria, the criteria of 700 – 2,700 vph within 15% achieved for 90% of modelled links/turns would not be met. However, given that there were 8 turn movements that had flows within the 700 – 2,700 vph criteria and 7 of which had met the within 15% criteria, the model can still be considered calibrated.
- During the second Saturday peak hour (12:30 – 13:30), 100 percent of modelled links/turns were within 15 percent of vehicles for all links/turns with observed counts of 700 to 2700 vehicles for both cars and trucks.

Saturday Peak - 11:30 – 12:30

Table 4-6: Saturday 11:30 – 12:30 Link/Turn Count Calibration Summary

Link/Turn Count R^2 Measure	Criteria	Achieved R^2 Value
R^2 value for modelled versus observed volumes for all individual link	**> 0.95**	**0.9736**



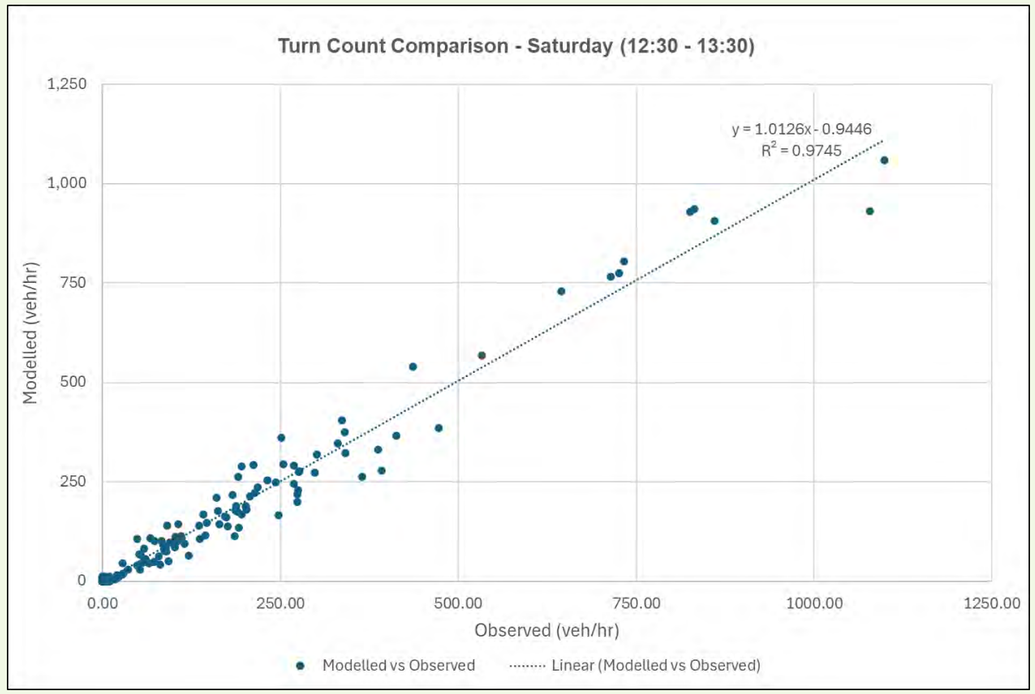
Criteria		Observed Total	Modelled Achieved	Achieved (%)
Cars				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	98	88%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	103	97	94%
700 – 2,700 vph within 15%	> 90% of cases	8	7	88%
> 2,700 vph within 400 vph	> 90% of cases	0	0	100%
Trucks				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	111	100%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	111	111	100%
700 – 2,700 vph within 15%	> 90% of cases	0	0	100%
> 2,700 vehicles per hour within 400 vph	> 90% of cases	0	0	100%

**vph = vehicles per hour*

Saturday Peak - 12:30 – 13:30

Table 4-7: Saturday 12:30 – 13:30 Link/Turn Count Calibration Summary

Link/Turn Count R^2 Measure	Criteria	Achieved R^2 Value
R^2 value for modelled versus observed volumes for all individual link	**> 0.95**	**0.9745**



Criteria		Observed Total	Modelled Achieved	Achieved (%)
Cars				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	102	92%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	103	99	96%
700 – 2,700 vph within 15%	> 90% of cases	8	8	100%
> 2,700 vph within 400 vph	> 90% of cases	0	0	100%
Trucks				
GEH < 5 for individual link/turn volumes	> 85% of cases	111	111	100%
GEH < 10 for individual link/turn volumes	> 95% of cases	111	111	100%
< 700 vph within 100 vph	> 90% of cases	111	111	100%
700 – 2,700 vph within 15%	> 90% of cases	0	0	100%
> 2,700 vehicles per hour within 400 vph	> 90% of cases	0	0	100%

**vph = vehicles per hour*

4.8 Root Mean Square Error

The root mean square error RMSE is calculated using the formulae below. The RMSE values for the peak hours are shown in Table 4-8. The RMSE provides an indication of the level of prediction error in a model. The RMSE criteria for Category 2 model require that the calculated RMSE value is less than 20% as specified in the Main Roads Mesoscopic and Hybrid Modelling guidelines. The Karrinyup model passes the criteria for Category 2 models.

$$\% \, RMSE = \frac{\sqrt{\frac{\sum(O-M)^2}{c-1}}}{\frac{\sum O}{c}} \times 100$$

Where: O is the observed count per hour

M is the modelled count per hour

c is the number of observed counts locations

Table 4-8: Base Model Root Mean Square Error (RMSE)

Peak Period	AM Peak (08:00 – 09:00)	PM Peak (16:30 – 17:30)	Saturday Peak (11:30 – 13:30)
RMSE	5.29%	7.69%	9.88%

4.9 Model Stability

Table 4-9, Table 4-10, and Table 4-11 summarises the overall modelled network performance statistics for all peak periods assessed. Figure 4-1, Figure 4-3, and Figure 4-5 shows the Vehicle Kilometre Travelled (VKT) statistics along with the Coefficient of Variance 15% bands for each peak period, while Figure 4-2, Figure 4-4, and Figure 4-6 shows the Vehicle Hours Travelled (VHT) statistics along with the Coefficient of Variance 15% bands for each peak period. The comparisons generally show stability between the replication runs

In both AM and Saturday peak, no unreleased or incomplete trips were present. However, in the PM peak, a maximum of 38 incomplete trips were observed, with an average of 14 incomplete trips. Delay for unreleased trips were low on the AM and Saturday peak periods, with higher delays present in the PM peak.

Table 4-9: Modelled Network Performance Statistics – AM Peak

Network Performance Statistics	AM Peak (08:00 – 09:00)							
	Run 1	Run 2	Run 3	Run 4	Run 5	Mean	SD*	COV**
Vehicle Kilometres Travelled (km)	4786.1	4979.1	4832.4	4881.4	4858.0	**4867.4**	71.8	1%
Vehicle Hours Travelled (hrs)	180.0	203.0	201.5	192.9	190.2	**193.5**	9.3	5%
Average Network Speed (km/h)	30.5	29.3	28.4	30.0	29.4	**29.5**	0.8	3%
Completed Trips (veh)	4456	4601	4491	4486	4505	**4508**	55.1	1%
Incomplete Trips (veh)	0	0	0	0	0	**0**	0.0	0%
Delay for Unreleased Trips (sec)	0.2	32.6	4.7	26.9	0.6	**13.1**	15.5	120%

* SD = Standard Deviation

** COV = Coefficient of Variance

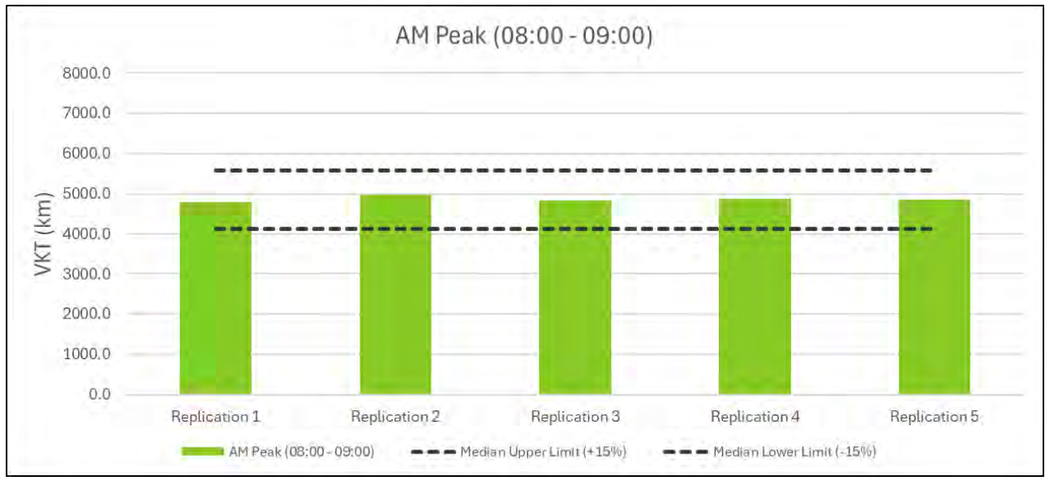


Figure 4-1: AM Peak (08:00 - 09:00) VKT Stability Plot

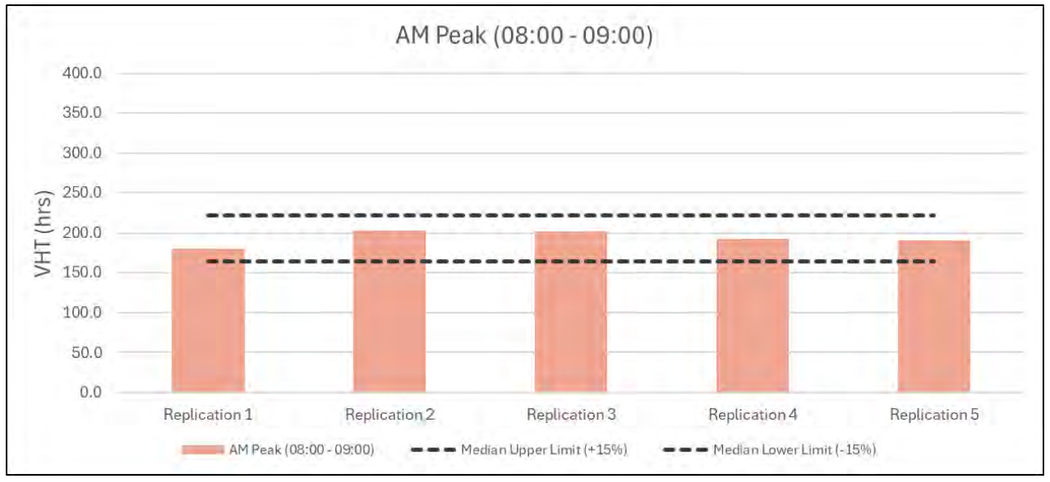


Figure 4-2: AM Peak (08:00 - 09:00) VHT Stability Plot

Table 4-10: Modelled Network Performance Statistics – PM Peak

Network Performance Statistics	PM Peak (16:30 – 17:30)							
	Run 1	Run 2	Run 3	Run 4	Run 5	Mean	SD*	COV**
Vehicle Kilometres Travelled (km)	6833.7	6452.4	6741.1	6784.5	6880.4	**6738.4**	168.2	2%
Vehicle Hours Travelled (hrs)	298.6	273.6	288.7	302.7	298.9	**292.5**	11.8	4%
Average Network Speed (km/h)	25.6	26.4	25.9	25.2	25.5	**25.7**	0.5	2%
Completed Trips (veh)	6305	5951	6275	6237	6327	**6219**	153.6	2%
Incomplete Trips (veh)	0	0	38	33	0	**14**	19.5	137%
Delay for Unreleased Trips (sec)	183.8	185.4	271.1	258.2	199.0	**219.7**	41.9	19%

* SD = Standard Deviation

** COV = Coefficient of Variance

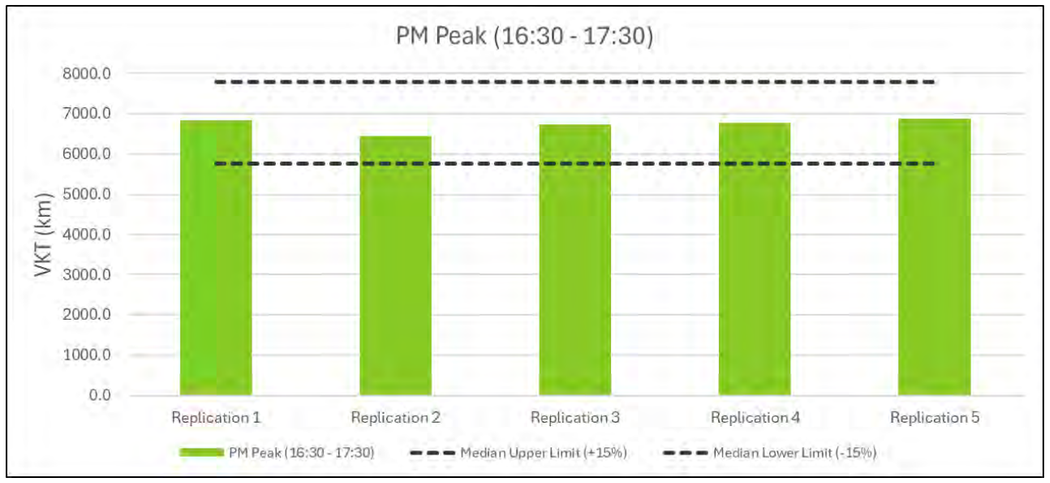


Figure 4-3: PM Peak (16:30 - 17:30) VKT Stability Plot

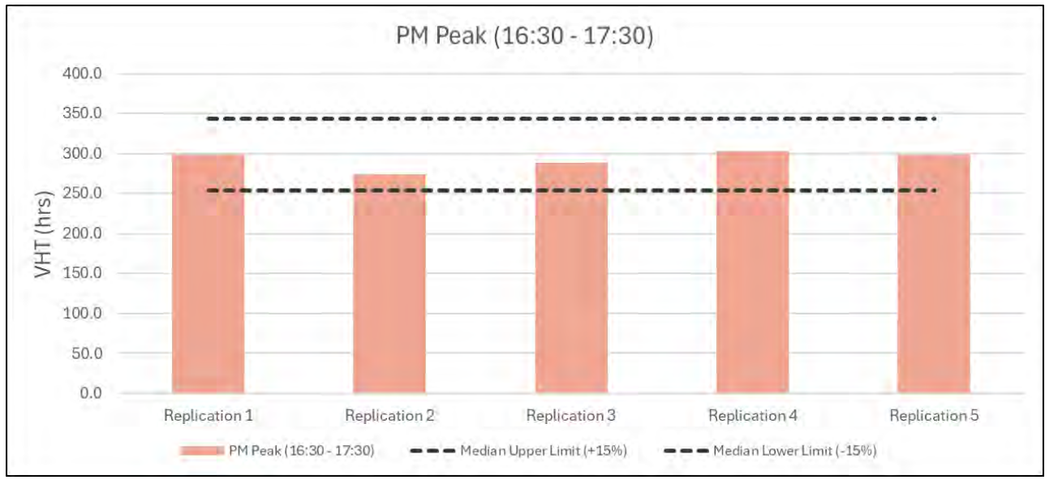


Figure 4-4: PM Peak (16:30 - 17:30) VHT Stability Plot

Table 4-11: Modelled Network Performance Statistics – Saturday Peak

Network Performance Statistics	Saturday Peak (11:30 – 13:30)							
	Run 1	Run 2	Run 3	Run 4	Run 5	Mean	SD*	COV**
Vehicle Kilometres Travelled (km)	13943.2	13995.8	13929.5	13822.8	13853.2	**13908.9**	70.1	1%
Vehicle Hours Travelled (hrs)	668.7	650.9	682.5	649.5	666.6	**663.6**	13.7	2%
Average Network Speed (km/h)	23.6	24.1	23.5	24.2	23.6	**23.8**	0.3	1%
Completed Trips (veh)	12915	12999	12937	12961	12853	**12933**	54.5	0%
Incomplete Trips (veh)	0	0	0	0	0	**0**	0.0	0%
Delay for Unreleased Trips (sec)	8.9	2.9	1.9	15.7	7.4	**7.4**	5.5	75%

* SD = Standard Deviation

** COV = Coefficient of Variance

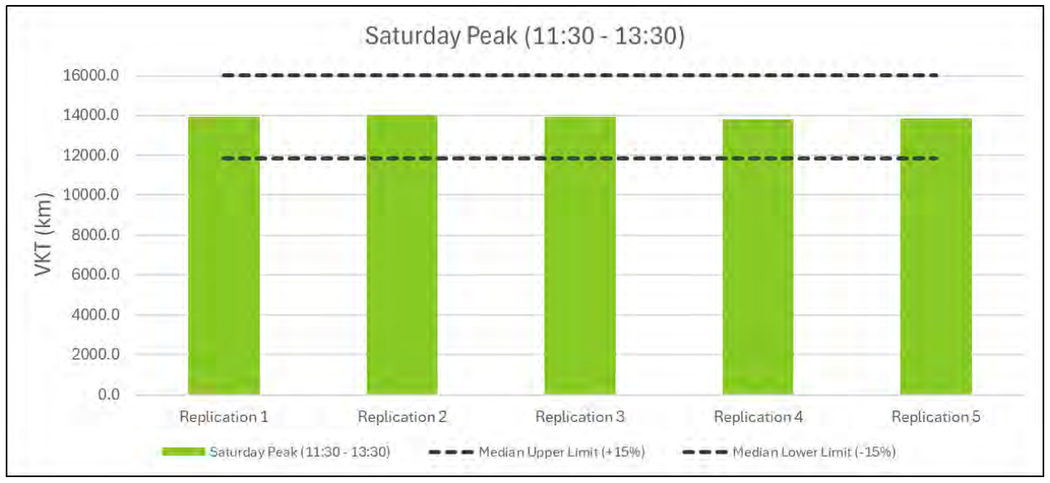


Figure 4-5: Saturday Peak (11:30 - 13:30) VKT Stability Plot

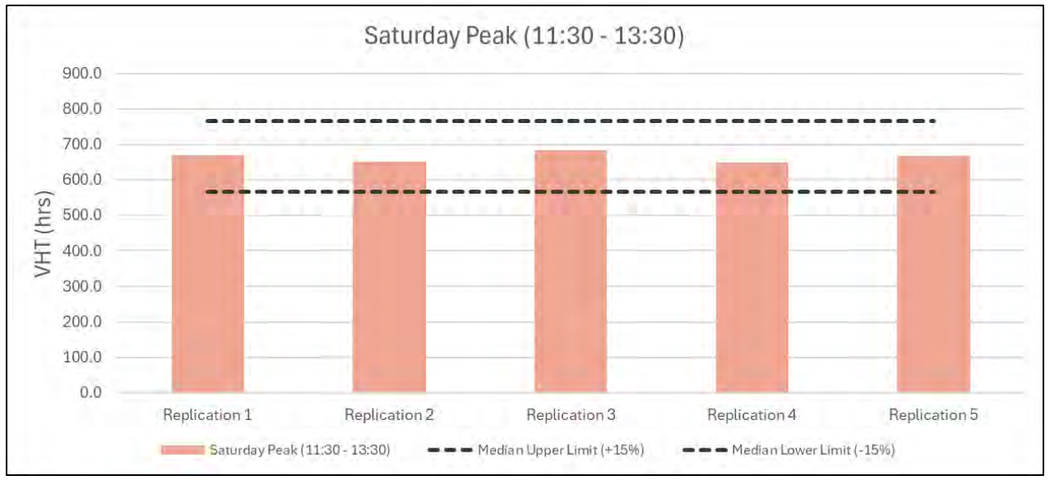


Figure 4-6: Saturday Peak (11:30 - 13:30) VHT Stability Plot

5 Validation

5.1 Validation Criteria

Model validation involves the comparison of observed and modelled traffic behaviour for datasets that are independent to the datasets used for the model calibration. Model calibration / validation is necessary to check that a model accurately represents an existing traffic situation and can be used with confidence to test alternatives.

Table 5-1 outlines the validation criteria, in reference to the Operational Modelling Guidelines for a Category 2 traffic model. The 2024 survey data has been adopted as the observed data for the vehicle travel time comparison.

Table 5-1: Validation Criteria (as per Operational Modelling Guidelines)

Validation Measures	Category 2 Criteria
Travel Time Average	±15% or one minute (whichever is greater) of average for full length of route for 90% of the routes
Travel Time Variability	Model to provide reasonably similar variability against observed data
Back of Queue check	Model to provide reasonably similar variability against observed data
Sensitivity Test	Model scenario replications run with 10%-30% additional demands to output stable results

The 2024 TomTom data has been adopted as the observed data for the vehicle travel time comparison.

5.2 Travel Time Validation

Travel time comparisons and validation had been undertaken for Route 1 identified in Section 2.4. Observed versus modelled travel time comparisons have been presented for each of the routes across the scenarios assessed.

Overall, all travel time segments assessed were within the Category 2 criteria of ±15% or one minute of the observed travel time in both the eastbound and westbound directions on all peak periods.

5.2.1 Thursday AM Peak Travel Time Validation

The modelled eastbound and westbound travel times along Karrinyup Road were comparable to the observed travel times, producing low deltas and satisfying the Category 2 travel time validation criteria.

Table 5-2: AM Peak 08:00 to 09:00 Travel Time Comparison

Time Travel Route Segment		Observed (mm:ss)	Modelled (mm:ss)	Delta (mm:ss)	Result
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	01:54	02:04	-00:10	Pass
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	01:51	01:58	-00:07	Pass

5.2.2 Thursday PM Peak Travel Time Validation

The modelled eastbound travel times along Karrinyup Road produced higher deltas than what was observed in the AM peak, reaching a difference of 29 seconds. The westbound direction however saw a similar level of performance as the AM peak, with a delta of 5 seconds. Irrespective of the higher delta, the time difference between the modelled and observed travel times were within one minute, thus satisfying the Category 2 travel time validation criteria.

Table 5-3: PM Peak 16:30 to 17:30 Travel Time Comparison

Time Travel Route Segment		Observed (mm:ss)	Modelled (mm:ss)	Delta (mm:ss)	Result
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	02:22	01:53	00:29	Pass
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	02:02	02:06	-00:05	Pass

5.2.3 Saturday Peak Travel Time Validation

During the Saturday peak period from 11:30 to 12:30, the modelled eastbound and westbound travel times along Karrinyup Road were comparable to the observed travel times, producing moderate deltas of 22 seconds and satisfying the Category 2 travel time validation criteria.

The second Saturday peak period from 12:30 to 13:30 had deltas marginally higher at 40 seconds for the eastbound direction and 43 seconds for the westbound direction. The time differences between the modelled and observed travel times, however, were under one minute, thus satisfying the Category 2 travel time validation criteria.

Table 5-4: Saturday Peak 11:30 to 12:30 Travel Time Comparison

Time Travel Route Segment		Observed (mm:ss)	Modelled (mm:ss)	Delta (mm:ss)	Result
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	03:10	02:47	00:22	Pass
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	02:40	02:18	00:22	Pass

Table 5-5: Saturday Peak 12:30 to 13:30 Travel Time Comparison

Time Travel Route Segment		Observed (mm:ss)	Modelled (mm:ss)	Delta (mm:ss)	Result
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	02:51	02:10	00:40	Pass
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	02:44	02:01	00:43	Pass

5.3 Queue Length Validation

The queue lengths in the model approximately match the site observation. The approach of Jeanes Road at Jeanes/Karrinyup intersection experience heavy queues for all modelled periods. There are heavy queues on Burroughs Road for Saturday peak. The morning and evening peaks experiences moderate to minor queuing on Burroughs Road.

As expected, the PM peak experience heavy westbound traffic flow which results in queues on Karrinyup Road for westbound traffic.

Table 5-6: Observed queues and Modelled queues comparison

5.4 Signal Timings

There are two signalised intersections in the model – Karrinyup Road/Jeanes Road and Karrinyup Road/Francis Avenue. The model also contains the signalised pedestrian crossing between.

The number of times a phase is activated in the model are consistent with SCATS data provided for Thursday 2024 and Saturday 2024.

Table 5-7 and Table 5-8 compares the cycle time between the SCATS data and modelled data for the modelled hour for AM, PM and Saturday peak.

Table 5-7 : Thursday SCATS v/s Modelled Signal Timing

Cycle Time	AM (08:00 – 09:00)			PM (16:30 – 17:30)		
	SCATS	Modelled	% Difference	SCATS	Modelled	% Difference
Karrinyup Road / Jeanes Road	116	116	0%	94	101	7%
Karrinyup Road / Francis Avenue	89	89	0%	94	94	0%

Table 5-8: Saturday SCATS v/s Modelled Signal Timing

Cycle Time	Saturday (11:30 – 12:30)			Saturday (12:30 – 13:30)		
	SCATS	Modelled	% Difference	SCATS	Modelled	% Difference
Karrinyup Road / Jeanes Road	69.5	70	1%	71	71.5	1%
Karrinyup Road / Francis Avenue	86	86	0%	88	88	0%

6 Options Modelling Assessment

6.1 Future Demand Development

The future demands are developed for Saturday 2034, AM 2034 and PM 2034 models using an additive growth approach. Aurecon was provided with ROM cordon matrices for the zones shown in , for years 2021, 2026, 2031 and 2036. These matrices were used to create pseudo-ROM 2024 and 2034 demands as these are the modelled years for this project.

The demand development process for the project includes the following steps:

1. Calculating peak flow factors for the three modelled periods - AM, PM, and Saturday. These factors determine the proportion of traffic demand during the peak periods compared to the overall demand.
2. Creating pseudo matrices for the future years 2024 and 2034. These matrices represent the estimated demand for these years based on projected growth.
3. Generating a difference matrix by subtracting the 2024 matrix from the 2034 matrix for each of the three modelled peaks (AM, PM, and Saturday). This difference matrix represents the change in demand between the two future years.
4. Distributing the ROM difference matrix from step 3 over the Aimsun zones. This distribution is straightforward for the external zones but more complex for the internal zones within the car mall. The distribution for the car mall zones is based on the ratio of the 2024 travel demand origin-destination total for the car mall zones over the total trips for the car mall. This ratio is used to distribute the difference matrix over the car mall Aimsun zones.
5. Calculating the future demands for each Aimsun zone using the following equation

$$Microscopic_{2034} = (ROM_{2034} - ROM_{2024}) + Microscopic_{2024}$$

The process outlined in the report generates the car and truck demand for the specified scenario. For the 2034 Do Minimum model, the car mall demands remain unchanged from 2024. However, for the 2034 option, the car mall demands for all three peaks have increased due to the Karrinyup West Village which will be complete by then.

6.2 Option Network Changes

The subsections that follow present the respective modelled changes that were implemented as part of the 2034 options.

6.2.1 Western Carpark

The entrance to the western carpark via Karrinyup Road has been converted to an exit as an only left turn onto Karrinyup Road. The southern section part of the western internal carpark also saw a layout update. The geometry of the existing 2024 and 2034 carpark are shown in Figure 6-1 and Figure 6-2.

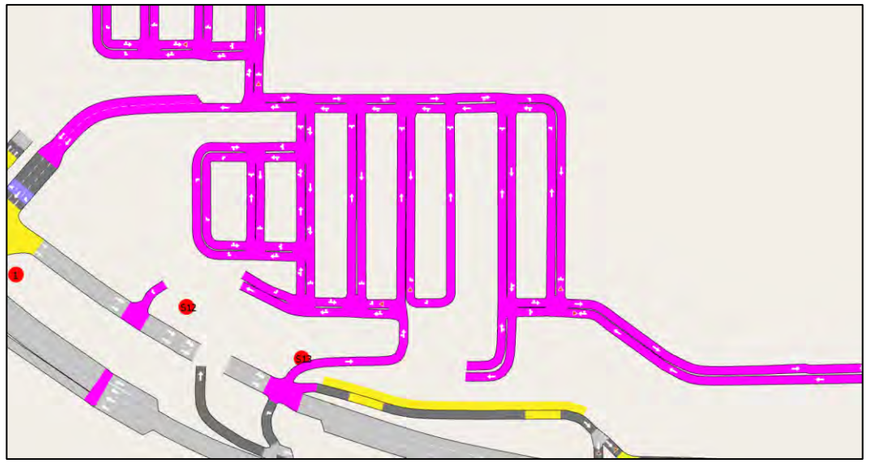


Figure 6-1: Base Western Carpark B01

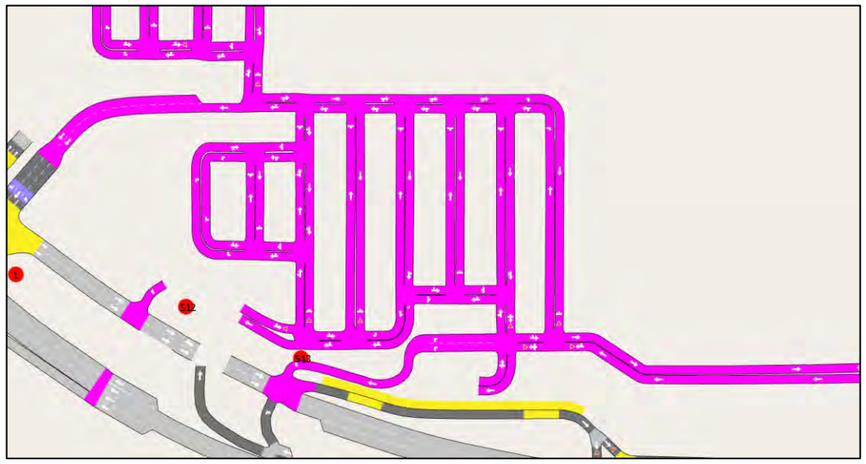


Figure 6-2: Updated Western Carpark – B01

6.2.2 Eastern Carpark

The eastern car park has been expanded with new parking areas on levels 3 and 4, adding a total of 267 spaces. These new areas are accessible from the existing eastern car park via a ramp located on level 2. Figure 6-3 and Figure 6-4 below depicts the comparison between the base model eastern carpark and the updated eastern carpark as part of the option scenario.

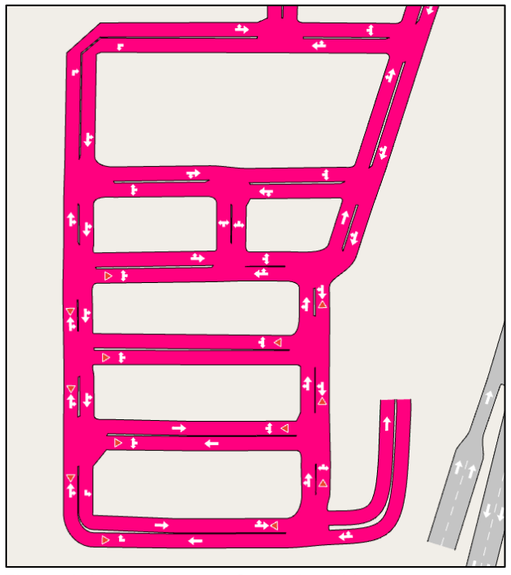


Figure 6-3: Base Eastern Carpark – L02

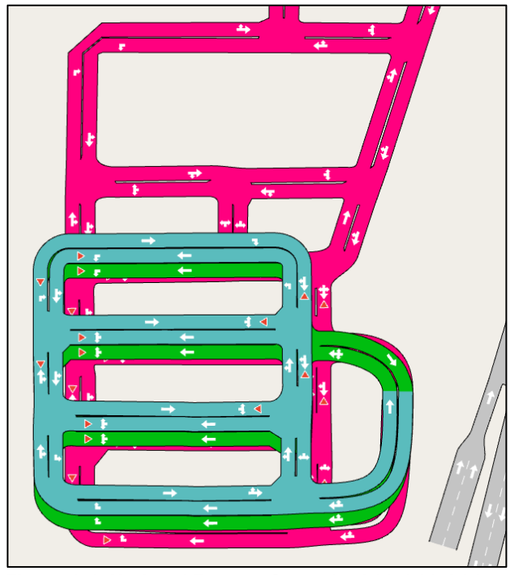


Figure 6-4: Updated Eastern Carpark – L02, L03, L04

6.3 Modelling Results

6.3.1 Network Performance

The average vehicle network performance for the Thursday AM and PM peaks and the Saturday peak are shown in Table 6-1, Table 6-2, and Table 6-3 respectively.

Thursday AM Peak

Table 6-1: Average Vehicle Network Performance – Thursday AM Peak

Network Performance Statistics	AM Peak (08:00 – 09:00)		
	Base	Do Minimum	Option
Vehicle Kilometres Travelled (km) – VKT	4867.4	5398.2	5477.4
Vehicle Hours Travelled (hrs) – VHT	193.5	238.1	235.5
Average Network Speed (km/h)	29.5	27.8	28.1
Completed Trips (veh)	4508	4928	4903
Incomplete Trips (veh)	0	0	0
Delay for Unreleased Trips (sec)	13.1	53.7	14.2

Thursday PM Peak

Table 6-2: Average Vehicle Network Performance – Thursday PM Peak

Network Performance Statistics	PM Peak (16:30 – 17:30)		
	Base	Do Minimum	Option
Vehicle Kilometres Travelled (km) - VKT	6738.4	7173.2	7348.6
Vehicle Hours Travelled (hrs) - VHT	292.5	337.9	332.8
Average Network Speed (km/h)	25.7	25.3	25.3
Completed Trips (veh)	6219	6589	6573
Incomplete Trips (veh)	14	0	2
Delay for Unreleased Trips (sec)	219.7	253.7	214.6

Saturday Peak

Table 6-3: Average Vehicle Network Performance – Saturday Peak

Network Performance Statistics	Saturday Peak (11:30 – 13:30)		
	Base	Do Minimum	Option
Vehicle Kilometres Travelled (km) - VKT	13908.9	14894.5	14988.7
Vehicle Hours Travelled (hrs) - VHT	663.6	792.2	747.1
Average Network Speed (km/h)	23.8	22.4	23.3
Completed Trips (veh)	12933	13684	13777
Incomplete Trips (veh)	0	1	0
Delay for Unreleased Trips (sec)	7.4	129.5	106.6

6.3.2 Intersection Performance (Level of Service)

The following section shows the level of service (LOS) for the three scenarios assessed; 2024 Base, 2034 Do Minimum, and 2034 Option. Table 6-4 provides the LOS criteria used for the assessment of the intersections with the Karrinyup Shopping Centre study area based on the average delay at each intersection. LOS categories delay from A, being the lowest level of delays, to F, being the highest levels of delay per vehicle for a given intersection.

Table 6-4: Level of Service (LOS) criteria

LOS	Average delay per vehicle (d) in seconds		
	Unsignalised Intersections	Roundabouts	Signalised Intersections
	HCM 2000 and 2016; SIDRA intersection	SIDRA intersection Recommended values	HCM 2000 and 2016; SIDRA intersection
A	d ≤ 10	d ≤ 10	d ≤ 10
B	10 < d ≤ 15	10 < d ≤ 20	10 < d ≤ 20
C	15 < d ≤ 25	20 < d ≤ 35	20 < d ≤ 35
D	25 < d ≤ 35	35 < d ≤ 50	35 < d ≤ 55
E	35 < d ≤ 50	50 < d ≤ 70	55 < d ≤ 80
F	50 < d	70 < d	80 < d

Thursday AM Peak

The AM peak period showed comparable results between the Do-Minimum and Option models except for a small increase in delay at the Karrinyup Road/ Francis Avenue intersection.

Table 6-5: Intersection Performance – Thursday AM Peak

Intersection	2024 Base			2034 Do Minimum			2034 Option		
	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS
Karrinyup Road / Jeanes Road	2902	54	D	2949	63	E	3121	51	D
Karrinyup Road / Burroughs Road	2343	17	C	2458	28	D	2399	31	D
Burroughs Road / Davenport Street	621	4	A	684	13	B	623	3	A
Francis Avenue / Davenport Street	597	3	A	750	3	A	598	3	A
Karrinyup Road / Francis Avenue	2624	18	B	2866	18	B	3074	26	C

Thursday PM Peak

The PM peak period showed comparable results between the Do-Minimum and Option models except for an increase in delay at the Karrinyup Road/ Francis Avenue intersection.

Table 6-6: Intersection Performance – Thursday PM Peak

Intersection	2024 Base			2034 Do Minimum			2034 Option		
	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS
Karrinyup Road / Jeanes Road	3182	63	E	3246	64	E	3333	60	E
Karrinyup Road / Burroughs Road	2699	7	A	2819	14	B	2865	10	A
Burroughs Road / Davenport Street	951	5	A	955	9	A	974	5	A
Francis Avenue / Davenport Street	823	3	A	928	4	A	810	3	A
Karrinyup Road / Francis Avenue	3438	19	B	3632	22	C	3747	25	C

Saturday Peak

The Saturday peak period showed comparable results between the Do-Minimum and Option models for both peak hours.

Table 6-7: Intersection Performance – Saturday 11:30 – 12:30 Peak

Intersection	2024 Base			2034 Do Minimum			2034 Option		
	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS
Karrinyup Road / Jeanes Road	3136	47	D	3054	72	E	2898	70	E
Karrinyup Road / Burroughs Road	2596	19	C	2635	23	C	2681	16	C
Burroughs Road / Davenport Street	938	7	A	880	8	A	930	7	A
Francis Avenue / Davenport Street	883	3	A	1064	7	A	1016	4	A
Karrinyup Road / Francis Avenue	4128	23	C	4226	25	C	4186	22	C

Table 6-8: Intersection Performance – Saturday 12:30 – 13:30 Peak

Intersection	2024 Base			2034 Do Minimum			2034 Option		
	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS	Count (veh)	Avg Delay (s)	LOS
Karrinyup Road / Jeanes Road	2907	58	E	3250	75	E	3105	70	E
Karrinyup Road / Burroughs Road	2477	14	B	2749	24	C	2772	18	C
Burroughs Road / Davenport Street	975	6	A	930	13	B	967	6	A
Francis Avenue / Davenport Street	884	4	A	1054	10	A	1016	5	A
Karrinyup Road / Francis Avenue	3980	22	C	4339	26	C	4305	24	C

6.3.3 Travel Time

Thursday AM Peak

In the AM peak, travel times for Karrinyup Road in both scenarios remain relatively equal, with a maximum delta of 21 seconds for the westbound direction.

Table 6-9: 2034 Travel Times – Thursday AM Peak

Time Travel Route Segment		Do Minimum (mm:ss)	Option (mm:ss)	Delta (mm:ss)
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street – Eastbound	02:19	02:28	00:09
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street – Westbound	02:03	02:24	00:21

Thursday PM Peak

In the PM peak, travel times for Karrinyup Road in both scenarios remain relatively equal, with a delta of 10 seconds in the westbound direction.

Table 6-10: 2034 Travel Times – Thursday PM Peak

Time Travel Route Segment		Do Minimum (mm:ss)	Option (mm:ss)	Delta (mm:ss)
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street – Eastbound	01:58	01:51	-00:07
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street – Westbound	02:08	02:18	00:10

Saturday Peak

In the Saturday peaks, the travel times for Karrinyup Road in both peaks remain relatively equal, with a maximum delta of 25 seconds for the eastbound direction in the first peak and 24 seconds in the second peak.

Table 6-11: 2034 Travel Times – Saturday 11:30 – 12:30 Peak

Time Travel Route Segment		Do Minimum (mm:ss)	Option (mm:ss)	Delta (mm:ss)
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	02:40	02:14	-00:25
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	02:13	02:21	00:09

Table 6-12: 2034 Travel Times – Saturday 12:30 – 13:30 Peak

Time Travel Route Segment		Do Minimum (mm:ss)	Option (mm:ss)	Delta (mm:ss)
1-EB	Karrinyup Road between Cheddar Place and Gwelup Street - Eastbound	02:47	02:23	-00:24
1-WB	Karrinyup Road between Cheddar Place and Gwelup Street - Westbound	02:27	02:23	-00:04

Appendix C

Modelling Performance – 2021 and 2031

1 Modified Development

1.1 Karrinyup Road / West Coast Highway / Marmion Avenue

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	39	D
	West	Karrinyup Road	63	E
	South	West Coast Highway	16	B
	East	Karrinyup Road	56	E

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	20	C
	West	Karrinyup Road	71	E
	South	West Coast Highway	18	B
	East	Karrinyup Road	78	E

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	16	B
	West	Karrinyup Road	57	E
	South	West Coast Highway	13	B
	East	Karrinyup Road	44	D

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	136	F
	West	Karrinyup Road	12	B
	South	West Coast Highway	82	F
	East	Karrinyup Road	52	D

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	21	C
	West	Karrinyup Road	72	E
	South	West Coast Highway	19	B
	East	Karrinyup Road	96	F

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	17	B
	West	Karrinyup Road	57	E
	South	West Coast Highway	18	B
	East	Karrinyup Road	50	D

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	31	C
	West	Karrinyup Road	59	E
	South	West Coast Highway	13	B
	East	Karrinyup Road	56	E

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	17	B
	West	Karrinyup Road	73	E
	South	West Coast Highway	20	C
	East	Karrinyup Road	77	E

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	17	B
	West	Karrinyup Road	60	E
	South	West Coast Highway	20	B
	East	Karrinyup Road	52	D

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	32	C
	West	Karrinyup Road	120	F
	South	West Coast Highway	17	B
	East	Karrinyup Road	55	D

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	12	B
	West	Karrinyup Road	71	E
	South	West Coast Highway	19	B
	East	Karrinyup Road	75	E

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	17	B
	West	Karrinyup Road	58	E
	South	West Coast Highway	14	B
	East	Karrinyup Road	45	D

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	29	C
	West	Karrinyup Road	110	F
	South	West Coast Highway	12	B
	East	Karrinyup Road	54	D

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	19	B
	West	Karrinyup Road	69	E
	South	West Coast Highway	17	B
	East	Karrinyup Road	64	E

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / West Coast Highway / Marmion Avenue	North	Marmion Avenue	14	B
	West	Karrinyup Road	71	E
	South	West Coast Highway	12	B
	East	Karrinyup Road	43	D

1.2 Karrinyup Road / Burroughs Road

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	58	F
	West	Karrinyup Road	6	A
	East	Karrinyup Road	44	E

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	24	C
	West	Karrinyup Road	1	A
	East	Karrinyup Road	10	A

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	36	E
	West	Karrinyup Road	26	D
	East	Karrinyup Road	40	E

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	92	F
	West	Karrinyup Road	6	A
	East	Karrinyup Road	4	A

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	26	C
	West	Karrinyup Road	1	A
	East	Karrinyup Road	2	A

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	37	D
	West	Karrinyup Road	2	A
	East	Karrinyup Road	4	A

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	84	F
	West	Karrinyup Road	5	A
	East	Karrinyup Road	5	A

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	36	D
	West	Karrinyup Road	1	A
	East	Karrinyup Road	3	A

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	40	D
	West	Karrinyup Road	1	A
	East	Karrinyup Road	4	A

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	100	F
	West	Karrinyup Road	7	A
	East	Karrinyup Road	4	A

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	23	C
	West	Karrinyup Road	1	A
	East	Karrinyup Road	2	A

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	30	C
	West	Karrinyup Road	2	A
	East	Karrinyup Road	3	A

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	93	F
	West	Karrinyup Road	6	A
	East	Karrinyup Road	6	A

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	39	D
	West	Karrinyup Road	2	A
	East	Karrinyup Road	3	A

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	69	E
	West	Karrinyup Road	56	E
	East	Karrinyup Road	14	B

1.3 Karrinyup Road / Jeanes Road

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	17	B
	West	Karrinyup Road	17	B
	South	Jeanes Road	13	B
	East	Karrinyup Road	24	C

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	21	C
	West	Karrinyup Road	21	C
	South	Jeanes Road	8	A
	East	Karrinyup Road	21	C

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	11	B
	West	Karrinyup Road	29	C
	South	Jeanes Road	9	A
	East	Karrinyup Road	29	C

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	20	C
	West	Karrinyup Road	17	B
	South	Jeanes Road	13	B
	East	Karrinyup Road	25	C

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	20	C
	West	Karrinyup Road	18	B
	South	Jeanes Road	11	B
	East	Karrinyup Road	19	B

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	11	B
	West	Karrinyup Road	22	C
	South	Jeanes Road	8	A
	East	Karrinyup Road	21	C

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	50	D
	West	Karrinyup Road	17	B
	South	Jeanes Road	12	B
	East	Karrinyup Road	15	B

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	39	D
	West	Karrinyup Road	18	B
	South	Jeanes Road	11	B
	East	Karrinyup Road	19	B

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	44	D
	West	Karrinyup Road	18	B
	South	Jeanes Road	13	B
	East	Karrinyup Road	20	C

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	19	B
	West	Karrinyup Road	16	B
	South	Jeanes Road	19	B
	East	Karrinyup Road	23	C

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	22	C
	West	Karrinyup Road	21	C
	South	Jeanes Road	8	A
	East	Karrinyup Road	21	C

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	12	B
	West	Karrinyup Road	22	C
	South	Jeanes Road	8	A
	East	Karrinyup Road	23	C

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	48	D
	West	Karrinyup Road	17	B
	South	Jeanes Road	17	B
	East	Karrinyup Road	16	B

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	47	D
	West	Karrinyup Road	20	C
	South	Jeanes Road	8	A
	East	Karrinyup Road	21	C

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Jeanes Road	North	Development Access	53	D
	West	Karrinyup Road	86	F
	South	Jeanes Road	60	E
	East	Karrinyup Road	58	E

1.4 Karrinyup Road / Francis Avenue

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	39	D
	West	Karrinyup Road	13	B
	East	Karrinyup Road	18	B

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	35	D
	West	Karrinyup Road	25	C
	East	Karrinyup Road	20	C

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	32	C
	West	Karrinyup Road	38	D
	East	Karrinyup Road	33	C

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	37	D
	West	Karrinyup Road	12	B
	East	Karrinyup Road	17	B

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	35	C
	West	Karrinyup Road	22	C
	East	Karrinyup Road	19	B

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	32	C
	West	Karrinyup Road	43	D
	East	Karrinyup Road	49	D

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	22	C
	West	Karrinyup Road	8	A
	East	Karrinyup Road	15	B

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	14	B
	West	Karrinyup Road	9	A
	East	Karrinyup Road	9	A

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	24	C
	West	Karrinyup Road	14	B
	East	Karrinyup Road	18	B

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	38	D
	West	Karrinyup Road	16	B
	East	Karrinyup Road	18	B

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	34	C
	West	Karrinyup Road	22	C
	East	Karrinyup Road	19	B

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	32	C
	West	Karrinyup Road	41	D
	East	Karrinyup Road	32	C

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	32	C
	West	Karrinyup Road	16	B
	East	Karrinyup Road	15	B

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	19	B
	West	Karrinyup Road	14	B
	East	Karrinyup Road	17	B

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	17	B
	West	Karrinyup Road	25	C
	East	Karrinyup Road	56	E

1.5 Karrinyup Road / Huntriss Road

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	5	A
	West	Karrinyup Road	32	C
	South	Huntriss Road	40	D
	East	Karrinyup Road	41	D

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	9	A
	West	Karrinyup Road	17	B
	South	Huntriss Road	23	C
	East	Karrinyup Road	53	D

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	9	A
	West	Karrinyup Road	44	D
	South	Huntriss Road	25	C
	East	Karrinyup Road	127	F

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	6	A
	West	Karrinyup Road	33	C
	South	Huntriss Road	34	C
	East	Karrinyup Road	42	D

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	12	B
	West	Karrinyup Road	20	B
	South	Huntriss Road	23	C
	East	Karrinyup Road	64	E

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	10	B
	West	Karrinyup Road	40	D
	South	Huntriss Road	23	C
	East	Karrinyup Road	131	F

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	6	A
	West	Karrinyup Road	26	C
	South	Huntriss Road	53	D
	East	Karrinyup Road	27	C

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	11	B
	West	Karrinyup Road	23	C
	South	Huntriss Road	21	C
	East	Karrinyup Road	27	C

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	9	A
	West	Karrinyup Road	38	D
	South	Huntriss Road	23	C
	East	Karrinyup Road	78	E

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	7	A
	West	Karrinyup Road	36	D
	South	Huntriss Road	24	C
	East	Karrinyup Road	42	D

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	10	B
	West	Karrinyup Road	18	B
	South	Huntriss Road	23	C
	East	Karrinyup Road	45	D

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	10	A
	West	Karrinyup Road	48	D
	South	Huntriss Road	17	B
	East	Karrinyup Road	133	F

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	15	B
	West	Karrinyup Road	54	D
	South	Huntriss Road	35	D
	East	Karrinyup Road	27	C

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	10	A
	West	Karrinyup Road	19	B
	South	Huntriss Road	25	C
	East	Karrinyup Road	38	D

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Huntriss Road	North	Huntriss Road	14	B
	West	Karrinyup Road	35	D
	South	Huntriss Road	30	C
	East	Karrinyup Road	127	F

1.6 Karrinyup Road / North Beach Road

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	9	A
	West	Karrinyup Road	35	D
	East	Karrinyup Road	18	B

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	5	A
	West	Karrinyup Road	33	C
	East	Karrinyup Road	16	B

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	3	A
	West	Karrinyup Road	53	D
	East	Karrinyup Road	21	C

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	15	B
	West	Karrinyup Road	43	D
	East	Karrinyup Road	19	B

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	2	A
	West	Karrinyup Road	32	C
	East	Karrinyup Road	15	B

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	2	A
	West	Karrinyup Road	47	D
	East	Karrinyup Road	24	C

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	9	A
	West	Karrinyup Road	30	C
	East	Karrinyup Road	18	B

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	2	A
	West	Karrinyup Road	31	C
	East	Karrinyup Road	12	B

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	3	A
	West	Karrinyup Road	52	D
	East	Karrinyup Road	21	C

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	21	C
	West	Karrinyup Road	66	E
	East	Karrinyup Road	25	C

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	6	A
	West	Karrinyup Road	35	C
	East	Karrinyup Road	16	B

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	3	A
	West	Karrinyup Road	61	E
	East	Karrinyup Road	25	C

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	9	A
	West	Karrinyup Road	70	E
	East	Karrinyup Road	17	B

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	5	A
	West	Karrinyup Road	41	D
	East	Karrinyup Road	16	B

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / North Beach Road	North	North Beach Road	4	A
	West	Karrinyup Road	62	E
	East	Karrinyup Road	42	C

1.7 Karrinyup Road / Mitchell Freeway Northbound Ramp

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	62	E
	South	Mitchell Freeway	35	D
	East	Karrinyup Road	28	C

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	32	C
	South	Mitchell Freeway	45	D
	East	Karrinyup Road	25	C

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	42	D
	South	Mitchell Freeway	43	D
	East	Karrinyup Road	21	C

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	70	E
	South	Mitchell Freeway	37	D
	East	Karrinyup Road	19	B

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	25	C
	South	Mitchell Freeway	55	E
	East	Karrinyup Road	27	C

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	49	D
	South	Mitchell Freeway	44	D
	East	Karrinyup Road	19	B

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	53	D
	South	Mitchell Freeway	37	D
	East	Karrinyup Road	18	B

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	29	C
	South	Mitchell Freeway	46	D
	East	Karrinyup Road	28	C

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	82	F
	South	Mitchell Freeway	64	E
	East	Karrinyup Road	24	C

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	97	F
	South	Mitchell Freeway	49	D
	East	Karrinyup Road	25	C

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	26	C
	South	Mitchell Freeway	64	E
	East	Karrinyup Road	23	C

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	49	D
	South	Mitchell Freeway	48	D
	East	Karrinyup Road	15	B

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	75	E
	South	Mitchell Freeway	50	D
	East	Karrinyup Road	23	C

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	28	C
	South	Mitchell Freeway	63	E
	East	Karrinyup Road	22	C

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Northbound Ramp	West	Karrinyup Road	61	E
	South	Mitchell Freeway	113	F
	East	Karrinyup Road	22	C

1.8 Karrinyup Road / Mitchell Freeway Southbound Ramp

2013 Base AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	37	D
	West	Karrinyup Road	13	B
	East	Karrinyup Road	42	D

2013 Base PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	119	F
	West	Karrinyup Road	11	B
	East	Karrinyup Road	181	F

2013 Base Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	136	F
	West	Karrinyup Road	12	B
	East	Karrinyup Road	82	F

2021 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	60	E
	West	Karrinyup Road	13	B
	East	Karrinyup Road	44	D

2021 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	44	D
	West	Karrinyup Road	11	B
	East	Karrinyup Road	108	F

2021 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	71	E
	West	Karrinyup Road	12	B
	East	Karrinyup Road	68	E

2021 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	52	D
	West	Karrinyup Road	13	B
	East	Karrinyup Road	45	D

2021 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	63	E
	West	Karrinyup Road	11	B
	East	Karrinyup Road	110	F

2021 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	70	E
	West	Karrinyup Road	19	B
	East	Karrinyup Road	93	F

2031 Do-minimum AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	56	E
	West	Karrinyup Road	15	B
	East	Karrinyup Road	51	D

2031 Do-minimum PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	53	D
	West	Karrinyup Road	19	B
	East	Karrinyup Road	75	E

2031 Do-minimum Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	60	E
	West	Karrinyup Road	16	B
	East	Karrinyup Road	49	D

2031 Option AM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	48	D
	West	Karrinyup Road	18	B
	East	Karrinyup Road	37	D

2031 Option PM

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	139	F
	West	Karrinyup Road	16	B
	East	Karrinyup Road	60	E

2031 Option Saturday

Intersection	Approach	Street Name	Delay (sec/veh)	LOS
Karrinyup Road / Mitchell Freeway Southbound Ramp	North	Mitchell Freeway	107	F
	West	Karrinyup Road	17	B
	East	Karrinyup Road	110	F

Appendix C1

Modelling Performance 2024 and 2034

1. Karrinyup Road/ Jeanes Road

2024 Base AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	52	D
	East	Karrinyup Road	28	C
	South	Jeanes Road	135	F
	West	Karrinyup Road	36	D

2034 Do-Minimum AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	54	D
	East	Karrinyup Road	27	C
	South	Jeanes Road	194	F
	West	Karrinyup Road	37	D

2024 Base PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	38	D
	East	Karrinyup Road	43	D
	South	Jeanes Road	155	F
	West	Karrinyup Road	37	D

2034 Do-Minimum PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	37	D
	East	Karrinyup Road	38	D
	South	Jeanes Road	166	F
	West	Karrinyup Road	47	D

2024 Base Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	22	C
	East	Karrinyup Road	38	D
	South	Jeanes Road	92	F
	West	Karrinyup Road	47	D

2034 Do-Minimum Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	23	C
	East	Karrinyup Road	42	D
	South	Jeanes Road	371	F
	West	Karrinyup Road	47	D

2034 Option AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	67	E
	East	Karrinyup Road	28	C
	South	Jeanes Road	113	F
	West	Karrinyup Road	38	D

2034 Option PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	38	D
	East	Karrinyup Road	39	D
	South	Jeanes Road	154	F
	West	Karrinyup Road	35	C

2034 Option Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Jeanes Road	North	Karrinyup Shopping Centre Access	26	C
	East	Karrinyup Road	36	D
	South	Jeanes Road	377	F
	West	Karrinyup Road	39	D

2. Karrinyup Road / Burroughs Road

2024 Base AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	43	E
	East	Karrinyup Road	6	A
	West	Karrinyup Road	18	C

2024 Base PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	20	C
	East	Karrinyup Road	5	A
	West	Karrinyup Road	1	A

2024 Base Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	56	F
	East	Karrinyup Road	5	A
	West	Karrinyup Road	16	C

2034 Do-Minimum AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	82	F
	East	Karrinyup Road	5	A
	West	Karrinyup Road	31	D

2034 Option AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	73	F
	East	Karrinyup Road	6	A
	West	Karrinyup Road	39	E

2034 Do-Minimum PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	49	E
	East	Karrinyup Road	4	A
	West	Karrinyup Road	9	A

2034 Option PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	33	D
	East	Karrinyup Road	5	A
	West	Karrinyup Road	4	A

2034 Do-Minimum Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	74	F
	East	Karrinyup Road	8	A
	West	Karrinyup Road	16	C

2034 Option Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Burroughs Road	North	Burroughs Road	63	F
	East	Karrinyup Road	10	A
	West	Karrinyup Road	4	A

3. Karrinyup Road / Francis Avenue

2024 Base AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	21	**C**
	East	Karrinyup Road	16	**B**
	West	Karrinyup Road	16	**B**

2024 Base PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	16	**B**
	East	Karrinyup Road	17	**B**
	West	Karrinyup Road	22	**C**

2024 Base Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	15	**B**
	East	Karrinyup Road	19	**B**
	West	Karrinyup Road	33	**C**

2034 Do-Minimum AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	19	**B**
	East	Karrinyup Road	17	**B**
	West	Karrinyup Road	18	**B**

2034 Do-Minimum PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	21	**C**
	East	Karrinyup Road	22	**C**
	West	Karrinyup Road	21	**C**

2034 Do-Minimum Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	15	**B**
	East	Karrinyup Road	21	**C**
	West	Karrinyup Road	37	**D**

2034 Option AM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	19	**B**
	East	Karrinyup Road	40	**D**
	West	Karrinyup Road	16	**B**

2034 Option PM

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	26	**C**
	East	Karrinyup Road	26	**C**
	West	Karrinyup Road	21	**C**

2034 Option Saturday

Intersection	Approach	Street	Delay (s)	LOS
Karrinyup Road / Francis Avenue	North	Francis Avenue	16	**B**
	East	Karrinyup Road	19	**B**
	West	Karrinyup Road	30	**C**

Appendix D
SIDRA Analysis Outputs

1 Modified Development

1.1 Karrinyup Road and Marmion Avenue

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	24	6.9	0.016	8.3	LOS A	0.2	1.5	0.13	0.63	61.1
2	T1	588	5.1	0.320	30.1	LOS C	15.6	113.7	0.65	0.57	48.1
3	R2	231	5.7	1.128	234.9	LOS F	34.7	254.6	1.00	1.17	12.9
Approach		843	5.3	1.128	85.6	LOS F	34.7	254.6	0.73	0.74	27.6
East: Karrinyup Road (E)											
4	L2	181	3.5	0.243	39.6	LOS D	10.1	72.8	0.68	0.75	40.0
5	T1	198	4.1	0.329	73.6	LOS E	7.8	56.8	0.93	0.74	29.1
6	R2	148	2.8	0.266	80.2	LOS F	5.8	41.8	0.93	0.77	27.7
Approach		527	3.5	0.329	63.8	LOS E	10.1	72.6	0.84	0.75	31.6
North: Marmion Avenue (N)											
7	L2	483	2.4	0.402	21.1	LOS C	17.1	122.1	0.50	0.79	48.6
8	T1	1280	3.1	0.975	91.3	LOS F	80.4	577.4	0.95	1.07	26.4
9	R2	28	9.1	0.420	105.0	LOS F	2.6	19.6	1.00	0.72	23.0
Approach		1791	3.0	0.975	72.6	LOS E	80.4	577.4	0.83	0.99	30.0
West: Karrinyup Road (W)											
10	L2	105	0.0	0.080	9.3	LOS A	1.6	10.9	0.22	0.64	60.0
11	T1	607	1.6	0.822	80.8	LOS F	27.1	192.5	1.00	0.91	27.6
12	R2	497	0.4	0.722	82.4	LOS F	21.0	147.4	1.00	0.85	27.3
Approach		1209	1.0	0.822	75.2	LOS E	27.1	192.5	0.93	0.86	28.8
All Vehicles		4370	3.0	1.128	74.8	LOS E	80.4	577.4	0.84	0.88	29.4

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	78	1.0	0.055	10.4	LOS B	1.2	8.8	0.22	0.65	59.8
2	T1	1449	1.4	0.905	46.4	LOS D	67.5	477.9	0.90	0.85	39.8
3	R2	141	8.4	0.680	94.0	LOS F	12.6	94.2	1.00	0.82	25.3
Approach		1668	1.9	0.905	48.8	LOS D	67.5	477.9	0.88	0.84	38.6
East: Karrinyup Road (E)											
4	L2	179	2.5	0.139	10.9	LOS B	3.5	25.0	0.27	0.66	58.2
5	T1	534	1.5	0.627	70.2	LOS E	21.8	154.5	0.96	0.82	30.0
6	R2	465	1.2	0.862	94.3	LOS F	21.7	153.3	1.00	0.91	25.1
Approach		1178	1.5	0.862	70.7	LOS E	21.8	154.5	0.87	0.83	29.9
North: Marmion Avenue (N)											
7	L2	100	3.7	0.071	9.0	LOS A	1.4	10.3	0.20	0.63	57.8
8	T1	604	1.4	0.373	39.1	LOS D	18.4	130.5	0.74	0.64	42.1
9	R2	23	0.0	0.230	100.5	LOS F	2.1	14.5	0.99	0.71	23.8
Approach		727	1.7	0.373	36.9	LOS D	18.4	130.5	0.67	0.64	42.6
West: Karrinyup Road (W)											
10	L2	3	0.0	0.004	32.2	LOS C	0.1	1.0	0.56	0.63	43.6
11	T1	173	3.7	0.291	74.7	LOS E	6.9	50.1	0.93	0.73	28.9
12	R2	226	0.5	0.541	91.6	LOS F	9.8	69.1	0.99	0.80	25.6
Approach		402	1.9	0.541	83.9	LOS F	9.8	69.1	0.96	0.77	27.0
All Vehicles		3975	1.8	0.905	56.6	LOS E	67.5	477.9	0.85	0.79	34.7

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	100	2.0	0.070	9.9	LOS A	1.5	10.5	0.21	0.65	60.1
2	T1	810	1.6	0.537	40.2	LOS D	28.1	199.8	0.79	0.70	42.7
3	R2	209	0.9	0.849	97.7	LOS F	19.3	136.4	1.00	0.90	24.8
Approach		1119	1.5	0.849	48.2	LOS D	28.1	199.8	0.78	0.73	38.5
East: Karrinyup Road (E)											
4	L2	277	0.4	0.239	16.2	LOS B	8.4	59.0	0.41	0.70	53.9
5	T1	322	0.8	0.393	65.3	LOS E	12.1	85.2	0.91	0.75	31.2
6	R2	220	0.7	0.243	64.6	LOS E	7.7	54.0	0.85	0.78	31.5
Approach		819	0.6	0.393	48.5	LOS D	12.1	85.2	0.72	0.74	36.5
North: Marmion Avenue (N)											
7	L2	280	0.6	0.215	14.1	LOS B	7.7	53.9	0.36	0.68	53.7
8	T1	664	1.0	0.498	49.4	LOS D	22.7	160.2	0.85	0.74	37.7
9	R2	114	0.0	1.105	215.0	LOS F	16.0	111.8	1.00	1.16	13.7
Approach		1058	0.8	1.105	57.9	LOS E	22.7	160.2	0.73	0.77	33.9
West: Karrinyup Road (W)											
10	L2	17	3.1	0.015	12.6	LOS B	0.4	2.6	0.30	0.63	56.5
11	T1	414	1.4	0.742	81.5	LOS F	17.8	126.3	1.00	0.86	27.4
12	R2	465	0.7	0.708	81.9	LOS F	19.3	136.0	1.00	0.84	27.4
Approach		896	1.1	0.742	80.4	LOS F	19.3	136.0	0.99	0.84	27.7
All Vehicles		3892	1.0	1.105	58.3	LOS E	28.1	199.8	0.80	0.77	33.8

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	23	6.9	0.015	8.2	LOS A	0.2	1.3	0.13	0.63	61.2
2	T1	664	5.1	0.381	33.5	LOS C	18.6	136.0	0.70	0.62	46.1
3	R2	197	5.7	0.764	90.4	LOS F	17.2	126.6	1.00	0.86	26.0
Approach		884	5.3	0.764	45.5	LOS D	18.6	136.0	0.75	0.67	39.5
East: Karrinyup Road (E)											
4	L2	212	3.5	0.249	29.0	LOS C	9.6	69.5	0.59	0.74	45.1
5	T1	171	4.1	0.737	95.1	LOS F	7.8	56.6	1.00	0.83	24.9
6	R2	191	2.8	0.726	99.5	LOS F	8.6	62.0	1.00	0.83	24.2
Approach		574	3.4	0.737	72.1	LOS E	9.6	69.5	0.85	0.80	29.5
North: Marmion Avenue (N)											
7	L2	593	2.4	0.489	20.5	LOS C	21.7	155.4	0.54	0.80	49.0
8	T1	1140	3.1	0.762	39.8	LOS D	45.8	329.0	0.84	0.76	41.7
9	R2	29	9.1	0.115	78.6	LOS E	2.2	16.7	0.90	0.73	27.5
Approach		1762	3.0	0.762	33.9	LOS C	45.8	329.0	0.74	0.77	43.5
West: Karrinyup Road (W)											
10	L2	224	0.0	0.171	10.9	LOS B	4.4	30.8	0.28	0.66	58.4
11	T1	549	1.6	0.753	75.4	LOS E	23.1	163.8	1.00	0.87	28.7
12	R2	547	0.4	0.738	79.9	LOS E	22.7	159.5	1.00	0.86	27.8
Approach		1320	0.8	0.753	66.3	LOS E	23.1	163.8	0.88	0.83	31.0
All Vehicles		4540	2.9	0.764	50.4	LOS D	45.8	329.0	0.80	0.77	36.4

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	72	6.9	0.052	10.9	LOS B	1.2	9.2	0.24	0.65	58.5
2	T1	1490	5.1	0.763	31.8	LOS C	50.5	368.7	0.81	0.75	47.0
3	R2	142	5.7	0.349	40.2	LOS D	5.7	41.8	0.88	0.78	40.2
Approach		1704	5.2	0.763	31.6	LOS C	50.5	368.7	0.79	0.75	46.8
East: Karrinyup Road (E)											
4	L2	164	3.5	0.127	11.9	LOS B	3.5	24.9	0.30	0.66	57.1
5	T1	543	4.1	0.757	75.7	LOS E	22.9	165.9	1.00	0.87	28.6
6	R2	468	2.8	0.665	73.5	LOS E	18.3	130.9	0.95	0.83	29.2
Approach		1175	3.5	0.757	85.9	LOS E	22.9	165.9	0.88	0.82	31.0
North: Marmion Avenue (N)											
7	L2	140	2.4	0.096	8.7	LOS A	1.8	12.9	0.20	0.64	58.1
8	T1	582	3.1	0.472	51.7	LOS D	20.1	144.6	0.85	0.74	36.7
9	R2	27	9.1	0.464	105.2	LOS F	2.5	18.8	1.00	0.72	23.0
Approach		749	3.2	0.472	45.6	LOS D	20.1	144.6	0.74	0.72	38.5
West: Karrinyup Road (W)											
10	L2	12	0.0	0.015	26.4	LOS C	0.5	3.3	0.51	0.66	46.9
11	T1	157	1.6	0.666	93.3	LOS F	7.1	50.2	1.00	0.80	25.2
12	R2	260	0.4	0.743	96.1	LOS F	11.6	81.6	1.00	0.84	24.8
Approach		429	0.8	0.743	93.1	LOS F	11.6	81.6	0.99	0.82	25.3
All Vehicles		4057	3.9	0.763	50.6	LOS D	50.5	368.7	0.83	0.77	36.7

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	120	6.9	0.085	9.7	LOS A	1.7	12.4	0.20	0.65	59.7
2	T1	869	5.1	0.568	43.7	LOS D	28.9	211.2	0.83	0.74	40.8
3	R2	225	5.7	0.614	43.8	LOS D	10.3	75.5	0.96	0.82	38.7
Approach		1214	5.4	0.614	40.4	LOS D	28.9	211.2	0.79	0.75	41.7
East: Karrinyup Road (E)											
4	L2	257	3.5	0.233	17.0	LOS B	8.0	57.8	0.43	0.70	52.9
5	T1	308	4.1	0.608	80.0	LOS F	12.9	93.4	0.99	0.81	27.7
6	R2	334	2.8	0.434	72.6	LOS E	12.7	90.9	0.92	0.81	29.4
Approach		899	3.4	0.608	59.3	LOS E	12.9	93.4	0.80	0.78	32.9
North: Marmion Avenue (N)											
7	L2	223	2.4	0.173	11.6	LOS B	4.7	33.5	0.30	0.67	55.5
8	T1	673	3.1	0.621	59.8	LOS E	25.4	182.7	0.93	0.81	34.0
9	R2	74	9.1	0.364	86.7	LOS F	6.1	45.9	0.97	0.77	26.0
Approach		970	3.4	0.621	50.7	LOS D	25.4	182.7	0.79	0.77	36.4
West: Karrinyup Road (W)											
10	L2	20	0.0	0.018	14.7	LOS B	0.5	3.5	0.34	0.64	55.1
11	T1	280	1.6	0.544	79.2	LOS E	11.6	82.3	0.98	0.80	27.9
12	R2	479	0.4	0.613	75.6	LOS E	19.0	133.6	0.96	0.84	28.8
Approach		779	0.8	0.613	75.3	LOS E	19.0	133.6	0.95	0.82	28.8
All Vehicles		3862	3.5	0.621	54.4	LOS D	28.9	211.2	0.83	0.77	35.1

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	34	6.9	0.023	8.4	LOS A	0.3	2.3	0.14	0.63	61.0
2	T1	640	5.1	0.372	33.9	LOS C	18.0	131.5	0.70	0.62	45.8
3	R2	206	5.7	0.799	92.4	LOS F	18.4	135.0	1.00	0.87	25.6
Approach		880	5.3	0.799	46.6	LOS D	18.4	135.0	0.75	0.68	39.0
East: Karrinyup Road (E)											
4	L2	228	3.5	0.280	32.8	LOS C	11.3	81.4	0.54	0.76	43.1
5	T1	218	4.1	0.794	95.1	LOS F	10.0	72.8	1.00	0.87	24.9
6	R2	174	2.8	0.716	100.2	LOS F	7.9	56.6	1.00	0.82	24.1
Approach		620	3.5	0.794	73.6	LOS E	11.3	81.4	0.87	0.81	29.1
North: Marmion Avenue (N)											
7	L2	558	2.4	0.469	20.8	LOS C	21.0	150.3	0.54	0.79	48.8
8	T1	1184	3.1	0.806	41.7	LOS D	49.4	355.1	0.86	0.78	40.8
9	R2	31	9.1	0.123	78.7	LOS E	2.4	17.9	0.91	0.79	27.5
Approach		1773	3.0	0.806	35.7	LOS D	49.4	355.1	0.76	0.79	42.6
West: Karrinyup Road (W)											
10	L2	235	0.0	0.177	10.7	LOS B	4.5	31.6	0.28	0.66	58.6
11	T1	559	1.6	0.724	72.5	LOS E	22.9	162.9	1.00	0.85	29.4
12	R2	571	0.4	0.793	83.8	LOS F	24.6	173.0	1.00	0.88	27.0
Approach		1365	0.8	0.793	66.6	LOS E	24.6	173.0	0.87	0.83	30.9
All Vehicles		4638	2.9	0.806	51.9	LOS D	49.4	355.1	0.81	0.78	35.8

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	76	6.9	0.055	10.3	LOS B	1.2	8.8	0.22	0.65	59.1
2	T1	1417	5.1	0.785	34.8	LOS C	51.3	374.8	0.83	0.77	45.3
3	R2	234	5.7	0.621	60.2	LOS E	13.5	99.2	0.96	0.88	33.0
Approach		1727	5.3	0.785	37.2	LOS D	51.3	374.8	0.82	0.78	43.5
East: Karrinyup Road (E)											
4	L2	196	3.5	0.155	12.5	LOS B	4.4	32.1	0.32	0.67	56.5
5	T1	529	4.1	0.660	69.9	LOS E	21.2	153.8	0.97	0.83	30.0
6	R2	685	2.8	0.787	77.3	LOS E	28.7	205.5	1.00	0.88	28.3
Approach		1410	3.4	0.787	65.5	LOS E	28.7	205.5	0.90	0.83	31.1
North: Marmion Avenue (N)											
7	L2	212	2.4	0.155	11.0	LOS B	4.1	29.6	0.28	0.66	56.0
8	T1	634	3.1	0.533	54.4	LOS D	22.7	162.9	0.88	0.76	35.8
9	R2	19	9.1	0.327	104.3	LOS F	1.7	13.1	1.00	0.70	23.1
Approach		865	3.1	0.533	44.8	LOS D	22.7	162.9	0.74	0.74	38.7
West: Karrinyup Road (W)											
10	L2	7	0.0	0.010	32.6	LOS C	0.3	2.2	0.58	0.65	43.5
11	T1	207	1.6	0.743	93.1	LOS F	9.4	66.6	1.00	0.84	25.3
12	R2	257	0.4	0.694	93.6	LOS F	11.3	79.1	1.00	0.82	25.2
Approach		471	0.9	0.743	92.5	LOS F	11.3	79.1	0.99	0.83	25.4
All Vehicles		4473	3.8	0.787	53.4	LOS D	51.3	374.8	0.85	0.79	35.6

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	54	6.9	0.040	10.2	LOS B	0.8	6.1	0.22	0.65	59.2
2	T1	826	5.1	0.540	43.1	LOS D	27.1	197.8	0.82	0.73	41.1
3	R2	230	5.7	0.645	44.6	LOS D	10.7	78.6	0.97	0.83	38.4
Approach		1110	5.3	0.645	41.8	LOS D	27.1	197.8	0.82	0.74	41.1
East: Karrinyup Road (E)											
4	L2	196	3.5	0.172	16.1	LOS B	5.8	41.5	0.40	0.69	53.6
5	T1	451	4.1	0.646	73.4	LOS E	18.4	133.1	0.98	0.82	29.2
6	R2	315	2.8	0.519	80.5	LOS F	12.7	90.8	0.96	0.81	27.7
Approach		964	3.5	0.646	64.0	LOS E	18.4	133.1	0.86	0.79	31.6
North: Marmion Avenue (N)											
7	L2	291	2.4	0.236	12.5	LOS B	6.9	49.0	0.34	0.68	54.8
8	T1	698	3.1	0.644	60.3	LOS E	26.6	191.0	0.94	0.81	33.9
9	R2	48	9.1	0.248	86.3	LOS F	3.9	29.4	0.95	0.75	26.0
Approach		1037	3.2	0.644	48.1	LOS D	26.6	191.0	0.77	0.77	37.3
West: Karrinyup Road (W)											
10	L2	17	0.0	0.015	14.0	LOS B	0.4	2.9	0.33	0.64	55.6
11	T1	326	1.6	0.461	70.5	LOS E	12.7	90.5	0.94	0.78	29.9
12	R2	405	0.4	0.656	82.4	LOS F	16.7	117.5	0.99	0.83	27.3
Approach		748	0.9	0.656	75.7	LOS E	16.7	117.5	0.96	0.80	28.7
All Vehicles		3859	3.4	0.656	55.6	LOS E	27.1	197.8	0.84	0.78	34.7

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	31	6.9	0.020	8.0	LOS A	0.2	1.6	0.12	0.63	61.4
2	T1	612	5.1	0.394	39.4	LOS D	18.5	135.1	0.75	0.66	42.9
3	R2	202	5.7	0.849	98.0	LOS F	18.7	137.6	1.00	0.90	24.7
Approach		845	5.3	0.849	52.2	LOS D	18.7	137.6	0.79	0.71	36.8
East: Karrinyup Road (E)											
4	L2	290	3.5	0.380	35.1	LOS D	15.6	112.6	0.69	0.78	42.0
5	T1	144	4.1	0.620	92.7	LOS F	6.4	46.7	1.00	0.78	25.3
6	R2	325	2.8	0.845	100.3	LOS F	15.1	108.5	1.00	0.90	24.1
Approach		759	3.3	0.845	73.9	LOS E	15.6	112.6	0.88	0.83	29.1
North: Marmion Avenue (N)											
7	L2	433	2.4	0.379	22.4	LOS C	16.7	119.4	0.53	0.78	47.8
8	T1	1150	3.1	0.847	51.0	LOS D	51.3	368.6	0.92	0.85	37.0
9	R2	18	9.1	0.077	80.0	LOS E	1.4	10.4	0.91	0.71	27.2
Approach		1601	3.0	0.847	43.6	LOS D	51.3	368.6	0.81	0.83	39.2
West: Karrinyup Road (W)											
10	L2	84	0.0	0.066	12.1	LOS B	1.8	12.5	0.30	0.65	57.3
11	T1	719	1.6	0.864	80.7	LOS F	32.7	232.4	1.00	0.95	27.6
12	R2	589	0.4	0.609	68.9	LOS E	22.5	158.4	0.94	0.84	30.4
Approach		1392	1.0	0.864	71.6	LOS E	32.7	232.4	0.93	0.89	29.7
All Vehicles		4597	2.9	0.864	58.7	LOS E	51.3	368.6	0.86	0.83	33.6

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	57	6.9	0.040	10.1	LOS B	0.9	6.3	0.21	0.64	59.3
2	T1	1532	5.1	0.747	30.0	LOS C	49.8	364.1	0.79	0.74	48.1
3	R2	92	5.7	0.442	50.4	LOS D	4.5	33.3	0.97	0.77	36.2
Approach		1681	5.2	0.747	30.4	LOS C	49.8	364.1	0.78	0.74	47.6
East: Karrinyup Road (E)											
4	L2	200	3.5	0.160	11.5	LOS B	4.1	29.8	0.30	0.67	57.4
5	T1	461	4.1	0.753	79.6	LOS E	19.8	143.2	1.00	0.87	27.8
6	R2	439	2.8	0.622	74.9	LOS E	17.3	123.6	0.95	0.83	28.9
Approach		1100	3.5	0.753	65.4	LOS E	19.8	143.2	0.85	0.81	31.2
North: Marmion Avenue (N)											
7	L2	172	2.4	0.112	8.1	LOS A	1.9	13.6	0.18	0.63	58.6
8	T1	611	3.1	0.355	34.1	LOS C	17.1	123.2	0.70	0.81	44.5
9	R2	29	9.1	0.499	105.5	LOS F	2.7	20.3	1.00	0.72	22.9
Approach		812	3.2	0.499	31.1	LOS C	17.1	123.2	0.60	0.62	45.3
West: Karrinyup Road (W)											
10	L2	15	0.0	0.019	25.5	LOS C	0.6	4.0	0.50	0.66	47.4
11	T1	141	1.6	0.658	94.4	LOS F	6.4	45.3	1.00	0.79	25.0
12	R2	289	0.4	0.739	94.2	LOS F	12.8	89.9	1.00	0.84	25.1
Approach		445	0.8	0.739	91.9	LOS F	12.8	89.9	0.98	0.82	25.5
All Vehicles		4038	3.8	0.753	46.9	LOS D	49.8	364.1	0.79	0.74	38.1

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	55	6.9	0.037	8.8	LOS A	0.6	4.3	0.16	0.64	60.6
2	T1	896	5.1	0.562	41.7	LOS D	29.2	213.4	0.82	0.73	41.8
3	R2	236	5.7	0.595	42.2	LOS D	10.3	75.6	0.95	0.82	39.3
Approach		1187	5.3	0.595	40.3	LOS D	29.2	213.4	0.81	0.74	41.9
East: Karrinyup Road (E)											
4	L2	270	3.5	0.246	17.1	LOS B	8.5	61.3	0.43	0.71	52.8
5	T1	242	4.1	0.603	84.3	LOS F	10.3	74.8	1.00	0.80	26.8
6	R2	305	2.8	0.538	82.4	LOS F	12.4	89.0	0.97	0.81	27.3
Approach		817	3.4	0.603	61.4	LOS E	12.4	89.0	0.80	0.77	32.3
North: Marmion Avenue (N)											
7	L2	282	2.4	0.230	13.0	LOS B	6.9	49.4	0.35	0.68	54.4
8	T1	672	3.1	0.608	58.8	LOS E	25.2	180.8	0.92	0.80	34.3
9	R2	49	9.1	0.230	84.1	LOS F	3.9	29.6	0.94	0.75	26.4
Approach		1003	3.2	0.608	47.2	LOS D	25.2	180.8	0.76	0.76	37.7
West: Karrinyup Road (W)											
10	L2	44	0.0	0.039	14.8	LOS B	1.1	7.9	0.35	0.65	55.0
11	T1	351	1.6	0.546	74.2	LOS E	14.2	100.5	0.97	0.80	29.0
12	R2	483	0.4	0.602	74.7	LOS E	19.0	133.8	0.96	0.83	29.0
Approach		878	0.9	0.602	71.5	LOS E	19.0	133.8	0.93	0.81	29.7
All Vehicles		3885	3.4	0.608	53.5	LOS D	29.2	213.4	0.82	0.77	35.4

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	32	6.9	0.021	8.1	LOS A	0.2	1.8	0.12	0.63	51.3
2	T1	609	5.1	0.334	30.2	LOS C	16.1	117.3	0.66	0.58	48.0
3	R2	116	5.7	0.780	100.5	LOS F	10.6	77.9	1.00	0.85	24.3
Approach		757	5.3	0.780	40.0	LOS D	16.1	117.3	0.69	0.63	42.1
East: Karrinyup Road (E)											
4	L2	285	3.5	0.392	37.7	LOS D	15.8	114.1	0.72	0.79	40.8
5	T1	173	4.1	0.683	92.7	LOS F	7.8	56.4	1.00	0.81	25.3
6	R2	222	2.8	0.784	100.5	LOS F	10.2	73.0	1.00	0.85	24.0
Approach		680	3.4	0.784	72.2	LOS E	15.8	114.1	0.88	0.81	29.5
North: Marmion Avenue (N)											
7	L2	399	2.4	0.323	16.7	LOS B	13.6	96.9	0.44	0.71	51.6
8	T1	1312	3.1	0.811	39.0	LOS D	53.0	381.0	0.86	0.79	42.0
9	R2	20	9.1	0.138	90.4	LOS F	1.7	12.5	0.96	0.71	25.3
Approach		1731	3.0	0.811	34.5	LOS C	53.0	381.0	0.77	0.77	43.6
West: Karrinyup Road (W)											
10	L2	102	0.0	0.078	10.3	LOS B	1.8	12.4	0.25	0.65	59.0
11	T1	694	1.6	0.809	74.2	LOS E	29.7	211.0	1.00	0.90	29.0
12	R2	605	0.4	0.700	74.3	LOS E	24.2	170.3	0.98	0.85	29.1
Approach		1401	1.0	0.809	69.6	LOS E	29.7	211.0	0.94	0.86	30.1
All Vehicles		4569	2.8	0.811	51.6	LOS D	53.0	381.0	0.82	0.78	35.9

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	36	6.9	0.026	10.8	LOS B	0.6	4.5	0.23	0.64	58.6
2	T1	1498	5.1	0.781	35.1	LOS D	52.4	382.8	0.85	0.79	45.1
3	R2	90	5.7	0.478	50.9	LOS D	4.2	31.0	0.98	0.77	36.0
Approach		1624	5.2	0.781	35.5	LOS D	52.4	382.8	0.84	0.78	44.7
East: Karrinyup Road (E)											
4	L2	223	3.5	0.177	11.6	LOS B	4.7	33.9	0.30	0.67	57.3
5	T1	582	4.1	0.766	74.6	LOS E	24.5	177.6	1.00	0.88	28.9
6	R2	530	2.8	0.609	71.9	LOS E	20.6	147.8	0.95	0.84	29.6
Approach		1335	3.5	0.766	63.0	LOS E	24.5	177.6	0.86	0.83	31.8
North: Marmion Avenue (N)											
7	L2	85	2.4	0.056	8.0	LOS A	0.9	6.4	0.17	0.62	58.7
8	T1	587	3.1	0.364	37.4	LOS D	17.2	123.6	0.73	0.63	42.8
9	R2	18	9.1	0.310	104.2	LOS F	1.6	12.4	1.00	0.70	23.1
Approach		690	3.2	0.364	35.5	LOS D	17.2	123.6	0.67	0.63	43.3
West: Karrinyup Road (W)											
10	L2	9	0.0	0.012	28.9	LOS C	0.4	2.6	0.54	0.65	45.5
11	T1	157	1.6	0.610	91.3	LOS F	7.0	49.4	1.00	0.78	25.6
12	R2	294	0.4	0.752	94.7	LOS F	13.1	91.9	1.00	0.84	25.0
Approach		460	0.8	0.752	92.2	LOS F	13.1	91.9	0.99	0.82	25.4
All Vehicles		4109	3.8	0.781	50.8	LOS D	52.4	382.8	0.84	0.78	36.6

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Coast Highway (S)											
1	L2	116	6.9	0.078	8.6	LOS A	1.2	8.7	0.16	0.64	60.6
2	T1	950	5.1	0.612	44.2	LOS D	32.2	235.3	0.85	0.76	40.6
3	R2	238	5.7	0.616	42.9	LOS D	10.7	78.4	0.96	0.82	39.0
Approach		1304	5.4	0.616	40.8	LOS D	32.2	235.3	0.81	0.76	41.6
East: Karrinyup Road (E)											
4	L2	291	3.5	0.276	18.6	LOS B	9.9	71.4	0.46	0.72	51.7
5	T1	216	4.1	0.602	86.1	LOS F	9.3	67.4	1.00	0.79	26.5
6	R2	196	2.8	0.359	80.8	LOS F	7.8	55.6	0.94	0.78	27.6
Approach		703	3.5	0.602	56.7	LOS E	9.9	71.4	0.76	0.76	33.7
North: Marmion Avenue (N)											
7	L2	230	2.4	0.185	11.7	LOS B	4.9	35.1	0.31	0.67	55.5
8	T1	673	3.1	0.621	59.6	LOS E	25.4	182.7	0.93	0.81	34.0
9	R2	40	9.1	0.188	83.5	LOS F	3.2	24.0	0.94	0.74	26.5
Approach		943	3.2	0.621	49.0	LOS D	25.4	182.7	0.78	0.77	37.1
West: Karrinyup Road (W)											
10	L2	55	0.0	0.047	14.3	LOS B	1.4	9.6	0.34	0.66	55.4
11	T1	256	1.6	0.362	69.0	LOS E	9.8	69.5	0.92	0.75	30.3
12	R2	558	0.4	0.631	72.2	LOS E	21.8	153.4	0.95	0.84	29.5
Approach		869	0.7	0.631	67.6	LOS E	21.8	153.4	0.91	0.80	30.7
All Vehicles		3819	3.4	0.631	51.9	LOS D	32.2	235.3	0.81	0.77	36.0

1.2 Karrinyup Road and Burroughs Road

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	75	3.6	0.473	36.6	LOS E	1.7	12.4	0.94	1.04	26.8
Approach		75	3.6	0.473	36.6	NA	1.7	12.4	0.94	1.04	26.8
NorthEast: Burroughs Road (NE)											
24	L2	104	0.9	0.253	15.7	LOS C	0.9	6.6	0.72	1.03	36.3
26	R2	27	4.0	0.165	29.3	LOS D	0.5	3.5	0.90	1.01	38.1
Approach		131	1.5	0.253	18.5	LOS C	0.9	6.6	0.76	1.02	36.8
NorthWest: Karrinyup Road (NW)											
27	L2	71	0.8	0.044	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	1529	1.8	0.397	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1600	1.8	0.397	0.3	LOS A	0.0	0.0	0.00	0.02	59.1
All Vehicles		1806	1.8	0.473	3.1	NA	1.7	12.4	0.09	0.14	53.9

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	62	3.6	0.401	35.0	LOS E	1.4	10.0	0.93	1.02	27.4
Approach		62	3.6	0.401	35.0	NA	1.4	10.0	0.93	1.02	27.4
NorthEast: Burroughs Road (NE)											
24	L2	82	0.9	0.202	15.3	LOS C	0.7	4.9	0.71	1.01	36.5
26	R2	62	4.0	0.382	34.7	LOS D	1.3	9.1	0.92	1.05	36.1
Approach		144	2.2	0.382	23.7	LOS C	1.3	9.1	0.80	1.03	36.3
NorthWest: Karrinyup Road (NW)											
27	L2	74	0.8	0.045	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	1541	1.8	0.400	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1615	1.8	0.400	0.3	LOS A	0.0	0.0	0.00	0.03	59.1
All Vehicles		1821	1.9	0.401	3.3	NA	1.4	10.0	0.10	0.14	53.7

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	276	0.5	0.296	7.2	LOS A	1.4	9.7	0.53	0.74	42.9
Approach		276	0.5	0.296	7.2	NA	1.4	9.7	0.53	0.74	42.9
NorthEast: Burroughs Road (NE)											
24	L2	241	1.4	0.254	8.9	LOS A	1.1	7.6	0.37	0.90	40.6
26	R2	134	0.9	0.203	11.8	LOS B	0.7	5.2	0.58	1.00	46.3
Approach		375	1.2	0.254	9.9	LOS A	1.1	7.6	0.45	0.93	43.2
NorthWest: Karrinyup Road (NW)											
27	L2	105	2.0	0.065	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	425	2.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		530	2.0	0.110	1.1	LOS A	0.0	0.0	0.00	0.11	56.8
All Vehicles		1181	1.4	0.296	5.3	NA	1.4	9.7	0.26	0.52	48.3

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	184	3.6	0.239	8.1	LOS A	1.0	7.1	0.57	0.79	42.1
Approach		184	3.6	0.239	8.1	NA	1.0	7.1	0.57	0.79	42.1
NorthEast: Burroughs Road (NE)											
24	L2	150	0.9	0.172	9.2	LOS A	0.7	4.7	0.41	0.91	40.3
26	R2	128	4.0	0.216	12.7	LOS B	0.8	5.7	0.62	1.01	45.8
Approach		278	2.3	0.216	10.8	LOS B	0.8	5.7	0.51	0.96	43.4
NorthWest: Karrinyup Road (NW)											
27	L2	128	1.8	0.079	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	570	0.8	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		698	1.0	0.147	1.0	LOS A	0.0	0.0	0.00	0.10	57.0
All Vehicles		1160	1.7	0.239	4.5	NA	1.0	7.1	0.21	0.42	50.2

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	212	1.4	0.334	10.5	LOS B	1.6	11.3	0.65	0.90	40.2
Approach		212	1.4	0.334	10.5	NA	1.6	11.3	0.65	0.90	40.2
NorthEast: Burroughs Road (NE)											
24	L2	235	0.5	0.299	10.2	LOS B	1.3	9.2	0.50	0.96	39.7
26	R2	83	0.7	0.178	14.4	LOS B	0.6	4.3	0.71	1.00	45.0
Approach		318	0.6	0.299	11.3	LOS B	1.3	9.2	0.58	0.97	41.6
NorthWest: Karrinyup Road (NW)											
27	L2	191	0.0	0.117	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	734	1.2	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		925	1.0	0.190	1.2	LOS A	0.0	0.0	0.00	0.11	56.7
All Vehicles		1455	0.9	0.334	4.7	NA	1.6	11.3	0.22	0.42	49.9

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	164	3.6	0.271	10.3	LOS B	1.2	8.4	0.65	0.87	40.4
Approach		164	3.6	0.271	10.3	NA	1.2	8.4	0.65	0.87	40.4
NorthEast: Burroughs Road (NE)											
24	L2	202	0.9	0.261	10.1	LOS B	1.0	7.4	0.50	0.95	39.8
26	R2	108	4.0	0.233	15.0	LOS B	0.9	6.2	0.72	1.02	44.6
Approach		310	2.0	0.261	11.8	LOS B	1.0	7.4	0.57	0.98	42.0
NorthWest: Karrinyup Road (NW)											
27	L2	182	1.8	0.112	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	755	0.8	0.195	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		937	1.0	0.195	1.1	LOS A	0.0	0.0	0.00	0.11	56.8
All Vehicles		1411	1.5	0.271	4.5	NA	1.2	8.4	0.20	0.39	50.5

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	71	3.6	0.397	30.8	LOS D	1.4	10.2	0.92	1.02	29.0
Approach		71	3.6	0.397	30.8	NA	1.4	10.2	0.92	1.02	29.0
NorthEast: Burroughs Road (NE)											
24	L2	65	0.9	0.150	14.3	LOS B	0.5	3.6	0.67	1.00	37.1
26	R2	56	4.0	0.310	30.4	LOS D	1.0	7.3	0.90	1.04	37.7
Approach		121	2.3	0.310	21.7	LOS C	1.0	7.3	0.78	1.02	37.5
NorthWest: Karrinyup Road (NW)											
27	L2	86	0.8	0.053	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	1472	1.8	0.382	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1558	1.8	0.382	0.4	LOS A	0.0	0.0	0.00	0.03	58.9
All Vehicles		1750	1.9	0.397	3.1	NA	1.4	10.2	0.09	0.14	54.1

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	216	3.6	0.286	8.6	LOS A	1.3	9.4	0.59	0.84	41.7
Approach		216	3.6	0.286	8.6	NA	1.3	9.4	0.59	0.84	41.7
NorthEast: Burroughs Road (NE)											
24	L2	86	0.9	0.099	9.1	LOS A	0.4	2.6	0.39	0.90	40.4
26	R2	171	4.0	0.313	14.2	LOS B	1.3	9.4	0.68	1.05	45.0
Approach		257	3.0	0.313	12.5	LOS B	1.3	9.4	0.59	1.00	43.9
NorthWest: Karrinyup Road (NW)											
27	L2	176	0.8	0.108	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	582	1.8	0.151	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		758	1.6	0.151	1.3	LOS A	0.0	0.0	0.00	0.13	56.4
All Vehicles		1231	2.2	0.313	4.9	NA	1.3	9.4	0.23	0.43	50.1

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	238	3.6	0.388	11.2	LOS B	2.0	14.3	0.68	0.93	39.6
Approach		238	3.6	0.388	11.2	NA	2.0	14.3	0.68	0.93	39.6
NorthEast: Burroughs Road (NE)											
24	L2	99	0.9	0.127	9.8	LOS A	0.5	3.3	0.45	0.93	40.0
26	R2	132	4.0	0.298	16.1	LOS C	1.2	8.4	0.75	1.05	44.0
Approach		231	2.7	0.298	13.4	LOS B	1.2	8.4	0.62	1.00	42.7
NorthWest: Karrinyup Road (NW)											
27	L2	141	0.8	0.087	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	741	1.8	0.192	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		882	1.7	0.192	0.9	LOS A	0.0	0.0	0.00	0.09	57.3
All Vehicles		1351	2.2	0.388	4.9	NA	2.0	14.3	0.23	0.39	50.3

2031 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	69	3.6	0.432	35.0	LOS E	1.5	11.1	0.93	1.03	27.4
Approach		69	3.6	0.432	35.0	NA	1.5	11.1	0.93	1.03	27.4
NorthEast: Burroughs Road (NE)											
24	L2	90	0.9	0.218	15.3	LOS C	0.8	5.5	0.71	1.01	36.5
26	R2	110	4.0	0.663	44.7	LOS E	2.7	19.2	0.96	1.16	32.9
Approach		200	2.6	0.663	31.5	LOS D	2.7	19.2	0.84	1.10	34.0
NorthWest: Karrinyup Road (NW)											
27	L2	71	0.8	0.044	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	1526	1.8	0.396	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1597	1.8	0.396	0.3	LOS A	0.0	0.0	0.00	0.02	59.1
All Vehicles		1866	1.9	0.663	4.9	NA	2.7	19.2	0.12	0.18	51.7

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	169	3.6	0.207	7.7	LOS A	0.9	6.2	0.54	0.76	42.4
Approach		169	3.6	0.207	7.7	NA	0.9	6.2	0.54	0.76	42.4
NorthEast: Burroughs Road (NE)											
24	L2	160	0.9	0.178	9.0	LOS A	0.7	4.9	0.39	0.90	40.4
26	R2	134	4.0	0.210	12.1	LOS B	0.8	5.6	0.59	1.00	46.1
Approach		294	2.3	0.210	10.4	LOS B	0.8	5.6	0.48	0.95	43.6
NorthWest: Karrinyup Road (NW)											
27	L2	130	0.8	0.080	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	520	1.8	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		650	1.6	0.135	1.1	LOS A	0.0	0.0	0.00	0.11	56.8
All Vehicles		1113	2.1	0.210	4.6	NA	0.9	6.2	0.21	0.43	50.1

2031 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	157	3.6	0.273	10.7	LOS B	1.2	8.4	0.67	0.88	40.0
Approach		157	3.6	0.273	10.7	NA	1.2	8.4	0.67	0.88	40.0
NorthEast: Burroughs Road (NE)											
24	L2	191	0.9	0.253	10.3	LOS B	1.0	7.1	0.50	0.96	39.7
26	R2	78	4.0	0.179	15.1	LOS C	0.6	4.4	0.72	1.00	44.6
Approach		269	1.8	0.253	11.7	LOS B	1.0	7.1	0.57	0.97	41.6
NorthWest: Karrinyup Road (NW)											
27	L2	213	0.8	0.131	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	789	1.8	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1002	1.6	0.205	1.2	LOS A	0.0	0.0	0.00	0.12	56.6
All Vehicles		1428	1.9	0.273	4.2	NA	1.2	8.4	0.18	0.36	50.9

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	102	3.6	0.397	22.8	LOS C	1.5	11.2	0.88	1.01	32.5
Approach		102	3.6	0.397	22.8	NA	1.5	11.2	0.88	1.01	32.5
NorthEast: Burroughs Road (NE)											
24	L2	111	0.9	0.216	13.2	LOS B	0.8	5.5	0.63	1.01	37.8
26	R2	106	4.0	0.457	28.0	LOS D	1.7	12.4	0.90	1.09	38.6
Approach		217	2.4	0.457	20.4	LOS C	1.7	12.4	0.76	1.05	38.3
NorthWest: Karrinyup Road (NW)											
27	L2	124	0.8	0.076	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	1288	1.8	0.334	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1412	1.7	0.334	0.5	LOS A	0.0	0.0	0.00	0.05	58.4
All Vehicles		1731	1.9	0.457	4.3	NA	1.7	12.4	0.15	0.23	51.9

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	364	3.6	0.352	6.7	LOS A	1.8	13.3	0.48	0.69	43.3
Approach		364	3.6	0.352	6.7	NA	1.8	13.3	0.48	0.69	43.3
NorthEast: Burroughs Road (NE)											
24	L2	188	0.9	0.185	8.4	LOS A	0.7	5.3	0.30	0.89	40.8
26	R2	236	4.0	0.365	13.2	LOS B	1.7	12.3	0.63	1.07	45.5
Approach		424	2.6	0.365	11.0	LOS B	1.7	12.3	0.49	0.99	43.9
NorthWest: Karrinyup Road (NW)											
27	L2	94	0.8	0.056	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	313	1.8	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		407	1.6	0.081	1.3	LOS A	0.0	0.0	0.00	0.13	56.4
All Vehicles		1195	2.6	0.365	6.4	NA	1.8	13.3	0.32	0.60	47.2

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
23	R2	190	3.6	0.203	6.9	LOS A	0.9	6.2	0.49	0.70	43.2
Approach		190	3.6	0.203	6.9	NA	0.9	6.2	0.49	0.70	43.2
NorthEast: Burroughs Road (NE)											
24	L2	81	0.9	0.084	8.5	LOS A	0.3	2.2	0.32	0.88	40.7
26	R2	195	4.0	0.279	11.9	LOS B	1.2	8.4	0.58	1.03	46.2
Approach		276	3.1	0.279	10.9	LOS B	1.2	8.4	0.50	0.99	45.0
NorthWest: Karrinyup Road (NW)											
27	L2	168	0.8	0.103	5.6	LOS A	0.0	0.0	0.00	0.55	50.6
28	T1	403	1.8	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		571	1.5	0.105	1.7	LOS A	0.0	0.0	0.00	0.16	55.6
All Vehicles		1037	2.3	0.279	5.1	NA	1.2	8.4	0.22	0.48	49.8

1.3 Karrinyup Road and Jeanes Road

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	164	1.0	0.155	13.0	LOS B	3.5	24.9	0.42	0.67	45.9
22	T1	435	8.1	0.398	39.7	LOS D	11.2	83.7	0.85	0.72	36.3
23	R2	50	0.9	0.165	56.0	LOS E	2.7	19.2	0.90	0.74	23.0
Approach		649	5.8	0.398	34.2	LOS C	11.2	83.7	0.75	0.71	37.3
NorthEast: Shopping Centre Access (NE)											
24	L2	83	0.0	0.156	16.4	LOS B	2.7	18.8	0.63	0.60	36.2
25	T1	4	0.0	0.156	14.9	LOS B	2.7	18.8	0.63	0.60	33.9
26	R2	3	10.5	0.010	43.6	LOS D	0.1	1.1	0.81	0.57	25.0
Approach		90	0.4	0.156	17.2	LOS B	2.7	18.8	0.64	0.60	35.6
NorthWest: Karrinyup Road (NW)											
27	L2	78	1.3	0.053	6.3	LOS A	0.4	2.8	0.15	0.59	47.7
28	T1	1285	2.3	0.835	34.3	LOS C	38.7	276.5	0.88	0.83	38.4
29	R2	264	0.8	0.497	27.4	LOS C	7.9	55.7	0.89	0.80	38.7
Approach		1627	2.0	0.835	31.8	LOS C	38.7	276.5	0.84	0.82	38.7
SouthWest: Jeanes Road (SW)											
30	L2	160	3.3	0.417	23.4	LOS C	5.8	41.4	0.82	0.77	40.2
31	T1	57	0.0	0.417	22.1	LOS C	5.8	41.4	0.82	0.77	30.9
32	R2	169	0.8	0.456	51.4	LOS D	9.3	65.4	0.91	0.80	30.8
Approach		386	1.7	0.456	35.5	LOS D	9.3	65.4	0.86	0.78	34.3
All Vehicles		2752	2.8	0.835	32.4	LOS C	38.7	276.5	0.82	0.78	37.6

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov.	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	116	0.0	0.096	10.4	LOS B	1.8	12.7	0.37	0.65	47.4
22	T1	679	1.1	0.368	20.3	LOS C	11.8	83.6	0.69	0.60	45.0
23	R2	186	0.0	1.090	158.1	LOS F	18.6	130.5	1.00	1.35	10.9
Approach		961	0.8	1.090	45.2	LOS D	18.6	130.5	0.71	0.75	32.6
NorthEast: Shopping Centre Access (NE)											
24	L2	287	1.3	0.437	8.6	LOS A	5.1	36.4	0.62	0.62	41.2
25	T1	17	0.0	0.437	7.4	LOS A	5.1	36.4	0.62	0.62	38.3
26	R2	12	0.0	0.031	33.6	LOS C	0.5	3.3	0.77	0.60	28.4
Approach		316	1.1	0.437	9.7	LOS A	5.1	36.4	0.62	0.62	40.4
NorthWest: Karrinyup Road (NW)											
27	L2	151	0.5	0.119	7.1	LOS A	1.3	9.5	0.24	0.62	46.8
28	T1	684	1.3	0.376	20.4	LOS C	12.0	84.6	0.69	0.60	45.0
29	R2	113	0.0	0.649	60.8	LOS E	6.2	43.5	1.00	0.82	28.6
Approach		958	1.0	0.649	22.9	LOS C	12.0	84.6	0.65	0.63	42.1
SouthWest: Jeanes Road (SW)											
30	L2	207	0.0	0.388	15.6	LOS B	5.2	36.2	0.72	0.75	43.9
31	T1	49	0.8	0.388	14.3	LOS B	5.2	36.2	0.72	0.75	34.5
32	R2	173	0.8	0.410	40.9	LOS D	7.8	54.7	0.87	0.79	33.8
Approach		429	0.4	0.410	25.7	LOS C	7.8	54.7	0.78	0.76	38.3
All Vehicles		2684	0.8	1.090	30.0	LOS C	18.6	130.5	0.69	0.69	37.2

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	154	0.7	0.122	9.3	LOS A	2.2	15.5	0.33	0.64	48.1
22	T1	1132	1.6	0.720	27.3	LOS C	27.6	196.1	0.84	0.75	41.4
23	R2	174	0.0	1.226	272.0	LOS F	24.8	173.3	1.00	1.58	6.9
Approach		1460	1.3	1.226	54.6	LOS D	27.6	196.1	0.80	0.83	30.3
NorthEast: Shopping Centre Access (NE)											
24	L2	169	1.0	0.288	11.6	LOS B	4.1	29.1	0.62	0.60	39.3
25	T1	23	0.0	0.288	10.1	LOS B	4.1	29.1	0.62	0.60	36.6
26	R2	101	0.0	0.220	34.8	LOS C	4.4	30.7	0.79	0.68	28.0
Approach		293	0.6	0.288	19.5	LOS B	4.4	30.7	0.68	0.63	34.3
NorthWest: Karrinyup Road (NW)											
27	L2	127	0.0	0.087	6.2	LOS A	0.6	4.3	0.15	0.59	47.7
28	T1	468	3.3	0.271	22.1	LOS C	8.6	61.7	0.67	0.57	44.1
29	R2	67	0.0	0.463	65.2	LOS E	3.9	27.4	1.00	0.76	27.7
Approach		662	2.4	0.463	23.4	LOS C	8.6	61.7	0.61	0.59	41.8
SouthWest: Jeanes Road (SW)											
30	L2	300	0.5	0.442	18.3	LOS B	10.1	71.0	0.70	0.79	42.4
31	T1	12	0.0	0.442	17.0	LOS B	10.1	71.0	0.70	0.79	33.0
32	R2	144	1.8	0.313	39.0	LOS D	6.5	46.0	0.81	0.76	34.4
Approach		456	0.9	0.442	24.8	LOS C	10.1	71.0	0.74	0.78	39.3
All Vehicles		2871	1.4	1.226	39.1	LOS D	27.6	196.1	0.73	0.75	34.1

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	198	1.0	0.187	11.5	LOS B	4.2	29.5	0.37	0.66	46.8
22	T1	554	8.1	0.642	56.6	LOS E	18.7	139.9	0.96	0.82	31.1
23	R2	52	0.9	0.697	89.1	LOS F	4.1	28.9	1.00	0.80	17.1
Approach		804	5.9	0.697	47.6	LOS D	18.7	139.9	0.82	0.78	32.8
NorthEast: Shopping Centre Access (NE)											
24	L2	92	0.0	0.157	15.5	LOS B	3.1	22.0	0.60	0.59	36.8
25	T1	6	0.0	0.157	14.0	LOS B	3.1	22.0	0.60	0.59	34.4
26	R2	15	10.5	0.032	35.6	LOS D	0.7	5.4	0.69	0.57	27.5
Approach		113	1.4	0.157	18.1	LOS B	3.1	22.0	0.61	0.58	35.1
NorthWest: Karrinyup Road (NW)											
27	L2	78	1.3	0.052	6.3	LOS A	0.5	3.4	0.14	0.58	47.6
28	T1	1247	2.3	0.824	35.3	LOS D	40.9	292.2	0.85	0.78	38.0
29	R2	286	0.8	0.644	35.1	LOS D	11.3	79.3	0.96	0.83	35.8
Approach		1611	2.0	0.824	33.9	LOS C	40.9	292.2	0.84	0.78	37.8
SouthWest: Jeanes Road (SW)											
30	L2	110	3.3	0.231	20.4	LOS C	4.7	33.3	0.67	0.70	41.5
31	T1	47	0.0	0.231	19.1	LOS B	4.7	33.3	0.67	0.70	32.2
32	R2	179	0.8	0.801	79.3	LOS E	13.6	96.1	1.00	0.90	25.0
Approach		336	1.5	0.801	51.6	LOS D	13.6	96.1	0.85	0.81	29.7
All Vehicles		2854	3.0	0.824	39.2	LOS D	40.9	292.2	0.82	0.78	35.1

2021 Do-minimum PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	153	1.0	0.116	7.3	LOS A	1.3	9.4	0.25	0.62	49.4
22	T1	1035	8.1	0.801	35.1	LOS D	26.8	200.9	0.93	0.87	38.1
23	R2	151	0.9	0.594	32.1	LOS C	4.8	33.6	0.99	0.79	30.4
Approach		1339	6.5	0.801	31.6	LOS C	26.8	200.9	0.85	0.83	38.4
NorthEast: Shopping Centre Access (NE)											
24	L2	160	0.0	0.217	8.3	LOS A	2.7	18.7	0.54	0.55	41.7
25	T1	20	0.0	0.217	6.9	LOS A	2.7	18.7	0.54	0.55	38.7
26	R2	124	10.5	0.232	26.9	LOS C	4.6	34.9	0.73	0.66	30.8
Approach		304	4.3	0.232	15.8	LOS B	4.6	34.9	0.61	0.59	36.3
NorthWest: Karrinyup Road (NW)											
27	L2	124	1.3	0.159	23.8	LOS C	3.8	27.1	0.66	0.72	34.7
28	T1	462	2.3	0.501	39.5	LOS D	11.0	78.5	0.92	0.77	36.4
29	R2	94	0.8	0.776	66.5	LOS E	5.5	38.7	1.00	0.87	27.4
Approach		680	1.9	0.776	40.4	LOS D	11.0	78.5	0.88	0.77	34.5
SouthWest: Jeanes Road (SW)											
30	L2	241	3.3	0.354	15.1	LOS B	6.8	49.0	0.63	0.73	44.1
31	T1	17	0.0	0.354	13.8	LOS B	6.8	49.0	0.63	0.73	34.7
32	R2	132	0.8	0.763	62.2	LOS E	7.5	53.0	1.00	0.90	28.3
Approach		390	2.3	0.763	31.0	LOS C	7.5	53.0	0.76	0.78	36.7
All Vehicles		2713	4.5	0.801	31.9	LOS C	26.8	200.9	0.82	0.78	36.9

2021 Do-minimum SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	102	1.0	0.154	23.5	LOS C	2.9	20.2	0.72	0.72	40.6
22	T1	796	8.1	0.818	39.3	LOS D	18.5	138.9	1.00	0.97	36.5
23	R2	176	0.9	0.772	51.6	LOS D	8.2	58.1	1.00	0.90	24.0
Approach		1074	6.3	0.818	39.8	LOS D	18.5	138.9	0.97	0.93	34.9
NorthEast: Shopping Centre Access (NE)											
24	L2	274	0.0	0.310	6.9	LOS A	4.7	32.6	0.50	0.54	42.7
25	T1	15	0.0	0.310	5.5	LOS A	4.7	32.6	0.50	0.54	39.6
26	R2	34	10.5	0.063	19.9	LOS B	0.9	7.1	0.65	0.57	34.0
Approach		323	1.1	0.310	6.2	LOS A	4.7	32.6	0.52	0.54	41.5
NorthWest: Karrinyup Road (NW)											
27	L2	160	1.3	0.150	7.1	LOS A	1.3	9.3	0.27	0.63	46.8
28	T1	691	2.3	0.697	33.7	LOS C	14.2	101.6	0.96	0.84	38.6
29	R2	113	0.8	0.485	47.1	LOS D	4.8	34.1	0.98	0.76	32.1
Approach		984	1.9	0.697	30.4	LOS C	14.2	101.6	0.84	0.79	38.5
SouthWest: Jeanes Road (SW)											
30	L2	113	3.3	0.169	13.1	LOS B	2.8	20.1	0.53	0.65	45.2
31	T1	26	0.0	0.169	11.8	LOS B	2.8	20.1	0.53	0.65	35.9
32	R2	115	0.8	0.724	52.5	LOS D	5.4	38.1	1.00	0.87	30.5
Approach		254	1.8	0.724	30.8	LOS C	5.4	38.1	0.74	0.74	36.3
All Vehicles		2635	3.6	0.818	31.6	LOS C	18.5	138.9	0.84	0.81	36.9

2021 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	190	1.0	0.152	7.7	LOS A	2.1	15.0	0.24	0.62	49.2
22	T1	427	8.1	0.384	38.5	LOS D	10.7	79.9	0.84	0.70	36.7
23	R2	30	0.9	0.264	71.4	LOS E	1.9	13.5	0.99	0.72	19.8
Approach		647	5.7	0.384	31.0	LOS C	10.7	79.9	0.57	0.68	38.7
NorthEast: Shopping Centre Access (NE)											
24	L2	36	0.0	0.085	52.9	LOS D	1.4	9.5	0.89	0.68	22.6
25	T1	13	0.0	0.085	50.9	LOS D	1.4	9.5	0.89	0.66	22.0
26	R2	16	10.5	0.070	52.9	LOS D	0.9	6.7	0.89	0.66	22.5
Approach		65	2.6	0.085	52.5	LOS D	1.4	9.5	0.89	0.67	22.5
NorthWest: Karrinyup Road (NW)											
27	L2	40	1.3	0.031	10.9	LOS B	0.7	5.1	0.33	0.61	43.4
28	T1	1274	2.3	0.550	12.8	LOS B	21.8	155.7	0.57	0.52	49.6
29	R2	278	0.8	0.369	34.1	LOS C	12.1	85.6	0.74	0.79	35.9
Approach		1592	2.0	0.550	16.5	LOS B	21.8	155.7	0.60	0.57	46.4
SouthWest: Jeanes Road (SW)											
30	L2	141	3.3	0.180	13.8	LOS B	3.6	26.0	0.49	0.66	44.7
31	T1	7	0.0	0.180	12.4	LOS B	3.6	26.0	0.49	0.66	35.4
32	R2	115	0.8	0.526	61.5	LOS E	7.0	49.1	0.97	0.80	28.2
Approach		263	2.1	0.526	34.6	LOS C	7.0	49.1	0.70	0.72	35.4
All Vehicles		2567	3.0	0.550	22.9	LOS C	21.8	155.7	0.63	0.61	42.2

2021 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	161	1.0	0.107	6.1	LOS A	0.6	5.5	0.14	0.59	50.2
22	T1	1042	8.1	0.769	36.1	LOS D	28.5	213.4	0.91	0.81	37.7
23	R2	51	0.9	0.449	72.5	LOS E	3.3	23.3	1.00	0.75	19.6
Approach		1254	6.9	0.769	33.8	LOS C	28.5	213.4	0.81	0.78	38.0
NorthEast: Shopping Centre Access (NE)											
24	L2	31	0.0	0.030	26.2	LOS C	0.9	6.1	0.62	0.56	31.0
25	T1	15	0.0	0.030	24.2	LOS C	0.9	6.1	0.62	0.50	29.9
26	R2	203	10.5	0.367	31.0	LOS C	9.0	68.5	0.74	0.70	28.9
Approach		249	8.6	0.367	30.0	LOS C	9.0	68.6	0.72	0.67	29.2
NorthWest: Karrinyup Road (NW)											
27	L2	45	1.3	0.046	19.3	LOS B	1.3	9.0	0.51	0.65	37.4
28	T1	584	2.3	0.387	30.1	LOS C	13.1	93.6	0.76	0.66	40.2
29	R2	44	0.8	0.387	72.2	LOS E	2.8	20.0	1.00	0.74	26.1
Approach		673	2.1	0.387	32.1	LOS C	13.1	93.6	0.76	0.66	38.7
SouthWest: Jeanes Road (SW)											
30	L2	376	3.3	0.654	28.5	LOS C	14.6	104.7	0.82	0.91	36.0
31	T1	46	0.0	0.654	27.1	LOS C	14.6	104.7	0.82	0.91	28.8
32	R2	177	0.8	0.316	32.6	LOS C	7.6	53.6	0.72	0.75	36.2
Approach		599	2.3	0.654	29.6	LOS C	14.6	104.7	0.79	0.87	36.9
All Vehicles		2775	4.9	0.769	32.1	LOS C	28.5	213.4	0.79	0.76	37.3

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	70	1.0	0.046	6.0	LOS A	0.3	2.0	0.12	0.58	50.2
22	T1	691	8.1	0.425	26.8	LOS C	14.9	111.8	0.74	0.64	41.7
23	R2	108	0.9	0.423	61.9	LOS E	6.4	45.2	0.96	0.78	21.6
Approach		869	6.7	0.425	29.5	LOS C	14.9	111.8	0.72	0.66	39.4
NorthEast: Shopping Centre Access (NE)											
24	L2	217	0.0	0.220	39.9	LOS D	5.6	39.3	0.80	0.71	26.0
25	T1	16	0.0	0.220	37.9	LOS D	5.6	39.3	0.80	0.71	25.0
26	R2	65	10.5	0.160	39.2	LOS D	3.1	23.6	0.79	0.68	26.1
Approach		298	2.3	0.220	39.7	LOS D	5.6	39.3	0.80	0.70	25.9
NorthWest: Karrinyup Road (NW)											
27	L2	96	1.3	0.098	18.1	LOS B	2.7	19.3	0.50	0.67	38.1
28	T1	717	2.3	0.433	26.7	LOS C	15.8	112.9	0.74	0.64	41.7
29	R2	33	0.8	0.129	59.0	LOS E	1.9	13.1	0.91	0.72	26.9
Approach		848	2.1	0.433	27.0	LOS C	15.8	112.9	0.72	0.65	40.7
SouthWest: Jeanes Road (SW)											
30	L2	179	3.3	0.248	11.3	LOS B	3.6	26.2	0.50	0.67	46.2
31	T1	13	0.0	0.248	9.8	LOS A	3.6	26.2	0.50	0.67	36.9
32	R2	126	0.8	0.424	50.6	LOS D	6.9	48.7	0.89	0.79	30.8
Approach		318	2.2	0.424	26.8	LOS C	6.9	48.7	0.66	0.72	38.2
All Vehicles		2333	3.8	0.433	29.5	LOS C	15.8	112.9	0.72	0.67	38.0

2031 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	216	1.0	0.192	11.0	LOS B	4.4	30.8	0.35	0.66	47.1
22	T1	597	8.1	0.581	49.4	LOS D	19.7	147.8	0.91	0.78	33.2
23	R2	48	0.9	0.644	88.3	LOS F	3.7	26.4	1.00	0.78	17.2
Approach		861	6.0	0.644	41.9	LOS D	19.7	147.8	0.78	0.75	34.7
NorthEast: Shopping Centre Access (NE)											
24	L2	69	0.0	0.162	17.7	LOS B	3.4	23.9	0.64	0.61	35.5
25	T1	8	0.0	0.162	16.3	LOS B	3.4	23.9	0.64	0.61	33.3
26	R2	18	10.5	0.041	37.2	LOS D	0.9	6.7	0.70	0.58	27.0
Approach		115	1.6	0.162	20.7	LOS C	3.4	23.9	0.65	0.60	33.7
NorthWest: Karrinyup Road (NW)											
27	L2	77	1.3	0.051	6.3	LOS A	0.5	3.3	0.14	0.58	47.6
28	T1	1323	2.3	0.824	33.8	LOS C	43.1	307.3	0.86	0.79	38.6
29	R2	252	0.8	0.684	50.0	LOS D	11.8	82.8	0.98	0.89	31.3
Approach		1652	2.0	0.824	35.0	LOS D	43.1	307.3	0.84	0.79	37.4
SouthWest: Jeanes Road (SW)											
30	L2	114	3.3	0.249	20.9	LOS C	4.5	32.3	0.69	0.71	41.3
31	T1	48	0.0	0.249	19.6	LOS B	4.5	32.3	0.69	0.71	32.0
32	R2	165	0.8	0.829	82.6	LOS F	12.6	90.6	1.00	0.93	24.4
Approach		327	1.6	0.829	51.9	LOS D	12.8	90.6	0.85	0.82	29.6
All Vehicles		2955	3.1	0.829	38.3	LOS D	43.1	307.3	0.82	0.78	35.5

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	149	1.0	0.112	7.3	LOS A	1.3	9.1	0.24	0.62	49.4
22	T1	986	8.1	0.753	32.2	LOS C	24.1	180.7	0.91	0.82	39.3
23	R2	128	0.9	0.581	33.1	LOS C	4.1	28.9	0.99	0.78	30.0
Approach		1263	6.6	0.753	29.3	LOS C	24.1	180.7	0.84	0.79	39.5
NorthEast: Shopping Centre Access (NE)											
24	L2	153	0.0	0.204	7.8	LOS A	2.4	17.1	0.51	0.53	42.1
25	T1	18	0.0	0.204	6.3	LOS A	2.4	17.1	0.51	0.53	39.1
26	R2	122	10.5	0.227	26.2	LOS C	4.4	33.9	0.72	0.65	31.1
Approach		293	4.4	0.227	15.3	LOS B	4.4	33.9	0.60	0.58	36.5
NorthWest: Karrinyup Road (NW)											
27	L2	101	1.3	0.075	6.6	LOS A	0.6	4.4	0.19	0.60	47.3
28	T1	462	2.3	0.482	38.5	LOS D	10.8	77.4	0.91	0.76	36.8
29	R2	80	0.8	0.770	67.5	LOS E	4.7	33.1	1.00	0.86	27.2
Approach		643	1.9	0.770	37.1	LOS D	10.8	77.4	0.81	0.75	35.9
SouthWest: Jeanes Road (SW)											
30	L2	243	3.3	0.389	17.7	LOS B	7.4	52.9	0.67	0.77	42.8
31	T1	33	0.0	0.389	16.4	LOS B	7.4	52.9	0.67	0.77	33.4
32	R2	138	0.8	0.740	60.7	LOS E	7.8	54.7	1.00	0.88	28.6
Approach		414	2.2	0.740	31.9	LOS C	7.8	54.7	0.78	0.81	36.1
All Vehicles		2613	4.5	0.770	30.1	LOS C	24.1	180.7	0.79	0.76	37.7

2031 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	112	1.0	0.144	22.5	LOS C	3.3	23.2	0.65	0.71	41.0
22	T1	816	8.1	0.725	36.6	LOS D	19.4	145.4	0.96	0.85	37.5
23	R2	175	0.9	0.758	57.9	LOS E	9.4	66.1	1.00	0.88	22.5
Approach		1103	6.3	0.758	38.5	LOS D	19.4	145.4	0.93	0.84	35.4
NorthEast: Shopping Centre Access (NE)											
24	L2	276	0.0	0.316	7.5	LOS A	5.3	37.0	0.51	0.55	42.3
25	T1	14	0.0	0.316	6.0	LOS A	5.3	37.0	0.51	0.55	39.2
26	R2	12	10.5	0.023	23.0	LOS C	0.4	2.9	0.65	0.54	32.5
Approach		302	0.4	0.316	8.0	LOS A	5.3	37.0	0.52	0.55	41.6
NorthWest: Karrinyup Road (NW)											
27	L2	162	1.3	0.133	7.4	LOS A	1.4	10.2	0.26	0.62	46.6
28	T1	654	2.3	0.575	33.9	LOS C	14.3	101.8	0.90	0.77	38.6
29	R2	65	0.8	0.276	51.9	LOS D	3.1	21.9	0.95	0.75	30.8
Approach		881	2.0	0.575	30.3	LOS C	14.3	101.8	0.79	0.74	38.6
SouthWest: Jeanes Road (SW)											
30	L2	107	3.3	0.215	19.9	LOS B	4.4	31.5	0.63	0.73	41.8
31	T1	53	0.0	0.215	18.6	LOS B	4.4	31.5	0.63	0.73	32.5
32	R2	116	0.8	0.693	58.6	LOS E	6.2	43.7	1.00	0.85	29.1
Approach		276	1.6	0.693	35.9	LOS D	6.2	43.7	0.79	0.78	33.8
All Vehicles		2562	3.6	0.758	31.8	LOS C	19.4	145.4	0.82	0.76	36.7

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	249	1.0	0.174	7.4	LOS A	2.6	18.3	0.23	0.62	49.3
22	T1	445	8.1	0.237	18.9	LOS B	7.7	58.0	0.60	0.51	45.8
23	R2	8	0.9	0.030	56.7	LOS E	0.4	3.1	0.88	0.67	22.7
Approach		702	5.5	0.237	15.2	LOS B	7.7	58.0	0.47	0.55	45.7
NorthEast: Shopping Centre Access (NE)											
24	L2	34	0.0	0.063	46.2	LOS D	1.3	8.8	0.83	0.65	24.3
25	T1	15	0.0	0.063	44.2	LOS D	1.3	8.8	0.83	0.63	23.6
26	R2	7	10.5	0.023	45.7	LOS D	0.4	2.7	0.82	0.61	24.3
Approach		56	1.3	0.063	45.6	LOS D	1.3	8.8	0.83	0.64	24.1
NorthWest: Karrinyup Road (NW)											
27	L2	24	1.3	0.020	12.2	LOS B	0.5	3.3	0.36	0.62	42.3
28	T1	1197	2.3	0.680	24.4	LOS C	30.2	215.5	0.78	0.70	42.9
29	R2	176	0.8	0.652	63.5	LOS E	10.8	76.2	1.00	0.82	27.9
Approach		1397	2.1	0.680	29.1	LOS C	30.2	215.5	0.80	0.71	40.1
SouthWest: Jeanes Road (SW)											
30	L2	82	3.3	0.134	14.1	LOS B	1.9	13.3	0.56	0.66	44.6
31	T1	10	0.0	0.134	12.7	LOS B	1.9	13.3	0.56	0.66	35.3
32	R2	196	0.8	0.675	58.1	LOS E	11.9	83.7	0.98	0.84	29.0
Approach		288	1.5	0.675	44.0	LOS D	11.9	83.7	0.85	0.79	32.4
All Vehicles		2443	3.0	0.680	27.2	LOS C	30.2	215.5	0.71	0.67	40.2

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	126	1.0	0.087	6.6	LOS A	0.9	6.5	0.18	0.60	49.8
22	T1	887	8.1	0.592	31.1	LOS C	21.6	161.6	0.83	0.73	39.7
23	R2	23	0.9	0.180	69.5	LOS E	1.4	10.1	0.97	0.71	20.1
Approach		1036	7.1	0.592	29.0	LOS C	21.6	161.6	0.75	0.71	40.2
NorthEast: Shopping Centre Access (NE)											
24	L2	79	0.0	0.101	29.7	LOS C	3.0	20.9	0.68	0.63	29.5
25	T1	66	0.0	0.101	27.7	LOS C	3.0	20.9	0.68	0.55	28.8
26	R2	243	10.5	0.481	34.0	LOS C	11.4	87.2	0.79	0.73	27.8
Approach		388	6.6	0.481	32.1	LOS C	11.4	87.2	0.75	0.68	28.3
NorthWest: Karrinyup Road (NW)											
27	L2	54	1.3	0.050	18.7	LOS B	1.3	9.3	0.45	0.65	39.7
28	T1	367	2.3	0.230	26.0	LOS C	7.4	52.8	0.69	0.57	42.1
29	R2	76	0.8	0.594	72.5	LOS E	5.0	34.9	1.00	0.78	26.1
Approach		497	2.0	0.594	32.0	LOS C	7.4	52.8	0.71	0.61	38.2
SouthWest: Jeanes Road (SW)											
30	L2	294	3.3	0.443	13.7	LOS B	7.8	56.2	0.63	0.74	44.8
31	T1	7	0.0	0.443	12.3	LOS B	7.8	56.2	0.63	0.74	35.4
32	R2	170	0.8	0.372	38.3	LOS D	6.1	56.8	0.79	0.77	34.3
Approach		471	2.4	0.443	22.6	LOS C	6.1	56.8	0.69	0.75	40.2
All Vehicles		2392	5.0	0.594	28.9	LOS C	21.6	161.6	0.73	0.69	38.1

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	56	1.0	0.039	6.5	LOS A	0.4	2.5	0.16	0.59	50.0
22	T1	320	8.1	0.267	34.8	LOS C	7.5	55.8	0.78	0.65	38.2
23	R2	38	0.9	0.167	61.5	LOS E	2.2	15.5	0.93	0.73	21.7
Approach		414	6.5	0.267	33.4	LOS C	7.5	55.8	0.71	0.65	37.8
NorthEast: Shopping Centre Access (NE)											
24	L2	200	0.0	0.190	27.5	LOS C	6.0	41.8	0.67	0.64	30.5
25	T1	97	0.0	0.190	25.5	LOS C	6.0	41.8	0.67	0.59	29.4
26	R2	57	10.5	0.106	27.1	LOS C	2.2	16.9	0.65	0.61	30.4
Approach		354	1.7	0.190	26.9	LOS C	6.0	41.8	0.67	0.62	30.2
NorthWest: Karrinyup Road (NW)											
27	L2	79	1.3	0.055	6.1	LOS A	0.4	2.5	0.13	0.58	47.8
28	T1	343	2.3	0.275	34.9	LOS C	8.0	57.2	0.79	0.65	38.2
29	R2	61	0.8	0.268	62.4	LOS E	3.6	25.3	0.95	0.75	28.1
Approach		483	1.9	0.276	33.6	LOS C	8.0	57.2	0.70	0.65	37.2
SouthWest: Jeanes Road (SW)											
30	L2	126	3.3	0.260	16.9	LOS B	4.1	28.9	0.64	0.70	43.4
31	T1	67	0.0	0.260	15.4	LOS B	4.1	28.9	0.64	0.70	34.0
32	R2	114	0.8	0.275	35.7	LOS D	5.1	36.0	0.74	0.75	35.2
Approach		307	1.7	0.275	23.5	LOS C	5.1	36.0	0.68	0.72	38.2
All Vehicles		1558	3.0	0.276	30.1	LOS C	8.0	57.2	0.69	0.66	36.2

1.4 Karrinyup Road and Francis Avenue

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	595	5.0	0.266	13.4	LOS B	8.9	64.7	0.51	0.45	49.0
6	R2	266	0.9	0.781	63.8	LOS E	17.0	120.0	1.00	0.89	27.9
Approach		861	3.7	0.781	29.0	LOS C	17.0	120.0	0.66	0.58	39.6
North: Francis Avenue (N)											
7	L2	163	0.6	0.206	10.7	LOS B	3.8	26.5	0.42	0.65	46.4
9	R2	135	2.1	0.436	68.0	LOS E	4.2	30.2	0.99	0.76	26.4
Approach		298	1.3	0.436	36.7	LOS D	4.2	30.2	0.68	0.70	34.7
West: Karrinyup Road (W)											
10	L2	60	1.5	0.042	8.2	LOS A	0.7	5.3	0.24	0.60	48.6
11	T1	1249	1.8	0.548	16.9	LOS B	23.5	166.9	0.65	0.59	46.7
Approach		1309	1.8	0.548	16.5	LOS B	23.5	166.9	0.63	0.59	46.8
All Vehicles		2468	2.4	0.781	23.3	LOS C	23.5	166.9	0.65	0.60	42.3

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	627	5.0	0.313	18.0	LOS B	10.9	79.5	0.60	0.52	46.1
6	R2	279	0.9	0.578	50.7	LOS D	15.4	108.9	0.93	0.83	31.0
Approach		906	3.7	0.578	28.0	LOS C	15.4	108.9	0.70	0.61	40.0
North: Francis Avenue (N)											
7	L2	137	0.6	0.155	10.9	LOS B	3.0	21.4	0.41	0.64	46.3
9	R2	141	2.1	0.557	71.1	LOS E	4.6	32.6	1.00	0.77	25.8
Approach		278	1.4	0.557	41.4	LOS D	4.6	32.6	0.71	0.70	33.1
West: Karrinyup Road (W)											
10	L2	60	1.5	0.043	8.1	LOS A	0.7	5.1	0.24	0.60	48.6
11	T1	1202	1.8	0.591	22.0	LOS C	25.8	183.2	0.74	0.66	43.8
Approach		1262	1.8	0.591	21.4	LOS C	25.8	183.2	0.71	0.66	44.0
All Vehicles		2446	2.5	0.591	26.1	LOS C	25.8	183.2	0.71	0.65	40.9

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1324	1.5	0.691	27.5	LOS C	32.7	232.0	0.82	0.75	41.0
6	R2	466	0.0	0.916	73.6	LOS E	35.4	247.9	1.00	0.99	26.0
Approach		1790	1.1	0.916	39.5	LOS D	35.4	247.9	0.87	0.81	35.6
North: Francis Avenue (N)											
7	L2	212	0.6	0.196	7.3	LOS A	3.1	21.9	0.29	0.60	48.5
9	R2	278	1.0	0.783	74.4	LOS E	9.6	68.1	1.00	0.89	25.2
Approach		490	0.8	0.783	45.4	LOS D	9.6	68.1	0.69	0.76	31.9
West: Karrinyup Road (W)											
10	L2	39	0.0	0.031	12.1	LOS B	0.8	5.6	0.34	0.61	46.2
11	T1	766	1.3	0.399	22.6	LOS C	15.6	110.1	0.67	0.59	43.5
Approach		805	1.2	0.399	22.1	LOS C	15.6	110.1	0.66	0.59	43.6
All Vehicles		3085	1.1	0.916	35.9	LOS D	35.4	247.9	0.79	0.75	36.7

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1330	5.0	0.763	30.4	LOS C	34.0	248.5	0.88	0.80	39.7
6	R2	413	0.9	0.746	50.3	LOS D	23.9	168.3	0.97	0.87	31.1
Approach		1743	4.0	0.763	35.1	LOS D	34.0	248.5	0.90	0.82	37.2
North: Francis Avenue (N)											
7	L2	225	0.6	0.204	8.0	LOS A	3.7	25.9	0.32	0.61	48.1
9	R2	263	2.1	0.719	69.6	LOS E	8.6	61.2	1.00	0.85	26.0
Approach		488	1.4	0.719	41.2	LOS D	8.6	61.2	0.69	0.74	33.2
West: Karrinyup Road (W)											
10	L2	40	1.5	0.032	10.3	LOS B	0.7	4.7	0.31	0.61	47.2
11	T1	790	1.8	0.444	25.1	LOS C	16.7	118.9	0.73	0.64	42.2
Approach		830	1.8	0.444	24.4	LOS C	16.7	118.9	0.71	0.64	42.4
All Vehicles		3061	3.0	0.763	33.2	LOS C	34.0	248.5	0.81	0.75	37.7

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	869	0.7	0.275	3.1	LOS A	6.6	46.7	0.26	0.23	57.0
6	R2	488	0.2	0.807	53.0	LOS D	30.5	214.1	0.98	0.90	30.4
Approach		1357	0.5	0.807	21.1	LOS C	30.5	214.1	0.52	0.47	43.2
North: Francis Avenue (N)											
7	L2	428	0.2	0.407	15.1	LOS B	14.6	102.6	0.60	0.77	44.1
9	R2	215	0.0	0.601	70.0	LOS E	7.1	49.4	1.00	0.79	26.0
Approach		643	0.1	0.601	33.5	LOS C	14.6	102.6	0.74	0.78	35.9
West: Karrinyup Road (W)											
10	L2	45	0.9	0.037	12.0	LOS B	0.9	6.4	0.35	0.62	46.2
11	T1	1008	1.3	0.588	29.9	LOS C	24.7	174.8	0.81	0.72	39.9
Approach		1053	1.3	0.588	29.2	LOS C	24.7	174.8	0.79	0.72	40.2
All Vehicles		3053	0.7	0.807	26.5	LOS C	30.5	214.1	0.66	0.62	40.4

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	940	5.0	0.622	32.8	LOS C	23.3	170.3	0.85	0.75	38.7
6	R2	438	0.9	0.643	41.9	LOS D	22.8	161.1	0.89	0.84	33.5
Approach		1378	3.7	0.643	35.7	LOS D	23.3	170.3	0.86	0.78	36.8
North: Francis Avenue (N)											
7	L2	433	0.6	0.394	15.1	LOS B	13.2	92.6	0.57	0.76	44.0
9	R2	209	2.1	0.619	68.6	LOS E	6.7	47.6	1.00	0.80	26.2
Approach		642	1.1	0.619	32.5	LOS C	13.2	92.6	0.71	0.78	36.2
West: Karrinyup Road (W)											
10	L2	43	1.5	0.036	10.0	LOS A	0.7	4.9	0.31	0.62	47.4
11	T1	997	1.8	0.649	33.7	LOS C	25.5	181.2	0.87	0.77	38.3
Approach		1040	1.8	0.649	32.7	LOS C	25.5	181.2	0.85	0.76	38.6
All Vehicles		3060	2.5	0.649	34.0	LOS C	25.5	181.2	0.82	0.77	37.3

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	694	5.0	0.317	16.4	LOS B	12.3	89.5	0.55	0.48	47.1
6	R2	243	0.9	0.273	53.5	LOS D	7.0	49.0	0.86	0.77	30.4
Approach		937	3.9	0.317	26.0	LOS C	12.3	89.5	0.63	0.56	41.1
North: Francis Avenue (N)											
7	L2	426	0.6	0.510	21.9	LOS C	19.7	138.7	0.77	0.88	40.8
9	R2	31	2.1	0.154	77.9	LOS E	1.1	7.8	0.98	0.69	24.7
Approach		457	0.7	0.510	25.7	LOS C	19.7	138.7	0.78	0.87	39.1
West: Karrinyup Road (W)											
10	L2	22	1.5	0.015	6.4	LOS A	0.1	1.0	0.14	0.58	49.8
11	T1	1202	1.8	0.533	19.5	LOS B	25.2	178.0	0.66	0.59	45.2
Approach		1224	1.8	0.533	19.3	LOS B	25.2	178.0	0.65	0.59	45.3
All Vehicles		2618	2.4	0.533	22.8	LOS C	25.2	178.0	0.66	0.63	42.5

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1495	5.0	0.683	21.9	LOS C	35.3	257.8	0.74	0.68	43.9
6	R2	234	0.9	0.263	53.3	LOS D	6.7	47.1	0.85	0.77	30.4
Approach		1729	4.4	0.683	26.2	LOS C	35.3	257.8	0.76	0.69	41.4
North: Francis Avenue (N)											
7	L2	587	0.6	0.567	9.3	LOS A	18.5	130.1	0.54	0.72	47.3
9	R2	25	2.1	0.124	77.6	LOS E	0.9	6.2	0.98	0.68	24.8
Approach		612	0.7	0.567	12.0	LOS B	18.5	130.1	0.56	0.72	45.6
West: Karrinyup Road (W)											
10	L2	97	1.5	0.064	6.4	LOS A	0.7	4.8	0.15	0.59	49.8
11	T1	721	1.8	0.320	16.5	LOS B	12.8	90.3	0.55	0.49	47.0
Approach		818	1.8	0.320	15.3	LOS B	12.8	90.3	0.51	0.50	47.3
All Vehicles		3159	3.0	0.683	20.6	LOS C	35.3	257.8	0.65	0.65	43.6

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1394	5.0	0.695	23.6	LOS C	31.8	231.9	0.79	0.72	43.0
6	R2	434	0.9	0.437	47.9	LOS D	11.4	80.4	0.88	0.80	31.9
Approach		1828	4.0	0.695	29.4	LOS C	31.8	231.9	0.81	0.74	39.7
North: Francis Avenue (N)											
7	L2	625	0.6	0.687	25.1	LOS C	24.3	171.1	0.83	0.97	39.4
9	R2	37	2.1	0.164	69.6	LOS E	1.2	8.3	0.98	0.70	26.2
Approach		662	0.7	0.687	27.5	LOS C	24.3	171.1	0.84	0.96	38.3
West: Karrinyup Road (W)											
10	L2	68	1.5	0.049	7.2	LOS A	0.6	4.6	0.20	0.60	49.2
11	T1	1121	1.8	0.543	21.2	LOS C	22.9	161.9	0.71	0.64	44.3
Approach		1189	1.8	0.543	20.4	LOS C	22.9	161.9	0.68	0.63	44.5
All Vehicles		3679	2.7	0.696	26.2	LOS C	31.8	231.9	0.77	0.74	40.8

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	750	5.0	0.380	19.3	LOS B	13.8	100.6	0.63	0.56	45.3
6	R2	290	0.9	0.584	50.0	LOS D	16.0	112.7	0.92	0.83	31.2
Approach		1040	3.9	0.584	27.9	LOS C	16.0	112.7	0.71	0.63	40.1
North: Francis Avenue (N)											
7	L2	118	0.6	0.131	10.6	LOS B	2.5	17.5	0.39	0.63	46.5
9	R2	148	2.1	0.584	71.4	LOS E	4.8	34.3	1.00	0.78	25.7
Approach		266	1.4	0.584	44.4	LOS D	4.8	34.3	0.73	0.71	32.2
West: Karrinyup Road (W)											
10	L2	59	1.5	0.043	8.1	LOS A	0.7	5.0	0.24	0.60	48.6
11	T1	1182	1.8	0.589	22.6	LOS C	25.5	181.6	0.74	0.67	43.5
Approach		1241	1.8	0.589	21.9	LOS C	25.5	181.6	0.72	0.67	43.7
All Vehicles		2547	2.6	0.589	26.7	LOS C	25.5	181.6	0.72	0.66	40.7

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1210	5.0	0.718	30.7	LOS C	30.4	222.2	0.87	0.78	39.6
6	R2	410	0.9	0.722	48.7	LOS D	23.1	163.3	0.95	0.86	31.6
Approach		1620	4.0	0.722	35.3	LOS D	30.4	222.2	0.89	0.80	37.1
North: Francis Avenue (N)											
7	L2	212	0.6	0.183	7.1	LOS A	2.9	20.3	0.28	0.60	48.6
9	R2	275	2.1	0.698	68.2	LOS E	8.9	63.2	1.00	0.84	26.3
Approach		487	1.5	0.698	41.6	LOS D	8.9	63.2	0.69	0.73	33.0
West: Karrinyup Road (W)											
10	L2	43	1.5	0.034	10.0	LOS B	0.7	4.9	0.31	0.61	47.4
11	T1	687	1.8	0.400	25.7	LOS C	14.5	102.9	0.72	0.63	41.9
Approach		730	1.8	0.400	24.8	LOS C	14.5	102.9	0.70	0.63	42.2
All Vehicles		2837	3.0	0.722	33.7	LOS C	30.4	222.2	0.80	0.74	37.5

2031 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	963	5.0	0.663	34.9	LOS C	24.7	180.6	0.88	0.78	37.8
6	R2	474	0.9	0.668	41.0	LOS D	24.7	174.5	0.89	0.85	33.8
Approach		1437	3.6	0.668	36.9	LOS D	24.7	180.6	0.88	0.80	36.4
North: Francis Avenue (N)											
7	L2	438	0.6	0.390	14.5	LOS B	12.9	90.6	0.55	0.75	44.4
9	R2	219	2.1	0.648	69.1	LOS E	7.0	50.2	1.00	0.81	26.2
Approach		657	1.1	0.648	32.7	LOS C	12.9	90.6	0.70	0.77	36.2
West: Karrinyup Road (W)											
10	L2	54	1.5	0.046	10.6	LOS B	0.9	6.6	0.33	0.62	47.0
11	T1	968	1.8	0.656	35.1	LOS D	25.2	178.9	0.88	0.78	37.7
Approach		1022	1.8	0.656	33.8	LOS C	25.2	178.9	0.85	0.77	38.1
All Vehicles		3116	2.5	0.668	35.0	LOS C	25.2	180.6	0.83	0.79	36.9

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	785	5.0	0.378	18.7	LOS B	14.8	107.8	0.60	0.53	45.7
6	R2	198	0.9	0.215	50.1	LOS D	5.3	37.6	0.83	0.76	31.3
Approach		983	4.2	0.378	25.0	LOS C	14.8	107.8	0.65	0.58	41.7
North: Francis Avenue (N)											
7	L2	409	0.6	0.481	23.2	LOS C	17.7	124.4	0.75	0.89	40.2
9	R2	150	2.1	0.574	75.7	LOS E	5.2	37.1	1.00	0.77	25.1
Approach		559	1.0	0.574	37.3	LOS D	17.7	124.4	0.82	0.86	34.7
West: Karrinyup Road (W)											
10	L2	38	1.5	0.025	6.2	LOS A	0.2	1.5	0.13	0.58	49.9
11	T1	1268	1.8	0.592	22.1	LOS C	28.2	199.3	0.72	0.65	43.8
Approach		1306	1.8	0.592	21.7	LOS C	28.2	199.3	0.70	0.65	43.9
All Vehicles		2848	2.5	0.592	25.9	LOS C	28.2	199.3	0.71	0.67	41.0

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1431	5.0	0.654	21.4	LOS C	32.9	240.4	0.72	0.66	44.2
6	R2	482	0.9	0.541	57.3	LOS E	14.9	105.0	0.93	0.82	29.5
Approach		1913	4.0	0.654	30.4	LOS C	32.9	240.4	0.77	0.70	39.2
North: Francis Avenue (N)											
7	L2	555	0.6	0.542	9.3	LOS A	16.7	117.6	0.52	0.71	47.3
9	R2	110	2.1	0.545	80.6	LOS F	4.0	28.6	1.00	0.76	24.3
Approach		665	0.9	0.545	21.1	LOS C	16.7	117.6	0.60	0.72	41.0
West: Karrinyup Road (W)											
10	L2	76	1.5	0.054	7.7	LOS A	0.9	6.4	0.21	0.60	48.9
11	T1	741	1.8	0.329	16.5	LOS B	13.2	93.5	0.56	0.49	46.9
Approach		817	1.8	0.329	15.8	LOS B	13.2	93.5	0.53	0.50	47.1
All Vehicles		3395	2.8	0.654	25.1	LOS C	32.9	240.4	0.68	0.66	41.2

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	500	5.0	0.391	34.8	LOS C	11.9	87.0	0.81	0.69	37.9
6	R2	554	0.9	0.434	40.6	LOS D	13.4	94.7	0.82	0.80	34.1
Approach		1054	2.8	0.434	37.8	LOS D	13.4	94.7	0.81	0.75	35.7
North: Francis Avenue (N)											
7	L2	721	0.6	0.567	14.9	LOS B	16.9	132.7	0.60	0.82	44.1
9	R2	66	2.1	0.102	52.9	LOS D	1.8	12.5	0.87	0.71	29.9
Approach		787	0.7	0.567	18.1	LOS B	18.9	132.7	0.62	0.81	42.5
West: Karrinyup Road (W)											
10	L2	104	1.5	0.081	7.8	LOS A	1.2	8.5	0.24	0.61	48.8
11	T1	775	1.8	0.588	38.0	LOS D	20.1	141.9	0.88	0.77	36.7
Approach		879	1.8	0.588	34.4	LOS C	20.1	141.9	0.81	0.75	37.8
All Vehicles		2720	1.9	0.588	31.0	LOS C	20.1	141.9	0.75	0.77	38.2

1.5 Karrinyup Road and Huntriss Road

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	77	2.5	0.208	42.1	LOS D	5.6	40.0	0.79	0.71	33.4
2	T1	38	3.5	0.208	37.5	LOS D	5.6	40.0	0.79	0.71	32.2
3	R2	232	1.5	1.165	241.6	LOS F	32.3	229.0	1.00	1.56	11.9
Approach		347	1.9	1.165	175.0	LOS F	32.3	229.0	0.93	1.28	15.0
East: Karrinyup Road (E)											
4	L2	355	4.0	0.648	44.1	LOS D	18.9	136.7	0.87	0.83	32.7
5	T1	782	3.9	0.651	38.9	LOS D	22.8	164.8	0.89	0.77	36.6
6	R2	16	2.0	0.053	56.3	LOS E	0.9	6.3	0.87	0.89	29.5
Approach		1153	3.9	0.651	40.8	LOS D	22.8	164.8	0.88	0.79	35.2
North: Huntriss Road (N)											
7	L2	216	1.5	0.535	48.2	LOS D	11.7	82.9	0.88	0.80	31.2
8	T1	159	2.5	0.368	42.4	LOS D	8.9	63.9	0.85	0.71	31.6
9	R2	11	1.5	0.368	47.0	LOS D	8.9	63.9	0.85	0.71	33.0
Approach		386	1.9	0.535	45.8	LOS D	11.7	82.9	0.87	0.76	31.4
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	27.9	LOS C	0.0	0.3	0.58	0.60	38.3
11	T1	1019	2.3	0.613	31.2	LOS C	25.4	181.3	0.83	0.74	39.7
12	R2	261	3.0	0.566	52.6	LOS D	14.9	107.1	0.93	0.83	30.4
Approach		1281	2.4	0.613	35.5	LOS D	25.4	181.3	0.85	0.76	37.4
All Vehicles		3167	2.8	1.165	54.0	LOS D	32.3	229.0	0.87	0.83	30.9

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	250	0.9	0.673	48.3	LOS D	20.2	142.8	0.92	0.82	31.6
2	T1	104	1.4	0.673	43.7	LOS D	20.2	142.8	0.92	0.82	30.5
3	R2	339	1.8	1.527	561.7	LOS F	74.0	526.3	1.00	2.16	5.8
Approach		693	1.4	1.527	298.7	LOS F	74.0	526.3	0.96	1.48	10.0
East: Karrinyup Road (E)											
4	L2	329	2.4	0.475	39.8	LOS D	16.5	117.7	0.81	0.81	34.0
5	T1	1123	0.5	0.961	75.0	LOS E	47.7	335.0	0.94	1.12	26.9
6	R2	202	0.0	0.828	75.0	LOS E	14.3	100.3	1.00	0.90	25.6
Approach		1654	0.8	0.961	69.0	LOS E	47.7	335.0	0.92	1.03	27.9
North: Huntriss Road (N)											
7	L2	205	3.4	0.451	48.8	LOS D	11.3	81.1	0.87	0.80	31.0
8	T1	54	2.1	0.156	47.3	LOS D	3.2	22.8	0.85	0.67	30.3
9	R2	5	0.0	0.156	51.9	LOS D	3.2	22.8	0.85	0.67	31.6
Approach		264	3.1	0.451	48.6	LOS D	11.3	81.1	0.87	0.77	30.9
West: Karrinyup Road (W)											
10	L2	1	7.7	0.001	25.7	LOS C	0.0	0.3	0.54	0.60	39.1
11	T1	1145	0.9	0.660	29.3	LOS C	30.3	213.5	0.82	0.73	40.5
12	R2	217	0.6	0.536	56.8	LOS E	12.9	90.8	0.94	0.82	29.4
Approach		1363	0.8	0.660	33.7	LOS C	30.3	213.5	0.84	0.75	38.2
All Vehicles		3974	1.1	1.527	95.2	LOS F	74.0	526.3	0.89	0.99	23.0

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	371	2.0	1.040	154.0	LOS F	49.7	354.1	1.00	1.27	16.5
2	T1	91	2.5	1.040	149.4	LOS F	49.7	354.1	1.00	1.27	16.2
3	R2	389	0.4	1.317	370.7	LOS F	68.8	483.1	1.00	1.85	8.4
Approach		851	1.3	1.317	252.6	LOS F	68.8	483.1	1.00	1.53	11.4
East: Karrinyup Road (E)											
4	L2	419	1.5	0.804	43.9	LOS D	22.9	162.3	0.84	0.86	32.8
5	T1	1398	2.0	1.098	175.9	LOS F	96.2	685.0	1.00	1.62	15.4
6	R2	68	0.5	0.189	54.3	LOS D	3.7	26.2	0.88	0.75	30.0
Approach		1885	1.8	1.098	142.2	LOS F	96.2	685.0	0.96	1.42	17.9
North: Huntriss Road (N)											
7	L2	123	1.4	0.242	44.8	LOS D	6.2	43.9	0.82	0.76	32.1
8	T1	52	1.5	0.114	38.7	LOS D	2.7	19.2	0.78	0.61	32.7
9	R2	4	1.0	0.114	43.2	LOS D	2.7	19.2	0.78	0.61	34.1
Approach		179	1.4	0.242	43.0	LOS D	6.2	43.9	0.81	0.71	32.3
West: Karrinyup Road (W)											
10	L2	1	0.2	0.001	30.9	LOS C	0.0	0.3	0.62	0.60	37.1
11	T1	860	1.2	0.562	33.5	LOS C	21.6	152.9	0.83	0.73	38.7
12	R2	79	2.2	0.223	54.7	LOS D	4.4	31.1	0.88	0.76	29.9
Approach		940	1.3	0.562	35.3	LOS D	21.6	152.9	0.84	0.74	37.8
All Vehicles		3855	1.6	1.317	135.9	LOS F	96.2	685.0	0.93	1.24	18.3

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	81	2.5	0.151	30.9	LOS C	4.4	31.4	0.67	0.68	37.1
2	T1	29	3.5	0.151	26.4	LOS C	4.4	31.4	0.67	0.68	35.6
3	R2	239	1.5	0.771	56.1	LOS E	15.1	107.3	0.98	0.91	29.5
Approach		349	1.9	0.771	47.8	LOS D	15.1	107.3	0.88	0.84	31.4
East: Karrinyup Road (E)											
4	L2	337	4.0	0.663	46.8	LOS D	18.2	131.6	0.91	0.84	31.9
5	T1	836	3.8	0.793	45.9	LOS D	27.1	196.3	0.95	0.88	34.3
6	R2	17	2.0	0.201	73.8	LOS E	1.1	7.9	0.99	0.69	25.8
Approach		1190	3.9	0.793	46.5	LOS D	27.1	196.3	0.94	0.86	33.4
North: Huntriss Road (N)											
7	L2	195	1.5	0.308	36.9	LOS D	8.9	62.8	0.77	0.77	34.5
8	T1	144	2.5	0.232	31.5	LOS C	6.7	48.0	0.74	0.62	35.0
9	R2	8	1.5	0.232	36.0	LOS D	6.7	48.0	0.74	0.62	36.6
Approach		347	1.9	0.308	34.6	LOS C	8.9	62.8	0.76	0.70	34.8
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	25.1	LOS C	0.0	0.2	0.55	0.60	39.4
11	T1	915	2.3	0.516	26.2	LOS C	20.2	144.3	0.76	0.67	41.9
12	R2	286	3.0	0.786	62.6	LOS E	18.2	130.9	1.00	0.89	28.1
Approach		1202	2.4	0.786	34.9	LOS C	20.2	144.3	0.82	0.72	37.5
All Vehicles		3088	2.9	0.793	40.8	LOS D	27.1	196.3	0.86	0.79	34.8

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	364	2.5	0.656	31.3	LOS C	20.7	148.3	0.77	0.78	36.9
2	T1	96	3.5	0.656	26.7	LOS C	20.7	148.3	0.77	0.78	35.4
3	R2	402	1.5	1.073	167.8	LOS F	46.9	332.7	1.00	1.37	15.5
Approach		862	2.1	1.073	94.5	LOS F	46.9	332.7	0.88	1.05	22.4
East: Karrinyup Road (E)											
4	L2	385	4.0	0.664	38.2	LOS D	18.7	135.5	0.83	0.82	34.6
5	T1	1334	3.9	1.063	147.2	LOS F	82.3	594.8	1.00	1.51	17.6
6	R2	70	2.0	0.710	76.6	LOS E	4.8	33.8	1.00	0.83	25.3
Approach		1789	3.8	1.063	121.0	LOS F	82.3	594.8	0.96	1.34	19.9
North: Huntriss Road (N)											
7	L2	134	1.5	0.176	29.9	LOS C	5.3	37.4	0.67	0.72	37.0
8	T1	49	2.5	0.084	29.6	LOS C	2.2	15.7	0.70	0.55	35.5
9	R2	4	1.5	0.084	34.2	LOS C	2.2	15.7	0.70	0.55	37.2
Approach		187	1.8	0.176	30.0	LOS C	5.3	37.4	0.68	0.68	36.6
West: Karrinyup Road (W)											
10	L2	2	1.0	0.003	30.5	LOS C	0.1	0.5	0.62	0.61	37.2
11	T1	859	2.3	0.570	33.0	LOS C	21.1	150.8	0.84	0.74	39.0
12	R2	105	3.0	1.072	160.2	LOS F	11.0	79.0	1.00	1.21	16.0
Approach		966	2.3	1.072	46.8	LOS D	21.1	150.8	0.86	0.79	33.7
All Vehicles		3804	3.0	1.073	91.6	LOS F	82.3	594.8	0.90	1.10	23.5

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	243	2.5	0.468	34.0	LOS C	16.1	115.6	0.78	0.76	36.1
2	T1	111	3.5	0.468	29.4	LOS C	16.1	115.6	0.78	0.76	34.6
3	R2	340	1.5	1.019	127.1	LOS F	34.5	244.4	1.00	1.25	18.8
Approach		694	2.2	1.019	78.9	LOS E	34.5	244.4	0.89	1.00	24.7
East: Karrinyup Road (E)											
4	L2	299	4.0	0.439	37.9	LOS D	14.0	101.7	0.80	0.80	34.6
5	T1	1159	3.9	1.001	109.3	LOS F	56.9	411.3	1.00	1.31	21.5
6	R2	198	2.0	0.879	77.3	LOS E	14.0	100.0	1.00	0.95	25.2
Approach		1656	3.7	1.001	92.6	LOS F	56.9	411.3	0.96	1.17	23.5
North: Huntriss Road (N)											
7	L2	191	1.5	0.276	34.5	LOS C	8.3	59.0	0.74	0.76	35.4
8	T1	52	2.5	0.116	34.4	LOS C	2.8	19.6	0.75	0.61	33.9
9	R2	9	1.5	0.116	39.0	LOS D	2.8	19.6	0.75	0.61	35.4
Approach		252	1.7	0.276	34.7	LOS C	8.3	59.0	0.74	0.72	35.0
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	33.1	LOS C	0.0	0.3	0.65	0.60	36.3
11	T1	1141	2.3	0.869	48.7	LOS D	39.2	279.5	0.98	0.97	33.4
12	R2	199	3.0	1.016	121.3	LOS F	18.2	131.0	1.00	1.13	19.3
Approach		1341	2.4	1.016	59.5	LOS E	39.2	279.5	0.98	0.99	30.1
All Vehicles		3943	2.8	1.019	75.2	LOS E	56.9	411.3	0.94	1.05	26.3

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	76	2.5	0.162	35.9	LOS D	4.4	31.7	0.73	0.70	35.3
2	T1	26	3.5	0.162	31.3	LOS C	4.4	31.7	0.73	0.70	34.0
3	R2	179	1.5	0.701	57.1	LOS E	11.0	78.1	0.97	0.87	29.2
Approach		281	2.0	0.701	49.0	LOS D	11.0	78.1	0.88	0.80	31.1
East: Karrinyup Road (E)											
4	L2	284	4.0	0.375	31.7	LOS C	12.3	91.3	0.72	0.77	36.9
5	T1	867	3.9	0.517	28.1	LOS C	19.7	141.4	0.78	0.68	41.1
6	R2	13	2.0	0.058	60.2	LOS E	0.7	5.2	0.91	0.69	28.6
Approach		1164	3.9	0.517	29.3	LOS C	19.7	141.4	0.76	0.71	39.8
North: Huntriss Road (N)											
7	L2	181	1.5	0.338	42.4	LOS D	8.9	62.9	0.82	0.78	32.8
8	T1	168	2.5	0.343	37.9	LOS D	8.9	63.5	0.82	0.69	33.0
9	R2	13	1.5	0.343	42.4	LOS D	8.9	63.5	0.82	0.69	34.6
Approach		362	2.0	0.343	40.3	LOS D	8.9	63.5	0.82	0.73	33.0
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	26.8	LOS C	0.0	0.2	0.57	0.60	38.7
11	T1	1137	2.3	0.675	31.0	LOS C	28.4	203.0	0.86	0.77	39.8
12	R2	300	3.0	0.670	66.7	LOS E	9.5	68.0	1.00	0.83	27.3
Approach		1438	2.4	0.675	38.4	LOS D	28.4	203.0	0.89	0.78	36.3
All Vehicles		3245	2.8	0.701	36.3	LOS D	28.4	203.0	0.84	0.75	36.5

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	515	2.5	0.740	30.9	LOS C	25.5	182.8	0.80	0.81	36.7
2	T1	36	3.5	0.740	26.4	LOS C	25.5	182.8	0.80	0.81	35.3
3	R2	122	1.5	0.387	48.4	LOS D	6.5	46.1	0.87	0.78	31.4
Approach		673	2.4	0.740	33.9	LOS C	25.5	182.8	0.81	0.81	35.6
East: Karrinyup Road (E)											
4	L2	409	4.0	0.578	37.4	LOS D	20.5	151.2	0.83	0.82	34.8
5	T1	1076	3.9	0.697	33.7	LOS C	28.3	203.1	0.88	0.79	38.6
6	R2	35	2.0	0.414	75.1	LOS E	2.3	16.5	1.00	0.73	25.6
Approach		1520	3.8	0.697	35.6	LOS D	28.3	203.1	0.87	0.80	37.1
North: Huntriss Road (N)											
7	L2	149	1.5	0.199	30.9	LOS C	6.0	42.5	0.68	0.73	36.6
8	T1	54	2.5	0.141	38.7	LOS D	3.0	21.6	0.80	0.64	32.7
9	R2	9	1.5	0.141	43.2	LOS D	3.0	21.6	0.80	0.64	34.2
Approach		212	1.8	0.199	33.4	LOS C	6.0	42.5	0.72	0.70	35.4
West: Karrinyup Road (W)											
10	L2	3	1.0	0.004	29.3	LOS C	0.1	0.8	0.61	0.62	37.7
11	T1	1149	2.3	0.752	34.7	LOS C	31.5	224.9	0.91	0.81	38.2
12	R2	124	3.0	0.739	78.5	LOS E	4.3	30.7	1.00	0.83	25.1
Approach		1276	2.3	0.752	39.0	LOS D	31.5	224.9	0.92	0.82	36.4
All Vehicles		3681	2.9	0.752	36.3	LOS D	31.5	224.9	0.87	0.80	36.5

2021 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	314	2.5	0.687	40.3	LOS D	20.5	147.0	0.87	0.82	33.8
2	T1	86	3.5	0.687	35.7	LOS D	20.5	147.0	0.87	0.82	32.6
3	R2	207	1.5	0.953	94.7	LOS F	17.3	122.5	1.00	1.13	22.5
Approach		607	2.3	0.953	56.2	LOS E	20.5	147.0	0.91	0.92	28.7
East: Karrinyup Road (E)											
4	L2	172	4.0	0.250	30.6	LOS C	7.5	57.4	0.68	0.73	37.4
5	T1	1489	3.9	0.940	59.6	LOS E	58.8	422.0	0.98	1.08	30.3
6	R2	115	2.0	0.907	84.9	LOS F	8.4	60.1	1.00	0.98	24.0
Approach		1776	3.7	0.940	58.4	LOS E	58.8	422.0	0.95	1.04	30.4
North: Huntriss Road (N)											
7	L2	210	1.5	0.473	46.8	LOS D	11.0	77.9	0.87	0.80	31.6
8	T1	80	2.5	0.219	39.6	LOS D	5.1	36.4	0.82	0.68	32.3
9	R2	24	1.5	0.219	44.1	LOS D	5.1	36.4	0.82	0.68	33.8
Approach		314	1.8	0.473	44.7	LOS D	11.0	77.9	0.86	0.76	31.9
West: Karrinyup Road (W)											
10	L2	7	1.0	0.007	21.0	LOS C	0.2	1.4	0.49	0.53	41.2
11	T1	1271	2.3	0.634	23.4	LOS C	28.4	202.5	0.77	0.70	43.4
12	R2	376	3.0	0.896	58.7	LOS E	8.9	63.7	1.00	1.00	29.1
Approach		1654	2.4	0.896	31.4	LOS C	28.4	202.5	0.82	0.77	39.0
All Vehicles		4351	2.9	0.953	47.1	LOS D	58.8	422.0	0.89	0.90	33.0

2031 Do-minimum AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	96	2.5	0.200	30.3	LOS C	6.1	43.4	0.68	0.67	37.5
2	T1	56	3.5	0.200	25.7	LOS C	6.1	43.4	0.68	0.67	36.0
3	R2	283	1.5	0.826	59.2	LOS E	18.9	134.3	0.99	0.96	28.8
Approach		435	2.0	0.826	48.5	LOS D	18.9	134.3	0.88	0.86	31.2
East: Karrinyup Road (E)											
4	L2	365	4.0	0.675	42.9	LOS D	18.9	136.8	0.88	0.83	33.1
5	T1	962	3.9	0.835	45.7	LOS D	32.8	237.5	0.94	0.91	34.3
6	R2	25	2.0	0.296	74.5	LOS E	1.6	11.7	1.00	0.71	25.7
Approach		1352	3.9	0.835	45.5	LOS D	32.8	237.5	0.93	0.88	33.8
North: Huntriss Road (N)											
7	L2	211	1.5	0.311	34.2	LOS C	9.2	65.2	0.74	0.76	35.5
8	T1	108	2.5	0.169	27.9	LOS C	4.8	34.4	0.69	0.58	36.1
9	R2	9	1.5	0.169	32.5	LOS C	4.8	34.4	0.69	0.58	37.9
Approach		328	1.8	0.311	32.1	LOS C	9.2	65.2	0.72	0.70	35.8
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	27.4	LOS C	0.0	0.2	0.58	0.60	38.5
11	T1	1012	2.3	0.611	30.4	LOS C	24.5	175.0	0.83	0.74	40.0
12	R2	196	3.0	0.824	71.8	LOS E	13.2	95.1	1.00	0.91	26.2
Approach		1209	2.4	0.824	37.1	LOS D	24.5	175.0	0.86	0.77	36.9
All Vehicles		3324	2.9	0.835	41.5	LOS D	32.8	237.5	0.88	0.82	34.6

2031 Do-minimum PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	349	2.5	0.516	30.9	LOS C	19.3	138.6	0.76	0.77	37.0
2	T1	98	3.5	0.516	26.3	LOS C	19.3	138.6	0.76	0.77	35.5
3	R2	387	1.5	1.026	134.2	LOS F	40.6	287.9	1.00	1.26	18.1
Approach		824	2.1	1.026	78.9	LOS E	40.6	287.9	0.87	1.00	24.8
East: Karrinyup Road (E)											
4	L2	422	4.0	0.785	41.2	LOS D	21.9	158.8	0.84	0.85	33.6
5	T1	1288	3.9	1.027	122.2	LOS F	73.2	529.0	1.00	1.39	20.0
6	R2	78	2.0	0.923	88.6	LOS F	5.8	41.5	1.00	0.98	23.4
Approach		1788	3.8	1.027	101.6	LOS F	73.2	529.0	0.96	1.24	22.2
North: Huntriss Road (N)											
7	L2	175	1.5	0.229	30.6	LOS C	7.1	50.1	0.69	0.74	36.7
8	T1	52	2.5	0.076	26.8	LOS C	2.1	15.2	0.66	0.52	36.6
9	R2	2	1.5	0.076	31.3	LOS C	2.1	15.2	0.66	0.52	38.4
Approach		229	1.7	0.229	29.7	LOS C	7.1	50.1	0.68	0.69	36.7
West: Karrinyup Road (W)											
10	L2	2	1.0	0.003	29.9	LOS C	0.1	0.5	0.62	0.61	37.5
11	T1	787	2.3	0.512	31.3	LOS C	18.6	133.0	0.81	0.71	39.6
12	R2	78	3.0	0.929	89.7	LOS F	5.9	42.2	1.00	0.99	23.2
Approach		867	2.3	0.929	36.6	LOS D	18.6	133.0	0.82	0.73	37.3
All Vehicles		3708	3.0	1.027	76.9	LOS E	73.2	529.0	0.89	1.04	25.9

2031 Do-minimum SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	233	2.5	0.488	38.1	LOS D	17.1	122.8	0.81	0.77	34.7
2	T1	114	3.5	0.488	33.5	LOS C	17.1	122.8	0.81	0.77	33.4
3	R2	301	1.5	0.985	109.0	LOS F	28.7	203.6	1.00	1.18	20.7
Approach		648	2.2	0.985	70.2	LOS E	28.7	203.6	0.90	0.96	26.3
East: Karrinyup Road (E)											
4	L2	281	4.0	0.375	34.7	LOS C	12.7	91.7	0.74	0.79	35.7
5	T1	1268	3.9	0.997	90.5	LOS F	58.0	419.6	0.95	1.22	24.2
6	R2	212	2.0	0.868	77.6	LOS E	15.4	109.4	1.00	0.94	25.2
Approach		1761	3.7	0.997	80.0	LOS F	58.0	419.6	0.92	1.12	25.6
North: Huntriss Road (N)											
7	L2	233	1.5	0.382	38.8	LOS D	11.2	79.5	0.79	0.78	34.0
8	T1	56	2.5	0.115	36.1	LOS D	2.9	20.8	0.76	0.60	33.4
9	R2	6	1.5	0.115	40.6	LOS D	2.9	20.8	0.76	0.60	34.9
Approach		295	1.7	0.382	38.3	LOS D	11.2	79.5	0.78	0.74	33.9
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	32.7	LOS C	0.0	0.3	0.64	0.60	36.4
11	T1	1175	2.3	0.856	46.6	LOS D	40.3	287.7	0.97	0.94	34.0
12	R2	175	3.0	0.999	114.8	LOS F	15.8	113.1	1.00	1.10	20.0
Approach		1351	2.3	0.999	55.5	LOS E	40.3	287.7	0.97	0.96	31.2
All Vehicles		4055	2.8	0.999	67.2	LOS E	58.0	419.6	0.92	1.01	27.9

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	56	2.5	0.242	46.8	LOS D	5.5	39.4	0.84	0.72	32.3
2	T1	52	3.5	0.242	42.2	LOS D	5.5	39.4	0.84	0.72	31.1
3	R2	123	1.5	0.611	61.4	LOS E	7.6	53.6	0.98	0.82	28.3
Approach		231	2.2	0.611	53.5	LOS D	7.6	53.6	0.92	0.77	29.8
East: Karrinyup Road (E)											
4	L2	476	4.0	0.497	26.2	LOS C	18.9	137.1	0.69	0.79	39.0
5	T1	977	3.9	0.490	20.4	LOS C	19.6	141.5	0.68	0.61	45.0
6	R2	17	2.0	0.086	62.7	LOS E	1.0	7.0	0.93	0.70	28.0
Approach		1470	3.9	0.497	22.7	LOS C	19.6	141.5	0.68	0.67	42.6
North: Huntriss Road (N)											
7	L2	144	1.5	0.351	50.6	LOS D	7.7	54.8	0.89	0.78	30.6
8	T1	133	2.5	0.412	47.6	LOS D	8.6	61.3	0.91	0.75	30.3
9	R2	23	1.5	0.412	52.2	LOS D	8.6	61.3	0.91	0.75	31.6
Approach		300	1.9	0.412	49.4	LOS D	8.6	61.3	0.90	0.77	30.5
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	20.3	LOS C	0.0	0.2	0.48	0.59	41.6
11	T1	1261	2.3	0.648	22.5	LOS C	29.5	210.5	0.76	0.68	43.8
12	R2	227	3.0	0.580	67.1	LOS E	7.1	50.9	1.00	0.79	27.2
Approach		1489	2.4	0.648	29.4	LOS C	29.5	210.5	0.79	0.70	40.1
All Vehicles		3490	3.0	0.648	29.9	LOS C	29.5	210.5	0.76	0.70	39.1

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	251	2.5	0.535	43.9	LOS D	15.9	113.8	0.88	0.81	32.7
2	T1	54	3.5	0.535	39.4	LOS D	15.9	113.8	0.88	0.81	31.5
3	R2	167	1.5	0.782	67.8	LOS E	11.1	78.8	1.00	0.91	26.9
Approach		472	2.3	0.782	51.9	LOS D	15.9	113.8	0.92	0.85	30.3
East: Karrinyup Road (E)											
4	L2	341	4.0	0.366	22.7	LOS C	12.5	93.5	0.60	0.74	40.6
5	T1	1635	3.8	0.760	23.7	LOS C	40.6	290.9	0.84	0.77	43.2
6	R2	46	2.0	0.544	76.0	LOS E	3.1	21.9	1.00	0.75	25.4
Approach		2022	3.8	0.760	24.7	LOS C	40.6	290.9	0.80	0.76	42.1
North: Huntriss Road (N)											
7	L2	108	1.5	0.225	45.0	LOS D	5.4	38.0	0.83	0.76	32.1
8	T1	55	2.5	0.229	49.9	LOS D	3.8	27.1	0.90	0.71	29.6
9	R2	14	1.5	0.229	54.5	LOS D	3.8	27.1	0.90	0.71	30.9
Approach		177	1.8	0.229	47.3	LOS D	5.4	38.0	0.85	0.74	31.2
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	18.9	LOS B	0.0	0.2	0.46	0.59	42.2
11	T1	1213	2.3	0.570	20.0	LOS B	24.7	175.9	0.70	0.64	45.2
12	R2	51	3.0	0.304	74.6	LOS E	1.7	12.0	1.00	0.71	25.8
Approach		1265	2.3	0.570	22.2	LOS C	24.7	175.9	0.72	0.64	43.9
All Vehicles		3936	3.1	0.782	28.2	LOS C	40.6	290.9	0.79	0.73	40.1

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Huntriss Road (S)											
1	L2	116	2.5	0.640	50.6	LOS D	17.3	124.2	0.94	0.82	31.5
2	T1	190	3.5	0.640	46.0	LOS D	17.3	124.2	0.94	0.82	30.4
3	R2	127	1.5	0.699	65.6	LOS E	8.2	58.1	1.00	0.87	27.4
Approach		433	2.6	0.699	53.0	LOS D	17.3	124.2	0.96	0.83	29.7
East: Karrinyup Road (E)											
4	L2	468	4.0	0.570	32.2	LOS C	21.7	159.8	0.78	0.82	36.7
5	T1	990	3.9	0.608	26.3	LOS C	25.4	181.9	0.77	0.69	41.9
6	R2	192	2.0	0.717	65.3	LOS E	12.1	86.3	1.00	0.85	27.5
Approach		1650	3.7	0.717	32.5	LOS C	25.4	181.9	0.80	0.74	38.0
North: Huntriss Road (N)											
7	L2	192	1.5	0.476	49.1	LOS D	10.3	72.9	0.89	0.80	31.0
8	T1	112	2.5	0.360	49.5	LOS D	6.9	49.2	0.91	0.74	29.9
9	R2	12	1.5	0.360	54.0	LOS D	6.9	49.2	0.91	0.74	31.1
Approach		316	1.9	0.476	49.4	LOS D	10.3	72.9	0.90	0.77	30.5
West: Karrinyup Road (W)											
10	L2	1	1.0	0.001	24.5	LOS C	0.0	0.2	0.54	0.60	39.7
11	T1	1232	2.3	0.709	28.7	LOS C	31.8	227.1	0.84	0.76	40.8
12	R2	181	3.0	0.341	60.2	LOS E	5.3	37.7	0.94	0.77	28.7
Approach		1414	2.3	0.709	32.7	LOS C	31.8	227.1	0.86	0.76	38.7
All Vehicles		3813	2.9	0.717	36.3	LOS D	31.8	227.1	0.85	0.76	36.4

1.6 Karrinyup Road and North Beach Road

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	874	3.4	0.389	13.0	LOS B	12.5	90.1	0.57	0.51	47.5
6	R2	133	3.0	0.585	57.2	LOS E	7.1	51.1	0.99	0.80	26.2
Approach		1007	3.3	0.585	18.8	LOS B	12.5	90.1	0.63	0.54	42.9
North: North Beach Road (N)											
7	L2	285	2.5	0.324	23.5	LOS C	9.4	67.5	0.65	0.75	36.7
9	R2	402	2.5	0.780	45.0	LOS D	20.7	148.0	0.95	0.89	32.1
Approach		687	2.5	0.780	36.1	LOS D	20.7	148.0	0.83	0.83	33.7
West: Karrinyup Road (W)											
10	L2	291	1.0	0.206	9.3	LOS A	4.3	30.2	0.30	0.66	47.5
11	T1	1183	1.8	0.748	30.1	LOS C	27.4	194.9	0.91	0.82	37.3
Approach		1474	1.6	0.748	26.0	LOS C	27.4	194.9	0.79	0.79	39.3
All Vehicles		3168	2.3	0.780	25.9	LOS C	27.4	194.9	0.75	0.72	38.7

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1634	1.5	0.634	13.4	LOS B	29.7	210.8	0.63	0.58	47.2
6	R2	231	0.5	0.568	31.7	LOS C	7.8	54.9	0.94	0.81	33.8
Approach		1865	1.3	0.834	15.7	LOS B	29.7	210.8	0.67	0.61	45.0
North: North Beach Road (N)											
7	L2	168	1.0	0.165	19.8	LOS B	5.2	36.7	0.52	0.69	38.5
9	R2	365	1.0	0.916	74.1	LOS E	27.0	190.4	1.00	1.01	25.6
Approach		533	1.0	0.916	57.0	LOS E	27.0	190.4	0.85	0.91	28.2
West: Karrinyup Road (W)											
10	L2	379	0.4	0.342	12.9	LOS B	7.0	49.3	0.54	0.73	45.4
11	T1	1053	1.2	0.784	41.3	LOS D	31.3	221.5	0.95	0.86	32.7
Approach		1432	1.0	0.784	33.8	LOS C	31.3	221.5	0.84	0.83	35.8
All Vehicles		3830	1.1	0.916	28.2	LOS C	31.3	221.5	0.76	0.73	37.8

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1519	0.6	0.608	12.4	LOS B	23.9	168.4	0.64	0.58	47.9
6	R2	241	1.9	0.867	65.4	LOS E	14.7	104.6	1.00	0.95	24.4
Approach		1760	0.8	0.867	19.7	LOS B	23.9	168.4	0.69	0.63	42.3
North: North Beach Road (N)											
7	L2	55	1.6	0.066	22.6	LOS C	1.7	11.7	0.59	0.68	37.1
9	R2	387	0.9	0.849	55.2	LOS E	22.5	158.7	1.00	0.95	29.5
Approach		442	1.0	0.849	51.1	LOS D	22.5	158.7	0.95	0.92	30.1
West: Karrinyup Road (W)											
10	L2	242	0.6	0.177	10.1	LOS B	3.8	27.0	0.32	0.67	47.0
11	T1	1450	0.8	0.894	42.1	LOS D	44.7	315.1	0.97	1.01	32.4
Approach		1692	0.7	0.894	37.5	LOS D	44.7	315.1	0.88	0.96	34.2
All Vehicles		3894	0.8	0.894	31.0	LOS C	44.7	315.1	0.80	0.81	36.8

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	918	3.4	0.422	12.9	LOS B	12.5	90.2	0.61	0.54	47.5
6	R2	178	3.0	0.753	55.0	LOS E	9.1	65.1	1.00	0.88	26.7
Approach		1096	3.3	0.753	19.8	LOS B	12.5	90.2	0.67	0.59	42.2
North: North Beach Road (N)											
7	L2	277	2.5	0.410	29.8	LOS C	10.0	71.8	0.79	0.78	34.1
9	R2	415	2.5	0.734	39.0	LOS D	18.6	133.2	0.95	0.87	33.9
Approach		692	2.5	0.734	35.3	LOS D	18.6	133.2	0.89	0.83	34.0
West: Karrinyup Road (W)											
10	L2	306	1.0	0.286	16.8	LOS B	7.4	52.3	0.54	0.73	43.3
11	T1	1091	1.8	0.745	29.3	LOS C	23.3	165.2	0.93	0.83	37.7
Approach		1397	1.6	0.745	26.6	LOS C	23.3	165.2	0.84	0.81	39.0
All Vehicles		3185	2.4	0.753	28.1	LOS C	23.3	165.2	0.79	0.74	38.6

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1573	3.4	0.665	13.1	LOS B	24.5	176.6	0.70	0.64	47.4
6	R2	206	3.0	0.708	51.1	LOS D	10.1	72.3	1.00	0.86	27.7
Approach		1779	3.3	0.708	17.5	LOS B	24.5	176.6	0.73	0.67	43.8
North: North Beach Road (N)											
7	L2	178	2.5	0.279	29.8	LOS C	6.2	44.7	0.76	0.76	34.1
9	R2	327	2.5	0.689	41.4	LOS D	14.7	105.2	0.96	0.85	33.2
Approach		505	2.5	0.689	37.3	LOS D	14.7	105.2	0.89	0.82	33.5
West: Karrinyup Road (W)											
10	L2	406	1.0	0.393	18.8	LOS B	11.1	78.0	0.61	0.76	42.3
11	T1	1074	1.8	0.696	26.8	LOS C	21.8	154.8	0.89	0.79	38.9
Approach		1480	1.5	0.696	24.6	LOS C	21.8	154.8	0.81	0.78	39.9
All Vehicles		3764	2.5	0.708	22.9	LOS C	24.5	176.6	0.79	0.73	40.4

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1511	3.4	0.619	11.4	LOS B	21.7	156.2	0.65	0.59	48.8
6	R2	213	3.0	0.837	58.3	LOS E	11.4	82.0	1.00	0.94	25.9
Approach		1724	3.3	0.837	17.2	LOS B	21.7	156.2	0.69	0.63	44.0
North: North Beach Road (N)											
7	L2	82	2.5	0.145	31.4	LOS C	2.9	20.8	0.76	0.73	33.5
9	R2	382	2.5	0.872	54.2	LOS D	20.9	149.7	1.00	0.98	29.7
Approach		464	2.5	0.872	50.2	LOS D	20.9	149.7	0.96	0.94	30.2
West: Karrinyup Road (W)											
10	L2	268	1.0	0.255	17.0	LOS B	6.5	45.8	0.54	0.73	43.2
11	T1	1418	1.8	0.855	33.2	LOS C	35.6	252.6	0.96	0.95	35.9
Approach		1686	1.6	0.855	30.7	LOS C	35.6	252.6	0.89	0.92	37.0
All Vehicles		3874	2.5	0.872	27.0	LOS C	35.6	252.6	0.81	0.79	38.4

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	929	3.4	0.389	10.1	LOS B	11.1	79.8	0.54	0.48	49.6
6	R2	178	3.0	0.816	35.8	LOS D	5.9	42.0	1.00	0.90	32.3
Approach		1107	3.3	0.816	14.2	LOS B	11.1	79.8	0.61	0.54	45.8
North: North Beach Road (N)											
7	L2	346	2.5	0.612	24.1	LOS C	10.6	75.8	0.90	0.82	36.4
9	R2	390	2.5	0.822	47.8	LOS D	19.8	141.6	1.00	0.94	31.4
Approach		736	2.5	0.822	36.7	LOS D	19.8	141.6	0.96	0.88	33.3
West: Karrinyup Road (W)											
10	L2	325	1.0	0.383	16.3	LOS B	7.0	49.6	0.70	0.77	43.5
11	T1	1169	1.8	0.798	32.3	LOS C	26.8	190.1	0.96	0.90	36.3
Approach		1494	1.6	0.798	28.8	LOS C	26.8	190.1	0.90	0.87	37.9
All Vehicles		3337	2.4	0.822	25.7	LOS C	26.8	190.1	0.82	0.76	38.7

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1362	3.4	0.499	6.9	LOS A	14.6	104.7	0.48	0.44	52.7
6	R2	244	3.0	0.746	31.8	LOS C	8.1	58.4	1.00	0.86	33.7
Approach		1606	3.3	0.746	10.7	LOS B	14.6	104.7	0.56	0.50	48.5
North: North Beach Road (N)											
7	L2	199	2.5	0.390	24.3	LOS C	5.9	42.1	0.85	0.78	36.4
9	R2	214	2.5	0.690	48.6	LOS D	10.3	73.6	0.99	0.85	31.1
Approach		413	2.5	0.690	37.0	LOS D	10.3	73.6	0.93	0.82	33.2
West: Karrinyup Road (W)											
10	L2	322	1.0	0.426	18.7	LOS B	7.9	55.6	0.76	0.78	42.3
11	T1	1202	1.8	0.760	27.8	LOS C	25.5	181.0	0.92	0.83	38.4
Approach		1524	1.6	0.760	25.9	LOS C	25.5	181.0	0.89	0.82	39.3
All Vehicles		3543	2.5	0.760	20.3	LOS C	25.5	181.0	0.74	0.68	41.8

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1709	3.4	0.626	6.0	LOS A	21.3	152.9	0.57	0.52	51.6
6	R2	232	3.0	0.851	38.8	LOS D	8.9	63.9	1.00	0.93	31.3
Approach		1941	3.3	0.851	11.7	LOS B	21.3	152.9	0.62	0.57	47.9
North: North Beach Road (N)											
7	L2	120	2.5	0.263	25.3	LOS C	3.6	25.6	0.84	0.75	35.9
9	R2	251	2.5	0.809	53.4	LOS D	13.0	93.1	1.00	0.93	29.9
Approach		371	2.5	0.809	44.3	LOS D	13.0	93.1	0.95	0.87	31.4
West: Karrinyup Road (W)											
10	L2	300	1.0	0.370	17.3	LOS B	6.9	48.5	0.71	0.77	43.1
11	T1	1370	1.8	0.807	28.6	LOS C	30.5	216.7	0.94	0.88	38.0
Approach		1670	1.6	0.807	26.6	LOS C	30.5	216.7	0.90	0.86	39.0
All Vehicles		3982	2.5	0.851	21.0	LOS C	30.5	216.7	0.76	0.72	41.6

2031 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1071	3.4	0.453	10.7	LOS B	13.6	98.0	0.57	0.51	49.4
6	R2	323	3.0	0.807	50.6	LOS D	16.4	117.8	1.00	0.91	27.8
Approach		1394	3.3	0.807	19.9	LOS B	16.4	117.8	0.67	0.60	41.8
North: North Beach Road (N)											
7	L2	305	2.5	0.408	27.0	LOS C	10.5	75.2	0.76	0.78	35.2
9	R2	383	2.5	0.807	46.7	LOS D	19.1	136.7	1.00	0.92	31.7
Approach		688	2.5	0.807	38.0	LOS D	19.1	136.7	0.89	0.86	33.0
West: Karrinyup Road (W)											
10	L2	438	1.0	0.475	23.1	LOS C	13.9	98.2	0.70	0.79	40.3
11	T1	1092	1.8	0.833	38.1	LOS D	27.0	191.8	0.99	0.96	33.9
Approach		1530	1.5	0.833	33.8	LOS C	27.0	191.8	0.91	0.91	35.8
All Vehicles		3612	2.4	0.833	29.2	LOS C	27.0	191.8	0.81	0.78	37.1

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1597	3.4	0.664	12.5	LOS B	24.5	176.3	0.69	0.63	47.9
6	R2	299	3.0	0.747	47.6	LOS D	14.4	103.6	0.99	0.88	28.6
Approach		1896	3.3	0.747	18.0	LOS B	24.5	176.3	0.74	0.67	43.3
North: North Beach Road (N)											
7	L2	201	2.5	0.275	26.3	LOS C	6.6	47.1	0.72	0.75	35.5
9	R2	340	2.5	0.745	44.1	LOS D	16.1	114.9	0.98	0.88	32.4
Approach		541	2.5	0.745	37.5	LOS D	16.1	114.9	0.88	0.83	33.3
West: Karrinyup Road (W)											
10	L2	404	1.0	0.438	22.6	LOS C	12.5	88.4	0.69	0.78	40.5
11	T1	1046	1.8	0.775	33.1	LOS C	23.7	168.4	0.96	0.88	35.9
Approach		1450	1.5	0.775	30.2	LOS C	23.7	168.4	0.88	0.85	37.3
All Vehicles		3887	2.5	0.775	25.3	LOS C	24.5	176.3	0.81	0.76	39.1

2031 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1570	3.4	0.611	10.6	LOS B	23.0	165.9	0.60	0.55	49.4
6	R2	285	3.0	0.862	62.0	LOS E	16.9	121.6	1.00	0.95	25.1
Approach		1855	3.3	0.862	18.5	LOS B	23.0	165.9	0.66	0.61	43.0
North: North Beach Road (N)											
7	L2	111	2.5	0.181	32.2	LOS C	4.2	29.9	0.74	0.74	33.2
9	R2	352	2.5	0.884	61.3	LOS E	21.4	153.3	1.00	0.99	28.1
Approach		463	2.5	0.884	54.3	LOS D	21.4	153.3	0.94	0.93	29.0
West: Karrinyup Road (W)											
10	L2	283	1.0	0.277	19.2	LOS B	7.9	55.5	0.56	0.74	42.1
11	T1	1431	1.8	0.888	40.8	LOS D	42.9	304.9	0.97	1.00	32.8
Approach		1714	1.6	0.888	37.3	LOS D	42.9	304.9	0.90	0.96	34.3
All Vehicles		4032	2.5	0.888	30.6	LOS C	42.9	304.9	0.80	0.80	36.7

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1106	3.4	0.464	10.7	LOS B	14.1	101.3	0.57	0.51	49.3
6	R2	154	3.0	0.706	32.3	LOS C	4.7	33.5	1.00	0.83	33.5
Approach		1260	3.3	0.706	13.4	LOS B	14.1	101.3	0.63	0.55	46.6
North: North Beach Road (N)											
7	L2	322	2.5	0.569	23.8	LOS C	9.7	69.4	0.89	0.81	36.6
9	R2	396	2.5	0.835	48.9	LOS D	20.4	146.1	1.00	0.95	31.1
Approach		718	2.5	0.835	37.6	LOS D	20.4	146.1	0.95	0.89	33.1
West: Karrinyup Road (W)											
10	L2	359	1.0	0.406	15.6	LOS B	7.5	53.0	0.69	0.77	43.9
11	T1	1229	1.8	0.839	35.8	LOS D	30.1	213.7	0.98	0.96	34.8
Approach		1588	1.6	0.839	31.2	LOS C	30.1	213.7	0.91	0.92	36.8
All Vehicles		3566	2.4	0.839	26.2	LOS C	30.1	213.7	0.82	0.78	38.6

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1826	3.4	0.698	10.3	LOS B	26.6	191.0	0.66	0.61	49.6
6	R2	188	3.0	0.739	33.1	LOS C	6.2	44.9	1.00	0.86	33.2
Approach		2014	3.3	0.739	12.4	LOS B	26.6	191.0	0.69	0.63	47.4
North: North Beach Road (N)											
7	L2	192	2.5	0.390	24.9	LOS C	5.8	41.2	0.86	0.78	36.1
9	R2	287	2.5	0.786	49.9	LOS D	14.4	103.1	1.00	0.91	30.8
Approach		479	2.5	0.786	39.9	LOS D	14.4	103.1	0.94	0.86	32.5
West: Karrinyup Road (W)											
10	L2	308	1.0	0.371	16.8	LOS B	6.9	48.4	0.70	0.77	43.3
11	T1	1266	1.8	0.782	28.3	LOS C	27.4	195.0	0.93	0.86	38.1
Approach		1574	1.6	0.782	26.0	LOS C	27.4	195.0	0.88	0.84	39.2
All Vehicles		4067	2.6	0.786	20.9	LOS C	27.4	195.0	0.80	0.74	41.6

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
5	T1	1552	3.4	0.602	9.7	LOS A	20.5	147.3	0.60	0.55	50.2
6	R2	180	3.0	0.762	55.3	LOS E	9.2	66.1	1.00	0.88	26.6
Approach		1732	3.3	0.762	14.4	LOS B	20.5	147.3	0.64	0.58	45.9
North: North Beach Road (N)											
7	L2	122	2.5	0.167	25.2	LOS C	3.8	27.1	0.68	0.72	36.0
9	R2	294	2.5	0.767	48.2	LOS D	14.5	103.5	1.00	0.90	31.3
Approach		416	2.5	0.767	41.4	LOS D	14.5	103.5	0.91	0.85	32.3
West: Karrinyup Road (W)											
10	L2	181	1.0	0.192	12.8	LOS B	2.5	17.4	0.57	0.72	45.4
11	T1	1456	1.8	0.803	25.2	LOS C	31.7	225.3	0.90	0.84	39.7
Approach		1637	1.7	0.803	23.8	LOS C	31.7	225.3	0.87	0.83	40.4
All Vehicles		3785	2.5	0.803	21.4	LOS C	31.7	225.3	0.77	0.72	41.3

1.7 Karrinyup Road / Mitchell Freeway Northbound Ramp

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	269	2.0	0.211	40.2	LOS D	6.3	44.8	0.74	0.76	35.2
3	R2	45	2.0	0.162	61.5	LOS E	2.7	18.9	0.91	0.74	22.9
Approach		314	2.0	0.211	43.3	LOS D	6.3	44.8	0.77	0.76	33.2
East: Karrinyup Road (E)											
5	T1	740	2.5	0.426	17.3	LOS B	17.5	124.8	0.59	0.52	39.0
6	R2	224	2.0	0.716	59.2	LOS E	13.8	98.2	0.95	0.84	23.5
Approach		964	2.4	0.716	27.1	LOS C	17.5	124.8	0.67	0.59	32.5
West: Karrinyup Road (W)											
10	L2	326	1.4	0.177	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1173	1.9	0.684	26.5	LOS C	33.2	235.9	0.78	0.70	31.6
Approach		1499	1.8	0.684	22.2	LOS C	33.2	235.9	0.61	0.68	37.8
All Vehicles		2777	2.0	0.716	26.3	LOS C	33.2	235.9	0.65	0.66	35.2

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	734	2.0	0.668	53.1	LOS D	22.8	162.4	0.93	0.85	30.6
3	R2	29	2.0	0.095	61.0	LOS E	1.7	12.3	0.88	0.72	23.0
Approach		763	2.0	0.668	53.4	LOS D	22.8	162.4	0.93	0.84	30.3
East: Karrinyup Road (E)											
5	T1	1137	1.7	0.742	19.2	LOS B	42.8	303.8	0.71	0.65	37.2
6	R2	260	0.3	0.765	59.5	LOS E	16.6	116.7	0.93	0.85	23.8
Approach		1397	1.4	0.765	26.7	LOS C	42.8	303.8	0.75	0.69	32.5
West: Karrinyup Road (W)											
10	L2	324	0.3	0.175	6.7	LOS A	0.0	0.0	0.00	0.57	59.2
11	T1	838	1.2	0.510	28.6	LOS C	22.1	156.1	0.74	0.66	30.3
Approach		1162	0.9	0.510	22.5	LOS C	22.1	156.1	0.54	0.63	38.4
All Vehicles		3322	1.4	0.765	31.4	LOS C	42.8	303.8	0.71	0.70	33.4

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	609	0.7	0.488	47.6	LOS D	18.7	131.5	0.83	0.81	32.5
3	R2	110	0.0	0.437	73.5	LOS E	7.8	54.3	0.97	0.79	20.4
Approach		719	0.6	0.488	51.6	LOS D	18.7	131.5	0.85	0.81	30.3
East: Karrinyup Road (E)											
5	T1	1147	0.6	0.800	25.6	LOS C	51.7	364.2	0.79	0.72	32.2
6	R2	167	1.0	0.379	58.7	LOS E	10.5	74.3	0.89	0.80	23.7
Approach		1314	0.7	0.800	29.8	LOS C	51.7	364.2	0.80	0.73	30.3
West: Karrinyup Road (W)											
10	L2	291	1.5	0.158	6.7	LOS A	0.0	0.0	0.00	0.57	58.8
11	T1	1146	1.4	0.652	28.2	LOS C	34.9	247.5	0.76	0.68	30.5
Approach		1437	1.4	0.652	23.8	LOS C	34.9	247.5	0.61	0.66	36.4
All Vehicles		3470	1.0	0.800	31.8	LOS C	51.7	364.2	0.73	0.72	32.4

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	257	2.0	0.386	50.0	LOS D	6.2	44.0	0.93	0.79	31.8
3	R2	55	2.0	0.472	83.5	LOS E	3.0	21.7	1.00	0.75	22.4
Approach		312	2.0	0.472	52.4	LOS D	6.2	44.0	0.94	0.78	29.9
East: Karrinyup Road (E)											
5	T1	840	2.5	0.386	6.4	LOS A	11.1	79.0	0.41	0.36	54.1
6	R2	214	2.0	0.514	46.3	LOS D	10.2	72.5	0.93	0.82	27.3
Approach		1054	2.4	0.514	14.5	LOS B	11.1	79.0	0.51	0.46	42.7
West: Karrinyup Road (W)											
10	L2	248	1.4	0.135	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1094	1.9	0.521	16.9	LOS B	18.4	131.0	0.68	0.61	39.4
Approach		1342	1.8	0.521	15.0	LOS B	18.4	131.0	0.56	0.60	44.0
All Vehicles		2708	2.0	0.521	19.1	LOS B	18.4	131.0	0.58	0.57	40.2

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	674	2.0	0.605	41.4	LOS D	15.7	111.6	0.90	0.83	34.7
3	R2	38	2.0	0.326	62.7	LOS E	2.1	14.8	0.99	0.73	22.6
Approach		712	2.0	0.605	42.5	LOS D	15.7	111.6	0.91	0.83	34.0
East: Karrinyup Road (E)											
5	T1	1104	2.5	0.618	14.8	LOS B	23.9	170.5	0.86	0.59	41.6
6	R2	296	2.0	0.456	35.1	LOS D	12.2	86.9	0.82	0.81	31.8
Approach		1400	2.4	0.618	19.1	LOS B	23.9	170.5	0.69	0.64	38.2
West: Karrinyup Road (W)											
10	L2	260	1.4	0.141	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	836	1.9	0.519	25.4	LOS C	16.6	117.8	0.80	0.70	32.3
Approach		1096	1.8	0.519	21.0	LOS C	16.6	117.8	0.61	0.67	39.0
All Vehicles		3208	2.1	0.618	24.9	LOS C	23.9	170.5	0.71	0.69	37.0

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	602	2.0	0.583	43.4	LOS D	14.0	99.6	0.91	0.83	33.9
3	R2	87	2.0	0.523	60.3	LOS E	4.7	33.3	1.00	0.77	23.2
Approach		689	2.0	0.583	45.5	LOS D	14.0	99.6	0.93	0.82	32.5
East: Karrinyup Road (E)											
5	T1	1118	2.5	0.598	13.0	LOS B	22.7	162.4	0.62	0.56	43.8
6	R2	157	2.0	0.524	52.1	LOS D	7.9	56.2	0.96	0.80	25.4
Approach		1275	2.4	0.598	17.8	LOS B	22.7	162.4	0.66	0.59	39.0
West: Karrinyup Road (W)											
10	L2	248	1.4	0.135	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1161	1.9	0.519	14.6	LOS B	18.4	131.1	0.65	0.58	41.9
Approach		1409	1.8	0.519	13.2	LOS B	18.4	131.1	0.53	0.58	45.8
All Vehicles		3373	2.1	0.598	21.6	LOS C	22.7	162.4	0.66	0.63	38.9

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	263	2.0	0.395	50.1	LOS D	6.3	45.1	0.93	0.79	31.5
3	R2	54	2.0	0.360	60.4	LOS E	2.9	20.5	0.98	0.75	23.2
Approach		317	2.0	0.395	51.8	LOS D	6.3	45.1	0.94	0.78	30.1
East: Karrinyup Road (E)											
5	T1	844	2.5	0.388	6.4	LOS A	11.1	79.5	0.41	0.36	54.0
6	R2	196	2.0	0.406	41.9	LOS D	8.7	62.1	0.87	0.80	28.8
Approach		1040	2.4	0.406	13.1	LOS B	11.1	79.5	0.50	0.45	44.3
West: Karrinyup Road (W)											
10	L2	315	1.4	0.171	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1154	1.9	0.407	18.9	LOS B	13.0	92.3	0.68	0.60	37.4
Approach		1469	1.8	0.407	16.3	LOS B	13.0	92.3	0.54	0.59	42.9
All Vehicles		2826	2.0	0.407	19.1	LOS B	13.0	92.3	0.57	0.56	40.4

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	592	2.0	0.556	42.3	LOS D	13.5	96.2	0.90	0.83	34.4
3	R2	39	2.0	0.260	59.8	LOS E	2.1	14.6	0.97	0.73	23.3
Approach		631	2.0	0.556	43.4	LOS D	13.5	96.2	0.90	0.82	33.6
East: Karrinyup Road (E)											
5	T1	1009	2.5	0.548	13.0	LOS B	19.9	142.0	0.60	0.54	43.8
6	R2	289	2.0	0.434	34.1	LOS C	11.7	83.2	0.81	0.81	32.1
Approach		1298	2.4	0.548	17.7	LOS B	19.9	142.0	0.65	0.60	39.5
West: Karrinyup Road (W)											
10	L2	302	1.4	0.164	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	982	1.9	0.435	26.3	LOS C	12.8	91.1	0.78	0.67	31.7
Approach		1284	1.8	0.435	21.7	LOS C	12.8	91.1	0.60	0.65	38.4
All Vehicles		3213	2.1	0.556	24.3	LOS C	19.9	142.0	0.68	0.66	37.2

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	812	2.0	0.687	40.2	LOS D	19.7	140.1	0.91	0.85	35.2
3	R2	68	2.0	0.454	61.0	LOS E	3.7	26.1	0.99	0.76	23.0
Approach		880	2.0	0.687	41.8	LOS D	19.7	140.1	0.92	0.84	34.2
East: Karrinyup Road (E)											
5	T1	1130	2.5	0.664	17.0	LOS B	26.4	188.7	0.71	0.64	39.3
6	R2	265	2.0	0.482	39.8	LOS D	11.7	83.2	0.87	0.82	29.6
Approach		1395	2.4	0.664	21.4	LOS C	26.4	188.7	0.74	0.67	36.3
West: Karrinyup Road (W)											
10	L2	190	1.4	0.103	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1237	1.9	0.471	22.2	LOS C	15.2	108.2	0.74	0.65	34.7
Approach		1427	1.8	0.471	20.1	LOS C	15.2	108.2	0.64	0.64	38.3
All Vehicles		3702	2.1	0.687	25.7	LOS C	26.4	188.7	0.74	0.70	36.1

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Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	525	2.0	0.298	24.9	LOS C	8.4	60.0	0.64	0.76	42.9
3	R2	138	2.0	0.691	60.6	LOS E	7.6	54.0	1.00	0.83	23.1
Approach		663	2.0	0.691	32.3	LOS C	8.4	60.0	0.72	0.78	37.7
East: Karrinyup Road (E)											
5	T1	372	2.5	0.296	22.8	LOS C	8.3	59.4	0.70	0.58	34.2
6	R2	309	2.0	0.697	45.2	LOS D	15.0	106.6	0.94	0.84	27.6
Approach		681	2.2	0.697	33.0	LOS C	15.0	106.6	0.81	0.70	30.3
West: Karrinyup Road (W)											
10	L2	270	1.4	0.147	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1181	1.9	0.711	24.5	LOS C	27.1	192.5	0.84	0.75	33.0
Approach		1451	1.8	0.711	21.2	LOS C	27.1	192.5	0.68	0.72	38.2
All Vehicles		2795	2.0	0.711	26.7	LOS C	27.1	192.5	0.72	0.73	36.0

2031 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	541	2.0	0.647	44.9	LOS D	15.4	109.9	0.94	0.84	33.4
3	R2	180	2.0	0.569	52.4	LOS D	9.1	64.6	0.97	0.81	25.3
Approach		821	2.0	0.647	46.5	LOS D	15.4	109.9	0.95	0.83	31.6
East: Karrinyup Road (E)											
5	T1	1251	2.5	0.681	13.4	LOS B	28.2	201.3	0.65	0.59	43.3
6	R2	270	2.0	0.630	43.7	LOS D	12.6	89.9	0.92	0.82	28.2
Approach		1521	2.4	0.681	18.8	LOS B	28.2	201.3	0.70	0.63	38.4
West: Karrinyup Road (W)											
10	L2	295	1.4	0.160	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	854	1.9	0.554	27.2	LOS C	17.6	125.0	0.83	0.72	31.1
Approach		1149	1.8	0.554	22.0	LOS C	17.6	125.0	0.61	0.68	38.5
All Vehicles		3491	2.1	0.681	26.3	LOS C	28.2	201.3	0.73	0.70	35.9

2031 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	548	2.0	0.633	47.7	LOS D	13.4	95.3	0.95	0.83	32.3
3	R2	64	2.0	0.549	84.0	LOS E	3.6	25.4	1.00	0.76	22.3
Approach		612	2.0	0.633	49.4	LOS D	13.4	95.3	0.96	0.83	31.2
East: Karrinyup Road (E)											
5	T1	1296	2.5	0.645	11.0	LOS B	25.6	182.8	0.59	0.54	46.5
6	R2	170	2.0	0.537	51.4	LOS D	8.5	60.6	0.96	0.81	25.6
Approach		1466	2.4	0.645	15.7	LOS B	25.6	182.8	0.63	0.57	41.1
West: Karrinyup Road (W)											
10	L2	184	1.4	0.100	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1218	1.9	0.530	13.6	LOS B	19.0	135.1	0.63	0.57	43.0
Approach		1402	1.8	0.530	12.7	LOS B	19.0	135.1	0.55	0.57	45.9
All Vehicles		3480	2.1	0.645	20.4	LOS C	25.6	182.8	0.66	0.62	39.2

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	483	2.0	0.427	39.2	LOS D	10.3	73.6	0.85	0.80	35.6
3	R2	115	2.0	0.461	54.9	LOS D	5.9	41.8	0.97	0.79	24.6
Approach		598	2.0	0.461	42.2	LOS D	10.3	73.6	0.87	0.80	33.4
East: Karrinyup Road (E)											
5	T1	770	2.5	0.431	13.0	LOS B	14.2	101.5	0.57	0.50	43.8
6	R2	233	2.0	0.466	41.8	LOS D	10.5	74.7	0.88	0.81	28.8
Approach		1003	2.4	0.466	19.7	LOS B	14.2	101.5	0.64	0.58	37.8
West: Karrinyup Road (W)											
10	L2	261	1.4	0.142	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1165	1.9	0.472	24.1	LOS C	14.8	105.5	0.77	0.67	33.2
Approach		1426	1.8	0.472	20.9	LOS C	14.8	105.5	0.63	0.65	38.3
All Vehicles		3027	2.0	0.472	24.7	LOS C	14.8	105.5	0.58	0.66	36.6

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	773	2.0	0.723	44.2	LOS D	19.4	137.8	0.95	0.86	33.6
3	R2	45	2.0	0.300	60.0	LOS E	2.4	17.0	0.98	0.74	23.3
Approach		818	2.0	0.723	45.0	LOS D	19.4	137.8	0.95	0.85	33.0
East: Karrinyup Road (E)											
5	T1	1250	2.5	0.696	15.2	LOS B	29.0	207.6	0.69	0.62	41.2
6	R2	242	2.0	0.415	37.5	LOS D	10.2	72.7	0.83	0.80	30.6
Approach		1492	2.4	0.696	18.8	LOS B	29.0	207.6	0.71	0.65	38.3
West: Karrinyup Road (W)											
10	L2	333	1.4	0.181	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1023	1.9	0.406	22.6	LOS C	12.4	88.3	0.73	0.63	34.3
Approach		1356	1.8	0.406	18.7	LOS B	12.4	88.3	0.55	0.62	41.0
All Vehicles		3666	2.1	0.723	24.5	LOS C	29.0	207.6	0.71	0.68	37.2

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mitchell Freeway (S)											
1	L2	448	2.0	0.585	49.5	LOS D	11.0	78.5	0.95	0.82	31.7
3	R2	44	2.0	0.294	60.0	LOS E	2.3	16.6	0.98	0.74	23.3
Approach		492	2.0	0.585	50.4	LOS D	11.0	78.5	0.96	0.81	31.0
East: Karrinyup Road (E)											
5	T1	1259	2.5	0.601	9.2	LOS A	22.4	160.0	0.54	0.49	49.3
6	R2	155	2.0	0.388	45.7	LOS D	7.2	51.2	0.90	0.79	27.5
Approach		1414	2.4	0.601	13.2	LOS B	22.4	160.0	0.58	0.52	44.0
West: Karrinyup Road (W)											
10	L2	231	1.4	0.126	6.7	LOS A	0.0	0.0	0.00	0.57	58.9
11	T1	1217	1.9	0.393	15.9	LOS B	12.6	89.7	0.63	0.55	40.5
Approach		1448	1.8	0.393	14.4	LOS B	12.6	89.7	0.53	0.56	44.3
All Vehicles		3354	2.1	0.601	19.2	LOS B	22.4	160.0	0.61	0.58	40.2

1.8 Karrinyup Road / Mitchell Freeway Southbound Ramp

2013 Base AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	31	4.8	0.026	8.3	LOS A	0.3	2.2	0.20	0.62	57.4
5	T1	705	2.5	0.604	43.8	LOS D	20.2	144.1	0.91	0.79	29.2
Approach		736	2.6	0.604	42.3	LOS D	20.2	144.1	0.88	0.78	30.2
North: Mitchell Freeway (N)											
7	L2	423	0.4	0.458	8.6	LOS A	6.4	44.8	0.30	0.68	58.3
9	R2	262	4.3	0.669	60.2	LOS E	16.3	118.3	0.97	0.84	23.4
Approach		685	1.9	0.669	28.3	LOS C	16.3	118.3	0.56	0.74	41.4
West: Karrinyup Road (W)											
11	T1	716	2.6	0.268	8.2	LOS A	8.8	62.8	0.40	0.35	55.5
12	R2	502	1.9	0.409	41.8	LOS D	12.7	90.0	0.80	0.80	28.6
Approach		1218	2.3	0.409	22.1	LOS C	12.7	90.0	0.57	0.54	40.0
All Vehicles		2639	2.3	0.669	29.3	LOS C	20.2	144.1	0.65	0.66	37.3

2021 Do-minimum AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	27	4.8	0.022	8.6	LOS A	0.3	1.8	0.24	0.63	57.1
5	T1	722	2.5	0.609	34.9	LOS C	16.5	118.2	0.91	0.78	33.1
Approach		749	2.6	0.609	34.0	LOS C	16.5	118.2	0.88	0.78	34.0
North: Mitchell Freeway (N)											
7	L2	448	0.4	0.436	9.0	LOS A	6.5	45.6	0.36	0.70	57.9
9	R2	332	4.3	0.614	42.3	LOS D	15.4	111.7	0.91	0.84	28.7
Approach		780	2.1	0.614	23.2	LOS C	15.4	111.7	0.60	0.76	44.1
West: Karrinyup Road (W)											
11	T1	653	2.6	0.288	11.7	LOS B	8.5	60.7	0.53	0.46	51.0
12	R2	495	1.9	0.594	47.0	LOS D	12.0	85.6	0.95	0.83	26.8
Approach		1148	2.3	0.594	26.9	LOS C	12.0	85.6	0.71	0.62	36.7
All Vehicles		2677	2.3	0.614	27.8	LOS C	16.5	118.2	0.73	0.70	38.2

2013 Base PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	23	0.0	0.017	7.5	LOS A	0.2	1.1	0.16	0.61	59.4
5	T1	1028	1.7	1.001	102.7	LOS F	48.4	343.7	1.00	1.25	16.4
Approach		1051	1.6	1.001	100.6	LOS F	48.4	343.7	0.98	1.23	16.8
North: Mitchell Freeway (N)											
7	L2	190	0.6	0.179	7.7	LOS A	1.6	11.3	0.19	0.64	59.0
9	R2	371	0.5	0.746	55.7	LOS E	22.5	158.4	0.98	0.87	24.5
Approach		561	0.5	0.746	39.4	LOS D	22.5	158.4	0.71	0.79	33.5
West: Karrinyup Road (W)											
11	T1	569	1.2	0.229	10.6	LOS B	7.6	53.8	0.45	0.39	52.4
12	R2	299	4.2	0.253	40.7	LOS D	7.1	51.4	0.77	0.78	29.2
Approach		868	2.2	0.253	20.9	LOS C	7.6	53.8	0.56	0.52	41.1
All Vehicles		2480	1.6	1.001	58.9	LOS E	48.4	343.7	0.77	0.88	25.0

2021 Do-minimum PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	25	4.8	0.018	7.6	LOS A	0.2	1.2	0.18	0.62	58.0
5	T1	1106	2.5	0.623	23.7	LOS C	22.3	159.2	0.81	0.72	39.9
Approach		1131	2.5	0.623	23.4	LOS C	22.3	159.2	0.80	0.72	40.3
North: Mitchell Freeway (N)											
7	L2	169	0.4	0.167	7.8	LOS A	1.3	9.3	0.22	0.64	59.0
9	R2	292	4.3	0.615	45.2	LOS D	13.9	101.0	0.93	0.83	27.7
Approach		461	2.9	0.615	31.5	LOS C	13.9	101.0	0.67	0.77	37.4
West: Karrinyup Road (W)											
11	T1	620	2.6	0.258	9.6	LOS A	7.3	51.9	0.48	0.41	53.6
12	R2	253	1.9	0.633	58.7	LOS E	6.8	48.6	1.00	0.81	23.5
Approach		873	2.4	0.633	23.8	LOS C	7.3	51.9	0.63	0.53	39.1
All Vehicles		2465	2.5	0.633	25.1	LOS C	22.3	159.2	0.71	0.66	39.2

2013 Base SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	41	0.0	0.034	8.7	LOS A	0.5	3.4	0.21	0.63	58.3
5	T1	942	0.9	0.852	61.2	LOS E	36.4	256.4	1.00	0.95	23.7
Approach		983	0.9	0.852	59.0	LOS E	36.4	256.4	0.97	0.94	24.7
North: Mitchell Freeway (N)											
7	L2	198	0.5	0.204	7.9	LOS A	2.0	14.1	0.19	0.64	58.9
9	R2	373	0.2	0.843	73.2	LOS E	28.8	201.9	1.00	0.91	20.6
Approach		571	0.3	0.843	50.5	LOS D	28.8	201.9	0.72	0.82	29.6
West: Karrinyup Road (W)											
11	T1	682	1.0	0.257	9.8	LOS A	9.6	67.8	0.41	0.36	53.3
12	R2	575	1.6	0.573	46.2	LOS D	16.4	116.6	0.82	0.81	27.1
Approach		1257	1.3	0.573	26.5	LOS C	16.4	116.6	0.60	0.57	37.0
All Vehicles		2811	1.0	0.852	42.7	LOS D	36.4	256.4	0.75	0.75	30.1

2021 Do-minimum SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	58	4.8	0.048	9.0	LOS A	0.6	4.5	0.27	0.64	56.7
5	T1	906	2.5	0.725	35.2	LOS D	21.6	154.7	0.94	0.83	33.0
Approach		964	2.6	0.725	33.7	LOS C	21.6	154.7	0.90	0.82	34.4
North: Mitchell Freeway (N)											
7	L2	168	0.4	0.171	8.1	LOS A	1.5	10.8	0.24	0.65	58.7
9	R2	370	4.3	0.729	46.2	LOS D	18.4	133.7	0.96	0.87	27.4
Approach		538	3.1	0.729	34.3	LOS C	18.4	133.7	0.74	0.80	35.5
West: Karrinyup Road (W)											
11	T1	699	2.6	0.299	10.9	LOS B	8.8	63.0	0.51	0.45	52.0
12	R2	551	1.9	0.726	49.2	LOS D	14.0	99.6	0.97	0.85	26.1
Approach		1250	2.3	0.726	27.8	LOS C	14.0	99.6	0.71	0.63	36.2
All Vehicles		2752	2.6	0.729	31.1	LOS C	21.6	154.7	0.78	0.73	35.4

2021 Option AM

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	25	4.8	0.020	8.4	LOS A	0.2	1.5	0.23	0.62	57.3
5	T1	731	2.5	0.582	33.1	LOS C	16.3	116.6	0.89	0.77	34.0
Approach		756	2.6	0.582	32.3	LOS C	16.3	116.6	0.87	0.76	34.8
North: Mitchell Freeway (N)											
7	L2	461	0.4	0.472	9.6	LOS A	7.9	55.8	0.42	0.72	57.3
9	R2	307	4.3	0.586	42.7	LOS D	14.2	103.0	0.91	0.83	28.6
Approach		768	2.0	0.586	22.8	LOS C	14.2	103.0	0.61	0.76	44.5
West: Karrinyup Road (W)											
11	T1	729	2.6	0.317	11.5	LOS B	9.5	67.9	0.53	0.46	51.2
12	R2	478	1.9	0.598	47.8	LOS D	11.7	83.3	0.95	0.83	26.6
Approach		1207	2.3	0.598	25.9	LOS C	11.7	83.3	0.70	0.61	37.4
All Vehicles		2731	2.3	0.598	26.8	LOS C	16.3	116.6	0.72	0.69	38.9

2021 Option PM

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	30	4.8	0.022	7.8	LOS A	0.2	1.5	0.19	0.62	57.9
5	T1	953	2.5	0.636	29.1	LOS C	20.7	148.0	0.87	0.77	36.3
Approach		983	2.5	0.636	28.5	LOS C	20.7	148.0	0.85	0.76	37.0
North: Mitchell Freeway (N)											
7	L2	162	0.4	0.161	8.3	LOS A	1.6	11.0	0.25	0.65	58.5
9	R2	345	4.3	0.620	41.7	LOS D	15.9	115.5	0.91	0.84	29.0
Approach		507	3.1	0.620	31.0	LOS C	15.9	115.5	0.70	0.78	37.2
West: Karrinyup Road (W)											
11	T1	703	2.6	0.315	12.5	LOS B	9.5	67.9	0.55	0.48	50.1
12	R2	315	1.9	0.630	55.8	LOS E	8.3	59.0	0.99	0.81	24.2
Approach		1018	2.4	0.630	25.9	LOS C	9.5	67.9	0.69	0.58	37.7
All Vehicles		2508	2.6	0.636	27.9	LOS C	20.7	148.0	0.75	0.69	37.3

2021 Option SATURDAY

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	72	4.8	0.058	8.9	LOS A	0.7	5.4	0.26	0.64	55.9
5	T1	1052	2.5	0.745	32.2	LOS C	24.9	178.0	0.93	0.82	34.5
Approach		1124	2.6	0.745	30.7	LOS C	24.9	178.0	0.89	0.81	36.0
North: Mitchell Freeway (N)											
7	L2	221	0.4	0.242	8.5	LOS A	2.4	17.0	0.28	0.67	58.3
9	R2	344	4.3	0.750	49.4	LOS D	17.8	129.0	0.98	0.88	26.3
Approach		565	2.8	0.750	33.4	LOS C	17.8	129.0	0.71	0.79	36.7
West: Karrinyup Road (W)											
11	T1	786	2.6	0.322	9.7	LOS A	9.5	67.7	0.49	0.43	53.5
12	R2	520	1.9	0.711	50.5	LOS D	13.3	94.9	0.98	0.85	25.7
Approach		1306	2.3	0.711	25.9	LOS C	13.3	94.9	0.68	0.60	37.4
All Vehicles		2995	2.5	0.750	29.2	LOS C	24.9	178.0	0.76	0.72	36.7

2031 Do-minimum AM

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	44	4.8	0.037	8.8	LOS A	0.4	3.2	0.26	0.63	56.9
5	T1	774	2.5	0.569	30.8	LOS C	16.8	119.9	0.86	0.75	35.4
Approach		818	2.6	0.569	29.7	LOS C	16.8	119.9	0.83	0.74	36.6
North: Mitchell Freeway (N)											
7	L2	451	0.4	0.519	9.0	LOS A	7.1	50.0	0.39	0.71	57.8
9	R2	408	4.3	0.566	50.1	LOS D	10.1	73.1	0.95	0.82	26.1
Approach		859	2.3	0.566	28.5	LOS C	10.1	73.1	0.66	0.76	40.5
West: Karrinyup Road (W)											
11	T1	768	2.6	0.290	6.9	LOS A	7.8	55.8	0.41	0.37	57.4
12	R2	554	1.9	0.548	41.7	LOS D	12.7	90.0	0.90	0.83	28.7
Approach		1322	2.3	0.548	21.5	LOS C	12.7	90.0	0.62	0.56	40.4
All Vehicles		2999	2.4	0.569	25.7	LOS C	16.8	119.9	0.69	0.67	39.4

2031 Do-minimum PM

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	15	4.8	0.011	8.2	LOS A	0.1	0.9	0.22	0.62	57.5
5	T1	1083	2.5	0.622	24.4	LOS C	22.0	157.0	0.82	0.73	39.5
Approach		1098	2.5	0.622	24.1	LOS C	22.0	157.0	0.81	0.73	39.8
North: Mitchell Freeway (N)											
7	L2	249	0.4	0.260	7.7	LOS A	2.0	14.1	0.23	0.65	59.0
9	R2	435	4.3	0.604	50.5	LOS D	10.8	78.6	0.96	0.82	26.0
Approach		684	2.9	0.604	34.9	LOS C	10.8	78.6	0.69	0.76	35.7
West: Karrinyup Road (W)											
11	T1	624	2.6	0.235	6.6	LOS A	6.0	43.2	0.40	0.34	57.9
12	R2	401	1.9	0.602	51.0	LOS D	10.1	71.9	0.97	0.82	25.6
Approach		1025	2.3	0.602	24.0	LOS C	10.1	71.9	0.62	0.53	38.8
All Vehicles		2807	2.5	0.622	26.7	LOS C	22.0	157.0	0.71	0.66	38.2

2031 Do-minimum SATURDAY

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	53	4.8	0.043	8.8	LOS A	0.5	3.9	0.26	0.64	56.9
5	T1	927	2.5	0.650	30.6	LOS C	20.6	147.3	0.89	0.78	35.5
Approach		980	2.6	0.650	29.5	LOS C	20.6	147.3	0.85	0.77	36.7
North: Mitchell Freeway (N)											
7	L2	207	0.4	0.228	8.1	LOS A	1.9	13.4	0.25	0.66	58.7
9	R2	545	4.3	0.666	48.9	LOS D	13.5	98.3	0.97	0.84	26.5
Approach		752	3.3	0.666	37.6	LOS D	13.5	98.3	0.77	0.79	33.6
West: Karrinyup Road (W)											
11	T1	743	2.6	0.292	8.1	LOS A	8.1	58.3	0.45	0.39	55.6
12	R2	537	1.9	0.651	46.5	LOS D	13.1	92.9	0.95	0.83	27.0
Approach		1280	2.3	0.651	24.2	LOS C	13.1	92.9	0.66	0.58	38.5
All Vehicles		3012	2.6	0.666	29.3	LOS C	20.6	147.3	0.75	0.69	36.4

2031 Option AM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	41	4.8	0.033	8.4	LOS A	0.4	2.7	0.23	0.63	57.3
5	T1	740	2.5	0.493	27.1	LOS C	14.9	106.6	0.81	0.70	37.7
Approach		781	2.6	0.493	26.1	LOS C	14.9	106.6	0.78	0.70	38.8
North: Mitchell Freeway (N)											
7	L2	408	0.4	0.493	8.8	LOS A	5.9	41.4	0.36	0.70	58.0
9	R2	266	4.3	0.427	51.2	LOS D	6.5	47.3	0.94	0.79	25.8
Approach		674	2.0	0.493	25.6	LOS C	6.5	47.3	0.59	0.74	42.9
West: Karrinyup Road (W)											
11	T1	795	2.6	0.289	5.8	LOS A	7.4	53.1	0.38	0.34	59.1
12	R2	485	1.9	0.485	41.9	LOS D	11.0	78.1	0.89	0.82	28.6
Approach		1280	2.3	0.485	19.5	LOS B	11.0	78.1	0.57	0.52	42.1
All Vehicles		2735	2.3	0.493	22.9	LOS C	14.9	106.6	0.64	0.62	41.4

2031 Option PM

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	16	4.8	0.012	7.9	LOS A	0.1	0.9	0.20	0.61	57.6
5	T1	1110	2.5	0.590	21.4	LOS C	21.2	151.3	0.77	0.69	41.7
Approach		1126	2.5	0.590	21.2	LOS C	21.2	151.3	0.76	0.69	42.0
North: Mitchell Freeway (N)											
7	L2	217	0.4	0.247	7.9	LOS A	1.9	13.1	0.24	0.65	58.9
9	R2	384	4.3	0.586	51.9	LOS D	9.7	70.1	0.97	0.82	25.6
Approach		601	2.9	0.586	36.0	LOS D	9.7	70.1	0.70	0.76	35.2
West: Karrinyup Road (W)											
11	T1	722	2.6	0.265	6.0	LOS A	6.8	48.6	0.38	0.34	58.8
12	R2	345	1.9	0.575	52.4	LOS D	8.8	62.4	0.97	0.81	25.2
Approach		1067	2.3	0.575	21.0	LOS C	8.8	62.4	0.57	0.49	41.1
All Vehicles		2794	2.5	0.590	24.3	LOS C	21.2	151.3	0.68	0.63	39.7

2031 Option SATURDAY

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Karrinyup Road (E)											
4	L2	50	4.8	0.040	8.8	LOS A	0.5	3.7	0.26	0.63	56.9
5	T1	1083	2.5	0.651	26.0	LOS C	22.9	163.6	0.84	0.75	38.3
Approach		1133	2.6	0.651	25.3	LOS C	22.9	163.6	0.82	0.75	39.3
North: Mitchell Freeway (N)											
7	L2	213	0.4	0.247	7.7	LOS A	1.7	11.9	0.22	0.65	59.0
9	R2	377	4.3	0.640	54.3	LOS D	9.7	70.8	0.99	0.82	24.9
Approach		590	2.9	0.640	37.5	LOS D	9.7	70.8	0.71	0.76	34.6
West: Karrinyup Road (W)											
11	T1	722	2.6	0.259	5.3	LOS A	6.4	45.5	0.36	0.32	59.9
12	R2	540	1.9	0.659	46.6	LOS D	13.2	93.5	0.95	0.83	27.0
Approach		1262	2.3	0.659	23.0	LOS C	13.2	93.5	0.61	0.54	39.4
All Vehicles		2985	2.5	0.659	26.7	LOS C	22.9	163.6	0.71	0.66	38.1

Appendix D1

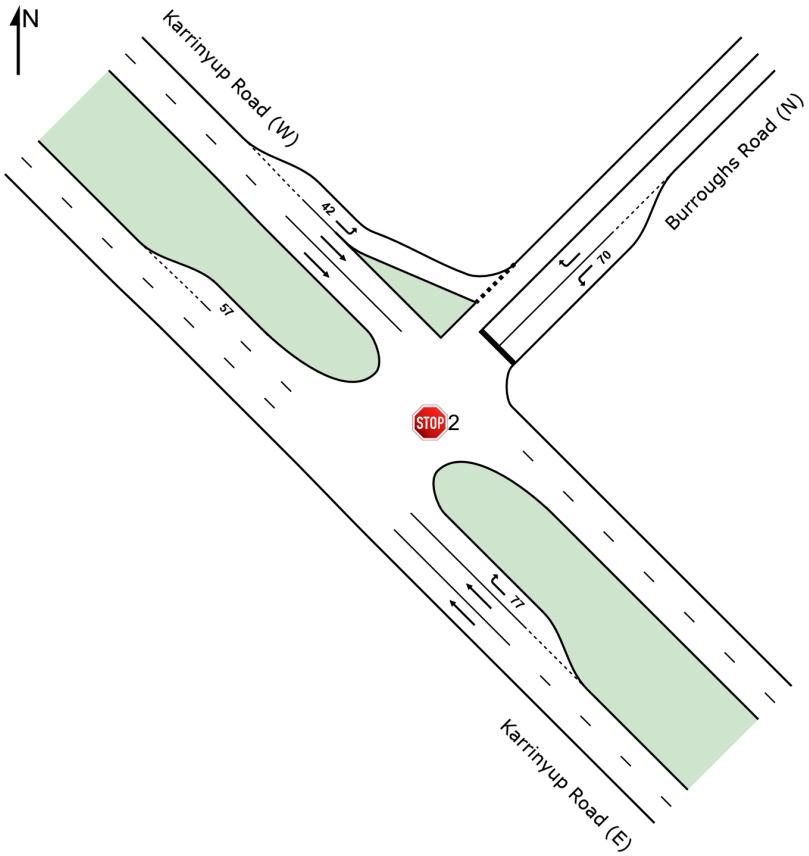
SIDRA Analysis Outputs – 2024 and 2034

SITE LAYOUT

Site: 2 [2024 Base AM (Site Folder: General)]

Karrinyup Road / Burroughs Road
Site Category: (None)
Stop (Two-Way)

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



2024 Base AM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2024 Base AM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	626	17	659	2.7	0.172	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	96	2	101	2.5	0.501	30.8	LOS D	1.9	13.6	0.92	1.05	1.26	20.1
Approach		723	19	761	2.7	0.501	4.1	LOS NA	1.9	13.6	0.12	0.14	0.17	52.2
NorthEast: Burroughs Road (N)														
24	L2	138	2	146	1.2	0.243	10.8	LOS B	0.8	5.3	0.56	1.02	0.62	29.7
26	R2	20	0	21	0.0	0.210	44.5	LOS E	0.6	4.4	0.93	1.02	0.98	28.9
Approach		159	2	167	1.0	0.243	15.1	LOS C	0.8	5.3	0.61	1.02	0.66	29.5
NorthWest: Karrinyup Road (W)														
27	L2	120	2	127	1.3	0.083	6.8	LOS A	0.2	1.6	0.13	0.57	0.13	49.3
28	T1	1337	12	1408	0.9	0.363	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.1
Approach		1458	13	1534	0.9	0.363	1.6	LOS A	0.2	1.6	0.01	0.21	0.01	64.8
All Vehicles		2339	34	2462	1.5	0.501	3.3	LOS NA	1.9	13.6	0.09	0.24	0.10	57.7

2024 Base PM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2024 Base PM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1348	6	1419	0.5	0.365	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
23	R2	150	2	158	1.1	0.219	9.4	LOS A	0.9	6.2	0.59	0.78	0.59	32.4
Approach		1498	8	1577	0.5	0.365	1.0	LOS NA	0.9	6.2	0.06	0.08	0.06	57.1
NorthEast: Burroughs Road (N)														
24	L2	288	0	303	0.0	0.326	8.2	LOS A	1.2	8.1	0.37	0.94	0.39	31.5
26	R2	201	0	212	0.0	0.532	21.6	LOS C	2.8	19.7	0.80	1.18	1.26	39.2
Approach		489	0	515	0.0	0.532	13.7	LOS B	2.8	19.7	0.55	1.04	0.75	35.9
NorthWest: Karrinyup Road (W)														
27	L2	104	0	110	0.0	0.073	6.8	LOS A	0.2	1.4	0.17	0.57	0.17	49.1
28	T1	606	2	638	0.4	0.164	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.3
Approach		710	2	748	0.3	0.164	1.9	LOS A	0.2	1.4	0.03	0.24	0.03	63.3
All Vehicles		2698	10	2840	0.4	0.532	3.5	LOS NA	2.8	19.7	0.14	0.29	0.17	53.8

2024 Base Sat

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2024 Base Sat
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1674	6	881	0.4	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	210	1	111	0.4	0.252	13.9	LOS B	1.0	6.9	0.75	0.91	0.84	28.7
Approach		1884	7	992	0.4	0.252	1.6	LOS NA	1.0	6.9	0.08	0.10	0.09	56.1
NorthEast: Burroughs Road (N)														
24	L2	330	2	174	0.6	0.225	9.0	LOS A	0.7	4.7	0.44	0.98	0.44	30.9
26	R2	539	0	284	0.0	1.336	344.7	LOS F	49.9	349.3	1.00	4.94	12.26	6.7
Approach		870	2	458	0.2	1.336	217.2	LOS F	49.9	349.3	0.79	3.43	7.77	8.0
NorthWest: Karrinyup Road (W)														
27	L2	415	0	219	0.0	0.142	6.8	LOS A	0.4	2.9	0.15	0.57	0.15	49.2
28	T1	1902	0	1001	0.0	0.257	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.2
Approach		2318	0	1220	0.0	0.257	2.1	LOS A	0.4	2.9	0.03	0.25	0.03	62.5
All Vehicles		5071	9	2669	0.2	1.336	38.8	LOS NA	49.9	349.3	0.18	0.74	1.38	29.0

2034 Do Minimum AM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Do Minimum AM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	605	25	637	4.2	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	87	2	91	2.3	0.571	39.6	LOS E	2.1	15.1	0.95	1.07	1.35	17.4
Approach		692	27	729	3.9	0.571	5.0	LOS NA	2.1	15.1	0.12	0.13	0.17	51.2
NorthEast: Burroughs Road (N)														
24	L2	155	8	163	5.4	0.310	12.4	LOS B	1.0	7.5	0.63	1.06	0.76	28.6
26	R2	36	0	38	0.0	0.474	67.5	LOS F	1.5	10.5	0.96	1.07	1.18	23.0
Approach		190	8	200	4.4	0.474	22.7	LOS C	1.5	10.5	0.69	1.06	0.84	26.3
NorthWest: Karrinyup Road (W)														
27	L2	130	0	137	0.0	0.088	6.7	LOS A	0.2	1.7	0.12	0.57	0.12	49.3
28	T1	1442	16	1518	1.1	0.392	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.1
Approach		1572	16	1655	1.0	0.392	1.6	LOS A	0.2	1.7	0.01	0.21	0.01	64.8
All Vehicles		2455	51	2584	2.1	0.571	4.2	LOS NA	2.1	15.1	0.09	0.26	0.12	56.5

2034 Do Minimum PM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Do Minimum PM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1351	12	1423	0.9	0.367	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
23	R2	126	8	132	6.5	0.250	12.0	LOS B	1.0	7.4	0.68	0.87	0.74	30.1
Approach		1477	20	1555	1.4	0.367	1.0	LOS NA	1.0	7.4	0.06	0.07	0.06	57.2
NorthEast: Burroughs Road (N)														
24	L2	278	6	293	2.2	0.348	9.0	LOS A	1.3	9.4	0.43	0.99	0.50	30.9
26	R2	214	0	225	0.0	0.707	30.1	LOS D	4.2	29.6	0.90	1.32	1.75	34.9
Approach		492	6	518	1.3	0.707	18.2	LOS C	4.2	29.6	0.64	1.13	1.05	33.4
NorthWest: Karrinyup Road (W)														
27	L2	77	0	81	0.0	0.053	6.8	LOS A	0.1	1.0	0.15	0.57	0.15	49.2
28	T1	774	0	815	0.0	0.209	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.3
Approach		851	0	895	0.0	0.209	1.6	LOS A	0.1	1.0	0.01	0.22	0.01	64.7
All Vehicles		2819	26	2968	0.9	0.707	4.2	LOS NA	4.2	29.6	0.15	0.30	0.22	53.5

2034 Do Minimum Sat

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Do Minimum Sat
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1699	12	894	0.7	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	240	2	126	0.9	0.371	18.5	LOS C	1.5	10.7	0.83	0.99	1.06	25.7
Approach		1939	14	1020	0.7	0.371	2.3	LOS NA	1.5	10.7	0.10	0.12	0.13	54.9
NorthEast: Burroughs Road (N)														
24	L2	341	3	179	0.9	0.253	9.7	LOS A	0.8	5.7	0.48	1.02	0.52	30.4
26	R2	532	0	280	0.0	1.776	741.0	LOS F	80.2	561.2	1.00	6.07	16.09	3.3
Approach		873	3	459	0.3	1.776	455.4	LOS F	80.2	561.2	0.80	4.10	10.01	4.1
NorthWest: Karrinyup Road (W)														
27	L2	376	0	198	0.0	0.130	6.8	LOS A	0.4	2.6	0.16	0.57	0.16	49.2
28	T1	2194	0	1155	0.0	0.296	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.2
Approach		2569	0	1352	0.0	0.296	1.9	LOS A	0.4	2.6	0.02	0.24	0.02	63.3
All Vehicles		5381	17	2832	0.3	1.776	75.6	LOS NA	80.2	561.2	0.18	0.82	1.68	19.3

2034 Option AM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Option AM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	634	26	667	4.2	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	111	3	117	2.7	0.819	60.5	LOS F	3.7	26.6	0.98	1.22	1.92	13.2
Approach		744	29	784	3.9	0.819	9.0	LOS NA	3.7	26.6	0.15	0.18	0.29	46.2
NorthEast: Burroughs Road (N)														
24	L2	91	3	95	2.9	0.182	11.5	LOS B	0.5	3.7	0.60	1.00	0.60	29.2
26	R2	35	0	36	0.0	0.478	70.2	LOS F	1.5	10.6	0.96	1.07	1.18	22.5
Approach		125	3	132	2.1	0.478	27.7	LOS D	1.5	10.6	0.70	1.02	0.76	25.6
NorthWest: Karrinyup Road (W)														
27	L2	40	0	42	0.0	0.027	6.7	LOS A	0.1	0.5	0.14	0.56	0.14	49.3
28	T1	1487	14	1565	0.9	0.404	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.1
Approach		1527	14	1607	0.9	0.404	1.3	LOS A	0.1	0.5	0.00	0.19	0.00	66.3
All Vehicles		2396	46	2522	1.9	0.819	5.1	LOS NA	3.7	26.6	0.08	0.23	0.13	55.7

2034 Option PM

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Option PM
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1376	12	1449	0.9	0.374	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
23	R2	136	9	143	6.5	0.253	11.5	LOS B	1.0	7.6	0.65	0.86	0.72	30.6
Approach		1512	21	1592	1.4	0.374	1.1	LOS NA	1.0	7.6	0.06	0.08	0.06	57.1
NorthEast: Burroughs Road (N)														
24	L2	283	3	297	1.0	0.343	8.8	LOS A	1.3	9.1	0.42	0.98	0.47	31.1
26	R2	220	0	232	0.0	0.713	30.0	LOS D	4.4	30.5	0.90	1.33	1.78	35.0
Approach		503	3	529	0.6	0.713	18.1	LOS C	4.4	30.5	0.63	1.13	1.04	33.5
NorthWest: Karrinyup Road (W)														
27	L2	118	0	124	0.0	0.082	6.8	LOS A	0.2	1.6	0.16	0.57	0.16	49.1
28	T1	733	0	772	0.0	0.198	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.3
Approach		851	0	895	0.0	0.198	1.9	LOS A	0.2	1.6	0.02	0.24	0.02	63.5
All Vehicles		2865	24	3016	0.8	0.713	4.3	LOS NA	4.4	30.5	0.15	0.31	0.22	53.2

2034 Option Sat

Project Name: Int_2_Karrinyup Road_Burroughs Road
Site Name: 2034 Option Sat
Site Title: Karrinyup Road / Burroughs Road

Folder Name: General
Site Type: Two-Way Stop

Vehicle Movement Performance

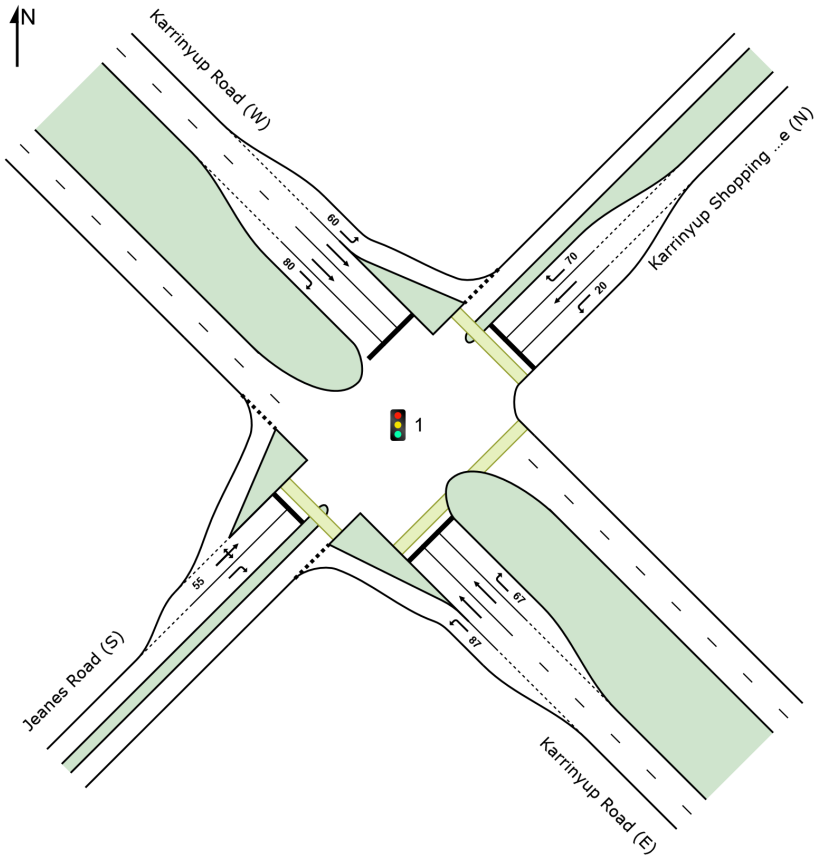
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
22	T1	1725	12	908	0.7	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	283	2	149	0.6	0.421	18.8	LOS C	1.8	12.8	0.84	1.01	1.13	25.6
Approach		2007	14	1056	0.7	0.421	2.7	LOS NA	1.8	12.8	0.12	0.14	0.16	54.1
NorthEast: Burroughs Road (N)														
24	L2	362	3	190	0.7	0.266	9.7	LOS A	0.9	6.1	0.48	1.02	0.53	30.4
26	R2	529	0	279	0.0	1.781	745.0	LOS F	80.0	560.1	1.00	6.06	16.05	3.3
Approach		891	3	469	0.3	1.781	446.5	LOS F	80.0	560.1	0.79	4.01	9.75	4.1
NorthWest: Karrinyup Road (W)														
27	L2	395	0	208	0.0	0.138	6.8	LOS A	0.4	2.8	0.17	0.58	0.17	49.1
28	T1	2158	0	1136	0.0	0.291	1.1	LOS A	0.0	0.0	0.00	0.18	0.00	67.2
Approach		2552	0	1343	0.0	0.291	2.0	LOS A	0.4	2.8	0.03	0.24	0.03	63.0
All Vehicles		5451	16	2869	0.3	1.781	74.9	LOS NA	80.0	560.1	0.18	0.82	1.67	19.4

SITE LAYOUT

Site: 1 [2024 Base AM (Site Folder: General)]

Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



1 Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

2024 Base AM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2024 Base AM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	232	3	244	1.3	0.201	12.3	LOS B	4.9	34.5	0.42	0.67	0.42	45.3
22	T1	505	17	532	3.4	0.425	32.7	LOS C	11.7	84.4	0.83	0.71	0.83	39.1
23	R2	62	0	65	0.0	0.156	48.3	LOS D	3.0	20.7	0.84	0.77	0.84	18.5
Approach		799	20	841	2.5	0.425	28.0	LOS C	11.7	84.4	0.71	0.70	0.71	37.4
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	25	0	27	0.0	0.044	28.2	LOS C	1.0	7.1	0.71	0.53	0.71	19.7
25	T1	12	0	13	0.0	0.153	61.3	LOS E	0.7	5.2	0.99	0.67	0.99	16.7
26	R2	10	0	11	0.0	0.137	61.4	LOS E	0.6	4.5	0.99	0.67	0.99	16.7
Approach		48	0	51	0.0	0.153	43.8	LOS D	1.0	7.1	0.84	0.59	0.84	18.2
NorthWest: Karrinyup Road (W)														
27	L2	63	0	66	0.0	0.046	25.4	LOS C	0.4	2.5	0.16	0.59	0.16	48.9
28	T1	998	12	1051	1.2	0.936	72.8	LOS E	36.5	257.9	1.00	1.09	1.22	29.1
29	R2	405	2	427	0.4	1.115	131.4	LOS F	34.8	244.4	1.00	1.23	1.63	19.2
Approach		1467	13	1544	0.9	1.115	87.0	LOS F	36.5	257.9	0.96	1.11	1.29	23.8
SouthWest: Jeanes Road (S)														
30	L2	203	2	213	1.0	0.578	5.6	LOS A	11.8	82.8	0.75	0.80	0.75	41.8
31	T1	46	0	49	0.0	0.578	37.2	LOS D	11.8	82.8	0.75	0.80	0.75	15.7
32	R2	339	2	357	0.5	0.578	40.6	LOS D	11.8	82.8	0.86	0.80	0.86	35.1
Approach		588	4	619	0.6	0.578	28.3	LOS C	11.8	82.8	0.81	0.80	0.81	33.7
All Vehicles		2902	37	3055	1.3	1.115	58.1	LOS E	36.5	257.9	0.86	0.93	1.03	28.1

2024 Base PM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2024 Base PM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	130	0	137	0.2	0.110	16.0	LOS B	1.9	13.0	0.37	0.65	0.37	46.7
22	T1	1086	7	1144	0.6	1.042	87.2	LOS F	38.1	268.0	1.00	1.32	1.53	26.3
23	R2	114	0	120	0.0	0.508	63.6	LOS E	5.4	37.6	0.98	0.79	0.98	18.2
Approach		1331	7	1401	0.5	1.042	78.2	LOS E	38.1	268.0	0.94	1.21	1.37	24.8
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	67	0	71	0.0	0.112	30.8	LOS C	2.2	15.5	0.72	0.56	0.72	20.3
25	T1	141	0	149	0.0	0.619	51.0	LOS D	6.7	46.9	0.99	0.82	1.02	18.2
26	R2	122	0	129	0.0	0.502	41.9	LOS D	5.7	39.8	0.97	0.77	0.97	18.3
Approach		331	0	348	0.0	0.619	43.5	LOS D	6.7	46.9	0.93	0.75	0.94	18.2
NorthWest: Karrinyup Road (W)														
27	L2	100	0	105	0.0	0.075	9.5	LOS A	0.7	4.9	0.23	0.74	0.23	22.9
28	T1	610	3	642	0.4	0.554	30.1	LOS C	12.5	87.7	0.89	0.76	0.89	40.2
29	R2	191	0	201	0.0	0.849	56.5	LOS E	10.2	71.7	1.00	0.97	1.25	29.5
Approach		901	3	948	0.3	0.849	33.5	LOS C	12.5	87.7	0.84	0.80	0.90	34.6
SouthWest: Jeanes Road (S)														
30	L2	291	1	306	0.3	0.597	12.9	LOS B	14.9	104.4	0.78	0.81	0.78	40.8
31	T1	91	0	96	0.0	0.597	37.0	LOS D	14.9	104.4	0.78	0.81	0.78	20.7
32	R2	238	1	251	0.3	0.597	41.9	LOS D	14.9	104.4	0.91	0.81	0.91	34.7
Approach		620	2	652	0.3	0.597	27.6	LOS C	14.9	104.4	0.83	0.81	0.83	33.4
All Vehicles		3182	11	3350	0.4	1.042	52.1	LOS D	38.1	268.0	0.89	0.97	1.09	27.3

2024 Base Sat

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2024 Base Sat
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	288	2	151	0.6	0.119	9.5	LOS A	2.1	14.6	0.35	0.64	0.35	46.9
22	T1	1294	7	681	0.5	0.542	30.5	LOS C	13.9	98.0	0.87	0.75	0.87	40.0
23	R2	266	0	140	0.0	0.512	53.9	LOS D	6.6	46.4	0.97	0.80	0.97	18.0
Approach		1848	8	972	0.5	0.542	30.6	LOS C	13.9	98.0	0.81	0.74	0.81	34.7
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	530	0	279	0.0	0.538	42.2	LOS D	11.1	77.7	0.85	0.72	0.85	19.7
25	T1	269	0	142	0.0	0.817	67.2	LOS E	7.7	53.6	1.00	1.04	1.29	16.9
26	R2	287	0	151	0.0	0.592	46.1	LOS D	7.3	51.2	0.99	0.80	0.99	17.9
Approach		1086	0	572	0.0	0.817	49.4	LOS D	11.1	77.7	0.92	0.82	0.99	17.6
NorthWest: Karrinyup Road (W)														
27	L2	358	0	188	0.0	0.134	14.1	LOS B	1.4	10.1	0.23	0.75	0.23	22.9
28	T1	1633	1	859	0.1	0.707	35.0	LOS C	19.6	137.1	0.94	0.82	0.94	39.0
29	R2	231	1	122	0.4	0.447	49.7	LOS D	5.7	40.1	0.96	0.79	0.96	31.2
Approach		2222	2	1169	0.1	0.707	33.1	LOS C	19.6	137.1	0.83	0.80	0.83	33.5
SouthWest: Jeanes Road (S)														
30	L2	303	0	160	0.1	0.435	5.9	LOS A	7.6	54.2	0.59	0.75	0.59	44.4
31	T1	153	0	80	0.0	0.435	21.3	LOS C	7.6	54.2	0.59	0.75	0.59	21.6
32	R2	431	25	227	5.7	0.435	30.5	LOS C	7.6	54.2	0.74	0.76	0.74	37.5
Approach		887	25	467	2.8	0.435	20.5	LOS C	7.6	54.2	0.67	0.75	0.67	35.0
All Vehicles		6043	35	3180	0.6	0.817	33.5	LOS C	19.6	137.1	0.81	0.78	0.83	29.2

1 Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

2034 Do Minimum AM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Do Minimum AM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	230	2	243	0.8	0.200	12.6	LOS B	4.9	34.7	0.42	0.67	0.42	45.2
22	T1	497	27	523	5.5	0.424	32.7	LOS C	11.5	84.5	0.83	0.70	0.83	39.1
23	R2	57	0	60	0.0	0.145	48.2	LOS D	2.7	19.2	0.84	0.77	0.84	18.5
Approach		785	29	826	3.7	0.424	27.9	LOS C	11.5	84.5	0.71	0.70	0.71	37.5
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	16	0	17	0.0	0.027	28.0	LOS C	0.6	4.4	0.70	0.51	0.70	19.8
25	T1	17	0	18	0.0	0.218	61.8	LOS E	1.1	7.5	1.00	0.69	1.00	16.3
26	R2	15	0	15	0.0	0.192	61.8	LOS E	0.9	6.3	0.99	0.68	0.99	16.7
Approach		48	0	50	0.0	0.218	50.6	LOS D	1.1	7.5	0.90	0.63	0.90	17.4
NorthWest: Karrinyup Road (W)														
27	L2	17	0	18	0.0	0.012	33.3	LOS C	0.1	0.6	0.14	0.72	0.14	23.0
28	T1	1169	17	1231	1.4	1.089	121.2	LOS F	53.8	381.1	1.00	1.37	1.53	22.5
29	R2	403	7	425	1.6	1.125	140.1	LOS F	35.0	248.4	1.00	1.24	1.65	18.8
Approach		1589	23	1673	1.5	1.125	125.1	LOS F	53.8	381.1	0.99	1.33	1.55	19.4
SouthWest: Jeanes Road (S)														
30	L2	176	0	185	0.0	0.600	6.2	LOS A	12.2	86.0	0.84	0.80	0.84	39.5
31	T1	24	0	25	0.0	0.600	44.7	LOS D	12.2	86.0	0.84	0.80	0.84	20.4
32	R2	327	4	344	1.3	0.600	47.3	LOS D	12.2	86.0	0.91	0.81	0.91	33.8
Approach		527	4	555	0.8	0.600	33.4	LOS C	12.2	86.0	0.89	0.81	0.89	34.5
All Vehicles		2949	56	3104	1.9	1.125	81.7	LOS F	53.8	381.1	0.90	1.06	1.20	24.4

2034 Do Minimum PM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Do Minimum PM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	125	4	132	2.9	0.111	15.5	LOS B	1.9	13.9	0.40	0.65	0.40	46.3
22	T1	1056	20	1111	1.9	1.009	76.3	LOS E	35.2	250.6	1.00	1.26	1.44	28.3
23	R2	68	0	72	0.0	0.304	62.0	LOS E	3.1	21.8	0.95	0.77	0.95	18.3
Approach		1249	24	1315	1.9	1.009	69.5	LOS E	35.2	250.6	0.94	1.17	1.31	26.9
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	58	0	61	0.0	0.097	37.4	LOS D	1.9	13.3	0.71	0.55	0.71	20.4
25	T1	176	0	185	0.0	0.782	61.7	LOS E	8.9	62.6	1.00	0.96	1.17	17.4
26	R2	124	0	130	0.0	0.507	42.0	LOS D	5.8	40.3	0.97	0.78	0.97	18.3
Approach		358	0	376	0.0	0.782	50.9	LOS D	8.9	62.6	0.94	0.83	1.03	17.3
NorthWest: Karrinyup Road (W)														
27	L2	129	0	136	0.0	0.093	10.4	LOS B	0.7	5.0	0.19	0.74	0.19	23.0
28	T1	744	6	784	0.8	0.684	32.3	LOS C	16.2	113.9	0.94	0.81	0.94	39.5
29	R2	184	0	193	0.1	0.816	54.7	LOS D	9.6	67.3	1.00	0.94	1.21	29.9
Approach		1057	6	1113	0.6	0.816	33.5	LOS C	16.2	113.9	0.86	0.83	0.90	34.3
SouthWest: Jeanes Road (S)														
30	L2	299	0	315	0.0	0.555	12.2	LOS B	13.6	95.2	0.76	0.80	0.76	41.0
31	T1	87	0	91	0.0	0.555	37.2	LOS D	13.6	95.2	0.76	0.80	0.76	20.8
32	R2	196	2	207	1.0	0.555	42.2	LOS D	13.6	95.2	0.91	0.80	0.91	34.2
Approach		582	2	613	0.3	0.555	26.1	LOS C	13.6	95.2	0.81	0.80	0.81	33.8
All Vehicles		3246	32	3417	1.0	1.009	47.9	LOS D	35.2	250.6	0.89	0.95	1.05	28.2

2034 Do Minimum Sat

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Do Minimum Sat
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	389	7	205	1.8	0.163	9.7	LOS A	2.9	20.7	0.36	0.65	0.36	46.8
22	T1	1377	14	725	1.0	0.578	31.0	LOS C	15.1	106.3	0.89	0.77	0.89	39.8
23	R2	240	0	127	0.0	0.463	53.5	LOS D	5.9	41.6	0.96	0.80	0.96	18.1
Approach		2006	21	1056	1.0	0.578	29.6	LOS C	15.1	106.3	0.79	0.75	0.79	35.7
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	577	0	304	0.0	0.583	44.3	LOS D	12.3	86.3	0.87	0.74	0.87	19.7
25	T1	265	0	139	0.0	0.820	69.0	LOS E	7.6	52.9	1.00	1.05	1.30	16.9
26	R2	279	0	147	0.0	0.576	46.0	LOS D	7.1	49.7	0.98	0.79	0.98	18.0
Approach		1121	0	590	0.0	0.820	50.6	LOS D	12.3	86.3	0.93	0.83	1.00	17.5
NorthWest: Karrinyup Road (W)														
27	L2	323	0	170	0.0	0.119	20.1	LOS C	1.2	8.3	0.22	0.74	0.22	22.9
28	T1	1949	3	1026	0.1	0.882	54.1	LOS D	29.2	204.7	1.00	1.04	1.20	34.3
29	R2	240	0	126	0.1	0.462	55.9	LOS E	5.9	41.5	0.96	0.79	0.96	31.1
Approach		2512	3	1322	0.1	0.882	49.9	LOS D	29.2	204.7	0.90	0.98	1.05	29.8
SouthWest: Jeanes Road (S)														
30	L2	283	0	149	0.1	0.304	6.0	LOS A	5.5	38.9	0.48	0.71	0.48	44.9
31	T1	105	0	55	0.0	0.304	21.3	LOS C	5.5	38.9	0.48	0.71	0.48	21.8
32	R2	277	20	146	7.4	0.304	31.2	LOS C	5.5	38.9	0.69	0.72	0.69	37.4
Approach		665	21	350	3.1	0.304	18.9	LOS B	5.5	38.9	0.57	0.71	0.57	35.9
All Vehicles		6305	45	3318	0.7	0.882	40.3	LOS D	29.2	204.7	0.83	0.85	0.91	28.2

1 Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

2034 Option AM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Option AM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	270	8	284	2.9	0.229	11.0	LOS B	5.2	37.2	0.39	0.66	0.39	46.0
22	T1	500	29	527	5.8	0.428	32.7	LOS C	11.6	85.5	0.83	0.71	0.83	39.1
23	R2	94	0	99	0.0	0.237	49.2	LOS D	4.6	32.2	0.86	0.79	0.86	18.4
Approach		864	37	909	4.3	0.428	27.8	LOS C	11.6	85.5	0.70	0.70	0.70	36.3
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	4	0	4	0.0	0.007	27.6	LOS C	0.1	1.0	0.69	0.46	0.69	19.8
25	T1	31	0	32	0.0	0.386	62.7	LOS E	1.9	13.5	1.00	0.72	1.00	16.2
26	R2	18	0	19	0.0	0.231	62.1	LOS E	1.1	7.6	1.00	0.69	1.00	16.7
Approach		52	0	55	0.0	0.386	59.9	LOS E	1.9	13.5	0.98	0.69	0.98	16.6
NorthWest: Karrinyup Road (W)														
27	L2	18	0	19	0.0	0.013	34.2	LOS C	0.1	0.8	0.17	0.72	0.17	22.9
28	T1	1220	15	1284	1.3	1.117	132.6	LOS F	56.7	401.1	1.00	1.42	1.59	21.2
29	R2	329	1	347	0.3	0.834	72.7	LOS E	20.4	143.1	1.00	0.93	1.13	29.2
Approach		1566	16	1649	1.0	1.117	118.9	LOS F	56.7	401.1	0.99	1.31	1.48	20.1
SouthWest: Jeanes Road (S)														
30	L2	220	0	232	0.2	0.610	5.6	LOS A	12.1	85.1	0.74	0.79	0.74	42.6
31	T1	58	0	61	0.0	0.610	30.1	LOS C	12.1	85.1	0.74	0.79	0.74	21.2
32	R2	361	7	380	2.0	0.610	39.2	LOS D	12.1	85.1	0.86	0.80	0.86	35.4
Approach		639	8	672	1.2	0.610	26.8	LOS C	12.1	85.1	0.81	0.80	0.81	35.3
All Vehicles		3121	61	3286	1.9	1.117	73.8	LOS E	56.7	401.1	0.87	1.03	1.12	25.4

2034 Option PM

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Option PM
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	199	3	210	1.7	0.158	16.0	LOS B	2.8	19.8	0.34	0.64	0.34	47.1
22	T1	1076	21	1133	1.9	1.003	78.3	LOS E	37.6	267.3	1.00	1.25	1.40	28.3
23	R2	137	0	144	0.0	0.860	79.2	LOS E	7.9	55.2	1.00	0.92	1.30	17.0
Approach		1412	24	1487	1.7	1.003	69.6	LOS E	37.6	267.3	0.91	1.13	1.24	26.1
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	45	0	47	0.0	0.110	39.5	LOS D	1.8	12.7	0.82	0.62	0.82	19.3
25	T1	115	0	121	0.0	0.953	74.1	LOS E	7.2	50.6	1.00	1.20	1.49	15.9
26	R2	114	0	120	0.0	0.921	63.4	LOS E	6.9	48.5	1.00	1.24	1.43	16.6
Approach		273	0	288	0.0	0.953	64.0	LOS E	7.2	50.6	0.97	1.12	1.36	16.4
NorthWest: Karrinyup Road (W)														
27	L2	137	0	144	0.0	0.105	10.5	LOS B	1.1	7.5	0.23	0.74	0.23	22.9
28	T1	720	2	758	0.3	0.613	31.5	LOS C	15.8	111.1	0.90	0.78	0.90	39.8
29	R2	164	0	173	0.2	1.035	92.2	LOS F	11.5	80.6	1.00	1.12	1.62	22.9
Approach		1021	3	1075	0.3	1.035	38.5	LOS D	15.8	111.1	0.83	0.83	0.93	32.5
SouthWest: Jeanes Road (S)														
30	L2	321	0	338	0.0	0.490	15.6	LOS B	13.2	92.4	0.72	0.77	0.72	40.7
31	T1	53	0	56	0.0	0.490	38.7	LOS D	13.2	92.4	0.72	0.77	0.72	20.7
32	R2	252	2	265	0.9	0.490	39.0	LOS D	13.2	92.4	0.88	0.80	0.88	34.8
Approach		626	2	659	0.4	0.490	26.9	LOS C	13.2	92.4	0.79	0.78	0.79	35.4
All Vehicles		3333	29	3508	0.9	1.035	51.6	LOS D	37.6	267.3	0.87	0.97	1.07	27.8

2034 Option Sat

Project Name: Int_1_Karrinyup Road_Jeanes Road
Site Name: 2034 Option Sat
Site Title: Karrinyup Road / Jeanes Road / Shopping Centre Access Way 1

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

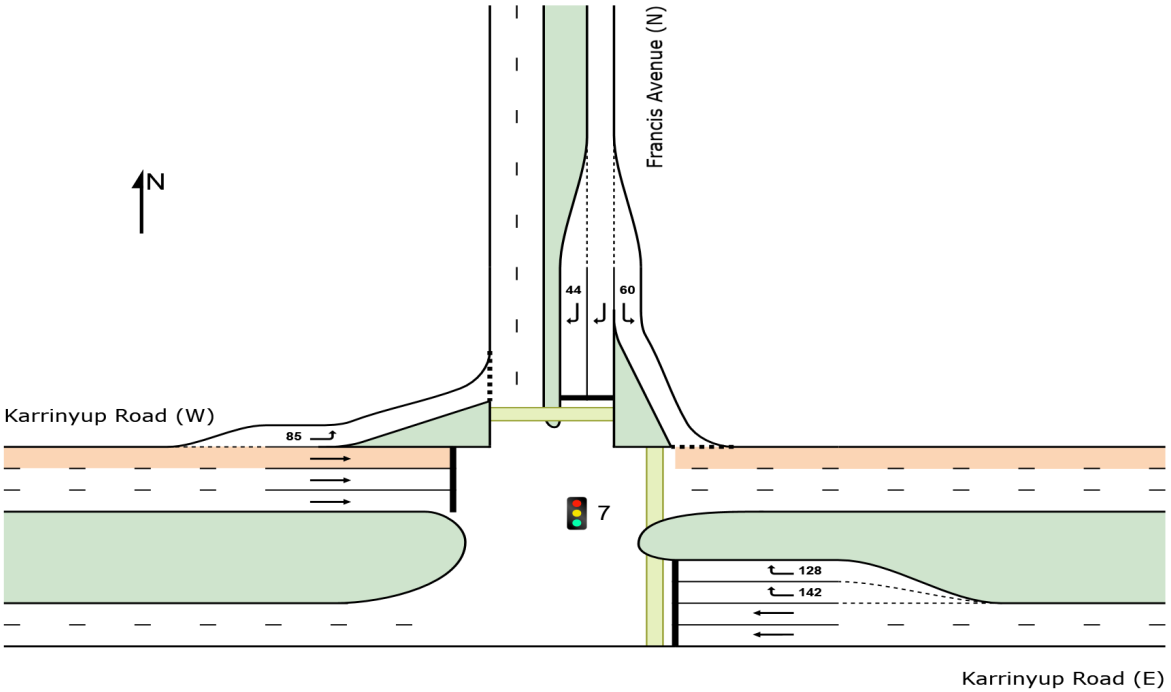
Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Karrinyup Road (E)														
21	L2	386	7	203	1.8	0.156	8.8	LOS A	2.5	18.0	0.33	0.64	0.33	47.3
22	T1	1430	14	753	1.0	0.600	31.3	LOS C	15.8	111.4	0.90	0.77	0.90	39.7
23	R2	248	0	131	0.0	0.478	53.6	LOS D	6.2	43.1	0.96	0.80	0.96	18.0
Approach		2064	20	1086	1.0	0.600	29.8	LOS C	15.8	111.4	0.80	0.75	0.80	35.6
NorthEast: Karrinyup Shopping Centre Entrance (N)														
24	L2	191	0	101	0.0	0.154	31.3	LOS C	3.4	23.9	0.72	0.58	0.72	20.2
25	T1	251	0	132	0.0	0.581	53.0	LOS D	6.4	44.5	0.98	0.79	0.98	17.5
26	R2	266	0	140	0.0	0.550	45.8	LOS D	6.7	47.2	0.98	0.79	0.98	18.0
Approach		708	0	373	0.0	0.581	44.4	LOS D	6.7	47.2	0.91	0.73	0.91	17.9
NorthWest: Karrinyup Road (W)														
27	L2	468	0	246	0.0	0.173	16.6	LOS B	1.8	12.7	0.23	0.75	0.23	22.9
28	T1	1781	2	937	0.1	0.806	42.9	LOS D	24.1	168.6	0.98	0.92	1.07	37.1
29	R2	251	0	132	0.2	0.485	53.2	LOS D	6.2	43.7	0.96	0.79	0.96	31.1
Approach		2499	3	1315	0.1	0.806	39.0	LOS D	24.1	168.6	0.84	0.88	0.90	31.2
SouthWest: Jeanes Road (S)														
30	L2	314	0	165	0.1	0.335	6.1	LOS A	6.2	43.9	0.50	0.71	0.50	44.8
31	T1	114	0	60	0.0	0.335	21.7	LOS C	6.2	43.9	0.50	0.71	0.50	21.7
32	R2	303	22	159	7.4	0.335	31.7	LOS C	6.2	43.9	0.70	0.73	0.70	37.3
Approach		731	23	385	3.1	0.335	19.1	LOS B	6.2	43.9	0.58	0.72	0.58	35.9
All Vehicles		6003	46	3159	0.8	0.806	34.0	LOS C	24.1	168.6	0.80	0.80	0.83	30.3

SITE LAYOUT

Site: 7 [2024 Base AM (Site Folder: General)]

Karrinyup Road / Francis Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



2024 Base AM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2024 Base AM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	716	17	753	2.4	0.266	4.0	LOS A	5.2	36.9	0.35	0.31	0.35	56.4
6	R2	319	0	336	0.0	0.569	43.8	LOS D	6.9	48.5	0.97	0.80	0.97	30.6
Approach		1035	17	1089	1.7	0.569	16.3	LOS B	6.9	48.5	0.54	0.46	0.54	44.7
North: Francis Avenue (N)														
7	L2	210	7	221	3.5	0.262	9.4	LOS A	4.2	30.6	0.52	0.64	0.52	41.4
9	R2	146	1	154	0.5	0.366	43.4	LOS D	3.2	22.5	0.97	0.75	0.97	30.2
Approach		356	8	375	2.3	0.366	23.4	LOS C	4.2	30.6	0.71	0.69	0.71	35.9
West: Karrinyup Road (W)														
10	L2	128	1	135	0.5	0.096	7.3	LOS A	1.1	7.5	0.27	0.62	0.27	43.6
11	T1	1107	17	1165	1.5	0.603	16.9	LOS B	17.8	126.3	0.77	0.69	0.77	47.0
Approach		1235	17	1300	1.4	0.603	15.9	LOS B	17.8	126.3	0.72	0.68	0.72	46.7
All Vehicles		2626	43	2764	1.6	0.603	17.1	LOS B	17.8	126.3	0.65	0.59	0.65	44.1

2024 Base PM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2024 Base PM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1242	8	1307	0.6	0.472	6.2	LOS A	12.8	89.9	0.47	0.42	0.47	54.5
6	R2	588	2	619	0.3	0.628	38.8	LOS D	12.7	89.1	0.94	0.83	0.94	31.9
Approach		1830	9	1926	0.5	0.628	16.7	LOS B	12.8	89.9	0.62	0.55	0.62	44.3
North: Francis Avenue (N)														
7	L2	460	1	484	0.3	0.429	9.0	LOS A	10.4	72.8	0.56	0.67	0.56	41.6
9	R2	202	0	212	0.1	0.384	42.8	LOS D	4.5	31.8	0.95	0.76	0.95	30.4
Approach		662	1	697	0.2	0.429	19.3	LOS B	10.4	72.8	0.68	0.70	0.68	37.4
West: Karrinyup Road (W)														
10	L2	195	0	205	0.1	0.163	8.8	LOS A	2.5	17.8	0.35	0.65	0.35	42.8
11	T1	756	7	796	1.0	0.546	25.0	LOS C	14.3	100.7	0.84	0.73	0.84	42.6
Approach		951	7	1001	0.8	0.546	21.7	LOS C	14.3	100.7	0.74	0.71	0.74	42.6
All Vehicles		3442	18	3624	0.5	0.628	18.6	LOS B	14.3	100.7	0.66	0.63	0.66	42.3

2024 Base Sat

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2024 Base Sat
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2267	10	1193	0.4	0.455	7.0	LOS A	11.6	81.6	0.51	0.45	0.51	53.9
6	R2	1526	0	803	0.0	0.775	39.6	LOS D	16.7	116.9	0.98	0.90	1.08	31.7
Approach		3793	10	1997	0.3	0.775	20.1	LOS C	16.7	116.9	0.70	0.64	0.74	42.0
North: Francis Avenue (N)														
7	L2	1432	15	753	1.0	0.687	18.2	LOS B	16.5	116.3	0.73	0.89	0.73	38.8
9	R2	328	2	172	0.5	0.267	38.0	LOS D	3.2	22.6	0.91	0.74	0.91	31.9
Approach		1759	17	926	1.0	0.687	21.9	LOS C	16.5	116.3	0.76	0.86	0.76	36.4
West: Karrinyup Road (W)														
10	L2	592	1	311	0.2	0.266	10.9	LOS B	4.9	34.7	0.47	0.68	0.47	41.8
11	T1	1964	28	1034	1.4	0.849	36.6	LOS D	23.1	163.4	1.00	1.00	1.17	37.6
Approach		2556	29	1345	1.1	0.849	30.6	LOS C	23.1	163.4	0.88	0.93	1.01	38.5
All Vehicles		8108	56	4267	0.7	0.849	23.8	LOS C	23.1	163.4	0.77	0.78	0.83	39.5

2034 Do Minimum AM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Do Minimum AM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	790	27	831	3.4	0.295	4.1	LOS A	5.9	42.3	0.36	0.32	0.36	56.3
6	R2	320	0	337	0.0	0.570	43.8	LOS D	6.9	48.6	0.97	0.80	0.97	30.6
Approach		1110	27	1168	2.4	0.570	15.5	LOS B	6.9	48.6	0.54	0.46	0.54	45.2
North: Francis Avenue (N)														
7	L2	311	2	327	0.5	0.389	13.0	LOS B	8.9	62.3	0.71	0.74	0.71	39.8
9	R2	124	2	131	1.4	0.313	43.1	LOS D	2.7	19.1	0.96	0.74	0.96	30.3
Approach		435	3	458	0.8	0.389	21.6	LOS C	8.9	62.3	0.78	0.74	0.78	36.5
West: Karrinyup Road (W)														
10	L2	129	0	136	0.2	0.096	7.3	LOS A	1.1	7.6	0.27	0.62	0.27	43.6
11	T1	1194	23	1257	1.9	0.652	17.5	LOS B	19.9	141.8	0.80	0.72	0.80	46.7
Approach		1323	23	1393	1.7	0.652	16.5	LOS B	19.9	141.8	0.75	0.71	0.75	46.3
All Vehicles		2868	53	3019	1.8	0.652	16.9	LOS B	19.9	141.8	0.67	0.61	0.67	44.1

2034 Do Minimum PM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Do Minimum PM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1233	16	1298	1.3	0.471	6.2	LOS A	12.7	89.7	0.47	0.42	0.47	54.5
6	R2	676	0	711	0.0	0.720	40.8	LOS D	15.4	107.5	0.97	0.86	1.00	31.3
Approach		1909	16	2009	0.8	0.720	18.5	LOS B	15.4	107.5	0.64	0.58	0.66	43.2
North: Francis Avenue (N)														
7	L2	476	1	501	0.1	0.452	10.4	LOS B	11.1	77.7	0.59	0.72	0.59	41.0
9	R2	200	7	211	3.6	0.391	43.0	LOS D	4.5	32.6	0.95	0.77	0.95	30.3
Approach		676	8	712	1.2	0.452	20.0	LOS C	11.1	77.7	0.70	0.74	0.70	37.1
West: Karrinyup Road (W)														
10	L2	228	0	240	0.1	0.196	9.9	LOS A	3.5	24.6	0.40	0.66	0.40	42.3
11	T1	823	12	867	1.4	0.598	25.7	LOS C	16.0	113.0	0.86	0.75	0.86	42.3
Approach		1052	12	1107	1.1	0.598	22.2	LOS C	16.0	113.0	0.76	0.73	0.76	42.3
All Vehicles		3636	36	3828	1.0	0.720	19.8	LOS B	16.0	113.0	0.69	0.65	0.69	41.6

2034 Do Minimum Sat

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Do Minimum Sat
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2360	16	1242	0.7	0.474	7.1	LOS A	12.3	86.8	0.52	0.46	0.52	53.7
6	R2	1639	0	863	0.0	0.832	43.1	LOS D	19.2	134.3	1.00	0.95	1.17	30.7
Approach		3999	16	2105	0.4	0.832	21.9	LOS C	19.2	134.3	0.71	0.67	0.78	41.1
North: Francis Avenue (N)														
7	L2	1525	21	802	1.4	0.754	19.7	LOS B	20.2	142.9	0.79	0.92	0.79	38.2
9	R2	359	8	189	2.2	0.296	38.2	LOS D	3.6	25.4	0.91	0.75	0.91	31.9
Approach		1884	29	992	1.5	0.754	23.2	LOS C	20.2	142.9	0.81	0.89	0.81	35.9
West: Karrinyup Road (W)														
10	L2	594	1	313	0.2	0.270	11.3	LOS B	5.2	36.3	0.48	0.69	0.48	41.6
11	T1	2089	26	1099	1.2	0.902	43.4	LOS D	27.2	192.0	1.00	1.10	1.28	35.1
Approach		2683	27	1412	1.0	0.902	36.3	LOS D	27.2	192.0	0.88	1.01	1.10	36.4
All Vehicles		8566	72	4508	0.8	0.902	26.7	LOS C	27.2	192.0	0.79	0.82	0.89	38.3

2034 Option AM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Option AM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	703	28	740	4.0	0.264	3.9	LOS A	5.1	36.7	0.35	0.30	0.35	56.4
6	R2	393	0	413	0.0	0.700	45.9	LOS D	8.9	62.6	1.00	0.86	1.08	30.0
Approach		1096	28	1154	2.6	0.700	19.0	LOS B	8.9	62.6	0.58	0.50	0.61	42.9
North: Francis Avenue (N)														
7	L2	433	5	456	1.2	0.527	14.6	LOS B	12.3	86.9	0.76	0.84	0.76	39.2
9	R2	170	8	179	4.7	0.438	43.9	LOS D	3.8	27.5	0.97	0.77	0.97	30.0
Approach		603	13	635	2.2	0.527	22.9	LOS C	12.3	86.9	0.82	0.82	0.82	36.1
West: Karrinyup Road (W)														
10	L2	287	3	302	1.0	0.219	8.0	LOS A	3.0	21.4	0.32	0.64	0.32	43.2
11	T1	1090	22	1147	2.0	0.595	16.8	LOS B	17.5	124.2	0.77	0.68	0.77	47.1
Approach		1377	25	1449	1.8	0.595	15.0	LOS B	17.5	124.2	0.67	0.67	0.67	46.2
All Vehicles		3076	66	3237	2.1	0.700	18.0	LOS B	17.5	124.2	0.67	0.64	0.68	42.7

2034 Option PM

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Option PM
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1144	16	1205	1.4	0.437	6.0	LOS A	11.3	80.4	0.45	0.41	0.45	54.7
6	R2	760	0	800	0.0	0.810	44.9	LOS D	18.7	131.1	1.00	0.92	1.11	30.3
Approach		1905	16	2005	0.9	0.810	21.5	LOS C	18.7	131.1	0.67	0.61	0.72	41.3
North: Francis Avenue (N)														
7	L2	483	4	509	0.9	0.461	10.5	LOS B	11.3	79.5	0.60	0.73	0.60	41.0
9	R2	264	7	278	2.7	0.512	43.8	LOS D	6.1	43.6	0.97	0.79	0.97	30.1
Approach		747	11	786	1.5	0.512	22.3	LOS C	11.3	79.5	0.73	0.75	0.73	36.3
West: Karrinyup Road (W)														
10	L2	279	0	294	0.0	0.244	10.8	LOS B	4.9	34.1	0.44	0.68	0.44	41.8
11	T1	820	9	863	1.0	0.594	25.6	LOS C	15.9	112.0	0.86	0.75	0.86	42.3
Approach		1100	9	1157	0.8	0.594	21.9	LOS C	15.9	112.0	0.75	0.73	0.75	42.2
All Vehicles		3751	36	3949	1.0	0.810	21.8	LOS C	18.7	131.1	0.71	0.67	0.73	40.5

2034 Option Sat

Project Name: Int_7_Karrinyup Road_Francis Avenue
Site Name: 2034 Option Sat
Site Title: Karrinyup Road / Francis Avenue

Folder Name: General
Site Type: Signals

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2319	16	1220	0.7	0.466	7.1	LOS A	12.0	84.6	0.51	0.46	0.51	53.8
6	R2	1620	0	853	0.0	0.823	42.4	LOS D	18.7	131.1	1.00	0.94	1.15	30.9
Approach		3939	16	2073	0.4	0.823	21.6	LOS C	18.7	131.1	0.71	0.66	0.78	41.2
North: Francis Avenue (N)														
7	L2	1511	21	795	1.4	0.749	19.7	LOS B	20.0	141.5	0.79	0.92	0.79	38.2
9	R2	372	7	196	2.0	0.307	38.3	LOS D	3.7	26.3	0.91	0.75	0.91	31.8
Approach		1884	29	991	1.5	0.749	23.3	LOS C	20.0	141.5	0.81	0.89	0.81	35.9
West: Karrinyup Road (W)														
10	L2	555	1	292	0.2	0.252	11.2	LOS B	4.7	33.2	0.47	0.68	0.47	41.7
11	T1	2113	27	1112	1.3	0.913	45.4	LOS D	28.2	199.3	1.00	1.13	1.31	34.5
Approach		2668	28	1404	1.1	0.913	38.3	LOS D	28.2	199.3	0.89	1.04	1.14	35.8
All Vehicles		8491	73	4469	0.9	0.913	27.2	LOS C	28.2	199.3	0.79	0.83	0.90	38.1

Appendix E
Flow Density Plots

1 Modified Development

The flow density plots for the each model case are shown in the following sections. These highlight locations where there is a high density of traffic, leading to congestion.

1.1 2014 Base

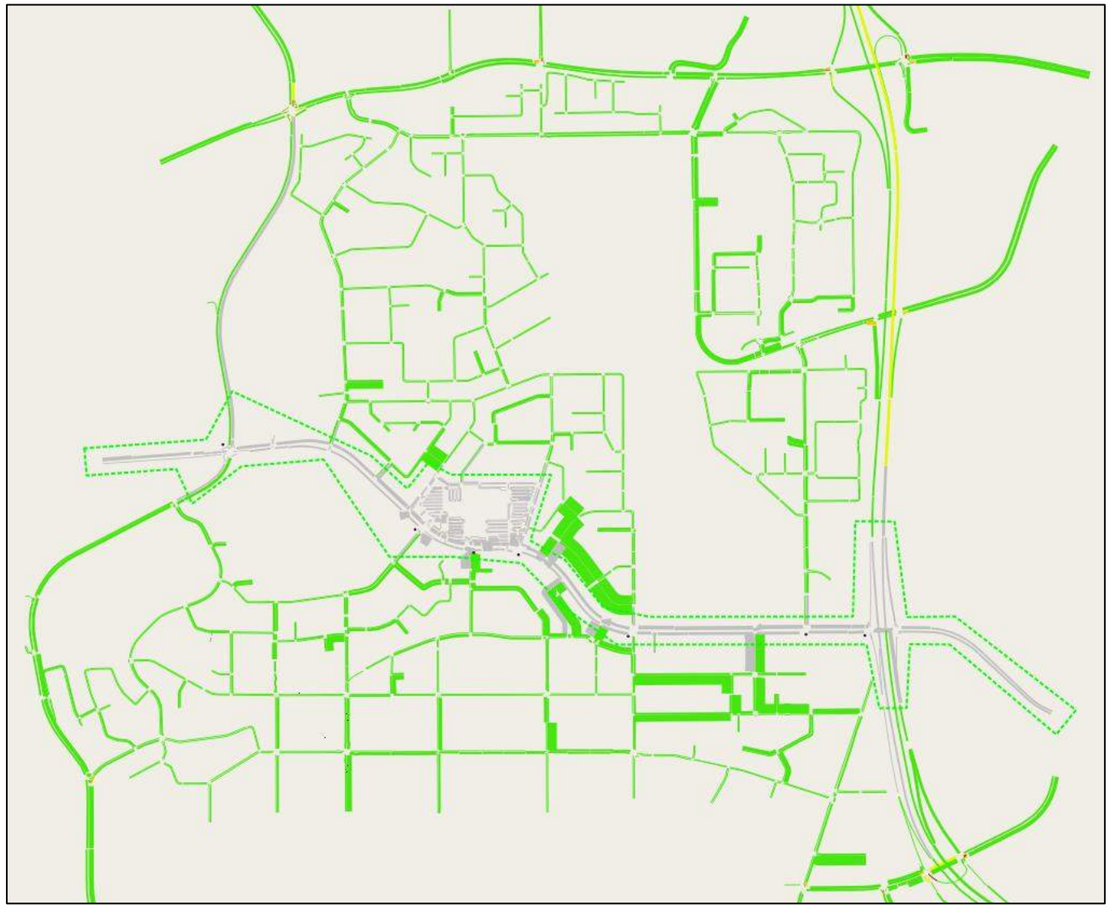


Figure 1-1 Flow density plot – 2014 Base AM

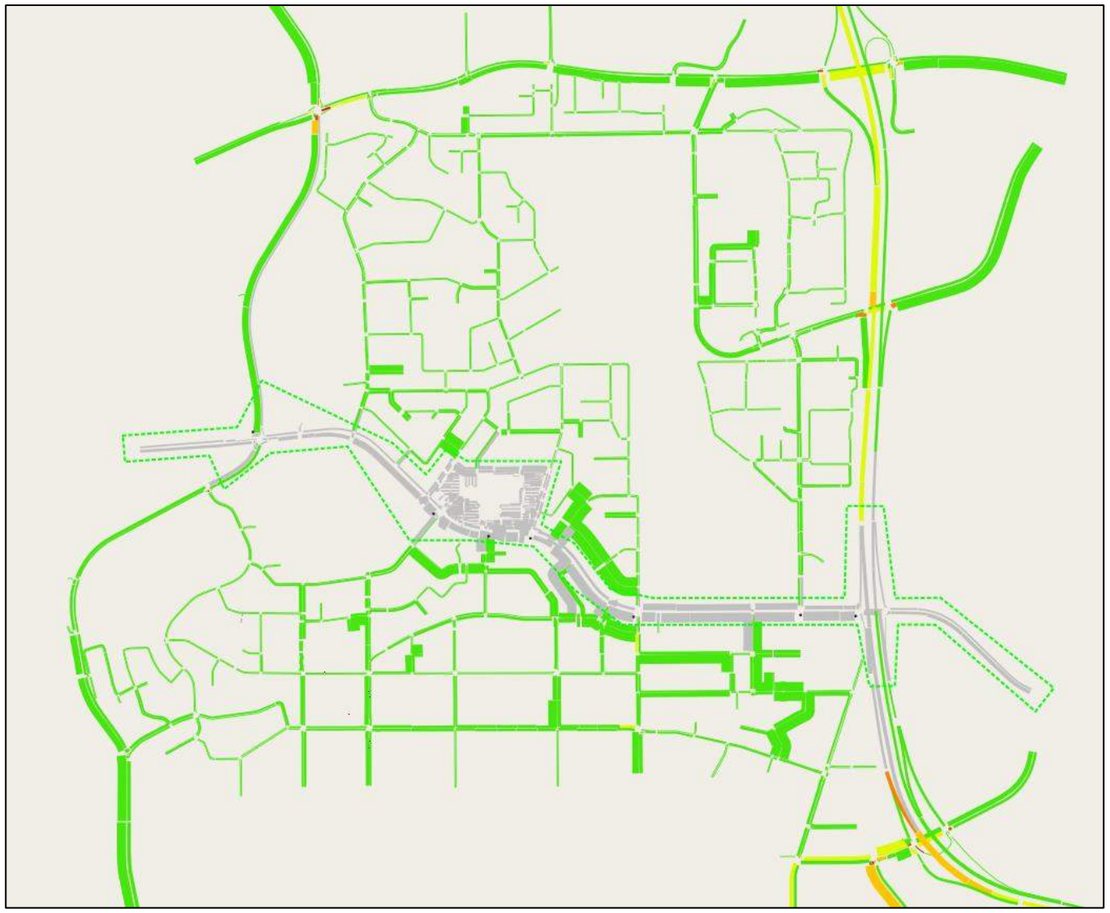


Figure 1-2 Flow density plot – 2014 Base PM

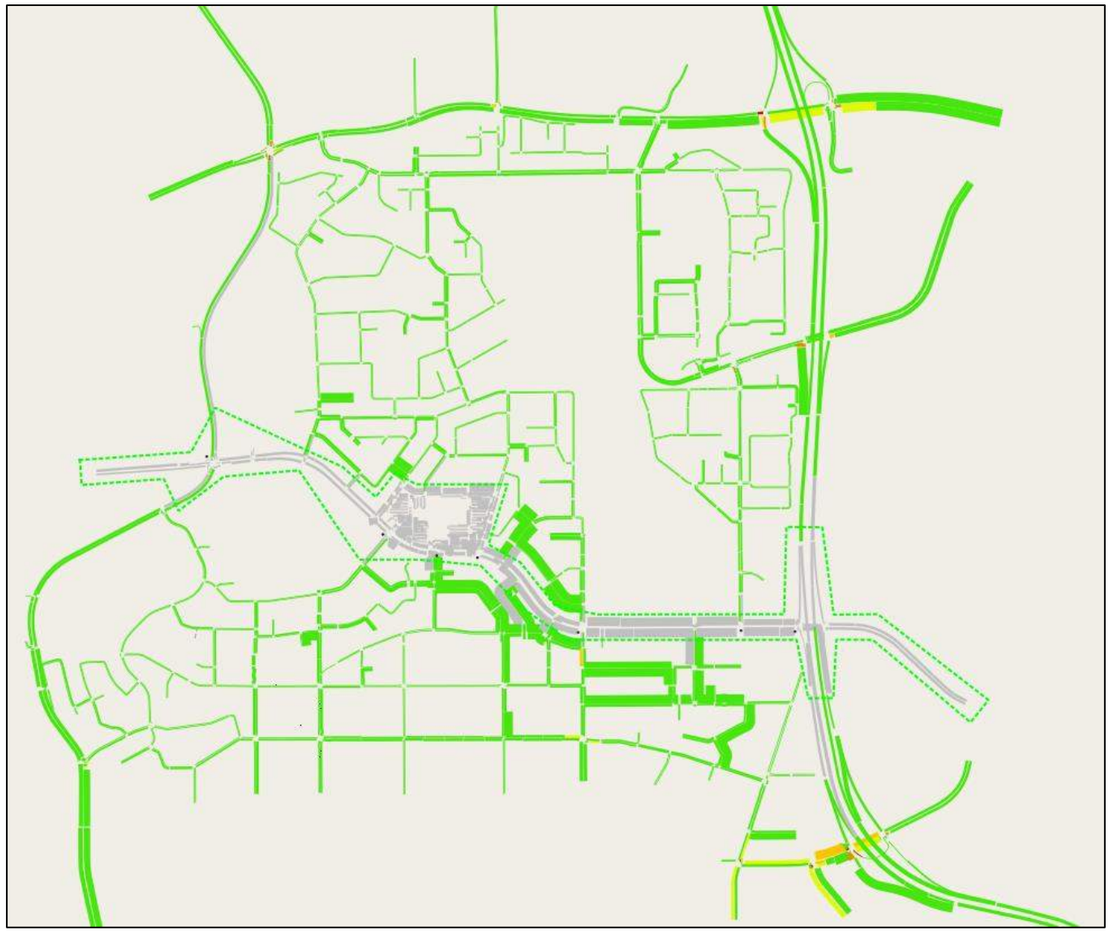


Figure 1-3 Flow density plot – 2014 Base Saturday

1.2 2021 Do-minimum

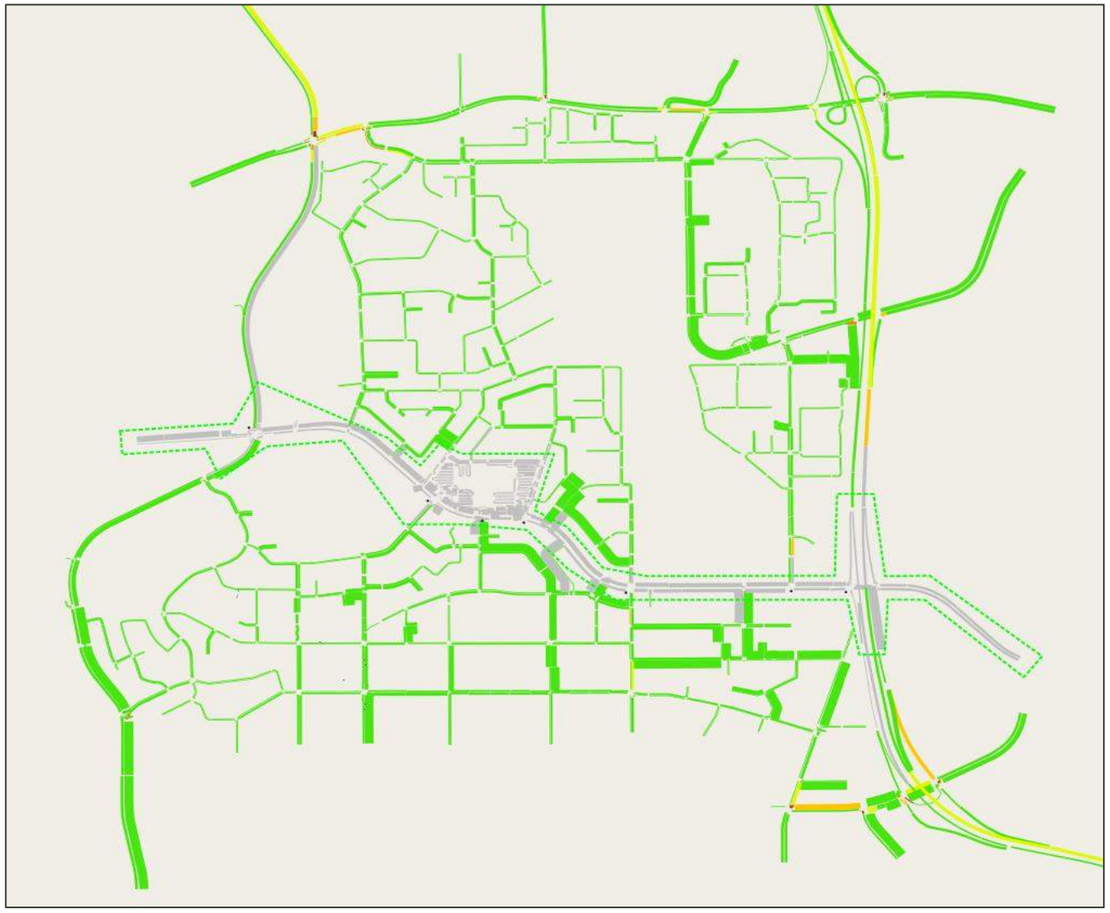


Figure 1-4 Flow density plot – 2021 Do-minimum AM

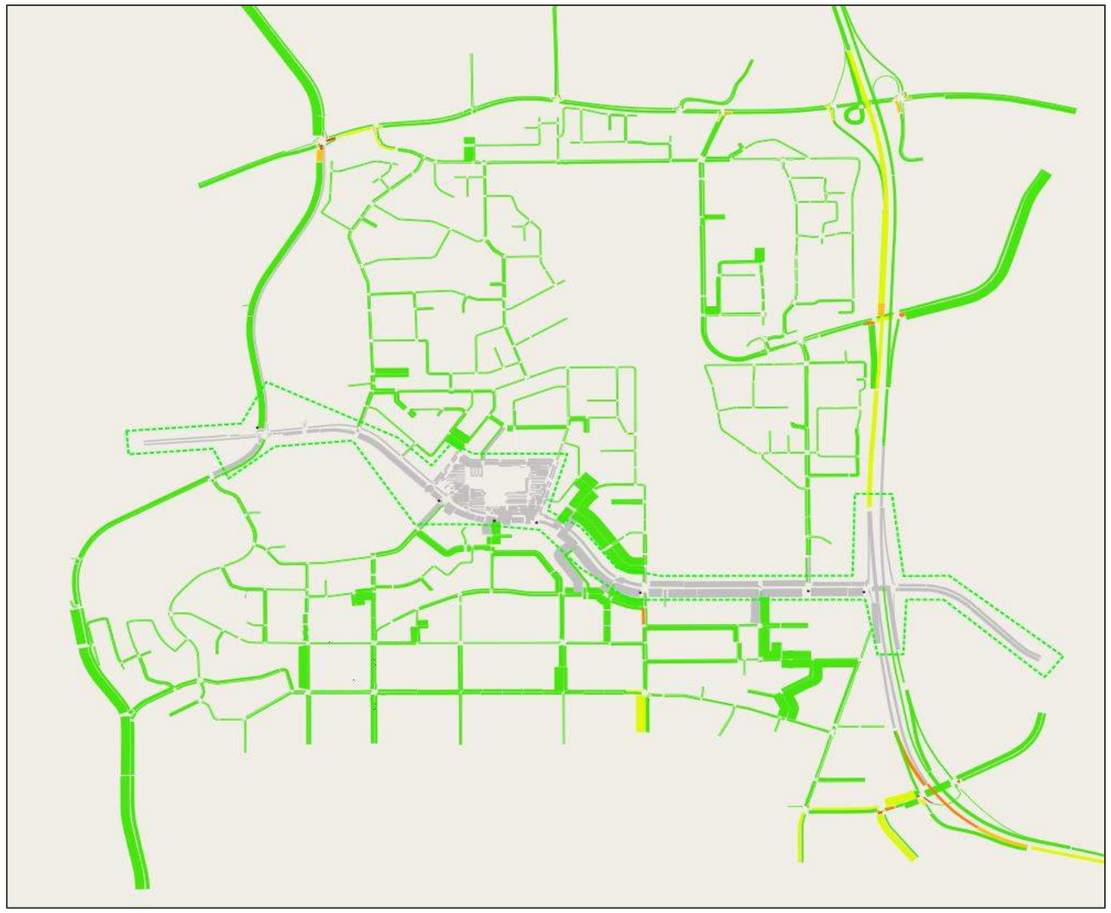


Figure 1-5 Flow density plot – 2021 Do-minimum PM

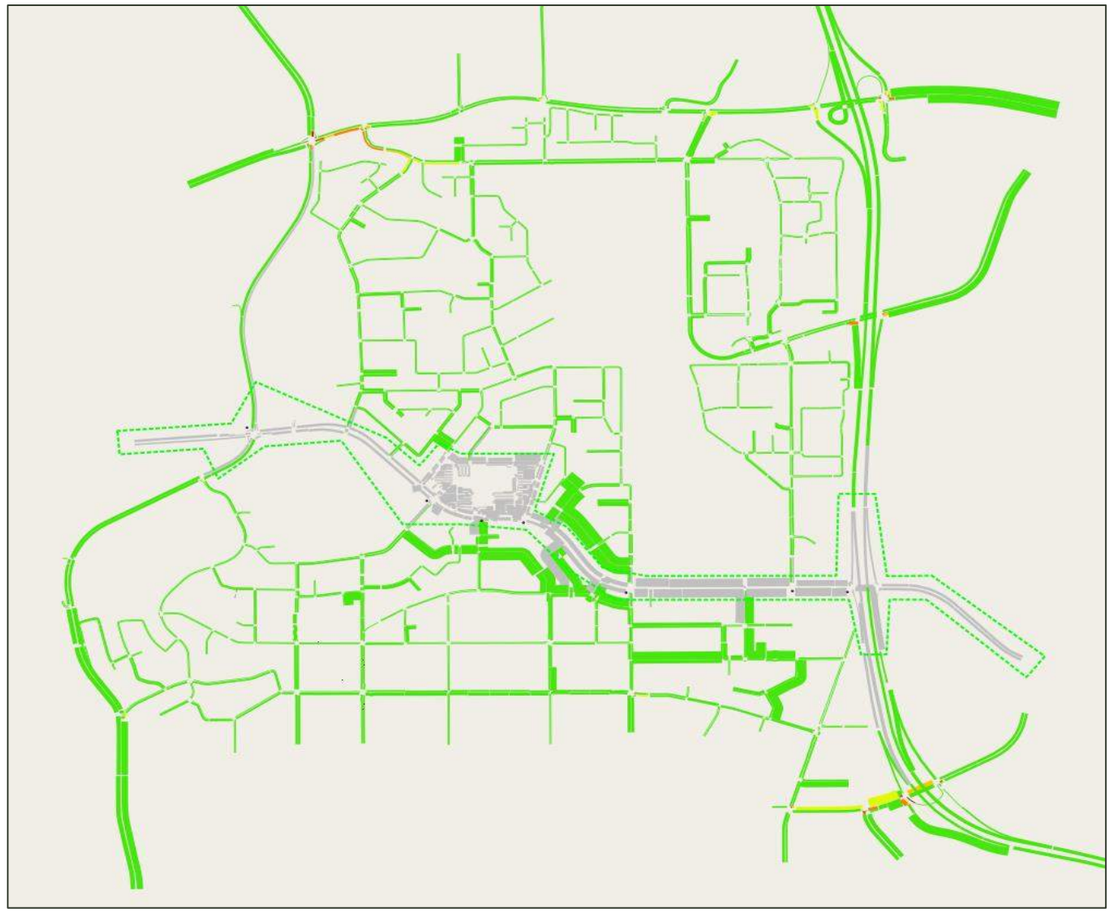


Figure 1-6 Flow density plot – 2021 Do-minimum Saturday

1.3 2021 Option

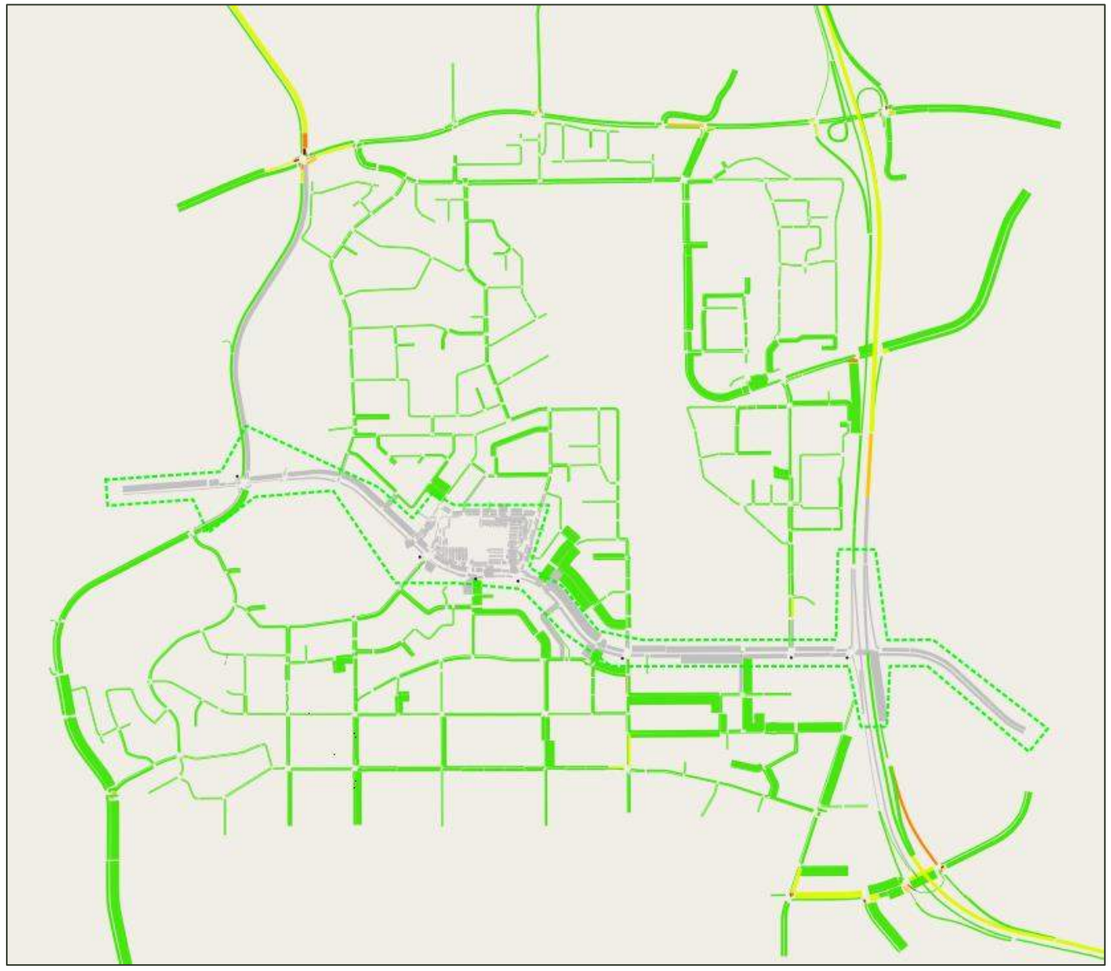


Figure 1-7 Flow density plot – 2021 Option AM

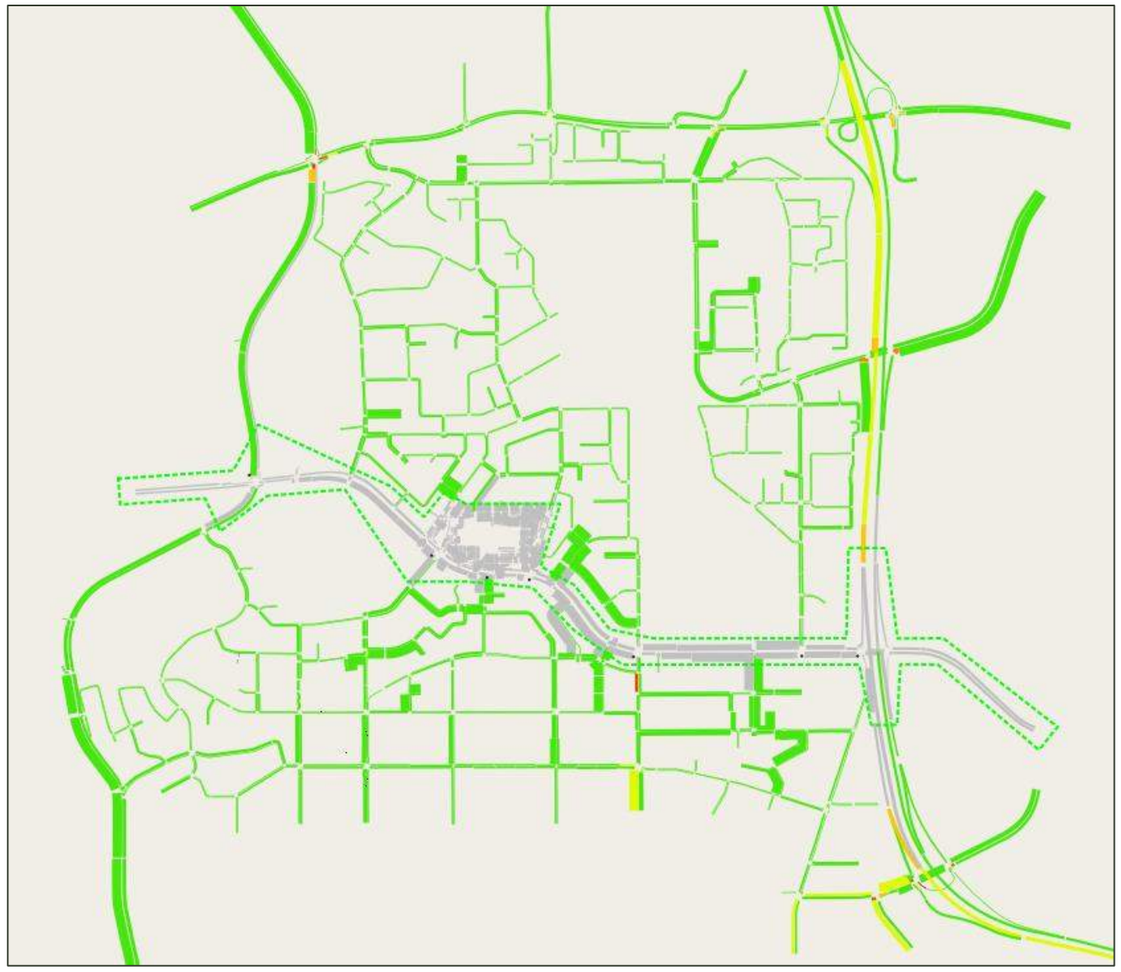


Figure 1-8 Flow density plot – 2021 Option PM

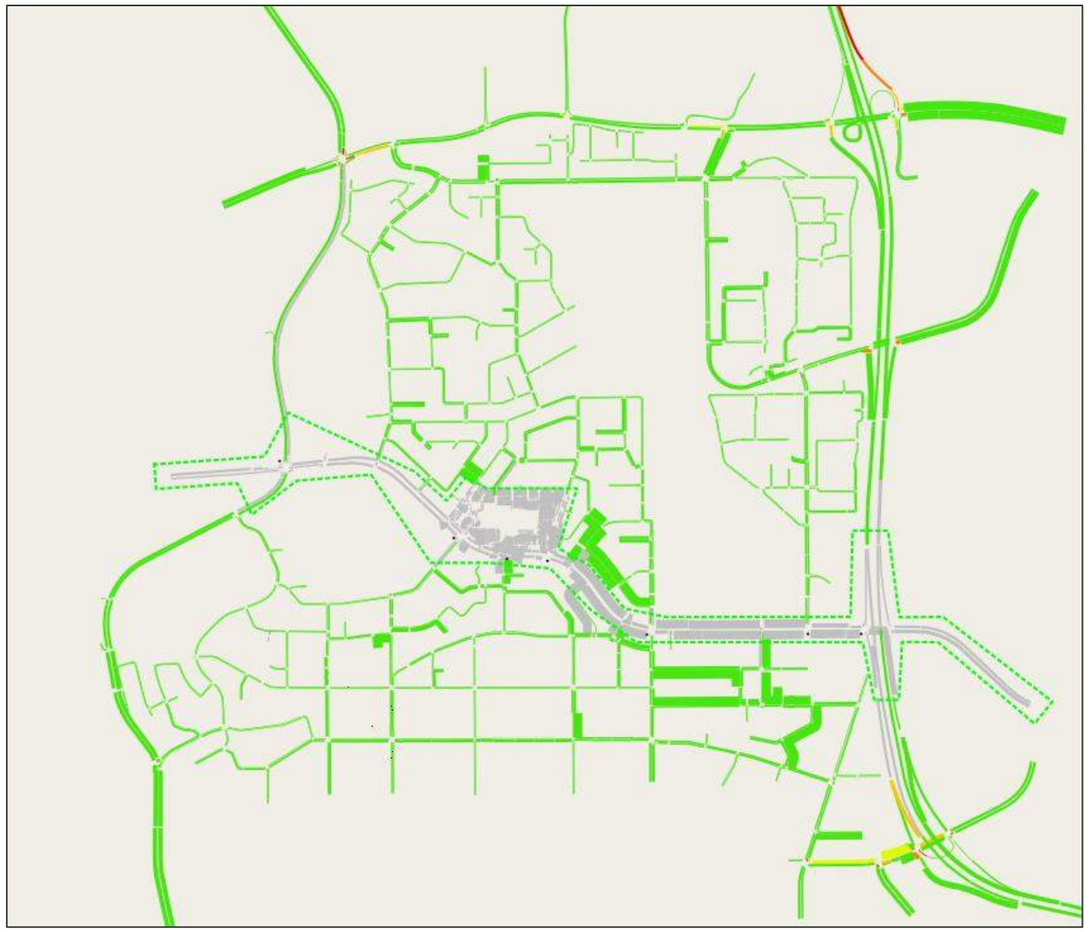


Figure 1-9 Flow density plot – 2021 Option Saturday

1.4 2031 Do-minimum

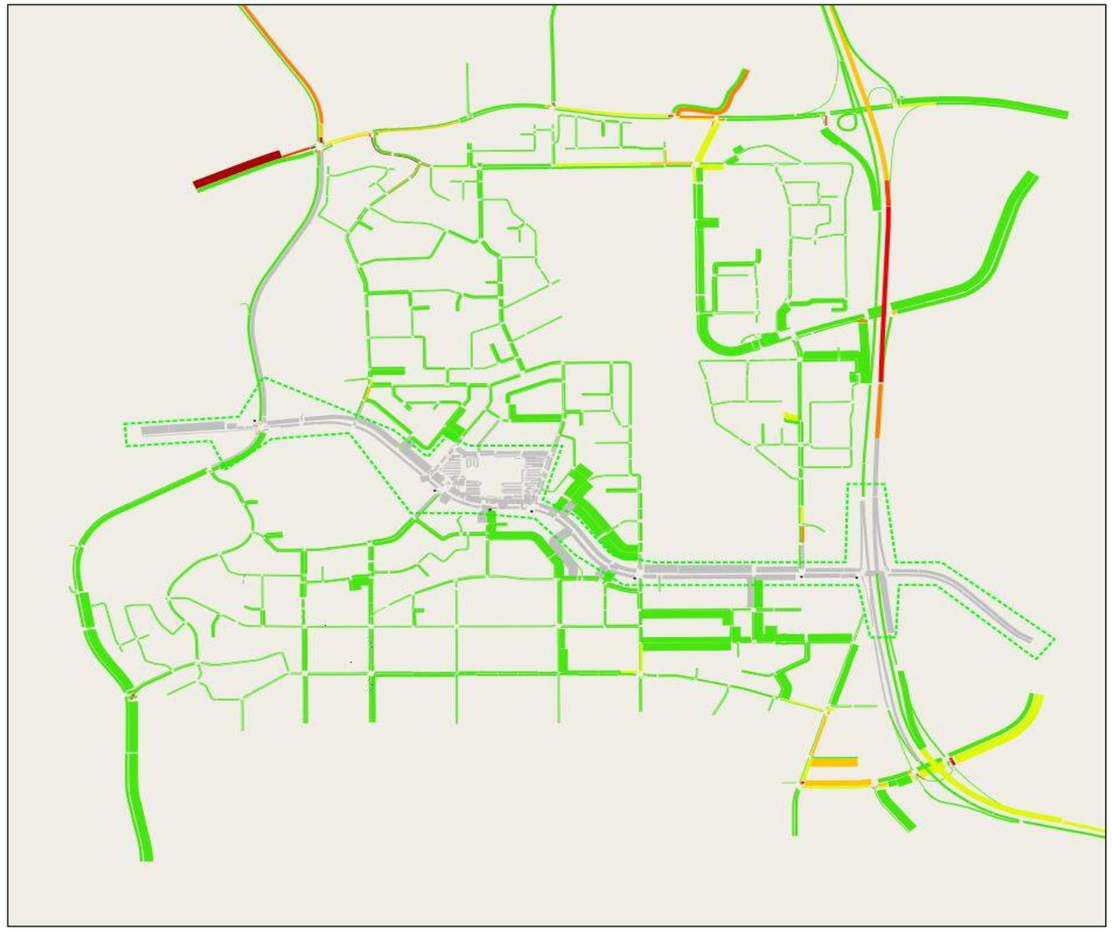


Figure 1-10 Flow density plot – 2031 Do-minimum AM

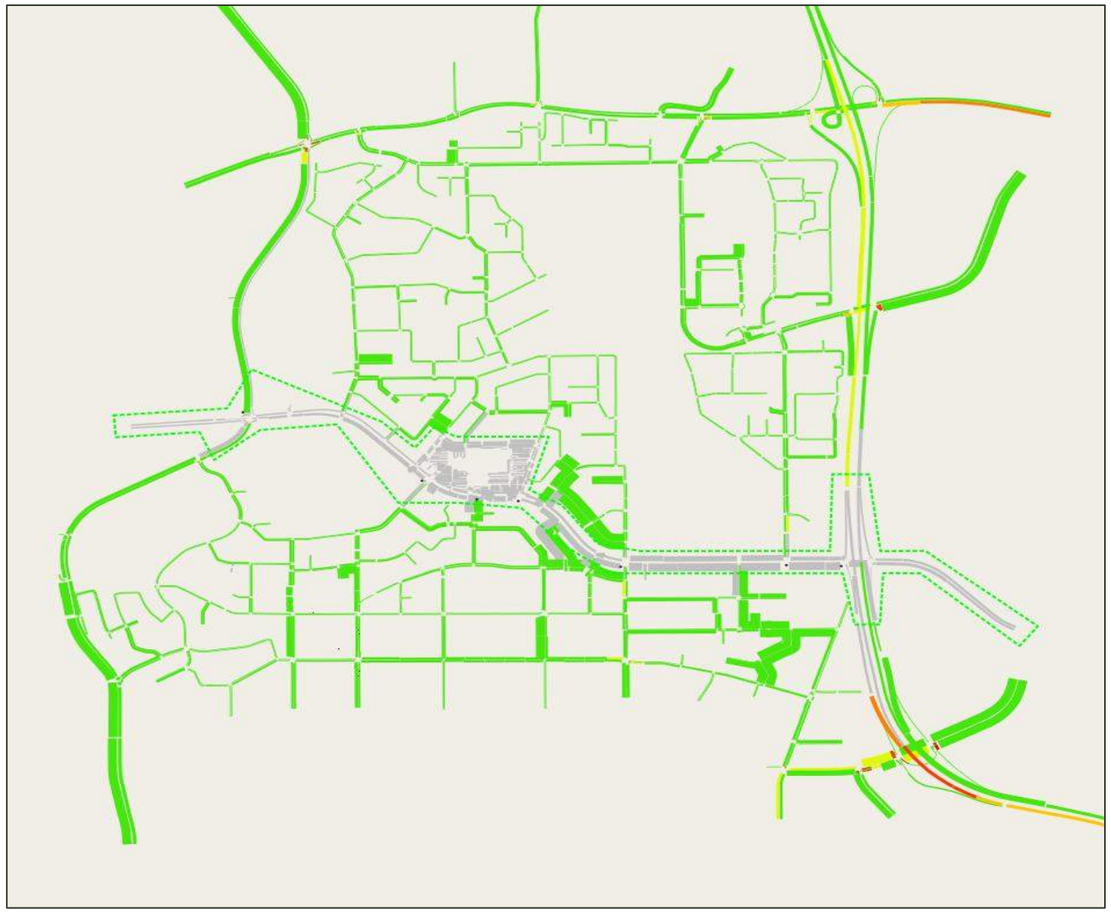


Figure 1-11 Flow density plot – 2031 Do-minimum PM

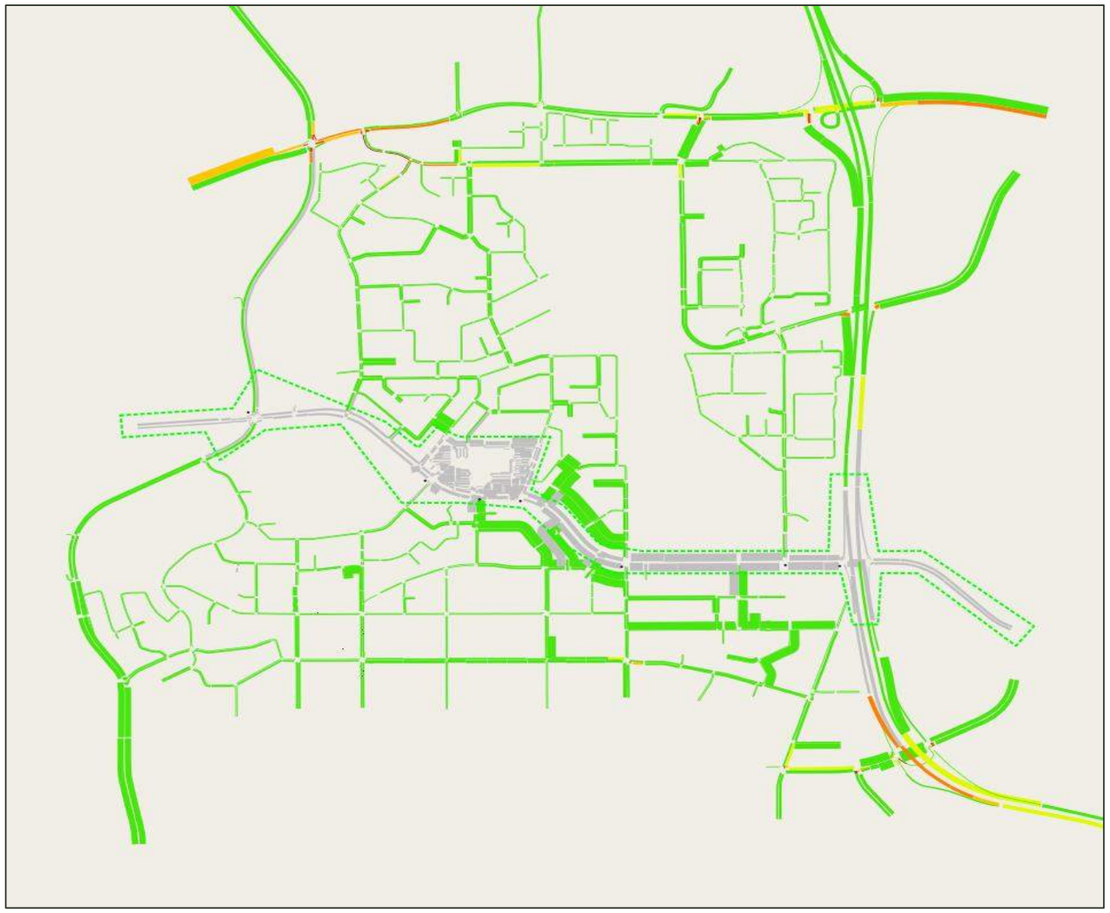


Figure 1-12 Flow density plot – 2031 Do-minimum Saturday

1.5 2031 Option

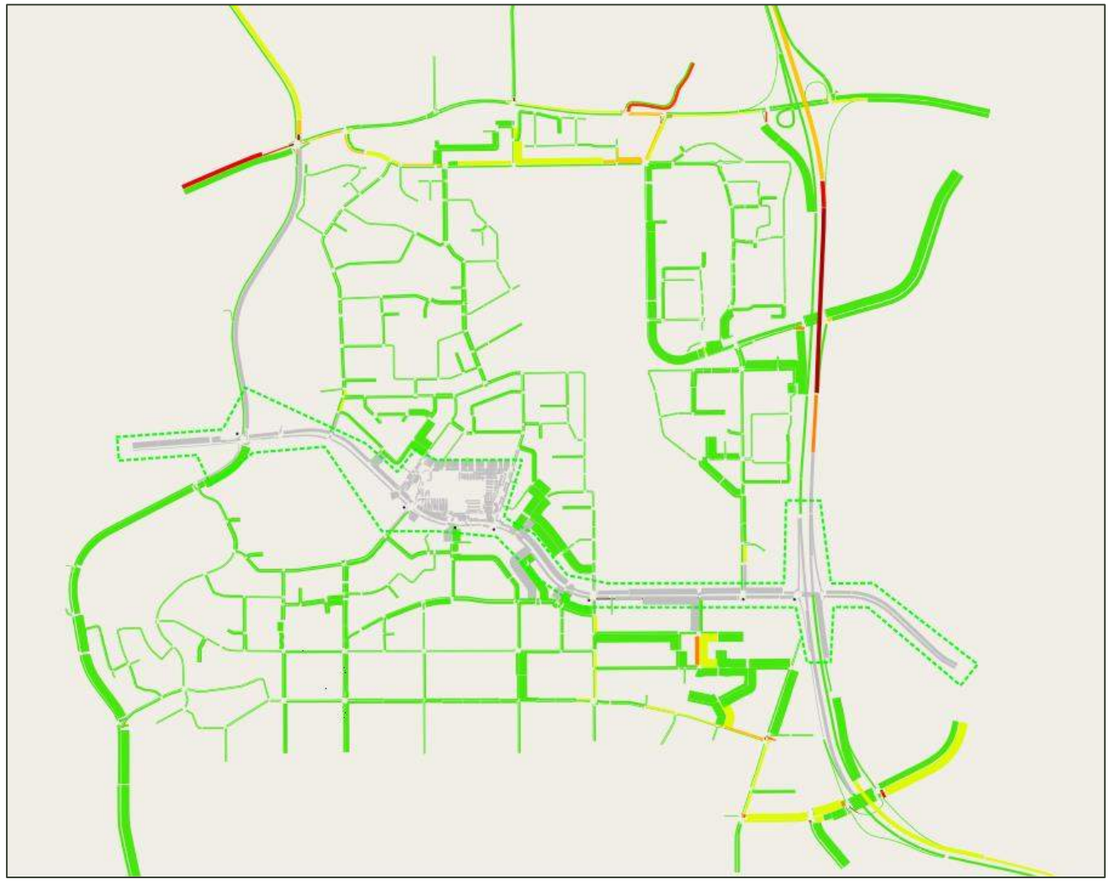


Figure 1-13 Flow density plot – 2031 Option AM

Figure 1-14 Flow density plot – 2031 Option PM

Figure 1-15 Flow density plot – 2031 Option Saturday

Appendix F

Development Access SIDRA Analysis Outputs

1 Modified Development

1.1 Karrinyup Road / Jeanes Road - Access Way 1

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	185	1.0	0.141	8.1	LOS A	2.2	15.8	0.27	0.63	48.9
22	T1	398	8.1	0.316	34.7	LOS C	9.5	71.2	0.79	0.66	38.3
23	R2	29	0.9	0.337	74.7	LOS E	1.9	13.4	1.00	0.72	19.3
Approach		612	5.7	0.337	28.5	LOS C	9.5	71.2	0.64	0.66	39.8
NorthEast: Shopping Centre Access (NE)											
24	L2	33	0.0	0.095	55.0	LOS E	1.4	9.7	0.91	0.68	22.1
25	T1	16	0.0	0.095	53.0	LOS D	1.4	9.7	0.91	0.67	21.7
26	R2	19	10.5	0.091	54.8	LOS D	1.1	8.2	0.90	0.67	22.3
Approach		68	2.9	0.095	54.5	LOS D	1.4	9.7	0.90	0.68	22.1
NorthWest: Karrinyup Road (NW)											
27	L2	34	1.3	0.025	10.7	LOS B	0.6	4.2	0.32	0.61	43.6
28	T1	1309	2.3	0.582	12.5	LOS B	25.3	180.6	0.57	0.52	49.8
29	R2	260	0.8	0.433	26.6	LOS C	8.4	59.0	0.84	0.79	39.1
Approach		1603	2.0	0.582	14.7	LOS B	25.3	180.6	0.61	0.56	47.6
SouthWest: Jeanes Road (SW)											
30	L2	144	3.3	0.217	16.1	LOS B	3.9	27.8	0.59	0.69	43.5
31	T1	9	0.0	0.217	14.8	LOS B	3.9	27.8	0.59	0.69	34.2
32	R2	99	0.8	0.501	63.0	LOS E	6.0	42.6	0.98	0.79	28.1
Approach		252	2.2	0.501	34.5	LOS C	6.0	42.6	0.74	0.73	35.5
All Vehicles		2535	2.9	0.582	21.1	LOS C	25.3	180.6	0.64	0.61	43.2

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	176	1.0	0.113	6.3	LOS A	1.0	6.8	0.15	0.59	50.1
22	T1	1004	8.1	0.564	24.1	LOS C	22.4	167.6	0.74	0.66	43.0
23	R2	49	0.9	0.488	74.1	LOS E	3.2	22.7	1.00	0.74	19.4
Approach		1229	6.8	0.564	23.6	LOS C	22.4	167.6	0.67	0.65	42.6
NorthEast: Shopping Centre Access (NE)											
24	L2	48	0.0	0.058	37.1	LOS D	1.4	10.0	0.75	0.63	26.9
25	T1	15	0.0	0.058	35.1	LOS D	1.4	10.0	0.75	0.60	26.1
26	R2	221	10.5	0.551	43.7	LOS D	11.9	90.5	0.89	0.78	25.0
Approach		284	8.2	0.551	42.1	LOS D	11.9	90.5	0.86	0.74	25.4
NorthWest: Karrinyup Road (NW)											
27	L2	40	1.3	0.026	6.4	LOS A	0.2	1.7	0.16	0.58	47.5
28	T1	558	2.3	0.290	20.6	LOS C	10.4	74.5	0.63	0.54	44.8
29	R2	43	0.8	0.419	73.6	LOS E	2.8	19.7	1.00	0.74	26.0
Approach		641	2.1	0.419	23.3	LOS C	10.4	74.5	0.63	0.56	42.8
SouthWest: Jeanes Road (SW)											
30	L2	31	3.3	0.210	36.7	LOS D	2.8	19.5	0.86	0.76	35.2
31	T1	45	0.0	0.210	35.4	LOS D	2.8	19.5	0.86	0.76	26.2
32	R2	177	0.8	0.448	45.9	LOS D	9.3	65.5	0.87	0.79	32.3
Approach		253	1.0	0.448	42.9	LOS D	9.3	65.5	0.87	0.78	31.8
All Vehicles		2407	5.1	0.564	27.7	LOS C	22.4	167.6	0.70	0.65	39.2

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	94	1.0	0.061	6.3	LOS A	0.5	3.4	0.15	0.59	50.1
22	T1	710	8.1	0.397	23.8	LOS C	14.7	110.1	0.70	0.61	43.2
23	R2	77	0.9	0.413	66.7	LOS E	4.7	33.4	0.98	0.77	20.8
Approach		881	6.8	0.413	25.7	LOS C	14.7	110.1	0.66	0.62	41.3
NorthEast: Shopping Centre Access (NE)											
24	L2	207	0.0	0.226	41.6	LOS D	5.5	38.5	0.82	0.72	25.5
25	T1	16	0.0	0.226	39.6	LOS D	5.5	38.5	0.82	0.71	24.6
26	R2	63	10.5	0.164	40.5	LOS D	3.1	23.4	0.80	0.67	25.9
Approach		286	2.3	0.226	41.2	LOS D	5.5	38.5	0.82	0.71	25.5
NorthWest: Karrinyup Road (NW)											
27	L2	80	1.3	0.075	17.5	LOS B	2.2	15.3	0.49	0.66	38.5
28	T1	751	2.3	0.416	24.0	LOS C	15.5	110.4	0.70	0.62	43.1
29	R2	42	0.8	0.221	65.0	LOS E	2.5	17.7	0.96	0.74	27.7
Approach		873	2.1	0.416	25.4	LOS C	15.5	110.4	0.70	0.63	41.6
SouthWest: Jeanes Road (SW)											
30	L2	180	3.3	0.274	12.2	LOS B	3.7	26.5	0.55	0.69	45.6
31	T1	16	0.0	0.274	10.9	LOS B	3.7	26.5	0.55	0.69	36.3
32	R2	115	0.8	0.407	51.9	LOS D	6.4	44.8	0.90	0.78	30.7
Approach		311	2.2	0.407	26.8	LOS C	6.4	44.8	0.68	0.72	38.3
All Vehicles		2351	3.9	0.416	27.6	LOS C	15.5	110.4	0.70	0.65	39.1

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	207	1.0	0.166	8.2	LOS A	2.6	18.2	0.28	0.63	48.8
22	T1	451	8.1	0.395	38.7	LOS D	11.5	86.1	0.84	0.71	36.7
23	R2	16	0.9	0.186	73.7	LOS E	1.0	7.3	0.99	0.69	19.5
Approach		674	5.8	0.395	30.2	LOS C	11.5	86.1	0.67	0.69	39.3
NorthEast: Shopping Centre Access (NE)											
24	L2	31	0.0	0.088	54.0	LOS D	1.3	9.4	0.90	0.68	22.4
25	T1	17	0.0	0.088	51.9	LOS D	1.3	9.4	0.90	0.66	21.9
26	R2	21	10.5	0.097	53.9	LOS D	1.2	8.9	0.90	0.67	22.5
Approach		69	3.2	0.097	53.5	LOS D	1.3	9.4	0.90	0.67	22.3
NorthWest: Karrinyup Road (NW)											
27	L2	32	1.3	0.024	11.0	LOS B	0.6	4.1	0.33	0.61	43.3
28	T1	1284	2.3	0.543	12.8	LOS B	22.4	159.6	0.57	0.52	49.6
29	R2	295	0.8	0.395	35.8	LOS D	13.3	93.7	0.77	0.79	35.6
Approach		1611	2.0	0.543	17.0	LOS B	22.4	159.6	0.60	0.57	46.2
SouthWest: Jeanes Road (SW)											
30	L2	104	3.3	0.343	32.4	LOS C	5.8	41.4	0.85	0.77	36.6
31	T1	32	0.0	0.343	31.1	LOS C	5.8	41.4	0.85	0.77	27.5
32	R2	109	0.8	0.523	62.3	LOS E	6.6	46.8	0.98	0.79	28.2
Approach		245	1.8	0.523	45.5	LOS D	6.6	46.8	0.91	0.78	31.4
All Vehicles		2599	3.0	0.543	24.0	LOS C	22.4	159.6	0.66	0.62	41.7

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	89	1.0	0.060	6.8	LOS A	0.7	4.8	0.19	0.60	49.7
22	T1	962	8.1	0.619	30.0	LOS C	24.1	180.6	0.82	0.73	40.2
23	R2	61	0.9	0.354	67.3	LOS E	3.8	26.5	0.98	0.76	20.6
Approach		1112	7.2	0.619	30.2	LOS C	24.1	180.6	0.78	0.72	39.6
NorthEast: Shopping Centre Access (NE)											
24	L2	50	0.0	0.066	34.9	LOS C	1.7	12.1	0.73	0.63	27.5
25	T1	28	0.0	0.066	32.9	LOS C	1.7	12.1	0.73	0.58	26.9
26	R2	204	10.5	0.462	39.5	LOS D	10.3	78.5	0.84	0.75	26.3
Approach		282	7.6	0.462	38.0	LOS D	10.3	78.5	0.81	0.71	26.6
NorthWest: Karrinyup Road (NW)											
27	L2	57	1.3	0.050	14.5	LOS B	1.3	9.2	0.43	0.64	40.6
28	T1	487	2.3	0.290	25.5	LOS C	10.0	71.6	0.59	0.59	42.3
29	R2	102	0.8	0.580	68.9	LOS E	6.4	45.4	1.00	0.76	26.9
Approach		646	2.0	0.580	31.4	LOS C	10.0	71.6	0.72	0.62	38.6
SouthWest: Jeanes Road (SW)											
30	L2	252	3.3	0.481	19.4	LOS B	9.0	64.3	0.79	0.79	41.9
31	T1	25	0.0	0.481	18.1	LOS B	9.0	64.3	0.79	0.79	32.6
32	R2	153	0.8	0.367	42.5	LOS D	7.6	53.7	0.83	0.77	33.3
Approach		430	2.2	0.481	27.6	LOS C	9.0	64.3	0.80	0.79	37.9
All Vehicles		2470	5.0	0.619	30.9	LOS C	24.1	180.6	0.77	0.70	37.6

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Karrinyup Road (SE)											
21	L2	94	1.0	0.064	6.8	LOS A	0.7	5.1	0.19	0.60	49.7
22	T1	665	8.1	0.385	24.9	LOS C	14.0	104.7	0.71	0.61	42.6
23	R2	82	0.9	0.381	64.4	LOS E	4.9	34.9	0.97	0.77	21.2
Approach		841	6.6	0.385	26.7	LOS C	14.0	104.7	0.68	0.63	40.8
NorthEast: Shopping Centre Access (NE)											
24	L2	275	0.0	0.342	42.9	LOS D	8.6	60.0	0.85	0.74	25.1
25	T1	46	0.0	0.342	40.6	LOS D	7.7	53.9	0.84	0.73	24.4
26	R2	69	10.5	0.187	41.7	LOS D	3.4	26.0	0.81	0.69	25.6
Approach		390	1.9	0.342	42.4	LOS D	8.6	60.0	0.84	0.73	25.1
NorthWest: Karrinyup Road (NW)											
27	L2	77	1.3	0.053	6.4	LOS A	0.5	3.3	0.16	0.59	47.5
28	T1	724	2.3	0.414	25.2	LOS C	15.2	106.4	0.72	0.63	42.5
29	R2	90	0.8	0.410	64.6	LOS E	5.4	38.3	0.97	0.77	27.8
Approach		891	2.1	0.414	27.6	LOS C	15.2	106.4	0.70	0.64	40.5
SouthWest: Jeanes Road (SW)											
30	L2	143	3.3	0.340	20.1	LOS C	4.7	33.4	0.76	0.75	41.7
31	T1	44	0.0	0.340	18.8	LOS B	4.7	33.4	0.76	0.75	32.3
32	R2	97	0.8	0.414	54.7	LOS D	5.5	38.9	0.92	0.78	30.0
Approach		284	1.9	0.414	31.7	LOS C	5.5	38.9	0.81	0.76	35.6
All Vehicles		2406	3.6	0.414	30.2	LOS C	15.2	108.4	0.73	0.66	37.4

1.2 Karrinyup Road - Access Way 2

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	72	0.0	0.295	14.9	LOS B	1.0	8.0	0.84	0.96	21.1
3a	R1	9	100.0	0.295	50.5	LOS F	1.0	8.0	0.84	0.96	21.1
Approach		81	11.1	0.295	18.9	LOS C	1.0	8.0	0.84	0.96	21.1
West: Karrinyup Road											
10	L2	80	0.0	0.367	5.6	LOS A	0.0	0.0	0.00	0.10	54.7
10a	L1	16	100.0	0.367	5.5	LOS A	0.0	0.0	0.00	0.10	54.1
11	T1	1311	0.8	0.367	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		1409	2.0	0.367	0.5	NA	0.0	0.0	0.00	0.05	59.3
All Vehicles		1490	2.5	0.367	1.4	NA	1.0	8.0	0.05	0.10	58.0

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	233	0.0	0.323	8.4	LOS A	1.5	10.9	0.61	0.85	29.3
3a	R1	7	100.0	0.323	17.7	LOS C	1.5	10.9	0.61	0.85	29.3
Approach		240	2.9	0.323	8.7	LOS A	1.5	10.9	0.61	0.85	29.3
West: Karrinyup Road											
10	L2	96	0.0	0.209	5.6	LOS A	0.0	0.0	0.00	0.20	53.6
10a	L1	22	100.0	0.209	5.5	LOS A	0.0	0.0	0.00	0.20	53.2
11	T1	674	0.6	0.209	0.0	LOS A	0.0	0.0	0.00	0.08	59.3
Approach		792	3.3	0.209	0.9	NA	0.0	0.0	0.00	0.10	58.7
All Vehicles		1032	3.2	0.323	2.7	NA	1.5	10.9	0.14	0.27	55.2

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	326	0.0	0.585	13.6	LOS B	3.6	25.4	0.79	1.07	24.4
3a	R1	6	100.0	0.585	32.6	LOS D	3.6	25.4	0.79	1.07	24.4
Approach		332	1.8	0.585	13.9	LOS B	3.6	25.4	0.79	1.07	24.4
West: Karrinyup Road											
10	L2	71	0.0	0.277	5.6	LOS A	0.0	0.0	0.00	0.11	54.6
10a	L1	14	100.0	0.277	5.5	LOS A	0.0	0.0	0.00	0.11	54.1
11	T1	977	0.5	0.277	0.0	LOS A	0.0	0.0	0.00	0.05	59.5
Approach		1062	1.8	0.277	0.5	NA	0.0	0.0	0.00	0.05	59.3
All Vehicles		1394	1.6	0.585	3.7	NA	3.6	25.4	0.19	0.30	54.3

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	44	0.0	0.244	14.7	LOS B	0.8	6.5	0.85	0.95	19.7
3a	R1	10	100.0	0.244	51.1	LOS F	0.8	6.5	0.85	0.95	19.7
Approach		54	18.5	0.244	21.4	LOS C	0.8	6.5	0.85	0.95	19.7
West: Karrinyup Road											
10	L2	25	0.0	0.372	5.6	LOS A	0.0	0.0	0.00	0.05	55.4
10a	L1	17	100.0	0.372	5.5	LOS A	0.0	0.0	0.00	0.05	54.6
11	T1	1388	0.6	0.372	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		1430	2.0	0.372	0.3	NA	0.0	0.0	0.00	0.02	59.7
All Vehicles		1484	2.6	0.372	1.0	NA	0.8	6.5	0.03	0.06	58.7

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	206	0.0	0.243	6.8	LOS A	1.0	7.2	0.53	0.73	31.3
3a	R1	7	100.0	0.243	12.7	LOS B	1.0	7.2	0.53	0.73	31.4
Approach		213	3.3	0.243	7.0	LOS A	1.0	7.2	0.53	0.73	31.3
West: Karrinyup Road											
10	L2	19	0.0	0.163	5.6	LOS A	0.0	0.0	0.00	0.11	54.9
10a	L1	21	100.0	0.163	5.5	LOS A	0.0	0.0	0.00	0.11	54.5
11	T1	578	0.5	0.163	0.0	LOS A	0.0	0.0	0.00	0.05	59.7
Approach		618	3.9	0.163	0.5	NA	0.0	0.0	0.00	0.05	59.4
All Vehicles		831	3.7	0.243	2.1	NA	1.0	7.2	0.14	0.23	56.0

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	93	0.0	0.121	6.7	LOS A	0.5	3.4	0.51	0.70	31.3
3a	R1	6	100.0	0.121	12.4	LOS B	0.5	3.4	0.51	0.70	31.3
Approach		99	6.1	0.121	7.1	LOS A	0.5	3.4	0.51	0.70	31.3
West: Karrinyup Road											
10	L2	66	0.0	0.171	5.6	LOS A	0.0	0.0	0.00	0.16	54.1
10a	L1	11	100.0	0.171	5.5	LOS A	0.0	0.0	0.00	0.16	53.7
11	T1	579	0.3	0.171	0.0	LOS A	0.0	0.0	0.00	0.07	59.4
Approach		656	1.9	0.171	0.7	NA	0.0	0.0	0.00	0.08	59.0
All Vehicles		755	2.5	0.171	1.5	NA	0.5	3.4	0.07	0.16	57.3

1.3 Karrinyup Road - Access Way 3

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	54	0.0	0.122	11.2	LOS B	0.4	2.8	0.73	0.87	26.4
Approach		54	0.0	0.122	11.2	LOS B	0.4	2.8	0.73	0.87	26.4
North: Access 3											
7	L2	152	0.0	0.153	4.1	LOS A	0.6	4.3	0.51	0.60	47.3
Approach		152	0.0	0.153	4.1	LOS A	0.6	4.3	0.51	0.60	47.3
West: Karrinyup Road											
10	L2	63	0.0	0.296	5.6	LOS A	0.0	0.0	0.00	0.07	30.0
11	T1	1078	1.7	0.296	0.0	LOS A	0.0	0.0	0.00	0.03	59.6
Approach		1141	1.6	0.296	0.3	NA	0.0	0.0	0.00	0.03	57.9
All Vehicles		1347	1.4	0.296	1.2	NA	0.6	4.3	0.09	0.13	56.5

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	194	0.0	0.219	6.7	LOS A	0.8	5.9	0.52	0.74	33.3
Approach		194	0.0	0.219	6.7	LOS A	0.8	5.9	0.52	0.74	33.3
North: Access 3											
7	L2	337	0.0	0.243	2.7	LOS A	1.1	8.0	0.32	0.42	48.3
Approach		337	0.0	0.243	2.7	LOS A	1.1	8.0	0.32	0.42	48.3
West: Karrinyup Road											
10	L2	99	0.0	0.151	5.6	LOS A	0.0	0.0	0.00	0.20	29.5
11	T1	476	2.7	0.151	0.0	LOS A	0.0	0.0	0.00	0.08	59.2
Approach		577	2.2	0.151	1.0	NA	0.0	0.0	0.00	0.10	53.6
All Vehicles		1108	1.2	0.243	2.5	NA	1.1	8.0	0.19	0.31	51.0

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	319	0.0	0.488	10.8	LOS B	2.6	18.2	0.72	0.98	27.0
Approach		319	0.0	0.488	10.8	LOS B	2.6	18.2	0.72	0.98	27.0
North: Access 3											
7	L2	506	0.0	0.388	3.2	LOS A	2.0	14.3	0.43	0.50	47.8
Approach		506	0.0	0.388	3.2	LOS A	2.0	14.3	0.43	0.50	47.8
West: Karrinyup Road											
10	L2	166	0.0	0.221	5.6	LOS A	0.0	0.0	0.00	0.23	29.4
11	T1	681	1.6	0.221	0.0	LOS A	0.0	0.0	0.00	0.09	59.1
Approach		847	1.3	0.221	1.1	NA	0.0	0.0	0.00	0.12	52.9
All Vehicles		1672	0.7	0.488	3.6	NA	2.6	18.2	0.27	0.40	49.4

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	102	0.0	0.275	14.3	LOS B	1.0	6.9	0.81	0.94	23.2
Approach		102	0.0	0.275	14.3	LOS B	1.0	6.9	0.81	0.94	23.2
North: Access 3											
7	L2	107	0.0	0.115	4.4	LOS A	0.4	3.1	0.52	0.61	47.0
Approach		107	0.0	0.115	4.4	LOS A	0.4	3.1	0.52	0.61	47.0
West: Karrinyup Road											
10	L2	68	0.0	0.327	5.6	LOS A	0.0	0.0	0.00	0.06	30.0
11	T1	1189	1.8	0.327	0.0	LOS A	0.0	0.0	0.00	0.03	59.6
Approach		1257	1.7	0.327	0.3	NA	0.0	0.0	0.00	0.03	57.9
All Vehicles		1466	1.5	0.327	1.6	NA	1.0	6.9	0.09	0.14	56.3

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	493	0.0	0.511	7.9	LOS A	3.4	24.1	0.60	0.89	31.2
Approach		493	0.0	0.511	7.9	LOS A	3.4	24.1	0.60	0.89	31.2
North: Access 3											
7	L2	365	0.0	0.267	2.8	LOS A	1.3	8.9	0.35	0.43	48.2
Approach		365	0.0	0.267	2.8	LOS A	1.3	8.9	0.35	0.43	48.2
West: Karrinyup Road											
10	L2	41	0.0	0.129	5.6	LOS A	0.0	0.0	0.00	0.10	29.9
11	T1	454	2.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		495	1.8	0.129	0.5	NA	0.0	0.0	0.00	0.05	56.9
All Vehicles		1353	0.7	0.511	3.8	NA	3.4	24.1	0.31	0.46	50.2

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Karrinyup Road (East Right Turn Movement)											
2	T1	191	0.0	0.206	6.4	LOS A	0.8	5.5	0.50	0.72	33.8
Approach		191	0.0	0.206	6.4	LOS A	0.8	5.5	0.50	0.72	33.8
North: Access 3											
7	L2	475	0.0	0.325	2.5	LOS A	1.7	11.8	0.29	0.39	48.4
Approach		475	0.0	0.325	2.5	LOS A	1.7	11.8	0.29	0.39	48.4
West: Karrinyup Road											
10	L2	131	0.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.29	29.1
11	T1	404	1.6	0.140	0.0	LOS A	0.0	0.0	0.00	0.10	59.1
Approach		535	1.2	0.140	1.4	NA	0.0	0.0	0.00	0.14	51.2
All Vehicles		1201	0.5	0.325	2.6	NA	1.7	11.8	0.19	0.33	49.3

1.4 Francis Avenue - Access Way 4

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	48	0.0	0.026	3.4	LOS A	0.0	0.0	0.00	0.51	40.8
2	T1	218	0.0	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		266	0.0	0.112	0.6	NA	0.0	0.0	0.00	0.09	47.1
West: Access 4											
10	L2	7	0.0	0.004	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
Approach		7	0.0	0.004	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
All Vehicles		273	0.0	0.112	0.7	NA	0.0	0.0	0.00	0.10	46.1

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	74	0.0	0.040	3.4	LOS A	0.0	0.0	0.00	0.51	40.8
2	T1	256	0.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		330	0.0	0.131	0.8	NA	0.0	0.0	0.00	0.11	46.5
West: Access 4											
10	L2	135	0.0	0.083	2.0	LOS A	0.0	0.0	0.00	0.32	31.2
Approach		135	0.0	0.083	2.0	LOS A	0.0	0.0	0.00	0.32	31.2
All Vehicles		465	0.0	0.131	1.1	NA	0.0	0.0	0.00	0.18	38.4

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	96	0.0	0.052	3.4	LOS A	0.0	0.0	0.00	0.51	40.8
2	T1	406	0.0	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		502	0.0	0.208	0.7	NA	0.0	0.0	0.00	0.10	46.9
West: Access 4											
10	L2	111	0.0	0.068	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
Approach		111	0.0	0.068	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
All Vehicles		613	0.0	0.208	0.9	NA	0.0	0.0	0.00	0.14	41.2

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	19	0.0	0.020	3.4	LOS A	0.0	0.0	0.00	0.26	44.1
2	T1	216	0.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.02	49.3
Approach		235	0.0	0.101	0.3	NA	0.0	0.0	0.00	0.04	48.6
West: Access 4											
10	L2	12	0.0	0.007	2.0	LOS A	0.0	0.2	0.07	0.31	31.5
Approach		12	0.0	0.007	2.0	LOS A	0.0	0.2	0.07	0.31	31.5
All Vehicles		247	0.0	0.101	0.4	NA	0.0	0.2	0.00	0.06	46.3

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	57	0.0	0.048	3.4	LOS A	0.0	0.0	0.00	0.33	43.2
2	T1	501	0.0	0.240	0.0	LOS A	0.0	0.0	0.00	0.02	49.3
Approach		558	0.0	0.240	0.4	NA	0.0	0.0	0.00	0.05	48.2
West: Access 4											
10	L2	56	0.0	0.035	2.1	LOS A	0.1	1.0	0.10	0.32	31.4
Approach		56	0.0	0.035	2.1	LOS A	0.1	1.0	0.10	0.32	31.4
All Vehicles		614	0.0	0.240	0.5	NA	0.1	1.0	0.01	0.08	44.3

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	144	0.0	0.078	3.4	LOS A	0.0	0.0	0.00	0.51	40.8
2	T1	516	0.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		660	0.0	0.265	0.7	NA	0.0	0.0	0.00	0.11	46.6
West: Access 4											
10	L2	152	0.0	0.093	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
Approach		152	0.0	0.093	2.0	LOS A	0.0	0.0	0.00	0.32	31.8
All Vehicles		812	0.0	0.265	1.0	NA	0.0	0.0	0.00	0.15	40.9

1.5 Francis Avenue - Access Way 5

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	84	0.0	0.144	4.5	LOS A	0.8	5.8	0.08	0.49	33.8
2	T1	132	0.0	0.144	4.8	LOS A	0.8	5.8	0.08	0.49	43.7
3u	U	8	0.0	0.144	9.8	LOS A	0.8	5.8	0.08	0.49	37.4
Approach		224	0.0	0.144	4.9	LOS A	0.8	5.8	0.08	0.49	39.5
North: Francis Avenue											
8	T1	294	0.0	0.262	5.7	LOS A	1.6	11.0	0.39	0.53	38.3
9	R2	11	0.0	0.262	9.0	LOS A	1.6	11.0	0.39	0.53	37.0
Approach		305	0.0	0.262	5.8	LOS A	1.6	11.0	0.39	0.53	38.2
West: Access 5											
10	L2	12	0.0	0.144	1.9	LOS A	0.7	5.1	0.31	0.49	31.5
12	R2	157	0.0	0.144	4.3	LOS A	0.7	5.1	0.31	0.49	28.6
Approach		169	0.0	0.144	4.1	LOS A	0.7	5.1	0.31	0.49	28.8
All Vehicles		698	0.0	0.262	5.1	LOS A	1.6	11.0	0.27	0.51	35.9

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	132	0.0	0.271	4.7	LOS A	1.9	13.1	0.20	0.53	32.3
2	T1	177	0.0	0.271	5.0	LOS A	1.9	13.1	0.20	0.53	41.2
3u	U	80	0.0	0.271	10.0	LOS A	1.9	13.1	0.20	0.53	35.4
Approach		389	0.0	0.271	5.9	LOS A	1.9	13.1	0.20	0.53	36.8
North: Francis Avenue											
8	T1	240	0.0	0.299	7.2	LOS A	1.8	12.8	0.60	0.68	36.3
9	R2	41	0.0	0.299	10.5	LOS B	1.8	12.8	0.60	0.68	35.1
Approach		281	0.0	0.299	7.7	LOS A	1.8	12.8	0.60	0.68	36.1
West: Access 5											
10	L2	6	0.0	0.286	2.8	LOS A	1.7	11.8	0.49	0.59	30.7
12	R2	296	0.0	0.286	5.2	LOS A	1.7	11.8	0.49	0.59	27.9
Approach		302	0.0	0.286	5.1	LOS A	1.7	11.8	0.49	0.59	27.9
All Vehicles		972	0.0	0.299	6.2	LOS A	1.9	13.1	0.40	0.59	33.4

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	186	0.0	0.280	4.6	LOS A	2.0	14.0	0.12	0.53	32.7
2	T1	166	0.0	0.280	4.8	LOS A	2.0	14.0	0.12	0.53	42.0
3u	U	84	0.0	0.280	9.8	LOS A	2.0	14.0	0.12	0.53	36.0
Approach		436	0.0	0.280	5.7	LOS A	2.0	14.0	0.12	0.53	36.7
North: Francis Avenue											
8	T1	290	0.0	0.330	7.3	LOS A	2.1	14.5	0.62	0.69	36.4
9	R2	17	0.0	0.330	10.7	LOS B	2.1	14.5	0.62	0.69	35.2
Approach		307	0.0	0.330	7.5	LOS A	2.1	14.5	0.62	0.69	36.4
West: Access 5											
10	L2	9	0.0	0.295	2.8	LOS A	1.7	12.1	0.47	0.58	30.8
12	R2	306	0.0	0.295	5.1	LOS A	1.7	12.1	0.47	0.58	27.9
Approach		315	0.0	0.295	5.1	LOS A	1.7	12.1	0.47	0.58	28.0
All Vehicles		1058	0.0	0.330	6.0	LOS A	2.1	14.5	0.37	0.59	33.6

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	33	0.0	0.152	4.5	LOS A	0.9	6.0	0.07	0.48	34.0
2	T1	195	0.0	0.152	4.8	LOS A	0.9	6.0	0.07	0.48	43.7
3u	U	11	0.0	0.152	9.8	LOS A	0.9	6.0	0.07	0.48	37.4
Approach		239	0.0	0.152	5.0	LOS A	0.9	6.0	0.07	0.48	41.9
North: Francis Avenue											
8	T1	370	0.0	0.292	5.3	LOS A	1.8	12.9	0.30	0.49	39.1
9	R2	9	0.0	0.292	8.6	LOS A	1.8	12.9	0.30	0.49	37.7
Approach		379	0.0	0.292	5.4	LOS A	1.8	12.9	0.30	0.49	39.0
West: Access 5											
10	L2	4	0.0	0.079	2.2	LOS A	0.4	2.7	0.36	0.51	31.3
12	R2	83	0.0	0.079	4.6	LOS A	0.4	2.7	0.36	0.51	28.4
Approach		87	0.0	0.079	4.5	LOS A	0.4	2.7	0.36	0.51	28.5
All Vehicles		705	0.0	0.292	5.1	LOS A	1.8	12.9	0.23	0.49	38.3

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	162	0.0	0.351	4.6	LOS A	2.8	19.4	0.11	0.52	32.8
2	T1	293	0.0	0.351	4.8	LOS A	2.8	19.4	0.11	0.52	42.0
3u	U	109	0.0	0.351	9.8	LOS A	2.8	19.4	0.11	0.52	36.1
Approach		564	0.0	0.351	5.7	LOS A	2.8	19.4	0.11	0.52	38.0
North: Francis Avenue											
8	T1	339	0.0	0.373	7.3	LOS A	2.4	17.0	0.63	0.69	36.4
9	R2	13	0.0	0.373	10.6	LOS B	2.4	17.0	0.63	0.69	35.2
Approach		352	0.0	0.373	7.4	LOS A	2.4	17.0	0.63	0.69	36.4
West: Access 5											
10	L2	3	0.0	0.278	3.7	LOS A	1.6	11.2	0.57	0.66	30.0
12	R2	260	0.0	0.278	6.1	LOS A	1.6	11.2	0.57	0.66	27.2
Approach		263	0.0	0.278	6.1	LOS A	1.6	11.2	0.57	0.66	27.2
All Vehicles		1179	0.0	0.373	6.3	LOS A	2.8	19.4	0.37	0.60	34.6

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Francis Avenue											
1	L2	192	0.0	0.415	4.7	LOS A	3.5	24.7	0.24	0.51	32.3
2	T1	325	0.0	0.415	5.0	LOS A	3.5	24.7	0.24	0.51	41.3
3u	U	95	0.0	0.415	10.0	LOS B	3.5	24.7	0.24	0.51	35.4
Approach		612	0.0	0.415	5.7	LOS A	3.5	24.7	0.24	0.51	37.3
North: Francis Avenue											
8	T1	307	0.0	0.403	8.0	LOS A	2.7	19.1	0.71	0.76	35.5
9	R2	40	0.0	0.403	11.3	LOS B	2.7	19.1	0.71	0.76	34.4
Approach		347	0.0	0.403	8.4	LOS A	2.7	19.1	0.71	0.76	35.4
West: Access 5											
10	L2	27	0.0	0.423	4.3	LOS A	2.8	19.5	0.66	0.72	29.6
12	R2	363	0.0	0.423	6.6	LOS A	2.8	19.5	0.66	0.72	26.8
Approach		390	0.0	0.423	6.5	LOS A	2.8	19.5	0.66	0.72	27.0
All Vehicles		1349	0.0	0.423	6.6	LOS A	3.5	24.7	0.48	0.63	33.3

1.6 Davenport Street - Access Way 6

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	20	0.0	0.014	2.2	LOS A	0.1	0.4	0.18	0.33	28.5
3	R2	1	0.0	0.014	3.0	LOS A	0.1	0.4	0.18	0.33	27.4
Approach		21	0.0	0.014	2.2	LOS A	0.1	0.4	0.18	0.33	28.5
East: Davenport Road											
4	L2	8	0.0	0.051	4.3	LOS A	0.0	0.0	0.00	0.04	46.0
5	T1	92	0.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.04	48.4
Approach		100	0.0	0.051	0.3	NA	0.0	0.0	0.00	0.04	48.1
West: Davenport Road											
11	T1	92	0.0	0.072	0.1	LOS A	0.2	1.6	0.13	0.16	42.2
12	R2	39	0.0	0.072	4.9	LOS A	0.2	1.6	0.13	0.16	34.1
Approach		131	0.0	0.072	1.5	NA	0.2	1.6	0.13	0.16	38.9
All Vehicles		252	0.0	0.072	1.1	NA	0.2	1.6	0.08	0.13	40.3

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	16	0.0	0.081	2.4	LOS A	0.3	1.9	0.34	0.50	27.1
3	R2	59	0.0	0.081	4.2	LOS A	0.3	1.9	0.34	0.50	25.0
Approach		75	0.0	0.081	3.8	LOS A	0.3	1.9	0.34	0.50	26.3
East: Davenport Road											
4	L2	73	0.0	0.117	4.3	LOS A	0.0	0.0	0.00	0.18	42.7
5	T1	151	0.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.18	44.0
Approach		224	0.0	0.117	1.4	NA	0.0	0.0	0.00	0.18	43.5
West: Davenport Road											
11	T1	230	0.0	0.141	0.2	LOS A	0.3	1.8	0.10	0.07	45.5
12	R2	33	0.0	0.141	5.4	LOS A	0.3	1.8	0.10	0.07	35.7
Approach		263	0.0	0.141	0.8	NA	0.3	1.8	0.10	0.07	43.6
All Vehicles		562	0.0	0.141	1.4	NA	0.3	1.9	0.09	0.17	39.6

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	10	0.0	0.097	2.6	LOS A	0.3	2.2	0.43	0.60	26.0
3	R2	64	0.0	0.097	5.2	LOS A	0.3	2.2	0.43	0.60	25.0
Approach		74	0.0	0.097	4.8	LOS A	0.3	2.2	0.43	0.60	25.1
East: Davenport Road											
4	L2	75	0.0	0.138	4.3	LOS A	0.0	0.0	0.00	0.15	43.2
5	T1	190	0.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.15	44.7
Approach		265	0.0	0.138	1.2	NA	0.0	0.0	0.00	0.15	44.2
West: Davenport Road											
11	T1	363	0.0	0.195	0.1	LOS A	0.1	0.7	0.03	0.02	48.6
12	R2	12	0.0	0.195	5.6	LOS A	0.1	0.7	0.03	0.02	37.2
Approach		375	0.0	0.195	0.2	NA	0.1	0.7	0.03	0.02	48.0
All Vehicles		714	0.0	0.195	1.1	NA	0.3	2.2	0.06	0.13	42.0

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	3	0.0	0.008	2.3	LOS A	0.0	0.2	0.25	0.40	27.9
3	R2	5	0.0	0.008	3.7	LOS A	0.0	0.2	0.25	0.40	26.8
Approach		8	0.0	0.008	3.2	LOS A	0.0	0.2	0.25	0.40	27.2
East: Davenport Road											
4	L2	24	0.0	0.073	4.3	LOS A	0.0	0.0	0.00	0.09	44.7
5	T1	117	0.0	0.073	0.0	LOS A	0.0	0.0	0.00	0.09	46.6
Approach		141	0.0	0.073	0.7	NA	0.0	0.0	0.00	0.09	46.2
West: Davenport Road											
11	T1	235	0.0	0.136	0.1	LOS A	0.2	1.2	0.06	0.05	46.9
12	R2	24	0.0	0.136	5.0	LOS A	0.2	1.2	0.06	0.05	36.4
Approach		259	0.0	0.136	0.5	NA	0.2	1.2	0.06	0.05	45.4
All Vehicles		408	0.0	0.136	0.6	NA	0.2	1.2	0.04	0.07	45.0

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	23	0.0	0.046	2.9	LOS A	0.2	1.1	0.40	0.50	26.9
3	R2	19	0.0	0.046	5.4	LOS A	0.2	1.1	0.40	0.50	25.9
Approach		42	0.0	0.046	4.0	LOS A	0.2	1.1	0.40	0.50	26.5
East: Davenport Road											
4	L2	34	0.0	0.165	4.3	LOS A	0.0	0.0	0.00	0.06	45.6
5	T1	286	0.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.06	47.8
Approach		320	0.0	0.165	0.5	NA	0.0	0.0	0.00	0.06	47.5
West: Davenport Road											
11	T1	340	0.0	0.186	0.1	LOS A	0.1	1.0	0.05	0.02	48.1
12	R2	15	0.0	0.186	5.9	LOS A	0.1	1.0	0.05	0.02	37.0
Approach		355	0.0	0.186	0.3	NA	0.1	1.0	0.05	0.02	47.4
All Vehicles		717	0.0	0.186	0.6	NA	0.2	1.1	0.05	0.07	44.9

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 6											
1	L2	47	0.0	0.129	3.8	LOS A	0.4	3.1	0.53	0.65	25.3
3	R2	43	0.0	0.129	7.6	LOS A	0.4	3.1	0.53	0.65	24.2
Approach		90	0.0	0.129	5.6	LOS A	0.4	3.1	0.53	0.65	24.8
East: Davenport Road											
4	L2	69	0.0	0.281	4.3	LOS A	0.0	0.0	0.00	0.07	45.3
5	T1	475	0.0	0.281	0.0	LOS A	0.0	0.0	0.00	0.07	47.4
Approach		544	0.0	0.281	0.5	NA	0.0	0.0	0.00	0.07	47.1
West: Davenport Road											
11	T1	313	0.0	0.201	0.6	LOS A	0.5	3.4	0.18	0.07	44.2
12	R2	40	0.0	0.201	7.3	LOS A	0.5	3.4	0.18	0.07	35.1
Approach		353	0.0	0.201	1.3	NA	0.5	3.4	0.18	0.07	42.6
All Vehicles		987	0.0	0.281	1.3	NA	0.5	3.4	0.11	0.12	41.5

1.7 Davenport Street - Access Way 7

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	6	0.0	0.004	2.2	LOS A	0.0	0.1	0.18	0.32	33.2
3	R2	5	0.0	0.005	3.3	LOS A	0.0	0.1	0.31	0.43	27.2
Approach		11	0.0	0.005	2.7	LOS A	0.0	0.1	0.24	0.37	30.6
East: Davenport Road											
4	L2	20	0.0	0.058	4.6	LOS A	0.0	0.0	0.00	0.10	44.8
5	T1	92	0.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.10	47.5
Approach		112	0.0	0.058	0.8	NA	0.0	0.0	0.00	0.10	47.0
West: Davenport Road											
11	T1	126	0.0	0.101	0.2	LOS A	0.3	2.4	0.15	0.17	44.1
12	R2	58	0.0	0.101	4.9	LOS A	0.3	2.4	0.15	0.17	37.7
Approach		184	0.0	0.101	1.7	NA	0.3	2.4	0.15	0.17	41.7
All Vehicles		307	0.0	0.101	1.4	NA	0.3	2.4	0.10	0.15	42.8

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	24	0.0	0.016	2.2	LOS A	0.1	0.4	0.16	0.32	33.3
3	R2	19	0.0	0.023	4.1	LOS A	0.1	0.5	0.41	0.53	26.4
Approach		43	0.0	0.023	3.0	LOS A	0.1	0.5	0.27	0.41	30.4
East: Davenport Road											
4	L2	89	0.0	0.088	4.6	LOS A	0.0	0.0	0.00	0.29	40.4
5	T1	79	0.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.29	43.2
Approach		168	0.0	0.088	2.4	NA	0.0	0.0	0.00	0.29	41.8
West: Davenport Road											
11	T1	244	0.0	0.182	0.2	LOS A	0.6	4.2	0.17	0.14	44.5
12	R2	85	0.0	0.182	5.2	LOS A	0.6	4.2	0.17	0.14	37.9
Approach		329	0.0	0.182	1.5	NA	0.6	4.2	0.17	0.14	42.4
All Vehicles		540	0.0	0.182	1.9	NA	0.6	4.2	0.13	0.21	40.9

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	20	0.0	0.013	2.3	LOS A	0.1	0.4	0.19	0.33	33.1
3	R2	32	0.0	0.044	4.9	LOS A	0.1	1.0	0.47	0.61	25.6
Approach		52	0.0	0.044	3.9	LOS A	0.1	1.0	0.36	0.50	28.6
East: Davenport Road											
4	L2	90	0.0	0.104	4.6	LOS A	0.0	0.0	0.00	0.24	41.3
5	T1	109	0.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.24	44.1
Approach		199	0.0	0.104	2.1	NA	0.0	0.0	0.00	0.24	42.9
West: Davenport Road											
11	T1	343	0.0	0.230	0.2	LOS A	0.6	4.4	0.15	0.11	45.6
12	R2	79	0.0	0.230	5.4	LOS A	0.6	4.4	0.15	0.11	38.6
Approach		422	0.0	0.230	1.2	NA	0.6	4.4	0.15	0.11	43.9
All Vehicles		673	0.0	0.230	1.7	NA	0.6	4.4	0.12	0.18	42.0

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	12	0.0	0.008	2.2	LOS A	0.0	0.2	0.19	0.33	33.2
3	R2	17	0.0	0.019	3.9	LOS A	0.1	0.4	0.38	0.50	26.7
Approach		29	0.0	0.019	3.2	LOS A	0.1	0.4	0.30	0.43	29.5
East: Davenport Road											
4	L2	20	0.0	0.063	4.6	LOS A	0.0	0.0	0.00	0.09	45.0
5	T1	101	0.0	0.063	0.0	LOS A	0.0	0.0	0.00	0.09	47.7
Approach		121	0.0	0.063	0.8	NA	0.0	0.0	0.00	0.09	47.2
West: Davenport Road											
11	T1	241	0.0	0.159	0.1	LOS A	0.4	2.6	0.10	0.10	46.1
12	R2	55	0.0	0.159	5.0	LOS A	0.4	2.6	0.10	0.10	38.9
Approach		296	0.0	0.159	1.0	NA	0.4	2.6	0.10	0.10	44.4
All Vehicles		446	0.0	0.159	1.1	NA	0.4	2.6	0.09	0.12	43.7

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	256	0.0	0.195	2.9	LOS A	0.9	6.0	0.36	0.45	32.3
3	R2	60	0.0	0.084	5.2	LOS A	0.3	1.9	0.49	0.65	25.3
Approach		316	0.0	0.195	3.3	LOS A	0.9	6.0	0.38	0.49	31.0
East: Davenport Road											
4	L2	60	0.0	0.160	4.6	LOS A	0.0	0.0	0.00	0.11	44.6
5	T1	249	0.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.11	47.3
Approach		309	0.0	0.160	0.9	NA	0.0	0.0	0.00	0.11	46.8
West: Davenport Road											
11	T1	294	0.0	0.181	0.2	LOS A	0.3	2.4	0.12	0.07	46.8
12	R2	39	0.0	0.181	5.8	LOS A	0.3	2.4	0.12	0.07	39.3
Approach		333	0.0	0.181	0.9	NA	0.3	2.4	0.12	0.07	45.6
All Vehicles		958	0.0	0.195	1.7	NA	0.9	6.0	0.17	0.22	39.4

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 7											
1	L2	130	0.0	0.111	3.3	LOS A	0.4	3.1	0.42	0.50	32.0
3	R2	90	0.0	0.156	6.8	LOS A	0.5	3.6	0.59	0.75	23.8
Approach		220	0.0	0.156	4.7	LOS A	0.5	3.6	0.49	0.60	28.7
East: Davenport Road											
4	L2	158	0.0	0.272	4.6	LOS A	0.0	0.0	0.00	0.16	43.1
5	T1	364	0.0	0.272	0.0	LOS A	0.0	0.0	0.00	0.16	45.9
Approach		522	0.0	0.272	1.4	NA	0.0	0.0	0.00	0.16	45.1
West: Davenport Road											
11	T1	265	0.0	0.213	1.1	LOS A	0.8	5.9	0.32	0.15	43.1
12	R2	79	0.0	0.213	7.1	LOS A	0.8	5.9	0.32	0.15	37.0
Approach		344	0.0	0.213	2.4	NA	0.8	5.9	0.32	0.15	41.4
All Vehicles		1086	0.0	0.272	2.4	NA	0.8	5.9	0.20	0.25	39.3

1.8 Davenport Street - Access Way 8A

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	22	0.0	0.071	2.1	LOS A	0.2	1.7	0.15	0.39	34.0
3	R2	61	0.0	0.071	3.0	LOS A	0.2	1.7	0.15	0.39	32.2
Approach		83	0.0	0.071	2.8	LOS A	0.2	1.7	0.15	0.39	32.7
East: Davenport Road											
4	L2	58	0.0	0.052	4.6	LOS A	0.0	0.0	0.00	0.32	41.8
5	T1	40	0.0	0.052	0.0	LOS A	0.0	0.0	0.00	0.32	44.3
Approach		98	0.0	0.052	2.7	NA	0.0	0.0	0.00	0.32	42.9
West: Davenport Road											
11	T1	123	0.0	0.072	0.0	LOS A	0.1	0.7	0.05	0.06	48.4
12	R2	15	0.0	0.072	4.9	LOS A	0.1	0.7	0.05	0.06	39.7
Approach		138	0.0	0.072	0.6	NA	0.1	0.7	0.05	0.06	47.3
All Vehicles		319	0.0	0.072	1.8	NA	0.2	1.7	0.06	0.23	41.6

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	126	0.0	0.304	2.2	LOS A	1.3	9.0	0.23	0.44	33.3
3	R2	213	0.0	0.304	4.0	LOS A	1.3	9.0	0.23	0.44	31.6
Approach		339	0.0	0.304	3.3	LOS A	1.3	9.0	0.23	0.44	32.3
East: Davenport Road											
4	L2	34	0.0	0.054	4.6	LOS A	0.0	0.0	0.00	0.18	44.3
5	T1	69	0.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.18	46.7
Approach		103	0.0	0.054	1.5	NA	0.0	0.0	0.00	0.18	46.0
West: Davenport Road											
11	T1	116	0.0	0.138	0.3	LOS A	0.6	4.5	0.20	0.28	43.5
12	R2	126	0.0	0.138	4.9	LOS A	0.6	4.5	0.20	0.28	36.0
Approach		242	0.0	0.138	2.7	NA	0.6	4.5	0.20	0.28	39.4
All Vehicles		684	0.0	0.304	2.8	NA	1.3	9.0	0.18	0.34	36.4

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	101	0.0	0.394	2.4	LOS A	2.0	14.0	0.28	0.50	32.5
3	R2	306	0.0	0.394	4.6	LOS A	2.0	14.0	0.28	0.50	30.8
Approach		407	0.0	0.394	4.0	LOS A	2.0	14.0	0.28	0.50	31.2
East: Davenport Road											
4	L2	67	0.0	0.068	4.6	LOS A	0.0	0.0	0.00	0.28	42.5
5	T1	62	0.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.28	44.9
Approach		129	0.0	0.068	2.4	NA	0.0	0.0	0.00	0.28	43.8
West: Davenport Road											
11	T1	117	0.0	0.151	0.4	LOS A	0.7	5.1	0.24	0.30	43.0
12	R2	144	0.0	0.151	5.0	LOS A	0.7	5.1	0.24	0.30	35.6
Approach		261	0.0	0.151	2.9	NA	0.7	5.1	0.24	0.30	38.8
All Vehicles		797	0.0	0.394	3.4	NA	2.0	14.0	0.22	0.40	35.3

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	10	0.0	0.048	2.1	LOS A	0.2	1.1	0.24	0.44	33.2
3	R2	38	0.0	0.048	3.8	LOS A	0.2	1.1	0.24	0.44	31.4
Approach		48	0.0	0.048	3.5	LOS A	0.2	1.1	0.24	0.44	31.8
East: Davenport Road											
4	L2	45	0.0	0.059	4.6	LOS A	0.0	0.0	0.00	0.22	43.7
5	T1	68	0.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.22	46.0
Approach		113	0.0	0.059	1.8	NA	0.0	0.0	0.00	0.22	45.2
West: Davenport Road											
11	T1	257	0.0	0.153	0.1	LOS A	0.2	1.7	0.06	0.07	48.2
12	R2	34	0.0	0.153	4.9	LOS A	0.2	1.7	0.06	0.07	39.5
Approach		291	0.0	0.153	0.6	NA	0.2	1.7	0.06	0.07	47.1
All Vehicles		452	0.0	0.153	1.2	NA	0.2	1.7	0.07	0.14	44.6

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	66	0.0	0.289	3.6	LOS A	1.2	8.2	0.52	0.70	30.6
3	R2	154	0.0	0.289	6.5	LOS A	1.2	8.2	0.52	0.70	29.1
Approach		220	0.0	0.289	5.6	LOS A	1.2	8.2	0.52	0.70	29.7
East: Davenport Road											
4	L2	153	0.0	0.263	4.6	LOS A	0.0	0.0	0.00	0.16	44.6
5	T1	352	0.0	0.263	0.0	LOS A	0.0	0.0	0.00	0.16	46.9
Approach		505	0.0	0.263	1.4	NA	0.0	0.0	0.00	0.16	46.3
West: Davenport Road											
11	T1	181	0.0	0.150	1.0	LOS A	0.6	4.1	0.32	0.16	44.7
12	R2	60	0.0	0.150	6.8	LOS A	0.6	4.1	0.32	0.16	36.9
Approach		241	0.0	0.150	2.4	NA	0.6	4.1	0.32	0.16	42.7
All Vehicles		966	0.0	0.289	2.6	NA	1.2	8.2	0.20	0.29	40.6

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 8											
1	L2	68	0.0	0.213	3.1	LOS A	0.8	5.4	0.48	0.62	31.5
3	R2	103	0.0	0.213	6.2	LOS A	0.8	5.4	0.48	0.62	29.8
Approach		171	0.0	0.213	5.0	LOS A	0.8	5.4	0.48	0.62	30.5
East: Davenport Road											
4	L2	181	0.0	0.258	4.6	LOS A	0.0	0.0	0.00	0.20	44.0
5	T1	313	0.0	0.258	0.0	LOS A	0.0	0.0	0.00	0.20	46.3
Approach		494	0.0	0.258	1.7	NA	0.0	0.0	0.00	0.20	45.5
West: Davenport Road											
11	T1	241	0.0	0.161	0.6	LOS A	0.4	3.0	0.20	0.09	46.7
12	R2	40	0.0	0.161	6.8	LOS A	0.4	3.0	0.20	0.09	38.4
Approach		281	0.0	0.161	1.5	NA	0.4	3.0	0.20	0.09	45.4
All Vehicles		946	0.0	0.258	2.2	NA	0.8	5.4	0.14	0.24	42.1

1.9 Davenport Street - Access Way 8B

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.032	4.6	LOS A	0.0	0.0	0.00	0.01	47.8
5	T1	62	0.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.01	49.8
Approach		63	0.0	0.032	0.1	NA	0.0	0.0	0.00	0.01	49.8
West: Davenport Road											
11	T1	149	0.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
12	R2	1	0.0	0.077	5.0	LOS A	0.0	0.0	0.00	0.00	40.5
Approach		150	0.0	0.077	0.0	NA	0.0	0.0	0.00	0.00	49.8
All Vehicles		213	0.0	0.077	0.0	NA	0.0	0.0	0.00	0.01	49.8

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.114	4.6	LOS A	0.0	0.0	0.00	0.00	47.9
5	T1	221	0.0	0.114	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
Approach		222	0.0	0.114	0.0	NA	0.0	0.0	0.00	0.00	49.9
West: Davenport Road											
11	T1	249	0.0	0.148	0.1	LOS A	0.2	1.6	0.09	0.06	48.0
12	R2	29	0.0	0.148	5.6	LOS A	0.2	1.6	0.09	0.06	39.1
Approach		278	0.0	0.148	0.7	NA	0.2	1.6	0.09	0.06	47.0
All Vehicles		500	0.0	0.148	0.4	NA	0.2	1.6	0.05	0.04	48.3

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.092	4.6	LOS A	0.0	0.0	0.00	0.00	47.9
5	T1	178	0.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
Approach		179	0.0	0.092	0.0	NA	0.0	0.0	0.00	0.00	49.9
West: Davenport Road											
11	T1	279	0.0	0.173	0.1	LOS A	0.3	2.3	0.10	0.08	47.6
12	R2	44	0.0	0.173	5.5	LOS A	0.3	2.3	0.10	0.08	38.8
Approach		323	0.0	0.173	0.9	NA	0.3	2.3	0.10	0.08	46.3
All Vehicles		502	0.0	0.173	0.6	NA	0.3	2.3	0.06	0.05	47.5

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.034	4.6	LOS A	0.0	0.0	0.00	0.01	47.8
5	T1	66	0.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.01	49.8
Approach		67	0.0	0.034	0.1	NA	0.0	0.0	0.00	0.01	49.8
West: Davenport Road											
11	T1	299	0.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
12	R2	1	0.0	0.153	5.1	LOS A	0.0	0.0	0.00	0.00	40.5
Approach		300	0.0	0.153	0.0	NA	0.0	0.0	0.00	0.00	49.9
All Vehicles		367	0.0	0.153	0.0	NA	0.0	0.0	0.00	0.00	49.9

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.218	4.6	LOS A	0.0	0.0	0.00	0.00	48.0
5	T1	424	0.0	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
Approach		425	0.0	0.218	0.0	NA	0.0	0.0	0.00	0.00	49.9
West: Davenport Road											
11	T1	237	0.0	0.128	0.1	LOS A	0.1	0.6	0.04	0.02	49.2
12	R2	8	0.0	0.128	6.6	LOS A	0.1	0.6	0.04	0.02	40.0
Approach		245	0.0	0.128	0.3	NA	0.1	0.6	0.04	0.02	48.9
All Vehicles		670	0.0	0.218	0.1	NA	0.1	0.6	0.02	0.01	49.5

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Davenport Road											
4	L2	1	0.0	0.191	4.6	LOS A	0.0	0.0	0.00	0.00	48.0
5	T1	371	0.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
Approach		372	0.0	0.191	0.0	NA	0.0	0.0	0.00	0.00	49.9
West: Davenport Road											
11	T1	278	0.0	0.155	0.1	LOS A	0.1	1.0	0.06	0.03	48.8
12	R2	15	0.0	0.155	6.4	LOS A	0.1	1.0	0.06	0.03	39.7
Approach		293	0.0	0.155	0.4	NA	0.1	1.0	0.06	0.03	48.3
All Vehicles		665	0.0	0.191	0.2	NA	0.1	1.0	0.03	0.01	49.2

1.10 Davenport Street - Access Way 9

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	1	0.0	0.023	2.1	LOS A	0.1	0.5	0.24	0.42	21.1
3	R2	24	0.0	0.023	2.9	LOS A	0.1	0.5	0.24	0.42	32.7
Approach		25	0.0	0.023	2.9	LOS A	0.1	0.5	0.24	0.42	32.3
East: Davenport Road											
4	L2	22	0.0	0.046	4.6	LOS A	0.0	0.0	0.00	0.13	45.5
5	T1	67	0.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.13	46.5
Approach		89	0.0	0.046	1.1	NA	0.0	0.0	0.00	0.13	46.2
West: Davenport Road											
11	T1	96	0.0	0.062	0.1	LOS A	0.1	0.9	0.08	0.10	47.0
12	R2	21	0.0	0.062	4.1	LOS A	0.1	0.9	0.08	0.10	34.6
Approach		117	0.0	0.062	0.8	NA	0.1	0.9	0.08	0.10	44.8
All Vehicles		231	0.0	0.062	1.2	NA	0.1	0.9	0.06	0.15	43.2

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	134	0.0	0.136	2.4	LOS A	0.5	3.8	0.25	0.40	21.3
3	R2	39	0.0	0.136	4.1	LOS A	0.5	3.8	0.25	0.40	32.8
Approach		173	0.0	0.136	2.8	LOS A	0.5	3.8	0.25	0.40	24.0
East: Davenport Road											
4	L2	18	0.0	0.082	4.6	LOS A	0.0	0.0	0.00	0.06	46.9
5	T1	141	0.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.06	48.3
Approach		159	0.0	0.082	0.5	NA	0.0	0.0	0.00	0.06	48.1
West: Davenport Road											
11	T1	176	0.0	0.140	0.2	LOS A	0.5	3.4	0.18	0.17	44.8
12	R2	76	0.0	0.140	4.4	LOS A	0.5	3.4	0.18	0.17	33.0
Approach		252	0.0	0.140	1.5	NA	0.5	3.4	0.18	0.17	41.1
All Vehicles		584	0.0	0.140	1.6	NA	0.5	3.8	0.15	0.21	35.6

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	86	0.0	0.129	2.3	LOS A	0.5	3.4	0.24	0.42	21.2
3	R2	61	0.0	0.129	4.3	LOS A	0.5	3.4	0.24	0.42	32.7
Approach		147	0.0	0.129	3.1	LOS A	0.5	3.4	0.24	0.42	26.1
East: Davenport Road											
4	L2	31	0.0	0.076	4.6	LOS A	0.0	0.0	0.00	0.12	45.9
5	T1	115	0.0	0.076	0.0	LOS A	0.0	0.0	0.00	0.12	47.0
Approach		146	0.0	0.076	1.0	NA	0.0	0.0	0.00	0.12	46.7
West: Davenport Road											
11	T1	199	0.0	0.171	0.3	LOS A	0.7	4.8	0.20	0.19	44.2
12	R2	107	0.0	0.171	4.4	LOS A	0.7	4.8	0.20	0.19	32.6
Approach		306	0.0	0.171	1.7	NA	0.7	4.8	0.20	0.19	40.0
All Vehicles		599	0.0	0.171	1.9	NA	0.7	4.8	0.16	0.23	36.6

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	1	0.0	0.027	2.1	LOS A	0.1	0.6	0.31	0.47	20.8
3	R2	25	0.0	0.027	3.5	LOS A	0.1	0.6	0.31	0.47	32.3
Approach		26	0.0	0.027	3.5	LOS A	0.1	0.6	0.31	0.47	31.9
East: Davenport Road											
4	L2	20	67.0	0.041	5.2	LOS A	0.0	0.0	0.00	0.15	40.0
5	T1	49	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.15	48.3
Approach		69	19.4	0.041	1.5	NA	0.0	0.0	0.00	0.15	45.1
West: Davenport Road											
11	T1	238	0.0	0.150	0.1	LOS A	0.3	2.1	0.07	0.09	47.3
12	R2	46	0.0	0.150	4.1	LOS A	0.3	2.1	0.07	0.09	34.8
Approach		284	0.0	0.150	0.7	NA	0.3	2.1	0.07	0.09	45.2
All Vehicles		379	3.5	0.150	1.0	NA	0.3	2.1	0.07	0.13	43.7

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	74	0.0	0.172	3.5	LOS A	0.6	4.4	0.47	0.61	20.3
3	R2	77	0.0	0.172	5.4	LOS A	0.6	4.4	0.47	0.61	31.3
Approach		151	0.0	0.172	4.4	LOS A	0.6	4.4	0.47	0.61	26.0
East: Davenport Road											
4	L2	23	0.0	0.209	4.6	LOS A	0.0	0.0	0.00	0.03	47.5
5	T1	383	0.0	0.209	0.0	LOS A	0.0	0.0	0.00	0.03	49.1
Approach		406	0.0	0.209	0.3	NA	0.0	0.0	0.00	0.03	49.0
West: Davenport Road											
11	T1	151	0.0	0.120	0.7	LOS A	0.4	3.0	0.27	0.15	44.5
12	R2	50	0.0	0.120	5.5	LOS A	0.4	3.0	0.27	0.15	32.8
Approach		201	0.0	0.120	1.9	NA	0.4	3.0	0.27	0.15	41.5
All Vehicles		758	0.0	0.209	1.5	NA	0.6	4.4	0.16	0.18	40.0

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Access 9											
1	L2	57	0.0	0.220	2.8	LOS A	0.8	5.7	0.43	0.59	20.3
3	R2	138	0.0	0.220	5.0	LOS A	0.8	5.7	0.43	0.59	31.4
Approach		195	0.0	0.220	4.4	LOS A	0.8	5.7	0.43	0.59	28.2
East: Davenport Road											
4	L2	109	0.0	0.182	4.6	LOS A	0.0	0.0	0.00	0.17	44.9
5	T1	240	0.0	0.182	0.0	LOS A	0.0	0.0	0.00	0.17	45.7
Approach		349	0.0	0.182	1.4	NA	0.0	0.0	0.00	0.17	45.4
West: Davenport Road											
11	T1	140	0.0	0.149	0.9	LOS A	0.7	4.8	0.36	0.25	42.3
12	R2	98	0.0	0.149	5.2	LOS A	0.7	4.8	0.36	0.25	31.2
Approach		238	0.0	0.149	2.7	NA	0.7	4.8	0.36	0.25	37.6
All Vehicles		782	0.0	0.220	2.5	NA	0.8	5.7	0.22	0.30	37.3

1.11 Burroughs Road - Access Way 10

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	12	0.0	0.011	2.2	LOS A	0.0	0.3	0.19	0.34	27.8
23	R2	3	0.0	0.011	3.0	LOS A	0.0	0.3	0.19	0.34	26.5
Approach		15	0.0	0.011	2.4	LOS A	0.0	0.3	0.19	0.34	27.6
NorthEast: Burroughs Road											
24	L2	1	0.0	0.052	3.7	LOS A	0.0	0.0	0.00	0.01	46.7
25	T1	102	4.2	0.052	0.0	LOS A	0.0	0.0	0.00	0.01	59.7
Approach		103	4.2	0.052	0.0	NA	0.0	0.0	0.00	0.01	59.5
SouthWest: Burroughs Road											
31	T1	116	2.1	0.069	0.1	LOS A	0.1	0.8	0.07	0.08	53.9
32	R2	18	0.0	0.069	4.6	LOS A	0.1	0.8	0.07	0.08	38.4
Approach		134	1.8	0.069	0.7	NA	0.1	0.8	0.07	0.08	50.1
All Vehicles		252	2.7	0.069	0.5	NA	0.1	0.8	0.05	0.06	49.8

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	5	0.0	0.018	2.6	LOS A	0.1	0.4	0.38	0.48	26.3
23	R2	10	0.0	0.018	4.7	LOS A	0.1	0.4	0.38	0.48	25.0
Approach		15	0.0	0.018	4.0	LOS A	0.1	0.4	0.38	0.48	25.5
NorthEast: Burroughs Road											
24	L2	1	0.0	0.116	3.7	LOS A	0.0	0.0	0.00	0.00	46.8
25	T1	224	5.8	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		225	5.7	0.116	0.0	NA	0.0	0.0	0.00	0.00	59.7
SouthWest: Burroughs Road											
31	T1	346	0.0	0.181	0.0	LOS A	0.1	0.8	0.03	0.02	57.8
32	R2	13	0.0	0.181	5.2	LOS A	0.1	0.8	0.03	0.02	39.7
Approach		361	0.0	0.181	0.2	NA	0.1	0.8	0.03	0.02	56.5
All Vehicles		601	2.2	0.181	0.2	NA	0.1	0.8	0.03	0.03	55.3

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	1	0.0	0.040	2.6	LOS A	0.1	0.9	0.45	0.57	25.6
23	R2	29	0.0	0.040	4.7	LOS A	0.1	0.9	0.45	0.57	24.4
Approach		30	0.0	0.040	4.6	LOS A	0.1	0.9	0.45	0.57	24.4
NorthEast: Burroughs Road											
24	L2	1	0.0	0.110	3.7	LOS A	0.0	0.0	0.00	0.00	46.8
25	T1	218	2.6	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		219	2.6	0.110	0.0	NA	0.0	0.0	0.00	0.00	59.7
SouthWest: Burroughs Road											
31	T1	322	0.9	0.181	0.1	LOS A	0.2	1.7	0.07	0.05	55.2
32	R2	30	0.0	0.181	5.1	LOS A	0.2	1.7	0.07	0.05	38.8
Approach		352	0.8	0.181	0.5	NA	0.2	1.7	0.07	0.05	52.5
All Vehicles		601	1.4	0.181	0.6	NA	0.2	1.7	0.07	0.06	50.9

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	5	0.0	0.009	2.4	LOS A	0.0	0.2	0.28	0.40	27.3
23	R2	5	0.0	0.009	3.8	LOS A	0.0	0.2	0.28	0.40	26.0
Approach		10	0.0	0.009	3.1	LOS A	0.0	0.2	0.28	0.40	26.7
NorthEast: Burroughs Road											
24	L2	1	0.0	0.083	3.7	LOS A	0.0	0.0	0.00	0.00	46.8
25	T1	159	7.2	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		160	7.2	0.083	0.0	NA	0.0	0.0	0.00	0.00	59.6
SouthWest: Burroughs Road											
31	T1	258	0.0	0.130	0.0	LOS A	0.0	0.2	0.01	0.01	59.4
32	R2	3	0.0	0.130	4.8	LOS A	0.0	0.2	0.01	0.01	40.2
Approach		261	0.0	0.130	0.1	NA	0.0	0.2	0.01	0.01	58.9
All Vehicles		431	2.7	0.130	0.1	NA	0.0	0.2	0.01	0.01	56.9

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	6	0.0	0.011	3.2	LOS A	0.0	0.3	0.44	0.48	26.1
23	R2	3	0.0	0.011	6.2	LOS A	0.0	0.3	0.44	0.48	24.9
Approach		9	0.0	0.011	4.2	LOS A	0.0	0.3	0.44	0.48	25.7
NorthEast: Burroughs Road											
24	L2	1	2.7	0.192	3.7	LOS A	0.0	0.0	0.00	0.00	46.7
25	T1	378	3.4	0.192	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		379	3.4	0.192	0.0	NA	0.0	0.0	0.00	0.00	59.8
SouthWest: Burroughs Road											
31	T1	371	4.7	0.227	0.4	LOS A	0.5	3.5	0.12	0.05	53.8
32	R2	32	39.4	0.227	6.9	LOS A	0.5	3.5	0.12	0.05	38.2
Approach		403	7.4	0.227	0.9	NA	0.5	3.5	0.12	0.05	51.4
All Vehicles		791	5.4	0.227	0.5	NA	0.5	3.5	0.07	0.03	54.1

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 10											
21	L2	8	0.0	0.020	2.7	LOS A	0.1	0.5	0.38	0.47	26.5
23	R2	10	0.0	0.020	4.8	LOS A	0.1	0.5	0.38	0.47	25.2
Approach		18	0.0	0.020	3.9	LOS A	0.1	0.5	0.38	0.47	25.8
NorthEast: Burroughs Road											
24	L2	4	0.0	0.126	3.7	LOS A	0.0	0.0	0.00	0.01	46.7
25	T1	249	1.2	0.126	0.0	LOS A	0.0	0.0	0.00	0.01	59.5
Approach		253	1.2	0.126	0.1	NA	0.0	0.0	0.00	0.01	59.1
SouthWest: Burroughs Road											
31	T1	307	1.0	0.185	0.2	LOS A	0.4	2.6	0.12	0.07	53.1
32	R2	44	0.0	0.185	5.3	LOS A	0.4	2.6	0.12	0.07	38.1
Approach		351	0.9	0.185	0.8	NA	0.4	2.6	0.12	0.07	49.7
All Vehicles		622	1.0	0.185	0.6	NA	0.4	2.6	0.08	0.06	51.0

1.12 Burroughs Road - Access Way 11

2021 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	102	0.0	0.094	2.3	LOS A	0.4	2.6	0.23	0.37	28.3
23	R2	21	0.0	0.094	3.8	LOS A	0.4	2.6	0.23	0.37	27.2
Approach		123	0.0	0.094	2.6	LOS A	0.4	2.6	0.23	0.37	28.1
NorthEast: Burroughs Road											
24	L2	7	0.0	0.066	4.3	LOS A	0.0	0.0	0.00	0.51	34.5
25	T1	120	2.6	0.066	3.0	LOS A	0.0	0.0	0.00	0.51	23.2
Approach		127	2.7	0.066	3.1	LOS A	0.0	0.0	0.00	0.51	23.7
SouthWest: Burroughs Road											
31	T1	141	9.6	0.095	3.3	LOS A	0.6	4.5	0.30	0.39	21.4
32	R2	17	0.0	0.095	14.4	LOS B	0.6	4.5	0.30	0.39	31.3
Approach		158	8.8	0.095	4.5	LOS A	0.6	4.5	0.30	0.39	22.4
All Vehicles		408	4.2	0.095	3.5	NA	0.6	4.5	0.19	0.42	24.6

2021 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	12	0.0	0.011	2.7	LOS A	0.0	0.3	0.33	0.40	27.8
23	R2	1	0.0	0.011	6.4	LOS A	0.0	0.3	0.33	0.40	26.7
Approach		13	0.0	0.011	3.0	LOS A	0.0	0.3	0.33	0.40	27.8
NorthEast: Burroughs Road											
24	L2	1	0.0	0.134	4.3	LOS A	0.0	0.0	0.00	0.51	34.6
25	T1	258	1.9	0.134	3.0	LOS A	0.0	0.0	0.00	0.51	23.3
Approach		259	1.9	0.134	3.0	LOS A	0.0	0.0	0.00	0.51	23.3
SouthWest: Burroughs Road											
31	T1	373	0.0	0.213	3.3	LOS A	1.8	12.4	0.40	0.33	21.0
32	R2	18	0.0	0.213	43.3	LOS E	1.8	12.4	0.40	0.33	30.4
Approach		391	0.0	0.213	5.2	LOS A	1.8	12.4	0.40	0.33	21.4
All Vehicles		663	0.7	0.213	4.3	NA	1.8	12.4	0.24	0.40	22.2

2021 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	19	0.0	0.016	2.6	LOS A	0.1	0.4	0.31	0.39	28.0
23	R2	1	0.0	0.016	6.1	LOS A	0.1	0.4	0.31	0.39	26.9
Approach		20	0.0	0.016	2.8	LOS A	0.1	0.4	0.31	0.39	27.9
NorthEast: Burroughs Road											
24	L2	4	0.0	0.122	4.3	LOS A	0.0	0.0	0.00	0.51	34.6
25	T1	232	0.7	0.122	3.0	LOS A	0.0	0.0	0.00	0.51	23.3
Approach		236	0.7	0.122	3.0	LOS A	0.0	0.0	0.00	0.51	23.4
SouthWest: Burroughs Road											
31	T1	364	0.8	0.205	3.3	LOS A	1.7	11.7	0.38	0.34	21.1
32	R2	15	0.0	0.205	44.9	LOS E	1.7	11.7	0.38	0.34	30.6
Approach		379	0.8	0.205	5.0	LOS A	1.7	11.7	0.38	0.34	21.5
All Vehicles		635	0.7	0.205	4.2	NA	1.7	11.7	0.24	0.40	22.4

2031 Option AM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	66	0.0	0.129	2.7	LOS A	0.5	3.4	0.37	0.49	27.3
23	R2	56	0.0	0.129	5.1	LOS A	0.5	3.4	0.37	0.49	26.2
Approach		122	0.0	0.129	3.8	LOS A	0.5	3.4	0.37	0.49	26.8
NorthEast: Burroughs Road											
24	L2	6	0.0	0.116	4.3	LOS A	0.0	0.0	0.00	0.51	34.6
25	T1	218	1.8	0.116	3.0	LOS A	0.0	0.0	0.00	0.51	23.3
Approach		224	1.7	0.116	3.0	LOS A	0.0	0.0	0.00	0.51	23.5
SouthWest: Burroughs Road											
31	T1	213	9.0	0.133	3.3	LOS A	1.0	7.5	0.40	0.33	20.7
32	R2	14	0.0	0.133	35.5	LOS E	1.0	7.5	0.40	0.33	30.1
Approach		227	8.4	0.133	5.3	LOS A	1.0	7.5	0.40	0.33	21.3
All Vehicles		573	4.0	0.133	4.1	NA	1.0	7.5	0.24	0.44	23.3

2031 Option PM

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	32	0.0	0.083	3.5	LOS A	0.3	2.0	0.52	0.61	25.2
23	R2	22	0.0	0.083	9.0	LOS A	0.3	2.0	0.52	0.61	24.2
Approach		54	0.0	0.083	5.8	LOS A	0.3	2.0	0.52	0.61	24.8
NorthEast: Burroughs Road											
24	L2	16	0.0	0.229	4.3	LOS A	0.0	0.0	0.00	0.51	34.6
25	T1	426	1.6	0.229	3.0	LOS A	0.0	0.0	0.00	0.51	23.3
Approach		442	1.5	0.229	3.0	LOS A	0.0	0.0	0.00	0.51	23.6
SouthWest: Burroughs Road											
31	T1	385	0.0	0.314	3.6	LOS A	3.2	22.7	0.59	0.32	18.7
32	R2	74	0.0	0.314	31.2	LOS D	3.2	22.7	0.59	0.32	26.7
Approach		459	0.0	0.314	8.1	LOS A	3.2	22.7	0.59	0.32	19.9
All Vehicles		955	0.7	0.314	5.6	NA	3.2	22.7	0.31	0.42	21.7

2031 Option SATURDAY

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Access 11											
21	L2	30	0.0	0.090	2.9	LOS A	0.3	2.2	0.43	0.56	26.2
23	R2	38	0.0	0.090	6.3	LOS A	0.3	2.2	0.43	0.56	25.1
Approach		68	0.0	0.090	4.8	LOS A	0.3	2.2	0.43	0.56	25.6
NorthEast: Burroughs Road											
24	L2	17	0.0	0.150	4.3	LOS A	0.0	0.0	0.00	0.51	34.5
25	T1	274	0.5	0.150	3.0	LOS A	0.0	0.0	0.00	0.51	23.2
Approach		291	0.5	0.150	3.1	LOS A	0.0	0.0	0.00	0.51	23.8
SouthWest: Burroughs Road											
31	T1	311	0.8	0.220	3.3	LOS A	1.8	12.4	0.46	0.34	20.4
32	R2	46	0.0	0.220	23.2	LOS C	1.8	12.4	0.46	0.34	29.4
Approach		357	0.7	0.220	5.9	LOS A	1.8	12.4	0.46	0.34	21.4
All Vehicles		716	0.5	0.220	4.6	NA	1.8	12.4	0.27	0.43	22.7

Appendix F1

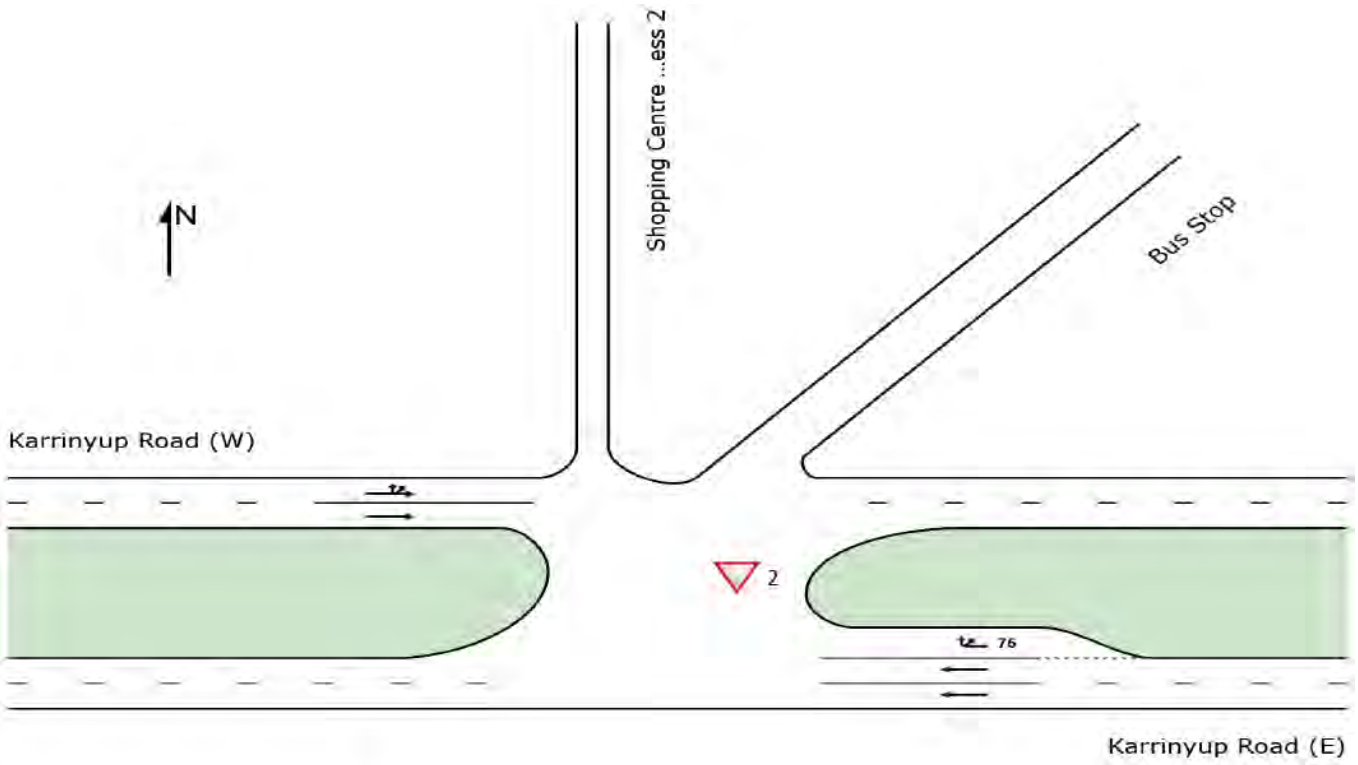
Development Access SIDRA Analysis Outputs – 2024 and 2034

SITE LAYOUT

Site: 2 [2024 Base AM (Site Folder: General)]

Karrinyup Road / Shopping Centre Access 2
Site Category: (None)
Give-Way (Two-Way)

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

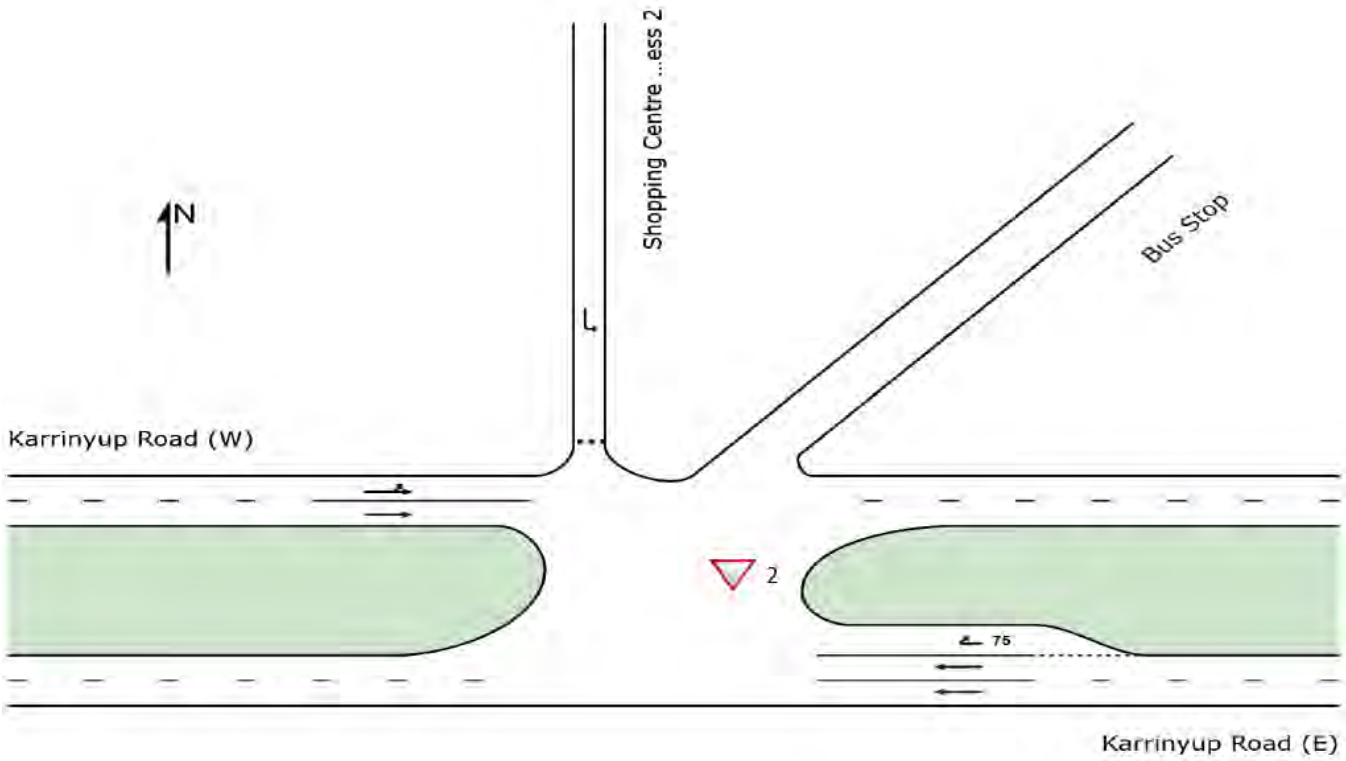


SITE LAYOUT

Site: 2 [2034 Option AM (Site Folder: General)]

Karrinyup Road / Shopping Centre Access 2
Site Category: (None)
Give-Way (Two-Way)

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



1 Karrinyup Road / Shopping Centre Access Way 2

2024 Base AM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2024 Base AM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	810	21	853	2.6	0.222	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	14	0	15	0.0	0.119	26.5	LOS D	0.4	2.8	0.90	0.97	0.90	19.9
6b	R3	2	2	2	100.0	0.119	85.7	LOS F	0.4	2.8	0.90	0.97	0.90	19.9
Approach		826	23	869	2.8	0.222	0.7	LOS NA	0.4	2.8	0.02	0.02	0.02	57.6
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	33	0	34	0.0	0.378	7.0	LOS A	0.0	0.0	0.00	0.04	0.00	56.4
10a	L1	8	8	8	100.0	0.378	7.1	LOS A	0.0	0.0	0.00	0.04	0.00	53.8
11	T1	1340	16	1411	1.2	0.378	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		1381	24	1453	1.8	0.378	0.3	LOS NA	0.0	0.0	0.00	0.02	0.00	59.4
All Vehicles		2207	47	2323	2.1	0.378	0.5	LOS NA	0.4	2.8	0.01	0.02	0.01	58.7

2024 Base PM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2024 Base PM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1320	7	1389	0.5	0.357	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	47	0	50	0.0	0.132	15.6	LOS C	0.5	3.5	0.73	0.93	0.73	21.9
6b	R3	4	4	4	100.0	0.132	30.6	LOS D	0.5	3.5	0.73	0.93	0.73	21.9
Approach		1371	11	1444	0.8	0.357	0.7	LOS NA	0.5	3.5	0.03	0.03	0.03	56.1
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	48	0	50	0.0	0.252	6.9	LOS A	0.0	0.0	0.00	0.09	0.00	56.1
10a	L1	8	8	8	100.0	0.252	7.0	LOS A	0.0	0.0	0.00	0.09	0.00	54.8
11	T1	867	3	912	0.4	0.252	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		922	11	971	1.2	0.252	0.5	LOS NA	0.0	0.0	0.00	0.05	0.00	59.3
All Vehicles		2294	22	2415	1.0	0.357	0.6	LOS NA	0.5	3.5	0.02	0.04	0.02	57.3

2024 Base Sat

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2024 Base Sat
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1856	8	977	0.5	0.251	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	121	0	64	0.0	0.278	26.1	LOS D	1.0	6.9	0.88	1.00	1.00	20.8
6b	R3	1	1	1	100.0	0.278	67.3	LOS F	1.0	6.9	0.88	1.00	1.00	20.8
Approach		1979	9	1041	0.5	0.278	1.7	LOS NA	1.0	6.9	0.05	0.06	0.06	53.5
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	148	0	78	0.0	0.353	6.9	LOS A	0.0	0.0	0.00	0.09	0.00	56.0
10a	L1	1	1	1	100.0	0.353	7.2	LOS A	0.0	0.0	0.00	0.09	0.00	51.6
11	T1	2445	26	1287	1.0	0.353	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		2594	27	1365	1.0	0.353	0.5	LOS NA	0.0	0.0	0.00	0.05	0.00	59.2
All Vehicles		4573	36	2407	0.8	0.353	1.0	LOS NA	1.0	6.9	0.02	0.05	0.03	56.6

1 Karrinyup Road / Shopping Centre Access Way 2

2034 Do Minimum AM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Do Minimum AM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	794	29	835	3.6	0.219	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	20	0	21	0.0	0.179	34.4	LOS D	0.5	3.9	0.93	0.99	0.95	19.4
6b	R3	1	1	1	100.0	0.179	133.5	LOS F	0.5	3.9	0.93	0.99	0.95	19.4
Approach		814	30	857	3.6	0.219	1.0	LOS NA	0.5	3.9	0.02	0.02	0.02	56.8
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	26	0	27	0.0	0.415	7.0	LOS A	0.0	0.0	0.00	0.03	0.00	56.5
10a	L1	1	1	1	100.0	0.415	7.2	LOS A	0.0	0.0	0.00	0.03	0.00	52.0
11	T1	1495	22	1573	1.5	0.415	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		1522	23	1602	1.5	0.415	0.3	LOS NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles		2336	52	2459	2.2	0.415	0.5	LOS NA	0.5	3.9	0.01	0.02	0.01	58.6

2034 Do Minimum PM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Do Minimum PM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1237	24	1302	2.0	0.338	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	47	0	49	0.0	0.152	17.1	LOS C	0.5	3.9	0.77	0.94	0.77	21.7
6b	R3	4	4	4	100.0	0.152	36.5	LOS E	0.5	3.9	0.77	0.94	0.77	21.7
Approach		1287	28	1355	2.2	0.338	0.8	LOS NA	0.5	3.9	0.03	0.04	0.03	55.9
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	38	0	40	0.0	0.275	6.9	LOS A	0.0	0.0	0.00	0.07	0.00	56.2
10a	L1	8	8	8	100.0	0.275	7.1	LOS A	0.0	0.0	0.00	0.07	0.00	54.3
11	T1	960	8	1011	0.8	0.275	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		1007	16	1060	1.6	0.275	0.4	LOS NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles		2294	44	2415	1.9	0.338	0.6	LOS NA	0.5	3.9	0.02	0.04	0.02	57.4

2034 Do Minimum Sat

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Do Minimum Sat
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2026	21	1066	1.0	0.275	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	87	0	46	0.0	0.337	33.0	LOS D	1.1	8.4	0.92	1.02	1.08	19.5
6b	R3	8	8	4	100.0	0.337	93.3	LOS F	1.1	8.4	0.92	1.02	1.08	19.5
Approach		2121	29	1116	1.4	0.337	1.8	LOS NA	1.1	8.4	0.04	0.05	0.05	54.7
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
West: Karrinyup Road (W)														
10	L2	145	0	76	0.0	0.386	7.0	LOS A	0.0	0.0	0.00	0.09	0.00	56.0
10a	L1	16	16	8	100.0	0.386	7.1	LOS A	0.0	0.0	0.00	0.09	0.00	53.8
11	T1	2664	23	1402	0.9	0.386	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		2825	39	1487	1.4	0.386	0.5	LOS NA	0.0	0.0	0.00	0.04	0.00	59.2
All Vehicles		4946	68	2603	1.4	0.386	1.1	LOS NA	1.1	8.4	0.02	0.04	0.02	57.2

1 Karrinyup Road / Shopping Centre Access Way 2

2034 Option AM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Option AM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	871	37	917	4.2	0.242	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6b	R3	2	2	2	100.0	0.108	177.2	LOS F	0.3	3.6	0.98	1.00	0.98	11.3
Approach		873	39	919	4.4	0.242	0.5	LOS NA	0.3	3.6	0.00	0.00	0.00	59.3
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
7	L2	6	0	7	0.0	0.050	25.8	LOS D	0.1	1.0	0.91	0.91	0.91	20.0
Approach		6	0	7	0.0	0.050	25.8	LOS D	0.1	1.0	0.91	0.91	0.91	20.0
West: Karrinyup Road (W)														
10a	L1	8	8	8	100.0	0.438	7.2	LOS A	0.0	0.0	0.00	0.01	0.00	53.6
11	T1	1593	24	1676	1.5	0.438	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		1601	32	1685	2.0	0.438	0.2	LOS NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		2480	70	2611	2.8	0.438	0.4	LOS NA	0.3	3.6	0.00	0.01	0.00	59.2

2034 Option PM

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Option PM
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1394	24	1467	1.8	0.380	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6b	R3	4	4	4	100.0	0.033	37.8	LOS E	0.1	1.3	0.87	0.97	0.87	19.6
Approach		1398	28	1471	2.0	0.380	0.2	LOS NA	0.1	1.3	0.00	0.00	0.00	59.4
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
7	L2	195	0	205	0.0	0.539	13.2	LOS B	2.6	18.0	0.84	1.24	1.30	21.5
Approach		195	0	205	0.0	0.539	13.2	LOS B	2.6	18.0	0.84	1.24	1.30	21.5
West: Karrinyup Road (W)														
10a	L1	8	8	8	100.0	0.279	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	55.2
11	T1	1017	5	1070	0.5	0.279	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1025	13	1079	1.2	0.279	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		2617	41	2755	1.6	0.539	1.2	LOS NA	2.6	18.0	0.06	0.10	0.10	52.6

2034 Option Sat

Project Name: Acc_2_Karrinyup Road_Access Way 2
Site Name: 2034 Option Sat
Site Title: Karrinyup Road / Shopping Centre Access 2

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

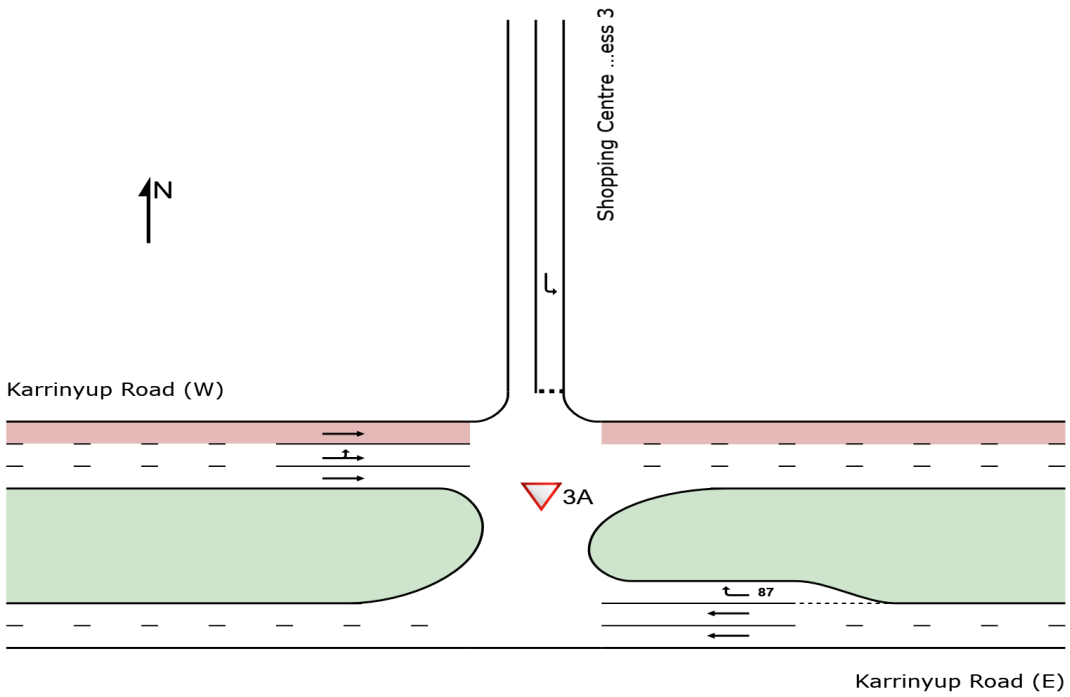
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2080	21	1095	1.0	0.282	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6b	R3	8	8	4	100.0	0.047	49.7	LOS E	0.1	1.8	0.91	0.98	0.91	18.4
Approach		2088	29	1099	1.4	0.282	0.3	LOS NA	0.1	1.8	0.00	0.00	0.00	59.3
NorthEast: Bus Stop														
Approach		0	0	0	0.0	0.000	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	0.0
North: Shopping Centre Access 2														
7	L2	576	0	303	0.0	0.981	59.6	LOS F	12.9	90.1	0.99	4.05	4.72	16.9
Approach		576	0	303	0.0	0.981	59.6	LOS F	12.9	90.1	0.99	4.05	4.72	16.9
West: Karrinyup Road (W)														
10a	L1	16	16	8	100.0	0.314	7.1	LOS A	0.0	0.0	0.00	0.01	0.00	54.3
11	T1	2282	25	1201	1.1	0.314	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2298	41	1210	1.8	0.314	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		4962	69	2611	1.4	0.981	7.1	LOS NA	12.9	90.1	0.12	0.47	0.55	46.0

SITE LAYOUT

Site: 3A [2024 Base AM (Site Folder: General)]

Karrinyup Road / Shopping Centre Access 3
Site Category: (None)
Give-Way (Two-Way)

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



2 Karrinyup Road / Shopping Centre Access Way 3

2024 Base AM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2024 Base AM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	777	16	818	2	0	0	LOS A	0	0	0	0	0	60
6	R2	83	0	88	0.0	0.270	21.7	LOS C	1.0	7.2	0.81	0.98	0.92	16.0
Approach		860	16	905	1.9	0.270	2.1	LOS NA	1.0	7.2	0.08	0.09	0.09	36.8
North: Shopping Centre Access 3														
7	L2	28	0	30	0.0	0.022	0.0	LOS A	0.1	0.7	0.04	0.00	0.04	17.5
Approach		28	0	30	0.0	0.022	0.0	LOS A	0.1	0.7	0.04	0.00	0.04	17.5
West: Karrinyup Road (W)														
10	L2	139	0	146	0.0	0.367	6.8	LOS A	0.0	0.0	0.00	0.16	0.00	52.9
11	T1	1206	20	1269	1.7	0.367	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	57.3
Approach		1345	20	1416	1.5	0.367	0.7	LOS NA	0.0	0.0	0.00	0.08	0.00	56.3
All Vehicles		2233	36	2351	1.6	0.367	1.3	LOS NA	1.0	7.2	0.03	0.09	0.03	44.5

2024 Base Sat

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2024 Base Sat
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1961	8	1032	0.4	0.265	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	629	0	331	0.0	0.808	31.8	LOS D	6.7	47.1	0.92	1.40	2.41	15.0
Approach		2590	8	1363	0.3	0.808	7.7	LOS NA	6.7	47.1	0.22	0.34	0.58	24.9
North: Shopping Centre Access 3														
7	L2	568	0	299	0	0	0	LOS A	1	8	0	0	0	18
Approach		568	0	299	0.0	0.225	0.0	LOS A	1.2	8.2	0.03	0.00	0.03	17.5
West: Karrinyup Road (W)														
10	L2	464	0	244	0.0	0.336	6.8	LOS A	0.0	0.0	0.00	0.29	0.00	51.4
11	T1	1989	29	1047	1.5	0.336	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	56.0
Approach		2453	29	1291	1.2	0.336	1.3	LOS NA	0.0	0.0	0.00	0.15	0.00	54.3
All Vehicles		5611	37	2953	0.7	0.808	4.2	LOS NA	6.7	47.1	0.11	0.22	0.27	28.5

2024 Base PM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2024 Base PM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1288	4	1356	0.3	0.348	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	150	0	158	0.0	0.288	15.8	LOS C	1.3	8.8	0.65	0.94	0.75	16.6
Approach		1438	4	1514	0.3	0.348	1.7	LOS NA	1.3	8.8	0.07	0.10	0.08	36.7
North: Shopping Centre Access 3														
7	L2	201	0	212	0	0	0	LOS A	1	5	0	0	0	18
Approach		201	0	212	0.0	0.160	0.0	LOS A	0.8	5.4	0.04	0.00	0.04	17.5
West: Karrinyup Road (W)														
10	L2	125	0	132	0.0	0.238	6.8	LOS A	0.0	0.0	0.00	0.22	0.00	52.3
11	T1	752	7	792	1.0	0.238	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	56.8
Approach		877	7	923	0.8	0.238	1.0	LOS NA	0.0	0.0	0.00	0.11	0.00	55.4
All Vehicles		2517	11	2649	0.5	0.348	1.3	LOS NA	1.3	8.8	0.04	0.10	0.05	34.2

2034 Do Minimum AM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Do Minimum AM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	776	27	816	3	0	0	LOS A	0	0	0	0	0	60
6	R2	136	0	143	0.0	0.533	29.8	LOS D	2.4	16.8	0.89	1.09	1.33	15.2
Approach		911	27	959	2.9	0.533	4.4	LOS NA	2.4	16.8	0.13	0.16	0.20	30.6
North: Shopping Centre Access 3														
7	L2	8	0	8	0.0	0.010	2.8	LOS A	0.0	0.3	0.51	0.34	0.51	17.2
Approach		8	0	8	0.0	0.010	2.8	LOS A	0.0	0.3	0.51	0.34	0.51	17.2
West: Karrinyup Road (W)														
10	L2	183	0	193	0.0	0.410	6.9	LOS A	0.0	0.0	0.00	0.19	0.00	52.5
11	T1	1317	26	1386	2.0	0.410	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	56.9
Approach		1500	26	1579	1.7	0.410	0.9	LOS NA	0.0	0.0	0.00	0.10	0.00	55.7
All Vehicles		2419	52	2546	2.2	0.533	2.2	LOS NA	2.4	16.8	0.05	0.12	0.08	41.7

2034 Do Minimum Sat

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Do Minimum Sat
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2100	20	1105	1.0	0.285	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	613	0	323	0.0	0.877	41.2	LOS E	8.4	58.8	0.96	1.56	3.05	14.2
Approach		2713	20	1428	0.7	0.877	9.3	LOS NA	8.4	58.8	0.22	0.35	0.69	24.5
North: Shopping Centre Access 3														
7	L2	466	0	245	0	0	0	LOS A	1	6	0	0	0	18
Approach		466	0	245	0.0	0.184	0.0	LOS A	0.9	6.4	0.03	0.00	0.03	17.5
West: Karrinyup Road (W)														
10	L2	436	0	229	0.0	0.364	6.8	LOS A	0.0	0.0	0.00	0.26	0.00	51.9
11	T1	2229	27	1173	1.2	0.364	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	56.3
Approach		2665	27	1403	1.0	0.364	1.1	LOS NA	0.0	0.0	0.00	0.13	0.00	54.8
All Vehicles		5844	47	3076	0.8	0.877	4.9	LOS NA	8.4	58.8	0.10	0.22	0.32	29.2

2034 Do Minimum PM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Do Minimum PM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1211	19	1275	1.6	0.330	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	222	0	233	0.0	0.468	18.8	LOS C	2.5	17.6	0.75	1.04	1.09	16.3
Approach		1433	19	1508	1.4	0.468	2.9	LOS NA	2.5	17.6	0.12	0.16	0.17	31.5
North: Shopping Centre Access 3														
7	L2	226	0	238	0	0	0	LOS A	1	6	0	0	0	18
Approach		226	0	238	0.0	0.179	0.0	LOS A	0.9	6.2	0.04	0.00	0.04	17.5
West: Karrinyup Road (W)														
10	L2	139	0	147	0.0	0.263	6.8	LOS A	0.0	0.0	0.00	0.23	0.00	52.2
11	T1	826	12	870	1.5	0.263	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	56.7
Approach		966	12	1016	1.2	0.263	1.0	LOS NA	0.0	0.0	0.00	0.11	0.00	55.3
All Vehicles		2624	31	2763	1.2	0.468	2.0	LOS NA	2.5	17.6	0.07	0.13	0.10	31.7

2034 Option AM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Option AM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	839	34	883	4	0	0	LOS A	0	0	0	0	0	60
6	R2	32	0	33	0.0	0.143	24.9	LOS C	0.5	3.3	0.85	0.96	0.85	15.7
Approach		871	34	917	3.9	0.232	0.9	LOS NA	0.5	3.3	0.03	0.04	0.03	47.2
North: Shopping Centre Access 3														
7	L2	20	0	21	0.0	0.016	0.0	LOS A	0.1	0.5	0.04	0.00	0.04	17.5
Approach		20	0	21	0.0	0.016	0.0	LOS A	0.1	0.5	0.04	0.00	0.04	17.5
West: Karrinyup Road (W)														
10	L2	242	0	255	0.0	0.439	6.9	LOS A	0.0	0.0	0.00	0.24	0.00	52.0
11	T1	1362	28	1434	2.0	0.439	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	56.4
Approach		1604	28	1689	1.7	0.439	1.1	LOS NA	0.0	0.0	0.00	0.12	0.00	55.0
All Vehicles		2495	62	2627	2.5	0.439	1.0	LOS NA	0.5	3.3	0.01	0.09	0.01	50.4

2034 Option Sat

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Option Sat
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	2049	20	1079	1.0	0.413	1.2	LOS A	2.5	17.4	0.20	0.20	0.21	55.5
6	R2	637	0	335	0.0	1.016	78.9	LOS F	15.9	111.3	1.00	2.12	5.17	11.6
Approach		2686	20	1414	0.7	1.016	19.6	LOS NA	15.9	111.3	0.39	0.65	1.39	20.2
North: Shopping Centre Access 3														
7	L2	271	0	143	0	0	0	LOS A	0	3	0	0	0	18
Approach		271	0	143	0.0	0.107	0.0	LOS A	0.5	3.4	0.03	0.00	0.03	17.5
West: Karrinyup Road (W)														
10	L2	472	0	248	0.0	0.392	6.9	LOS A	0.0	0.0	0.00	0.26	0.00	51.8
11	T1	2400	29	1263	1.2	0.392	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	56.3
Approach		2872	29	1511	1.0	0.392	1.1	LOS NA	0.0	0.0	0.00	0.13	0.00	54.8
All Vehicles		5829	48	3068	0.8	1.016	9.6	LOS NA	15.9	111.3	0.18	0.36	0.64	27.5

2034 Option PM

Project Name: Acc_3_Karrinyup Road_Access Way 3
Site Name: 2034 Option PM
Site Title: Karrinyup Road / Shopping Centre Access 3

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

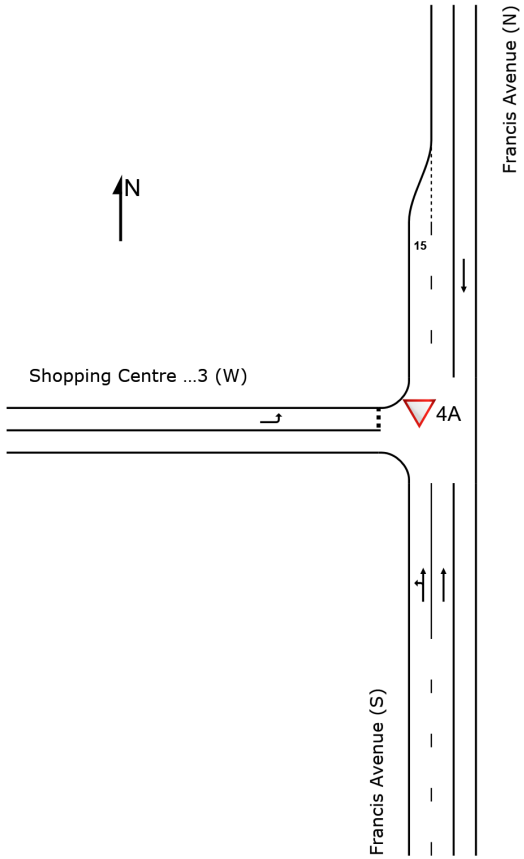
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
East: Karrinyup Road (E)														
5	T1	1302	19	1371	1.5	0.355	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	109	0	114	0.0	0.301	20.0	LOS C	1.2	8.6	0.78	0.98	0.92	16.2
Approach		1411	19	1485	1.4	0.355	1.6	LOS NA	1.2	8.6	0.06	0.08	0.07	39.7
North: Shopping Centre Access 3														
7	L2	108	0	113	0	0	0	LOS A	0	3	0	0	0	18
Approach		108	0	113	0.0	0.085	0.0	LOS A	0.4	2.7	0.04	0.00	0.04	17.5
West: Karrinyup Road (W)														
10	L2	224	0	236	0.0	0.330	6.8	LOS A	0.0	0.0	0.00	0.29	0.00	51.5
11	T1	990	9	1042	0.9	0.330	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	56.1
Approach		1214	9	1278	0.7	0.330	1.3	LOS NA	0.0	0.0	0.00	0.14	0.00	54.4
All Vehicles		2733	28	2877	1.0	0.355	1.4	LOS NA	1.2	8.6	0.03	0.10	0.04	40.3

SITE LAYOUT

Site: 4A [2024 Base AM (Site Folder: General)]

Francis Avenue / Shopping Centre Access Way 4
Site Category: (None)
Give-Way (Two-Way)

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



3 Francis Avenue / Shopping Centre Access Way 4

2024 Base AM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2024 Base AM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	122	0	128	0.0	0.069	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	324	1	341	0.2	0.175	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		446	1	470	0.1	0.175	1.4	LOS NA	0.0	0.0	0.00	0.16	0.00	39.2
North: Francis Avenue (N)														
8	T1	359	8	378	2.3	0.197	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		359	8	378	2.3	0.197	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Shopping Centre Access Way 3 (W)														
10	L2	49	0	52	0.0	0.032	0.6	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		49	0	52	0.0	0.032	0.6	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		854	9	899	1.1	0.197	0.8	LOS NA	0.0	0.0	0.00	0.09	0.00	37.7

2024 Base Sat

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2024 Base Sat
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	791	0	417	0.0	0.224	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	1326	1	698	0.1	0.358	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		2117	1	1114	0.1	0.358	1.9	LOS NA	0.0	0.0	0.00	0.23	0.00	38.9
North: Francis Avenue (N)														
8	T1	1763	17	928	1.0	0.479	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
Approach		1763	17	928	1.0	0.479	0.3	LOS NA	0.0	0.0	0.00	0.00	0.00	39.8
West: Shopping Centre Access Way 3 (W)														
10	L2	677	0	356	0.0	0.218	2.3	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		677	0	356	0.0	0.218	2.3	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		4557	18	2399	0.4	0.479	1.3	LOS NA	0.0	0.0	0.00	0.10	0.00	34.9

2024 Base PM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2024 Base PM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	234	0	246	0.0	0.132	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	550	2	579	0.3	0.297	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		783	2	824	0.2	0.297	1.5	LOS NA	0.0	0.0	0.00	0.18	0.00	39.1
North: Francis Avenue (N)														
8	T1	663	1	697	0.2	0.358	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		663	1	697	0.2	0.358	0.2	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Shopping Centre Access Way 3 (W)														
10	L2	178	0	187	0.0	0.114	1.4	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		178	0	187	0.0	0.114	1.4	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		1623	3	1709	0.2	0.358	1.0	LOS NA	0.0	0.0	0.00	0.09	0.00	36.1

2034 Do Minimum AM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Do Minimum AM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	87	0	91	0.0	0.049	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	362	0	381	0.1	0.195	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		448	0	472	0.0	0.195	1.0	LOS NA	0.0	0.0	0.00	0.12	0.00	39.4
North: Francis Avenue (N)														
8	T1	437	4	460	0.8	0.237	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		437	4	460	0.8	0.237	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Shopping Centre Access Way 3 (W)														
10	L2	67	0	70	0.0	0.043	0.7	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		67	0	70	0.0	0.043	0.7	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		952	4	1002	0.4	0.237	0.6	LOS NA	0.0	0.0	0.00	0.05	0.00	37.4

2034 Do Minimum Sat

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Do Minimum Sat
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	785	0	413	0.0	0.222	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	1448	1	762	0.1	0.391	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
Approach		2233	1	1175	0.1	0.391	1.8	LOS NA	0.0	0.0	0.00	0.21	0.00	38.9
North: Francis Avenue (N)														
8	T1	1889	29	994	1.5	0.515	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	39.7
Approach		1889	29	994	1.5	0.515	0.3	LOS NA	0.0	0.0	0.00	0.00	0.00	39.7
West: Shopping Centre Access Way 3 (W)														
10	L2	645	0	339	0.0	0.207	2.6	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		645	0	339	0.0	0.207	2.6	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		4766	30	2509	0.6	0.515	1.3	LOS NA	0.0	0.0	0.00	0.10	0.00	35.3

2034 Do Minimum PM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Do Minimum PM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	283	0	297	0.0	0.160	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	621	0	654	0.0	0.335	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		904	0	951	0.0	0.335	1.6	LOS NA	0.0	0.0	0.00	0.19	0.00	39.0
North: Francis Avenue (N)														
8	T1	675	8	711	1.2	0.367	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		675	8	711	1.2	0.367	0.2	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Shopping Centre Access Way 3 (W)														
10	L2	79	0	83	0.0	0.051	1.5	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		79	0	83	0.0	0.051	1.5	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		1658	8	1745	0.5	0.367	1.0	LOS NA	0.0	0.0	0.00	0.10	0.00	37.9

3 Francis Avenue / Shopping Centre Access Way 4

2034 Option AM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Option AM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	233	0	245	0.0	0.132	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	446	3	470	0.7	0.242	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		680	3	715	0.4	0.242	1.7	LOS NA	0.0	0.0	0.00	0.21	0.00	39.0
North: Francis Avenue (N)														
8	T1	607	13	639	2.2	0.332	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		607	13	639	2.2	0.332	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Shopping Centre Access Way 3 (W)														
10	L2	121	0	127	0.0	0.078	1.0	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		121	0	127	0.0	0.078	1.0	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		1407	16	1481	1.2	0.332	1.0	LOS NA	0.0	0.0	0.00	0.10	0.00	36.8

2034 Option Sat

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Option Sat
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	716	0	377	0.0	0.203	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	1459	1	768	0.1	0.394	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
Approach		2174	1	1144	0.0	0.394	1.7	LOS NA	0.0	0.0	0.00	0.20	0.00	39.0
North: Francis Avenue (N)														
8	T1	1889	29	994	1.5	0.515	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	39.7
Approach		1889	29	994	1.5	0.515	0.3	LOS NA	0.0	0.0	0.00	0.00	0.00	39.7
West: Shopping Centre Access Way 3 (W)														
10	L2	703	0	370	0.0	0.226	2.8	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		703	0	370	0.0	0.226	2.8	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		4767	30	2509	0.6	0.515	1.3	LOS NA	0.0	0.0	0.00	0.09	0.00	35.0

2034 Option PM

Project Name: Acc_4_Francis Avenue_Access Way 4
Site Name: 2034 Option PM
Site Title: Francis Avenue / Shopping Centre Access Way 4

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

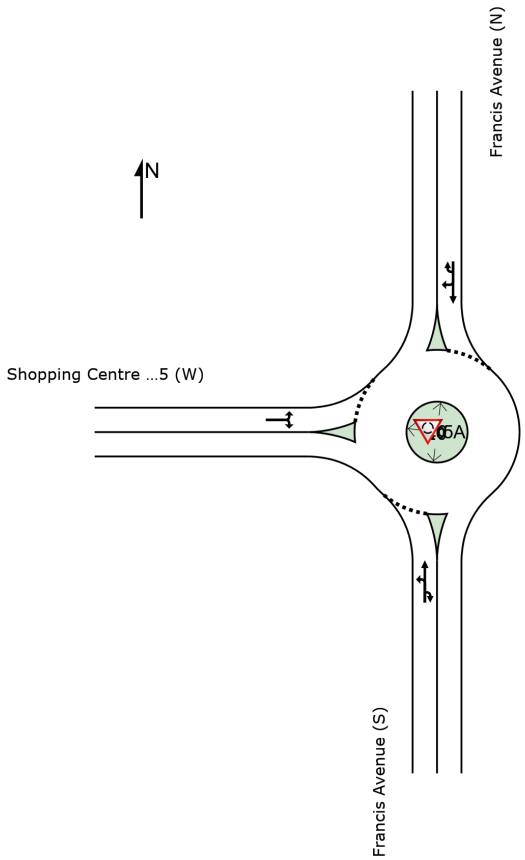
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	322	0	339	0.0	0.183	4.9	LOS A	0.0	0.0	0.00	0.60	0.00	37.3
2	T1	718	0	756	0.0	0.388	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
Approach		1040	0	1095	0.0	0.388	1.6	LOS NA	0.0	0.0	0.00	0.19	0.00	39.0
North: Francis Avenue (N)														
8	T1	749	11	788	1.5	0.408	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
Approach		749	11	788	1.5	0.408	0.2	LOS NA	0.0	0.0	0.00	0.00	0.00	39.8
West: Shopping Centre Access Way 3 (W)														
10	L2	292	0	307	0.0	0.188	2.4	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
Approach		292	0	307	0.0	0.188	2.4	LOS A	0.0	0.0	0.00	0.00	0.00	21.5
All Vehicles		2081	11	2190	0.5	0.408	1.2	LOS NA	0.0	0.0	0.00	0.09	0.00	35.2

SITE LAYOUT

Site: 5A [2024 Base AM (Site Folder: General)]

Francis Avenue / Shopping Centre Access Way 5
Site Category: (None)
Roundabout

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



2024 Base AM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2024 Base AM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	95	1	100	0.8	0.252	4.1	LOS A	1.6	11.1	0.04	0.45	0.04	21.6
2	T1	217	0	229	0.0	0.252	2.2	LOS A	1.6	11.1	0.04	0.45	0.04	38.2
3u	U	91	0	96	0.0	0.252	6.8	LOS A	1.6	11.1	0.04	0.45	0.04	37.9
	Approach	403	1	424	0.2	0.252	3.7	LOS A	1.6	11.1	0.04	0.45	0.04	32.3
North: Francis Avenue (N)														
8	T1	279	11	294	3.8	0.236	2.8	LOS A	1.3	9.4	0.28	0.34	0.28	38.3
9	R2	2	0	2	0.0	0.236	7.9	LOS A	1.3	9.4	0.28	0.34	0.28	21.6
9u	U	1	0	1	0.0	0.236	7.3	LOS A	1.3	9.4	0.28	0.34	0.28	38.0
	Approach	282	11	297	3.8	0.236	2.9	LOS A	1.3	9.4	0.28	0.34	0.28	38.1
West: Shopping Centre Access Way 5 (W)														
10	L2	8	8	8	100.0	0.017	3.3	LOS A	0.1	0.8	0.48	0.31	0.48	21.0
12	R2	3	0	3	0.0	0.017	1.5	LOS A	0.1	0.8	0.48	0.31	0.48	21.1
	Approach	11	8	11	73.6	0.017	2.8	LOS A	0.1	0.8	0.48	0.31	0.48	21.0
	All Vehicles	696	19	732	2.8	0.252	3.3	LOS A	1.6	11.1	0.14	0.40	0.14	34.1

2024 Base PM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2024 Base PM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	168	0	176	0.0	0.470	4.1	LOS A	4.3	30.3	0.11	0.46	0.11	21.5
2	T1	315	2	332	0.6	0.470	2.3	LOS A	4.3	30.3	0.11	0.46	0.11	37.9
3u	U	249	0	263	0.1	0.470	6.8	LOS A	4.3	30.3	0.11	0.46	0.11	37.6
	Approach	732	2	771	0.3	0.470	4.2	LOS A	4.3	30.3	0.11	0.46	0.11	32.2
North: Francis Avenue (N)														
8	T1	372	3	391	0.8	0.400	4.6	LOS A	2.6	18.0	0.58	0.52	0.58	37.6
9	R2	9	0	9	0.0	0.400	9.7	LOS A	2.6	18.0	0.58	0.52	0.58	21.4
9u	U	1	0	1	0.0	0.400	9.1	LOS A	2.6	18.0	0.58	0.52	0.58	37.3
	Approach	382	3	402	0.8	0.400	4.7	LOS A	2.6	18.0	0.58	0.52	0.58	37.0
West: Shopping Centre Access Way 5 (W)														
10	L2	26	0	28	0.0	0.111	3.5	LOS A	0.6	4.1	0.61	0.46	0.61	20.9
12	R2	60	0	64	0.0	0.111	3.5	LOS A	0.6	4.1	0.61	0.46	0.61	20.9
	Approach	87	0	91	0.0	0.111	3.5	LOS A	0.6	4.1	0.61	0.46	0.61	20.9
	All Vehicles	1201	5	1264	0.4	0.470	4.3	LOS A	4.3	30.3	0.30	0.48	0.30	32.3

2024 Base Sat

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2024 Base Sat
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	542	0	285	0.0	0.637	4.1	LOS A	8.4	58.9	0.15	0.47	0.15	21.4
2	T1	687	1	361	0.1	0.637	2.3	LOS A	8.4	58.9	0.15	0.47	0.15	37.8
3u	U	781	0	411	0.0	0.637	6.8	LOS A	8.4	58.9	0.15	0.47	0.15	37.5
	Approach	2010	1	1058	0.0	0.637	4.5	LOS A	8.4	58.9	0.15	0.47	0.15	31.2
North: Francis Avenue (N)														
8	T1	715	0	376	0.0	0.463	7.0	LOS A	3.3	23.1	0.75	0.68	0.80	37.0
9	R2	17	0	9	0.0	0.463	12.1	LOS B	3.3	23.1	0.75	0.68	0.80	21.2
9u	U	1	0	1	0.0	0.463	11.5	LOS B	3.3	23.1	0.75	0.68	0.80	36.7
	Approach	733	0	386	0.0	0.463	7.1	LOS A	3.3	23.1	0.75	0.68	0.80	36.3
West: Shopping Centre Access Way 5 (W)														
10	L2	25	0	13	0.0	0.226	5.6	LOS A	1.3	9.5	0.74	0.59	0.74	20.7
12	R2	275	1	145	0.5	0.226	5.6	LOS A	1.3	9.5	0.74	0.59	0.74	20.7
	Approach	300	1	158	0.5	0.226	5.6	LOS A	1.3	9.5	0.74	0.59	0.74	20.7
	All Vehicles	3044	2	1602	0.1	0.637	5.3	LOS A	8.4	58.9	0.35	0.54	0.36	30.7

2034 Do Minimum AM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Do Minimum AM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	85	0	90	0.0	0.289	4.0	LOS A	1.9	13.3	0.03	0.43	0.03	21.6
2	T1	281	0	296	0.1	0.289	2.2	LOS A	1.9	13.3	0.03	0.43	0.03	38.3
3u	U	99	0	104	0.2	0.289	6.8	LOS A	1.9	13.3	0.03	0.43	0.03	38.0
	Approach	465	1	490	0.1	0.289	3.5	LOS A	1.9	13.3	0.03	0.43	0.03	33.5
North: Francis Avenue (N)														
8	T1	351	3	369	1.0	0.291	2.9	LOS A	1.7	12.0	0.30	0.35	0.30	38.2
9	R2	1	0	1	0.0	0.291	6.1	LOS A	1.7	12.0	0.30	0.35	0.30	37.9
9u	U	1	0	1	0.0	0.291	7.4	LOS A	1.7	12.0	0.30	0.35	0.30	37.9
	Approach	353	3	372	1.0	0.291	2.9	LOS A	1.7	12.0	0.30	0.35	0.30	38.2
West: Shopping Centre Access Way 5 (W)														
10	L2	1	0	1	0.0	0.004	1.9	LOS A	0.0	0.1	0.47	0.25	0.47	21.1
12	R2	3	0	3	0.0	0.004	1.9	LOS A	0.0	0.1	0.47	0.25	0.47	21.1
	Approach	4	0	4	0.0	0.004	1.9	LOS A	0.0	0.1	0.47	0.25	0.47	21.1
	All Vehicles	822	4	865	0.5	0.291	3.2	LOS A	1.9	13.3	0.15	0.40	0.15	35.3

2034 Do Minimum PM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Do Minimum PM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	187	0	197	0.0	0.461	4.1	LOS A	4.1	28.7	0.14	0.43	0.14	21.5
2	T1	358	0	377	0.0	0.461	2.3	LOS A	4.1	28.7	0.14	0.43	0.14	38.0
3u	U	160	0	169	0.1	0.461	6.9	LOS A	4.1	28.7	0.14	0.43	0.14	37.7
	Approach	706	0	743	0.0	0.461	3.8	LOS A	4.1	28.7	0.14	0.43	0.14	31.6
North: Francis Avenue (N)														
8	T1	450	6	474	1.2	0.447	4.1	LOS A	3.1	21.9	0.55	0.49	0.55	37.7
9	R2	14	0	14	0.0	0.447	9.2	LOS A	3.1	21.9	0.55	0.49	0.55	21.4
9u	U	1	0	1	0.0	0.447	8.6	LOS A	3.1	21.9	0.55	0.49	0.55	37.4
	Approach	465	6	489	1.2	0.447	4.2	LOS A	3.1	21.9	0.55	0.49	0.55	36.9
West: Shopping Centre Access Way 5 (W)														
10	L2	14	0	14	0.0	0.109	3.1	LOS A	0.6	4.1	0.59	0.44	0.59	21.0
12	R2	75	0	79	0.0	0.109	3.1	LOS A	0.6	4.1	0.59	0.44	0.59	21.0
	Approach	89	0	93	0.0	0.109	3.1	LOS A	0.6	4.1	0.59	0.44	0.59	21.0
	All Vehicles	1260	6	1326	0.5	0.461	3.9	LOS A	4.1	28.7	0.32	0.45	0.32	32.1

2034 Do Minimum Sat

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Do Minimum Sat
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	521	0	274	0.0	0.657	4.1	LOS A	9.3	65.3	0.12	0.47	0.12	21.5
2	T1	845	1	445	0.1	0.657	2.3	LOS A	9.3	65.3	0.12	0.47	0.12	37.9
3u	U	738	1	389	0.1	0.657	6.8	LOS A	9.3	65.3	0.12	0.47	0.12	37.6
	Approach	2104	1	1108	0.1	0.657	4.3	LOS A	9.3	65.3	0.12	0.47	0.12	31.8
North: Francis Avenue (N)														
8	T1	884	28	465	3.2	0.573	8.6	LOS A	5.0	36.2	0.81	0.79	0.97	36.4
9	R2	10	0	5	0.0	0.573	13.6	LOS B	5.0	36.2	0.81	0.79	0.97	21.0
9u	U	1	0	1	0.0	0.573	13.0	LOS B	5.0	36.2	0.81	0.79	0.97	36.1
	Approach	895	28	471	3.1	0.573	8.7	LOS A	5.0	36.2	0.81	0.79	0.97	36.1
West: Shopping Centre Access Way 5 (W)														
10	L2	26	0	13	0.0	0.245	6.4	LOS A	1.5	10.4	0.77	0.62	0.77	20.6
12	R2	287	0	151	0.0	0.245	6.4	LOS A	1.5	10.4	0.77	0.62	0.77	20.6
	Approach	312	0	164	0.0	0.245	6.4	LOS A	1.5	10.4	0.77	0.62	0.77	20.6
	All Vehicles	3312	29	1743	0.9	0.657	5.7	LOS A	9.3	65.3	0.36	0.57	0.41	31.2

2034 Option AM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Option AM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	173	0	182	0.0	0.372	4.0	LOS A	3.0	20.8	0.03	0.53	0.03	21.5
2	T1	146	0	154	0.0	0.372	2.2	LOS A	3.0	20.8	0.03	0.53	0.03	37.8
3u	U	281	3	296	1.1	0.372	6.8	LOS A	3.0	20.8	0.03	0.53	0.03	37.5
	Approach	600	3	632	0.5	0.372	4.9	LOS A	3.0	20.8	0.03	0.53	0.03	30.9
North: Francis Avenue (N)														
8	T1	336	10	353	3.1	0.352	4.4	LOS A	2.1	15.1	0.53	0.49	0.53	37.8
9	R2	1	0	1	0.0	0.352	9.4	LOS A	2.1	15.1	0.53	0.49	0.53	21.4
9u	U	1	0	1	0.0	0.352	8.8	LOS A	2.1	15.1	0.53	0.49	0.53	37.5
	Approach	337	10	355	3.1	0.352	4.4	LOS A	2.1	15.1	0.53	0.49	0.53	37.7
West: Shopping Centre Access Way 5 (W)														
10	L2	0	0	0	0.0	0.005	2.2	LOS A	0.0	0.2	0.50	0.28	0.50	21.1
12	R2	4	0	5	0.0	0.005	2.2	LOS A	0.0	0.2	0.50	0.28	0.50	21.1
	Approach	5	0	5	0.0	0.005	2.2	LOS A	0.0	0.2	0.50	0.28	0.50	21.1
	All Vehicles	942	13	992	1.4	0.372	4.7	LOS A	3.0	20.8	0.22	0.52	0.22	32.9

2034 Option PM

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Option PM
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	179	0	188	0.0	0.639	4.1	LOS A	8.2	57.5	0.14	0.47	0.14	21.5
2	T1	410	0	431	0.0	0.639	2.3	LOS A	8.2	57.5	0.14	0.47	0.14	37.8
3u	U	424	0	446	0.0	0.639	6.8	LOS A	8.2	57.5	0.14	0.47	0.14	37.5
	Approach	1012	0	1065	0.0	0.639	4.5	LOS A	8.2	57.5	0.14	0.47	0.14	33.2
North: Francis Avenue (N)														
8	T1	298	9	314	2.9	0.364	5.5	LOS A	2.2	15.9	0.65	0.59	0.65	37.5
9	R2	7	0	8	0.0	0.364	10.6	LOS B	2.2	15.9	0.65	0.59	0.65	21.3
9u	U	1	0	1	0.0	0.364	10.0	LOS A	2.2	15.9	0.65	0.59	0.65	37.2
	Approach	306	9	322	2.8	0.364	5.7	LOS A	2.2	15.9	0.65	0.59	0.65	36.8
West: Shopping Centre Access Way 5 (W)														
10	L2	6	0	6	0.0	0.032	6.0	LOS A	0.2	1.3	0.73	0.56	0.73	20.7
12	R2	14	0	14	0.0	0.032	6.0	LOS A	0.2	1.3	0.73	0.56	0.73	20.7
	Approach	19	0	20	0.0	0.032	6.0	LOS A	0.2	1.3	0.73	0.56	0.73	20.7
	All Vehicles	1337	9	1408	0.6	0.639	4.8	LOS A	8.2	57.5	0.26	0.50	0.26	33.7

2034 Option Sat

Project Name: Acc_5_Francis Avenue_Access Way 5
Site Name: 2034 Option Sat
Site Title: Francis Avenue / Shopping Centre Access Way 5

Folder Name: General
Site Type: Roundabout

Vehicle Movement Performance

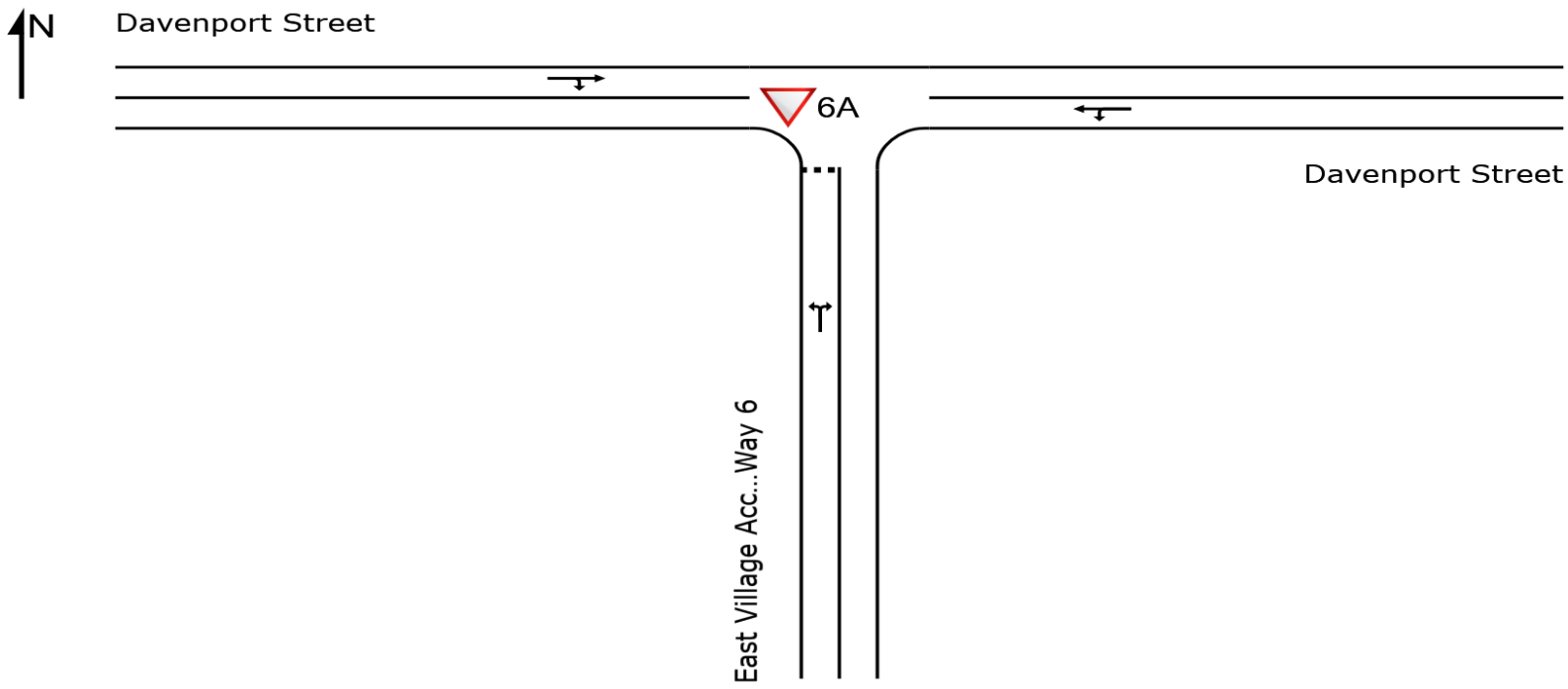
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Francis Avenue (S)														
1	L2	604	0	318	0.0	0.675	4.1	LOS A	10.1	70.8	0.09	0.48	0.09	21.5
2	T1	796	1	419	0.1	0.675	2.3	LOS A	10.1	70.8	0.09	0.48	0.09	37.9
3u	U	777	0	409	0.0	0.675	6.8	LOS A	10.1	70.8	0.09	0.48	0.09	37.6
	Approach	2177	1	1146	0.0	0.675	4.4	LOS A	10.1	70.8	0.09	0.48	0.09	31.2
North: Francis Avenue (N)														
8	T1	873	29	460	3.3	0.564	8.6	LOS A	4.9	35.0	0.80	0.78	0.96	36.4
9	R2	6	0	3	0.0	0.564	13.5	LOS B	4.9	35.0	0.80	0.78	0.96	21.0
9u	U	1	0	1	0.0	0.564	13.0	LOS B	4.9	35.0	0.80	0.78	0.96	36.1
	Approach	880	29	463	3.3	0.564	8.6	LOS A	4.9	35.0	0.80	0.78	0.96	36.2
West: Shopping Centre Access Way 5 (W)														
10	L2	24	0	13	0.0	0.221	6.2	LOS A	1.3	9.3	0.75	0.61	0.75	20.6
12	R2	262	0	138	0.0	0.221	6.2	LOS A	1.3	9.3	0.75	0.61	0.75	20.6
	Approach	286	0	151	0.0	0.221	6.2	LOS A	1.3	9.3	0.75	0.61	0.75	20.6
	All Vehicles	3343	30	1760	0.9	0.675	5.7	LOS A	10.1	70.8	0.34	0.57	0.38	30.9

SITE LAYOUT

Site: 6A [2024 Base AM (Site Folder: General)]

Davenport Street / East Village Access Way 6
Site Category: (None)
Give-Way (Two-Way)

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



5 Davenport Street / East Village Access Way 6

2024 Base AM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2024 Base AM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	22	0	23	0.0	0.018	0.7	LOS A	0.1	0.5	0.30	0.16	0.30	21.3
3	R2	1	0	1	0.0	0.018	1.1	LOS A	0.1	0.5	0.30	0.16	0.30	21.3
Approach		23	0	24	0.0	0.018	0.7	LOS A	0.1	0.5	0.30	0.16	0.30	21.3
East: Davenport Street														
4	L2	35	0	37	0.0	0.137	4.9	LOS A	0.0	0.0	0.00	0.10	0.00	39.0
5	T1	217	1	228	0.5	0.137	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	39.7
Approach		252	1	265	0.4	0.137	0.7	LOS NA	0.0	0.0	0.00	0.10	0.00	39.6
West: Davenport Street														
11	T1	57	8	60	14.0	0.036	0.1	LOS A	0.0	0.2	0.05	0.07	0.05	39.8
12	R2	4	0	4	0.0	0.036	4.9	LOS A	0.0	0.2	0.05	0.07	0.05	21.8
Approach		61	8	64	13.1	0.036	0.4	LOS NA	0.0	0.2	0.05	0.07	0.05	37.7
All Vehicles		336	9	353	2.7	0.137	0.7	LOS NA	0.1	0.5	0.03	0.09	0.03	37.1

2024 Base PM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2024 Base PM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	32	0	34	0.0	0.033	1.0	LOS A	0.1	0.9	0.37	0.23	0.37	21.3
3	R2	4	0	4	0.0	0.033	2.9	LOS A	0.1	0.9	0.37	0.23	0.37	21.3
Approach		36	0	38	0.0	0.033	1.2	LOS A	0.1	0.9	0.37	0.23	0.37	21.3
East: Davenport Street														
4	L2	5	0	6	0.0	0.156	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.2
5	T1	283	0	298	0.0	0.156	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		288	0	303	0.0	0.156	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	39.9
West: Davenport Street														
11	T1	310	0	327	0.0	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	0	0	0	0.0	0.168	4.1	LOS A	0.0	0.0	0.00	0.00	0.00	21.9
Approach		311	0	327	0.0	0.168	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
All Vehicles		635	0	668	0.0	0.168	0.1	LOS NA	0.1	0.9	0.02	0.02	0.02	38.0

2024 Base Sat

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2024 Base Sat
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	80	0	42	0.0	0.046	1.2	LOS A	0.2	1.2	0.42	0.29	0.42	21.3
3	R2	13	0	7	0.0	0.046	3.4	LOS A	0.2	1.2	0.42	0.29	0.42	21.3
Approach		93	0	49	0.0	0.046	1.5	LOS A	0.2	1.2	0.42	0.29	0.42	21.3
East: Davenport Street														
4	L2	12	0	6	0.0	0.189	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.2
5	T1	686	0	361	0.0	0.189	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		699	0	368	0.0	0.189	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	39.9
West: Davenport Street														
11	T1	609	1	321	0.2	0.166	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	40.0
12	R2	4	0	2	0.0	0.166	4.4	LOS A	0.0	0.1	0.01	0.01	0.01	21.9
Approach		613	1	323	0.2	0.166	0.0	LOS NA	0.0	0.1	0.01	0.01	0.01	39.7
All Vehicles		1405	1	739	0.1	0.189	0.2	LOS NA	0.2	1.2	0.03	0.03	0.03	37.6

5 Davenport Street / East Village Access Way 6

2034 Do Minimum AM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Do Minimum AM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	24	0	25	0.0	0.020	0.9	LOS A	0.1	0.5	0.34	0.19	0.34	21.3
3	R2	0	0	0	0.0	0.020	1.7	LOS A	0.1	0.5	0.34	0.19	0.34	21.3
Approach		24	0	26	0.0	0.020	0.9	LOS A	0.1	0.5	0.34	0.19	0.34	21.3
East: Davenport Street														
4	L2	33	0	35	0.0	0.167	4.9	LOS A	0.0	0.0	0.00	0.08	0.00	39.0
5	T1	269	7	283	2.8	0.167	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	39.7
Approach		302	7	318	2.5	0.167	0.6	LOS NA	0.0	0.0	0.00	0.08	0.00	39.6
West: Davenport Street														
11	T1	106	2	112	1.7	0.063	0.1	LOS A	0.1	0.4	0.05	0.06	0.05	39.8
12	R2	6	0	6	0.0	0.063	5.2	LOS A	0.1	0.4	0.05	0.06	0.05	21.9
Approach		112	2	118	1.6	0.063	0.4	LOS NA	0.1	0.4	0.05	0.06	0.05	38.1
All Vehicles		439	9	462	2.1	0.167	0.6	LOS NA	0.1	0.5	0.03	0.08	0.03	37.5

2034 Do Minimum PM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Do Minimum PM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	23	0	24	0.0	0.026	0.9	LOS A	0.1	0.7	0.38	0.23	0.38	21.3
3	R2	4	0	4	0.0	0.026	3.3	LOS A	0.1	0.7	0.38	0.23	0.38	21.3
Approach		27	0	28	0.0	0.026	1.3	LOS A	0.1	0.7	0.38	0.23	0.38	21.3
East: Davenport Street														
4	L2	6	0	7	0.0	0.154	4.9	LOS A	0.0	0.0	0.00	0.02	0.00	39.2
5	T1	279	0	293	0.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.9
Approach		285	0	300	0.0	0.154	0.2	LOS NA	0.0	0.0	0.00	0.02	0.00	39.9
West: Davenport Street														
11	T1	371	4	391	1.2	0.202	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	0	0	0	0.0	0.202	4.1	LOS A	0.0	0.0	0.00	0.00	0.00	21.9
Approach		372	4	391	1.2	0.202	0.0	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
All Vehicles		684	4	720	0.6	0.202	0.1	LOS NA	0.1	0.7	0.02	0.02	0.02	38.6

2034 Do Minimum Sat

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Do Minimum Sat
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	83	0	44	0.0	0.049	1.5	LOS A	0.2	1.3	0.45	0.34	0.45	21.2
3	R2	10	0	5	0.0	0.049	4.1	LOS A	0.2	1.3	0.45	0.34	0.45	21.2
Approach		93	0	49	0.0	0.049	1.8	LOS A	0.2	1.3	0.45	0.34	0.45	21.2
East: Davenport Street														
4	L2	13	0	7	0.0	0.223	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.2
5	T1	813	1	428	0.1	0.223	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		826	1	435	0.1	0.223	0.2	LOS NA	0.0	0.0	0.00	0.01	0.00	39.9
West: Davenport Street														
11	T1	649	3	341	0.5	0.177	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	40.0
12	R2	2	0	1	0.0	0.177	4.4	LOS A	0.0	0.1	0.00	0.00	0.00	21.9
Approach		651	3	343	0.5	0.177	0.0	LOS NA	0.0	0.1	0.00	0.00	0.00	39.9
All Vehicles		1570	4	826	0.2	0.223	0.2	LOS NA	0.2	1.3	0.03	0.03	0.03	37.9

5 Davenport Street / East Village Access Way 6

2034 Option AM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Option AM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	4	0	5	0.0	0.023	0.4	LOS A	0.1	0.5	0.31	0.18	0.31	21.4
3	R2	18	0	19	0.0	0.023	1.1	LOS A	0.1	0.5	0.31	0.18	0.31	21.4
Approach		23	0	24	0.0	0.023	1.0	LOS A	0.1	0.5	0.31	0.18	0.31	21.4
East: Davenport Street														
4	L2	9	0	10	0.0	0.086	4.9	LOS A	0.0	0.0	0.00	0.04	0.00	39.1
5	T1	149	0	157	0.3	0.086	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	39.9
Approach		159	0	167	0.3	0.086	0.3	LOS NA	0.0	0.0	0.00	0.04	0.00	39.8
West: Davenport Street														
11	T1	113	3	119	2.3	0.083	0.2	LOS A	0.2	1.5	0.13	0.17	0.13	39.4
12	R2	30	0	32	0.0	0.083	4.6	LOS A	0.2	1.5	0.13	0.17	0.13	21.7
Approach		143	3	151	1.8	0.083	1.1	LOS NA	0.2	1.5	0.13	0.17	0.13	33.6
All Vehicles		324	3	341	0.9	0.086	0.7	LOS NA	0.2	1.5	0.08	0.11	0.08	34.9

2034 Option Sat

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Option Sat
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	80	0	42	0.0	0.047	1.4	LOS A	0.2	1.2	0.43	0.31	0.43	21.3
3	R2	12	0	6	0.0	0.047	3.7	LOS A	0.2	1.2	0.43	0.31	0.43	21.3
Approach		92	0	48	0.0	0.047	1.7	LOS A	0.2	1.2	0.43	0.31	0.43	21.3
East: Davenport Street														
4	L2	14	0	7	0.0	0.205	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.2
5	T1	744	0	392	0.0	0.205	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		758	0	399	0.0	0.205	0.2	LOS NA	0.0	0.0	0.00	0.01	0.00	39.9
West: Davenport Street														
11	T1	624	3	328	0.4	0.170	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	40.0
12	R2	3	0	1	0.0	0.170	4.4	LOS A	0.0	0.1	0.01	0.00	0.01	21.9
Approach		626	3	330	0.4	0.170	0.0	LOS NA	0.0	0.1	0.01	0.00	0.01	39.8
All Vehicles		1476	3	777	0.2	0.205	0.2	LOS NA	0.2	1.2	0.03	0.03	0.03	37.8

2034 Option PM

Project Name: Acc_6_Davenport Street_EastVillage_Access Way 6
Site Name: 2034 Option PM
Site Title: Davenport Street / East Village Access Way 6

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

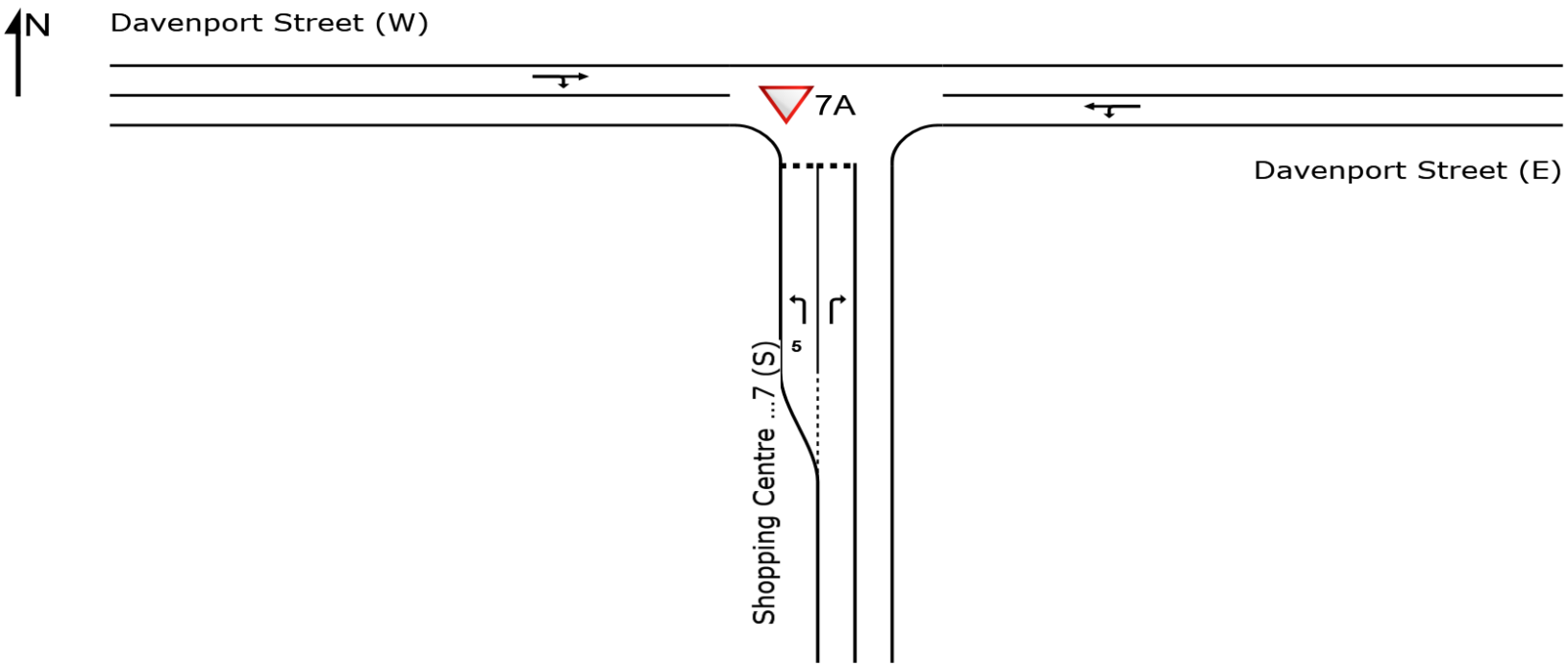
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: East Village Access Way 6														
1	L2	22	0	24	0.0	0.026	1.0	LOS A	0.1	0.7	0.39	0.24	0.39	21.3
3	R2	5	0	5	0.0	0.026	2.5	LOS A	0.1	0.7	0.39	0.24	0.39	21.3
Approach		27	0	28	0.0	0.026	1.3	LOS A	0.1	0.7	0.39	0.24	0.39	21.3
East: Davenport Street														
4	L2	5	0	5	0.0	0.168	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.2
5	T1	307	0	323	0.0	0.168	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		312	0	328	0.0	0.168	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	39.9
West: Davenport Street														
11	T1	231	8	243	3.5	0.129	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	40.0
12	R2	2	0	2	0.0	0.129	4.3	LOS A	0.0	0.1	0.01	0.01	0.01	21.9
Approach		233	8	245	3.4	0.129	0.0	LOS NA	0.0	0.1	0.01	0.01	0.01	39.7
All Vehicles		571	8	601	1.4	0.168	0.1	LOS NA	0.1	0.7	0.02	0.02	0.02	38.3

SITE LAYOUT

Site: 7A [2024 Base AM (Site Folder: General)]

Davenport Street / Shopping Centre Access Way 7
Site Category: (None)
Give-Way (Two-Way)

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



2024 Base AM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2024 Base AM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	11	0	12	0.0	0.008	0.4	LOS A	0.0	0.2	0.22	0.09	0.22	21.4
3	R2	11	0	12	0.0	0.011	0.8	LOS A	0.0	0.2	0.28	0.15	0.28	21.4
Approach		22	0	24	0.0	0.011	0.6	LOS A	0.0	0.2	0.25	0.12	0.25	21.4
East: Davenport Street (E)														
4	L2	21	0	23	0.0	0.084	4.9	LOS A	0.0	0.0	0.00	0.10	0.00	39.0
5	T1	132	1	139	0.8	0.084	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	39.7
Approach		154	1	162	0.7	0.084	0.7	LOS NA	0.0	0.0	0.00	0.10	0.00	39.6
West: Davenport Street (W)														
11	T1	55	8	58	15.0	0.047	0.2	LOS A	0.1	1.0	0.16	0.22	0.16	39.1
12	R2	22	0	23	0.0	0.047	5.0	LOS A	0.1	1.0	0.16	0.22	0.16	21.7
Approach		77	8	81	10.6	0.047	1.6	LOS NA	0.1	1.0	0.16	0.22	0.16	31.8
All Vehicles		253	9	266	3.6	0.084	1.0	LOS NA	0.1	1.0	0.07	0.14	0.07	34.4

2024 Base PM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2024 Base PM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	104	0	109	0.0	0.084	0.9	LOS A	0.3	2.4	0.34	0.22	0.34	21.3
3	R2	62	0	66	0.0	0.083	2.3	LOS A	0.3	1.9	0.45	0.39	0.45	21.2
Approach		166	0	175	0.0	0.084	1.4	LOS A	0.3	2.4	0.38	0.28	0.38	21.3
East: Davenport Street (E)														
4	L2	38	0	40	0.0	0.158	4.9	LOS A	0.0	0.0	0.00	0.09	0.00	39.0
5	T1	252	0	266	0.0	0.158	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
Approach		291	0	306	0.0	0.158	0.7	LOS NA	0.0	0.0	0.00	0.09	0.00	39.6
West: Davenport Street (W)														
11	T1	187	0	197	0.0	0.125	0.2	LOS A	0.3	1.8	0.14	0.17	0.14	39.5
12	R2	31	0	32	0.0	0.125	5.6	LOS A	0.3	1.8	0.14	0.17	0.14	21.8
Approach		218	0	229	0.0	0.125	1.0	LOS NA	0.3	1.8	0.14	0.17	0.14	35.4
All Vehicles		674	0	710	0.0	0.158	1.0	LOS NA	0.3	2.4	0.14	0.16	0.14	31.7

2024 Base Sat

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2024 Base Sat
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	241	0	127	0.0	0.097	0.9	LOS A	0.4	2.8	0.34	0.21	0.34	21.3
3	R2	167	0	88	0.0	0.123	3.0	LOS A	0.4	2.8	0.50	0.48	0.50	21.1
Approach		408	0	215	0.0	0.123	1.7	LOS A	0.4	2.8	0.40	0.32	0.40	21.2
East: Davenport Street (E)														
4	L2	234	0	123	0.0	0.197	4.9	LOS A	0.0	0.0	0.00	0.22	0.00	38.6
5	T1	483	0	254	0.0	0.197	0.1	LOS A	0.0	0.0	0.00	0.22	0.00	39.3
Approach		716	0	377	0.0	0.197	1.7	LOS NA	0.0	0.0	0.00	0.22	0.00	39.0
West: Davenport Street (W)														
11	T1	369	1	194	0.4	0.185	0.9	LOS A	0.8	5.6	0.34	0.40	0.34	38.8
12	R2	198	0	104	0.0	0.185	6.0	LOS A	0.8	5.6	0.34	0.40	0.34	21.6
Approach		568	1	299	0.2	0.185	2.7	LOS NA	0.8	5.6	0.34	0.40	0.34	30.3
All Vehicles		1692	1	890	0.1	0.197	2.0	LOS NA	0.8	5.6	0.21	0.30	0.21	30.1

2034 Do Minimum AM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Do Minimum AM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
								m			km/h			
South: Shopping Centre Access Way 7 (S)														
1	L2	15	0	16	0.0	0.012	0.6	LOS A	0.0	0.3	0.28	0.13	0.28	21.3
3	R2	17	0	18	0.0	0.019	1.4	LOS A	0.1	0.4	0.36	0.24	0.36	21.3
Approach		32	0	34	0.0	0.019	1.0	LOS A	0.1	0.4	0.32	0.19	0.32	21.3
East: Davenport Street (E)														
4	L2	20	0	21	0.0	0.119	4.9	LOS A	0.0	0.0	0.00	0.07	0.00	39.1
5	T1	194	8	204	3.9	0.119	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	39.8
Approach		214	8	226	3.5	0.119	0.5	LOS NA	0.0	0.0	0.00	0.07	0.00	39.7
West: Davenport Street (W)														
11	T1	101	2	106	1.8	0.082	0.3	LOS A	0.3	1.8	0.19	0.24	0.19	39.2
12	R2	37	0	39	0.0	0.082	5.2	LOS A	0.3	1.8	0.19	0.24	0.19	21.7
Approach		137	2	145	1.3	0.082	1.6	LOS NA	0.3	1.8	0.19	0.24	0.19	32.2
All Vehicles		384	9	404	2.4	0.119	0.9	LOS NA	0.3	1.8	0.10	0.14	0.10	34.4

2034 Do Minimum PM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Do Minimum PM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
								m			km/h			
South: Shopping Centre Access Way 7 (S)														
1	L2	125	0	132	0.0	0.107	1.1	LOS A	0.4	3.0	0.38	0.26	0.38	21.3
3	R2	59	0	62	0.0	0.084	2.7	LOS A	0.3	1.9	0.48	0.43	0.48	21.2
Approach		185	0	194	0.0	0.107	1.6	LOS A	0.4	3.0	0.41	0.31	0.41	21.3
East: Davenport Street (E)														
4	L2	12	0	12	0.0	0.164	4.9	LOS A	0.0	0.0	0.00	0.03	0.00	39.2
5	T1	291	0	307	0.0	0.164	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	39.9
Approach		303	0	319	0.0	0.164	0.2	LOS NA	0.0	0.0	0.00	0.03	0.00	39.8
West: Davenport Street (W)														
11	T1	242	4	254	1.8	0.142	0.1	LOS A	0.1	0.8	0.05	0.07	0.05	39.8
12	R2	13	0	13	0.0	0.142	5.7	LOS A	0.1	0.8	0.05	0.07	0.05	21.9
Approach		254	4	268	1.7	0.142	0.4	LOS NA	0.1	0.8	0.05	0.07	0.05	38.3
All Vehicles		742	4	781	0.6	0.164	0.6	LOS NA	0.4	3.0	0.12	0.11	0.12	32.3

2034 Do Minimum Sat

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Do Minimum Sat
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
								m			km/h			
South: Shopping Centre Access Way 7 (S)														
1	L2	229	0	121	0.0	0.093	0.9	LOS A	0.4	2.6	0.34	0.22	0.34	21.3
3	R2	171	0	90	0.0	0.129	3.2	LOS A	0.4	3.0	0.51	0.49	0.51	21.1
Approach		400	0	210	0.0	0.129	1.9	LOS A	0.4	3.0	0.41	0.33	0.41	21.2
East: Davenport Street (E)														
4	L2	320	0	168	0.0	0.225	4.9	LOS A	0.0	0.0	0.00	0.26	0.00	38.4
5	T1	497	1	261	0.2	0.225	0.1	LOS A	0.0	0.0	0.00	0.26	0.00	39.1
Approach		817	1	430	0.1	0.225	2.0	LOS NA	0.0	0.0	0.00	0.26	0.00	38.8
West: Davenport Street (W)														
11	T1	390	3	205	0.8	0.176	0.9	LOS A	0.7	4.8	0.31	0.37	0.31	38.9
12	R2	154	0	81	0.0	0.176	6.3	LOS A	0.7	4.8	0.31	0.37	0.31	21.6
Approach		544	3	286	0.6	0.176	2.4	LOS NA	0.7	4.8	0.31	0.37	0.31	31.7
All Vehicles		1761	4	927	0.2	0.225	2.1	LOS NA	0.7	4.8	0.19	0.31	0.19	30.9

2034 Option AM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Option AM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	42	0	44	0.0	0.030	0.4	LOS A	0.1	0.8	0.22	0.09	0.22	21.4
3	R2	61	0	65	0.0	0.064	1.1	LOS A	0.2	1.5	0.32	0.22	0.32	21.4
Approach		104	0	109	0.0	0.064	0.8	LOS A	0.2	1.5	0.28	0.17	0.28	21.4
East: Davenport Street (E)														
4	L2	45	0	48	0.0	0.092	4.9	LOS A	0.0	0.0	0.00	0.18	0.00	38.7
5	T1	122	0	129	0.3	0.092	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	39.4
Approach		167	0	176	0.2	0.092	1.3	LOS NA	0.0	0.0	0.00	0.18	0.00	39.2
West: Davenport Street (W)														
11	T1	101	3	107	2.6	0.071	0.1	LOS A	0.2	1.1	0.12	0.16	0.12	39.4
12	R2	23	0	24	0.0	0.071	5.0	LOS A	0.2	1.1	0.12	0.16	0.12	21.8
Approach		124	3	131	2.1	0.071	1.0	LOS NA	0.2	1.1	0.12	0.16	0.12	34.4
All Vehicles		395	3	416	0.8	0.092	1.1	LOS NA	0.2	1.5	0.11	0.17	0.11	31.0

2034 Option PM

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Option PM
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	56	0	59	0.0	0.047	0.9	LOS A	0.2	1.3	0.35	0.21	0.35	21.3
3	R2	93	0	98	0.0	0.123	2.4	LOS A	0.4	2.9	0.46	0.41	0.46	21.2
Approach		149	0	157	0.0	0.123	1.8	LOS A	0.4	2.9	0.42	0.33	0.42	21.3
East: Davenport Street (E)														
4	L2	46	0	48	0.0	0.171	4.9	LOS A	0.0	0.0	0.00	0.10	0.00	39.0
5	T1	269	0	283	0.0	0.171	0.1	LOS A	0.0	0.0	0.00	0.10	0.00	39.6
Approach		314	0	331	0.0	0.171	0.8	LOS NA	0.0	0.0	0.00	0.10	0.00	39.5
West: Davenport Street (W)														
11	T1	176	8	185	4.5	0.108	0.1	LOS A	0.1	0.8	0.07	0.09	0.07	39.7
12	R2	13	0	14	0.0	0.108	5.7	LOS A	0.1	0.8	0.07	0.09	0.07	21.9
Approach		189	8	199	4.2	0.108	0.5	LOS NA	0.1	0.8	0.07	0.09	0.07	37.6
All Vehicles		653	8	687	1.2	0.171	0.9	LOS NA	0.4	2.9	0.12	0.15	0.12	32.6

2034 Option Sat

Project Name: Acc_7_Davenport Street_Access Way 7
Site Name: 2034 Option Sat
Site Title: Davenport Street / Shopping Centre Access Way 7

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

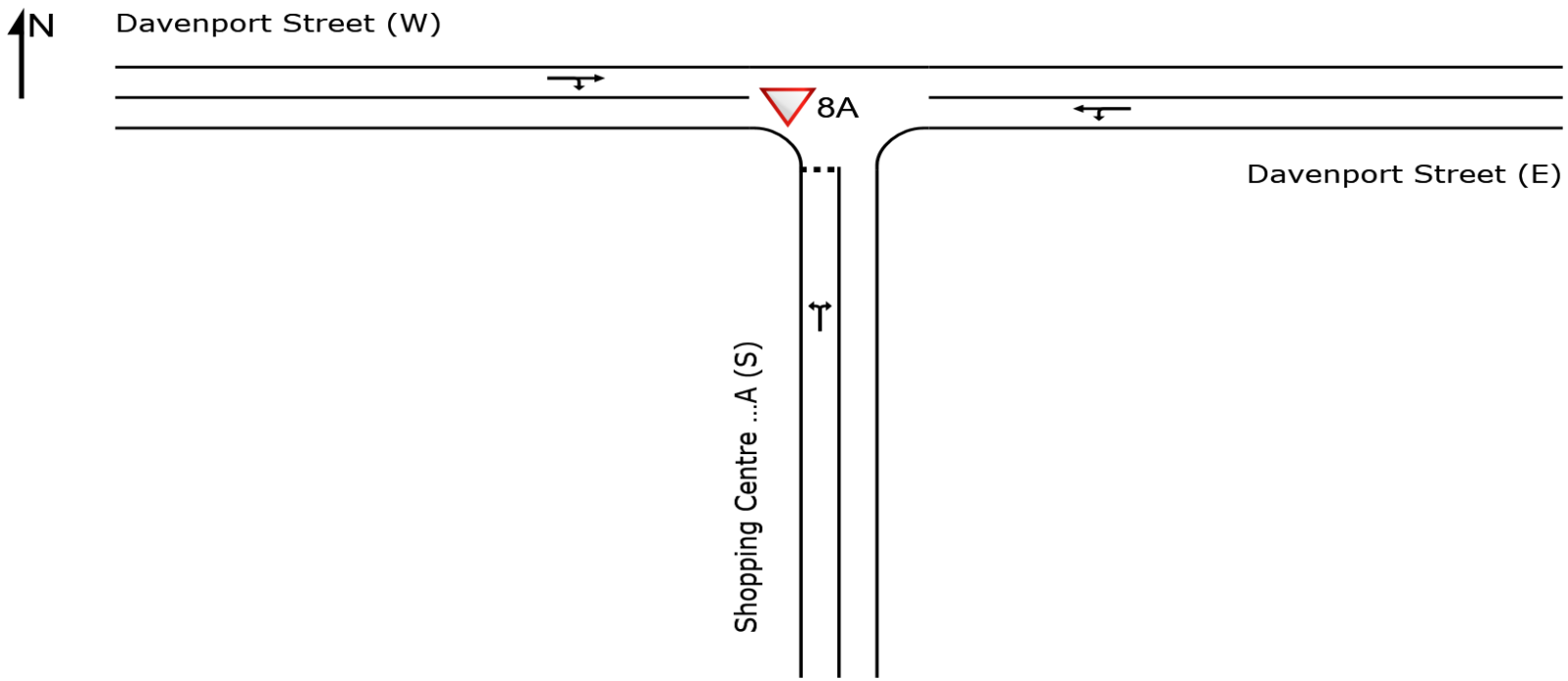
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 7 (S)														
1	L2	196	0	103	0.0	0.084	1.1	LOS A	0.3	2.3	0.38	0.26	0.38	21.3
3	R2	179	0	94	0.0	0.143	3.6	LOS A	0.5	3.3	0.53	0.53	0.53	21.1
Approach		375	0	198	0.0	0.143	2.3	LOS A	0.5	3.3	0.45	0.39	0.45	21.2
East: Davenport Street (E)														
4	L2	188	0	99	0.0	0.217	4.9	LOS A	0.0	0.0	0.00	0.16	0.00	38.7
5	T1	605	0	319	0.0	0.217	0.1	LOS A	0.0	0.0	0.00	0.16	0.00	39.4
Approach		793	0	418	0.0	0.217	1.2	LOS NA	0.0	0.0	0.00	0.16	0.00	39.3
West: Davenport Street (W)														
11	T1	413	3	217	0.7	0.193	0.9	LOS A	0.8	5.6	0.33	0.39	0.33	38.9
12	R2	182	0	96	0.0	0.193	6.2	LOS A	0.8	5.6	0.33	0.39	0.33	21.6
Approach		594	3	313	0.5	0.193	2.5	LOS NA	0.8	5.6	0.33	0.39	0.33	31.2
All Vehicles		1763	3	928	0.2	0.217	1.9	LOS NA	0.8	5.6	0.21	0.28	0.21	31.0

SITE LAYOUT

Site: 8A [2024 Base AM (Site Folder: General)]

Davenport Street / Shopping Centre Access Way 8A
Site Category: (None)
Give-Way (Two-Way)

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



2024 Base AM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2024 Base AM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	14	0	15	0.0	0.021	0.2	LOS A	0.1	0.5	0.21	0.09	0.21	21.4
3	R2	10	0	11	0.0	0.021	1.1	LOS A	0.1	0.5	0.21	0.09	0.21	21.4
Approach		24	0	25	0.0	0.021	0.6	LOS A	0.1	0.5	0.21	0.09	0.21	21.4
East: Davenport Street (E)														
4	L2	65	0	69	0.0	0.079	4.9	LOS A	0.0	0.0	0.00	0.30	0.00	38.3
5	T1	78	1	82	1.3	0.079	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	39.0
Approach		143	1	151	0.7	0.079	2.2	LOS NA	0.0	0.0	0.00	0.30	0.00	38.7
West: Davenport Street (W)														
11	T1	63	8	66	13.1	0.112	0.4	LOS A	0.5	3.9	0.26	0.40	0.26	38.5
12	R2	114	0	120	0.0	0.112	4.6	LOS A	0.5	3.9	0.26	0.40	0.26	21.5
Approach		177	8	186	4.6	0.112	3.1	LOS NA	0.5	3.9	0.26	0.40	0.26	25.4
All Vehicles		344	9	362	2.7	0.112	2.6	LOS NA	0.5	3.9	0.15	0.34	0.15	29.2

2024 Base Sat

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2024 Base Sat
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	230	0	121	0.0	0.149	0.8	LOS A	0.6	4.1	0.37	0.26	0.37	21.3
3	R2	85	0	45	0.0	0.149	2.7	LOS A	0.6	4.1	0.37	0.26	0.37	21.3
Approach		315	0	166	0.0	0.149	1.3	LOS A	0.6	4.1	0.37	0.26	0.37	21.3
East: Davenport Street (E)														
4	L2	208	0	109	0.0	0.178	4.9	LOS A	0.0	0.0	0.00	0.22	0.00	38.6
5	T1	442	0	233	0.0	0.178	0.1	LOS A	0.0	0.0	0.00	0.22	0.00	39.3
Approach		650	0	342	0.0	0.178	1.6	LOS NA	0.0	0.0	0.00	0.22	0.00	39.1
West: Davenport Street (W)														
11	T1	337	1	177	0.4	0.157	0.7	LOS A	0.6	4.4	0.30	0.34	0.30	39.0
12	R2	159	0	84	0.0	0.157	5.4	LOS A	0.6	4.4	0.30	0.34	0.30	21.6
Approach		496	1	261	0.3	0.157	2.2	LOS NA	0.6	4.4	0.30	0.34	0.30	31.0
All Vehicles		1461	1	769	0.1	0.178	1.7	LOS NA	0.6	4.4	0.18	0.27	0.18	30.8

2024 Base PM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2024 Base PM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	HV veh/h	DEMAND FLOWS Total veh/h	HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	95	0	100	0.0	0.148	0.9	LOS A	0.6	4.0	0.39	0.28	0.39	21.3
3	R2	55	0	58	0.0	0.148	2.2	LOS A	0.6	4.0	0.39	0.28	0.39	21.3
Approach		151	0	159	0.0	0.148	1.4	LOS A	0.6	4.0	0.39	0.28	0.39	21.3
East: Davenport Street (E)														
4	L2	69	0	73	0.0	0.172	4.9	LOS A	0.0	0.0	0.00	0.15	0.00	38.8
5	T1	245	0	258	0.0	0.172	0.1	LOS A	0.0	0.0	0.00	0.15	0.00	39.5
Approach		314	0	331	0.0	0.172	1.1	LOS NA	0.0	0.0	0.00	0.15	0.00	39.3
West: Davenport Street (W)														
11	T1	122	0	129	0.0	0.104	0.5	LOS A	0.4	2.5	0.25	0.29	0.25	39.1
12	R2	46	0	49	0.0	0.104	5.3	LOS A	0.4	2.5	0.25	0.29	0.25	21.7
Approach		169	0	177	0.0	0.104	1.8	LOS NA	0.4	2.5	0.25	0.29	0.25	32.0
All Vehicles		634	0	667	0.0	0.172	1.4	LOS NA	0.6	4.0	0.16	0.22	0.16	31.2

2034 Do Minimum AM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Do Minimum AM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	13	0	13	0.0	0.023	0.3	LOS A	0.1	0.6	0.25	0.12	0.25	21.4
3	R2	12	0	13	0.0	0.023	1.4	LOS A	0.1	0.6	0.25	0.12	0.25	21.4
Approach		25	0	26	0.0	0.023	0.8	LOS A	0.1	0.6	0.25	0.12	0.25	21.4
East: Davenport Street (E)														
4	L2	116	0	122	0.0	0.119	4.9	LOS A	0.0	0.0	0.00	0.36	0.00	38.1
5	T1	94	8	99	8.1	0.119	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	38.8
Approach		210	8	221	3.6	0.119	2.7	LOS NA	0.0	0.0	0.00	0.36	0.00	38.4
West: Davenport Street (W)														
11	T1	125	2	131	1.4	0.119	0.4	LOS A	0.5	3.3	0.25	0.30	0.25	39.0
12	R2	69	0	73	0.0	0.119	4.8	LOS A	0.5	3.3	0.25	0.30	0.25	21.6
Approach		194	2	204	0.9	0.119	2.0	LOS NA	0.5	3.3	0.25	0.30	0.25	30.3
All Vehicles		429	9	452	2.2	0.119	2.3	LOS NA	0.5	3.3	0.13	0.32	0.13	32.9

2034 Do Minimum Sat

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Do Minimum Sat
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	217	0	114	0.0	0.138	0.9	LOS A	0.5	3.8	0.38	0.26	0.38	21.3
3	R2	74	0	39	0.0	0.138	2.7	LOS A	0.5	3.8	0.38	0.26	0.38	21.3
Approach		292	0	153	0.0	0.138	1.3	LOS A	0.5	3.8	0.38	0.26	0.38	21.3
East: Davenport Street (E)														
4	L2	193	0	102	0.0	0.183	4.9	LOS A	0.0	0.0	0.00	0.20	0.00	38.7
5	T1	474	1	249	0.2	0.183	0.1	LOS A	0.0	0.0	0.00	0.20	0.00	39.3
Approach		667	1	351	0.1	0.183	1.5	LOS NA	0.0	0.0	0.00	0.20	0.00	39.1
West: Davenport Street (W)														
11	T1	328	3	173	0.9	0.146	0.6	LOS A	0.5	3.8	0.28	0.32	0.28	39.0
12	R2	135	0	71	0.0	0.146	5.4	LOS A	0.5	3.8	0.28	0.32	0.28	21.6
Approach		463	3	244	0.6	0.146	2.0	LOS NA	0.5	3.8	0.28	0.32	0.28	31.6
All Vehicles		1422	4	748	0.3	0.183	1.6	LOS NA	0.5	3.8	0.17	0.25	0.17	31.3

2034 Do Minimum PM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Do Minimum PM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	143	0	151	0.0	0.182	1.2	LOS A	0.7	5.1	0.43	0.32	0.43	21.3
3	R2	44	0	46	0.0	0.182	2.6	LOS A	0.7	5.1	0.43	0.32	0.43	21.3
Approach		187	0	197	0.0	0.182	1.6	LOS A	0.7	5.1	0.43	0.32	0.43	21.3
East: Davenport Street (E)														
4	L2	44	0	47	0.0	0.191	4.9	LOS A	0.0	0.0	0.00	0.09	0.00	39.0
5	T1	307	0	323	0.0	0.191	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
Approach		351	0	369	0.0	0.191	0.7	LOS NA	0.0	0.0	0.00	0.09	0.00	39.6
West: Davenport Street (W)														
11	T1	111	4	117	4.0	0.098	0.6	LOS A	0.3	2.5	0.27	0.31	0.27	39.1
12	R2	43	0	45	0.0	0.098	5.4	LOS A	0.3	2.5	0.27	0.31	0.27	21.6
Approach		154	4	163	2.8	0.098	2.0	LOS NA	0.3	2.5	0.27	0.31	0.27	31.9
All Vehicles		692	4	729	0.6	0.191	1.2	LOS NA	0.7	5.1	0.18	0.20	0.18	30.8

7 Davenport Street / Shopping Centre Access Way 8A

2034 Option AM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Option AM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	3	0	3	0.0	0.017	0.4	LOS A	0.1	0.4	0.33	0.19	0.33	21.3
3	R2	14	0	14	0.0	0.017	1.3	LOS A	0.1	0.4	0.33	0.19	0.33	21.3
Approach		16	0	17	0.0	0.017	1.2	LOS A	0.1	0.4	0.33	0.19	0.33	21.3
East: Davenport Street (E)														
4	L2	45	0	47	0.0	0.101	4.9	LOS A	0.0	0.0	0.00	0.17	0.00	38.8
5	T1	139	0	146	0.3	0.101	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	39.5
Approach		184	0	193	0.2	0.101	1.2	LOS NA	0.0	0.0	0.00	0.17	0.00	39.3
West: Davenport Street (W)														
11	T1	121	3	127	2.1	0.110	0.3	LOS A	0.4	2.9	0.22	0.27	0.22	39.1
12	R2	62	0	65	0.0	0.110	4.7	LOS A	0.4	2.9	0.22	0.27	0.22	21.6
Approach		183	3	193	1.4	0.110	1.8	LOS NA	0.4	2.9	0.22	0.27	0.22	30.7
All Vehicles		383	3	404	0.8	0.110	1.5	LOS NA	0.4	2.9	0.12	0.22	0.12	33.6

2034 Option PM

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Option PM
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	67	0	70	0.0	0.102	1.2	LOS A	0.4	2.6	0.42	0.32	0.42	21.3
3	R2	33	0	34	0.0	0.102	2.4	LOS A	0.4	2.6	0.42	0.32	0.42	21.3
Approach		99	0	104	0.0	0.102	1.6	LOS A	0.4	2.6	0.42	0.32	0.42	21.3
East: Davenport Street (E)														
4	L2	44	0	47	0.0	0.196	4.9	LOS A	0.0	0.0	0.00	0.08	0.00	39.0
5	T1	317	0	334	0.0	0.196	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	39.7
Approach		361	0	380	0.0	0.196	0.7	LOS NA	0.0	0.0	0.00	0.08	0.00	39.6
West: Davenport Street (W)														
11	T1	123	8	129	6.5	0.093	0.4	LOS A	0.2	1.8	0.20	0.23	0.20	39.3
12	R2	29	0	30	0.0	0.093	5.5	LOS A	0.2	1.8	0.20	0.23	0.20	21.7
Approach		151	8	159	5.3	0.093	1.4	LOS NA	0.2	1.8	0.20	0.23	0.20	34.1
All Vehicles		612	8	644	1.3	0.196	1.0	LOS NA	0.4	2.6	0.12	0.16	0.12	33.6

2034 Option Sat

Project Name: Acc_8A_Davenport Street_Access Way 8A
Site Name: 2034 Option Sat
Site Title: Davenport Street / Shopping Centre Access Way 8A

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

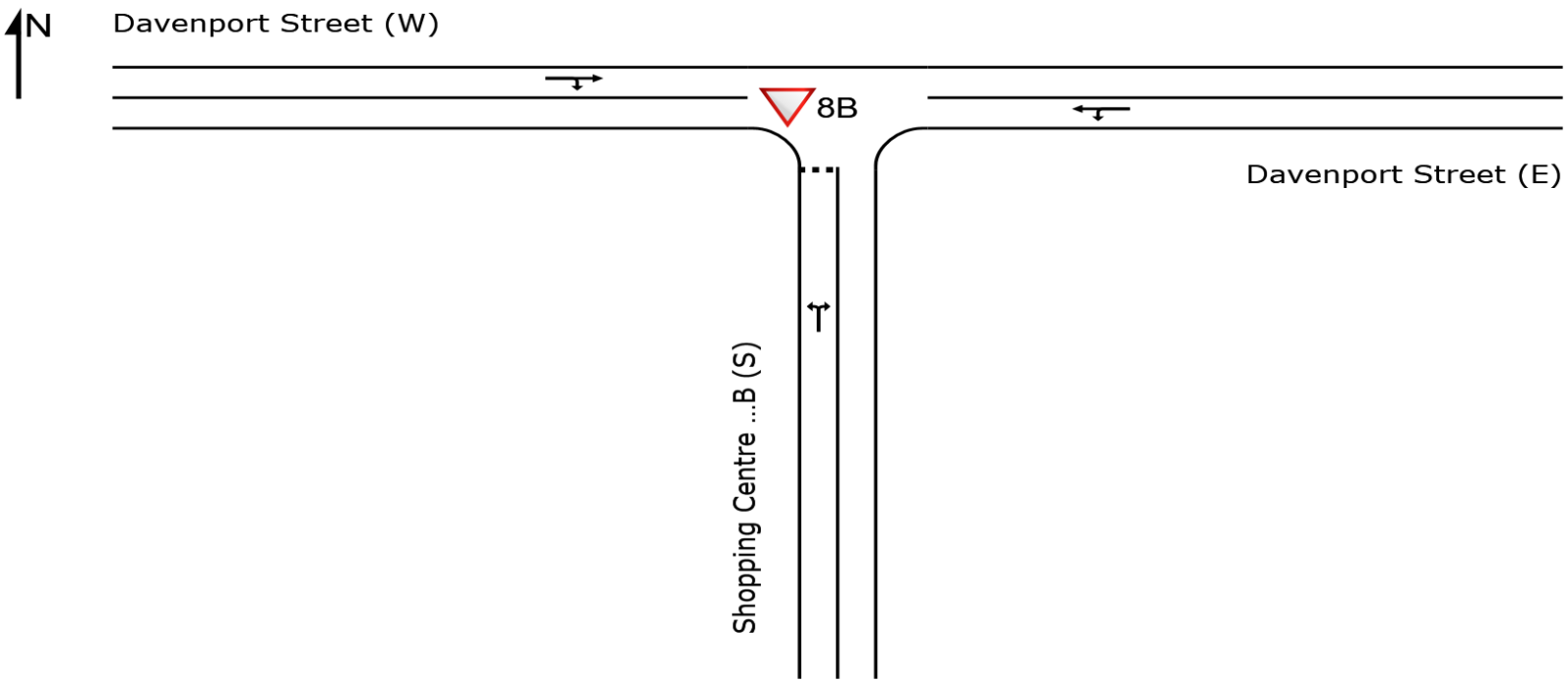
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8A (S)														
1	L2	248	0	131	0.0	0.161	0.9	LOS A	0.6	4.5	0.39	0.27	0.39	21.3
3	R2	85	0	45	0.0	0.161	3.1	LOS A	0.6	4.5	0.39	0.27	0.39	21.3
Approach		333	0	175	0.0	0.161	1.5	LOS A	0.6	4.5	0.39	0.27	0.39	21.3
East: Davenport Street (E)														
4	L2	319	0	168	0.0	0.216	4.9	LOS A	0.0	0.0	0.00	0.27	0.00	38.4
5	T1	465	0	245	0.0	0.216	0.1	LOS A	0.0	0.0	0.00	0.27	0.00	39.1
Approach		784	0	413	0.0	0.216	2.1	LOS NA	0.0	0.0	0.00	0.27	0.00	38.8
West: Davenport Street (W)														
11	T1	347	3	183	0.8	0.168	0.9	LOS A	0.7	4.9	0.34	0.38	0.34	38.9
12	R2	164	0	87	0.0	0.168	5.7	LOS A	0.7	4.9	0.34	0.38	0.34	21.6
Approach		512	3	269	0.5	0.168	2.5	LOS NA	0.7	4.9	0.34	0.38	0.34	30.9
All Vehicles		1628	3	857	0.2	0.216	2.1	LOS NA	0.7	4.9	0.19	0.31	0.19	31.1

SITE LAYOUT

Site: 8B [2024 Base AM (Site Folder: General)]

Davenport Street / Shopping Centre Access Way 8B
Site Category: (None)
Give-Way (Two-Way)

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



8 Davenport Street / Shopping Centre Access Way 8B

2024 Base AM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2024 Base AM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.037	0.2	LOS A	0.1	0.8	0.33	0.21	0.33	21.4
3	R2	33	0	35	0.0	0.037	1.2	LOS A	0.1	0.8	0.33	0.21	0.33	21.4
Approach		34	0	36	0.0	0.037	1.1	LOS A	0.1	0.8	0.33	0.21	0.33	21.4
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.046	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.3
5	T1	84	1	89	1.2	0.046	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	40.0
Approach		85	1	90	1.2	0.046	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	40.0
West: Davenport Street (W)														
11	T1	161	8	169	5.0	0.120	0.1	LOS A	0.3	2.2	0.10	0.16	0.10	39.4
12	R2	48	0	50	0.0	0.120	4.4	LOS A	0.3	2.2	0.10	0.16	0.10	21.7
Approach		208	8	219	3.8	0.120	1.1	LOS NA	0.3	2.2	0.10	0.16	0.10	33.2
All Vehicles		328	9	345	2.7	0.120	0.8	LOS NA	0.3	2.2	0.10	0.12	0.10	32.8

2024 Base Sat

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2024 Base Sat
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.115	0.9	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
3	R2	157	0	83	0.0	0.115	2.9	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
Approach		158	0	83	0.0	0.115	2.9	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.142	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	527	0	277	0.1	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		528	0	278	0.1	0.142	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Davenport Street (W)														
11	T1	466	0	245	0.1	0.184	0.4	LOS A	0.6	4.2	0.22	0.25	0.22	39.2
12	R2	149	0	79	0.0	0.184	5.1	LOS A	0.6	4.2	0.22	0.25	0.22	21.7
Approach		615	0	324	0.1	0.184	1.5	LOS NA	0.6	4.2	0.22	0.25	0.22	32.8
All Vehicles		1301	1	685	0.1	0.184	1.1	LOS NA	0.6	4.2	0.16	0.18	0.16	33.0

2024 Base PM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2024 Base PM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.070	1.0	LOS A	0.2	1.6	0.44	0.37	0.44	21.2
3	R2	53	0	56	0.0	0.070	2.2	LOS A	0.2	1.6	0.44	0.37	0.44	21.2
Approach		54	0	57	0.0	0.070	2.2	LOS A	0.2	1.6	0.44	0.37	0.44	21.2
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.154	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	284	0	299	0.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		285	0	300	0.0	0.154	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Davenport Street (W)														
11	T1	155	0	163	0.0	0.116	0.4	LOS A	0.3	2.3	0.19	0.22	0.19	39.3
12	R2	41	0	43	0.0	0.116	5.1	LOS A	0.3	2.3	0.19	0.22	0.19	21.7
Approach		195	0	206	0.0	0.116	1.4	LOS NA	0.3	2.3	0.19	0.22	0.19	33.6
All Vehicles		534	0	562	0.0	0.154	0.8	LOS NA	0.3	2.3	0.11	0.12	0.11	34.5

7 Davenport Street / Shopping Centre Access Way 8B

2034 Do Minimum AM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Do Minimum AM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.042	0.3	LOS A	0.1	0.9	0.36	0.25	0.36	21.3
3	R2	36	0	38	0.0	0.042	1.4	LOS A	0.1	0.9	0.36	0.25	0.36	21.3
Approach		37	0	39	0.0	0.042	1.4	LOS A	0.1	0.9	0.36	0.25	0.36	21.3
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.059	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	39.3
5	T1	103	8	108	7.4	0.059	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	40.0
Approach		104	8	109	7.3	0.059	0.1	LOS NA	0.0	0.0	0.00	0.01	0.00	40.0
West: Davenport Street (W)														
11	T1	180	2	190	1.0	0.140	0.1	LOS A	0.4	3.0	0.13	0.19	0.13	39.3
12	R2	63	0	67	0.0	0.140	4.4	LOS A	0.4	3.0	0.13	0.19	0.13	21.7
Approach		243	2	256	0.7	0.140	1.3	LOS NA	0.4	3.0	0.13	0.19	0.13	32.5
All Vehicles		384	9	404	2.4	0.140	1.0	LOS NA	0.4	3.0	0.12	0.14	0.12	32.5

2034 Do Minimum Sat

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Do Minimum Sat
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.112	1.0	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
3	R2	154	0	81	0.0	0.112	2.9	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
Approach		155	0	82	0.0	0.112	2.8	LOS A	0.4	2.6	0.49	0.46	0.49	21.1
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.148	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	548	1	289	0.1	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		549	1	289	0.1	0.148	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Davenport Street (W)														
11	T1	438	2	230	0.4	0.177	0.4	LOS A	0.6	4.1	0.23	0.27	0.23	39.2
12	R2	149	0	78	0.0	0.177	5.2	LOS A	0.6	4.1	0.23	0.27	0.23	21.7
Approach		586	2	309	0.3	0.177	1.6	LOS NA	0.6	4.1	0.23	0.27	0.23	32.5
All Vehicles		1291	2	679	0.2	0.177	1.1	LOS NA	0.6	4.1	0.16	0.18	0.16	33.0

2034 Do Minimum PM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Do Minimum PM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.079	1.2	LOS A	0.3	1.8	0.46	0.40	0.46	21.2
3	R2	57	0	60	0.0	0.079	2.4	LOS A	0.3	1.8	0.46	0.40	0.46	21.2
Approach		58	0	61	0.0	0.079	2.4	LOS A	0.3	1.8	0.46	0.40	0.46	21.2
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.180	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	332	0	350	0.0	0.180	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		333	0	351	0.0	0.180	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Davenport Street (W)														
11	T1	143	4	151	2.9	0.106	0.4	LOS A	0.3	2.0	0.19	0.22	0.19	39.4
12	R2	33	0	34	0.0	0.106	5.4	LOS A	0.3	2.0	0.19	0.22	0.19	21.7
Approach		176	4	185	2.4	0.106	1.3	LOS NA	0.3	2.0	0.19	0.22	0.19	34.2
All Vehicles		567	4	597	0.7	0.180	0.7	LOS NA	0.3	2.0	0.10	0.11	0.10	35.0

2034 Option AM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Option AM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.039	0.5	LOS A	0.1	0.9	0.39	0.28	0.39	21.3
3	R2	31	0	33	0.0	0.039	1.7	LOS A	0.1	0.9	0.39	0.28	0.39	21.3
Approach		32	0	34	0.0	0.039	1.6	LOS A	0.1	0.9	0.39	0.28	0.39	21.3
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.081	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.3
5	T1	148	0	156	0.3	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		149	0	157	0.3	0.081	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Davenport Street (W)														
11	T1	172	3	181	1.5	0.147	0.3	LOS A	0.5	3.7	0.18	0.24	0.18	39.2
12	R2	77	0	81	0.0	0.147	4.6	LOS A	0.5	3.7	0.18	0.24	0.18	21.7
Approach		249	3	262	1.0	0.147	1.6	LOS NA	0.5	3.7	0.18	0.24	0.18	31.3
All Vehicles		430	3	453	0.7	0.147	1.1	LOS NA	0.5	3.7	0.14	0.16	0.14	32.6

2034 Option PM

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Option PM
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.119	1.3	LOS A	0.4	2.8	0.47	0.43	0.47	21.2
3	R2	86	0	90	0.0	0.119	2.6	LOS A	0.4	2.8	0.47	0.43	0.47	21.2
Approach		86	0	91	0.0	0.119	2.6	LOS A	0.4	2.8	0.47	0.43	0.47	21.2
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.180	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	332	0	349	0.0	0.180	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
Approach		333	0	350	0.0	0.180	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	39.9
West: Davenport Street (W)														
11	T1	139	8	147	5.6	0.116	0.5	LOS A	0.4	2.7	0.24	0.28	0.24	39.2
12	R2	46	0	49	0.0	0.116	5.4	LOS A	0.4	2.7	0.24	0.28	0.24	21.7
Approach		186	8	195	4.2	0.116	1.7	LOS NA	0.4	2.7	0.24	0.28	0.24	32.6
All Vehicles		605	8	636	1.3	0.180	0.9	LOS NA	0.4	2.8	0.14	0.15	0.14	33.4

2034 Option Sat

Project Name: Acc_8B_Davenport Street_Access Way 8B
Site Name: 2034 Option Sat
Site Title: Davenport Street / Shopping Centre Access Way 8B

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

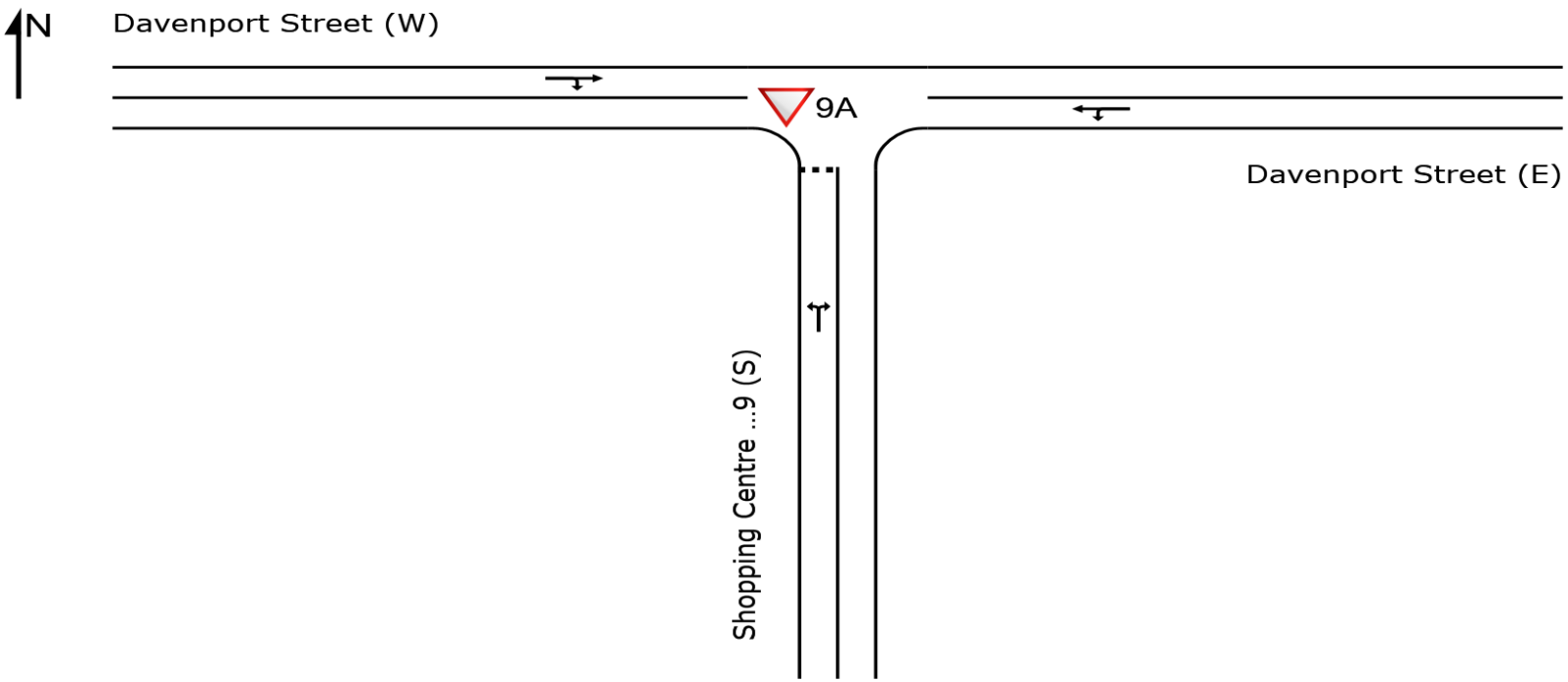
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 8B (S)														
1	L2	1	0	1	0.0	0.121	1.0	LOS A	0.4	2.8	0.50	0.48	0.50	21.1
3	R2	161	0	85	0.0	0.121	3.1	LOS A	0.4	2.8	0.50	0.48	0.50	21.1
Approach		162	0	85	0.0	0.121	3.1	LOS A	0.4	2.8	0.50	0.48	0.50	21.1
East: Davenport Street (E)														
4	L2	1	0	1	0.0	0.149	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	39.2
5	T1	551	0	290	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		552	0	290	0.0	0.149	0.1	LOS NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Davenport Street (W)														
11	T1	487	1	256	0.3	0.193	0.4	LOS A	0.6	4.5	0.22	0.26	0.22	39.2
12	R2	157	0	83	0.0	0.193	5.2	LOS A	0.6	4.5	0.22	0.26	0.22	21.7
Approach		644	1	339	0.2	0.193	1.6	LOS NA	0.6	4.5	0.22	0.26	0.22	32.7
All Vehicles		1357	2	714	0.1	0.193	1.2	LOS NA	0.6	4.5	0.17	0.18	0.17	33.0

SITE LAYOUT

Site: 9A [2024 Base AM (Site Folder: General)]

Davenport Street / Shopping Centre Access Way 9
Site Category: (None)
Give-Way (Two-Way)

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



2024 Base AM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2024 Base AM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	14	5	15	38.0	0.047	0.3	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
3	R2	30	0	31	0.7	0.047	1.6	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
Approach		44	6	46	12.7	0.047	1.2	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
East: Davenport Street (E)														
4	L2	28	0	29	0.0	0.056	4.9	LOS A	0.0	0.0	0.00	0.19	0.00	38.7
5	T1	73	2	77	2.5	0.056	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	39.4
Approach		101	2	107	1.8	0.056	1.4	LOS NA	0.0	0.0	0.00	0.19	0.00	39.2
West: Davenport Street (W)														
11	T1	196	2	206	1.2	0.165	0.2	LOS A	0.6	4.1	0.15	0.22	0.15	39.2
12	R2	89	0	93	0.0	0.165	4.4	LOS A	0.6	4.1	0.15	0.22	0.15	21.7
Approach		285	2	300	0.8	0.165	1.5	LOS NA	0.6	4.1	0.15	0.22	0.15	31.3
All Vehicles		430	10	453	2.3	0.165	1.4	LOS NA	0.6	4.1	0.13	0.20	0.13	31.3

2024 Base PM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2024 Base PM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	68	0	72	0.0	0.326	1.4	LOS A	1.5	10.2	0.52	0.52	0.59	21.1
3	R2	193	0	203	0.0	0.326	3.5	LOS A	1.5	10.2	0.52	0.52	0.59	21.1
Approach		261	0	275	0.0	0.326	3.0	LOS A	1.5	10.2	0.52	0.52	0.59	21.1
East: Davenport Street (E)														
4	L2	71	0	75	0.0	0.184	4.9	LOS A	0.0	0.0	0.00	0.14	0.00	38.8
5	T1	267	0	281	0.0	0.184	0.1	LOS A	0.0	0.0	0.00	0.14	0.00	39.5
Approach		338	0	356	0.0	0.184	1.1	LOS NA	0.0	0.0	0.00	0.14	0.00	39.4
West: Davenport Street (W)														
11	T1	142	0	149	0.0	0.152	0.9	LOS A	0.7	4.7	0.35	0.40	0.35	38.8
12	R2	90	0	95	0.0	0.152	5.4	LOS A	0.7	4.7	0.35	0.40	0.35	21.5
Approach		232	0	244	0.0	0.152	2.6	LOS NA	0.7	4.7	0.35	0.40	0.35	29.6
All Vehicles		831	0	875	0.0	0.326	2.1	LOS NA	1.5	10.2	0.26	0.33	0.28	28.9

2024 Base Sat

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2024 Base Sat
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	88	0	47	0.0	0.295	1.5	LOS A	1.2	8.5	0.56	0.60	0.64	21.0
3	R2	307	0	161	0.0	0.295	4.7	LOS A	1.2	8.5	0.56	0.60	0.64	21.0
Approach		395	0	208	0.0	0.295	4.0	LOS A	1.2	8.5	0.56	0.60	0.64	21.0
East: Davenport Street (E)														
4	L2	105	0	55	0.0	0.184	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
5	T1	569	1	300	0.2	0.184	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		675	1	355	0.1	0.184	0.8	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
West: Davenport Street (W)														
11	T1	530	0	279	0.1	0.235	0.7	LOS A	0.9	6.5	0.30	0.34	0.30	39.0
12	R2	218	0	115	0.0	0.235	5.6	LOS A	0.9	6.5	0.30	0.34	0.30	21.6
Approach		748	0	393	0.1	0.235	2.1	LOS NA	0.9	6.5	0.30	0.34	0.30	31.6
All Vehicles		1817	1	956	0.1	0.295	2.0	LOS NA	1.2	8.5	0.25	0.31	0.26	30.5

2034 Do Minimum AM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Do Minimum AM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	21	0	22	0.0	0.055	0.3	LOS A	0.2	1.3	0.29	0.15	0.29	21.3
3	R2	33	0	34	0.0	0.055	1.8	LOS A	0.2	1.3	0.29	0.15	0.29	21.3
Approach		53	0	56	0.0	0.055	1.2	LOS A	0.2	1.3	0.29	0.15	0.29	21.3
East: Davenport Street (E)														
4	L2	29	0	31	0.0	0.064	4.9	LOS A	0.0	0.0	0.00	0.18	0.00	38.7
5	T1	83	8	88	9.4	0.064	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	39.4
Approach		112	8	118	7.0	0.064	1.3	LOS NA	0.0	0.0	0.00	0.18	0.00	39.2
West: Davenport Street (W)														
11	T1	230	2	243	0.8	0.180	0.2	LOS A	0.6	4.0	0.14	0.19	0.14	39.3
12	R2	82	0	86	0.0	0.180	4.5	LOS A	0.6	4.0	0.14	0.19	0.14	21.7
Approach		312	2	329	0.6	0.180	1.3	LOS NA	0.6	4.0	0.14	0.19	0.14	32.4
All Vehicles		478	10	503	2.0	0.180	1.3	LOS NA	0.6	4.0	0.12	0.18	0.12	31.9

2034 Do Minimum Sat

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Do Minimum Sat
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	112	0	59	0.0	0.263	1.3	LOS A	1.0	7.1	0.53	0.49	0.55	21.1
3	R2	275	0	145	0.0	0.263	3.9	LOS A	1.0	7.1	0.53	0.49	0.55	21.1
Approach		387	0	204	0.0	0.263	3.2	LOS A	1.0	7.1	0.53	0.49	0.55	21.1
East: Davenport Street (E)														
4	L2	122	0	64	0.0	0.189	4.9	LOS A	0.0	0.0	0.00	0.12	0.00	38.9
5	T1	572	1	301	0.1	0.189	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	39.6
Approach		694	1	365	0.1	0.189	0.9	LOS NA	0.0	0.0	0.00	0.12	0.00	39.5
West: Davenport Street (W)														
11	T1	480	1	252	0.1	0.196	0.6	LOS A	0.7	4.8	0.26	0.30	0.26	39.2
12	R2	156	0	82	0.0	0.196	5.5	LOS A	0.7	4.8	0.26	0.30	0.26	21.7
Approach		636	1	335	0.1	0.196	1.8	LOS NA	0.7	4.8	0.26	0.30	0.26	32.7
All Vehicles		1716	1	903	0.1	0.263	1.8	LOS NA	1.0	7.1	0.21	0.27	0.22	31.0

2034 Do Minimum PM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Do Minimum PM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	58	0	61	0.0	0.311	1.7	LOS A	1.3	9.3	0.54	0.56	0.61	21.1
3	R2	177	0	187	0.0	0.311	3.8	LOS A	1.3	9.3	0.54	0.56	0.61	21.1
Approach		235	0	248	0.0	0.311	3.3	LOS A	1.3	9.3	0.54	0.56	0.61	21.1
East: Davenport Street (E)														
4	L2	65	0	68	0.0	0.210	4.9	LOS A	0.0	0.0	0.00	0.12	0.00	38.9
5	T1	321	0	338	0.1	0.210	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	39.6
Approach		386	0	407	0.1	0.210	0.9	LOS NA	0.0	0.0	0.00	0.12	0.00	39.5
West: Davenport Street (W)														
11	T1	129	4	136	2.9	0.147	1.1	LOS A	0.7	4.7	0.38	0.43	0.38	38.7
12	R2	86	0	91	0.0	0.147	5.7	LOS A	0.7	4.7	0.38	0.43	0.38	21.5
Approach		215	4	227	1.8	0.147	2.9	LOS NA	0.7	4.7	0.38	0.43	0.38	29.3
All Vehicles		837	4	881	0.5	0.311	2.1	LOS NA	1.3	9.3	0.25	0.32	0.27	29.6

2034 Option AM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Option AM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	23	0	24	0.0	0.050	0.3	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
3	R2	28	0	29	0.0	0.050	1.8	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
Approach		50	0	53	0.0	0.050	1.1	LOS A	0.2	1.2	0.28	0.15	0.28	21.3
East: Davenport Street (E)														
4	L2	58	0	61	0.0	0.087	4.9	LOS A	0.0	0.0	0.00	0.25	0.00	38.5
5	T1	100	1	105	1.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	39.2
Approach		158	1	166	0.6	0.087	1.8	LOS NA	0.0	0.0	0.00	0.25	0.00	39.0
West: Davenport Street (W)														
11	T1	236	2	248	1.0	0.160	0.1	LOS A	0.3	2.4	0.11	0.14	0.11	39.5
12	R2	46	0	49	0.0	0.160	4.6	LOS A	0.3	2.4	0.11	0.14	0.11	21.8
Approach		282	2	297	0.9	0.160	0.9	LOS NA	0.3	2.4	0.11	0.14	0.11	34.9
All Vehicles		490	3	516	0.7	0.160	1.2	LOS NA	0.3	2.4	0.09	0.18	0.09	33.8

2034 Option Sat

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Option Sat
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	107	0	57	0.0	0.264	1.3	LOS A	1.0	7.2	0.55	0.53	0.58	21.0
3	R2	260	0	137	0.0	0.264	4.5	LOS A	1.0	7.2	0.55	0.53	0.58	21.0
Approach		367	0	193	0.0	0.264	3.6	LOS A	1.0	7.2	0.55	0.53	0.58	21.0
East: Davenport Street (E)														
4	L2	116	0	61	0.0	0.191	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
5	T1	584	0	307	0.1	0.191	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		700	0	368	0.1	0.191	0.9	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
West: Davenport Street (W)														
11	T1	541	1	285	0.1	0.228	0.7	LOS A	0.8	5.9	0.28	0.32	0.28	39.1
12	R2	193	0	101	0.0	0.228	5.6	LOS A	0.8	5.9	0.28	0.32	0.28	21.6
Approach		734	1	386	0.1	0.228	2.0	LOS NA	0.8	5.9	0.28	0.32	0.28	32.3
All Vehicles		1801	1	948	0.1	0.264	1.9	LOS NA	1.0	7.2	0.23	0.28	0.23	31.1

2034 Option PM

Project Name: Acc_9_Davenport Street_Access Way 9
Site Name: 2034 Option PM
Site Title: Davenport Street / Shopping Centre Access Way 9

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

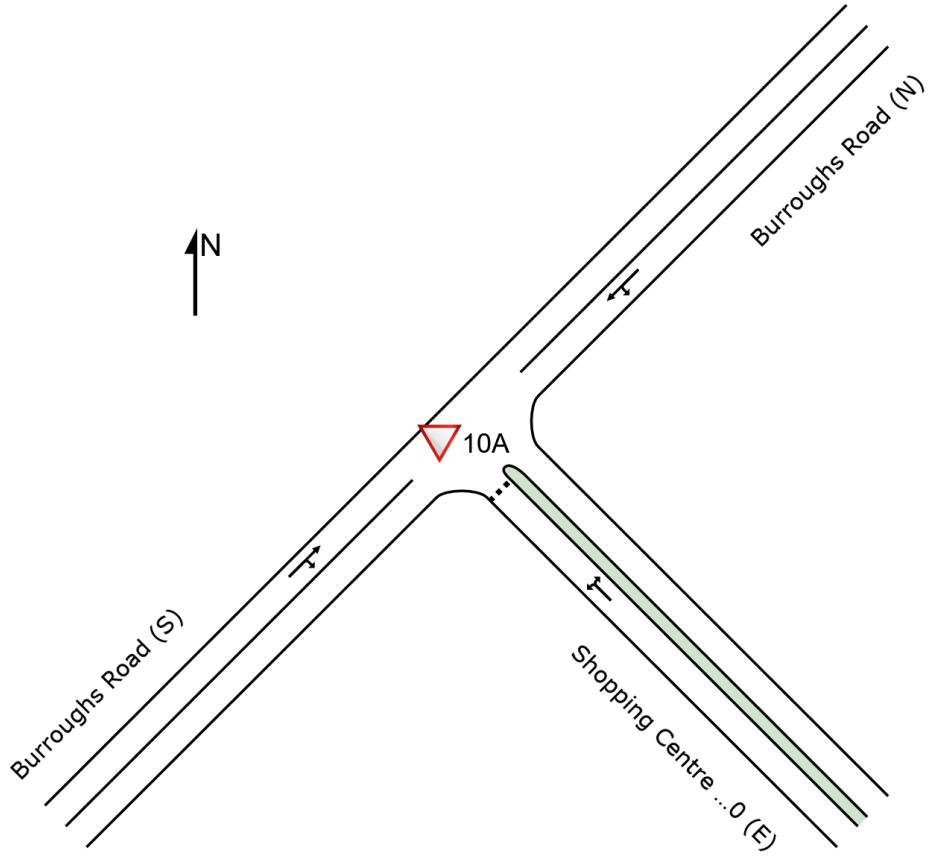
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
South: Shopping Centre Access Way 9 (S)														
1	L2	58	0	61	0.0	0.310	1.9	LOS A	1.3	9.2	0.55	0.60	0.64	21.0
3	R2	165	0	174	0.0	0.310	4.2	LOS A	1.3	9.2	0.55	0.60	0.64	21.0
Approach		224	0	235	0.0	0.310	3.6	LOS A	1.3	9.2	0.55	0.60	0.64	21.0
East: Davenport Street (E)														
4	L2	64	0	68	0.0	0.227	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
5	T1	352	0	371	0.1	0.227	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		417	0	439	0.1	0.227	0.8	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
West: Davenport Street (W)														
11	T1	140	7	147	5.3	0.159	1.2	LOS A	0.7	5.2	0.39	0.45	0.39	38.7
12	R2	90	0	94	0.0	0.159	5.9	LOS A	0.7	5.2	0.39	0.45	0.39	21.5
Approach		229	7	241	3.2	0.159	3.0	LOS NA	0.7	5.2	0.39	0.45	0.39	29.5
All Vehicles		869	8	915	0.9	0.310	2.1	LOS NA	1.3	9.2	0.24	0.32	0.27	30.0

SITE LAYOUT

Site: 10A [2024 Base AM (Site Folder: General)]

Burroughs Road / Shopping Centre Access Way 10
Site Category: (None)
Give-Way (Two-Way)

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



9 Burroughs Road / Shopping Centre Access Way 10

2024 Base AM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2024 Base AM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	15	0	16	0.0	0.030	0.5	LOS A	0.1	0.7	0.31	0.17	0.31	21.3
23	R2	16	0	17	0.0	0.030	1.6	LOS A	0.1	0.7	0.31	0.17	0.31	21.3
Approach		32	0	33	0.0	0.030	1.0	LOS A	0.1	0.7	0.31	0.17	0.31	21.3
NorthEast: Burroughs Road (N)														
24	L2	33	0	35	0.0	0.100	4.9	LOS A	0.0	0.0	0.00	0.12	0.00	38.9
25	T1	149	1	157	0.9	0.100	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	39.6
Approach		182	1	192	0.8	0.100	0.9	LOS NA	0.0	0.0	0.00	0.12	0.00	39.5
SouthWest: Burroughs Road (S)														
31	T1	174	4	183	2.3	0.123	0.2	LOS A	0.3	2.0	0.13	0.16	0.13	39.4
32	R2	39	0	41	0.0	0.123	4.9	LOS A	0.3	2.0	0.13	0.16	0.13	21.8
Approach		213	4	225	1.9	0.123	1.0	LOS NA	0.3	2.0	0.13	0.16	0.13	34.3
All Vehicles		427	5	449	1.3	0.123	1.0	LOS NA	0.3	2.0	0.09	0.15	0.09	34.7

2024 Base PM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2024 Base PM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	82	0	86	0.0	0.102	1.3	LOS A	0.4	2.7	0.43	0.33	0.43	21.3
23	R2	18	0	19	0.0	0.102	3.2	LOS A	0.4	2.7	0.43	0.33	0.43	21.3
Approach		100	0	105	0.0	0.102	1.7	LOS A	0.4	2.7	0.43	0.33	0.43	21.3
NorthEast: Burroughs Road (N)														
24	L2	23	0	24	0.0	0.201	4.9	LOS A	0.0	0.0	0.00	0.04	0.00	39.1
25	T1	347	1	365	0.4	0.201	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	39.8
Approach		370	1	389	0.4	0.201	0.4	LOS NA	0.0	0.0	0.00	0.04	0.00	39.8
SouthWest: Burroughs Road (S)														
31	T1	207	2	218	0.8	0.149	0.4	LOS A	0.4	2.7	0.19	0.22	0.19	39.4
32	R2	42	0	44	0.0	0.149	5.8	LOS A	0.4	2.7	0.19	0.22	0.19	21.7
Approach		249	2	262	0.6	0.149	1.3	LOS NA	0.4	2.7	0.19	0.22	0.19	34.7
All Vehicles		719	3	756	0.4	0.201	0.9	LOS NA	0.4	2.7	0.13	0.15	0.13	33.9

2024 Base Sat

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2024 Base Sat
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	169	0	89	0.0	0.099	1.1	LOS A	0.4	2.6	0.40	0.29	0.40	21.3
23	R2	35	0	19	0.0	0.099	3.1	LOS A	0.4	2.6	0.40	0.29	0.40	21.3
Approach		204	0	108	0.0	0.099	1.5	LOS A	0.4	2.6	0.40	0.29	0.40	21.3
NorthEast: Burroughs Road (N)														
24	L2	93	0	49	0.0	0.188	4.9	LOS A	0.0	0.0	0.00	0.09	0.00	39.0
25	T1	598	1	315	0.2	0.188	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
Approach		692	1	364	0.2	0.188	0.7	LOS NA	0.0	0.0	0.00	0.09	0.00	39.6
SouthWest: Burroughs Road (S)														
31	T1	456	1	240	0.2	0.161	0.4	LOS A	0.4	2.8	0.18	0.21	0.18	39.4
32	R2	89	0	47	0.0	0.161	5.7	LOS A	0.4	2.8	0.18	0.21	0.18	21.7
Approach		544	1	287	0.1	0.161	1.2	LOS NA	0.4	2.8	0.18	0.21	0.18	34.8
All Vehicles		1441	2	758	0.2	0.188	1.0	LOS NA	0.4	2.8	0.12	0.17	0.12	33.7

9 Burroughs Road / Shopping Centre Access Way 10

2034 Do Minimum AM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Do Minimum AM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	27	0	29	0.0	0.077	0.6	LOS A	0.3	1.9	0.36	0.25	0.36	21.3
23	R2	45	0	47	0.0	0.077	2.1	LOS A	0.3	1.9	0.36	0.25	0.36	21.3
Approach		72	0	76	0.0	0.077	1.5	LOS A	0.3	1.9	0.36	0.25	0.36	21.3
NorthEast: Burroughs Road (N)														
24	L2	31	0	33	0.0	0.110	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
25	T1	166	8	175	4.7	0.110	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		197	8	208	4.0	0.110	0.8	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
SouthWest: Burroughs Road (S)														
31	T1	198	2	208	1.1	0.157	0.3	LOS A	0.5	3.5	0.19	0.23	0.19	39.2
32	R2	68	0	71	0.0	0.157	5.0	LOS A	0.5	3.5	0.19	0.23	0.19	21.7
Approach		266	2	280	0.8	0.157	1.5	LOS NA	0.5	3.5	0.19	0.23	0.19	32.5
All Vehicles		535	10	563	1.9	0.157	1.2	LOS NA	0.5	3.5	0.14	0.19	0.14	32.3

2034 Do Minimum Sat

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Do Minimum Sat
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	274	0	144	0.0	0.175	1.2	LOS A	0.7	4.9	0.43	0.33	0.43	21.3
23	R2	75	0	40	0.0	0.175	3.6	LOS A	0.7	4.9	0.43	0.33	0.43	21.3
Approach		349	0	184	0.0	0.175	1.7	LOS A	0.7	4.9	0.43	0.33	0.43	21.3
NorthEast: Burroughs Road (N)														
24	L2	94	0	49	0.0	0.187	4.9	LOS A	0.0	0.0	0.00	0.09	0.00	39.0
25	T1	591	2	311	0.4	0.187	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
Approach		685	2	361	0.4	0.187	0.7	LOS NA	0.0	0.0	0.00	0.09	0.00	39.6
SouthWest: Burroughs Road (S)														
31	T1	305	2	160	0.7	0.207	1.1	LOS A	1.0	7.3	0.41	0.48	0.41	38.5
32	R2	298	0	157	0.0	0.207	5.7	LOS A	1.0	7.3	0.41	0.48	0.41	21.5
Approach		602	2	317	0.4	0.207	3.4	LOS NA	1.0	7.3	0.41	0.48	0.41	27.6
All Vehicles		1636	5	861	0.3	0.207	1.9	LOS NA	1.0	7.3	0.24	0.29	0.24	29.5

2034 Do Minimum PM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Do Minimum PM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	185	0	195	0.0	0.268	1.5	LOS A	1.1	7.8	0.48	0.39	0.48	21.2
23	R2	71	0	75	0.0	0.268	3.4	LOS A	1.1	7.8	0.48	0.39	0.48	21.2
Approach		256	0	269	0.0	0.268	2.0	LOS A	1.1	7.8	0.48	0.39	0.48	21.2
NorthEast: Burroughs Road (N)														
24	L2	61	0	64	0.0	0.214	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
25	T1	330	5	347	1.6	0.214	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		390	5	411	1.3	0.214	0.8	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
SouthWest: Burroughs Road (S)														
31	T1	125	8	131	6.7	0.132	1.0	LOS A	0.6	4.0	0.35	0.41	0.35	38.7
32	R2	70	0	74	0.0	0.132	5.9	LOS A	0.6	4.0	0.35	0.41	0.35	21.5
Approach		195	8	205	4.3	0.132	2.7	LOS NA	0.6	4.0	0.35	0.41	0.35	30.1
All Vehicles		841	14	885	1.6	0.268	1.6	LOS NA	1.1	7.8	0.23	0.26	0.23	29.6

2034 Option AM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Option AM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	25	0	26	0.0	0.048	0.3	LOS A	0.2	1.2	0.27	0.14	0.27	21.4
23	R2	27	0	29	0.0	0.048	1.4	LOS A	0.2	1.2	0.27	0.14	0.27	21.4
Approach		52	0	55	0.0	0.048	0.9	LOS A	0.2	1.2	0.27	0.14	0.27	21.4
NorthEast: Burroughs Road (N)														
24	L2	44	0	47	0.0	0.084	4.9	LOS A	0.0	0.0	0.00	0.20	0.00	38.7
25	T1	108	2	114	1.7	0.084	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	39.4
Approach		152	2	160	1.2	0.084	1.4	LOS NA	0.0	0.0	0.00	0.20	0.00	39.2
SouthWest: Burroughs Road (S)														
31	T1	135	3	142	2.4	0.119	0.3	LOS A	0.4	3.0	0.19	0.25	0.19	39.1
32	R2	66	0	69	0.0	0.119	4.8	LOS A	0.4	3.0	0.19	0.25	0.19	21.7
Approach		201	3	212	1.6	0.119	1.7	LOS NA	0.4	3.0	0.19	0.25	0.19	30.9
All Vehicles		405	5	427	1.2	0.119	1.5	LOS NA	0.4	3.0	0.13	0.22	0.13	31.6

2034 Option PM

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Option PM
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	205	0	216	0.0	0.273	1.4	LOS A	1.2	8.1	0.48	0.38	0.48	21.2
23	R2	61	0	64	0.0	0.273	3.8	LOS A	1.2	8.1	0.48	0.38	0.48	21.2
Approach		266	0	280	0.0	0.273	2.0	LOS A	1.2	8.1	0.48	0.38	0.48	21.2
NorthEast: Burroughs Road (N)														
24	L2	64	0	67	0.0	0.211	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	38.9
25	T1	323	2	340	0.5	0.211	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	39.6
Approach		386	2	407	0.4	0.211	0.9	LOS NA	0.0	0.0	0.00	0.11	0.00	39.5
SouthWest: Burroughs Road (S)														
31	T1	131	9	137	6.6	0.174	1.2	LOS A	0.8	6.0	0.42	0.48	0.42	38.5
32	R2	115	0	121	0.0	0.174	5.9	LOS A	0.8	6.0	0.42	0.48	0.42	21.5
Approach		245	9	258	3.5	0.174	3.4	LOS NA	0.8	6.0	0.42	0.48	0.42	28.1
All Vehicles		897	10	944	1.1	0.273	1.9	LOS NA	1.2	8.1	0.26	0.29	0.26	28.9

2034 Option Sat

Project Name: Acc_10_Burroughs Road_Access Way 10
Site Name: 2034 Option Sat
Site Title: Burroughs Road / Shopping Centre Access Way 10

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

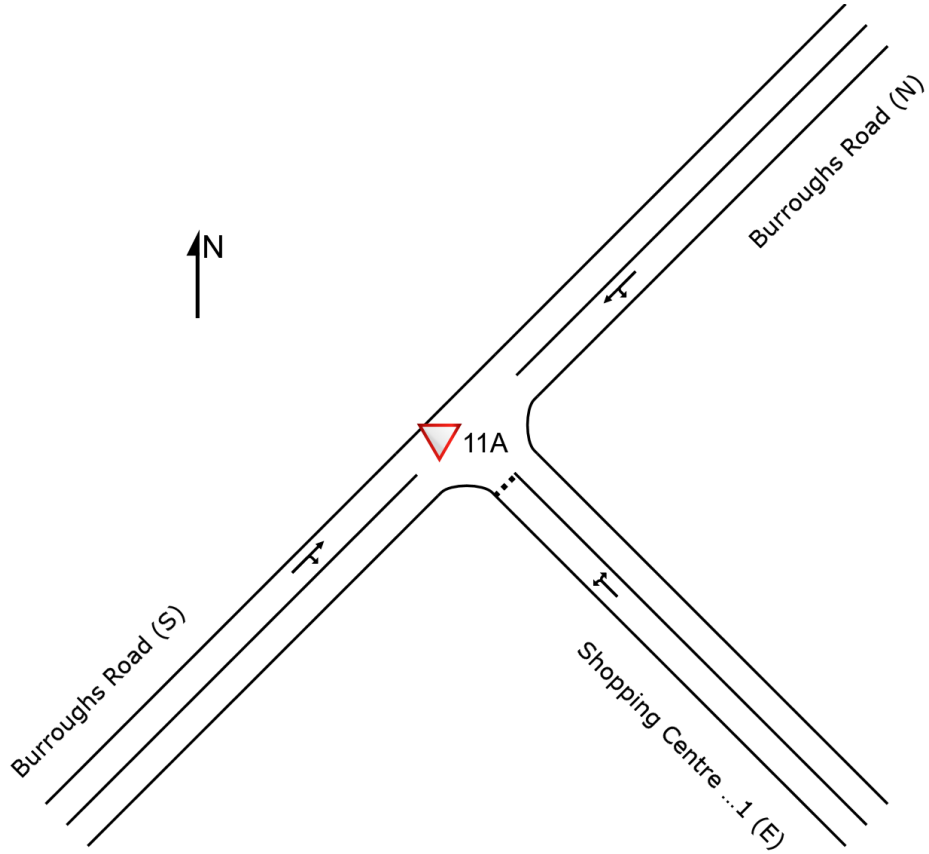
Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 10 (E)														
21	L2	288	0	152	0.0	0.193	1.2	LOS A	0.8	5.4	0.44	0.34	0.44	21.2
23	R2	87	0	46	0.0	0.193	3.9	LOS A	0.8	5.4	0.44	0.34	0.44	21.2
Approach		375	0	197	0.0	0.193	1.8	LOS A	0.8	5.4	0.44	0.34	0.44	21.2
NorthEast: Burroughs Road (N)														
24	L2	93	0	49	0.0	0.186	4.9	LOS A	0.0	0.0	0.00	0.09	0.00	39.0
25	T1	591	2	311	0.3	0.186	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
Approach		685	2	360	0.2	0.186	0.7	LOS NA	0.0	0.0	0.00	0.09	0.00	39.6
SouthWest: Burroughs Road (S)														
31	T1	399	2	210	0.5	0.220	1.0	LOS A	1.0	7.2	0.37	0.43	0.37	38.7
32	R2	267	0	140	0.0	0.220	5.7	LOS A	1.0	7.2	0.37	0.43	0.37	21.5
Approach		665	2	350	0.3	0.220	2.9	LOS NA	1.0	7.2	0.37	0.43	0.37	29.3
All Vehicles		1725	3	908	0.2	0.220	1.8	LOS NA	1.0	7.2	0.24	0.28	0.24	29.9

SITE LAYOUT

Site: 11A [2024 Base AM (Site Folder: General)]

Burroughs Road / Shopping Centre Access Way 11
Site Category: (None)
Give-Way (Two-Way)

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



10 Burroughs Road / Shopping Centre Access Way 11

2024 Base AM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2024 Base AM
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	9	0	10	0.0	0.044	0.5	LOS A	0.1	1.0	0.35	0.23	0.35	21.3
23	R2	31	0	33	0.0	0.044	1.6	LOS A	0.1	1.0	0.35	0.23	0.35	21.3
Approach		40	0	42	0.0	0.044	1.4	LOS A	0.1	1.0	0.35	0.23	0.35	21.3
NorthEast: Burroughs Road (N)														
24	L2	32	0	33	0.0	0.103	4.9	LOS A	0.0	0.0	0.00	0.12	0.00	38.9
25	T1	157	2	165	1.0	0.103	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	39.6
Approach		189	2	199	0.8	0.103	0.9	LOS NA	0.0	0.0	0.00	0.12	0.00	39.5
SouthWest: Burroughs Road (S)														
31	T1	208	4	219	1.9	0.120	0.0	LOS A	0.1	0.5	0.03	0.03	0.03	39.9
32	R2	8	0	9	0.0	0.120	4.6	LOS A	0.1	0.5	0.03	0.03	0.03	21.9
Approach		217	4	228	1.8	0.120	0.2	LOS NA	0.1	0.5	0.03	0.03	0.03	38.6
All Vehicles		446	6	469	1.3	0.120	0.6	LOS NA	0.1	1.0	0.05	0.09	0.05	36.3

2024 Base Sat

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2024 Base Sat
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	132	0	69	0.0	0.111	1.5	LOS A	0.4	2.8	0.47	0.39	0.47	21.2
23	R2	58	0	30	0.0	0.111	4.0	LOS A	0.4	2.8	0.47	0.39	0.47	21.2
Approach		190	0	100	0.0	0.111	2.2	LOS A	0.4	2.8	0.47	0.39	0.47	21.2
NorthEast: Burroughs Road (N)														
24	L2	35	0	19	0.0	0.211	4.9	LOS A	0.0	0.0	0.00	0.03	0.00	39.1
25	T1	744	2	391	0.3	0.211	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	39.8
Approach		779	2	410	0.3	0.211	0.3	LOS NA	0.0	0.0	0.00	0.03	0.00	39.8
SouthWest: Burroughs Road (S)														
31	T1	469	1	247	0.2	0.197	0.7	LOS A	0.7	5.0	0.28	0.32	0.28	39.1
32	R2	157	0	82	0.0	0.197	5.8	LOS A	0.7	5.0	0.28	0.32	0.28	21.6
Approach		626	1	329	0.1	0.197	2.0	LOS NA	0.7	5.0	0.28	0.32	0.28	32.5
All Vehicles		1595	3	839	0.2	0.211	1.2	LOS NA	0.7	5.0	0.17	0.19	0.17	33.4

2024 Base PM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2024 Base PM
Site Title: Burroughs Road / Shopping Centre Access Way 11
0

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	106	0	112	0.0	0.215	1.6	LOS A	0.8	5.7	0.51	0.44	0.51	21.2
23	R2	71	0	75	0.0	0.215	4.0	LOS A	0.8	5.7	0.51	0.44	0.51	21.2
Approach		177	0	187	0.0	0.215	2.6	LOS A	0.8	5.7	0.51	0.44	0.51	21.2
NorthEast: Burroughs Road (N)														
24	L2	39	1	41	3.6	0.227	5.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.0
25	T1	379	0	399	0.0	0.227	0.1	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
Approach		417	1	439	0.3	0.227	0.5	LOS NA	0.0	0.0	0.00	0.06	0.00	39.7
SouthWest: Burroughs Road (S)														
31	T1	186	2	196	0.9	0.164	0.8	LOS A	0.6	4.3	0.30	0.35	0.30	39.0
32	R2	68	0	72	0.0	0.164	5.9	LOS A	0.6	4.3	0.30	0.35	0.30	21.6
Approach		254	2	267	0.6	0.164	2.2	LOS NA	0.6	4.3	0.30	0.35	0.30	32.1
All Vehicles		848	3	893	0.4	0.227	1.5	LOS NA	0.8	5.7	0.20	0.23	0.20	31.6

2034 Do Minimum AM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Do Minimum AM
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	22	0	23	0.0	0.079	0.6	LOS A	0.3	1.9	0.37	0.26	0.37	21.3
23	R2	51	0	54	0.0	0.079	1.8	LOS A	0.3	1.9	0.37	0.26	0.37	21.3
Approach		73	0	77	0.0	0.079	1.5	LOS A	0.3	1.9	0.37	0.26	0.37	21.3
NorthEast: Burroughs Road (N)														
24	L2	29	0	31	0.0	0.115	4.9	LOS A	0.0	0.0	0.00	0.10	0.00	39.0
25	T1	177	8	186	4.7	0.115	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	39.7
Approach		206	8	217	4.1	0.115	0.7	LOS NA	0.0	0.0	0.00	0.10	0.00	39.6
SouthWest: Burroughs Road (S)														
31	T1	210	2	221	1.0	0.119	0.0	LOS A	0.1	0.4	0.03	0.03	0.03	39.9
32	R2	7	0	7	0.0	0.119	4.6	LOS A	0.1	0.4	0.03	0.03	0.03	21.9
Approach		217	2	228	0.9	0.119	0.2	LOS NA	0.1	0.4	0.03	0.03	0.03	38.9
All Vehicles		496	10	523	2.1	0.119	0.6	LOS NA	0.3	1.9	0.07	0.09	0.07	34.9

2034 Do Minimum Sat

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Do Minimum Sat
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	38	0	20	0.0	0.033	1.6	LOS A	0.1	0.8	0.48	0.37	0.48	21.2
23	R2	16	0	8	0.0	0.033	4.1	LOS A	0.1	0.8	0.48	0.37	0.48	21.2
Approach		54	0	28	0.0	0.033	2.3	LOS A	0.1	0.8	0.48	0.37	0.48	21.2
NorthEast: Burroughs Road (N)														
24	L2	29	0	15	0.0	0.238	4.9	LOS A	0.0	0.0	0.00	0.02	0.00	39.2
25	T1	849	3	447	0.4	0.238	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	39.9
Approach		878	3	462	0.4	0.238	0.2	LOS NA	0.0	0.0	0.00	0.02	0.00	39.8
SouthWest: Burroughs Road (S)														
31	T1	575	2	303	0.4	0.175	0.2	LOS A	0.2	1.5	0.09	0.11	0.09	39.7
32	R2	40	0	21	0.0	0.175	6.0	LOS A	0.2	1.5	0.09	0.11	0.09	21.8
Approach		615	2	324	0.4	0.175	0.6	LOS NA	0.2	1.5	0.09	0.11	0.09	37.7
All Vehicles		1547	5	814	0.3	0.238	0.5	LOS NA	0.2	1.5	0.05	0.07	0.05	37.8

2034 Do Minimum PM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Do Minimum PM
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service m	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	26	0	27	0.0	0.058	1.9	LOS A	0.2	1.4	0.50	0.42	0.50	21.1
23	R2	18	0	19	0.0	0.058	3.8	LOS A	0.2	1.4	0.50	0.42	0.50	21.1
Approach		44	0	46	0.0	0.058	2.7	LOS A	0.2	1.4	0.50	0.42	0.50	21.1
NorthEast: Burroughs Road (N)														
24	L2	33	0	35	0.0	0.272	5.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.1
25	T1	466	6	490	1.4	0.272	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
Approach		498	6	525	1.3	0.272	0.4	LOS NA	0.0	0.0	0.00	0.05	0.00	39.7
SouthWest: Burroughs Road (S)														
31	T1	169	8	178	4.8	0.128	0.6	LOS A	0.3	2.5	0.22	0.25	0.22	39.3
32	R2	33	0	35	0.0	0.128	6.3	LOS A	0.3	2.5	0.22	0.25	0.22	21.7
Approach		202	8	213	4.1	0.128	1.6	LOS NA	0.3	2.5	0.22	0.25	0.22	34.7
All Vehicles		744	15	783	2.0	0.272	0.9	LOS NA	0.3	2.5	0.09	0.12	0.09	36.4

2034 Option AM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Option AM
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	17	0	17	0.0	0.070	0.4	LOS A	0.2	1.7	0.30	0.18	0.30	21.4
23	R2	54	0	57	0.0	0.070	1.2	LOS A	0.2	1.7	0.30	0.18	0.30	21.4
	Approach	71	0	75	0.0	0.070	1.0	LOS A	0.2	1.7	0.30	0.18	0.30	21.4
NorthEast: Burroughs Road (N)														
24	L2	31	0	33	0.0	0.082	4.9	LOS A	0.0	0.0	0.00	0.14	0.00	38.8
25	T1	118	3	124	2.2	0.082	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	39.5
	Approach	149	3	157	1.7	0.082	1.0	LOS NA	0.0	0.0	0.00	0.14	0.00	39.4
SouthWest: Burroughs Road (S)														
31	T1	142	3	149	2.1	0.084	0.0	LOS A	0.1	0.5	0.04	0.05	0.04	39.8
32	R2	10	0	10	0.0	0.084	4.5	LOS A	0.1	0.5	0.04	0.05	0.04	21.9
	Approach	151	3	159	2.0	0.084	0.3	LOS NA	0.1	0.5	0.04	0.05	0.04	37.8
	All Vehicles	372	6	391	1.5	0.084	0.7	LOS NA	0.2	1.7	0.07	0.11	0.07	33.4

2034 Option PM

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Option PM
Site Title: Burroughs Road / Shopping Centre Access Way 11

Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	27	0	28	0.0	0.060	1.9	LOS A	0.2	1.4	0.51	0.44	0.51	21.1
23	R2	17	0	18	0.0	0.060	4.4	LOS A	0.2	1.4	0.51	0.44	0.51	21.1
	Approach	44	0	46	0.0	0.060	2.9	LOS A	0.2	1.4	0.51	0.44	0.51	21.1
NorthEast: Burroughs Road (N)														
24	L2	34	0	36	0.0	0.277	5.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.1
25	T1	476	3	501	0.7	0.277	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
	Approach	510	3	537	0.6	0.277	0.4	LOS NA	0.0	0.0	0.00	0.05	0.00	39.7
SouthWest: Burroughs Road (S)														
31	T1	220	9	232	4.0	0.156	0.5	LOS A	0.4	2.6	0.18	0.22	0.18	39.4
32	R2	33	0	34	0.0	0.156	6.5	LOS A	0.4	2.6	0.18	0.22	0.18	21.7
	Approach	253	9	266	3.5	0.156	1.3	LOS NA	0.4	2.6	0.18	0.22	0.18	35.7
	All Vehicles	807	12	849	1.5	0.277	0.8	LOS NA	0.4	2.6	0.08	0.12	0.08	36.7

2034 Option Sat

Project Name: Acc_11_Burroughs Road_Access Way 11
Site Name: 2034 Option Sat
Site Title: Burroughs Road / Shopping Centre Access Way 11

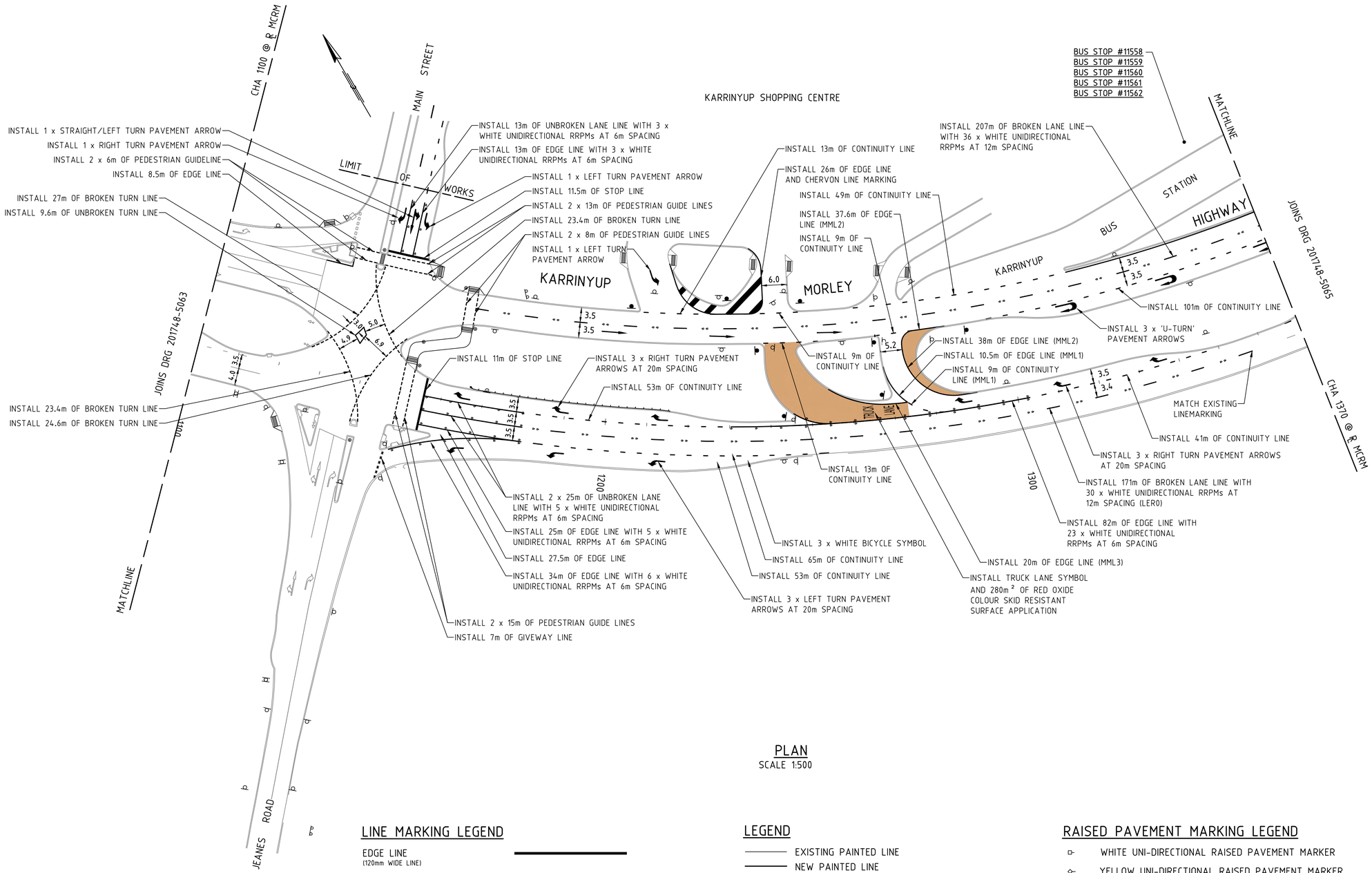
Folder Name: General
Site Type: Give-Way/Yield

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES Total veh/h	INPUT VOLUMES HV veh/h	DEMAND FLOWS Total veh/h	DEMAND FLOWS HV %	Deg. Satn. v/c	Average Delay sec	Level of Service	% BACK OF QUEUE Vehicles veh	% BACK OF QUEUE Distance m	Prop. Queued km/h	Effective Stop Rate per veh	Average No. Cycles	Average Speed km/h
SouthEast: Shopping Centre Access Way 11 (E)														
21	L2	38	0	20	0.0	0.034	1.6	LOS A	0.1	0.8	0.49	0.38	0.49	21.2
23	R2	16	0	9	0.0	0.034	4.4	LOS A	0.1	0.8	0.49	0.38	0.49	21.2
	Approach	54	0	29	0.0	0.034	2.5	LOS A	0.1	0.8	0.49	0.38	0.49	21.2
NorthEast: Burroughs Road (N)														
24	L2	32	0	17	0.0	0.242	4.9	LOS A	0.0	0.0	0.00	0.02	0.00	39.1
25	T1	863	3	454	0.3	0.242	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	39.8
	Approach	894	3	471	0.3	0.242	0.3	LOS NA	0.0	0.0	0.00	0.02	0.00	39.8
SouthWest: Burroughs Road (S)														
31	T1	637	2	335	0.3	0.191	0.2	LOS A	0.2	1.5	0.08	0.10	0.08	39.8
32	R2	40	0	21	0.0	0.191	6.1	LOS A	0.2	1.5	0.08	0.10	0.08	21.8
	Approach	677	2	356	0.3	0.191	0.6	LOS NA	0.2	1.5	0.08	0.10	0.08	37.9
	All Vehicles	1626	4	856	0.3	0.242	0.5	LOS NA	0.2	1.5	0.05	0.07	0.05	37.9

Appendix G

Karrinyup Road/ Jeanes Road/ Main Street Schematic Road Upgrade Drawing



PLAN
SCALE 1:500

LINE MARKING LEGEND

EDGE LINE (120mm WIDE LINE)	
BROKEN LANE LINE (80mm WIDE LINE)	3m 9m 3m 9m 3m
UNBROKEN LANE LINE (80mm WIDE LINE)	
CONTINUITY LINES (120mm WIDE LINE)	1m 3m 1m 3m 1m 3m 1m
GIVE WAY LINE (450mm WIDE LINE)	0.6m LINE AND GAP
STOP LINE (450mm WIDE LINE)	
BROKEN TURN LINE (100mm WIDE LINE)	0.6m LINE AND GAP
PEDESTRIAN GUIDE LINES (150mm WIDE LINE)	1.0m LINE AND 0.3m GAP

LEGEND

- EXISTING PAINTED LINE
- NEW PAINTED LINE
- EXISTING PAVEMENT ARROW
- NEW PAVEMENT ARROW
- NEW URBAN LANE CHANGE PAVEMENT ARROW
- EXISTING ONE POST SIGN
- NEW OR REPOSITIONED ONE POST SIGN
- EXISTING TWO POST SIGN
- NEW OR REPOSITIONED TWO POST SIGN
- TRAFFIC SIGNAL POLE
- DIAGONAL MARKING
- TACTILE GROUND SURFACE INDICATOR
- COLOURED CYCLE LANE TREATMENT, REFER NOTE 4.
- RED ASPHALT BUS LANES
- (MLL2) MX STRING LABEL FOR SETOUT
- PROPOSED W-BEAM SAFETY BARRIER

RAISED PAVEMENT MARKING LEGEND

- WHITE UNI-DIRECTIONAL RAISED PAVEMENT MARKER
- YELLOW UNI-DIRECTIONAL RAISED PAVEMENT MARKER
- YELLOW BI-DIRECTIONAL RAISED PAVEMENT MARKER

NOT FOR CONSTRUCTION

AMENDMENTS

No.	DESCRIPTION	APPROVED & DATE
A	ISSUED FOR MRWA 15% REVIEW	27.02.17
B	ISSUED FOR MRWA 85% REVIEW	30.06.17
C	ISSUED FOR MRWA 100% REVIEW	05.02.18

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS PLAN TO BE PRINTED AND VIEWED IN COLOUR.
3. FOR SIGNAGE INFORMATION REFER TO DRGS. 201748-5073 TO 5085.
4. FOR PAVEMENT MARKING LINE TYPES REFER TO MRWA STANDARD DRG 9931-0198.
5. FOR PAVEMENT MARKING ARROW DETAILS REFER TO MRWA STANDARD DRG 9531-2010.
6. FOR RAISED RETRO-REFLECTIVE PAVEMENT MARKER LOCATIONS REFER TO MRWA STANDARD DRG 9120-0158
7. FOR BUS STOP PAVEMENT MARKINGS STANDARDS REFER TO MRWA STANDARD DRG 200331-092

METADATA

GROUND SURVEY STANDARD: 67-08-43
DATE OF CAPTURE:
MAPPING SURVEY STANDARD:
DATE OF CAPTURE:
MAIN ROADS PROJECT ZONE: PCG94
HEIGHT DATUM: AHD

pritchard francis
civil and structural engineering consultants
Level 1, 430 Roberts Road
PO Box 2150
Subiaco WA 6904
Telephone: (08) 9382 5111
Facsimile: (08) 9382 5199
admin@pfeng.com.au
ACN: 008 891 094

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VERIFIED JT
DIRECTOR DI

THE GOVERNMENT OF WESTERN AUSTRALIA
mainroads WESTERN AUSTRALIA
ROAD NETWORK SERVICES
METROPOLITAN REGION
WATERLOO CRESCENT EAST PERTH 6004
Telephone (08) 9323 4111 Fax (08) 9323 4430

SCALES 1:500
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MRWA FILE NUMBER
APPROVED (MRWA)

KARRINYUP ROAD UPGRADE
KARRINYUP MORLEY HIGHWAY (H028)
SLK 0 TO SLK 3.46
PAVEMENT MARKING PLAN
CHA 1100 TO CHA 1370 @ MCRM
LOCAL AUTHORITY CITY OF STIRLING (125)
MRWA DRAWING NUMBER
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E:\WORKING\2015\15-368 KARRINYUP SC\CIVIL\SARA WORKING

Aurecon Australasia Pty Ltd

Level 5, 863 Hay Street
Perth WA 6000
Australia
T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

Key Contact
Antony Johnstone
WA/NT Transport, Land, & Water Leader
E antony.johnstone@aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Bahrain, Botswana, China, Ethiopia, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.

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City of Stirling
11 Sept 2024
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Karrinyup Shopping Centre

Traffic Impact Assessment Update

GTP Group

Reference: 525467

Revision: 3

2024-09-11

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Document control record

Document prepared by:

Aurecon Australasia Pty Ltd
ABN 54 005 139 873
Level 5, 863 Hay Street
Perth WA 6000
Australia

T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

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Name	Nic Catto	Name	A Johnstone
Title	Engineer	Title	WA/NT Transport, Land & Water Leader

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Executive Summary

Karrinyup Shopping Centre (the Development) is a premier shopping centre in Perth and functions as the major activity centre within the Karrinyup-Gwelup locality. GPT Group (the Applicant) are proposing two changes to the existing transport infrastructure within the Centre which are the topic of this TIA:

- Converting the existing Ramp 14 at Karrinyup Rd from entry-only to exit-only.
- Addition of two levels of parking in the eastern building, totalling 267 carparks.

The Development is proposing these two changes to improve the experience of vehicle access and car parking for customers. The Applicant has received feedback in relation to exiting the Development from the western carpark area to Karrinyup Road during peak periods. This aligns with a general point of frustration customers have expressed regarding exiting the Development.

These two changes are not expected to increase the trip generation of the Development, but to manage the discrepancy between existing demand, supply of parking, and ease internal traffic congestion.

1 Background

Karrinyup Shopping Centre (the Development) is a premier shopping centre in Perth and functions as the major activity centre within the Karrinyup-Gwelup locality. GPT Group (the Applicant) are proposing two changes to the existing transport infrastructure within the shopping centre which are the topic of this TIA:

- Converting the existing Ramp 14 at Karrinyup Rd from entry-only to exit-only.
- Addition of two floors of parking in the eastern building, totalling 267 carparks.

1.1 Name of Applicant and Consultant

The Applicant have engaged Aurecon (the Consultant) to prepare this Traffic Impact Assessment (TIA) for proposed changes to the Development.

This report has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016) and the TIA Checklist is included in Appendix A.

1.2 Development Location and Context

Karrinyup Shopping Centre functions as the major activity centre within the Karrinyup-Gwelup locality in the City of Stirling, located approximately 12 km northwest of Perth CBD. The location of the Development relative to Perth CBD is shown in Figure 1-1.

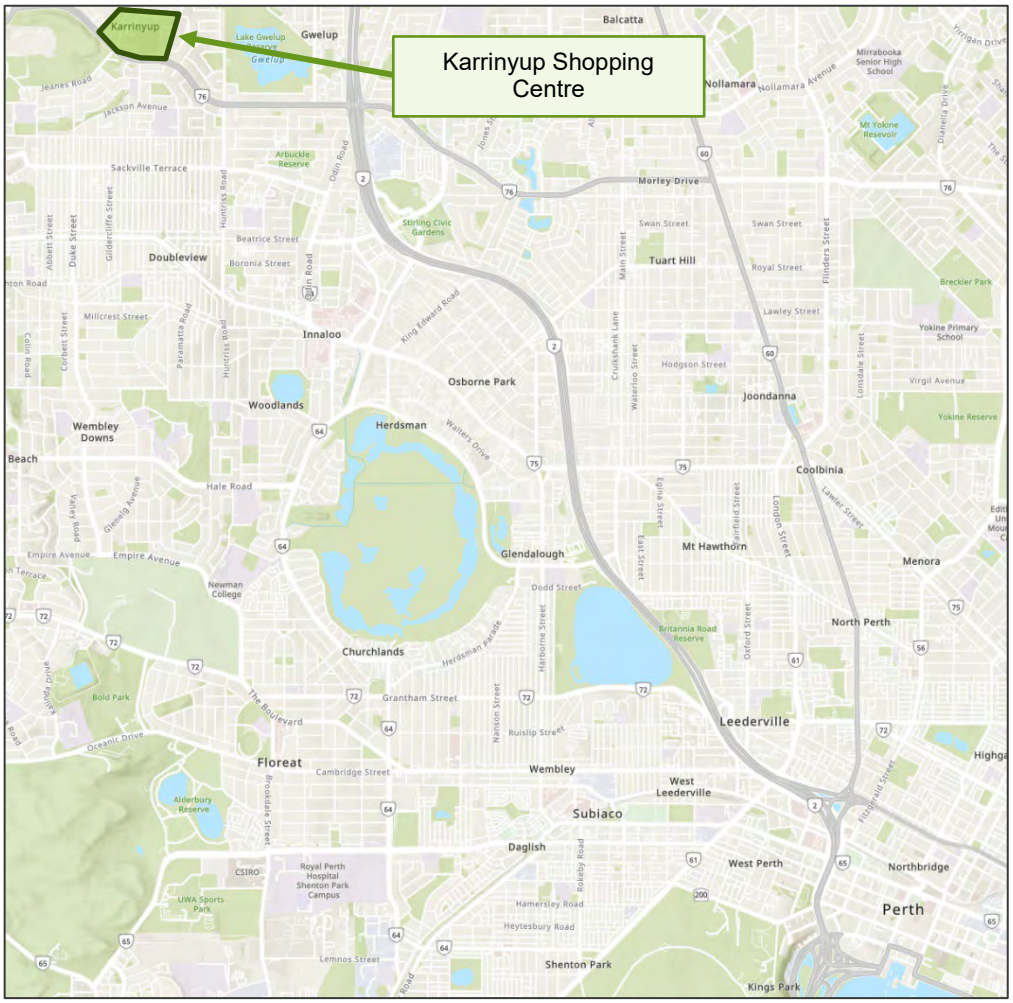

Figure 1-1 - Location of Karrinyup Shopping Centre Relative to Perth CBD

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Figure 1-2 - Karrinyup Shopping Centre

Karrinyup is identified as a secondary activity centre in the WAPC State Planning Policy 4.2. Karrinyup is a premier shopping centre in Perth, with high end fashion retailers and a broad combination of other retail, entertainment, and food & beverage offerings. Given this variety of stores located in the same destination, Karrinyup has a wider customer catchment than other large shopping centres in Perth.

It was also understood that other centres would have been redeveloped in recent years but this has not occurred. Subsequently, there is greater than expected level of sustained demand for the Centre, with the settling of the trip generation after the initial surge during opening not being realised to the extent expected.

The expansion completed in 2021 was to include a total of 4,880 carparks, however less than this was constructed as it was expected they would not be required within the initial few years of the expansion and could be built once the ongoing expected growth was realised. With the sustained demand for the shopping centre drawing shoppers from a wider Perth catchment, the Applicant now wishes to add carparking spaces to meet the demand.

1.3 Description of Development Proposal

The Development is proposing two changes to its transport infrastructure. These are listed below and displayed in Figure 1-3:

- Reversal of an existing access ramp connecting the Development to Karrinyup Road east of Jeanes Road. This ramp currently serves as an entrance to the Centre, with the proposal to convert this to an exit ramp.
- Two additional floors of parking to be constructed atop the existing eastern parking facility. This is to add 267 additional carparks to the existing 4,683 for a proposed total of 4,950 parking spaces. This is a change of 70 additional carparks over the previously consented number.

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Figure 1-3 - Proposed Development Locations

These two changes are not expected to increase the trip generation of the Development, only to manage the discrepancy between existing demand, supply of parking, and ease internal traffic congestion.

The valet parking is proposed to also be relocated to the Eastern Parking Structure on Level 2 in the northern section. Given that the demand profile for valet parking generally aligns with the demand profile for rest of the Centre's carparks, the impact of this change will be minimal.

1.4 Key Issues and Background Information

The Development is proposing these two changes to improve the experience of vehicle access and car parking for customers. The Applicant has received feedback in relation to exiting the Development from the western carpark area to Karrinyup Road during peak periods. This aligns with a general point of frustration customers have expressed regarding exiting the Development.

The Karrinyup Shopping Centre had an approved Transport Plan as part of the Development Application (DA). Consent was granted for the current layout with 4,880 carparks and the redevelopment was completed in 2021.

The current number of parks present at Karrinyup is fewer than the approved number under the DA. During peak shopping hours, the demand for parking spaces gets close to exceeding supply, resulting in drivers circulating through the shopping centre looking for a carpark. As such, the proposed remedy is to increase this number by adding two additional levels of parking atop the eastern car park structure. This will increase the total number of carparks available to 4,950, 70 more than the original consented number.

The key document previously issued regarding assessment of transport impacts of the Development is the Transport Plan undertaken for the purposes of the DA titled, Mixed Use Expansion at Karrinyup – Transport Plan for Development Application (Aurecon, 10 July 2019).

1.5 Report Structure

This TIA outlines the impact of the two proposed changes to Karrinyup regarding access and parking. The report follows the structure as outlined in the Western Australia Planning Commission (WAPC) guidelines, Volume 4 for Individual developments.

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2 Existing Situation

This section will review the existing site conditions at the Karrinyup Shopping Centre. The use of the centre itself will be outlined, as well as the levels of traffic in its immediate vicinity. Other items of interest such as crash data, public transport, and active mode access to the Development will also be examined.

2.1 Existing Site Use

The Development is currently a mixed-use area, consisting of commercial, civic, and entertainment spaces and residential apartments/townhouses. This includes the Karrinyup Shopping Centre, a cinema, and food & beverage offerings. A small number of offices, professional services and residential properties sit on land facing the centre and fronting the surrounding streets. The Karrinyup Bus Station sits at the southern edge of the Centre on Karrinyup Road. Table 2-1 shows the existing land use types at the Karrinyup Shopping Centre.

Table 2-1 - Current Land Use at the Karrinyup Shopping Centre

Land Use Type	Floor Space (m^2)
Retail	93,355
Office / Business	10,394
Entertainment / Community	3,916
Cinema	6,200
Health	2,654
Utility	300
Total:	**116,819**
Land Use Type	**Number of units**
Residential Dwellings	134

2.2 Existing Parking and Demand

The Development currently provides 4,683 parking spaces, giving a rate of 4.2 bays per 100m^2 for the total floor space within the development. Observation of the existing demand is that customers are having to search for a parking space for as long as 20 minutes during peak times. This has flow on effects, causing difficulty with internal circulation and exiting the Centre.

2.3 Existing Access Arrangements

There are currently twelve access points to the Development outlined in Table 2-2:

Table 2-2 - Karrinyup Shopping Centre General Traffic Access Points

Road Name	Access Points	Access Point Control
Karrinyup Road	3	1 x signalised four-way intersection, 2x unsignalized T-intersections
Francis Avenue	2	2 x unsignalised T-intersections, one with northbound access only
Burroughs Road	2	2 x unsignalised T-intersections
Davenport Street	5	5 x unsignalised T-intersections

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2.4 Existing Site Traffic

Karrinyup Shopping Centre serves as a premier shopping centre in Perth and is classed as a secondary activity centre. As such, it generates a large volume of vehicle trips on a daily basis from the immediate City of Stirling and the wider Perth area. During peak hours, it is noted that the Development generates traffic that is close to the capacity of the current parking facilities.

2.5 Surrounding Land Use

The land use surrounding Karrinyup is predominantly single-unit residential dwellings (design code R20/R30) with various public reserves, including Lake Gwelup Reserve to the east and Millington Reserve to the southwest. A number of primary schools are located within close proximity to Karrinyup including Karrinyup Primary School, Our Lady of Good Counsel Primary School, St. Mary's Anglican Girls School, and Newborough Primary School.

2.6 Surrounding Road Network and Traffic Management

The Development is surrounded by a well-connected road network of various classes. The road hierarchy, as assigned by Main Roads Western Australia (MRWA), is provided in Figure 2-1. The primary distributor routes leading to Karrinyup, either directly or indirectly, include Karrinyup Road, Marmion Ave, West Coast Highway, Reid Highway, and Mitchell Freeway. The surrounding road hierarchy is displayed in Figure 2-1.

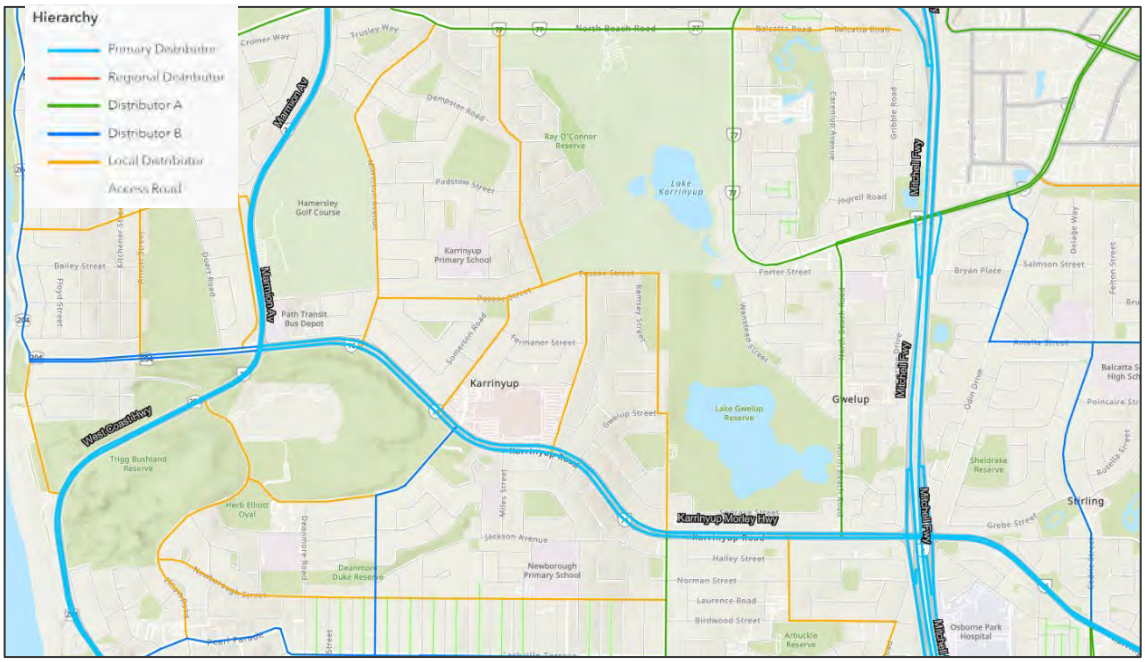

Figure 2-1 - Existing Road Hierarchy (Source Mainroads Western Australia)

There are five key frontage roads connecting directly to Karrinyup. Operational information of these roads is outlined in Table 2-3.

Table 2-3 - Traffic Management on Roads Surrounding the Development

Road Name	Road Hierarchy	Lane Geometry	Posted Speed Limit (km/h)	Parking Provision	Number of Accesses to Karrinyup shopping centre	Footpaths and Cycleways
Karrinyup Road	Major east-west distributor	Dual carriageway, two lanes in each direction with a wide median	60 adjacent to Development, 70 elsewhere	No Parking on either side	Three general accesses and one freight access via T-intersections	Footpath on northern side. Bi-directional shared path on southern

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Burroughs Road	Local distributor	Single carriageway with one lane in each direction	50	No Parking on either side	Two accesses via T-intersections	Footpath on both sides
Davenport Street	Local access	Single carriageway with one lane in each direction	50	Right angle parking spaces available at childcare facilities on north side. Sets of indented 2-hour parallel bays dotted along southern side	Four general accesses and one freight access via T-intersections	Footpath on southern side
Francis Avenue	Local distributor	Single carriageway with one lane in each direction	50	No Parking on either side	Two accesses via T-intersection	Footpath on both sides
Jeanes Road	Distributor B	Single carriageway with one lane in each direction	50	No Parking on either side	One through signalised intersection at Karrinyup Road	Footpath on east side, bi-directional shared path on west

2.7 Traffic Flows on Surrounding Roads

The current traffic flows on the roads surrounding Karrinyup Shopping Centre are shown in Table 2-4. The times used for each peak flow are:

- Weekday AM Peak: 08:00 – 09:00
- Weekday PM Peak: 17:00 – 18:00
- Weekend Peak: 12:00 – 13:00

Table 2-4 - Traffic Flows at the Development (Source: Mainroads WA 2022/23, On-Site Survey March 2024)

Road Name	Weekday AM Peak (vehicles per hour)	Weekday PM Peak (vehicles per hour)	Weekend Peak (vehicles per hour)
Karrinyup Road	1,913	1,968	2,062
Francis Avenue	564	976	1,327
Burroughs Road	429	662	716
Davenport Street	359	602	816
Jeanes Road	1,144	1,137	822

2.8 Traffic Flows at Major Intersections

There are three major intersections in the vicinity of the Karrinyup Shopping Centre, traffic volumes through these intersections are identified in Table 2-5.

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Table 2-5 - Intersection Traffic Flows at Karrinyup (Source: Mainroads WA Feb 2022)

Intersection	Control	Weekday AM Peak	Weekday PM Peak	Weekend Peak
Karrinyup Road and Burroughs Road	Unsignalised T-intersection	2,409	3,104	2,858
Karrinyup Road and Jeanes Road	Signalised four-leg intersection	2,765	2,779	2,521
Karrinyup Road and Francis Avenue	Signalised T-intersection	2,434	3,285	3,906

2.9 Operation of Surrounding Intersections

The updated modelling is currently being finalised. This will be supplied to the City of Stirling as soon as possible.

2.10 Existing Pedestrian/Cycle Networks

Karrinyup Shopping Centre is situated within a large residential area with many residents within walking distance. Walking access to the Development is predominantly accommodated on footpaths and shared paths along the adjacent and surrounding road network. Footpaths are provided alongside all of the direct access routes to the shopping centre.

Cycle infrastructure exists around the Development primarily through a separated bi-directional shared path on the south side of Karrinyup Road. Jeanes Road has a similar bi-directional cycle path to the Development's south. Other streets in the immediate vicinity of the Development have no specific provisions for cyclists. Safe cycle crossing to the Centre is facilitated by a mid-block signalised crossing on Karrinyup Road and crossing facilities at the Karrinyup Road intersections with Francis Road and Jeanes Road. As part of the development in 2021, bike storage, lockers, and showers were constructed for end-of-trip facilities.

2.11 Existing Public Transport Services Surrounding the Development

Karrinyup Bus Station sits at the southern edge of the Development, adjacent to Karrinyup Road. The Station is currently serviced by five bus routes:

- Route 423, the most frequent, operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. The service runs at approximately 10–20-minute intervals during weekday peak periods, 30-minute intervals during off-peak times and on Saturdays, and hourly on Sundays and Public Holidays.
- Route 425 operates between Stirling Station and Warwick Station via the Karrinyup Bus Station. The service runs at approximately 15–20-minute intervals during weekday peak periods, 30-minute intervals during off-peak times, and hourly on weekends and Public Holidays.
- Route 422 operates between Stirling Station and Scarborough Beach via Karrinyup Bus Station every 20 to 30 minutes during the weekday morning peak period. The service runs hourly at any other time during the week, hourly on Saturdays, and does not run on Sundays or Public Holidays.
- Route 424 operates between Stirling Station and Karrinyup Bus Station every 20 minutes during the weekday morning peak period and every 30 minutes during the afternoon peak. During weekday off-peak periods and on Saturdays the service runs hourly and does not operate on Sundays or Public Holidays.

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Patronage data received from Western Australia PTA for the month of March 2023 shows an average boarding numbers of 514 passengers per day during the week, and 449 passengers during the weekend. Average number of passengers alighting the bus per day at the shopping centre are 646 during the week and 508 during the weekend. The data shows 8:00AM to 9:00AM as a consistent peak time for passengers getting off the bus at the shopping centre and 4:00PM to 6:00PM as a consistent boarding peak time. This implies that the buses are well used by staff of the centre as their means of commuting.

It was also observed that there was high usage between 3:00PM and 4:00PM during the week, which could correlate to school age students accessing the shopping centre.

Sundays have consistently lower usage, which aligns with the reduced frequency of buses on Sundays.

2.12 Crash Data

The recorded crash data sourced from ArcGIS via the Integrated Road Information System (IRIS) has been examined from January 2019 to August 2023. The “prior to development” period refers to being prior to October 2021 when the development was completed. The crash data is displayed in Table 2-6.

Table 2-6 - Crash Data at Karrinyup Shopping Centre (Source: IRIS on ArcGIS)

Midblock (M) or Intersection (I)	Location	Total Crashes	Crash Nature	Severity
M	Karrinyup Road between Burroughs Road and Francis Avenue	24 (10 prior to development)	Rear End x 5 Right Turn Thru x 8 (4 prior to development) Right Angle x 2 (2 prior to development) Sideswipe Same Direction x 7 (3 prior to development) Hit Pedestrian x 1 (1 prior to development) Other x 1	PDO Minor x 6 (3 prior to development) PDO Major x 13 (5 prior to development) Medical x 5 (2 prior to development)
I	Karrinyup Road and Burroughs Road	51 (18 prior to development)	20 x Rear End (8 prior to development) 9 x Right Turn Thru (2 prior to development) 21 x Right Angle (7 prior to development) 1 x Sideswipe Same Direction (1 prior to development)	8 x PDO Minor (2 prior to development) 32 x PDO Major (9 prior to development) 9 x Medical (6 prior to development) 2 x Hospital (1 prior to development)
M	Burroughs Road between Karrinyup Rd and Davenport Street	3 (2 prior to development)	1 x Rear End (1 prior to development) 2 x Right Angle (1 prior to development)	2 x PDO Major (2 prior to development) 1 x Medical

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M	Davenport Street between Burroughs Road and Francis Avenue	15 (3 prior to development)	Right Angle x 10 (1 prior to development) Sideswipe Same Direction x 1 (1 prior to development) Head On x 1 Other x 2 (1 prior to development)	PDO Minor x 4 PDO Major x 9 (3 prior to development) Medical x 1
I	Davenport Street and Francis Avenue	1 (1 prior to development)	Right Angle x 11 (2 prior to development) Sideswipe Same Direction x 1 (1 prior to development) Head On x 1 Other x 2 (1 prior to development)	PDO Minor x 4 PDO Major x 10 (4 prior to development) Medical x 1
M	Francis Avenue between Karrinyup Road and Davenport Street	6 (5 prior to development)	Rear End x 3 (3 prior to development) Right Angle x 2 (1 prior to development) Sideswipe in Same Direction x 1 (1 prior to development)	PDO Major x 1 (1 prior to development) PDO Major x 4 (3 prior to development) Medical x 1 (1 prior to development)
I	Karrinyup Road and Francis Avenue	34 (13 prior to development)	26 x Rear End (8 prior to development) 2 x Right Angle (1 prior to development) 6 x Sideswipe Same Direction (4 prior to development)	17 x PDO Minor (7 prior to development) 11 x PDO Major (4 prior to development) 6 x Medical (2 prior to development)
I	Karrinyup Road and Jeanes Road	19 (9 prior to development)	10 x Rear End (5 prior to development) 1 x Right Turn Thru 5 x Right Angle (2 prior to development) 3 x Other (2 prior to development)	6 x PDO Minor (4 prior to development) 9 x PDO Major (4 prior to development) 4 x Medical (1 prior to development)

It is worth noting that the traffic volumes for 2020 and 2021 were lower than other years due to the restrictions of the COVID-19 pandemic. This in turn would likely lead to reduced crash volumes for these years.

The crash data also shows that there is an ongoing high crash rate at the Karrinyup Road and Burroughs Road intersection with 51 crashes in the observed period. 18 (35%) were prior to development. In the previous DA process, it was proposed that this intersection is signalised, however that option was rejected by Main Roads. The revised parking provision is expected to result in a minor redistribution of traffic on the network, with this intersection likely to benefit with a minor reduction in traffic volume.

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3 Development Proposal

This section discusses the proposed changes to the Karrinyup Shopping Centre and its surrounding area. This will outline the increased parking capacity and conversion of Ramp 14 from entry to exit only, and touch on the other areas that are not being adjusted as part of this development.

3.1 Regional Context

As discussed in Section 1.2, Karrinyup Shopping Centre functions as the major activity centre within the Karrinyup-Gwelup locality in the City of Stirling, located approximately 12 km northwest of Perth CBD.

Karrinyup is identified as a secondary activity centre in the WAPC State Planning Policy 4.2. Karrinyup is a premier shopping centre in Perth with high end fashion retailers who do not have other stores in Western Australia. It is also a unique facility with a wide catchment due to the variety of stores available. It was understood that other centres would open up or redevelop, however this has not occurred. Subsequently, there is greater than expected level of sustained demand for the shopping centre, with the expected dip in trip generation after the initial surge, not being fully realised.

3.2 Proposed Land Uses

No changes to land use are proposed as part of the Development. A breakdown of the existing land use is provided in Table 2-1.

3.3 Table of Land Uses and Quantities

There is no proposed change to the existing land use at the Development. See Table 2-1 for current land use.

3.4 Access Arrangements

The Applicant has received feedback that exiting the Development is a point of frustration for customers. In order to reduce this issue, it is proposed to reverse the direction of a single lane, entry-only ramp (Ramp 14) on Karrinyup Road. The ramp is immediately west of the Karrinyup bus station.

Currently, the ramp can be accessed as an entry from the west, or by using a break within the Karrinyup Road median from the east. The proposal is to convert the direction of this ramp to exit-only with a left-turn only restriction. Vehicles using this exit would travel eastbound on Karrinyup Road, noting there is also an existing nearby U-turn facility to the east. The proposed Ramp 14 access change and associated internal B01 changes, including the more direct connection from B02, are shown in Figure 3-1.

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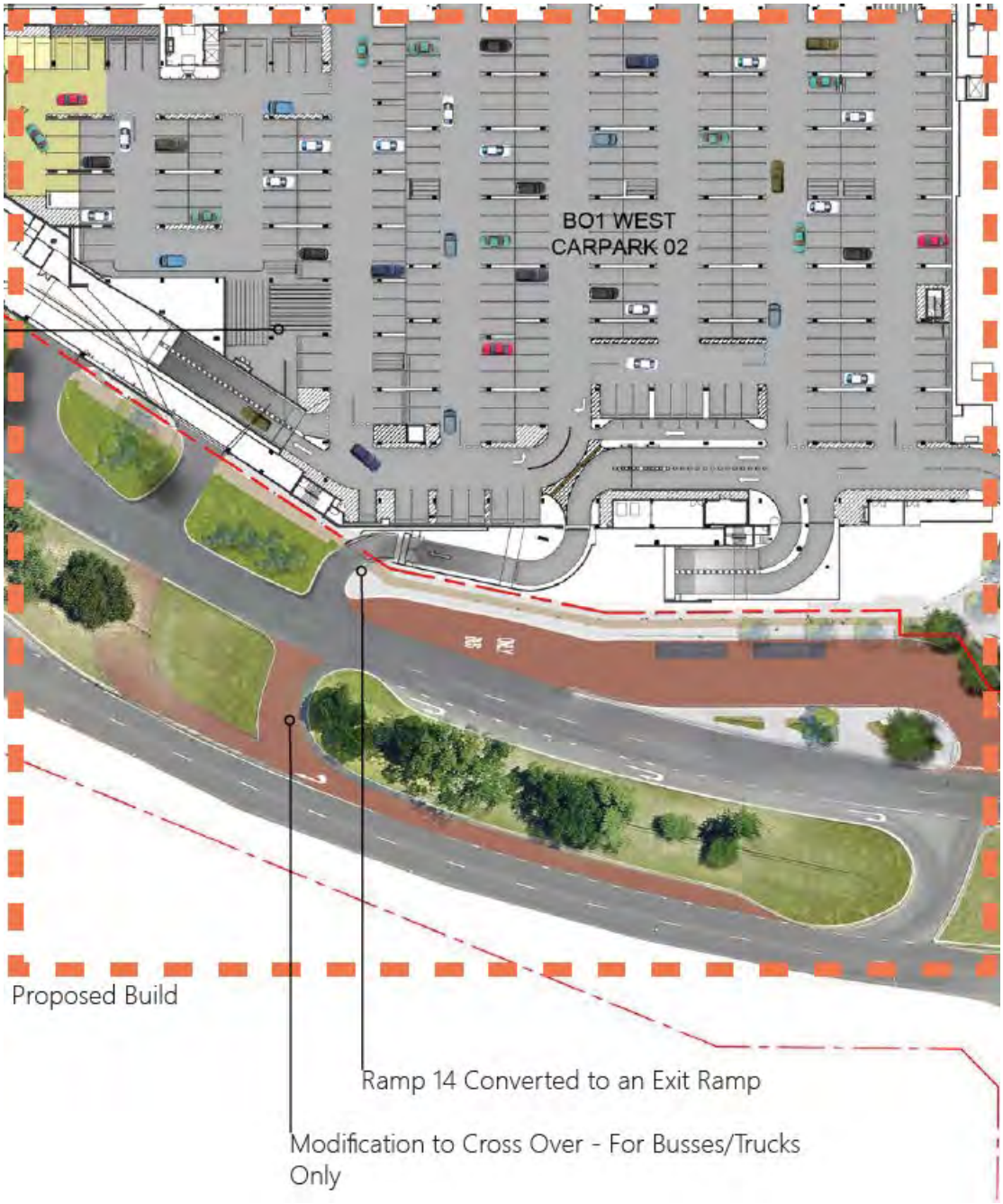

Figure 3-1 - Proposed Ramp 14 access change

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3.5 Parking Provision

The Applicant is proposing to increase the parking provision at the Development by 267 bays, for a total of 4,950 parking spaces. This total number of car park spaces is 70 more than has been previously consented. These car parking bays will be provided in the eastern carpark by construction of two additional levels on the existing structure. These levels will be accessed by extending the existing podium D-handle ramp structure upwards. These additional bays will further satisfy existing parking demand, and support better onsite circulation. The general area of the additional car park spaces on the eastern parking structure is highlighted in Figure 3-3, the proposed changes to Level 2 in this area are shown in Figure 3-4, and the proposed additional Levels 3 & 4 are shown in Figure 3-5.

Figure 3-2 - Eastern Parking Structure Additional Car Park Spaces Location

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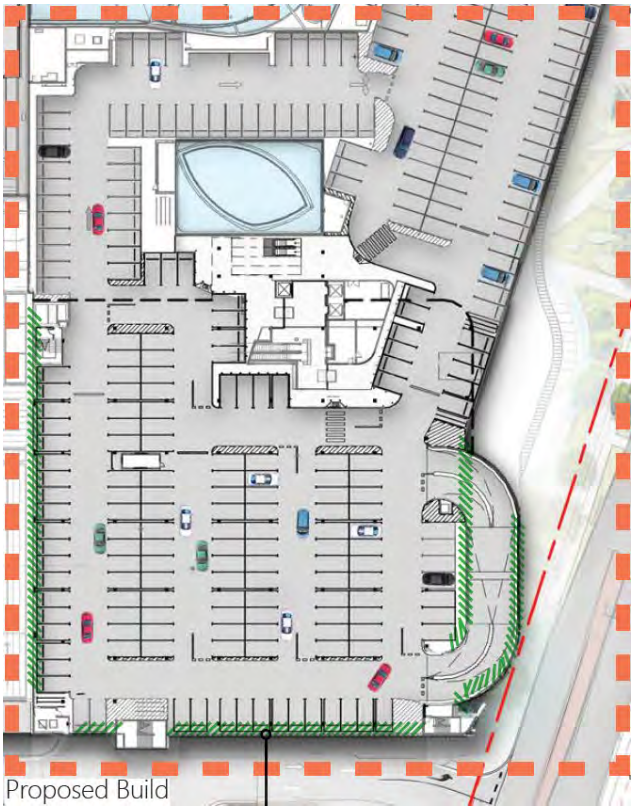

Figure 3-3 - Proposed Level 2 Change

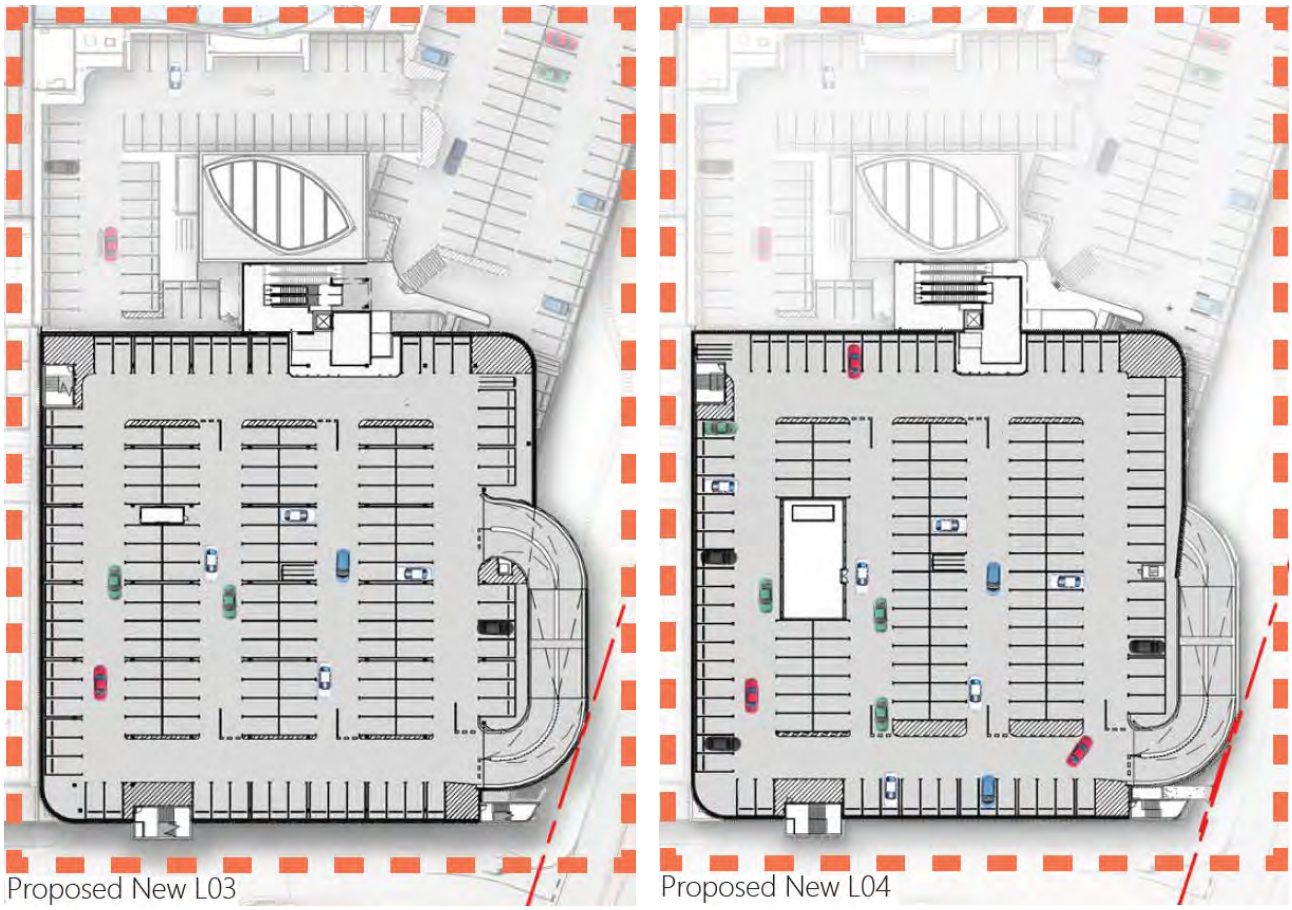

Figure 3-4 - Proposed New Levels 3 and 4

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3.6 End of Trip Facilities

The Development proposes no change to the existing end of trip facilities. The current provisions are adequate for demand and have capacity for future growth in use.

3.7 Any Specific Issues

The Applicant has observed that customers at peak hours are reported to be circulating the parking facilities for as long as 20 minutes searching for an available space. This increase in circulating traffic has also impacted internal congestion in the parking areas and has a negative impact on the customer experience.

The Applicant has also observed that exiting the Development is a point of frustration for customers. By converting the entry only Ramp 14 to an exit only facility, this should help to alleviate the congestion for exit manoeuvres from the western parking facilities, particularly for those exiting from level B02 in peak periods.

3.8 Changes to Surrounding Road Network and Intersections

The Development proposes one minor change to the road network. The reversal of Ramp 14 from entry-only to exit-only will require minor adjustments to the intersection with Karrinyup Road. The turning bay currently shared by buses accessing the adjacent Karrinyup Bus Station and vehicles using Ramp 14 will now be a dedicated bus turn facility.

3.9 Changes to Pedestrian/Cycle Networks and Crossing Facilities

No significant changes are proposed to the active mode networks surrounding the Development. There will be a new pedestrian kerb cutdown constructed following the adjustment to Ramp 14 in order to accommodate the new road alignment.

3.10 Changes to Public Transport Services

No changes are proposed to public transport services as part of this Development.

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4 Integration with Surrounding Area

This section will outline how the Karrinyup Shopping Centre fits within the surrounding area. Expected impact on the traffic flow in the surrounding area will be outlined, as well as the ability of the transport network to support this.

4.1 Surrounding Major Attractors/Generators

4.1.1 Generators

The Development is generally surrounded by single-unit residential dwellings. Within the immediate vicinity (~1.2km) there is a local medical centre, Moline Village retirement living, Juniper Chrystal Halliday aged care, Lake Karrinyup Country Club, Perth Bible College, Swan Transit Karrinyup Bus Depot, and Bethanie Gwelup Aged Care Home, which could be considered higher-density trip generators than the residential dwellings.

4.1.2 Attractors

Various public reserves surround the development, including the Lake Gwelup Reserve to the east and Millington Reserve to the west. Several schools are within an approximate 1.2km Radius of the Karrinyup Shopping Centre, including Karrinyup Primary School, Our Lady of Good Counsel Primary School, St. Mary's Anglican Girls School, and Newborough Primary School.

4.2 Committed Developments and Transport Proposals

4.2.1 Proposed Changes to Land Use Within 1200m.

Within approximately the next 3 years, the Karrinyup West Residential Apartments will be completed. This committed development will contain approximately 270 dwellings with 612 bays split across residential use and Centre staff use. The trips from this committed development have been considered within the modelling undertaken for this TIA. Further details can be found in the Karrinyup West Residential Apartments TIA (Aurecon, 12 March 2021)

4.3 Travel Desire Lines from Development

As discussed, Karrinyup Shopping Centre is a destination shopping centre, with many high-end retailers and other offerings that creates a Centre that is unlike others in Perth. This suggests that it attracts shoppers, and staff, from other suburbs of Perth, and further afield. It is well-connected to the surrounding transport network. The Development is directly adjacent to Karrinyup Road, which serves as a major east-west primary distributor road. Two intersections with Karrinyup Road connect the Development to the residential areas and schools to the north:

- Unsignalised intersection with Burroughs Road
- Signalised intersection with Francis Ave

Two intersections with Karrinyup Road connect the shopping centre to the residential area to the south:

- Unsignalised intersection with Miles Street
- Signalised intersection with Jeanes Road

An important desire line to consider is crossing Karrinyup Road to reach the residential area to the south of the Development. The intersection with Jeanes Road facilitates this movement from the western parking

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structure. The signalised intersection with Francis Ave and the adjacent unsignalised intersection facilitates the movement from the east of the development.

For access to the shopping centre from wider Perth, it is approximately 2.5km to the east to access the grade separated interchange with the Mitchell Freeway (State Route 2). 1.2 km west of the Development is West Coast Highway/ Marmion Avenue (State Route 71)

4.4 Adequacy of Existing Transport Networks

The current infrastructure to provide access to the site is considered adequate in terms of both safety and efficiency.

4.5 Deficiencies in Existing Transport Networks

There are no significant deficiencies noted in the existing transport network surrounding Karrinyup Shopping Centre. Customers have expressed that exiting the Development is currently a point of dissatisfaction when visiting the centre. It is understood that this is primarily due to congestion within the shopping centre's parking facilities rather than an underlying issue with the existing transport network surrounding the shopping centre.

4.6 Remedial Measures to Address Deficiencies

The Development has identified the need to provide additional carparks and to reconfigure an access point to improve the visitor experience at the centre. The proposal is to add 267 car parking spaces to reduce the onsite queuing and searching for an empty car bay, and to convert the low-use entry only Ramp 14 at Karrinyup Road to an exit-only ramp and exit point. This will alleviate the pressure on existing parking supply and provide an additional option to exit the Development, particularly for those exiting from the western level B02.

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5 Analysis of Transport Networks

This section will discuss the impact of the traffic generated by Karrinyup Shopping Centre on the surrounding transport network and how this might be distributed. The traffic modelling report has been included as Appendix A.

The updated modelling is currently being finalised. This will be supplied to the City of Stirling as soon as possible.

5.1 Model Area

The area modelled for the data in this section is highlighted in Figure 5-1.

Figure 5-1 - Traffic Model Area

5.2 Assessment Years and Time Periods

The traffic modelling is being undertaken using data collected in 2023 and 2024. The time periods used for modelling are:

- Thursday 07:00 am to 09:30 am (Weekday morning peak)
- Thursday 03:30 pm to 06:00 pm (Weekday evening peak)
- Saturday 11:30 am to 01:30 pm (Weekend peak)

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5.3 Development Generated Traffic

The proposed development does not fundamentally change the land use or trip generation potential of the Karrinyup Shopping Centre. As such, no additional traffic is expected to be generated.

5.4 Distribution of Generated Traffic

Minor changes to the distribution of traffic are expected due to the proposed changes at the Development. The purpose of the conversion of Ramp 14 to be a left-out, exit-only ramp is to attract some vehicles to use this as an exit route instead of the Karrinyup Road/Jeanes Road signalised intersection or the access road adjacent to Hungry Jacks. As the existing number of vehicles using this entrance is relatively low at 100 vehicles during a Saturday peak hour, it is expected these trips will be redistributed to other in entry points, with only a minor change in operational efficiency. 100 vehicles is approximately 4% of all entry movements into the Centre during the Saturday peak hour.

The addition of 267 parking spaces in the eastern parking structure may cause some of the traffic attraction/generation to shift to the east. This is estimated to cause a minor increase in use of the Karrinyup Road/Francis Ave intersection and the access point adjacent to Hungry Jacks.

5.5 Parking Supply and Demand

The current demand for parking at the Development is close to the capacity of the available car park spaces. During peak hours, it is estimated that vehicles can experience circulation times of up to 20 minutes to find an available space. This then leads to issues with circulation within the car park areas, and to customers having difficulty exiting the facility.

The proposed increase in parking supply of 267 spaces is expected to provide more available car parking spaces throughout the facility. This will lead to reduced circulation time and congestion within the parking structures, resulting in a better user experience, particularly exiting the facility during peak times.

The valet parking is proposed to also be relocated to the Eastern Parking Structure on level 2 in the northern section. Given that the demand profile for valet parking generally aligns with the demand profile for rest of the Centre's carparks, the impact of this change will be minimal.

5.6 Base and 'With Development' Traffic Flows

The proposed development does not fundamentally change the land use or increase trip generation at Karrinyup Shopping Centre. It is assumed that the post-development traffic generation is the same as existing, with minor changes in distribution as outline in Section 5.4.

This assumption is to be confirmed by traffic modelling once finalised. This will be supplied to the City of Stirling as soon as possible.

5.7 Analysis of Development Accesses

The Development is proposing to make changes to one access – Ramp 14, which will have only a negligible to minor effect on the other access in the Development.

The updated modelling is currently being finalised. This will be supplied to the City of Stirling as soon as possible.

The Applicant has noted that customers become frustrated when leaving the Karrinyup Shopping Centre during peak hours. In order to improve the operation of the western car park structure, it is proposed to reverse the direction of Ramp 14. This would convert the current entry-only ramp to an exit-only ramp. The traffic volumes using this entrance have been observed at 100 vehicles during a weekend peak hour, indicating that the impact to entry movements will be minimal while significantly improving the ability of customers to exit the parking structure by using the new exit point.

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The conversion of Ramp 14 will require clear signposting to minimise customer confusion. Installation of sufficient “No Entry” or “Exit Only” signage and pavement markings will be required in order to make drivers aware of the change.

Figure 5-2 shows the Safe Stopping Distance of 65m can comfortably be achieved from the new exit point. The maximum sight distance available from the new exit is 97m, this is less than the that the Safe Intersection Sight Distance required of 123m.

Figure 5-2 - Sight Distance Plan

5.8 Impact on Surrounding Roads

The proposed development does not fundamentally impact the roads surrounding the Karrinyup Shopping Centre. A minor redistribution of traffic will be noticed resulting from the proposed conversion of Ramp 14 adjusting traffic controls at the minor intersection with Karrinyup Road.

5.9 Impact on Surrounding Intersections

The proposed development does not make direct changes to intersections other than that of Karrinyup Road with Ramp 14. The conversion of this entrance point will have minor redistribution of vehicle movements to the adjacent intersections of Karrinyup Road with Jeanes Road, the access point adjacent to Hungry Jacks, and Francis Avenue.

The Karrinyup Road/ Burroughs Road intersection is expected to have a minor reduction in traffic volumes compared to the future do-minimum case.

5.10 Impact on Neighbouring Areas

The proposed changes at Karrinyup Shopping Centre are minor in nature. It is not expected to adversely impact surrounding residential areas.

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5.11 Road Safety

The conversion of Ramp 14 from entry to exit only will create some minor road safety issues in the short-to-medium term. Customers may attempt to use the new exit ramp as an exit, or not initially be prepared for vehicles exiting the Development in this area.

This will be mitigated through installation of appropriate “No Entry” and/or “Exit Only” signs will address this issue and aid with customers comprehending the change.

5.12 Public Transport Access

No change is proposed to public transport access at Karrinyup Shopping Centre.

5.13 Pedestrian and Cycle Access and Amenity

No change is proposed to the pedestrian or cycle facilities at Karrinyup Shopping Centre.

5.14 Analysis of Pedestrian/Cycle Networks

No change is proposed to the pedestrian or cycle networks surrounding Karrinyup Shopping Centre as part of this development.

5.15 Safe Walk/Cycle to School

This is not relevant, as the development is a shopping centre.

5.16 Traffic Management Plan

Construction is expected to be the most significant impact on traffic behaviour as part of this development. There will be short term disruption to the intersection of Ramp 14 and Karrinyup Road while construction progresses, and this may somewhat impact access to the adjacent Karrinyup Bus Station.

The construction will at times reduce the capacity of the eastern and western parking structures due to the nature of the works.

An appropriate Traffic Management Plan will need to be prepared by the Construction Contractor prior to construction in order to ensure the impacts of the works on the surrounding network are minimised.

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6 Conclusions

The proposed changes to the Karrinyup Shopping Centre are as follows:

- Conversion of Ramp 14 from entry only to exit only at Karrinyup Road
- Addition of 267 parking spaces across two floors atop the existing eastern parking structure

These changes do not fundamentally alter the existing land use or trip generation potential of Karrinyup Shopping Centre. As such, any impact to the surrounding road network is expected to be minor. Some redistribution of traffic movements along Karrinyup Road immediately adjacent to the Development will occur as customers adjust to the new parking availability and the new exit point.

In the short-to-medium term, there will be some minor road safety adjustments regarding the conversion of Ramp 14. Appropriate “No Entry” or “Exit Only” signage will be required to make customers aware of the changes.

The valet parking is proposed to also be relocated to the Eastern Parking Structure on level 2 in the northern section. Given that the demand profile for valet parking generally aligns with the demand profile for rest of the Centre’s carparks, the impact of this change will be minimal.

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Appendix A

Traffic Modelling Report

Appendix A
Traffic Modelling Report

The updated modelling is currently being finalised. This will be supplied to the City of Stirling as soon as possible.

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Document prepared by

Aurecon Australasia Pty Ltd
ABN 54 005 139 873

Level 5, 863 Hay Street
Perth WA 6000
Australia

T +61 8 6145 9300
F +61 8 6145 5020
E perth@aurecongroup.com
W aurecongroup.com

City of Stirling
11 Sept 2024
RECEIVED

Department of Planning

Western Australian Planning Commission

PLANNING IN BUSHFIRE PRONE AREAS
BAL ASSESSMENT (BASIC) REPORT

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

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

1. Fire Danger Index (FDI)

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

80

2. Bushfire prone vegetation

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

Nil

3. Distance between the proposed building and bushfire prone vegetation

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

Yes

4. Slope of the land under bushfire prone vegetation

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

N/A

Step 5: Bushfire Attack Level (BAL)

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

Low

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

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

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

Lot 12 (No. 200) Karrinyup Road, Karrinyup

And being the whole of the land described in Certificate of Title: Volume 2997 Folio 489

The BAL rating is: BAL-Low Date of assessment: 26/06/2024

Signed:

Postal address: Level 3, 369 Newcastle Street, Northbridge WA 6003

Phone: (08) 9221 1991 Email: nathan.stewart@rowegroup.com.au

City of Stirling
11 Sept 2024
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KARRINYUP SHOPPING CENTRE

DEVELOPMENT APPLICATION

REV A

10.09.2024

www.trcb.com.au / www.hamessharley.com.au

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1. CONTEXT + CHARACTER

Karrinyup Shopping centre sits within a coastal suburb 12km north of Perth's CBD. It's uniquely positioned with Perth's beautiful beaches to the west, lake Gwelup to the east and a biodiverse bush forever zone across the road, to the south.

The original 2,000sq m shopping centre was built in the late 1950's and the centre has undergone several significant expansions and upgrades over the decades.

The centre's popularity has surpassed expectations, therefore, the proposed modifications;

- Extension of the SE car park – adding Level 03 + Level 04
- Changing ramp 14 from and entry to an exit
- Modifications to the L02 north car park to provide valet services

are primarily born out of a need to address traffic congestion that occurs when the centre is busy. External factors influencing the context are many and varied: client brief, authority requirements, program needs, and last and by no means least budget constraints.

The design context for this package of modifications was determined by factors both internal and external to the site. Drawing on strategies from the most recent development, these proposed modifications include organic forms, natural textures and coastal colours across the exterior and interior. Some design decisions have been made based on the need and ability to work around the existing car parks, to provide reasonable access, and to maintain services and provide sufficient parking.

2. LANDSCAPE QUALITY

The proposed modifications only touch the ground plane east of the bus port. The intent is that the works have minimal impact on the existing high quality landscaped areas.

3. BUILT FORM AND SCALE

The extension of height in the southeast corner is an appropriate one as we are adding to the existing multideck car park that is a landmark element at the prominent corner. The form of the proposed car park extension in the southeast draws upon the cues from the existing big bold sweeping facades and textural qualities noted earlier.

To help break down the overall form of the building at the southeast corner the cladding at Level 02 is purposefully different - it is intended to be darker and act as an oversized shadowline – a visual break between new and existing.

The proposed modifications to the Level 2 north car park does slightly increase the building height, but provides additional amenity to the customer by providing cover to the car parking area. The built form of the proposed roof has been chosen for three main reasons;

• To reduce the height of the overall roof as much as possible
• Allow for cross ventilation at high level - alleviating the need for mechanical ventilation to the whole area.
• Future proofed for installation of solar array - PV cells in future.

4. FUNCTIONALITY AND BUILD QUALITY

As noted previously, the proposed works are primarily a functional requirement, responding to the congestion that occurs when the center is busy, to ensure the centre can function better.

The conversion of Ramp 14 from an entry to an exit and the associated proposed modifications to the internal layout alleviates traffic congestion upon existing by providing more direct access from the upper level ramps to the exit point and Karrinyup rd, heading east. The layout changes also provide an alternative exit from B02 to Karrinyup rd, without having to loop around to the Jeans rd intersection.

The additional bays in the extension of the south east multideck car park provide additional amenity and opportunity to park during peak trading times.

A high level build quality is expected here. The proximity to the coast is a driver behind the selection of durable and fit for purpose façade materials.

Refer our traffic engineer's report for more information on traffic movements.

5. SUSTAINABILITY

The proposed extensions to the car park areas will be naturally ventilated. The roof areas will be designed so that they have capacity to take a solar array of PV cells in future.

6. AMENITY

The modifications will create improved access and exit to an already diverse activity and community centre. There will also be improved amenity through the addition of a valet service at L02 and shaded car parking.

7. LEGIBILITY

As these works are related to the car park wayfinding will be an innate inclusion in the works. The works reinforce the existing landmark corner at the south east of the site and improve the fine grain connection routes within the center and its context.

8. SAFETY

All areas of the car park and centre will be well lit and secure spaces. The upper levels of the car parks will include a screen that projects 2400mm above the crash barriers to discourage climbing.

9. COMMUNITY

The modifications will benefit the community who use visit the centre and use the surrounding roads – particularly on busy days – as the primary intent is to alleviate congestion, provide more parking and therefore provide an elevated experience.

10. AESTHETICS

The overall narrative for the design of the previous Karrinyup Shopping centre development drew on inspiration from the local context – primarily the natural coastal context, but also the surrounding bush and lake contexts. The proposed modifications will draw on that and add to it.

The Karrinyup Road façade is primarily viewed from some distance and is typically seen by moving traffic rather than by pedestrians or from local residences. The architecture of the façade responds to this being made up of large strong forms and geometries designed to be read at a distance and in motion.

The intent is to provide an elegant and coherent outcome by utilizing a cladding material for the south east car park upper levels (L03 + L04) that references the vertical cladding treatments and big bold facades that populate the south and east elevations today. The intent is for this refined perforated screen to encapsulate the new car park, and sit atop the existing, giving it a crown-like quality.

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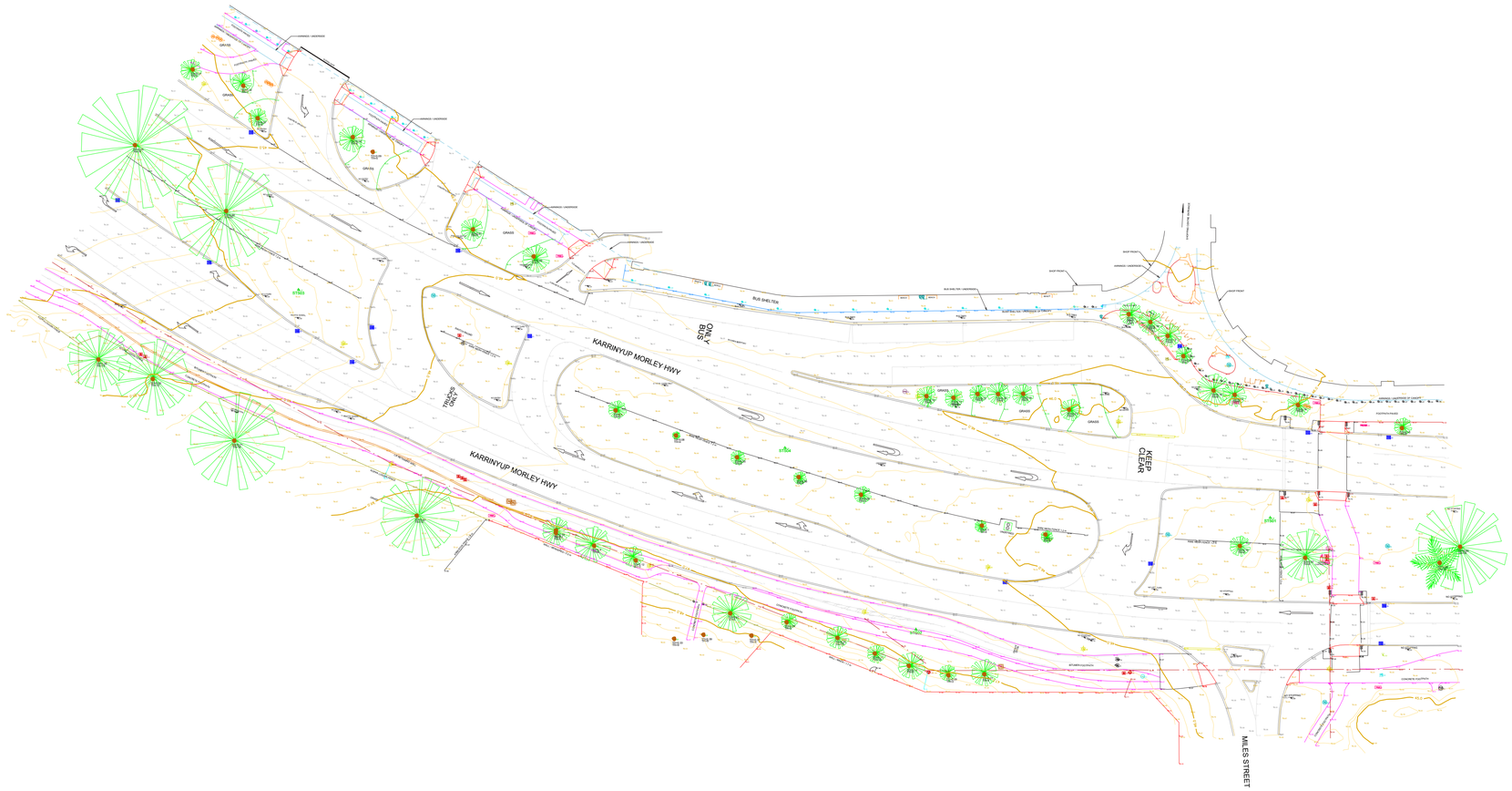

SURVEY BY SCANTECH

Site Survey - Existing Ramp 14 Entry

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:500@A1

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DA3

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Site Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:4000@A3/1:2000@A1

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DA4

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Level B01 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

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DA5

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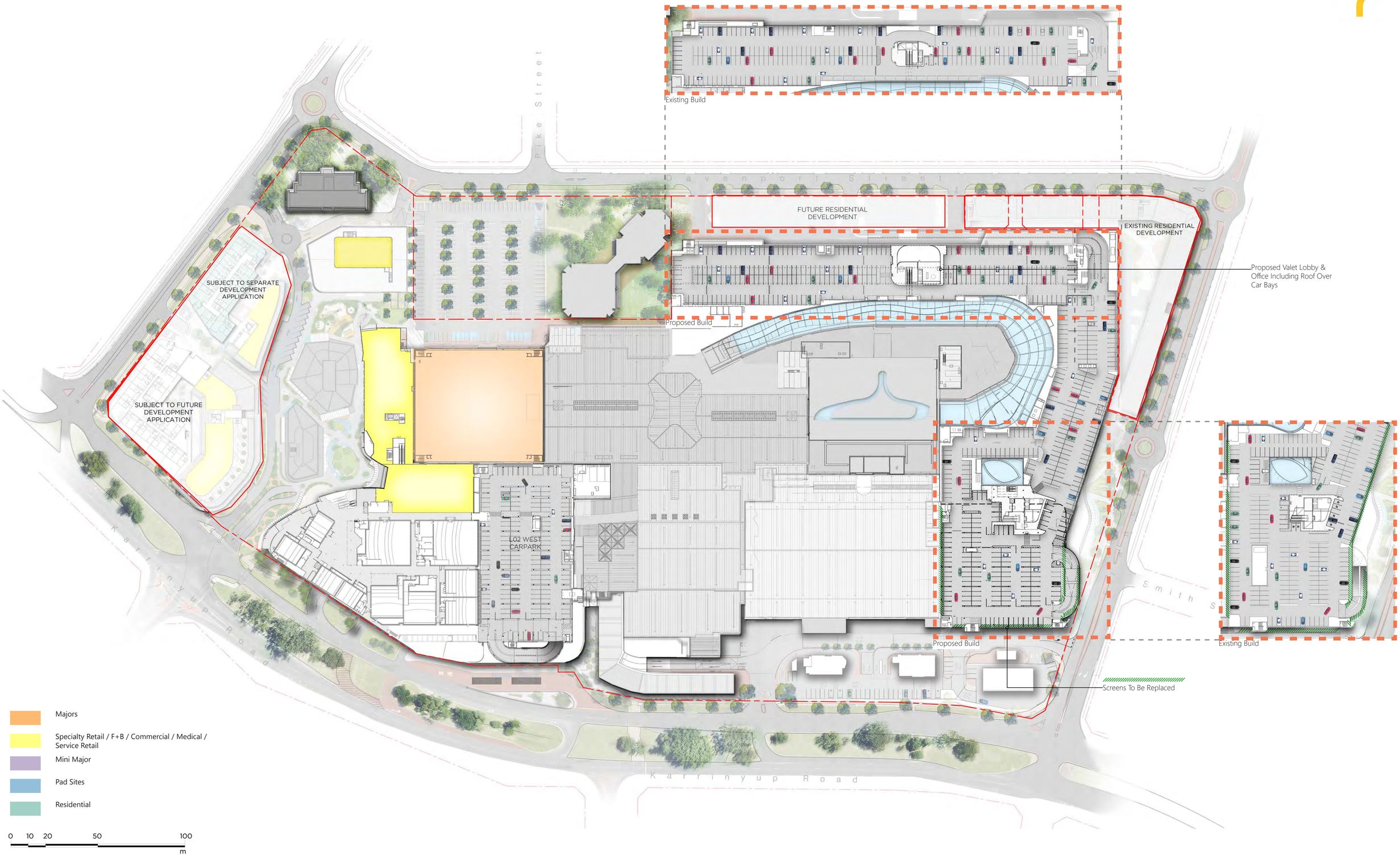

Level 02 Plan

KARRINYUP SHOPPING CENTRE

Development Application - Rev A

NORTH

SCALE: 1:2000@A3/1:1000@A1

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Level 03 Plan

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NORTH

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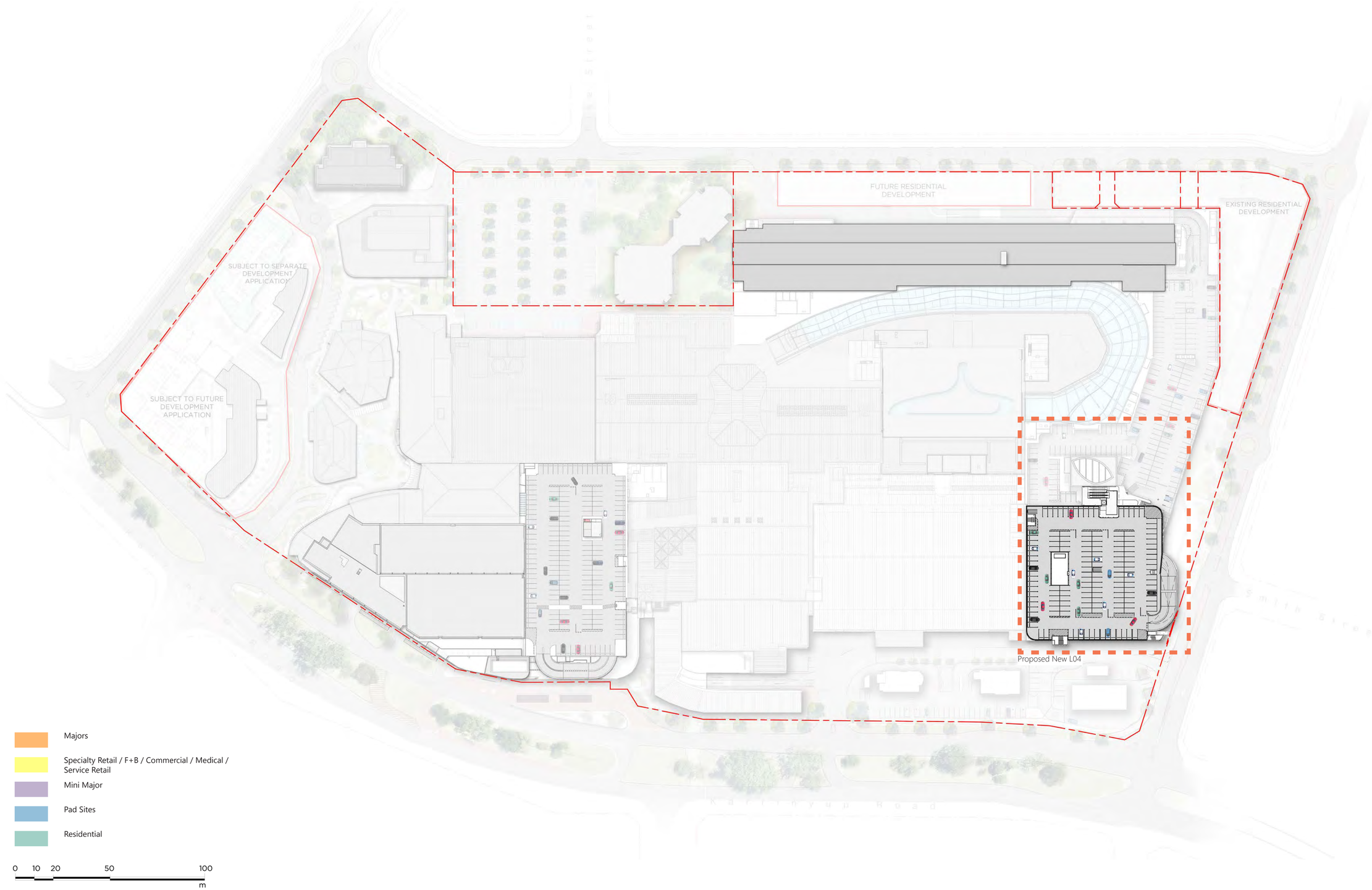

Level 04 Plan

KARRINYUP SHOPPING CENTRE

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NORTH

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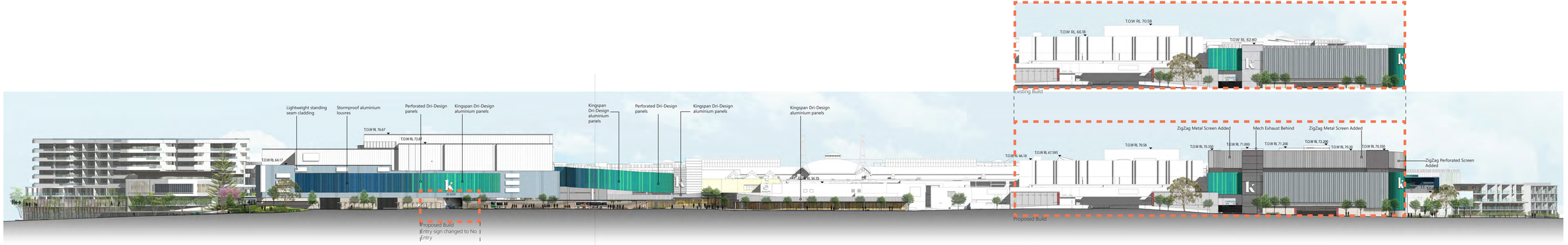
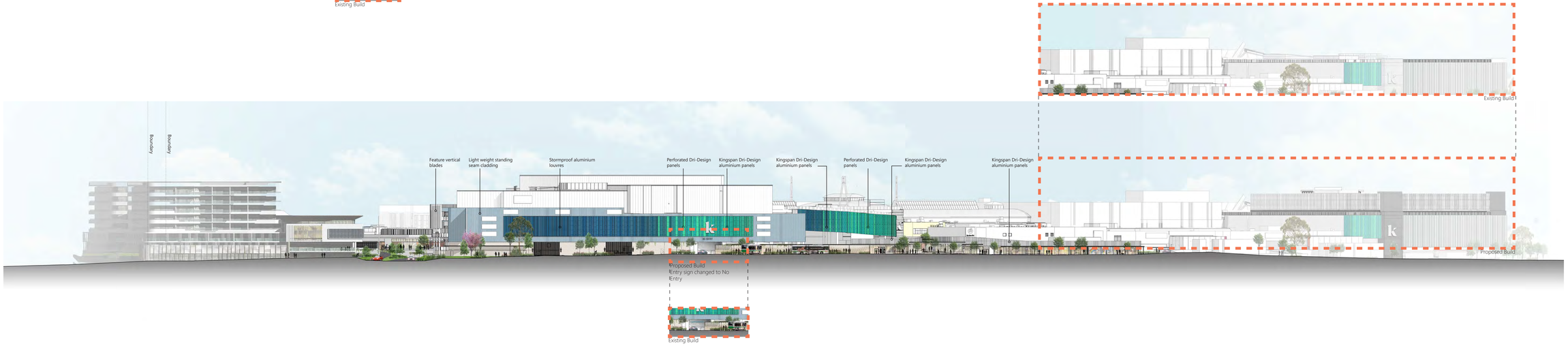


Karrinyup Road elevation-South Elevation (EAST)



Karrinyup Road elevation-South Elevation (WEST)

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Version: 1, Version Date: 13/09/2024

Elevations
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

SCALE: 1:1000 @A3/ 1:500 @A1 DATE: 10.09.2024
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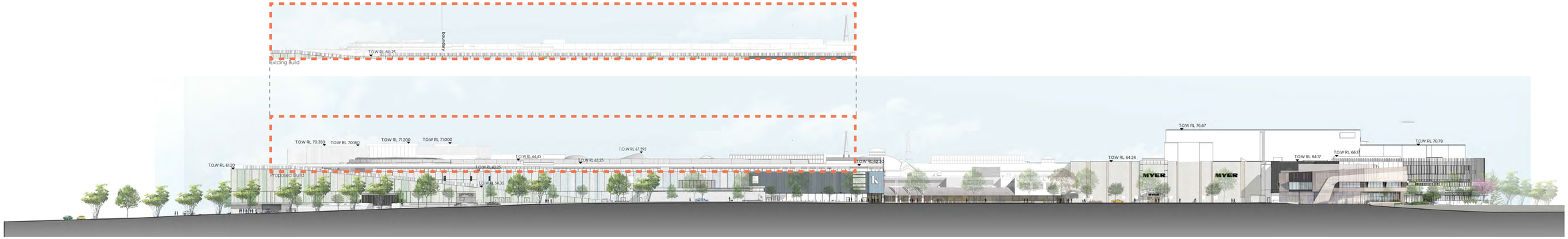
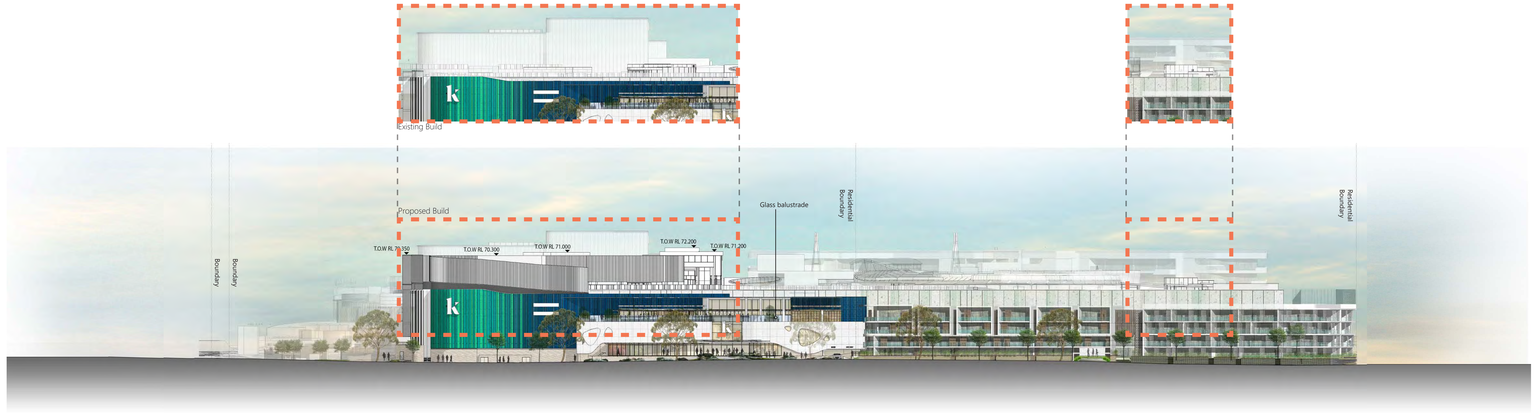
DA9



Davenport Street - North Elevation



Francis Avenue elevation - East Elevation

Elevations
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

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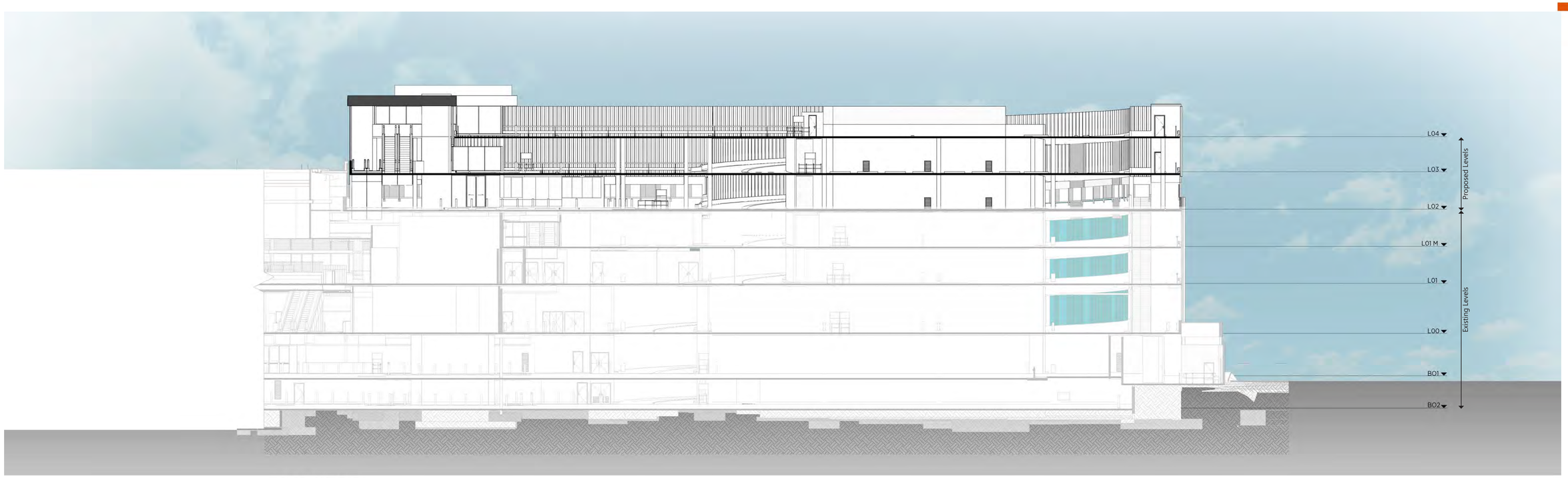

1 / 201 SECTION A-A
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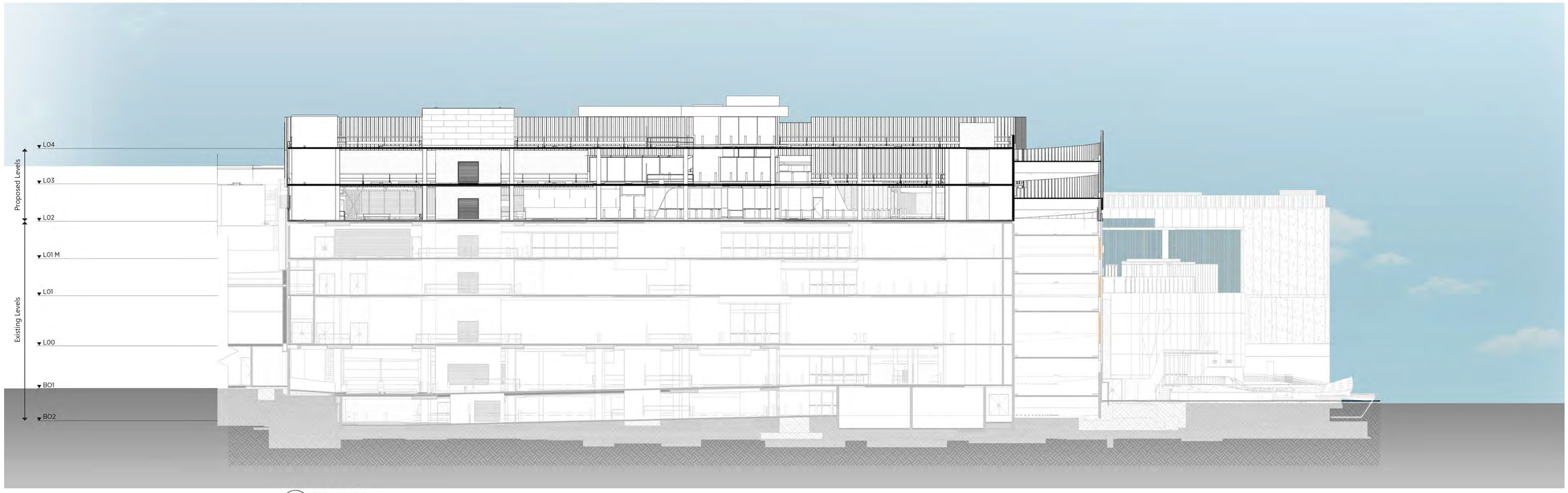

2 / 201 SECTION B-B
1 : 200

gpt

Sections

KARRINYUP SHOPPING CENTRE

development application - Rev a

NORTH

SCALE: 1:200@A1

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Illustratrative View - Ramp 14

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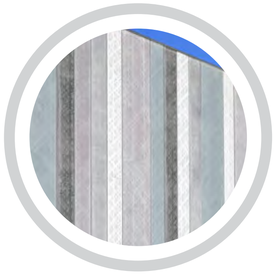
light weight cladding
(Karrinyup Road - South elevation)

alternating perforated and solid feature screening
(Karrinyup Road - South elevation)



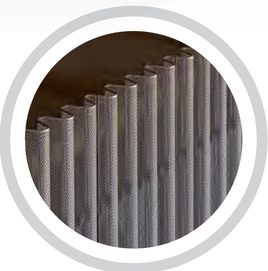
precast concrete panels
(Karrinyup Road - South elevation)

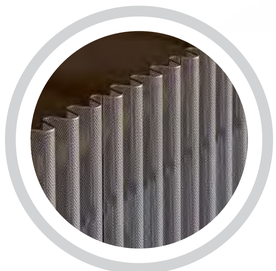
painted precast
(Karrinyup Road - South elevation)

aramax freespan screen
(Karrinyup Road - South elevation)

perforated metal cladding screen added

perforated metal cladding screen added





gpt

Illustratrative View - SE Carpark
KARRINYUP SHOPPING CENTRE
Development Application - Rev a

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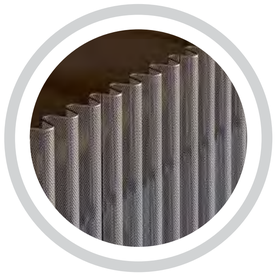


perforated metal cladding screen added

pergola structure
(Francis Avenue - East elevation)

light weight cladding
(Karrinyup Road - South elevation)

Screen added

jesmonite composite panels
(Francis Avenue - East elevation)

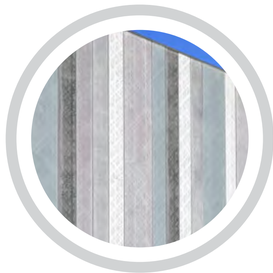
Subject to separate development application

blockwork wall
(Francis Avenue - East elevation)

shopfront glazing
(Francis Avenue - East elevation)

laminated patterned glass
(Francis Avenue - East elevation)

precast concrete panels
(Francis Avenue - East elevation)



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Illustratrative View - SE Carpark

KARRINYUP SHOPPING CENTRE

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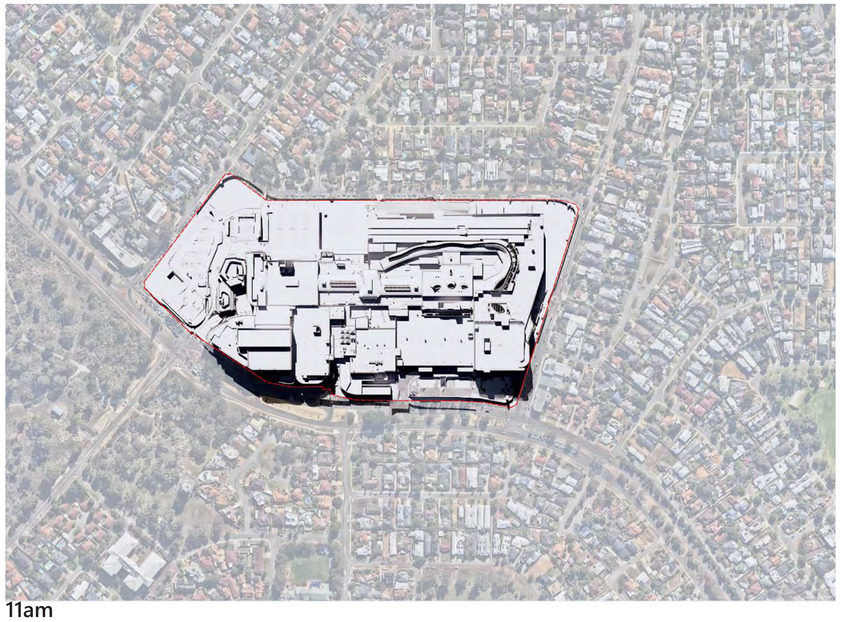
DA14

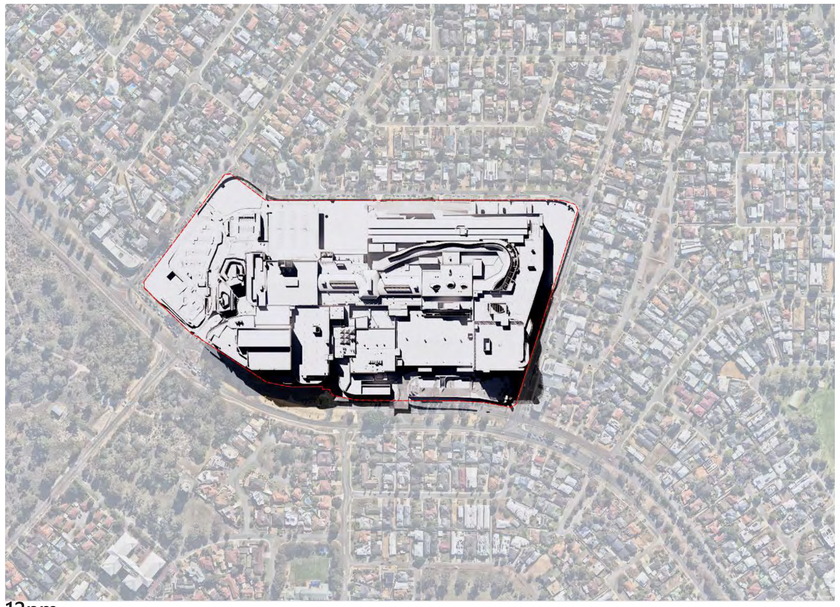
8am

9am

10am



11am



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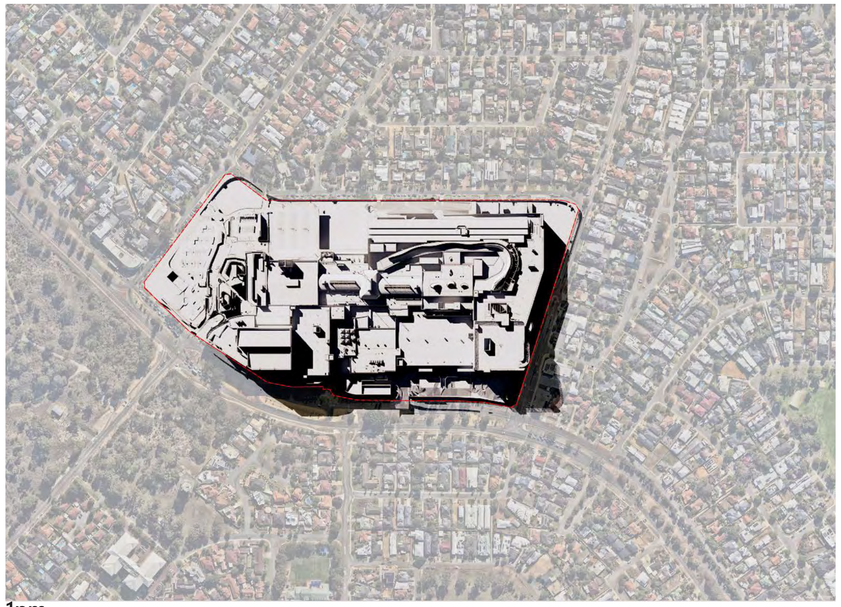

1pm

gpt

Overshadowing Diagrams

KARRINYUP SHOPPING CENTRE

development application - Rev a

NORTH

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2pm

3pm - sun too low to cast shadows

4pm - sun too low to cast shadows

5pm - sun too low to cast shadows

Overshadowing Diagrams

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PART C – OTHER BUSINESS

1. State Administrative Tribunal Applications and Supreme Court Appeals

2. Meeting Closure