



AMENDMENT 1- MUNSTER PHASE 2 STRUCTURE PLAN

Structure Plan Amendment

Prepared for
OTHERSIDE PROPERTY
October 2025



ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Cockburn
Local Planning Scheme No. 3.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE
WESTERN AUSTRALIAN PLANNING COMMISSION ON:

31 OCTOBER 2006

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Date of Expiry:

19 OCTOBER 2035

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director Kris Nolan
Associate Director Emma Dunning

Project Code P0052872
Report Number 3.2 FINAL MODIFICATIONS (OCTOBER 2025)

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Aboriginal and Torres Strait Islander people make in
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Owners on whose land we stand.**

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CONTENTS

Endorsement page	1
Amendments	2
Executive Summary.....	3
Part One: Implementation	5
1. Implementation of Structure Plan Amendment.....	6
1.1. Structure Plan Area.....	6
1.2. Structure Plan Content.....	6
1.3. Staging.....	6
1.4. Subdivision and Development Requirements	6
1.4.1. Land Use Zones and Reserves	6
1.4.2. Subdivision Layout	6
1.4.3. Residential Development	6
1.4.4. Public Open Space.....	6
1.4.5. Local Development Plans.....	6
1.4.6. Notification on title – Midge from nearby Lakes and Wetlands	7
1.4.7. Heritage Protection and Management.....	7
1.4.8. Contaminated Sites	7
1.5. Other Requirements.....	7
1.5.1. Development Contributions	7
Part Two: Explanatory Section.....	10
1. Site and Context Analysis	11
2. Planning Framework	13
2.1. South Metropolitan Peel Sub-regional Planning Framework.....	13
2.2. Metropolitan Region Scheme	13
2.3. City of Cockburn Town Planning Scheme No. 3	13
2.3.1. Zone and Structure Plans.....	13
2.3.2. Munster Phase 2 Structure Plan	14
2.3.3. Heritage	18
2.4. State Planning Policies	18
2.4.1. State Planning Policy 2.9 – Water Resources	18
2.4.2. State Planning Policy No.3 - Urban Growth and Settlement.....	19
2.4.3. State Planning Policy 3.5 Historic Heritage Conservation	19
2.4.4. State Planning Policy 3.6 Infrastructure Contributions.....	19
2.4.5. State Planning Policy 3.7 – Bushfire	19
2.4.6. State Planning Policy 5.4 – Road and Rail Noise	19
2.4.7. Residential Design Codes – Volume 1	20
2.5. Local Planning Policies	20
2.6. Preliminary Engagement	23
3. Amendment Design Response	24
3.1. Lot Layout and Density Coding.....	24
3.2. Traffic and Road Layout.....	26
3.3. Public Open Space	26
3.4. Stormwater Management	28
3.5. Heritage Wall and Ruins	28
3.6. Acoustic Considerations	28
3.7. Bushfire Attack Level Assessment	29
Disclaimer.....	30

Appendix A	Transport Impact Assessment
Appendix B	Stormwater Management Technical Note
Appendix C	Structural Assessment
Appendix D	Noise Management Plan
Appendix E	Landscape Concept Plan
Appendix F	Bushfire Attack Level Assessment

FIGURES

Figure 1 – Aerial Photo	12
Figure 2 – City Mapping Hub extract - zoning	14
Figure 3 – Munster Phase 2 Structure Plan	15
Figure 4 – Structure Plan Summary	25
Figure 5 – Public Open Space in Munster Phase 2 Structure Plan area	26

TABLES

Table 1 – Structure Plan Elements	15
Table 2 – Local Planning Policies.....	20
Table 3 – Structure Plan Amendment Area and Yield Summary	24
Table 4 – Public Open Space provision – structure plan amendment area	27
Table 5 – Public Open Space schedule – structure plan area	27

AMENDMENTS

Amendment No.	Summary	Date approved by WAPC
1	<ul style="list-style-type: none">• Recoding of Lot 3 and Lot 345 Rockingham Road and 103 West Churchill Road and subsequent design inclusions• Amending the Part 1 to conform to the WAPC manner and form for Structure Plans	24 October 2025

EXECUTIVE SUMMARY

The Munster Phase 2 Structure Plan (the **structure plan**) applies to a portion of Development Area 5 Munster that is in the Development Zone in the City of Cockburn Local Planning Scheme No. 3. The structure plan was originally approved by the Western Australian Planning Commission in 2010 and has recently received an extension of time until 2035.

This report has been prepared, on behalf of Otherside Property acting for the owner of Lot 104 (645) Rockingham Road, Lake Coogee, to support the structure plan amendment to modify the northern portion of Structure Plan. The portion of the structure plan subject of the amendment is the last remaining portion yet to be developed and is considered to have minimal implications on the rest of the structure plan area.

The structure plan amendment has been prepared with regard to the Planning and Development (Local Planning Schemes) Regulations 2015 and the WA Planning Manual – Guidance for Structure Plans (August 2023). As the Munster Phase 2 Structure Plan was approved in 2010, this report provides the information necessary for the amendment to be assessed and determined and acts as an addendum rather than a consolidated amendment.

As part of the preparation of the amendment, the following technical and supporting documentation has been prepared and summarised in the report, with full copies included in the appendices:

- Transport Impact Assessment
- Stormwater Management Technical Note
- Limestone Dry Walls structural assessment
- Noise Management Plan
- Bushfire Attack Level Assessment

This report presents a comprehensive analysis and justification for the amendment to the Munster Phase 2 Structure Plan. The amendment is designed to optimise the use of the last remaining undeveloped portion of the structure plan area. The amendment responds to the ability for the site to increase density whilst retaining the identified heritage wall and ruins located on Lot 103 (#66) West Churchill Avenue. The increase in residential density from R20 to R30 and R40 over a portion of the structure plan area will offer increased housing stock and diversity in the precinct, which aligns with the City and State's visions and objectives for housing.

Item	Data	Structure Plan Ref (section no.)
Total area covered by the structure plan	21.7605ha	-
Total area covered by the structure plan amendment	2.1373ha	3.1
Area of each land use proposed within the amendment area: <ul style="list-style-type: none">• Residential	1.5177ha	3.1
Total estimated lot yield within the amendment area	60	3.1
Estimated number of dwellings within the amendment area	60	3.1
Estimated residential site density within the amendment area	28 dwellings per hectare	3.1
Estimated population within the amendment area	162	-

<p>Estimated area and percentage of public open space given over to:</p> <ul style="list-style-type: none"> Local parks 	<p>2.2007 hectares 10.2%</p>	<p>3.1</p>
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PART ONE: IMPLEMENTATION

1. IMPLEMENTATION OF STRUCTURE PLAN AMENDMENT

1.1. STRUCTURE PLAN AREA

The structure plan amendment to the *Munster Phase 2 Structure Plan* applies to the land identified within the boundary of the **Plan 1: Structure Plan Amendment**. The structure plan, as amended, comes into effect on the day the amendment is approved by the Western Australian Planning Commission (WAPC).

The structure plan amendment does not present a consolidated update to the Munster Phase 2 Structure Plan, rather this structure plan amendment is an addendum, as summarised in **Table 1**.

The Munster Phase Two Structure Plan is in effect from the date stated on the cover and for a period of 10 years or for any other period approved by the WAPC.

1.2. STRUCTURE PLAN CONTENT

The Structure Plan comprises:

- Part 1 – Implementation Section with the structure plan map and provisions;
- Part 2 – Explanatory Section with background and rationale for the amendment;
- Part 3 – Technical Appendices; and
- Part 4 – Original Structure Plan Report.

1.3. STAGING

- a) Construction of the road network between Figtree Drive and Templetonia Rise is to occur in the first stage of subdivision and/or development of Lot 104 West Churchill Avenue.
- b) Public open space may be developed in two stages, at the time of subdivision or development of Lot 103 and Lot 104.

1.4. SUBDIVISION AND DEVELOPMENT REQUIREMENTS

The Structure Plan should be read in conjunction with the City of Cockburn Local Planning Scheme No. 3 and the Residential Design Codes. The additional subdivision and development requirements for the structure plan area are set out below.

1.4.1. Land Use Zones and Reserves

Land use permissibility within the structure plan area shall be in accordance with the Structure Plan Map at Plan 1 and the corresponding Zones and Reserves under the City of Cockburn Town Planning Scheme No.3.

1.4.2. Subdivision Layout

- a) Development and subdivision is to be of a layout generally in accordance with the **Plan 1**.

1.4.3. Residential Development

- a) Residential densities are shown on **Plan 1**. Residential development shall be in accordance with the correlating density code requirements in the Residential Design Codes.

1.4.4. Public Open Space

- a) Public open space is shown on **Plan 1**. The heritage place is to be incorporated into the development of public open space on Lot 103 at the time of subdivision or development.

1.4.5. Local Development Plans

Local Development Plans may be required to be prepared and implemented pursuant to Schedule 2, Part 6 of the Planning and Development (Local Planning Schemes) Regulations 2015. A Local Development Plan should address the following matters:

- (a) Lots with an area of 260 square metres or less;
- (b) Lots abutting public open space;
- (c) Lots with laneway access;
- (d) Lots with a dual road aspect;
- (e) Dwelling orientation
- (f) Bin storage and bin pads; and/or
- (g) Lots/development directly abutting Lot 21 (#70) West Churchill Avenue.

1.4.6. Notification on title – Midge from nearby Lakes and Wetlands

- a) A notification, pursuant to 70A of the *Transfer of Land Act 1893*, is to be imposed on the title of each new residential lot, created through subdivision, strata subdivision and/or development, advising prospective purchaser(s) that the land may be affected by midges, as follows:

This land may be affected by midge from nearby lakes and/or wetlands. Enquiries can be made with the City of Cockburn Environmental Services.

1.4.7. Heritage Protection and Management

- a) A detailed Heritage Management Plan is to be prepared and submitted with a subdivision or development application of Lot 103 West Churchill Avenue, Lake Coogee to address how the heritage wall and ruins will be protected and managed when the public open space is constructed.

1.4.8. Contaminated Sites

- a) An investigation for soil and groundwater contamination report is required to accompany a subdivision and/or development proposal, to determine any remediation requirements arising from the site's previous use as a market garden.

1.5. OTHER REQUIREMENTS

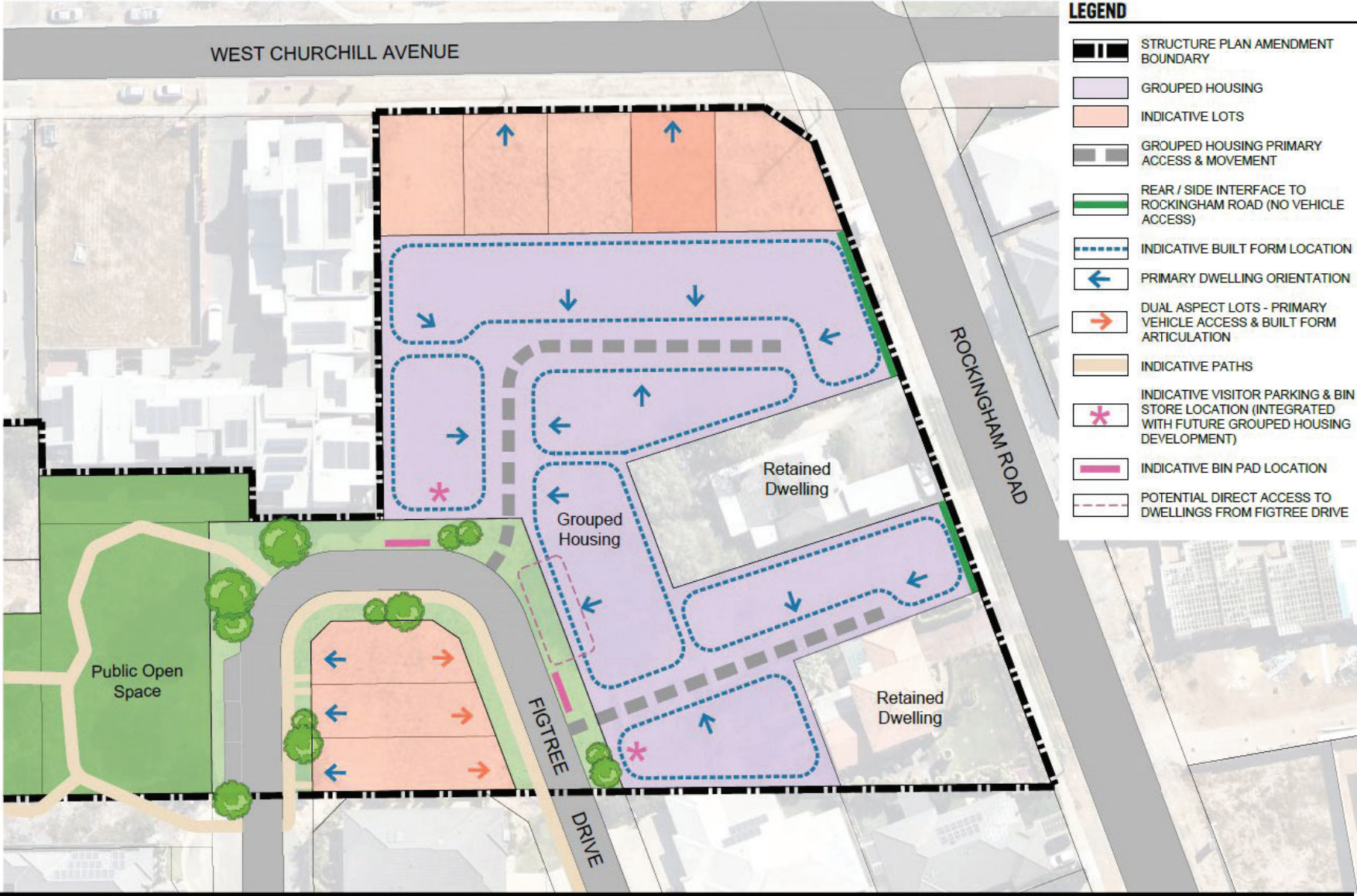
1.5.1. Development Contributions

The structure plan area is subject to the requirements of Development Contribution Area 6 (Munster, Lake Coogee) and Development Contribution Area 13 (Community Infrastructure) of the City of Cockburn Local Planning Scheme.

8



Plan 2 – Lot 104 Indicative Layout Plan



PART TWO: EXPLANATORY SECTION

1. SITE AND CONTEXT ANALYSIS

The land included in the structure plan amendment (the 'Site') is Lot 104 (645) Rockingham Road, Lot 103 (66) West Churchill Avenue, Lot 3 (643) Rockingham Road) and Lot 22, Lake Coogee. The site is 2.1373 hectares bounded by Rockingham Road to the east, Western Churchill Avenue to the north, Coogee Road to the west with residential dwellings and the cul-de-sacs of Velaluka Drive, Templetonia Drive and Figtree Avenue to the south.

The key site details are as follows:

Address	Lot No	Plan	Area sq.m	Proprietor(s)
645 Rockingham Road	104	P003563	9348sq.m	Darriwell Investments Pty Ltd
66 West Churchill Avenue	103	P003563	10951sq.m	Estate of Lucy Radich
643 Rockingham Road	3	D063904	850sq.m	Craig Smorneburg & Deidre Smorneburg
-	22	P074216	224sq.m	Reserve (52516)
			21,373sq.m (2.1373ha)	

The site is an irregular shape and essentially vacant, with an existing single house fronting Rockingham Road, existing single house fronting West Churchill Avenue and a Limestone wall with heritage significance in the south western part of the site (discussed later in the report). The northern part of the site adjoins a separate lot with existing single house to be retained, fronting Rockingham Road and medium density grouped dwelling sites, fronting West Churchill Avenue.

The site is opposite a local centre, on the north west corner of Rockingham-West Churchill Avenue intersection. It is currently occupied by a barber and an antique store, noting that the local centre is listed for sale. A new childcare centre has been constructed on the adjacent, north-east corner of Rockingham-West Churchill Avenue.

The site is serviced by Bus route 549 which connects to Fremantle and Rockingham including Spearwood and Phoenix Shopping Centres. The north bound bus stop abuts the site on Rockingham Road. The south bound bus stop is on the corner of Stock Road and East Churchill Avenue, approximately 175 metres east of the north bound bus stop. The site is serviced approximately every 10-15 minutes in the morning peak hour and 20-35 minutes in the afternoon peak.

Figure 1 – Aerial Photo



2. PLANNING FRAMEWORK

2.1. SOUTH METROPOLITAN PEEL SUB-REGIONAL PLANNING FRAMEWORK

The South Metropolitan Peel Sub-Regional Planning Framework, which builds on the principles of *Directions 2031 and Beyond*, guides future infill growth in the South Metropolitan Peel sub-region and focuses on infill residential development occurring in activity centres, urban corridors and station precincts. While the site is not included in these areas, the Framework generally promotes new residential development within existing urban areas which are intended to become vibrant and revitalised neighbourhoods.

The structure plan amendment offers an opportunity to address housing diversity and affordability, by changing the residential density code to provide additional dwellings, including smaller lots and townhouses. The increased density may also provide an incentive for development of the vacant land and contribute to the community in this local area.

2.2. METROPOLITAN REGION SCHEME

The site is zoned Urban under the Metropolitan Region Scheme (MRS).

2.3. CITY OF COCKBURN TOWN PLANNING SCHEME NO. 3

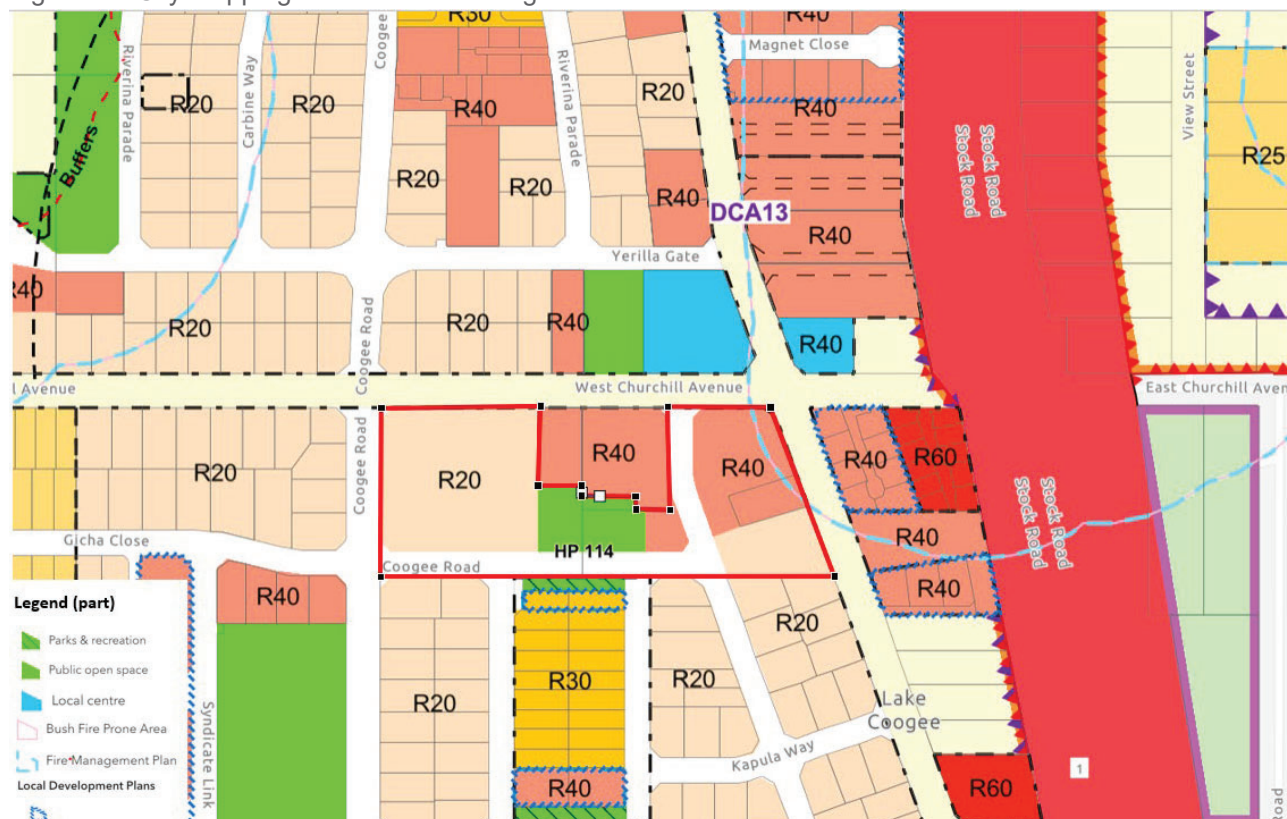
2.3.1. Zone and Structure Plans

The site and surrounding areas are zoned Development DA 5 under the City of Cockburn Local Planning Scheme No. 3 (**TPS 3**). The purpose of the Development zone is to require a Structure Plan to guide further subdivision and/or development. TPS 3 provides specific provisions to DA 5 which, in addition to the Structure Plan requirement, relate to planning issues that do not affect the Site, i.e. Woodman Point WWTP, Munster Pump Station and Cockburn Cement buffer zone.

The structure plan area is subject to the requirements of Development Contribution Area 6 (Munster, Lake Coogee) and Development Contribution Area 13 (Community Infrastructure) of the City of Cockburn Local Planning Scheme. Therefore, any subdivision and/or development may include a condition for contributions to both Developer Contribution Plans.

The site and surrounding area within DA 5 are affected by approximately 23 structure plans, many of which have been fully implemented (substantially subdivided or built out). The City are progressing a basic scheme amendment (No. 173) for the partial rationalisation of DA 5 for those areas where the structure plan has been fully implemented and revoke the structure plans. **Figure 2** below is an extract from the City's mapping hub, which has digitised the structure plan land uses for context. The map indicates the site is in a residential area with densities ranging from R20-R60 and local centres zoned sites to the north.

Figure 2 – City Mapping Hub extract - zoning

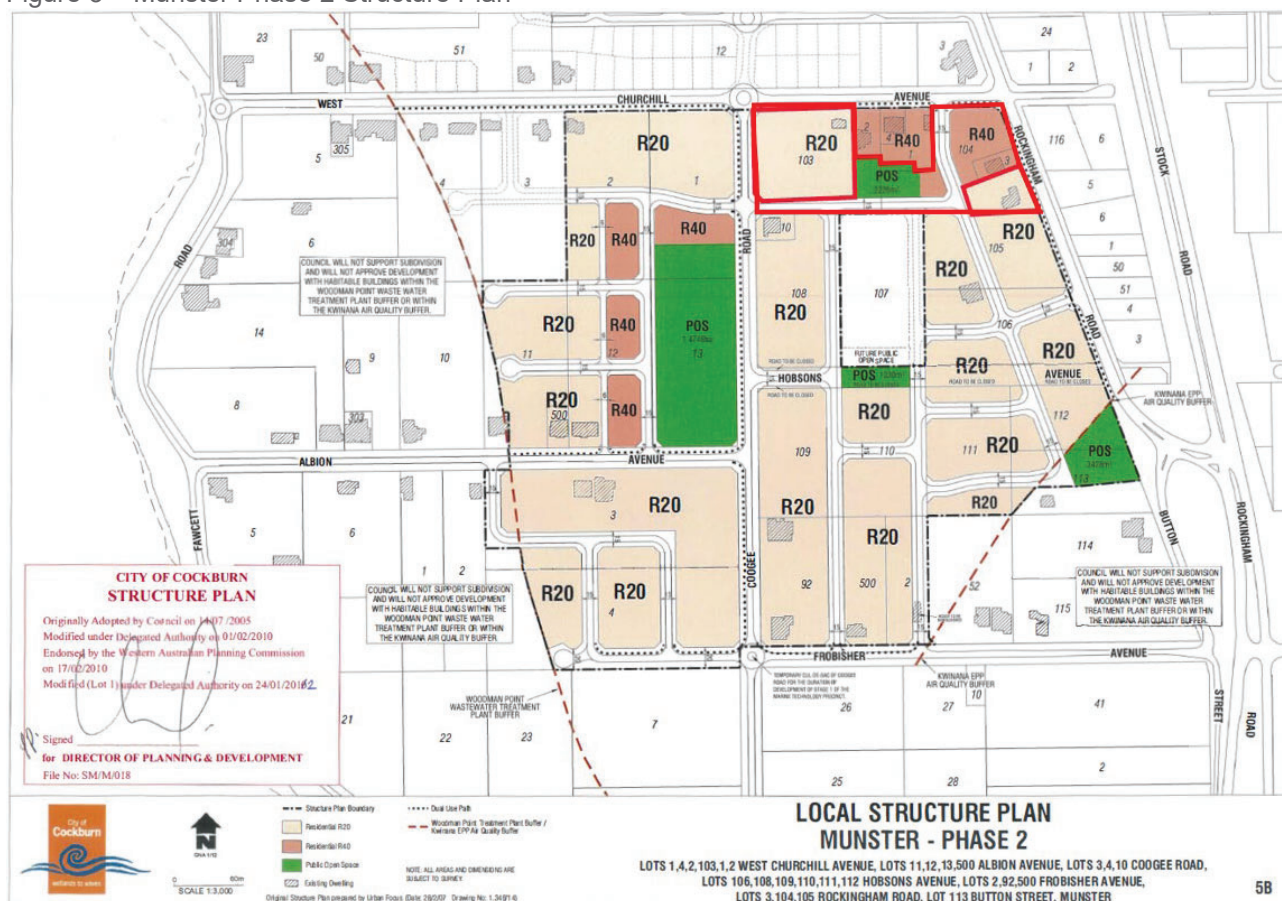


2.3.2. Munster Phase 2 Structure Plan

The Munster Phase 2 Structure Plan was originally approved by the WAPC on 17 February 2010 and recently WAPC granted an extension of time until 19 October 2035.

The site is located in the north-east corner of the structure plan area, as indicated in **Figure 3**. The structure plan zones the land Residential with R20 and R40 density coding and land for POS. The structure plan road layout indicates Figtree Avenue continuing through the site with a new intersection at Churchill Avenue. The site is the last remaining portion of the structure plan area to be developed, as depicted on the aerial photo in **Figure 1**.

Figure 3 – Munster Phase 2 Structure Plan



The structure plan comprises the elements set out in the Table 1 below, which are summarised with commentary about the effect of the amendment.

Table 1 – Structure Plan Elements

Element	Description	Provision	Amendment
5.0 Development Constraints	5.1 Existing Residences	Existing residences located within the structure plan area are to be retained and accommodated with the structure plan.	There are currently three existing residences within the structure plan area that will be maintained.
	5.2 Development Plans for Marine Technology Park	City of Cockburn to prepare structure plan for Australian Marine Complex Technology Park.	AMC Strategic Infrastructure & Land Use Plan (ILUP) finalised and approved on 28/08/2020.
	5.3 Existing Land Uses	Land is generally occupied by rural homesites with limited market garden activities. There are a number of substantial residences in the structure plan area.	The site is not within any ILUP designated precincts and therefore there is no direct impact on the approved plan. N/A

	5.4 Kwinana EPP area	N/A	site is not within Kwinana EPP area.
	5.5 Woodman Point WWTP	N/A	site not within Woodman Point WWTP area.
	5.6 Geotechnical Conditions	Geotechnical investigations undertaken to address very loose conditions in an area judged to have karstic limestone collapse, located adjacent to Coogee Road, allocated for public open space.	N/A
	5.7 Midge Infested Lakes	Residential development within 500m buffer from lake Coogee not supported, unless it can be demonstrated that the lake does not have or can be prevented from infestation.	Local Planning Policy 1.10 – LPP 1.10 - Planning Around Mosquito and Midge Infested Wetlands requires notifications on title, under section 70A of the <i>Transfer of Land Act 1893</i> for each new residential lot within 500 – 800 metres of lakes and wetlands, advising prospective purchaser(s) that the land may be affected by midge. The amendment includes the requirement to impose a notification on each new residential lot, created through subdivision, strata subdivision and/or development.
6.0 Structure Plan	6.1 Residential component – Neighbourhood Design	The structure plan includes varying densities to enable subdivision and development with a housing type diversity. A base R20 coding is proposed for the structure plan area. Medium density of R40 is proposed on the corner of Rockingham Road and West Churchill Avenue and adjacent to the high amenity area of public open space on Coogee Road.	The amendment upcodes a portion from R20 to R40 and R20 to R30 zoning, whilst maintaining the balance of the R40 area. Lot layout and density coding is addressed in Section 3.1 .
	6.2 Road System	The proposed road layout provides for the majority of lots to have an east-west orientation. The internal road network is designed to be highly interconnected street	The amendment includes minor changes to the internal road networks within the site, whilst focusing on increasing safety.

		<p>system for traffic efficiency, safety and amenity of neighbourhood, with focus on maintaining permeability.</p> <p>Roundabouts are proposed for the intersections of Coogee Road and West Churchill Avenue and Frobisher Avenue to act as traffic calming proponents.</p>	<p>It is noted that any potential Crime Prevention Through Environmental Design (CPTED) issues will be addressed in subsequent development stages.</p> <p>A detailed summary of a Traffic Impact Assessment is in section 3.2.</p>
	6.3 Bus Routes	<p>Existing bus routes currently located on Rockingham Road with changes envisaged to the bus routes in this locality.</p> <p>The proposed road system and paths within structure plan area to ensure maximum walkability to the existing and likely future bus stops.</p>	<p>The Traffic Impact Assessment, in section 3.2 addresses public transport.</p>
	6.4 Public Open Space	<p>Public open space to be provided at the rate of 10% of the Gross Subdividable Area.</p> <p>The Structure Plan identifies some land for POS and sets out arrangements for future provision and cash-in-lieu arrangements.</p>	<p>POS changes are addressed in section 3.3.</p>
	6.5 Schools	N/A	N/A
	6.6 Commercial Centre	N/A	N/A
	6.7 Community Facilities	<p>No additional community facilities are planned for the structure plan given the close proximity of existing community facilities nearby.</p>	N/A
7.0 Engineering Services	7.1 General	<p>Engineering services within the structure plan will be provided to the standard required by the servicing authorities.</p>	No change
	7.2 Sewerage Disposal	<p>All lots within the plan area will be provided with a connection to the Water Corporation sewerage system.</p>	No change
	7.3 Water Supply	<p>Water supply will be provided to the structure plan area to meet the</p>	No change

		specifications and standards of the Water Corporation	
	7.4 Roads and Drainage	<p>All roads will be constructed to meet the specifications and standards of the City of Cockburn.</p> <p>The drainage strategy is to dispose of stormwater by soakage and use of water sensitive design methods.</p>	<p>No change to road construction specification.</p> <p>Drainage is addressed in section 3.5.</p>
Appendix 1	POS - Participating Owners POS	Lots within the structure plan amendment area are Pt 103 and Pt 1 on West Churchill Avenue and Pt 104 on Rockingham Road.	The structure plan amendment modifies the area and layout of the POS, addressed in section 3.3
Appendix 2	Commercial Centres	N/A	N/A
Appendix 3	Geotechnical Investigation	N/A	N/A
Appendix 4	Midge Nuisance Assessment	N/A	N/A
Appendix 5	Arboricultural Report	N/A	N/A
Appendix 6	Drainage Strategy Report	-	Drainage is addressed in section 3.5 .

2.3.3. Heritage

Part of the site contains Heritage Place No. 114, which is described as 'Limestone Wall and Ruins', Munster'. The Limestone Wall and Ruins is on the City's Heritage List as a Category B place, with considerable significance for its association with the market garden industry. It comprises a section of dry-stone wall, up to 2m high, running along part of the southern boundary of the lots.

The Heritage List description of the place notes that if appropriately interpreted, it has the potential to be an educational/ recreational resource for the community, demonstrating the market gardening industry in the City of Cockburn. Category B places are protected under TPS 3.

The amendment includes a requirement that a Heritage Management Plan is prepared and submitted with any future subdivision application to address how the heritage wall and ruins will be protected and managed when the public open space is constructed.

2.4. STATE PLANNING POLICIES

2.4.1. State Planning Policy 2.9 – Water Resources

The main objective of State Planning Policy No. 2.9 (SPP2.9) Water Resources and draft SPP2.9 Planning for Water, is to ensure planning, development and decision making adequately considers and contributes to the protection and wise management of water resources by ensuring structure plans, schemes and subdivisions adopt the appropriate water sensitive measures.

The site is located within 1km of significant wetlands and within 2km of selected coastal embayments. Environmental management design and management will need to be incorporated in the design of later development phases.

Section 3.4 confirms that an Urban Water Management Plan will be prepared as part of the subdivision process, which will address the requirements of SPP 2.9 and draft SPP2.9 as agreed with the City.

2.4.2. State Planning Policy No.3 - Urban Growth and Settlement

State Planning Policy No. 3 (SPP 3) applies to the whole of the State in promoting a more consolidated settlement pattern which is more aligned to sustainable design and development. The objectives and principles of Directions 2031 and Liveable Neighbourhoods are preserved in this policy.

SPP 3 recognises the historical low density housing trend and urban sprawl which has occurred in metropolitan Perth, acknowledging that this form of development only intensifies pressure on valuable land and water resources, imposes additional costs of infrastructure and services, and increases the dependency on private vehicles as a mode of transport.

Accordingly, the structure plan provides a consolidated development response which builds upon existing communities and established local economies, resulting in a more liveable and sustainable development.

2.4.3. State Planning Policy 3.5 Historic Heritage Conservation

State Planning Policy No. 3.5 (SPP 3.5) aims to conserve historic heritage places and areas, ensuring development respects their significance, while providing clear and balanced planning processes for heritage conservation and protection. This policy applies throughout Western Australia

A portion of the site contains infrastructure identified within the City's local Heritage List and is therefore subject to this policy. Limestone Wall and Ruins, Munster (#114) is located on the western portion of the Structure Plan Area and therefore must be given due regard.

2.4.4. State Planning Policy 3.6 Infrastructure Contributions

State Planning Policy No. 3.6 (SPP3.6) Infrastructure Contributions and associated guidelines coordinate and provide for contributions to community infrastructure required for new development. The structure plan is subject to the requirements of Development Contribution Area 6 and 13 in accordance with Part One, section 1.5.1.

2.4.5. State Planning Policy 3.7 – Bushfire

State Planning Policy No. 3.7 (SPP 3.7) directs how land use should address bushfire risk management in Western Australia. It applies to all land designated as bushfire prone by the Fire and Emergency Services (DFES) Commissioner. It applies to all higher order strategic planning documents, strategic planning proposals, subdivision and development applications located in designated bushfire prone areas.

The entirety of the site is situated within a Bushfire Prone Area 2, and a BAL assessment has been undertaken that identified the site to have a BAL-Low rating. This means that the site is potentially at risk of bushfire impact.

It is highlighted that the bushfire risk associated with the site is largely resulting from the undeveloped nature of the site itself, with the north western corner being the only portion subject to external bushfire risk. Once the site is developed the bushfire risk to the majority of the site will be negated.

Bushfire is addressed in Section 3.7 and Appendix F of this report.

2.4.6. State Planning Policy 5.4 – Road and Rail Noise

State Planning Policy No. 5.4 (SPP 5.4) has been prepared to minimise the adverse impact of road and rail noise on noise-sensitive land uses. The Site is located adjacent to and within the trigger distance of Rockingham Road, which is identified as being a noise emitting roadway.

Stock Road further to the east, is classified as a 'strategic freight route and/or major traffic route under SPP 5.4. Any future redevelopment that proposes sensitive land uses (i.e. residential purposes, educational establishment, childcare premises, hospital, nursing home; or place of worship) within the trigger distance, noise mitigation construction requirements may be warranted.

Noise Management is addressed in **Section 3.6**.

2.4.7. Residential Design Codes – Volume 1

Residential Design Codes – Volume 1 (R-Codes) is the basis for the control of residential development throughout Western Australia, providing a framework for controlling development intensity within residential zones through the application of R-Code densities. The R-Code density primarily controls the minimum and average lot sizes, with built form performance standards and ‘deemed-to-comply’ examples, specific to the stipulated density, outlined within Part 5 and 6 of the R-Codes.

2.5. LOCAL PLANNING POLICIES

The local planning policies that apply to the site at the structure plan level include:

Table 2 – Local Planning Policies

Policy	Summary of Relevant Provisions	Application
LPP 1.10 – Planning Around Mosquito and Midge Infested Wetlands	The purpose of this policy is to restrict residential subdivision, strata’s and development in areas considered to be prone to a midge nuisance/infestation. Typically, the council will not support subdivision or rezoning in these areas unless it can be demonstrated that the lake or wetland does not have or can prevent midge infestation. Developers/Subdividers will also be required to impose a notification on each residential lot and Deposited Plan.	The amendment includes the requirement to impose a notification on each new residential lot, created through subdivision, strata subdivision and/or development.
LPP 1.12 – Noise Attenuation	<p>The purpose of this policy is to provide noise attenuation guidelines for noise sensitive land uses through various stages of a lot’s development. At the structure planning stage, the development may be required to model existing and future noise levels, and provide detail of mitigation measures, within an acoustic report were in the vicinity of a noise emitting use/development. Subdivisions may require a preliminary acoustic report or noise exposure forecast.</p> <p>Note: The subject site is within an identified SPP 5.4 – Road and Rail Noise area.</p>	Refer to section 3.6

<p>LPP 4.4 – Heritage Conservation Design Guidelines</p>	<p>The purpose of this policy includes the development control principles for places on the City's Heritage List to provide greater certainty to landowners and the community.</p> <p>Category A and B places are protected under the policy and demolition is generally not supported. The heritage Limestone Walls and Ruins (Inherit #ID 27017) located on the subject site is a Category B place.</p>	<p>Refer to Section 3.5.</p>
<p>LPP 5.1 – Development of the Public Realm</p>	<p>The purpose of this policy is to provide an extension to element 5 of the Liveable Neighbourhoods Guidelines. This extension highlights circumstances where the City would view the location of public open space as inappropriate and thereby not contributing to the minimum open space requirements. This policy primarily applies at the structure plan and subdivision stage of developments.</p>	<p>Refer to Section 3.3.</p>
<p>LPP 5.3 – Engineering, Drainage and Construction Standards</p>	<p>The purpose of this policy is to establish procedures by which drainage generated from subdivision can be controlled through best practice water sensitive urban design, so as to ensure the protection of water resources in receiving environments. At the subdivision and structure plan level, developments should consider the Better Urban Water Management Publication and chapter 7 & 9 of the Stormwater Management Manual of Western Australia.</p> <p>These considerations can be demonstrated through a local water management strategy, and/or urban water management</p>	<p>Refer to Section 3.4.</p>

	plan, and/or storm water management plan.	
LPP 5.11 – Filling and Retaining of Land	<p>At the completion of the subdivisional earthworks, and in any event prior to applying for subdivision clearance or a Building Permit for any form of development, the Applicant/landowner shall provide the following form of certification:</p> <p>Engineer's geotechnical report and certificate which classifies the site as class A in accordance to AS 2870-2011. Permission for class P, H, and E sites are given under exceptional circumstances.</p>	These requirements will be addressed at subdivision stage, as relevant.
LPP 5.13 – Percent for Art	<p>This policy seeks to ensure the City achieves their objectives of the City's public art strategy. This development sets out the cost ratio of development to public art, and the relevant provisions to the design and siting of public art. For multiple dwellings of a value greater than \$2million (exclusive of GST) are to set aside a minimum of one per cent (1%) of the total project cost (up to a maximum value of \$250,000) for the development of artworks on the subject land which reflect the place, locality and/community</p>	It is unlikely that future development on the sites would include multiple dwellings with a value \$2 million or greater.
LPP 5.18 – Subdivision & Street Trees	<p>The purpose of this policy is to increase the number of street trees in the City's Road reserves in new and infill areas and provide a framework for their installation and management.</p> <p>In accordance with the policy, Street Trees are to be planted at a rate of one tree per 10m of linear lot width to a public road reserve. As well as set out the</p>	These requirements will be addressed at subdivision stage, as relevant.

	requirements for condition clearance.	
--	---------------------------------------	--

2.6. PRELIMINARY ENGAGEMENT

Targeted preliminary engagement with community and key stakeholders has been undertaken to understand any concerns with the proposed approach and to ensure any identified issues were addressed in this structure plan amendment report.

This included several meetings with City and DPLH officers between May and August 2024. The key topics of discussion included:

- Feedback and refinement of early concept plans for the structure plan amendment, particularly road layout, POS configuration and density coding;
- Approach to stormwater drainage and water management;
- Heritage values of the Limestone wall, structural integrity investigations and approach to ensure its retention and management;
- Bushfire risk;
- Acoustic requirements; and
- Landscaping and reticulation options.

Otherside Property also met with the owners of 66 West Churchill Avenue to discuss the structure plan amendment, including the changes to road layout, heritage wall and ruins and the upcoding from R20 to R30, and which were all supported.

3. AMENDMENT DESIGN RESPONSE

3.1. LOT LAYOUT AND DENSITY CODING

The Munster Phase 2 Structure Plan allocates majority of the site as Residential zone with a combination of R20 and R40 density coding. The structure plan amendment reconfigures and increases the R40-coded area and upcodes the remaining R20 areas to R30. The structure plan amendment areas are shown in **Figure 4** and set out in **Table 3**.

Table 3 – Structure Plan Amendment Area and Yield Summary

Lot/s	Existing (approx.)	Yield*	Amended	Yield	Area	Yield*
R20	10,095sq.m	22	7,532sq.m (R30)	25	- 2,566sq.m	+ 3
R40	4,589sq.m	21	7,645sq.m	35	+ 3,056sq.m	+ 14
POS	2,226sq.m**	-	2,607sq.m	-	+ 381sq.m	
Road	4,463sq.m	-	3,589sq.m	-	- 871sq.m	
Totals	21,373sq.m	43	21,373sq.m	60		+17

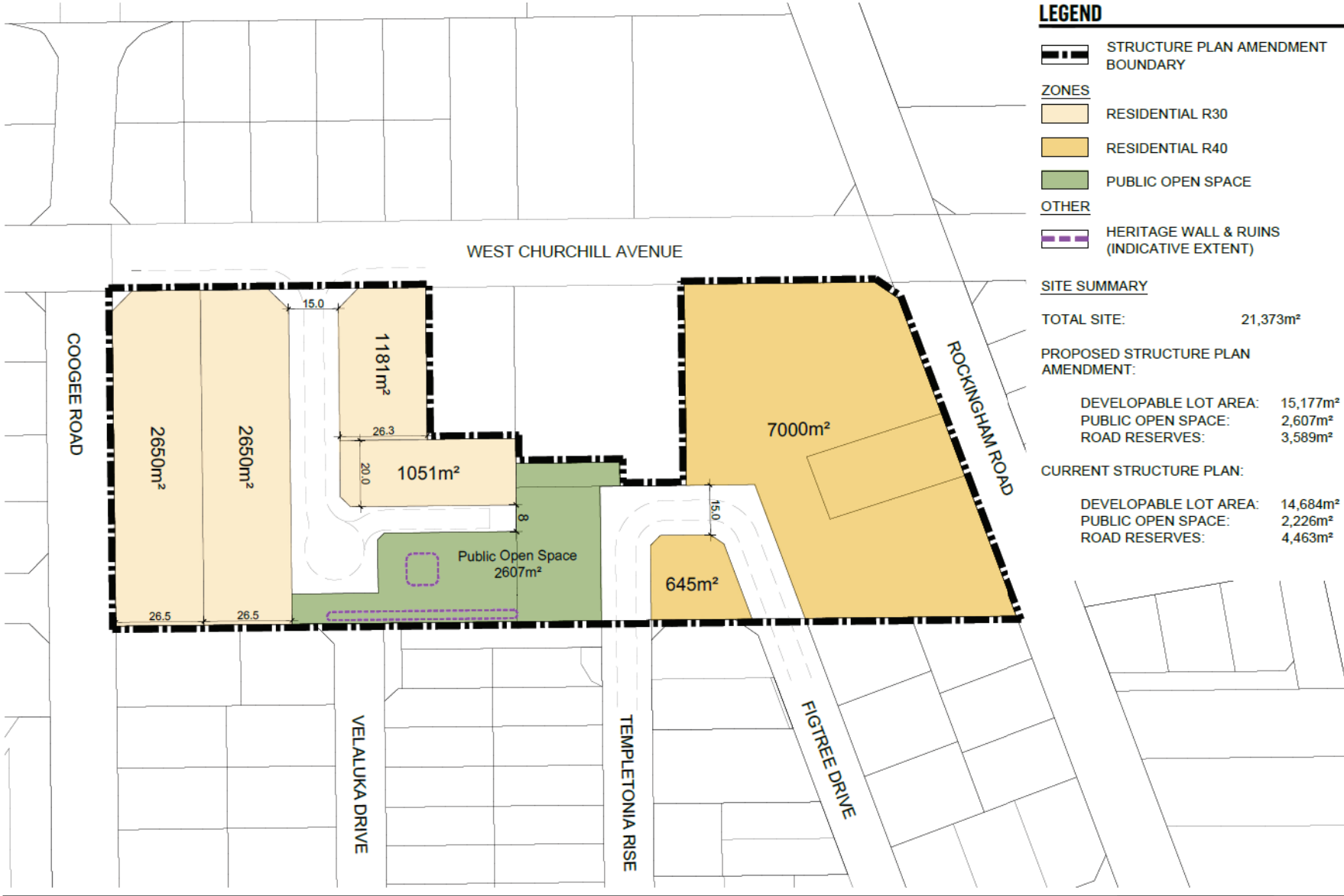
* Based on average lot sizes (R20 – 450sq.m, R30 – 300sq.m, R40 – 220sq.m)

** Public Open Space Appendix notes the required POS area is 2,254sq.m (Pt 103 - 0.1095, Pt 1 - 0.0225 and Pt 104 - 0.0934)

The rationale for the lot reconfiguration and residential upcoding includes:

- **Close Proximity to existing R40 development:** The site is in close proximity to existing R40 development to the north and northeast which indicates that the area can support higher density living and new higher density living is in keeping with the existing character of the area while contributing to a balanced and diverse housing mix in the area.
- **Continuation of Existing R30 Development on 'Lot 107' on the Structure Plan:** The upcoding is a continuation of the R30 development on Lot 107 to the south, which assists to integrate the future development with the existing built form and character.
- **Incentive for development:** The R30 upcoding will act as an incentive to develop this remnant vacant land and also provide a transition between the R20 and R40 coded areas.
- **Close Proximity to the Local Centre to the North:** The site is in close proximity to the local centre to the north, providing access to existing services and enhanced amenities in the future.
- **Existing access to bus route:** The site has convenient access to public transport, with the existing bus route service on Rockingham and Stock Roads.
- **Opportunity to embellish heritage place:** The structure plan amendment has facilitated the review of the heritage place and provides for the retention and embellishment of the limestone wall, identified as a heritage place with a unique presentation of local history.

Figure 4 – Structure Plan Summary



Structure Plan Amendment - Summary
West Churchill Avenue, Lake Coogee

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3.2. TRAFFIC AND ROAD LAYOUT

The existing road layout in the structure plan area was created on the basis of a highly interconnected street system with a choice of routes. The structure plan amendment modifies the layout to retain connectivity while improving the efficiency of land use with the reduction in road surface areas, as noted in **Table 3**.

A Transport Impact Assessment (TIA), at **Appendix A** has been prepared by PTG Consulting in accordance with the WAPC *Transport Assessment Guidelines for Developments: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans* (2016) and made the following conclusions:

- The structure plan amendment comprises of approximately 60 residential dwellings, with R30 and R40 zoning
- An estimated 58-59 peak hour trips and 642 daily trips will be generated, representing a net increase of 15-16 peak hour trips and 192 daily trips compared to existing estimated yield.
- Proposed changes to internal road network are considered to have minimal impact on vehicle trips, while retaining pedestrian and cycling permeability for local journeys and access to POS.
- Public transport services to the LSP area are limited, there are currently no plans for the PTA to expand services in the area.
- The proposed LSP amendment is unlikely to have any material impact on the transport network.

3.3. PUBLIC OPEN SPACE

The Munster Phase 2 Structure Plan provided public open space (POS) at the standard 10% of the gross subdivisible area, in accordance with policy. The primary POS is located centrally within the structure plan (Albion Park) with two local parks (Hobsons Park and Mihaljevich Park), and an existing undeveloped POS reserve (West Churchill Reserve) within the structure plan amendment area as shown in **Figure 5**.

Figure 5 – Public Open Space in Munster Phase 2 Structure Plan area

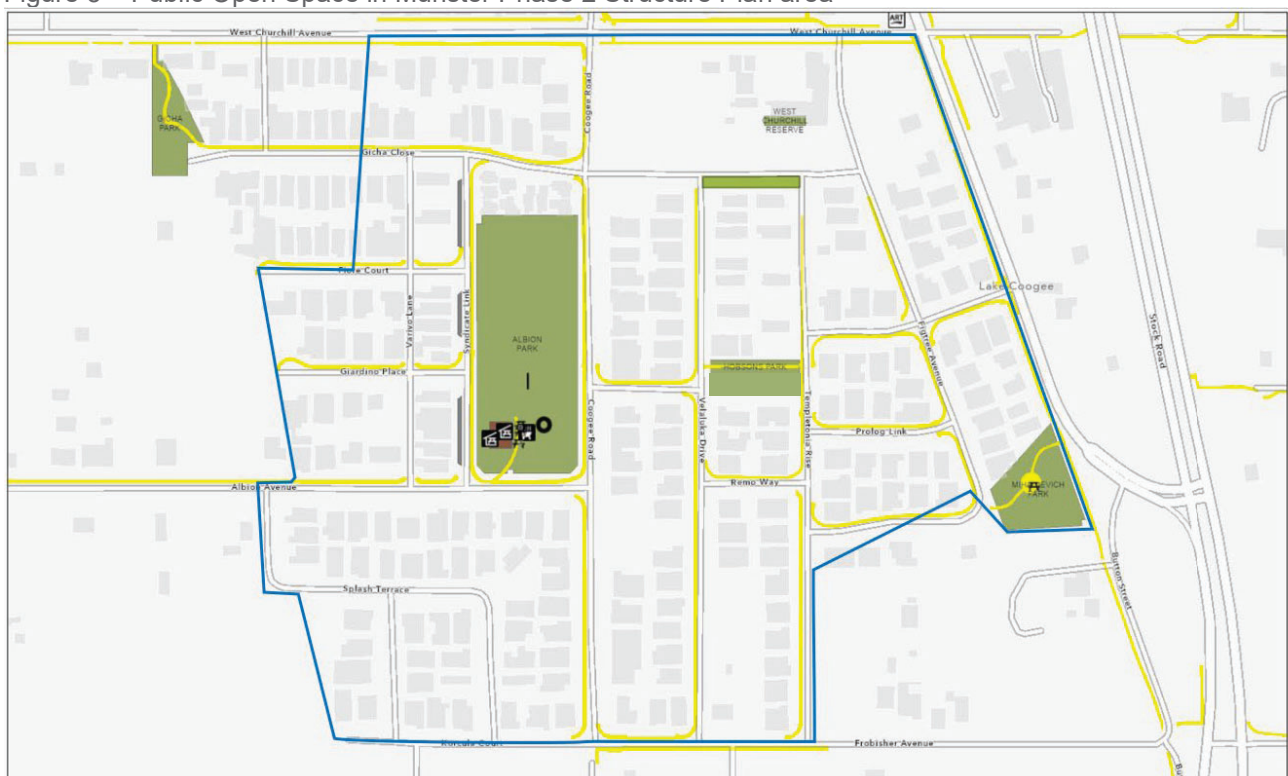


Table 4 – Public Open Space provision – structure plan amendment area

Lot	Area	POS contribution*	Amendment
Pt-103	1.095	0.1095	0.1367
Pt-104	0.9345	0.0934	0.1016
Pt-1 (R52516)	0.0224	0.0224	0.0224
Total	2.1373	0.2254 (0.2029)	0.2607

*minimum provision, noting that 2,226sq.m is depicted on the structure plan map..

The structure plan amendment provides for 2,607sq.m of POS, which integrates the planned POS with the existing POS (West Churchill reserve) adjoining Pt-Lot 1 and with the linear POS created between Velaluka Drive and Templetonia Rise. This reconfiguration enhances the function and useability of the POS overall, retains access and frontage to road with the new loop linking Templetonia Rise and Figtree Drive and Velaluka Drive with the new cul-de-sac accessed from West Churchill Avenue.

A POS schedule for the structure plan area is set out in **Table 5**. There are no area reductions for stormwater drainage or any restricted POS, as noted in section 7.4 of the approved structure plan report. The stormwater management technical note indicates that no drainage needs to be managed in the structure plan amendment area POS. The POS schedule calculates there is a surplus POS in the structure plan area.

Table 5 – Public Open Space schedule – structure plan area

Structure Plan Area ha			21.7605ha
Less ha			
EPA Wetlands to be ceded	0		
Protected bushland sites	0		
Unrestricted POS sites not included in POS contribution	0		
Foreshore Reserves to be ceded	0		
Total		0	
Net Site Area ha			21.7605ha
Deductions			
Primary School	0		
Town Centres and Commercial	0		
Dedicated Drainage Reserve	0		
Transmission corridors	0		
Other	0		
Total Deductions		0	
Gross Subdivisible Area			21.7605ha
Public Open Space @ 10%			2.1760
Public Open Space Contribution			
May Comprise			
minimum 80% unrestricted POS	1.7408		
maximum 20% restricted POS	0.4352		
Unrestricted POS sites			
As Constructed			
Albion Park	1.4765		
Hobsons Park (excluding Hobsons Avenue road reserve)	0.0744		
Mihaljevich Park	0.3411		
Top of Lot 107 - R52522	0.0481		
West Churchill reserve	0.0224		
Sub-total		1.9625	9.018%
Planned			

Pt-103	0.1367		
Pt-104	0.1015		
		0.2382	1.09%
Unrestricted POS Total area		2.2007	10.11%
Restricted Use POS sites			
Restricted POS contribution			
Contributing POS			
Unrestricted POS	2.2007		
Restricted POS	0		
Total Contributing POS	2.2007		
Total POS provided		2.2007	
Surplus POS		0.0246	

A Landscape Concept Plan, at **Appendix E**, has been prepared for all the POS areas and shows how the consolidated POS areas could be improved, including provision for the retention and management of the limestone wall and ruins. The creation of the new POS areas and the implementation of the landscaping plans is subject to subsequent stages of subdivision and development and arrangements with the City.

The structure plan amendment provides for the POS to be developed in two stages, at the time of subdivision or development of Lot 103 and Lot 104.

A water licence application was made to Department Water and Environmental Regulation (application reference 066267) to access 1,500kL of non-artesian well groundwater to irrigate the POS, this has subsequently been denied. Discussions between the proponent and the City of Cockburn in early 2025 have occurred regarding utilisation of the City's water licence allocation for the POS. The City has identified that there is approximately 2000kL available and have confirmed they are willing to enter into an agreement with the proponent in this regard. A formal agreement has yet to be entered into however conversations are ongoing in relation to the POS outcomes.

3.4. STORMWATER MANAGEMENT

A Stormwater Management Technical Note, at **Appendix B**, has been prepared by JDA Pty Ltd to assess the structure plan amendment change to the Drainage Strategy Report appended to the Structure Plan.

The Technical Note identifies that the structure plan amendment will not adversely impact on existing drainage infrastructure, and further detail will be presented as part of the subdivision process in an Urban Water Management Plan. The suitability of this approach was confirmed by the City of Cockburn during the preparation of the structure plan amendment. There is no identified need for additional drainage basins in the structure plan amendment POS area.

3.5. HERITAGE WALL AND RUINS

The structural integrity of the Limestone Wall and Ruins, located on Lot 103, was considered by At Van Der Meer Pty Ltd structural engineer, at **Appendix C**, to assess the condition and structural integrity to identify opportunities for retention. The assessment found that the wall measured up to 1.8m high and building ruins up to 1m high. Both the limestone wall and building ruins are considered structurally stable and capable of withstanding prescribed wind load in the area and should remain in safe condition for at least 50 years.

The structure plan amendment includes provision for the retention of the limestone wall and ruins to be protected and embellished at the time of Lot 103 is subdivided or developed.

3.6. ACOUSTIC CONSIDERATIONS

A Noise Management Plan has been prepared, in accordance with SPP 5.4, attached at **Appendix D**. The Noise Management Plan concluded that the noise received from future traffic on Stock Road is not forecast to exceed external noise criteria, therefore, 'Quiet House Design' is not required for single or two storey houses.

3.7. BUSHFIRE ATTACK LEVEL ASSESSMENT

A Bushfire Attack Level (BAL) Assessment and Certificate has been prepared, in accordance with SPP 3.7, attached at **Appendix F**. The BAL assessment determined that the BAL risk for Low and no specific construction requirements are necessary for future development.

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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.

APPENDIX A

TRANSPORT IMPACT ASSESSMENT

PTG/00518

Transport Impact Assessment 645 Rockingham Road, Lake Coogee - Proposed Local Structure Plan Amendment

26th August 2024 | Revision B

Prepared for Otherside Property

CONTENTS

REPORT DETAILS	4
1 Introduction	5
1.1 Background	5
2 Structure Plan Proposal	6
2.1 Regional Context	6
2.2 Proposed Land Uses	7
2.3 Table of Land Uses and Quantities	8
2.3.1 Comparison with Existing Local Structure Plan	8
2.4 Major Attractors/Generators	8
2.5 Specific Issues	9
3 Existing Situation	10
3.1 Existing Land Uses Within Structure Plan	10
3.2 Existing Land Uses Within 800 Metres of Structure Plan Area	10
3.3 Existing Road Network Within Structure Plan Area	11
3.4 Existing Pedestrian/Cycle Networks Within Structure Plan Area	11
3.5 Existing Public Transport Services Within Structure Plan Area	11
3.6 Existing Road Network Within 2 (or 5) km of Structure Plan Area	11
3.7 Traffic Flows on Roads Within Structure Plan Area (AM and/or PM Peak Hours)	13
3.8 Traffic Flows on Roads Within 2 (or 5) km Of Structure Plan Area (AM and/or PM Peak Hours)	14
3.9 Existing Pedestrian/Cycle Networks Within 800m of Structure Plan Area	15
3.10 Existing Public Transport Services Within 800m of Structure Plan Area	15
4 Proposed Internal Transport Networks	17
4.1 Changes/Additions to Existing Road Network or Proposed New Road Network	17
4.2 Road Reservation Widths	17
4.3 Road Cross-Sections & Speed Limits	17
4.4 Intersection Controls	19
4.5 Pedestrian/Cycle Networks and Crossing Facilities	19
4.6 Public Transport Routes	19
5 Changes to External Transport Networks	20
5.1 Road Network	20
5.2 Pedestrian/Cycle Networks and Crossing Facilities	20
5.3 Public Transport Services	20
6 Intergration with Surrounding Area	21
6.1 Trip Attractors/Generators Within 800 Metres	21
6.2 Proposed Changes to Land Uses Within 800 Metres	21
6.3 Travel Desire Lines from Structure Plan to These Attractors/Generators	22
6.4 Adequacy and Deficiencies of the External Transport Networks	22
7 Analysis of Internal Transport Networks	23
7.1 Assessment Year(s) and Time Period(s)	23
7.2 Structure Plan Generated Traffic	23
7.2.1 Trip Generation Comparison with the Existing Local Structure Plan	24
7.3 Extraneous (Through) Traffic	25

CONTENTS

7.4 Design Traffic Flows	26
7.5 Road Cross-Sections	27
7.6 Access Strategy	27
7.7 Pedestrian/Cycle Networks.....	28
7.8 Safe Routes to Schools.....	28
7.9 Pedestrian Permeability & Efficiency	28
7.10 Access To Public Transport	28
8 Analysis of External Transport networks.....	29
8.1 Extent of Analysis	29
8.2 Base Flows for Assessment Year(s).....	29
8.3 Total Traffic Flows	29
8.4 Road Cross-Sections	29
8.5 Intersection Layouts & Controls.....	29
8.6 Pedestrian/Cycle Networks.....	29
9 Summary and Conclusions	30
Appendix A – WAPC Checklist.....	32
Appendix B – Concept Local Structure Plan	34

REPORT DETAILS

Unique Document Identification

Document Title	Transport Impact Assessment – 645 Rockingham Road, Lake Coogee – Proposed Local Structure Plan Amendment
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Client	Otherside Property

PTG Consulting Office Details

Location	Perth
Telephone	0412 138 963
Email	Ray.cook@ptgconsulting.com.au

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Document Approval

Author

Nuary Coloma/Edmond Hoang

Approved By

Sam Laybutt

1 INTRODUCTION

1.1 Background

PTG Consulting WA (PTG) has been commissioned by **Otherside Property** to prepare a Transport Impact Assessment (TIA) for the proposed amendment to the Munster – Phase 2 Local Structure Plan (the LSP) approved by the Western Australian Planning Commission (WAPC) in February 2010.

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

Specifically, this report aims to assess the operations of the proposed LSP amendment internally and its connections to the adjacent road network, with a focus on traffic volumes, access and accessibility.

This report also outlines the requirements and opportunities associated with traffic and transport within the development, referencing relevant Council and WAPC policies and guidelines as well as best-practice planning within Western Australia.

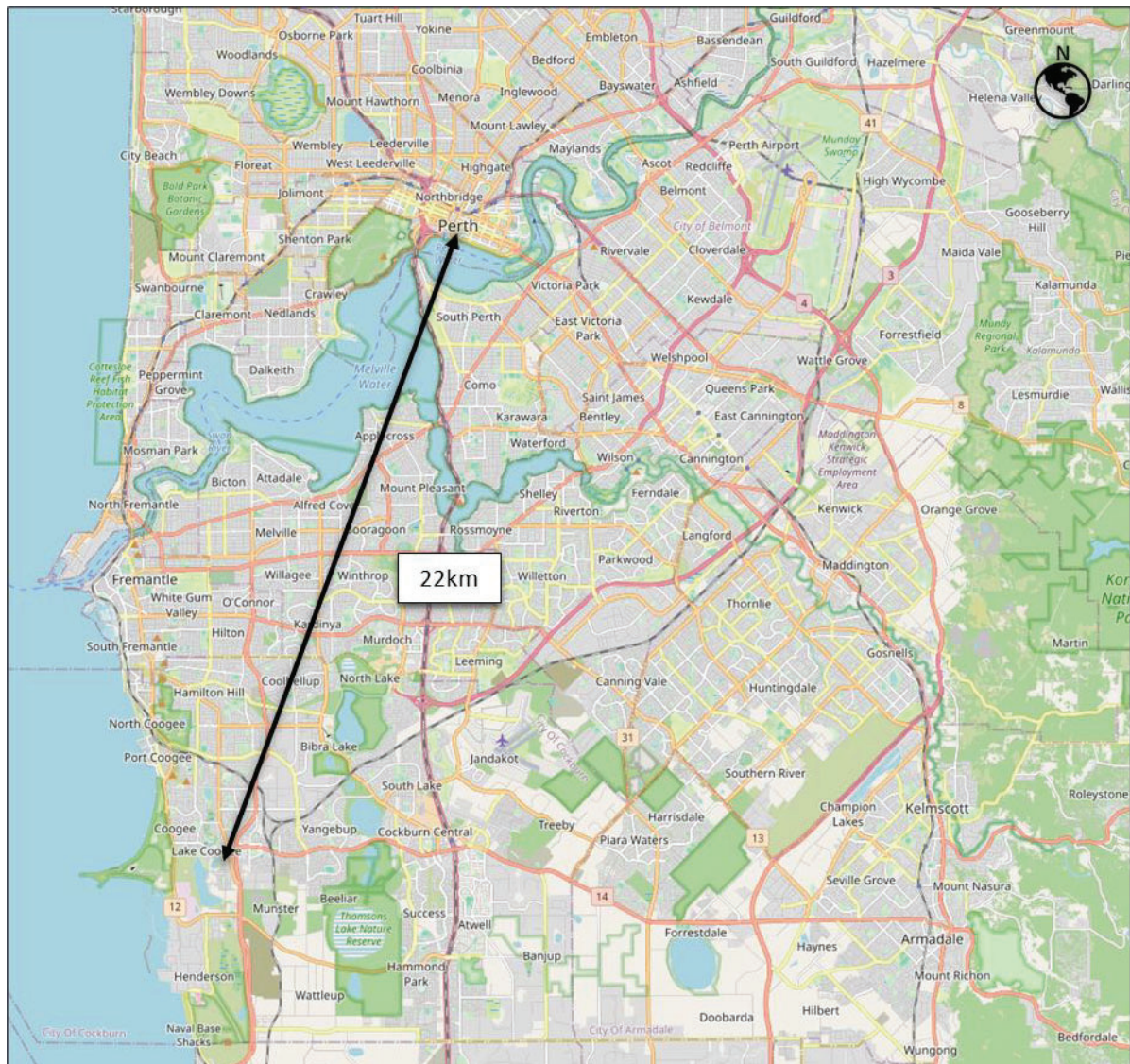
2 STRUCTURE PLAN PROPOSAL

2.1 Regional Context

The LSP area is located in the suburb of Lake Coogee, part of the City of Cockburn, situated in the southern suburbs of Perth, approximately 22 kilometres from the Perth CBD, as shown in **Figure 1**.

The suburb is primarily residential, with some additional light industrial and commercial areas towards the south. It is well connected to the Perth, Fremantle and Rockingham via the existing road network.

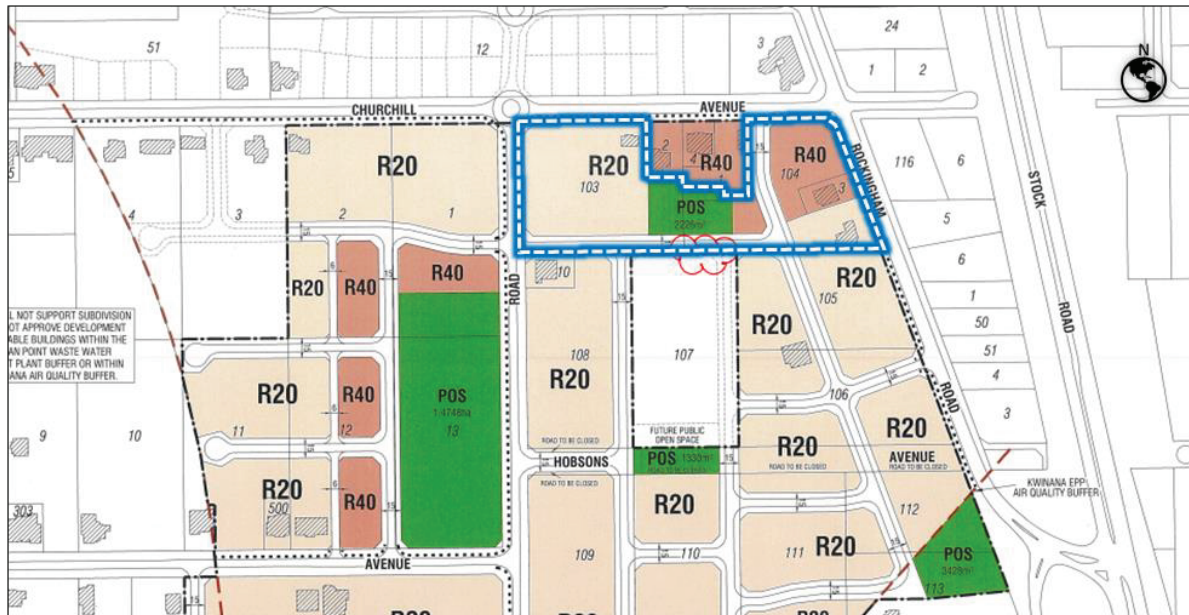
Figure 1 Regional Location



2.2 Proposed Land Uses

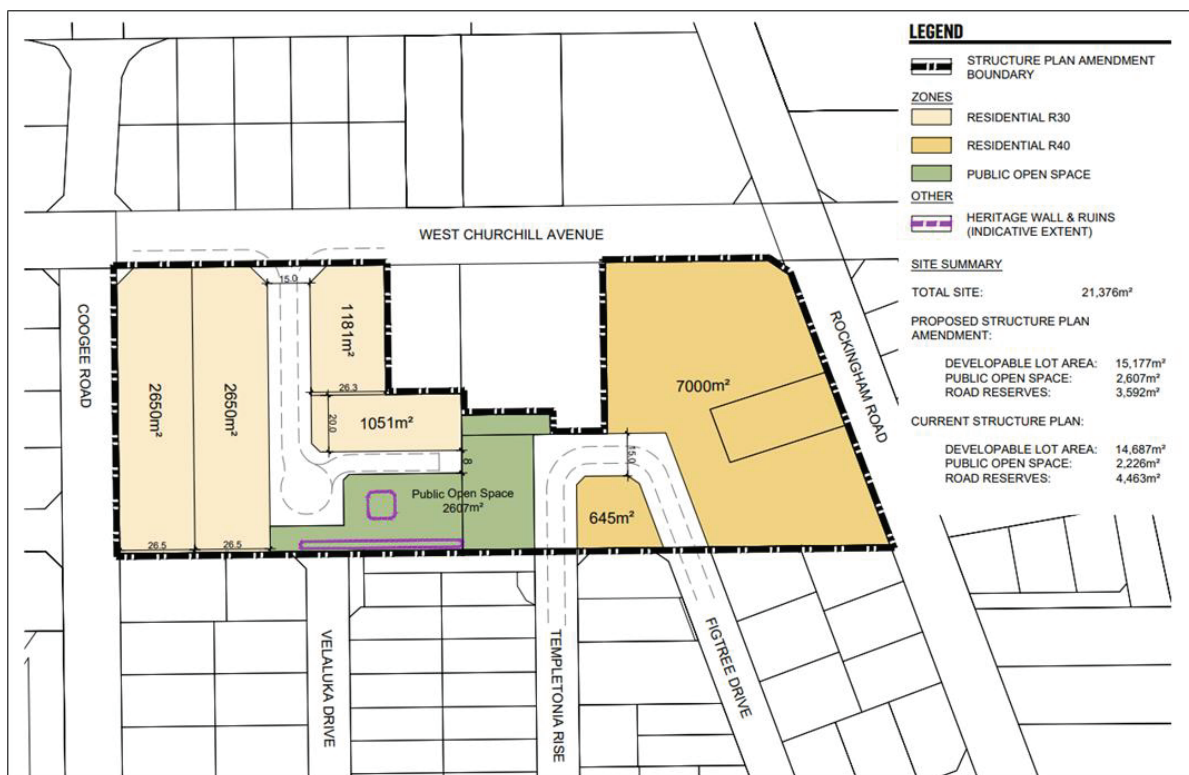
The proposed LSP amendment contemplates changes to the area shown in blue on Figure 2 below, with the proposed new LSP shown in Figure 3.

Figure 2 Existing Structure Plan – Munster Phase 2



Source: Urban Focus

Figure 3 Proposed Structure Plan Amendment Area



Source: Urbis

2.3 Table of Land Uses and Quantities

Table 1 provides a summary of the proposed land use yields within the amendment area.

Table 1 Land Uses

Land Uses	Yield
Residential (R30)	7,532 m ²
Residential (R40)	7,645 m ²
Public Open Space	2,607 m ²
Total	17,784 m ²

2.3.1 Comparison with Existing Local Structure Plan

The principal changes compared to the existing LSP include:

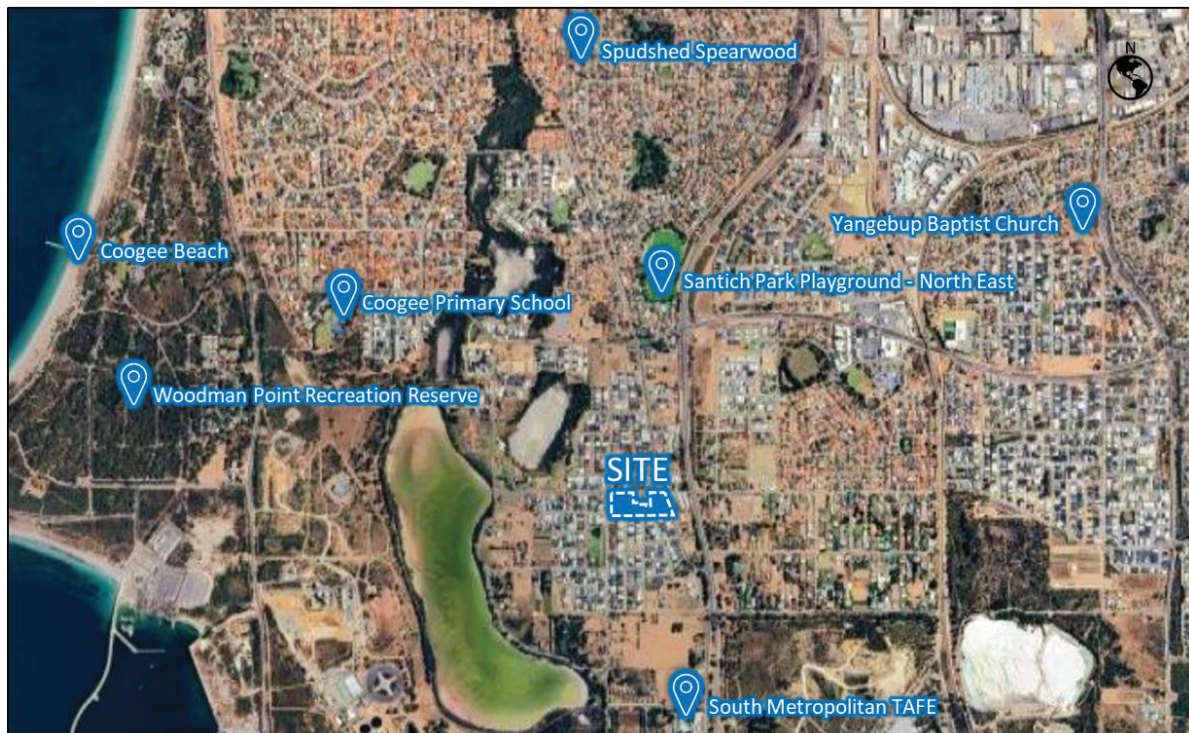
- » Increase in estimated dwelling yield from 44 to 60 based on changes to zoning.
- » Repositioning of the Public Open Space (POS).
- » Modifications to the internal road network, as follows:
 - The east-west access street along the southern boundary of the LSP Amendment area is deleted;
 - Velaluka Drive ends at the existing cul-de-sac and is not extended into the LSP Amendment area;
 - Figtree Avenue and Templetonia Rise are extended into the LSP Amendment area and connected together to form a loop road;
 - The extension of Figtree Avenue north to West Churchill Avenue is deleted; and
 - A new internal cul-de-sac access road extends south from West Churchill Avenue to the POS.

2.4 Major Attractors/Generators

Major attractors and generators within the surrounding area are shown in Figure 4 and listed below:

- » Coogee Beach
- » Woodman Point Recreation Reserve
- » Santich Park Playground
- » Spudshed Spearwood
- » Coogee Primary School
- » South Metropolitan TAFE
- » Yangebup Baptist Church

Figure 4 Major Attractors/Generators within the Surrounding Area



Source: Google Maps

2.5 Specific Issues

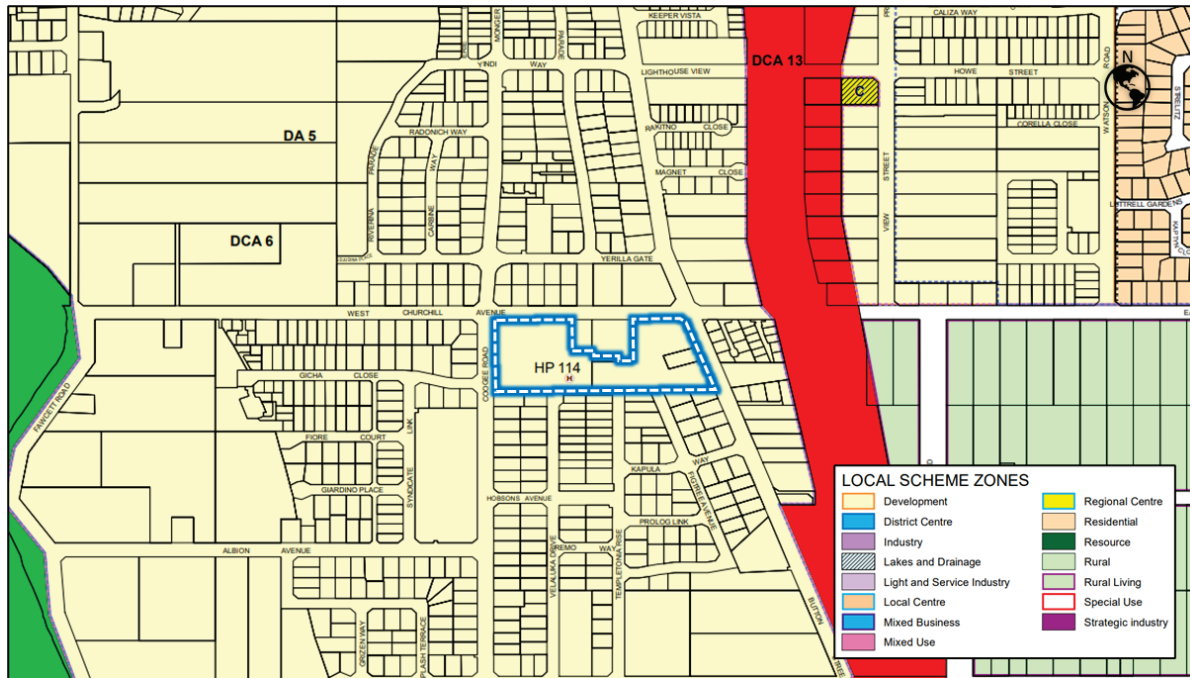
No specific issues are noted directly related to the LSP site.

3 EXISTING SITUATION

3.1 Existing Land Uses Within Structure Plan

According to the City of Cockburn planning information, the amendment area and its immediate surroundings are currently zoned as 'Development,' as shown in **Figure 5**.

Figure 5 Existing Land Use

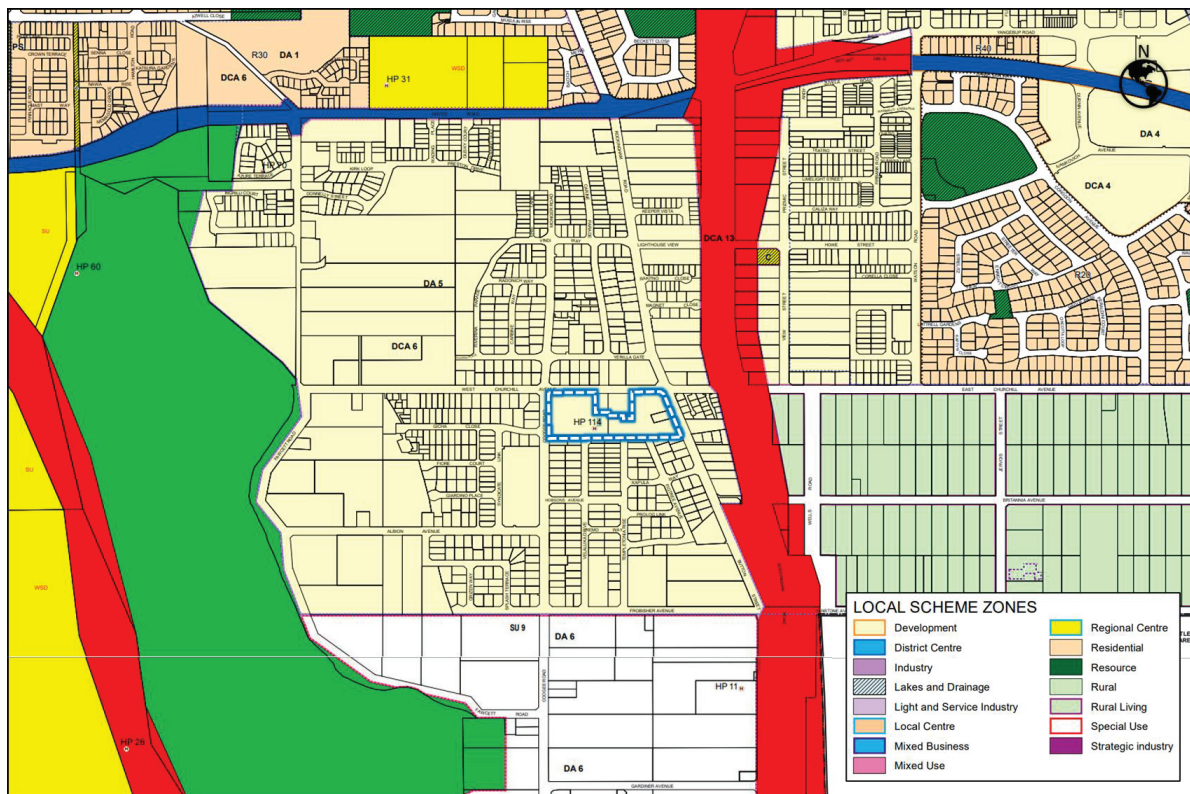


Source: City of Cockburn Town Planning Scheme No. 3

3.2 Existing Land Uses Within 800 Metres of Structure Plan Area

The surrounding area of the site consists of Special Use area to the south, Development and Rural to the east, Development and Residential to the north, and Parks and Recreation to the west as shown in **Figure 6**.

Figure 6 Existing Land Use – 800 metres



Source: City of Cockburn Town Planning Scheme No. 3

3.3 Existing Road Network Within Structure Plan Area

The amendment area is currently mostly vacant with a few residential properties that front the external roads. As a result, there is no internal road network within the LSP Amendment area.

3.4 Existing Pedestrian/Cycle Networks Within Structure Plan Area

The amendment area is currently mostly vacant with a few residential properties that front the roads. As a result, there is no existing pedestrian/cycle networks within the LSP Amendment area..

3.5 Existing Public Transport Services Within Structure Plan Area

The amendment area is currently mostly vacant with a few residential properties that front the roads. As a result, there is no existing public transport network within the LSP Amendment area.

3.6 Existing Road Network Within 2 (or 5) km of Structure Plan Area

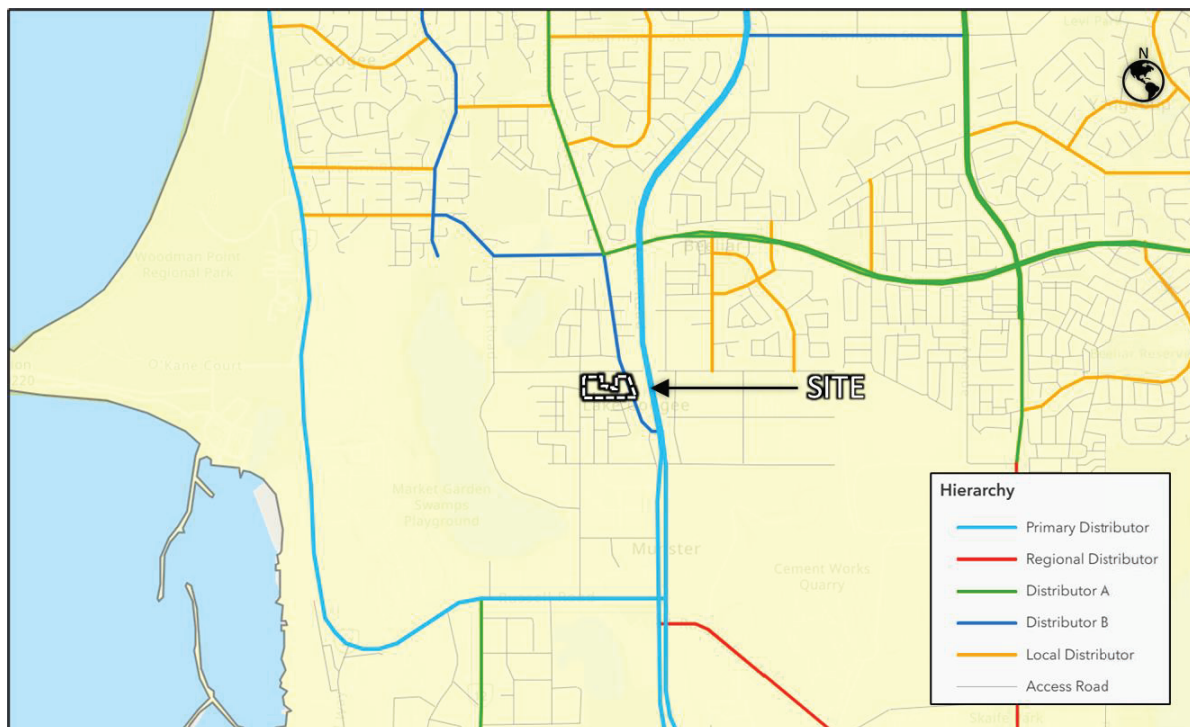
The road network within Western Australia is defined by Main Roads WA road hierarchy which describes the function, characteristic and management of each type of road. A description of each road type as per Main Roads WA Road Hierarchy criteria is summarised in Table 2 below.

Table 2 Road Hierarchy Description

Road Type	Description
Primary Distributors	Provide for major regional and inter-regional traffic movement and carry large volumes of generally fast moving traffic. Some are strategic freight routes, and all are State Roads. They are managed by Main Roads Western Australia.
District Distributor A	Carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by local government.
District Distributor B	Perform a similar function to type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by local government.
Regional Distributor	Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by local government.
Local Distributor (Urban)	Roads that carry traffic within a cell and link District Distributors or Regional Distributors at the boundary, to access roads. The route of Local Distributors should discourage through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. Urban Local Distributor roads are managed by local government.
Local Distributor (Rural)	Connect to other Rural Distributors and to Rural Access Roads. Not Regional Distributors, but which are designed for efficient movement of people and goods within regional areas. Rural Local Distributor roads are managed by local government.
Access Roads	Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by local government.

Figure 7 shows the road hierarchy network and Table 3 provides a summary of the road characteristics of the surrounding road network.

Figure 7 Road Hierarchy



Source: MRWA Road Information Mapping

Table 3 Existing Road Network

Road Name	Hierarchy	Lanes	Footpaths	Width (m)	Speed Limit (km/h)
Stock Road	Primary Distributor	4	-	21	70-90
Rockingham Road (north of Beeliar Drive)	Distributor A	2	2	7	60
Rockingham Road (south of Beeliar Drive)	Distributor B	2	2	7	60
West Churchill Avenue	Access Road	2	2	7.5	50
Coogee Road	Access Road	2	1	7.5	50
Templetonia Rise	Access Road	2	1	6	50
Figtree Avenue	Access Road	2	1	6	50
Velaluka Drive	Access Road	2	1	6	50

Source: MRWA Road Information Mapping

3.7 Traffic Flows on Roads Within Structure Plan Area (AM and/or PM Peak Hours)

There are no existing internal roads within the LSP area.

3.8 Traffic Flows on Roads Within 2 (or 5) km Of Structure Plan Area (AM and/or PM Peak Hours)

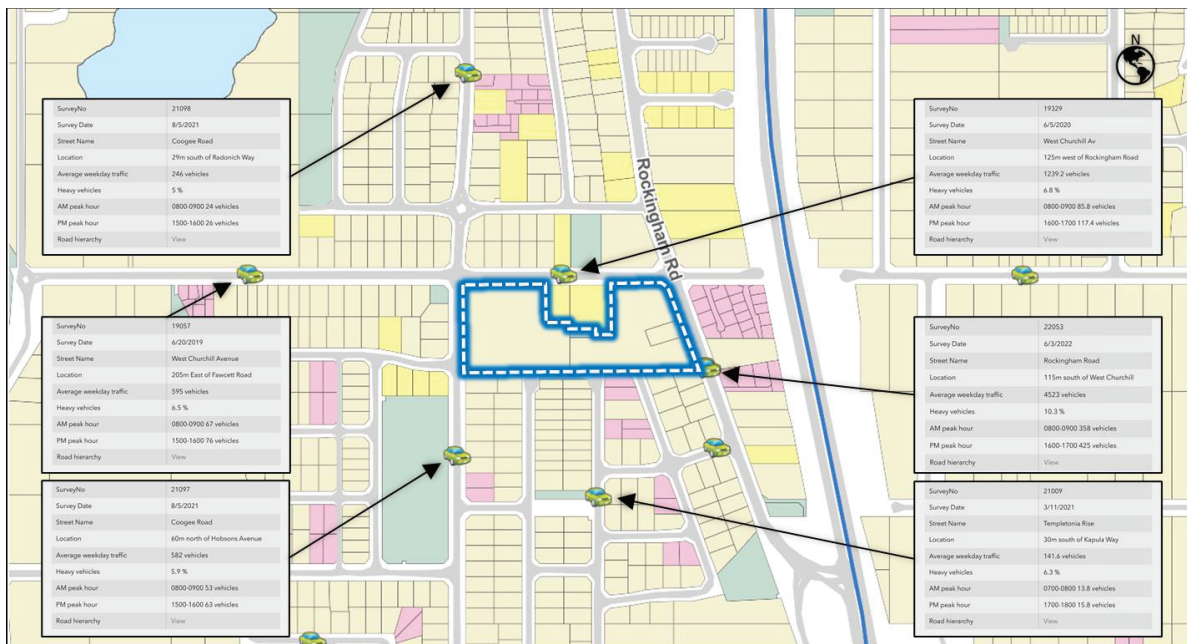
Existing traffic volumes were sourced from City of Cockburn and are summarised in Table 4 and illustrated in Figure 8.

Table 4 Existing Traffic Volumes

Road Name	Year	Weekday (HV%)	AM Peak Hour	PM Peak Hour
West Churchill Avenue (125m west of Rockingham Rd)	2020	1,239 (6.8%)	86	117
Coogee Road (60m north of Hobsons Ave)	2021	582 (5.9%)	53	63
Rockingham Road (115m south of West Churchill Ave)	2022	4,523 (10.3%)	358	425
Templetonia Rise (30m south of Kapula Way)	2021	142 (6.3%)	14	16

Source: City of Cockburn Maps

Figure 8 Existing Traffic Volumes

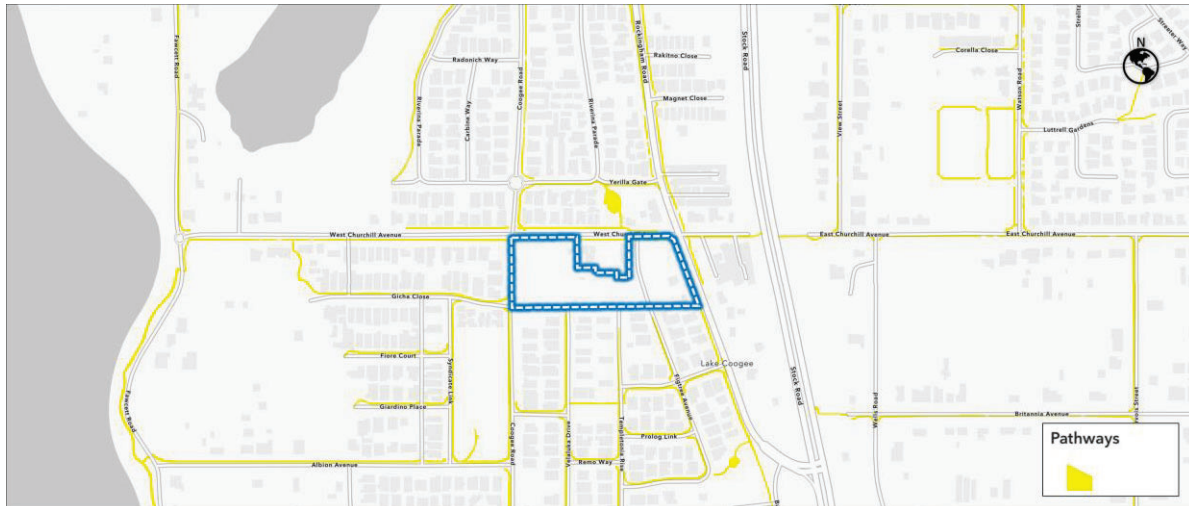


Source: City of Cockburn Maps

3.9 Existing Pedestrian/Cycle Networks Within 800m of Structure Plan Area

The pedestrian and cycling network within the surrounding area is well connected as shown in Figure 9.

Figure 9 Existing Pedestrian/Cycle Network



Source: City of Cockburn Maps

3.10 Existing Public Transport Services Within 800m of Structure Plan Area

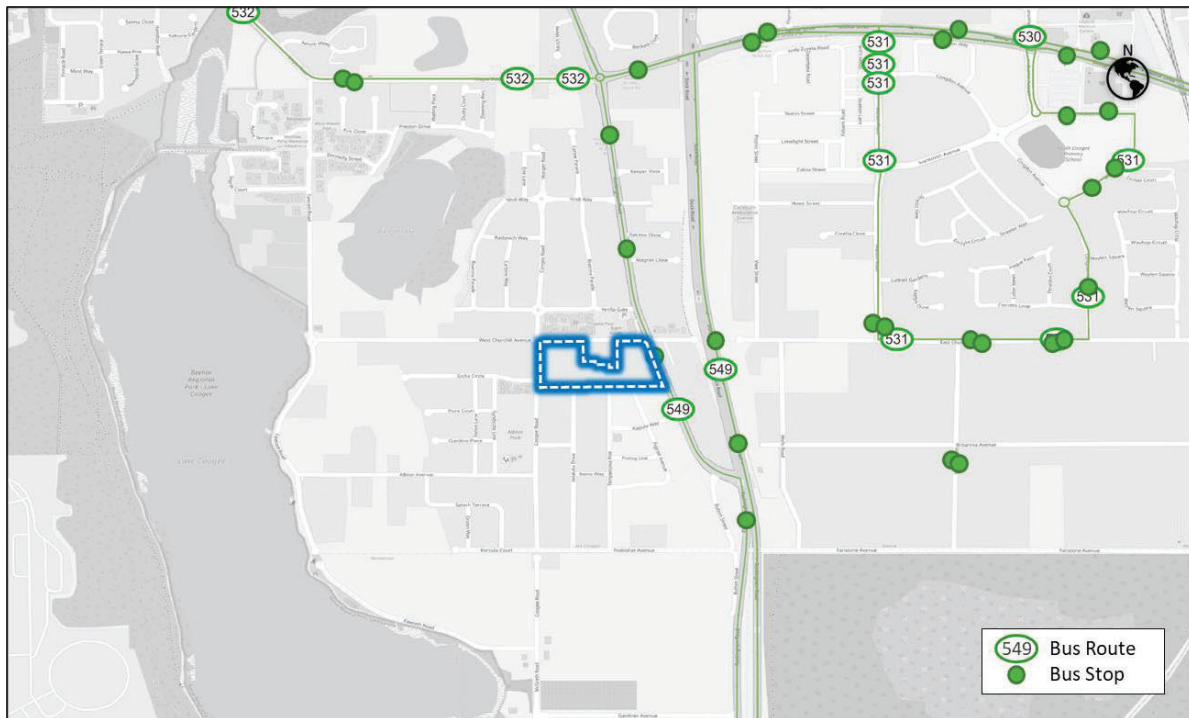
Bus Route 549 operates along Rockingham Road, which forms the eastern boundary of the amendment area. Additionally, there is a bus stop located at this boundary. The nearest bus routes and stops are illustrated in Figure 10.

Presently, this service only operates in the northbound direction along Rockingham Road, with southbound buses using Stock Road.

Table 5 Bus Route Description and Frequency

Bus Route	Route Description	Weekday Frequency	Saturday Frequency	Sunday and Public Holiday Frequency
549	Fremantle Stn - Rockingham Stn via Rockingham Rd & Kwinana Town Centre	10 -60 mins	30 - 60 mins	30 - 60 mins

Figure 10 Existing Public Transport



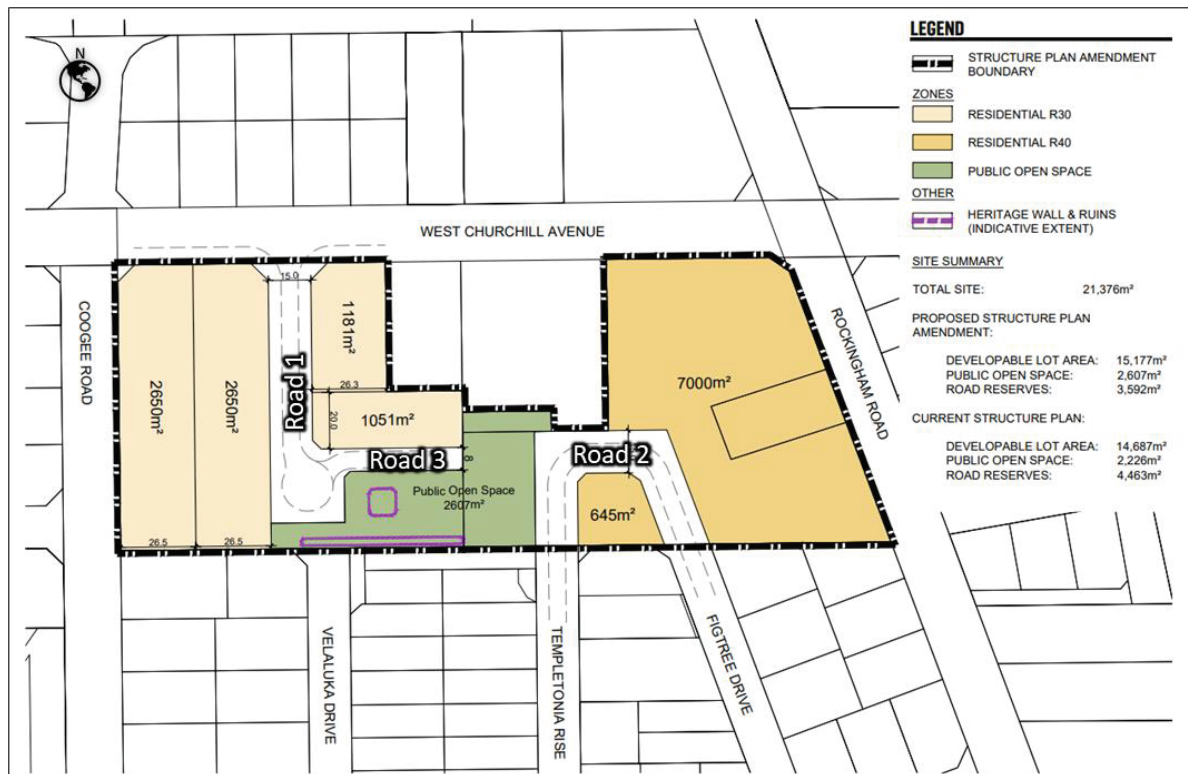
Source: Transperth

4 PROPOSED INTERNAL TRANSPORT NETWORKS

4.1 Changes/Additions to Existing Road Network or Proposed New Road Network

All roads within the amendment area will be newly constructed and classified as Access Roads, as shown in Figure 11. This includes Road 1, an access road perpendicular to West Churchill Avenue, Road 2, the extensions of both Templetonia Rise and Figtree Avenue that will form a loop, and Road 3, an access road perpendicular to Road 1.

Figure 11 Proposed Structure Plan Amendment Road Network



Source: Urbis

4.2 Road Reservation Widths

Roads 1 and 2 are indicated to be 15m wide, corresponding to an Access Street D in Liveable Neighbourhoods.

Road 3 is indicated to be 8m wide, functioning as a laneway to provide access to potential lots fronting the POS.

4.3 Road Cross-Sections & Speed Limits

Indicative cross sections for the proposed internal roads are shown in Figure 12 through to Figure 14.

All internal roads are anticipated to be subject to the default built-up area speed limit of 50km/h.

Figure 12 Indicative Cross Section – Road 1



Source: Streetmix

Figure 13 Indicative Cross Section – Road 2



Source: Streetmix

Figure 14 Indicative Cross Section – Road 3



Source: Streetmix

4.4 Intersection Controls

One new intersection will be created at West Churchill Avenue / Road 1. This intersection will be priority-controlled.

4.5 Pedestrian/Cycle Networks and Crossing Facilities

The pedestrian and cycle network will be determined later in the detail design or subdivision stage. Provision has been made in the road reserves for a footpath on at least one side of each internal road. Path links will also be provided through the POS to provide connectivity between Road 1, Road 2 and Road 3.

4.6 Public Transport Routes

There are no public transport routes planned within the amendment area or the LSP.

5 CHANGES TO EXTERNAL TRANSPORT NETWORKS

5.1 Road Network

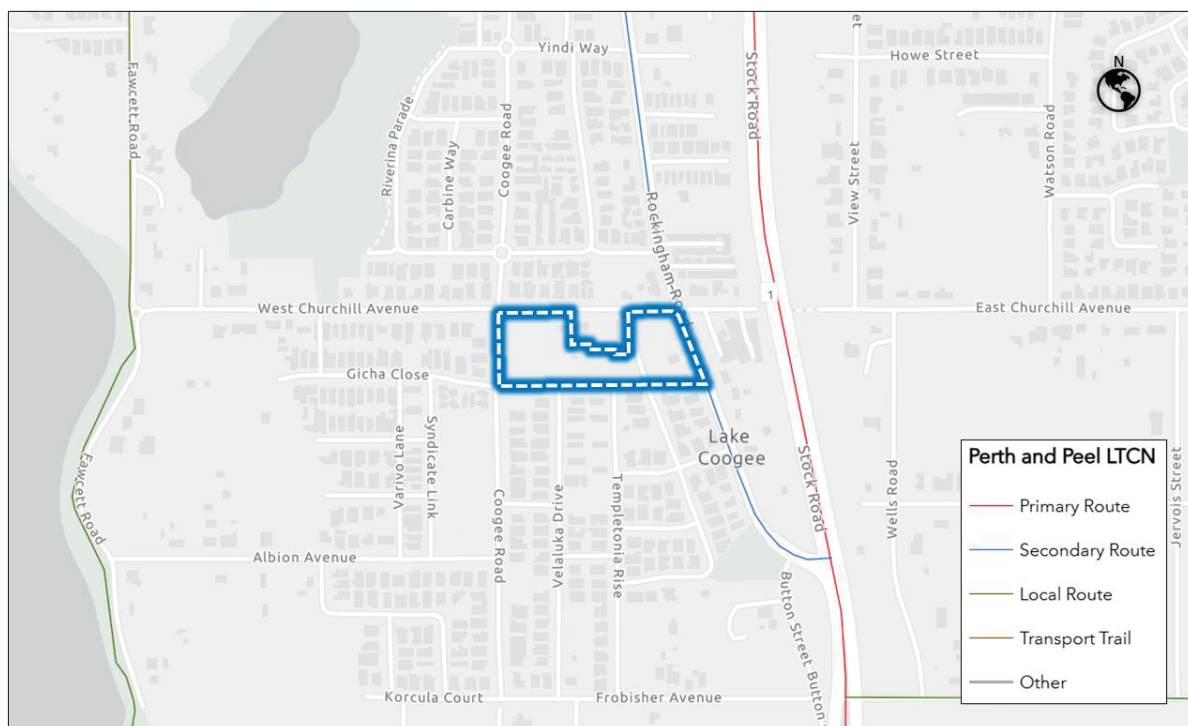
There are no planned changes to the road network within the area surrounding the Site.

5.2 Pedestrian/Cycle Networks and Crossing Facilities

Figure 15 shows the Department of Transport's aspirational future cycling network within the Perth metro region. The map shows the proposed cycle route hierarchy for the roads surrounding the LSP which is summarised below.

- » Stock Road - Primary Route
- » Rockingham Road - Secondary Route
- » Fawcett Road - Local Route

Figure 15 Perth and Peel Long-Term Cycle Network



Source: Department of Transport Long Term Cycle Network for Perth

5.3 Public Transport Services

The Public Transport Authority (PTA) were contacted who mentioned that there were no short to medium term changes to bus routes proposed.

6 INTEGRATION WITH SURROUNDING AREA

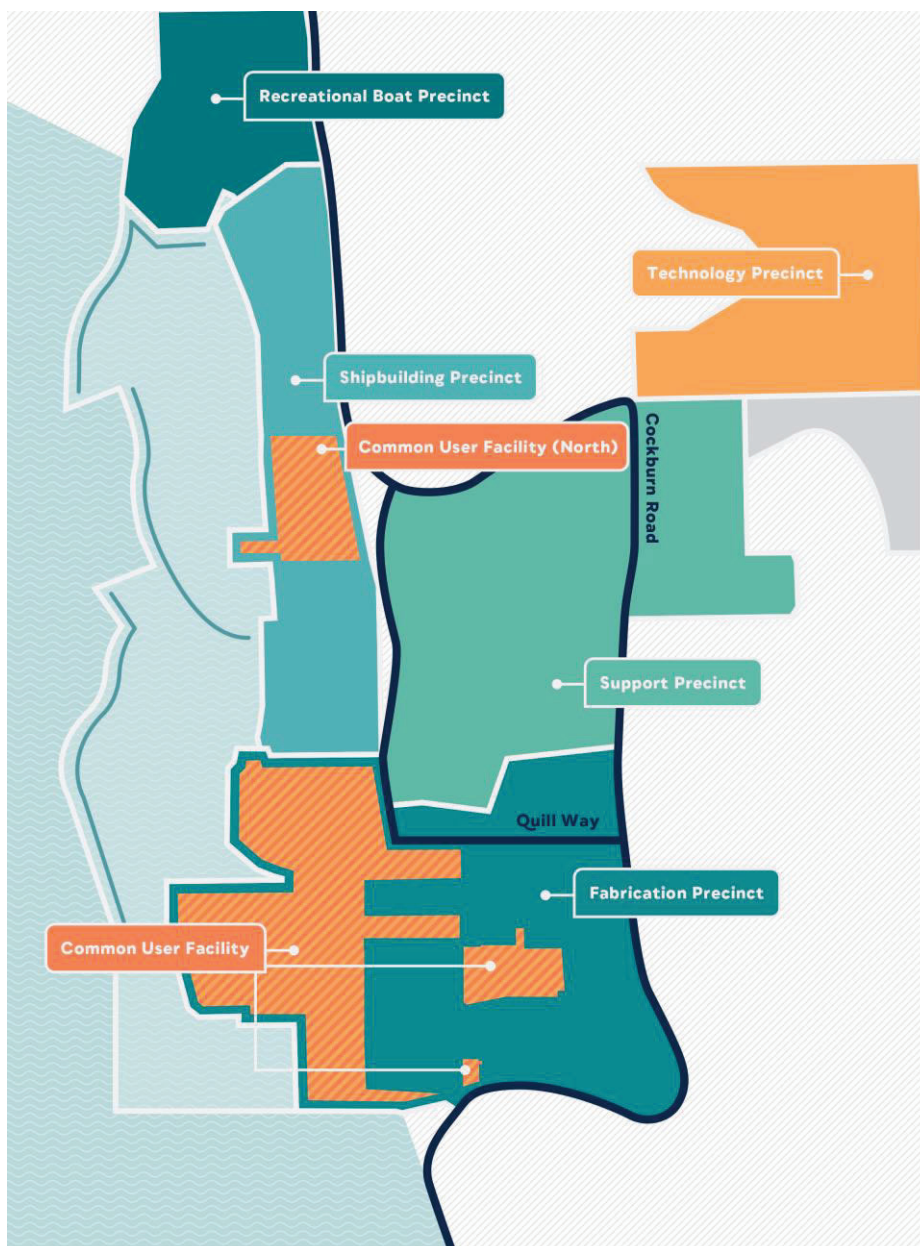
6.1 Trip Attractors/Generators Within 800 Metres

The LSP is located within a primarily residential area. Trip attractors within 800m indicate Lake Coogee, a passive recreational reserve, and the Australian Marine Complex (AMC) Technology Precinct to the south.

6.2 Proposed Changes to Land Uses Within 800 Metres

The AMC Technology Precinct is located approximately 500m south of the LSP. The majority of the Precinct is currently undeveloped, however a Structure Plan is in place to guide future development of the area to support the operations of the AMC. The location of the Technology Precinct in the context of the overall AMC is shown in Figure 16.

Figure 16 AMC Precincts



Source: Development WA

6.3 Travel Desire Lines from Structure Plan to These Attractors/Generators

Under the current road network arrangement, the main travel desire lines will be via West Churchill Avenue and Rockingham Road to reach the wider road network.

Currently there is no vehicular access from Coogee Road to the AMC Technology Precinct, however this may change in the future and provide convenient access for residents to services and employment within the Precinct.

6.4 Adequacy and Deficiencies of the External Transport Networks

The external transport is considered adequate to accommodate the proposed LSP Amendment.

7 ANALYSIS OF INTERNAL TRANSPORT NETWORKS

7.1 Assessment Year(s) and Time Period(s)

The assessment years adopted are as follows:

- » Year 2034 – Future year with LSP completed in its entirety, including amendment.

As per WAPC Transport Impact Assessment Guidelines for Structure Plans, the assessment will be undertaken only for the full build-out of the development. Peak times selected are 08:00 – 09:00 and 16:00pm – 17:00pm, which are the peak times of West Churchill Avenue and Rockingham Road intersections based on the traffic count data provided in the City of Cockburn Traffic Counts Map.

7.2 Structure Plan Generated Traffic

The trip generation rates for the subdivision were obtained from the following sources:

- » Roads and Maritime Services (RMS) TD2013/04a Guide to Traffic Generating Developments – Updated Traffic Surveys (trip generation rates)
- » Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition (trip distribution percentages).

The average site area per dwelling is 300m² for R30 and 220m² for R40. These figures were used in the calculation of the number of dwellings.

Table 6 shows the trip generation rates for the proposed land uses, **Table 7** shows the directional distribution and **Table 8** shows the total traffic generated by the amendment area.

Table 6 Trip Generation Rates

Land Use	Source	Yield	AM Peak	PM Peak	Daily
Residential R30	RMS	25 dwellings	0.95 trips/dwelling	0.99 trips/dwelling	10.7 trips/dwelling
Residential R40	RMS	35 dwellings	0.95 trips/dwelling	0.99 trips/dwelling	10.7 trips/dwelling

Table 7 Trip Distribution

Land Use	AM Peak		PM Peak		Daily	
	IN	OUT	IN	OUT	IN	OUT
Residential R30	26%	74%	64%	36%	50%	50%
Residential R40	26%	74%	64%	36%	50%	50%

Table 8 Total Trip Generation

Land Use	AM Peak		PM Peak		Daily	
	IN	OUT	IN	OUT	IN	OUT
Residential R30	6	18	16	9	134	134
Residential R40	9	25	22	12	187	187
Total	58		59		642	

The proposed LSP is estimated to generate approximately 58 vehicle trips in the AM peak period and 59 vehicle trips in the PM peak period.

As the trip generation associated with the LSP is less than 100 vehicle trips in the peak hour, it falls within the “moderate impact” range according to WAPC TIA guidelines and no detailed traffic analysis is warranted.

7.2.1 Trip Generation Comparison with the Existing Local Structure Plan

To provide a clearer understanding of the traffic impacts as a result of the proposed LSP amendment, a comparison of the traffic generated by the existing LSP and the proposed LSP amendment was conducted and summarised in **Table 9**.

Table 9 Total Trip Generation

Land Use	AM Peak		PM Peak		Daily	
	IN	OUT	IN	OUT	IN	OUT
Existing LSP	11	31	28	16	235	235
Proposed LSP	15	43	38	21	321	321
Net change	+4	+12	+10	+5	+86	+86
	16		15		192	

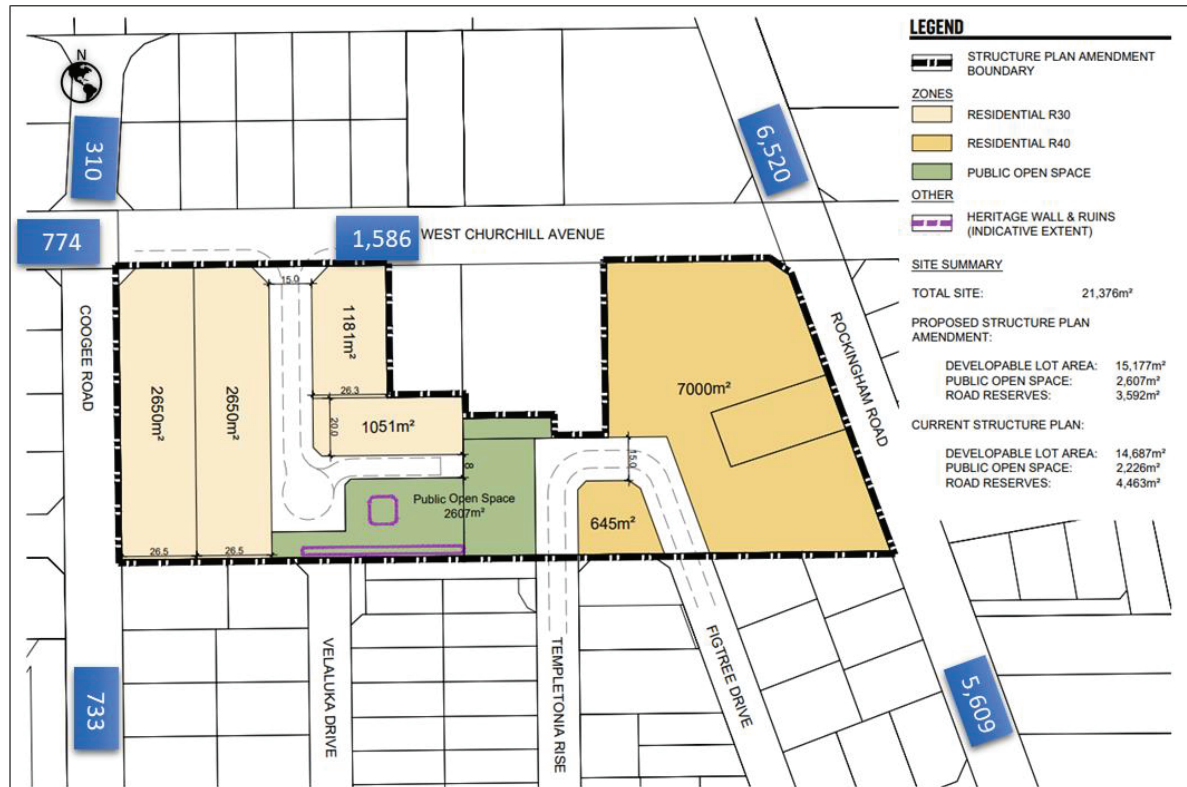
Overall, the amended LSP results in an additional 15-16 peak hour trips and approximately 171 daily trips, in comparison to the existing LSP. As the net trip generation associated with the LSP is less than 100 vehicle trips in the peak hour, it falls within the “moderate impact” range according to WAPC TIA guidelines and no detailed traffic analysis is warranted.

7.3 Extraneous (Through) Traffic

In order to project 2034 daily traffic volumes, an annual growth rate of 2% was applied to the through traffic sourced from City of Cockburn Traffic Counts Map. Refer to **Figure 17** for illustration.

Rockingham Road, north of West Churchill, does not have a count provided. The estimation is based on the count for Rockingham Road, south of West Churchill, plus the count for Yindi Way, west of Rockingham Road.

Figure 17 Daily Through Traffic – 2034



7.4 Design Traffic Flows

Figure 18 shows the development traffic while Figure 19 shows the total traffic flows generated by the structure plan amendment area throughout the network that is being assessed. The assumed distribution of the traffic volumes are as follows:

- » 2% to/from Coogee Road North
- » 6% to/from West Churchill West
- » 5% to/from Coogee Road South
- » 47% to/from Rockingham Road North
- » 40% to/from Rockingham Road South

All road sections remain within the capacity thresholds for the relevant road hierarchy.

Figure 18 Daily Development Traffic – 2034

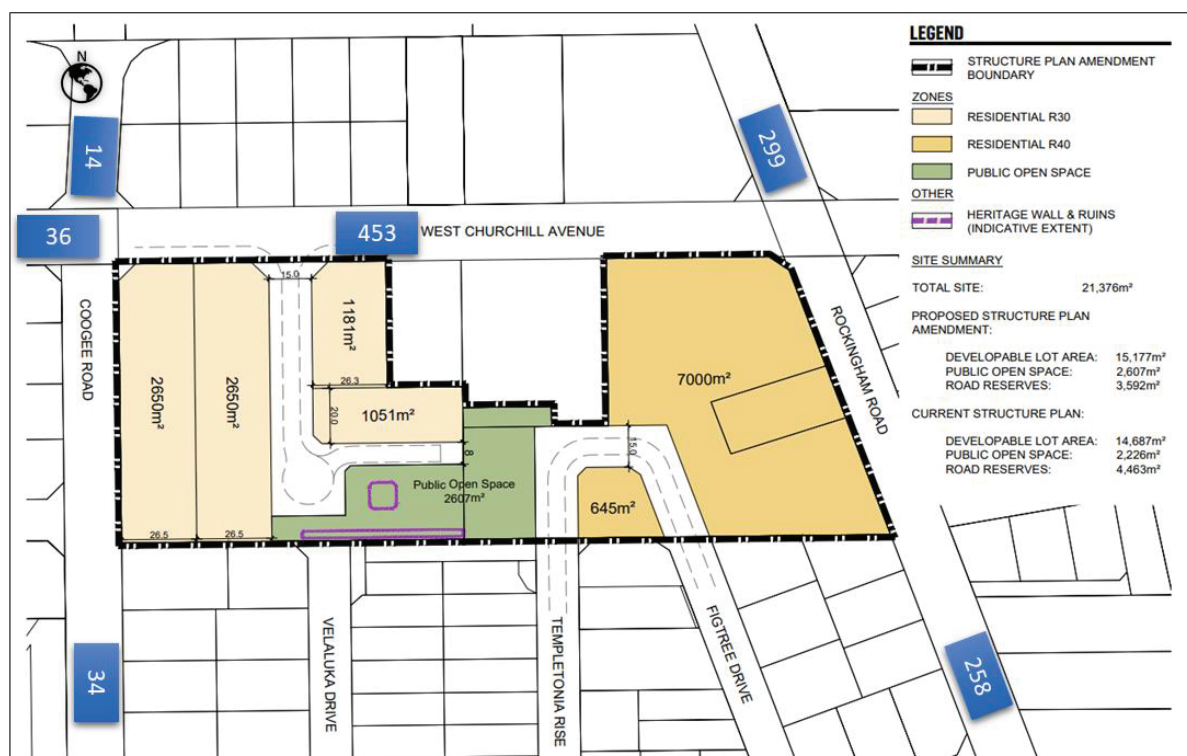
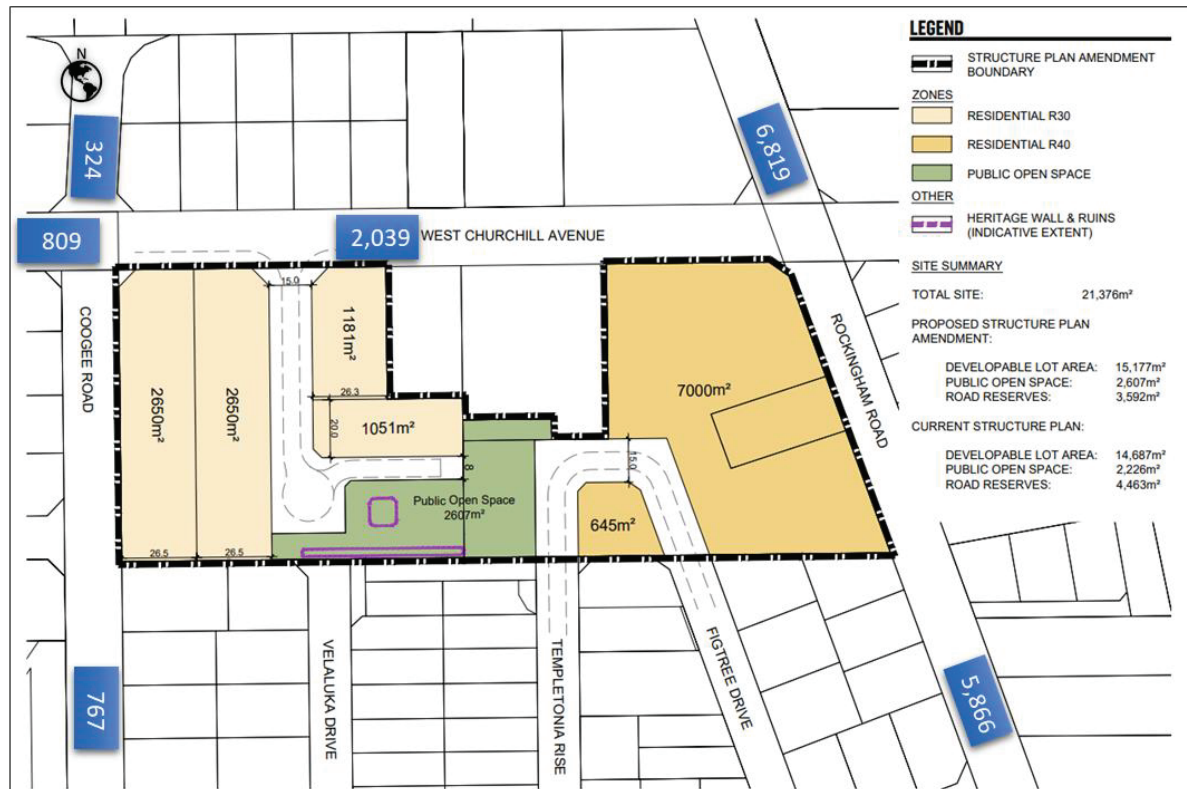


Figure 19 Daily Total Traffic – 2034



7.5 Road Cross-Sections

Section 4.3 discusses the indicative road cross sections based on Liveable Neighbourhoods guidelines.

7.6 Access Strategy

The LSP Amendment contemplates changes to the planned road network within the LSP. These changes can be summarised as follows:

- » The east-west access street along the southern boundary of the LSP Amendment area is deleted;
- » Velaluka Drive ends at the existing cul-de-sac and is not extended into the LSP Amendment area;
- » Figtree Avenue and Templetonia Rise are extended into the LSP Amendment area and connected together to form a loop road;
- » The extension of Figtree Avenue north to West Churchill Avenue is deleted; and
- » A new internal cul-de-sac access road extends south from West Churchill Avenue to the POS.

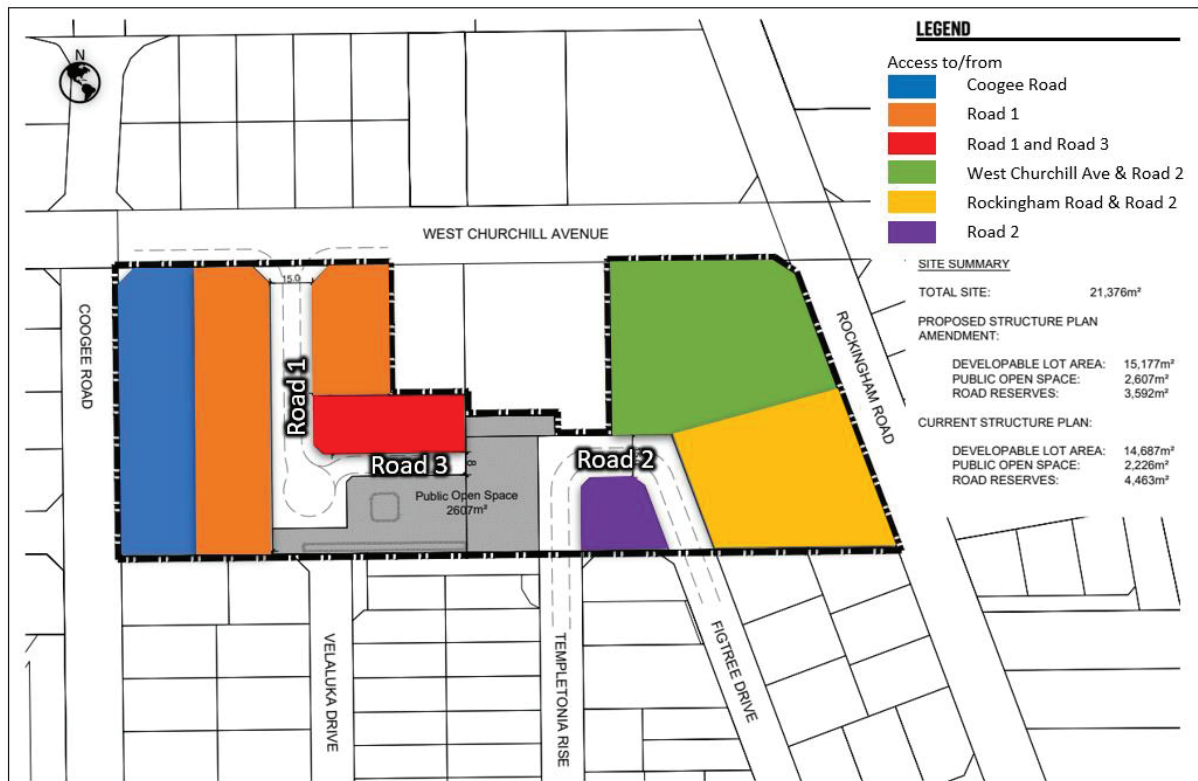
Overall, the proposed changes to the road network reduce the length of new road to be constructed and reduce the volume of traffic moving through the Site.

It is considered that the changes to the road network will have minimal impact on vehicular trips. Existing residents on Velaluka Drive, Templetonia Rise and Figtree Drive will see no change to their existing travel routes and minimal additional traffic using these streets.

Pedestrian connectivity between the existing residential areas and West Churchill Avenue will be provided via the POS, ensuring permeability for local walking and cycling journeys. It is likely that the R40 zoned area adjacent to Rockingham Road will have pedestrian access to Figtree Avenue for residents, ensuring convenient access to the POS.

An indicative access strategy is provided in Figure 20. It is noted that this is subject to future subdivision and development application processes. It is not proposed to implement access restrictions to any frontage road as part of the LSP.

Figure 20 Access Strategy



7.7 Pedestrian/Cycle Networks

As mentioned in Section 4.5, the pedestrian and cycle network will be determined later in the detail design or subdivision stage. The proposed pedestrian and cycle network should be consistent with the local character with sensible path connections both internally and externally.

7.8 Safe Routes to Schools

Not applicable as the proposed structure plan consists of only residential dwellings.

7.9 Pedestrian Permeability & Efficiency

The indicative path network is assumed to conform to the existing footpath layout along Templetonia Rise and Figtree Avenue.

7.10 Access To Public Transport

Not applicable as there are no public transport links or facilities within the proposed structure plan amendment area.

8 ANALYSIS OF EXTERNAL TRANSPORT NETWORKS

8.1 Extent of Analysis

A SIDRA assessment was not conducted because the volume of development traffic is below 100 vehicles per peak hour and is within the “moderate impact” range as per WAPC TIA guidelines. Given this relatively low traffic volume, it was determined that a detailed SIDRA analysis was not necessary to assess the impact on traffic flow and performance.

8.2 Base Flows for Assessment Year(s)

Not applicable as development traffic is less than 100 vehicles per peak hour.

8.3 Total Traffic Flows

Not applicable as development traffic is less than 100 vehicles per peak hour.

8.4 Road Cross-Sections

Not applicable as no changes are proposed to external transport networks.

8.5 Intersection Layouts & Controls

Not applicable as no changes are proposed to external transport networks.

8.6 Pedestrian/Cycle Networks

As volume of development traffic is fewer than 100 vehicles per peak hour, it is expected that there will be minimal to no impact on the surrounding pedestrian and cycle network.

9 SUMMARY AND CONCLUSIONS

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

The following conclusions can be drawn from this TIA:

- » The LSP amendment comprises of approximately 60 residential dwellings, with R30 and R40 zoning.
- » The LSP amendment is estimated to generate 58-59 peak hour trips and 642 daily trips. This represents a net increase of 15-16 peak hour trips and 192 daily trips compared to the existing LSP yield.
- » As the volume of traffic generated by the development is less than 100 peak hour vehicle trips, the impact is within the 'moderate' range as per WAPC TIA guidelines and no detailed traffic analysis is warranted.
- » The proposed changes to the internal road network are considered to have minimal impact on vehicle trips, while retaining pedestrian and cycling permeability for local journeys and access to the POS.
- » Public transport services in the vicinity of the LSP are limited, with only a single bus route towards Fremantle operating on Rockingham Road. There are no plans for the PTA to expand services in this area.
- » The existing pedestrians and cycling network in the area is improving in line with development occurring.
- » Overall, the proposed LSP Amendment is unlikely to have any material impact on the transport network.



Appendix A

WAPC CHECKLIST FOR INDIVIDUAL
DEVELOPMENT - TRANSPORT
IMPACT STATEMENT



APPENDIX A – WAPC CHECKLIST

Item	Status	Comments/Proposal
Summary	Section 9	
Introduction/Background	Section 1	
Structure Plan Proposal		
Regional Context	Section 2	
Proposed Land Uses	Section 2	
Table Of Land Uses and Quantities	Section 2	
Major Attractors/Generators	Section 2	
Specific Issues	Section 2	
Existing Situation		
Existing Land Uses Within Structure Plan	Section 3	
Existing Land Uses Within 800 Metres of Structure Plan Area	Section 3	
Existing Road Network Within Structure Plan Area	Section 3	
Existing Pedestrian/Cycle Networks Within Structure Plan Area	Section 3	
Existing Public Transport Services Within Structure Plan Area	Section 3	
Existing Road Network Within 2 (Or 5) km of Structure Plan Area	Section 3	
Traffic Flows on Roads Within Structure Plan Area (PM and/or AM Peak Hours)	Section 3	
Traffic Flows on Roads Within 2 (Or 5) km of Structure Plan Area (AM and/or PM Peak Hours)	Section 3	
Existing Pedestrian/Cycle Networks Within 800m of Structure Plan Area	Section 3	
Existing Public Transport Services Within 800m of Structure Plan Area	Section 3	
Proposed Internal Transport Networks		
Changes/Additions to Existing Road Network or Proposed New Road Network	Section 4	
Road Reservation Widths	Section 4	
Road Cross-Sections & Speed Limits	Section 4	
Intersection Controls	Section 4	
Pedestrian/Cycle Networks and Crossing Facilities	Section 4	
Public Transport Routes	Section 4	
Changes to External Transport Networks		
Road Network	Section 5	
Intersection Controls	Section 5	
Pedestrian/Cycle Networks and Crossing Facilities	Section 5	
Public Transport Services	Section 5	

Integration With Surrounding Area		
Trip Attractors/Generators Within 800 Metres	Section 6	
Proposed Changes to Land Uses Within 800 Metres	Section 6	
Travel Desire Lines from Structure Plan to These Attractors/Generators	Section 6	
Adequacy of External Transport Networks	Section 6	
Deficiencies in External Transport Networks	Section 6	
Remedial Measures to Address Deficiencies	Section 6	
Analysis of Internal Transport Networks		
Assessment Year(s) and Time Period(s)	Section 7	
Structure Plan Generated Traffic	Section 7	
Extraneous (Through) Traffic	Section 7	
Design Traffic Flows (That is, Total Traffic)	Section 7	
Road Cross-Sections	Section 7	
Intersection Controls	Section 7	
Access Strategy	Section 7	
Pedestrian/Cycle Networks	Section 7	
Safe Routes to Schools	Section 7	
Pedestrian Permeability & Efficiency	Section 7	
Access to Public Transport	Section 7	
Analysis of External Transport Networks		
Extent of Analysis	Section 8	
Base Flows for Assessment Year(s)	Section 8	
Total Traffic Flows	Section 8	
Road Cross-Sections	Section 8	
Intersection Layouts & Controls	Section 8	
Pedestrian/Cycle Networks	Section 8	
Conclusions	Section 9	

APPENDIX B – CONCEPT LOCAL STRUCTURE PLAN



APPENDIX B

STORMWATER MANAGEMENT TECHNICAL NOTE

Our Ref: J7604b
 15 August 2024

TECHNICAL NOTE

West Churchill Avenue, Lake Coogee Structure Plan Amendment - Stormwater Management

This Technical Note has been prepared on behalf of Darriwell Investments Pty Ltd to outline the stormwater management strategy for the proposed structure plan amendment for West Churchill Avenue, Lake Coogee.

PLANNING BACKGROUND

A structure plan report was prepared for the "Lake Coogee Estate – Proposed Structure Plan Development Area 5 Munster" (Urban Focus, 2007). It covers an area of approximately 21.76 ha and the existing structure plan is shown in Figure 1.

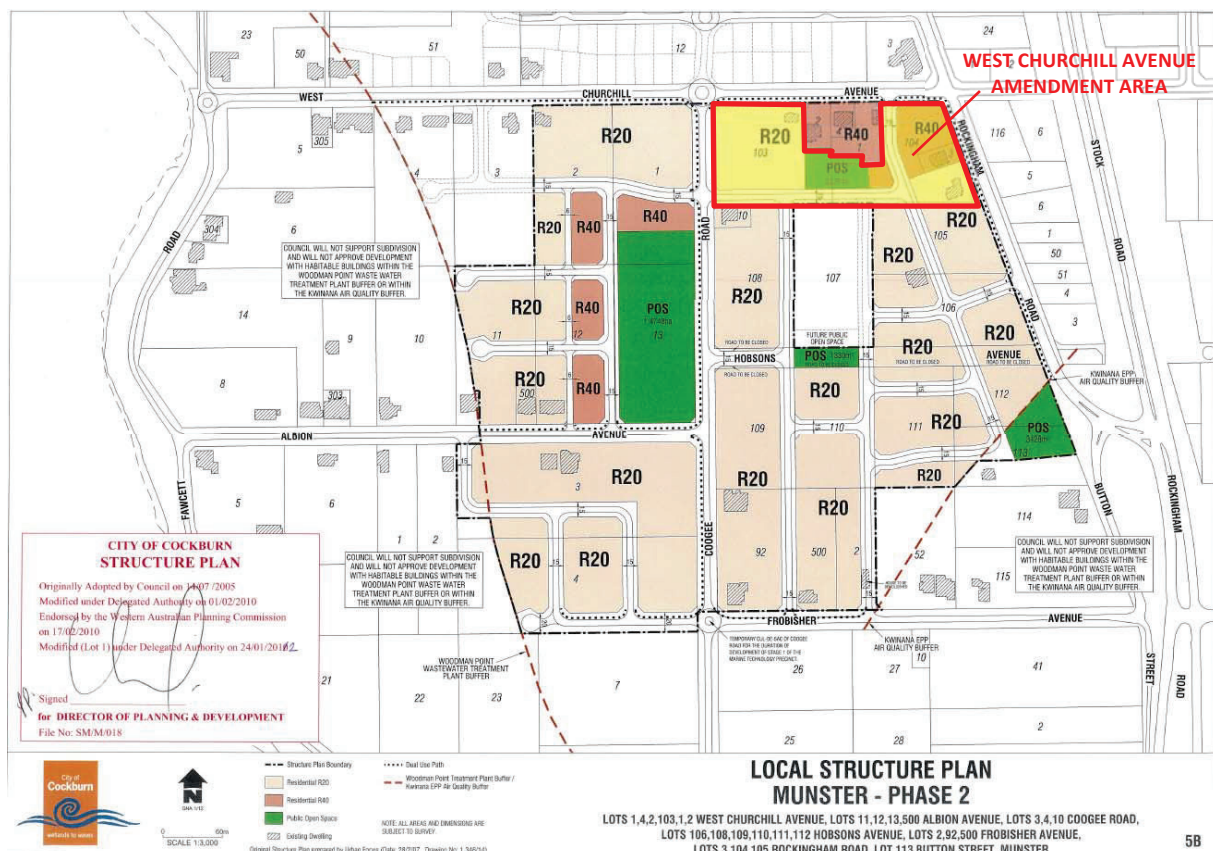


Figure 1: Local Structure Plan Munster – Phase 2 (City of Cockburn, 2012)

The *West Churchill Avenue Structure Plan Amendment, Lake Coogee* (Urbis, 2024) covers an area of approximately 2.14 ha and is comprised of 66 West Churchill Avenue and 645 Rockingham Rd, Lake Coogee (Figure 2). It proposes a mix of Residential Lots (R30 and R40) and Public Open Space, consistent with the existing structure plan.

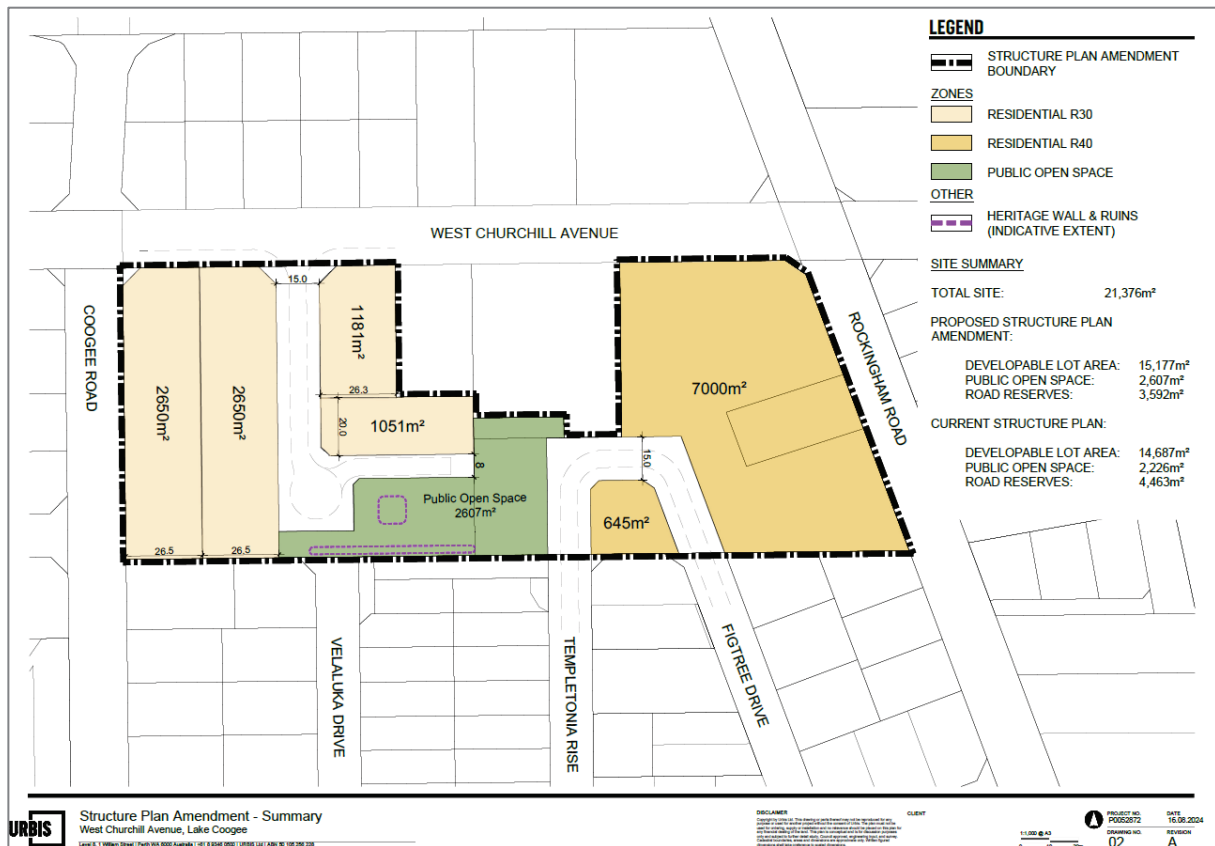


Figure 2: Structure Plan Amendment – West Churchill Avenue, Lake Coogee (Urbis, 2024)

EXISTING SITE CHARACTERISTICS

Natural surface contours show topography ranges from 10 m AHD in the centre of the site to 4 m AHD in the west and 7 m AHD to the east. Long term annual average rainfall since 1974 to 2023 is 812 mm based on Bureau of Meteorology Jandakot Aero station.

Surface geology mapping by Gozzard (1983) indicates the site is situated in the Tamala Limestone System with Limestone (Ls1) under 66 West Churchill Avenue and Sand (S7) under 645 Rockingham Rd. Presence of limestone and sand is generally conducive to high infiltration rates.

The site is classified as 'no known risk' of acid sulphate soil occurring less than 3m from the surface. There are no classified wetlands or surface water features located within the Study Area. The nearest conservation wetland is Lake Coogee which is approx. 500m west from study area.

DWER online mapping indicates groundwater flow east to west with maximum groundwater level of approximately 1.7 m AHD, indicating 2.3 m to 8.3 m separation to natural surface.

STORMWATER MANAGEMENT

The “Lake Coogee Draft Structure Plan – Drainage Area” (DEC, 18 July 2004) (attached as Appendix A) outlined a drainage strategy to support the structure plan report (Urban Focus, 2007). It divided the area into eastern and western drainage catchments with stormwater disposal via soakage in two drainage basins.

The West Churchill Avenue Amendment Area is also located within both catchments. The majority is within the East Catchment as shown in extract of the DEC (2004) East drainage catchment plan (see Figure 3). A proposed road in the south-west portion of the amendment area is located in the West Catchment.

City of Cockburn Online Mapping Hub indicates both the east and west drainage basins have already been constructed. A pipe drainage system also exists in Figtree Avenue from the southern boundary of the amendment area to the east drainage basin to allow for stormwater flow from the amendment area (Appendix B).

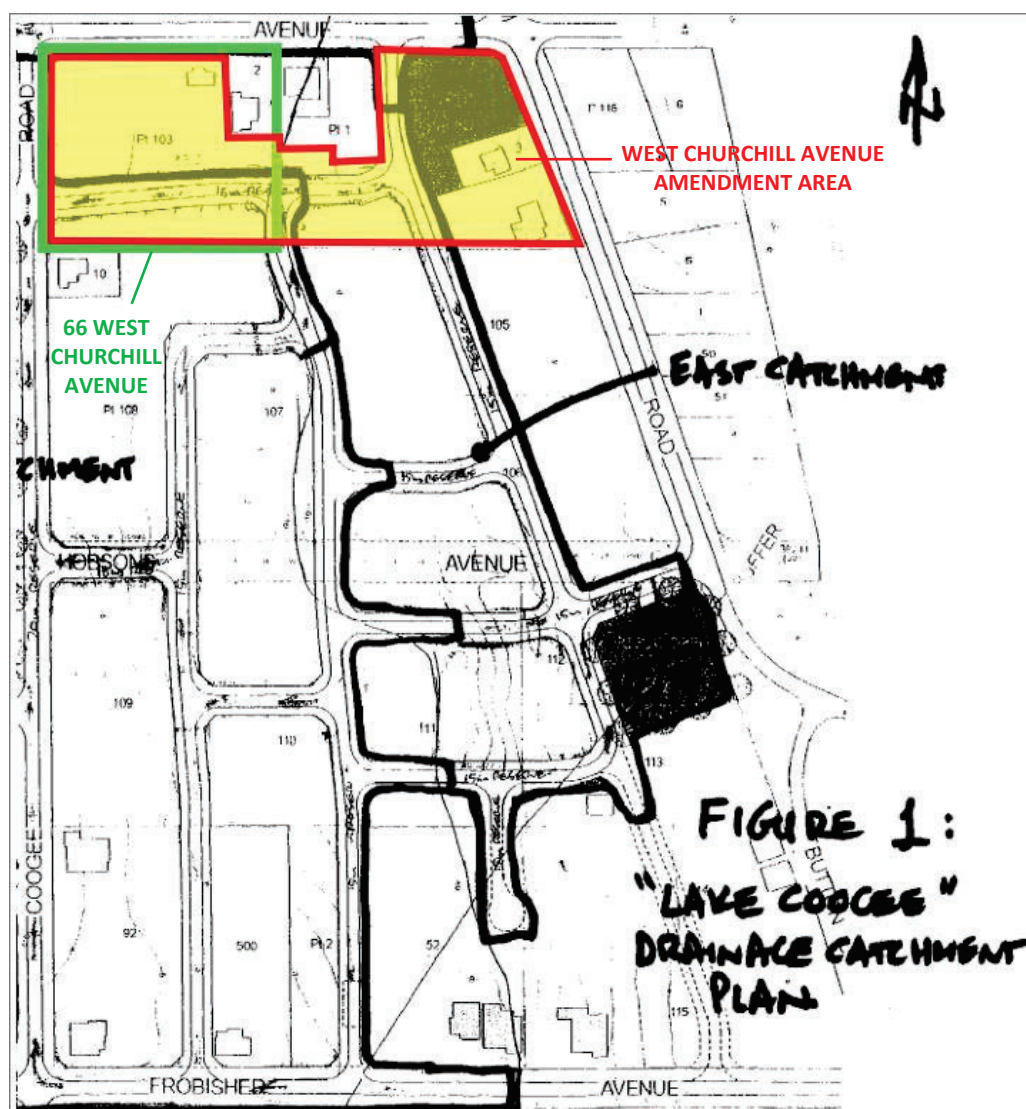


Figure 3: Lake Coogee Draft Structure Plan – Drainage Areas (DEC, 2004)

The contributing impervious road area calculated by DEC (2004) for the East Catchment is 11,100 m².

Within the amendment area, the road area based on the current structure plan is 4,463 m², and will reduce by approximately 20% to 3,592 m² in the proposed structure plan amendment (Figure 2).

In addition, it is proposed that stormwater runoff generated within the amendment area will be infiltrated and managed at source in the public open space area and may include underground infiltration cells. Whilst no discharge to the greater structure plan area is proposed for the small event (15 mm) and minor rainfall events, overland flow to existing street connections may occur in the major event to pre-development rates consistent with DEC (2004).

Therefore, with an overall reduction in the contributing road catchment to existing drainage basins, and stormwater infiltrated and managed on site, the proposed structure plan amendment does not adversely impact existing drainage infrastructure.

Further detail on the stormwater management design for the proposed structure plan amendment area, will be presented as part of the subdivision approval process in an Urban Water Management Plan (UWMP), consistent with the *Better Urban Water Management* (WAPC, 2008) water reporting framework.

The UWMP will include detail on groundwater level, infiltration rate, catchment area, hydraulic modelling and required storage volumes for water quality treatment of the first 15 mm of rainfall and the critical 20% AEP and 1% AEP storm events.

References

City of Cockburn (2012) *Local Structure Plan Munster – Phase 2*, Modified (Lot 1) under delegated authority on 24/01/2012.
Development Engineering Consultants [DEC] (2004) *Lake Coogee Draft Structure Plan – Drainage Area*, 18 July 2004, Report ref: Pro13804.

Urban Focus (2007) *Lake Coogee Estate – Proposed Structure Plan Development Area 5, Munster*, March 2007.

Urbis (2024) *Structure Plan Amendment, West Churchill Avenue, Lake Coogee*, P0052872 Drawing 02, 16 August 2024.

West Australian Planning Commission [WAPC] (2008) *Better Urban Water Management*

Attachments

Appendix A: *Lake Coogee Draft Structure Plan – Drainage Area* (DEC, 2004)

Appendix B: City of Cockburn Online Mapping Hub – Drainage Infrastructure

Should you have any queries, please do not hesitate to contact Matthew Yan on 6380 3423 or by email matt@jdahydro.com.au.

Yours sincerely,



JDA Consultant Hydrologists

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APPENDIX A

20-7-04



DEVELOPMENT
ENGINEERING
CONSULTANTS

Telephone: (08) 9481 1900

Facsimile: (08) 9481 1700

Ground Floor "The Atrium"

Suite 3, 123A Colin Street

West Perth W.A. 6005

Our Ref: Pro13804

July 18, 2004

Mr Colin Evans
Urban Focus
14 Prowse Street
WEST PERTH WA 6005

Dear Colin,

URBAN FOCUS

LAKE COOGEE DRAFT STRUCTURE PLAN - DRAINAGE AREA

Further to our conversation in regard to the drainage for the area south of West Churchill Ave in Munster, we confirm that we have assessed your plan entitled "Lake Coogee Draft Structure Plan" dated 12 May 2004.

As requested we have further analysed the drainage and attached a comprehensive report for your information and submission to the various authorities.

We trust that this is to your satisfaction.

If you have any queries on this matter, please call me on the above numbers at any time.

Yours faithfully,

DEVELOPMENT ENGINEERING CONSULTANTS PTY LTD

STEPHEN R. ALLEN

PRINCIPAL CIVIL ENGINEER



**LAKE COOGEE - AREA SOUTH OF WEST CHURCHILL AVE AND WEST OF
ROCKINGHAM ROAD, MUNSTER**

DRAINAGE STRATEGY REPORT

1. General

The drainage strategy is to dispose of stormwater by soakage and use of water sensitive design methods. The total area will be directed to two drainage areas, one is for the western catchment which is a large drainage basin located in the area of central Public Open Space off Hobsons Ave. The second basin, being for the eastern catchment is proposed to be located in the area of Public Open Space located just north of the intersection between Button Street and Rockingham Road. Figure 1 shows the design catchments and the location of the proposed drainage areas.

The required footprint area for each of the basins is dependent on the strategy adopted for the drainage basin, that is whether the drainage is "wet" or "dry". A dry basin is typically installed as a swale. Its base is located a minimum of 0.4m above maximum recorded groundwater level, thereby ensuring the area is dry in all situations. To maximise usability as public open space, underfloor storage such as soakwells and other soakage mechanisms such as Atlantis Cells or other proprietary products are installed. This means that each time it rains, water does not flood the basin until the capacity of the soakage areas is exceeded.

The various alternatives are listed in the table below:

Basin Description	Catchment (Ha)	Storage required (100Yr)	Storage required (10Yr)	Site Area Required (100Yr)(Sqm)	Site Area Required (10Yr) (Sqm)
Western Basin - LWL0.9mAHD (Wet Basin)	6.11	6,900	3,700	5,700	4,600
Western Basin - LWL1.9mAHD (Dry Basin)	6.11	5,000	2,500	9,000	8,200
Eastern Basin - LWL2.0mAHD (Dry Basin)	1.11	1,350	780	1,540	1,200
Total	7.22	8,250	4,480	7,240	5,800

In addition to the soakage areas, the practice approved by the Waters and Rivers Commission of installing baseless manholes and maximising soakage prior to outflow to the drainage system will be used for this development. Where suitable roads abut open space, flush kerbs will be installed to maximize soakage opportunities.

2. Western Basin

According to the Water and Rivers Commission Groundwater Atlas, the maximum groundwater level at the site is RL 1.5m AHD. Based on the geotechnical work undertaken in March 2000 the groundwater level was recorded at approximately RL 0.3m AHD. The WRC information probably represents an absolute maximum figure, however the recorded level is more likely to be the lower annual level. Some investigation on the likely groundwater fluctuations in the area was undertaken by Rockwater Pty Ltd in August 1996 for the City of Cockburn. In this study, they found that there was generally a 0.7m fluctuation between summer minimum and winter



maximum groundwater levels. Assuming that this is correct, the groundwater level in the proximity of the proposed basin will fluctuate between 0.3m AHD and 1.0m AHD. Rockwater had advised that the general summer minimum for Market Garden Swamps 1 and 2 would be between 0.6m and 0.75m AHD for wetter periods. This is consistent with the levels used for this investigation. An ambient level of 0.9m AHD has been used for the purposes of our calculations.

Given that the road levels in the vicinity of the western basin will be at around RL2.5m AHD, there is minimal opportunity to provide cover and grade for drainage pipework to grade to the basin. There is also minimal level difference between maximum groundwater level and minimum road levels. In addition, groundwater levels could feasibly fluctuate from say RL0.0m AHD to RL1.5m AHD there will be a difficulty in presentation of the basin.

Two main options have been examined:

- (a) The first is to excavate a lake. In this instance the base would need to be excavated to say RL-2.0 to ensure that water will be in place year round, however we understand that the new Waters and Rivers Commission guidelines do not support drainage basins intersecting the water table. This is defined as a "wet" basin. In this case, the area of the lake would be approximately 3200 square metres at RL0.9m AHD. In the event that a lake is not supported, the 10 year basin area could be constructed as a wetland. The base would be set at RL0.9m AHD and planted with wetland vegetation. Its ecological operation would be similar to that of the surrounding market garden swamps although during periods of high water table, as per the market garden swamps it will not dry out which may cause some eutrophication issues.
- (b) The second alternative examined was to construct a true "dry" basin. The base of the basin would need to be conservatively set at around RL1.9m AHD, being 0.4m above the maximum likely groundwater level, thereby ensuring a dry oval area all year around year in and year out. Given the excellent soakage characteristics in the area, water would not be expected to stand in the area for much longer than 24hours for a major storm.

3. Eastern Basin

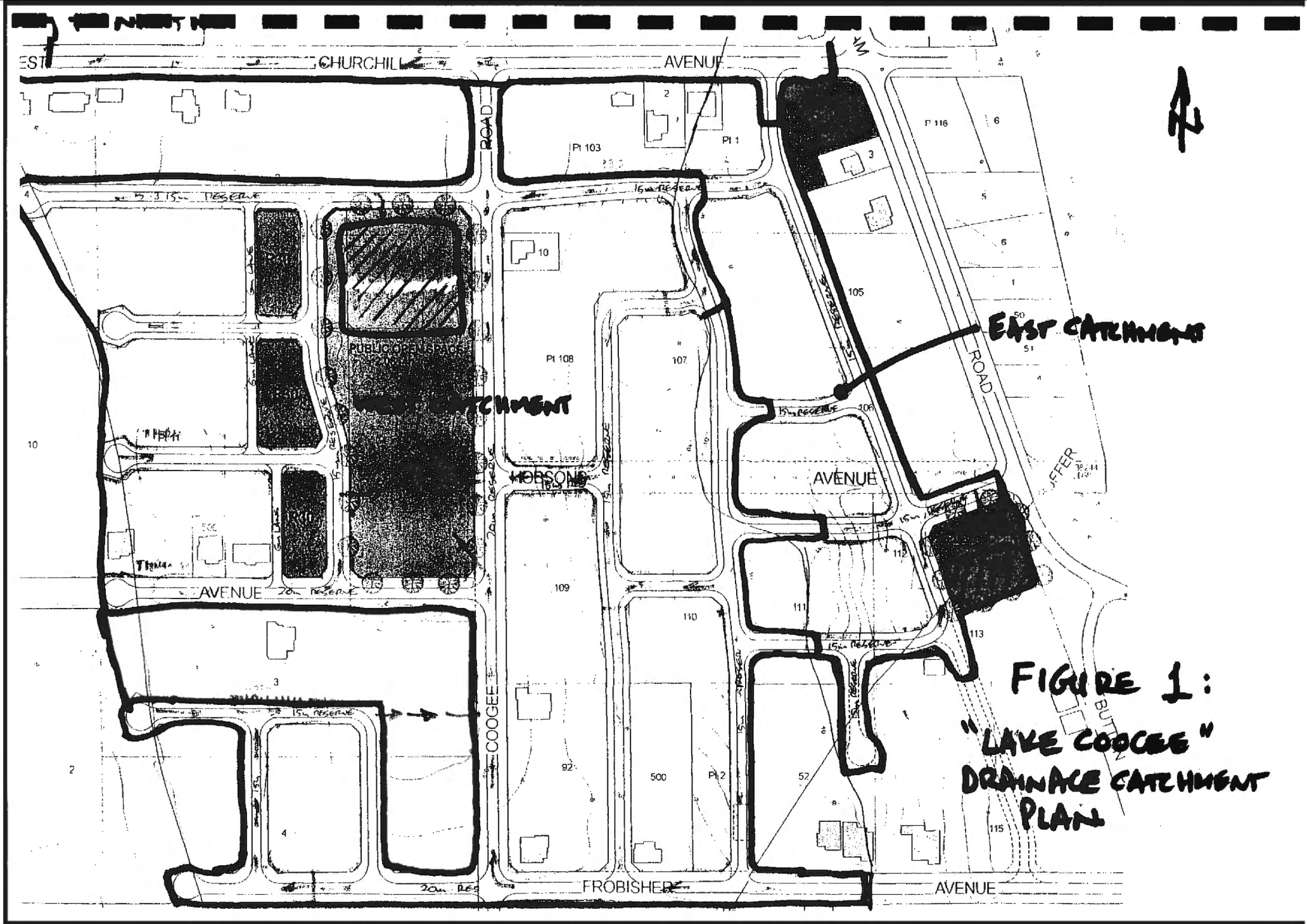
The groundwater in the vicinity of the eastern basin is slightly higher than that of the western basin, but probably only 0.1m. Therefore the maximum likely groundwater level in the area will be around 0.1m above those discussed above.

The minimum road levels in the area are however much higher, making it simpler and more practical to install a dry park basin area. The basin will be approximately 1.5m deep for the 1 in 100 year storm. Detention times will also be minimal given the good soakage characteristics of the area. Subsurface storage will be installed in conjunction with subdivision works.



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ATTACHMENT 1: CATCHMENT PLAN





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ATTACHMENT 2: DRAINAGE CALCULATIONS

Development Engineering Consultants - Drainage Basin Spreadsheet



DEVELOPMENT
ENGINEERING
CONSULTANTS

Project: Urban Focus Management

Location: South of West Churchill Ave "Lake Coogee" - West Catchment

Option 1: Lake for Storage LWL 0.9m AHD TWL: 2.5m AHD (100Yr), 1.85m AHD (10Yr)

Data to be Input

Rainfall AR (Years)	100
Run-off Coefficient	0.9
Impervious Area (Ha):	6.11
Req'd Storage (10 year) (m3)	3,665.52
Req'd Storage (100 year) (m3)	8,125.24
Soakage Rate (l/s/m2)	0.005

Data From A, R & R Volume 2

Location	Perth WA
Map 1	20.6
Map 2	4.5
Map 3	1.3
Map 4	35.5
Map 5	7
Map 6	2.1
Map 7	0.68
Map 8	4.82
Map 9	17

Tc (mins)	Tc (hrs)	I (mm/hr)	Q (l/s)	Total V in	Preliminary Height (m)	Q out (Soakage) (l/s)	V out	Net Storage
40	0.667	61.34	936.81	2248.333216	0.63	15.77	37.84567684	2210.487538
50	0.833	52.08	795.49	2386.476997	0.66	15.77	47.31018543	2339.166812
60	1.000	45.44	683.97	2498.283204	0.69	15.77	56.77518894	2441.508015
90	1.500	38.81	592.69	3200.52536	0.85	15.78	85.18976019	3115.3356
120	2.000	31.59	482.46	3473.73218	0.91	15.78	113.5997845	3360.132395
240	4.000	19.11	291.94	4203.866699	1.07	15.78	227.2686914	3976.598008
480	8.000	11.56	176.58	5085.597271	1.25	15.79	454.6951329	4630.902138
960	16.000	8.08	123.37	7106.214504	1.63	15.80	910.053546	6196.160969
1440	24.000	6.08	92.85	8021.645337	1.79	15.80	1365.499223	6656.346114
2880	48.000	3.65	55.69	9623.719793	2.05	15.81	2732.393425	6891.326368
4320	72.000	2.62	40.08	10388.7784	2.18	15.82	4099.551479	6289.226916

Catchment Area:	RR Width(m)	Length(m)	Area (Total)
	24	0	-
	22	0	-
	20	1300	26,000
	18	0	-
	15	2700	40,500
	14	0	-
	11	0	-
	10	0	-
	6	230	1,380
			67,880

Drainage Basin Base Dimensions: (Option 1 - Wet Lake Available Storage Depth From RL0.9 to RL2.5m AHD)

Side Slopes	Length(m)	Breadth(m)
6	63	50

Height(m)	A(TWL)	Average Area	Vol(m ³)	Revised H	Site Area (0m freeboard, 0m berm)	Minimum Breadth	Constraining Breadth	Other Dimension
2.18772266	6805.7547	19222.307	10638.9176	1.417090661	6805.754703	83.85267188	80	85.07193379
1.41709066	5360.74795	18732.323	5961.95332	1.637892401	5360.747952	74.60508793	80	67.00934939
1.6379924	5757.47245	17428.59	7189.71173	1.570012908	5757.472447	77.25590881	80	71.96840558
1.57001291	5633.88894	17212.826	6802.52979	1.590507016	5633.88894	76.44015489	80	70.42361174
1.59050702	5671.00612	17277.734	6918.37145	1.584289456	5671.006123	76.68608419	80	70.88757654
1.58428946	5659.73263	17258.029	6883.14668	1.586172169	5659.732625	76.61147347	80	70.74665782
1.58617217	5663.14513	17263.995	6893.80555	1.585601743	5663.145131	76.63406603	80	70.78931414
1.58560174	5662.1111	17262.187	6890.57544	1.585774541	5662.1111	76.62722092	80	70.77638875
1.58577454	5662.42433	17262.735	6891.55387	1.585722193	5662.424327	76.62929449	80	70.78030409
1.58572219	5662.32944	17262.569	6891.25745	1.585738051	5662.329436	76.62866632	80	70.77911795

Development Engineering Consultants - Drainage Basin Spreadsheet



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CONSULTANTS

Project: Urban Focus Management

Location: South of West Churchill Ave "Lake Coogee" - West Catchment

Option 2: Dry Park for Storage LWL 1.9m AHD TWL: 2.5m AHD (100Yr), 2.2m AHD (10Yr)

Data to be Input

Rainfall ARI (Years)	100
Run-off Coefficient	0.9
Impervious Area (Ha):	6.11
Req'd Storage (10 year) (m3)	3,665.52
Req'd Storage (100 year) (m3)	8,125.24
Soakage Rate (l/s/m2)	0.005

Data From A, R & R Volume 2

Location	Perth WA
Map 1 z_{11}	20.6
Map 2 z_{12}	4.5
Map 3 z_{12}	1.3
Map 4 s_{11}	35.5
Map 5 s_{12}	7
Map 6 s_{12}	2.1
Map 7 G	0.68
Map 8 F2	4.82
Map 9 F50	.17

Tc (mins)	Tc (hrs)	I (mm/hr)	Q (l/s)	Total V in	Preliminary Height (m)	Q out (Soakage) (l/s)	V out	Net Storage
40	0.667	61.34	936.81	2248.333216	0.29	37.51	90.02097832	2158.312238
50	0.833	52.08	795.49	2386.476997	0.30	37.51	112.5277658	2273.949231
60	1.000	45.44	693.97	2498.283204	0.32	37.51	135.034811	2363.248393
90	1.500	38.81	592.69	3200.52536	0.40	37.51	202.5660814	2997.959278
120	2.000	31.59	482.46	3473.73218	0.43	37.51	270.095185	3203.636995
240	4.000	19.11	291.94	4203.866699	0.52	37.52	540.2275867	3663.639112
480	8.000	11.56	176.58	5085.597271	0.62	37.52	1080.542824	4005.054447
960	16.000	8.08	123.37	7106.214504	0.84	37.53	2161.470569	4944.743935
1440	24.000	6.08	92.85	8021.845337	0.94	37.53	3242.456976	4779.388361
2880	48.000	3.65	55.69	9623.719793	1.10	37.53	6485.76428	3137.955513
4320	72.000	2.62	40.08	10388.7784	1.17	37.54	9729.237879	659.5405163

West of Ridge

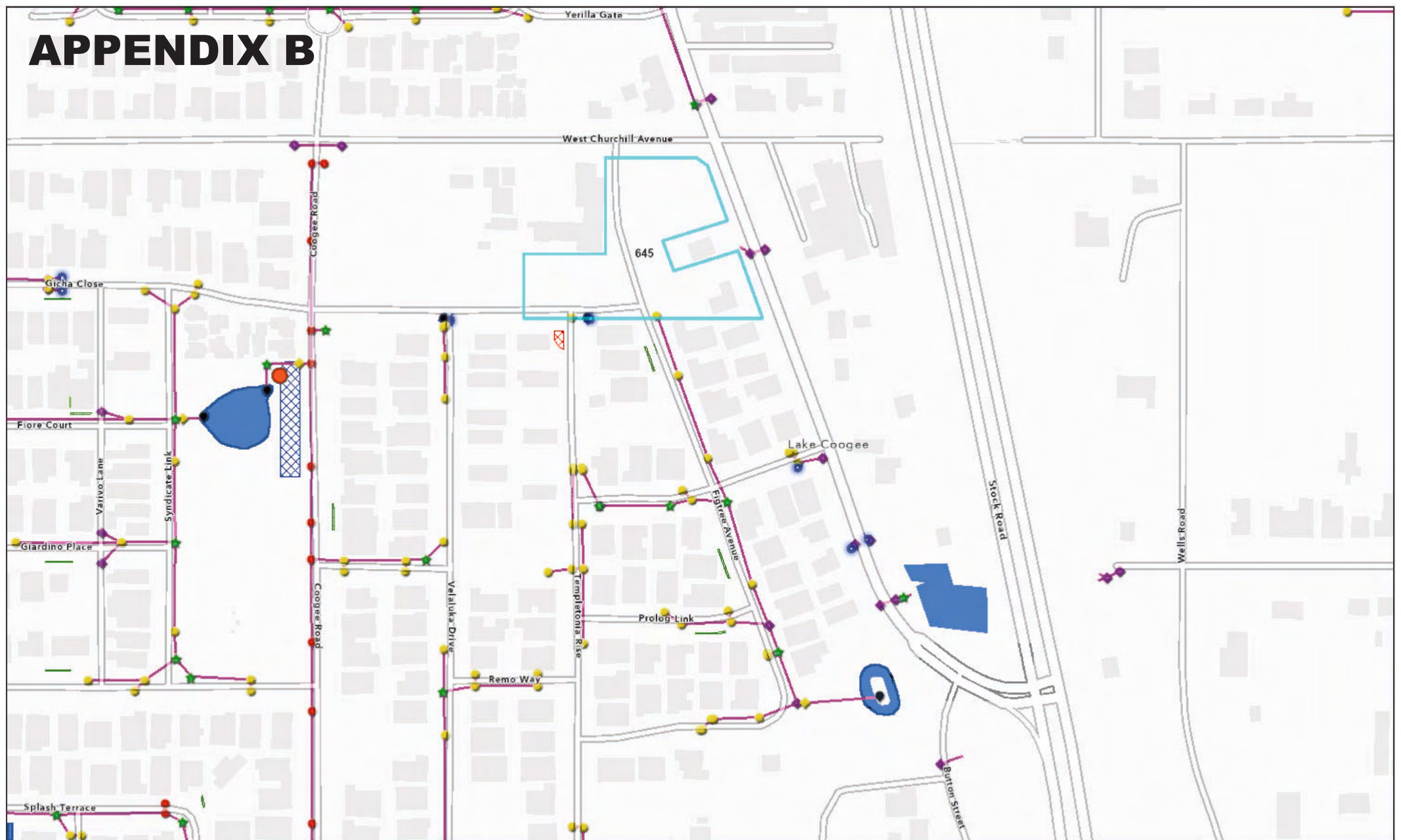
Catchment Area:	RR Width (m)	Length (m)	Area (Total)
	24	0	-
	22	0	-
	20	1300	26,000
	18	0	-
	15	2700	40,500
	14	0	-
	11	0	-
	10	0	-
	6	230	1,380
			67,880

Drainage Basin Base Dimensions: (Option 2 - Dry Parkland Area Available Storage Depth From RL1.9 to RL2.5m AHD)






Side Slopes	Length (m)	Breadth (m)
6	125	60

Height (m)	A (TWL)	Average Area	Vol (m ³)	Revised H	Site Area (0.0m freeboard, 0m berm)	Minimum Breadth	Constraining Breadth	Other Dimension
0.65929919	9026.23747	32989.882	5440.98955	0.599167789	9026.237466	75.5115903	80	112.8279683
0.59916779	8881.84878	32712.001	4902.5756	0.604321388	8881.848785	74.79001346	80	111.0231098
0.60432139	8894.18291	32735.776	4948.38087	0.603877228	8894.182906	74.85185666	80	111.1772863
0.60387723	8893.11958	32733.727	4944.43066	0.603915489	8893.119595	74.84652673	80	111.1639949
0.60391549	8893.21119	32733.904	4944.77092	0.603912193	8893.21119	74.84698587	80	111.1651399
0.60391219	8893.2033	32733.888	4944.74161	0.603912477	8893.203299	74.84694632	80	111.1650412
0.60391248	8893.20398	32733.89	4944.74414	0.603912452	8893.203979	74.84694972	80	111.1650497
0.60391245	8893.20392	32733.89	4944.74392	0.603912455	8893.20392	74.84694943	80	111.165049
0.60391245	8893.20393	32733.89	4944.74394	0.603912454	8893.203925	74.84694945	80	111.1650491
0.60391245	8893.20392	32733.89	4944.74393	0.603912454	8893.203925	74.84694945	80	111.1650491

APPENDIX B



Drainage Pits

-  BUP
-  CHUT
-  CPIT
-  CSEP
-  DGP

City of Cockburn

Date Printed: 3/07/2024
Scale: 1:2,610
Datum: WGS 1984



City of Cockburn
G.I.S Services

APPENDIX C

STRUCTURAL ASSESSMENT

1. I Andrew T van der Meer advise that I reside at 10 Hepworth Road, TRIGG in the State of Western Australia.
2. I have been practicing as a consulting structural engineer since 1970.
3. I have attached my CV to this report.
4. I was requested by Mr Matthew Groom representing Otherside Property to inspect and assess several low height stone walls existing on land situated in West Churchill Avenue, Munster.
5. I attended site on 9 May 2024 and inspected a boundary wall (wall) and the lower remains of the building (ruins).
6. The walls are shown in plan on Plate 1.
7. The walls were constructed in about 1946 using roughly flattish limestone boulders dry stacked. Both the wall and ruins were constructed as double skin walls with smaller rubble infill between the skins.
8. Part of the wall is shown in Plate 2 and the ruins are shown in Plate 3.
9. The wall measured up to 1800 high with a width varying between about 1 metre to 1800mm wide. Part of the eastern end of the wall was retaining sand fill.
10. The ruins stood up to about 1 metre high with a width of about 1 metre.
11. Both the wall and the ruins can be considered as being structurally stable and capable of withstanding the prescribed wind loading for this area. The imposition of backfill to a part of the wall does not appear to have affected the stability of the wall.
12. Measures should be taken to prevent vehicle impact on the wall and ruins.
13. The rocks within the walls are facially discoloured but remain in a structurally sound condition.
14. The stonework should remain in a structurally safe condition for at least 50 years.

Should you have any queries with regard to the above, please do not hesitate to contact the undersigned on 0430 239 450.

Yours faithfully

A handwritten signature in blue ink, appearing to read 'A.T. van der Meer', with a stylized, cursive script.

A.T. van der Meer

B.E. M.Eng.Sc. M.I.E.

AT VAN DER MEER PTY LTD

Encl – Andrew van der Meer – CV

Plate 1-3

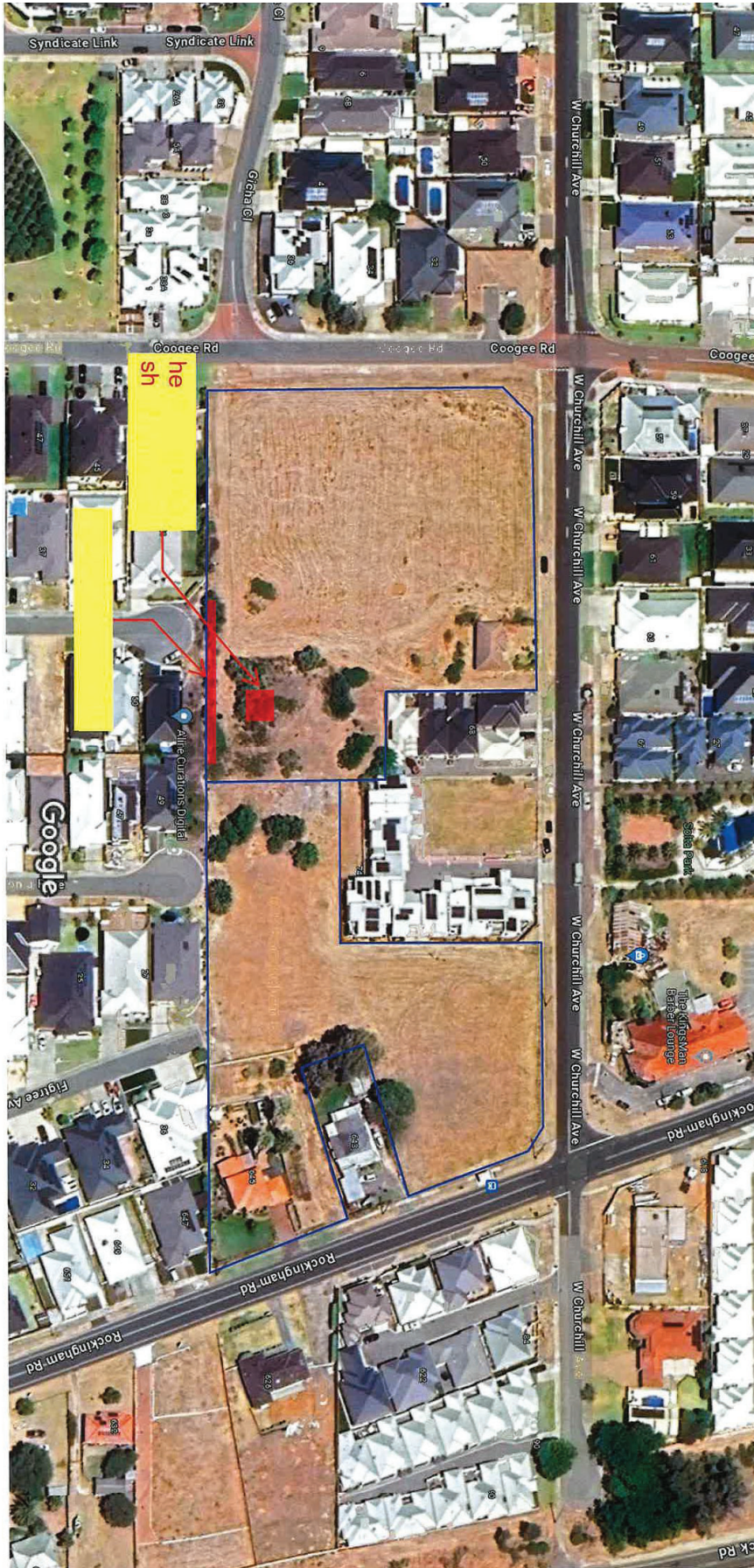


PLATE 1



PLATE 2



PLATE 3

APPENDIX D

NOISE MANAGEMENT PLAN

OTHERSIDE PROPERTY

**RESIDENTIAL DEVELOPMENT
645 ROCKINGHAM ROAD
LAKE COOGEE**

SPP 5.4 NOISE MANAGEMENT PLAN

AUGUST 2024

OUR REFERENCE: 33243-2-24245

DOCUMENT CONTROL PAGE

SPP 5.4 NOISE MANAGEMENT PLAN
645 ROCKINGHAM ROAD
LAKE COOGEE

Job No: 24245

Document Reference: 33243-2-24245

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CONTENTS

1.	INTRODUCTION	1
2.	ACOUSTIC CRITERIA	1
2.1	Noise	1
3.	MEASUREMENTS	4
4.	MODELLING	4
5.	TRAFFIC NOISE ASSESSMENT	5
6.	CONCLUSION	5

APPENDICES

A	Site Layout
B	Future Day Time Noise Contours
C	Lots Requiring “Quiet House Design” Packages
D	MRWA Traffic Flows

1. INTRODUCTION

Herring Storer Acoustics were commissioned by Otherside Property to carry out an acoustic study with regards to traffic related noise for the proposed residential development located at 645 Rockingham Road, Lake Coogee.

The purpose of the study was to:

- Assess the noise that would be received within the development area from vehicles travelling on Stock Road for future traffic volumes.
- Compare the results with accepted criteria and if exceedances exist, develop the framework for the management of noise.

A plan is attached in Appendix A.

2. ACOUSTIC CRITERIA

2.1 NOISE

The Western Australian Planning Commission (WAPC) released on 6th September 2019 State Planning Policy 5.4 “Road and Rail Noise”. The requirements of State Planning Policy 5.4 are outlined below.

POLICY APPLICATION (Section 4)

When and where it applies (Section 4.1)

SPP 5.4 applies to the preparation and assessment of planning instruments, including region and local planning schemes; planning strategies, structure plans; subdivision and development proposals in Western Australia, where there is proposed:

- a) noise-sensitive land-use within the policy’s trigger distance of a transport corridor as specified in **Table 1**;*
- b) New or major upgrades of roads as specified in **Table 1** and maps (**Schedule 1, 2 and 3**); or*
- c) New railways or major upgrades of railways as specified in maps (**Schedule 1, 2 and 3**); or any other works that increase capacity for rail vehicle storage or movement and will result in an increased level of noise.*

Policy trigger distances (Section 4.1.2)

Table 1 identifies the State’s transport corridors and the trigger distances to which the policy applies.

*The designation of land within the trigger distances outlined in **Table 1** should not be interpreted to imply that land is affected by noise and/or that areas outside the trigger distances are un-affected by noise.*

*Where any part of the lot is within the specified trigger distance, an assessment against the policy is required to determine the likely level of transport noise and management/mitigation required. An initial screening assessment (**guidelines: Table 2: noise exposure forecast**) will determine if the lot is affected and to what extent.”*

TABLE 1: TRANSPORT CORRIDOR CLASSIFICATION AND TRIGGER DISTANCES

Transport corridor classification	Trigger distance	Distance measured from
Roads		
Strategic freight and major traffic routes <i>Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume</i>	300 metres	Road carriageway edge
Other significant freight/traffic routes <i>These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meet the criteria of either >=23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)</i>	200 metres	Road carriageway edge
Passenger railways		
	100 metres	Centreline of the closest track
Freight railways		
	200 metres	Centreline of the closest track

Proponents are advised to consult with the decision making authority as site specific conditions (significant differences in ground levels, extreme noise levels) may influence the noise mitigation measures required, that may extend beyond the trigger distance.

POLICY MEASURES (Section 6)

The policy applies a performance-based approach to the management and mitigation of transport noise. The policy measures and resultant noise mitigation will be influenced by the function of the transport corridor and the type and intensity of the land-use proposed. Where there is risk of future land-use conflict in close proximity to strategic freight routes, a precautionary approach should be applied. Planning should also consider other broader planning policies. This is to ensure a balanced approach takes into consideration reasonable and practical considerations.

Noise Targets (Section 6.1)

Table 2 sets out noise targets that are to be achieved by proposals under which the policy applies. Where exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

In the application of the noise targets the objective is to achieve:

- indoor noise levels as specified in **Table 2** in noise sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and
- a reasonable degree of acoustic amenity for outdoor living areas on each residential lot. For non-residential noise-sensitive developments, for example schools and child care centres the design of outdoor areas should take into consideration the noise target.

It is recognised that in some instances, it may not be reasonable and/or practicable to meet the outdoor noise targets. Where transport noise is above the noise targets, measures are expected to be implemented that balance reasonable and practicable considerations with the need to achieve acceptable noise protection outcomes.

TABLE 2: NOISE TARGETS

Proposals	New/Upgrade	Noise Targets		
		Outdoor		Indoor
		Day ($L_{Aeq}(\text{Day})$ dB) (6 am-10 pm)	Night ($L_{Aeq}(\text{Night})$ dB) (10 pm-6 am)	(L_{Aeq} dB)
Noise-sensitive land-use and/or development	New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor	55	50	L_{Aeq} (Day) 40(Living and work areas) L_{Aeq} (Night) 35 (bedrooms)
Roads	New	55	50	N/A
	Upgrade	60	55	N/A
Railways	New	55	50	N/A
	Upgrade	60	55	N/A

Notes:

- The noise target is to be measured at one metre from the most exposed, habitable façade of the proposed building, which has the greatest exposure to the noise-source. A habitable room has the same meaning as defined in State Planning Policy 3.1 Residential Design Codes.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors (as amended) for each relevant time period.
- The 5dB difference in the criteria between new and upgrade infrastructure proposals acknowledges the challenges in achieving noise level reduction where existing infrastructure is surrounded by existing noise-sensitive development.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practical to do so using the various noise mitigation measures outlined in the guidelines. For example, it is likely unreasonable for a transport infrastructure provider to achieve the outdoor targets at more than 1 or 2 floors of an adjacent development with direct line of sight to the traffic.

Noise Exposure Forecast (Section 6.2)

When it is determined that SPP 5.4 applies to a planning proposal as outlined in Section 4, proponents and/or decision makers are required to undertake a preliminary assessment using **Table 2**: noise exposure forecast in the guidelines. This will provide an estimate of the potential noise impacts on noise-sensitive land-use and/or development within the trigger distance of a specified transport corridor. The outcomes of the initial assessment will determine whether:

- no further measures is required;
- noise-sensitive land-use and/or development is acceptable subject to deemed-to-comply mitigation measures; or
- noise-sensitive land-use and/or development is not recommended. Any noise-sensitive land-use and/or development is subject to mitigation measures outlined in a noise management plan.”

3. MEASUREMENTS

The noise measurements were conducted on 12 June 2023 for a short term period during peak hour to determine the L_{A10} noise level.

Utilising this measurement, reference to the DEFRA publication has been sought and the difference between the $L_{A10,18hr}$ and the $L_{Aeq,8hr}$ and the $L_{Aeq,16hr}$ has been calculated. The results of the measurement and the determination of the $L_{Aeq(Day)}$ and $L_{Aeq(Night)}$ are shown in Table 3.1.

Noise measurements were conducted with a Larson Davis 831 Sound Level Meter. The Sound Level Meter was calibrated prior to and after use with a Bruel and Kjaer 4230 Calibrator. All equipment used is currently NATA laboratory calibrated. Calibration certificates are available on request.

TABLE 3.1 : SUMMARY OF MEASURED NOISE LEVELS

Measurement Location	Measured/Calculated Noise Level, dB(A)		
	L_{A10}	$L_{Aeq, day}$ (6am to 10pm)	$L_{Aeq, night}$ (10pm to 6am)
Stock Road	73.8	71.2	62.6

4. MODELLING

To determine the noise levels from traffic on Stock Road, acoustic modelling was carried out using SoundPlan, using the Calculation of Road Traffic Noise (CoRTN)¹ algorithms.

The input data for the model included:

- Plans supplied by client (Shown in Appendix A).
- Traffic data as per Table 4.1 (And Sourced in Appendix C).
- Adjustments as listed in Table 4.2.

TABLE 4.1 - NOISE MODELLING INPUT DATA

Parameter	Stock Road (Current) 2021	Stock Road (Future) 2041
Traffic Volumes	22,000 vpd	50,700 vpd
Percentage traffic 0600 – 2400 hours (Assumed)	94%	94%
Heavy Vehicles (%) (Assumed)	11.6%	11.6%
Speed (km/hr)	80 km/hr	80 km/hr
Road Surface	Chip Seal	Dense Graded Asphalt

TABLE 4.2 – ADJUSTMENTS FOR NOISE MODELLING

Description	Value
Façade Reflection Adjustment	+2.5 dB
Conversion from L_{A10} (18 hour) to L_{Aeq} (16 hour) (Day)	-2.6 dB*

* Based on measured results listed in Table 3.1.

¹ Calculation of Road Traffic Noise UK Department of Transport 1987

5. TRAFFIC NOISE ASSESSMENT

Using the data contained in Tables 4.1 and 4.2, noise modelling was conducted for the future planning window, with noise contours shown in Appendix B.

Additionally, Appendix A contains a site plan for reference.

It is noted that all requirements pertain to only acoustic advice in regard to *State Planning Policy 5.4* and may be superseded by other requirements (BAL, Thermal, etc).

6. CONCLUSION

In accordance with the WAPC Planning Policy 5.4, an assessment of the noise that would be received within the development located at 645 Rockingham Road, Lake Coogee from vehicles travelling on Stock Road has been undertaken.

In accordance with the Policy, the following would be the acoustic criteria applicable to this project:

External

Day	55 dB(A) L_{Aeq}
Night	50 dB(A) L_{Aeq}

Internal

Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

The results of the acoustic assessment indicate that noise received at the development from future traffic on Stock Road, do not exceed external noise level criteria. Therefore, no "Quiet House Design" is required for single or two storey houses.

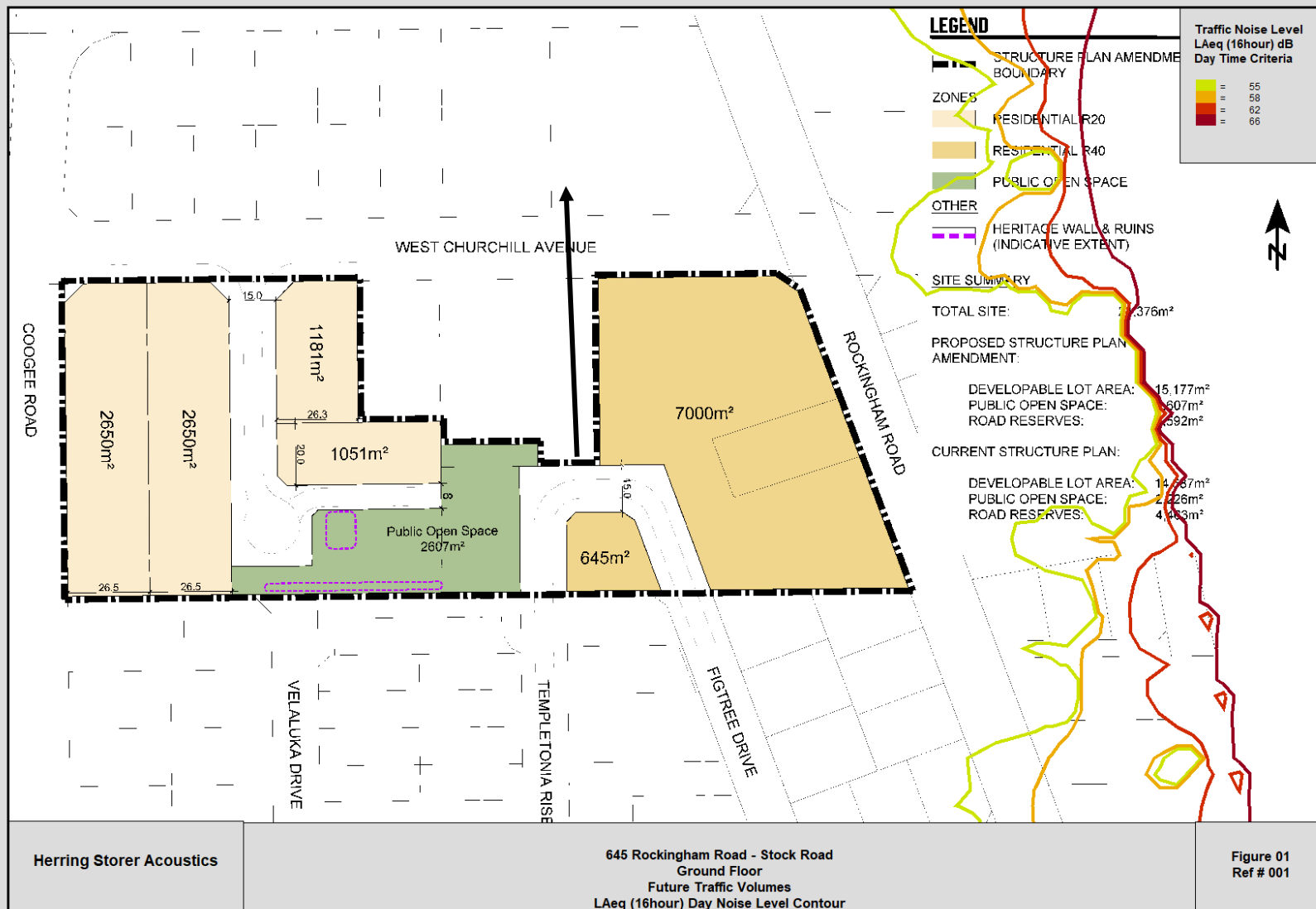
APPENDIX A

Site Layout



APPENDIX B

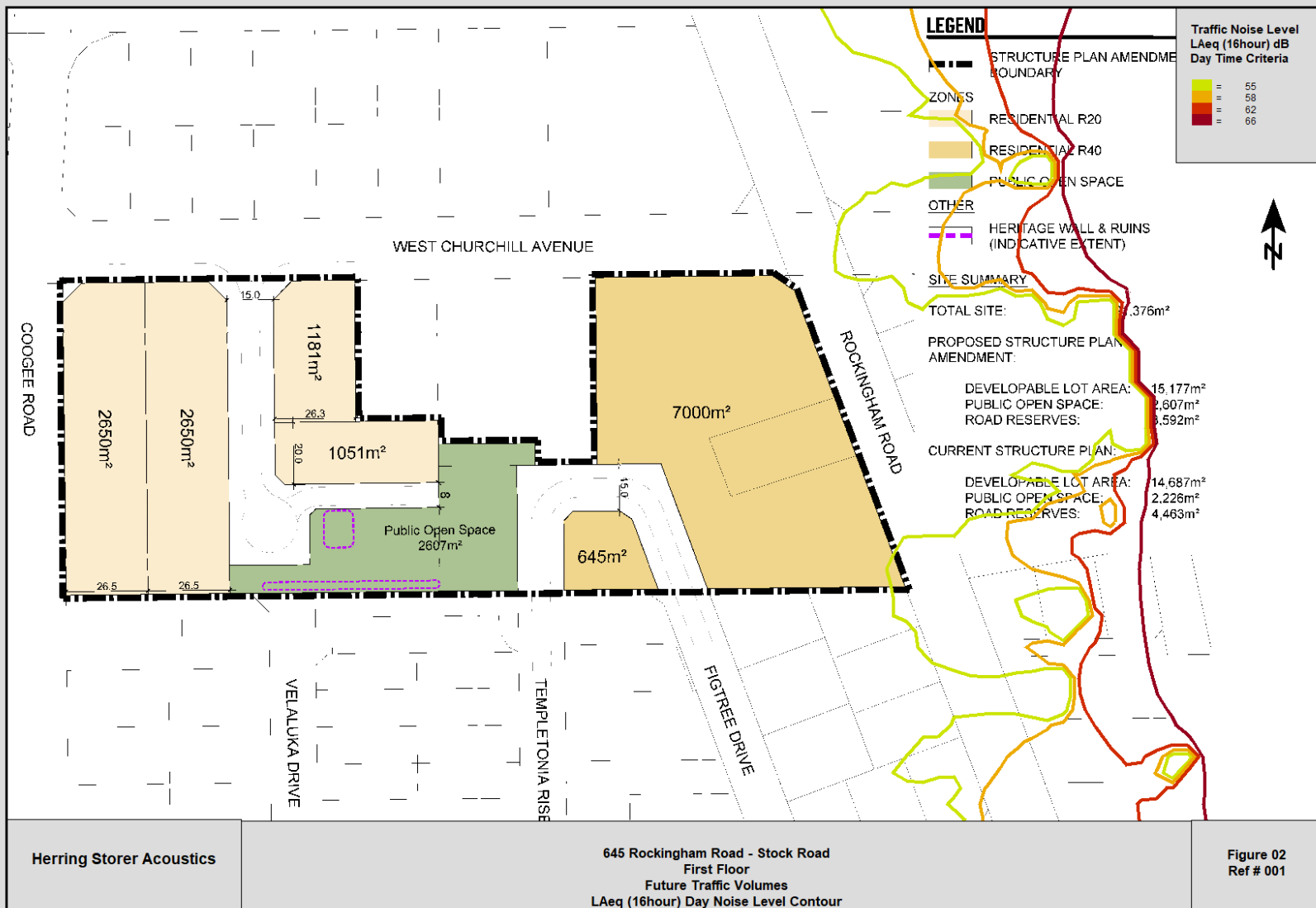
Future Day Time Noise Contours



Herring Storer Acoustics

645 Rockingham Road - Stock Road
Ground Floor
Future Traffic Volumes
LAeq (16hour) Day Noise Level Contour

Figure 01
Ref # 001



APPENDIX C

MRWA Traffic Flows

2021 ROM24 Scenario - Link Volume Plot for Mayor Rd, Coogee Noise Assessment All Day Land Use Scenario: DAEDS Version 3.1

MODEL ASSUMPTIONS

NETWORK: 2021 ROM24 Network (20-Year Road Network Development Plan)
LAND USE: 2021 DAEDS V3.1 Land Use

ROM24 Multi-Modal Model V4.40

24-Hour Traffic Volumes (Factor X 100)

Terms & Conditions:
MRWA Traffic Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations. This data should not be used for any purpose other than the stated purpose for which it was requested from MRWA. The MRWA ROM is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads. The MRWA ROM includes local roads but this is to provide connectivity in the model. MRWA Traffic Modelling Data should be interpreted by an experienced/qualified person. This data should not be used in making decisions relating to commercial or residential developments.



Transport Modelling Section
Engineers Claire Yu 8323 4987
MRWA Reference Job #42616
Thu 01 Jun 2023
T:\W01\AGRU\085_V2023\42616\Reports\LVP42616_All Day_LVP_Y21 DAEDS V31_Mayor Rd_Coogee VPR



MRWA ROM24 Base Network - Version 2014
MRWA Transport Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations

(Licensed to)

2041 ROM24 Scenario - Link Volume Plot for Mayor Rd, Coogee Noise Assessment

All Day

Land Use Scenario: DAEDS Version 3.1

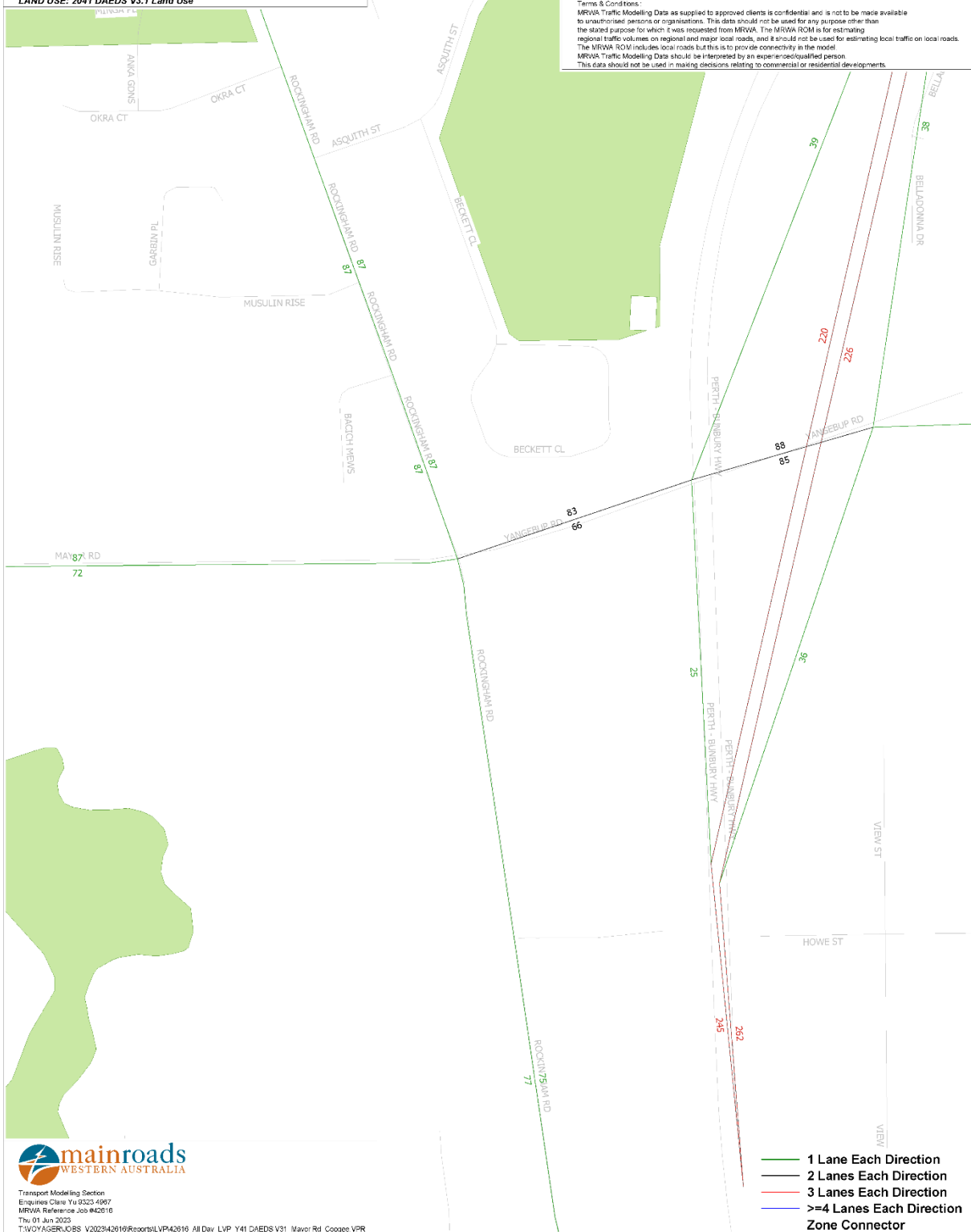
MODEL ASSUMPTIONS

NETWORK: 2041 ROM24 Network (20-Year Road Network Development Plan)
LAND USE: 2041 DAEDS V3.1 Land Use

ROM24 Multi-Modal Model V4.40

24-Hour Traffic Volumes (Factor X 100)

Terms & Conditions:
MRWA Traffic Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations. This data should not be used for any purpose other than the stated purpose for which it was requested from MRWA. The MRWA ROM is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads. The MRWA ROM includes local roads but this is to provide connectivity in the model. MRWA Traffic Modelling Data should be interpreted by an experienced/qualified person. This data should not be used in making decisions relating to commercial or residential developments.



Transport Modelling Section
Enquiries Clara Yu 9523 4967
MRWA Reference Joo-WC2016
Thu 01 Jun 2023
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MRWA ROM24 Base Network - Version 2014

MRWA Transport Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations

cube

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APPENDIX E

LANDSCAPE CONCEPT PLAN

Nature Based Play



seeing the world of children

OUR-CUBBY

INITIAL CONCEPT SET

REVISION 02

01/08/2025

LAKE COOGEE PUBLIC OPEN SPACE
NATURE PLAY LANDSCAPE

FOR CONSIDERATION BY
OTHERSIDE PROPERTY

DRAWING	CONTENTS	PAGE
	NATURE PLAY BACKGROUND INFORMATION	02
	EXISTING CONDITIONS	03
	NBP CONCEPT PLAN (ANNOTATED)	04
	NBP CONCEPT	05
	EXAMPLE IMAGES 1/2	06
	EXAMPLE IMAGES 2/2	07

WHY IS NATURE PLAY IMPORTANT?

Playing in nature is the most instinctual and ready response for children throughout the world and throughout time. Nature provides children a highly complex, relationship based, open-ended and non-judgmental space to explore and learn from. As our ecological systems are removed for human development there are fewer and fewer of these spaces which are locally available for children to play.

The worldwide nature play movement seeks to introduce the natural 'wilds' back into our urban lives so as children can continue this all-essential connection to their natural world and their inheritance of it. Australia is privileged to have an Indigenous cultural history that reaches back at least 65,000 years and the nature play movement has a unique opportunity to learn from this cultural wisdom and its deep connection to country, place, belonging and meaning.

Nature Play and Outdoor Learning is a pioneering movement, with hugely positive benefits to kids, schools and communities. These outcomes have been well documented through research globally, highlighting the many different benefits to kids' wellbeing and learning opportunities.

KEY BENEFITS

- Children who play regularly in natural settings are sick less often. Mud, sand, water, leaves, sticks, pine cones and gum nuts can help to stimulate children's immune system as well as their imagination.
- Children who play in natural settings are more resilient to stress. They have lower incidents of behavioural disorders, anxiety and depression; and have a higher measure of self-worth.
- Children who play in natural settings play in more diverse, imaginative and creative ways and show improved language and collaboration skills. Single use, repetitive play equipment becomes boring quickly.
- Natural, irregular and challenging spaces help kids to learn to recognise, assess and negotiate risk and build confidence and competence.
- Children who play in nature have more positive feelings about each other. Bullying behaviour is greatly reduced where children have access to diverse nature-based play environments.
- Symptoms of Attention Deficit Disorder are reduced after contact with nature.

Martin, K., 2011. Putting Nature back into Nurture: A Literature Review. Nature Play WA, 01 February.



LAKE COOGEE PUBLIC OPEN SPACE
NATURE PLAY LANDSCAPE

EXISTING SITE CONDITIONS

PROJECT LEAD: ANGUS
DRAWN: ANGUS
REV: 00 31/07/2025
NOT TO SCALE N: 0

FUTURE WORKS

LOT 22 West Churchill Ave

POS ALLOCATION
645 Rockingham Rd
approx 1020m2

STEEP INCLINE

EX. TREES
(TO REMOVE)

EX. TREES
(TO REMAIN)

EX. TREES
(TO REMOVE)

POS ALLOCATION
66 West Churchill Ave

LIMESTONE RUINS
(BUILDING)

LIMESTONE RUINS
(WALL)

LOT 8007 Templetonia Rise

EXISTING SITE PHOTOS



**LAKE COOGEE PUBLIC OPEN SPACE
NATURE PLAY LANDSCAPE**

CONCEPT PLAN & SCOPE OF WORK

PROJECT LEAD: ANGUS
DRAWN: ANGUS
REV: 02 01/08/2025
1:200 @A3 N: ①

NOTES:

INITIAL CONCEPT ONLY, SUBJECT TO REVISION.

- ALL NBP TIMBER IS SUSTAINABLY SOURCED NATIVE HARDWOOD,
JARRAH, WANDOO, OR OTHER NBP APPROVED SPECIES

- STRUCTURAL TIMBER ELEMENTS TO BE TREATED WITH PROTECTIVE
OIL COAT.

- ALL ROCKS AND TIMBER TO HAVE EXTREME SHARPS REMOVED.

- LIGHTING AND SHADESAILS NOT SHOWN.
CAN BE INCLUDED AT ADDITIONAL COST

BESPOKE SHADE STRUCTURE MAY BE SUBSTITUTED FOR EXISTING
SHELTER ON SITE. SEE PHOTO BELOW

HABITAT CREATION



EXAMPLE DRINK FOUNTAIN



PROJECT FEATURES by Nature Base Play

DESIGN DEVELOPMENT AND FINALISATION
LOGISTICS AND PLANNING FOR CONSTRUCTION

SURFACES:

EXCAVATE / DISPOSE / FILL SOIL
LANDSCAPE MULCH
Average Depth 100mm
SOFTFALL MULCH (Playground Grade)
Average depth 100mm, 300mm in Fall Zones
SCREENED WHITE SAND
Minimum Depth 300mm
CONCRETE PATH
Grey concrete path

LIMESTONE BLOCK EDGING

Broken up with Logs/Rocks
Height 200-500mm

CONCRETE KERB

Mowing Kerb to City of Cockburn standard

PLANTINGS:

SOIL PREP
New Soil and Soil Conditioner
SELECT 90L TREES
Approved Native Species
SHRUB PLANTINGS
Low Shrubs and groundcover under 1m
High Shrubs up to 1.3m
For all plant species,
refer to original planting palette URBIS

NBP LANDSCAPE:

SELECT GROUND ROCKS
WA Limestone. Up to 1m across
SELECT GROUND LOGS
Select Logs 400mm+ Ø Placed for stability
CARVED TOP BOWL LOGS
Shallow bowls carved and sealed
FLAT TOP BENCH LOGS
Top edge cut flat and sealed
BALANCE LOGS
With support posts as required
ALLOWANCE FOR WHARF ROPE FIXING
80mm+ Ø rope. Bolted to timbers
TIMBER STEPPERS
Fixed in concrete footings

NBP TIMBER GIANT

Large climbing stump with carved notches

CUBBY CLIMBER

Bespoke cubby/ climbing frame

HABITAT WATERING ROCK

Temporary water pooling with retic

ADDITIONAL SERVICES:

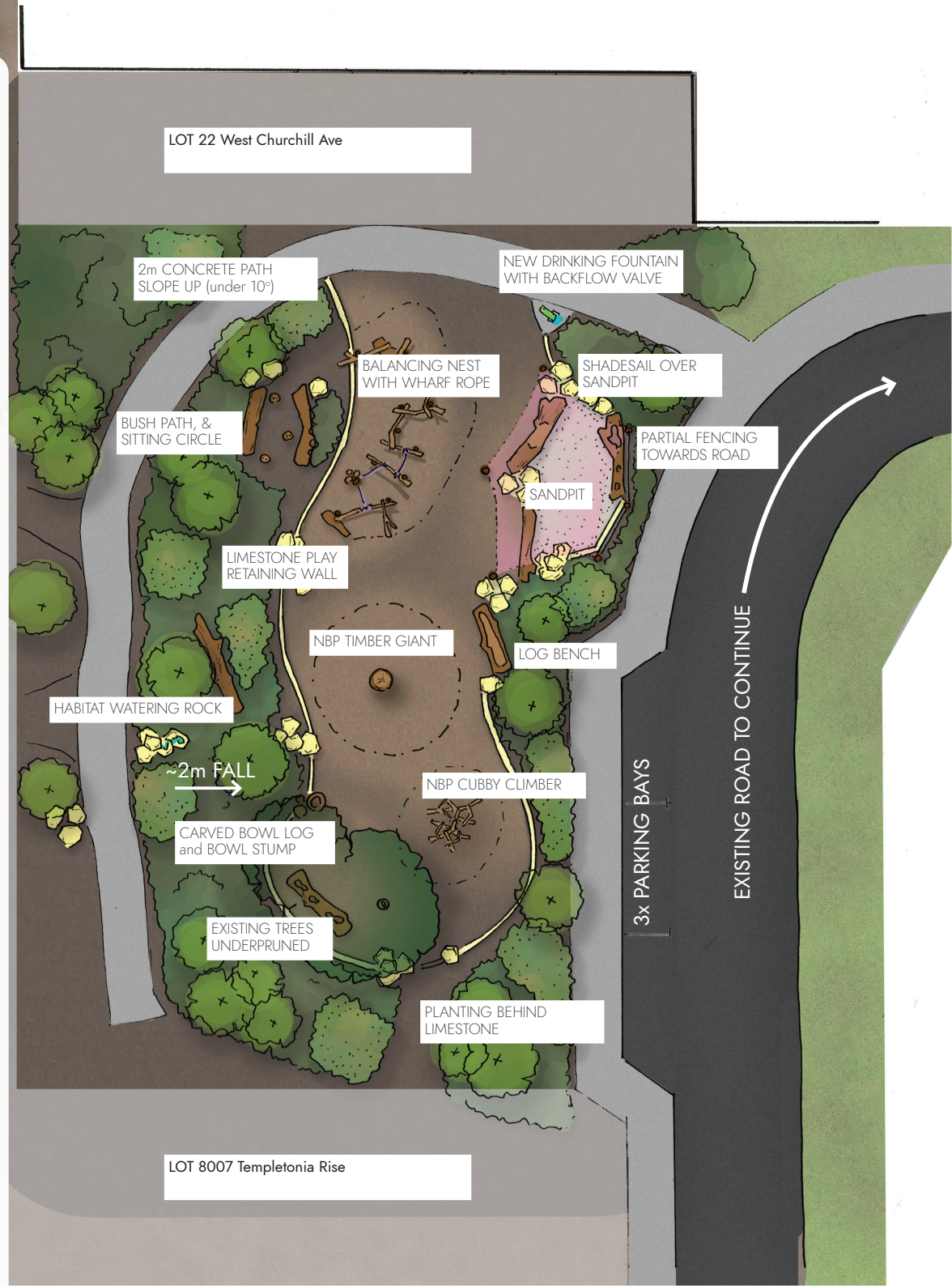
DRINK FOUNTAIN
Mains water connect and backflow valve
Drainage to planting

SHADESAIL

Commercial Shadesail on Select Timber Posts

PARTIAL FENCING

1200mm Pool Fence with Timber Posts



LOT 8007
Templetonia Rise
NOT IN SCOPE

LOT 22 West Churchill Ave
NOT IN SCOPE



Nature
Based Play



LAKE COOGEE PUBLIC OPEN SPACE
CONCEPT IMAGES 1/2

NBP CUBBY CLIMBER



NBP TIMBER GIANT



NBP BALANCING NEST



NBP ROPES



CARVED BOWL LOG





SANDPIT with STEP THROUGH LOG



NBP FLAT TOP LOG BENCHES



SAND PLAY



SHADESAILS ON TIMBER POSTS





HABITAT WATER ROCK

APPENDIX F

**BUSHFIRE ATTACK LEVEL
ASSESSMENT**

DOCUMENT CONTROL

Description:		AS 3959 Bushfire Attack Level Assessment	
Revision	Date	Certified By	
1	11 July 2024 AS 3959 Bushfire Attack Level Assessment	Name:	Matthew Sobelik Senior Building Surveyor BPAD Level 1 - 36534
		Signature:	
2	16 October 2024 AS 3959 Bushfire Attack Level Assessment	Name:	Matthew Sobelik Senior Building Surveyor BPAD Level 1 - 36534
		Signature:	

Liability limited by a scheme approved under Professional Standards Legislation

JOB DETAILS

Client:	Otherside Property
Address:	645 Rockingham Road, Lake Coogee
Local Government Area:	City of Cockburn
Description of Building Works:	Proposed Subdivision

ASSESSMENT DETAILS

Assessment Date:	10 July 2024
Determined BAL Rating:	Low
BAL Exposure Level:	There is insufficient risk to warrant specific construction requirements
Applicable Construction:	AS 3959-2018 Section 4, requirements listed in Appendix 3 of this document



SITE ASSESSMENT & SITE PLAN

The assessment of this site / development was undertaken on 10/07/24 by Building Certification Services WA for the purpose of determining the Bushfire Attack Level on the Proposed Subdivision in accordance with AS 3959-2018 Simplified Procedure (Method 1).

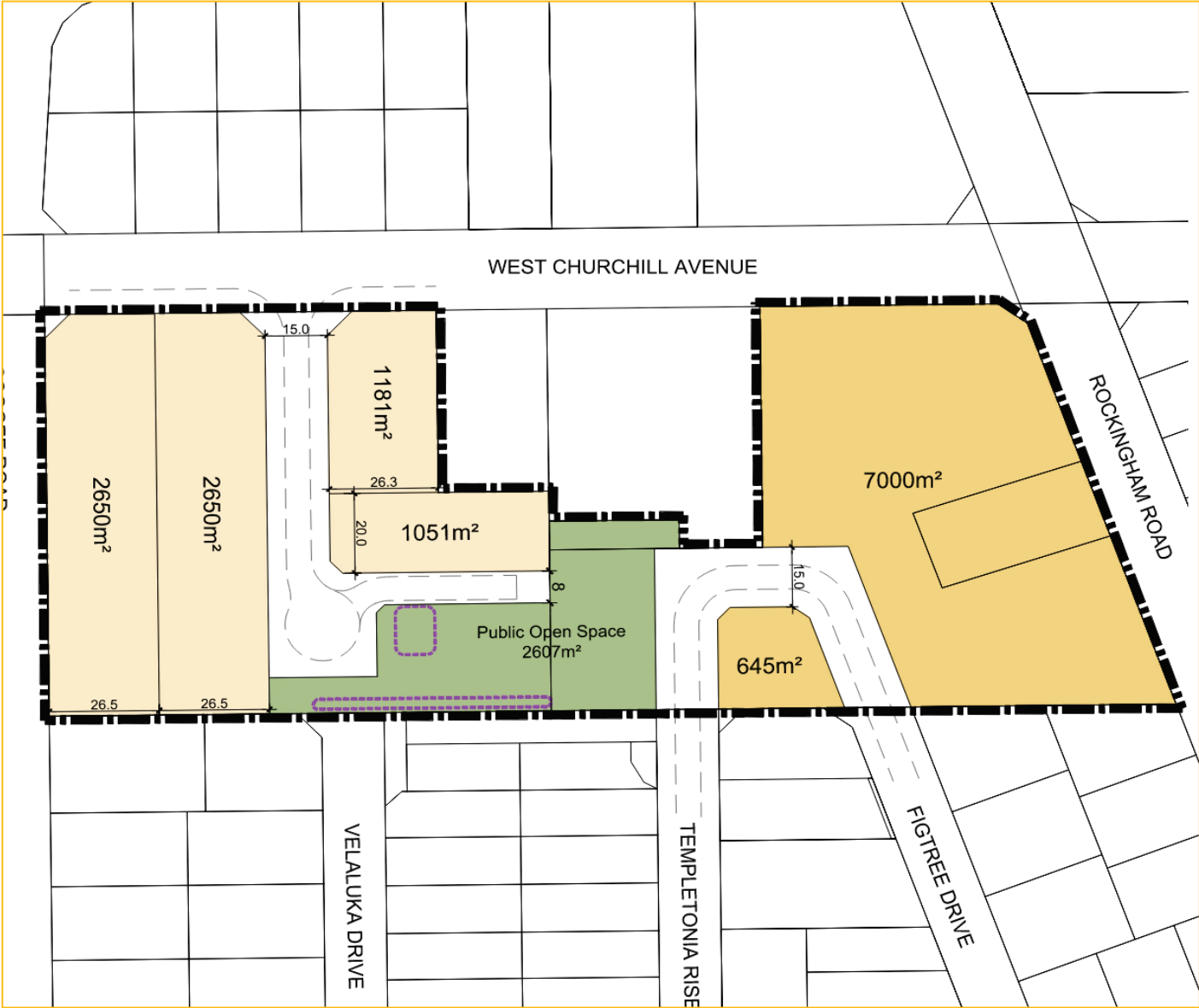
Designated Bushfire Prone Area

The following map identifies the area designated by the Department of Fire and Emergency Services (DFES) as being subject, or likely to be subject, to bushfire attack.



Proposed Site Plan

The site assessment has been undertaken in conjunction with the site plan provided by the client, as detailed below, and is limited to the surrounding environment within 150m of the proposed building at the time of the inspection.



The following map identifies the plots that impact on the bushfire attack level assessment of the subject lot.



LEGEND



North Point



100m Assessment Area



150m Assessment Area



Subject lot and works



Photo ID



Plot A - Exclusion 2.2.3.2(f)



Plot B - Exclusion 2.2.3.2(b)



Plot C - Exclusion 2.2.3.2(f)



Plot D - Exclusion 2.2.3.2(f)



Plot E - Exclusion 2.2.3.2(f)



Plot F - Exclusion 2.2.3.2(f)



Plot G - Exclusion 2.2.3.2(a)



Plot H - Exclusion 2.2.3.2(f)



Plot I - Exclusion 2.2.3.2(f)



Plot J - Exclusion 2.2.3.2(f)





Plot K - Exclusion 2.2.3.2(e)



VEGETATION CLASSIFICATION

All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2018. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below.


Plot :	A	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, lot currently in a low fuel state and subject to proposed subdivision			
Photo ID: 1		Photo ID: 2	




Plot :	B	Classification or Exclusion Clause:	Exclusion 2.2.3.2(b)
Description / Justification for Classification:			
Single areas of vegetation less than 1ha in area and not within 100m of other areas of vegetation being classified			
			
Photo ID: 3		Photo ID: 4	



Plot :	C	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, lot currently in a low fuel state and subject to proposed subdivision			
			
Photo ID: 5		Photo ID: 6	




Plot :	D	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, including grassland managed in a minimal fuel condition. Lot subject to City of Cockburn's fire control order, grasses to trimmed to a maximum height of 50mm			
			
Photo ID: 7			



Plot :	E	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks			
			
Photo ID: 8		Photo ID: 9	

Plot :	F	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, including grassland managed in a minimal fuel condition. Lot subject to City of Cockburn's fire control order, grasses to trimmed to a maximum height of 50mm			
			
Photo ID: 10			

Plot :	G	Classification or Exclusion Clause:	Exclusion 2.2.3.2(a)
Description / Justification for Classification:			
Vegetation of any type that is more than 100m from the site			
			
Photo ID: 11		Photo ID: 12	



Plot :	H	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, including grassland managed in a minimal fuel condition. Lot subject to City of Cockburn's fire control order, grasses to trimmed to a maximum height of 50mm			
<div> <div> <div>S</div> <div>180</div> </div> <div> <div>SW</div> <div>210</div> </div> <div> <div>W</div> <div>270</div> </div> <div> <div>NW</div> <div>330</div> </div> </div> <div> <div>259°W (T)</div> <div>32°8'10"S, 115°47'11"E ±16ft</div> <div>▲ 53ft</div> </div>  <div>10 Jul 2024, 10:14:07</div>			
Photo ID: 13			

Plot :	I	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks			
<div> <div> <div>N</div> <div>0</div> </div> <div> <div>NE</div> <div>30</div> </div> <div> <div>E</div> <div>90</div> </div> <div> <div>SE</div> <div>120</div> </div> <div> <div>S</div> <div>180</div> </div> </div> <div> <div>91°E (T)</div> <div>32°8'10"S, 115°47'8"E ±9ft</div> <div>▲ 71ft</div> </div>  <div>10 Jul 2024, 10:12:04</div>		<div> <div> <div>S</div> <div>180</div> </div> <div> <div>SW</div> <div>210</div> </div> <div> <div>W</div> <div>270</div> </div> <div> <div>NW</div> <div>330</div> </div> </div> <div> <div>239°SW (T)</div> <div>32°8'10"S, 115°47'11"E ±13ft</div> <div>▲ 50ft</div> </div>  <div>10 Jul 2024, 10:14:15</div>	
Photo ID: 14		Photo ID: 15	

Plot :	J	Classification or Exclusion Clause:	Exclusion 2.2.3.2(f)
Description / Justification for Classification:			
Shrubs greater than 2m high, less than 30% foliage cover, understorey containing smaller dense shrubs			
Photo ID: 16		Photo ID: 17	

Plot :	K	Classification or Exclusion Clause:	Exclusion 2.2.3.2(e)
Description / Justification for Classification:			
Shrubs greater than 2m high, less than 30% foliage cover, understorey containing smaller dense shrubs			
Photo ID: 18			

RELEVANT FIRE DANGER INDEX

The fire danger index for this site has been determined in accordance with Table 2.1 or otherwise determined in accordance with a jurisdictional variation applicable to the site.

Fire Danger Index							
FDI 100 - Table 2.4	<input type="checkbox"/>	FDI 80 - Table 2.5	<input checked="" type="checkbox"/>	FDI 50 - Table 2.6	<input type="checkbox"/>	FDI 40 - Table 2.7	<input type="checkbox"/>

Potential Bushfire Impacts

The potential bushfire impact to the site / proposed development from each of the identified vegetation plots are identified below

Plot	Vegetation Classification	Effective Slope	Separation (m)	BAL
A	Exclusion 2.2.3.2(f)			Low
B	Exclusion 2.2.3.2(b)			Low
C	Exclusion 2.2.3.2(f)			Low
D	Exclusion 2.2.3.2(f)			Low
E	Exclusion 2.2.3.2(f)			Low
F	Exclusion 2.2.3.2(f)			Low
G	Exclusion 2.2.3.2(a)			Low
H	Exclusion 2.2.3.2(f)			Low
I	Exclusion 2.2.3.2(f)			Low

Table 1: BAL Analysis

Determined Bushfire Attack Level (BAL)

The determined bushfire attack level has been calculated using the above Table 1: BAL Analysis and represents the highest BAL rating for the site/development where there is no requirement for additional vegetation to be modified or cleared. The rating represents the site's current state.

Determined Bushfire Attack Level (BAL)	BAL Low
--	---------



APPENDIX 1 - VEGETATION CLASSIFICATION

Vegetation Classification

Vegetation shall be classified in accordance with Table 2.3 and Figures 2.4(A) to 2.4(G). Where there is more than one vegetation type, each type shall be classified separately with the worst case scenario (predominant vegetation is not necessarily the worst case scenario) applied.

2.2.3.2 Exclusions - Low threat vegetation and non-vegetated areas

The Bushfire Attack Level shall be classified BAL - LOW where the vegetation is one or a combination of any of the following:

- (a) Vegetation of any type that is more than 100m from the site
- (b) Single areas of vegetation less than 1ha in area and not within 100m of other areas of vegetation being classified
- (c) Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other
- (d) Strips of vegetation less than 20m in width regardless of length and not within 20m of the site, or each other, or other areas of vegetation being classified
- (e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops
- (f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks

Table 2.3 Classification of Vegetation

Vegetation Classification	Vegetation Type	Description
A Forest	Tall open forest	Trees over 30m high; 30-70% foliage cover. Found in areas of high reliable rainfall. Typically dominated by eucalyptus
	Tall woodland	
	Open forest	Trees 30m high; 30-70% foliage cover. Typically dominated by eucalyptus
	Low open forest	
B Woodland	Pine Plantation	Trees 30m in height at maturity, generally comprising Pinus species or other softwood species, planted as a single species
	Woodland	Trees 10-30m high; 10-30% foliage cover dominated by eucalyptus; understorey or low trees to tall shrubs
	Open Woodland	
	Low woodland	Low trees and shrubs 2-10m high; foliage cover less than 10%. Dominated by eucalyptus and Acacias. Often have a grassy understorey or low shrubs
C Shrubland	Low open woodland	
	Open shrubland	
	Closed heath	Found in wet areas and/or areas affected by poor soil fertility or shallow soils. Shrubs 1-2m high
D Scrub	Open heath	
	Low shrubland	Shrubs <2m high; greater than 30% foliage cover. Understorey may contain grasses
	Closed scrub	Found in wet areas and/or areas affected by poor soil fertility or shallow soils; >30% foliage cover. Shrubs >2m high
D Scrub	Open scrub	Shrubs greater than 2m high; 10-30% foliage cover with a mixed species composition

E Mallee/ Mulga	Tall shrubland	Vegetation dominated by shrubs with a multi-stemmed habit; usually greater than 2m in height; <30% foliage cover. Understorey of widespread to dense low shrubs or sparse grasses
F Rainforest	Tall closed forest Closed forest Low closed forest	Trees 10-40m in height; >90% foliage cover; understorey may contain a large number of species with a variety of heights
G Grassland	Low open shrubland Tussock grassland Hummock grassland Herbfield	All forms, including situations with shrubs and trees, if the overstorey foliage cover is less than 10%



APPENDIX 2 - BUSHFIRE ATTACK LEVEL

Bushfire Attack Level Assessment Explained

A Bushfire Attack Level (BAL) Assessment is a means of measuring the severity of a buildings potential exposure to ember attack, radiant heat and direct flam contact in a bushfire event, and thereby determining the construction measures required for the dwelling.

The methodology used for the determination of the BAL rating, and the subsequent building construction standards, are directly referenced from Australian Standard AS 3959-2018 Construction of buildings in bushfire prone areas.

The BAL rating is determined through identification and assessment of the following parameters:

- Fire Danger Index (FDI) rating; assumed to be FDI-80 for WA;
- All classified vegetation within 100m of the subject building;
- Separation distance between the building and the classified vegetation source/s; and
- Slope of the land under the classified vegetation.

AS 3959-2018 has six (6) levels of BAL, based on the radiant heat flux exposure to the building, and also identifies the relevant sections for building construction, as detailed below:

Bushfire Attack Level (BAL)	Heat flux exposure thresholds	Description of predicted bushfire attack and levels of exposure	Construction Section (within AS 3959)
BAL Low	See clause 2.2.3.2	There is insufficient risk to warrant specific construction requirements	4
BAL 12.5	$\leq 12.5\text{kW/m}^2$	Ember attack	3 & 5
BAL 19	$> 12.5\text{kW/m}^2 \leq 19\text{kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 & 6
BAL 29	$> 19\text{kW/m}^2 \leq 29\text{kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 & 7
BAL 40	$> 29\text{kW/m}^2 \leq 40\text{kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames	3 & 8
BAL FZ	$> 40\text{kW/m}^2$	Direct exposure to flames from the front in addition to heat flux and ember attack	3 & 9



APPENDIX 3 - CONSTRUCTION REQUIREMENTS

SECTION 4 BAL - LOW

This standard does not provide construction requirements for buildings assessed in bushfire-prone areas in accordance with section 2 as being BAL-LOW

The bushfire attack level BAL-LOW is based on insufficient risk to warrant specific bushfire construction requirements. It is predicated on low threat vegetation and non-vegetated areas (see clause 2.2.3.2)



Bushfire Attack Level (BAL) Certificate

Determined in accordance with AS 3959-2018

This Certificate has been issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme. The certificate details the conclusions of the full Bushfire Attack Level Assessment Report (full report) prepared by the Accredited Practitioner.

Property Details and Description of Works


Address Details	Unit No	Street No	Lot No	Street Name/Plan Reference	
		645		Rockingham Road	
Local government area	Suburb			State	Postcode
	Lake Coogee			W.A.	
	City of Cockburn				
Main BCA class of the building		Use(s) of the building			
Description of the building or works	Proposed Subdivision				

Determination of Highest Bushfire Attack Level

AS3959 Assessment Procedure	Vegetation Classification	Effective Slope	Separation Distance (m)	BAL
Method 1	Exclusion 2.2.3.2(f)			Low

BPAD Accredited Practitioner Details

Name
Matthew Sobelik
Company Details
BCSWA Pty Ltd
I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959-2018 (Incorporating Amendments 1, 2 and 3)

I hereby declare that I am a BPAD accredited bushfire practitioner.	
Accreditation No.	BPAD36534
Signature	
Date	16/10/2024

Authorised Practitioner Stamp

Reliance on the assessment and determination of the Bushfire Attack Level contained in this certificate should not extend beyond a period of 12 months from the date of issue of the certificate. If this certificate was issued more than 12 months ago, it is recommended that the validity of the determination be confirmed with the Accredited Practitioner and where required an updated certificate issued.

DISCLAIMER & LIMITATION

This assessment has been carried out in accordance with AS 3959-2018 for the purpose of calculating the potential Bushfire Attack Level (BAL).

A fire event is unpredictable and can be influenced by many factors such as, but not limited to, temperature, wind speed, wind direction, humidity, the slope of the land, vegetation fuel load, growth, planting or removal, level of implementation and maintenance of fire prevention measures and the construction of additional structures upon the property that are not included as part of this assessment. If you are concerned or notice that factors have changed a new Bushfire Attack Level should be undertaken.

As permitted by the law and to its greatest extent, BCSWA Pty Ltd and its associated employees excludes all liability whatsoever for: Damage, loss, injury, death or claim to any property and/or person caused by a fire regardless of how that fire was caused and Errors and/or omissions in this report with the client expressly acknowledging that such exclusion of liability is reasonable in all circumstances.

This assessment is not a Bushfire Management Plan and does not in any way certify that the proposed structure has been built in accordance with the assessed BAL rating. In providing this report as part of a development application or building licence the client and landowner acknowledges that they understand, approve and will comply with all requirements to maintain the separation distances detailed in this report. Furthermore, the client/landowner acknowledges and accepts all responsibility in maintaining the required building protection zone defined in AS 3959-2018.

This report is valid for 12 months only from the date of issue.