



Structure Plan Part One

Southern River Precinct 3E – Lots 13, 14,
18, 19, 20, 21 and 22 Southern River Road
and Matison Street, Southern River

Prepared for LWP

Prepared by Taylor Burrell Barnett / MGA Town Planners

May 2025



Document Information

Structure Plan

Southern River Precinct 3E Structure Plan
(WAPC Ref: SPN/0221M-1)

Technical Reports

Acoustic Assessment, prepared by Herring Storer Acoustics.

Revised Traffic Impact Assessment, prepared by Transcore.

Local Water Management Strategy Addendum, prepared by RPS.

Bushfire Management Plan Addendum, prepared by Strategen.

Landscape Masterplan, prepared by Plan E.

Flora and Vegetation Assessment, prepared by RPS.

Engineering Services Report, prepared by Cossill and Webley.

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Doc ID: PART 1 - 16~043 RPT Southern River Precinct 3E LSP (Modified 2) - Part 1

Revision	Reviewer	Date Issue
16/043 - Rev 0	MGA Town Planners	April 2017
16/043 - Rev 1	ST	17-09-2019
16/043 - Rev 2	ST	14-11-2022
16/043 - Rev 3	ST	21-05-2025

Disclaimer

This document was prepared for LWP Southern River Pty Ltd for the purposes of the Southern River Precinct 3E Local Structure Plan – Part One, and may only be used in accordance with the executed agreement between Taylor Burrell Barnett and the Client.

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ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Gosnells Town
Planning Scheme No. 6.

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

04 MAY 2017

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:

04 MAY 2027

Table of Amendments

Each time a Structure Plan is amended, the amendment is to be recorded in the table of amendments at the front of the Structure Plan, including the amendment type (minor or major).

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC
1 SPN/0221M-1 (as prepared by TBB for LWP Southern River Pty Ltd)	Refer Addendum 1: <ol style="list-style-type: none"> 1. Revised street cell structure and orientation. 2. Relocated entrance road connection to Southern River Road. 3. Relocated road connection from within Lot 18 to Lot 19 to southern portion of subdivision area and Matison Street. 4. Additional laneway lot opportunities. 5. Public Open Space (POS) modification and associated road frontage. 6. Additional medium density (R40-R60) allocation and distribution. 7. Additional drainage provision. 8. Minor modifications to the drainage, road and lot layout confined to the north-west corner of the Structure Plan area, adjacent Southern River Road in response to bushfire impacts. 	Minor	19 May 2020
2 SPN/0221M-2	Refer Addendum 2: <ol style="list-style-type: none"> 1. Land previously identified as 'Subject to Further Planning' to be designated 'Residential R25 – R40', with a proposed street block layout 2. Modification to the kennel buffer alignment, removing the Precinct 3E local structure plan area from the kennel buffer area. 3. Residential zones and roads which have now been created, following subdivision approval, are updated to reflect the approved subdivision layout. 4. Local Centre relocated to intersection of Matison Street and Evandra Road. 5. Public Open Space (POS) relocated adjacent Matison Street. 6. Landscape Concept Plan Updated based on modifications requested from DPLH/ 	Minor	05 June 2025

Table of Density Plans

Each time a density plan is approved, the plan is to be recorded in the table of density plans at the front of the Structure Plan.

Density Plan No.	Area of Density Plan Application	Date Endorsed by WAPC
16/043/025D	Stage 1 and 2	01 June 2018
16/043/041B	Stage 2B	13 October 2021
16/043/041A	Stage 3-6	24 December 2019
16/043/062C	Stage 7 & 8	1 December 2021

Executive Summary

MGA Town Planners (MGA) was commissioned by the Department of Housing and Maddestra Group to progress a Structure Plan (SP) over the Southern River Precinct 3E area. Modifications have been made by Taylor Burrell Barnett on behalf of LWP Southern River Pty Ltd.

Southern River is situated at the edge of the urban development front within the south east corridor and is characterised by new greenfield urban development and small rural landholdings. The SP area is made up of seven lots with a combined land area of 25.7ha, comprising the entirety of Southern River Precinct 3E. The SP area is surrounded by existing medium density urban development to the west (Blechley Park) and south west (Southern River) and other small rural landholdings to the north, east and south. A shopping centre has recently been approved and constructed over Lot 11 Southern River Road, directly to the east of the site.

The intended outcome of the SP is to facilitate the establishment of a range of housing types and appropriate residential density meeting the emerging needs of the Perth Metropolitan Region with respect to lifestyle and changing demographics. Also, the SP facilitates the appropriate management of natural elements and features, including significant tracts of native vegetation and the reuse of stormwater within a high-quality urban landscaping framework.

The SP will guide the future development of Precinct 3E in harmony with surrounding urban development, drawing on contemporary urban design and urban water management principles.

History – Original Approved LSP

An original SP plan and report dated February 2010 was prepared by Urbanplan. The SP was approved by the City of Gosnells at its ordinary meeting on 9 August 2011 subject to modifications.

Subsequent to the City approving the SP, matters raised by the Department of Planning (DoP) and Department of Environment Regulation (DER) during their assessment, resulted in various additional studies being required in order to progress the LSP.

Additional studies undertaken or altered since August 2011 to inform the original adopted 2017 SP included the following:

- Modified LSP report, statutory component, modified plans – MGA Town Planners.
- Environmental Noise Assessment – Lloyd George.
- Traffic Impact Assessment – Cardno Eppell Olsen.
- Retail Needs Assessment / Local Activity Centres Strategy 2012 - City of Gosnells.
- Local Water Management Strategy – Bioscience.
- Landscaping Strategy Plan – EPCAD.
- Landscape Masterplan – RPS.

Those involved in the preparation of the original SP included:

- Urbanplan - Planning and Design.
- Bioscience Pty Ltd (Environmental / Wetland investigations and Local Water Management Strategy).
- RPS Environment (Investigations informing Precinct 3 SP).

Noise impacts associated with the existing kennel uses to the west of the subject land were investigated and reported on to the DER. This resulted in the need to provide an alternative land use outcome for land in the south western corner of the SP area included in the 500m noise buffer, given that residential development was identified as being unsuitable in this location.

Accordingly, the SP showed an area being identified as 'Subject to Further Planning', to be addressed through a subsequent amendment to the SP, or development application progressed by the landowner. Other immediate alternative land uses now incorporated in the affected area include a local activity centre.

The local activity centre will provide opportunity for the establishment of a local commercial centre which may include a small supermarket and supporting convenience retailing or alternative uses such as childcare. Traffic studies were originally undertaken by Cardno Eppell Olsen, with subsequent Traffic Impact Assessment prepared by Transcore, in order to investigate various alternative road designs, road alignments and future traffic volumes.

The SP provides a framework enabling highest and best use of the subject land, while having the capacity to respond to altering perceptions of market demand through the indicative R-Code ranges identified on the SP.

Modification 1 – September 2019

Subsequent to the adoption of the Structure Plan by the WAPC on 4 May 2017, Taylor Burrell Barnett, on behalf of LWP Southern River Pty Ltd, submitted a modification to the adopted Structure Plan in September 2019 seeking the following:

1. Revised street cell structure and orientation.
2. Relocated entrance road connection to Southern River Road.
3. Relocated road connection from within Lot 18 to Lot 19 to southern portion of subdivision area and Matison Street.
4. Additional laneway lot opportunities.
5. Public Open Space (POS) modification and associated road frontage.
6. Additional medium density (R40-R60) allocation and distribution.
7. Additional drainage provision.
8. Minor modifications to the drainage, road and lot layout confined to the north-west corner of the Structure Plan area, adjacent Southern River Road in response to bushfire impacts.

In support of the modification to the Structure Plan, the following addendums to previous technical studies were undertaken:

- Traffic Impact Assessment prepared by Transcore;
- Local Water Management Strategy Addendum prepared by RPS;
- Bushfire Management Plan Addendum prepared by Strategen;
- Landscape Concept Plan Addendum prepared by Plan E;
- Environmental Addendum prepared by RPS;
- Engineering Services Addendum preparation by Cossill and Webley; and
- Transportation Noise Assessment prepared by Lloyd George Acoustics.

Part 1 of the Structure Plan was then updated to reflect the modified Structure Plan. No modifications were made to Part 2 of the Structure Plan directly, with all relevant revisions being covered in the updated addendums to the Structure Plan and technical studies.

Modification 2 – November 2022

Since the adoption of the Modified SP, further investigations have been undertaken to confirm that residential development is viable and appropriate within the area of the SP identified as 'Subject to Further Planning'. Technical studies have been completed to verify the relative noise impacts on future sensitive development within the 500-metre kennel zone buffer (the 'kennel buffer'). These studies demonstrate that noise can be maintained within the assigned levels of the Environment Protection (Noise) Regulations 1997. These studies confirm that sensitive development can be accommodated within the kennel buffer. As such, a modification to the kennel buffer alignment is proposed to allow noise sensitive development within 500 metres of the kennel zone. A modification to the adopted Structure Plan has been prepared to incorporate the area shown as 'Subject to Further Planning' and provides for the following modifications:

1. Land previously identified as 'Subject to Further Planning' to be designated 'Residential R25 – R40', Local Centre and Public Open Space, with a proposed street block layout.
2. Residential zones and roads which have now been created, following subdivision approval, are updated to reflect approved subdivision layout.
3. Local Centre relocated to intersection of Matison Street and Evandra Road.
4. Public Open Space (POS) relocated adjacent Matison Street.

In support of the modification to the SP, a Noise Assessment has been prepared by Herring Storer Associates. Additionally, the following Addendum's to previous technical studies have been prepared:

- Revised Traffic Impact Assessment prepared by Transcore;
- Local Water Management Strategy Addendum prepared by RPS;
- Bushfire Management Plan Addendum prepared by Strategen;
- Landscape Concept Plan Addendum prepared by Plan E;
- Flora and Vegetation Assessment prepared by RPS;
- Engineering Services Addendum preparation by Cossill and Webley; and
- Transportation Noise Assessment prepared by Lloyd George Acoustics.

Part 2 of this report has been retained in its previously approved form (4 May 2017) and a brief Addendum to Part 2 has been prepared documenting the changes which are the subject of the current modification. All other aspects of Part 2 remain unchanged as a result of this SP modification.

Table 1 below provides a summary of key data and planning outcomes sought within the SP.

Item	Data	Structure Plan Section No.
Total area covered by the Structure Plan	25.784ha	Part Two – Section 3.0
Area of each land use proposed	Hectares	
• Residential	13.8903	
• Local Centre	0.3234	
• Southern River Road ORR Widening	0.1290	Sections 7.0, 8.0, 9.0
• Drainage (1:1YR)	0.4389	
• Estimated area of Public Open Space	4.5851	
• Estimated unrestricted area (local parks)	0.9030	
Total Estimated Lot Yield	408	Section 7.0
Estimated No. of Dwellings	383 – 433 dwellings	Section 7.0
Residential Site Hectare Density (Directions 2031 Target – 26 dwellings / site hectare)	28 + dwellings / site hectare	Section 7.0
Estimated Population	996 – 1,126 persons (@ 2.6 persons per dwelling)	Section 7.0
Shop / Retail Floor Space	Maximum 1,200m ² NLA PLUC 5 shop/retail floor space	Section 15.0

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Technical Appendices

Appendix A Part Two – Addendum 1
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The background is a solid blue color. In the upper left, there is a light blue diagonal line. Below it, the text '1.0' is written in a large, dark blue, sans-serif font. Underneath '1.0', the word 'Implementation' is written in a smaller, white, sans-serif font. In the bottom right corner, there is a complex geometric arrangement: a dark blue diagonal line, a light blue parallelogram, and a thin orange diagonal line crossing through them.

1.0

Implementation

1.0 Implementation

1. Structure Plan Area

This Structure Plan shall apply to Lots 13, 14, 21 and 22 Southern River Road and Lots 18, 19 and 20 Matison Street, being the land contained within the inner edge of the line denoting the Structure Plan boundary, on the Structure Plan Map (Plan 1).

2. Operation

The date the structure plan comes into effect is the date the structure plan is approved by the WAPC.

3. Objectives

The objectives of this Structure Plan are to:

- i) Provide a range of lot sizes to facilitate the creation of a mix of housing typologies and affordable housing options to cater to a variety of household types.
- ii) Provide a vibrant and attractive Local Activity Centre (Village Hub), meeting the daily and weekly shopping needs of local residents.
- iii) Retain the general landform and natural features of the site, as far as practicable, through the designation of appropriate land uses, the design of the road network and consideration of future built form.
- iv) Encourage the use of alternative modes of transport by creating safe and efficient connections to public transport, pedestrian and cyclist networks throughout the Structure Plan area.
- v) Embrace the landscape amenity afforded by the established vegetation and wetland setting.
- vi) Maximise opportunities for passive surveillance of public open space, pedestrian and cyclist routes to enhance the amenity and safety of the public realm.
- vii) Deliver a highly connected road network featuring shared use paths that also align with movement networks through public open space areas.

4. Structure Plan Map

The Structure Plan Map (**Plan 1**) depicts the planned pattern of development, zones and reserves for the Local Structure Plan area.

5.2 Residential Zone

5.2.1

- a. For land zoned Residential on the Structure Plan, subdivision and development shall generally be in accordance with the Structure Plan.
- b. Use class permissibility shall be in accordance with Table 1 of the Scheme as applicable to the 'Residential' zone.

5.2.2

a. Applicable Dwelling Target

- i) To provide a minimum density of 26 dwellings per residential site hectare.

b. Subdivision and Local Development Plans shall achieve the following:

- i) To provide a range of lot sizes and types to meet the needs of different household types.
- ii) To encourage higher densities to support activity centres and public transport, and encourage reduced private vehicle trips.
- iii) Streetscape design and accessibility to be implemented that facilitates the use and enjoyment of the street and public spaces by pedestrians and cyclists.
- iv) Development shall be designed and sited to promote the use, enjoyment and surveillance of public open spaces.
- v) To ensure development and the orientation of streets facilitates passive solar access for lots.
- vi) To promote formal and informal active recreation areas adjacent to wetland and conservation areas able to support recreational activity.
- vii) Facilities are to be provided in open space areas to support passive recreation activities, including walking and cycling paths.
- viii) Landscaping is to incorporate the use of water collection and re-use where possible.
- ix) Satisfactory arrangements being made to upgrade existing roads and road reserves that abut the LSP area to an urban standard, including drainage, pathways, lighting and intersection treatments.
- x) Satisfactory arrangements facilitating the timely construction of the crossing over Balannup Lake branch drain.
- xi) A suitable uniform screen wall or fencing will need to be constructed and landscaping installed where lots are proposed to back onto Lander Street. The uniform screen wall is required to enhance streetscape and residential amenity outcomes, and address the requirement for noise amelioration from the nearby industrial / commercial precinct, Southern River Road and the Southern River kennel zone.
- xii) Matters of detailed design (i.e. provision of rear lanes, public open space, road alignments and intersection design) may be considered and refined at the subdivision stage.
- xiii) A 2.4m high noise wall shall be constructed along the residential properties facing Matison Street for the extent detailed on Plan 1 and as defined by the Acoustic Assessment (February 2024 or as amended).
- xiv) At subdivision stage, a 2.0m high masonry wall is to be constructed along the boundary of the Local Centre lot where it abuts the residential development as detailed on Plan 1 and as defined by the Acoustic Assessment (February 2024 or as amended).
- xv) At subdivision stage, a proportional contribution shall be required by Lot 18 Matison Street for the construction of Evandra Road, to the extent necessary to deliver pedestrian connectivity and access / egress to the Local Centre.

5.2.3 Residential Code Plan

- a. The Structure Plan (Figure 1) defines residential density ranges associated with specific areas within the Structure Plan. Lot specific residential densities, within the defined residential density ranges, are to be subsequently assigned in accordance with a Residential Code Plan approved by the WAPC.
- b. A Residential Code Plan shall be submitted at the time of subdivision to the WAPC showing an R-Coding applicable to each lot, being consistent with the Structure Plan (Figure 1) and the locational criteria contained in Clause 5.2.4.
- c. Approval of the Residential Code Plan shall be undertaken at the time of determination of the subdivision application by the WAPC. The approved Residential Code Plan shall then form part of the Structure Plan and be used for the determination of future subdivision applications.
- d. Variations to the Residential Code Plan will require approval from the WAPC, in conjunction with an approved plan of subdivision issued by the WAPC.
- e. A revised Residential Code Plan may replace, wholly or partially, the previously approved Residential Code Plan, and shall then form part of the Structure Plan.

- f. Residential Code Plans are not required if the WAPC considers that the subdivision is for one or more of the following:
 - i) the amalgamation of lots;
 - ii) consolidation of land for "super lot" purposes for future development;
 - iii) the provision of access, services or infrastructure; or
 - iv) land which by virtue of its zoning or reservation under the Structure Plan cannot be developed for residential purposes.

5.2.4 Locational Criteria

The allocation of residential densities on the R-Code Plan shall be in accordance with the following criteria:

a. Residential R25 – R40

- i) A base density code of R25 shall be provided for all other residential lots within the SP.
- ii) Medium densities of up to R40 shall be provided in areas of higher amenity including within 800m of activity centres, around public open space and adjacent to neighbourhood connector routes.

b. Residential R40 – R60

- i) Densities of up to R60 shall be provided in areas of high amenity including within the 400m walkable catchment of the Southern River Road Neighbourhood Centre (SR-08) located adjacent and opposite the LSP area, as well as adjacent to areas of public open space amenity and the Local Centre site located on Matison Street within Lot 18.

5.3 Local Centre Zone

5.3.1

a. Restricted Uses

Use class permissibility shall be in accordance with Table 1 of the Scheme as applicable to the 'Local Centre' zone, excluding the following uses:

- Aged or dependent persons dwelling
- Ancillary accommodation
- Bed and Breakfast
- Educational Establishment
- Family Day Care Centre
- Grouped Dwelling
- Home Business
- Home Occupation
- Home Office
- Home Store
- Hotel
- Multiple Dwelling
- Place of Worship
- Single House

b. Local Development Plan

If required by the Council or WAPC a Local Development Plan shall be prepared in respect of the Local Centre achieving the following standards, along with the requirements of Statement of Planning Policy 4.2; and the standards under Clause 7.6.3 of the Scheme guiding the preparation of Local Development Plans.

- i) Design and development that promotes walking and cycling, to encourage minimisation of private vehicle trips.
- ii) To provide for development addressing both Matison Street and Evandra Road; that provides a focal point for the local community.
- iii) Development to facilitate the establishment of uses meeting the daily and weekly shopping needs of local residents.
- iv) A covered and continuous pedestrian walkway is to be provided to the façade of buildings with the awning designed at a pedestrian scale providing shade and shelter.
- v) On site car parking not to be located between the front building setback line and the street reserve. Parking shall be located to the north and east of buildings.
- vi) Car parking shall be provided on site at a rate consistent with the Scheme; or the rate specified under Statement of Planning Policy SPP 4.2 – Activity Centres for Perth and Peel for shop/retail uses, at the discretion of the Council.
- vii) Building facades shall be presented in an attractive manner from vantage points within and beyond site boundaries.
- viii) Ground floor shop front elevations to be glazed, or incorporate similar visually permeable material, for a minimum 50% of the facade extent.
- ix) The maximum amount of PLUC 5 shop/retail floor space shall be limited to 1,200m² NLA. Should a Local Development Plan or development application propose a greater amount of PLUC 5 shop/retail floor space exceeding this limit, a Retail Sustainability Assessment shall be lodged to support the variation and be approved by the Council.

5.4 Public Open Space

TABLE 2a – Public Open Space Schedule

Total Site Area	25.7781ha
Less Deductions	
• Local Centre	0.3234ha
• Southern River Road ORR Widening	0.1290ha
• Drainage (POS #1-4)	0.4389ha
• Restricted POS not included in 20% contribution	2.8065ha
Gross Subdivisible Area	22.0803ha
Public open space @ 10%	2.2080ha
POS May Comprise:	
80% Unrestricted Use (Minimum)	1.7664ha
20% Restricted Use (Maximum)	0.4416ha
Total	2.2080ha
POS Provided:	
Unrestricted Use	
3 Local Parks (POS #5, 6 & 7)	0.9030ha
Restricted Use	
3.2481ha Total (POS #8 & 9)	
• Maximum POS credit for unrestricted use (20% POS requirement)	0.4416ha
• Restricted POS not included in POS contribution	2.8065ha
Total Creditable POS	1.3446ha
% Gross Subdivisible Area	6.1%

The POS contribution arrangements for Precinct 3 are to be addressed through the Development Contribution Scheme. The following table shows the distribution of restricted and unrestricted areas for each Lot within the SP area:

TABLE 2b - Southern River Precinct 3E POS Provided (Per Parent Lot)

Lot	Restricted (Ha)	Unrestricted (Ha)	Total (Ha)
13	0.5574	0	0.5574
14	0.0800	0	0.0800
18	0	0.5676	0.5676
19	1.9312	0	1.9312
20	0.8485	0	0.8485
21	0.0554	0.3354	0.3908
22	0.2078	0	0.2078
Total	3.6803	0.9030	4.5833

Lot 18, which contains Public Open Space Number 7 (0.5676ha), is owned by Carmelo Radici and Rosina Radici. The remainder of all undeveloped land and identified Public Open Space within the LSP area is owned by LWP Property.

6. Subsequent Plans and Strategies

Prior to the commencement of subdivision and development, the City will require the preparation and approval of the following:

6.1 Urban Water Management Plan

The requirement for an Urban Water Management Plan is to be imposed as a condition of subdivision approval and prepared generally in accordance with the adopted Local Water Management Strategy.

6.2 Landscape Management Plan

A Landscape Management Plan is to be prepared as a requirement of a condition of subdivision or development approval to the satisfaction of the Director of Planning, addressing management of public open space and landscaping associated with the Local Centre.

6.3 Wetland and Conservation Management Plan

A Wetland and Conservation Management Plan (or similar) is to be prepared prior to the submission of any application for subdivision, or development of land that may impact on the environmental values or drainage functionality of the proposed Public Open Space area. The plan is to be prepared in accordance with relevant City, Department of Water and Department of Parks and Wildlife Guidelines.

6.4 Flora Survey

A targeted flora survey for Declared Rare Flora listed under the Wildlife Conservation Act 1950 and known to occur in similar habitat in the local area shall be undertaken. The flora survey is to be submitted to the Department of Parks and Wildlife in conjunction with, or prior to, any application for subdivision or development.

6.5 Fauna Survey

A fauna survey shall be undertaken to determine whether there is a need for a fauna relocation management plan.

6.6 Transport Noise Assessment

If required in accordance with State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning, a Transport Noise Assessment is to be submitted in conjunction with any application for subdivision or development, to address noise impacts arising from Southern River Road.

6.7 Bushfire Management Plan

The applicant/landowner shall, in proceeding with subdivision and/or development, implement the relevant requirements of the Bushfire Management Plan (prepared in accordance with State Planning Policy 3.7 – Planning in Bushfire Prone Areas and the associated Guidelines for Planning in Bushfire Prone Areas).

7. Other Requirements

The following notification requirements to be applied as conditions of subdivision approval.

- i) A Notification, pursuant to Section 165 of the Planning and Development Act 2005, is to be placed on the Certificate(s) of Title of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the existence of a hazard or other factor.

The Notification is to state as follows:

‘This land is within a bushfire prone area, as designated by an Order made by the Fire and Emergency Services Commissioner and may be subject to a Bushfire Management Plan. Additional planning and building requirements may apply to development on this land.’

- ii) A Notification, pursuant to Section 165 of the Planning and Development Act 2005 is to be placed on the Certificates of Title of the proposed lot(s) within 1000 metres of the Southern River kennel zone advising of the existence of a hazard or other factor.

The Notification is to state as follows:

‘This lot is located within 1000 metres of a property with a current Kennel Licence and as such may be subject to noise impact from that operation.’

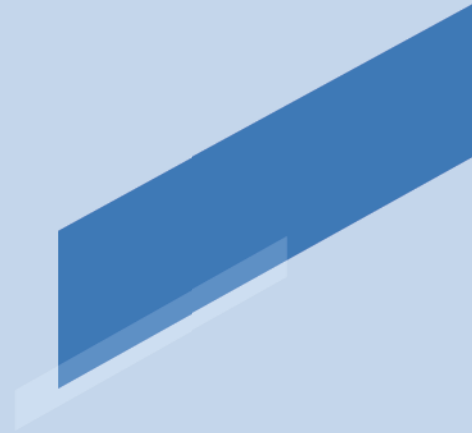
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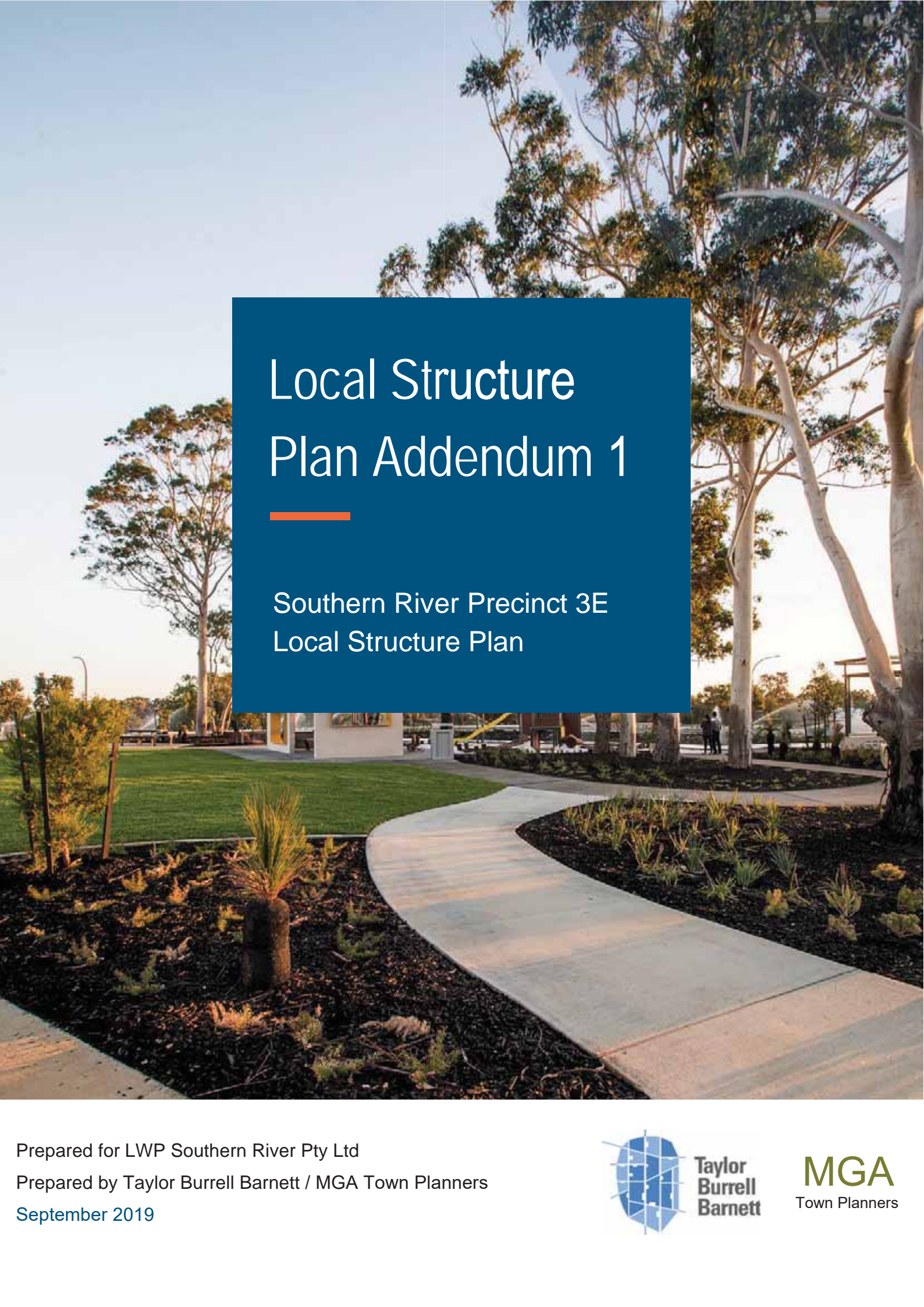
2.0

Explanatory Section

Appendix A

Part Two – Addendum 1





Local Structure Plan Addendum 1

Southern River Precinct 3E
Local Structure Plan

DOCUMENT HISTORY AND STATUS

**Southern River Precinct 3E
Local Structure Plan
(WAPC Ref: SPN/0221M-1)**

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EXECUTIVE SUMMARY

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Accordingly, the LSP shows an area being identified as 'Subject to Further Planning', to be addressed through a subsequent amendment to the LSP, or development application progressed by the landowner. Other immediate alternative land uses now incorporated in the affected area include a local activity centre.

The local activity centre will provide opportunity for the establishment of a local shopping centre including a small supermarket and supporting convenience retailing. Traffic studies were originally undertaken by Cardno Eppell Olsen, with subsequent Traffic Impact Assessment prepared by Transcore, in order to investigate various alternative road designs, road alignments and future traffic volumes.

The LSP provides a framework enabling highest and best use of the subject land, while having the capacity to respond to altering perceptions of market demand through the indicative R - Code ranges identified on the LSP.

Subsequent to the adoption of the Structure Plan by the WAPC on 4 May 2017, Taylor Burrell Barnett, on behalf of LWP Southern River Pty Ltd, submitted a modification to the adopted Structure Plan in September 2017 seeking the following:

1. Revised street cell structure and orientation.
2. Relocated entrance road connection to Southern River Road.
3. Relocated road connection from within Lot 18 to Lot 19 to southern portion of subdivision area and Matison Street.
4. Additional laneway lot opportunities.
5. Public Open Space (POS) modification and associated road frontage.
6. Additional medium density (R40-R60) allocation and distribution.
7. Additional drainage provision.
8. Minor modifications to the drainage, road and lot layout confined to the north-west corner of the Structure Plan area, adjacent Southern River Road in response to bushfire impacts.

In support of the modification to the Structure Plan, the following Addendums to previous technical studies have been undertaken:

- Traffic Impact Assessment prepared by Transcore.
- Local Water Management Strategy Addendum prepared by RPS.
- Bushfire Management Plan Addendum prepared by Strategen.
- Landscape Concept Plan Addendum prepared by Plan E.
- Environmental Addendum prepared by RPS.
- Engineering Services Addendum preparation by Cossill and Webley.
- Transportation Noise Assessment prepared by Lloyd George Acoustics.

Part 1 of this Structure Plan has been updated to reflect the modified Structure Plan. Part 2 of this report has been retained in its previously approved form (4 May 2017) and a brief Addendum to Part 2 has been prepared documenting the changes the subject of this recent modification (WAPC Ref: SPN/0221M-1). All other aspects of Part 2 remain unchanged as a result of this Structure Plan modification.

Table 1 below summarises key data and planning outcomes sought within the LSP.

Item	Data	Structure Plan Ref. (Section No.)
Total area covered by the Structure Plan	25.784 ha	Part Two - Section 3.0
Area of each land use proposed: <ul style="list-style-type: none"> Residential Local Centre Southern River Road ORR Widening Land Subject to Further Planning Drainage (1:1YR) Estimated Area of Public Open Space Estimated unrestricted area (local parks)	Hectares 10.6315 ha 0.2623 ha 0.1290 ha 4.1630 ha 0.2433 ha 4.3919 ha 3 local parks - 0.7107 ha	Sections 7.0, 8.0, 9.0
Total Estimated Lot Yield	350-375 lots	Section 7.0
Estimated No. of Dwellings	350-375 dwellings	Section 7.0
Residential Site Hectare Density (Directions 2031 target 26 dwellings / site hectare)	28+ dwellings / residential site hectare	Section 7.0
Estimated Population	910 + persons (@ 2.6 persons per dwelling)	Section 7.0
Shop/Retail floor space	Maximum 1,200m ² NLA PLUC 5 shop/retail floor space.	Section 14.0

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PART ONE IMPLEMENTATION

PART ONE - IMPLEMENTATION

1 STRUCTURE PLAN AREA

This Local Structure Plan shall apply to Lots 13, 14, 21 and 22 Southern River Road and Lots 18, 19 and 20 Matison Street, being the land contained within the inner edge of the line denoting the Local Structure Plan boundary, on the Local Structure Plan (Figure 1).

2 OPERATION

The date the structure plan comes into effect is the date the structure plan is approved by the WAPC.

3 OBJECTIVES

The objectives of this Local Structure Plan are to:

- i) Provide a range of lot sizes to facilitate the creation of a mix of housing typologies and affordable housing options to cater to a variety of household types.
- ii) Provide a vibrant and attractive Local Activity Centre (Village Hub), meeting the daily and weekly shopping needs of local residents.
- iii) Retain the general landform and natural features of the site, as far as practicable, through the designation of appropriate land uses, the design of the road network and consideration of future built form.
- iv) Encourage the use of alternative modes of transport by creating safe and efficient connections to public transport, pedestrian and cyclist networks throughout the Local Structure Plan area.
- v) Embrace the landscape amenity afforded by the established vegetation and wetland setting.
- vi) Maximise opportunities for passive surveillance of public open space, pedestrian and cyclist routes to enhance the amenity and safety of the public realm.
- vii) Deliver a highly connected road network featuring shared use paths that also align with movement networks through public open space areas.
- viii) Incorporate best practice principles of sustainability in the design process, including passive solar lot orientation and stormwater retention and reuse.

4 LOCAL STRUCTURE PLAN MAP

The Local Structure Plan Map (**Figure 1**) depicts the planned pattern of development, zones and reserves for the Local Structure Plan area.

5 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

The Local Structure Plan Map delineates and depicts the zones and residential density code ranges applicable to the Local Structure Plan.

5.1 LOCAL DEVELOPMENT PLANS

5.1.1

The WAPC may approve an application for subdivision subject to a condition requiring the applicant to submit and gain local government approval to a Local Development Plan prior to final subdivision approval, where a Local Development Plan has not previously been prepared and approved.

5.1.2

The provisions, standards and requirements of the Residential Zone are in accordance with those applicable to the same zone in the Scheme, except where varied by a Local Development Plan. Local Development Plans may be required by the WAPC or Council for:

- i) Rear loaded or Laneway lots;
- ii) Lots with dual frontages;
- iii) Lots abutting public open space;
- iv) The Local Activity Centre (if required by the Council or the WAPC);
- v) Lots affected by vehicle noise associated with Southern River Road;
- vi) Lots with an area less than 260m²;
- vii) Lots with a frontage less than 11m (for front loaded lots); and
- viii) Lots requiring an elevated construction standard for bushfire hazard mitigation purposes.

5.2 RESIDENTIAL ZONE

5.2.1

- a) For land zoned Residential on the Local Structure Plan, subdivision and development shall generally be in accordance with the Local Structure Plan.
- b) Use class permissibility shall be in accordance with Table 1 of the Scheme as applicable to the 'Residential' zone.

5.2.2

- a) Applicable Dwelling Target
 - i) To provide a minimum density of 26 dwellings per residential site hectare.

- b) Subdivision and Local Development Plans shall achieve the following:
- i) To provide a range of lot sizes and types to meet the needs of different household types.
 - ii) To encourage higher densities to support activity centres and public transport, and encourage reduced private vehicle trips.
 - iii) Streetscape design and accessibility to be implemented that facilitates the use and enjoyment of the street and public spaces by pedestrians and cyclists.
 - iv) Development shall be designed and sited to promote the use, enjoyment and surveillance of public open spaces.
 - v) To ensure development and the orientation of streets facilitates passive solar access for lots.
 - vi) To promote formal and informal active recreation areas adjacent to wetland and conservation areas able to support recreational activity.
 - vii) Facilities are to be provided in open space areas to support passive recreation activities, including walking and cycling paths.
 - viii) Landscaping is to incorporate the use of water collection and re-use where possible.
 - ix) Satisfactory arrangements being made to upgrade existing roads and road reserves that abut the LSP area to an urban standard, including drainage, pathways, lighting and intersection treatments.
 - x) Satisfactory arrangements facilitating the timely construction of the crossing over Balannup Lake branch drain, coinciding with an approval for subdivision being issued in respect of Parent Lot 20 and/or Lot 22.
 - xi) A suitable uniform screen wall or fencing will need to be constructed and landscaping installed where lots are proposed to back onto Lander Street. The uniform screen wall is required to enhance streetscape and residential amenity outcomes, and address the requirement for noise amelioration from the nearby industrial / commercial precinct, Southern River Road and the Southern River kennel zone.
 - xii) Matters of detailed design (i.e. provision of rear lanes, public open space, road alignments and intersection design) may be considered and refined at the subdivision stage.

5.2.3 Residential Code Plan

- a) The Local Structure Plan (**Figure 1**) defines residential density ranges associated with specific areas within the Local Structure Plan. Lot specific residential densities, within the defined residential density ranges, are to be subsequently assigned in accordance with a Residential Code Plan approved by the WAPC.
- b) A Residential Code Plan shall be submitted at the time of subdivision to the WAPC showing an R-Coding applicable to each lot, being consistent with the Local Structure Plan (**Figure 1**) and the locational criteria contained in Clause 5.2.4.
- c) Approval of the Residential Code Plan shall be undertaken at the time of determination of the subdivision application by the WAPC. The approved Residential Code Plan shall then form part of the Local Structure Plan and be used for the determination of future subdivision applications.
- d) Variations to the Residential Code Plan will require approval from the WAPC, in conjunction with an approved plan of subdivision issued by the WAPC.

- e) A revised Residential Code Plan may replace, wholly or partially, the previously approved Residential Code Plan, and shall then form part of the Local Structure Plan.
- f) Residential Code Plans are not required if the WAPC considers that the subdivision is for one or more of the following: -
 - i) the amalgamation of lots;
 - ii) consolidation of land for "superlot" purposes for future development;
 - iii) the provision of access, services or infrastructure; or
 - iv) land which by virtue of its zoning or reservation under the Local Structure Plan cannot be developed for residential purposes.

5.2.4 Locational Criteria

The allocation of residential densities on the R-Code Plan shall be in accordance with the following criteria:

- a) Residential R25 – R40
 - i) A base density code of R25 shall be provided for all other residential lots within the LSP.
 - ii) Medium densities of up to R40 shall be provided in areas of higher amenity including within 800m of activity centres, around public open space and adjacent to neighbourhood connector routes.
- b) Residential R40 – R60
 - i) Densities of up to R60 shall be provided in areas of high amenity including within the 400m walkable catchment of the Southern River Road Neighbourhood Centre (SR-08) located adjacent and opposite the LSP area, as well as adjacent to areas of public open space amenity and the Local Centre site located on Matison Street within Lot 18.

5.3 LOCAL CENTRE ZONE

5.3.1

- a) Restricted Uses

Use class permissibility shall be in accordance with Table 1 of the Scheme as applicable to the 'Local Centre' zone, excluding the following uses:

- *Aged or dependent persons dwelling*
- *Ancillary accommodation*
- *Bed and Breakfast*
- *Child Care Premises*
- *Educational Establishment*
- *Family Day Care Centre*
- *Grouped Dwelling*
- *Home Business*
- *Home Occupation*
- *Home Office*
- *Home Store*

- *Hotel*
- *Multiple Dwelling*
- *Place of Worship*
- *Single House*

b) Local Development Plan

If required by the Council or WAPC a Local Development Plan shall be prepared in respect of the Local Centre achieving the following standards, along with the requirements of Statement of Planning Policy 4.2; and the standards under Clause 7.6.3 of the Scheme guiding the preparation of Local Development Plans.

- Design and development that promotes walking and cycling, to encourage minimisation of private vehicle trips.
- To provide for development addressing both Matison Street and the internal north - south road; that provides a focal point for the local community.
- Development to facilitate the establishment of uses meeting the daily and weekly shopping needs of local residents.
- A covered and continuous pedestrian walkway is to be provided to the façade of buildings with the awning designed at a pedestrian scale providing shade and shelter.
- On site car parking not to be located between the front building setback line and the street reserve. Parking shall be located to the north and east of buildings.
- Car parking shall be provided on site at a rate consistent with the Scheme; or the rate specified under Statement of Planning Policy SPP 4.2 – Activity Centres for Perth and Peel for shop/retail uses, at the discretion of the Council.
- Building facades shall be presented in an attractive manner from vantage points within and beyond site boundaries.
- Ground floor shop front elevations to be glazed, or incorporate similar visually permeable material, for a minimum 50% of the facade extent.
- The maximum amount of PLUC 5 shop/retail floor space shall be limited to 1,200m² NLA. Should a Local Development Plan or development application propose a greater amount of PLUC 5 shop/retail floor space exceeding this limit, a Retail Sustainability Assessment shall be lodged to support the variation and be approved by the Council.

5.4 SUBJECT TO FURTHER PLANNING

5.4.1 (a)

- The land shown as 'subject to further planning' is excluded from the approved Structure Plan. A Structure Plan amendment is to be finalised to incorporate the area shown as 'Subject to Further Planning' under Clause 29 of the Planning and Development (Local Planning Schemes) Regulations 2015, Schedule 2 Deemed provisions, prior to subdivision or development. The Structure Plan amendment is to address as a minimum:
 - The allocation of zoning and land use planning controls to restrict noise sensitive development within the designated 500 metre kennel zone buffer;

- ii) Where modification to the kennel buffer alignment is proposed to allow noise sensitive development within 500 metres of the kennel zone a noise assessment as endorsed by the Department of Environment Regulation and City of Gosnells is to be submitted which demonstrates that noise can be maintained within the assigned levels of the Environment Protection (Noise) Regulations 1997;
 - iii) The coordination of roads and access to be supported by a transport impact assessment if deemed necessary;
 - iv) Dependent upon the nature of zoning / land uses, the need to contribute towards open space;
 - v) An appropriate transition between the proposed development and adjoining residential sites;
 - vi) Other relevant matters deemed necessary by the local government and WAPC.
- b) With respect to Clause 5.4.1 (a), a decision maker for an application for development approval or subdivision approval in the area 'Subject to Further Planning' may approve the application if the decision-maker is satisfied that:
- i) the proposed development or subdivision does not conflict with the principles of orderly and proper planning; and
 - ii) the proposed development or subdivision would not prejudice the overall development potential of the area.
- c) Restricted Uses

Should an application be lodged within the area defined as 'Subject to Further Planning' in the absence of a Structure Plan, the use class permissibility shall be in accordance with Table 1 of the Scheme for the established Residential Development Zone, excluding the following uses:

- *Aged or dependent persons dwelling*
- *Ancillary accommodation*
- *Bed and Breakfast*
- *Child Care Premises*
- *Educational Establishment*
- *Family Day Care Centre*
- *Grouped Dwelling*
- *Home Business*
- *Home Occupation*
- *Home Office*
- *Home Store*
- *Hospital*
- *Hotel*
- *Multiple Dwelling*
- *Place of Worship*
- *Residential Building*
- *Single House*

5.5 PUBLIC OPEN SPACE

TABLE 2a – Public Open Space Schedule

Total Site Area		25.78ha
Less Deductions:		
• Local Centre	0.2623ha	
• Drainage (POS #1-4)	0.4304ha	
• Southern River Road ORR Widening	0.1290ha	
• Land Subject to Further Planning	4.1630ha	
• Restricted POS not included in 2% contribution	2.8432ha	
Gross Subdivisible Area		17.9502ha
Public open space @ 10%		1.7950ha
POS May Comprise:		
80% Unrestricted Use (Minimum)	1.4360ha	
20% Restricted Use (Maximum)	0.3590ha	
Total		1.7950ha
POS Provided:		
<u>Unrestricted Use</u> 3 Local Parks (POS #5, 6 & 7)	0.7107ha	
<u>Restricted Use</u> 3.2508ha Total (POS #8 & 9) - Maximum POS credit for unrestricted use (20% POS requirement) - Restricted POS not included in POS contribution	0.3590ha 2.8732ha	
Total Creditable POS		1.0697ha
% Gross Subdivisible Area		6.0%

The POS contribution arrangements for Precinct 3 are to be addressed through the Development Contribution Scheme to be established through Amendment 110 to TPS6, once gazetted. The following table shows the distribution of restricted and unrestricted areas for each Lot within the LSP area:

TABLE 2b - Southern River P3E POS Provided (Per Parent Lot)

Lot	Restricted - Ha	Unrestricted- Ha	Total
13	0.5573	0	0.5573
14	0.0794	0	0.0794
18	0	0.3753	0.3753
19	1.9310	0	1.9310
20	0.8484	0	0.8484
21	0.0507	0.3354	0.3861
22	0.2144	0	0.2144
Total	3.6812	0.7107	4.3919

The local park on Lot 18, being 0.37ha in area and located immediately north of the local centre, is owned by Carmelo Radici and Rosina Radici. The remainder of all land and identified POS within the LSP area is owned by LWP Property.

6 SUBSEQUENT PLANS AND STRATEGIES

Prior to the commencement of subdivision and development, the City will require the preparation and approval of the following:

6.1 URBAN WATER MANAGEMENT PLAN

The requirement for an Urban Water Management Plan is to be imposed as a condition of subdivision approval and prepared generally in accordance with the adopted Local Water Management Strategy.

6.2 LANDSCAPE MANAGEMENT PLAN

A Landscape Management Plan is to be prepared as a requirement of a condition of subdivision or development approval to the satisfaction of the Director of Planning, addressing management of public open space and landscaping associated with the Local Centre.

6.3 WETLAND AND CONSERVATION MANAGEMENT PLAN

A Wetland and Conservation Management Plan (or similar) is to be prepared prior to the submission of any application for subdivision, or development of land that may impact on the environmental values or drainage functionality of the proposed Public Open Space area. The plan is to be prepared in accordance with relevant City, Department of Water and Department of Parks and Wildlife Guidelines.

6.4 FLORA SURVEY

A targeted flora survey for Declared Rare Flora listed under the Wildlife Conservation Act 1950 and known to occur in similar habitat in the local area shall be undertaken. The flora survey is to be submitted to the Department of Parks and Wildlife in conjunction with, or prior to, any application for subdivision or development.

6.5 FAUNA SURVEY

A fauna survey shall be undertaken to determine whether there is a need for a fauna relocation management plan.

6.6 TRANSPORT NOISE ASSESSMENT

If required in accordance with *State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning*, a Transport Noise Assessment is to be submitted in conjunction with any application for subdivision or development, to address noise impacts arising from Southern River Road.

6.7 BUSHFIRE MANAGEMENT PLAN

The applicant/landowner shall, in proceeding with subdivision and/or development, implement the relevant requirements of the Bushfire Management Plan (prepared in accordance with *State Planning Policy 3.7 – Planning in Bushfire Prone Areas* and the associated *Guidelines for Planning in Bushfire Prone Areas*).

7 OTHER REQUIREMENTS

The following notification requirements to be applied as conditions of subdivision approval.

- i. A Notification, pursuant to Section 165 of the Planning and Development Act 2005, is to be placed on the Certificate(s) of Title of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the existence of a hazard or other factor.

The Notification is to state as follows:

'This land is within a bushfire prone area, as designated by an Order made by the Fire and Emergency Services Commissioner and may be subject to a Bushfire Management Plan. Additional planning and building requirements may apply to development on this land.'

- ii. A Notification, pursuant to Section 165 of the Planning and Development Act 2005 is to be placed on the Certificates of Title of the proposed lot(s) within 1000 metres of the Southern River kennel zone advising of the existence of a hazard or other factor.

The Notification is to state as follows:

'This lot is located within 1000 metres of a property with a current Kennel Licence and as such may be subject to noise impact from that operation.'



PART TWO EXPLANATORY SECTION

PART TWO – EXPLANATORY SECTION

1.0 Introduction

MGA Town Planners (MGA) has been commissioned by the Department of Housing and Maddestra Group to progress a Local Structure Plan (LSP) over the Southern River Precinct 3E area, comprising Lots 13, 14, 18, 19 20, 21 and 22 Southern River Road and Matison Street.

The original LSP report was prepared by Urbanplan and Bioscience Pty Ltd.

This section of the report provides information as required under the City of Gosnells (CoG) Town Planning Scheme No. 6 (TPS6) addressing relevant urban design, amenity and environmental issues.

Key aspects of the LSP include:

- Providing a desirable distribution and density of residential development facilitating a variety of housing types, to address the changing demographics and emerging needs of the Perth Metropolitan Region.
- Sustainable environmental outcomes with respect to water use, conservation and transport, while taking advantage of natural features.
- Providing an attractive commercial centre meeting the daily and weekly shopping needs of residents and local employment opportunities; being co-located with local recreation space.
- A high level of linkage within and beyond the edge of the LSP area for pedestrians, cyclists and private vehicles.

The LSP has been prepared in accordance with the City of Gosnells Town Planning Scheme No. 6; Council's local planning policies and the WAPC's Liveable Neighbourhoods policy, being a guide to the assessment and determination of applications for land use and subdivision.

The LSP report contains an Implementation section based on the requirements of the Structure Plan Preparation Guidelines (WAPC, August 2012), and some additional information added to portions of the explanatory section. Not all of the suggested requirements of the Structure Plan Preparation Guidelines have been addressed, given the LSP was recommended for approval by the City of Gosnells during 2011.

2.0 Preamble

This document should be read in conjunction with:

- The Department of Planning's Southern River Precinct 3 Local Structure Plan 2009.
- The former Department of Planning and Infrastructure's Southern River Forrestdale Brookdale Wungong District Structure Plan 2001.
- Urbanplan's 2007 submission to Council and the WAPC (on behalf of the Departments of Housing and Education) regarding the co-location of primary and high schools and district playing fields for stormwater detention adjacent the Forrestdale Brookdale Wungong District Drain within Precinct 3.
- Taylor Burrell Barnett's Precinct 3 Local Structure Plan report that concurs with Urbanplan's 2007 assessment.
- The Forrestdale Main Drain Arterial Drainage Strategy supplemented by the district water management work undertaken to support the Integrated Land and Water Management Plan.

Southern River is an area with strong development interest, and a range of environmental and development challenges. These include conservation and environmental constraints, urban water management, fragmented land ownership and the need for coordinated integrated urban form of suitable critical mass.

Within Southern River the City of Gosnells has identified a number of precincts. Of interest to this LSP is the Precinct 3 Structure Plan - Southern River Precinct and the surrounding area. Southern River Road, Ranford Road, Matison Road and the Southern River bound Precinct 3.

This area is within the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan approved by the Western Australian Planning Commission in 2001. This District Plan provides a strong regional context and an approved basis for the Department's Local Structure Plan approved by the WAPC.

This proposed LSP follows the City of Gosnells adoption of the Precinct 3 Local Structure Plan (as devised by the Department of Planning – DoP), which provides guidance on the development of the subject land in consideration of surrounding green-field sites.

Enhanced knowledge of the environmental values of the area and changes in water sensitive urban design and drainage requirements has implications for planning in Precinct 3. Equally, creation of an integrated urban form with critical mass highlights the difficulties of achieving mutually inclusive outcomes.

3.0 Subject Land and Ownership

The subject land is bounded by Southern River Road, Matison Street, Lander Street and the Balannup Lake Drain; and lies within the suburb of Southern River approximately 20kms from the Perth central business district.

Refer to Figure 2 – Location Plan

Refer to Figure 3 – Study Area

Southern River is situated at the edge of the urban development front within the south east corridor; and is characterised by new greenfield urban development and small rural landholdings.

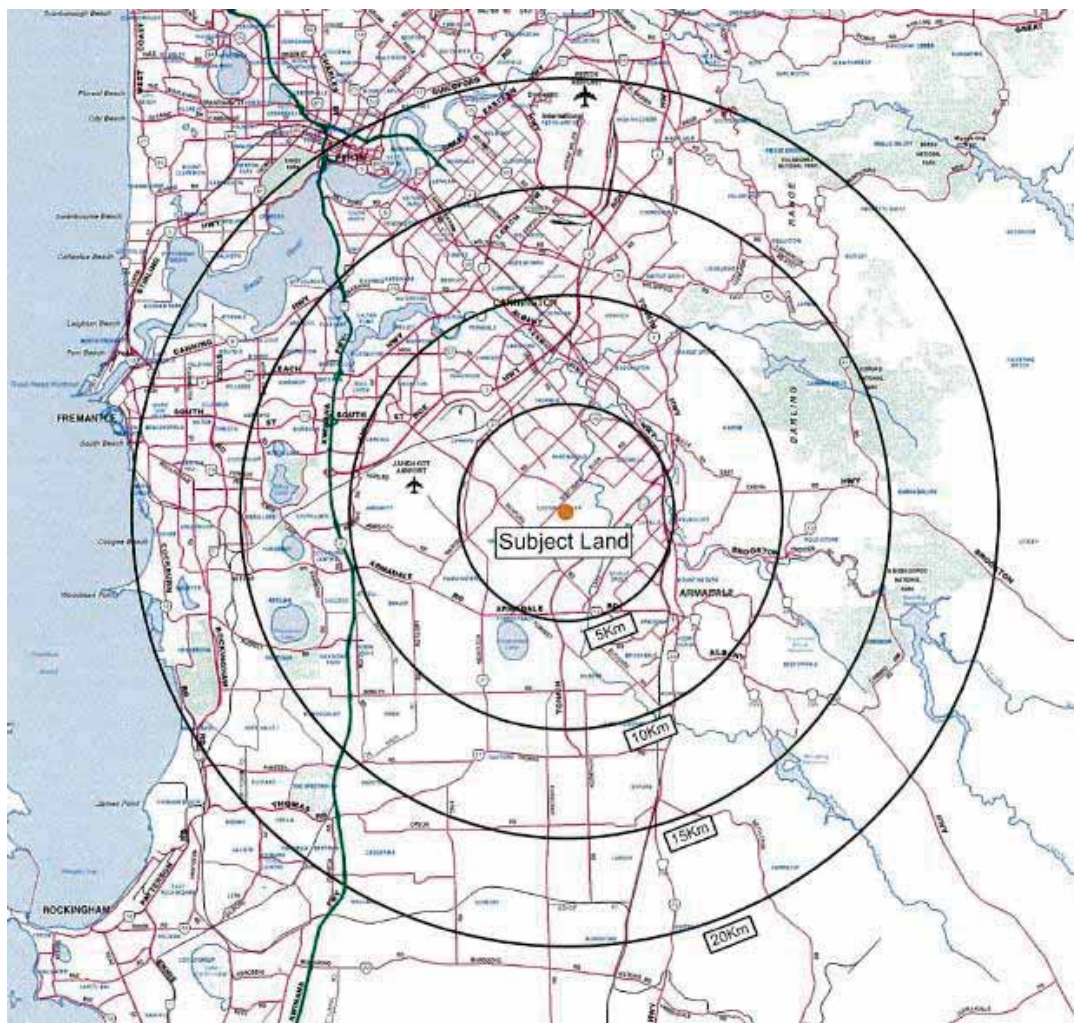


Figure 2 - Location Plan

The subject land has a combined area of 25.7781ha, comprising seven lots, and may be described legally as:

- Lot 13 Southern River Road, Southern River is described on Certificate of Title Volume 208 Folio 84A Plan 8225. The registered owner is LWP Southern River Pty. Ltd. and Lot 13 has a legal land area of 4.0494ha.
- Lot 14 Southern River Road, Southern River is described on Certificate of Title Volume 27 Folio 389A Plan 8225. The registered owner is LWP Southern River Pty. Ltd. and Lot 14 has a legal land area of 4.0469ha.
- Lot 21 Southern River Road, Southern River is described on Certificate of Title Volume 1813 Folio 671 Diagram 72294. The registered owner is LWP Southern River Pty. Ltd. and Lot 21 has a legal land area of 2.0011ha.
- Lot 22 Southern River Road, Southern River is described on Certificate of Title Volume 1813 Folio 672 Diagram 72294. The registered owner is LWP Southern River Pty. Ltd. and Lot 22 has a legal land area of 2.2199ha.
- Lot 18 Matison Street, Southern River is described on Certificate of Title Volume 358 Folio 11A Diagram 31754. The registered owners are Carmelo Radici and Rosina Radici and Lot 18 has a legal land area of 4.5072ha.
- Lot 19 Matison Street, Southern River is described on Certificate of Title Volume 1342 Folio 833 Diagram 31754. The registered owner is LWP Southern River Pty. Ltd. and Lot 19 has a legal land area of 4.5881ha.
- Lot 20 Matison Street, Southern River is described on Certificate of Title Volume 1311 Folio 770 Diagram 31754. The registered owner is LWP Southern River Pty. Ltd. and Lot 20 has a legal land area of 4.3655ha.

TABLE 3 - LEGAL LAND AREA, OWNERSHIP AND DESCRIPTION

Lot No.	Certificate of Title	Registered Owner	Land Area
13	208/84A	LWP Southern River Pty. Ltd.	4.0494ha
14	27/389A	LWP Southern River Pty. Ltd.	4.0469ha
21	1813/671	LWP Southern River Pty. Ltd.	2.0011ha
22	1813/672	LWP Southern River Pty. Ltd.	2.2199ha
18	358/11A	Carmelo Radici and Rosina Radici	4.5072ha
19	1342/833	LWP Southern River Pty. Ltd.	4.5881ha
20	1311/770	LWP Southern River Pty. Ltd.	4.3655ha
TOTAL			25.7781ha

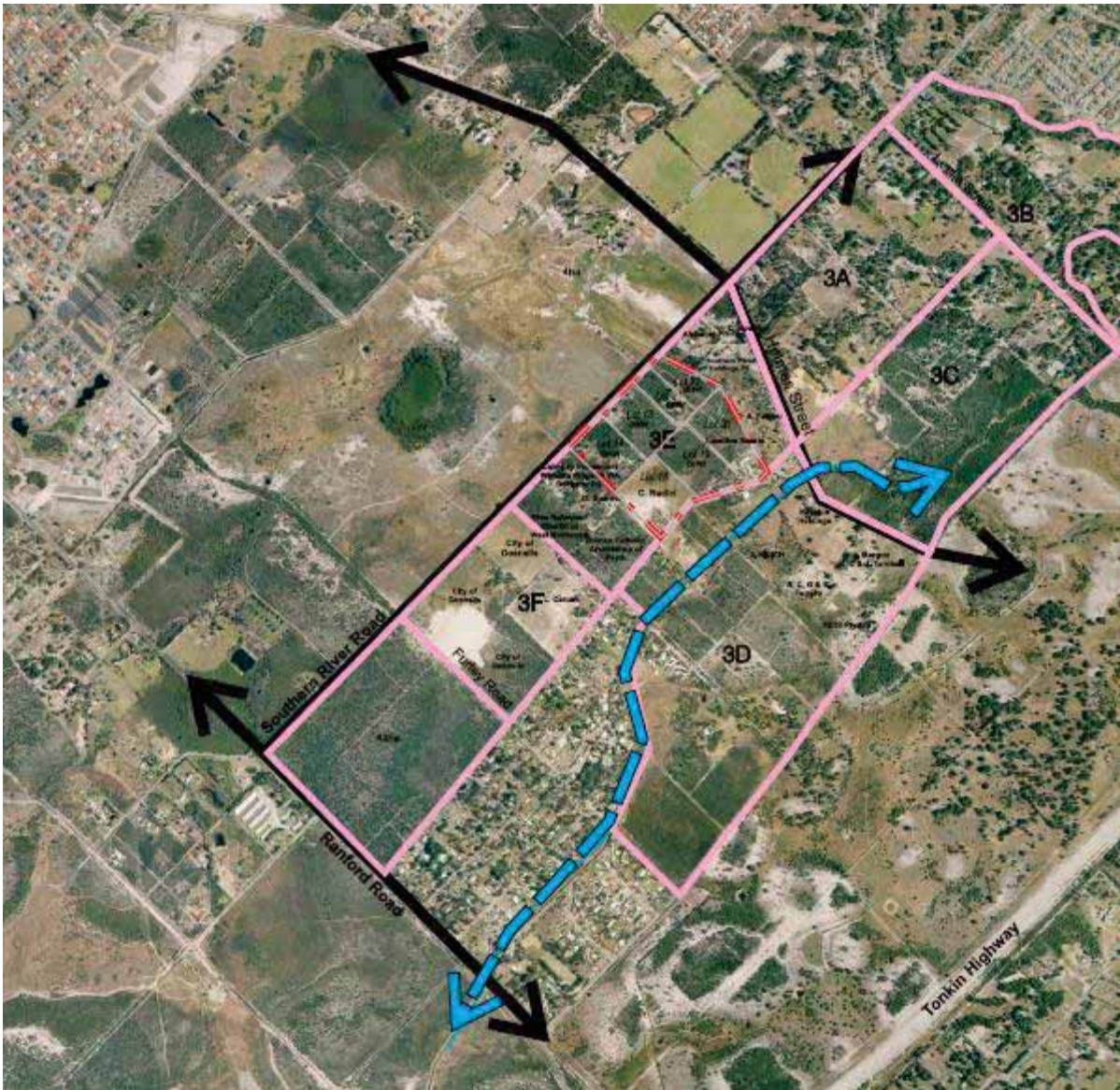


Figure 3 – Study Area

Legend

- Sub Precinct Boundary
- Study Area
- District "living stream" Drain

4.0 Report Structure

The report is essentially structured based on the Liveable Neighbourhoods framework:

- A site analysis including a detailed assessment of hydritic soils, hydrology and wetland vegetation is discussed in Section 5.0.
- Section 6.0 outlines the relevant planning framework that guides development of the subject land.
- The community design philosophy is described in Section 7.0 with details of lot variety and densities.
- The movement network is discussed in Section 8.0.
- Parkland and urban water management are described in Sections 9.0 and 10.0 respectively.
- An overview of utilities is given in Section 13.0.
- Activity centres and employment are considered in Section 14.0.
- Consultation and implementation are discussed in the final sections.

5.0 Site Analysis

5.1 Landform

The landscape of Precinct 3 comprises Bassendean dune landform. It is the oldest of the three Aeolian dune systems on the Swan Coastal Plain, is generally low relief and consists of broad interdunal swales or relatively flat sand sheets between low dunes. In part the Bassendean sands overlay alluvial soils and remnant drainage systems.

Refer Appendix 2 - Bioscience Geotech Report

5.2 Hydritic Soils

Soils throughout the subject site were found to be composed of deep quartz sand of the Bassendean system. The one exception was at bore number DHW1 where ferruginous induration “coffee rock” was found at depths of 0.35 to 0.7 metre, and under this was a layer of clayey sand before becoming coarse, rounded quartz sand, suggestive of an ancient drainage channel. Details of soil profiles are contained in Appendix 1 of the Bioscience report.

The chemical properties of recovered soil were investigated in Bioscience’s soil laboratory. Redox potential (a measure of soil’s history of inundation) was measured, as was carbon and sulphur content and SPOCAS testing for acid sulphate conditions, which also are hydritic indicators (Refer Bioscience Appendices).

The results presented in the Bioscience Appendices show that:

- The only soil which displayed a redox potential indicative of hydritic soil (i.e. less than 400 mV) were the samples collected below 150 mm from DHW1. The most electronegative sample corresponded to the ferruginous layer.
- The amount of carbon was generally low except for the surface soils. The exception was again DHW1 where a spike of carbon occurred at depth. DHW2 had relatively low carbon at the surface.
- The amount of sulphur present was at very low levels. None of the soils would be classified as Acid Sulphate.

Bioscience concluded from the data obtained that soil throughout the profile of DHW1 displays typical hydritic characteristics, whereas none of the other soils are indicative of wetlands.

5.3 Groundwater

Two Department of Water monitoring bores lie equidistant, about 1.6 km north (bore 4880) and south (bore 4879) of the site. These bores were installed as part of the Lake Thompson project and have been monitored for over 30 years. Hydrographs are reproduced in the Bioscience Appendices. The Hydrographs show very similar seasonal trends in terms of the extent and timing of annual variation, with a 2 m difference between minima and maxima, with maxima recorded mostly in October. Unlike many other bores in the Perth area, these show no significant long term trend to water level decline.

The 2 metre difference between maxima and minima is somewhat greater than the typical 1 m variation in Bassendean sand-hosted superficial aquifers as reported by Davidson (1995) suggesting the area has higher hydraulic conductivity, and is in proximity to discharge points (drains) thus recharges and discharges generally faster than similar areas.

Details of the soil profile and the depth to groundwater are contained in the piezometer logs in Annex B of the Bioscience report). By reference to the 30 year records from DoW bores, and considering the fairly average rainfall year and timing in 2008, it is inferred at the time recordings (30 October) groundwater levels would have been declining and be in the order of 0.25 to 0.5 m below maxima.

From the then single recording we can thus make the tentative conclusion that at DHW1, groundwater probably inundates the area in most years, with standing water up to 250 mm deep in heavy rainfall years.

At DHW2, groundwater probably rises to be 150 mm below the surface at its peak, and in very wet winters could be temporarily at the surface.

The remaining locations across the Owners' Collaborative have groundwater significantly deeper, and it is unlikely to ever rise to within 1.5 m from the surface, even in very wet years, thus the vast majority of the land has suitable clearance to groundwater for urban development. Piezometer monitoring is ongoing, and will provide finer detail of groundwater dynamics and water quality for inclusion in a Local Water Management Strategy.

5.4 Vegetation

The subject land was reviewed by ENV Australia in 2006 as part of a site assessment report commissioned by the City of Gosnells to assist with the planning of the area. Bioscience was commissioned to undertake a review of the current state of vegetation and wetlands. Bioscience's commission involved reviewing previous studies, aerial photography and satellite imagery prior to visiting the site and undertaking parallel transects through the entire area approximately 20 metres apart.

Refer Appendix 3 – Bioscience Wetland Assessment

There are areas of upland bushland, particularly on Lot 14, and wetland fringing vegetation on Lot 19 that have native vegetation in good to very good condition, as judged by the Bush Forever rating system. Bioscience recommends that this bushland area be protected and preserved as Public Open Space, as it has higher biodiversity and conservation significance than the remnant wetland area, and is more likely to be successfully conserved.

Vegetation units within DHW's site were mapped and the condition of vegetation was assessed using a modified Trudgen method noting the approach taken by Keighery as used in the ENV Australia report.

TABLE 4 - VEGETATION CONDITION RATING SYSTEM		
Trudgeon	Keighery	Bioscience Score
Excellent	Pristine	0 - 4
Very Good	Excellent	5 – 8
Good	Very Good	9-13
Poor	Good	14 -17
Very Poor	Degraded	18-21
Completely degraded	Completely degraded	22 - 25

The condition of the sectors defined in the vegetation map is colour coded on Figure 2 – Site Specific Wetland Analysis Map for the vegetation condition. Greater detail of vegetation condition analysis is described in Annex B.

The only area with vegetation unequivocally described wetland vegetation is the area surrounding piezometer DHW1 that contains the swamp paperbark *Melaleuca raphiophylla*. This area had been previously cleared and used for summer grazing, so the vegetation was in degraded condition.

The areas of the other 4 bores contained vegetation that included wetland indicator species such as *Melaleuca preissiana*, *Pericalymma ellipticum* and *Atsartea affinis*, but also contained non-wetland species such as *Nuytsia floribunda*, *Eucalyptus todtiana* and *E. decipiens*. The vegetation surrounding these bores is thus best described as transitional between typical wetland vegetation and typical upland vegetation of the Southern River area.

No other wetland areas are apparent on Lots 21 and 22, other than an area at the northern tip of Lot 22 contains a stand of *Melaleuca raphiophylla*. However this is in degraded condition with no other native vegetation present.

Soil investigations undertaken in this locality immediately adjacent to a local drain found the distance to groundwater to be greater about 1 metre. The construction of the drain is likely to have altered the local hydrology, reducing groundwater levels. This northern section of Lot 22 is thus a wetland that is likely to decline further.

Lot 20 has a central area of 'Low Open Woodland of *Melaleuca raphiophylla*' ranges from Good to Degraded condition with the understorey replaced by weeds. The area immediately northwest of the existing vacant dwellings is Completely Degraded with insufficient native vegetation cover remaining to provide a starting point for rehabilitation.

Lot 18 has been completely degraded through grazing and infestation of pasture grasses.

The areas that contain remnant vegetation in Good to Very Good condition are planned to be reserved as Public Open Space.

5.5 Wetland

5.5.1 Preamble

The DEC's Geomorphic Wetlands of the Swan Coastal Plain dataset illustrate a Resource Enhancement wetland located across a portion of some of the subject lots.

Resource Enhancement wetlands are defined as:

"Priority wetlands that may have been partially modified but still support substantial ecological attributes and functions. The objective is for management, restoration and protection towards improving their conservation value. Such wetlands have the potential to be restored to conservation category wetlands."

Refer Appendix 3 – Bioscience Wetland Assessment

5.5.2 Context

General site analysis was undertaken by ENV Australia, as commissioned by the City of Gosnells, to provide a high level assessment of wetland vegetation in Precinct 3 using aerial photography. Using Statement 33 as guidance, a number of wetland assets were identified by this study with recommendations for protection of wetland and flora values.

The report reviews the management category of wetlands in the precinct and describes their characteristics, including two Resource Enhancement Wetlands within the subject land. In doing so, the report made a number of recommendations including:

- the importance of site specific vegetation assessment as part of more detailed planning;
- the categorisation of wetlands within the precinct that may impact on structure planning for the precinct;
- a number of priority species; and
- vegetation linkages and the protection of important species.

Initial site assessment by Urbanplan revealed the extent of the wetland was far less than that purported through aerial photographic interpretation. Accordingly, Bioscience was engaged to substantiate the extent of the wetland vegetation on Lots 13, 14, 19, 21 and 22, and more recently for the Radici Family and Landflow Assets on Lot 18 and Lot 20 respectively, by researching hydritic soils, hydrogeology and wetland vegetation type and condition; a summary follows (refer to the Bioscience report contained at Appendix B). RPS had undertaken a less detailed study on Lot 20, see comments below (refer to the RPS report contained at Appendix C).

Bioscience installed 25 groundwater monitoring piezometers across the subject land to determine the depth to groundwater, water quality and seasonal variations. Refer to Figure 2 - Site Specific Wetland Analysis for the Groundwater Bore Locations.

5.5.3 Bioscience Investigations

Bioscience's fieldwork included a feature survey to precisely determine elevation and investigations of groundwater. Data collected from the site and from other investigations (DoW, JDA, BoM) has been used for hydrological modelling to determine both short term and long term variation in groundwater levels. Combined with survey data, this enabled determination of the area subject to inundation and water logging, and thus the wetland boundaries.

The Geomorphic Wetlands Dataset compiled through aerial photographic interpretation of across the Swan Coastal Plain, initially suggested the vast majority of the subject land is wetlands with about half of the area having high conservation value. Biosciences fieldwork has established the wetland extent is very much smaller than was originally mapped by DEC. The reduction is in part due to local authority drains to the north east and south west, which have lowered groundwater to a minor extent. Further, as recommended by the DEC, detailed site analysis has resulted in refinement of the wetland extent in contrast to the broad nature of DEC's method of aerial photographic determination. The reduced wetland area is not due to a seasonal reduction in rainfall, as existing groundwater levels accord with long term Department of Water groundwater records that do not show a decline in this area.

The conservation value of the remaining wetland area is low, as this area has been cleared in the past for grazing purposes. Although paperbark trees have regenerated, there are few other native species present, whereas pasture species and weeds are abundant.

There are areas of upland bushland, particularly on Lot 14, and wetland fringing vegetation on Lot 19 that have native vegetation in good to very good condition, as judged by the Bush Forever rating system. Bioscience recommends that this bushland area be protected and preserved as Public Open Space, as it has higher biodiversity and conservation significance than the remnant wetland area, and is more likely to be successfully conserved.

The adjoining wetland area of Lot 18 can also be retained as additional open space and may serve a useful hydrological function. Details of how it is best managed will be elucidated in Bioscience's current work, which is collecting data for an Urban Water Management Strategy (Refer to Annex D).

5.5.4 RPS Environment Investigations

The RPS brief did not seek to investigate wetland boundaries, rather management categories based on vegetation condition assessment. Essentially, the area proposed to be reclassified to Multiple Use Wetland varies in condition from Completely Degraded to Good.

5.5.5 Summary

Environmental investigations of the wetland areas and wetland dependent vegetation have been conducted by Bioscience, where it was concluded that the soil profiles obtained suggest that the central part of Lot 19, demarked as area 6 on the vegetation mapping is wetland which formed on a relic drainage channel, probably in a swale of Holocene origin. It has progressively silted up and acquired a more anaerobic character, with darker soil and iron deposition at depth. It is a typical and characteristic wetland, but is in very degraded condition due to past land use. Because it has lost many of the wetland values and natural attributes, of itself, it is properly classified into the management category of Multiple Use Wetland.

The Bioscience investigations have been submitted to the DEC in support of a request to redefine wetland boundaries and to reclassify a portion of the wetland from Resource Enhancement to Multiple Use Wetland to accurately reflect the site's hydrology and vegetation. Because of the extensive research by Bioscience, a favourable determination of the request to reclassify is anticipated to facilitate the development of the land for residential purposes.

This approach is consistent with the DEC's process to reclassify wetlands and that proposed by the Precinct 3 Local Structure Plan.

Based on the results of the site inspection and vegetation assessment, the current DEC wetland classification for the central portion of Lot 20 does not appear accurate. Degradation through weed colonisation in addition to impacts through uncontrolled public access (and likely influence of nearby Balannup Drainage) has significantly reduced the water table and diminished the biodiversity values of this portion. Therefore, it is recommended that the central portion of Lots 18, 19 and 20 be reclassified to Multiple Use Wetland to better represent its current condition and limited value as more than a wetland function area. The request to reclassify the wetland is currently before the Department of Environment and Conservation for assessment and determination. The DEC has informed that due a change to wetland guidance policy the Multiple Use Wetland is no longer classified as a wetland.

5.6 Land Use and Development

The diversity of land uses surrounding the site is typical for areas undergoing land use transition from primarily rural to urban activities.

5.6.1 Current Land Use

The subject land is situated within a locality characterised by small rural landholdings, located between the urban development fronts of Southern River / Harrisdale (north - west of Southern River Road) and Champion Lakes/Seville Grove (south east of Tonkin Highway). To the north east the area is bounded by the established residential suburb of Huntingdale. There is a regional reservation for parks and recreation on the corner of Southern River Road and Ranford Road. This reservation protects a Bush Forever site and EPP Wetland. Western Power has constructed a substation off Southern River Road to the west of the subject land.

A kennel area operates within Precinct 3 along Ranford Road and Matison Road. The Kennel area is outside the study area; however the required buffer of 500 metres influences the opportunities for sensitive land uses within this vicinity. Affected areas unable to accommodate residential development and for which no alternatives are identified as yet, have been notated as 'Subject to Further Planning' on the LSP plan. A former liquid waste disposal site operated between 1955 and 1981 adjacent Furley Road. The site is owned by the City and has been remediated to industrial standard.

5.6.2 Future Land Use – Precinct 3

Southern River Precinct 3 is an area that has been identified for urbanisation within the Southern River Forrestdale Brookdale Wungong District Structure Plan (DSP). The approved structure plan provides for:

- urban development focused in the northern portion of the precinct;
- a light industrial area with some mixed business/commercial along Southern River Road;
- a local activity centre adjoining Southern River Road; and
- recreation and Bush Forever reserves and drainage corridors.

More recent Local Structure Planning undertaken by the Department of Planning has refined the framework proposed by the DSP, reaffirmed the future development of the precinct and refined the location of the proposed urban, commercial, community, open space and industrial uses.

The subject land lies within a distinct urban and open space precinct serviced by adjoining neighbourhoods containing local and neighbourhood centres and education facilities. The LSP confirmed the location of a site suitable to co-locate a high school, special education facilities and district playing fields on land fronting Passmore Street. The District Playing fields also assist in flood water retention from the Forrestdale Brookdale Wungong District Drain. Primary school sites have, and will be, developed in adjoining neighbourhoods to the north and east. Under current arrangements, the land immediately west of Lander Street, west of the subject land, is proposed to be developed for light industrial purposes.

6.0 Planning Framework

Southern River has been the subject of extensive land use and environmental planning at both the State and local levels resulting in a detailed framework to guide the preparation and assessment of applications for land use, subdivision and development.

6.1 State Planning Framework

6.1.1 Directions 2031

Directions 2031 provides a spatial planning framework that establishes a vision for the future growth of the Perth and Peel regions; and the detailed planning and delivery of housing, infrastructure and services required to accommodate a forecast population of 556,000 by the year 2031.

The subject land is located within the south-east sub-region, which is forecast to grow to 228,000 by 2031, requiring 35,000 additional dwellings and 31,000 new jobs. Direction 2031 suggests that growth will be accommodated by a combination of infill and green-field development, where green-field development will be expected to achieve a minimum of 15 dwellings per urban zoned hectare (26 dwellings per residential site hectare).

Located within close proximity to the Strategic City Centre of Armadale, the Regional Town Centre of Maddington (as well as a number of other smaller shopping and service centres) and the Regional Industrial Centre located at Forrestdale (as well as a number of areas identified for Industrial Investigation), the area currently has access to the full range of services, facilities and local and sub - regional employment opportunities.

6.1.2 Southern River / Forrestdale / Brookdale / Wungong District Structure Plan

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan 2001 (DSP), prepared by the Western Australian Planning Commission, provides a broad framework for land use and development including major community facilities, conservation areas, open space and potential areas for development together with the management of key environmental issues for a region facing increasing development pressure.

The Structure Plan identifies the subject land as being Urban (including balance of POS) where a Village Centre is notionally shown at the intersection of Southern River Rd and a proposed subdivisional road crossing the subject land and land to the north west of Southern River road. Areas of Open Space (Including drainage corridors) are located on the southern and western edges of the subject land.

The DSP establishes a framework for the implementation of the preferred land uses, transport networks, conservation areas, cost sharing and coordination of development through various mechanisms such as the Metropolitan Region Scheme, local town planning schemes, Local Structure Plans and Developer Contribution Scheme. Part of the consultation outcome derived from the DSP was a clear expression that landowners be compensated fairly.

It is understood that this compensation would include Wetland reserves being jointly compensate within the Developer Contribution Scheme.

6.1.3 Metropolitan Region Scheme

The subject land is zoned Urban under the Metropolitan Region Scheme (MRS). The MRS amendment lifting the urban deferred was gazetted on 7 May 2010.

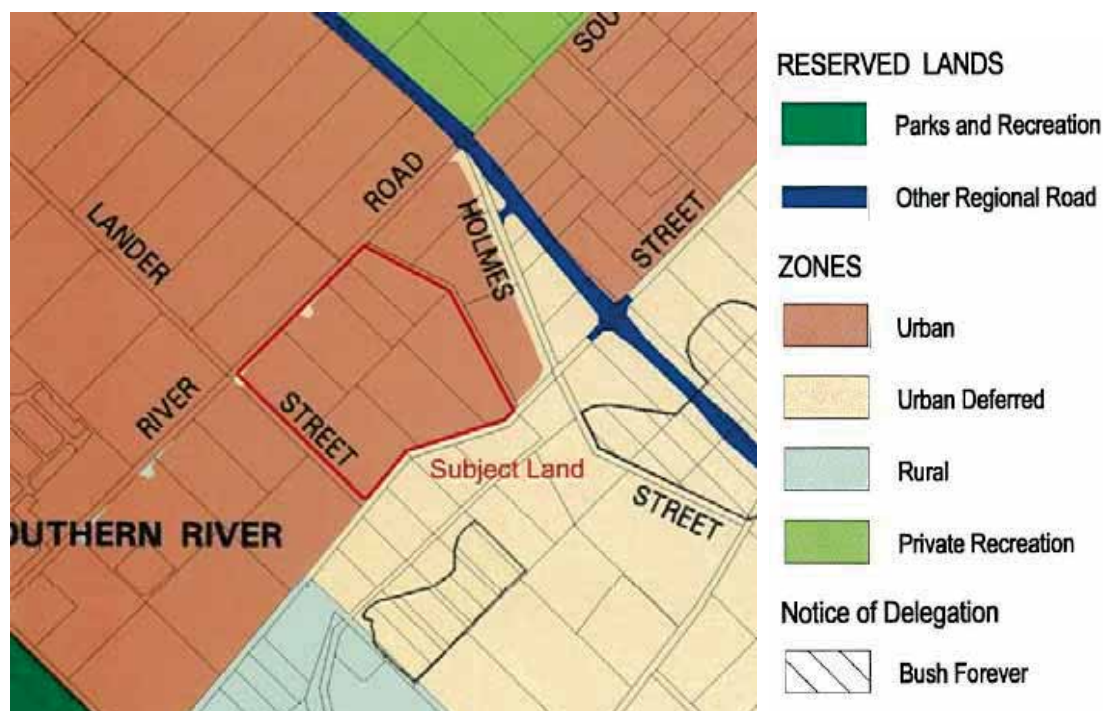


Figure 4 – Metropolitan Region Scheme Zoning

6.1.4 Liveable Neighbourhoods

The proposed LSP has been prepared in accordance with the WAPC's Liveable Neighbourhoods policy, as the current operational policy guiding the design and assessment of structure plans and subdivision applications for greenfield sites and for the redevelopment of large brownfield and urban infill sites.

The LSP is addressed with reference to the requirements of Liveable Neighbourhoods throughout and particularly in Sections 7.0 – 9.0 below.

6.2 Local Planning Framework

6.2.1 City of Gosnells Town Planning Scheme No. 6

The subject land is zoned 'Residential Development' under the City of Gosnells Town Planning Scheme No. 6 (TPS6).

In accordance with Section 126 (3) of the *Planning and Development Act, 2005*, a request to amend the Town Planning Scheme concurrently with the MRS was made to the City of Gosnells and the WAPC. Once the land transferred into the Urban Zone under the MRS by notice in the Government Gazette, the rezoning of the land from 'General Rural' to 'Residential Development' under TPS6 came into effect.

Those matters to be addressed in the preparation of an LSP identified under Clause 7.3 of TPS6 have been observed.

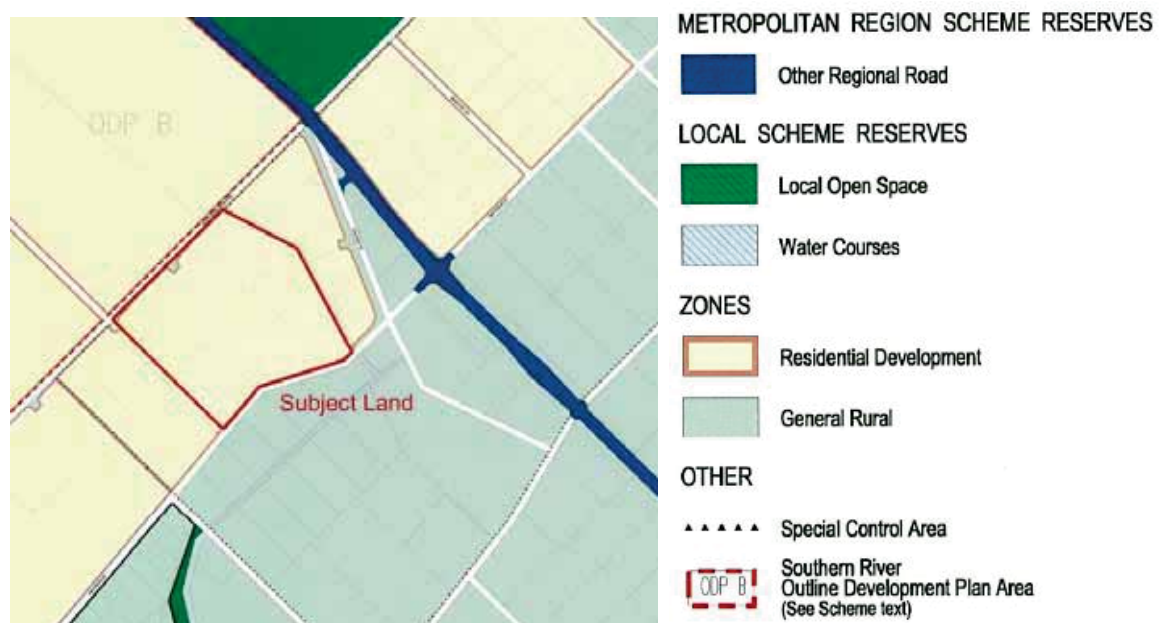


Figure 5 – City of Gosnells Town Planning Scheme No.6 Zoning

6.2.2 Southern River Precinct 3 Planning Framework (Policy No. 6.3.3.1)

On 28 November 2006 Gosnells Council resolved to adopt a local planning policy that established a planning framework for Precinct 3, the intent being to coordinate planning of disparate landholdings. The Southern River Precinct 3 Planning Framework divides Precinct 3 into six sub-precincts 3A to 3F and outlines a framework to ensure that planning applications (such as region and local scheme amendments) appropriately address the various planning requirements and integration of planning outcomes at the appropriate stage. A key objective of the Policy was for the preparation of a Local Structure Plan, across the whole Precinct to further refine the work of the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan and guide the preparation of sub-precinct level Local Structure Plans and associated arrangements for shared infrastructure provision.

The Precinct 3 LSP is further refined by the work undertaken to prepare this LSP report and plan, which fulfils the intent of the Policy to achieve coordinated planning amongst fragmented land ownership.

6.2.3 Southern River Precinct 3 Local Structure Plan

In accordance with the Planning Framework Policy the Southern River Precinct 3 Local Structure Plan (2009) was prepared by the DoP to further refine the broad urban structure identified in the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan; and provide a framework for the coordinated development of the Precinct 3 sub-precincts.

The Draft Precinct 3 LSP, as advertised for public comment, illustrated the subject land within an Eco Living Zone, where the majority of the land is shown as Conservation. Submissions made during the comment period raised concerns over the extent of the Eco Living Zone and Core Conservation areas across the subject land (and other landholdings south of Matison Street) and questioned the validity of the wetland mapping and appropriateness of development parameters.

On 14 April 2009 in consideration of the submissions, but mindful of the need to provide a framework to facilitate and coordinate the preparation of sub-precinct Local Structure Plans, Council resolved to amend the LSP to require that those areas shown as Conservation be subject to for further environmental assessment and detailed planning and that the Eco Living Zone be removed from the LSP and replaced with a notation requiring further environmental.

On 12 May 2009 Gosnells Council resolved to adopt a Local Structure Plan (LSP) for Southern River Precinct 3 (encompassing the subject land).

On 15 September 2009, following further modifications, the WAPC resolved to identify the Southern River Precinct 3 LSP as a basis to guide land use planning decisions, thereby facilitating the adoption of this LSP.

The adopted LSP identifies the subject land as Residential and Wetland with an annotation that states "Land use and development parameters to be determined through further environmental review and detailed planning", which is the subject of this LSP and associated process.

7.0 Community Design – Liveable Neighbourhoods

7.1 Preamble

Liveable Neighbourhoods principles apply to the preparation and review of regional, district and local structure plans for new urban areas, local structure plans for new subdivisions and in planning for the revitalisation or redevelopment of existing areas. Liveable Neighbourhoods currently functions as an operational policy. Relevant principles to be observed during the planning process include:

- *A sense of community, strong local identity and sense of place in neighbourhoods and towns.*
- *Active street frontages with buildings facing streets to improve personal safety through increased surveillance and activity.*
- *New development which supports the efficiency of public transport systems where available and provides safe, direct access to the system for residents.*
- *A variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services.*
- *The protection of key environmental areas and the incorporation of significant cultural and environmental features of a site into the design of an area with an integrated approach to the design of open space and urban water management.*

Relevant objectives listed under the Elements of the Liveable Neighbourhoods policy are addressed below with reference to the LSP (Figure 1), in addition to other supporting plans referenced. This is intended to demonstrate that the proposal will provide an efficient and desirable future form of development, which may be further refined through the Local Development Planning process.

7.2 Design Philosophy

The Local Structure Plan has been prepared to guide the development of 25.77ha of land currently comprising small rural landholdings for urban purposes. The LSP reflects a site responsive approach that aims to enhance the local context, strengthen local character and identity and promote community creation.

The LSP will facilitate the development of a high quality, liveable urban precinct offering residents a diversity of lot products with access to the full range of urban services and facilities, including primary and high schools, public open space and local shops. The LSP design is based on the following broad urban design objectives:

- Retain the general landform and significant natural features of the site, as far as practicable, through the designation of appropriate land uses, the design of the road network and consideration of the future built form.

- Ensure that the urban development of the precinct responds to and integrates with established and future neighbouring residential development.
- Locate land uses and residential densities appropriately, having regard to established and future surrounding land uses and the potential for conflicts.
- Facilitate the orderly and independent subdivision of lots in fragmented ownership.
- Achieve a residential density range exceeding 26 dwellings per residential site hectare.
- Provide a range of lot products and sizes to facilitate the creation of a mix of housing typologies and range of affordability to cater for a varied demographic.
- Locate higher density development in areas within proximity of the future activity centre on adjoining Matison Street, to support viability and accessibility.
- Locate higher density development opposite areas of public open space to capitalise on landscape amenity and sense of place afforded by the established areas of vegetation and the wetland setting.
- Provide an efficient, connected, legible and safe road network appropriate to the residential character of the precinct, whilst minimising connections to Southern River Road.
- Encourage the use of alternative modes of transport by creating safe and efficient connections to primary schools, neighbourhood centres, public transport along Southern River Road, pedestrian and cycle networks and a high standard of walkability.
- Provide sufficient and accessible public open space to meet the recreation needs of the future residents.
- Maximise opportunities for passive surveillance of public open spaces, and pedestrian and cycle routes to enhance the amenity and safety of the public realm.
- Incorporate best practice principles of sustainability through the design in consideration of solar orientation, prevailing winds and stormwater retention and reuse.

The principles for future urban layout for the greater sub-precincts 3E, 3D and 3F provide context for the more detailed design of Sub-precinct 3E and comprise:

- The placement of activity centres around intersections of major transport routes and the placement of medium density residential development adjacent activity centres and open space areas to provide proximate facility provision and amenity.
- The provision of a pedestrian network within the wetland vegetation corridor that interconnects local services and facilities; north south street orientation (within the skewed grid of the locality) to enable creation of east-west single residential allotments and north - south laneway allotments;
- The integration of wetland vegetation corridors with the district drain to assist flood mitigation strategies; and
- The maintenance of vegetation remnants within passive open space areas to complement species protection in vegetation corridors.

Subsequently, the specific principles of the urban layout for the Owners' Collaborative are defined as:

- Enhancement of the north south drain along the east of boundary of Lots 20 and 22 as a re-created intermittent living stream environment;

- Maintenance of some remnant wetland vegetation corridors in vegetation areas 6 and 7, with wetland buffers in adjoining area 5, within WSUD swales to connect to recreated intermittent living stream environments;
- Placement of medium density Residential (eg R30 - R40) development overlooking open space areas to emphasise amenity; whilst facilitating use of the open space area by the public with pedestrian connections separating lots
- Intended future placement of medium density Residential Code and R40 development within proximity to commercial and retail facility provision along Southern River Road; and R20 and R30 densities elsewhere.
- The resultant LSP provides a consolidated and integrated urban form inclusive of an enhanced wetland vegetation corridor.

7.3 Response to Site and Context Analysis

The outcome of the site analysis and opportunities and constraints mapping highlighted key design drivers that have influenced the proposed road and lot layout. These key drivers are summarised below. Refer to Figure 3 - Opportunities and Directions.

7.3.1 Wetland and Remnant Vegetation

With regard to the vegetation wetland complex, consideration needs to be given to the attributes and management objectives of remnant environments and the potential to achieve connection between remnants.

The extent of wetlands identified as worthy of conservation and retention could impact on the critical mass and integration of future urban form if fully applied. Conversely, future urban development that surrounds remnant vegetation may impact on its survival regardless of the proposed vegetation separation buffer.

The guidance recommends reduced risk of further degradation and pollution of Resource Enhancement Wetlands and management that promotes enhanced condition. Achieving these objectives must be linked to:

- the identification of well connected, functional land parcels for management and the creation of vegetation corridors, and
- minimising the threat of off-site impacts to vegetation and wetland condition such as stormwater flows increased by urban development and surface and groundwater pollutants in order to accomplish survival of wetland vegetation.

Given the above, it is valid to question the retention of Resource Enhancement Wetlands that are not part of broader environmental corridors and those that will be under threat from surrounding urban development, stormwater drainage, pollution and impacts on the hydrological regime. In these circumstances, which are likely to impact the degraded wetland within the subject land, it may be unlikely that the Resource Enhancement objectives to restore and enhance will be met in the long term.

The options are to:

- endeavour to protect the identified remnant wetlands within proposed WSUD drainage corridors;
- assess and seek reclassification of the Wetland; or
- dispense with the remnant (wetland) vegetation on the basis that survival prospects are limited.

Urbanplan, in conjunction with Bioscience, identified and sought reclassification of the wetland to a Multiple Use Category Wetland. In addition, quality remnant vegetation space has been set aside within the proposed area of public open. The DEC have informed that the request to reclassify the wetland has resulted in a declassification of the wetland due to the newly revised Wetland Policy Guidance. Regardless, it is proposed that an urban water management swale drain will be created to facilitate drainage and create more open space amenity.

7.3.2 Balannup Drain

Balannup Drain, located on the eastern boundary of the subject land, currently provides a stormwater management function for the wider locality. It has been suggested that development of adjoining land will result in its re-contouring and rehabilitated as a living stream drainage swale. As such the LSP acknowledges the future enhanced function and amenity of the drain and provides a road interface to maximise opportunities for passive surveillance, improve residential amenity and aspect, minimise weed invasion and enable passive recreation. The drain reserve is proposed to be widened in two locations, comprising a total additional area of 700m².

7.3.3 Access onto Southern River Road

The adopted Precinct 3 LSP reflects the intent to reserve Southern River Road as an Other Regional Road (subject to a future reservation under the MRS) consistent with its proposed function and traffic forecasts.

7.3.4 Integrated Urban Form

Achieving a functional integrated settlement pattern in Precinct 3 and the surrounding area requires planning to address:

- appropriate spatial location of uses and open space;
- critical mass of urban form to ensure the success of urban function; and
- integration of uses through permeable and legible linkages to promote transport accessibility and mobility as a function of urban mass and proposed residential densities.

The ability to deliver integrated functional urban form will depend on achieving development areas that are not fragmented by environment and conservation objectives and can achieve suitable residential densities.

This LSP proposes:

- refined definition and reclassification of the Multiple Use Wetland;
- rehabilitate the Balannup Drain to endeavour to create a living stream drainage swale;
- potential for higher residential densities overlooking open space areas and areas within walking distance of neighbourhood facilities.

7.4 Land Use and Distribution

In accordance with the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan and the Southern River Precinct 3 Local Structure Plan; the subject site is proposed to be developed for residential and public open space purposes, along with a local activity centre primarily catering to daily / weekly shopping needs. No schools or community purpose sites are identified, as the location of these facilities has been confirmed elsewhere through the LSP.

The location and distribution of public open space proposed was driven primarily in response to the extent of remnant vegetation and the wetland. The LSP reflects the recommendations of the two environmental consultants for the retention of vegetation across Lots 13 and 19 and the retention of the wetland with redefined boundaries located in Lots 18, 19 and 20.

The balance of the land is proposed for residential development at densities of R20, R30 and R40. The rationale for the distribution of densities essentially reinforces the need to create a critical mass immediately adjacent the local centre facilities and take advantage of the amenity from open space areas. A site has also been identified for a place of worship and a local centre. The residential yield is constrained by the extent of public open space to be ceded and the noise buffer at the south western corner of the LSP area.

7.5 Residential Lot Layout

7.5.1 Layout and Climate Responsive Design

The road network comprises a modified grid pattern with skewed orientation to the north east, and south west. The road orientation facilitates the majority of single residential lots to be oriented maximising opportunities for solar passive design response.

Local Development Plans

Local Development Plans (DAP) are generally required under circumstances such as the following:

- Lots having an area below 350m² and an irregular shape (Clause R10).
- Lots where it is important to control vehicle access / egress.
- Lots abutting POS.
- Narrow lots requiring special conditions to be set.

LDP's may be required by the WAPC as a condition of subdivision approval.

Relationship with Public Open Space

The Landscape Strategy Plan prepared by EPCAD (**Figure 6 and Appendix 4**) depicts the future intended formal access pathway network around the entire perimeter and centrally within the POS area. The Landscape Strategy identified that an appropriate setting may be established complementing the development and facilitating sound public access. A path network would provide the benefit of strong connections between residential cells and the local activity centre through an attractive setting.

The approach to the landscape design of public realm spaces and open space for this project has focused on the protection of conservation quality vegetation and its integration within open space which provides passive recreational areas for the community. Combined with this is the requirement to integrate effective urban water drainage into the landscape.

The objectives of the landscape approach are;

- To create public places that will be valued by the community that will use them.
- To protect and enhance the environmental qualities of the site.
- To accommodate use by the community in a secure manner.
- To create a landscape that meets the maintenance and management requirements of the adopting authority.
- To accommodate drainage infrastructure as best practice water sensitive design in POS.

The design of open space retains all conservation value vegetation associated with wetlands and creates secure managed access areas that the public cannot traverse. At the same time the public is encouraged into other areas and provided with circulating footpaths that link into the streets and other open space areas. It is intended that all areas of POS are planted using predominantly native species with exotics only used in areas away from retained vegetation and used only for accent and shade. The design approach will be to create an informal modified natural landscape.

Those areas of open space that are isolated and utilized for drainage management will be developed using all native species. These locations will incorporate informal seating and paths where practical and will be designed to provide safe passive recreation opportunities within a strongly natural setting.

All parks and open space will be designed to minimise the use of irrigation; through utilizing drainage infrastructure for the passive irrigation of areas.



Figure 6 – Landscape Strategy Plan (EPCAD)

7.5.2 Residential Lot Size and Variety

The LSP proposes a road network that results in the creation of street blocks being robust and adaptable to accommodate a variety of lot sizes. Higher density lots are to be concentrated around areas of public open space; and the Precinct 3E local centre. The Local Structure Plan (Figure 1) describes the range of residential densities to be applied. An indication as to the expected lot type and yield is provided in Table 4.

TABLE 5 – INDICATIVE LOT SIZE AND VARIETY	
Density Codes	R25 – R60
Estimated Indicative Minimum / Maximum lot size	170m ² – 550m ²
Indicative Average lot size	300m ²
Estimated Lot Yield	360 Lots
Estimated Dwelling Yield	360 Dwellings

7.5.3 Residential Density Targets and Yield Forecast

Density targets for the development of the site have been pre-determined by regional frameworks and preceding district and local structure plans.

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) estimated lot yields and population projections based on single residential development at 10 dwellings per hectare (2.6 persons per dwelling) and medium density residential at 25 dwellings per hectare (2 persons per dwelling). Medium density residential was forecast to comprise 18.5% of the total study area and approximately 24.8% across Area 1 Southern River, containing the subject land.

The Southern River Precinct 3 Local Structure Plan (LSP) does not suggest a density target for the Precinct but instead recommends a based density of R20 for residential areas. Clearly, the proposed LSP exceeds this target specified in the Precinct 3 LSP.

Liveable Neighbourhoods suggests that in new urban areas urban densities should achieve 15 dwellings per gross hectare and an average of 22 dwellings per site hectare, being distributed as follows:

- 12 to 20 dwellings per site hectare for standard lot layouts; and
- 20 to 30 dwellings per site hectare for areas within 400m of a neighbourhood centre and within 250m from a main bus route.

Directions 2031 and beyond sets a target of 15 dwellings per gross urban zoned hectare which represents a 50 per cent improvement on the current average density achieved in Greenfield development. The equivalent site hectare density target is 26 dwellings per residential site hectare, being applicable to district and local structure plans and Local Structure Plans.

This LSP provides for an average lot size of 300m², and an estimated lot yield of 360. Based on the measurements provided in **Table 1**, a calculated density of over 30 dwellings per residential site

hectare is anticipated, exceeding the recommendations of the DSP, Precinct 3 LSP, Liveable Neighbourhoods and the requirements of Directions 2031.

The LSP design has inherent flexibility to enable composite development and separate or individual development stages. Dependent on future housing market demand, the LSP statutory framework enables flexibility to current intentions, through the density ranges applied to the LSP (Figure 1).

The development of the subdivision is also subject to the requirements and contributions as set by the developer contributions scheme.

8.0 Movement Network

8.1 Preamble

Ranford Road and Holmes Street (the Garden street extension) will provide the district distributor connector function linking the district to the Roe and the Tonkin Highways. Southern River Road is also a significant distributor and will be a key avenue for public transport routing. Southern River Road has been recommended for an elevation in classification to an Other Regional Road in the MRS. Accordingly, this road reserve is proposed for widening.

Cardno Eppel Olsen (Cardno) undertook a traffic study in July 2012, which was updated to account for the addition of the local activity centre and reduced extent of residential development following the EPA and DoP decision to avoid residential development in the 500m kennel buffer area.

To complete the Precinct 3E traffic assessment, information was compiled by Cardno from existing data and the Precinct 3A Transport Assessment. Additional data was generated from first-principles for the Precinct 3 South area, including Precinct 3E.

The final Cardno Traffic Impact Assessment dated March 2013 is attached at **Appendix 5**.

8.2 External Road Network

Traffic volumes associated with Precinct 3E are not anticipated to significantly impact the boundary road network and as such, no modifications are proposed to Southern River Road or Matison Street, outside of the requirements of the broader Precinct 3 Structure Plan.

The current Southern River Developer Contributions Scheme (DCP) provides for significant improvements to the function and operation of Holmes Street. These improvements include road widening and signalisation of the intersections of Holmes Street with Southern River Road and Holmes Street.

Based on the analysis included in this report, which includes the traffic impact for all of Precinct 3 against the existing background traffic, these upgrades are not considered necessary in the near term. The strategic network improvements proposed for the 2021 and 2031 scenarios, including the Holmes Street realignment (to connect Garden Street / Nicholson Road to Tonkin Highway) are likely to require mitigation measures required, including signalisation. However, the need for any

modifications would result from changes to the strategic road network and are not triggered or required by development of Precinct 3.

8.3 Connectivity

The movement network has been designed to provide a low-key connected street network that clearly distinguished between connecting routes and local access places. This establishes good internal and external access for residents, maximises safety, encourages walking and cycling and supports the use of public transport. As shown previously in **Figure 7**, the landscaping strategy delivers connectivity through the central POS areas.

8.4 Street Network and Road Reserve Width

The internal road network is affected by the wetland topography and proposals to conserve remnant vegetation as open space. Accordingly, the main site access meanders through the site connecting Southern River Road and Matison Street. Internal roads provide an edge to the Wetlands and remnant vegetation open space.

The road network has been designed to facilitate the creation of regular shaped lots, capable of accommodating standard residential dwellings and smaller housing types, with access via a rear laneway or with frontage to an access place.

The proposed central north - south road reserve features a width of ~23m falling to 18m, being consistent with an access street type 'A' reserve; and subsequently an access street type 'B' reserve width (16.5 - 18.0m). The verge width available is sufficient to accommodate a wide reserve path enabling sound pedestrian and cycle access centrally through the LSP area.

8.5 Public Transport

8.5.1 Existing Services

The nearest train station is the Gosnells Station (Armadale line) located approximately 4.8 kilometres away from the corner of Southern River Road/Lander Street intersection. The Murdoch Station (Mandurah line) is located approximately 13 kilometres away from the corner of Southern River Road/Lander Street intersection. The network of bus routes serving the Southern River area is summarised in Table 5 and illustrated in Figure 3 below.

TABLE 6 – BUS ROUTES			
Route	No. Service Type	Destinations	Nearest Bus Stop
231	Full Time, Monday to Sunday including Public	Gosnells Train Station – King St/Eudoria St–Chamberlain St/ Southern River Rd – Harry St/Corfield St – Gosnells Train Station(Anti-Clockwise Circular Route)	2.6 km
232	Full Time, Monday to Sunday including Public Holidays	Gosnells Train Station – Harry St/Corfield St – Southern River Rd/Chamberlain St – King St/Eudoria St – Gosnells Train Station (Clockwise Circular Route)	2.5 km
517	Full Time, Monday to Sunday including Public Holidays	Murdoch Station – Livingston Shopping Centre – Castlewood Parkway/Edencourt Drive (Southern River)	1.5 km
518	Full Time, Monday to Saturday only	Murdoch Station – Livingston Shopping Centre – Wright Road/Lauraine Drive – Wright Road/Bordeaux Parade (Piara Waters)	3.3 km

The 517 route passes a number of local employment, commercial and retail nodes including Livingston Marketplace Shopping Centre and surrounding bulky goods retail/showrooms, Market Square, Canning Vale industrial area and the Bull Creek Shopping Centre. Murdoch Stations is within close proximity to St John of God Hospital Murdoch, Murdoch University and the Fiona Stanley Hospital, currently under construction.

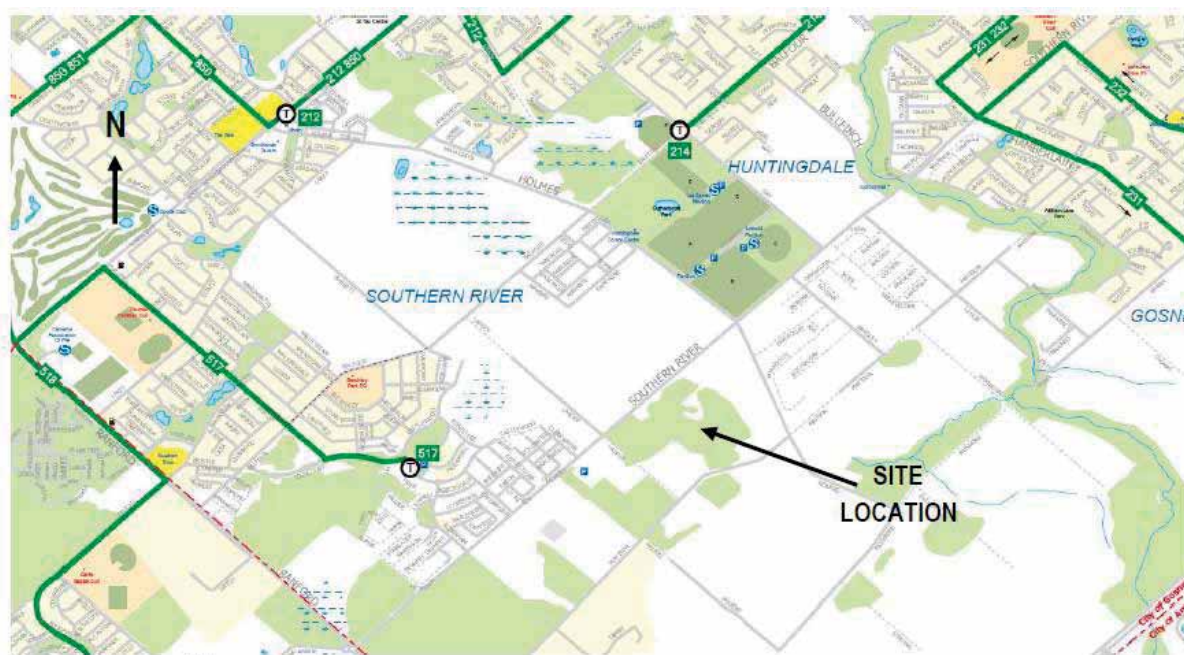


Figure 7 – Current Bus Route Network (TransPerth)

8.5.2 Future Public Transport Services

As Southern River Precinct 2 and 3 are progressively developed into residential neighbourhoods it is anticipated that Transperth's bus services will be expanded to provide bus stops and routes within walking distance to a greater proportion of the future residents.

The adopted Precinct 3 LSP illustrates bus services traversing Southern River Road, Holmes Street and Matison Street (to the east of Holmes Street).

The viability of Transperth's services will be improved through the application of a higher density of dwellings per residential site hectare than is currently established on average throughout the Perth Metropolitan Region.

8.6 Pedestrian and Cycle Access

8.6.1 Existing Networks

Pedestrian

The pedestrian network in Southern River is disjointed as a result of the historical land use of the area for small rural landholdings and its progressive development for residential purposes. Surrounding residential neighbourhoods are well served and connected with a network of shared paths and footpaths.













Cycling

The Department of Transport's (DoT) Perth Bike Maps illustrates the extent of existing cycle networks in and surrounding Southern River. The network, comprising dedicated cycle paths, shared paths and on street cycling, caters for destination trips (i.e. to work or school) and recreational cycling.



Legend

Advice to Cyclists

-  Perth Bicycle Network (PBN) - Continuous Signed Routes
-  Principal Shared Path
-  City to Sea Greenway
-  Good Road Riding Environment
-  Medium Road Riding Environment
-  Poor Road Riding Environment
-  Steep Incline
-  Shared Path (Shared by Pedestrians & Cyclists)
-  Proposed Shared Path
-  Bicycle Lanes or Sealed Shoulder Either Side
-  Contra Flow Bike Lane
-  Other Riding (Carinyah, Mundaring Loop & Railway Reserve Trails)

Source: Department for Transport

Figure 8 – Bicycle Route Map

Future Networks

As Southern River Precinct 2 and 3 are progressively developed into residential neighbourhoods the pedestrian and cycle network will be expanded to provide additional dedicated/shared paths and on-street cycling lanes to provide greater pedestrian and cyclist opportunities to service the development and connect to the established network and surrounding neighbourhoods.

8.7 Walkable Catchments

The subject land's situation and siting provides accessibility to a number of community facilities, including the following:

- The LSP design shrouds open space and wetlands to take advantage of the amenity and aspect. The most distant lot is 250 metres to this centrally located park.
- The subject land falls within 400 to 800 metres from the activity centre proposed for the intersection of Southern River Road and Holmes Street.
- Future bus routes will run along Southern River Road and it is anticipated the nearest Bus stop will adjoin the proposed development.
- The proposed local activity centre in the Precinct 3E LSP area.
- The closest proposed Primary schools are 800 metres to the north east and north of the subject land. Alternatively, the development of the proposed independent primary school, understood to be planned for adjacent Lot 17.
- The Gosnells, Seaforth and Kelmscott Train Stations, on the Armadale to Perth railway line, are located approximately 4.75km of the subject land and are all connected to the local and regional cycle network.

Consequently, the LSP facilitates the application of residential R-Code ranges that will serve to deliver an acceptable level of residential density within the walkable catchments of the abovementioned services and attractions.

8.8 Balannup Drain Crossing

A crossing of the Balannup Drain is proposed between the Precinct 3E LSP area and the adjacent Precinct 3A lands to the east.

Through discussions with the adjoining landowners, a copy the draft LSP for Precinct 3A had been obtained. Three alternative options were investigated to determine if an alternative design could yield better results, which are described in detail within **Section 5.6** of the Cardno Traffic Impact Assessment at **Appendix 5**.

Alternative 1 involved investigating the establishment of a staggered T – intersection and relocating the crossing further to the east. This reduces the viability of a roundabout form and suggests a staggered-tee arrangement. Traffic demand analysis showed a much higher split of traffic along the Balannup Drain reserve, potentially impacting on the amenity of this system.

Alternative 2 involved realigning the crossing to create an angled bridge over the drain, as shown in Figure 16. This arrangement retained the detrimental features of Alternative 1 including a staggered-tee intersection form, and also created a streamlined connection through Precinct 3A to Matison Street (a non-preferred distributor road) which would require additional traffic calming measures. The cost of an angled crossing would also likely to be significantly higher than the perpendicular bridge as a result of the additional engineering requirements, longer crossing length and non - symmetrical loading.

Alternative 3 retains the original crossing location, but does not include a roundabout, but a staggered tee as an alternative. The proposed alignment is preferred to the alternatives; as it reduces the priority of the connection to Matison Street. The intersection configuration within Precinct 3E supports the distribution of traffic throughout this north-eastern cell, while retaining amenity for active modes (walking and cycling etc.), particularly along the drain frontage. The proposed staggered-T arrangement is also considered a viable alternative due to the short lengths associated with the major roadway and lack of expected cross traffic over the stagger, between the residential cells. The proposed crossing location and the staggered-tee intersection are therefore the preferred option, and is not expected to result in appreciable volumes of crossing traffic.

8.9 Assessment of Future Traffic Impacts

8.9.1 Preamble

Cardno have undertaken an assessment of future traffic conditions, originally incorporating the provision of housing in the area now identified as being Subject to Further Planning on the LSP.

The modelling undertaken by Cardno was based on 420 residential units, which has now decreased to an anticipated 337. The resulting traffic generation quoted in the Cardno report may therefore be viewed as a very conservative estimate, as stated in the most recent update to the report (Appendix 5).

8.9.2 Future Traffic - SIDRA Analysis 2021

The Cardno traffic impact assessment provides the outcomes of modelled SIDRA analysis scenarios undertaken for the year 2021.

SIDRA analysis of the network has been undertaken for the boundary road network under the Ultimate (existing plus full development of Precinct 3) for AM and PM peak hours, using 2021 ROM outputs to determine background traffic flows. The following intersections were modelled:

- Southern River Road / Ranford Road.
- Southern River Road / Holmes Street.
- Matison Street / Ranford Road.

For the purpose of the assessment, traffic volumes along Holmes Street were not projected to substantially increase, as no additional regional connection is proposed prior to the 2021 horizon. On this basis, a reassessment of the Holmes Street / Access Road intersection was conducted for the year 2031.

Southern River Road / Ranford Road

The Southern River Road/Ranford Road intersection has been analysed in its current roundabout form. The results above show that the roundabout is insufficient to accommodate the regional traffic growth along these two major regional connections and an alternative arrangement will be required by 2021. A potential signalised intersection arrangement is described in the Cardno report and further modelling of the proposed signalised intersection was undertaken by Cardno, demonstrating that a signalised intersection at Southern River Road / Ranford Road is an orderly proposition beyond 2021.

Southern River Road / Holmes Street

The significant increase in traffic volumes resulting from the Garden Street extension to Southern River Road suggest that the existing intersection geometry will be unable to accommodate the Southern River Road/Holmes Street intersection as a priority controlled 4-way intersection. An alternative layout and phasing diagram is proposed by Cardno. The proposed intersection geometry has been modelled in SIDRA and designed to provide an acceptable level of service for the 2021 PM peak.

Matison Street / Ranford Road

The existing Matison Street/Ranford Road intersection is a priority controlled T- intersection. A revised intersection form was modelled for the 2021 scenario, including a wider central median allowing for staged crossing for right-turning egress from Matison Street and sufficient storage for a single vehicle. The results above show that the operational performance of all approaches is generally acceptable, though the right turning egress into Ranford Road from the central median is constrained by the volume of traffic. It should be noted that this analysis does not include the impact of upstream signals likely to be required at Ranford Road / Southern River Road, which would improve the intersection operation.

Summary of 2021 Scenarios

Modifications to the strategic road network will be required as a result of regional traffic growth. Intersection analysis undertaken for the future 2021 scenario indicates that:

- The form of Southern River Road / Ranford Road and Southern River Road / Holmes Street intersections will be insufficient to accommodate expected traffic and will require signalisation by 2021.
- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median allowing staged crossing is constructed.

8.9.3 Future Traffic - SIDRA Analysis 2031

Additional modifications to the strategic road network will be required as a result of changes to regional traffic flows resulting from the proposed Holmes Street (Garden Street) extension to Tonkin Highway and further regional growth.

Further intersection analysis undertaken in another scenario for the year 2031, indicating that:

- The form of the Southern River Road / Holmes Street intersection will need to be modified to support additional traffic travelling to and from the Tonkin Highway, including minor increases in turning pocket length to ensure sufficient queuing space.
- The Southern River Road / Ranford Road intersection will continue to operate effectively in its 2021 form with only minor changes to turning pocket length.
- Upgrade of Holmes Street (Garden Street) will impact the Holmes Street / E-W Access Street intersection, requiring provision of a central median to facilitate staged crossing.
- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median sufficient to allow staged crossing is constructed.

The results of the SIDRA analysis show that the operational performances of all approaches for each of the intersections modelled are generally acceptable, and that signalisation of intersections along Holmes Street is not required as a result of the Precinct 3 development in the short term up to 2021.

Further operational analysis based on the 2021 and 2031 scenarios supports the findings of previous studies which suggest a requirement for signalisation at Southern River Road / Ranford Road and Southern River Road / Holmes Street.

9.0 Public Parkland

9.1 Distribution

The POS provision will provide space for passive recreation and conservation pursuits. Recreation opportunities within the central open space area will be supplemented by areas abutting the wetland and drainage swale accommodating passive recreation, and affording high landscape amenity for the benefit of adjoining residents and the wider locality.

The public open space contribution comprises both unrestricted and restricted open space. The total restricted open space contribution component is 0.365ha in area (maximum allowable area). The WAPC may agree to such features as landscaped compensating basins being included and credited either in whole or in part as a portion of a public open space contribution. Two local parks are proposed, having a combined total area of 0.4692ha, which will not have a drainage function under the urban water management plan.

Active recreation opportunities will be supplemented by Sutherlands Park (containing playing fields, facilities and car parking) and the district playing fields proposed in the Precinct 3 LSP, located south of the subject land.

9.2 District Facilities

The adopted Precinct 3 LSP identifies the provision of district open space to be co – located with the proposed government high school site, situated approximately 400 to 500m south of the subject land.

9.3 Ongoing Management Arrangements and Responsibilities

The public open space, wetland and additional land for drainage associated with the Balannup Lake Drain would be ceded to the City of Gosnells as a condition of subdivision approval.

9.4 POS Schedule

The POS Schedule is provided in Part One Section 5.5, based on the RPS Landscape Masterplan approved by the City of Gosnells at **Appendix 4**.

Refer Figure 9 – Public Open Space.

The Department of Environment and Conservation previously considered the proposed LSP plan and agreed to the clearing of two areas of vegetation for the establishment of unrestricted public open space. The proposed LSP plan maintains the same location and size for these areas as per the LSP plan approved by the City.

With reference to **Figure 9** (Public Open Space plan) the first local park (POS 1) on Lot 21 measures 0.1786ha in area. The second local park (POS 2), on Lot 18, measures 0.2906ha in area and is located immediately north of the local centre. Neither of the two local parks are planned to accommodate any drainage function, consistent with the requirements of the City of Gosnells.

The maximum POS credit provided for restricted use areas, combined with the unrestricted POS areas does not meet the minimum 10% requirement for POS specified under Liveable Neighbourhoods. The Council previously identified the need to consider POS in a broader context, given the history of the site and nature of the POS area as a wetland and vegetation conservation area. Further, it was identified the overall POS area far exceeded the 10% to be provided as POS and that Precinct 3E is located within 400m from Sutherland Park, providing future residents a large area of unrestricted POS for active recreational use. Also, district playing fields are proposed in the Precinct 3 LSP south of the subject land.

The City has indicated the POS arrangements proposed are satisfactory with reference to the broader development context of the Precinct 3 area, as identified during consideration of the original LSP by Council.

KEY

	Residential R25-R40		Residential R30-R60
	Conservation POS		Traditional POS
	Urban Water Management POS Swale Drainage		Swale Drainage
	Subject to Further Planning		Local Centre
			Road Reserve

--- 500m Buffer to the outer boundary of all kernels zone properties

ROAD A = Access Street B
ROAD B = Access Street C

■■■■■ Structure Plan Extent

1. Endemic native vegetated Drainage Swales with engineered slopes of 1:6 (no irrigation) - 0.0707ha
2. Endemic native vegetated Drainage Swale with engineered slopes of 1:6 (no irrigation) - 0.1128ha
3. Endemic native vegetated Drainage Swale with engineered slopes of 1:6 (no irrigation) - 0.0645ha
4. Irrigated turf active space - 0.1786ha
5. Irrigated turf active space - 0.2906ha
6. Area of open space comprising of conservation and drainage areas. Open space comprises of the following
 - Higher quality conservation value bush land - 1.4852ha
 - Remnant vegetation and drainage - 1.9913ha

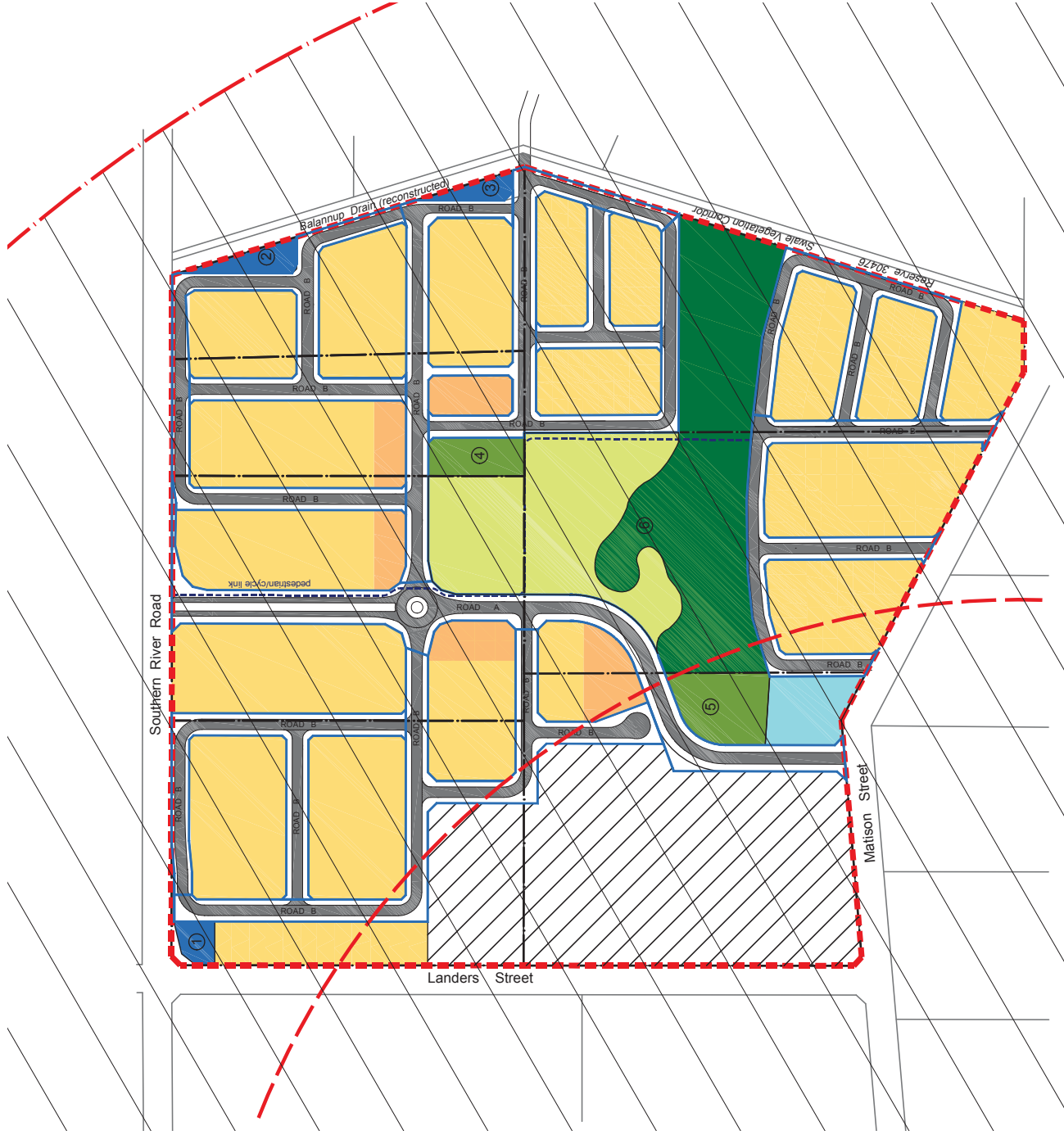


FIGURE 9
PUBLIC OPEN SPACE PLAN (indicative plan subject to change and detailed design)
Lots 12, 14, 18, 19, 20, 21 and 22 Southern River Road and Matison Street



10.0 Urban Water Management

10.1 District Urban Water Management Framework

The Southern River Integrated Land and Water Management Plan (ILWMP) was released in January 2009.

The ILWMP was prepared to provide guidance on the range of water management issues to be addressed as part of zoning, structure planning, subdivision and development processes with the intent of managing post-development district run off.

The ILWMP sets out management requirements for water at the regional, local and lot scale, including targets (design objectives) for the management of surface and groundwater quality and quantity and for potable water use and contains requirements for monitoring, auditing and reporting.

The Forrestdale Main Drain Arterial Drainage Strategy (ADS) supplements the district water management work undertaken to support the ILWMP and district and local structure plans. It is considered that the ADS was prepared in lieu of the District Water Management Strategy and has sufficient information and guidance to fulfil this function.

The ILWMP and the ADS outlines that at the Town Planning Scheme Amendment/Local Structure Plan stage a proponent is required to prepare a Local Water Management Strategy to the satisfaction of the City of Gosnells, Department of Water and the Water Corporation. This is being achieved as a part of the LSP.

10.2 Local Water Management Strategy

10.2.1 Water Demand and Conservation Strategies

According to Rockwall (2005) the total annual water use expected for a water wise house without restrictions is 304kL/house/year, of which 149kL/house/year is used internally and 155kL/house/year is used externally.

See Bioscience Local Water Management Strategy and Addendum at Appendix 6.

A residential consumption target for potable scheme water usage of 100kL/person/year has been recommended by State Water Plan (2007), however the more recent Better Urban Water Management (WAPC, 2008) recommend a target for potable scheme water usage of between 40-60kL/person/yr. Considering the average occupancy rate per house is 2.4 people (Australian Bureau of Statistics website, accessed 08/01/2010), this represents a target of 96 to 144kl/house/year and a reduction from current levels in the order 68 to 47%, which is somewhat ambitious.

Consequently, methods for sustainable water use, conservation and reuse of water should be implemented within the development where possible. As 51% of potable scheme water is used externally on gardens, possibly the greatest opportunity to reduce potable water usage involves reducing this external use whilst encouraging owners to become waterwise internally.

10.2.2 Rainwater Tanks & Stormwater Harvesting

Rainwater from roofs and other hardstand areas can be collected in rainwater tanks, and used in gardens (51% total residential water usage) and internally for toilets (9% internal water usage) and washing machines (11% internal water usage). Due to the seasonal nature of Perth rainfall (i.e. 85% occurring during the months of May to October) very large storage tanks of approximately 100m³ would be required to irrigate over the summer months, however tanks of this size are not feasible in urban residential areas. Notwithstanding smaller tanks can still have a significant impact on reducing the use of scheme water.

10.2.3 Groundwater Use

Approximately one third of all households in Perth use groundwater for irrigation purposes. The shallow depth to groundwater in the Southern River area makes this a cost effective option, particularly as there currently are government rebates available.

Currently the DoW considers the City of Gosnells groundwater supplies to be fully allocated, at least in regards to properties over 2000m² as lots less than this do not require a groundwater license. Consequently, areas larger than 2000m² such as POS are unlikely to receive a groundwater license. As land use in the area changes for rural to urban, there is in all likelihood that water allocations will become available.

As the majority of the POS with the proposed development is comprised of native vegetation, perceivably there is little requirement for this area to be irrigated (possible during re-vegetation and or during extreme drought).

10.2.4 Waterwise Landscaping

Reducing the amount of water used for irrigation can be achieved via planting drought tolerant species, reducing the area of lawn, improving soil water holding capacity and via the installation of water efficient irrigation.

Another method of water conservation is through the establishment of native vegetation that has minimal or no irrigation requirements. Such plants also help to promote a more natural environment and minimise the introduction of alien species. A substantial proportion of the proposed POS areas has been strategically located to maximise the conservation of native vegetation. As previously motioned it is anticipated that this POS will not require any irrigation.

Where landscaping requirements may exist such as within swales and buffer strips, suitable native species should be selected. Where irrigation of vegetated areas cannot be avoided, it should be restricted during the day as this is when evaporation rates are at their greatest.

10.2.5 Domestic Greywater

Whilst greywater use is technically feasible (excluding the possible concern of nutrient loading to groundwater) the large scale use within the development is not advised.

10.2.6 Water Efficient Fittings & Appliances

The use of waterwise fixtures such as showerheads, taps, toilets and washing machines is recommended where possible. According to Rockwater (2005) a 12% reduction in internal potable scheme water can be achieved via the installation of waterwise fitting and appliances.

10.2.7 Water Balance

Rockwater (2005) estimated the evapo-transpiration of the area to have accounted for 75% of total annual rainfall. Thus 25% of annual rainfall would recharge surface and groundwater systems. As the total area of the site is 25.778Ha and the average annual rainfall is 837mm/yr, the total volume of annual rainfall for the site is estimated to be 215.76ML/yr, of which 53.94L/yr would actively recharge surface and groundwater systems.

Post-development water balance is considerably more complex than pre-development as it must take into account changes to runoff characteristics from impermeable surfaces such as roofs and roads. It must also take into account importation of potable water and its use externally. More information regarding post-development water balance will be undertaken during the development of an UWMP.

10.2.8 Surface and Stormwater Management

Drain Design and Flood Management

A series of pipes, drains, swales, living streams, bio-retention systems, roadways and attenuation/infiltration POS areas are to be used to transfer and/or store extreme stormwater flows (i.e. a 1 in 100 year ARI event) and provide water quality treatment prior to discharge into the Southern River via the Forrestdale Main Drain.

Drainage will be designed using a major/minor approach, more specifically the minor drainage will integrate underground pipes, swales, kerbs and gutters to carry runoff generated by low frequency ARI events (i.e. less than a 1 in 5 year ARI event); whereas the major drainage will integrate roadways, living streams, drainage reserves, attenuation/infiltration POS areas to provide safe passage of water during extreme runoff events (i.e. up to a 1 in 100 year ARI event).

Whilst the use of swales is proposed the specific locations and design will not be determined until the Urban Water Management Plan (UWMP). Dry drainage reserves will be used in POS proposed for lots 18, 19 and 20. This area will remain dry for the majority of the year except following moderate ARI events (i.e. 1 in 6 month ARI event) and will have an elevation above AAMGL.

The drainage system proposed for the site is a mixture of swales, bioretention systems and drainage basins in POS; however the actual design is yet to be confirmed by the CoG. Bioscience recommends the following point regarding drainage design and maintenance.

Swales to be grassed and irrigated (Note: Not expected to require much irrigation) and managed by the CoG to avoid land owners fertilising and/or filling in swales. Areas of POS that are inundated in a 1 in 1 year event will be planted with native reeds and rushes. Subsoil drainage shall be provided in these areas to avoid water ponding in parks.

Post - Development Flow

As yet the structure plan is not available; hence more detail analysis of post development flow will be undertaken during the development of an UWMP.

Living Streams

This LWMS seeks to maintain existing drainage catchments, flow paths, and maintain post-development flows at pre-development conditions. To achieve this, the existing local authority drains and natural landscape depression are proposed to be established as living streams within a POS corridor.

The Local Structure Plan (LSP) currently being prepared by Urban Plan has assigned higher density housing adjacent to proposed living streams (yet to be approved), thereby reducing the ability for high nutrient application via domestic gardens to leach into the living stream. More detail design and analysis of site conditions will be undertaken during the development of an UWMP, including preparation of landscape plans, design drawing, determining the extent of any catchment areas feeding directly into the living streams and addressing specific water quality treatment measures to be implemented for these catchments prior to discharge to these streams.

10.2.9 Groundwater Management

There are three primary objectives for groundwater protection and management for the proposed development, these include:

- Protection of infrastructure and assets from flooding and inundation which may be brought about by high groundwater levels.
- Protection of groundwater dependent ecosystems from modified run-off following development.
- Maintaining and managing groundwater levels and quality following development.

Protection of Infrastructure and Assets

The shallow depth to groundwater (less than 1m BGL in many areas, see Figure 9 and 10) and relative flatness of the site increases the potential risk of damage to infrastructure to flooding. The implementation of controlled groundwater levels (CGL) within a development area is dependent on a range of local and site conditions including the soil type and its relationship to groundwater levels

(regional and/or perched), the presence of ASS, the existence of pollutants or nutrients within groundwater, and the need to protect wetlands and groundwater dependant ecosystems.

According to the LWMP there is a requirement to determine the controlled groundwater levels for the development area, to enable the setting of minimum drainage invert levels and to calculate the extent of land filling requirements. We propose establishing a CGL at pre-development AAMGL within the development area; however this will continue to be updated and refined throughout the UWMP process.

Despite the control of groundwater levels, flooding still remains a considerable risk to infrastructure. The primary method of protecting buildings/infrastructure from flooding and inundation is through the implementation of a minimum separation distance of 1.2m between the AAMGL and the base of the building foundations and infrastructure. This separation distance of 1.2m is recommended to maintain free-draining soils, to allow for the installation of underground services, avoid water-logging and encourage soil filtration/aerobic microbial action to attenuate leached contaminants. In areas where insufficient separation exists between AAMGL and natural surface levels, engineering fill will be required.

Groundwater-Dependent Ecosystems

While it is acknowledged that development in the district structure plan area will require some degree of groundwater management to protect infrastructure and assets, care should be taken to maintain the requirements of groundwater dependent ecosystems.

An increase in groundwater levels may result in upland vegetation being unable to tolerate wetland like conditions; likewise a decrease to groundwater levels may result in wetland vegetation being unable to tolerate dryer conditions. It is likely that the majority of remnant vegetation within the proposed POS located on Lot 19 is to some extent dependent on shallow groundwater, whereas the remnant vegetation within the proposed POS located on lot 13 at its maximum is approximately 2m BGL and dependent on upland conditions.

Post-development alterations to groundwater levels may decrease due to an increase in abstraction of groundwater for residential irrigation (particularly during summer), or due to the control of groundwater levels through subsurface drainage (during winter) and increase due to greater stormwater infiltration.

Several considerations have been proposed to minimise the impacts of development on groundwater levels. To protect upland and wetland vegetation alike by not constructing subsurface drains above or below 0.3m AAMGL; and secondly, to only permit residential use of superficial groundwater for irrigation if models can conclusively demonstrate sufficient water is available.

Groundwater Quantity

Post-development annual discharge volume and peak flow be maintained relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments (DoW, 2008).

10.2.10 Wetland and Environmental Water Management

There are no Conservation Category Wetlands (CCW) or Environmental Protection Policy lakes (EPP) within the development area. There is however a CCW located approximately 200m east of Lot 20.

A rehabilitation wetland (RW) is located on the proposed development site. Surveys undertaken for the Department of Housing by Bioscience (2009) indicate that this RW is in poor condition. Consequently this area is proposed to become an living streams within a POS corridor.

Directly north of the site is a Local Authority drain with an approximate depth of 19.6m ADH or 0.9m below AAMGL. The purpose of this drain is to remove surface water from the surrounding area and direct it towards the Forrestdale drain, where it is redirected into the Southern River. A recent Urban Water Management Strategy report from the Southern River/Forrestdale/Brookdale/Wungong, Structure Plan titled "Impact of Existing Drains and Proposed Living Streams on Groundwater Table and Nutrient Export" (JDA, 2002) specifies the drawdown influence of drains of varying depths within this region. Their results can be used to estimate desirable drain depth and distances from significant environmental features such as CCW to provide protection from groundwater lowering (Table 2). Consequently, it can be used in the reverse manner to deduce the impact a drain has on a wetland given its invert below AAMGL and distance are known.

In relation to the site, the drain invert is approximately 0.9 m below AAMGL, consequently, groundwater levels within 1km of this drain will be reduced logarithmically from between 0.57m to 0.08m, and thus has a significant drying effect of the RW located on the site.

10.2.11 Water Quality Management

Designs for infrastructure and management measures to achieve water quality outcomes are based on the methodologies established in the Stormwater management manual for Western Australia (Department of Water 2004–07). The aim in regards to water quality is to maintain pre-development quality and where possible to improve water quality. Assessment of compliance with targets will be through post development monitoring. To achieve this emphasis on nutrient input control, and maintaining 1 in 1 year ARI post-development discharge volumes and peak flow rates at pre-development levels. The proposed water quality management approach for the proposed development area includes:

Non Structural Controls

- Planning practices (POS locations and configuration).
- Construction practices (construction management, soil amendment, use of native plantings).
- Maintenance practices (street sweeping, stormwater system, POS areas).
- Educational and participatory practices (capacity building programs, community education).

Structural Controls

- Retention and infiltration of frequent events where possible (soakwells, and swales).
- Conversion of existing open drains to living streams.
- Creation of ephemeral retention/detention areas within POS areas.
- Gross Pollutant Traps (GPT) at outlets to sensitive environments.

Monitoring

- Establishment of pre and post development monitoring network.
- Annual reporting, including ongoing assessment of BMP's performance and suitability to provide ongoing guidance and review for future WSUD planning within the Study Area.
- As compared with a development that does not actively managed water quality, developments should achieve.
 - at least 80 per cent reduction of total suspended solids.
 - at least 60 per cent reduction of total phosphorus.
 - at least 45 per cent reduction of total nitrogen.
 - at least 70 per cent reduction of gross pollutants.

Best Management Practices

Water sensitive urban design and best management practices should not only promote infiltration to aid in prevention of possible local flooding from increased runoff due to urbanisation, but should also treat the water prior to its discharge to waterways, wetlands and to groundwater (JDA, 2002). The primary method of maintaining water quality is to avoid nutrients from entering the groundwater and/or surface water from fertilisers, via direct infiltration or through stormwater.

Reducing the amount of fertilisers used by educating residents and by providing landscaping packages in which minimal fertilisers are required. More specifically the landscaping package should minimise the amount of lawn and make soil amendments that increase the phosphorus retention index. For example the application of Bauxite residue to soil has the potential to reduce eutrophication of rivers, waterways and groundwater by retaining nutrients on infertile sandy soils. The best application rates of red mud which will reduce phosphorus leaching are 10–20 t/ha (Summers et al 1996). As fill is required on site to increase the separation of building foundations and infrastructure from AAMGL, this could be included in the composition of the imported fill. However at this stage it is uncertain whether this would constitute clean fill.

Bio-retention is a best management practice (BMP) to prevent groundwater quality deterioration. It can be incorporated to where subsurface drainage is installed for groundwater level control. A bioretention treatment system generally utilizes soils and both woody and herbaceous plants to remove pollutants from storm water runoff generally within a swale or basin. Water passes first over or through a sand bed, which slows the runoff's velocity and distributes it evenly along the length of the swale or basin, which consists of a surface organic layer and/or ground cover and the underlying planting soil. Water is ponded to a depth of 15 centimetres and gradually infiltrates the bioretention area or is evapo-transpired.

10.2.12 Construction Management

Imported Fill Material and Compaction

The permeability of imported soil is an important consideration, particularly where there is a shallow depth to groundwater. The permeability of a soil is proportional to the amount of fine particles (i.e. <0.075mm) within a soil. Bioscience considers most sandy soils suitable fill material provided it that

it contains less than 5% fines, has a maximum particle size of 40mm and is free of any organic or deleterious material. Several upland area on site have been identified as being suitable for fill excavation, as they have natural sand cover over AAMGL of greater than 1.5m (Figure 9).

Fill materials, placement and compaction methods and quality control should apply with relevant structure fill requirements according to standard industry practice and AS 3798 “Guidelines on Earthworks for Commercial and Residential Developments”.

The fill should generally be placed in loose layers not exceeding 300mm thickness and each layer should be compacted with suitable equipment to a minimum of 95% modified maximum density or 70% density index as appropriate.

Dewatering

Throughout the construction phase of the development dewatering may be required.

Prior to the commencement of any dewatering a licence to take water, will be required to apply for and obtain from DoW. If possible, site preparation should occur during dry periods to reduce or eliminate dewatering requirements. Should dewatering be required, care must be taken to ensure neighbouring wetlands or groundwater dependent ecosystems are not adversely affected.

10.2.13 LWMS Modifications - Post Original LSP

The final version of the LWMS includes minor amendments requested by the City of Gosnells (requested modifications are provided as an addendum to the LWMS at **Appendix 5**).

The City of Gosnells requested two further changes, including lifting the discharge invert of subsoil drains and achieving a minimum clearance of finished lot levels to groundwater of 2 m.

Following further discussion between the property owners, MGA Town Planners, JDSi Engineers and the City’s engineering staff, consideration of these requested modifications were delayed by the City, given the final detailed design and finished lot levels are not yet able to be completed.

The City of Gosnells and Department of Planning agreed to delay the requirement for an Urban Water Management Plan (UWMP) to be presented in conjunction with a subdivision application, as required under Clause 6.4.3 (b) of TPS6. The UWMP will be required and delivered as a condition of subdivision approval.

It was agreed that the extent of fill and level of subsoil drainage will be addressed during preparation of the UWMP, at which time further supporting information from detailed engineering designs will be available.

10.3 Ongoing Management Arrangements and Responsibilities

The ongoing management and responsibilities associated with urban water management are outlined in the Local Water Management Strategy.

11.0 Environmental Noise Assessment

11.1 Preamble

Lloyd George Acoustics was commissioned to assess the noise resulting from the Southern River Kennel Zone, located within 500 metres from the western boundary of the LSP area. Noise measurements were made on two occasions over a period of 10 days from 4 to 13 February 2012, at Location 1, and from the 28 June to 8 July 2012, at Location 2. The noise measurement locations are shown in Figure 11 below.

The Environmental Noise Assessment is attached at **Appendix 7**.

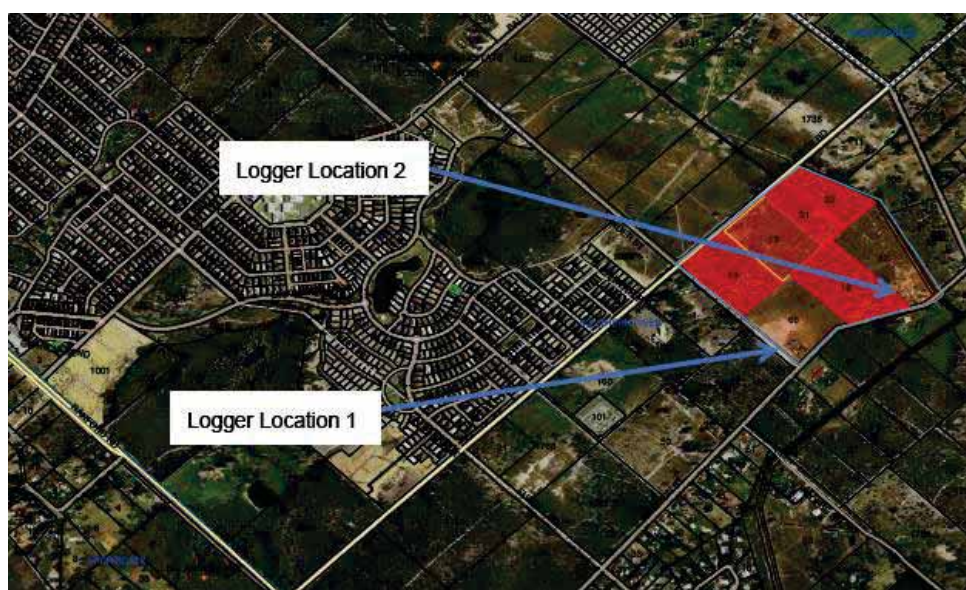


Figure 10 – Noise Logger Locations

11.2 Measurements

Location 1

For Location 1, the time period chosen was between 3.00 am and 7.00 am on Sunday 12 February 2012. From analysis of the recorded noise during this period, Figure 4.3 shows a “snap-shot” of the instantaneous noise levels when background noise level, resulting mainly from insects (crickets) and birds, was at least 10 dB lower than the noise from dogs barking and therefore not influencing the levels. It should be noted that, although the overall noise levels were influenced by the background noise, the barking was audible throughout this entire time period. From this analysis, it has been determined that the LA10 noise level, which is the level considered by the Department of Environment and Conservation to be relevant to dog barking, is LA10 42dB.

Location 2

For Location 2, the time period chosen was between 11.00 pm and Midnight on Saturday 7 July 2012. From analysis of the recorded noise during this period, Figure 4.4 shows a “snap-shot” of the instantaneous noise levels when background noise level, was at least 10 dB lower than the noise from dogs barking and therefore not influencing the levels. From this analysis, it has been determined that the LA10 noise level is LA10 38dB.

11.3 Noise Contours and Noise Assessment Conclusion

Figure 11 below describes the results of the analysis through noise contour levels.

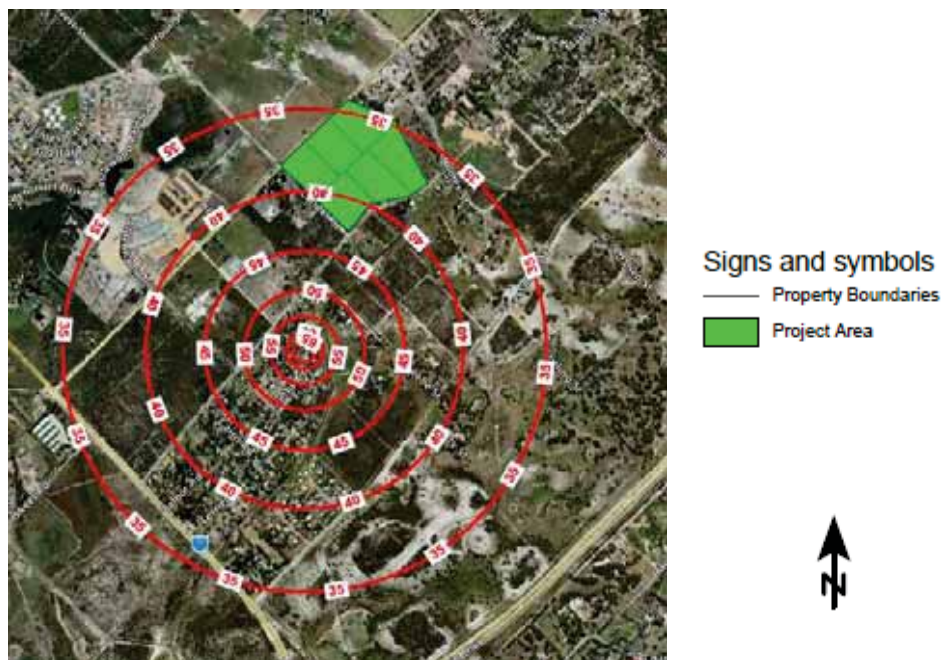


Figure 11 – Noise Contours (from Lloyd George Acoustic Assessment Appendix 7)

The conclusion drawn by Lloyd George Acoustics is summarised as follows:

The results of the assessment show that assuming buildings are constructed on the industrial land to the south and houses are constructed on proposed lots, the predicted noise levels exceed the assigned levels under the *Environmental Protection (Noise) Regulations 1997* by 2dB and 3dB in the southern section of the proposed development.

Although the assigned levels are exceeded, a good level of amenity could be achieved within a house by the use of facade protection, similar to that specified in State Planning Policy 5.4 (which addresses transportation noise impacts). In addition, outdoor entertainment areas should be positioned behind the house, so that the house acts as a barrier to shield noise from the kennel zone.

11.4 Outcome

The Environmental Noise Assessment was reviewed by the Department of Environment Regulation (DER) which recommended that a 500 metre buffer distance from the kennel zone be maintained.

DER noted that the construction of noise barriers and future non – noise sensitive development had the potential to screen residential development. However, in the absence of any certainty over the ultimate form of development south of Lander Street, it was concluded that the assumptions made in relation to barrier effects could not be supported as a means to reduce the buffer at the present time. Concerns were also raised in respect of the modelling which did not factor in assumptions relating to the full build out of properties in the kennel zone.

The Structure Plan shows the required 500 metre buffer from the nearest property boundary within the kennel zone to accord with the Southern River/Forrestdale/Brookdale/Wungong District Structure Plan. To address constraints associated with noise sensitive development within the buffer a Local Centre and area nominated as ‘Subject to Further Planning’ are proposed.

12.0 Acid Sulphate Soils

Subject to the findings of the preliminary soil investigations an Acid Sulphate Soils Preliminary Investigation and/or Management Plan may possibly be required as a condition of subdivision approval.

13.0 Bushfire Management Plan

A Bushfire Management Plan has been prepared by Strategen, providing an assessment against the requirements of State Planning Policy 3.7 – *Planning in Bushfire Prone Areas*. Bushfire management measures have been devised to meet with applicable bushfire protection criteria.

See Appendix 8 – Bushfire Management Plan

14.0 Utilities

Refer to Section 3.9 of the Southern River Precinct 3 Local Structure Plan report produced by Taylor Burrell Barnett.

14.1 Western Power

Western Power advises that the existing power services located within the Southern River Road reserve and the subdivision to the north (of Southern River Road) can be extended to service the development of Precinct 3.A Western Power substation is located on the southern side of Southern River Road west of the subject land.

14.2 Water Corporation

14.2.1 Reticulated Water

The Water Corporation advise that the Precinct 3 can be serviced with reticulated water by an extension of the existing 400mm diameter water distribution main at Chamberlain Street, along Southern River Road through a pre-funding agreement.

14.2.2 Reticulated Sewer

The Water Corporation has advised that sewer planning for this area has been completed and that Precinct 3 will be served by a reticulated gravity system draining to main sewer lines and/or the permanent wastewater pump stations. The system will then connect to a proposed Type 180 permanent pump station within Bletchley Park Estate (north of Southern River Road) and ultimately will connect to the major wastewater transfer station.

14.3 Telecommunications

Telstra has confirmed that existing services within the area can be extended to connect to and service the development of Precinct 3.

14.4 Gas Supply

Alinta Gas has confirmed that existing services within the area can be extended to connect to and service the development of Precinct 3.

15.0 Activity Centres and Employment

15.1 Activity Centres

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) proposed a hierarchy of retail, commercial and industrial centres to meet the shopping, commercial and employment needs of the future population.

The DSP illustrated a Village Centre, three Neighbourhood Centres and a Mixed Business/Commercial and Light Industrial area within Precinct 3 to service the local and wider population. The Village Centre was notionally located across Precinct 2 and Sub-precinct 3E within the immediate vicinity of the subject land.

The initially adopted Precinct 2 Local Structure Plan, for the area of land abutting the northern side of Southern River Road (directly opposite Lots 21 and 22), identifies a Local Centre with a maximum floor space of 1250m² NLA.

The City has recently completed its Local Activity Centres Strategy 2012, which identifies potential for the implementation of an additional 1,200m² of PLUC 5 shop/retail floor space in the vicinity of the Precinct 3E LSP area.

Discussions with the City have confirmed that the City is willing to entertain the incorporation of a local centre in the LSP area, to service the daily convenience needs of local residents, consistent with the above specified limit of 1,200m² PLUC 5 shop/retail floor space.

MGA Town Planners met with supermarket operators to confirm that the identification and location of the local centre on the LSP was an attractive proposition. To date, the Department of Housing have received a written expression of interest for the establishment of a supermarket on the local centre site; following endorsement of the LSP.

15.2 Employment

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) proposes significant areas being allocated for commercial land use at the centre of neighbourhoods and suggests that provisions be made for home based business in order to achieve a target for local employment the equivalent of 15% of the resident population for the entire DSP area. This workforce is based on employment in local shops and other small local neighbourhood employment activities.

Assuming 50 employees per 1000m² of shop/retail floorspace alone, the proposed local centre could generate in the order of 60 full and part time employment positions. Further, the subject land is located in proximity to nearby planned activity centres, including:

- The proposed local centre adjacent to the subject land on opposite side of Southern River Road;
- Three proposed north east of the subject land on south eastern side of Southern River Road);
- The proposed mixed business/light industrial area (south east of the subject land);
- Larger retail facilities such as the Amherst Road Warton Road retail and commercial centre; and
- The boardwalk shopping centre.

16.0 Schools

16.1 School Site Planning

The LSP does not set land aside for the provision of government or private primary or high schools. The site will be serviced by established and future schools in adjoining precincts and sub-precincts, in accordance with the established district and local structure plans.

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) identified the need for 3 to 4 primary school sites and 1 high school site within Area 1, encompassing Southern River and the subject land, based on the estimated lot yield and subsequent population projections. Originally, the DSP did not propose a government primary school site within Sub-precinct 3E (containing the subject land), suggesting that the sub-precinct be served by government primary schools located in the adjoining precincts of Precinct 2 (north west / existing school), Sub-precinct 3A (north east) and Precinct 4 (south). The adopted Precinct 3 LSP illustrates a 4 hectares government primary school site within Sub-precinct 3A, approximately 300m east of the subject land, and an 11ha government high school site located approximately 400m south of the subject site.

16.2 Catchment Requirements

As outlined in Section 4.4.3, the LSP will yield an estimated 337 lots equating to an estimated 343 dwellings.

Liveable Neighbourhoods outlines that government primary school sites are to be provided on a ratio of one school site per 1,500 housing units. On the basis that the development of the subject land is anticipated to equate to 22.8% of a whole catchment, it is reasonable that the development be served by the established and future schools located in Precinct 2, Sub-precinct 3A and Precinct 4.

17.0 Consultation

Consultation with surrounding landowners and wider community was undertaken previously through the broad, district-scale planning framework established for Southern River by the Western Australian Planning Commission in 2001 through a District Structure Plan (DSP) prepared to guide development. The DSP identified potential development areas, road networks, major community facilities and land for public open space, drainage and conservation.

Following the district scale planning undertaken by the WAPC, Taylor Burrell Barnett, on behalf of Viento Property Pty Ltd, submitted a proposed Structure Plan for Precinct 3 (covering the subject land) and a proposed Local Structure Plan for Precinct 3A (abutting the subject land). The proposals were advertised for public comment during October and November 2008, the submissions were considered by Council at its meeting of 12 May 2009, where it resolved to adopt a revised Structure Plan and forward it to the Western Australian Planning Commission for its consideration.

18.0 Developer Contributions

The Precinct 3 LSP outlines an initial framework for the acquisition of developer contributions and identifies common infrastructure and land requirements considered appropriate for cost sharing by landowners within Precinct 3.

Amendment 110 to TPS6 provides a framework for POS contributions based over the entire Precinct 3 area. Council, on 22 March 2011, resolved to initiate Amendment No. 110 and forward it to the Environment Protection Authority (EPA) for review and the Western Australian Planning Commission (WAPC) for consent to be advertised for public comment.

On 20 October 2011, the WAPC advised of its consent to advertise the amendment, subject to several modifications being made to the amendment text, mainly to bring the proposal into line with State Planning Policy 3.6. The Developer Contribution Report informing the calculation of POS and WIC contributions is yet to be completed. Ultimately, each landowner will be responsible for contribution costs that apply to the entire Precinct 3 area, in addition to those that may apply specifically to each of the six sub-precincts that comprise the area.

19.0 Conclusion

This LSP has been prepared and modified by MGA Town Planners, providing additional information and modifications to the LSP plan and report initially prepared by Urbanplan and approved by the City of Gosnells at its ordinary meeting on 9 August 2011, subject to modifications.

Following consideration by the Department of Planning and Environmental Protection Authority, various matters were raised necessitating further investigations and modifications addressing the LSP design, lot yield and arrangement, the progression of an environmental noise assessment, traffic impact assessment, and statutory framework guiding operation of the LSP. These subsequent modifications have been undertaken as required in order to progress the LSP.

The Department of Housing has progressively acquired Lots 13, 14, 19, 21, and 22 as a consolidated holding to achieve housing development in the locality. The proposal stems from the need to provide affordable housing opportunities through maintaining continuity of land supply to satisfy the Department's objectives in the provision of housing. During the planning process, the Department of Housing has collaborated with the owners of Lots 18 and 20 to deliver a coordinated outcome wherever possible; and integrate with surrounds.

Detailed environmental research and documentation conducted by Bioscience for the subject land distinguishes between the land that is to be set aside for wetlands and open space and land available for the development. Based on the environmental investigations undertaken, a formal request was lodged with the DEC Wetland Office to modify the geomorphic wetlands dataset for Lots 13, 14, 18, 19, 20, 21 and 22. The thoroughness of these investigations is ample to inform the creation of a Local Water Management Strategy. Matters raised by the City in relation to the Local Water Management Strategy in 2011, were resolved during 2012 by JDSi Engineers and Bioscience.

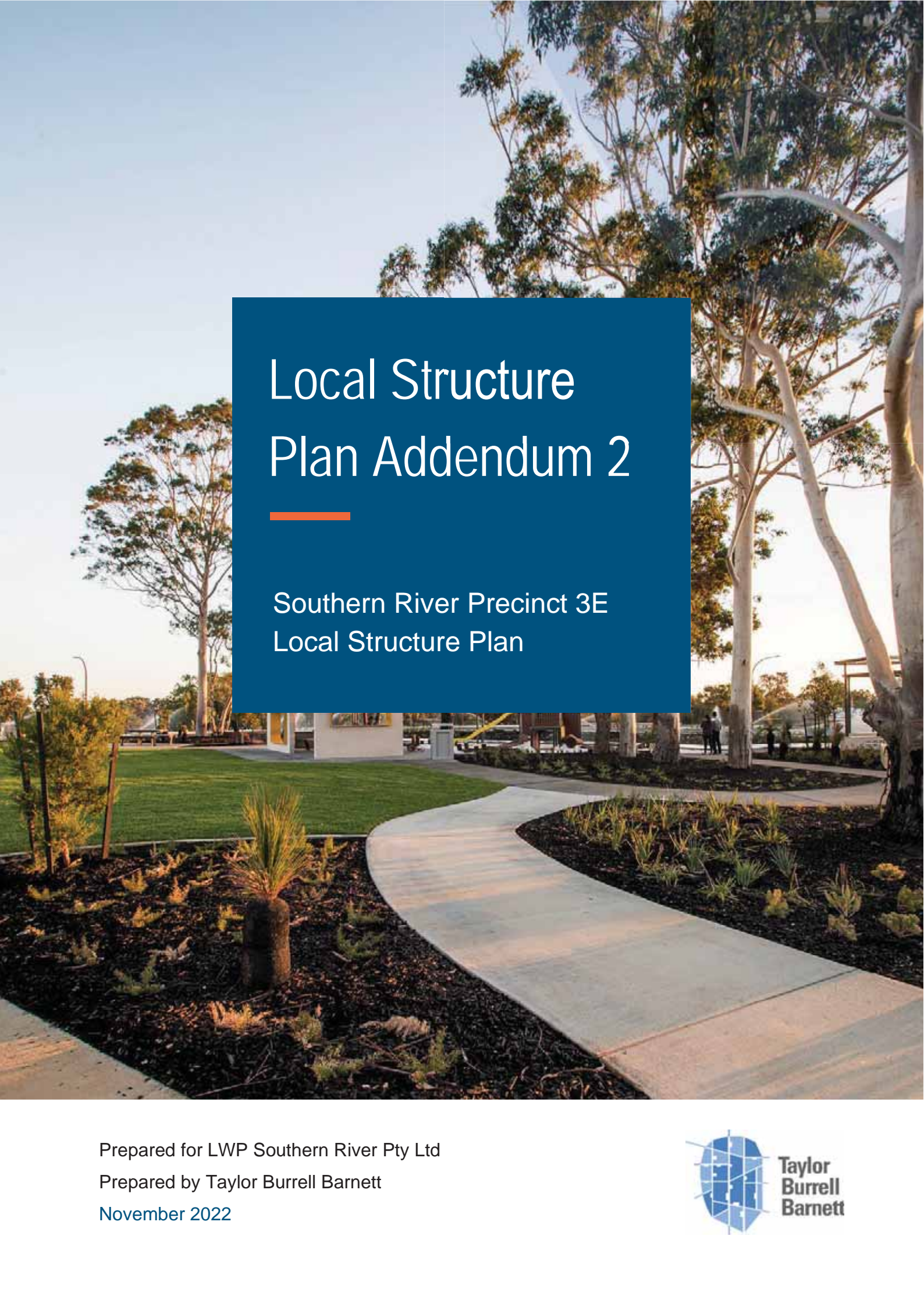
The LSP meets with the intent of Liveable Neighbourhoods, with respect to community design, road configuration, distribution of residential density and ensuring appropriate residential amenity and safety. Based on the retail potential identified in the City's Local Activity Centres Strategy 2012, the LSP now also identifies a local centre to improve access to facilities meeting the daily and weekly needs of future residents. Positive feedback from supermarket operators has verified the orderliness and viability of this proposition.

The LSP has been refined and further informed following the completion of further technical studies, including the assessment of alternative traffic and development scenarios; and the identification of alternative land uses where possible in response to noise impact constraints affecting the LSP area. The modified LSP plan, report and applicable statutory provisions provide a framework guiding subdivision, development and future planning throughout Precinct 3E that may also accommodate changing market demands.

Appendix B

Part Two – Addendum 2





Local Structure Plan Addendum 2

Southern River Precinct 3E
Local Structure Plan

Prepared for LWP Southern River Pty Ltd
Prepared by Taylor Burrell Barnett
November 2022



Document Information

Local Structure Plan Addendum 2

Southern River Precinct 3E Local Structure Plan

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1.0 Introduction

The following Addendum has been prepared by Taylor Burrell Barnett, on behalf of our client LWP Southern River Pty Ltd (LWP), in support of a modification to the adopted Southern River Precinct 3E Structure Plan (WAPC Ref. SPN/0221M-1), which was adopted by the Western Australian Planning Commission on 5 May 2017, and amended on 15 April 2020.

The provisions and content within the adopted Structure Plan report (Part 2) remain valid unless modified by this Addendum. Part 1 of the Structure Plan report has been updated in keeping with this addendum.

The modified Structure Plan is supported by the following technical assessments appended to the Structure Plan as revisions or addendums to the original reports:

- **Appendix A** – Acoustic Assessment, prepared by Herring Storer Acoustics.
- **Appendix B** – Revised Traffic Impact Assessment, prepared by Transcore.
- **Appendix C** - Local Water Management Strategy (LWMS) Addendum, prepared by RPS.
- **Appendix D** - Bushfire Management Plan Addendum, prepared by Strategen.
- **Appendix E** - Landscape Masterplan, prepared by Plan E.
- **Appendix F** – Flora and Vegetation Assessment, prepared by RPS.
- **Appendix G** - Engineering Services Report, prepared by Cossill and Webley.

1.1 Amendment Area

The proposed Structure Plan (SP) Amendment relates to Lot 9009 and Lot 18 identified in **Table 1** and outlined in **Figure 1** below.

Table 1 Subject Site

Lot No.	Deposited Plan	Volume	Folio	Registered Proprietor
9009	422572	4018	701	LWP Southern River Pty Ltd
18	031754	358	11A	Carmelo Radici

- LEGEND**
- Structure Plan Extent
 - - - Proposed Amendment Area Boundary
- METROPOLITAN REGION SCHEME**
- Reserves
- Other Regional Roads (Existing to be retained)
 - Other Regional Roads (Existing to be removed from Metropolitan Region Scheme)
 - Other Regional Roads (Proposed - Subject to design confirmation)
- LOCAL PLANNING SCHEME**
- Reserves
- Conservation POS
 - Urban Water Management - POS Swale Drainage
 - Traditional POS
 - POS - Swale Drainage
- Zones**
- Local Centre
 - Restricted Uses (Refer to Part 1 Implementation)
 - Residential R25 - R40
 - Residential R40 - R80
- Other**
- Road Reserve
 - Subject to Further Planning
 - Restricted Uses (Refer to Part 1 Implementation)
 - Cycle Path
 - 1000m Kennel Notification Area
 - 500m Buffer to the outer boundary of all kennel zone properties
 - POS Identification Number
- The residential densities provide a range between the lower and higher R-Code that can be considered for each residential site. The specific residential density is subject to the preparation and approval of a Residential Code Plan. The R-Code Plan, once approved, is to form part of the Structure Plan.



Figure 1 Proposed Amendment Area

1.2 Proposed Modifications

The modifications to the approved Southern River Precinct 3E Local Structure Plan generally consist of the following, as depicted on **Figure 2**:

1. Land previously identified as 'Subject to Further Planning' to be designated 'Residential R25 – R40', Local Centre and Public Open Space, with a proposed street block layout.
2. Residential zones and roads which have now been created, following subdivision approval, are updated to reflect the approved subdivision layout.
3. Local Centre relocated to intersection of Matison Street and Evandra Road.
4. Public Open Space (POS) relocated adjacent Matison Street.



Figure 2 Proposed Local Structure Plan Modifications

1.3 Background

This SP Amendment is prepared by Taylor Burrell Barnett, on behalf of the landowners of the subject site, LWP Southern River Pty Ltd and Carmelo Radici. The proposed SP Amendment provides for detailed planning over Lot 9009 and Lot 18, Southern River Road, Southern River (the subject site). The subject site was previously identified as 'Subject to Further Planning' in accordance with Clause 5.4.1(a) of the approved SP.

During the preparation of the approved SP, noise impacts associated with the existing kennel uses to the south of the subject land were investigated and reported on to the Department of Environmental Regulations. This resulted in the need to provide an alternative land use outcome for land in the southern portion of the SP area included in the 500m generic noise buffer, given that residential development was identified as being unsuitable in this location, based on the information available at the time.

Clause 5.4.1(a) of the approved SP, requires that the area identified as Subject to Further Planning is progressed through the preparation of a subsequent amendment to the approved SP or a development application progressed by the landowner. Accordingly, this SP Amendment has been prepared to satisfy this requirement.

Clause 5.4.1(a) of the approved SP is outlined as follows:

- a) *The land shown as 'subject to further planning' is excluded from the approved Structure Plan. A Structure Plan amendment is to be finalised to incorporate the area shown as 'Subject to Further Planning' under Clause 29 of the Planning and Development (Local Planning Schemes) Regulations 2015, Schedule 2 Deemed provisions, prior to subdivision or development. The Structure Plan amendment is to address as a minimum:*
- i) *The allocation of zoning and land use planning controls to restrict noise sensitive development within the designated 500 metre kennel zone buffer;*
 - ii) *Where modification to the kennel buffer alignment is proposed to allow noise sensitive development within 500 metres of the kennel zone a noise assessment as endorsed by the Department of Environment Regulation and City of Gosnells is to be submitted which demonstrates that noise can be maintained within the assigned levels of the Environment Protection (Noise) Regulations 1997;*
 - iii) *The coordination of roads and access to be supported by a transport impact assessment if deemed necessary;*
 - iv) *Dependent upon the nature of zoning / land uses, the need to contribute towards open space;*
 - v) *An appropriate transition between the proposed development and adjoining residential sites;*
 - vi) *Other relevant matters deemed necessary by the local government and WAPC.*

This SP Amendment is considered to meet the requirements of Clause 5.4.1(a) of the approved Southern River Precinct 3E Local Structure Plan, through the provision of a suite of relevant technical reports. In particular, a suitable Noise Assessment has been prepared by Herring Storer Acoustics for the consideration of the Department of Water and Environment Regulations and the City of Gosnells, a Traffic Impact Assessment has been prepared by Transcore reflective of the proposed movement network, and an amended design concept has been provided, inclusive of sufficient public open space and with consideration to the findings and recommendations of further technical reports appended to this SP Addendum.

1.3.1 Kennel Buffer

Background

In August 2000, an Acoustic Assessment was prepared to determine the Forrestdale Southern River Structure Plan Area Noise Management Strategy, in accordance with the *Environmental Protection Act 1986*. This resulted in the 500m generic buffer being applied around the perimeter of the kennel zone, to the south west of the approved Southern River Precinct 3E SP.

In October 2018, Herring Storer Acoustics (HSA) undertook an assessment to quantify noise levels from the kennel zone at the proposed development of Lot 18 Matison Street and provide comment on the appropriateness of residential or other developments within land situated in the kennel buffer. Based on the analysis of the monitored noise levels, the assessment concluded that noise levels at the proposed development would be considered as complying with the regulatory criteria for all hours. The assessment recommended that for the first row of houses, upgraded residential building design, such as Package A of the State Planning Policy 5.4 – Road and Rail Noise should be incorporated. In addition to this, the

Assessment advised that a notification on titles would be required to advise that the lots are located within a kennel buffer and may be subject to noise impact associated with the Southern River kennel zone.

In December 2019, the Environmental Noise Branch (ENB) of the Department of Water and Environmental Regulations (DWER) undertook a technical review of the HSA 2018 Assessment outlined above, and provided their comments for the consideration of HSA. HSA provided a response to the ENB's comments in February 2020, and further responses were then provided by ENB.

In 2021, Taylor Burrell Barnett and HSA, attempted to arrange a meeting with the DWER to discuss the generic kennel buffer over lots in the Southern River Precinct 3E Local Structure Plan area and the latest comments provided by the ENB team. However, DWER advised that they cannot provide further advice unless a formal application is made, proposing residential development over the site. The City of Gosnells also attempted to arrange a meeting with DWER in 2021, however, were unsuccessful with this regard.

Rationale

In June 2005, the Environmental Protection Authority released a document providing guidance for the assessment of environmental factors in accordance with the *Environmental Protection Act 1986*. The Guidance Statement relates to separation distances between industrial and sensitive land uses.

The Guidance Statement notes that a sound site-specific technical analysis will provide the most appropriate guide to the separation distance that should be maintained between a particular industry and sensitive land uses, or between industrial precincts and sensitive land uses, to avoid or minimise land use conflicts.

Importantly, the Guidance Statement outlines when the generic separation distances should be used, noting they are helpful to provide general guidance on separation distances in the absence of site-specific technical studies, or, where only an estimation of the area that could be subject to land use conflicts is required.

In the case of the proposed SP Amendment, where the separation distance is proposed to be less than the generic distance, the Guidance Statement requires that a scientific study based on site and industry specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts. The Acoustic Assessment prepared by HSA is considered to fulfil this requirement.

Proposal

In August 2022, Herring Storer Acoustics prepared an Acoustic Assessment that included a site specific, technical study, to identify an appropriate separation distance between residential land uses and the kennel zone that are in accordance with the *Environmental Protection Act 1986* and do not result in any unacceptable impacts. The Acoustic Assessment also addresses comments raised by DWER and includes further studies undertaken since the original report was prepared in 2018. An updated version of the Acoustic report was prepared in February 2024 to provide additional noise modelling detail. Further details are outlined in **Section 4.1** of this Addendum and in the full report attached as **Appendix A**.

Importantly, the outcomes of 2022 and 2024 Herring Storer Acoustics' Noise Assessments confirm residential development is viable and appropriate beyond 300 metres of the kennel zone. This SP Amendment therefore reflects the outcomes of the noise assessment and proposes residential development, open space and local centre development within the subject site.

2.0 Planning Framework

2.1 Strategic Planning Framework

2.1.1 State Planning Strategy 2050

The State Planning Strategy highlights the overall strategic plan for the State, informing future framework plans, strategies and policies. The State Planning Strategy sets out a vision for sustained growth and prosperity for the State, in which by 2050, Western Australia will have a diverse range of interconnected and vibrant local communities and regional centres. The key strategic goals of the Strategy include striving for global competitiveness, strong and resilient regions, sustainable communities, infrastructure planning and coordination and conservation.

The State Planning Strategy recognises that as the State population continues to grow, so will the demand for land for residential, industrial, education, social, recreational and environmental purposes.

The proposed SP Amendment presents an opportunity to address the key challenges and goals identified in the *State Planning Strategy* and provide essential residential land for development with public open space in the City of Gosnells. The subject site is ideally suited for housing, taking advantage of its close proximity to essential services particularly within the suburb and the town centre. The SP Amendment will provide appropriately zoned land, and initiate the provision of housing to respond to market demands in the City of Gosnells.

2.1.2 Perth and Peel @ 3.5 million

The Perth and Peel @3.5million strategic document (the Strategy), was published in March 2018 by the Western Australian Planning Commission and provides a unified, long-term growth strategy for land use and infrastructure provision for the Perth and Peel regions. The Strategy recognises that land for residential, commercial and industrial development is a finite resource and requires the exploration of new urban growth opportunities. Importantly, the Framework aims to accommodate 3.5 million in the Perth and Peel regions by 2050.

The Strategy defines the necessary urban form to provide by 2050, highlighting the need to limit urban sprawl and increase housing diversity to meet the changing needs of communities. Development of vibrant new communities are encouraged around key transport links and activity centres, creating a well-connected and compact city.

The proposed SP Amendment seeks to facilitate the development of residential land, in close proximity to commercial and recreational facilities, and the future development of necessary road infrastructure to support future residents. The proposal is therefore consistent with the aims of Perth and Peel @ 3.5 million.

2.1.3 South Metropolitan Peel Sub-Regional Framework

The City of Gosnells is located within the Southern Metropolitan Peel Sub-Regional Framework (the Framework). The Framework works in conjunction with Perth and Peel @ 3.5million to guide the strategic growth of the southern sub-region of the Perth Metropolitan area. The document seeks to enable the creation of a more consolidated urban form to enable for the growing population whilst still ensuring existing communities, environments and infrastructure are accommodated for.

The Framework has set minimum dwelling targets for all local government areas, tailored to their respective expected growth scenarios. In 2011, the City of Gosnells recorded a population of 112,440 people, and is expected to reach a total population of 182,200 people by 2050. Based on this forecast, the City of Gosnells requires an additional 71,290 dwellings to meet the minimum requirements of the population.

The proposed SP amendment over the subject site will provide a relatively small, but important contribution to infill targets in the City of Gosnells. The proposal will not only assist with meeting housing targets, but also help to diversify dwelling options.

2.1.4 City of Gosnells Local Planning Strategy

The City of Gosnells Local Planning Strategy (LPS) was endorsed by the Western Australian Planning Commission (WAPC) in July 2019 to inform strategic land use and decision making and set out the long-term planning direction for the City. The LPS has been prepared to deliver the following functions:

- *Establish and document the rationale for the zoning, reservation of land, development and associated scheme provisions to undertake orderly and proper planning.*
- *Provide a strategic framework for assessment and decision-making in relation to proposed scheme amendment, subdivision and development.*
- *Identify the need for further studies within the City to address longer term strategic planning and development issues.*
- *Provide a flexible and robust framework that can readily adapt to forecast growth in the City and changing community expectations as they arise.*
- *Ensure consistency with State Government planning strategies, sub-regional structure plans and planning policies.*

The LPS identifies the subject site as Urban Development. It is considered that the proposed SP Amendment is consistent with the LPS objectives as it seeks to establish and provide appropriately zoned land, noting the subject site is well serviced and located in close proximity to essential services and amenities. Furthermore, the zoning of the subject site and eventual subdivision seeks to address the gaps within the current market and will provide increased housing opportunities and housing diversity in areas close to local centres. The SP Amendment is therefore considered to strongly align with the LPS, and will ensure that future land use and development can meet the purpose, strategies and actions of the LPS.

2.2 Statutory Planning Framework

2.2.1 Planning and Development Act 2005

The *Planning and Development Act 2005* outlines that a Local Structure Plan may be amended in accordance with Clause 29 is outlined as follows:

- 1) *A structure plan may be amended by the Commission at the request of the local government or a person who owns land in the area covered by the plan.*
- 2) *The procedures for making a structure plan set out in this Part, with any necessary changes, are to be followed in relation to an amendment to a structure plan under this clause.*
- 3) *Despite subclause (2), the local government may decide not to advertise an amendment to a structure plan if, in the opinion of the local government and the Commission, the amendment is of a minor nature.*
- 4) *An amendment to a structure plan under this clause or clause 29A (2) does not extend the period of approval of the plan unless, at the time the amendment is approved, the Commission agrees to extend the period.*

This SP Amendment request has been prepared on behalf of LWP Southern River Pty Ltd and Carmelo Radici as the land owners of the area covered by the Structure Plan.

2.2.2 Environmental Protection Act 1986

The Acoustic Report prepared in August 2000 to determine the Forrestdale Southern River Structure Plan Area Noise Management Strategy was prepared in accordance with the *Environmental Protection Act 1986*.

Guidance for the Assessment of Environmental Factors

The Environmental Protection Authority has prepared a document providing guidance for the assessment of environmental factors in accordance with the *Environmental Protection Act 1986*. The Guidance Statement relates to separation distances between industrial and sensitive land uses. The term 'Industrial Land Use' is used in the Guidance Statement in a general way to encompass a range of industrial, commercial and rural activities, and infrastructure, associated with off-site emissions that affect adversely the amenity of sensitive land uses. The guidance statement notes that this term includes dog kennels, and is of particular relevance to the proposed SP Amendment.

The Guidance Statement recognises that generally, protection of sensitive land uses from industrial emissions is assisted by the identification of suitable buffers at the strategic and structure planning stages of the land use planning process, and in the early project formulation stages in the case of individual projects. However, it also notes that a sound site-specific technical analysis will provide the most appropriate guide to the separation distance that should be maintained between a particular industry and sensitive land uses, or between industrial precincts and sensitive land uses, to avoid or minimise land use conflicts.

Importantly, the Guidance Statement outlines when the generic separation distances should be used, noting they are helpful to provide general guidance on separation distances in the absence of site-specific technical studies, or, where only an estimation of the area that could be subject to land use conflicts is required.

In the case of the proposed SP Amendment, where the separation distance is proposed to be less than the generic distance, the Guidance Statement requires that a scientific study based on site and industry specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts.

2.2.3 Metropolitan Region Scheme

The SP Amendment area is zoned 'Urban' under the *Metropolitan Region Scheme* (MRS). Land identified as Urban under the MRS is considered suitable for residential, commercial, recreational and light industry uses.

2.2.4 State Planning Policy

State Planning Policies that require consideration are outlined below.

State Planning Policy 3.7 – Planning in Bushfire Prone Areas

This policy applies to bushfire prone areas in Western Australia and seeks to guide the implementation of risk-based land use planning and development to preserve life and reduce the impact of bushfires on properties and infrastructure.

The subject site has been designated Bushfire Prone, and a Bushfire Management Plan has been prepared by Strategen-JBS&G to support the proposed SP Amendment (refer **Appendix D**). This is further discussed in **Section 4.1** of this report.

2.2.5 Development Control Policy

Development Control Policy 2.2 – Residential Subdivision

This policy addresses requirements for the subdivision of land into residential lots. The policy facilitates the supply of residential lots with a housing diversity and mix of lot sizes which reflect the statutory provisions of local planning schemes, availability of reticulated sewerage, electricity and water and the need for frontage to public streets for access.

A preliminary subdivision concept plan is provided in **Section 3.1** of this report, and has been designed in accordance with this policy. It is intended that a subdivision application will be lodged over the subject site in the future for assessment by the WAPC.

2.2.6 Local Planning Scheme

The City of Gosnells Local Planning Scheme No. 6 (LPS6) was gazetted on 15 February 2002 and defines permissible land uses and development standards. In line with the aims of LPS6, the proposed SP Amendment seeks to ensure that the development of the subject site is well coordinated, land use conflicts are avoided and the land is used efficiently.

The subject site is zoned 'Residential Development' under LPS6. The objectives of the Residential Development zone are as follows:

To provide for the progressive and planned development of future urban areas for residential purposes and for commercial and other uses normally associated with residential development generally in accordance with a Structure Plan.

The proposed SP Amendment provides further detail regarding the zoning, residential densities and development control provisions applicable to the subject land.

3.0 Structure Plan Amendment

The proposed SP Amendment will guide the future detailed planning and development for the area with a focus on providing for low to medium density residential development within the walkable catchment of public open space, providing a permeable street network and improvements to the public realm.

As illustrated in **Figure 1**, the SP Amendment incorporates the following:

1. Land previously identified as 'Subject to Further Planning' to be designated 'Residential R25 – R40', Local Centre and Public Open Space, with a proposed street block layout.
2. Residential zones and roads which have now been created, following subdivision approval, are updated to reflect approved subdivision layout.
3. Local Centre relocated to intersection of Matison Street and Evandra Road.
4. Public Open Space (POS) relocated adjacent Matison Street.

3.1 Land Use and Density

3.1.1 Residential Land

The SP Amendment proposes the identification of the site for residential and POS purposes, along with a local activity centre, and includes low and medium density (R25-R40) allocation and distribution as reflected on the Structure Plan map (**Figure 1**) contained in Part 1.

The preliminary subdivision concept plan for the subject site indicates a yield of 77 residential lots. A diverse range of lot sizes are proposed, ranging from a minimum of 308m² to a maximum of 904m². An average lot size of 422m² is proposed. It is considered that the diversity of lot size will provide increased opportunities for improved housing affordability, a more diversified lot and housing product range and better opportunities for meeting density targets of Perth and Peel @3.5 million. Lots capable of higher density development through further subdivision are proposed in closer proximity to areas of high amenity, including POS and the local centre.

To guide the detailed allocation of densities at the subdivision stage, densities of up to R40 shall be provided in areas located adjacent to areas of public open space amenity and the Local Centre site located on the corner of Matison Street and Evandra Road within Lot 18.

Consistent with the indicative lot yield and density targets as outlined in Part 2 of the adopted Structure Plan, the dwelling target possible under the modified Structure Plan is approximately 409 dwellings.

Local development plans

In line with the requirements of Clause 5.1.2 of Part 1 and at the request of the WAPC, a Local Development Plan (LDP) is also to be prepared for lots:

- With a frontage less than 11m (for front loaded lots); and
- Requiring an elevated construction standard for bushfire hazard mitigation purposes.

Preparation of a LDP for the above lots will ensure that bushfire hazard measures are identified and implemented and appropriate development parameters are put in place for the Local Centre.

3.1.2 Local Centre

Consistent with the approved SP, a local centre of a similar size and location is proposed. The local centre site measures 3,234m², and fronts Matison Street, leveraging its interface with adjacent Business Development and General Rural zoned land along Evandra Road and Matison Street respectively. Whilst the Local Centre site has increased in area by 611m², the 1,200m² NLA limit for PLUC 5 shop/retail floor space referenced in Part 1 5.3.1b ix of the SP remains. The local centre will provide opportunities for the establishment of a local commercial centre which may include a small supermarket and supporting convenience retailing or alternative uses such as a childcare centre.

3.1.3 Public Open Space

The allocation and distribution of POS is generally consistent with the adopted Structure Plan. A modification has been undertaken to the POS area 7, located within the generic kennel buffer, within Lot 18 (refer revised POS plan attached to this Addendum).

The proposed location and distribution of POS 7 as identified on the modified Structure Plan responds to the topography of the site and necessary drainage regime. The location of the POS provides the opportunity for public open space in close proximity to the new residential zoned land proposed as part of this amendment, as well as the previously approved residential zoned areas.

This modification facilitates the following outcomes:

1. Increase in size of proposed total POS and drainage from 39,615m² to 54,474m²; and increase in creditable POS from 10,697m² to 13,446m².
2. A high-quality landscaped park which will provide for passive recreation opportunities which complement the existing POS within the structure plan area.
3. Appropriate location and size of open space to adequately accommodate the drainage requirements of the proposed new residential zoned land.

A revised Landscape Masterplan has been prepared by Plan E based on the amended SP (refer **Appendix E**).

A revised POS calculation has been undertaken with an updated Table 2a & 2b – POS Schedule contained in Part 1 of this SP. The revised POS calculations identify additional POS being provided in comparison to the adopted Structure Plan, as summarised below in **Table 2** below.

Table 2 POS Summary

	Approved Structure Plan	Modified Structure Plan
Creditable POS and Drainage	1.0691ha	1.3446ha
Excess Restricted POS	2.8918ha	2.8065ha
Total POS and Drainage	3.9615ha	4.1511ha

3.1.4 Movement Network

The movement network provides for a revised street cell structure, orientation and improved subdivision efficiencies. A logical extension to the standard grid road alignment is proposed, with the following additions to the approved movement network:

1. Minor modifications to the street network of the adopted Structure Plan to reflect subdivision approvals and roads gazetted to date.
2. Proposed street network over land previously identified as 'Subject to Further planning', facilitating an efficient subdivision design which reflects the principles of Liveable Neighbourhoods.
3. Accommodating a new entrance location to Matison Street which:
 - a) Provides for the creation of a new internal street which avoids the need for direct vehicle access to residential lots from Matison Street; and
 - b) Has appropriate separation from existing approved intersections on Matison Street and Evandra Road.

A Traffic Impact Assessment (TIA) has been undertaken by Transcore in support of the SP Amendment (refer **Appendix B**). A summary of the TIA findings is provided in **Section 4.2**.

3.1.5 Kennel Zone Buffer

Further investigations have been undertaken to confirm that residential development is viable and appropriate within the area of the approved SP identified as Subject to Further Planning. Technical studies have been completed to verify the relative noise impacts on future sensitive development within the 500 metre kennel zone buffer. These studies demonstrate that noise can be maintained within the assigned levels of the *Environment Protection (Noise) Regulations 1997*.

Importantly, the outcomes of Herring Storer Acoustics' Noise Assessment confirm residential development is viable and appropriate beyond 300 metres of the kennel zone. This SP Amendment therefore reflects the outcomes of the noise assessment and proposes residential development, open space and local centre development within the subject site.

4.0 Technical Analysis

4.1 Noise Assessment

A Noise Assessment has been prepared by Herring Storer Acoustics to quantify noise levels from the kennel zone at the subject site. The Assessment provides comment on the appropriateness of residential or other development within the section of land contained within the generic kennel buffer, which constitutes approximately 93% of the land within Lot 18 and 21% of the total Precinct 3E Structure Plan Area (refer **Appendix A**).

4.1.1 Measured noise levels

Measured noise level at the boundary of the proposed development for periods of dogs barking have been measured at 35 dB(A) for short periods between other noise influences. Given the difficulty in obtaining a 15-minute assessable noise level as per regulatory requirements, the short term measured noise level of 35 dB(A) would be considered as an overly high estimation when compared to both regulatory parameters for duration of noise, i.e. LA10 and also when compared to background noise levels.

The assigned LA10 noise level for the most critical period (night) for future proposed residence at the boundary location of Lot 18 would be 39 dB(A) given the influence of surrounding industrial land.

Given the noise emissions of the dogs were only audible at low levels between occurrences of other noise sources, the noise emissions would not be considered as containing annoying characteristics such as tonality or impulsiveness.

4.1.2 Predicted noise levels

Predictive noise modelling employed for the assessment utilised dog noise sources in an open field environment to allow for a worst-case scenario. Using this method, the predicted noise level at the subject site (under maximum noise propagation conditions) resulted in noise levels similar to the highest noise levels measured during the monitoring period.

Based on the analysis of the monitored noise levels, the assessable noise levels at the subject site would be considered as complying with the regulatory criteria for all hours.

The measured and predicted noise levels comply with regulatory criteria. Nonetheless, further predictive noise modelling was employed to provide possible noise control options to further reduce any noise impact from the kennel zone for future development.

Dependent on the lot layout for the subdivision, the proposed local centre and first row of houses would provide a barrier to noise levels for houses located behind.

The recommendations are that for the first row of houses, upgraded residential building design (likely in the form of Package A from SPP 5.4 guidelines) would need to be incorporated. Additionally, notification on titles would be required advising these lots that they are 'located within 1,000 metres of a property with a current Kennel Licence and as such may be subject to noise impact from that operation'. It is noted that although SPP 5.4 is based on an average noise level over a day and night period for traffic noise, Package A considers noise up to 55 dB(A) for night and 60 dB(A) for day. Given the dog noise emissions are intermittent and at a lower noise level than 50 d(A), the quiet house design would be considered as ameliorating the noise levels associated with the kennel zone.

4.1.3 Conclusion

Based on the analysis of the monitored noise levels, the assessable noise levels at the proposed development would be considered as complying with the regulatory criteria for all hours. The findings therefore satisfy Clause 5.4.1(a) ii of the approved SP, which states that: *Where modification to the kennel buffer alignment is proposed to allow noise sensitive development within 500 metres of the kennel zone, a noise assessment as endorsed by the Department of Environment Regulation and City of Gosnells is to be submitted which demonstrates that noise can be maintained within the assigned levels of the Environment Protection (Noise) Regulations 1997.*

4.2 Traffic Impact Assessment

A Traffic Impact Assessment has been prepared by to provide an analysis of the future traffic flows that would be generated by future development of the subject site to the proposed and existing road network connections that serve the area (refer **Appendix B**). The Traffic Impact Assessment confirms following findings:

- The road network of the LSP area has been planned in accordance with WAPC Liveable Neighbourhoods principles to accommodate the future traffic flows that will travel within the area;
- The Southern River Road / Evandra Road T-intersection will operate satisfactorily under the forecast future traffic forecasts;
- Existing and future bus services on Southern River Road provide appropriate public transport access for the majority of the LSP area; and
- The proposed LSP Amendment area provides an appropriate network of shared paths and footpaths with direct connections to neighbouring areas to encourage and facilitate non-motorised local travel as well.

4.3 Urban Water Management

A Local Water Management Strategy (LWMS) Addendum has been prepared by RPS in support of this Structure Plan Amendment (refer **Appendix C**). The LWMS addresses the drainage management within the subject site and how it interfaces with the remainder of the Southern River Precinct 3E area.

The LWMS concludes that urban development within the site can be undertaken with the stormwater and groundwater management strategies in compliance with the approved LWMS (Cardno 2015). Stormwater in the 20% and 1% AEP events and subsoil flows will be discharged to the wetland detention area in the POS corridor to the north with minimal impact on the adjacent development. Run-off generated from road reserves during small 15mm events will be treated in a vegetated system, located in the POS area within the existing Lot 18. Detailed design of the earthworks, stormwater drainage and subsoil drainage systems will be undertaken by the engineers in parallel with preparation of the UWMP at the subdivision stage.

4.4 Bushfire Management

An Addendum to the approved Bushfire Management Plan (BMP) has been prepared by Strategen-JBS&G to support the proposed SP Amendment (refer **Appendix D**). The BMP Addendum provides an updated strategic level bushfire assessment specific to the project area, including a Bushfire Attack Level (BAL) contour map; identification of any bushfire hazard issues; and assessment against bushfire protection requirements under state government policy and guidelines.

The BMP recommends that with appropriate management, any potential bushfire hazards can be appropriately mitigated. As further clearing will occur as part of the development of the Structure Plan area and surrounding lands, the BAL contour map will be reassessed and updated as part of future stages of the development process, including the subdivision application and building permit stages.

4.5 Landscape Masterplan

A Landscape Masterplan has been prepared by Plan E in support of the SP amendment and comprises a design concept, character inspiration and proposed colours and materials palette for POS area 7 (refer **Appendix E**). The landscape masterplan proposes the following features:

- Non-irrigated feature flowering and native plant species;
- Non-irrigated 200m³ planted drainage swale;
- Multiple well-shaded picnic and seating opportunities;
- Lounging seating overlooking swale habitat;
- 2.0m wide concrete footpath;
- Allocated play area;
- Opportunity for a half basketball court, hit up wall with climbing, upright wall with swings & parkour rail equipment; and
- Open turf area with proposed street trees, approximately 1,600m² (75 x 22m) – with the irrigation source to be determined at subdivision stage.

At subdivision stage, should groundwater be unavailable and/or unfeasible for the irrigation of POS 7, a non-irrigated design that delivers a functional and usable POS shall be considered to the satisfaction of the City of Gosnells.

4.6 Vegetation

A Flora and Vegetation Assessment was prepared by RPS in May 2022 to review the extent, structure, composition and condition of existing vegetation within Lot 18 Matison Street, Southern River (refer **Appendix F**). The Assessment notes that despite the known presence of conservation significant species and ecological communities in close proximity to the site, its land use history has resulted in no remnant stands of native vegetation within the lot and no significant flora and vegetation values. Only four vegetation types were described and mapped within the site, all assessed to be in a completely degraded condition, and either contained or were wholly composed of introduced weed species.

4.7 Services and Utilities

An Engineering Servicing Report Addendum has been prepared by Cossill and Webley to support the SP Amendment (refer **Appendix G**). The report confirms that the subject site can be serviced by water, power, sewer, gas and communications from the adjacent approved SP area, with the main infrastructure requirements to facilitate development being:

- Installation of HV Feeder from Southern River Zone Substation
- Relocation of Western Power overhead Powerlines
- Intersections works within Southern River Road
- Construction next to existing services and high-pressure gas main on Matison Street
- Extension of gas distribution main from Holmes Street

Stormwater Drainage

The subject site benefits from the Water Corporation Forrestdale Main Drain, located downstream of the Balannup Lake Branch Drain. The internal drainage design will comprise of collector pit and pipe systems, open swales for detention and bio-retention swales. Bio-retention swales will ensure storm water runoff will be treated and detained for 1 year 1 hour storm events. The LSP Amendment area will be serviced by stormwater reticulation to the Public Open Space area, flowing through the central POS spine, and into the Balannup Drain.

Sewer

The subject site falls within the Balanup Waste Water Pumping Station B sewer catchment and is included in the Water Corporation's sewer planning for the area. Planning for the area indicates the site can be serviced by the extension of an existing DN450 trunk sewer through the subdivision. Construction of the DN450 sewer through the site is a key item, Discussions with the Water Corporation regarding the construction of the DN450 sewer through the site have commenced and they have responded favourably in relation to a Tankering Agreement. With regards to internal sewer, a standard sewer reticulation network will be required to service all internal lots within the subject site.

Water Reticulation

The subject site will be serviced directly by the reticulation network within the current approved SP area.

Power

It is noted that the site will likely require approximately 1.65 MVA in its developed state. It is expected that Western Power may need an extension of HV feeder mains from their Zone Substation 800m southwest of the site to increase their network capacity.

Telecommunications

The proposed development is within NBN Co's optic fibre footprint and meets the minimum size requirement of 100 lots. Noting that the subject site is eligible to receive NBN Co's optic fibre rollout provided all pit and pipe infrastructure is installed by the Developer. Other telecommunication providers such as Opticom and Telstra are available and provide an alternative option for fibre to the premises connectivity.

5.0 Conclusion

This Addendum has been prepared in support of an application to modify the Southern River Precinct 3E Structure Plan.

The Amended SP incorporates the area identified as 'Subject to Further Planning' in the approved SP, which is generally located within the 500 metre kennel zone buffer. This amendment reflects the outcomes of the Noise Assessment technical study undertaken by Herring Storer Acoustics, which concludes that sensitive uses are viable and appropriate beyond 300 metres of the kennel zone. This SP Amendment therefore reflects the outcomes of the noise assessment and proposes residential development, open space and local centre development within the subject site.

The modified Structure Plan process encompasses a detailed design review with technical reporting to support the subdivision design and land use allocation. The modified Structure Plan provides for urban design best practices based on Liveable Neighbourhoods recommendations, whilst taking into consideration site constraints such as access; drainage; existing vegetation; and location, which have all been used as opportunities to improve amenity for future residents.

The detail contained within this Addendum satisfies the objectives of the adopted Structure Plan whilst justifying the modified Structure Plan through addressing the key elements of urban design; statutory planning; traffic engineering; servicing infrastructure; hydrology and drainage; environmental considerations; landscaping; and bushfire management.



Appendix A

Acoustic Assessment





LWP SOUTHERN RIVER PTY LTD

**LOCAL STRUCTURE PLAN AMENDMENT
SOUTHERN RIVER PRECINCT 3E**

ACOUSTIC ASSESSMENT

FEBRUARY 2024

OUR REFERENCE: 23615-8-18103



DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT
LOCAL STRUCTURE PLAN AMENDMENT
SOUTHERN RIVER PRECINCT 3E

Job No: 18103

Document Reference: 23615-8-18103

FOR

LWP SOUTHERN RIVER PTY LTD

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3	Finalised Structure Plan	01/09/2022	PLD	
4	Revision for worst case noise levels – QHD	21/09/2023	PLD	TR
5	Client Comments	16/10/2023	PLD	
6	Inclusion of Industry Built Form	23/11/2023	PLD	
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EXECUTIVE SUMMARY

Herring Storer Acoustics has been commissioned by LWP Southern River Pty Ltd (LWP) to assess noise for a proposed development located at Lot 18 Matison Street, Southern River.

On 5 May 2017 the WA Planning Commission endorsed a Local Structure Plan over Precinct 3E, incorporating the above land.

On 1 September 2017 LWP lodged a Local Structure Plan Amendment over Precinct 3E with the City of Gosnells. It was conditionally approved by the City on 27 February 2018 and referred to the WA Planning Commission for final adoption which was expected by early May 2018.

Under both the approved LSP and the LSP Amendment, Lot 18 and a portion of the LWP Land ("subject land") were excluded from development approval and designated "subject to further planning "Restricted Uses" because they fall within the 500m kennel buffer ("Buffer").

The purpose of this assessment is to quantify noise levels from the kennel zone at the proposed development of Lot 18 Matison Street and provide comment on the appropriateness of residential or other development within the section of land containing the kennel buffer.

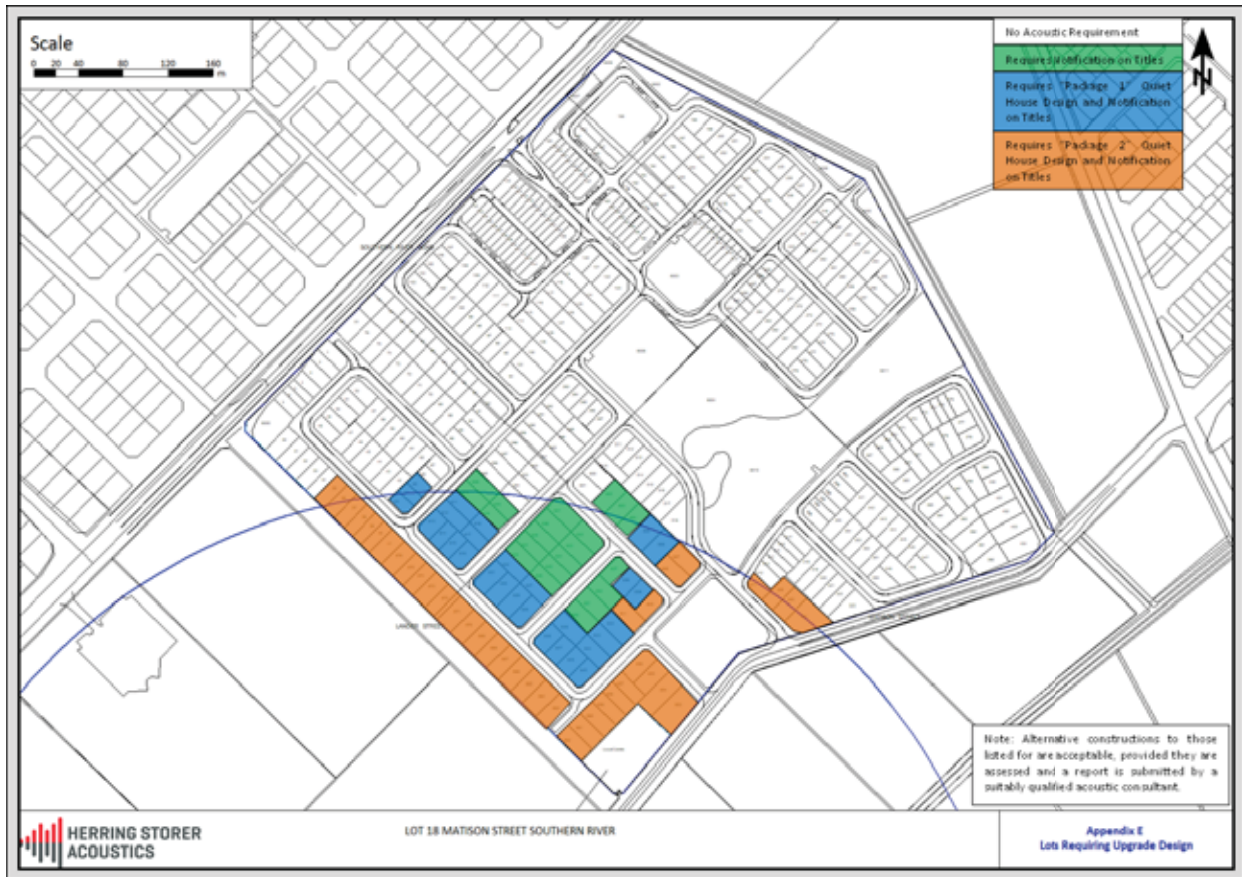
Measured noise level at the boundary of the proposed development for periods of dogs barking have been measured at 35 dB(A) for short periods between other noise influences. Given the difficulty to obtain a 15-minute assessable noise level as per regulatory requirements, the short term measured noise level of 35 dB(A) would be considered as an overly high estimation when compared to both regulatory parameters for duration of noise, ie L_{A10} and also when compared to background noise levels.

The assigned L_{A10} noise level for the most critical period (night) for future proposed residence at the boundary location of Lot 18 would be 39 dB(A) given the influence of surrounding industrial land. It is noted that the land to the south of Landers Road is slated as Industrial usage, therefore has been considered under the future scenario within this assessment.

Although the monitoring resulted in general compliance, further analysis has been undertaken to provide a possible worst case noise level. Predictive noise modelling has been undertaken for a scenario of all dog kennel (properties) at full capacity, with dogs in the open on the premises (representing dogs in outside exercise area). Using this method, the predicted noise level at the proposed development (under maximum noise propagation conditions) resulted in noise levels up to 55 dB(A) for day periods. Expectations are that for night periods this would be reduced to around 45 dB(A) as generally dogs are housed internally in kennels.

Based on the findings of the assessment, and in consultation with the land owners, the usage of the land is proposed to be residential development within all of Lot 18. This includes development within 500m kennel buffer placing the closest future residential premise 300m from the edge of the kennel zone.

To mitigate the noise levels for the worst case (maximum capacity) the development will have a 2.4m noise wall along the southern boundary (Landers Road). Housing will back onto the wall, hence affording a barrier for the closest residential Lots. Additionally, based on the propagation of noise as per the noise contour plot, quiet house design (QHD) will be implemented based on the received noise level. Notification on titles would also be required advising these lots that they are located within a kennel buffer and possibly subjected to noise levels associated with dogs barking.



AMBIA ESTATE PRECINCT 3E – CONCEPT PLAN

Given the current noise levels measured at the proposed development, the use of predictive noise modelling to provide a worst-case noise level which will be used to inform any design requirements into future residential premises, and the notification on titles to future landowners, the reduction of the buffer to 300m from the kennel zone to allow residential use has been shown to not have an undue impact on future residents outside the modified buffer and is therefore recommended.

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1.0 INTRODUCTION

Herring Storer Acoustics has been commissioned by LWP Southern River Pty Ltd (LWP) to assess noise for a proposed development located at Lot 18 Matison Street, Southern River.

On 5 May 2017 the WA Planning Commission endorsed a Local Structure Plan over Precinct 3E, incorporating the above land.

On 1 September 2017 LWP lodged a Local Structure Plan Amendment over Precinct 3E with the City of Gosnells. It was conditionally approved by the City on 27 February 2018 and referred to the WA Planning Commission for final adoption which was expected by early May 2018.

Under both the approved LSP and the LSP Amendment, Lot 18 and a portion of the LWP Land ("subject land") were excluded from development approval and designated "subject to further planning "Restricted Uses" because they fall within the 500m kennel buffer ("Buffer").

The purpose of this assessment was to assess the noise levels associated with the kennel zone at the above development site in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997* and provide advice on the appropriate land use for the development.

As a part of the study, the following was carried out:

- Review of all studies relating to the development, including noise assessments for the kennel zone and Local Structure Plan for Precinct 3E.
- Monitoring of noise levels at the proposed development.
- Assessment of noise emissions from the kennel zone in accordance with the *Environmental Protection (Noise) Regulations 1997*.
- Construct predictive noise model to allow for the consideration of built form outcomes (Industrial land south of Landers) to mitigate noise levels on Lot 18 Matison Street, specifically the corner of Matison/Lander Streets, Southern River.

2.0 CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

TABLE 2.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Highly sensitive premises	0700 - 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

- “impulsiveness”** means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{AmaxSlow}$ is more than 15 dB when determined for a single representative event;
- “modulation”** means a variation in the emission of noise that –
- (a) is more than 3 dB $L_{A Fast}$ or is more than 3 dB $L_{A Fast}$ in any one-third octave band;
 - (b) is present for more at least 10% of the representative assessment period; and
 - (c) is regular, cyclic and audible;
- “tonality”** means the presence in the noise emission of tonal characteristics where the difference between –
- (a) the A-weighted sound pressure level in any one-third octave band; and
 - (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,
- is greater than 3dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8dB at any time when the sound pressure levels are determined as $L_{A Slow}$ levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2.2 below.

TABLE 2.2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The influencing factor for the proposed residential premises of concern, has been assessed as 4 dB based on the influence of the neighbouring industrial land use. Figure 1 details the location of the proposed residence in relation to the Kennel Zone and industrial land.

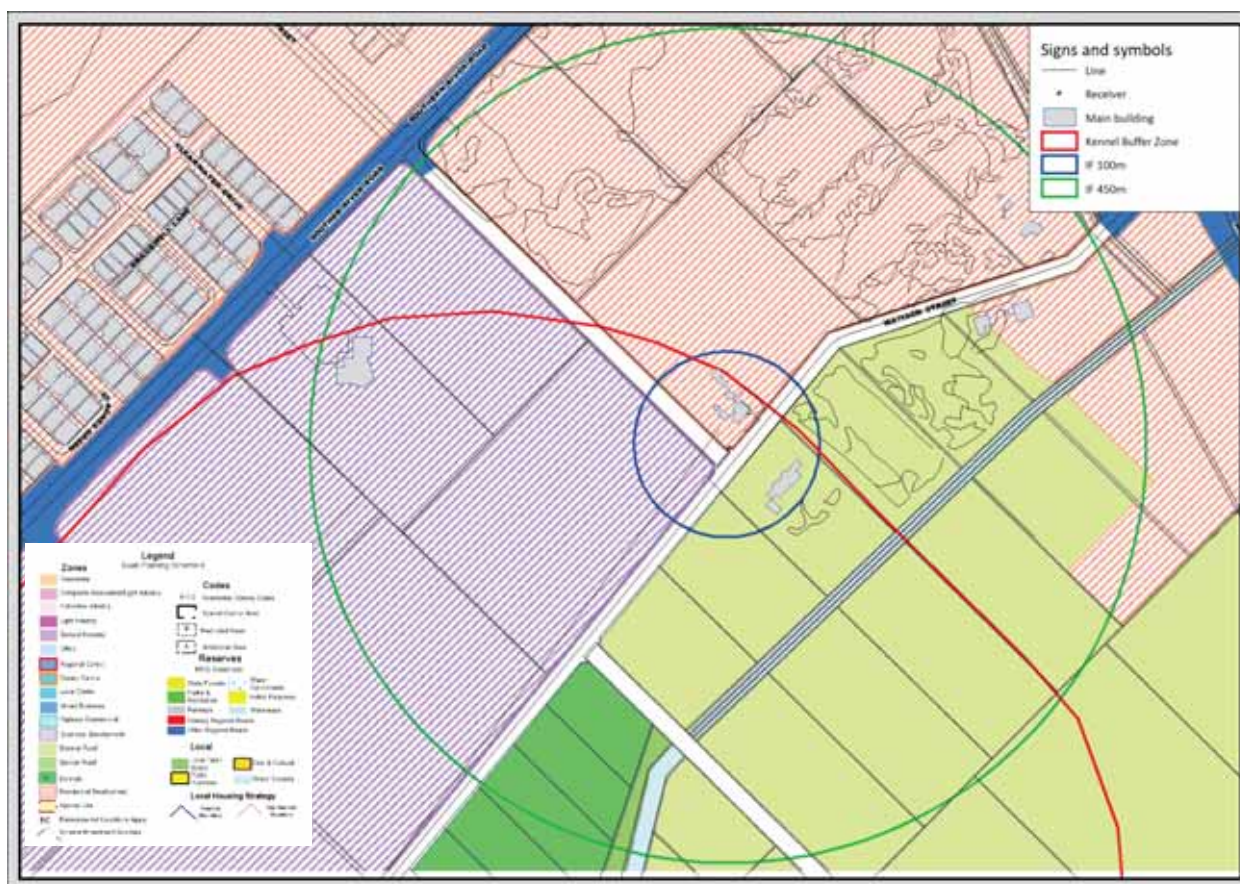


Figure 1 –Future Highly Noise Sensitive Receiver Locations

Given the above calculations, Table 2.3 contains the assigned noise levels for the neighboring residential premises.

TABLE 2.3 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Highly Sensitive Premise	0700 - 1900 hours Monday to Saturday	49	59	69
	1900 - 2200 hours all days	44	54	64
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	39	49	59

Note: L_{A10} is the noise level exceeded for 10% of the time.

L_{A1} is the noise level exceeded for 1% of the time.

L_{Amax} is the maximum noise level.

3.0 MEASUREMENT / MONITORING

3.1 METHODOLOGY

The acoustic environment was monitored at a location within the proposed development from 15th to 28th August 2018 and then again from 31st August to 10th September 2018. Monitoring was performed using automatic noise data logger. The loggers were set to measure statistical data at in accordance with EPA Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise. Of the statistical noise level data recorded, the L_{Aeq} , L_{A1} , L_{A10} , and L_{A90} levels are reported. Additionally, the monitor recorded wav files for the entire period. The wav files were used for post analysis to confirm “audibly” if the noise contained “audible” dog barking.

Figure 2 contains an overall map detailing the location of the noise monitor.



Figure 2 –Monitoring Location

Additional to the above continuous noise monitoring, observed visits were conducted over a couple of nights during the monitoring period. The objective of the site visits was to conduct hand held, observed noise level measurements of periods of dogs barking. However, during the night time visits, there were no discernible (measurable) periods of dogs barking.

3.2 MONITORING RESULTS

Based on the data collected over the monitoring periods, post analysis was conducted to isolate periods of dogs barking within the kennel zone and establish a noise level. The focus of the analysis was on the data collected for the second monitoring series due to the lesser influence of weather (rain and wind) on the results. Additionally, subjective information from the residence at the property was that there were no obvious periods of continuous dogs barking noise.

Weather conditions over the monitoring period were analysed from the Bureau of Meteorology web site, with the results used to compare periods of highest noise level propagation from the kennels to the proposed development.

Initial analysis of the overall 15-minute intervals for the monitored noise levels showed no clear indication of increased noise levels for periods of dog barking. Generally, noise levels were influenced by localised traffic movements. Therefore, more finite data was analysed, namely the 0.10 second noise levels. This allowed for the separation of vehicle noise to establish a clear noise level for dog barking. The audio files were used to confirm the presence of dog noise for these periods. An example of the analysed noise (time history) for a one-hour period (31st August 2018 at 20:00) is contained in Figure 3 and 4. The graphs represent an overall hour, then a three-minute period within the hour. During this period, the weather conditions were fine with winds from a south westerly direction.

Results of the overall monitoring are shown in detail in Appendix B.

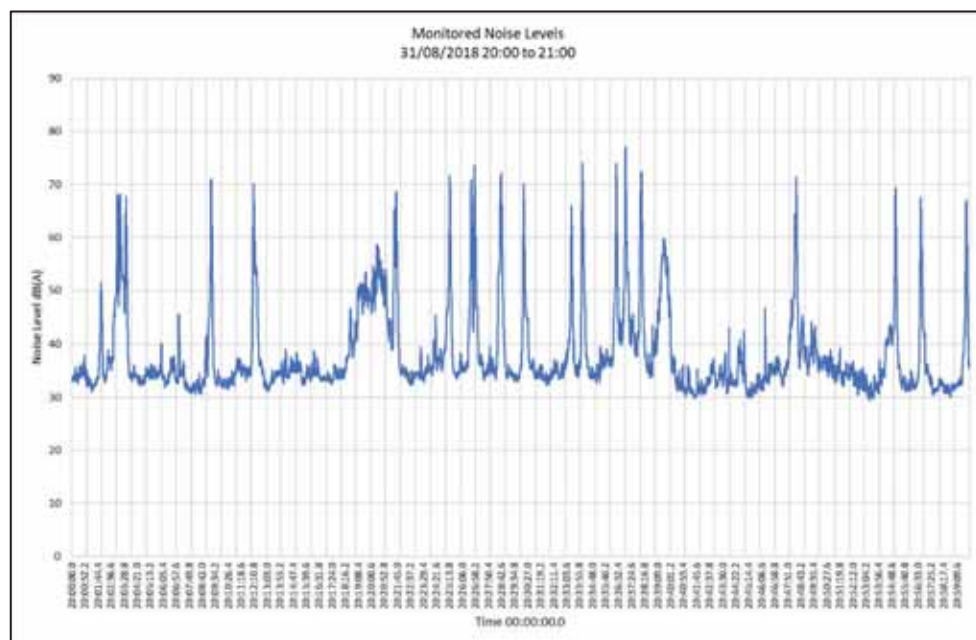


Figure 3 – One Hour Time History Noise Levels

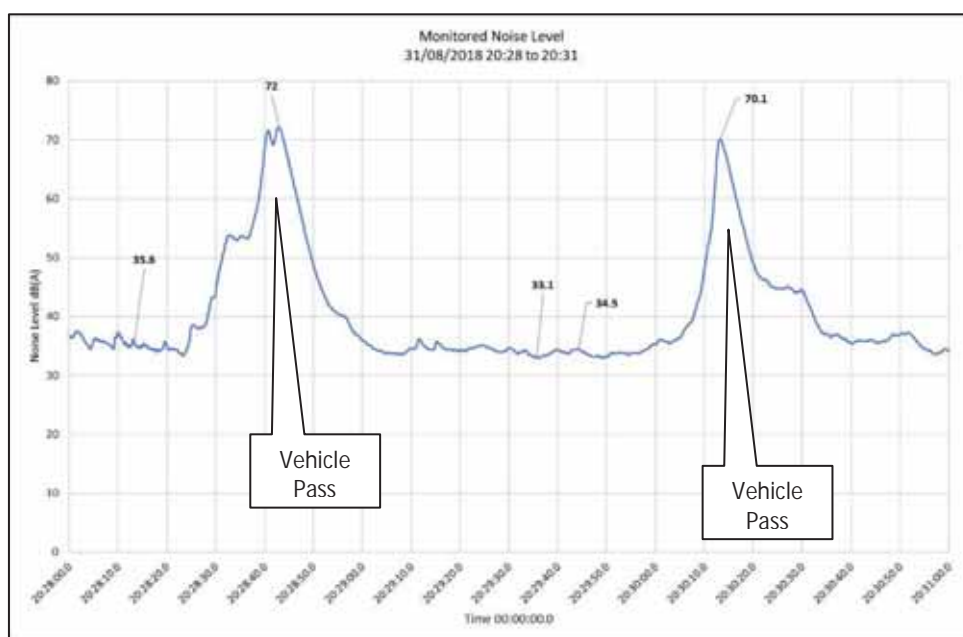


Figure 4 – Three Minute Time History Noise Levels

Based on the analysed noise levels, generally, for periods of dog barking, the resultant noise level was around 35 dB(A) at the nearest location of the proposed development. This noise level is based on an instantaneous noise, rather than an average over a minimum 15-minute period, as per regulatory requirements. Due to the influence of other noise sources such as vehicles and bird noise and the low noise level of the dog barking noise, this instantaneous method is the only way to quantify a level of the dog barking.

It is noted that it is difficult to establish the direction of the barking noise emission, however, given that the kennels are present, it has been considered that dogs barking would be from the kennel zone. Additionally, the analysis of the audio files for the periods of dog barking indicated that there were multiple dogs barking and intermittent howling, hence likely that the noise emissions are from an area where there are multiple dogs present.

4.0 MODELLING

Noise immissions¹ at the proposed residential development, due to noise associated with the dog kennel zone, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of a medium sized dog (Labrador / Collie). The noise sound power level for a dog this size is 101 dB(A). However, for the purpose of this assessment, as the size and breed of the dogs may vary, the sound power level has been increased to 105 dB(A) to allow for a larger variety of dogs.

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 4.1.

TABLE 4.1 – SOUND POWER LEVEL - NOISE SOURCES

Element name	Unit	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Sum dB(A)
Medium Sized Dog Barking	dB	70	75	87	103	90	75	64	105
		72	74	100	92	87	77	64	
		76	84	98	85	85	76	63	

Based on noise emissions² from the above dog barking, various operating scenarios have been developed. These scenarios represent period of worst-case noise emissions for the kennel operations.

To allow for the multiple locations of dogs throughout the kennel zone, the modelling included the as built structures, including kennels as per Figure 5 below. Additionally, a 2.4m noise wall at the southern boundary of the development has been included, along with the future housing withing the development.

Individual point sources were located at each premises within the kennel zone. For the purpose of assessment 10 dogs were located at each property. This allows for the noise level of a dog barking in an open area, representing dogs outside a kennel, in the exercise areas. This approach would be considered conservative, as it is likely dogs would be housed inside a kennel during the night period. Figure 5 shows the layout of the noise source in relation to the kennel zone.

Whilst it is understood that different kennels operate with difference licence as to the number of dogs allowed at each property, the modelling of 10 large dogs at each location would be conservative in terms of noise as it is known that some properties are catteries. Additionally, the predictive noise modelling assumes that all dogs are barking at the same time, which is an unlikely scenario given the diversity in numbers with not all properties having this many large dogs outside at the same time.

It is noted that for the purpose of assessment, only the northern properties of the kennel zone have been modelled with dog noise sources (north of Furley Road). This is due to the development laying directly north of the kennel zone, hence noise sources further than those considered (ie to the south) have been assessed as not contributing to the overall noise at the development due to the additional distance. Weather propagation conditions in the scenario have been based on south winds at 3 m/sec which is the maximum from source to receiver.

¹ Immissions – noise received at a source

² Emissions – noise emanating from a source and / or location



Figure 5 – Kennel Noise Source

Additionally, it is understood the development of the land to the west of the kennel zone, (Lots 21, 100, 101 & 1768 Southern River Road & Lots 17, 1766 & 1767 Matison Street) is proposed as an Industrial land use. The Local Development Plan concept (Figure 7 below) shows the proposed layout for the Industrial Lots.

As the built form of the industrial development is likely to provide attenuation in the form of buildings /barriers, the predictive noise modelling has been updated to include this.

Analysis of the Lots size for the industry was undertaken, and a similar sized industrial estate was used as a basis for likely sized buildings on each Lot. The example location was in the Kenwick industrial area (Corner Albany Highway and Austin Ave). The general building arrangement for this industrial area was then transferred to the proposed development Lots to the west of the kennel zone. This provided a like for like built-form industrial estate for the purposes of modelling. The height of the buildings within the estate were limited to 6m.

A layout of the proposed Local Development Plan for the Industrial Area is shown in Figure 7. The built-form industrial buildings within the western industrial area detailing the 3D layout are shown in Figure 8.



Figure 6 –Industrial Area – Local Development Plan



Figure 7 –Possible Future Neighbouring Industrial Built-Form

The following input data was used in the calculations:

- Locality plans, shown in Appendix A.
- Sound Power Levels listed in Table 4.1.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise*" and for the day and night periods are as listed in Table 4.2.

TABLE 4.2 – WEATHER CONDITIONS

Condition	Day	Night
Temperature	20°C	15°C
Relative humidity	50%	50%
Pasquil Stability Class	E	F
Wind speed	4 m/s*	3 m/s*

* From sources, towards receivers.

Noise contour plots for the above scenarios are contained in Appendix C.

5.0 DISCUSSION

The purpose of this assessment is to quantify noise levels at the proposed development of Lot 18 Matison Street and provide comment on the appropriateness of residential development within the section of land containing the kennel buffer.

5.1 MEASURED NOISE LEVELS

Measured noise level at the boundary of the proposed development for periods of dogs barking have been measured at 35 dB(A) for short periods between other noise influences. Given the difficulty in obtaining a 15-minute assessable noise level as per regulatory requirements, the short term measured noise level of 35 dB(A) would be considered as an overly high estimation when compared to both regulatory parameters for duration of noise, ie L_{A10} and also when compared to background noise levels.

The assigned L_{A10} noise level for the most critical period (night) for future proposed residence at the boundary location of Lot 18 would be 39 dB(A) given the influence of surrounding industrial land.

Given the noise emissions of the dogs were only audible at low levels between occurrences of other noise sources, the noise emissions would not be considered as containing annoying characteristics such as tonality or impulsiveness.

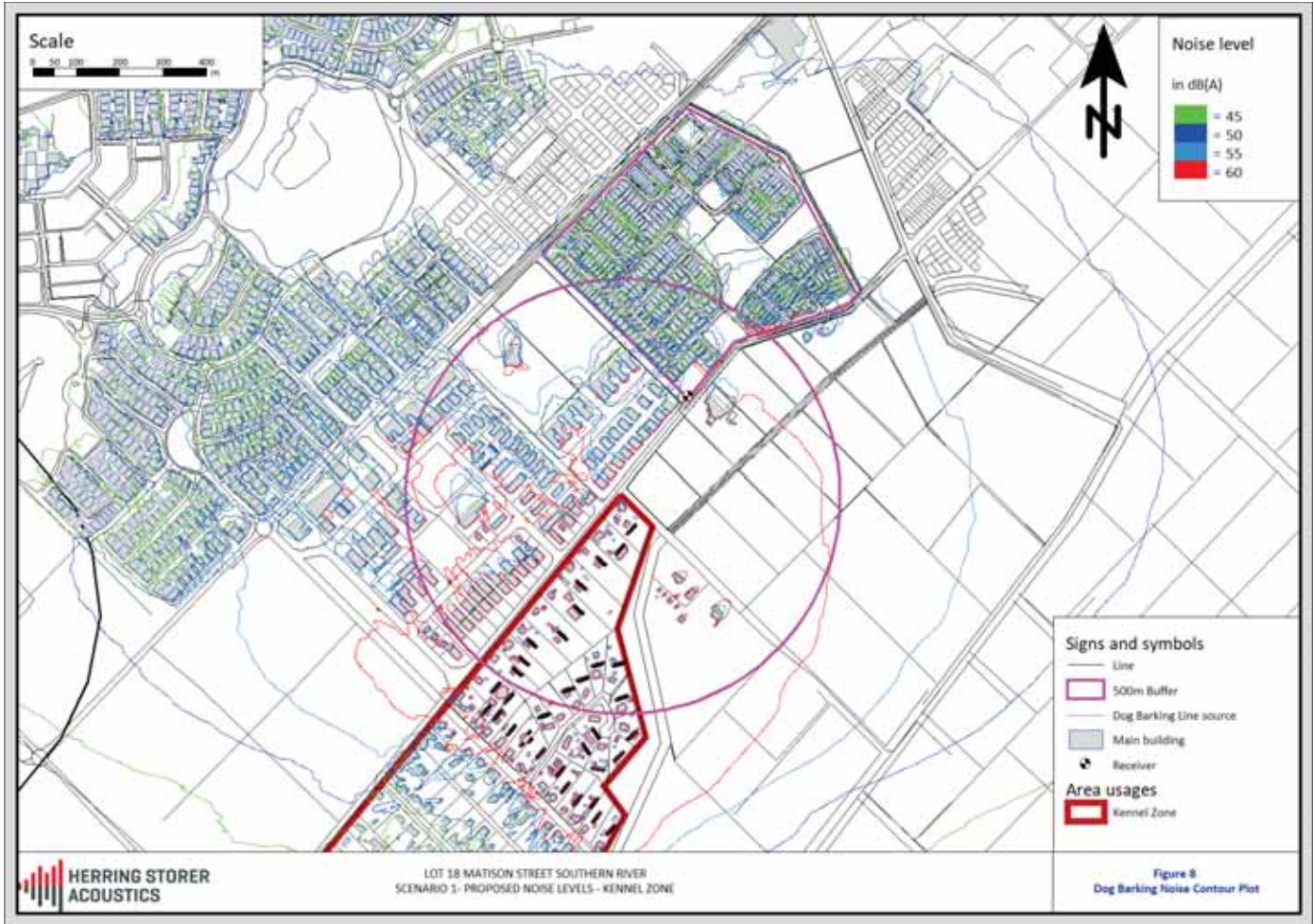
Based on the analysis of the monitored noise levels, the assessable noise levels at the proposed development would be considered as complying with the regulatory criteria for all hours.

5.2 WORST CASE PREDICTED NOISE LEVELS

Although the monitoring resulted in general compliance, further analysis has been undertaken to provide a possible worst case noise level. Predictive noise modelling has been undertaken for a scenario of all dog kennel (properties) at full capacity, with dogs in the open on the premises (representing dogs in outside exercise area). Using this method, the predicted noise level at the proposed development (under maximum noise propagation conditions) resulted in noise levels up to 55 dB(A) for day periods. Expectations are that for night periods this would be reduced to around 45 dB(A) as generally dogs are housed internally in kennels.

As can be seen in the noise contour plot in Figure 8 below, the noise propagation of the kennel zone is attenuated to the western side but does not attenuate noise levels propagating to the north.

Given the likelihood of light industrial use within this section of land, future noise levels from the kennel zone would be further reduced through the built form of the industrial buildings.



6.0 RECOMMENDATIONS

Based on the findings of the assessment, and in consultation with the land owners, the usage of the land is proposed to be residential development within all of Lot 18. This includes development within 500m kennel buffer placing the closest future residential premise 300m from the edge of the kennel zone.

Noise levels for the worst case scenario for the kennel zone results in exceedances of up to 10 dB(A) at the nearest residential lots within the development.

To mitigate this predicted exceedance, upgraded architectural designs have been developed for the proposed residential dwellings to ensure internal noise levels meet the criteria. As the noise level varies based on the Lot location, Package 1 has been developed for noise level exceedances between 0-5 dB, with package 2 being 5-10 dB. The Lots requiring the upgraded designs and the details design requirements contained in Appendix E. For information the spread of noise through the development is shown in Figure 9, below.

External noise levels for outdoor living areas have been reduced as far as practical for the southern most Lots of the development with the implementation of the noise wall on the southern boundary. For other residential Lots, generally the built form of the dwellings will provide barriers for those behind.

Given the current noise levels measured at the proposed development, the use of predictive noise modelling to provide a worst-case noise level which will be used to inform any design requirements into future residential premises, and the notification on titles to future landowners, the reduction of the buffer to 300m from the kennel zone to allow residential use has been shown to be achievable.



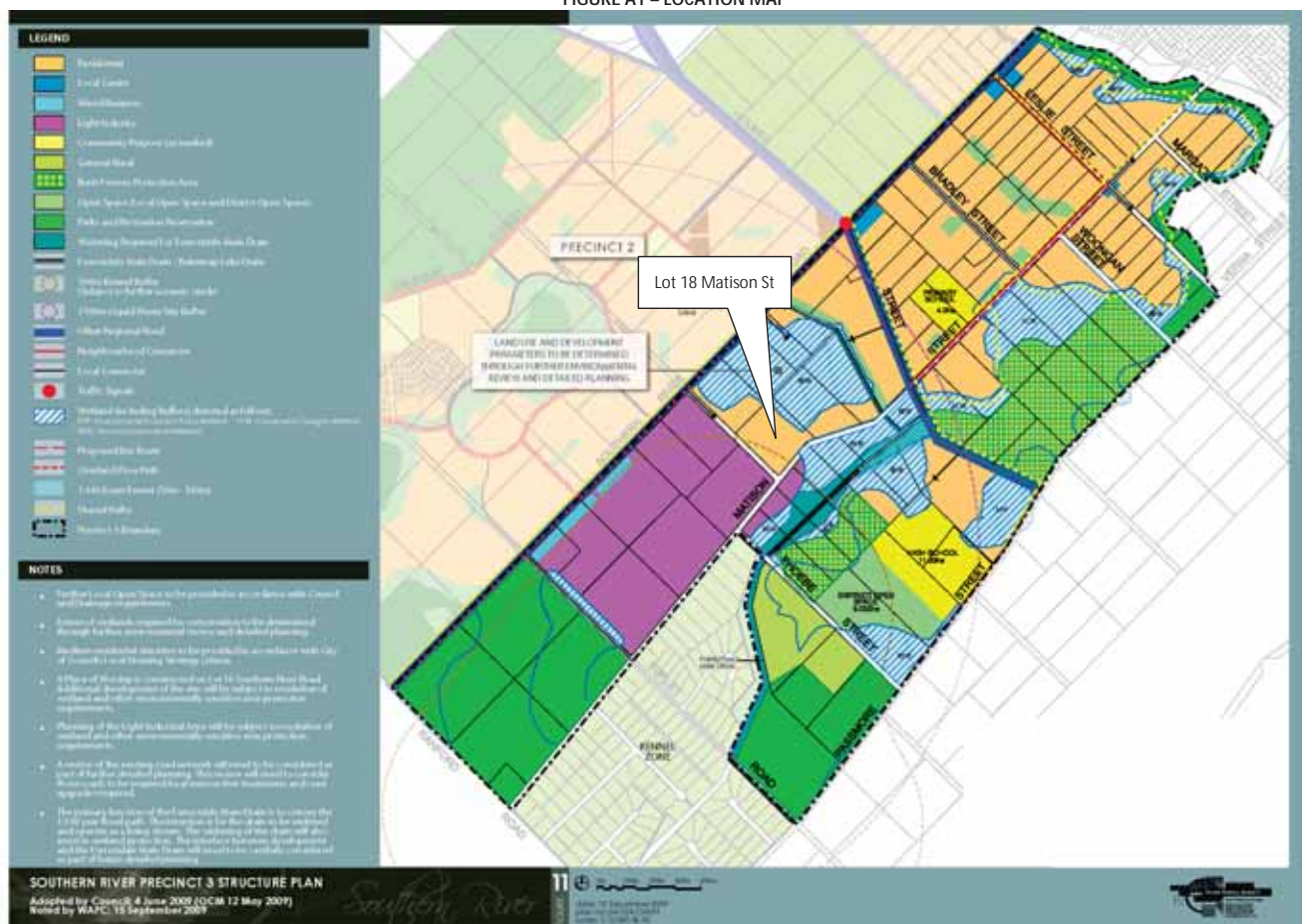
APPENDIX A

FIGURE A1 – LOCATION MAP

FIGURE A2 – LSP

FIGURE A3 – CONCEPT SUBDIVISION PLAN

FIGURE A1 – LOCATION MAP



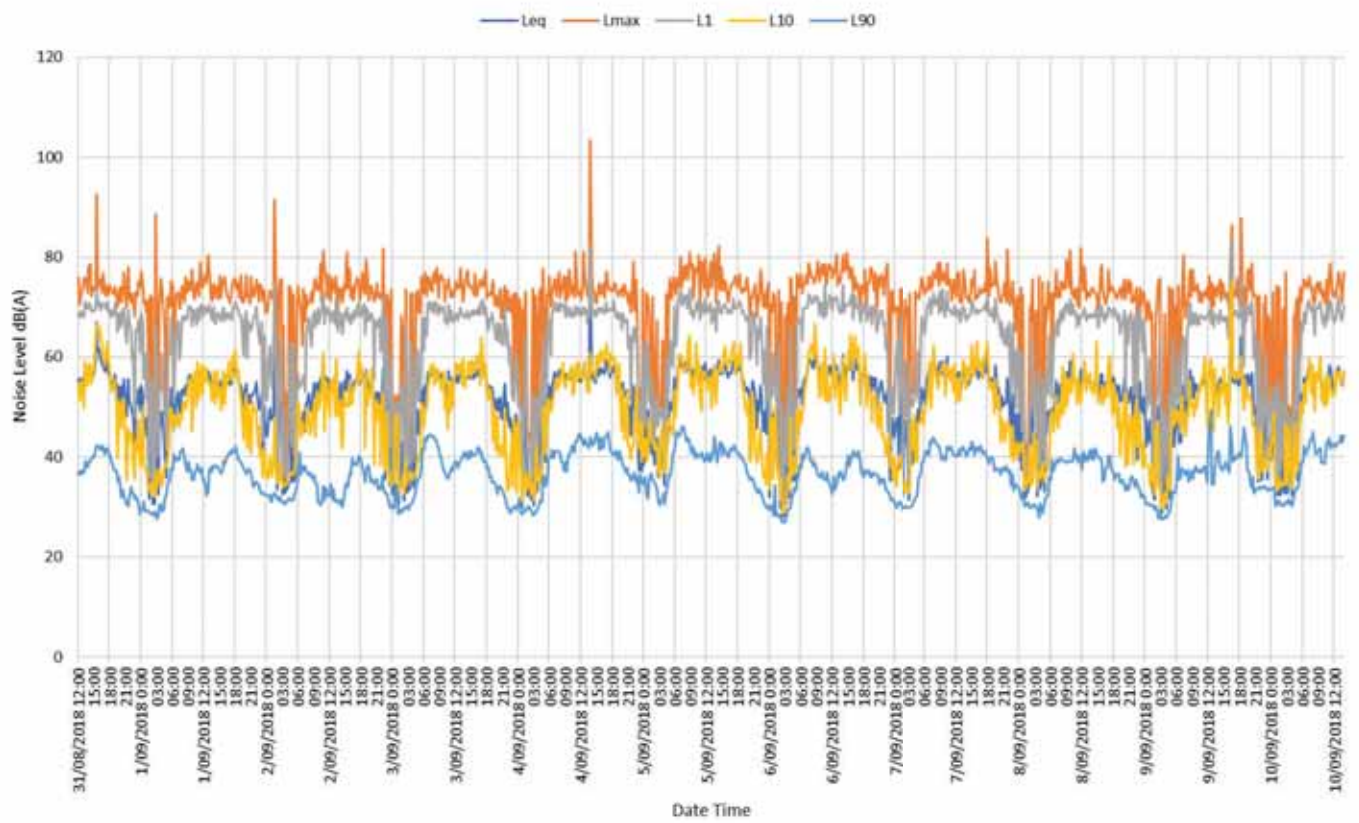




APPENDIX B

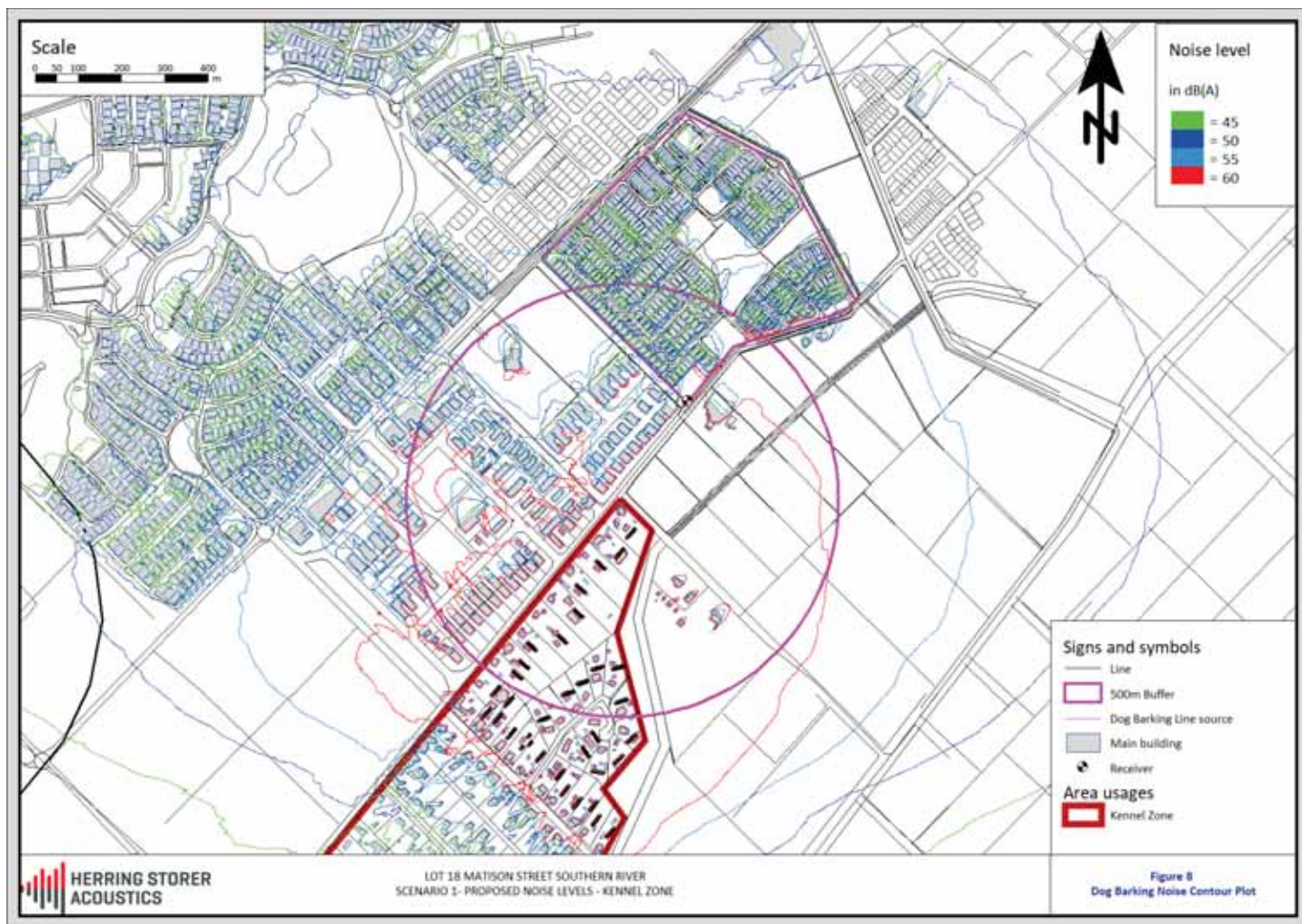
MONITORING RESULTS

Monitored Noise Levels - Lot 18 Matison St, Southern River



APPENDIX C

NOISE CONTOUR PLOT





APPENDIX D

WEATHER DATA

[illegible]

APPENDIX E

QUIET HOUSE DESIGN PACKAGES



Package 1

0-5 dB(A) Exceedance

QUIET HOUSE DESIGN PACKAGES FOR RESIDENCE

AREA TYPE	ORIENTATION	DESIGN
Bedrooms	Any	Glazing up to 40% of floor area (minimum Rw + Ctr 28) e.g. 6mm thick glass (monolithic, toughened or laminated) in fixed sash, awning or casement opening with seals to openings.
Living and Work Areas	Facing Kennel	<ul style="list-style-type: none"> • Glazing up to 60% of floor area (minimum Rw + Ctr 28) e.g. 6mm thick glass (monolithic, toughened or laminated) in fixed sash, awning or casement opening with seals to openings. • Sliding doors to incorporate acoustic seals.
	Opposite and sides	No Requirements
Walls	External	<p>Rw + Ctr 45dB</p> <p>Stud Frame Walls</p> <ul style="list-style-type: none"> ➤ One row of 92mm studs at 60mm centres with: ➤ Resilient steel channels fixed to the outside of the studs; and ➤ 9.5mm hardboard or 9mm fibre cement weatherboards or one layer of 19mm board cladding fixed to the outside of the channels; and ➤ 75mm glass wool (11kg/m³) or 75mm polyester (14kg/m³) insulation, positioned between the studs; and ➤ -Two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs. <p>Brick Walls</p> <ul style="list-style-type: none"> ➤ Single leaf of 150mm brick masonry with 13mm cement render on each face: OR <p>Double brick: two leaves of 90 mm clay brick masonry with a 20mm cavity between leaves.</p>
Roof and Ceilings	Highest Floor	<p>Rw+Ctr 35dB</p> <p>Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard ceiling</p>

Notes :

1. Alternative constructions are acceptable, provided they are assessed to comply with the internal acoustic criteria as outlined in State Planning Policy 5.4 and a report is submitted by a suitably qualified acoustic consultant.

Package 2

5-10 dB(A) Exceedance

QUIET HOUSE DESIGN PACKAGES FOR RESIDENCE

AREA TYPE	ORIENTATION	DESIGN
Bedrooms	Facing Kennel	Glazing up to 40% of floor area (minimum $R_w + C_{tr}$ 31) e.g. 10mm thick glass (monolithic, toughened or laminated) in fixed sash, awning or casement opening with seals to openings. • No external doors.
	Opposite and sides	Glazing up to 40% of floor area (minimum $R_w + C_{tr}$ 30) e.g. 6.5mm thick VLam Hush glass in fixed sash, awning or casement opening with seals to openings.
Living and Work Areas	Facing Kennel	• Glazing up to 40% of floor area (minimum $R_w + C_{tr}$ 28) e.g. 6mm thick glass (monolithic, toughened or laminated) in fixed sash, awning or casement opening with seals to openings. • Sliding doors to incorporate acoustic seals. Up to 60% floor area: As per Bedrooms at up to 40% area ($R_w + C_{tr}$ 31dB).
	Opposite and sides	6mm Glazing
Walls	External	$R_w + C_{tr}$ 50dB Single leaf of 90 mm clay brick masonry with: <ul style="list-style-type: none"> ➤ A row of 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres; ➤ A cavity of 25 mm between leaves; ➤ 50 mm glass wool or polyester cavity insulation (R2.0+) insulation between studs; and ➤ One layer of 10mm plasterboard fixed to the inside face ➤ Single leaf of 220mm brick masonry with 13mm cement render on each face ➤ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face Double brick: two leaves of 90mm clay brick masonry with: <ul style="list-style-type: none"> ➤ A 50mm cavity between leaves ➤ 50mm glass wool or polyester cavity insulation (R2.0+) ➤ Resilient ties where required to connect leaves Double brick: two leaves of 110mm clay brick masonry with <ul style="list-style-type: none"> ➤ 50mm cavity between leaves and R2.0+ cavity insulation ➤
Roof and Ceilings	Highest Floor	$R_w + C_{tr}$ 45dB Concrete or terracotta tile sarking and at least 10mm plasterboard ceiling, R3.0+ insulation OR Metal sheet roof, sarking and at least 10mm plasterboard ceiling, R3.0+ insulation

Notes :

- 1 Alternative constructions are acceptable, provided they are assessed to comply with the internal acoustic criteria as outlined in State Planning Policy 5.4 and a report is submitted by a suitably qualified acoustic consultant.



Appendix B

Traffic Impact Assessment Addendum



Southern River Precinct 3E Structure Plan

Transport Impact Assessment

PREPARED FOR:
LWP Southern River Pty Ltd

August 2022

Document history and status

Author	Revision	Approved by	Date approved	Revision type
R White	r01	B Bordbar	28/8/2017	
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R White	r01b	B Bordbar	21/11/2018	Revised
R White	r01c	B Bordbar	22/02/2019	Revised
R White	r01d	B Bordbar	6/09/2019	Revised
R White	r01e	B Bordbar	4/03/2020	Revised
R White	r01f	B Bordbar	29/08/2022	Revised

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Author: Robin White

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Project: Various Lots, Matison St & Southern River Rd, Southern River

Document revision: r01f

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1 Introduction

This Transport Impact Assessment has been prepared by Transcore on behalf of LWP Southern River Pty Ltd with regard to the proposed (modified) Local Structure Plan (LSP) for Southern River Precinct 3E in the City of Gosnells.

The subject site is located on the southeast side of Southern River Road southwest of Holmes Street, as shown in **Figure 1**. This figure shows the site in relation to Other Regional Roads (ORR) alignments for Southern River Road and Garden Street (Holmes Street) in the Metropolitan Region Scheme (MRS).

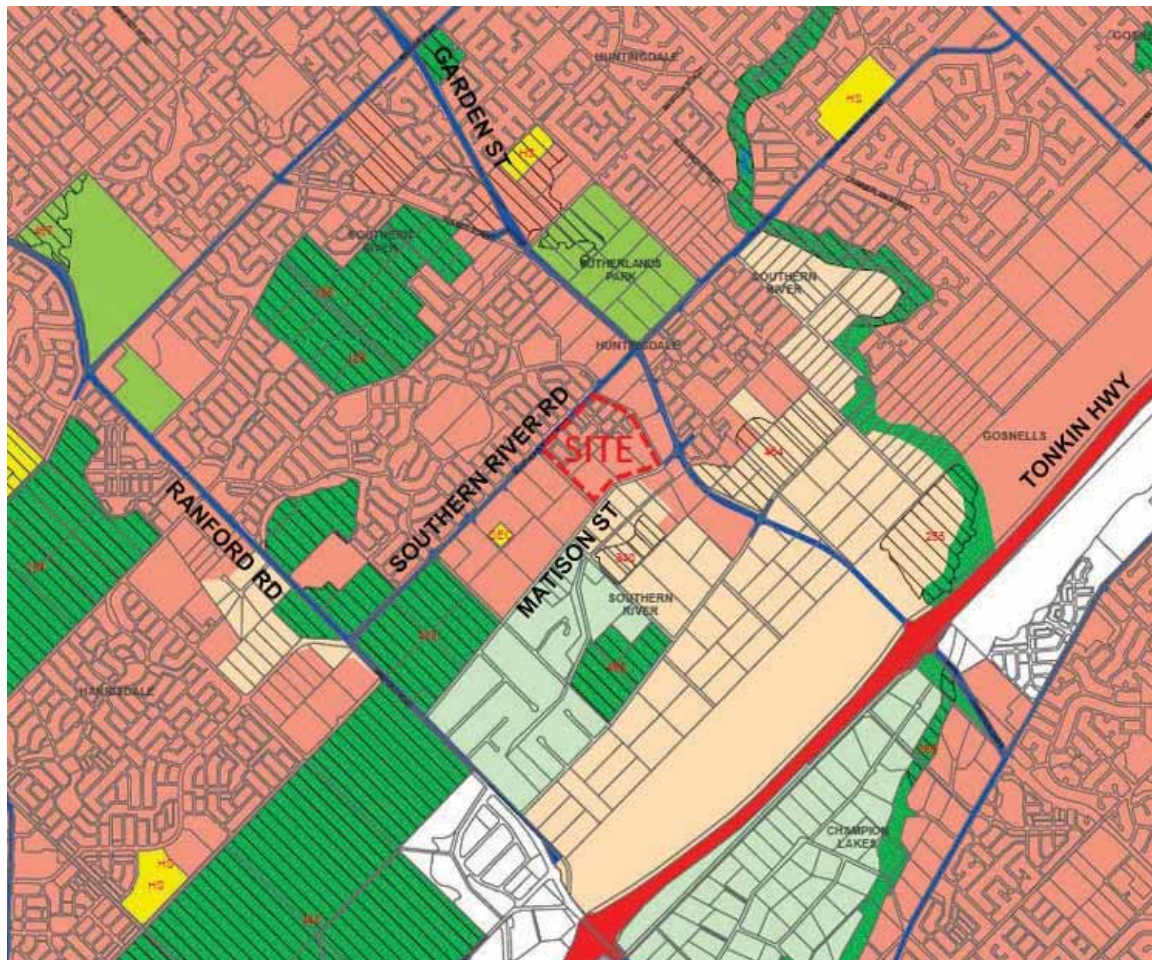


Figure 1: Site location

This report includes analysis of the future traffic flows that would be generated by future residential development of this area and the proposed road network connections to serve this area.

This latest revision of this report is for modification of the LSP to include future development of Lot 18 at the southern corner of the site, which was previously excluded from the traffic analysis.

2 Proposed Local Structure Plan

The proposed (modified) Local Structure Plan (LSP) for this site is shown at **Figure 2** and at **Appendix A** to illustrate the proposed future residential and commercial development of this site.



Figure 2: Proposed Local Structure Plan

The site is bounded by Southern River Road on the northwest side, Matison Street on the southeast side, the road reserve for Lander Street on the southwest side and the Balannup Drain reserve on the northeast side.

Preliminary concept plans for this LSP area (excluding Lot 18 at the southern corner of the site) indicated a potential lot yield of approximately 350 dwellings ranging from R25 to R60 residential density.

The subdivision concept plan for Lot 18 indicates a yield of 77 residential lots plus a 3,234m² Local Centre site at the corner of Matison Street and Lander Street.

The LSP proposes one T-intersection on Southern River Road and three intersections along Matison Street.

The LSP also includes a local access road link across the Balannup Drain reserve to tie in with the Precinct 3A (South) Outline Development Plan (ODP), as indicated by the arrow shown in **Figure 2**.

3 Existing Situation

3.1 Existing Land Use

Existing land uses in the LSP area are still rural/residential on the southern half of the site but subdivision development has already progressed on the northern half of the site, as shown in **Figure 3** (Nearmap image dated June 2022).



Figure 3: Existing Land Use

Surrounding land uses are predominantly similar rural/residential properties although there is substantial residential development in progress on the northwest side of Southern River Road and northeast of Holmes Street, as shown in **Figure 3**. This includes the Southern Grove Primary School approximately 350m northwest from this LSP area. The Southern River Square Shopping Centre has also been constructed at the southern corner of Southern River Road and Holmes Street, north of the LSP area.

Sutherlands Park is located northeast of Holmes St / northwest of Southern River Rd and provides a number of playing fields and recreational facilities for this district.

There is also an existing church about 200m southwest of the LSP area (south of Southern River Road) and a proposed shopping centre at the corner of Southern River Road and Holmes Street, which has recently obtained development approval.

3.2 Existing Road Network

Southern River Road is identified as a Distributor A road within the Main Roads WA Functional Road Hierarchy and is covered by an Other Regional Roads reservation in the MRS, as shown in **Figure 1**. It is currently being upgraded to dual carriageway standard (two lanes each way with 6m median) by the City of Gosnells. The posted speed limit along Southern River Road is currently 80km/h from Ranford Road to Holmes Street.

Holmes Street to the northwest of Southern River Road is defined as a Distributor B Road within the Main Roads WA Functional Road Hierarchy. That section of Holmes Street has a 7.2 metre wide pavement, with a posted speed limit of 70km/h.

To the south-east of Southern River Road, Holmes Street narrows to approximately 6.5 metres with gravel shoulders and a posted speed limit of 80km/h. This section of Holmes Street is currently classified as an Access Road in the MRWA Functional Road Hierarchy.

However, Holmes Street is also covered by an Other Regional Roads reservation in the MRS for the future extension of Garden Street through to Tonkin Highway, as shown in Figure 1.

The 4-way intersection of Southern River Rd / Holmes St was upgraded to a two-lane roundabout by the City of Gosnells. More recently, a new dual-lane roundabout has also been constructed at 4-way intersection of Southern River Rd / Lockway St, which is approximately 60m northeast of the northern corner of the LSP area.

The intersection of the main entry road into the LSP area (Halcyon Loop) onto Southern River Road has been constructed as a channelised T-intersection with a right turn lane in the median of Southern River Road and a left turn deceleration lane in the southeast verge of Southern River Road.

Matson Street is a 2-lane Access Street with a pavement width of approximately 6 metres. It is classified as an Access Road in the MRWA Functional Road Hierarchy and has a posted speed limit of 60km/h.

The Matson St / Holmes St 4-way intersection is now constructed as a single-lane roundabout.

Lander Street is currently unconstructed adjacent to the LSP area.

Existing weekday traffic volumes on Southern River Road (east of Ranford Road) were around 9,277 vehicles per day (vpd) in 2019/20 (MRWA traffic count). The directional split and proportion of average weekday traffic (AWT) flows that occurs during morning and afternoon peak hours on Southern River Road is illustrated in **Table 1**.

Table 1: Existing Peak Period Traffic Flows

Road	AWT (HV)	AM Peak	PM Peak	Date
Southern River Rd (E of Ranford Rd)	9,277vpd (7.3%)	859vph 0730-0830 9.3% of AWT 47%E/53%W	875vph 1615-1715 9.4% of AWT 55%E/45%W	2019/20

Average weekday traffic volumes on this section of Southern River Road (east of Ranford Rd) increased from 7,170vpd in 2015/16 to 8,043vpd in 2017/18, then 9,227vpd in 2018/19 and 9,277vpd in 2019/20. This represents an increase of 29.4% from 2015/16 to 2019/20, or an average of 7.3% per year (527vpd) over this four-year period.

3.3 Public Transport

The nearest bus services in the vicinity of the proposed Structure Plan is Route 517 (Thornlie Station to Murdoch Station), which runs on Southern River Road adjacent to the LSP area. This route provides hourly services on all days but frequency increases significantly (up to 3 or 4 buses per hour) during weekday morning and afternoon peak periods.

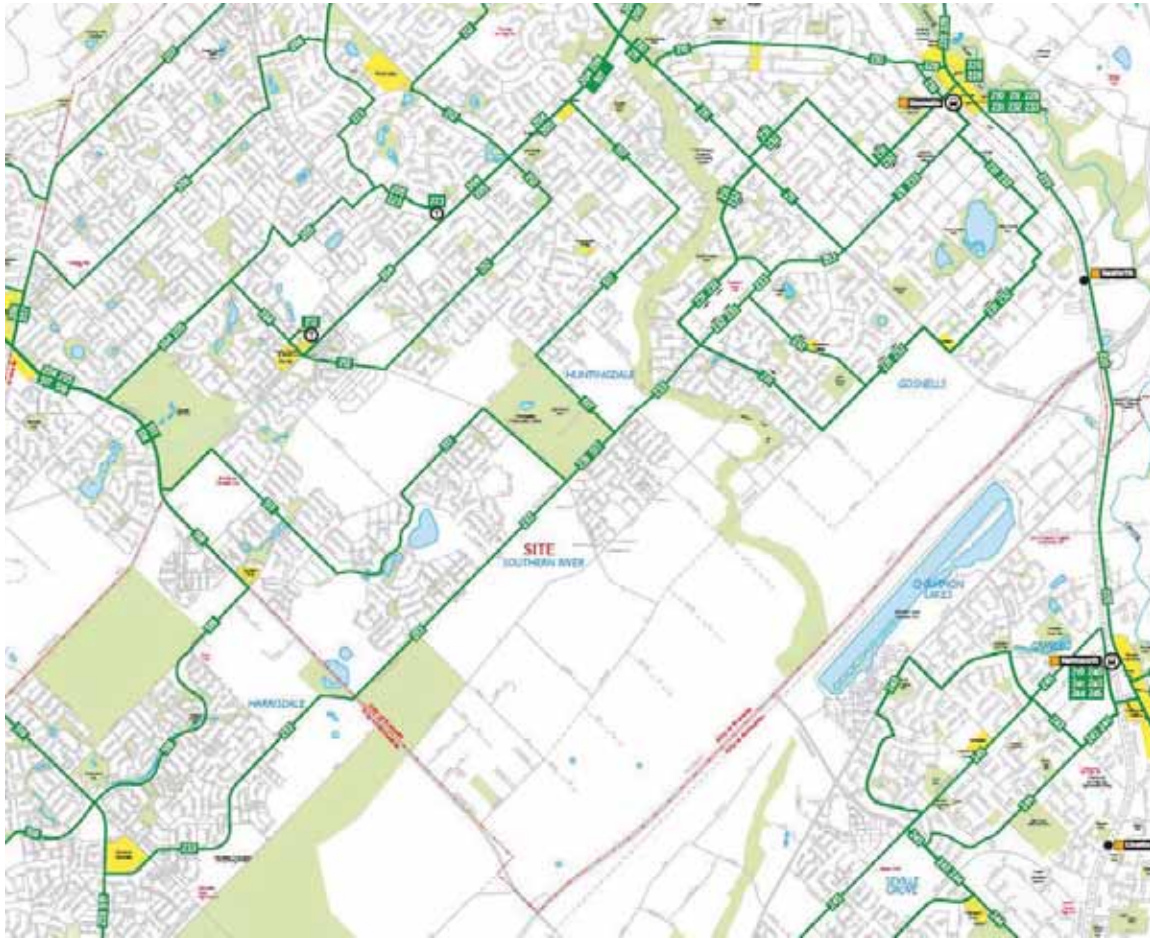


Figure 4: Existing bus routes

3.4 Pedestrian and Cyclist Facilities

There is an existing dual use path along the northern side of Southern River Road and a 2m path is progressively being constructed on the southern side as adjacent land is developed, including the LSP area. The path network within the LSP area is progressively being construction as subdivision progresses.

The Department of Transport's Perth Bike Map series (see **Figure 5**) shows that Holmes Street and Matison Street are considered a good road riding environment.

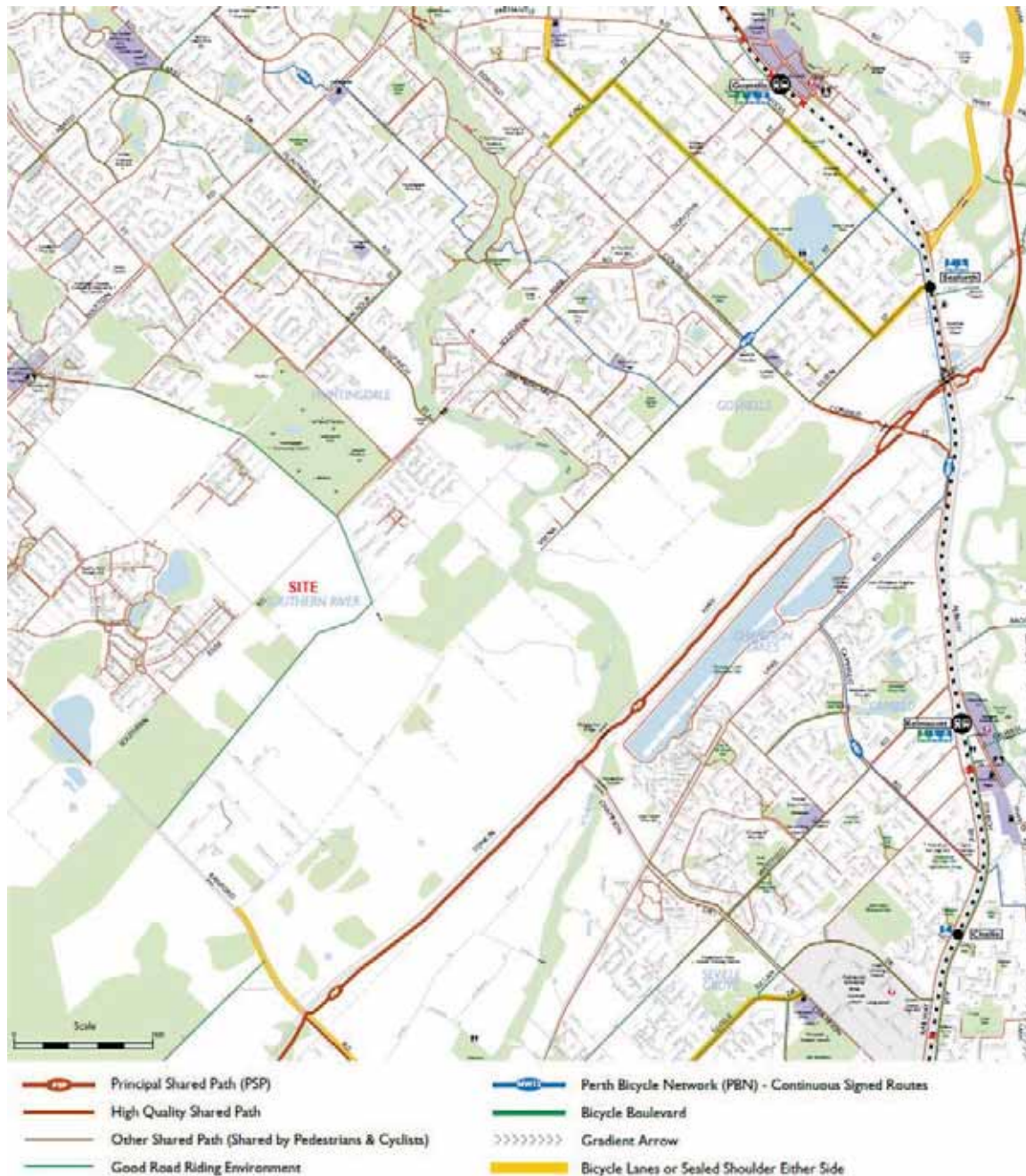


Figure 5: Bike Map

3.5 Changes to Surrounding Road Network

The City of Gosnells is progressively upgrading Southern River Road to dual carriageway standard and has constructed a two-lane roundabout at the Southern River Rd / Holmes St intersection.

Garden Street will ultimately extend southeast along the Holmes Street alignment to connect to Tonkin Hwy and Champion Drive.

4 Proposed Transport Network

4.1 Road Hierarchy

The proposed hierarchy of roads in and around the LSP area is illustrated in **Figure 6** using the road hierarchy defined in the Western Australian Planning Commission *Liveable Neighbourhoods* (LN) policy.



Figure 6: Road Hierarchy

The Access Street B standard has been adopted for the street connecting to Southern River Road to accommodate higher traffic flows (above 1,000vpd). A road reserve width of 19.6m (instead of the 17.9m indicated in the current *Liveable Neighbourhoods*) is proposed, which will provide slightly wider verges in line with current preferred practice. The northernmost section of this road will be widened to 23.6m to accommodate a widened median island as an entry statement and is shown as Access Street A in **Figure 6**.

All other access streets within the LSP area are proposed as Access Street D, which is appropriate for low volume streets (less than 1,000 vehicles per day). A road reserve width of 15m (instead of the 14.2m indicated in the current Liveable Neighbourhoods) is proposed, which will again provide slightly wider verges in line with current preferred practice.

In Liveable Neighbourhoods an Access Street can have one verge reduced when adjacent to public open space. This principle is applied on a number of Access Streets as shown in **Figure 6**. One verge is proposed to be reduced by 2m on these streets.

The 10m laneways shown in **Figure 6** allow for provision of parking for laneway lots without another street frontage (eg. abutting POS).

The proposed road reserve width of other laneways will be 6.0 metres. These would typically be designed with flush kerbing (i.e. at the same level as the laneway pavement) and central drainage, and can accommodate two-way vehicle movement and rubbish collection. Details relating to the design of these laneways will be addressed in more detail during the subdivision planning stages.

It is recommended that visitor car parking should be constructed in the road reserve adjacent to proposed lots serviced by laneways.

Typical road cross sections have been prepared for each of the types of street proposed in the LSP area and are included at **Appendix B**.

4.2 Public Transport

No bus service would be anticipated within the LSP area itself but this area would be within convenient walking distance of bus routes on Southern River Road.

4.3 Pedestrian and Cyclist Facilities

The proposed path network within the LSP area is illustrated in **Figure 7**.

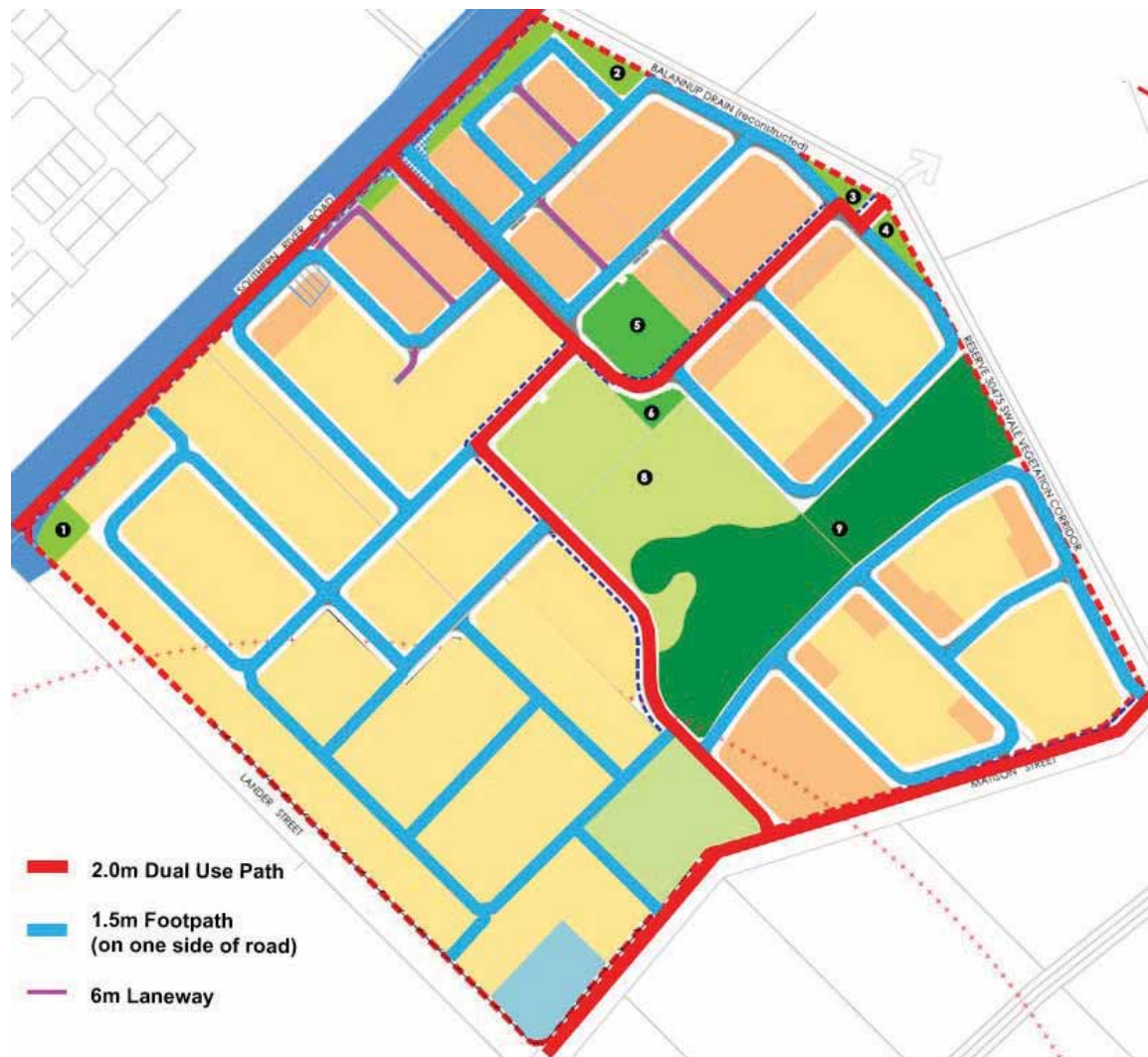


Figure 7: Proposed Path Network

In addition, a dual use path (shared path) is indicated alongside the Balannup Drain within the Precinct 3A (South) ODP in **Figure 8**. There would also be shared paths provided on one side (and footpaths on the other side) of the district distributor roads (Southern River Road and Garden Street) as part of their future upgrading.

A cycle path (dual use path or shared path) is indicated on **Figure 7** through the middle of the LSP area from Southern River Road to Matison Street and connecting to the road link across the Balannup Drain into the Precinct 3A (South) ODP area.

Footpaths would be provided on at least one side of all access streets within the LSP area in accordance with standard Liveable Neighbourhoods practice.

Laneway lots are to have footpath access to the visitor parking bays provided for them in the road reserve.

5 Integration with Surrounding Area

The planning for this LSP area takes into consideration the broader planning for the surrounding precincts including the planned road connection to Precinct 3A (South) across the Balannup Drain reserve (see **Figure 8**).



Figure 8: The adjacent Precinct 3A (South) ODP

The planning for this LSP area also takes into consideration the proposed planning for land on the opposite side of Matison Street, as indicated in the proposed ODP for Lot 9 Holmes Street (see **Figure 9**).

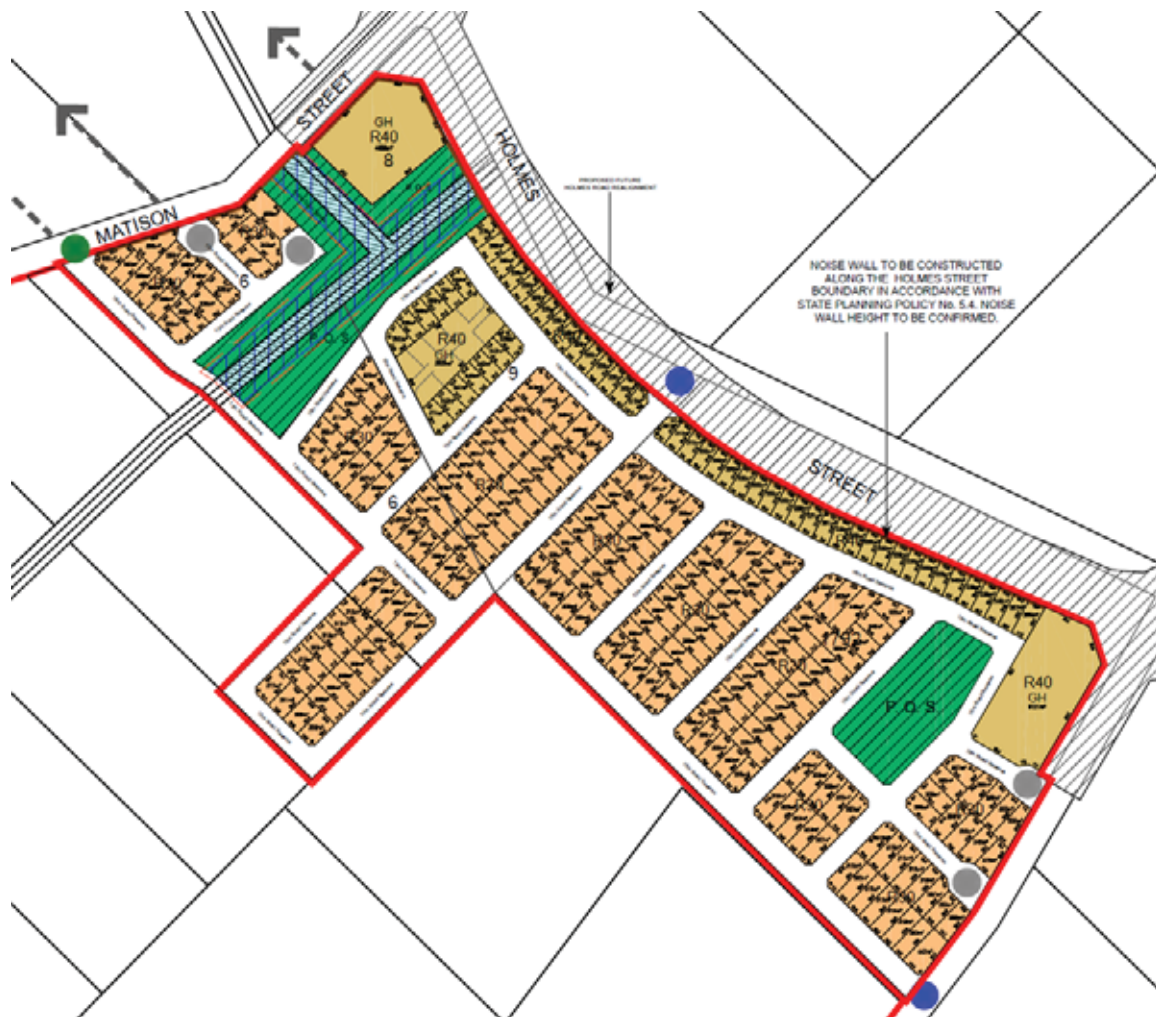


Figure 9: Proposed ODP for Lot 9 Holmes Street

The LSP path network will also provide opportunities for pedestrian and cyclist access across the site with convenient access points on all four sides of the LSP area.

6 Analysis of the Transport Network

6.1 Assessment Period

The assessment year that has been previously been adopted for the traffic analysis in previous revisions of this Transport Impact Assessment report is nominally 2031. That traffic analysis has always been based on the assumption of full development of structure plans in this area.

However, WAPC *Transport Impact Assessment Guidelines* recommend that traffic analysis should consider ten-years traffic growth, so additional growth in base traffic flows to at least 2032 will now be factored into this traffic analysis.

The analysis in this report focusses on the weekday AM and PM peak periods. See **Table 1** for details of existing Southern River Road peak hours.

6.2 Traffic Generation

The daily traffic generation rate used in the subject site for this transport assessment is 8 vehicle trips per day (vpd) per dwelling, which corresponds to peak hour trip generation rates recommended in the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines* (2016).

Therefore, the anticipated 350 dwellings in the LSP area (excluding Lot 18) will generate two-way total traffic flows of approximately 2,800vpd and the anticipated yield of 77 dwellings within Lot 18 will add a further 616vpd.

Details of future development on the 3,234m² Local Centre site are currently not known but for this traffic analysis a local shopping centre of approximately 1,000m² floor area is assumed. The NSW *Guide to Traffic Generating Developments* provides suitable guidance on traffic generation for this type of land use as approximately 121vpd per 100m² gross leasable floor area, so the local centre site is anticipated to generate approximately 1,210vpd for the purposes of this traffic analysis.

The distribution of these trips in this traffic analysis uses the same distribution as in the previous version of this Transport Impact Assessment. The distribution of trips to and from the subject site is summarised in **Table 2**.

Table 2: External Trip Distribution

Approach Road	Proportion
Garden St (northwest)	25%
Southern River Rd (northeast)	13%
Matison St (northeast)	2%
Garden St (southeast)	20%
Matison St (southwest)	8%
Southern River Rd (southwest)	30%
Bletchley Park (northwest)	2%
Total	100%

6.3 Traffic Flow Forecasts

The future total daily traffic flows on the road network around the subject site have been modelled for the future scenario of full development of this area as discussed above.

Figure 10 illustrates future total weekday traffic flows anticipated on the nearby road network.

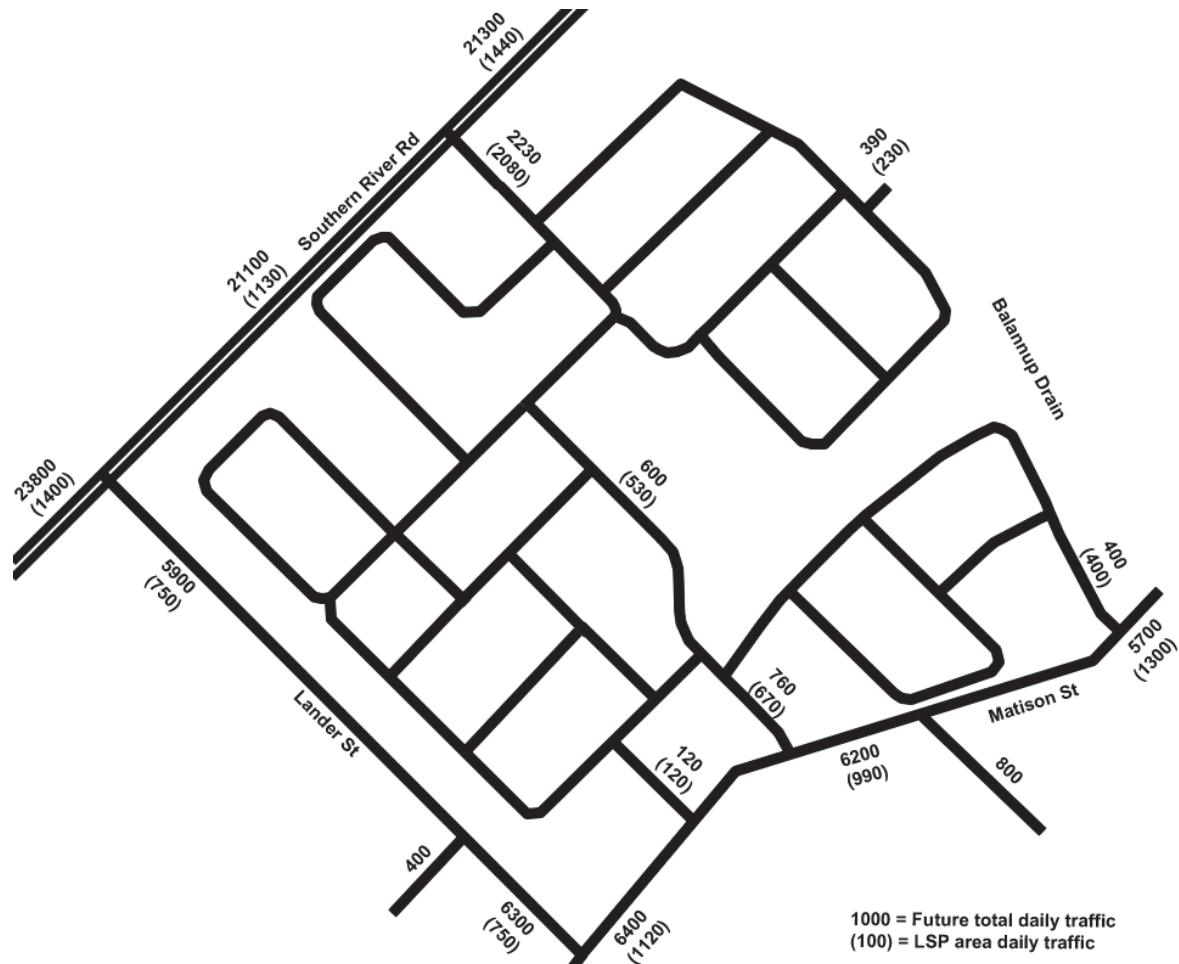


Figure 10: Future Daily Traffic Volumes

The traffic analysis has added traffic generated by proposed land uses on Lot 18 in the LSP area to the total traffic flows shown in the previous TIA report and now indicates future traffic flows of approximately 21,300vpd on Southern River Rd adjacent to the LSP area. In section 3.2 it is noted that Southern River Rd traffic volumes increased by an average of 527vpd per year from 2015/16 to 2019/20 with a highest annual increase of 1184vpd from 2017/18 to 2018/19.

Projecting forward for 13 years (to 2032) at 527vpd (the average annual traffic growth) from 9,277vpd in 2019 indicates an estimate of 16,100vpd on Southern River Road in 2032.

Projecting forward for 13 years (to 2032) at 1184vpd (the highest recorded annual growth) from 9,277vpd in 2019 indicates an upper estimate of 24,700vpd on Southern River Road in 2032.

Therefore, to ensure a robust assessment of future traffic conditions the future traffic volumes on Southern River Road will be treated as 3,500vpd higher than shown in **Figure 10** (i.e. 24,600vpd west of the LSP area entry road and 24,800vpd east of the LSP area entry road) in this Transport Impact Assessment.

The traffic analysis indicates there would be minimal through traffic travelling through the LSP area from Southern River Road to Matison Street or from LSP3 (South) across the Balannup Drain.

Peak hour traffic generation in this transport report is estimated based on the AM and PM peak hour residential trip rates recommended in the WAPC TIA guidelines (i.e. AM peak 0.6vph out/0.2vph in, PM peak 0.3vph out/0.5vph in per dwelling).

Future AM and PM peak hour proportions and directional splits on Southern River Road and Matison Street are based on the existing traffic patterns reported for Southern River Road in **Table 1**. For this assessment the future peak hour traffic flows in the AM peak hour are calculated as 9.3% of total weekday traffic generation with a 47/53 directional split (i.e. 47% heading northeast) and the PM peak is 9.4% with a 55/45 directional split (i.e. 55% heading northeast).

Use of these observed traffic patterns is appropriate for an existing major road like Southern River Road which does have existing traffic count information available, whereas the 'typical' traffic patterns associated with the WAPC residential trip rates are appropriate for the future road network within the LSP area.

6.4 Roads and Intersections

The proposed road network to accommodate these traffic volumes has been detailed in sections 3.5 and 4.1 of this transport assessment.

Figure 11 details the proposed intersection controls for key intersections adjacent to the LSP area.



Figure 11: Intersection Treatments

All of the intersections from the LSP area onto Southern River Road and Matison Street are proposed as full movement T-intersections.

The intersection of the main entry road into the LSP area (Halcyon Loop) onto Southern River Road has been constructed as a channelised T-intersection with a right turn lane and a left turn deceleration lane on Southern River Road.

There is one four-way intersection where two access streets cross within the LSP area. This would be constructed with appropriate entry treatments on the side roads, such as brick paved sections or raised plateau treatments, and give way signage to alert drivers on the side roads before entering these priority-controlled intersections and to manage traffic speed on these approaches. Guidance on appropriate treatments is provided in the WAPC Liveable Neighbourhoods policy (Element 2, Figure 29) and details of the appropriate treatment would be determined at subdivision design stage in consultation with the City of Gosnells.

There is also one four-way intersection formed where two laneways intersect an access street. An appropriate entry treatment has been provided on these laneways

similar to the flush kerb treatment across the laneway entrance that has already been constructed at other laneways within the existing subdivision stages in this LSP area.

None of the other internal intersections within the LSP area are expected to require any special treatments as all will be simple T-intersections with low traffic volumes. This includes pairs of T-intersections on opposite sides of the street that form a staggered T intersection formation.

A potential sight line issue has been identified at the proposed easternmost access street intersection on Matison Street due to an existing bend in the Matison Street road reserve west of that proposed intersection. This may potentially require some minor widening of the road reserve at that bend to move the property boundary clear of the required sight line area. This will be investigated in detail at subdivision stage in consultation with the City of Gosnells.

6.5 Intersection Analysis

Intersection capacity analysis has been undertaken for the main access intersection onto Southern River Road for the AM and PM peak hour flows that correspond to the modelled future daily traffic flows in **Figure 10** (with adjustment to include the upper estimate of 2032 traffic flows on Southern River Road as discussed in section 6.3). As noted in section 6.1 these are based on the existing peak periods in this area and are anticipated to remain the critical peak periods in future in this area.

Capacity analysis of the intersection has been undertaken using the SIDRA computer software package. SIDRA is an intersection modelling tool commonly used by traffic engineers for all types of intersections. SIDRA outputs are presented in the form of Degree of Saturation, Level of Service, Average Delay and 95% Queue. These characteristics are defined as follows:

- Degree of Saturation is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The Degree of Saturation ranges from close to zero for infrequent traffic flow up to one for saturated flow or capacity.
- Level of Service is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. In general, there are 6 levels of service, designated from A to F, with Level of Service A representing the best operating condition (i.e. free flow) and Level of Service F the worst (i.e. forced or breakdown flow).
- Average Delay is the average of all travel time delays for vehicles through the intersection.
- 95% Queue is the queue length below which 95% of all observed queue lengths fall.

The results of the SIDRA analysis are summarised in **Appendix C**

Southern River Rd / Halcyon Loop T-intersection

The SIDRA analysis at Tables C1a and C1b in Appendix C indicate that this T-intersection on Southern River Road will operate satisfactorily in the future AM and PM peak periods with the forecast traffic flows for full development of the subject site. The intersection is anticipated to be operating at around 60% of capacity in the AM peak hour and 36% during the weekday PM peak period. The right turn out from the side road will operate at level of service E in the AM peak and level of service C in the PM peak and all other movements are anticipated to operate at level of service A, B or C. The longest queues are expected to be 2 or 3 vehicles on the side road approach during the AM peak and all other movements should generally have minimal queues and delays.

6.6 Access to Frontage Properties

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

There will be no direct access from development along the Southern River Road, Matison Street and future Lander Street frontages in this LSP area.

On all streets within the LSP area the traffic volumes would be significantly less than 5,000vpd and no restriction on property access would apply.

The location of driveway crossovers on corner lots in each stage of subdivision in this LSP area is already being progressively addressed in a separate series of traffic impact statements prepared by Transcore as part of the subdivision application process. This either confirms suitable driveway locations on those corner lots or may require some other subdivision design solution such as amalgamation of lots on the corner as a group housing site or other solution. This will be addressed in detail at subdivision stage where required.

6.7 Pedestrian / Cycle Networks

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

The WAPC *Transport Impact Assessment Guidelines* (2016) provides guidance on the levels of traffic volumes that are likely to affect the ability for pedestrians to cross various types of road. Based on that guidance an undivided two-lane road should be acceptable for pedestrians crossing traffic volumes of up to approximately 11,000 vpd and this threshold can be increased to around 28,000 vpd by adding a central median or pedestrian refuge islands. On a four-lane road, because of its greater carriageway width, this threshold is lower; even with a median island the threshold is only around 16,000 vpd.

Southern River Rd is expected to carry future traffic flows above these levels. The neighbourhood activity centre planned at the Southern River Rd / Garden St intersection will be the major pedestrian attractor in this area, so it would be appropriate for suitable pedestrian facilities to be located on Southern River Road near that neighbourhood activity centre. This need was previously planned to be addressed by traffic signals at the Southern River Rd / Garden St intersection but the decision to construct a roundabout at that intersection has changed that. The City of Gosnells will need to consider how pedestrian movements are to be facilitated across Southern River Road when traffic flows on that road exceed 16,000vpd in future.

6.8 Access to Public Transport

At this stage of the structure planning process future bus stop locations are not known. However, in these circumstances the WAPC *Transport Impact Assessment Guidelines* (2016) suggest that it is desirable for at least 90 per cent of dwellings to be within 400m straight line distance of a bus route.

The width of the LSP area varies from about 470m at Lander Street to about 585m at the Balannup Drain, so it is estimated that about 75% to 80% of the LSP area would be within 400m from bus services on Southern River Road. The remaining 20% to 25% of dwellings would be less than 50% further away from those bus services. In this instance it is probably unlikely that the Public Transport Authority would want to deviate a bus service through this LSP area or plan a future bus route on Matison Street, so this guideline is probably simply not achievable for that small proportion of the LSP area.

7 Conclusions

This Transport Impact Assessment has been prepared by Transcore on behalf of LWP Southern River Pty Ltd with regard to the proposed (modified) Local Structure Plan (LSP) for Southern River Precinct 3E in the City of Gosnells.

The proposed modification of the LSP includes future development of Lot 18 at the southern corner of the site.

The LSP area was previously anticipated to accommodate approximately 350 dwellings and the concept plan for Lot 18 includes a further 77 residential lots and a 3,234m² Local Centre site at the southern corner of the LSP area.

This modified LSP area is now anticipated to generate traffic flows of approximately 4,600 vehicles per day (vpd).

The road network of the LSP area has been planned in accordance with WAPC *Liveable Neighbourhoods* principles to accommodate the future traffic flows that will travel within this area, although slightly wider road reserves are proposed to provide slightly wider verges in line with current preferred practice.

The LSP proposes four access points into this LSP area:

- A full movement T-intersection at Southern River Road / Lander Street (now constructed);
- Three full movement T-intersections on Matison Street; and
- A local access road link across the Balannup Drain reserve to tie in with the proposed Precinct 3A (South) ODP.

The Southern River Road / Lander Street T-intersection will operate satisfactorily under the forecast future traffic flows.

Existing and future bus services on Southern River Road provide appropriate public transport access for the majority of the LSP area.

The proposed LSP also provides for an appropriate network of shared paths and footpaths with direct connections to neighbouring areas to encourage and facilitate non-motorised local travel as well.

Appendix A

PROPOSED LOCAL STRUCTURE PLAN

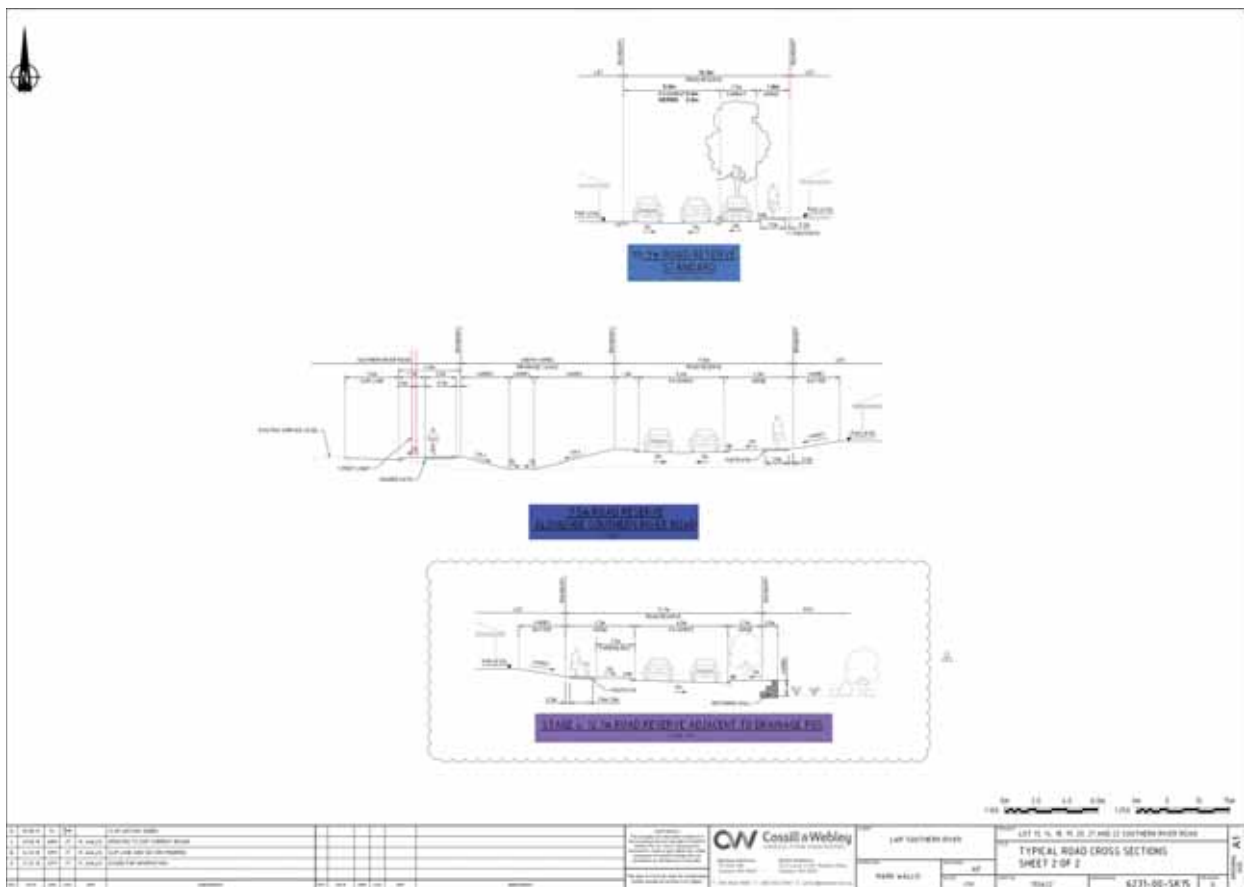


Appendix B

ROAD CROSS-SECTIONS



Figure B1: Road Cross Sections Index Plan



Appendix C

SIDRA INTERSECTION ANALYSIS

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

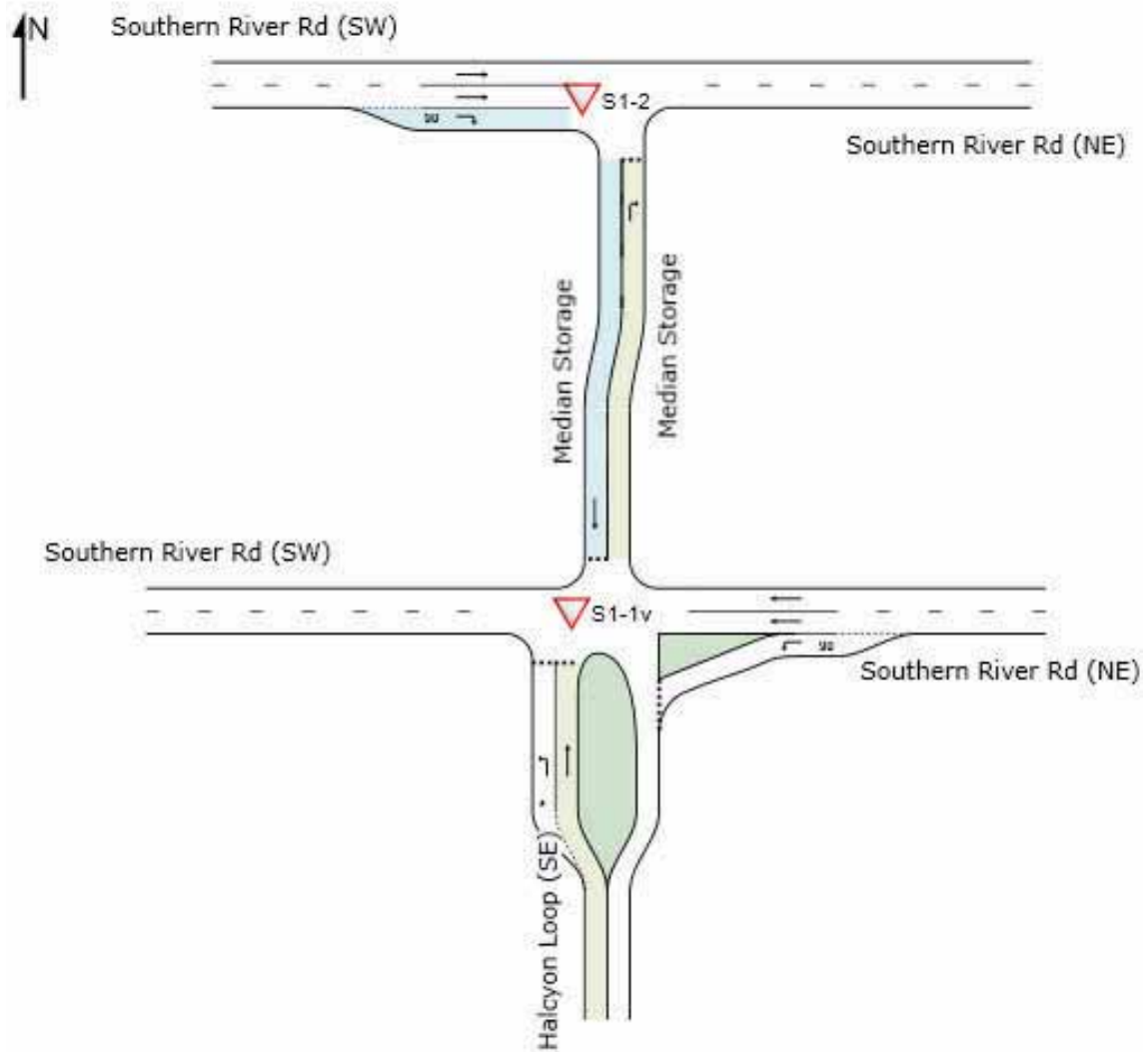


Figure C1. Southern River Rd / Precinct 3E main access intersection layout analysed in SIDRA Network

Note: This type of intersection is modelled in SIDRA as a network of two intersections linked together to allow analysis of the right turn out from the side road in two stages (from side road to median then right turn out from the median into the through traffic flow on the major road). This layout diagram is diagrammatic only and not to scale (for example, the median width modelled in the SIDRA analysis is 6 metres, not the very wide median that this diagram suggests).

Table C1a. SIDRA results – Southern River Rd / Halcyon Loop T-intersection – 2032 AM peak

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Halcyon Loop (SE)														
1	L2	80	2.0	80	2.0	0.097	7.6	LOS A	0.4	2.7	0.55	0.74	0.55	51.3
2	T1	96	2.0	96	2.0	0.599	43.6	LOS E	2.6	19.6	0.94	1.12	1.44	23.0
Approach		176	2.0	176	2.0	0.599	27.2	LOS D	2.6	19.6	0.76	0.95	1.04	35.0
East: Southern River Rd (NE)														
3	L2	32	2.0	32	2.0	0.023	7.4	LOS A	0.1	0.7	0.09	0.58	0.09	54.8
4	T1	1224	8.5	1224	8.5	0.343	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
Approach		1256	8.3	1256	8.3	0.343	0.3	LOS A	0.1	0.7	0.00	0.01	0.00	78.8
North: Median Storage														
5	T1	26	2.0	26	2.0	0.075	9.1	LOS A	0.2	1.8	0.78	0.78	0.78	37.7
Approach		26	2.0	26	2.0	0.075	9.1	LOS A	0.2	1.8	0.78	0.78	0.78	37.7
All Vehicles		1458	7.5	1458	7.5	0.599	3.7	NA	2.6	19.6	0.11	0.14	0.14	70.0
Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Median Storage														
1	R2	96	2.0	96	2.0	0.205	7.3	LOS A	0.7	5.0	0.72	0.80	0.76	49.7
Approach		96	2.0	96	2.0	0.205	7.3	LOS A	0.7	5.0	0.72	0.80	0.76	49.7
West: Southern River Rd (SW)														
2	T1	1085	8.5	1085	8.5	0.304	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	26	2.0	26	2.0	0.014	6.8	LOS A	0.0	0.0	0.00	0.67	0.00	61.8
Approach		1112	8.3	1112	8.3	0.304	0.2	NA	0.0	0.0	0.00	0.02	0.00	79.5
All Vehicles		1207	7.8	1207	7.8	0.304	0.8	NA	0.7	5.0	0.06	0.08	0.06	77.5

Table C1b. SIDRA results – Southern River Rd / Halcyon Loop T-intersection – 2032 PM peak

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Halcyon Loop (SE)														
1	L2	40	2.0	40	2.0	0.043	6.8	LOS A	0.2	1.2	0.50	0.66	0.50	51.8
2	T1	48	2.0	48	2.0	0.217	22.3	LOS C	0.8	5.9	0.85	0.95	0.91	31.2
Approach		88	2.0	88	2.0	0.217	15.3	LOS C	0.8	5.9	0.69	0.82	0.72	41.4
East: Southern River Rd (NE)														
3	L2	80	2.0	80	2.0	0.060	7.6	LOS A	0.2	1.8	0.16	0.57	0.16	54.6
4	T1	1051	8.5	1051	8.5	0.294	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach		1131	8.0	1131	8.0	0.294	0.6	LOS A	0.2	1.8	0.01	0.04	0.01	77.2
North: Median Storage														
5	T1	66	2.0	66	2.0	0.144	6.8	LOS A	0.5	3.6	0.72	0.72	0.72	39.5
Approach		66	2.0	66	2.0	0.144	6.8	LOS A	0.5	3.6	0.72	0.72	0.72	39.5
All Vehicles		1285	7.3	1285	7.3	0.294	1.9	NA	0.8	5.9	0.09	0.13	0.10	72.1
Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Median Storage														
1	R2	48	2.0	48	2.0	0.143	9.9	LOS A	0.4	3.2	0.79	0.83	0.79	46.4
Approach		48	2.0	48	2.0	0.143	9.9	LOS A	0.4	3.2	0.79	0.83	0.79	46.4
West: Southern River Rd (SW)														
2	T1	1283	8.5	1283	8.5	0.359	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
3	R2	66	2.0	66	2.0	0.036	6.8	LOS A	0.0	0.0	0.00	0.67	0.00	61.8
Approach		1349	8.2	1349	8.2	0.359	0.4	NA	0.0	0.0	0.00	0.03	0.00	79.1
All Vehicles		1398	8.0	1398	8.0	0.359	0.7	NA	0.4	3.2	0.03	0.06	0.03	78.1



Appendix C

Local Water Management Strategy (LWMS) Addendum



MEMO

Date: 29 August 2022
To: Brenton Scambler
From: Joycelyn Siew
Pages: 16 inc. this page
Regarding: Ambia, Southern River LWMS addendum

Ambia estate: Lot 18 Matison Street, Southern River, LWMS addendum

1 BACKGROUND

The Ambia estate forms Precinct 3E of the Southern River Precinct 3 Structure Plan (Figure 1). Bioscience (2011) originally prepared the Local Water Management Strategy (LWMS) for Precinct 3E, zoned Urban.

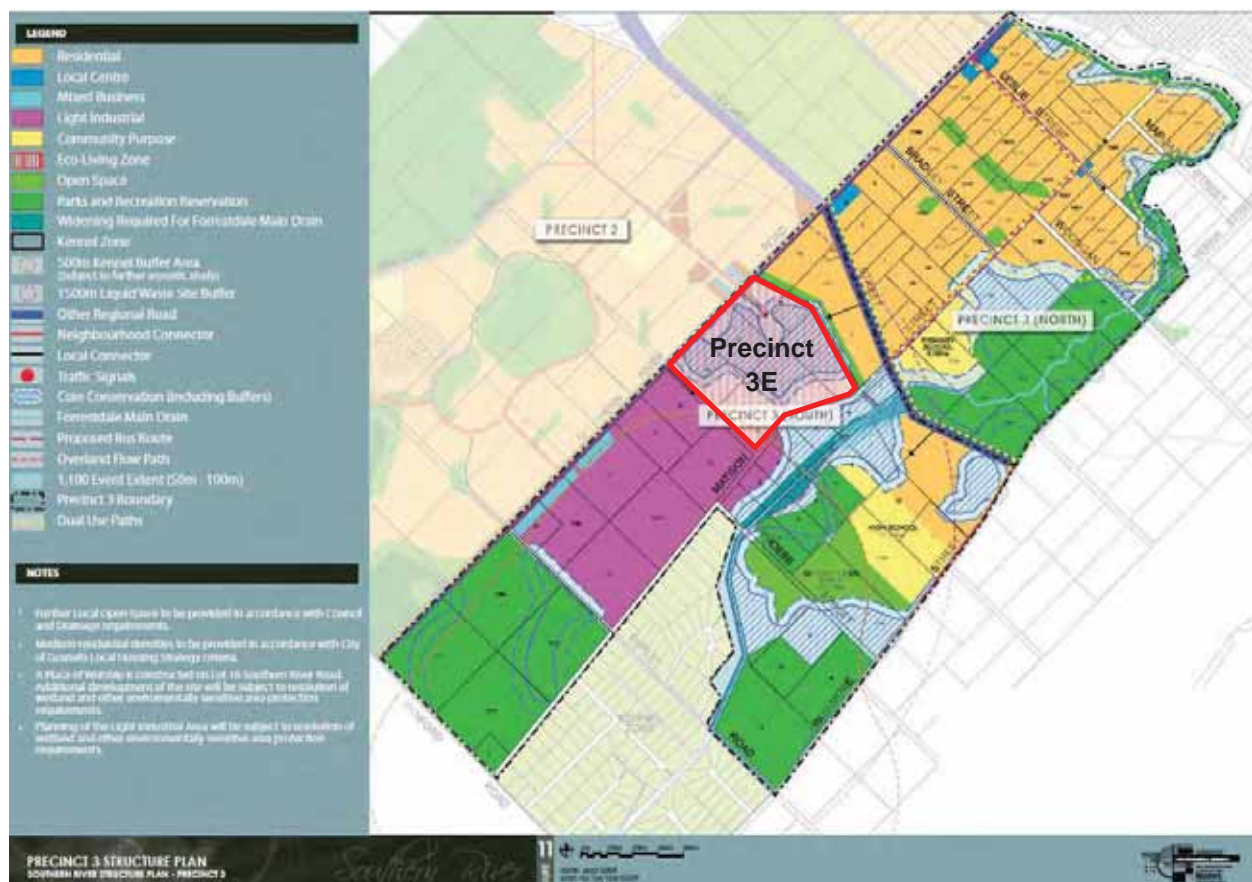


Figure 1: Southern River Precinct 3E

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

In July 2013, a new draft Local Structure Plan (LSP) for Precinct 3E was submitted and publicly advertised, with the area within the 500 m kennel zone buffer (mainly Lot 18 Matison Street) shown to be “subject to further planning” (Figure 2)

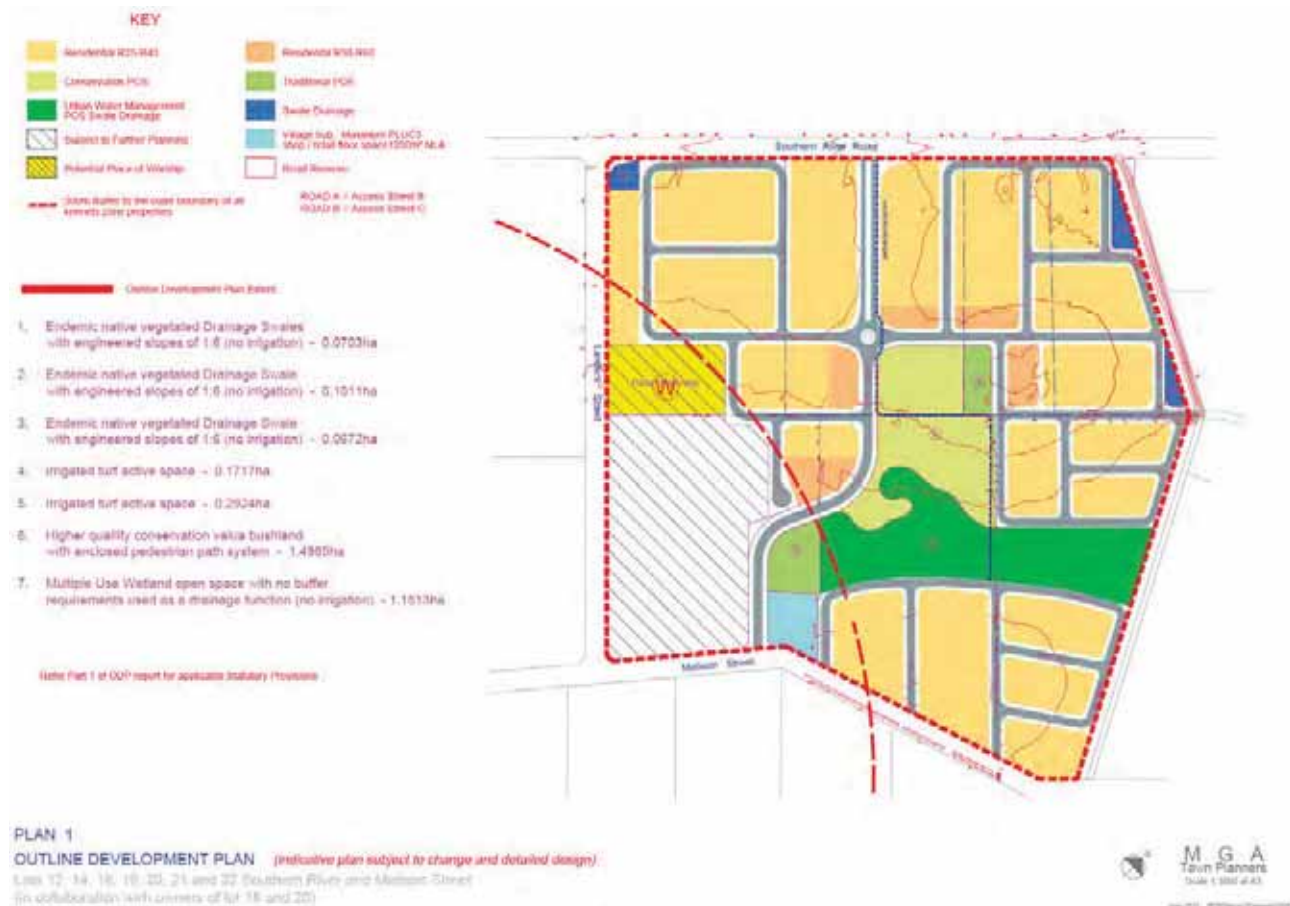


Figure 2: Outline development plan (2013)

Since then, a noise assessment has been undertaken by Herring Storer Acoustics to confirm that residential development is viable and appropriate within the kennel zone buffer. A modified structure plan for Precinct 3E is being lodged to provide for residential development, a local centre and open space within this area. The revised LSP is shown in Appendix A.

A draft subdivision concept plan (Taylor Burrell Barnett, 2022) is shown in Figure 3. The subdivision area (herein referred to as ‘the site’) consists of Lot 18 Matison Street and a portion of Lot 9009 Halcyon Loop. This addendum to the LWMS has been prepared to support the LSP amendment (Appendix A); it addresses the drainage management within the site and how it interfaces with the rest of the Ambia estate / Precinct 3E. The subdivision concept shown in Figure 3 is a draft at this stage for the purpose of providing drainage assumptions in this LWMS addendum. The subdivision layout may be further refined during the subdivision stage prior to being lodged with the Western Australian Planning commission (WAPC) for approval.

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum



Figure 3: Site boundary and subdivision concept plan (draft)

2 STORMWATER MANAGEMENT

2.1 Summary of previous water management documents

2.1.1 LWMS drainage strategy

The LWMS drainage catchments (Cardno 2015) are shown in Figure 4 with the site boundary outlined in red. The site forms part of LWMS catchments 2, 6 and 7.

In the minor 1 year 1 hour ARI storm, run-off generated on lots is detained on site through soakwells or rainwater tanks. Run-off from roads flow into a vegetated swale system located in public open spaces (POS) where water quality is treated prior to entering the detention area in the Catchment 6 POS corridor in the 5 and 100 year ARI events.

Stormwater is proposed to be discharged from the detention areas into the Balannup Lake Drain. The cumulative post-development 100 year ARI discharge from the LWMS area is estimated as 0.48 m³/s, below the pre-development discharge rate of 0.5 m³/s. The detention area within the POS corridor in Catchment 6 was modelled to discharge via a 250 mm diameter pipe at a peak flow rate of 0.1 m³/s in the 100 year ARI event.

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

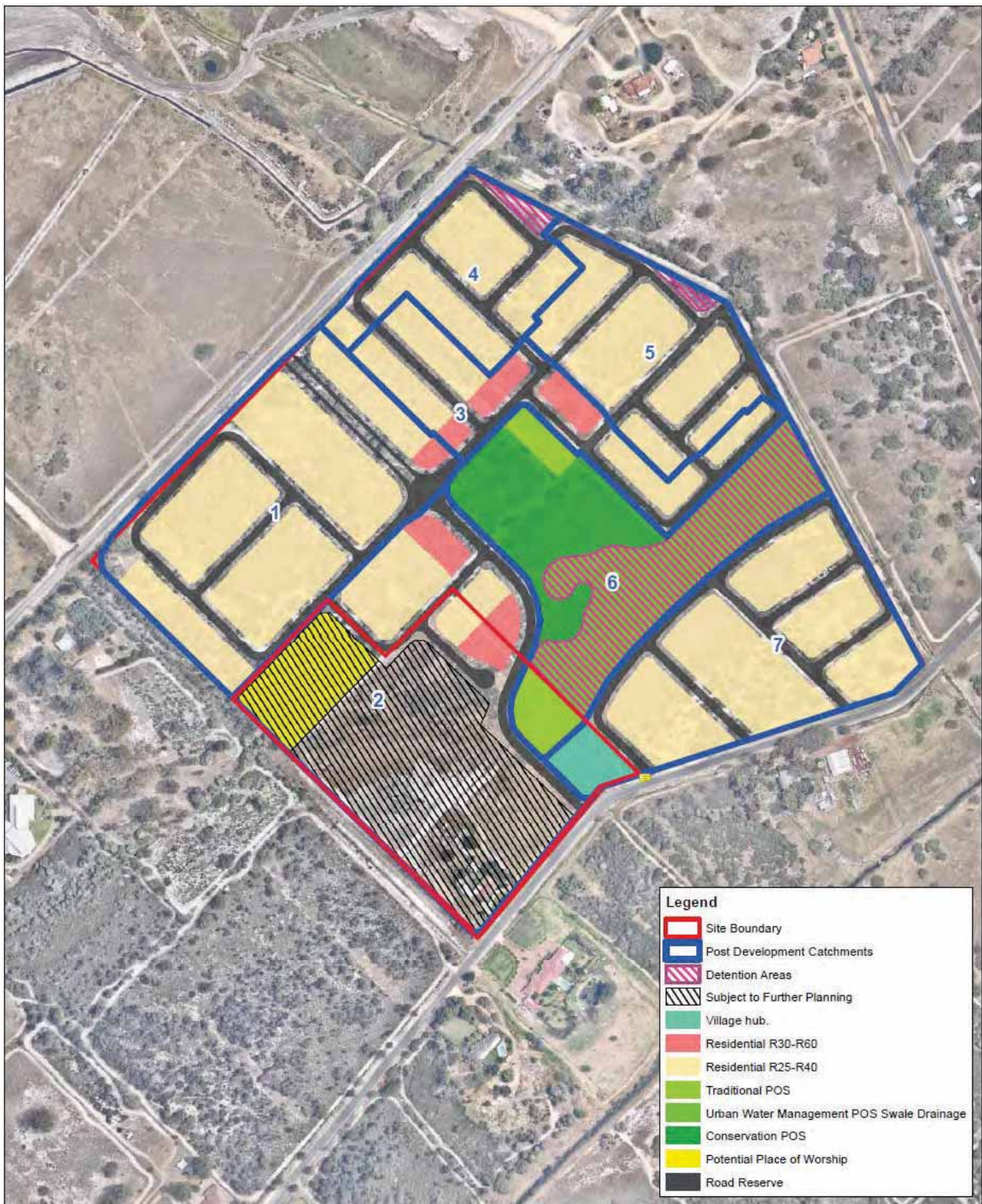


Figure 4: LWMS (Cardno 2015) post-development catchments and LWMS addendum site boundary (red outline)

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

2.1.2 UWMP drainage summary

RPS (2018) previously prepared an urban water management plan (UWMP) for Precinct 3E. The UWMP boundary and drainage catchments are shown in Figure 5. Detailed stormwater modelling was completed in XPSWMM for Lots 13, 14, 21 and 20 Southern River Road and Lots 19 and 20 Matison Street. Lot 18 Matison Street was excluded from the drainage catchments and the model as it was zoned “subject to further planning” at the time and not part of the urban development.

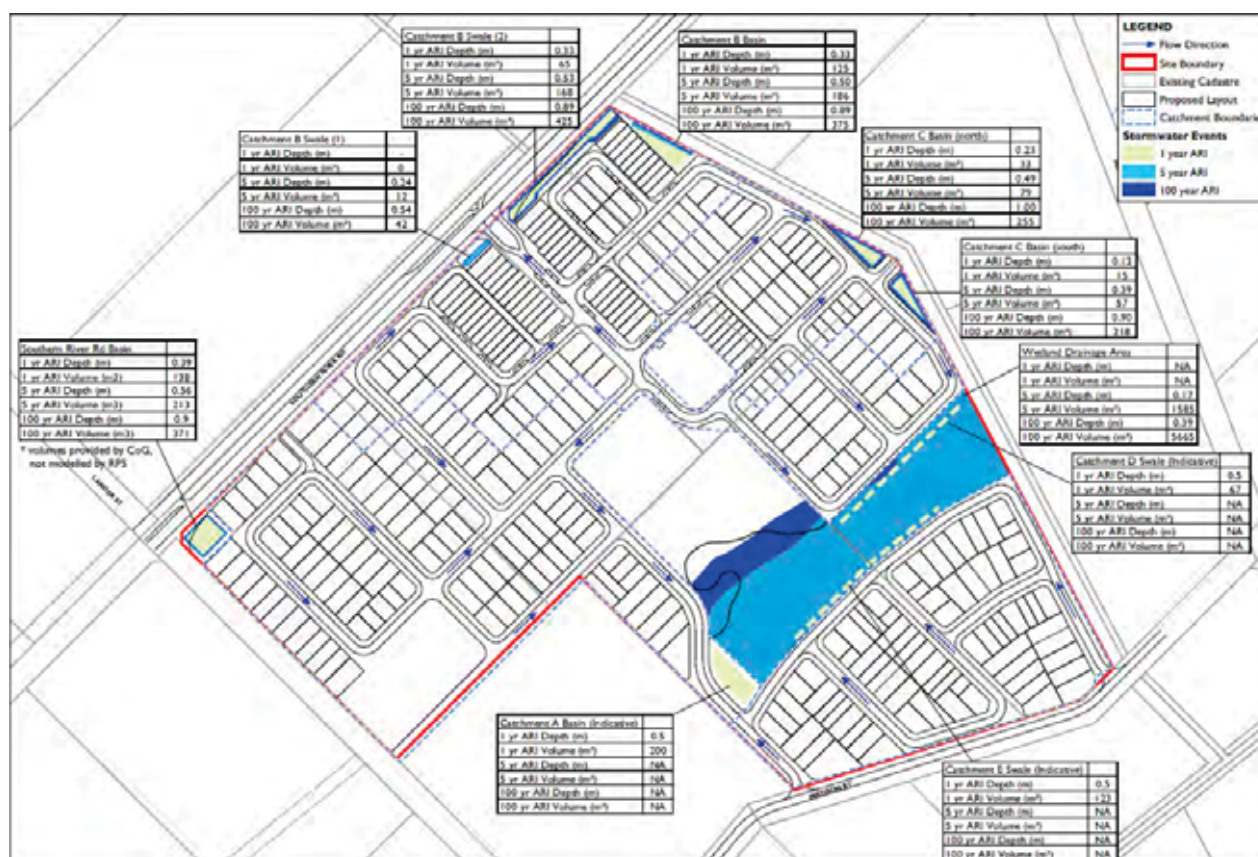


Figure 5: UWMP (RPS 2018) stormwater events plan

The UWMP generally complies with the drainage strategy outlined in the LWMS with the exception of discharge rates to the Balannup Drain. The UWMP adopted a lower 100 year ARI outflow of 0.13 m³/s as the peak allowable discharge rate from the whole UWMP area based on the *Forrestdale main drain arterial drainage strategy* (DoW 2009) and as specified by the City of Gosnells. Outflow from the wetland detention area in the POS corridor to Balannup Drain is via a 150 mm diameter pipe; the peak 100 year ARI outflow is 0.026 m³/s.

2.2 Stormwater management strategy

The stormwater management strategy for the site is generally consistent with the approved LWMS (Cardno 2015) and UWMP (RPS 2018), with some minor modifications to bring it up to date with more recent guidelines:

- As per the *Decision process for stormwater management in Western Australia* (DWER 2017), run-off from the first 15 mm of rainfall (instead of the 1 year ARI) is retained and treated in a biofiltration swale
- The stormwater modelling undertaken has adopted the Australian Rainfall and Run-off (ARR 2019) methodology and 2016 BoM IFD design storms

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

There is a POS located within Lot 18, where the run-off from the site will be directed to. The catchment area draining to the POS is shown in Figure 6.



Figure 6: Catchment and drainage plan

A breakdown of the different land use areas within the catchment is summarised in Table 1. The loss parameters adopted in the XPSWMM model for each land use is consistent with the model that was developed for the rest of Precinct 3E in the UWMP (RPS 2018).

Table 1: Catchment area breakdown

Land use	Area (ha)
Residential lot	3.10
Road reserve	1.20
Local centre	0.32
Public open space	0.52
Total	5.15

As per the LWMS (Cardno 2015), run-off generated from road reserves in the small 15 mm event (previously the 1 year 1 hour event) will be treated in a vegetated system (e.g. a biofiltration basin) located in the POS. The proposed location of the basin is shown in Figure 6. The basin will be integrated into the landscape design for the POS (Appendix B).

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

Flows greater than the small event will be discharged via a pipe to the wetland detention area located in the POS corridor to the north. A DN450 pipe has been modelled, however the outlet configuration for the basin will be refined during the detailed design. Table 2 presents the modelling results of the drainage basin for the first flush (15 mm), 20% AEP and 1% AEP events.

Table 2: Basin modelling results

Storm event	First flush	20% AEP	1% AEP
Max depth (m)	0.30	0.60	0.95
Inundation area (m ²)	355	515	705
Storage volume (m ³)	80	215	435
Discharge to wetland detention area (m ³ /s)	0	0.10	0.28

The existing wetland detention area in the POS corridor to the north will provide additional detention storage for the 20% and 1% AEP outflows from the site. This detention area discharges to the Balannup Drain via a DN150 mm pipe that was sized in the UWMP (RPS 2018). No change to the outlet is proposed to ensure that the discharge rate to Balannup Drain is maintained, however water levels in the detention area will increase due to the additional inflow. Table 3 presents a comparison of the modelling results in the UWMP (RPS 2018) and the results from the addition of Lot 18 as urban development to the revised LSP.

Table 3: Wetland detention area modelling results comparison

	UWMP (RPS 2018)	LWMS addendum (this report)
20% AEP		
Max depth (m)	0.17	0.23
Top water level (mAHD)	20.77	20.83
Inundation area (m ²)	15,555	17,980
Volume (m ³)	1,585	2,625
1% AEP		
Max depth (m)	0.39	0.55
Top water level (mAHD)	20.99	21.15
Inundation area (m ²)	20,240	21,650
Volume (m ³)	5,665	8,955
Discharge to Balannup Drain (m ³ /s)	0.03	0.03

There are no changes to the peak 1% AEP discharge to the Balannup Drain. The 1% AEP top water level in the wetland detention area increases to 21.15 mAHD, however the minimum lot level adjacent to the POS corridor is 22.40 mAHD (Appendix C), which provides greater than 500 mm clearance above the 1% AEP flood level.

3 GROUNDWATER MANAGEMENT

As per the LWMS (Cardno 2015), subsoil drainage is proposed to maintain sufficient separation between the shallow groundwater and the development. Subsoil drainage will be installed within road reserves generally at or above the pre-development AAMGL. Where subsoil drains are installed, there will be a minimum clearance of 1.5 m from the subsoil pipe invert to the finished lot level (RPS 2018). Subsoil drainage will be designed to be free-flowing and discharge to a biofiltration basin or detention area for water quality treatment.

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

Based on a spacing of 90 m between subsoil drainage lines, Cardno (2015) estimated a maximum mound crest height of 0.65 m would be experienced for uniform infiltration between the subsoil drain and the crest mound, and a maximum crest height of 1.24 m would be achieved for the worst-case infiltration scenario of having a soakwell placed directly over the mound. Road reserves in the subdivision concept (Figure 3) range between 75 m and 125 m in spacing.

4 CONCLUSION

Urban development within the site can be undertaken with the stormwater and groundwater management strategies in compliance with the approved LWMS (Cardno 2015). Stormwater in the 20% and 1% AEP events and/or subsoil flows will be discharged to the wetland detention area in the POS corridor to the north with minimal impact on the adjacent development. Detailed design of the earthworks, stormwater drainage and subsoil drainage systems will be undertaken by the engineers in parallel with preparation of the UWMP at the subdivision stage.

5 REFERENCES

Bioscience 2011, *Local Water Management Strategy (LWMS) for Lots 13, 14, 21 and 22 Southern River Road and Lots 18-20 Matison Street, Southern River*, December 2011.

Cardno 2015, *Southern River Precinct 3E LWMS Addendum*, prepared for Department of Housing, report ref. V14016, 13 October 2015.

Department of Water 2009, *Forrestdale main drain arterial drainage strategy*. Government of Western Australia. Perth, Western Australia.

Department of Water and Environmental Regulation 2017, *Decision process for stormwater management in Western Australia*, Government of Western Australia, Perth.

RPS 2018, *Urban Water Management Plan: Ambia Southern River*, prepared for LWP, report ref. EWP16060.002 Rev 2, 12 October 2018.

MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

Appendix A

Structure plan and subdivision concept

LEGEND

--- Structure Plan Extent

METROPOLITAN REGION SCHEME Reserves

Other Regional Roads (Existing to be retained)

Other Regional Roads (Existing to be removed from Metropolitan Region Scheme)

Other Regional Roads (Proposed - Subject to design confirmation)

LOCAL PLANNING SCHEME Reserves

Conservation POS

Urban Water Management - POS Swale Drainage

Traditional POS

POS - Swale Drainage

Zones

Local Centre
* Restricted Uses
(Refer to Part 1 Implementation)

Residential R25 - R40

Residential R40 - R60

Other

Road Reserve

Cycle Path

1000m Kennel Notification Area

500m Buffer to the outer boundary of all kennels zone properties

POS Identification Number

The residential densities provide a range between the lower and higher R-Code that can be considered for each residential site. The specific residential density is subject to the preparation and approval of a Residential Code Plan, The R-Code Plan, once approved, is to form part of the Structure Plan.

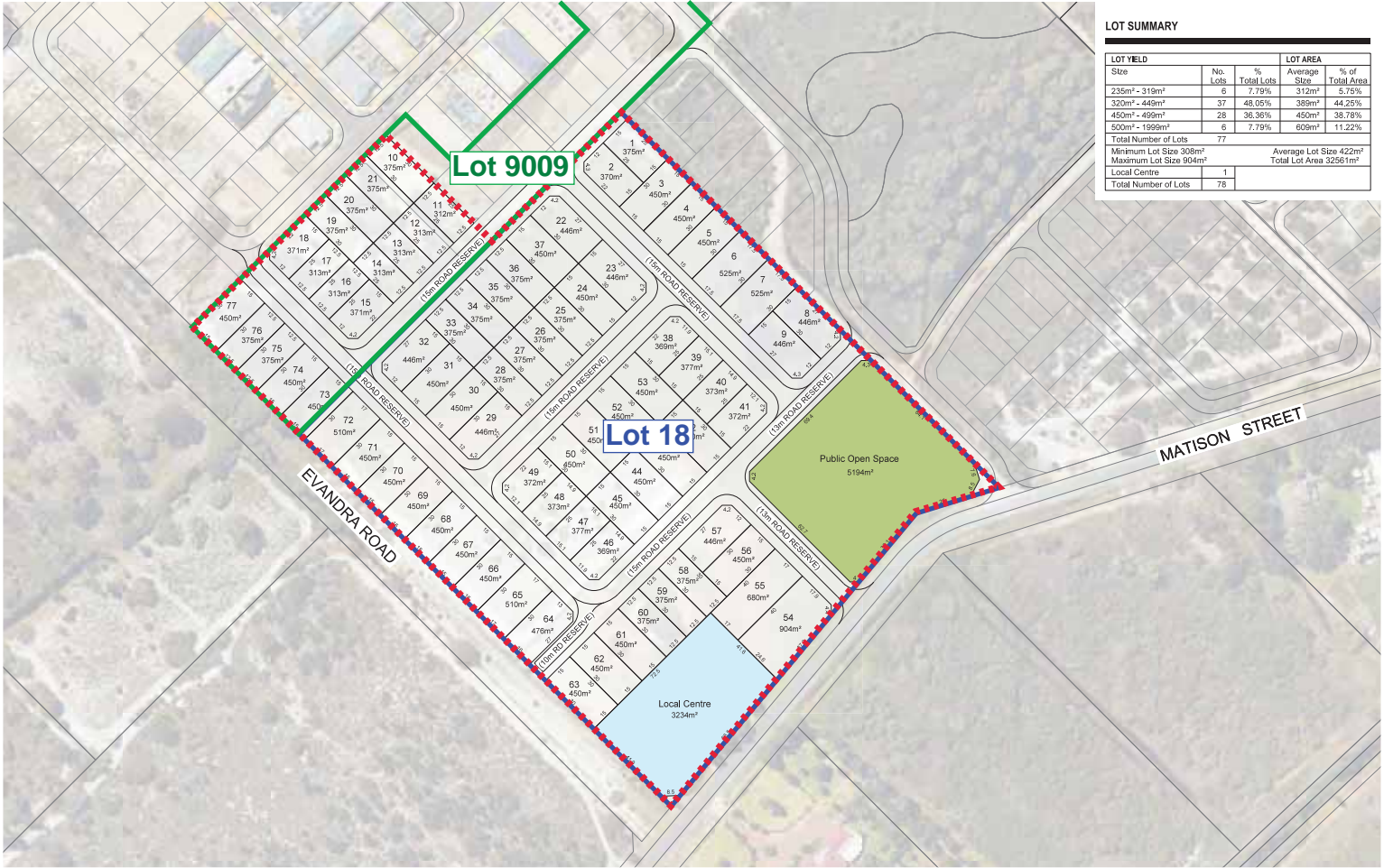


LOCAL STRUCTURE PLAN - SOUTHERN RIVER PRECINCT 3E Lots 13, 14, 18, 19, 20, 21 and 22 Southern River Road and Matison Street, Southern River

0m 25m 50m

S: 1:3,000@A3
d: 08/08/2022
p: 16/043/016M

Taylor Burdett Barnett Town Planning and Design
Level 1, 100 St Georges Terrace Perth WA 6000
p: (08) 9226 4276 f: (08) 9222 7879
e: admin@tbbplanning.com.au



LOT SUMMARY			
LOT YIELD		LOT AREA	
Size	No. Lots	Average Size	% of Total Area
235m² - 319m²	9	312m²	5.15%
320m² - 449m²	37	389m²	44.25%
450m² - 499m²	28	450m²	38.78%
500m² - 1999m²	6	609m²	11.22%
Total Number of Lots		77	
Minimum Lot Size 308m²		Average Lot Size 422m²	
Maximum Lot Size 904m²		Total Lot Area 32961m²	
Local Centre		1	
Total Number of Lots		78	

Subdivision Concept Plan - Option C
LOT 18 MATISON STREET, SOUTHERN RIVER

An LWP Southern River Pty Ltd Project

DRAFT

0 15 30m

plan: 16/04/063E

date: 30/05/2022

designed: SB

checked: SB

drawn: CR

scale: 1:1000 @ A3 1:750 @ A1

grid: PC004

airtel: Oct 2021

lot: 18

date: 30/05/2022

designed: SB

checked: SB

drawn: CR

lot: 18

date: 30/05/2022

designed: SB

checked: SB

drawn: CR

Taylor Burrell Barnett Town Planning & Design

Level 7, 160 St Georges Terrace, Perth WA 6000

4. starr@taylorburrellbarnett.com.au

pc (08) 9226 4276

Taylor Burrell Barnett

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MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

Appendix B Landscape concept plan



LEGEND

- 01 FEATURE FLOWERING NATIVE PLANT SPECIES - NON IRRIGATED
- 02 NATIVE PLANT SPECIES - NON IRRIGATED
- 03 ONLY MULCH AREA WITH NEW PROPOSED TRESS - NON IRRIGATED
- 04 PLANTED DRAINAGE SWALE VOLUME: 200M3 - NON IRRIGATED
- 05 PICNIC, SEATING OPPORTUNITY BENEATH SHELTER
- 06 2.0M WIDE CONCRETE FOOTPATH (TRAFFICABLE)
- 07 LOUNGING SEATING OVERLOOKING SWALE HABITAT
- 08 SEATING OPPORTUNITY
- 09 ALLOCATED PLAY AREA: OPPORTUNITY FOR HALF BASKETBALL COURT, HIT UP WALL WITH CLIMBING, UPRIGHT WALL WITH SWINGS & PARKOUR RAIL EQUIPMENT
- 10 ROADSIDE PARKING BAYS BY OTHERS

LOT 18 MATISON, SOUTHERN RIVER - PUBLIC OPEN SPACE
PREPARED FOR LWP SOUTHERN RIVER PTY LTD - AMBIA

LANDSCAPE CONCEPT FOR LSP
JULY 2022

JOB NO. 1703701
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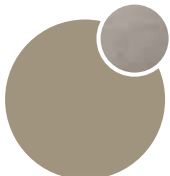


LANDSCAPE ARCHITECTS
414 ROKEBY RD SUBIACO WA 6008
T: (08) 9388 9566 E: mail@plano.com.au

CHARACTER + INSPIRATION



MATERIALS PALETTE



INSITU CONCRETE
COLOUR: CCS POMPEII ASH
FINISH: SMOOTH TROWEL



INSITU CONCRETE
COLOUR: NATURAL GREY
FINISH: BROOM FINISH



COMPACTED LIMESTONE PATH



ONLY MULCH AREAS



PLEXIPAWE WITH LINEMARKING



RUBBER SOFTFALL

LOT 18 MATISON, SOUTHERN RIVER - PUBLIC OPEN SPACE
PREPARED FOR LWP SOUTHERN RIVER PTY LTD - AMBIA

LANDSCAPE CONCEPT FOR LSP - INSPIRATION
JULY 2022

JOB NO. 1703701
NTS @ A3

C1.102

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MEMO

Date: 29 August 2022
Regarding: Ambia, Southern River LWMS addendum

Appendix C Preliminary earthworks design



Appendix D

Bushfire Management Plan Addendum



Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Ambia Estate Precinct 3E (Lot 18 Matison Street and part Lot 9009)

Suburb: Southern River

State: WA

P/code: 6110

Local government area: City of Gosnells

Description of the planning proposal: Structure Plan amendment

BMP Plan / Reference Number: 63288/146,399

Version: M01 Rev 0

Date of Issue: 11/07/2022

Client / Business Name: LWP Property Group

Reason for referral to DFES	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Strategic planning proposal (including rezoning applications)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Minor development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
High risk land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vulnerable land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?
The proposed Structure Plan amendment is a strategic planning proposal.

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	37803	31/08/2022
Company		Contact No.	
JBS&G Australia Pty Ltd T/A Strategen JBS&G		(08) 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner



Date 11/07/2022

Name: Nicholas Haslam

Date: 11 July 2022

Company: LWP Property Group

Job/Doc. No.: 63288/146,399

Email: NHaslam@lwpproperty.com.au

Inquiries: Zac Cockerill

Bushfire Management Plan Addendum: Ambia Estate Precinct 3E Structure Plan Amendment

1.1 Introduction

Taylor Burrell Barnett, on behalf of LWP Group Pty Ltd, is lodging a Structure Plan Amendment over the proposed Ambia Estate Precinct 3E development area (hereon referred to as the project area), which comprises Lot 18 Matison Street Southern River, plus an undeveloped portion of the existing Ambia Estate development area.

Since the previous Structure Plan Amendment in 2019, noise assessment has been undertaken to confirm residential development is viable and appropriate within the kennel buffer zone, west of Ambia Estate. This land was previously identified as 'subject to further planning' on the approved Structure Plan and is now proposed to be amended to provide for residential development, open space and local centre development as part of the proposed Structure Plan Amendment (refer to an indicative development concept provided in Figure 1).

Strategen (now Strategen-JBS&G) prepared a comprehensive Bushfire Management Plan (BMP) in September 2019 to support the previous Structure Plan Amendment for Ambia Estate. City of Gosnells has requested an addendum to this BMP be prepared to support the proposed Structure Plan amendment over the project area.

This BMP addendum provides an updated strategic level bushfire assessment specific to the project area (appropriate to the Structure Plan stage of development) and should be read in conjunction with the original Strategen (2019) BMP. This BMP addendum includes the following information:

1. A revised bushfire assessment including:
 - a. updated pre and post-development Vegetation Classification and Effective Slope maps specific to the project area and current vegetation conditions (Figure 2 and Figure 3)
 - b. updated pre and post-development Bushfire Hazard Level Assessments specific to the project area and current vegetation conditions mapped from Item 1a above (Figure 4 and Figure 5).
2. A revised assessment against the bushfire protection criteria of *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021) demonstrating that compliance can be achieved at subsequent planning stages (Table 4).

1.2 Purpose

The project area is designated bushfire prone on the Map of Bush Fire Prone Areas (refer to Plate 1; DFES 2021); therefore, bushfire risk considerations and assessment are required to inform the development proposal as per requirements under Policy Measure 6.2 of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP3.7; WAPC 2015).

This BMP addendum has been prepared to accompany Structure Plan Amendment for Ambia Estate Precinct 3E and address strategic planning requirements under Policy Measure 6.3 of SPP3.7 in accordance with the Guidelines.

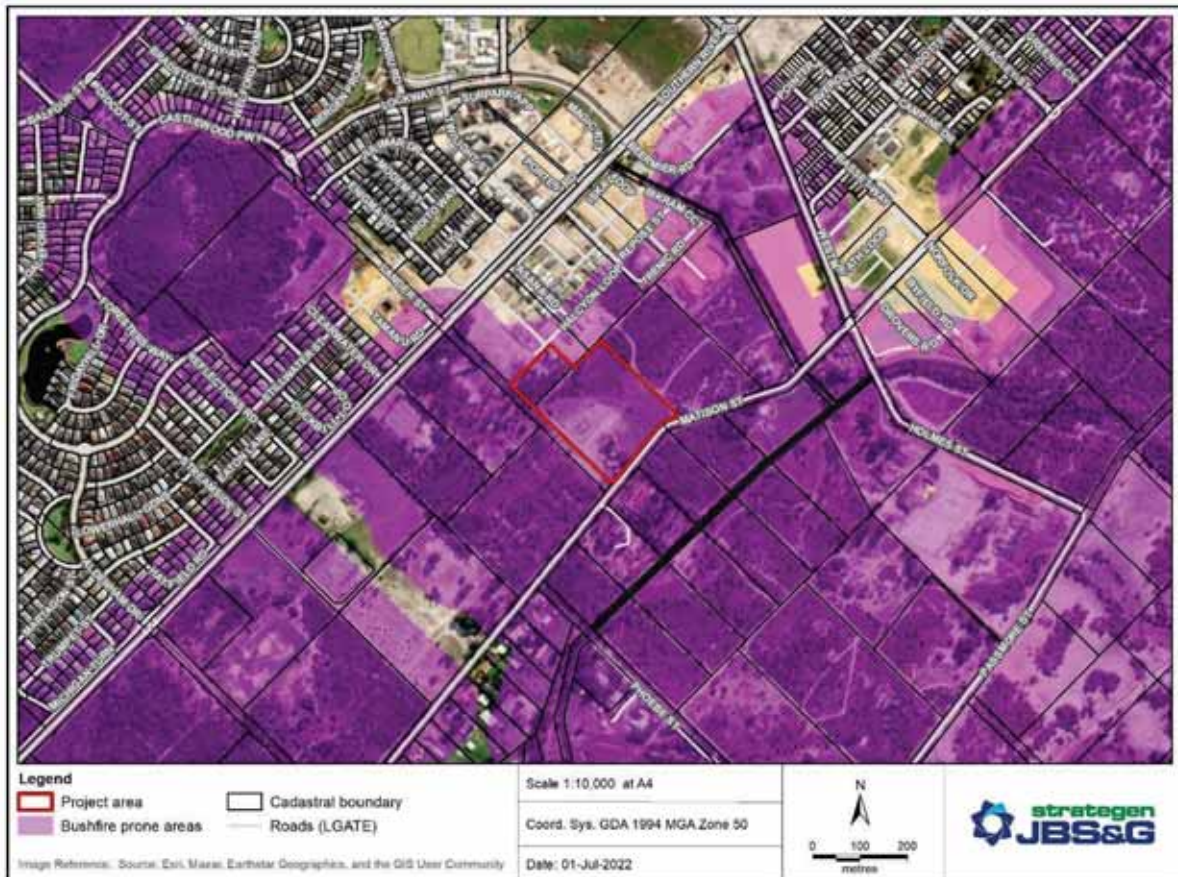


Plate 1: Designated bushfire prone status of the project area (DFES 2021)



LOT SUMMARY			
LOT YIELD		LOT AREA	
Size	No. Lots	Average Size	% of Total Area
235m² - 319m²	9	312m²	5.15%
320m² - 449m²	37	389m²	44.25%
450m² - 499m²	28	450m²	38.78%
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Subdivision Concept Plan - Option C
LOT 18 MATISON STREET, SOUTHERN RIVER

An LWP Southern River Pty Ltd Project

plan: 16/04/063E
scale: 1:1000 @ A3 1:750 @ A1
date: 30/05/2022
grid: PC034
aerial: Oct 2021

designed: SB
checked: SB
drawn: CR

Taylor Burrell Barnett Town Planning & Design
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1.3 Bushfire assessment results (assessment inputs)

1.3.1 Vegetation classification

Strategen-JBS&G assessed classified vegetation and exclusions within 150 m of the project area through on-ground verification on 29 June 2022.

Vegetation classifications have been assigned in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix A. Vegetation classification results are outlined in Table 1 and Figure 2 for existing pre-development conditions; and Table 2 and Figure 3 for anticipated post-development conditions.

Site observations indicate that the project area and adjacent 150 m comprises a broad variety of classified vegetation dispersed throughout the site and adjacent land, including:

- Class A Forest
- Class B Woodland
- Class D Scrub
- Class G Grassland.

Land excluded from classification under Clauses 2.2.3.2 (e) and (f) was also identified throughout existing non-vegetation areas and low threat managed vegetation.

1.3.2 Effective slope

Effective slope under classified vegetation was assessed through on ground verification on 29 June 2022 in accordance with AS 3959. Results were cross referenced with DPIRD 2m contour data. Effective slope under classified vegetation was assessed to be flat or upslope in all instances.

1.3.3 Pre-development inputs

A summary of the assessed pre-development classified vegetation, exclusions and effective slope within the project area and adjacent 150 m are listed in Table 1 and illustrated in Figure 2.

Table 1: Summary of pre-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Areas of remnant forest vegetation with a predominant eucalyptus canopy and three tiered fuel profile around existing rural-residential properties to the southeast.
2	Class B Woodland	Flat/upslope (0°)	Sparse eucalypts over grass on rural residential land to the northwest.
3	Class D Scrub	Flat/upslope (0°)	Shrubs 2–6 m high with a continuous horizontal fuel profile.
4	Class G Grassland	Flat/upslope (0°)	Unmanaged grass greater than 100 mm in height.
5	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated land (i.e. buildings, roads, footpaths sealed areas, etc) and low threat managed vegetation (i.e. urban street verges, managed turf, managed gardens, managed POS, etc).

1.3.4 Post-development inputs

A summary of the expected post-development classified vegetation, exclusions and effective slope within the assessment area and adjacent 150 m are listed in Table 2 and illustrated in Figure 3.

The post-development vegetation classifications for all land external to the project area are expected to remain the same as for the pre-development classifications, except for:

- removal of the current vegetation extent within the Ambia Estate Stages 7 and 8 development footprint, with construction of these stages imminent
- removal of the current vegetation extent throughout future Evandra Road to the west, which will be constructed as part of the proposal
- removal of the current grassland extent throughout Matison Road verges to the south, which will be upgraded as part of the proposal.

Table 2: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Areas of remnant forest vegetation with a predominant eucalyptus canopy and three tiered fuel profile around existing rural-residential properties to the southeast.
2	Class B Woodland	Flat/upslope (0°)	Sparse eucalypts over grass on rural residential land to the northwest.
3	Class D Scrub	Flat/upslope (0°)	Shrubs 2–6 m high with a continuous horizontal fuel profile.
4	Class G Grassland	Flat/upslope (0°)	Unmanaged grass greater than 100 mm in height.
5	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated land (i.e. buildings, roads, footpaths sealed areas, etc) and low threat managed vegetation (i.e. urban street verges, managed turf, managed gardens, managed POS, etc).
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Areas within the project area and surrounds to be modified to a low threat state as part of proposed development (proposed residential development, POS, roads and paths).



Legend

 Project area	 Class A Forest
 100m assessment area	 Class B Woodland
 150m assessment area	 Class D Scrub
 Cadastral boundary	 Class G Grassland
 POS	 Clause 2.2.3.2 (e) & (f)
 Existing 30m wide buffer	 Roads (LGATE)
 Indicative future subdivisions on adjacent stages	 Photo point directions
 Topographic contours (mAHD)	

Scale 1:3,600 at A4

0 25 50
metres

Coord. Sys. GDA 1994 MGA Zone 50

Z

Job No: 63288

Client: LWP Property Group

Version: A

Date: 06-Jul-2022

Drawn By: ianandagoda

Checked By: CT

**Ambia Precinct 3E,
Southern River, WA**

**PRE-DEVELOPMENT
VEGETATION CLASSIFICATION
AND EFFECTIVE SLOPE**

FIGURE 2





Legend

	Project area		Class A Forest
	100m assessment area		Class B Woodland
	150m assessment area		Class D Scrub
	Cadastral boundary		Class G Grassland
	POS		Clause 2.2.3.2 (e) & (f)
	Proposed lots		Area to be modified to non-vegetated and low threat state
	Existing 30m wide buffer		Roads (LGATE)
	Indicative future subdivisions on adjacent stages		
	Carriageways		
	Topographic contours (mAHD)		

Scale 1:3,600 at A4

0 25 50
metres

Coord. Sys. GDA 1994 MGA Zone 50

Z

Job No: 63288

Client: LWP Property Group

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Ambia Precinct 3E,
Southern River, WA

POST-DEVELOPMENT
VEGETATION CLASSIFICATION
AND EFFECTIVE SLOPE

FIGURE 3



1.4 Bushfire assessment results (assessment outputs)

1.4.1 Bushfire Hazard Level (BHL) assessment

Pre and post-development vegetation extents have been assigned a bushfire hazard level in accordance with the methodology detailed in Appendix Two of the Guidelines, as outlined in Table 3. Since proposed lot layout has not been confirmed, it is not appropriate to prepare a BAL contour map to inform the strategic planning stage. A BAL contour map will be prepared at the future subdivision stage once proposed lot layout has been confirmed.

Table 3: BHL assessment results

Bushfire hazard level	Characteristics*
Extreme	<ul style="list-style-type: none">• Class A Forest• Class B Woodland (05)• Class D Scrub• Any classified vegetation with a greater than 10° slope.
Moderate	<ul style="list-style-type: none">• Class B Low Woodland (07)• Class C Shrubland• Class E Mallee/Mulga• Class G Grassland, including sown pasture and crops• Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09)• Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	<ul style="list-style-type: none">• Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks• Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre• Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.
*Vegetation classifications from AS 3959-2018 Table 2.3.	

1.4.1.1 Pre-development BHL

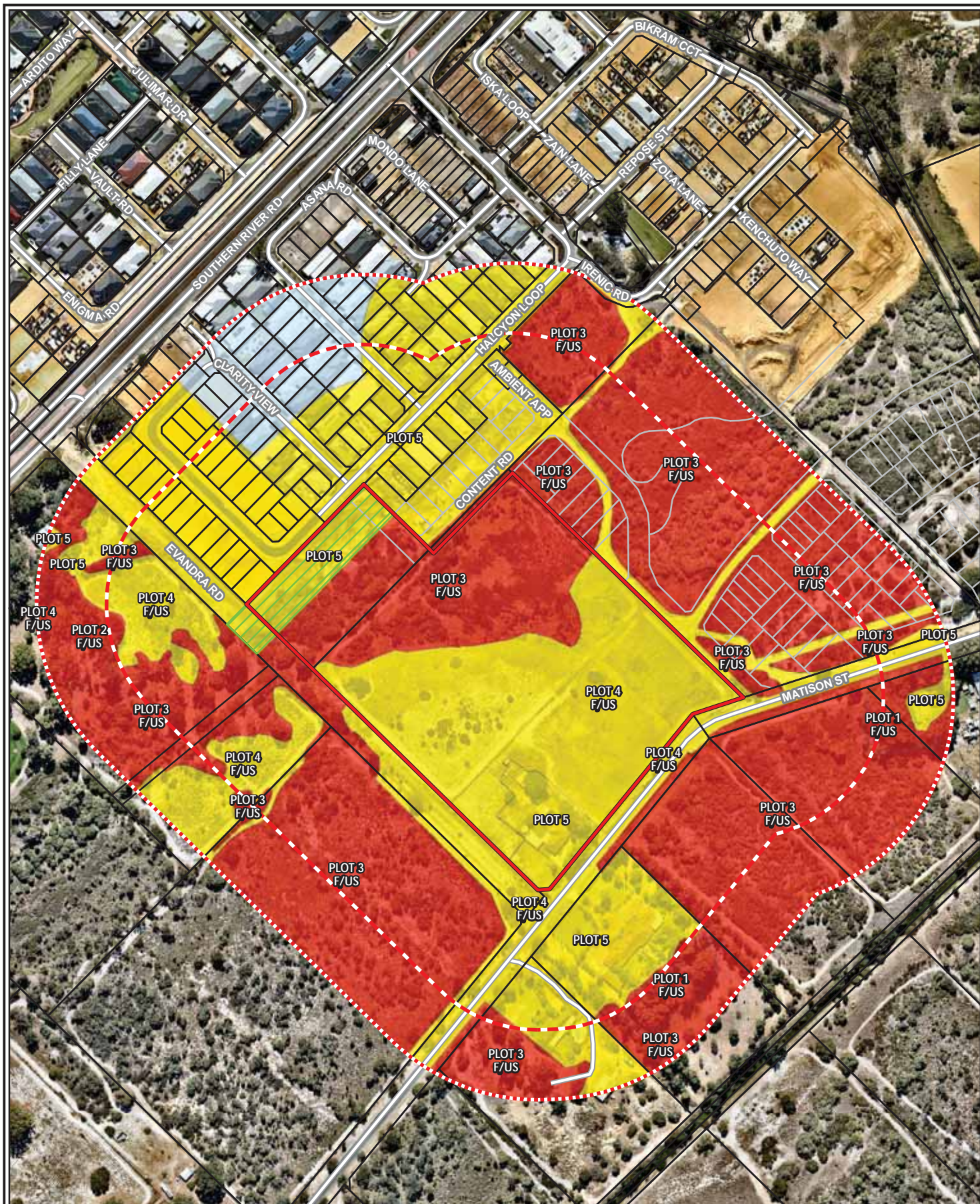
Strategen-JBS&G has mapped the pre-development BHLs within the project area and adjacent 150 m wide assessment area. The BHLs have been assessed on the basis of the vegetation discussed in Section 1.3.3 (i.e. the current pre-development extent of vegetation within and surrounding the project area).

The pre-development BHL assessment (refer to Figure 4) shows that based on the existing vegetation extent, the project area contains land with Moderate and Extreme BHLs.

1.4.1.2 Post-development BHLs

Strategen-JBS&G has mapped the expected post-development BHLs to demonstrate that the future bushfire hazard levels will be acceptable for future development to occur within the project area. The BHLs have been assigned on the basis of the vegetation discussed in Section 1.3.4 and the future expected vegetation extent within and surrounding the project area.

The post-development BHL assessment (refer to Figure 5) demonstrates that all future habitable development will be located on land with either a Low or Moderate BHL.



Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- 30m wide buffer
- Hazard level
- Extreme
- Moderate
- Low
- Indicative future subdivisions on adjacent stages
- Roads (LGATE)

Scale 1:3,600 at A4

0 25 50
metres

Coord. Sys. GDA 1994 MGA Zone 50

Z

Job No: 63288

Client: LWP Property Group

Version: A

Date: 08-Jul-2022

Drawn By: cthatcher

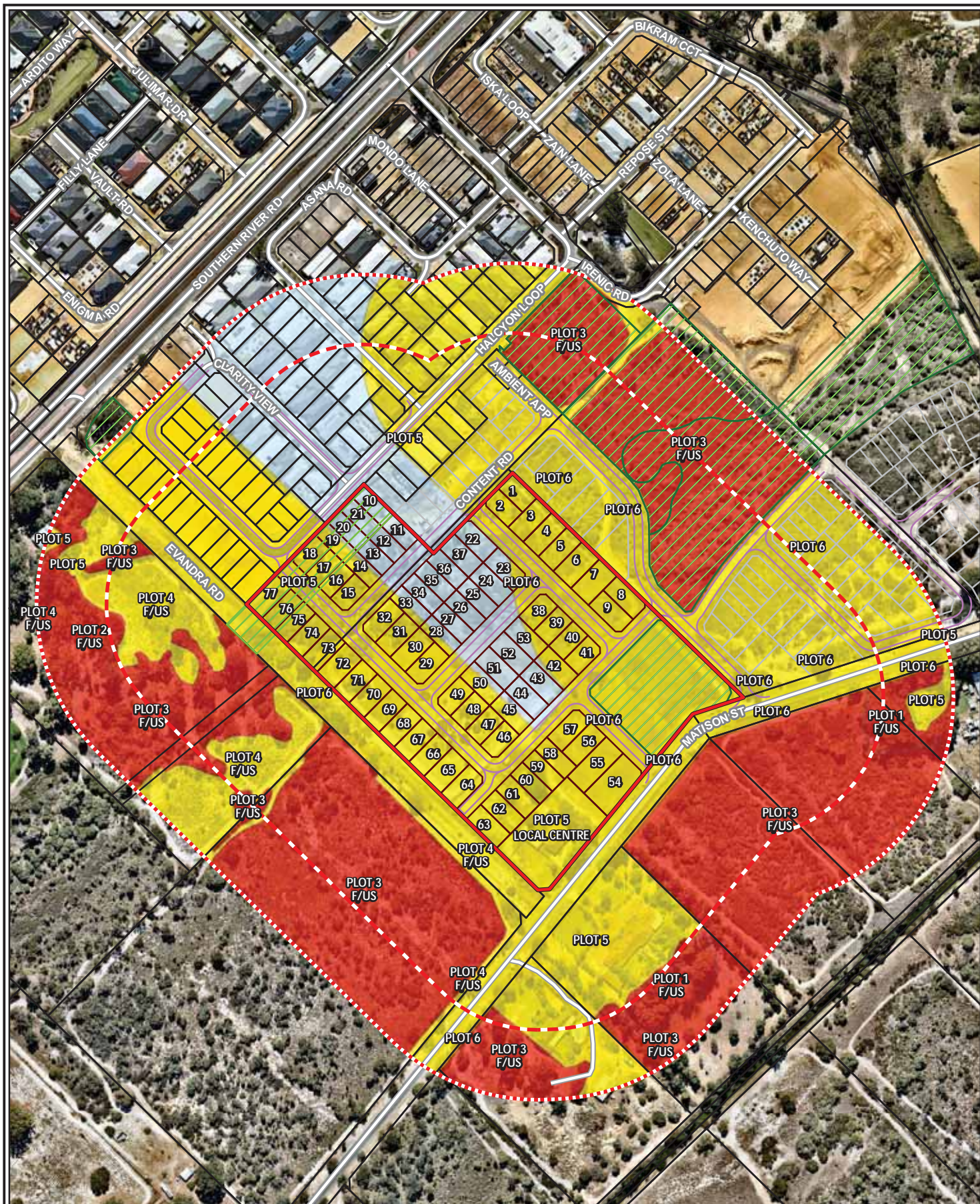
Checked By: OJ

**Ambia Precinct 3E,
Southern River, WA**

**PRE-DEVELOPMENT
BUSHFIRE HAZARD LEVELS**

FIGURE 4





Legend

	Project area		Hazard level
	100m assessment area		Extreme
	150m assessment area		Moderate
	Cadastral boundary		Low
	POS		Indicative future subdivisions on adjacent stages
	Proposed lots		Carriageways
	30m wide buffer		Roads (LGATE)

Scale 1:3,600 at A4



Coord. Sys. GDA 1994 MGA Zone 50

Z

Job No: 63288

Client: LWP Property Group

Version: A

Date: 08-Jul-2022

Drawn By: cthatcher

Checked By: OJ

**Ambia Precinct 3E,
Southern River, WA**

**POST DEVELOPMENT
BUSHFIRE HAZARD LEVELS**

FIGURE 5



1.5 Assessment against bushfire protection criteria

1.5.1 Compliance with Elements 1–4

Compliance with Elements 1–4 of the bushfire protection criteria of the Guidelines (Version 1.4) will be demonstrated by meeting the acceptable solutions, as detailed in Table 4.

Table 4: Compliance with the bushfire protection criteria of the Guidelines (Elements 1–4)

Bushfire protection criteria	Performance Principle	Method of compliance	Statement of development compliance	Compliance achieved
		Acceptable solutions		
Element 1: Location	Performance Principle P1 The strategic planning proposal, subdivision and development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low, or a BAL–29 or below, and the risk can be managed. For unavoidable development in areas where BAL–40 or BAL–FZ applies, demonstrating that the risk can be managed to the satisfaction of the decision-maker.	A1.1 Development location The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL–29 or below.	The post-development BHL assessment (see Table 2 and Figure 5) demonstrates that the project area will, on completion, be subject to either a moderate or low bushfire hazard level. A BAL contour map will be prepared to support the future subdivision stage once lot layout has been confirmed in order to demonstrate delivery of BAL-29 or lower for all proposed lots.	✓
Element 2: Siting and design	Performance Principle P2 The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. The proposal incorporates a defensible space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.	A2.1 Asset Protection Zone Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the requirements set out in Schedule 1.	No formal Asset Protection Zones will be required to deliver BAL-29 or lower for proposed lots given the sufficient extent of Clause 2.2.3.2 (e) and (f) exclusions proposed between future development areas and the surrounding classified vegetation. This separation will be provided in the form of non-vegetated and low threat managed areas such as road reserves and POS, which will deliver the following minimum separation distances necessary to achieve a BAL-29 rating for the relevant vegetation classifications: <ul style="list-style-type: none"> • 21 m for Class A Forest • 14 m for Class B Woodland • 13 m for Class D Scrub • 8 m for Class G Grassland. A BAL contour map will be prepared to support the future subdivision stage once lot layout has been confirmed. Any land to be modified to a low threat state as part of proposed development is to comply with Schedule 1 APZ standards of the Guidelines (refer to Appendix B).	✓
Element 3: Vehicular access	Performance Principle P3i The design and capacity of vehicular access and egress is to provide for the community to evacuate to a suitable destination before a bushfire arrives at the site, allowing emergency services personnel to attend the site and/or hazard vegetation.	A3.1 Public roads <i>The minimum requirements under this acceptable solution are applicable to all proposed and existing public roads.</i> Public roads are to meet the minimum technical requirements in Table 6, Column 1. The trafficable (carriageway/pavement) width is to be in accordance with the relevant class of road in the Local Government Guidelines for Subdivisional Development (IPWEA Subdivision Guidelines), Liveable Neighbourhoods, Austroad standards and/or any applicable standards for the local government area.	All proposed public roads will be constructed to the technical requirements of the Guidelines (see Appendix C) and in accordance with relevant federal, State and local government requirements.	✓
		A3.2a Multiple access routes Public road access is to be provided in two different directions to at least two different suitable destinations with an all-weather surface (two-way access). If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the road access is to be a maximum of 200 metres from the subject lot(s) boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints and the following requirements are met:		

Bushfire protection criteria	Performance Principle	Method of compliance	Statement of development compliance	Compliance achieved
		Acceptable solutions		
		<ul style="list-style-type: none"> the no-through road travels towards a suitable destination; and the balance of the no-through road, that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area – Figure 23. 		
		<p>A3.2b Emergency access way</p> <p>Where it is demonstrated that A3.2a cannot be achieved due to site constraints, or where an alternative design option does not exist, an emergency access way can be considered as an acceptable solution.</p> <p>An emergency access way is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 2; provides a through connection to a public road; be no more than 500 metres in length; and must be signposted and if gated, gates must open the whole trafficable width and remain unlocked. 	Based on indicative development design, no permanent EAWs will be required as part of the proposed development. Any temporary EAWs required as part of development staging will be constructed to the technical requirements of the Guidelines (see Appendix C).	✓
		<p>A3.3 Through-roads</p> <p>All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where:</p> <ul style="list-style-type: none"> it is demonstrated that no alternative road layout exists due to site constraints; and the no-through road is a maximum length of 200 metres to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a of this table. <p>A no-through road is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements of a public road (Table 6, Column 1); and turn-around area as shown in Figure 24. 	Based on indicative development design, all proposed public roads will be through roads. Any temporary no-through-roads required as part of development staging will be constructed to the technical requirements of the Guidelines (see Appendix C).	✓
	<p>Performance Principle P3ii</p> <p>The design of vehicular access and egress provides:</p> <ul style="list-style-type: none"> access and egress for emergency service vehicles while allowing the community to evacuate; a defensible space for emergency services personnel on the interface between classified vegetation and development site; and hazard separation between classified vegetation and the subject site to reduce the potential radiant heat that may impact a lot(s). 	<p>A3.4a Perimeter roads</p> <p>A perimeter road is a public road and should be provided for greenfield or infill development where 10 or more lots are being proposed (including as part of a staged subdivision) with the aim of:</p> <ul style="list-style-type: none"> separating areas of classified vegetation under AS3959, which adjoin the subject site, from the proposed lot(s); and removing the need for battle-axe lots that back onto areas of classified vegetation. <p>A perimeter road is to meet the requirements contained in Table 6, Column 1.</p> <p>A perimeter road may not be required where:</p> <ul style="list-style-type: none"> the adjoining classified vegetation is Class G Grassland; lots are zoned for rural living or equivalent; it is demonstrated that it cannot be provided due to site constraints; or all lots have frontage to an existing public road. 	Based on indicative development design, perimeter roads will be provided at all external development interfaces to provide separation between adjoining classified vegetation hazards and a defensible space for firefighting activities.	✓

Bushfire protection criteria	Performance Principle	Method of compliance	Statement of development compliance	Compliance achieved
		Acceptable solutions		
	Performance Principle P3iii Vehicular access is provided which allows: <ul style="list-style-type: none"> access and egress for emergency service vehicles; defendable space for emergency services personnel on the interface between classified vegetation and development; and hazard separation between classified vegetation and the site to reduce the potential radiant heat that may impact a lot(s). 	A3.4b Fire service access route <i>Where proposed lots adjoin classified vegetation under AS3959, and a perimeter road is not required in accordance with A3.4a, a fire service access route can be considered as an acceptable solution to provide firefighter access, where access is not available, to the classified vegetation.</i> A fire service access route is to meet all the following requirements: <ul style="list-style-type: none"> requirements in Table 6, Column 3; be through-routes with no dead-ends; linked to the internal road system at regular intervals, every 500 metres; must be signposted; no further than 500 metres from a public road; if gated, gates must open the required horizontal clearance and can be locked by the local government and/or emergency services, if keys are provided for each gate; and turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres. 	As discussed under A3.4a, the proposed development (based on indicative development design) is expected to provide perimeter roads at all external development interfaces. In this regard, fire service access routes (FSARs) are not considered to be required for the proposed development.	N/A
	Performance Principle P3iv Vehicular access is provided which allows emergency service vehicles to directly access all habitable buildings and water supplies and exit the lot without entrapment.	A3.5 Battle-axe access legs <i>Where it is demonstrated that a battle-axe cannot be avoided due to site constraints, it can be considered as an acceptable solution.</i> There are no battle-axe technical requirements where the point the battle-axe access leg joins the effective area of the lot, is less than 50 metres from a public road in a reticulated area. In circumstances where the above condition is not met, or the battle-axe is in a non-reticulated water area, the battle-axe is to meet all the following requirements: <ul style="list-style-type: none"> requirements in Table 6, Column 4; and passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres). 	Based on indicative development design, no battle-axe lots are proposed as part of the development and the project area is not serviced by an existing battle-axe.	N/A
		A3.6 Private driveways There are no private driveway technical requirements where the private driveway is: <ul style="list-style-type: none"> within a lot serviced by reticulated water; no greater than 70 metres in length between the most distant external part of the development site and the public road measured as a hose lay; and accessed by a public road where the road speed limit is not greater than 70 km/h. In circumstances where all of the above conditions are not met, or the private driveway is in a non-reticulated water area, the private driveway is to meet all the following requirements: <ul style="list-style-type: none"> requirements in Table 6, Column 4; 	The proposed development will be located within a reticulated area where roads speeds will be lower than 70 km/hr and proposed lots are of size where all future habitable development will be located within 70 m of a public road. In this regard, there will be no private driveway compliance requirements for the proposed development.	N/A

Bushfire protection criteria	Performance Principle	Method of compliance	Statement of development compliance	Compliance achieved
		Acceptable solutions		
		<ul style="list-style-type: none"> passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres); and turn-around area as shown in Figure 28 and within 30 metres of the habitable building. 		
Element 4: Water	No performance principle applies	A4.1 Identification of future water supply Evidence that a reticulated or sufficient non-reticulated water supply for bushfire fighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements of Schedule 2. Where the provision of a strategic water tank(s) is required a suitable area within a road reserve or a dedicated lot the location should be identified, should be identified on the structure plan, to the satisfaction of the local government.	A reticulated water supply will be provided for proposed development in accordance with the specifications of the relevant water supply authority through extension of existing services from surrounding development areas.	✓
	Performance Principle P4 Provide a permanent water supply that is: <ul style="list-style-type: none"> sufficient and available for firefighting purposes; constructed from non-combustible materials (e.g. steel), or able to maintain its integrity throughout a bushfire; and accessible, with legal access for maintenance and re-filling by tankers and emergency service vehicles. 	A4.2 Provision of water for firefighting purposes Where a reticulated water supply is existing or proposed, hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority. Where these specifications cannot be met, then the following applies: <ul style="list-style-type: none"> The provision of a water tank(s), in accordance with the requirements of Schedule 2; and Where the provision of a strategic water tank(s) is applicable, then the following requirements apply: <ul style="list-style-type: none"> land to be ceded free of cost to the local government for the placement of the tank(s); the lot or road reserve where the tank is to be located is identified on the plan of subdivision; tank capacity, construction, and fittings, provided in accordance with the requirements of Schedule 2; and a strategic water tank is to be located no more than 10 minutes from the subject site (at legal road speeds). Where a subdivision includes an existing habitable building(s) that is to be retained, a water supply should be provided to this existing habitable building(s), in accordance with the requirements listed above.	The proposed development will be connected to a reticulated water supply via extension of services from adjacent development in accordance with Water Corporations Design Standard 63 requirements. Existing water hydrants are located at 200 m intervals along the constructed public road network.	✓

1.6 Responsibilities for implementation and management of the bushfire measures

This BMP addendum has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs/addendums to accompany future subdivision and development applications where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs/addendums prepared for subsequent subdivision and development applications are to meet the relevant commitments outlined in this strategic level BMP addendum, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.4 and 6.5 respectively) and demonstrate in detail how the proposed development will comply with the relevant acceptable solutions of the Guidelines. Future BMPs/addendums are to include the following detailed information:

- confirmation of proposed lot layout
- information to inform proposed POS landscaping treatments that support the intended low threat vegetation outcomes
- confirmation of the post-development classified vegetation extent, effective slope and separation distances
- preparation of a BAL contour map demonstrating that proposed development areas achieve a rating of BAL-29 or lower
- confirmation of the width/alignment of compliant APZs (or other sufficient separation)
- confirmation of how BAL management will be addressed during development staging, including the management of temporary bushfire hazards on adjacent future stages (i.e. provision of low threat staging buffers or temporary quarantining of lots where required),
- confirmation of how vehicular access provisions will be addressed during development staging, including demonstration that a minimum of two access routes will be achieved for each stage of development (i.e. provision of temporary compliant access provisions such as no-through-roads and EAWs)
- confirmation of water supply provisions regarding reticulated water
- provisions for notification on Title for any future lots situated within a designated bushfire prone area containing a rating of BAL-12.5 or greater
- compliance requirements with the annual City of Gosnells firebreak notice
- acceptable solutions assessment against the bushfire protection criteria
- proposed audit and compliance program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

Based on the information contained in this BMP, Strategen-JBS&G considers the bushfire hazards within and adjacent to the project area and the associated bushfire risks are readily manageable through standard acceptable solutions management responses outlined in the Guidelines. Strategen-JBS&G considers that on implementation of the proposed management measures, the project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with SPP3.7 and the Guidelines.

1.7 References

- Department of Fire and Emergency Services (DFES) 2021, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: <https://maps.slip.wa.gov.au/landgate/bushfireprone/>, [5/07/2022].
- Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.
- Standards Australia (SA) 2018, Australian Standard *AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.
- Strategen 2019, *Bushfire Management Plan Lots 13, 14, 21 and 22 Southern River Road and Lots 19 and 20 Matison Street, Southern River*, report prepared for LWP Property Group, September 2019.
- Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.4 December 2021, Western Australian Planning Commission, Perth.

Appendix A Vegetation plot photos and description

Plot 1		
Vegetation classification	Pre-development	Class A Forest
	Post-development	Class A Forest
Description / justification		
Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey		

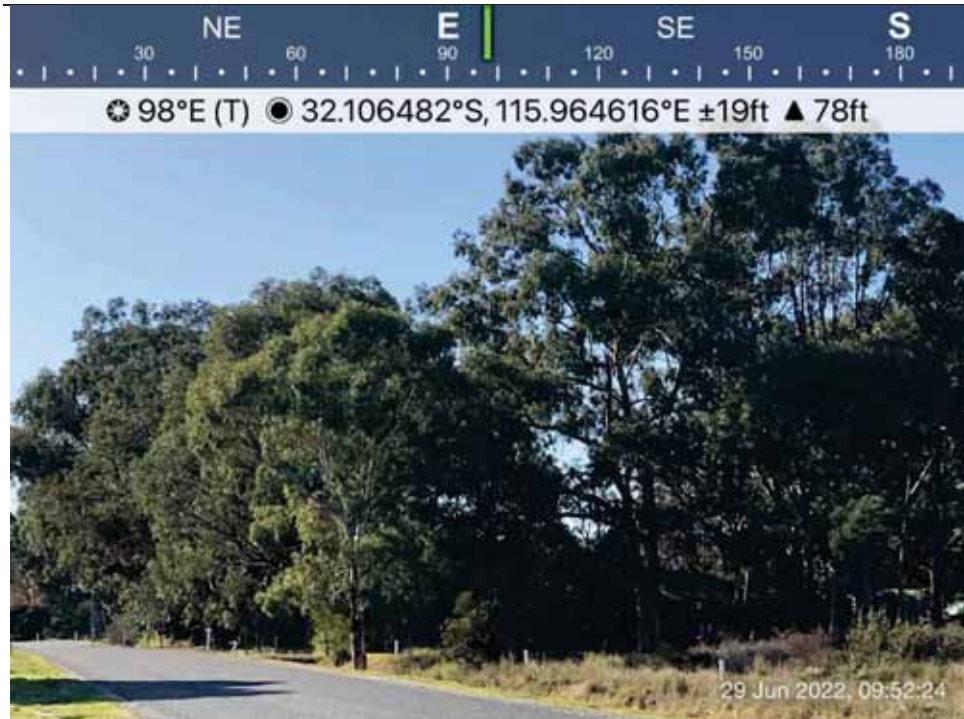


Photo ID: 1a

Plot 2		
Vegetation classification	Pre-development	Class B Woodland
	Post-development	Class B Woodland
Description / justification		

Trees 2-30 m at maturity, dominated by trees with a grassy understorey (lacks shrubby middle layer and deep surface litter)



Photo ID: 2a

Plot 3		
Vegetation classification	Pre-development	Class D Scrub
	Post-development	Class D Scrub and Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification		
Shrubs 2–6 m in height with a continuous horizontal fuel profile		
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<div> <div>Photo ID: 3a</div> <div>Photo ID: 3b</div> </div>		
<div> <div>  </div> <div>  </div> </div>		
<div> <div>Photo ID: 3c</div> <div>Photo ID: 3d</div> </div>		
<div> <div>  </div> <div>  </div> </div>		
<div> <div>Photo ID: 3e</div> <div>Photo ID: 3f</div> </div>		

Plot 3



Photo ID: 3g



Photo ID: 3h



Photo ID: 3i



Photo ID: 3j



Photo ID: 3k



Photo ID: 3l

Plot 3



Photo ID: 3m



Photo ID: 3n



Photo ID: 3o



Photo ID: 3p



Photo ID: 3q



Photo ID: 3r

Plot 3



Photo ID: 3s



Photo ID: 3t

Plot 4		
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Class G Grassland and Modified to non-vegetated and/or low threat (Clauses 2.2.3.2 [e] and/or [f])
Description / justification		
Grassland at maturity, greater than 100 mm in height		
		
Photo ID: 4a		Photo ID: 4b
		
Photo ID: 4c		Photo ID: 4d
		
Photo ID: 4e		Photo ID: 4f

Plot 4



Photo ID: 4g

Plot 5		
Vegetation classification	Pre-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification		

Low threat cultivated gardens and maintained lawns within surrounding properties and non-vegetated areas including roads, footpaths, driveways and building footprints



Photo ID: 5a



Photo ID: 5b



Photo ID: 5c



Photo ID: 5d



Photo ID: 5e



Photo ID: 5f

Plot 5

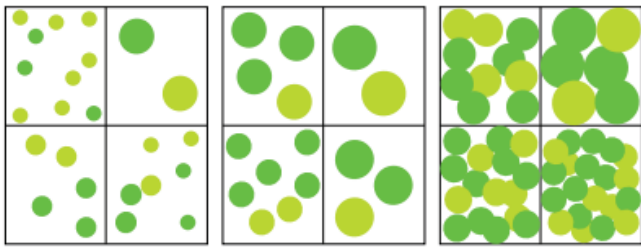


Photo ID: 5g



Photo ID: 5h

Appendix B APZ standards (Schedule 1 of the Guidelines)

Schedule 1: Standards for Asset Protection Zones	
Object	Requirement
Fences within the APZ	<ul style="list-style-type: none"> Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness)	<ul style="list-style-type: none"> Should be managed and removed on a regular basis to maintain a low threat state. Should be maintained at <2 tonnes per hectare (on average). Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch >6 millimetres in thickness.
Trees* (>6 metres in height)	<ul style="list-style-type: none"> Trunks at maturity should be a minimum distance of six metres from all elevations of the building. Branches at maturity should not touch or overhang a building or powerline. Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. Canopy cover within the APZ should be <15 per cent of the total APZ area. Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ. <p>Figure 19: Tree canopy cover – ranging from 15 to 70 per cent at maturity</p>  <p>15% 30% 70%</p>
Shrub* and scrub* (0.5 metres to six metres in height). Shrub and scrub >6 metres in height are to be treated as trees.	<ul style="list-style-type: none"> Should not be located under trees or within three metres of buildings. Should not be planted in clumps >5 square metres in area. Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground covers* (<0.5 metres in height. Ground covers >0.5 metres in height are to be treated as shrubs)	<ul style="list-style-type: none"> Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above. Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
Grass	<ul style="list-style-type: none"> Grass should be maintained at a height of 100 millimetres or less, at all times. Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.

Schedule 1: Standards for Asset Protection Zones	
Defendable space	Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
LP Gas Cylinders	<ul style="list-style-type: none"> • Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building. • The pressure relief valve should point away from the house. • No flammable material within six metres from the front of the valve. • Must sit on a firm, level and non-combustible base and be secured to a solid structure.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Appendix C Vehicular access technical standards of the Guidelines

Acceptable Solution A3.1 – Public Roads

Explanatory Note E3.1

These Guidelines do not prescribe values for the trafficable (carriageway/pavement) width of public roads as they should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area.

The IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards do not prescribe a horizontal clearance. However, it is recommended that a traversable verge is provided to allow for emergency services vehicles to stop and operate on the side of the public road, specifically where the public road may traverse large areas of classified vegetation.

Where local government roads are proposed to be widened by the proponent, they must obtain approval from the local government.

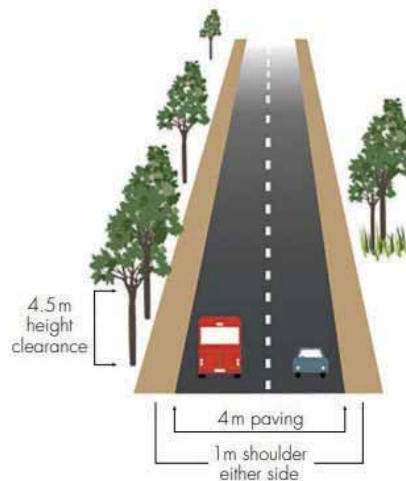


Figure 20: Example of a public road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2a – Multiple access routes

Explanatory Note E3.2a

Two-way public road access is public road access from a lot in at least two different directions to two suitable destinations, and provides residents and the community, as well as emergency services, with access and egress from

both the subdivision and individual habitable buildings/development in the event of a bushfire emergency. A single road provides no alternative route if the access becomes congested or is unable to be traversed due to smoke and/or fallen trees during a bushfire.

Two-way public road access applies to access/egress routes leading into a subdivision, as well as those within a subdivision. A road that loops back onto itself does not constitute the option of two different directions.

Two-way public road access should always be the first option. Where the site is not able to achieve two-way access within 200 metres of the lot boundary, due to demonstrated site or environmental constraints, the proponent should identify options for an emergency access way from the subject site to a suitable destination. Where an emergency

access way cannot be provided, the proponent should demonstrate compliance with the performance principle. Subject sites or proposed lots greater than 200 metres from an intersection, which provides two-way access, do not satisfy the requirement for two-way access unless they meet the provisions which allow for no-through roads greater than 200 metres in A3.2a.

To demonstrate compliance with the performance principle for two-way access, the bushfire planning practitioner may have regard to:

- the extent of the bushfire hazard, location and vegetation classification, the likelihood, potential severity and impact of bushfire to the subject site and the road network;
- time between fire detection and the onset of conditions in comparison to travel time for the community to evacuate to a suitable destination;
- available access route(s) travelling towards a suitable destination; and
- turn-around area for a fire appliance for no-through roads.

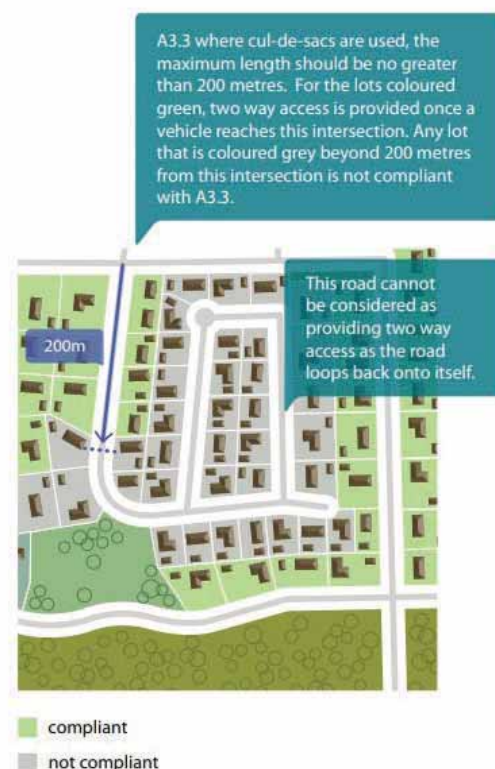


Figure 21: Example of compliant and non-compliant two-way

Source: *Guidelines for Planning in Bushfire Prone Areas* (WAPC 2021)

Acceptable Solution A3.4a – Perimeter roads

Explanatory Note E3.4a

Where a planning proposal includes the creation of 10 or more lots adjacent to each other, which adjoin classified vegetation under AS 3959 with the exception of Class G Grassland, as part of a greenfield development or large urban infill site, hazard separation and defendable space should be provided in the form of a perimeter road. Greenfield is 'undeveloped or minimally developed areas that have been identified for urban development'; and urban infill is 'the redevelopment of existing urban areas at a higher density than currently exists'. The creation of 10 or more lots includes cumulative subdivision applications where the subdivision application may be part of a staged subdivision.

A perimeter road should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area as per the requirements of a public road in Table 6, Column 1.

As the road is likely to function as a key neighbourhood distributor, or similar, consideration should be given to the provision of additional width to allow for emergency services vehicles to stop and operate on the side of the perimeter road, whilst simultaneously providing for the evacuation of the community (Figure 20).

When designing a strategic planning proposal and/or subdivision, creating a large setback between classified vegetation and proposed lots with a perimeter road, and orientating habitable buildings to front onto (rather than back onto) areas of vegetation has many benefits, including:

- passive surveillance;
- defendable space for firefighting and emergency management purposes;
- reducing the potential radiant heat that may impact a habitable building in a bushfire event;
- reducing the need for battle-axe lots; and
- unconstrained public access/egress for the community in the event of a bushfire.

In developments where no perimeter road exists, property defence in a bushfire event is difficult and can be impossible. Where proposed lots have frontage to an existing public road and abut the hazard at the rear or side, it may be an undesirable planning outcome to create lots which front the existing public road and back onto a perimeter road. In this instance, consideration should be given to a fire service access route. Refer to E3.4b.

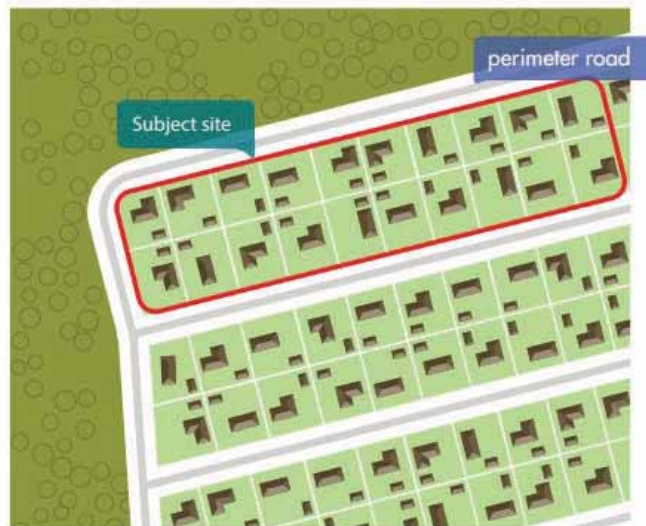


Figure 25: Example of a perimeter road

Source: *Guidelines for Planning in Bushfire Prone Areas* (WAPC 2021)

E3.2b Emergency access way

An emergency access way is not a preferred alternative to through public road access and should only be considered acceptable where it has been demonstrated that it will provide the safety and performance needs of emergency services and the community, including consideration for future needs, and that public road access to satisfy A3.2a cannot be achieved due to site constraints, such as an established road network with no opportunity to provide a public road for secondary access. Acceptance of an emergency access way should also consider the ability to accommodate reasonable worst-case vehicle volumes.

The principle function of the emergency access way is to provide a contingency (second) community evacuation route and simultaneously provide access for emergency services, in the event of a bushfire emergency. Where an emergency access way traverses classified vegetation, which has the potential to create a bushfire hazard, an emergency access way performs the secondary function of providing access by emergency services to this vegetation.

Emergency access ways should connect to a public road to allow alternative two-way through access. An emergency access way should not exceed 500 metres in length as they may not be as safe for road-use due to not being designed or constructed to the full requirements of a public road and may present uncertainties to emergency service personnel and the public as they are not part of the daily road network and not identified on Maps.

Permanent public emergency access way

An emergency access way can be provided as either a public easement in gross or a right-of-way. In both approaches, the management of the emergency access way is by the local government as the grantee of the easement or management body of the right-of-way. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or right-of-way; this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/or the local government and is also dependent on whether the land is to remain in private ownership or be ceded to the Crown. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take.

If the emergency access way is provided as an easement, it should be provided as a public easement in gross under sections 195 and 196 of the *Land Administration Act 1997* in favour of the local government and/or public authority, to ensure accessibility for emergency services and the public at all times. To be provided as a right-of-way the emergency access way should be vested in the Crown under section 152 of the *Planning and Development Act 2005* as a right-of-way and such land to be ceded free of cost and without any payment or compensation by the Crown. If gates are used to control traffic flow during non-emergency periods, these will be managed by the local government and must not be locked. Gates should be double gates wide enough to access the full pavement width and accommodate Type 3.4 fire appliances with the design and construction to be approved by the relevant local government.

Temporary public emergency access way

A temporary emergency access way may be proposed to facilitate the staging arrangements of a subdivision. The provision of two public roads may not be possible in the first stage of the subdivision and an emergency access way can be provided as an interim access route until the second public road is developed and gazetted in a subsequent stage of the subdivision (see figure 22). The emergency access way should be provided in the same manner as a permanent emergency access way, but it should be removed from the certificate of title once the public road is developed and gazetted. Where an emergency access way is proposed as an alternative to a public road, the Bushfire Management Plan should provide thorough justification for its use.

Restricted public emergency access way

There may be some instances where a restricted emergency access way is proposed as a performance principle-based solution where access is only available to the public in the event of a bushfire emergency. This option can only be considered where the local government or Main Roads WA have advised that vehicular access on the emergency access way is not allowed during non-emergency periods, as it provides an additional thoroughfare and entry point on a local or State road. In this scenario, the emergency access way can be provided as an easement under section 195 of the *Land Administration Act 1997*, as public access in the event of a bushfire emergency or vested in the Crown as a reserve under section 152 of the *Planning and Development Act 2005*. Such land is to be ceded free of cost without any payment or compensation by the Crown. The proponent must obtain written consent from the local government that

EXPLANATORY NOTES

the local government will accept care, control and management of the proposed reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval.

The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for emergency access only, or for emergency access and recreation. A reserve for emergency access and recreation can optimise the land-use as a dual purpose where it provides vehicular access in the event of a bushfire emergency, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage can ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government.

Right-of-carriageway emergency access way

There may be some instances where a right-of-carriageway easement is proposed as a performance principle-based solution. This may be where particular landowner(s) and emergency services, but not the public, require access over a neighbouring lot(s). A right-of-carriageway easement should be provided under section 195 of the *Land Administration Act 1997*. The easement is to provide alternative access for the particular landowner(s) in the event of a bushfire emergency and not for use by the public. In this scenario, support will be necessary from the adjoining lot owner(s). The easement is to be granted to the local government and it is to agree with the landowner on the arrangements of the management of the easement area by deed. These management arrangements will be at the discretion of the local government. If gated, the easement area can be locked to restrict day-to-day vehicular access.

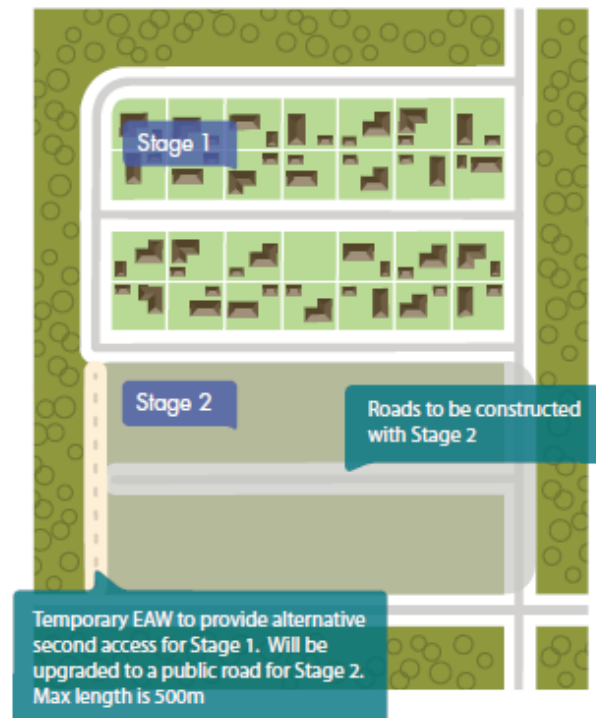


Figure 22: Example of an emergency access way

E3.3 Through-roads

In bushfire prone areas, a proposed structure plan or subdivision that incorporates no-through roads should be avoided because they do not provide a connected and legible design that allows for easy access and egress by the community, residents and emergency services in the event of a bushfire. No-through roads also reduce the options available for access and egress in the event of a bushfire emergency.

There will however be situations where a subject site is accessed via an existing or proposed no-through road and alternative access cannot be provided. In these situations, the proponent should demonstrate to the decision-maker, that all efforts have been made with the local government and/or adjoining landowners to secure alternative public road access or an emergency access way and that a redesign has been explored. The bushfire planning practitioner may need to develop a performance principle-based solution or address the non-compliance and demonstrate to the decision-maker why discretion should be exercised in accordance with section 2.6 of these Guidelines.

No-through roads will only be considered an acceptable solution where it is demonstrated by the proponent, to the satisfaction of the decision maker, that a no through-road cannot be avoided due to site constraints. For example, the internal road design of a structure plan or subdivision where site constraints, such as a water body or Bush Forever, prevent the ability to create a through-road and a no-through road may be a more appropriate road layout.

No-through roads should be a maximum of 200 metres from the lot(s) boundary to an intersection where two-way access is provided and may only exceed 200 metres if it meets the provisions which allow for no-through roads greater than 200 metres in A3.2a.

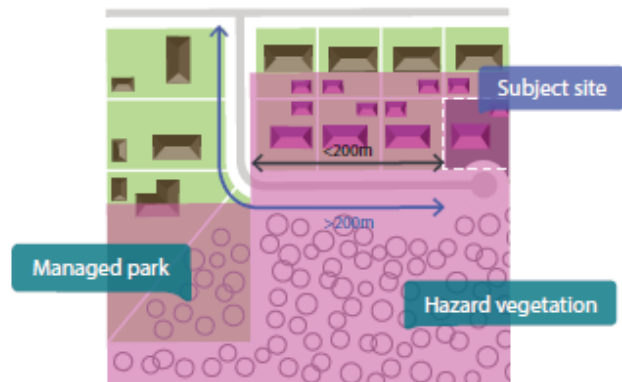


Figure 23: Example of a site on a no-through road greater than 200 metres from the intersection, but within 200 metres of BAL-LOW

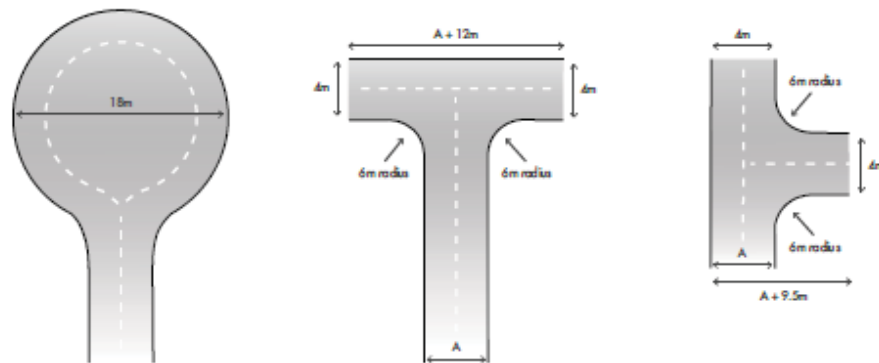


Figure 24: Turn-around area dimensions for a no-through road

Technical requirement	1	2	3	4
	Public road	Emergency access way ¹	Fire service access route ¹	Battle-axe and private driveways ²
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5	4.5	4.5	4.5
Minimum weight capacity (t)	15	15	15	15
Maximum grade unsealed road ³	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Maximum grade sealed road ³		1:7 (14.3%, 8°)	1:7 (14.3%, 8°)	1:7 (14.3%, 8°)
Maximum average grade sealed road		1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Minimum inner radius of road curves (m)		8.5	8.5	8.5
¹ To have crossfalls between 3 and 6%				
² Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision				
³ Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle.				



Appendix E

Landscape Masterplan





LEGEND

- 01 FEATURE FLOWERING NATIVE PLANT SPECIES - NON IRRIGATED
- 02 NATIVE PLANT SPECIES - NON IRRIGATED
- 03 ONLY MULCH AREA WITH NEW PROPOSED TREES - NON IRRIGATED
- 04 PLANTED DRAINAGE SWALE VOLUME: 200M3 - NON IRRIGATED
- 05 SHADE STRUCTURES WITH PICNIC SETTINGS PROMOTE PASSIVE SURVEILLANCE OF THE PARK AND PROVIDE MEETING NODES
- 06 2.0M WIDE CONCRETE FOOTPATH
- 07 LOUNGING SEATING OVERLOOKING SWALE HABITAT WITH GRAVEL
- 08 SEATING OPPORTUNITY
- 09 ROADSIDE PARKING BAYS BY OTHERS
- 10 OPEN TURF AREA WITH PROPOSED SHADE TREES, APPROXIMATELY 1600M2 (75M X 22M) - IRRIGATION SOURCE WILL NEED TO BE DETERMINED AT SUBDIVISION STAGE.

NOTE: IF GROUNDWATER SOURCE REMAINS UNAVAILABLE AND/OR UNFEASIBLE, A NON-IRRIGATED DESIGN OPTION WILL BE PROVIDED, TO DELIVER A FUNCTIONAL AND USEABLE POS

LOT 18 MATISON, SOUTHERN RIVER - PUBLIC OPEN SPACE

PREPARED FOR LWP SOUTHERN RIVER PTY LTD - AMBIA

LANDSCAPE CONCEPT FOR LSP
MAY 2025

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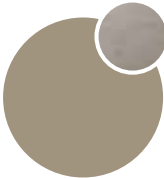


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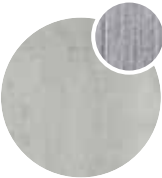
CHARACTER +



MATERIALS



INSITU CONCRETE
COLOUR: CCS POMPEII ASH
FINISH: SMOOTH TROWEL



INSITU CONCRETE
COLOUR: NATURAL GREY
FINISH: BROOM FINISH



COMPACTED LIMESTONE PATH



MULCH AREAS

LOT 18 MATISON, SOUTHERN RIVER - PUBLIC OPEN SPACE
PREPARED FOR LWP SOUTHERN RIVER PTY LTD - AMBIA

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Appendix F

Environmental Addendum



FLORA AND VEGETATION ASSESSMENT

Lot 18 Matison Street, Southern River



AU213002611.001
Rev 0
03 May 2022

REPORT

Document status

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Rev 0	Final for issue		GilGla	GilGla	02/05/2022

Approval for issue

G. Glasson

3 May 2022

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(compiled at rear of report)

- Figure A: Conservation significant vegetation and species in Lot 18 region
- Figure B: Vegetation types and survey points
- Figure C: Vegetation condition

Appendices

- Appendix A:** Threatened and Priority Flora database search results
- Appendix B:** EPBC Act Protected Matters Report

SUMMARY

RPS AAP Consulting Pty Ltd (RPS) was commissioned by LWP Property Group to undertake a flora and vegetation assessment of Lot 18 Matison Street in Southern River (the site). This assessment was undertaken to review the extent, structure, composition and condition of the existing vegetation within the site.

The key findings of the assessment are:

- Vegetation is mapped as being part of the Southern River complex, which is described as an open woodland of *Corymbia calophylla* (marri) - *Eucalyptus marginata* (jarrah) - Banksia species with fringing woodland of *Eucalyptus rudis* (flooded gum) - *Melaleuca raphiophylla* (swamp paperbark) along creek beds.
- A total of ten plant taxa were recorded within the site, eight of which were introduced (weed) species.
- No Threatened flora species listed under the state *Biodiversity Conservation Act 2016* (BC Act) or under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the site.
- No Priority flora species listed by the Department of Biodiversity Conservation and Attractions (DBCA) were recorded within the site.
- Of the eight weed species recorded, none are listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007* nor classified as a Weed of National Significance.
- Four vegetation types were described and mapped within the site:
 - **KgLI:** *Kunzea glabrescens*, **Leptospermum laevigatum* tall shrubland over **Cynodon dactylon*, **Stenotaphrum secundatum* grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses
 - **CdSsEc:** **Cynodon dactylon*, **Stenotaphrum secundatum* closed grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses
 - **CdEc:** **Cynodon dactylon*, **Ehrharta calycina* grassland
 - **AaSs:** *Astartea affinis* closed mid shrubland over **Stenotaphrum secundatum* grassland.
- The vegetation types were assessed to be in “Completely Degraded” condition using the Keighery (1994) scale and either contained or were wholly composed of introduced (weed) species.
- No vegetation types were considered representative of the Southern River complex nor conservation significant ecological communities (i.e. state or Commonwealth listed TECs or DBCA listed PECs).

Conclusions

Despite the known presence of conservation significant species and ecological communities proximate to the site, its land use history (i.e. previously cleared of native vegetation for agricultural land uses) has resulted in no remnant stands of native vegetation remaining within the lot and no significant flora and vegetation values.

1 INTRODUCTION

RPS AAP Consulting Pty Ltd (RPS) was commissioned by LWP Property Group (LWP) to undertake a flora and vegetation assessment of Lot 18 Matison Street in Southern River (the site) (Figure 1). The approximate 4.5 hectare (ha) site is located directly south of LWP's Ambia residential estate.



Figure 1 Lot 18 Matison Street, Southern River location

From a review of aerial imagery, the site appears to have been historically cleared of native vegetation to facilitate agricultural land uses. Regeneration of vegetation in the north of the lot appears to be ongoing since the early 2000s, however the southern portion of the site (which includes an existing residence) appears to have remained relatively free of regenerating vegetation.

The site is proposed to be included in an updated Local Structure Plan (LSP) for the Ambia residential development. Hence consideration for the existing flora and vegetation values of the site has been provided by this assessment to support its proposed inclusion in the updated LSP.

1.1 Scope of works

RPS' flora and vegetation assessment reviewed the extent, structure, composition and condition of the existing vegetation within site, and included:

- State and Commonwealth database searches
- Desktop review of previous flora and vegetation studies of relevance to the site
- Field assessment undertaken by RPS' botanist Martin Henson on 15 March 2022 to confirm the current flora and vegetation values.

2 METHODS

2.1 Desktop review

2.1.1 State and Commonwealth database searches

Database searches were conducted to determine a list of conservation significant flora species (i.e. those protected under the state *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or considered a Priority species by the Department of Biodiversity, Conservation and Attractions (DBCA)); and ecological communities of conservation significance that may occur within or proximate to the site. State and Commonwealth databases searched were:

- DBCA's Threatened and Priority Flora database (Appendix A)
- DBCA's Threatened and Priority Ecological Communities database (Figure A)
- DBCA's Western Australian Herbarium database (Appendix A)
- Department of Agriculture, Water and the Environment's (DAWE) Protected Matters Search Tool (Appendix B).

The searches used a central point at coordinates -32.1057 S, 115.9621 E with a ten kilometre (km) buffer.

2.1.2 Review of previous flora and vegetation studies

The following flora and vegetation surveys previously undertaken for / relating to the site were reviewed to provide a local context in which to assess the current flora and vegetation values:

- Geomorphic wetlands Swan Coastal Plain dataset request for modification Lots 13, 14, 21 and 22 Southern River Road and Lots 18, 19 and 20 Matison Street Southern River Precinct 3 City of Gosnells (Bioscience 2009)
 - Reviewed wetland values within the Ambia residential estate and within adjacent landholdings, including the site. The following broad vegetation communities were identified within the site:
 - Cleared and degraded, with only native present being isolated *Lepidospernum longitudinale* over pasture weeds including fescue, perennial ryegrass, bromegrass, *Avena sativa*, dock
 - Previously cleared, mono culture of *Kunzea glabrescens*
 - Vegetation condition within the site was reported as “Completely Degraded”
- Southern River Project – Vegetation Assessment (Ecologia 2016)
 - Mapped the vegetation units and vegetation condition within the Ambia residential estate.
- Targeted *Austrostipa jacobsoniana* Survey 2018 (RPS 2018)
 - Targeted flora search for the Threatened grass species *Austrostipa jacobsoniana* within a portion of the Ambia residential development deemed potential habitat. No *A. jacobsoniana* individuals were observed in any of the vegetation during the 2018 targeted search. *A. jacobsoniana* was determined not to be present within the Ambia residential development.

2.1.3 Vegetation mapping

Vegetation description and mapping was conducted using a combination of aerial photo-interpretation, regional vegetation mapping, on-ground confirmation and vegetation structure data. Each vegetation type was defined by the dominant plant species using the vegetation structure classes established under Bush Forever (Western Australian Planning Commission 2000).

Vegetation condition mapping was conducted using aerial photo-interpretation and on-site confirmation. Vegetation condition was assessed using the Vegetation Condition Scale adapted from Keighery (1994) as recommended in the Environmental Protection Authority's (EPA) Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a).

2.2 Field assessment

The field assessment was undertaken by RPS' botanist Martin Henson on 15 March 2022 to confirm the site's flora and vegetation values. The field assessment involved traversing the site on foot to:

- Verify the data from the desktop review.
- Characterise the vegetation within the site, including vegetation type and vegetation condition.
- Determine the likely presence of any conservation significant flora species or vegetation communities.
- Collect digital photos of each vegetation type, with coordinates recorded on a hand held GPS unit.
- Record existing vegetation information including its extent, structure, composition and condition; and any other observation considered relevant.

2.3 Limitations

The EPA's Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a) lists a series of issues that may impose limitations on the quality of flora and vegetation surveys. Table 1 addresses the key constraints relevant to the site.

Table 1: Potential survey limitations

Constraint	Relevance
Availability of contextual information at a regional and local scale	<ul style="list-style-type: none"> • Previous flora and vegetation survey/searches (Ecologia 2016, RPS 2018) have been undertaken for the directly adjacent Ambia residential estate • A wetland assessment undertaken by Bioscience (2009) included the site
Proportion of flora recorded and/or collected, any identification issues	The flora and vegetation assessment was aimed at confirming extent, structure, composition and condition of the existing vegetation within the site and determining the likely presence of any conservation significant flora species or vegetation communities. Due to the historical clearing of the site there was no remnant native vegetation remaining within the lot
Survey timing, rainfall, season of survey	The assessment was completed in March 2022 following a hot summer but due to the historical clearing this was not considered an issue
Disturbance that may have affected the results of survey such as fire, flood or clearing	The site has been previously cleared. Native vegetation on site is regrowth and it is heavily infested with grassy weeds
Was the appropriate area fully surveyed (effort and extent)	The site is approximately 4.5 ha in area, previously cleared and highly degraded. All features and vegetation extents were visited and assessed
Access restrictions within the survey area	The site was accessed by foot following landowner agreement
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	Martin Henson has over 20 years botanical survey experience in Western Australia

3 RESULTS

3.1 Desktop review

3.1.1 Interim Biogeographical Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) divides Australia into bioregions based on major biological and geographical/geological attributes (Thackway and Cresswell 1995). The IBRA currently recognises 89 bioregions and 419 biological subregions in Australia. The site is situated within the Swan Coastal Plain IBRA region and the Perth subregion (Environment Australia 2000).

The Perth subregion is broadly described as composed of colluvial and aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands on limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials (Mitchell et al. 2002).

3.1.2 Vegetation complex

Vegetation complexes are vegetation associations that are characteristic of various combinations of soil, landform and rainfall. A large part of the SCP has been mapped for vegetation complexes by Heddle et al. (1980). These complexes are closely related to the SCP Dune Systems (Quindalup, Spearwood, Bassendean, and Pinjarra Plain) and north to south variations in climate and rainfall.

Heddle et al. (1980) mapped the vegetation within the site as Southern River complex, which is described as an open woodland of *Corymbia calophylla* (marri) - *Eucalyptus marginata* (jarrah) - Banksia species with fringing woodland of *Eucalyptus rudis* (flooded gum) - *Melaleuca raphiophylla* (swamp paperbark) along creek beds.

The remnant extent and reservation status of the Southern River complex within the Swan Coastal Plain IBRA region is presented in Table 2.

Table 2: Pre-European extent and 2015 extent on the Swan Coastal Plain IBRA region of the Southern River Vegetation complex

Vegetation complex	Pre-European extent (ha)	2015 extent (ha)	Extent remaining (%)
Southern River	57,163	10,533	18.4

(Source: EPA 2016b)

3.1.3 Threatened and Priority flora

3.1.3.1 State database searches

DBCA's Threatened and Priority Flora and Western Australian Herbarium databases recorded a total of 89 conservation significant species (Appendix A). One Threatened and two Priority flora species have been recorded proximate to the site:

- *Austrostipa jacobsoniana* (Threatened under the BC Act and Critically Endangered under the EPBC Act), a perennial rhizomatous grass growing to a height of 80 cm to 120 cm including the inflorescences
- *Aponogeton hexatepalus* (Priority 4), a rhizomatous or cormous perennial aquatic herb found in freshwater ponds, rivers and claypans
- *Verticordia lindleyi* subsp. *lindleyi* (Priority 4) an erect shrub to 0.75 m tall, flowers pink. Found in winter-wet depressions on sand and sandy loam.

Figure A shows the location of the Threatened and Priority flora records relative to the site.

3.1.3.2 Commonwealth database search

DAWE's Protected Matters Search Tool identified that 24 Threatened flora species have the potential to be present within the site (Appendix B). Of these species, only *Austrostipa jacobiana* and *Caladenia huegelli* (Threatened under the BC Act and Endangered under the EPBC Act) has been recorded within 2 km of the site (Figure A).

3.1.4 Threatened and Priority ecological communities

3.1.4.1 State database searches

DBCA's Threatened and Priority Ecological Communities database identified that the site either contains or is in the buffer zones of two EPBC Act listed Threatened Ecological Communities (TEC) and one DBCA listed Priority Ecological Community (PEC):

- Banksia dominated woodlands of the Swan Coastal Plain IBRA region – Priority 3

The DBCA's Priority Ecological Communities list (DBCA 2021) describes it as:

Canopy is most commonly dominated or co-dominated by *Banksia attenuata* and/or *B. menziesii*. Other Banksia species that can dominate in the community are *B. prionotes* or *B. ilicifolia*. It typically occurs on well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean and Spearwood sands and occasionally on Quindalup sands; it is also common on sandy colluvium and aeolian sands of the Ridge Hill Shelf, Whicher Scarp and Dandaragan Plateau and, in other less common scenarios.

The description, area and condition thresholds that apply to the EPBC-listed TEC of the same name, also apply to this Priority ecological community.

It is noted that the concluding sentence aligns this Community with the EPBC-listed Banksia woodlands of the Swan Coastal Plain ecological community. This Community is therefore both a PEC and TEC. As a TEC it is listed as Endangered under the EPBC Act.

- Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain – Endangered

The description of this TEC shows a varied species grouping dependent on location on the Swan Coastal Plain. The Approved Conservation Advice (Department of the Environment and Energy 2017) describes it as:

The Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain ecological community occurs on the heavy soils of the eastern side of the Swan Coastal Plain. Known patches include wetland and well-drained habitats, in a variety of landforms (Tauss & Weston 2010). It is defined on the basis of rare limestone-influenced substrates. Where the best developed limestone occurs, near Gingin, the plant community is located on shallow black clay or sandy clay soils on limestone. Typical and common native species in areas of best developed limestone are the tree *Casuarina obesa*, the mallees *Eucalyptus decipiens* and *Eucalyptus foecunda* and the shrubs *Melaleuca huegelii*, *Alyogyne huegelii* var. *huegelii*, *Grevillea curviloba* ssp. *incurva*, *Grevillea curviloba* ssp. *curviloba*, *Grevillea evanescens*, *Melaleuca acerosa*, and the herb *Thysanotus arenarius*. Where the limestone substrate is less well developed and limestone may occur as nodules or chunks, the flora assemblages can be influenced by other characteristics of the substrate, such as clay content, with the presence of calcicoles such as *Alyogyne* sp. *Rockingham*, *Alyogyne hakeifolia*, *Carex thecata*, *Hibbertia spicata* subsp. *spicata*, *Lechenaultia linearoides*, *Thysanotus arenarius*, *Gahnia trifida*, *Eremophila glabra* and *Melaleuca brevifolia* providing evidence of the limestone influence.

Figure A shows the location of the TEC and PEC buffers relative to the site.

3.1.4.2 Commonwealth database search

DAWE's Protected Matters Search Tool identified that three TECs have the potential to occur within the site:

- Clay Pans of the Swan Coastal Plain – Critically Endangered

The EPBC listed TEC comprises four Western Australia listed TECs and a P1 PEC (Swan Coastal Plain community types in brackets)

- Herb rich saline shrublands in clay pans (SCP07)
- Herb rich shrublands in clay pans (SCP08)
- Dense shrublands on clay flats (SCP09)
- Shrublands on dry clay flats (SCP10a)
- Clay pans with shrubs over herbs P1 PEC

The TEC is described as:

The clay pan communities occur where clay substrate is low in the landscape and forms an impermeable layer close to the surface. These wetlands that rely on rainfall and local surface drainage to fill are considered unlikely to be connected to groundwater. The clay pans then dry out to form a relatively impervious substrate in summer. A suite of perennial plants that propagate by underground bulbs, tubers or corms (geophytes), and annual herbs flower sequentially as the clay pans dry out. The clay pans are the most diverse of the Swan Coastal Plain wetlands and contain a number of local endemic flora.

(Department of Parks and Wildlife 2015)

- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community – Critically Endangered

The TEC is described as

The ecological community occurs as woodlands or forests or other structural forms where the primary defining feature is the presence of *Eucalyptus gomphocephala* (Tuart) trees in the uppermost canopy layer. The ecological community includes the assemblage of plants, animals and other organisms that occur in association with Tuart. The ecological community has a discontinuous distribution in the west of the Swan Coastal Plain, of southwest Western Australia

(Department of Energy and the Environment 2018)

- Banksia woodlands of the Swan Coastal Plain ecological community – Endangered.

Of these TECs, only the Banksia woodlands of the Swan Coastal Plain ecological community has been recorded by the DBCA as being within 2 km of the site (Figure A).

3.2 Field assessment

As a result of the site's land use history (i.e. previously cleared of native vegetation for agricultural land uses) there are no remnant stands (i.e. previously uncleared areas) of native vegetation within the lot. This finding was also confirmed by the Bioscience (2009) assessment.

3.2.1 Flora

Ten vascular plant taxa were recorded within the sites, eight of which were introduced (weed) species (Table 3). None of the weed species are listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007* nor classified as Weeds of National Significance.

Table 3: Lot 18 species

Family	Status	Genus	Species
Myrtaceae		<i>Astartea</i>	<i>affinis</i>
		<i>Kunzea</i>	<i>glabrescens</i>
	*	<i>Eucalyptus</i>	sp.
	*	<i>Leptospermum</i>	<i>laevigatum</i>
Orobanchaceae	*	<i>Orobanche</i>	<i>minor</i>
Poaceae	*	<i>Stenotaphrum</i>	<i>secundatum</i>
	*	<i>Cynodon</i>	<i>dactylon</i>
	*	<i>Ehrharta</i>	<i>calycina</i>
	*	<i>Eragrostis</i>	<i>curvula</i>
	*	<i>Lolium</i>	<i>rigidum</i>

No flora species of conservation significance were recorded by the field assessment.

3.2.2 Vegetation types

Four vegetation types were described and mapped for the site (Figure B). Descriptions and photographs of the vegetation types are as follows.

1. **KgLI:** *Kunzea glabrescens*, **Leptospermum laevigatum* tall shrubland over **Cynodon dactylon*, **Stenotaphrum secundatum* grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses (Plate 1 and Plate 2)



Plate 1 Vegetation type KgLI



Plate 2 Vegetation type KgLI

2. **CdSsEc:** **Cynodon dactylon*, **Stenotaphrum secundatum* closed grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses (Plate 3 and Plate 4).



Plate 3 Vegetation type CdSsEc



Plate 4 Vegetation type CdSsEc

3. **CdEc:** **Cynodon dactylon*, **Ehrharta calycina* grassland (Plate 5).



Plate 5 Vegetation type CdEc (KgLI in background)

4. **AaSs:** *Astartea affinis* closed mid shrubland over **Stenotaphrum secundatum* grassland (Plate 6).



Plate 6 **Vegetation type AaSs**

These vegetation types are not considered representative of the regional Southern River complex nor conservation significant ecological communities (i.e. state or Commonwealth listed TECs or DBCA listed PECs).

3.3 Vegetation condition

Using the Keighery (1994) scale (Table 4), vegetation condition across the entire site was assessed to be “Completely Degraded” because of the presence of aggressive weeds and the lack of any native vegetation structure (i.e. different strata and a variety of species). Vegetation condition mapping is provided in Figure C.

Table 4: Vegetation condition scale

Definition	
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European Settlement
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation caused by repeated fires, the presence of more aggressive weeds, dieback, logging and grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing
Completely Degraded	Vegetation structure no longer intact and the area completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees and shrubs

4 DISCUSSION

As a result of the site's land use history (i.e. previously cleared of native vegetation for agricultural land uses) there are no remnant stands (i.e. previously uncleared areas) of native vegetation within the lot. This finding was also confirmed by the Bioscience (2009) assessment.

4.1 Flora

Only two endemic species were recorded within the site, *Astartea affinis* and *Kunzea glabrescens*. These species were restricted to the AaSs and KgLI vegetation types primarily in the north of the lot, with the remainder of the site comprised of introduced (weed) species. Portions of the site which appeared to be closer to the groundwater table / visibly damper were dominated by a dense grassland of **Stenotaphrum secundatum* and **Cynodon dactylon* with few other weeds recorded. The distribution of these species appeared to be linked to water availability, with **Ehrharta calycina* and **Eragrostis curvula* more abundant on the marginally higher / visibly drier portions of the site.

No flora species of conservation significance were recorded by the field assessment. Nor was there any potential habitat identified within the site to support flora species of conservation significance (i.e. remnant stands of native vegetation, freshwater ponds, rivers and claypans). Given the site has been previously cleared and used for agriculture, the composition and condition of assessed vegetation types and outcomes of the field assessment it is considered very unlikely that any species of conservation significance would persist within the lot.

4.2 Vegetation

DBCA's Threatened and Priority Ecological Communities database identified that the site either contains or is in the buffer zones of two EPBC Act listed TECs and one DBCA listed PEC. Additionally, DAWE's Protected Matters Search Tool identified that three TECs have the potential to occur within the site, one of which (*Banksia dominated woodlands of the Swan Coastal Plain*) was common with the DBCA's database.

Four vegetation types were described by the field assessment. These are:

1. **KgLI:** *Kunzea glabrescens*, **Leptospermum laevigatum* tall shrubland over **Cynodon dactylon*, **Stenotaphrum secundatum* grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses
2. **CdSsEc:** **Cynodon dactylon*, **Stenotaphrum secundatum* closed grassland, sparse **Ehrharta calycina*, **Eragrostis curvula* tussock grasses
3. **CdEc:** **Cynodon dactylon*, **Ehrharta calycina* grassland
4. **AaSs:** *Astartea affinis* closed mid shrubland over **Stenotaphrum secundatum* grassland.

Each of these vegetation types either contained or was wholly composed of introduced (weed) species and are not considered representative of the Southern River complex nor conservation significant ecological communities (i.e. state or Commonwealth listed TECs or DBCA listed PECs).

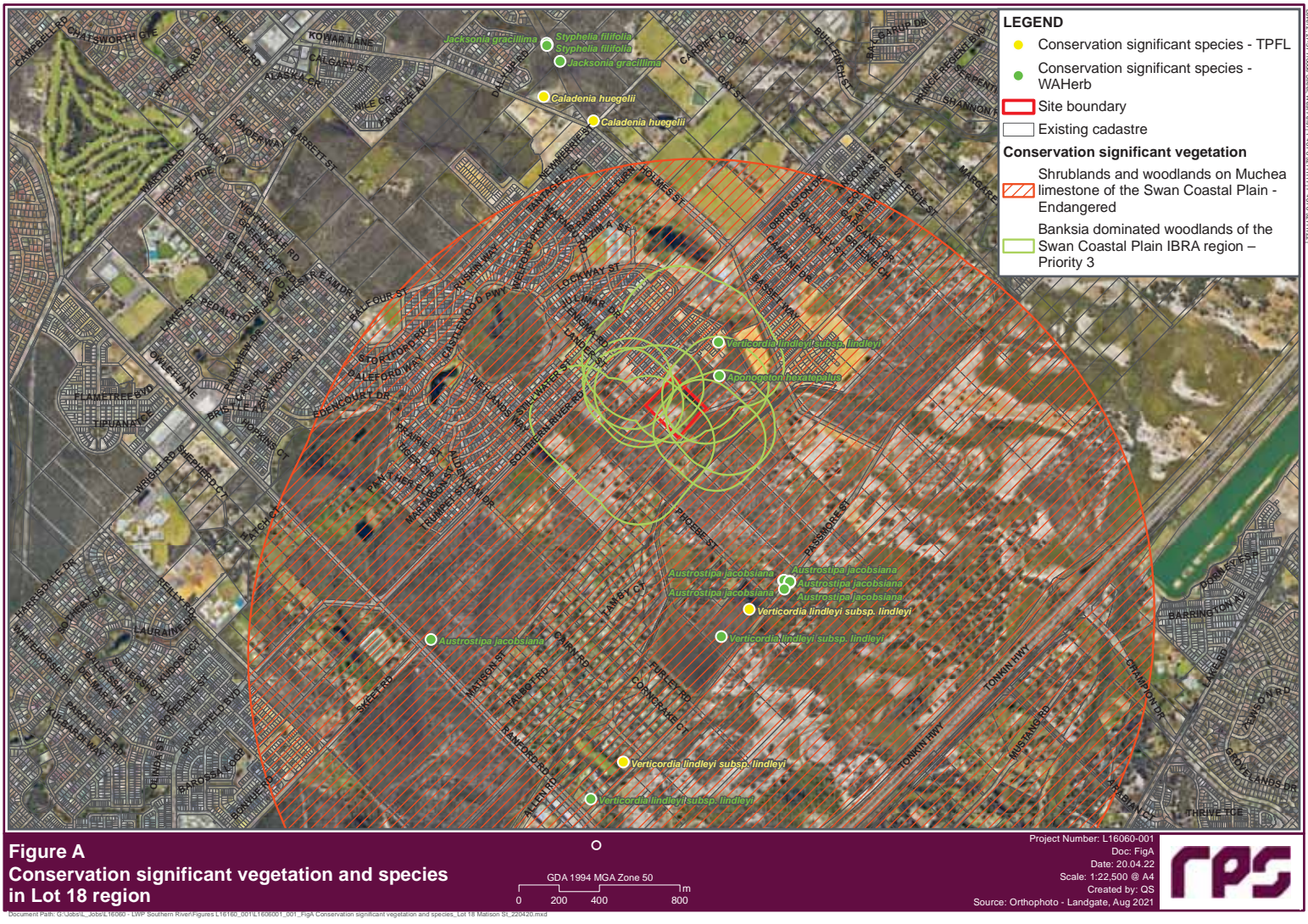
The vegetation types within the site were assessed to be in "Completely Degraded" condition using the Keighery (1994) scale. The loss of vegetation structure after clearing and invasion by introduced species has reduced the variety of native regrowth to just two species.

5 REFERENCES

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Figures







Appendix A

Threatened and Priority Flora database search results



APPENDIX A: Threatened and Priority Flora database search results

Taxon	Cons_code	WA rank	Database
<i>Acacia benthamii</i>	2		WA Herbarium, TPFL
<i>Acacia horridula</i>	3		WA Herbarium, TPFL
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	1		WA Herbarium, TPFL
<i>Acacia oncinophylla</i> subsp. <i>patulifolia</i>	4		WA Herbarium, TPFL
<i>Allocasuarina grevilleoides</i>	3		WA Herbarium
<i>Andersonia gracilis</i>	T	VU	WA Herbarium, TPFL
<i>Andersonia</i> sp. <i>Blepharifolia</i> (F. & J. Hort 1919)	2		WA Herbarium
<i>Angianthus micropodioides</i>	3		WA Herbarium
<i>Aponogeton hexatepalus</i>	4		WA Herbarium, TPFL
<i>Asteridea gracilis</i>	3		WA Herbarium, TPFL
<i>Austrostipa jacobsoniana</i>	T	CR	WA Herbarium, TPFL
<i>Babingtonia urbana</i>	3		WA Herbarium, TPFL
<i>Banksia kippistiana</i> var. <i>paenepeccata</i>	3		WA Herbarium
<i>Banksia mimica</i>	T		WA Herbarium
<i>Beaufortia purpurea</i>	3		WA Herbarium
<i>Bolboschoenus fluviatilis</i>	1		WA Herbarium
<i>Byblis gigantea</i>	3		WA Herbarium, TPFL
<i>Caladenia huegelii</i>	T	CR	WA Herbarium, TPFL
<i>Calandrinia uncinella</i>	1		WA Herbarium
<i>Calectasia grandiflora</i>	2		WA Herbarium
<i>Calothamnus accedens</i>	4		WA Herbarium
<i>Calothamnus graniticus</i> subsp. <i>leptophyllus</i>	4		WA Herbarium, TPFL
<i>Calytrix breviseta</i> subsp. <i>breviseta</i>	T	CR	WA Herbarium, TPFL
<i>Calytrix simplex</i> subsp. <i>simplex</i>	1		WA Herbarium
<i>Carex tereticaulis</i>	3		WA Herbarium, TPFL
<i>Chamaescilla gibsonii</i>	3		WA Herbarium
<i>Comesperma griffinii</i>	2		WA Herbarium
<i>Comesperma rhadinocarpum</i>	3		WA Herbarium, TPFL
<i>Conospermum undulatum</i>	T	VU	WA Herbarium, TPFL
<i>Cyathochaeta teretifolia</i>	3		WA Herbarium
<i>Darwinia apiculata</i>	T	EN	WA Herbarium, TPFL
<i>Diuris brevis</i>	2		WA Herbarium
<i>Diuris drummondii</i>	T		WA Herbarium
<i>Diuris purdiei</i>	T	EN	WA Herbarium, TPFL
<i>Dodonaea hackettiana</i>	4		WA Herbarium
<i>Drakaea elastica</i>	T	CR	WA Herbarium, TPFL
<i>Drakaea micrantha</i>	T		WA Herbarium, TPFL
<i>Drosera occidentalis</i>	4		WA Herbarium, TPFL
<i>Drosera oreopodium</i>	1		WA Herbarium, TPFL
<i>Eleocharis keigheryi</i>	T	VU	WA Herbarium, TPFL
<i>Eremophila glabra</i> subsp. <i>chlorella</i>	T	EN	WA Herbarium, TPFL
<i>Eriochilus</i> sp. Roleystone (G. Brockman 1140)	1		WA Herbarium

APPENDIX

Taxon	Cons_code	WA rank	Database
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459)	3		WA Herbarium
<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	3		WA Herbarium, TPFL
<i>Eucalyptus x balanites</i>	T	CR	WA Herbarium, TPFL
<i>Goodenia arthrotricha</i>	T		WA Herbarium, TPFL
<i>Grevillea thelemanniana</i>	T	EN	WA Herbarium, TPFL
<i>Halgania corymbosa</i>	3		WA Herbarium, TPFL
<i>Hydrocotyle lemnoides</i>	4		WA Herbarium, TPFL
<i>Isopogon autumnalis</i>	3		WA Herbarium, TPFL
<i>Isotropis cuneifolia</i> subsp. <i>glabra</i>	3		WA Herbarium, TPFL
<i>Jacksonia gracillima</i>	3		WA Herbarium
<i>Jacksonia sericea</i>	4		WA Herbarium, TPFL
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	2		WA Herbarium
<i>Kennedia beckxiana</i>	4		WA Herbarium
<i>Lasiopetalum glutinosum</i> subsp. <i>glutinosum</i>	3		WA Herbarium, TPFL
<i>Lepidosperma rostratum</i>	T	EN	WA Herbarium
<i>Lepyrodia curvescens</i>	2		WA Herbarium
<i>Levenhookia preissii</i>	1		WA Herbarium

Appendix B

EPBC Act Protected Matters Report





EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 12-Apr-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	41
Listed Migratory Species:	20

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	13
Commonwealth Heritage Places:	None
Listed Marine Species:	28
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	24
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity	Buffer Status
Forrestdale and thomsons lakes	Within Ramsar site	In feature area

Listed Threatened Ecological Communities [\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
INSECT			
Leioproctus douglasiellus a short-tongued bee [66756]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Neopasiphae simplicior A native bee [66821]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat likely to occur within area	In feature area
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Anthocercis gracilis Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Austrostipa jacobsoniana [87809]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In feature area
Calytrix breviseta subsp. breviseta Swamp Starflower [23879]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Conospermum undulatum Wavy-leaved Smokebush [24435]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Darwinia apiculata Scarp Darwinia [8763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leafed Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eremophila glabra subsp. chlorella [84927]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area	In feature area
Goodenia arthrotricha [12448]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In feature area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area	In feature area
Macarthuria keigheryi Keighery's Macarthuria [64930]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Synaphea sp. Fairbridge Farm (D. Papenfus 696)			
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Synaphea sp. Pinjarra Plain (A.S. George 17182)			
[86878]	Endangered	Species or species habitat may occur within area	In feature area
Synaphea sp. Serpentine (G.R. Brand 103)			
[86879]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra stellata			
Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa stagnatilis			
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51287]	WA	In buffer area only
Commonwealth Land - [51376]	WA	In buffer area only
Commonwealth Land - [51518]	WA	In buffer area only
Commonwealth Land - [50848]	WA	In buffer area only
Commonwealth Land - [51514]	WA	In buffer area only
Commonwealth Land - [51975]	WA	In buffer area only
Commonwealth Land - [50833]	WA	In buffer area only
Commonwealth Land - [50870]	WA	In buffer area only
Commonwealth Land - [50872]	WA	In buffer area only
Commonwealth Land - [50867]	WA	In buffer area only
Commonwealth Land - [50866]	WA	In buffer area only
Commonwealth Land - [50865]	WA	In buffer area only
Commonwealth Land - [50864]	WA	In buffer area only

Listed Marine Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Dotterel, Hooded Plover [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Balannup Lake	Nature Reserve	WA	In buffer area only
Canning River	Management Area	WA	In buffer area only
Forrestdale Lake	Nature Reserve	WA	In buffer area only
Piara	Nature Reserve	WA	In buffer area only
Unnamed WA49299	Nature Reserve	WA	In buffer area only
Nationally Important Wetlands			[Resource Information]
Wetland Name		State	Buffer Status
Gibbs Road Swamp System		WA	In feature area
EPBC Act Referrals			[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Garden Street road extension, Huntingdale, city of Gosnells, WA	2016/7735	Controlled Action	Post-Approval	In buffer area only
Keane Road Strategic Link, proposed construction central portion of Keane Road	2009/5035	Controlled Action	Completed	In buffer area only
Natural Gas Pipeline Expansion	2006/2813	Controlled Action	Post-Approval	In buffer area only
Residential development and bushfire protection within part Lot 9006 Reilly Road, Harrisdale, WA	2016/7846	Controlled Action	Post-Approval	In buffer area only
Residential Estate at Lot 1580 Warton Road, Southern River	2004/1471	Controlled Action	Post-Approval	In buffer area only
Thornlie-Cockburn Link Project, WA	2018/8188	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Armadale Road Duplication - Tapper to Anstey Road	2017/7972	Not Controlled Action	Completed	In buffer area only
Burslem Drive Bridge Duplication Over Canning River, Maddington, WA	2014/7115	Not Controlled Action	Completed	In buffer area only
Commercial development of Lot 106 Wright Road, Forrestdale WA	2003/1255	Not Controlled Action	Completed	In feature area
Construction of international rowing course and commercial/residential areas	2003/1034	Not Controlled Action	Completed	In feature area
Denny Avenue Level Crossing Removal, Kelmscott WA	2018/8377	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In feature area
Grazing of stock and associated works on Lot 1790 Passmore Street, Southern River Western Australia	2018/8176	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Perth Seawater Desalination Project: Thomsons Lake to Kogolup Pipeline	2005/1971	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Road widening - Eighth Road Armadale between Gribble Avenue and Armadale Road	2021/8964	Not Controlled Action	Completed	In buffer area only
Southern River Mixed Business Precinct F, City of Gosnells, WA	2013/6813	Not Controlled Action	Completed	In feature area
Southern River Precinct 3E	2017/7900	Not Controlled Action	Completed	In feature area
Tonkin Highway Extension	2001/470	Not Controlled Action	Completed	In buffer area only
Wungong Transfer Mains Project	2007/3532	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
City of Cockburn Sporting Facilities	2005/2139	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Appendix G

Engineering Services Report Addendum





Southern River Precinct 3E Engineering Services Report June 2022

Engineering Services Report

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Engineering Services Report

1. INTRODUCTION

Cossill & Webley has prepared the following Engineering Services Report to identify Opportunities and Constraints for Southern River Precinct 3E which is shown in Figure 1 below.

Cossill & Webley has also prepared and included in Appendix A an indicative Opinion of Probable Cost for the residential subdivision development of Lots 13, 14, 19, 20, 21 and 22.



Figure 1 – Proposed Local Structure Plan, Taylor Burrell Barnett



Local Structure Plan Amendment Area, Taylor Burrell Barnett

2. SITEWORKS AND EARTHWORKS

Southern River Precinct 3E is bound by Southern River Road to the north-west, Ballanup Lake Branch Drain to the north-east, Matison Street to the south-east and Lander Street to the south-west.

The Precinct (Site) comprises approximately 26 hectares of land and is generally heavily vegetated, except for one of the existing lots which has been cleared of vegetation as depicted in Figure 2 below.

There is an existing residential property located at the southern corner of the site which may require an environmental investigation for contamination. The Site is generally flat, and ranges in elevation from RL21m AHD eastern at the boundary to RL23m AHD at the western boundary.

Clearing and earthworks is required to create suitable lots for residential purposes.



Figure 2 – Aerial Photography (Nearmap 2022)

Engineering Services Report

2.1 Site Geology

The 1:50,000 Environmental Geology Series indicates the Site is generally covered with Bassendean sands overlaying sandy clay to clayey sand (Refer Figure 3 below). A Geotechnical Investigation was carried out in 2010 by Bioscience and generally describes the site as sandy soils over a layer of less permeable loamy sand at depth.

Bioscience considers the majority of the site in its present form "Class A" according to Australian Standards AS2870 – Residential Slabs and Footings. Some portions of the Site is "Class S" due to the presence of the more reactive sandy loam layer within 1.5m of natural surface. The site is expected to require a net import of clean fill for drainage and clearance to groundwater regardless so all subdivided lots are expected to achieve the "Class A" classification.

An average topsoil depth of around 250mm was identified in the Geotechnical Investigation. Depending on the organic content of the topsoil, it is recommended to reuse topsoil through screening, blending and top dressing on lots and verges where possible to minimise topsoil disposal costs.

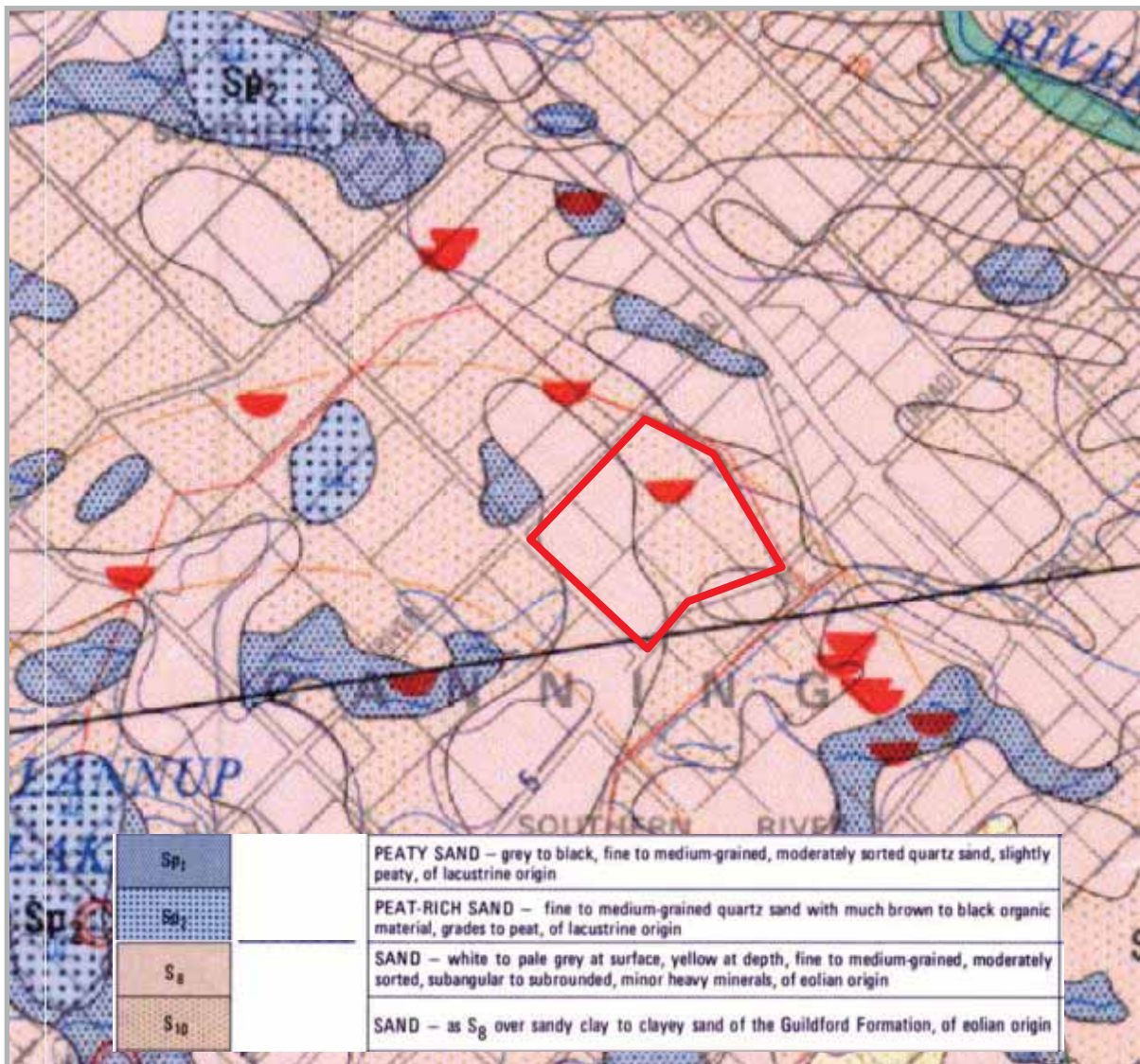


Figure 3 - 1:50,000 Environmental Geology Series Mapping (Armadale)

2.2 Contamination

Engineering Services Report

The Site is not listed in Department of Environment Regulation's (DER) Contaminated Sites Register and should be clear of contamination from previous land use. Visual inspections show that general domestic bulk waste was dumped on site in the past, inspections and clean-up will be undertaken in accordance with the recommendations and supervision of a suitably qualified environmental consultant.

2.3 Acid Sulphate Soils

The WA Atlas Shared Land Information Platform mapping suggests that the site has a medium risk of Acid Sulphate Soils (ASS) being present. Figure 3 below provides an excerpt from the Department of Environment & Conservation's (DEC) ASS maps.

Bioscience has also undertaken a desktop study and field investigation and does not anticipate any ASS or potential ASS to be encountered within 3m of natural surface levels. Some coffee rock was encountered within two of the twenty core samples at depths of around 2 metres which may need to be treated. No coffee rock was encountered in any of the fifteen test pits that were excavated to 3m depth. The sewer reticulation system for the Site is expected to be above this level anyway and is not expected to require ASS treatments during excavation.

ASS treatment is expected to be required for installation of the DN450 trunk sewer due to its depth. An ASS investigation and Management Plan has been prepared by RPS to inform the subdivision and trunk sewer works.

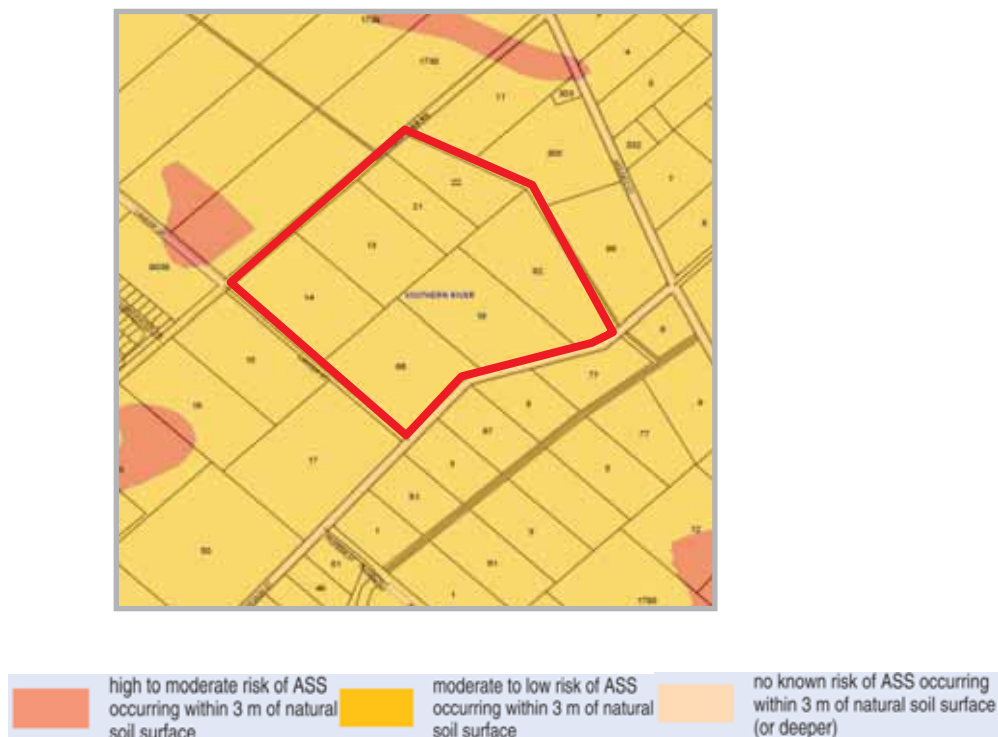


Figure 4 - Acid Sulphate Soils Map (WA Atlas, SLIP 2010)

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2.4 Groundwater

A review of available groundwater contour information from the Department of Water Perth Groundwater Atlas (Historical Maximum Levels) indicates that the maximum groundwater level ranges from approximately RL21.0m AHD to approximately RL22.0m AHD. The separation to groundwater varies across the site but is generally about 1m below existing grounds levels. An excerpt from the Groundwater Atlas is presented in Figure 5 below.

Typically, the Groundwater Atlas levels are approximately 0.5 metres above the Average Annual Maximum Groundwater Levels (AAMGLs), and it is standard practice to provide around 1.5 metres separation between the AAMGL and finished lot levels to allow effective disposal of stormwater drainage through soakwell. Imported fill is required to ensure adequate separation for roads and lots from the prevailing groundwater.

Further hydrological assessments have been undertaken to prepare the Urban Water Management Plan (UWMP) for the Site which has subsequently been approved by the City of Gonsells. The subsoil drainage network will be designed and installed in accordance with the requirements of that plan.

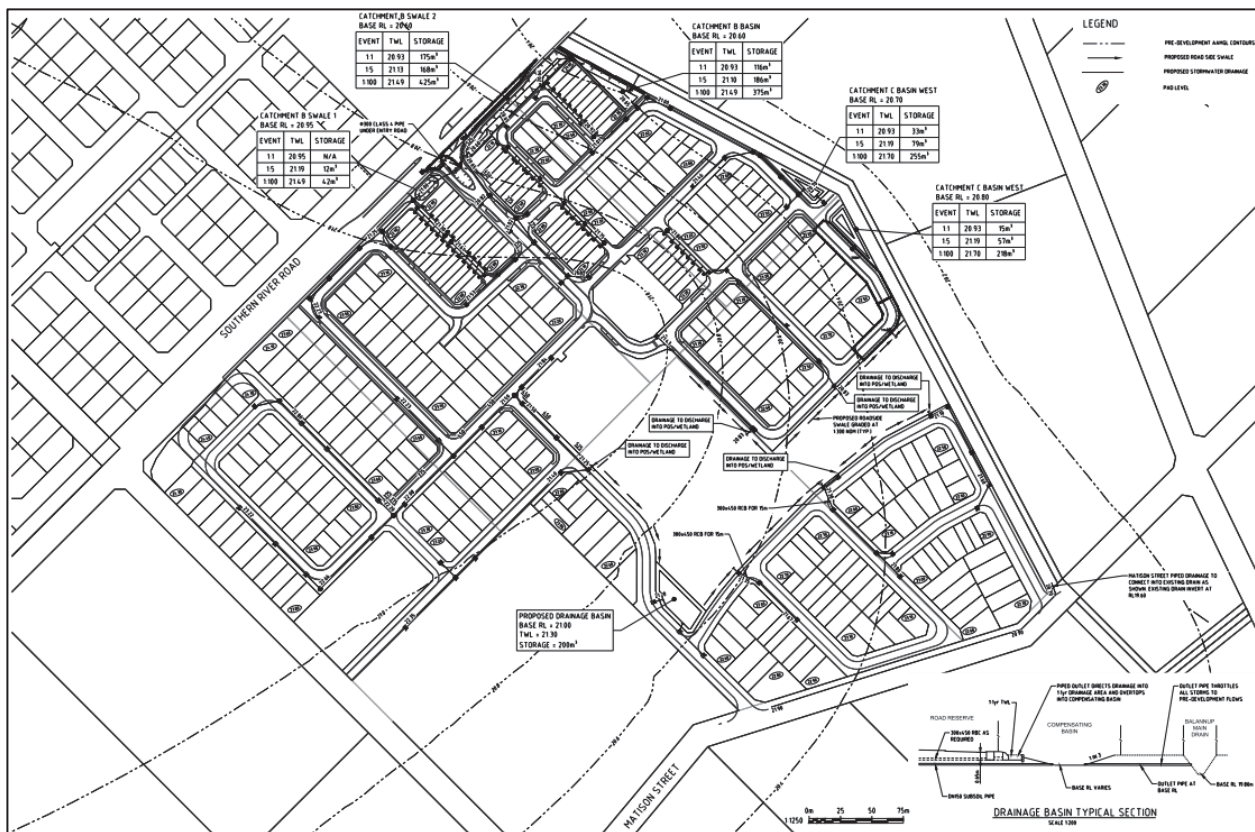


Figure 5 – Subsoil Drainage Networks and AAMGLs (Cossill & Webley / RPS - 2018)

3. ROADWORKS

3.1 Existing Roads

Access to the Site is available from Southern River Road and Matison Street as shown on the Outline Development Plan (ODP).

The Site fronts Southern River Road, which is an integrated arterial road that currently exists as a single carriageway. The City of Gosnells has upgraded Southern River Road to a dual carriageway 4 lane road.

The Southern River Road duplication works is funded through City of Gosnell's Development Contribution Plan (DCP) for Precincts 2 and 3E. The latest available DCP Report of 2011 has been superseded by recent advice which is further explained in Section 10.

Matison Street is expected to require an upgrade to full urban road standards, which is a typical condition of subdivision for development that fronts and is serviced by existing roads. Existing services such as high pressure gas, low voltage overhead power lines and Telstra pit and pipes exist on Matison Street and will require relocation as part of the road upgrade works.

Evandra Road is an unmade road and abuts the south-western boundary of the site. The Site does not have road access from Lander Street and does not front residential lots onto it. City of Gosnells has advised that no contribution is required to upgrade this road given the Site has no access or utility from Southern River Road. All lots will front internally to the development.

3.2 Future Internal Roads

The engineering design of future residential roads will be carried out to comply with City of Gosnells engineering standards. Road reserves for residential areas are typically 15 to 18 metres wide and road pavements 6 metres wide.

The Local Structure Plan (LSP) for the development site consists of several roads located on common boundaries and will require access to adjacent properties for construction of road and services.

Any roads that are constructed as part of this Development that abuts future development is subject to future cost share reimbursement under Section 159 of the Planning and Development Act.

3.3 Proposed Intersections with Southern River Road

The LSP identifies a proposed full movement intersection to Southern River Road consisting of a left in slip lane and right in turn pocket in the Southern River Road median.

There are also three existing 132 kV transmission Lines poles in Southern River that interfere with future permanent intersections to Clearwater Drive, Lander Street and the proposed full movement intersection into Precinct 3E. City of Gosnells advised (via email on 4/12/15) that whilst they are not building the future intersections or median island turn pockets, they intend to remove these power poles as part of their transmission line relocation works for the Holmes Street intersection. The cost of these works is included in the Precinct 3E DCP rate of \$167,000/Ha.

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3.4 Balannup Lake Branch Drain Crossing

The LSP Report identifies a future crossing over the Balannup Lake Branch Drain and references a roundabout as the preferred option in the Traffic Impact Assessment (TIA) prepared by Cardno in 2013. The road layout in the TIA shows a 4 way intersection, whereas the ODP shows a 3 way intersection due to the stagger in the 3E north-west / south-east road due to the triangular drainage POS in the corner. A roundabout is not shown on the ODP and is not expected to be required given this junction is no longer a 4 way intersection.

City of Gosnells has confirmed that an estimated \$97,500 contribution towards construction of this crossing (50m of road and drainage culverts) is required in addition to the DCP rate.

4. STORMWATER DRAINAGE

4.1 General

The Southern River Integrated Land and Water Management Plan (IL & WMP) was released by Department of Water in 2009 and provides a district level framework for better urban water management practices. A Local Water Management Strategy (LWMS) was prepared for the site by Bioscience in 2011 and an Addendum prepared by Cardno in 2015. We understand the LWMS has been approved by City of Gosnells following recent amendments by RPS.

Confirmation of the required separation to groundwater is a key driver of import fill and a major proportion of site costs.

The internal drainage design should comprise of collector pit and pipe systems, open swales for detention and bio-retention swales. Bio-retention swales will be required throughout the development to treat and detain storm water runoff from the 1 year 1 hour storm event.

The site is classified by Water Corporation as a Declared Drainage Area and is subject to Water Corporation drainage headwork fees. Declared drainage areas are areas that have been identified to benefit from Water Corporation main drains, in this case, the Forrestdale Main Drain which is downstream of the Balannup Lake Branch Drain.

4.2 Upgrade of the Balannup Lake Branch Drain

City of Gosnells requires the Balannup Lake Branch Drain to be upgraded and has provided (by email dated 9/3/16) an estimated contribution value described in Section 10. The City has also confirmed the contribution can be paid in a staged approach as a cost per lot.

Twin DN600 pipe culverts are expected to be required to convey base flows below the crossing. The cost of these works should be apportioned appropriately amongst adjoining Precincts and landowners.

4.3 Matison Street Drainage

Matison Street is a low-lying rural road with relatively flat grades. It is unkerbed and drains to an open channel that runs along the road on the southern side. The open channel drain grades north-east where it connects to the Balannup Lake Branch Drain.

We expect the level of the road needs to be raised by approximately 800mm to grade storm water towards the Balannup Lake Branch Drain. The LWMS and Addendum does not make provision for this catchment so it is assumed that runoff can discharge directly into the Balannup Lake Branch Drain. If treatment is required, a physical area may need to be set aside before the drain, within Lot 21, to treat run off from Matison Street.

4.4 LSP Amendment Area

The LSP amendment area will be serviced by stormwater reticulation to the Public Open Space area, which will flow through the central POS spine, and into the Ballanup Drain at pre-development rates.

5. SEWER

5.1 External Sewer

The Site falls within the Balannup WWPS B sewer catchment and is included in Water Corporation's sewer planning for this area.

The Water Corporation's Planning indicates the site can be serviced by the extension of an existing DN450 trunk sewer. This trunk sewer grades north and discharges to a Type 180 Waste Water Pumping Station (WWPS) located near the intersection of Balfour Street and Barrett Street. The DN450 sewer is located within Bletchley Park between the WWPS and has been constructed to Southern River Road.

The trunk sewer will have to be extended from Southern River Road through the subdivision. Two access chambers with approximate depths up to 6m may need to be constructed within close proximity of existing kerbs and powerlines in Southern River Road and will require traffic management and reinstatement of existing road and kerbs. A further 4 or 5 access chambers will need to be built within the Site itself.

5.2 Trunk Sewer Alignment

The trunk sewer must be extended to Matison Street, and will be extended further east in the future based on the Water Corporations current planning. The most direct route through the development for the trunk main includes a section tunnelled through the POS.

The conservation POS that divides the north-western and south-eastern portions of the Site is identified on Landgate's vegetation mapping as Resource Enhancement Wetland and is approximately 150m in width. It is not classified as Conservation Category Wetland so there is an opportunity to construct the sewer through it by micro tunnelling if trees and vegetation at the surface are not disturbed. Water Corporation standards allow a maximum of 150m between access chambers so any disturbance to existing vegetation can be limited to only the ends of the POS. If acceptable to the City the option of open trenching in an existing firebreak corridor may be explored further in through the Water Corporations headworks delivery process.

5.3 Internal Sewer

A standard sewer reticulation network will be required to service all internal lots within the site. Water Corporation headwork fees for wastewater will apply.



6. WATER RETICULATION

Recent advice from Water Corporation confirms the site can be serviced from the existing 205mm diameter cast iron water pipe in Southern River Road. Water Corporation will monitor water supply pressures to the area and extend any future distribution mains through their Capital Works Program if required.

An extension of the existing 100mm diameter water main on Matison Street, near the Lander Street reserve, is required to service the southern portion of the site. Construction of this main will require supervision by an ATCO Gas representative to ensure the existing high-pressure gas main in the northern verge is protected.

This reticulation network may need to be connected to the reticulation network over balance of the Site via a crossing through the drainage POS. This will be confirmed by Water Corporation once detailed designs have been completed. Standard Water Corporation headwork fees will apply.

The LSP Amendment area will be serviced directly of the reticulation network within the current LSP approved area.



Figure 7 – Water Corporations Multi Stage Works Agreement Water Planning.

7. POWER

The following existing Western Power infrastructure has been identified.

7.1 Existing Power Infrastructure

Existing 132kV aerial transmission lines currently exist along the north-western verge of Southern River Road. These lines will likely end up in the median island of the upgraded Southern River Road dual carriageway at the time development of the Site commences. The lines are protected by implied 20m wide easements and do not impose a burden to the Site.

The three of the existing transmission line poles referenced in Section 3 are identified in Figure 8 below. City of Gosnells has relocated these poles as part of the Southern River Road works.

As a result of the change in the structure plan one of the poles will require relocation to suit the construction of the right in slip lane in the Southern River Road median. These works are designed and constructed by Western Power at the developer's expense.

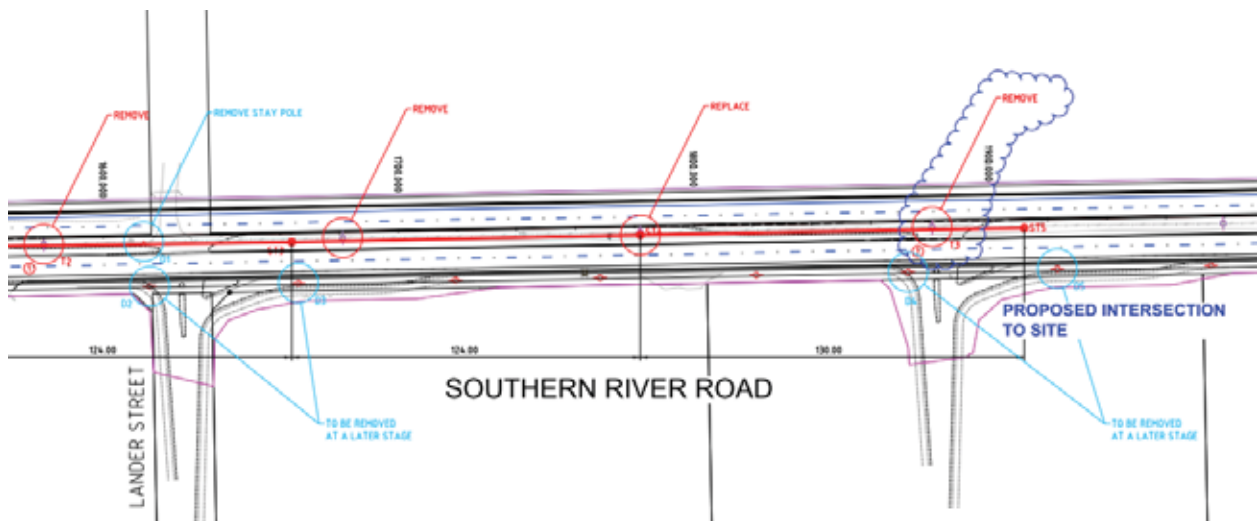


Figure 8 – Existing Power Infrastructure

7.2 22kV and 415/240V HV and LV Overhead Power Lines

LV and HV overhead power lines also exist in the verge of Southern River Road immediately adjoining the Site. We expect the undergrounding of these lines to form part of the subdivision approval conditions, which is common practice. A section of low voltage overhead lines on Matison Street abutting the Site will also likely require undergrounding at the time that portion of the Site is developed.

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7.3 Power Loads and likely Infrastructure Upgrade Requirements

Preliminary advice from ETC (Engineering Technology Consultants) suggests the site will require approximately 1.65 MVA in its developed state. Western Power may need an extension of HV feeder mains from their Zone Substation 800m southwest of the Site (See figure 9 below) to increase their network capacity. These works are typically funded by the developer.

A final subdivision layout is required for Western Power to complete their feasibility study in order to confirm if or when the HV feeder extension is required.



Figure 9 - Western Power Southern River Zone Substation and HV feeder extension

8. GAS SUPPLY

ATCO Gas has provided their network planning as shown in Figure 10 below. There is currently no gas infrastructure on Southern River Road, although a high pressure steel pipe exists in Matison Street along the southern boundary of the Site. We expect above average servicing costs may apply for proposed lots fronting Matison Street due to the need to work around the existing high pressure gas main.

An extension of the PE Distribution Main along Southern River Road, approximately 370m to Clearwater Drive is required to provide gas reticulation services to the proposed development. ATCO advises that construction of this extension would require a capital contribution from the developer, which is currently estimated at approximately \$60,000 exclusive of GST.

ATCO provides network expansions at their cost for developments which are frontal to their existing network infrastructure. Staging of the development from Southern River Road end and extending southward would be financially beneficial to minimise additional developer funded gas infrastructure costs.

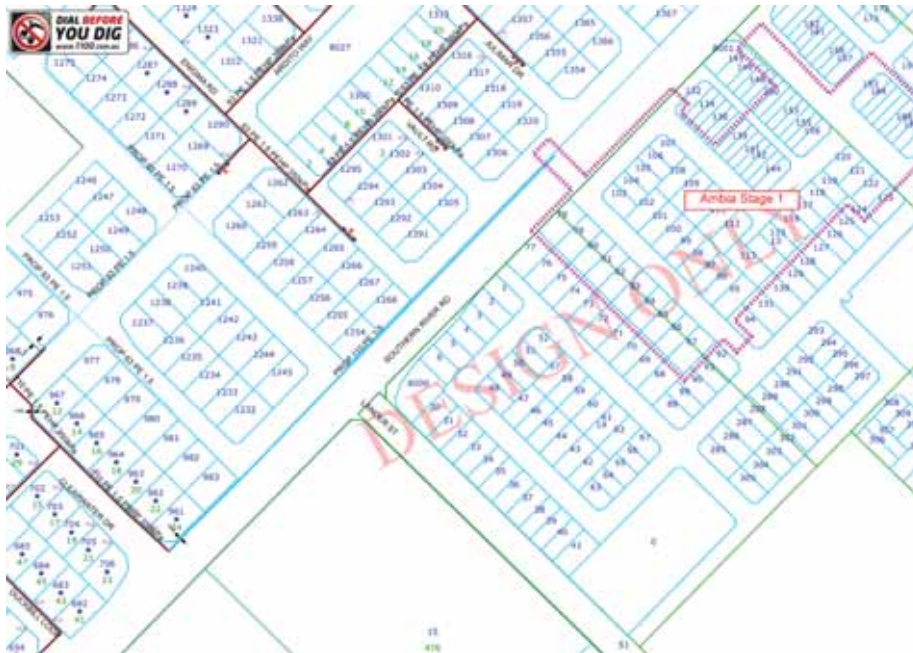


Figure 9 – ATCO Gas headworks supply design

9. TELECOMMUNICATIONS

The proposed development is within NBN Co's optic fibre footprint and meets the minimum size requirement of 100 lots. The Site is within 1km of existing NBN Co infrastructure situated within the Bletchley Park Estate, and therefore not subject to backhaul costs according to NBN Co's current policy on Backhaul Contributions.

The Project is eligible to receive NBN Co's optic fibre rollout provided all pit and pipe infrastructure is installed by the Developer. A network deployment charge of \$600 per dwelling will be levied by NBN Co to connect these dwellings to the fibre optic network.

The Developer is responsible for designing and constructing the pit and pipe system which is then gifted to NBN Co at completion of the works.

Preliminary advice from NBN Co suggests that they could expand their fibre network through the developed site as soon as 6 months after Practical Completion of the pit and pipe infrastructure. However, it is important to note that

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NBN Co does not commit to any timeframe for their network expansion as outlined in their standard Developer Agreements.

Other telecommunication providers such as Opticomm and Telstra are available and provide an alternative option for fibre to the premises connectivity. Opticomm provides a similar product to NBN Co at a lower cost per lot, but may be more expensive depending on how far they need to extend their network to reach the Site.

10. DEVELOPER CONTRIBUTIONS

A Development Contribution Plan exists over Precinct 3 and includes sub precinct 3E. City of Gosnells has advised that the Plan is likely to be finally adopted around mid-2017 so current contributions estimates are likely to increase. The City's advice regarding contribution estimates, as of September 2022, are

- | | |
|--|------------------------|
| • Common Infrastructure Works | \$165,452 / Ha |
| • Contribution towards upgrade of Balannup Lake Branch Drain | \$435,438 |
| • Balannup Lake Branch Drain Road Crossing | \$7,456.16 / Ha |

The contribution for Balannup Lake Branch Drain is calculated on land ownership of sub-precinct 3E. The applicable contribution can be paid progressively on a cost per lot basis.

City of Gosnells have stressed that the costs are still estimates and are likely to rise. We are aware of significant Contribution increases in other Developer Contribution Precincts within City of Gosnells and advise caution when budgeting for these allowances.

11. STAGING RECOMMENDATION

Development should commence from Southern River Road and proceed in an orderly manner towards Matison Street. The DN450 sewer will need to be constructed prior to or concurrent with Stage 1 although timing of this infrastructure could be managed to an extent through a sewer tankering arrangement with Water Corporation. The portion of the site fronting Matison Street is isolated by the drainage POS running through the Site and is recommended to be developed as the last stage once access issues with adjacent landowners has been resolved.

12. CONCLUSION

There are no major engineering impediments to the development of Southern River Precinct 3E. The main infrastructure requirements to facilitate development are;

- Installation of HV Feeder from Southern River Zone Substation
- Relocation of Western Power overhead Powerlines
- Intersections works within Southern River Road
- Construction next to existing services and high pressure gas main on Matison Street
- Extension of gas distribution main from Holmes Street

The earthworks strategy for the site represents a significant proportion of site costs and depends on the drainage strategy for the site. Class A site classifications are expected to be achieved for all created lots.

There is also uncertainty surrounding Developer Contribution costs for the Site as the City's advice to date is heavily qualified. We are aware of significant increases to cost and scope in some Developer Contribution Plans within City



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of Gosnells and advise caution when budgeting for these allowances.

Complete development of the Site comprising of Lots 13, 14, 19, 20, 21 and 22 will require negotiations with adjacent land owners to facilitate construction of roads and services on shared boundaries. Cost sharing contributions through Section S159 will be applicable for these roads as well as construction of Matison Street as part of the development.

The LSP Amendment area can be serviced by water, power, sewer, gas and communications from the adjacent LSP approved area.

These items represent the main issues for the Site but can be managed with appropriate time and planning. Construction of the DN450 sewer through the site is a key item, the risk could be mitigated to an extent through a Tankering agreement with Water Corporation. Discussions with the Water Corporation have commenced and they Water Corporation have responded favourably in relation to a Tankering Agreement.