



LOCAL STRUCTURE PLAN

LOTS 1, 327, 13255 AND 13256 RAILWAY PARADE - LOTS 2 AND
3 APPLE STREET - LOTS 27, 28, 30 32, AND 34 ORANGE AVENUE
AND LOTS 35 ROSE STREET, UPPER SWAN

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RECORD OF ENDORSEMENT

This structure plan is prepared under the provisions of the City of Swan Local Planning Scheme No.17

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

17 January 2018

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

Rigali

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

[Signature]

Witness

17 January 2018

Date

17 January 2028

Date of Expiry



TABLE OF AMENDMENTS

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC

TABLE OF DENSITY PLANS

Density Plan No.	Area of density plan application	Date Endorsed by WAPC



EXECUTIVE SUMMARY

The Local Structure Plan (LSP) provides a land use planning framework for a lot area of 137.6 hectares in Upper Swan of which 132.3 hectares is zoned 'Urban' under the Metropolitan Region Scheme (MRS) and therefore comprises the area subject to this LSP, the (Site). The subject site is located on the north eastern periphery of the Perth Metropolitan Region, 26 kilometres from Perth's Central Business District. It is bound by Orange Avenue and Railway Parade to the east, Rose Street to the south and Ellen Brook to the west. The site is located 700 metres west of the Great Northern Highway and is accessed via Apple Street and Railway Parade.

The purpose of this LSP is to facilitate the development of the subject site for residential purposes and supporting land uses. This LSP has therefore been prepared in accordance with the provisions of the Planning and Development Regulations 2015 and the requirements of the City of Swan's Local Planning Scheme No. 17.

The site is zoned 'Residential Development' under the City of Swan's Local Planning Scheme No.17 (LPS17). There is no existing LSP applicable to the land however the land is included within Developer Contribution area DCA5 of LPS17.

Structure Plan Summary Table

Item	Data	Section number referenced in report (Part 2)
Total area covered by the Structure Plan corresponding to MRS urban zoned land	132.3 hectares	1.2.2
Area of each land use proposed:	Hectares Lot yield	
Residential	67.73 hectares 1646 lots	3.1
Commercial	2.0 hectares 1 lot	
Total estimated lot yield	1646 lots	3.3
Estimated number of dwellings	1646 dwellings	3.3
Estimated residential site density	24.2 dwellings per site hectare 14.8 dwellings per gross hectare	3.3
Estimated population	4,230 people @ 2.5 people per household	3.3
Number of high schools	nil	3.6
Number of primary schools	1 primary school	3.6
Estimated commercial floor space (for activity centres if appropriate)	6,000m ² net lettable area	3.7
Estimated area and percentage of public open space given over to:		3.2
District open space	11.2 hectares, 9.8% 5 parks	
Neighbourhood parks	2.1 hectares, 1.8% 4 parks	
Local parks	0.26 hectares, 0.2% 1 park	

Note: All information and areas are approximate only and subject to survey and detailed design.



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15. Australian Rules Football Field Sizing Plan
16. Indicative Movement Network
17. Indicative Staging Plan

Technical Appendices

Appendix Number	Document Title	Nature of Document	Referral/Approval Agency	Summary of Document Modifications
1.	Certificates of Title	Informational	N/A	
2.	Environmental Assessment	Environmental Asset Management	DPaW	
3.	Flora and Vegetation Survey	Environmental Asset Management	DPaW/ City of Swan	
4.	Foreshore Management Strategy	Environmental Asset Management	DPaW / City of Swan	
5.	Bushfire Management Plan	Fire Mitigation	DFES/City of Swan	
6	City of Swan Municipal Heritage Inventory	Heritage Retention	N/A	
7.	Acoustic Assessment	Noise Attenuation	City of Swan	
8.	Landscape Strategy	Landscape Proposal	City of Swan	
9.	Transport Assessment	Traffic Management	MRWA/City of Swan	
10.	Local Water Management Strategy	Hydrology	DoW / City of Swan	
11.	Retail Needs Assessment	Local Centre Planning	City of Swan	
12.	Servicing Report	Engineering	WP, WC, City of Swan	



Part One

IMPLEMENTATION



ROWEGROUP

1. Structure Plan Area

This Local Structure Plan (LSP) shall apply to the land contained within the inner edge of the line denoting the Structure Plan boundary on the Local Structure Plan Map (Plan 1).

2. Operation

In accordance with Schedule 2, Part 4 of the Planning and Development (Local Planning Schemes) Regulations 2015, this LSP shall come into operation when it is approved by the Western Australian Planning Commission (WAPC).

3. Staging

Part Two depicts the indicative staging for the subdivision of the LSP area.

This LSP has been prepared on behalf of the Satterley Property Group. Satterley Brookside Pty Ltd (an entity of the Satterley Property Group) is the owner and contracted purchaser of the land within the LSP area. The settlement on the purchase of the various allotments that comprise the LSP area will occur progressively.

The staging of development will generally follow the settlement for the acquisition of the lots that comprise the LSP area. The settlement dates for the acquisition of the lots is as follows:

▲ Lot 28 Orange Avenue	Already owned by Satterley Brookside Pty Ltd;
▲ Lot 30 Orange Avenue	Already owned by Satterley Brookside Pty Ltd;
▲ Lot 27 Apple Street	Already owned by Satterley Brookside Pty Ltd;
▲ Lot 2 Apple Street	December 2018;
▲ Lot 1 Railway Parade	December 2019;
▲ Lot 3 Apple Street	December 2019;
▲ Lot 32 Orange Avenue	December 2019;
▲ Lot 34 Orange Avenue	December 2019;
▲ Lot 13255 Railway Parade	July 2020;
▲ Lot 13256 Railway Parade	July 2020; and
▲ Lot 35 Rose Street	December 2020.

Whilst the purchase of the englobo lots has (to a degree) determined the general development staging, the proposed staging will be predicated on approvals, construction requirements, and lot sales/typologies. Additionally, service utilities are to be extended from the south and north of the site. It is anticipated the development will be constructed and marketed in stages of between 30 to 60 lots each.

Stage 1 of the development will begin within Lot 30 Orange Avenue effectively forming an extension of Citrus Street, with a road connection through to an area of Public Open Space (POS) at the Ellen Brook foreshore.



4. Subdivision and Development Requirements

- 4.1** Plan 1 defines the residential density ranges that apply to the LSP. 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. Residential densities are indicatively shown at Figure 12.
- 4.2** A Residential Code Plan is to be submitted at the time of subdivision to the WAPC and shall indicate the R-Code applicable to each lot within the subdivision, and shall be consistent with the residential density ranges identified on Plan 1 and the locational criteria contained in Clause 5.
- 4.3** POS is to be provided in accordance with the LSP Map.
- 4.4** Land use permissibility within the LSP area shall accord with the corresponding land use classification in the City of Swan Local Planning Scheme No.17 (LPS17).
- 4.5** The LSP is supported by a Bushfire Management Plan (BMP). Notifications will be required on the titles of those lots identified in the BMP as having a Bushfire Attack Level (BAL) rating of 12.5 or above.
- 4.6** A portion of the LSP is in proximity to an existing railway. The LSP proposes separation distances and the provision of acoustic barriers to mitigate the impacts of the railway. Notifications will be required on the titles of those lots identified as being affected by noise from the railway.
- 4.7** The Western and Northern portions of the LSP adjoin the Ellen Brook. The LSP has acknowledged the Ellen Brook area and has carefully considered several environmental aspects to ensure future development has minimal impact on the brook and that an appropriate foreshore interface is achieved.
- 4.8** Although remote from the LSP area, the Apple Street and Great Northern Highway intersection will require upgrading as will the extent of Apple Street.
- 4.9** The LSP area includes two existing unconstructed road reserves. The portion of Apple Street that extends into the LSP can remain a road reserve however the portion of Lexia Avenue that extends into the LSP will be required to be closed.

5. Locational Criteria for Density Distribution

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

- 5.1** R10-R20
Lower density development shall apply to Residential zoned lots that have frontage to Apple Street (for the section between Orange Street and Railway Parade only), Orange Street and Rose Street.

5.2 R25-R40

The R30 density code shall be the predominant density code within the structure plan area.

The R40 density code shall apply to Residential zoned lots where:

- the lot is located within 400m of Public Open Space; or
- the lot is located within 200m of public transport or neighbourhood connector routes.

5.3 R40-R60

The R40 density code shall apply to Residential zoned lots where:

- the lot is located within 400m of Public Open Space; or
- the lot is located within 200m of public transport or neighbourhood connector routes; or
- the lot is located within 200m of the corridor linking the General Commercial area and the Primary School site.

The R60 density code shall apply to Residential zoned lots where:

- the lot is located within 200m of Public Open Space, or
- the lot is located within 200m of the General Commercial area, or
- the lot is located within 200m of public transport or neighbourhood connector routes.

6. Local Development Plans

Local Development Plan(s) are to be prepared for lots with one or more of the following attributes:

- a) Lots that have rear-loaded vehicle access and/or access restrictions;
- b) Lots with the potential for grouped and/or multiple dwellings;
- c) Lots with frontages of less than 10 metres;
- d) Lots that are suitable for R Code variations;
- e) Lots that are affected by noise from the railway line, with noise mitigation measures to comprise one or more of the following measures dependant on acoustic modelling:
 - quiet house design requirements and/or
 - a noise wall; and
- f) Lots which abut public open space.

7. Other Requirements

Under the City of Swan LPS17, the following development contribution arrangements apply :

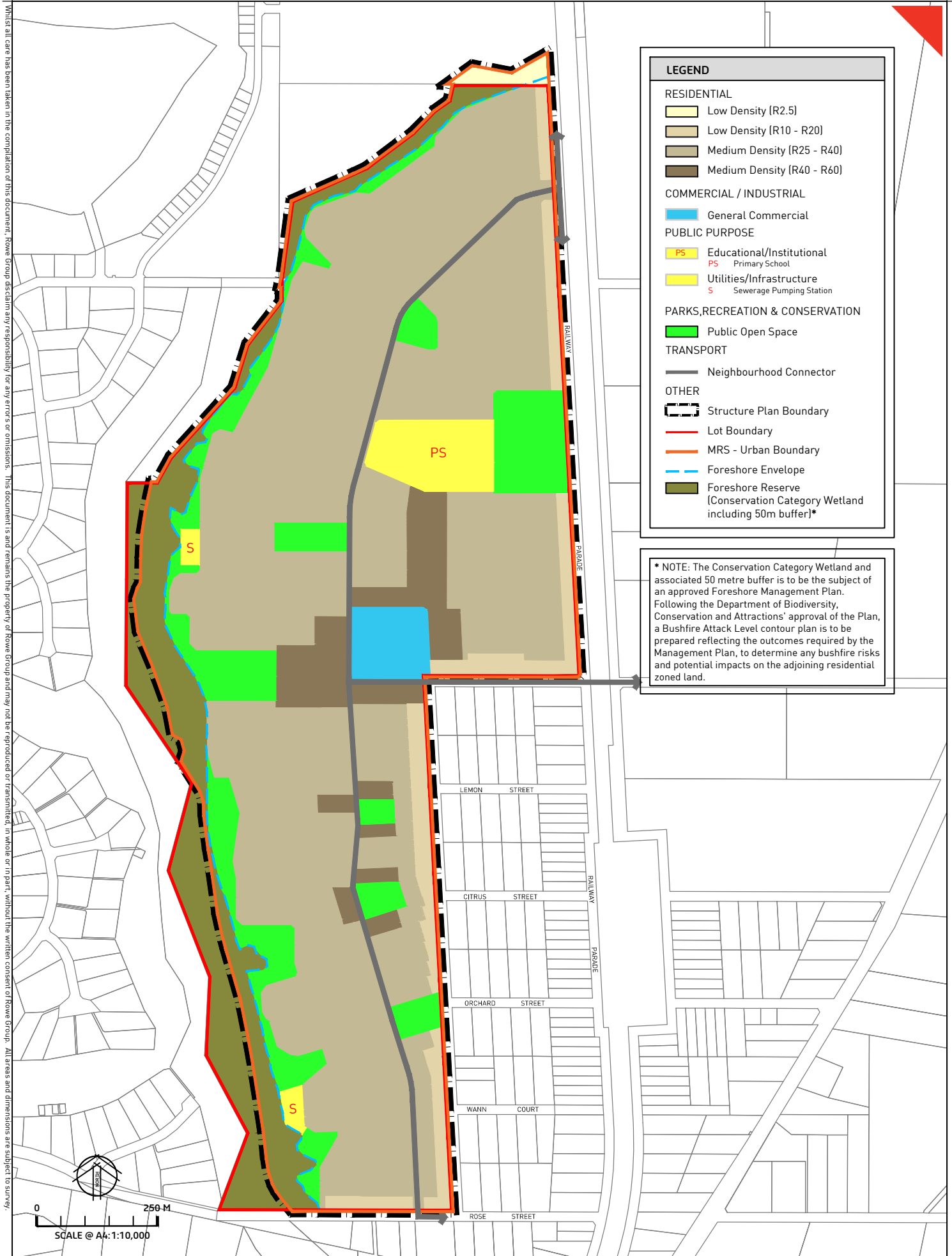
- a) Development Contribution Area 5 for the funding of 'hard' infrastructure. The contributions specifically relate to the pending construction of a bridge along Railway Parade across Ellen Brook to the immediate North East of the LSP.



8. Additional Information

An executed legal agreement detailing the terms of the cost sharing agreement and the cost apportionment schedule for road and intersection upgrades is to be executed by the City and the developer prior to the Western Australian Planning Commission endorsing a Deposited Plan for the Subdivision of the land.

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Part Two

EXPLANATORY SECTION



ROWEGROUP

Planning Background

1.1 Introduction and Purpose

This Local Structure Plan (LSP) has been prepared on behalf of the Satterley Property Group for the land located on Lots 1, 13255 and 13256 Railway Parade, Lots 2 and 3 Apple Street, Lots 27, 28, 30, 32 and 34 Orange Avenue and Lot 35 Rose Street, Upper Swan, being the land contained within the inner edge of the line denoting the Local Structure Plan (LSP) boundary on the LSP map.

The purpose of the Upper Swan LSP is to refine the provisions under the district framework and ensure a comprehensive approach to planning and development is undertaken with input from the landowner, the local community, government agencies and key stakeholders.

The LSP will guide future land use and development on the land, and will provide a framework for more detailed planning at the subdivision stage. Part 2 of the LSP provides an explanation for the Implementation (Part 1) provisions.

The project team comprises:

Discipline	Consultant
Environmental	Strategen Environmental
Traffic	Transcore
Engineering	Cossill and Webley Consulting Engineers
Town Planning and Design	Rowe Group
Landscaping	Plan E
Bushfire Management	Strategen Environmental
Geotechnical	Douglas Partners
Hydrologist	Strategen Environmental and Groundwork Consulting Engineers
Surveyor	MNG Survey
Retail	Shrapnel Urban Planning
Acoustic Engineer	Herring Storer

1.2 Land Description

1.2.1 Location

The subject site is located in the north-eastern metropolitan corridor within the municipality of the City of Swan, approximately 26km from Perth's Central Business District. The site is approximately 5km east of the Ellenbrook master planned community and approximately 16km from the Midland Gate shopping centre. The site is bounded by Orange Avenue and Railway Parade to the east, Rose Street to the south and Ellen Brook to the west, with Apple Street and Railway Parade providing connections to Great Northern Highway.

The Vines Estate is located to the west within 'General Rural' zoned land abutting the south eastern boundary. Land to the east of Orange Avenue is also zoned 'General Rural'. Refer to Figure 1 – Regional Location and Figure 2 – Locality Plan.

1.2.2 Area and Land Use

The total lot area is approximately 137.7 hectares in area (excluding two existing road reserves) of which 132.3 hectares is zoned 'Urban' under the MRS forming the site area subject to this LSP. The site is characterised as land historically used for agricultural purposes. A number of existing dwellings and associated outbuildings, fences and other structures are also located within the LSP area. These are intended to be demolished and removed as part of the development of the site, with the exception of the heritage house at 30 Orange Avenue.

The area west of the subject site has a Bush Forever (Site 300) classification and is referred to as the 'Ellen Brook Reserve'. The urban cells contained within western portion of the subject site are to contain an appropriate interface with the Ellen Brook Reserve through specific management and appropriate design responses.

Refer Figure 3 – Site Plan.

1.2.3 Legal Description and Ownership

As depicted in the table below, Satterley Brookside Pty Ltd (being an entity of the Satterley Property Group), owns Lots 28 and 30 Orange Avenue, Upper Swan. Lot 327, at the northern periphery of the Structure Plan area does not fall under the control of Satterley Property Group, however has been included to reflect the MRS Urban boundary. The remaining landholdings are under contract of sale to Satterley Brookside Pty Ltd with settlement occurring progressively during the life of the development project.

Lot Number	Address	Plan/ Diagram No.	Land Ownership
35	50 Rose Street	P3220	Thelma Joyce Kendall
34	27 Orange Ave	P3220	Thelma Joyce Kendall
32	41 Orange Ave	P3220	Thelma Joyce Kendall
30	51 Orange Ave	P3220	Satterley Brookside Pty Ltd
28	85 Orange Ave	P3220	Satterley Brookside Pty Ltd
27	135 Apple Street	P3220	John Arthur Hallatt
3	138 Apple Street	D12496	Guiseppe Caneloro
2	84 Apple Street	D12496	Caneloro Super Fund Pty Ltd
1	189 Railway Parade	D12496	Morris John and Carole Anne Yellas
13256	Railway Parade	DP219125	Yukich Debt Instalment Pty Ltd
13255	Railway Parade	DP219125	Yukich Debt Instalment Pty Ltd
327	Railway Parade	P63698	Datson, B and D

Refer Appendix 1 - Certificates of Title.

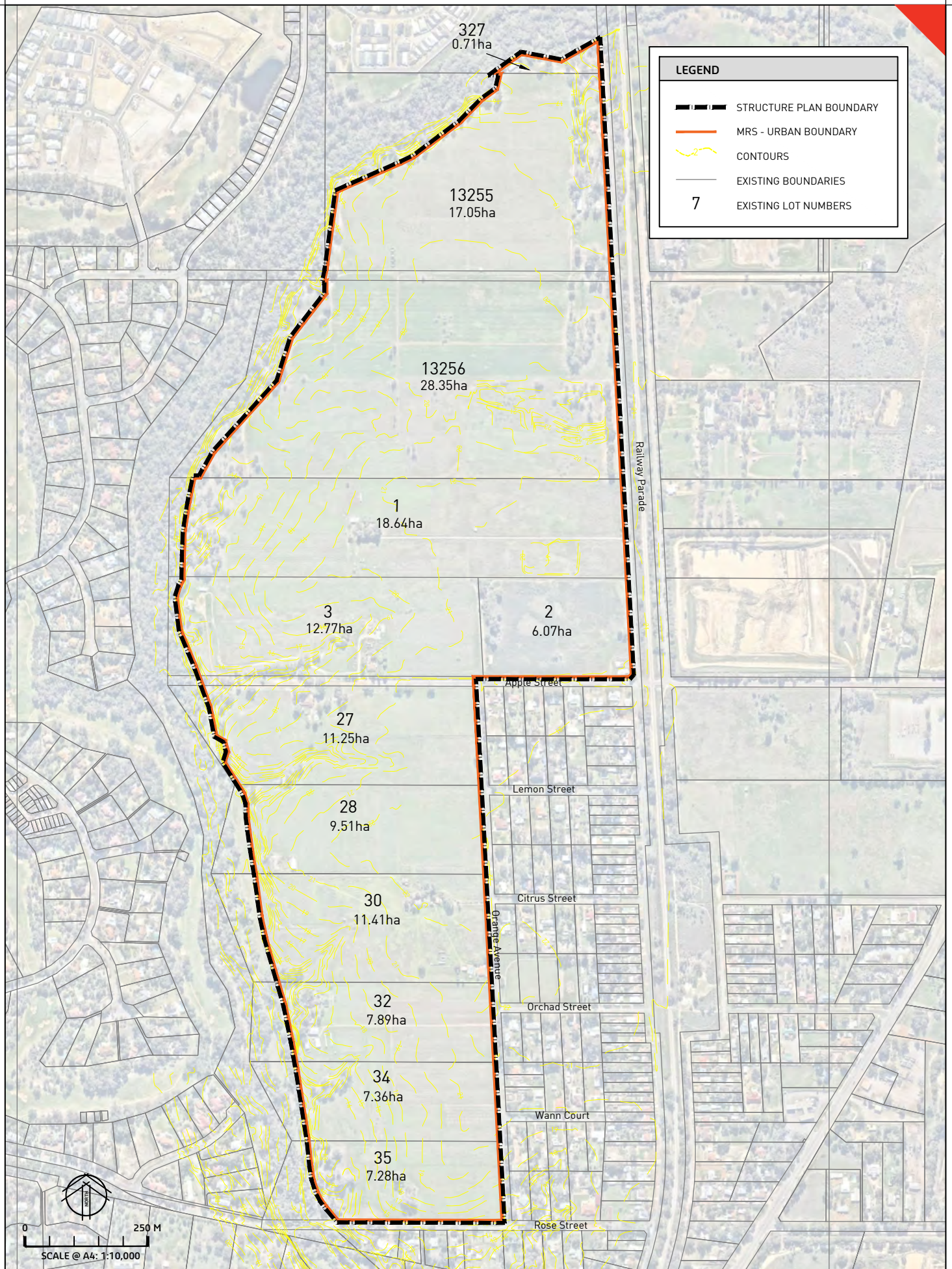
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FIGURE 2

LOCALITY PLAN

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1.3 Planning Framework

1.3.1 Zoning and Reservations

Land within the LSP boundary is predominantly zoned 'Urban' under the Metropolitan Region Scheme (MRS), however, part of the western portions of Lots 1, 3 and 27 to 35 (inclusive) are zoned 'Rural' under the MRS. The portions of the site that are in the MRS 'Urban' zone are included within the 'Residential Development' zone under the City of Swan LPS 17 whilst the portions that are included in the MRS 'Rural' zone are included in the 'General Rural' zone under the City of Swan LPS 17.

The Ellen Brook is contained within the 'Parks and Recreation' reservation of both the MRS and the City of Swan LPS 17.

Refer Figure 4 – Metropolitan Region Scheme Zoning and Refer Figure 5 - City of Swan Local Planning Scheme No.17 Zoning.

1.3.2 Directions 2031 and Beyond

Directions 2031 and Beyond was published in August 2010 and provides a broad strategic framework defining the overall visions for the Perth and Peel Regions for the next 20 years. It sets out the planning framework for the delivery of housing, infrastructure and services to accommodate future projected population growth within both regions.

Key elements of the overall visions identified by Directions 2031 include:

- ▲ Making more efficient use of available land use infrastructure; and
- ▲ Prioritising use of land that has already been zoned under the MRS.

Directions 2031 divides the Regions into a number of sub-regions. The subject land is located within the 'North-East Metropolitan Sub-Region' within which it is identified for 'Urban Expansion (2011-2015)'.

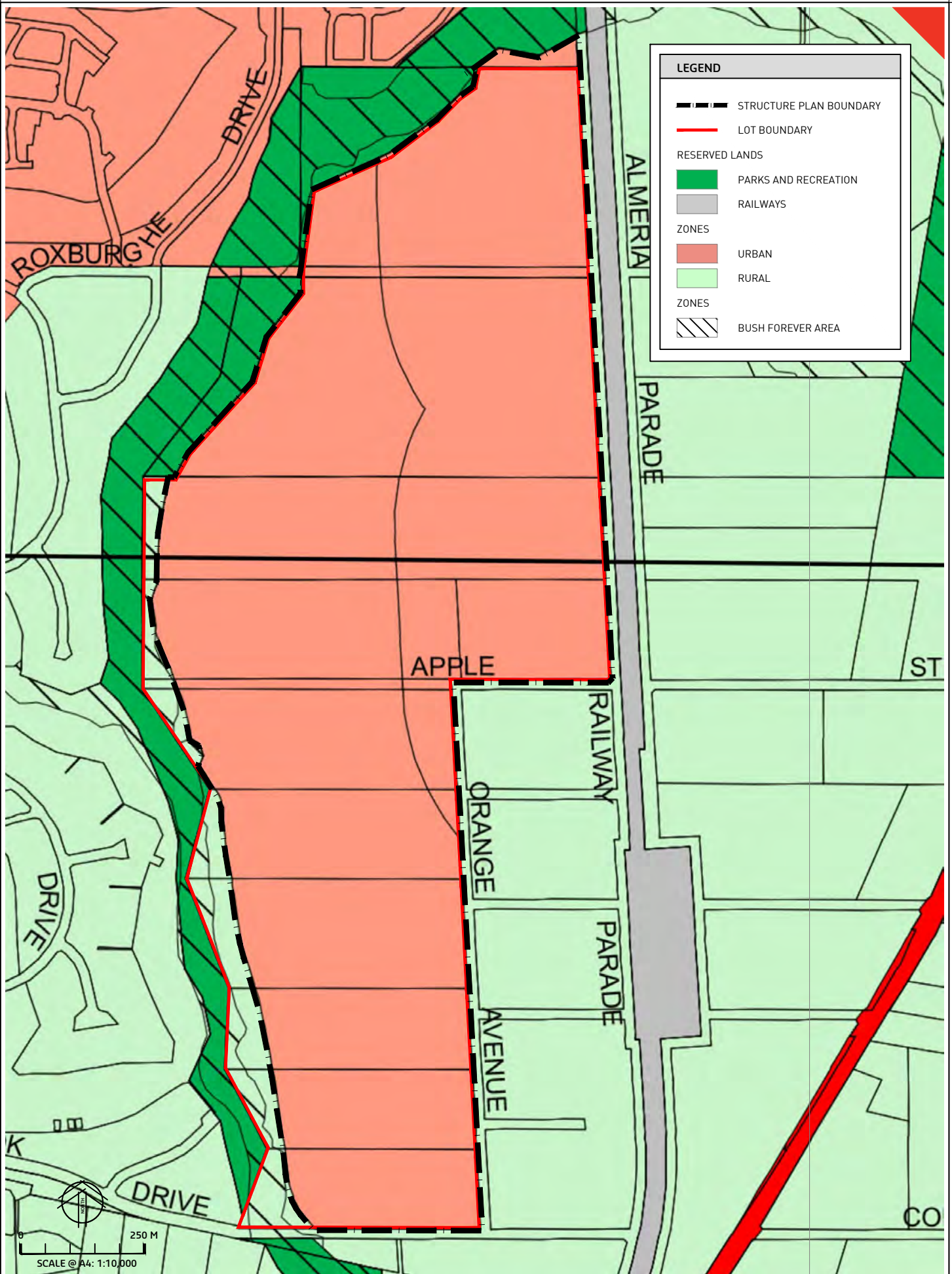
It is anticipated that demand for residential dwellings within the City of Swan will continue, which will invariably bring about associated development pressures. The LSP proposes future development of the subject site for predominantly residential purposes and is therefore consistent with the identification of the cell for urban development.

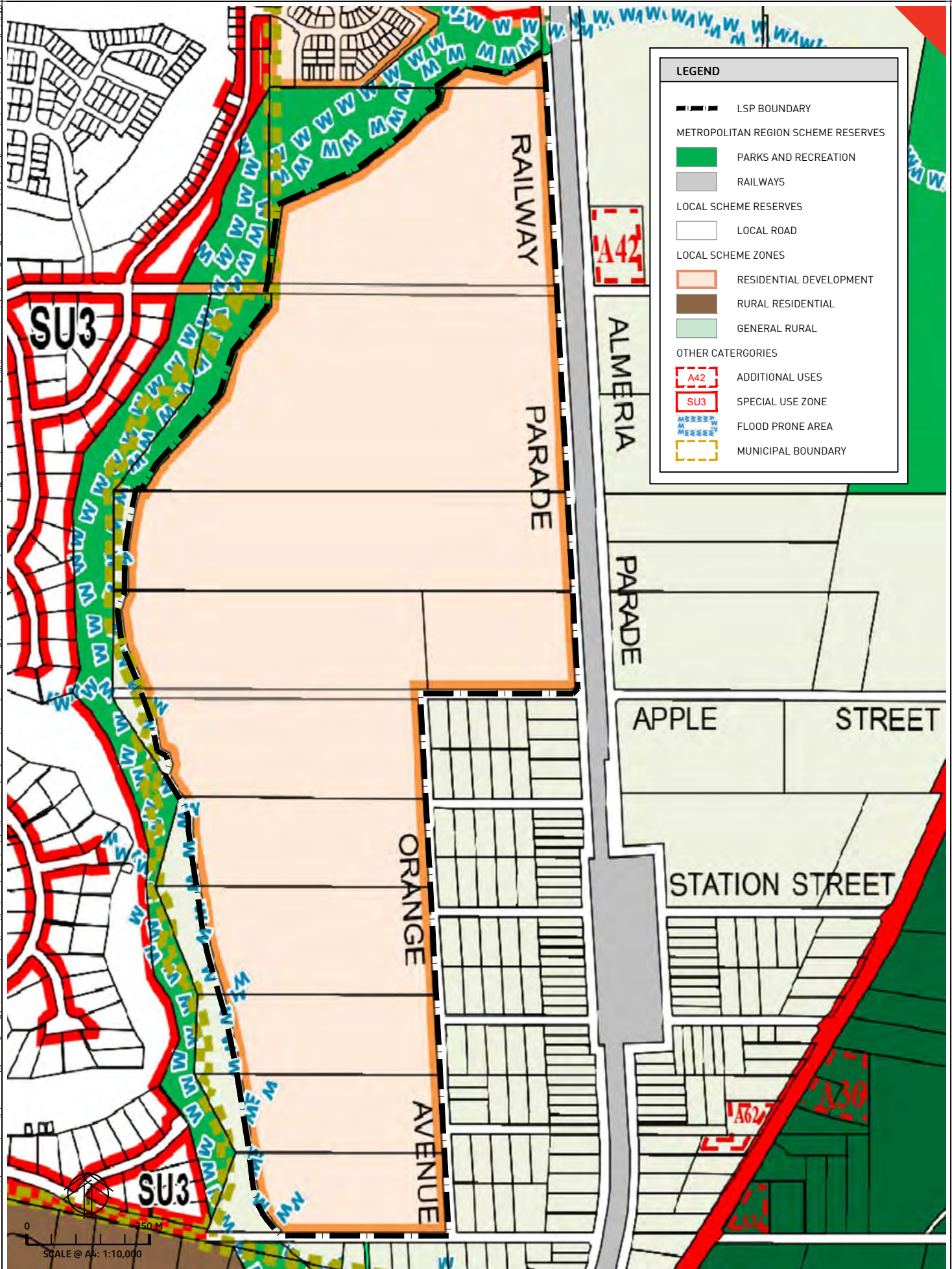
1.3.3 Draft Perth and Peel @ 3.5 Million

The Draft Perth and Peel @ 3.5 Million document was released on May 2015 for public comment. The document expands upon the principles of Directions 2031 and Beyond. A suite of draft documents including the North-East Sub-Regional Planning Framework, form an integral part of the Draft Perth and Peel @ 3.5 Million document.

The subject site is recognised as undeveloped Urban land in the draft North-East Sub-Regional Planning Framework. A consolidated Urban form achieving a minimum density target of 15 dwellings per gross hectare of urban zoned land is promoted.

The Urban Staging in the draft North-East Sub-Regional Planning Framework identifies the subject site as delivering urban land in the short term being 2015 – 2021.





1.3.4 City of Swan Urban Housing Strategy

The City of Swan Urban Housing Strategy was prepared to address future housing demands resulting from a rapid population growth with the intent of ensuring a long term sustainable future of residential development within the City of Swan. The LSP area has been identified under the Urban Housing Strategy as an area for potential Greenfield infill development, which will accommodate a diverse range of housing product.

The following recommendations highlighted for Greenfield areas within the Urban Housing Strategy are relevant for the subject site:

The LSP seeks to address the following objectives set out by the Strategy, as relevant to the subject site. These are as follows:

- ▲ The provision of a variety of residential densities and housing types;
- ▲ Higher residential densities to apply to lots near activity centres and along major public transport routes;
- ▲ Community facilities to be provided;
- ▲ Sufficient active and passive public open space is to be provided, and
- ▲ Environmentally sensitive areas are to be protected.

Refer Figure 6 – City of Swan Urban Housing Strategy.

1.3.5 Policies

1.3.5.1 Liveable Neighbourhoods

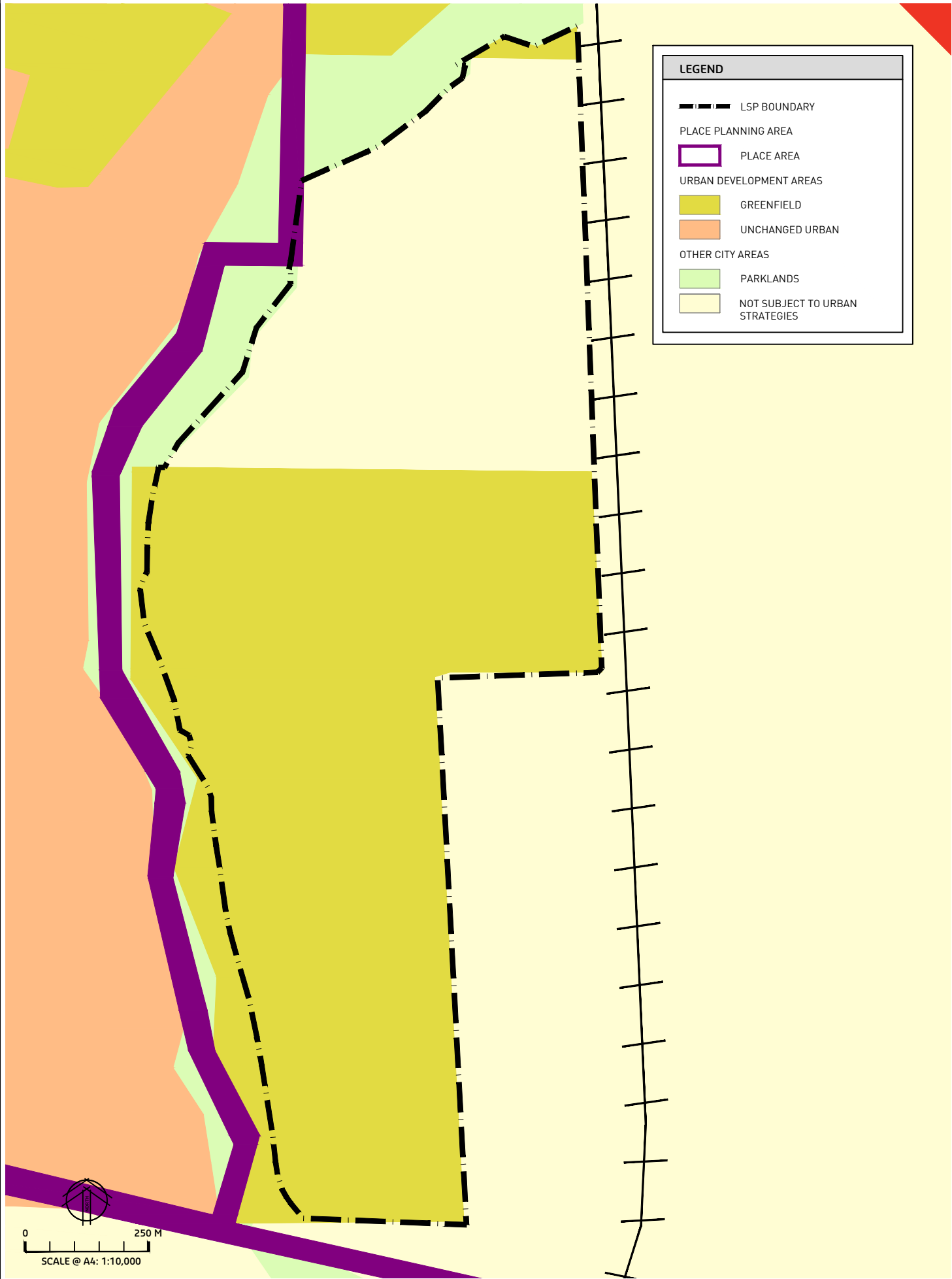
Liveable Neighbourhoods (LN) is a WAPC operational policy for the design and assessment of structure plans and subdivision in new urban areas. LN seeks to create more vibrant, self sufficient and interactive communities that provide a wide range of residential, employment, recreational and business opportunities within a reasonable catchment.

The aims of LN can be summarised as follows:

- ▲ To promote an environment for safe, efficient and pleasant walking, cycling and driving;
- ▲ To facilitate mixed use urban development which provide a wider range of living, employment and leisure opportunities;
- ▲ To provide for a flexible neighbourhood structure capable of adapting over time as a community changes;
- ▲ To provide for a variety of lot sizes for housing choice and diversity; and
- ▲ To provide a comprehensive approach to the design of open space and water management.

The LSP has been prepared in accordance with the requirements of LN to ensure that more detailed proposals at subdivision stage are also capable of satisfying the relevant criteria.

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1.3.5.2 Bush Forever

Bush Forever was prepared by the WAPC in 2000 as a ten year strategic plan for the retention and protection of regionally significant bushland within the Perth Metropolitan Region. Bush Forever presents a 'whole of government approach' to the protection of bushland (and associated wetlands), with the Bush Forever policy having been endorsed by the Government of Western Australia, the WAPC, the EPA, and other key environmental agencies.

One of the principle aims of Bush Forever is to assist landowners, developers and the community by clearly distinguishing each Bush Forever site and associated recommendations for site implementation.

Bush Forever Site 300 which is referred to as the 'Ellen Brook Reserve' has a substantial interface with the western boundary of the LSP area, although it does not extend into the LSP area. Under the MRS, the Ellen Brook foreshore is reserved as 'Parks and Recreation', with a portion of the LSP area containing floodways. These areas cannot be developed for urban purposes and must be considered in the context of environmental and drainage management.

1.3.5.3 Guidelines for Planning in Bushfire Prone Areas (2015)

The WAPC's revised Guidelines for Planning in Bushfire Prone Areas replaces the Planning for Bush Fire Protection (Edition 2) Guidelines and the draft Planning for Bushfire Risk Management Guidelines. These Guidelines should be read in conjunction to State Planning Policy 2.8, as they provide a framework for considering bush fire hazard and mitigation requirements through the planning approvals process.

Given the LSP area is located adjacent to areas of vegetation (predominantly within the adjacent Bush Forever Site 300) the LSP has been prepared in accordance with the requirements of Guidelines for Planning in Bushfire Prone Areas and is supported by a Bushfire Management Plan.

1.3.5.4 State Planning Policy (SPP 2.8) Bushland Policy for the Perth Metropolitan Region

State Planning Policy 2.8 (SPP 2.8) which was gazetted in June 2010, aims to provide a policy and implementation framework that will ensure bushland protection and management issues in the Perth Metropolitan Region are appropriately addressed and integrated with broader land use planning to the secure long-term protection of biodiversity and associated environmental values.

The policy applies to the metropolitan region and addresses two distinct aspects of bushland management being, Bush Forever site's and local bushland.

The policy recognises the protection and management of significant bushland areas as a fundamental consideration in the planning process, while also seeking to integrate and balance wider environmental, social and economic considerations. Generally, the policy does not prevent development where it is consistent with policy measures.

The north and western boundaries of the LSP abut existing bushland. The LSP does not impact upon the adjoining bushland and, where possible, seeks to retain remnant vegetation that is within the LSP area.

1.3.5.5 State Planning Policy 2.9 (SPP2.9) Water Resources

State Planning Policy 2.9 (SPP 2.9) was gazetted in December 2006. The aim of SPP 2.9 is to provide a policy and implementation framework to ensure the appropriate and sustainable management of all urban water sources within Australia.

Generally, the policy does not prevent development where it is consistent with policy measures, but aims to avoid or where appropriate to ameliorate, possible potential impacts such as soil erosion,

increased acidity and the leaching of acid sulphate soils, the removal of native vegetation or pollution and contamination from construction.

1.3.5.6 State Planning Policy 2.10 (SPP2.10) Swan-Canning River System

State Planning Policy 2.10 (SPP 2.10) was gazetted in December 2006. The aim of SPP 2.10 is to provide a regional framework and guiding principles for future land use and development in allocated precincts along the Swan- Canning River system.

The policy does not prevent development where it is consistent with policy measures.

The policy sets out to guide and inform agencies, authorities, landowners and the broader community on matters that relate to the protection and management of the river system. The LSP is considered to be consistent with the provisions of SPP 2.10.

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

State of Planning Policy 4.2 Activity Centres for Perth and Peel (SPP 4.2) provides a framework for the planning and development of new activity centres and the redevelopment and renewal of existing centres in Perth and Peel.

Under SPP 4.2, the centre proposed by the LSP is considered a local centre which provides the local community with daily to weekly household shopping and community needs.

The LSP is therefore considered consistent with the provisions of SPP 4.2.

1.3.5.8 State Planning Policy (SPP 5.4) Road and Rail Transport Noise and Freight Considerations in Land Use Planning

In accordance with State Planning Policy 5.4 (SPP 5.4), residential development is considered a 'noise sensitive development', for those portions of the site that are in proximity to the railway line.

An Acoustic Assessment has been undertaken to investigate the potential impact of the railway line. The assessment provides mitigation and management recommendations that have been incorporated in the LSP.

1.3.6 Local Planning Policies

Development within the LSP area should be in accordance with, but not limited to, the following City of Swan Local Planning Policies, except where otherwise varied by this LSP, an approved Local Development Plan (LDP), or otherwise by the City of Swan.

- ▲ POL - C – 061 Filling of Land;
- ▲ POL - C – 063 Interpretation of Watercourses and Wetlands;
- ▲ POL - C – 083 Commercial Centres Strategy;
- ▲ POL - C – 103 Neighbourhood Planning Policy;
- ▲ POL - C – 104 Environmental Planning;
- ▲ POL - C – 105 Community and Economic Planning;
- ▲ POL - C – 112 Public Open Space – Residential Areas;
- ▲ POL – E – 13.11 Inclusion of Pedestrian Access ways in Residential Subdivisions;
- ▲ POL – E – 9.2 Floodplain Management and Development.

1.3.7 Other Approvals and Decisions

1.3.7.1 Urban Deferred Lifting

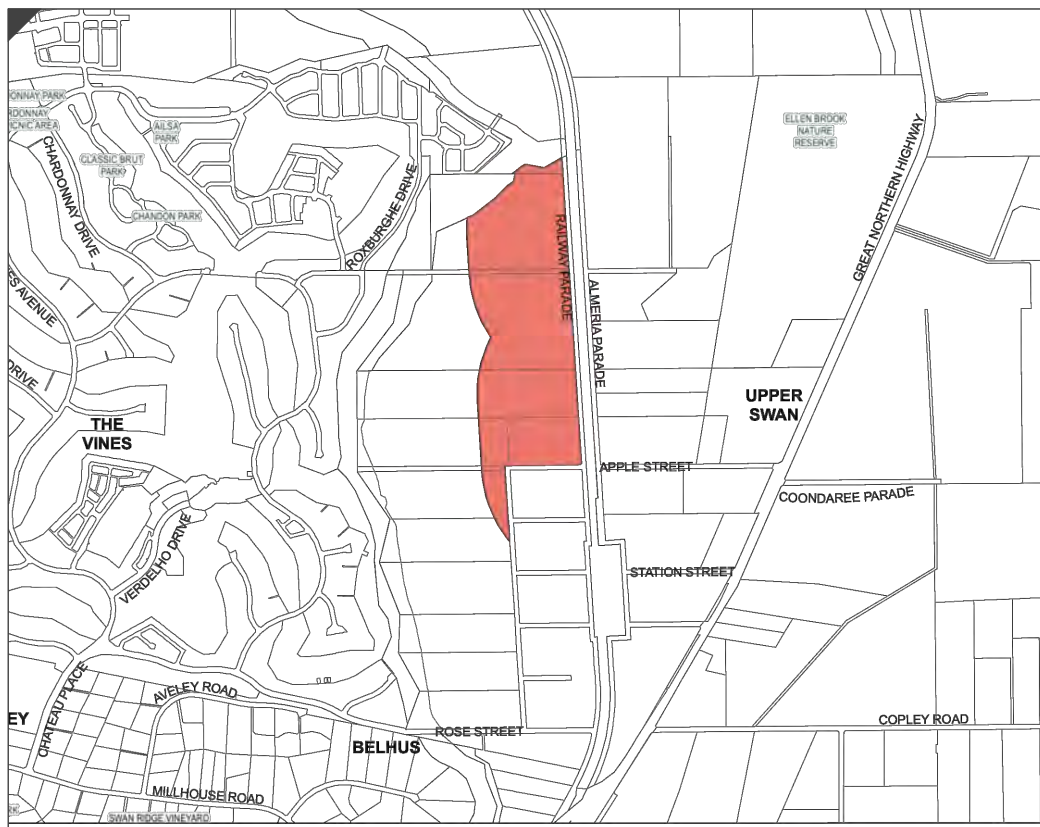
The LSP area was subject to a Metropolitan Region Scheme Amendment (Upper Swan Urban Precinct - MRS Ref. 1225/41). The proposal was initially published in the Government Gazette in September 2011 (WAPC amendment number 3.2461).

The amendment removed the majority of the site from the 'Rural' zone and transferred it into the 'Urban' zone, with parts of the site located in the north eastern portion of the site being transferred from the 'Rural' zone to the 'Urban Deferred' zone – the changes were accepted and endorsed in June 2012.

In accordance with Clause 27 of the MRS an additional MRS amendment was sought for the transfer of the north eastern portion of the site from the 'Urban Deferred' zone to the 'Urban' zone. The WAPC resolved on the 28 October 2014 to adopt these changes.

Refer Figure 7 – MRS Amendments.

MRS Amendment No.1225/41



MRS Amendment No.1279/27



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1.3.8 Pre-Lodgement Consultation

The following table summarises the pre-consultation undertaken to inform the preparation of this LSP document.

ORGANISATION	INDIVIDUALS CONSULTED	MATTER INVESTIGATED
City of Swan	Mr Steven Tan Mr Philip Russell	Town Planning/Urban Design
City of Swan	Mr Wayne Stuart	Recreation
City of Swan	Mr Yoon-Kah Wong	Engineering Drainage and Hydrology
City of Swan	Mr Tim Garrigan Mr Grant MacKinnon	Landscaping/Open Space Environment Foreshore Management
Atco Gas	Mr Chris Pemberton	Gas
NBN Co	Mr Alex Zimmermann	Telecommunications
Western Power	Mr Ajay Sood	Power Supply
Water Corporation	Mr Russell Nelson Mr Mark Busher	Water Supply/Effluent Disposal
Department of Water	Mr James Mackintosh Ms Carlie Slodecki Mr Gabriel Steel	Hydrology/Drainage Floodplain Management Groundwater Allocations
Department of Education	Mr Michael Cooper Mr Stephen Muldoon	Education
Main Roads WA	Mr Tony Freeman Mr Zeljko Zagorac Mr Justin McKirdy Mr David Van Dries Mr Brad Lenton Mr Aaron Milne	Regional Roads/Railway Crossing
Public Transport Authority	Ms Shelly Brindal	Railway Crossing
Ellen Brockman Integrated Catchment Group	Ms Rosannah Hindmarsh	Nutrient Management Wetland Vegetation Foreshore Management Groundwater Allocations

Site Conditions and Constraints

The following provides a summary of the environmental site conditions and constraints, however for further information it is recommended the reader consult the Environmental Assessment Report provided at Appendix 2.

2.1 Biodiversity and Natural Area Assets

2.1.1 Flora and Vegetation

A Level 1 flora and vegetation survey was undertaken across the whole of the LSP area during autumn 2016. The survey included portions of the lots proposed to form part of the Ellen Brook foreshore.

The majority of the site consists predominantly of cleared farmland with three vegetation types identified in patches over the LSP area, comprising:

1. Cleared paddocks with scattered *Corymbia Calophylla*; *Eucalyptus Wandoo* and *Eucalyptus Rudis* trees on clay soil.
2. *Eucalyptus Rudis* and *Melaleuca Rahpiophylla* open woodland over exotic herbs and grasses on clay soils.
3. Cleared paddocks with *Viminaria Juncea*, *Hypocalymma Angustifolium* and *Watsonia Meriana* regrowth on clay soils.

The condition of the vegetation ranges in quality across the site from Good to Completely Degraded.

Given the extensive history of agricultural activities and associated land uses undertaken across the site, in addition to the proximity of public roads, site clearing and weed infestation, the current condition of the vegetation is significantly degraded. To this extent the development area is primarily devoid of remnant vegetation and maintains little ecological value.

Refer Appendix 3 – Flora and Vegetation Survey.

2.1.2 Dieback

Evidence of Dieback was not observed during the Level 1 Flora and vegetation survey. Much of the area was found to be either heavily disturbed or completely cleared.

The site does not support Dieback indicator species rendering the Project area as uninterpretable and inconclusive. The Construction Environmental Management Plan will be applied to manage potential risks from Dieback.

2.1.3 Conservation Areas

The Bush Forever site 300 adjoins the western and northern boundary of the LSP however, the Bush Forever site does not extend into the LSP area. No areas of conservation significance are mapped over the LSP area.

The Bush Forever site contains Floristic Community Type 18 which is listed under the *Environmental Protection Biodiversity Conservation Act 1999* as Vulnerable. The development will be implemented in accordance with the foreshore management strategy (appendix 4) managing protecting and enhancing the foreshore area. Refer Appendix 4 – Foreshore Management Strategy.

2.1.3.1 Threatened Ecological Communities

As a result of the overall disturbed and degraded nature of the site and the low native flora species diversity, coupled with a high weed concentration, no threatened or priority ecological communities have been identified.

2.1.4 Fauna

A Level 1 Fauna field survey was undertaken during autumn 2016 for the whole of the LSP area, including the Ellen Brook foreshore area.

A total of 17 vertebrate fauna species were identified during the field survey consisting predominantly of locally abundant birds and reptiles that reside in semi - rural settings that may be highly disturbed. The Ellen Brook riparian corridor forms the most significant habitat suitable for the assemblage of native fauna. The cleared and degraded nature of the vegetation within the development area maintains little to no understorey vegetation considered suitable for supporting native fauna.

No black cockatoos were sighted during the field assessment, however, signs of foraging by the Forest Red-tailed Black Cockatoo (FRTBC) were evident. The amount of vegetation within the project area which may be considered suitable habitat for foraging for the Carnaby's Black Cockatoos (CBC) is predominately low. A tree assessment identified four trees with suitable hollows for CBC breeding although there was no indication of them being used as such.

The nearest Black cockatoo roosting site is located within 'The Vines' approximately 1.3 km west of the subject site.

Evidence of the European Red Fox (skeletal remains) and Rabbit (scats) were observed within the area, however, as introduced species they do not impact urban development.

2.1.5 Wetlands

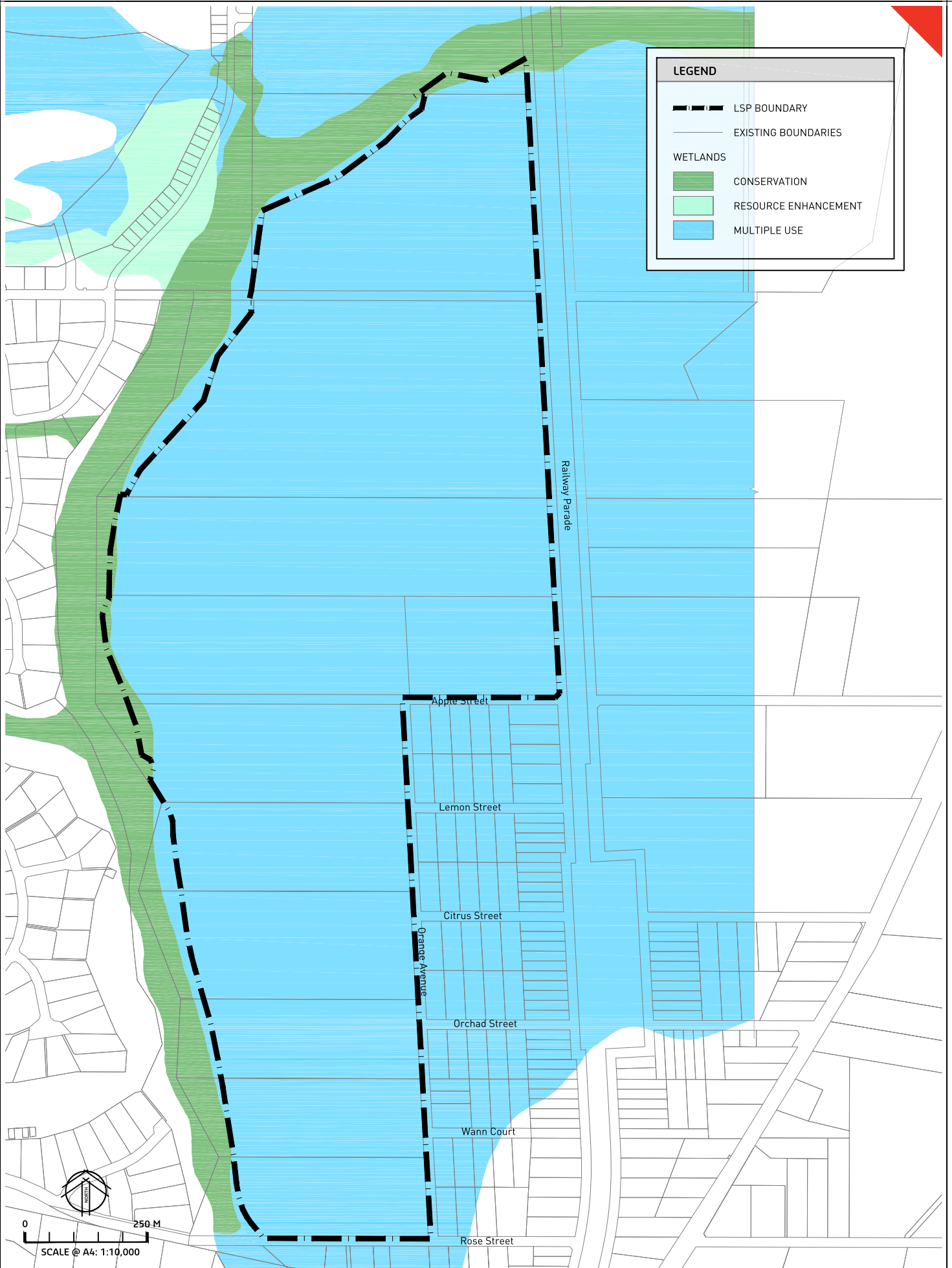
A Multiple-Use (MU) category wetland is mapped over the majority of the site, stretching over the southern and eastern portions of the LSP area. This wetland is considered to be significantly degraded with few natural attributes and of low environmental significance. It is suitable for urban development.

The Ellen Brook runs immediately adjacent to the site's western and northern boundary and is classified as a Conservation Category Wetland (CCW). The CCW does not extend into the proposed development area, furthermore a significant area of POS is proposed as an interface between the CCW and the proposed development providing a clear separation and setback to the CCW.

No Resource Enhancement (RE) wetland is identified within the LSP area, however an RE wetland is mapped west of the Ellen Brook Foreshore outside the LSP area.

Refer Figure 8 – Wetland Location.

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2.2 Landform and Soils

2.2.1 Acid Sulphate Soil

A search of the Swan Coastal Plain ASS risk mapping (Landgate 2016) identified the site as having a moderate to low risk of ASS occurring within 3m of the natural soil surface along the western portion, (Ellen Brook interface) of the LSP area. The balance of the LSP area is identified as having no risk of ASS.

ASS testing initially undertaken in 2006 indicated a low level risk, however, the results indicated the predominance of actual or existing acidity, but with no recorded potential acidity. The actual acidity represents pre-existing and probably natural acidity in the soil profile pre-dating any development of the site.

Recent ASS mapping and on site testing correlate to indicate a low risk of ASS impacting the subject site.

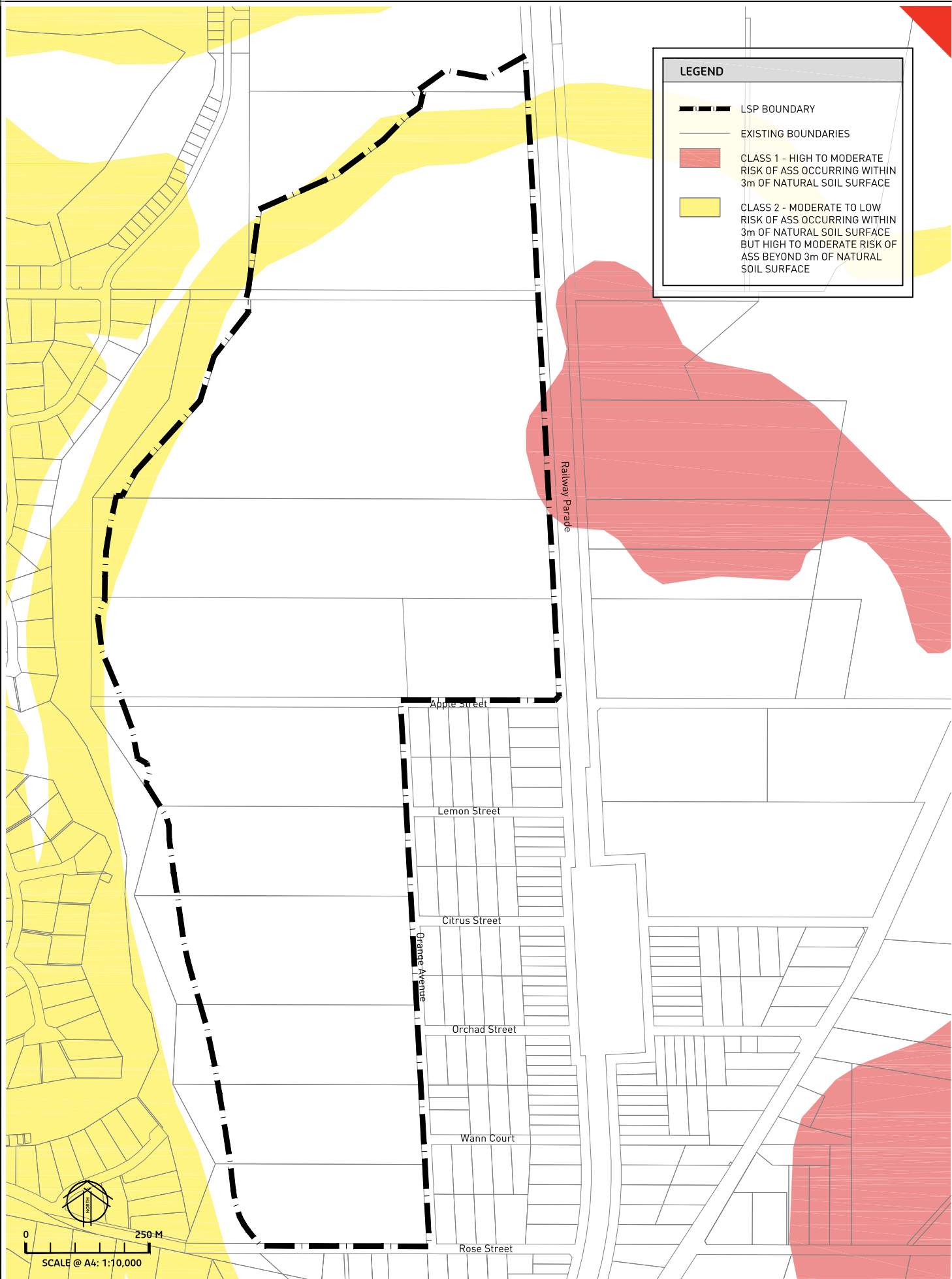
Refer Figure 9 – Acid Sulphate Soil Risk Plan.

2.2.2 Contamination

The Department of Environmental regulation Contaminated Site's Database does not list the site as being a known or suspected contaminated site.

Notwithstanding, a Preliminary Site Investigation is currently being undertaken by Strategen Environmental, which will be finalised prior to subdivision of the site.

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2.3 Groundwater and Surface Water

2.3.1 Surface Water

The ephemeral (seasonal) groundwater table for the area is intercepted by Ellen Brook, which is considered to be the dominant water body within the area.

A number of smaller tributaries (ephemeral streams) distribute flow from the LSP area into Ellen Brook during annual storm events which results in water logging or higher than normal water levels in the superficial aquifer. Water logging, however, is more likely to occur in areas below the rise on the edge of the Brook that will not be developed and on flatter areas closer to Railway Parade due to the sandy clay or clayey sandy soil located at the surface.

Current stormwater management infrastructure for the area consists of an open drain identified along Apple Street, connecting to Ellen Brook on Lot 3. The Apple Street drain has a relatively small catchment (estimated at 1.66ha). It is therefore not considered a major waterway as it is more likely to flow only after storm events or persistent wet weather.

Ellen Brook was modelled by the Department of Water for floodway's and associated flood fringe areas for the 1 in 100 year storm event. Flood fringe areas in the south-western portion of the site may be developed, however floor levels of all dwellings are to be built 0.5m above the maximum flood level. Filling large areas of the flood plain within the LSP area is not acceptable as this may increase the flood height in upstream areas.

A buffer of varying width is proposed to define the foreshore area and to provide additional setbacks to Ellen Brook.

The agreed setback (foreshore area) to Ellen Brook was defined in previous environmental studies undertaken in support of the MRS Amendment 2010 which identified boundaries based upon environmental factors considered when determining the foreshore buffer, which include flood prone land, topography, drainage lines, vegetation and habitat areas.

The surface water quality of Ellen Brook was measured as part of pre-development monitoring from November 2004 to September 2006. Results indicate water quality characterised by high nutrient concentrations, as a result of surface water flow due to direct runoff or leaching of nutrients from waterlogged Guildford Formation soils. These nutrients originate from agricultural activities that have since ceased or from upstream (off site) agricultural land uses.

2.3.2 Groundwater

Groundwater monitoring for the site was undertaken on 6 occasions in 2006. Water levels according to the Department of Environmental and Conservations (DEC) contour mapping and the Perth Groundwater Atlas indicate 13m AHD across the majority of the site with 9m AHD levels identified closer to Ellen Brook. The inter layered nature of the local geology appears to have caused a heterogeneous distribution of perched water tables supported on layers of clayey material, resulting in a more complex hydrogeology system to what was identified by the Atlas.

The groundwater levels across the site ranged from 7mAHD along the Brook in the west to 22mAHD being identified in the east. Data taken from groundwater modelling in 2007 indicates the majority of the site as ranging from 15 to 22mAHD.

Two aquifers were identified within the LSP area, consisting of a shallow seasonal unconfined/perched aquifer and a deeper semi confined aquifer. Both of these resulting in inconsistent water level readings in the set up monitoring points across the site. The Average Annual Maximum Groundwater Levels

(AAMGLs) undertaken at the reference bore located approximately 2km away (The Vines) was calculated at being L90A. This is considered to be 0.34m higher than readings taken on that day.

The AAMGL depths were less than 2m at 10 of the 13 bore locations, therefore it is likely that fill or subsoil drainage systems may be required. Subsoil drainage will help manage perched aquifers and control groundwater rise. If adopted, these will be designed to have free fall outlets.

2.4 Bushfire Hazard

A Bushfire Management Plan (BMP) has been prepared for the LSP area in accordance with the requirements of *State Planning Policy 3.7: Planning in Bushfire Prone Areas*. The BMP is provided in Appendix 5, however the following provides an overview of fire management assessment undertaken and the provisions applicable to development of the site.

2.4.1 Hazard Assessment

The BMP identifies the site as comprising predominantly low threat bushfire prone vegetation due to the site's cleared nature and its proposed future land use as residential. An area of the Ellen Brook is classified as Class B Woodland and poses an extreme bushfire hazard. Class C shrubland vegetation is to be planted within 1:1 year drainage areas which is a moderate threat bushfire vegetation mitigated through risk management measures.

The proposed residential development proposes a peripheral road along the Ellen Brook interface, effectively providing separation between the identified bushfire threat and the proposed residential dwellings.

Vegetation classifications, associated hazard and threat levels have been identified within the BMP.

2.4.2 Management Requirements

Bushfire management measures have been considered as part of the BMP to mitigate the risk to future residential dwellings within the hazard separation distances. These include all dwellings within 100 metres of the Class B woodland and Class C shrubland to which majority will have a BAL rating of 12.5. A portion of the northern most development area has a BAL rating of 19. Dwellings on lots impacted upon by BAL ratings will be constructed to increased standards in accordance with the requirements of SPP 3.7.

Refer Appendix 5 – Bushfire Management Plan.

2.5 Heritage

The subject site is not identified on the Heritage Council State Register however, a search of the City's Municipal Heritage Inventory for the site identified two lots within the LSP area, as listed below:

- ▲ Lot 30 (51) Orange Avenue, Upper Swan (Heritage Place No. 14379); and
- ▲ Lot 28 (85) Orange Avenue, Upper Swan (Heritage Place No. 23589)

Both lots were identified as containing single storey dwellings, representative of rural subdivisions of the 1900s. Conservation of both dwellings is desirable but not essential. The dwelling on Lot 28 Orange Street is no longer evident.

The heritage significance of the dwelling located on lot 30 is to be retained and celebrated within an area of Public Open Space. The dwelling will be renovated and used as a sales office for the development. When no longer required as a sales office it is proposed that it be ceded to the City of Swan as a future community asset. Please refer to Appendix 6 for the Extract from the Municipal Heritage Inventory.



Heritage Dwelling Indicative Concepts



Aboriginal Heritage Site *DAA3525 Ellen Brook: Upper Swan* affects all lands within the Local Structure Plan area, with the exception of Lot 2 Apple Street. Ongoing consultation with relevant stakeholders is proposed to be undertaken as part of the detailed design phase to determine the potential significance of any impact to Aboriginal heritage sites. If disturbance is unavoidable, potential impacts to registered Aboriginal Heritage sites will be managed in accordance with the Aboriginal Heritage Act 1972.

2.6 Foreshore Area

The subject site maintains an interface with the Ellen Brook (categorised as a CCW) on its entire western and northern boundaries. The extent of the foreshore reserve has been identified through assessment undertaken in the context of the MRS Amendment which rezoned the land for residential development.

Future development of the site may impact the foreshore area, therefore meeting the objectives set out by the Environmental Protection Authority (EPA) should be considered through the development and implementation of the following management plans:

- ▲ Foreshore Management Plan - included as an appendix to the Environmental Assessment Report;
- ▲ Construction Environmental Management Plan – proposed to be prepared before the commencement of construction; and
- ▲ LWMS – included as an appendix to this report. Refer Appendix 10.

Opportunities to minimise the potential impacts to the foreshore reserve as a result of development are addressed through the Foreshore Management Plan. A future MRS Amendment is required to be implemented to facilitate the reservation of the Ellen Brook foreshore.

2.7 Noise Management

An existing freight railway line abuts the eastern boundary of the subject site. A Road and Railway Acoustic Assessment has been prepared in accordance with *State Planning Policy 5.4: Rail and Road Transportation Noise and Freight Consideration in Land Use Planning* (SPP 5.4) and has been used to inform the LSP.

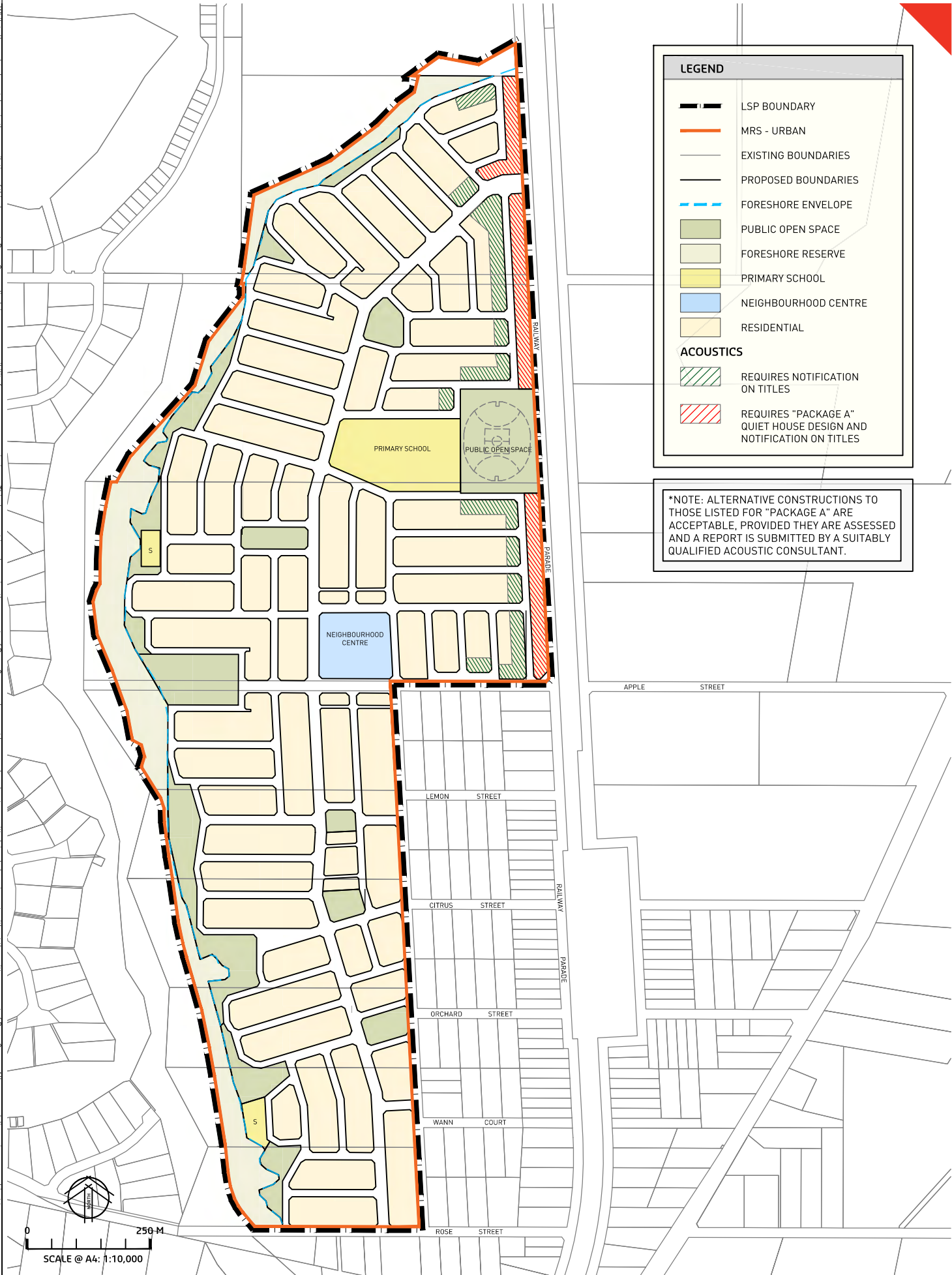
The acoustic modelling and assessment considers the potential noise impacts generated by trains using the railway line over a 20 year planning horizon (to year 2036).

Noise and vibration monitoring was initially conducted on site during November 2013. The acoustic modelling indicates that transport noise from both Railway Parade and the rail infrastructure are more likely to cause impacts to Lots 1, 13255 and 13256 Railway Parade and Lots 2 and 3 Apple Street. Modelling was undertaken based on the construction of a 3m high bund with a 50m separation buffer zone (measured from the rail infrastructure). It has subsequently been agreed that a noise mitigation wall will be used rather than a noise bund. Further amelioration in the form of 'Quiet House' design package requirements will be necessary for a number of identified allotments still predicted to receive noise levels above the minimum target levels prescribed under SPP 5.4.

This will be managed primarily through notifications on the Certificate of Title of future lots. These lots will also be identified on Local Development Plans for the site. The notifications will advise future affected dwellings are to be constructed to minimum construction standards consistent with the 'deemed to comply' noise limit Package A. These requirements are outlined within the Acoustic Assessment report contained in Appendix 7 of this report and the affected lots and proposed management measures are depicted in Figure 10 – Acoustic Requirements Plan.

Alternate constructions to those listed for Package A are acceptable, provided they are assessed and a report is submitted by a suitably qualified acoustic consultant at time of lodgement of a Building Licence.

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2.8 Summary of Opportunities and Constraints

From the above assessment of the LSP area a number of site constraints and opportunities were identified for consideration in the design response, these include:

2.8.1 Constraints

Ellen Brook – The Ellen Brook extends along the western and northern boundaries of the subject site. A number of significant environmental implications arise which have been considered in the context of the LSP. Whilst the Bush Forever designated vegetation within the locality of the Ellen Brook does not extend into the subject site, the potential impact of development on the vegetation must be considered. In particular drainage is to be managed to maintain an ecological balance that will not disrupt the Ellen Brook environment. Sympathetic revegetation and removal of introduced weeds will enhance the existing environment reinforcing the natural asset provided by the Ellen Brook.

Railway – The existing railway is separated from the northern half of the subject site by the existing Railway Parade road reserve. The future subdivision of the land will need to incorporate structures that mitigate the noise impacts (proposed as a noise wall) and future dwellings may require other measures to address noise impacts as outlined in the acoustic report. Future dwellings in proximity to the railway will need to be separated from the railway to mitigate the impact of vibration.

Railway Crossing – The existing railway crossing at Apple Street is currently uncontrolled and is potentially problematic given the proximity of the Apple Street/Railway Parade intersection to the railway. The construction of the bridge at the Railway Parade crossing of Ellen Brook will result in additional traffic movements along Railway Parade. This is an issue that would eventuate irrespective of the development of the LSP area however, the development of the LSP area does provide an opportunity to address the issue. Ultimately the diversion of Railway Parade to the west (into the LSP area) will create the opportunity to remove the northern 'leg' of the Apple Street/Railway Parade intersection.

Existing Residential Interface – The southern and south eastern boundaries of the subject site adjoin existing residential development. The existing residential properties are characterised by larger lots with established homes. The LSP needs to accommodate the conveyance of drainage from the existing residential areas whilst also ensuring that a suitable urban interface is achieved. The provision of larger lots at the interface seeks to facilitate a transition of urban form.

Heritage Building – The existing dwelling on Lot 30 Orange Avenue is included on the City's Municipal Heritage Inventory. Whilst retention of the dwelling is not required, it is desirable.

Apple Street/Great Northern Highway Intersection – The main access to the subject site will be via Apple Street from Great Northern Highway. The projected traffic generated by the future development of the site together with the additional traffic that will flow to and from the area north of the site once the Ellen Brook bridge is constructed, will generate a need for the Apple Street/Great Northern Highway Intersection to be upgraded.

2.8.2 Opportunities

Ellen Brook – Whilst the Ellen Brook is listed as a constraint it also provides a significant positive opportunity for the site in terms of passive recreation, visual relief and sense of place. The LSP has been specifically designed to draw the natural attributes of the brook into the urban area. This has been achieved through the use of linear POS 'green links' and landscaped boulevards that extend into the urban area adding value and amenity to the maximum number of future residents. The incorporation of a road interface along the extent of the Ellen Brook foreshore ensures the future protection of the foreshore reserve, public access to the foreshore whilst increasing separation for bushfire mitigation. The main entry into the LSP site is via Apple Street along the centralised Activity

Centre, terminating at a major point of arrival in the form of a large POS area that is contiguous with the Ellen Brook foreshore. The LSP design embraces the Ellen Brook reserve, providing a pedestrian/cycle network spine that uses the reserve linking the school, POS areas and the Activity Centre whilst creating the opportunity for active recreation 'circuits'.



Remnant Vegetation – The subject site was previously used for agricultural purposes and as such it has been predominantly cleared of vegetation. Whilst this removes the requirement for extensive clearing, there is considerable benefit provided through mature tree retention in new urban growth areas. The vegetation that is evident within the subject site is predominantly located on the western boundary in proximity to the Ellen Brook. These vegetated areas are to be included within POS areas.

Heritage Building – The retention of the existing dwelling on Lot 30 Orange Avenue and reuse for productive purposes provides the opportunity to establish a future community facility. It is intended that the building will be restored and incorporated within a POS area that will be ceded to the City of Swan after a period of use as a sales office by the Satterley Property Group. The details of the agreement will need to be discussed further with the City of Swan prior to the subdivision stage.



Bridge Connection – The continuation of Railway Parade north of the subject site is currently prevented by the Ellen Brook. A bridge across the Ellen Brook is programmed for construction with works to be completed by 30 June 2018. The bridge forms part of the Developer Contributions Scheme (DCA5) which is applicable to the subject site. The bridge will facilitate connection with the urban communities north of the subject site allowing those communities to access the primary school and the Activity Centre within the LSP area whilst also providing those communities with access to Great Northern Highway via Apple Street.

03

Land Use and Subdivision Requirements

The LSP sets out land use, residential densities, public open space, public and private transport provisions, environmental considerations and servicing requirements.

The urban pattern proposed through this LSP seeks to provide a site responsive layout which recognises the high quality natural environment in which the site is located. The LSP is predicated on the fundamentals of a modified grid providing for strong and legible connections throughout the development area to areas of amenity, which include the natural assets of the Ellen Brook, high quality POS areas, the Local Centre and the Primary School.

The layout forms a series of neighbourhoods each with an identifiable centre within a 5 minute/400m walk from the natural amenity of the brook and within close proximity to the Local Centre. A central north south neighbourhood connector road connects the neighbourhoods within the development area with the broader surrounds and connects the site to the suburb of Ellenbrook to the north-west through a future bridge crossing over the Ellen Brook.

The development is focussed around the Local Centre strategically located at the intersection of Apple Street and the neighbourhood connector, within close proximity to the centrally located Village Green link through the extension of Apple Street forming a significant town centre environment with a high level of amenity.

The local road network is aligned north- south, east-west providing for preferred solar orientation and regular lots with strong and legible connections to the natural amenity afforded by Ellen Brook. The road network draws the borrowed amenity offered by the Brook into the estate through a wider street network at appropriate locations.

Proposed lot typologies allow for a transition in residential density and diversity in housing choice. Areas of medium density will be consolidated around the local centre and immediately adjacent POS. Lot sizes will become progressively larger towards the periphery of the development area which allows for a range of lifestyle choices.

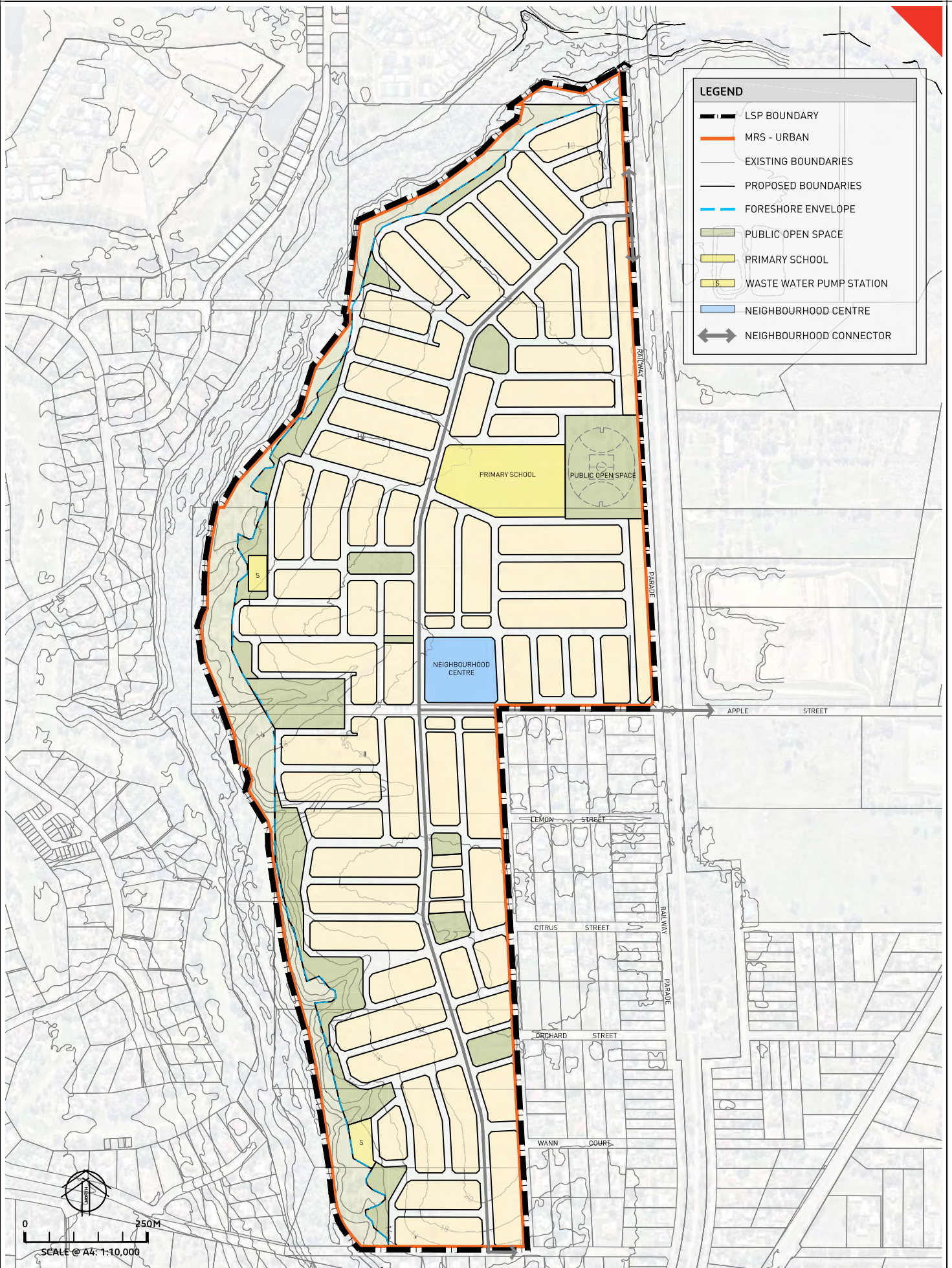
The Public Open Space seeks to celebrate the area's natural heritage offering an enhanced natural environment within the Ellen Brook foreshore through to landscaped areas within the development as an extension of the Brook.



The following describes the proposal set out in the LSP and addresses the relevant elements of Liveable Neighbourhoods (LN).

Refer Figure 11 – Indicative Plan of Subdivision.

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3.1 Land Use

The LSP is proposed to comprise predominantly residential development ranging from R10 to R60 densities. The LSP also comprises a range of local and neighbourhood public open space areas in accordance with the LN requirements, as well as a Primary School site to service the Upper Swan catchment and a local centre which will provide future employment opportunities for the area in addition to the daily and weekly shopping needs of the Community.

The following describes the design response proposed under the LSP and addresses the relevant elements of LN. Please refer to the land use summary table provided within the Executive Summary on page iii of this report.

Please also refer to Plan 1 – LSP and Figure 12 – Target Residential Densities.

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3.2 Public Open Space

Under the provisions of LN a range of site responsive urban parkland is required which appropriately addresses the district, neighbourhood and local needs of residents, comprising a mixture of active and passive recreational areas.

The LSP therefore provides a framework for the hierarchy and location of Public Open Space areas (POS) across the site, considering the requirements for drainage and vegetation retention and an improved interface with the Ellen Brook Reserve Foreshore. Detailed subdivision design will provide further refinement to the LSP's POS framework, defining the configuration, uses and treatment within each POS area.

The LSP provides for 11.35 hectares of POS across the site in the form of 3 areas of District POS which form an extension of the Ellen Brook foreshore reserve and an area of active recreation (playing fields) adjacent the Primary School, 6 neighbourhood parks and 1 local park. This comprises 11.35 hectares (10.2%) of the Gross Subdivisible Area). As noted above, the hierarchy and location of POS areas have been designed to ensure residents are within:

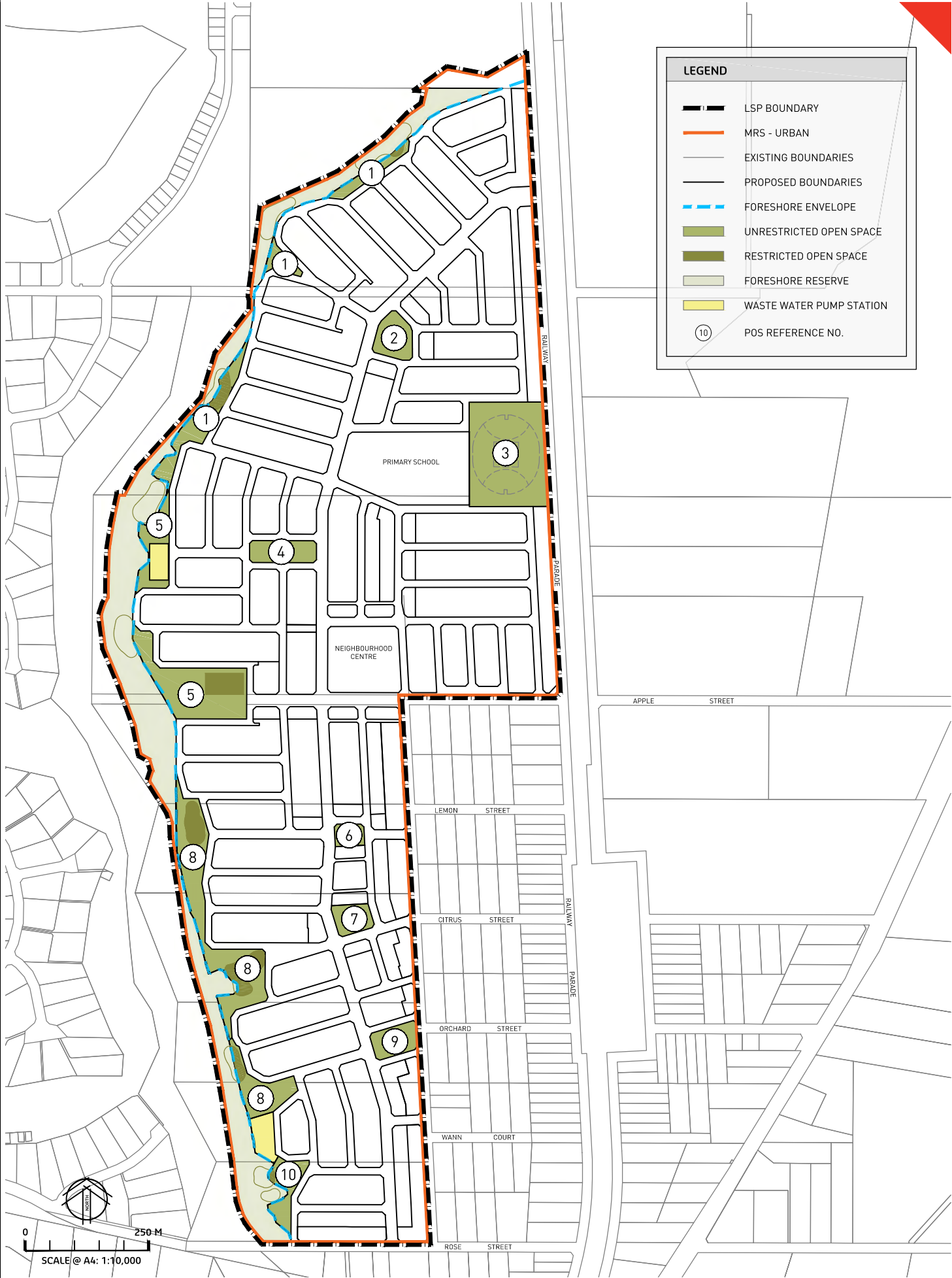
- ▲ 150m of a local park;
- ▲ 400m of a neighbourhood park; and
- ▲ 600m – 1km of an active playing field.

The following provides a detailed overview of the POS design response proposed under the LSP.

A Landscape Master Plan has been prepared for the LSP area, depicting the anticipated use and intent of each of the POS areas. Please also refer to Figure 13 – Public Open Space Schedule and Figure 14 – Public Open Space Plan and Appendix 8 – Landscape Master Plan

Upper Swan Local Structure Plan – Public Open Space Schedule			
Site Area (Local Structure Plan boundary)			132.3 ha
Deductions			
Foreshore Reserve	10.5 ha		
Primary School	3.5 ha		
Local Centre	1.9 ha		
Waste Water Pump Stations	0.7 ha		
1 in 1 Year ARI - Dedicated Drainage	1.8 ha		
Total		18.4 ha	
Gross Subdivisible Area			113.9 ha
POS @10%			11.39 ha
Public Open Space Contribution			
May comprise:			
– Min 80% unrestricted POS	9.1 ha		
– Max 20% restricted use POS	2.3 ha		
Total Required POS		11.39 ha	
POS Reference Number	1:1 yr Drainage (m²) <i>Deduction from net area</i>	Unrestricted Urban POS sites (m²)	Restricted Urban POS sites (m²)
1	4,890	8,700	2,170
2	540	5,436	0
3	0	32,496	0
4	0	5,948	0
5	5,260	17,046	3,220
6	480	2,139	0
7	0	4,306	0
8	4,650	20,859	7,495
9	230	4,991	0
10	2,010	3,759	277
Total	18,060 m²	105,681 m²	13,162 m²
	(1.81 ha)	(10.57 ha)	(1.32 ha)
		9.3%	1.2%

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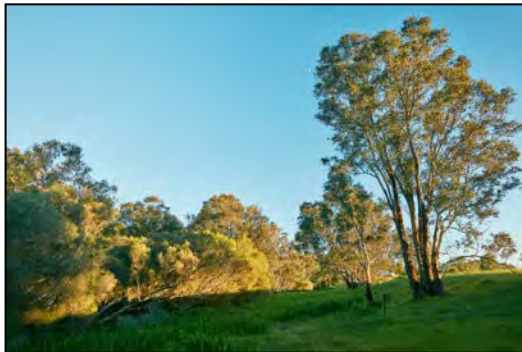
3.2.1 Ellen Brook Foreshore Reserve

A previous site investigation/reporting undertaken in support of the MRS Amendment process resulted in the identification of the foreshore reserve along the western boundary of the site.

The extent of the foreshore reserve as identified through the previous MRS rezoning process as the Foreshore Envelope has been utilised in the determination of the development boundary as part of this LSP.

The previous investigation comprised a detailed site investigation to assess the extent of vegetation, bank alignments and areas of flood and erosion. This method incorporated a holistic and comprehensive approach to the consideration of the development boundary to appropriately inform the western boundary of the site and meet the requirements of LN and SPP 2.10.

The Ellen Brook Reserve is considered a significant asset to the LSP area to be further enhanced through the provision of additional areas of adjoining POS and 'green links'. The provision of 'green links' will assist in linking the community to the foreshore through enhanced amenity and passive recreation opportunities.



3.2.2 Open Space – Drainage

The POS areas are proposed to capitalise on the site's location adjacent Ellen Brook, to integrate with the surrounding natural environment and rural character. The LSP strategically locates POS areas around existing natural attributes where possible, including stands of significant trees and the existing house on lot 30 in celebration of its heritage significance. Linear POS elements will extend from the Ellen Brook foreshore to assist in integrating the urban layout with the natural amenity of the Brook. POS will be landscaped to a high quality and useable to a wide range of the community.

A shared use path will run the length of the Ellen Brook foreshore with connections into the residential development providing strategic public access to the Brook.

Drainage is to be incorporated within the POS areas and landscaped appropriately so as to merge seamlessly with the surrounding area. The drainage regime seeks to retain stormwater runoff high within each catchment to disperse and infiltrate close to the source. Stormwater runoff will be arrested and infiltrated so as not to impact predevelopment flows into Ellen Brook. The strategic location of drainage basins seeks to minimise earthworks whilst retaining the natural landform as closely as possible.

1:1 year drainage basins are located to detain runoff from the development area in a normal rainfall event. Basins will be landscaped with reeds and sedges to assist with nutrient stripping and enhancing their visual appeal.

1:100 year drainage basins will be areas of turf which integrate seamlessly into the POS and foreshore reserve to be utilised as recreational space.

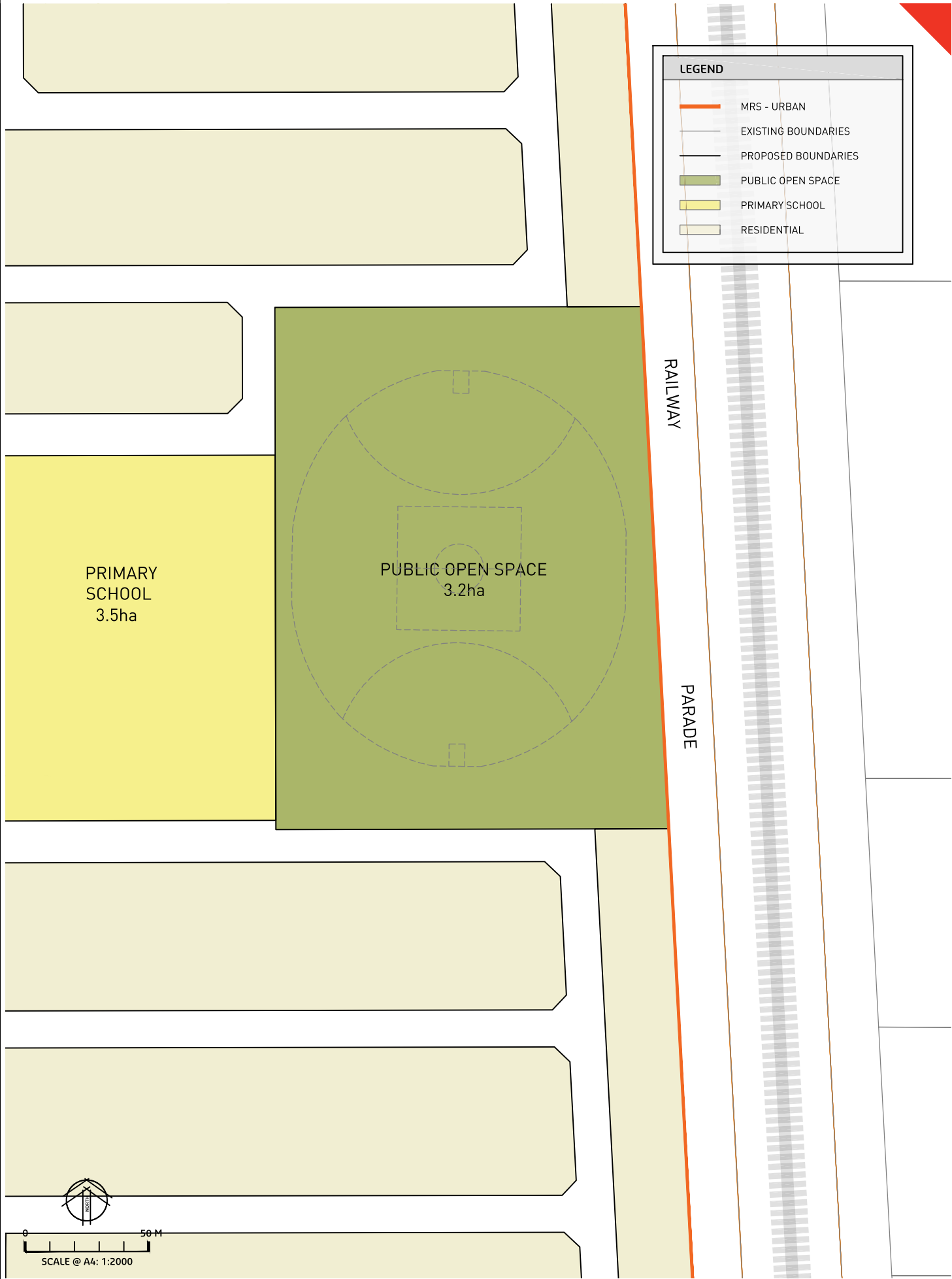
3.2.3 Local Playing Fields

The LSP includes the provision of a 3.5 hectare primary school with an adjoining 3.2 hectare POS area. The co-located primary school and POS allows for shared use of playing fields and parking. The City of Swan has indicated a preference for the POS area to have the capacity to accommodate a senior sized playing field. Australian Rules Football is the largest of the senior playing fields with the longest dimension measuring from between 135m to 185m. Other sporting codes can be accommodated within the area allocated for Australian Rules Football.

The playing fields will be turfed by the developer, but the delivery of any associated facilities on site (e.g. parking, clubrooms, seating and shelters) will be the responsibility of the City of Swan in consultation with the Department of Education.

Figure 15 depicts an Australian Rules Football field of 165m in its longest dimension to be accommodated within the POS co-located with the primary school.

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3.2.4 Landscape Strategy

The landscape philosophy and design for Upper Swan aims to create unique and engaging landscape areas that respond positively to the existing characteristics of the site and its immediate surrounds, dominated by its semi rural setting adjacent to the Ellen Brook, and strong visual connection to the nearby Darling Ranges. This existing landscape is characterised by farmsteads and grass paddocks with existing trees, predominantly located adjacent to the Ellen Brook, some introduced planting of native and exotic trees near homesteads and access roads, rural fences, and other infrastructure typically associated with current and past farming practices.

Public Open Space will be predominantly located adjoining the primary North South Neighbourhood Connector further enhancing the estates main green link, and also adjoining the Ellen Brook area. The Public Open Space located near the Ellen Brook Foreshore will provide areas of substantial usable space and draw people towards the primary environmental asset of the development, emphasising and significantly adding to the sense of place and community.

The use of locally inspired materials and themes throughout the estate's Public Open Space areas and hardscapes will help to further develop a strong sense of community and a deep connection to the Upper Swan area. This sense of place will be enhanced with the retention of existing vegetation, particularly within the Ellen Brook Foreshore, and where possible retained within the prominent drainage channels. Significant focus has been applied to maximising the retention of existing trees within Public Open Space areas where possible. In addition to this, an existing homestead with heritage value will be retained in situ and located within Public Open Space to add further strength to the estates sense of place.



A variety of Public Open Space areas will provide a number of different experiences for local residents with numerous opportunities for a variety of passive and active recreation. Public Open Space within the Upper Swan development is likely to include numerous strategically located footpaths connecting open space areas to the over arching footpath network and to the Ellen Brook Foreshore, shade structures, playgrounds, some BBQ facilities, turf areas for recreation, and planting of trees, shrubs and groundcovers. The planting palette is likely to include predominantly native plant species, however the use of culturally relevant exotic plant species, particularly trees, will be considered to further enhance the connection to the surrounding area and its rich agricultural history.

In addition to providing recreation opportunities to local residents, some Public Open Space areas will provide an important drainage function. 1 in 1 year basins will be incorporated into the development at key locations and will be planted with native reeds and sedges that will assist in the stripping of nutrients prior to infiltration. Allowance for 1 in 100 year drainage will be predominantly provided adjacent to the Ellen Brook, within the development's buffer zone. The 1:100 year drainage areas will be turfed and will provide a valuable usable open space for local residents.

A significant area of active open space will be co-located with the proposed Primary School and will accommodate a senior sized oval.

3.2.4.1 Ellen Brook

The existing Ellen Brook and adjoining foreshore defines the western boundary of the development site and is a crucial asset that will strengthen links to the existing local community, enhance the strong sense of place within the area and provide amenity of high value. Additional areas of adjoining Public Open Space have been provided to the eastern edge of the foreshore to align with the existing drainage channels and to further enhance the amenity of the Brook and its immediate surrounds.

Whilst the existing vegetation within the foreshore is generally degraded and dominated by pasture grass, there are numerous stands of trees that vary from low to high retention value (based on arboricultural advice). The retention of trees where appropriate in this area, is considered to be of strong importance to the overall outcome of the Ellen Brook Foreshore and the adjoining Public Open Space.



The existing creekline also varies in condition from degraded to good. Works will not be undertaken within Ellen Brook itself and will be restricted to revegetation within specific areas of the surrounding foreshore, installation of a meandering dual use path and small structures and furniture at key locations. The dual use path system will connect to the Public Open Space and estate footpath network, confirming the importance of the Ellen Brook and foreshore to the local community.

3.2.4.2 Green Links

To further enhance the connection between the development and the Ellen Brook, a series of green links or widened road reserves provide strongly treed vehicular and pedestrian connections, which frame the views of Ellen Brook and draw people closer to the primary community and environmental asset.

The alignment of the green links will also provide a strong visual connection to the nearby Darling Ranges.

3.2.4.3 Irrigation

The development has been provided with a water allocation to allow for the irrigation of Public Open Space. As such, irrigation is proposed to be undertaken from groundwater bores. The irrigation design will include the irrigation of all turf areas and more prominent garden bed areas. Some areas of unirrigated, dry land planting will also be implemented and will reduce the water usage across the project. Plant species will be largely selected for their low watering requirements and, together with the nominated irrigation philosophy, will assist in water usage and maintenance generally being minimised. Soil preparation utilising water-retention media and the appropriate plant species suitable for the site conditions will be included in the implementation strategy for the project. Low trajectory sprays to lawn areas and garden beds, and flood bubblers to trees will form the basis of the irrigation design.

* FOCAL POINTS AND OPPORTUNITIES FOR COMMUNITY GATHERING.



PLAN
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ULTIMATE LANDSCAPE



LANDSCAPE AT INSTALLATION



ULTIMATE LANDSCAPE



POS + ELLEN BROOK INTERFACE A - NTS





FEATURE STRUCTURES

RECREATION AREAS



RECREATION AREAS



PLAYGROUND



WALKWAYS



POS + ELLEN BROOK INTERFACE B - NTS





HERITAGE POS - NTS





POS + ELLEN BROOK INTERFACE B - NTS





HERITAGE POS - NTS





PERSPECTIVE - NOT TO SCALE



GREEN LINK - NTS



3.3 Residential

The LSP proposes a target average residential density of 22 dwellings per site hectare and 15 dwellings per gross urban hectare. This is consistent with LN requirements, which stipulates a minimum average of 22 dwellings per site hectare and 15 dwellings per urban hectare for Greenfield subdivision areas. This is also consistent with Directions 2031 targets of a minimum 15 dwellings per gross urban hectare.

An indicative subdivision layout has been prepared for the site, identifying a yield of approximately 1646 lots. Based on 1646 lots, the site achieves a density of approximately 24 dwellings per site hectare, and 15 dwellings per gross hectare, therefore achieving the proposed target densities outlined by the Western Australian Planning Commission. For reference, an Indicative Plan of Subdivision is provided at Figure 11. This plan is provided for explanatory purposes only and is subject to review and detailed design at the subdivision stage.

The LSP provides for a diversity of lot product across the site area, providing for a range of dwelling types and affordability. The LSP proposes lots for the majority of the development area in the range 300sqm – 450sqm. Smaller lots will also be provided to cater for smaller household types including singles and seniors. These lots will be close to areas of amenity and public transport and in proximity to the Neighbourhood Centre. Lifestyle lots will be allocated in areas with significant POS amenity and orientation, particularly with an interface to Ellen Brook. Larger rural interface lots will be incorporated predominately along the eastern interface of the site in keeping with the site's rural setting.

It is anticipated the diversity in lot types will be suitable for a wide range of lifestyle choice and budget providing for a diverse community.

Residential density codes have been allocated across the site and have been used in the preparation of indicative subdivision layouts and density calculations. The LSP generally allocates areas of R10-R20 lots to provide an interface with the existing rural setting to the east, lots at a density coding R30-R40 adjacent to POS areas and significant pedestrian routes. The inclusion of R40 -R60 density lots are allocated within immediate proximity to areas of high amenity and access including (but not limited to) around POS, and adjacent to the Local Centre.

The density code range also facilitates a diversity of lot product across the site, providing for a range of dwelling types. The preparation of Local Development Plans will also assist in facilitating the delivery of diversity in lot product, in addition to seeking to achieve built form outcomes consistent with the development intent of the site.

Notwithstanding the density allocation identified under this section, residential densities are to be determined and formally adopted at subdivision stage. In accordance with Part 1 of this LSP, a Residential Density Code Plan is required to be approved at the time of lodgement of Applications for Subdivision Approval.

Development standards for Medium Density Residential zoned lots shall be in accordance with the R-MD Codes as outlined in the City of Swan Policy POL-LP-11.

The LSP is sufficiently flexible to allow for the provision of group housing sites which will be strategically located within the development around areas of high amenity, particularly in close proximity to the Local Centre and POS.

The requirement for senior's living will be investigated through a needs assessment study and group housing sites will be allocated accordingly to provide for this type of housing. This will address the requirements of an ageing population allowing for ageing in place.

3.3.1 Locational Criteria for Density Distribution

The following criteria will act as a general guide to the density allocation.

LOW DENSITY R15

The R15 density code shall apply to Residential zoned lots that have frontage to Apple Street (for the section between Orange Street and Railway Parade only), Orange Street and Rose Street.

MEDIUM DENSITY R25 – R40

The R30 density code shall be the predominant density code within the structure plan area.

The R40 density code shall apply to Residential zoned lots where:

- ▲ The lot is located within 400m of Public Open Space; or
- ▲ The lot is located within 200m of public transport or neighbourhood connector routes.

MEDIUM DENSITY R40 – R60

The R40 density code shall apply to Residential zoned lots where:

- ▲ The lot is located within 400m of Public Open Space; or
- ▲ The lot is located within 200m of public transport or neighbourhood connector routes; or
- ▲ The lot is located within 200m of the corridor linking the General Commercial area and the Primary School site.

The R60 density code shall apply to Residential zoned lots where:

- ▲ The lot is located within 200m of Public Open Space, or
- ▲ The lot is located within 200m of the General Commercial area, or
- ▲ The lot is located within 200m of public transport or neighbourhood connector routes.

3.4 Movement Networks

The following provides a summary of the proposed movement network. Further and more detailed information along with typical cross sections are available in the Transport Assessment included at Appendix 9.

3.4.1 Existing Road Network

3.4.1.1 Great Northern Highway (GNH)

Great Northern Highway (GNH) is categorised as a Primary Distributor in the Main Roads WA functional road hierarchy.

GNH is constructed as a two lane highway with a 3.5m (painted) median, which accommodates right turn pockets or traffic islands at key locations. Two cycle lanes are implemented on both sides of the highway with left turn deceleration lanes at key intersections, including Railway Parade and Apple Street. GNH reverts to a two lane rural highway standard north of Apple Street.

To date, existing traffic volumes on GNH consist of approximately 16,691 vehicles per day south of Apple Street and approximately 15,698 vehicles per day (vpd) north of Apple Street.

3.4.1.2 Apple Street

Apple Street is a local distributor road which provides an east - west connection from the Ellen Brook foreshore through the subject site to Great Northern Highway (GNH). Apple Street crosses over the railway line on the eastern boundary of the subject site before connecting through to GNH at an unsignalised T-Section. This street is constructed to a sealed rural standard, and is intended to be upgraded as part of the future development to accommodate forecast traffic increases whilst maintaining the rural character of this section of Apple Street..

Apple Street will be utilised as the primary access and egress route for the site. Apple Street within the LSP area is constructed as a single-carriageway (4.5m) that widens to a 6m sealed road east of Railway Parade. Immediately west of its intersection with GNH Apple Street widens to 10m to accommodate kerbing, drainage and street lighting, providing heavy vehicle access to the road train assembly area located south of Apple Street, approximately 150m west of GNH.

Existing traffic volumes assessed at the railway crossing in 2014 are approximately 685 vpd.



3.4.1.3 Railway Parade

Railway Parade is a local distributor road south of Apple Street and acts as an access road from Apple Street proceeding north, along the subject site's entire eastern boundary.

Railway Parade connects through to GNH in the south. This intersection is proposed to ultimately become a left in / left out T-intersection in the future. Railway Parade is constructed as a sealed rural standard road, consisting of a single carriageway with a width of 3.5m north of Apple Street, widening to 7.5m between Apple Street and Rose Street before continuing on as a single carriageway between Rose Street and GNH.

The City of Swan proposes to connect the site with the Ellenbrook town site and the wider community through the extension of Railway Parade over the Ellen Brook watercourse through the construction of a bridge.

3.4.1.4 Rose Street

Rose Street is a single-carriageway access road constructed as a rural sealed road with a width of 4.5 to 5m west of Orange Avenue, widening to 6m to the east. Rose Street connects Railway Parade to the east through to, and terminates at, the Ellen Brook watercourse to the west.

3.4.1.5 Other Streets

Lemon, Citrus and Orchard Streets and Wann Court are all constructed to a sealed rural standard. The LSP proposes to extend Citrus and Rose Streets into the future residential development within the LSP, with Lemon Street, Orchard Street and Wann Court providing additional connectivity to the LSP area from Railway Parade via Orange Avenue which runs north / south along the site's eastern boundary.

3.4.2 Proposed Road Network

The proposed road hierarchy for the LSP area has been determined from modelling based on the indicative subdivision layout and provides for simple and efficient vehicle movements through the site.

The movement network reflects a strong north-south and east-west modified grid configuration, with a number of direct connections via Orange Avenue to the existing residential development abutting the LSP area in the south east.

The street block lengths are consistent with the requirements of LN, providing for connectivity and permeability through the site, for both pedestrians and vehicles.

The indicative road network is proposed to comprise of the following road classifications:


Road Classification	Indicative Upper Traffic Volume (Vehicles Per Day)	Indicative Road Reserve Width
Integrator B (existing)	15,000	20.1m
Neighbourhood Connector A – Variation 1 (existing)	7,000	20.1m
Neighbourhood Connector A – Variation 2	7,000	23m
Neighbourhood Connector A – Variation 3	7,000	25m
Neighbourhood Connector A – Variation 4 (existing)	7,000	20.1m
Neighbourhood Connector B – Variation 1	3,000	23m
Neighbourhood Connector B – Variation 2 (existing)	3,000	20.1m
Access Street C – Variation 1	3,000	15.4m
Access Street C – Variation 2 (existing)	3,000	20.1m
Access Street C – Variation 3	3,000	21m
Access Street D – Variation 1	1,000	19.4m
Access Street D – Variation 2	1,000	15m
Laneway	300	6m

The road hierarchy primarily consists of Laneways, Access Streets and a Central Spine, providing a north south link through the site.

The design intent of the LSP is to ensure the future urban development capitalises on its location adjacent the Ellen Brook reserve and draws the natural environment into the urban area. This will provide opportunities for pedestrian and cycle connectivity to the foreshore reserve through the provision of a series of wider road reserves and 'green links' that direct to the Ellen Brook reserve. Refer to Figure 16 for the Indicative Movement Network Plan which depicts the various road reserve widths throughout the LSP area.

3.4.2.1 Apple Street

The LSP proposes to upgrade Apple Street from its current 6m width to a 7m sealed width. The provision of two 3.5m traffic lanes and two 1.5m sealed shoulders is capable of accommodating the additional traffic as a result of the site's future development.



Recognising Apple Street will vary in its function as it traverses the development, it is proposed to upgrade Apple Street to four varying road reserve and carriageway widths, with the inclusion/exclusion of median treatments and on street parking relative to the proposed adjoining land uses. Its alignment provides extended vistas connecting through the site to Ellen Brook.

Section 1: The section from GNH west to the railway crossing will be upgraded to increase the width of the carriageway and include sealed shoulders. This will allow for an increase in traffic volume whilst retaining the rural character providing an aesthetically pleasing entry to the development and the broader area.

(Neighbourhood Connector A- Variation 1)



Section 2: The section between the railway crossing and Orange Avenue will be widened on the northern edge to accommodate a drainage swale and shared use path, providing a total road reserve width of 23 metres. The landscaped verge on the northern side will contribute to an enhanced streetscape.

(Neighbourhood Connector A- Variation 2)



Section 3: This section is between Orange Avenue and the intersection with the north-south neighbourhood connector and forms the 'main street' entrance to the proposed development. It will be immediately adjacent to and serve the Neighbourhood Centre and interface with rear loaded medium density dwellings to the south. It is proposed at a width of 25 metres which will accommodate travel lanes, dedicated on street parking and a bicycle lane in each direction with a 4 metre central median island.

The 25 metre wide road reserve will provide for street verges of 5.5 metres in width incorporating a 2.5 metre shared use path on the northern side of the street abutting the Neighbourhood Centre. This provides an opportunity for the provision of quality landscaping treatments in the verges and within the central median which offers an aesthetic interface with the Neighbourhood Centre and reinforces the connection to the Village Green and Ellen Brook through a safe and shaded pedestrian friendly environment.

(Neighbourhood Connector A- Variation 3)



Section 4: This section connects the north south neighbourhood connector to the POS interface with Ellen Brook. Recognising this section of road will carry the lowest volume of traffic it is proposed to be at a width of 21 metres.. This section of road offers a transition from the urban core of the development to the Ellen Brook interface and is intended to be a highly pedestrian environment.

(Access Street C - Variation 3)



3.4.2.2 Railway Parade

It is anticipated that the future Railway Parade bridge link across the Ellen Brook, north of the LSP will be constructed by 2018.

The proposed development seeks to realign Railway Parade from the north through the development site offering a central spine and logical road hierarchy with a connection to the proposed Local Centre.

Railway Parade south of Rose Street will provide vehicular connections to Great Northern Highway from within the LSP area and from further north, upon construction of the new bridge across Ellen Brook. It is proposed to widen Railway Parade through this section to a 10 metre road pavement to accommodate additional traffic generated by the future development of the LSP area and traffic generated through the construction of the bridge connecting the Ellenbrook suburb to the north-west. The existing character and amenity of this area will be preserved through the retention of trees and rural streetscape.

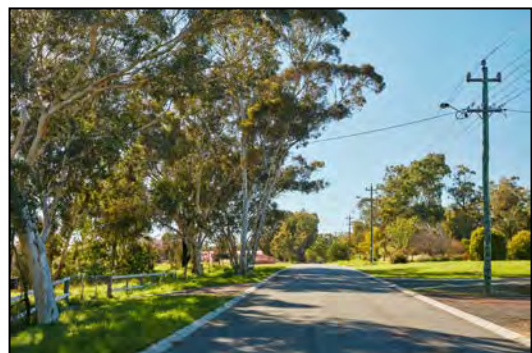
3.4.2.3 Neighbourhood Connectors

A central spine road is proposed in a north-south direction from Rose Street to Railway Parade with a connection at Apple Street.

It is anticipated that the northern section of the spine from and including Apple Street (Integrator B), will ultimately carry traffic volumes in the range of 10,000 vehicles per day. An Integrator B is proposed for this section, incorporated within a 25m road reserve.


The southern section of the spine road from and including Rose Street (Neighbourhood Connector B), is anticipated to carry traffic volumes of 2000 - 3000 vpd. A Neighbourhood Connector B road standard is considered appropriate for this section with the implementation of a 7m to 7.4m carriageway.. Notwithstanding the above, the LSP proposes to continue the proposed 25m central spine from Apple Street south to a standard commensurate with a Neighbourhood Connector A to provide a wide boulevard road with a landscaped central median and verges. It is anticipated, a road reserve which is wider than required from the perspective of traffic management will provide an aesthetically appealing public realm supporting the 'green links' to the Ellen Brook and reinforcing the area's natural amenity.

A portion of Rose Street will be upgraded to a 7.4 metre road pavement to accommodate the additional traffic generated between the proposed central Neighbourhood Connector and Railway Parade. The proposed road pavement width allows for on street parking should it be required in the future.



3.4.2.4 Access Streets and Wider Access Streets

The local road network, whilst conveying vehicular traffic is also intended to enhance the connection to the natural amenity afforded by Ellen Brook. This is supported through a primarily east-west road alignment which offers long vistas to, and draws in the amenity of, the Brook within the development and offers long elevated vistas to the Darling Ranges in the east. Wider access streets with a reserve



width of 19.4 metres are proposed at strategic locations to facilitate and readily identify the 'green links' which strengthen the connection to the Brook via wider landscaped verges incorporating trees and meandering shared use paths.

Ellen Brook provides a natural edge to the development boundary which indicates primarily local traffic will utilise the road network west of the north-south neighbourhood connector. Understanding this, the LSP comprises access streets designed to a 6m wide carriageway within a 15m road reserve. Where access streets run adjacent to POS and subterranean service infrastructure is not required within the verge, narrower verge areas may be constructed in accordance with LN.

The LSP proposes landscape treatments be implemented along Orange Avenue and western sections of Apple Street and Rose Street to enhance and integrate the interface with the existing urban development east of the development site.

3.4.2.5 Laneways

The LSP proposes 6.0m laneways, typically designed with flush kerbing that can accommodate two-way vehicle movement and rubbish collection. Further detailing on laneways will be provided during the subdivision planning stage.

3.4.2.6 Truncation Variation – Small Lot Product

In accordance with the provisions of LN, Element 2 – Movement Network R55, truncations are to be incorporated on corner lots.

With the introduction of small lot product, the traditional 6m x 6m truncations significantly impede on small lot sites. As such, truncations of 3m x 3m in accordance with LN may be considered for approval at the subdivision stage, subject to an assessment of appropriate sightlines in accordance with Austroads Standards.

Further assessment and documentation is proposed to be undertaken at the detailed subdivision stage, to facilitate truncations and kerb radii in accordance with R55 and R57 of LN

Neighbourhood Connectors



Access Streets



Wider Access Streets



3.4.3 Public Transport

The LSP area is not currently serviced directly by public transport. The nearest existing bus service is Bus Route No 310 (Midland Station – Upper Swan) and Bus Route No 311 (Midland Station – Bullsbrook). The nearest bus stop along Route 310 is located adjacent the intersection of Apple Street and Railway Parade which services the immediate area on Railway Parade and Apple Street with a terminus on GNH north of Copley Road. During peak periods (week days) this route provides seven bus services each way with two provided on Saturdays. Bus Route 311 runs along GNH located 350m east of the site, connecting Midland with Bullsbrook. During peak periods (week days) it provides seven bus services each way with two provided on Saturdays, Sundays and public holidays.

The proposed Neighbourhood Connector within the LSP will be designed to accommodate future bus route services as may be required.

The railway line located to the east of the LSP is a freight route with no opportunity for passenger transport. The closest passenger rail station is the Midland Terminal, approximately 14km south of the subject site.

3.4.4 Pedestrians and Cycle Networks

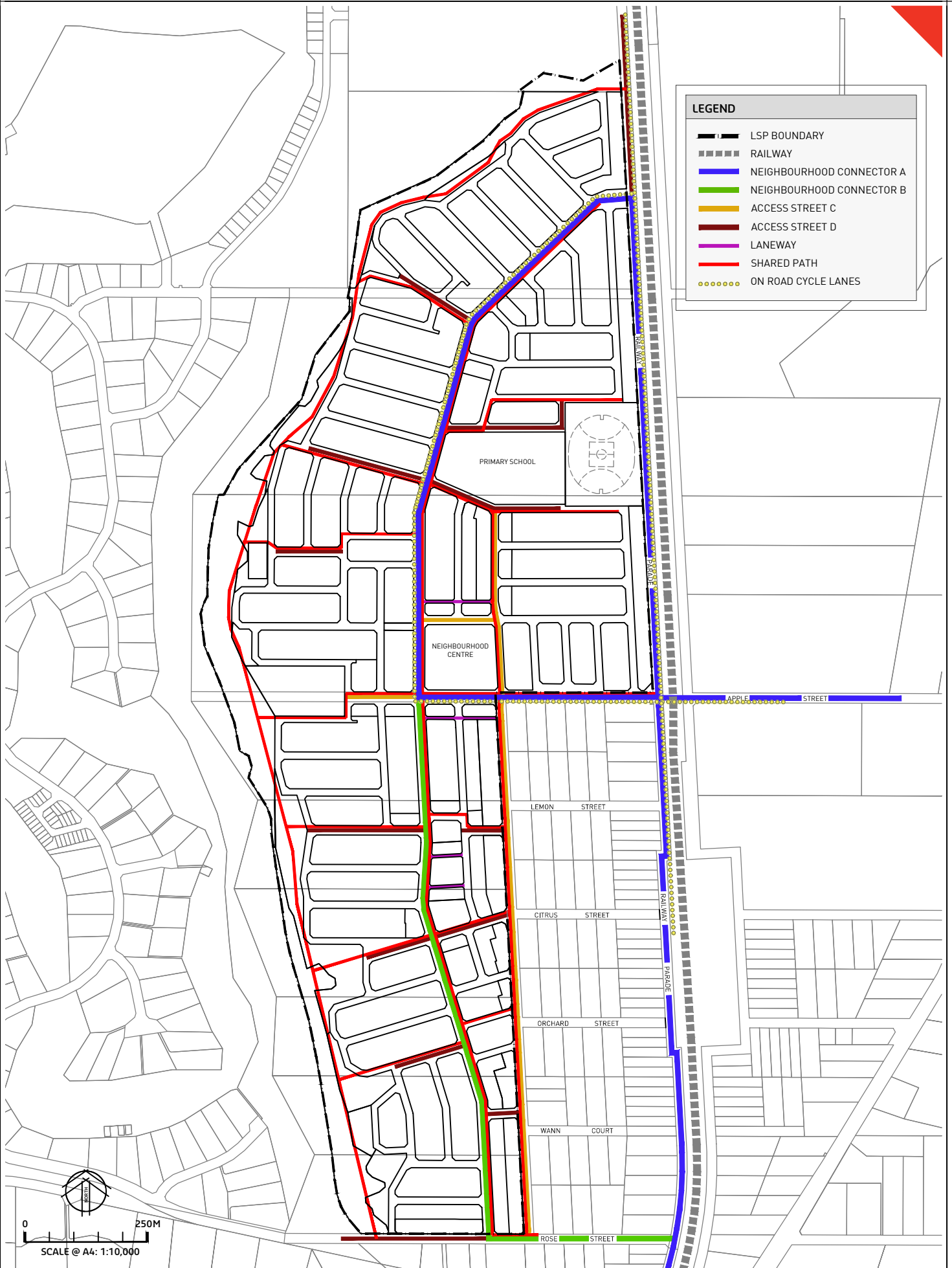
In accordance with LN requirements, footpaths are proposed on at least one side of every street. A logical and legible shared use path network connecting residents with the amenities of the estate is proposed throughout the development and within the foreshore reserve. The shared use path is to be incorporated within the central spine (Neighbourhood Connector) running north south through the site and along the wider access streets connecting to the Ellen Brook foreshore reserve, in addition to those servicing the proposed Local Centre, Primary School and POS areas.

The shared use path network is identified within the Transport Assessment report (Appendix 9) and the LSP Map.

The LSP proposes dedicated on street cycle lanes along the Neighbourhood Connector A running south from its connection with Railway Parade to Apple Street connecting with GNH.

Refer to Figure 16 – Indicative Movement Network.

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3.5 Water Management

3.5.1 District Water Management Strategy

A District Water Management Strategy (DWMS) was prepared by ENV in 2013 in support of the MRS zoning proposal. The DWMS was approved by the Department of Water (DoW) and by the City of Swan. The DWMS provides guidance on the groundwater management, water sources for POS, sizing of stormwater systems and outlines the results of the water monitoring program. The groundwater and surface water monitoring undertaken at the DWMS stage was extensive and as such no additional monitoring was required for the preparation of the Local Water Management Strategy (LWMS).

3.5.2 Local Water Management Strategy

The LWMS applicable to the LSP is contained in Appendix 10. The LWMS addresses the LSP area and provides a framework for stormwater management within the site, including the surface water management strategy and the groundwater management strategy at a local scale. The LWMS has been prepared in accordance with the requirements of *Planning Bulletin 92: Better Urban Water Management* (WAPC2008) and with the water sensitive urban design practices as described in the *Stormwater Management Manual of WA* (DoW 2007).

3.5.3 Proposed Drainage Network and Infrastructure Requirements

Surface water flows are to be managed to maintain pre-development hydrology by retaining or detaining surface water and infiltrating runoff close to source. The design parameters for managing stormwater within the LSP area are as follows:

- ▲ Provide a combination of overland flow and pipe systems within the road reserve to convey runoff for storm events up to the 1:5 yr event to detention basins and discharge points;
- ▲ To attenuate and provide adequate storage of post-development flows to predevelopment conditions and maintain the required free-board to finished lot levels;
- ▲ Discharge runoff to a receiving environment to be directed into Ellen Brook through the use of swales and ephemeral storage areas so as not to exceed predevelopment flows into the brook;
- ▲ Subsurface drainage (subsoil drainage) and drainage infrastructure set at or above the controlled ground level (CGL);
- ▲ Subsoil drainage outlets to be free draining.

Stormwater will be directed into detention basins located adjacent the Ellen Brook reserve through a pit and pipe drainage network.

3.5.3.1 Local Drainage

The local stormwater drainage system has been designed using a major/minor approach. The major drainage system strategy directs drainage to the low point adjacent POS areas with detention areas being within POS. All lots are to have a minimum 0.3m clearance above the 100 year ARI flood level in roads and POS with a 0.5m clearance above the estimated 100 year ARI flood level in detention areas. Peak post development drainage discharge is slightly below the pre-development discharge.

The minor drainage system comprises a series of swales, kerbs, pipes and gutters designed to convey stormwater generated by minor storms up to and including the 1 year ARI storm events. Stormwater is to be treated in vegetated detention areas.

3.5.3.2 Groundwater Management

Most of the subject site is anticipated to require subsoil drainage. Finished lot levels shall be a minimum 1m above the estimated CGL taking into account the subsoil drainage.

3.5.3.2.1 Ongoing Management Responsibilities

The ongoing water management and responsibilities are summarised in the table below. A more detailed table is available in the LWMS.

Organisation	Role/Responsibility
City of Swan	Assumes future long term responsibility for roads and storm water infrastructure including the ongoing operation and maintenance thereof subsequent to agreed handover by the developer.
Developer	Obtain approval of the UWMP. Transfer of water allocation licenses. Construct and subsequently maintain/manage stormwater control measures until handover to the City of Swan (note 12 month defects liability period). Management/Maintenance of stormwater storage landscaping and irrigation system for a period of 2 years following practical completion. Undertake post development monitoring, including the provision of appropriate monitoring locations, for a period of 3 years following practical completion of the development.

3.6 Education Facilities

In accordance with discussions undertaken with the Department of Education (DoE) regarding school catchment requirements, the LSP proposes one primary school to service the LSP area, positioned on the neighbourhood connector road. A 'green link' (wider access street) provides a connection between the Ellen Brook reserve and the primary school to reinforce the pedestrian and cycle movement network, integrating it with the primary school.

The subject site is currently within the intake area for the Upper Swan Primary School (approximately 2.7km to the south) and the Ellenbrook Secondary School (approximately 6.3km to the south west). It is understood the Upper Swan Primary School will service the resident population within the LSP area until such time as the new primary school is delivered.

3.7 Activity Centres and Employment

3.7.1 Strategic and Secondary Centres

In accordance with *SPP 4.2 – Activity Centres for Perth and Peel* (SPP 4.2), the closest strategic centre to the LSP area is the Midland Strategic Metropolitan Centre, located approximately 14km south of the site. Ellenbrook Centre is the closest Secondary Centre to the site, located approximately 8km to the west.

3.7.2 District Centres

In accordance with *SPP 4.2 – Activity Centres for Perth and Peel* (SPP 4.2), the closest existing District Centre to the LSP area is the Alexander Heights town centre, located approximately 14km south west of the site. It is anticipated that upon completion the Albion District Centre will become the nearest District Centre.

3.7.3 Neighbourhood Centre

The LSP proposes an area for retail and commercial uses within a Neighbourhood Centre which is generally in accordance with state and local government strategic planning guidelines and policies.

A retail needs assessment has been undertaken which demonstrates that the area is capable of supporting a 6000m² (NLA) retail site. An assessment is being undertaken to determine if the 2ha site allocated is of a sufficient size to accommodate the ultimate 6,000m² (NLA) neighbourhood retail centre.

Accordingly, the LSP proposes a Neighbourhood Centre at the intersection of Apple Street and the north – south Neighbourhood Connector, allowing for ease of access in a central location to its catchment.

In accordance with clause R31 in Element 8 of Liveable Neighbourhoods, the local primary school has not been located adjacent the Activity Centre but has been located within sufficient proximity to facilitate logical and simplified movement between the two land uses.

It is anticipated the Neighbourhood Centre will accommodate retail tenancies that may include, but not be limited to, an anchor tenant such as a supermarket, and supporting tenancies such as, pharmacy, newsagent, liquor store and other specialty shops. The Neighbourhood Centre may include non-retail and community services uses such as offices, child care, medical centre, gym and the like.

The centre is to be supported by medium density housing within close proximity. This is considered consistent with the requirements set out under LN and *SPP 4.2 – Activity Centres for Perth and Peel* (SPP 4.2).

Refer to Appendix 11 – Retail Needs Assessment.

3.8 Infrastructure Coordination, Servicing and Staging

The following provides a summary of the infrastructure and servicing for the LSP area. Further and more detailed information is contained in the Engineering Services Report provided in Appendix 12.

3.8.1 Water

The subject site falls within the Water Corporation's operating licence. The Ellenbrook Reservoir will ultimately service the site with initial stages of development being served from the existing Greenmount Reservoir to the south.


The Water Corporation has indicated that a DN250mm water main is required to service the development area from the existing DN500mm water main south of Rose Street.

All internal water reticulation pipe-work will be designed and constructed in accordance with Water Corporation standards and requirements. Standard Water Corporation headworks charges will apply.

3.8.2 Sewer

Preliminary information from the Water Corporation confirms sewerage infrastructure provisions are planned for the site. The sewer gravity catchment for the northern portion of the site will grade into a constructed Type 40 Waste Water Pump station, located close to the site's mid-western boundary. This is then pump pressured a short distance to a discharge point in the site's southern gravity catchment.

The catchment for the southern portion of the site will grade into a constructed Type 90 Waste Water Pump station, located close to the sites south western boundary. The construction of approximately 2.9km of 375mm pressure main (crossing Ellen Brook at Rose Street and Ellen Brook Drive) will discharge into the existing Millhouse Road Pump station located south west of the site.



The Type 90 WWPS and pressure main is to be included on the Water Corporations 5 year Capital Works Program. All internal water sewer pipe-work will be designed and constructed in accordance with Water Corporation standards and requirements. Standard Water Corporation headworks charges will apply.

3.8.3 Electricity

Western Power has undertaken a feasibility study which responds to the sites location with an advancing urban development area so as to assess the capability to provide infrastructure and supply capacity to the LSP area. The proposed development is relying and expectant upon the timely and orderly expansion of the electricity supply network.

It is intended all lots within the LSP area will be serviced from the Muchea substation via the MUC505 Fewster South HV feeder, which has capacity for servicing the initial stages of the development. A planned upgrade of the supply infrastructure network will coincide with the later stages of development of the site. Further investigations are required at the time a formal planning assessment is submitted via the DIP application process.

Standard Western Power requirements will apply, including the cost for head works upgrades and exclusions to service the site.

It is understood, as is standard practice, that a number of pad mount sites will be required throughout the development. The location of these sites will be determined at the detailed design and subdivision stage.

3.8.4 Gas

ATCO Gas has advised reticulated gas services are available within the surrounding locality.

It is most likely the extensions of ATCO gas mains infrastructure will be implemented via an underground service corridor adjacent to the proposed Railway Parade Bridge to the north of the site, or by additional boring services required under the Ellen Brook at Rose Street in the south.

3.8.5 Telecommunications

It is intended for all lots within the LSP area to be serviced with telecommunication services. This will be either by way of the optic fibre NBN roll out service or an external private supplier.

The service provider will be responsible for installing telecommunication faculties within the development. The developer will fund the provision of trenches for cable laying. Alternatively, where cable routes are the on the same alignment as Western Power's underground power supply routes, the telecommunications will use, where possible, the Western Power trenches in lieu of the developer providing any additional trenching.

Head works charges for telecommunication service extensions are anticipated.

3.8.6 Earthworks

Site grading will generally be determined by the servicing requirements and environmental constraints of the site, with a view to keeping grading and remodelling to minimum limits wherever possible. However, increased densities and decreasing lot sizes has led to a current trends for areas to be fully earth worked to create level lots terraced between retaining walls.

It is anticipated that bulk earthworks will be completed through the importation of locally sourced material placed over the site to achieve a minimum Site Classification of 'S'.

A preliminary earthworks strategy has been prepared for the site and is included as an Appendix to the Servicing Report located in Appendix 12 of this report.

3.8.7 Indicative Staging

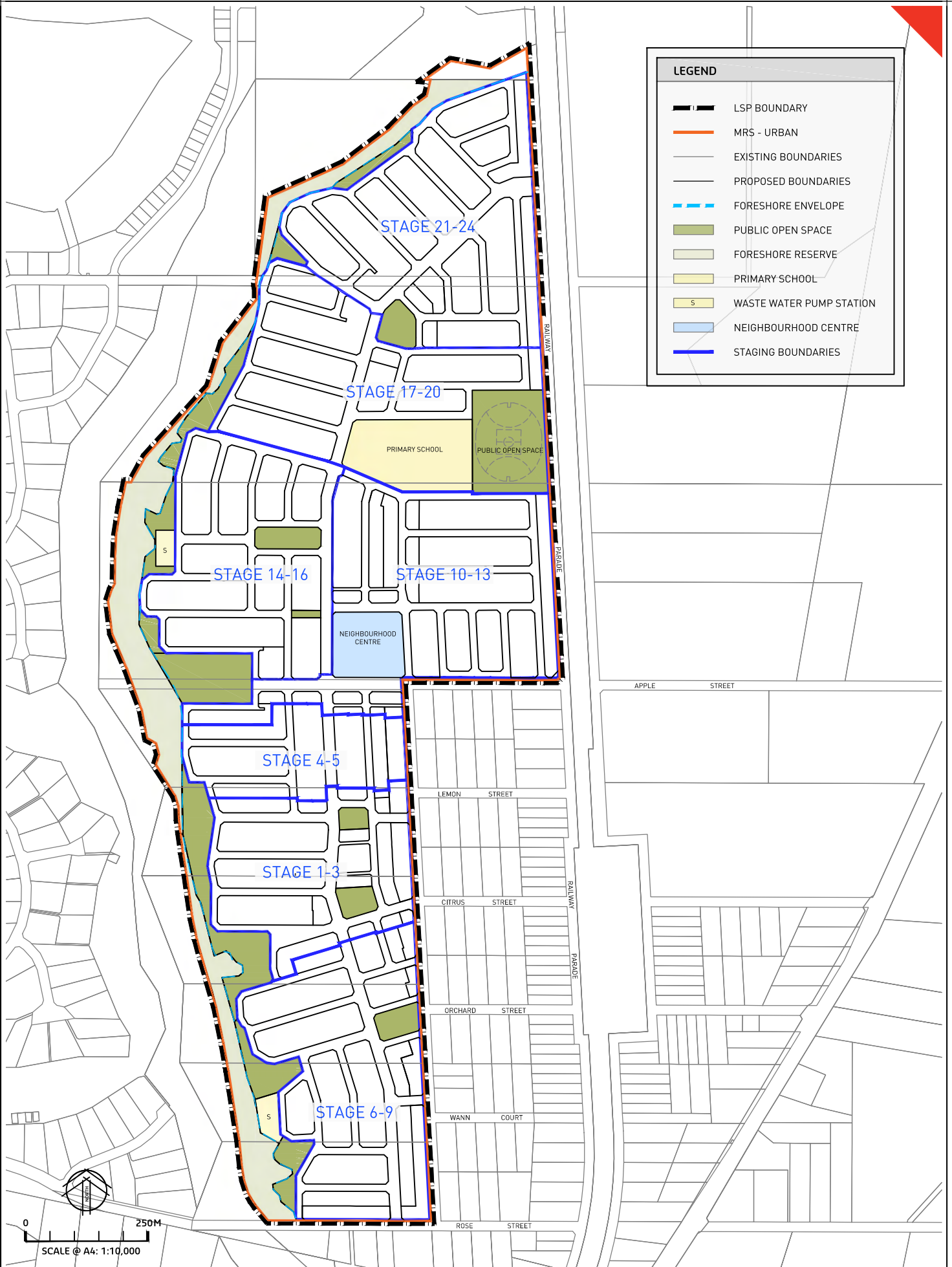
Staging of the site is influenced on settlement dates for the acquisition of lots that comprise the LSP area. Whilst the purchase of the englobo lots has (to a degree) determined the general development staging, the proposed staging will be predicated on approvals, construction requirements, and lot sales/typologies. It is anticipated the development will be constructed and marketed in stages of approximately 30 to 60 lots each.

As mentioned in Part One of this report, Stage 1 of the development will begin within Lot 30 Orange Avenue effectively forming an extension of Citrus Street, with a road connection through to an area of Public Open Space (POS) at the Ellen Brook foreshore. This stage will incorporate the existing dwelling of heritage value within an area of POS amenity. Subject to the agreement of the City of Swan, it is intended that the dwelling will be restored for use as a sales office and ultimately provided to the City of Swan to be used for Community Purposes.



Refer to Figure 17 – Indicative Staging Plan.

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3.9 Developer Contribution Arrangements

The LSP area is situated within the Upper Swan cell for the purposes of Developer Contribution Arrangements and forms part of Development Contribution Area 5 (DCA5) under LPS17.

DCA5 was introduced to Schedule 13 of LPS 17 by way of Scheme Amendment No.96. The works associated with DCA5 are programmed to be completed by 2018.

The following items are currently identified as being subject to funding by DCA5.

DCA5	Item
Sub - Regional	Traffic Bridge over Ellen Brook
Admin	Administrative Costs

The developer infrastructure item comprises the construction of a bridge over the Ellen Brook to link the two sides of Railway Parade. The construction of the bridge over the brook will consist of a 25 metre wide road, providing a primary connection to Ellenbrook Village 7B and Maralla Road to the north, in addition to the continuation of Railway Parade northwards.



Part Three

TECHNICAL APPENDICES



ATTACHMENT 1

CERTIFICATE OF TITLES



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ATTACHMENT 2

ENVIRONMENTAL ASSESSMENT REPORT



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ATTACHMENT 3

FLORA AND VEGETATION SURVEY



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ATTACHMENT 4

FORESHORE MANAGEMENT STRATEGY



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ATTACHMENT 5

ACOUSTIC ASSESSMENT



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ATTACHMENT 6

BUSHFIRE MANAGEMENT PLAN



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ATTACHMENT 7

MUNICIPAL HERITAGE INVENTORY



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ATTACHMENT 8

LANDSCAPE STRATEGY



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ATTACHMENT 9

TRANSPORT ASSESSMENT



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ATTACHMENT 10

LOCAL WATER MANAGEMENT STRATEGY



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ATTACHMENT 11

RETAIL NEEDS ASSESSMENT



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ATTACHMENT 12

SERVICING REPORT



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