Lot 500 Park Street, Brabham
Ariella North

LOCAL STRUCTURE PLAN (LSP 1D)

Prepared for **Cranford Property Pty Ltd** (wholly owned subsidiary company of Cedar Woods Properties Ltd)

Prepared by **Taylor Burrell Barnett**

May 2020

DOCUMENT HISTORY AND STATUS

Ariella North Local Structure Plan

Revision	Reviewer	Date Issued
19/006-0	RC	May 2019
19/006-1	RC	May 2019
19/006-2	RC	May 2019
19/006-3	RC	June 2019
19/006-4	RC	May 2020

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Strategen – JBS&G Environmental
JDA Consultant Hydrologists
Transcore
EPCAD

ENDORSEMENT

This Structure Plan is prepared under the provisions of the **City of Swan Local Planning Scheme 17.**

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

14 September 2020

Signed for and on behalf of the Western Australian Planning Commission

……

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

…… Witness

15 September 2020 Date

.....14 September 2030.....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

This Local Structure Plan (LSP) has been prepared to guide the subdivision and development of Lot 500 Park Street, Brabham, hereafter referred to as the 'LSP area' or 'subject land'. The LSP area is bound by Park Street to the north, Partridge Street to the west and Palfrey Street to the south. The LSP area is located within the City of Swan and the Albion (Brabham) District Structure Plan (ADSP) area.

The LSP proposes development of the subject land for:

- Residential purposes, comprising a mix of residential densities; and
- Public Open Space (POS).

The LSP area includes the proposed amendment to the approved Park Street Structure Plan (SP17-027) which comprises of the northern portion of Lot 500 Park Street. This LSP will revoke the existing approved Park Street LSP (and any amendments) and provide a consolidated structure plan for the whole of Lot 500 Park Street, also referred to as 'Ariella North'.

Outlined below is a summary of all the key statistics and planning outcomes of the LSP.

LOCAL STRUCTURE PLAN SUMMARY

Item	Data	Structure Plan Reference (section no.)
Total area covered by the LSP	20.2364 hectares	1.2
Area of residential land use proposed	13.4390 hectares	3.3
Estimated Lot and Dwelling Yield	385 lots/dwellings	3.3.1.1
Estimated Residential Density Residential Site Density (Perth and Peel@3.5million – target of 26 dwellings per residential site hectare) (Liveable Neighbourhoods – target of 22 dwellings per residential site hectare)	28 dwellings per site hectare	3.3.1.1
Estimated Population	1,078 people @ 2.8 people/household	3.3.1.1
Estimated Area and Percentage of Public Open Space	Required POS - 1.4792 hectares Provided POS - 1.9727 hectares (gross)	3.4

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Technical Appendices

PART ONE
IMPLEMENTATION

1 LOCAL STRUCTURE PLAN AREA

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

2 OPERATION

This LSP comes into effect on the date it is approved by the WAPC and has been prepared to supersede Structure Plan No. 27 (WAPC Ref. SPN/0505/1, City Ref. SP17-027).

3 STAGING

Subdivision will commence from the north adjacent to Park Street and Partridge Street utilising existing services and road infrastructure and will include the construction of a service/controlled access place (CAP) road to provide lots with access to Park Street. Development staging thereafter will follow an orderly sequence and is expected to occur from north to south.

4 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

4.1 LAND USE

The LSP Map (**Plan 1**) identifies the following zones and reserves:

- Residential zone (R20);
- Residential zone (R30);
- Residential zone (R30-40);
- Residential zone (R30-40/60); and
- Recreation reserve.

Land use permissibility within the LSP area shall accord with the land use permissibility of the corresponding zone/reserve in the City of Swan Local Planning Scheme No. 17 (LPS17).

4.2 RESIDENTIAL DENSITY

a) **Plan 1** applies a Residential Density Code of R20 to land adjacent to Park Street and R30 to the balance land, consistent with Park Street Structure Plan Amendment 1.

b) **Plan 1** also defines broad residential density ranges that apply to the remaining LSP area. Lot specific residential densities, generally in accordance with the defined residential density range, are to be assigned in accordance with a Residential Density Code Plan determined by the Western Australian Planning Commission (WAPC).

c) A Residential Density Code Plan is to be submitted at the time of application for subdivision to the WAPC, and shall indicate the residential density code applicable to each lot within the proposed subdivision. The Residential Density Code Plan shall be generally consistent with the residential density range identified on the LSP and the locational criteria outlined in clause 4.2.1.

d) The Residential Density Code Plan is to include a summary of the dwelling yield of the proposed subdivision.

e) Determination of the Residential Density Code Plan shall be undertaken at the time of determination of a subdivision application by the WAPC. An approved Residential Density Code Plan shall then form part of the LSP and be used for the determination of future development and building permit applications.

f) Variations to the Residential Density Code Plan will require the approval of the WAPC. A revised Residential Density Code Plan shall generally be consistent with the approved plan of subdivision issued by the WAPC. The revised Residential Density Code Plan shall be consistent with the residential density range identified on **Plan 1** and the locational criteria contained in clause 4.2.1.

g) A revised Residential Density Code Plan, consistent with clause 4.2 (f) will replace, wholly or partially, the previously approved Residential Density Code Plan, and shall then form part of the LSP as outlined in clause 4.2 (e).

h) A Residential Density Code Plan is not required if the WAPC considers that the subdivision is for one or more of the following:

1. the amalgamation of lots;
2. consolidation of land for 'superlot' purposes to facilitate land assembly for future development;
3. facilitating the provision of access, services or infrastructure; or
4. land which by virtue of its zoning or reservation under the LSP cannot be developed for residential purposes.

4.2.1 LOCATIONAL CRITERIA

The designation of R-Codes for all Residential zoned lots with a density range of R30-40 or R30-40/R60 shall be in accordance with the criteria outlined below.

1. The R30 density code shall apply as the base code, with the exception of land subject to 2) and 3) below.

2. The R40 density code may apply where one or more of the following applies:

   a) The lot has a laneway abutting the rear boundary;
   b) The lot has the potential to accommodate grouped or multiple dwellings;
   c) The lot is within a 300m walkable catchment of an area of high amenity i.e. POS, a public transport route or a planned primary school or local centre.

3. The R60 density code may be applied only where the subdivision/strata or development forms part of a comprehensive retirement living proposal that is integrated with the surrounding residential area.

4.3 DWELLING TARGET

Subdivision within the LSP area shall generally achieve 22 dwellings per residential site hectare.

4.4 INTERFACE

Development shall appropriately interface with the eastern boundary of the LSP area to enable integration with the existing and planned development within the Avonlee Estate.

4.5 PUBLIC OPEN SPACE

Public open space (POS) shall be provided generally in accordance with **Plan 1**.

A minimum of 7.11% POS shall be provided for the portion of the LSP area located within Development Contribution Area (DCA) 1 – Brabham (Albion), with the remaining 2.89% provided through Development Contribution Plan (DCP) 1 – Brabham (Albion). A minimum of 10% POS shall be provided for the portion of the LSP area located outside of DCA1.

4.6 ACCESS

a) Subdivision shall appropriately address lot access to Park Street, taking into consideration forecast traffic volumes.

b) Direct lot access to Partridge Street, south of Fairmount Boulevard, is not permitted.

4.7 NOTIFICATION ON TITLE

The Council shall recommend to the WAPC that a condition be imposed as part of subdivision approval for a notification to be placed on the certificate(s) of title(s) of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the hazard.

5 LOCAL DEVELOPMENT PLANS

Local Development Plans (LDPs) may be prepared to address:

a) Lots smaller than 260m²;

b) Lots with access restrictions, including corner lots and consolidated access to the lots from Partridge Street where applicable;

c) Lots which abut POS;

d) Lots with the potential to accommodate grouped or multiple dwellings;

e) Lots with a laneway abutting the rear boundary;

f) For land designated R30-40/60, where the R60 density code applies to a comprehensive retirement living development, to demonstrate integration with the surrounding residential area; and

g) The development interface with Park Street.

6 OTHER REQUIREMENTS

6.1 MANAGEMENT PLANS

6.1.1 BUSHFIRE MANAGEMENT PLAN

This LSP is supported by a Strategic Bushfire Management Plan (BMP) (Structure Plan) April 2019 – prepared by Strategen.

In accordance with the Strategic BMP (April 2019), a BMP shall be prepared to support a subdivision application to meet the relevant commitments outlined in the Strategic BMP, address the relevant requirements of State Planning Policy 3.7 Planning in Bushfire Prone Areas and demonstrate how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines for Planning in Bushfire Prone Areas (Guidelines).

6.1.2 URBAN WATER MANAGEMENT PLAN

An Urban Water Management Plan shall be prepared and submitted as a condition of subdivision approval.

6.1.3 ACID SULPHATE SOILS MANAGEMENT PLAN

An Acid Sulphate Soils Management Plan shall be prepared, if required, as a condition of subdivision approval.

6.2 DEVELOPMENT CONTRIBUTION ARRANGEMENTS

a) The majority of the LSP area is located within Development Contribution Area (DCA) 1 – Brabham (Albion) as identified in LPS17. A landowner shall be liable to make a cost contribution in accordance DCA1 and clause 5A.2 of LPS17.

b) Development of the LSP area will generate the need for contributions to a primary school in the locality at the subdivision stage.

6.3 ROAD WIDENING

Plan 1 identifies road widening for Partridge Street (4.6m, south of Fairmount Boulevard) to provide for future traffic volumes, in accordance with the approved Albion District Structure Plan (ADSP), Albion Local Structure Plan 1A and the Transport Assessment prepared by Transcore for this LSP.

The land required for road widening shall be transferred at the time of subdivision of the adjacent land.

Plan 1: Local Structure Plan Map

PART TWO
EXPLANATORY REPORT

1 PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This LSP has been prepared on behalf of Cedar Woods Properties for Lot 500 Park Street, Brabham and represents the future stages of Cedar Woods's highly successful Ariella Private Estate. The LSP area is bound by Park Street to the north, Partridge Street to the west and Palfrey Street to the south and includes the Park Street Structure Plan area (SP027). This report provides the planning framework and rationale to support the LSP.

The LSP will provide for the future subdivision and development of the subject land primarily for residential purposes, in accordance with the approved ADSP.

A LSP Amendment was recently approved in relation to the Park Street Structure Plan area (SP027) which comprises of the northern portion of this LSP area. The purpose of the LSP Amendment is to facilitate the delivery of lots to market earlier then would be possible within the broader Lot 500 LSP area. It is intended that this LSP will ultimately supersede the Park Street Structure Plan (SP027) so there is only one comprehensive LSP for Lot 500 Park Street.

The technical inputs prepared by the Project Team in support of this report are outlined in **Table 1.**

TABLE 1: PROJECT TEAM RESPONSIBILITIES

Technical Input	Consultant
Town Planning and Urban Design	Taylor Burrell Barnett
Environmental Assessment Report (**Appendix A**)	Strategen – JBS&G
Bushfire Management Plan (**Appendix B**)	Strategen – JBS&G
Local Water Management Strategy (**Appendix C**)	JDA Consultant Hydrologists
Report on Acid Sulfate Soil Investigation (**Appendix D**)	Douglas Partners
Transport Assessment (**Appendix E**)	Transcore
Engineering Servicing Report (**Appendix F**)	JDSi Consulting Engineers
Landscape (**section 3.4.1**)	EPCAD

1.2 LAND DESCRIPTION

1.2.1 LOCATION

The subject land is located in the suburb of Brabham, within the City of Swan.

The subject land is bound by Park Street to the north, Partridge Street to the west, Palfrey Street to the south and the Avonlee Estate to the east. The subject land is located approximately 20km north west of Perth's CBD refer **Figure 1**.

Figure 1: Location Plan

1.2.2 AREA AND LAND USE

The LSP area comprises of Lot 500 Park Street, Brabham, refer **Figure 1**. Lot 500 is 20.2364 hectares in area.

The subject land is currently vacant and was historically cleared for rural purposes. The surrounding land uses are predominately residential and include the Whiteman Edge Estate to the west, Ariella Private Estate to the south and Avonlee Estate to the east. Existing low-density residential development fronts Park Street, to the east and west of the LSP area. To the north of Park Street, the land has largely been cleared for rural pursuits, primarily large lot rural-residential living.

1.2.3 LEGAL DESCRIPTION AND OWNERSHIP

The land ownership details of Lot 500 are detailed in **Table 2.** The landowner has provided consent for the submission of this LSP.

TABLE 2: LAND OWNERSHIP

Lot	Registered Proprietor	Certificate of Title	AREA (HA)
500	West Swan Park Pty Ltd & Minx Pty Ltd	V 2818 F 800	20.2364

1.3 PLANNING FRAMEWORK

1.3.1 ZONING AND RESERVATIONS

1.3.1.1 METROPOLITAN REGION SCHEME

The LSP area is zoned Urban under the Metropolitan Region Scheme (MRS) (refer **Figure 2**).

Land to the north of Park Street (between Park Street and Gnangara Road), referred to as the Henley Brook Urban Precinct, was recently rezoned to Urban. Therefore, all land immediately surrounding the LSP area is zoned Urban under the MRS.

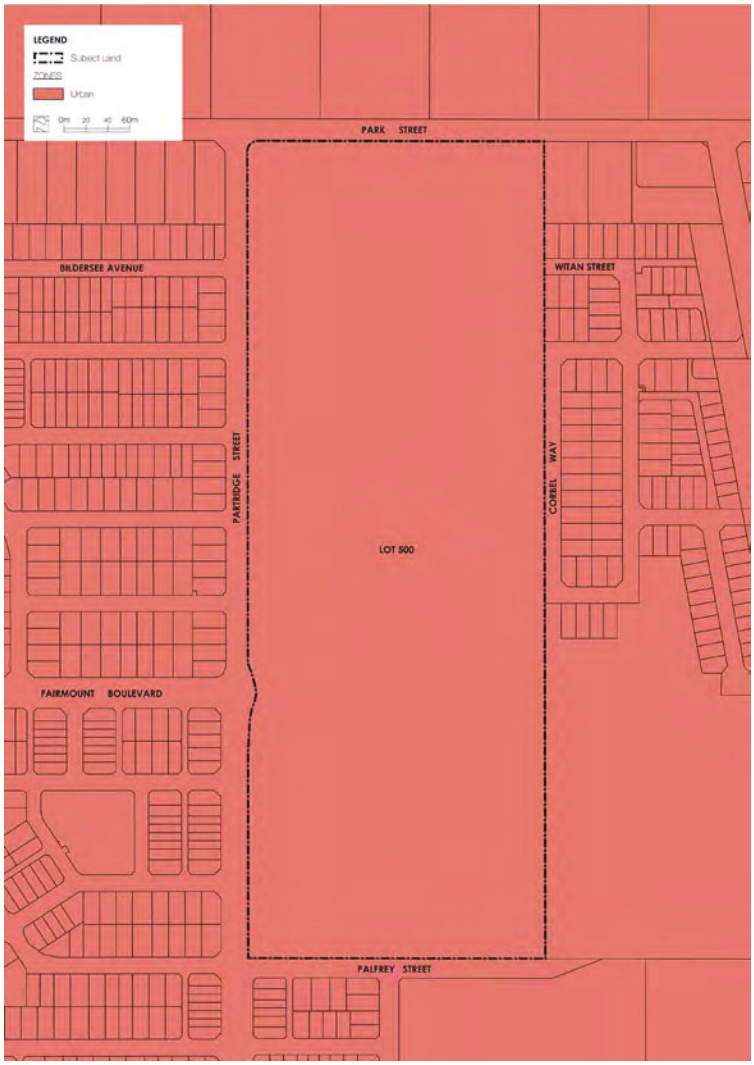

Figure 2: Metropolitan Region Scheme

1.3.1.2 CITY OF SWAN LOCAL PLANNING SCHEME NO. 17

The northern portion of the LSP area (Park Street Structure Plan area) is zoned Residential Development under the City of Swan LPS17, refer **Figure 3**. The balance of the LSP area is zoned Special Use 10 and is located within Development Contribution Area (DCA) 1 - Brabham (Albion).

Both the Residential Development zone and Special Use 10 zone require subdivision and development to be guided by a WAPC endorsed LSP.

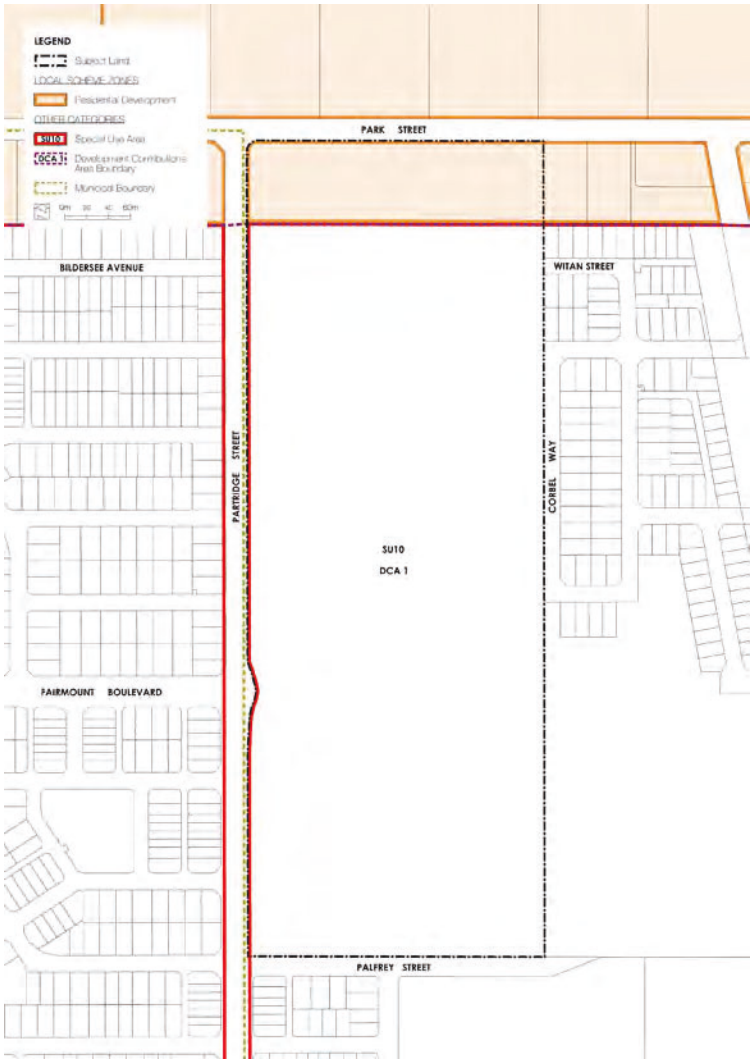

Figure 3: City of Swan Local Planning Scheme 17

1.3.2 REGIONAL AND SUB-REGIONAL STRUCTURE PLANS

1.3.2.1 SWAN URBAN GROWTH CORRIDOR SUB-REGIONAL STRUCTURE PLAN

The Swan Urban Growth Corridor Sub-Regional Structure Plan 2009 (Sub-Regional Structure Plan) was prepared by the WAPC to provide a strategic planning framework to guide future development and provide a coordinated response to planning considerations.

The Sub-Regional Structure Plan identifies the LSP area for residential development, refer **Figure 4**. The LSP is therefore consistent with the Sub-Regional Structure Plan.

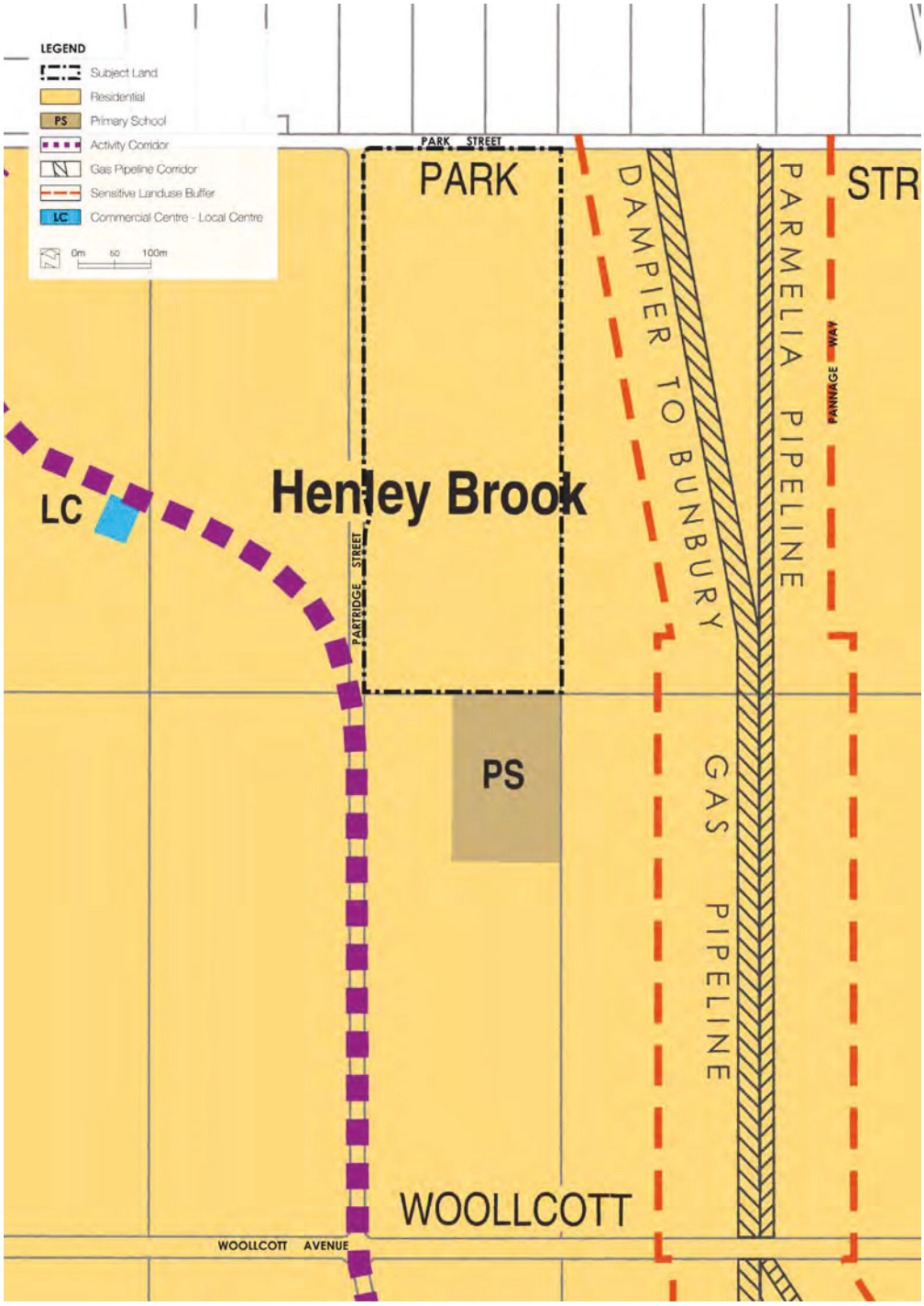

Figure 4: Swan Urban Growth Corridor Sub-Regional Structure Plan

1.4 PLANNING STRATEGIES

1.4.1 PERTH AND PEEL@3.5MILLION AND NORTH-EAST SUB-REGIONAL PLANNING FRAMEWORK

Perth and Peel@3.5Million is a suite of documents released by the WAPC in 2018 for the Perth and Peel metropolitan regions to identify:

- where future homes and jobs should be located;
- how to protect important environmental assets;
- how to best utilise existing and proposed infrastructure; and
- appropriate areas for greater infill development and residential density.

As part of this documentation, sub-regional planning frameworks have been prepared to guide future development. The northern portion of the LSP area (Park Street Structure Plan area) is identified as Urban Expansion under the North-East Sub-regional Planning Framework (Sub-regional Planning Framework), the balance of the LSP area is identified as Urban, refer **Figure 5**.

The minimum urban infill dwelling targets identified for the City of Swan are 5,640 dwellings in 2016-21 and 3,090 dwellings from 2021-26. The residential development proposed by the LSP is consistent with the designation under the Sub-regional Planning Framework and will assist in achieving the infill dwelling targets for the City of Swan.

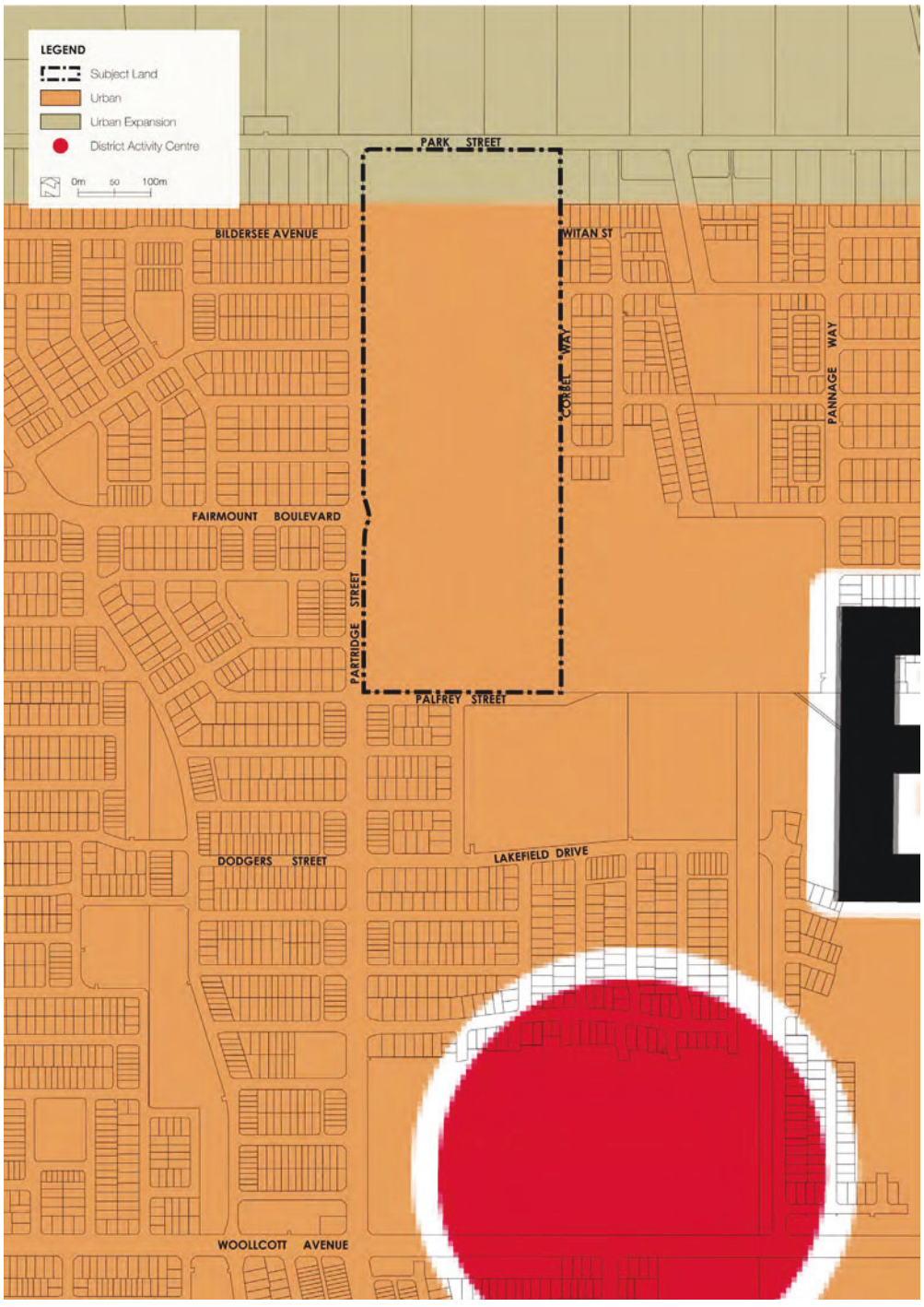

Figure 5: North-East Sub-Regional Planning Framework

1.5 PLANNING POLICIES

1.5.1 STATE PLANNING POLICIES

1.5.1.1 STATE PLANNING POLICY 2.2 GNANGARA GROUNDWATER PROTECTION

The intent of State Planning Policy (SPP) 2.2 is to ensure that land use change and development over the Gnangara mound is compatible with the long-term use of the groundwater for public consumption. Guidance on the compatibility of land uses in priority 1, 2 and 3 source protection areas in the underground water pollution control areas and requirements to be considered prior to planning proceeding in an area is also provided.

The LSP area is located within the Mirrabooka Groundwater Area of the Gnangara Mound and within Priority 3 (P3) Public Drinking Water Source Areas (PDWSA). P3 areas are defined to manage the risk of pollution to the water source from catchment activities. P3 areas are declared over land where water supply sources co-exist with other land uses such as residential, commercial and light industrial development.

SPP 2.2 also addresses Well Head Protection zones (WHPZs) to protect the drinking water source from direct contamination in the immediate vicinity of production wells. SPP 2.7 states that land use and activities within these areas need to be managed to prevent, restrict or control uses or activities such that contamination for the water resource is prevented at is abstraction point.

Residential development is an acceptable land use within P3 areas. A small portion of the LSP area is located within a WHPZ. The restriction to development within this WHPZ is the exclusion of fuel storage tanks. The LSP is therefore compliant with this constraint. Further detail is provided in **section 2.2.3** of this report.

1.5.1.2 STATE PLANNING POLICY 2.7 PUBLIC DRINKING WATER SOURCE

The intent of SPP 2.7 is to protect and manage public drinking water source areas from incompatible land uses and pollution in order to maintain the quality of the drinking water. As stated above, the LSP area is located within P3 PDWSA and a small portion of the LSP area is located within a WHPZ.

As stated above, residential development is an acceptable land use within P3 areas and the LSP is compliant with the WHPZ development restriction. Further detail is provided in **section 2.2.3** of this report.

1.5.1.3 STATE PLANNING POLICY 3.7: PLANNING FOR BUSHFIRE RISK MANAGEMENT

SPP 3.7 assists in reducing the risk of bushfire to people, property, and infrastructure by encouraging a conservative approach to strategic planning, subdivision, development, and other planning decisions proposed in bushfire prone areas. SPP 3.7 applies to all land which has been designated as bushfire prone by the Fire and Emergency Services (FES) Commissioner as identified on the Map of Bush Fire Prone Areas. The LSP area is identified as bushfire prone on the Map of Bush Fire Prone Areas.

Accordingly, a Strategic BMP has been prepared for the LSP area. A copy of the Strategic BMP is included in **Appendix C.**

1.5.2 LOCAL PLANNING POLICIES

1.5.2.1 POL-C-104 ENVIRONMENTAL PLANNING

This policy outlines the City's expectations for investigation and management of the natural environment, particularly in relation to urban growth areas. In summary, the policy contains the following objectives:

- Conservation of environmental assets and management of negative impacts on the environment;
- Consideration of off-site and cumulative impacts;
- Assessment of potential environmental and human impacts to be undertaken early in the process; and
- Understanding that long term environmental impacts may preclude development.

An Environmental Assessment Report, LWMS and Strategic BMP are appended to this report and address management of the natural environment in relation to the LSP area.

1.5.2.2 POL-LP-11 VARIATION TO DEEMED-TO-COMPLY REQUIREMENTS OF THE R-CODES – MEDIUM-DENSITY SINGLE HOUSE DEVELOPMETN STANDARDS (R-MD CODES)

POL-LP-11 replaces the following deemed-to-comply requirements of the R-Codes with the R-MD Codes:

- Building and garage setbacks;
- Open space;
- Parking;
- Visual privacy; and
- Solar access.

POL-LP-11 applies to the development of R25-R60 coded land within the LSP area.

1.6 OTHER APPROVALS AND DECISIONS

1.6.1 ALBION (BRABHAM) DISTRICT STRUCTURE PLAN

In accordance with Schedule 4 of LPS17, the ADSP was prepared to guide future land use and development within Henley Brook (Albion). The ADSP was endorsed by the WAPC in December 2009 and provides a land use and reporting framework for future local structure planning and subdivision applications. An amendment to the ADSP was approved in February 2018 to increase the size of the activity centre from a Large Neighbourhood to District.

Whilst the northern portion of the LSP area is located outside of the ADSP area, the ADSP does identify the subject land as Special Residential and states that it allows for a transition of lot sizes and land uses between the 'Special Rural' land north of Park Street and the ADSP area. As previously mentioned, the land north of Park Street (Henley Brook Urban Precinct) has recently been rezoned to Urban under the MRS and Residential Development under LPS17, therefore larger, transitional lots for this purpose are no longer required.

The balance of the LSP area is located within the ASDSP area and is identified for Residential development. An east/west access street is shown and a portion of the LSP area is located within the 400m walkable catchment of a local centre within LSP3A. The subject land is identified within structure planning precinct 1 and this structure plan encompasses all of the remaining land within that precinct, being LSP 1D.

The subject land, in the context of the ADSP, is identified in **Figure 6**. The LSP is consistent with the ADSP.

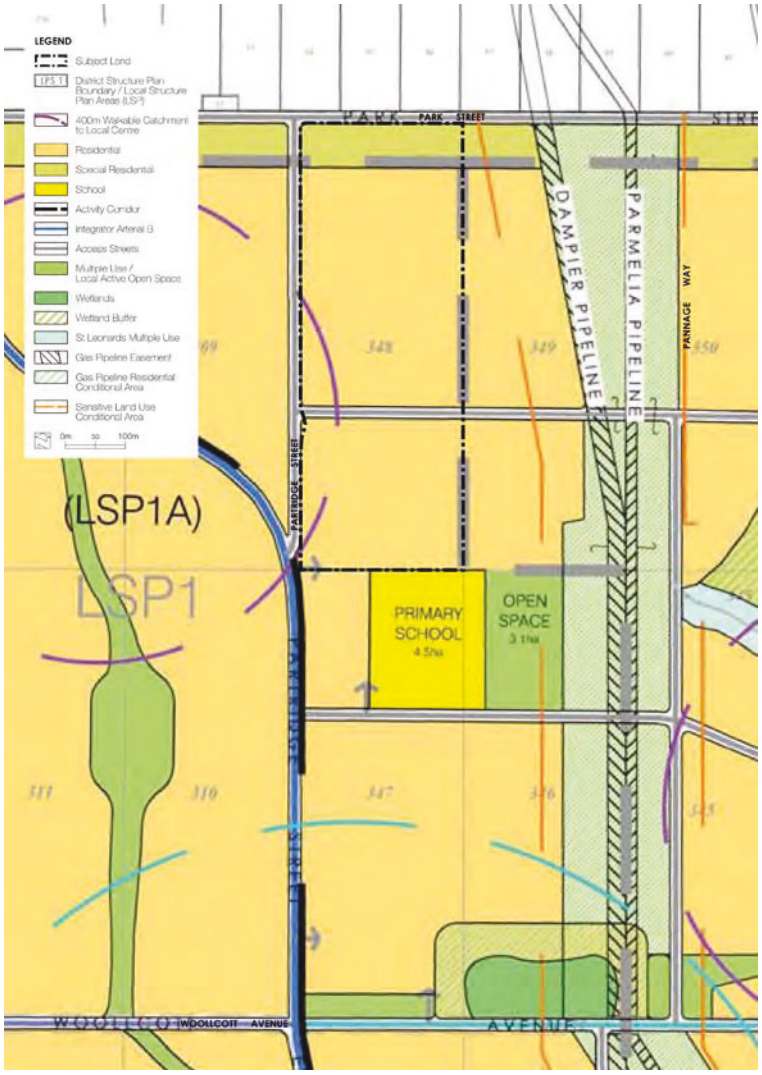

Figure 6: Albion District Structure Plan

1.6.2 PARK STREET STRUCTURE PLAN

The Park Street Structure Plan (SP027) applies to the northern portion of Lot 500 and was endorsed by the WAPC on 11 March 2013. The Structure Plan provides for the residential development and subdivision of the land at a R5 density code, yielding 9 lots which ranged in area from 2,250m² to 2,312m², refer **Figure 7**. The Structure Plan also required a minimum primary street setback of 15m. No technical information supported the Structure Plan.

No subdivision or development has occurred within the LSP area to date. An Amendment (No. 1) to the Park Street LSP has been approved and provides for residential development at a density of R20 and R30 which is consistent with the land use and density proposed in this LSP. It is intended that this LSP will ultimately supersede the Park Street Structure Plan (SP027), including any amendments, so there is only one comprehensive LSP for Lot 500 Park Street.

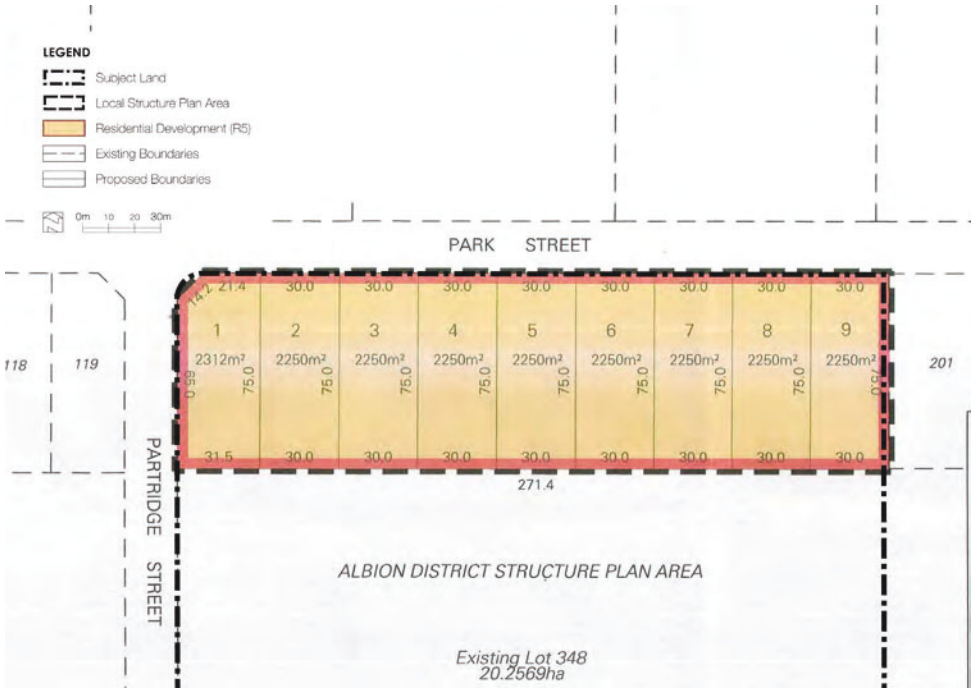

Figure 7: Approved Park Street Structure Plan

1.6.3 SURROUNDING STRUCTURE PLANNING

The LSP area is surrounded by the following approved LSPs:

- LSP 1A – Whiteman Edge Estate to the west (Estate is developed);
- LSP 1B – Ariella Private Estate to the south of Lot 500 (Estate is partially developed); and
- LSP 3A – Avonlee Estate to the east (Estate is partially developed).

The location and extent of development within these approved LSPs is depicted in **Figure 8**.

As demonstrated by **Figure 9**, the LSP will provide an appropriate interface with the adjoining Avonlee Estate development.

Figure 8: Development Context

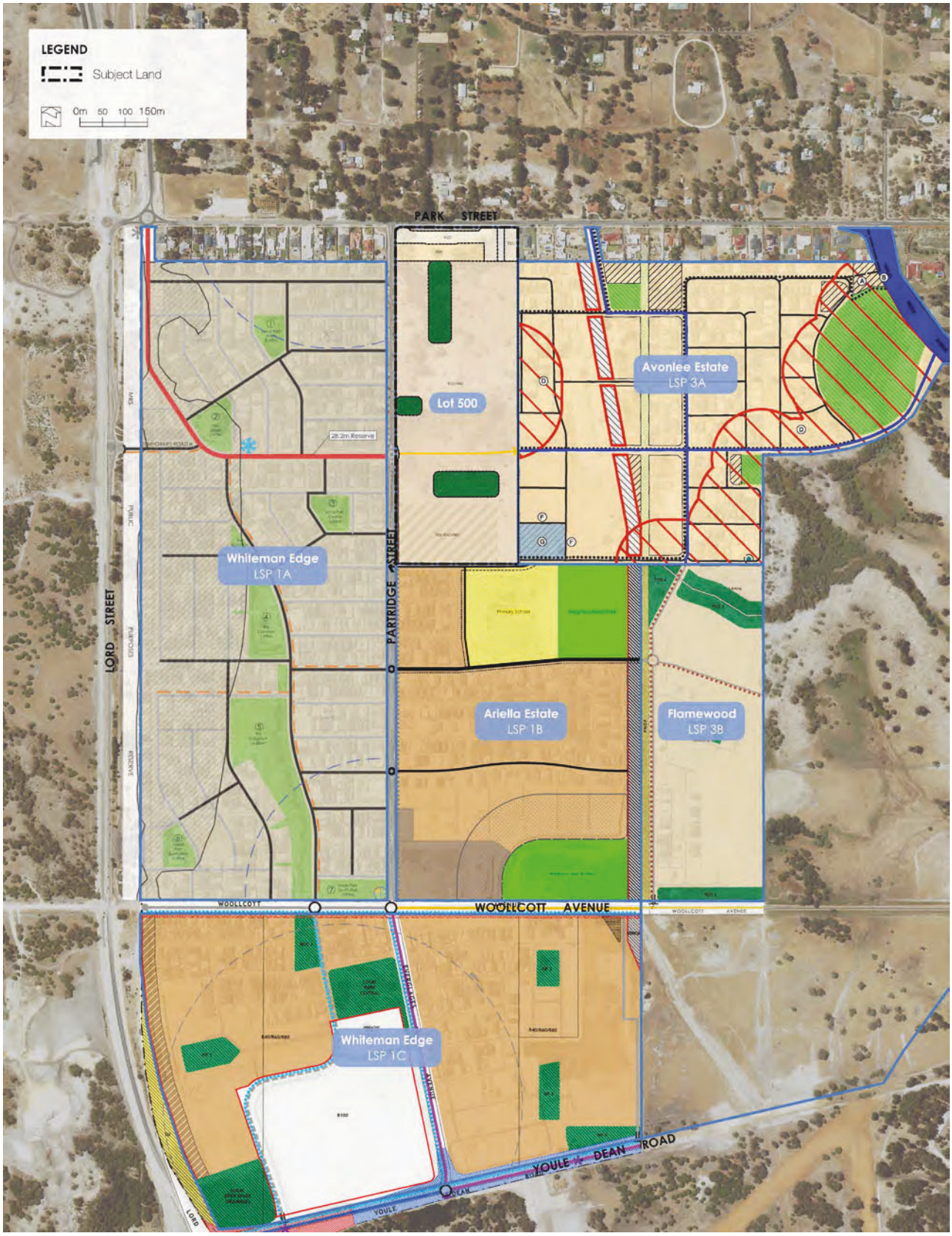

Figure 9: LSP Context

1.7 PRE-LODGEMENT CONSULTATION

Pre-lodgement consultation has occurred between the Project Team, the City of Swan, the Department of Biodiversity, Conservation and Attractions, Department of Water and Environmental Regulation and Department of Planning, Lands and Heritage during the preparation of this LSP.

A summary of the key pre-lodgement consultation undertaken during the preparation of the LSP is outlined in **Table 3.**

TABLE 3: PRE-LODGEMENT CONSULTATION

Agency	Date of Consultation	Consultation Method	Summary of Outcomes
Department of Biodiversity, Conservation and Attractions	7 December 2018	**Email** Ken Atkins (DBCA), email from Kathy Choo (Strategen)	Agreed with the outcomes of the Threatened Ecological Community (TEC) assessment and the quadrats established on site do not represent FCT3c TEC nor any other TECs.
Department of Water and Environmental Regulation	10 December 2018	**Email** Jim MacKintosh (DWER) to Scott Wills (JDA)	Confirmation that only a concise LWMS for Lot 500 Park Street is required.
City of Swan	5 March 2019	**Meeting** Attendees: Rachel Chapman, Julie-Anne Fitzgerald (TBB) Preston O'Keefe (CWP - LSP proponent) Mariska van der Linde, Patricia Wojcik (CoS)	• Preliminary meeting to discuss the structure planning for Lot 500 being undertaken in two phases, beginning with a LSP Amendment to the Park Street Structure Plan and followed by an overall LSP for the balance landholding. • A Concept Plan was presented to inform discussion regarding the proposed modifications to the Park Street Structure Plan and the new LSP for the whole of Lot 500. • An integrated retirement living concept was discussed for the southern portion of the new LSP with the potential for a higher density code (R60) to be applied as an alternative to single residential R30/40 development. • TBB and CWP provided rationale for the proposed new LSP and LSP Amendment based on the recent rezonings within the Henley Brook Urban Precinct. • As no technical documentation supported the Park Street Structure Plan, the LSP Amendment would need to be supplemented with technical inputs and prepared in a Part 1 and 2 format. The new LSP would also need to be prepared in accordance with WAPC Structure Plan Framework including technical appendices and density code ranges with location criteria. • Whilst the City's preference is for one structure plan for Lot 500, it was acknowledged that the subsequent structure plan lodged for the balance of Lot 500 would include the LSP Amendment area and would supersede the approved Park Street LSP.
City of Swan	12 March 2019	**Email** Julie-Anne Fitzgerald (TBB) to Mariska van der Linde (CoS)	Draft Concept Plan for Lot 500, including updated Concept for the LSP Amendment area, was provided to the City of Swan for circulation to internal departments.
City of Swan	13 March 2019	**Meeting** Attendees:	**LSP Amendment Concept Plan** (consistent with Concept Plan contained within the LSP Amendment report)

Agency	Date of Consultation	Consultation Method	Summary of Outcomes
		Rachel Chapman, Julie-Anne Fitzgerald (TBB) Robin White (Transcore) Matthew Yan (JDA Hydrologists) Mariska van der Linde, Rachel Sweeney, Wendy Griffiths, Wayne Stuart, Liam Smart, Aaron MacNish (CoS)	• No major concerns raised by the City. • Cross-section to be prepared for the cap road to demonstrate that there is sufficient width for services/tree planting. • The issue of driveway access for corner lots was raised by WG, consideration to this will need to be given. Possible solutions include wider lots (18m), designating garage locations on a LDP, preparation of technical note. • For the lots fronting Park Street, drainage will be directed to the existing Park Street drainage system. Additional drainage created by the cap road will also drain into Park Street. Remaining drainage will be directed south and accommodated within the balance of Lot 500. • No POS will be provided within the LSP Amendment area, the POS liability for the LSP area will be provided within the balance Structure Plan area. • The City does not want Partridge Street to take the additional traffic generated by the Henley Brook Structure Plan area, particularly a direct connection to Partridge Street. • The City's preference is for the traffic within Henley Brook to be directed north and then east/west to Lord Street and Henley Brook Avenue. Any access to Park Street should be closer to Lord Street and Henley Brook Avenue. • The proponent's support to a local structure plan amendment, initiated by the City, to include the LSP area within Development Contribution Area 1 was raised. **LSP Concept Plan** (similar to Concept Plan contained within the LSP report, key changes relate to POS areas to provide for greater retention of trees) • The City is comfortable with Fairmount Boulevard being reduced to a Neighbourhood Connector B east of the round-about at the Fairmount Boulevard/Partridge Street intersection (20m reserve). • The City was happy with the proposed 4-way intersection within the Concept Plan area having threshold treatments, e.g. on east and west legs, making north-south the major road at this intersection. • Bin pads will likely be required for the proposed access leg. • The City did not raise any issues with the proposed drainage strategy: all drainage being accommodated within the southern POS, draining along Palfrey Street to St Leonards Brook. • The City did advise that the parks need to be dry or there needs to be acceptance that any turf will not be irrigated in summer. • Delivery of POS areas needs to be in accordance with the City's policy (copy provided at the meeting). • A Concept Plan for each POS is required in accordance with the City's policy. • The City raised the need to be mindful of BAL ratings for POS particularly if the areas are unirrigated and have dense plantings/shrubs.

Agency	Date of Consultation	Consultation Method	Summary of Outcomes
			• Potential for irrigating a small portion of POS was discussed in relation to obtaining access to water and/or mains irrigation line from Stockland (bore in Flamewood estate). • The City would like to see trees retained if possible. • The City raised that there are not many spaces available for adolescents in the area, clay pump track could be considered. • City advised it would not support planting of 'Typha' species in POS and drainage areas. • It was noted that a flora and vegetation assessment has been undertaken and an EPBC Act referral would occur. • It was also noted that a spring flora survey has not yet been undertaken.
Department of Planning Lands and Heritage	14 March 2019	**Meeting** Attendees: Rachel Chapman, Julie-Anne Fitzgerald (TBB) Mat Selby, Mario Carbone (DPLH)	• DPLH did not raise any issues with the proposed process of submitting a Local Structure Plan Amendment, followed by a new overall LSP for Lot 500. • DPLH did not raise any issues in relation to the LSP concept design. • The proponent's support to a local structure plan amendment, initiated by the City, to include the LSP area within Development Contribution Area 1 was raised.
City of Swan	8 April 2019	**Meeting** Attendees: Rachel Chapman (TBB) Graham McArthur, Preston O'Keefe (CWP - LSP proponent) Phil Russell, Stephen Tan, Mike Foley (CoS)	• Advised the City that Park Street LSP Amendment had now been lodged and briefed them on the Amendment. No concerns were raised with the proposed LSP Amendment or accompanying Concept Plan. • Advised the City that a new LSP for the whole of Lot 500 would be lodged at end of April or early May and briefed them on the proposed new LSP and accompanying Concept Plan, including the option for an integrated retirement living concept for the southern portion. No concerns were raised. • Highlighted the importance of comprehensive structure planning for the urban development of the Henley Brook Urban Precinct north of Park Street, including consideration of future traffic movements north and south to mitigate impacts on local roads and ensure traffic volumes are directed to the higher order streets (Henley Brook Ave, Lord Street, Fairmount Blvd). • The City confirmed structure planning was being progressed north of Park Street in Henley Brook by consultants on behalf of some landowners, but a significant amount of work was still required before this could be formally considered. The City's preference for comprehensive structure planning for this area has been conveyed to the consultants and the DPLH, with particular attention to be given to staging of development, road planning, location of land uses and suitable residential densities.

Agency	Date of Consultation	Consultation Method	Summary of Outcomes
Water Corporation	10 April 2019	**Email** Simon Ridgewell (WC) to Michael Smithers (JDSi)	• The subject land is located in the Water Corporation's sewerage reticulation catchment. • An existing DN255 diameter and a DN150 diameter PVC sewer main are already reticulated through the subject land's boundaries and connects into the existing surrounding sewer network. • The sewer network is functional as a gravity sewer. • The development of the subject land can be supplied without further distribution mains, by way of extension from existing water mains in the area.

2 SITE CONDITIONS AND CONSTRAINTS

2.1 ENVIRONMENTAL ASSETS AND CONSTRAINTS

An Environmental Assessment Report has been prepared by Strategen in support of this LSP (refer **Appendix A**). Key aspects of the Assessment Report in relation to the existing environment are included below.

2.1.1 TOPOGRAPHY AND GEOLOGY

Topography of the subject land is low lying with elevation ranging from approximately 36 m to 30 m Australian height datum (AHD), undulating from the highest point in the north to the lowest point in the south (DPIRD 2018).

The subject land is located on the Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion) of Western Australia (Mitchell et al. 2002). Beard (1990) describes the Swan Coastal Plain as a low-lying coastal plain, often swampy, with sandhills also containing dissected country rising to the duricrusted Dandaragan plateau on Mesozoic, mainly sandy, yellow soils.

The subject land lies within the Bassendean Dunes system, characterised by sand dunes and sand plains comprising swamps and flats on sandy alluvium over sedimentary rocks (DPIRD 2018). The soils of this system typically have low fertility and are susceptible to leaching, consist of pale deep sand, semi-wet soil and wet soil (Safstrom and Short 2012).

2.1.2 VEGETATION AND FLORA

A flora and vegetation assessment was undertaken by one ecologist from Strategen on 22 June 2018. The survey was conducted according to standards set out in the Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

2.1.2.1 VEGETATION

Three Vegetation Types (VT's) were identified on the subject land **(Table 4; Figure 10**). The majority of the native vegetation on the subject land comprised VT1, which shows similarities to the Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain TEC. Whilst the species present within VT3 are analogous to the EPBC listed Banksia woodlands of the Swan Coastal Plain, the size and condition of the remnant is insufficient to meet the diagnostic criteria of the TEC.

TABLE 4: VEGETATION TYPES

Vegetation Type	Description	Area (ha)	Percentage of Subject Land
V1	Corymbia calophylla open woodland over Xanthorrhoea preissii	3.79	19
V2	Banksia woodland with a mixture of Eucalyptus sp. And Corymbia calophylla	1.62	8
V3	Melaleuca woodland in wetter areas	1.9	9
Cleared		13.05	64
TOTAL		**20.36**	**100**

The condition of the vegetation ranged from Good-Very Good to Completely Degraded, with most disturbance due to historical agricultural practices. The majority of the subject land was rated as Completely degraded (2.75 ha) due to the historical clearing (**Table 4; Figure 10**).

TABLE 5: VEGETATION CONDITION

Vegetation Condition	Area (ha)	Percentage of Subject Land
Good – Very Good	0.46	2
Good	2.41	12
Degraded	3.42	17
Completely Degraded	14.07	69
TOTAL	**20.36**	**100**

2.1.2.2 FLORA

Two flora species were identified in the desktop assessment as having the potential to occur within the subject land (refer **Appendix A**). This was based on one of the habitat requirements for both species (sandy soil; WAH 2018), being present within the subject land. However, neither species are expected to occur within the subject land based on the its highly degraded nature.

Most of the subject land is highly degraded and dominated by weed species. One weed species that was noted during the site visit, cotton bush (*Gomphocarpus fruticosus*), is listed as a declared pest under the *Biosecurity and Agriculture Management Act 2007*. This species typically requires regular and ongoing weed control.

2.1.2.3 THREATENED ECOLOGICAL COMMUNITIES

The Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain TEC (Corymbia calophylla - Xanthorrhoea preissii TEC) is an ecological community listed as endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This ecological community is a woodland associated with the Swan Coastal Plain of southwest Western Australia, featuring a prominent tree layer of Corymbia calophylla and shrubland layer of Xanthorrhoea preissii, and is aligned with FCT 3c.

Whilst, the canopy of VT1 matches the listed dominant trees (Corymbia calophylla) in the conservation advice, only one of the listed dominant shrubs (Xanthorrhoea preissii) is present in the VT1, and none of the listed dominant herbs were recorded. Furthermore, the vegetation within VT1 lacks the understorey diversity of the community description for FCT3c. Given this, the vegetation within VT1 in its current state does not represent the TEC.

Early consultation with Department of Biodiversity, Conservation and Attractions' (DBCAs') Species and Communities Program has been undertaken to determine their likely position on the matter. The DBCA has advised via email correspondence dated 7 December 2018, that they agree with the outcomes of the TEC assessment and that the quadrats established on the subject land do not represent FCT3c TEC, nor any other TECs.

Figure 10: Vegetation Types and Condition Source: *Strategen*

2.1.3 FAUNA AND HABITAT

A black cockatoo habitat assessment was conducted on the subject land in March 2019 by qualified zoologists with relevant experience as specified by the EPBC Act referral guidelines (DSEWPaC 2012) (refer **Appendix A**).

The assessment identified approximately 2.92 ha of suitable foraging habitat for all three species of black cockatoo (refer **Figure 10**). Foraging habitat consisted predominately of Marri, with several species of Banksia (but few trees), Eucalyptus todtiana, and one Jarrah. Foraging evidence in the form of chewed Marri fruits was observed in several locations, although this was not recent.

An assessment of black cockatoo roosting and breeding habitat was also undertaken within the subject land to identify potential black cockatoo roosting and breeding trees. 'Breeding habitat' for black cockatoos is defined in DSEWPaC (2012) as trees of a species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable Diameter at Breast Height (DBH) to develop a nest hollow (>300 mm for salmon gum and wandoo, and >500 mm for other species).

Trees of this size may also be large enough to provide roosting habitat (i.e. trees which provide a roost or rest area for the birds). Significant trees which contain hollows that have an entrance chamber of more than 100 mm are suitable for use by black cockatoos (Whitford and Williams 2002).

During the habitat assessment, 89 potential breeding trees were recorded (refer **Figure 11**). None of these trees had hollows of sufficient size to enable black cockatoos to nest in. It should also be noted that no black cockatoos were seen or heard in the survey area or adjacent whilst on the subject land.

Figure 11: Black cockatoo habitat Source: *Strategen*

2.1.4 CONSERVATION AREAS

SPP 2.8: Bushland Policy for the Perth Metropolitan Region aims to provide a policy and implementation framework that ensures bushland protection and management issues throughout the Perth Metropolitan Region are adequately addressed and integrated with broader land use planning and decision-making (WAPC 2010). The policy predominantly deals with two distinct subjects, Bush Forever areas and local bushland areas.

No Bush Forever sites or ecological linkages are located within the subject land. The nearest Bush Forever Site, 304, is located within 1 km of the subject land, approximately 700 m to the west. No Bush Forever sites will be directly impacted by the proposed development as there is existing residential development between the subject land and the nearest Bush Forever sites in all directions.

No DBCA or local government conservation reserves have been identified within, or nearby the subject land. However, based on the broad scale mapping provided within the City of Swan's Local Biodiversity Strategy, it appears that a Local Natural Area (LNA) is associated with the remnant vegetation located within Lot 500 (City of Swan 2015). This area is identified as 'to be negotiated' non-Local Government Area, reserved for special use or public purposes under the City of Swan Local Biodiversity Strategy (City of Swan 2015).

The location of POS within the LSP area will be informed by the remnant vegetation on the subject land to maximise the opportunity for retention.

2.1.5 CONTAMINATION

The Contaminated Sites Act 2003 (CS Act) defines contamination as having a substance present in land or water above background concentrations that presents a risk of harm to human health or the environment. The Act also provides for the identification, recording, management and remediation of contaminated sites. Contamination commonly occurs through accidental leakage and spillage, or poor site management practices.

A search of the Department of Water and Environment Regulation (DWER) contaminated sites database (DWER 2019) identified that no part of the subject land, or the surrounding land, is registered on the Contaminated Sites Database under the Contaminated Sites Act 2003. Furthermore, aerial imagery of the subject land and the surrounding area does not indicate any potentially contaminating activities within the LSP area or nearby.

A site visit was undertaken by Strategen personnel in 2018 to determine potential sources of contamination within the subject land. The following items were observed:

- illegal dumping of household waste;
- rubbish drift, likely form neighbouring developments;
- dirt piles;
- two small dams; and
- remnant brick structures.

None of the above are likely sources of contamination. No asbestos or other sources of potential contamination were observed during the site visit.

2.1.6 HERITAGE

2.1.6.1 INDIGENOUS HERITAGE

A search of the Department of Planning, Lands and Heritage – Aboriginal Heritage Places mapping tool (DPLH 2019) identified no Registered Sites on the subject land. The nearest Registered Aboriginal Heritage site is "Lord Street North 1" (Place No. 551) which is located approximately 0.5 km west of the subject land.

2.1.6.2 EUROPEAN HERITAGE

A search of the Heritage Council of Western Australia website identified no Registered European heritage places within the subject land (DPLH 2019). The nearest European heritage listed place is Whiteman Park (Place No. 25868) which is located approximately 0.65 km west of the subject land.

2.1.7 BUSH FIRE

The majority of the subject land is designated as bushfire prone on the WA Map of Bushfire Prone Areas. As a result of the bushfire prone status of the subject land, a Bushfire Management Plan (BMP) is required to accompany the Local Structure Plan to address the following requirements of State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7), namely Policy Measure 6.3:

- a bushfire hazard level (BHL) assessment or where lot layout is known, a Bushfire Attack Level (BAL) contour assessment to determine the indicative acceptable BAL ratings across the subject land;
- identification of any bushfire hazard issues arising from the above assessment;
- assessment against the bushfire protection criteria requirements contained within the Guidelines; and
- demonstrating compliance can be achieved in subsequent planning stages.

A BMP has been prepared in in support of this LSP in accordance with the Guidelines and is contained in **Appendix B**. Pre-development vegetation classifications north of Park Street are a combination of Class B Woodland and Glass G grassland. Undeveloped vacant land to the south and east also comprise Class G grassland, including future development stages in adjacent residential estates (Avonlee and Ariella Private Estates).

2.2 HYDROLOGY

A Local Water Management Strategy (LWMS) has been prepared by JDA in support of this LSP (refer **Appendix C**). Key aspects of the LWMS in relation to the pre-development environment are included below.

2.2.1 WETLANDS

The Geomorphic Wetlands of the Swan Coastal Plain mapping by Department of Parks and Wildlife (2016) is shown in **Appendix C**. The majority of the subject land is classified as a Multiple Use Palusplain (UFI 1339).

A Palusplain is defined as an area of flat land that is seasonally waterlogged, and wetlands with a 'Multiple Use' evaluation have few ecological attributes and functions remaining, and are not precluded from development.

2.2.2 SURFACE WATER HYDROLOGY

2.2.2.1 CATCHMENT MAPPING

The subject land is located within Sub-catchments A and B of St Leonard's Creek.

The majority of the subject land is within Catchment B, which flows east through drainage lines in adjacent lots and into St Leonards Creek, approximately 1.5km to the south-east. The southern portion of the LSP area is within Catchment A. Runoff from Catchment A flows south to a localised wetland depression that discharges east into the Woollcott Avenue drain.

There are no external upstream flow paths into the LSP area from the adjacent Whiteman Edge development to the west. Stormwater generated within the Whiteman Edge development is conveyed south and managed within their site. Similarly, the stormwater management strategy outlined in the LWMS (VDM, 2009) for the adjacent development to the east (Avonlee) indicates all stormwater is conveyed south with the natural fall of the land, with discharge to Palfrey Street. No allowance for discharge from the LSP area into this lot is provided in the LWMS.

2.2.2.2 PEAK FLOW ESTIMATES

Pre-development peak flow estimates for the Albion district area is presented in the Swan Urban Growth Corridor Drainage and Water Management Plan (DWMP) (DoW 2009a). Hydraulic modelling for St Leonards Creek indicates the peak 100 year Average Recurrence Interval (ARI) flow rate at the south eastern boundary of the LSP area is 0.11 m3/s and the 10 year ARI peak discharge as 0.05 m3/s. Based on the DWMP, the allowable post development outflow from the LSP area is:

- 20% Annual Exceedance Probability (AEP) (5 year ARI): 0.05 m3/s; and
- 1% AEP (100 year ARI) 0.11 m3/s.

Post-development flow rates for the critical 20% AEP and 1% AEP storm events from the LSP area will be consistent with these DoW (2009a) pre-development flow rates.

2.2.3 GROUNDWATER HYDROLOGY

The hydrogeological formations under the LSP area can be grouped into four distinct aquifers, each being assigned the name of the major geological unit contributing to it. In descending order of depth from natural surface they are: Superficial Aquifer (unconfined), Mirrabooka Aquifer (semi-unconfined), Leederville Aquifer (confined) and Yarragadee Aquifer (confined).

The superficial aquifer is unconfined and directly recharged from direct rainfall percolation, and below the LSP area has a saturated thickness of approximately 40 m. The superficial formations are underlain by the Mirrabooka, Leederville and Yarragadee formations (Water & Rivers Commission, 2000a). The Mirrabooka Formation comprises of cretaceous mainly sandstone and sand material. The Leederville Formation is made up of the Pinjar and Wanneroo Members. The Yarragadee Formation beneath the LSP area consists of laterally discontinuous interbedded sandstones, siltstones and shales (Davidson, 1995).

2.2.3.1 GROUNDWATER LEVELS

Pre-development Average Annual Maximum Groundwater Levels (AAMGL) have been previously presented in the Albion Local Water Management Strategy (JDA, 2008). The AAMGL across the LSP area shows groundwater flows north west to south east with levels ranging from 33 to 30m AHD. Typical seasonal variation between summer lows and winter highs for groundwater levels is 1.2m. The contours indicate shallow depth to groundwater (< 2 m) over the majority of the LSP area. Historical maximum groundwater levels (MGL) presented in the Perth Groundwater Atlas (WRC, 1997) are also consistent with these contours.

2.2.3.2 GROUNDWATER RESOURCES

The State's groundwater resources are managed by DWER by licensing abstraction in groundwater management areas. The LSP area is located within the Mirrabooka Groundwater Area (Whiteman Park Sub-area) of the Gnangara Mound. A search of DWER's resource allocation licensing database on 27 March 2019 shows that the groundwater resources of the Superficial Aquifer are fully allocated. Water from the underlying Mirrabooka and Leederville aquifers are reserved for Water Corporation and not available for public access.

A 9,000 kL/yr water licence allocation has been secured for the LSP area through water trading.

2.2.3.3 PUBLIC DRINKING WATER PROTECTION AREAS

A portion of the subject land is located within the Gnangara Underground Water Pollution Control Area (Gnangara UWPCA). The Gnangara UWPCA was proclaimed in 1990 under the Metropolitan Water Supply Sewage and Drainage Act 1909. Water from the mound is extracted by the Water Corporation as part of the Perth Metropolitan Integrated Water Supply System (IWSS).

DWER is the lead agency in protecting catchments for water supply in Western Australia. The Department supports the Australian Drinking Water Quality Guidelines (ADWQG) barrier approach to water quality protection, with catchment management the first barrier of protection. Subsequent barriers are water storage, treatment and disinfection. The catchment management measures are also supported by Public Drinking Water Source Areas (PDWSA) and Wellhead Protection Zones (WPZ) around water supply wells.

Public Drinking Water Source Area

PDWSAs are associated with the Gnangara Mound and Water Quality Protection Note 25 (WQPN) (DoW, 2016) sets out the groundwater catchment priority classification system and provides a guide on compatible land uses to protect groundwater from pollution risk.

The LSP area is located within a Priority 3 (P3) classification area of the PDSWA. P3 areas are defined to manage the risk of pollution to the water source from catchment activities. P3 areas are declared over land where water supply sources co-exist with other land uses such as residential, commercial and light industrial development. Residential development, including group housing, is permitted within a P3 area where the land is already zoned Urban or Urban Deferred in the MRS, as is the case for the Albion Structure Plan area (WAPC, 2001). There are no proposed land uses within the LSP area that may conflict with the regulation of the P3 area.

Well Head Protection Zone

Water Corporation groundwater production wells have a Well Head Protection Zone (WHPZ) to protect drinking water sources in the immediate vicinity of the well. The WHPZ is a circular buffer unless otherwise specified. In a P3 area a buffer of 300m extends around the well head. There is one Water Corporation groundwater production well adjacent to the LSP area, namely Mirrabooka 182 (M182). The WHPZ for this well is shown in **Appendix C**.

The restriction to development within the WHPZ buffer is the exclusion of fuel storage tanks (WAPC, 2001). The LSP is consistent with these restrictions and the protection of the public drinking water supply.

2.3 ACID SULFATE SOILS

An Acid Sulfate Soils (ASS) Investigation has been undertaken by Douglas Partners in support of this LSP (refer **Appendix D**).

ASS is considered to be present in soils described as brown or dark brown silty sand. These materials were encountered at the majority of the test locations at depths of between 1.4 m and 2.6 m.

2.4 EXISTING MOVEMENT NETWORK

A Transport Impact Assessment has been prepared by Transcore in support of this LSP Amendment (refer **Appendix E**). Key aspects of the Assessment in relation to the existing movement network are outlined below.

2.4.1 PARK STREET

Park Street is currently classified as a Local Distributor in the Main Roads WA functional road hierarchy. An area speed limit of 70km/h applies on Park Street. The existing road reserve width is approximately 20m. The section adjacent to the subject land is constructed with two 3.7m traffic lanes, kerbed on the south side and a sealed shoulder of approximately 1m on the north side. It has a 2.5m shared path constructed on the southern verge adjacent to the kerb. Other sections of Park Street are similar but have varying sealed shoulder width and path location.

There is localised widening of the eastbound traffic lane on Park St through the Partridge Street intersection to allow through traffic to pass a vehicle waiting on Park Street to turn right into Partridge Street.

2.4.2 PARTRIDGE STREET

Partridge Street is also currently classified as a Local Distributor in the Main Roads WA functional road hierarchy. The default built up area speed limit of 50km/h applies on this section of Partridge Street. The existing road reserve width is approximately 20m from Park Street to Fairmount Boulevard and this section is constructed as a 6m-wide two-lane carriageway, kerbed on both sides. It has a 2m shared path on the western verge. Access streets on the western side of this section of Partridge Street all connect with full movement T-intersections.

The section of Partridge Street south of Fairmount Boulevard is constructed to Integrator B standard consisting of two 3.5m traffic lanes, 1.5m cycle lanes and 6m median. The full road reserve width south of the LSP area is 29.2m, which involves approximately 4.6m widening on both sides of the original 20m road reserve. That road widening has been provided on the western side on the section abutting the LSP area but not yet on the eastern side within the LSP area, so the existing eastern verge is relatively narrow. Embayed parking has been constructed in the western verge but not yet in the eastern verge.

One access street on the western side of this section of Partridge Street has a full movement T-intersection with a right turn lane in the median on Partridge Street opposite the LSP area. Two other access streets (including Palfrey Street) are restricted to left in / left out only at Partridge Street.

2.4.3 FAIRMOUNT BOULEVARD

Fairmount Boulevard is currently classified as an Access Road in the Main Roads WA functional road hierarchy. The default built up area speed limit of 50km/h applies. West of Partridge Street it is constructed to an Integrator B standard similar to the southern section of Partridge Street, so that Fairmount Boulevard – Partridge Street route forms the Integrator B spine road through this part of Brabham.

The Partridge Street / Fairmount Boulevard intersection is constructed as a single-lane roundabout. An eastern section of Fairmount Boulevard is also constructed from approximately 420m to 810m east of Partridge Street. This eastern section is constructed with a two-lane carriageway approximately 7.4m wide between kerbs within a 20m road reserve.

2.4.4 PALFREY STREET

Palfrey Street is currently classified as an Access Road in the Main Roads WA functional road hierarchy. The default built up area speed limit of 50km/h applies. East of Partridge Street it is constructed with a 6m carriageway width between kerbs, widening to approximately 7m adjacent to the future primary school site. It has a 2m shared path on the southern side which is widened to 2.5m adjacent to the future primary school site. Palfrey Street is restricted to left in / left out access on both sides of Partridge Street.

2.4.5 PUBLIC TRANSPORT

Existing bus route 353 (Ellenbrook Transfer Station to Bassendean Station) runs on Partridge Street adjacent to this LSP area. It provides half-hourly service during weekday peak periods and hourly during the day and on weekends and public holidays.

Existing bus routes 955 (Ellenbrook north to Morley Bus Station via Bassendean) and 956 (Ellenbrook north to Bassendean Station) run on Lord Street approximately 600m west of the LSP area. Route 956 only runs on weekdays and provides a half-hourly service. Route 955 also provides half-hourly service, including on weekends and public holidays.

2.4.6 PEDESTRIAN AND CYCLIST FACILITIES

Existing bicycle facilities (as at 2016), are shown in **Appendix E**, which is taken from the Department of Transport's Perth Bike Map series. It does show that Park Street is classed as a good road riding environment. Since that map was prepared there is now an extensive network of shared paths and footpaths throughout the parts of Brabham where subdivision and development has occurred. The Integrator B route through Brabham (Fairmount Boulevard – Partridge Street – Everglades Avenue) includes on-road cycle lanes as well.

2.4.7 CHANGES TO SURROUNDING ROAD NETWORK

Transport network planning in this area has undergone a number of major changes in the last few years. The Metropolitan Region Scheme (MRS (refer **Appendix E**) still shows a Primary Regional Roads (PRR) reservation for the future Perth-Darwin National Highway (PDNH) parallel to Lord Street, west of the subject land. However, MRWA has subsequently decided to realign that future PDNH route further to the west of Whiteman Park. That section of PDNH is being constructed by the current NorthLink WA project and is scheduled to be completed in 2019.

Under the previous State Government there were plans for an Ellenbrook Bus Rapid Transit Way project that would have involved construction of a dedicated 2-lane busway (from Marshall Road to the Ellenbrook town centre) within the Public Purpose reservation (refer **Appendix E**)) on the western side of Brabham. Following the change of State Government in the 2017 WA elections, the current State Government has decided to construct a railway line to Ellenbrook instead, as part of the State Government's Metronet plan. The final alignment of the future railway line and station locations are yet to be finalised.

Both the previous Ellenbrook Bus Rapid Transit Way project and the new Metronet railway project also include the construction of a new road (referred to as New Lord Street or as Drumpellier Drive) in the PRR reservation. Under the previous transit way proposal there will only be a limited number of road connections across the transit way as the design standard for the transit way required all road crossings to be grade separated (i.e. bridge or underpass). The closest road connection to the subject land was planned at Park Street. The limited number of access points is still the basis of current planning, as shown in the road network diagram at **Figure 12**.

The Main Roads WA website indicates that New Lord Street is anticipated to be completed in 2019.

The MRS in **Appendix E** also shows an Other Regional Roads reservation for Henley Brook Avenue on the eastern side of Brabham. The City of Swan's Development Contributions Plans (DCPs) for Brabham and Dayton indicate progressive construction of Henley Brook Avenue northward from Reid Highway over a number of years with the section south of Park Street currently scheduled for 2025.

Figure 12: New Lord Street Source: *Main Roads WA*

3 LOCAL STRUCTURE PLAN

3.1 OPPORTUNITIES AND CONSTRAINTS

Analysis of the existing site conditions has been undertaken and the potential opportunities and constraints that require consideration in the planning and development of the LSP area, as identified on **Figure 13**.

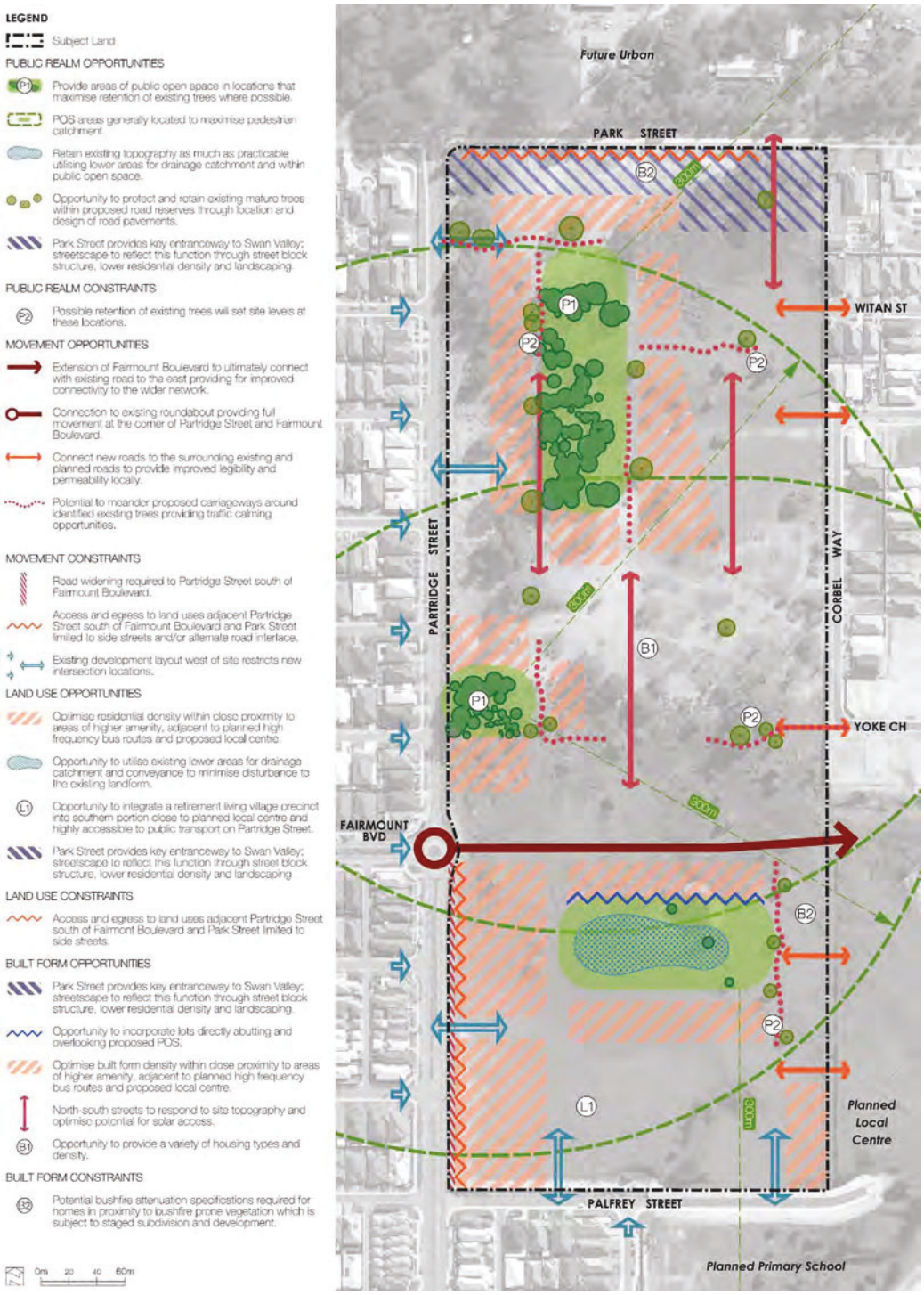

Figure 13: Figure Opportunities and Constraints

3.2 DEVELOPMENT CONCEPT PLAN

The Development Concept Plan included at **Figure 14** provides an indicative design which has been prepared to support the LSP by demonstrating how subdivision may occur in accordance with the LSP. The Development Concept Plan has been prepared based on the following key design considerations.

3.2.1 RESIDENTIAL DEVELOPMENT

R20 coded lots are proposed along the Park Street interface and extend along the north south access road, consistent with proposed Amendment No. 1 to the approved Park St LSP. The R20 coding will provide for appropriate built form (with a reduced number of crossovers) to Park Street, as one of the entranceways to the Swan Valley, whilst recognising the changing character of development to the north with the recent MRS Urban rezoning of the land. The R20 coding along the eastern edge of the LSP area also minimises the number of lots interfacing with existing development on larger lots.

A base code of R30 is proposed for the balance of Lot 500, consistent with the ADSP. Pockets of R40 are provided in proximity to areas of high amenity, a public transport route, a planned primary school and a planned local centre, providing opportunity for front-loaded single houses, rear-loaded lane way housing and grouped dwellings.

The public transport infrastructure proposed within the locality, including the METRONET Morley-Ellenbrook Line and the 'New Lord Street' project ensures the proposed density codes are appropriately supported and will assist in achieving strategic housing density targets.

3.2.2 ROAD STRUCTURE

The surrounding road network has informed the Development Concept Plan design. The subject land is bound by existing roads to the north (Park Street), west (Partridge Street) and south (Palfrey Street). A small portion of road interface also occurs within the Avonlee Estate to the east providing lots within this LSP area with access to an existing constructed road. Road connections to the east have also been positioned so as to align with existing or proposed roads within Avonlee Estate.

A CAP road is proposed along Park Street. This allows an extended development frontage to address Park Street and provide an appropriate interface to the Swan Valley entranceway whilst responding to the traffic volumes which prevent direct access. The verge within the CAP road will be landscaped, in addition to the southern Park Street verge; the existing powerlines within the southern Park Street verge will also be undergrounded to provide a high amenity streetscape.

An extension of Fairmount Boulevard is proposed, linking the LSP area to Whiteman Edge Estate and Avonlee Estate. Direct lot access has been provided to Partridge Street, north of Fairmount Boulevard, consistent with its Access Street classification and the existing residential development on the west side, within Whiteman Edge Estate. Lots with rear laneway access have been identified along Partridge Street, south of Fairmount Boulevard, given the higher order status of the road. The internal access streets all link in with the existing surrounding road reserves via a traditional gird pattern to maximise permeability and legibility.

3.2.3 PUBLIC OPEN SPACE

Three areas of POS are identified within the LSP area. The two northern areas have been located to maximise retention of existing trees. The southern area of POS will predominantly serve a drainage function. All future residents will be located well within a 300m walkable catchment to POS.

Figure 14: Development Concept Plan

3.2.4 RETIREMENT LIVING

A strata-title retirement living option is being explored within the south east corner of the LSP. **Figure 15** has been prepared to demonstrate how a portion of the LSP could be developed for this purpose. The site is appropriately located to support more intensive development given its proximity to the planned local centre within Avonlee Estate and public transport routes.

As identified in **Figure 15**, the Concept Plan provides for lots fronting the surrounding road network whilst ensuring access restrictions to Partridge Street are maintained. A central, communal open space area provides residents with access to a private recreation area which may also include shared use facilities and can accommodate drainage.

Part One of the LSP states that an R60 density code may be applied to a Retirement Living proposal where the subdivision/strata or development forms part of a comprehensive proposal that is integrated with the surrounding residential area. Part One also provides for the preparation of a LDP to ensure a development proposal is appropriately integrated with the surrounding residential area. These requirements will ensure a high standard of development is delivered. The Retirement Living Concept Plan demonstrates how the proposal could be integrated with surrounding single residential development, in accordance with the requirements in Part One of this LSP.

Figure 15: Retirement Living Concept Plan

3.3 LAND USE

The primary land use within the LSP is residential (net area – 13.4390ha), supplemented by POS (1.9727ha).

3.3.1 RESIDENTIAL

The LSP provides for the following R-Codes and R-Code ranges:

- Residential zone (R20);
- Residential zone (R30);
- Residential zone (R30-40); and
- Residential zone (R30-40/60).

The allocation of residential densities within the ranges outlined above shall be identified at the subdivision stage through the provision of a Residential Code Plan, in accordance with the following criteria:

1. The R30 density code shall apply as the base code, with the exception of land subject to 2) and 3) below.

2. The R40 density code may apply where one or more of the following applies:

    a) The lot has a laneway abutting the rear boundary;
    b) The lot has the potential to accommodate grouped or multiple dwellings;
    c) The lot is within a 300m walkable catchment of an area of high amenity i.e. POS, a public transport route or a planned primary school or local centre.

3. The R60 density code may be applied only where the subdivision/strata or development forms part of a comprehensive retirement living proposal that is integrated with the surrounding residential area.

3.3.1.1 DENSITY TARGETS

The estimated dwelling yield for the LSP area, based on the Development Concept Plan is 385 dwellings (refer **Table 6** below). This could accommodate a total population of up to 1,078 people based on 2.8 people per household.

Perth and Peel @3.5million recommends a residential site density of 26 dwellings per residential site hectare (encompassing land purely zoned for residential purposes). In addition to this, Liveable Neighbourhoods sets a target of 22 dwellings per residential site hectare. The applicable density targets under the LSP as calculated in accordance with Perth and Peel @3.5million and Liveable Neighbourhoods is 28 dwellings per net site hectare based on 383 dwellings.

The density codes applied and the resultant lot typology will provide flexibility to address the needs of the local housing market. Final yields will be determined during the detailed subdivision design process.

TABLE 6: ESTIMATED DWELLING YIELD

Density Coding	Yield
R20	22
R30	312
R40	79
TOTAL	**385**

The lot and dwelling yields anticipated exceed the anticipated yields in the ADSP (being 270 lots), which is reflective of the increase in density targets sought by the WAPC since preparation and approval of the ADSP.

3.4 PUBLIC OPEN SPACE

A total of 1.9727ha of POS is provided on the LSP, refer **Figure 16**. A breakdown of the POS areas is outlined in **Table 7.**

TABLE 7: PUBLIC OPEN SPACE PROVISION

POS	Area (Ha)
A	0.9159
B	0.2396
C	0.8172
TOTAL	**1.9727**

POS areas A and C constitute neighbourhood parks while POS area B is classified as a local park. All residents are within a 300m walkable catchment of POS. The POS areas provide for a range of both active and passive recreation opportunities and POS areas A and B allow for the retention of existing trees.

As the majority of the LSP area is included within DCA1 – Brabham (Albion), a pro-rata contribution to three neighbourhood parks and a local community centre is expected. This contribution equates to 2.89% of the overall 10% POS contribution in the locality. Accordingly, the balance POS provision of 7.11% will be provided within the LSP area to ensure a minimum 10% of the gross subdivisible area is provided as POS in accordance with Liveable Neighbourhoods. 10% POS will be provided for the portion of the LSP located outside of DCA1.

A POS calculation has been undertaken in accordance with Liveable Neighbourhoods for the portion of the LSP area located within DCA1 and the portion of the LSP area located outside of DCA1, as detailed in **Tables 8 and 9.** The POS calculation identifies a surplus of POS in the order of approximately 0.3357ha, as summarised in **Table 10**. The total POS provided will be further refined at the subdivision stage.

TABLE 8: PUBLIC OPEN SPACE SCHEDULE – LSP AREA WITHIN DCA1

PUBLIC OPEN SPACE SCHEDULE – LSP AREA WITHIN DCA1		
Gross Site Area (ha)		18.2031
DEDUCTIONS		
Partridge Street Road Widening	0.1001	
1 EY (1:1 Drainage)	0.1050	
Surplus Restricted	0.0235	
Total Deductions		**0.2579**
Gross Subdivisible Area		**17.9452**
Required Public Open Space (7.11%)		**1.2759**
PUBLIC OPEN SPACE REQUIREMENTS		
Unrestricted Public Open Space - minimum 80%	1.0207	
Restricted Public Open Space - maximum 20%	0.2552	
Total		**1.2759**
PUBLIC OPEN SPACE PROVISION		
Unrestricted Public Open Space		
POS A	0.9159	
POS B	0.2396	
POS C	0.4042	
Total Unrestricted POS		**1.5597**
Restricted Public Open Space		
AEP Northern Basin (1:5yr Drainage)	0.3080	
Total Restricted POS		**0.3080**
Restricted POS Not Credited	0.0528	
Total Credited Restricted POS		**0.2552**
Total Credited Restricted and Unrestricted POS		**1.8149**
Percentage of Credited POS (Unrestricted and Restricted POS Contribution)		**10.1135**

TABLE 9: PUBLIC OPEN SPACE SCHEDULE – LSP AREA OUTSIDE OF DCA1

PUBLIC OPEN SPACE SCHEDULE – LSP AREA OUTSIDE OF DCA1	
Gross Site Area (ha)	2.0333
Gross Subdivisible Area	**2.0333**
Required Public Open Space (10%)	**0.2033**
PUBLIC OPEN SPACE REQUIREMENTS	
Unrestricted Public Open Space - minimum 80%	0.1627
Restricted Public Open Space - maximum 20%	0.0407
Total	**0.2033**
PUBLIC OPEN SPACE PROVISION – NIL	

TABLE 10: OVERALL PUBLIC OPEN SPACE

PUBLIC OPEN SPACE	
Required POS	
LSP Area within DCA1 (7.11%)	1.2759
LSP Area outside of DCA1 (10%)	0.2033
Total Required POS	**1.4792**
POS Provided	
Total Credited Restricted POS	0.2552
Total Unrestricted POS	1.5597
Total POS Provided	**1.8149**
Surplus POS	**0.3357ha**

3.4.1 LANDSCAPE DESIGN

A Landscape Masterplan has been prepared by EPCAD to inform the detailed design and development of the POS areas in the LSP, refer **Figure 16.** The design principles of the POS areas are discussed in **section 3.4.1.1.**

LEGEND

- Subject Land
- Public Open Space Area
- Proposed Public Art
- Required Asset Protection Zones for POS A and POS C. POS A APZ is noted as 10m from the lot boundary. POS C AP is noted as 1m from the lot boundary.
- Proposed street trees along all streets. Variety of species will be selected to create hierarchy within the streetscape and for legibility. Street Tree species and their installation will be in accordance with the City of Swan's guidelines.

Figure 16: Landscape Masterplan *Source: EPCAD*

3.4.1.1 PUBLIC OPEN SPACE AREAS

Public Open Space A has extensive areas of mature, magnificent Marri and Melaleuca trees. The design is focused on the retention of native vegetation with both passive and active multi-generational recreational activity. It complements the trees, working in and around the groups, exploiting the shade and shelter in key locations and placing footpaths and open turf in the clear areas, away from the root protection zones.

The main feature is a play trail which weaves through the trees in the form of decking, ladders, timber steppers, nets, boulders and other play items and whilst long, it is low key and intimate. Each trail leads to a larger, feature play node in an open area, and these are surrounded by informal seating and other facilities to provide passive surveillance.

The central shade structure is at the start of this trail and provides shelter to two large picnic tables and a barbecue, with a bin, drinking fountain and bike racks. This structure provides formal shade next to the largest area of turf for family games such as cricket and provides good surveillance to the adjacent activities. The area next to the structure is organic and sculptural, with bespoke feature lounges and giant 'honky' nut cubby houses and mini forest of soft poles, all beneath overhead panels with kinetic movement appeal. Pedestrian or bike paths meander through the vegetation with low ground cover shrub planting to ensure clear sightlines throughout.

To the north is a shaded, casual area with more bespoke feature lounges and device charging facilities that should appeal to the teenage groups.

Public Open Space B was positioned to retain existing trees. It is predominantly covered in large, mature Marri trees with a very healthy understorey of Grass trees throughout. The feeling in this area is of shade and tranquillity and the design aims to tread carefully through the vegetation using a combination of compacted cement limestone and Modwood boardwalks. The park is unique in that it almost feel like a secret garden, and seating with interpretation provides an intimate relationship with the natural environment.

Public Open Space C has a significant drainage function, accommodating up to 1 in 100 year stormwater events, but also provides for a high level of amenity for all ages. The 1 in 1 year basin has soil amelioration and littoral planting to strip nutrients and 1 in 5 year events or greater are managed and directed through a series of informal 'dry river beds' into the larger grass basin. This park has plenty of room for kicking a football around and other family games, and a large shade structure with barbecue, picnic tables, drinking fountain and bike rack. Art sculptures provide additional interest within the drainage basin.

The feature arbor provides shade to seating and the intimate 'dry river beds' with boulders, Eucalypts and Grass trees embrace small spaces with seating and potential passive outdoor activities.

Public Open Spaces A, B and **C** have all been designed to comply with the City of Swan's Public Open Space policy. Particular attention has been given to the conservation of existing trees in POS A and B for future amenity. Plant and tree species will be selected at detailed design stage in accordance with the City's preferred plant lists and in keeping with the already established Ariella aesthetic to provide a cohesive legibility across the estate.

The current limited water within this catchment has been considered in the concept design, but some turf has been included at this stage as it provides an important amenity to the community. All shrub and tree planting will be robust and water wise.

Fire management will be an important component of the design. Ongoing maintenance of these public open spaces and specific areas are to be managed in a low threat state in accordance with Schedule 1 of the Guidelines (Standards for Asset Protection Zones).

3.4.1.2 CAP ROAD

As demonstrated by **Figure 17,** both the CAP road verge and Park Street southern verge will be landscaped with street trees, in accordance with the City's requirements. The street trees will provide a high amenity environment and reinforce Park Street's function as a key entranceway to the Swan Valley.

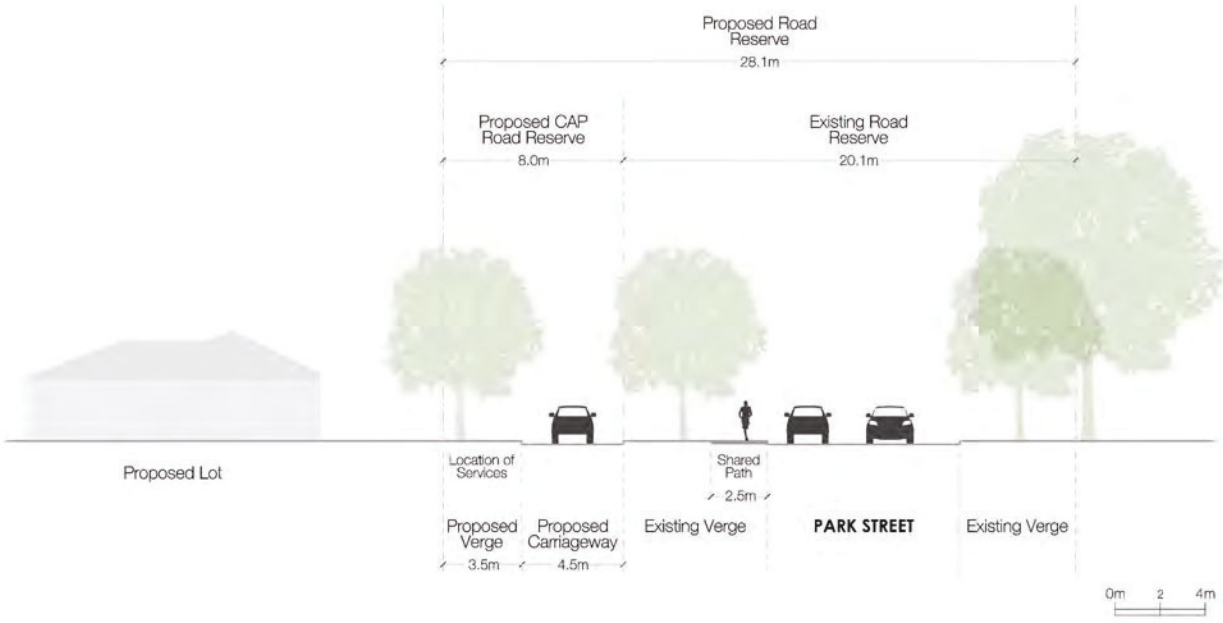

Figure 17: CAP Road Cross-section

3.4.2 WATER SUPPLY

The Landscape Masterplan prepared by EPCAD indicates an estimated irrigation area of approximately 1.55 ha. The area requiring irrigation is predominantly turf. Adopting the Department of Water and Environmental Regulation standard water application rate of 6,750 kL/ha/yr, this indicates a water requirement of approximately 10,462 kL/yr.

Landscaped POS areas are to be at least 50% native plants, with water wise irrigation system design. Considering a fit for purpose strategy, water supply for irrigation of POS is proposed to be from local groundwater resources, and not from potable water supply.

As outlined previously, an allocation of 9,000 kL/yr has been secured for the LSP area. An estimate of POS irrigation water requirements, based on an application rate of 6,750 kL/yr for the LSP area is outlined in **Table 11.**

TABLE 11: ESTIMATED POS IRRIGATION WATER REQUIREMENTS *Source: JDA*

POS	Permanent Water Requirements	Irrigated Area (ha)	Non-Irrigated Area (ha)	Total POS Area (ha)	Total Water Requirement (kL/yr)
Northern POS	Turf, Trees and Strategic Shrub Planting	0.3775 (41%)	0.5379 (59%)	0.9145	2,548
Central POS	Turf, Trees and Strategic Shrub Planting	0.2381 (99%)	0.0013 (1%)	0.2394	1,607
Southern POS	Turf, Trees and Strategic Shrub Planting	0.5960 (73%)	0.2209 (27%)	0.8169	4,023
Key Roads	Park St, Partridge St, Fairmount Blvd	0.1218	N/A	N/A	822
Total	-	-	-	-	9,000

3.5 MOVEMENT NETWORK

A Transport Impact Assessment has been prepared by Transcore in support of this LSP Amendment (refer **Appendix E**). Key aspects of the Assessment are outlined below.

3.5.1 ROAD HIERARCHY

The hierarchy of roads within and surrounding the LSP area are illustrated in **Figure 18**.

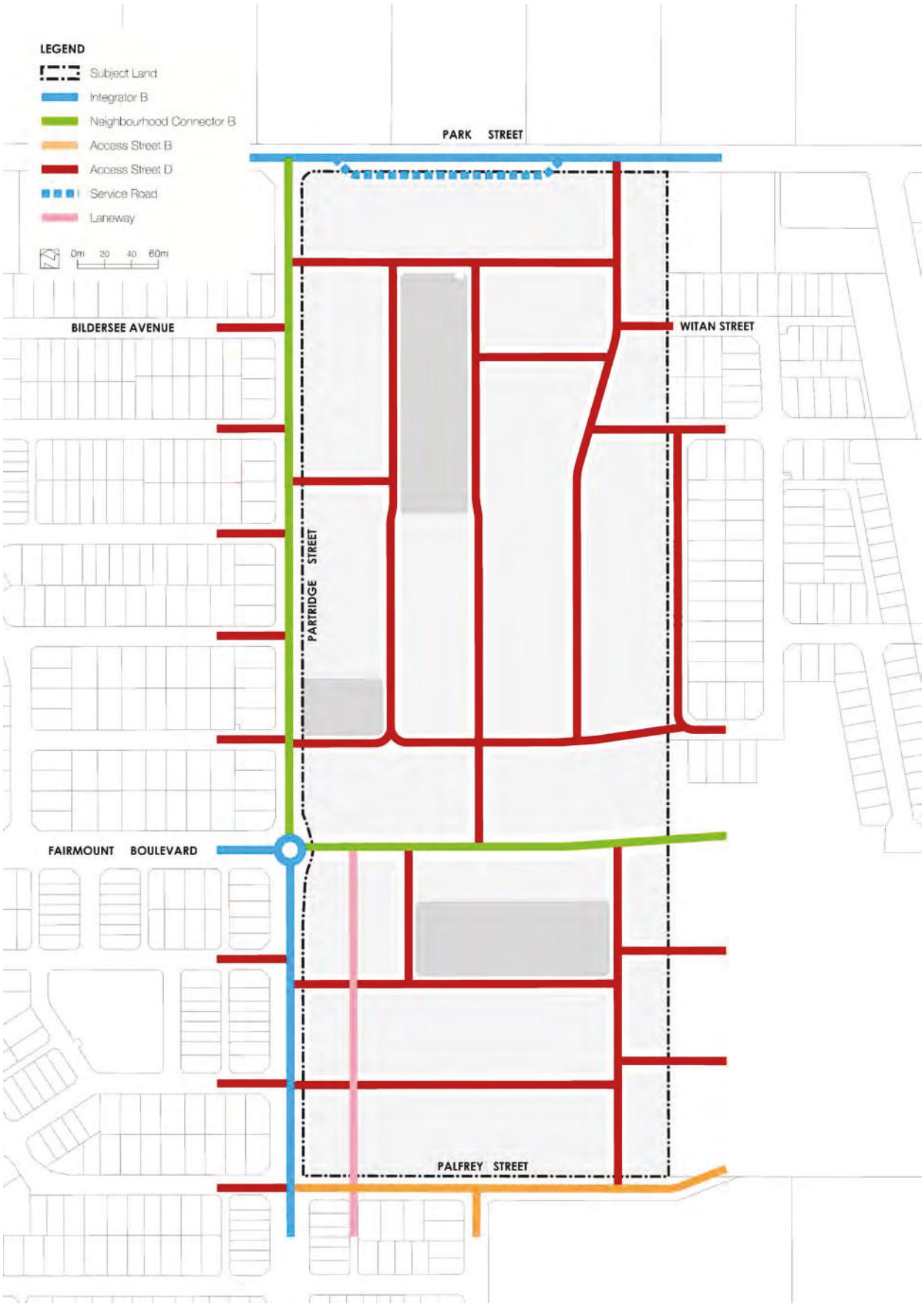

Figure 18: Road Hierarchy

3.5.1.1 PARTRIDGE STREET

Partridge Street (south of Fairmount Boulevard) is anticipated to function as an Integrator B road as part of an activity corridor linking through Brabham, Dayton and Caversham. The section south of Fairmount Boulevard adjacent to the LSP area is planned according to the 'Integrator B outside centres' cross section shown in Liveable Neighbourhoods Figure 15.

The section of Partridge Street from Fairmount Boulevard to Park Street is currently constructed as an Access Street in accordance with its classification in the ADSP and the adjacent Whiteman Edge LSP 1A. It has been determined through discussions with City of Swan that this section of Partridge Street should be upgraded to a Neighbourhood Connector B standard with a 7.2m carriageway as the road is a bus route. This will be accommodated within the existing 20.1m road reserve, as shown in **Appendix E**.

3.5.1.2 PARK STREET

The modelled traffic flows on Park Street indicate some sections will ultimately carry more than 7,000vpd, therefore the appropriate road standard is an Integrator B as per WAPC Liveable Neighbourhoods policy. A standard Integrator B cross section includes a 6m median, two 3.5m traffic lanes, two 1.5m cycle lanes and on-street parking (parking lane or indented in the verge). The standard road reserve width for this class of road in Liveable Neighbourhoods is 29.2m (or 27m with parking indented in the verges), however a 26m road reserve with 5m verges has been agreed to with the City of Swan as illustrated in **Appendix E**.

Residential development has already progressed along the southern side of Park Street in Brabham, except for the subject land. It is therefore not feasible to require any road widening on the southern side of Park Street, although the proposed LSP provides a 8m road widening for a CAP road to address driveway access for the proposed lots abutting this section of Park Street (other sections of Park Street have existing large lots with sufficient space for cars to turn around on site so they do not need to reverse out onto Park Street).

Therefore, it is recommended that ultimate future upgrading of Park Street to Integrator B standard should include road widening on the northern side of Park Street as part of the future structure planning for the Henley Brook Urban Precinct north of Park Street.

In the interim it is acknowledged that localised widening of the eastbound traffic lane would be required to allow through traffic to pass right turning vehicles at the proposed eastern access street intersection and the intersection at the eastern end of the CAP road. This would be similar to the existing Park Street widening through the Partridge Street intersection, within the existing road reserve.

3.5.1.3 FAIRMOUNT BOULEVARD

The Fairmount Boulevard extension through the subject land is proposed as a Neighbourhood Connector B in a 20m road reserve, consistent with the road standard that has already been constructed east of the LSP area.

3.5.1.4 ACCESS STREETS

All other planned roads within the LSP area will be classed as Access Streets. The Access Street B classification (typical reservation of 18m) is appropriate for streets adjacent to the school site. On-street parking will be highly utilised in these areas. Palfrey Street is already planned to this standard.

The Access Street C is appropriate for residential streets with volumes likely to exceed 1,000 vpd. No Access Street C roads are proposed in this LSP area.

The Access Street D (typical reservation of 15m) is appropriate for low volume (less than 1,000 vpd) streets and is the predominant road type within the LSP area. The standard Access Street D width in Liveable Neighbourhoods is 14.2m although the City of Swan prefers a 15m road reserve width. A 13m road reserve is proposed on access streets that abut POS, with reduced verge width abutting the POS in accordance with the provisions of the WAPC Liveable Neighbourhoods policy.

3.5.1.5 PARK STREET CAP ROAD

As noted previously, the proposed LSP includes an 8m road widening for a CAP road (or service road) to address driveway access for the proposed lots abutting the section of Park Street east of Partridge Street. This is proposed to be constructed as a 4.5m one-way (westbound) road carriageway with a 3.5m verge on the southern side, refer **Figure 19**. There is an existing shared path on the existing Park Street southern verge so there is no need for an additional footpath on the CAP road. The existing Park Street southern verge is also able to accommodate any major underground services (trunk services) along Park Street so there is no need for a larger verge width on the CAP road.

3.5.1.6 LANEWAYS

In relation to the minimum requirements for the proposed rear laneways within the LSP area, a minimum width of 6.0 metres (in accordance with Liveable Neighbourhoods) is acceptable to accommodate two-way movement and rubbish collection. Details relating to the design of these laneways will be addressed in more detail during the subdivision planning stages.

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

3.5.2 PUBLIC TRANSPORT

The future activity corridor along Partridge Street would ultimately offer a high-frequency bus service through Brabham, Dayton and Caversham.

The ADSP Transport and Access report also showed two potential future bus routes from Partridge Street to Henley Brook Avenue. None of those potential routes pass through the LSP area, although an existing bus service does run along Partridge Street adjacent to the LSP area.

It is anticipated that the Public Transport Authority will review bus routes in this area to operate as feeder bus services connecting to the future Ellenbrook railway line when rail alignment and station locations have been determined as part of the current State Government's Metronet project.

3.5.3 PEDESTRIAN AND CYCLIST FACILITIES

The proposed pedestrian and cyclist network for the LSP area is identified in **Appendix E**.

On the Neighbourhood Connector roads it is proposed to provide shared paths on one side and a footpath on the opposite side as required by Liveable Neighbourhoods. Footpaths at least 1.5m wide would be provided on at least one side of all roads. Laneway lots are to have footpath access to the visitor parking bays provided for them in the road reserve. On-street cycle lanes are already provided on the Integrator B section of Partridge Street south of Fairmount Boulevard.

When Park Street is upgraded to Integrator B status as part of the planning for future urban development in the Henley Brook Urban Precinct north of Park Street, that would include provision of on-road cycle lanes on Park Street. In the interim, cyclists are able to utilise the existing hard shoulder on the northern side of Park Street for eastbound travel and the existing shared path on the southern verge for westbound travel.

3.5.4 INTEGRATION

As this LSP area is being planned in accordance with the ADSP, the integration of the transport network across Brabham is assured. In particular, the LSP area road network is designed to connect smoothly with the existing and planned local road network east of the LSP area. The LSP path network will also provide opportunities for connection with existing development in surrounding areas via those external road network connections.

However, the recent rezoning of approximately 262ha of land in Henley Brook from Rural to Urban was not planned for when the ADSP was prepared and approved. The 'Brooklands' Structure Plan advertised in 2019 for the Henley Brook Urban area proposes several road connections onto Park Street including an extension of Partridge Street north of Park Street. That advertised Structure Plan proposed a 4-way roundabout at the Park Street/Partridge Street intersection. This is therefore considered to be the current planning position and is treated as the ultimate road network outcome in this assessment.

This 4-way roundabout treatment is not required to accommodate the traffic generated by this LSP and therefore is not proposed by this LSP.

3.5.5 TRANSPORT NETWORK ANALYSIS

It is anticipated that 385 dwellings in this LSP area would generate approximately 3,080vpd. **Figure 19** details the future daily traffic flows anticipated on the road network within and surround the LSP area and identifies the traffic associated with the land uses propose in the LSP area. **Appendix E** identifies the proposed controls for key intersections within the LSP area.

Intersection capacity analysis confirms that the interim T-intersection treatments on Park Street and the existing Partridge Street/Fairmount Boulevard roundabout will operate satisfactorily under the anticipated future traffic flows with full development of this area. The existing Park Street/Partridge Street T-intersection already has widening of the eastbound traffic lane on Park Street to allow through traffic to pass a vehicle that is waiting to turn right from Park Street into Partridge Street. No further upgrades to this intersection are required for this LSP. Development of the Henley Brook LSP area north of Park Street will trigger the upgrade of this intersection to a 4-way roundabout and the extension of Partridge Street northwards.

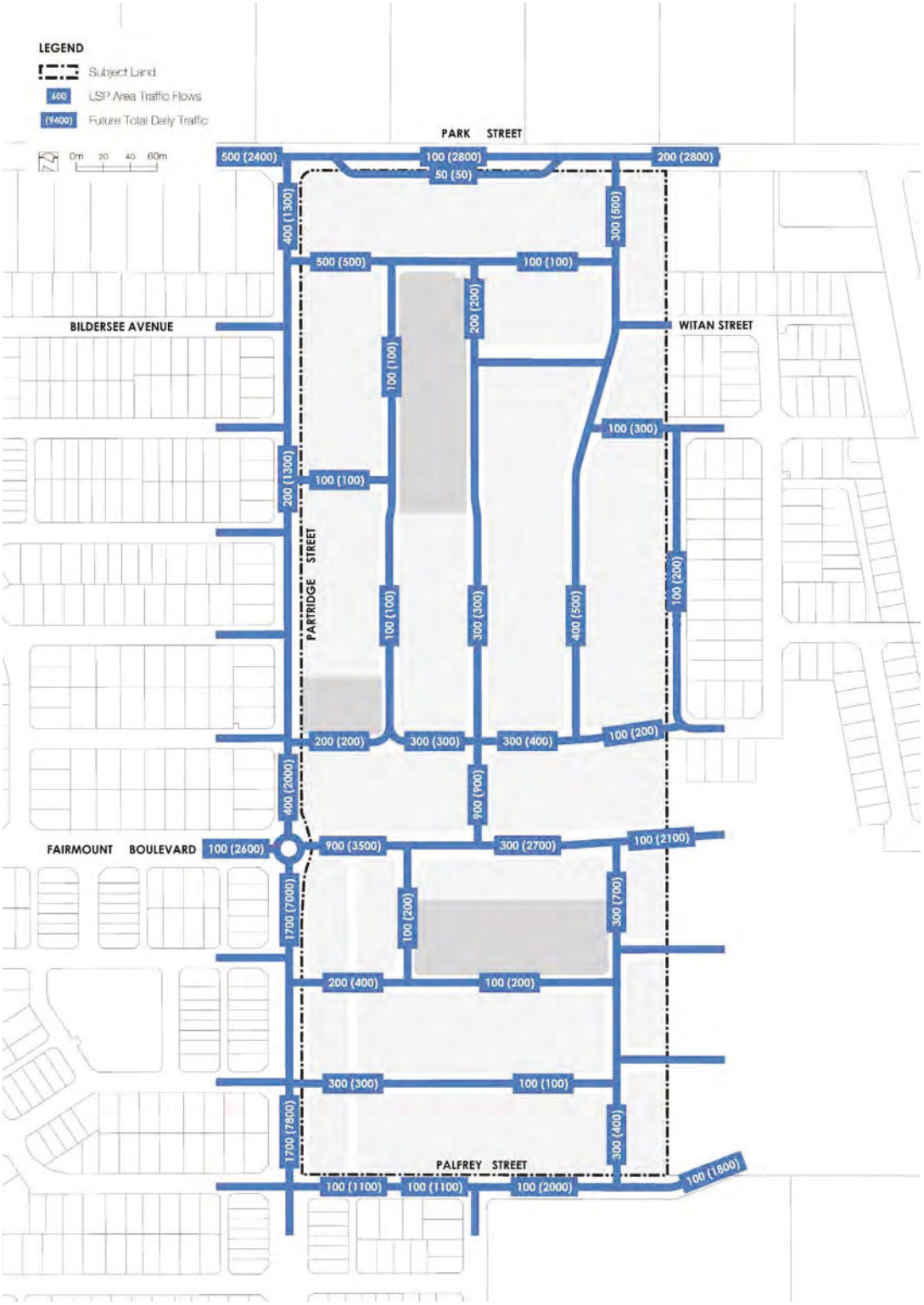

Figure 19: Traffic Volumes

3.5.6 WATER MANAGEMENT

A Local Water Management Strategy (LWMS) has been prepared by JDA in support of this LSP (refer **Appendix C**). Key aspects of the Strategy in relation to water management are included below.

3.5.6.1 STORMWATER MANAGEMENT

Key elements of the stormwater system are:

- Strategic catchment design with road and pipe grade to direct flow to the lowest point of each catchment;
- Soakwells on residential Lots (>300m2) sized to infiltrate the 20% AEP storm event, with overland flow for events greater to street drainage system;
- Bio-retention area designed with amended soil and wetland plants to represent a minimum 2% of the connected impervious areas;
- Safe conveyance and management of stormwater runoff for up to the critical 1% AEP rainfall event within flood storage areas in POS;
- Habitable floor levels to be at least 0.3 m above the 1% AEP flood level;
- Outflow from flood storage area to Palfrey Street restricted to pre-development design rates.

Catchment Areas and Runoff Parameters

The LSP area is divided into northern and southern post-development drainage catchments (B1 and B2) as shown in **Appendix C**. Runoff parameters and loss model have been determined based on the following considerations, consistent with the Albion LWMS (JDA, 2009):

- Lots >300m² – lot area sufficient in size to accommodate soakwells to manage the 1 in 20% AEP storm event in accordance with City of Swan standards. For events that exceed the 20% AEP, soakwells will have an overflow to the street drainage network.
- Lots ≤300m² – lot area insufficient in size to accommodate soakwell. Direct drainage lot connection into street pipe drainage system required.
- Group Housing – area sufficient in size to accommodate soakwells to manage the 1 in 20% AEP storm event in accordance with City of Swan standards. For events that exceed the 20% AEP, soakwells will have an overflow to the street drainage network.

If the R60 Retirement Living Concept identified along the southern boundary of the subject land proceeds, all stormwater generated in that area will be managed on site with soakwells sized for the 1 in 20% AEP storm event in accordance with the City of Swan standards. This will reduce the impervious contributing catchment area of B1 that is discharged to the flood storage area in the POS.

Drainage Discharge Criteria

Post-development drainage discharge criteria to guide drainage design for each catchment in the LSP area are as follows:

- Catchment B1 drains south into the southern POS area. Majority of outflow is to the drainage connection provided in Avonlee Estate at the eastern boundary of the Study Area. Allowable outflow rates from the Study Area are limited to 0.05 m3/s and 0.11 m3/s post-development in the 20% AEP and 1% AEP storm events, respectively, in accordance with the Swan Urban Growth Corridor Drainage and Water Management Plan (DoW, 2009a).
- Provision for minor outflow to an existing drainage connection at Palfrey Street into the Ariella South estate also exists if required. Outflow to this connection is limited to 0.02 m3/s in the 1% AEP storm event as defined in the Urban Water Management Plan for Ariella South (JDA, 2015).

- Catchment B2 is the northern portion of Lot 500 Park Street and drains north into the existing Park Street pipe network, on the northern boundary of the LSP area. Outflow rate should not exceed existing pre-development rates.
- Landholdings to the west of the LSP area (Whiteman Edge) drain in a westerly direction and will not impact on the drainage system of the LSP area. Similarly, landholdings directly east of the LSP area will drain in an easterly direction and will not impact the drainage system of the LSP area.

Note that the discharge criteria could be further refined with detailed modelling and hydraulic analysis once engineering design of the Palfrey Street drainage system is completed by others.

3.5.6.2 GROUNDWATER MANAGEMENT

To protect infrastructure from high groundwater levels, subsoil drains are proposed with inverts at the Average Annual Maximum Groundwater Level (AAMGL) Level. The AAMGL is the Groundwater Design Level (GDL) for the LSP area. The GDL will be refined as part of detail subdivision design.

The criteria for the installation of subsoil drainage is as follows:

- Subsoil drainage to be provided where separation of lot finished level from GDL is less than 2.0 m to protect infrastructure from groundwater mounding;
- Subsoil drainage pipes will be placed to control the groundwater levels;
- Subsoil drainage pipes will be laid in the road network where appropriate and discharge into the bio-retention area within the southern POS;
- Subsoil drainage systems must be designed with free draining outlets, except in major storms;
- Where subsoil drainage is provided the GDL will be considered to be the maximum groundwater mounding level between the subsoil pipes, calculated on a case by case basis.

3.5.6.3 WATER QUALITY MANAGEMENT

A number of non-structural and structural controls are proposed to achieve water quality management of stormwater consistent with State Planning Policy 2.10: Swan Canning River System (WAPC, 2006). These controls include native plantings, street sweeping and bio-retention area. The following water quality management approach shall be applied to the LSP area.

Non-Structural Controls

Non-structural source controls to reduce nutrient export will focus on reducing nutrient inputs to the landscape. The following strategies are proposed:

- Local native plants make up a minimum 50% of the planted areas and streetscape treatments. Any non-local species will be selected for drought tolerance, deep root system and low fertiliser requirements. Plants selected should have a root system that can reach the groundwater table, thereby requiring very little irrigation water to supplement growth.
- Street sweeping and GPT eductions. Reporting at the next stage during subdivision (Urban Water Management Plan) will outline the schedule and cleaning requirements for street sweeping and GPT eductions, which will be coordinated with the City of Swan.
- Use of local native vegetation in streetscapes and encouragement of native plantings in residential lots where possible.

Structural Controls

Structural source controls are proposed to complement the non-structural source controls and provide a complete treatment train for stormwater movement through the development area. The following structural controls are considered appropriate for the LSP area:

- Infiltration of rainfall events through soakwells on lots greater than 300m²;
- Bio-retention area and flood storage area to be planted with a combination of wetland sedge and garden planting to assist water quality improvement;
- Gross Pollutant Traps (GPT) installed immediately upstream of stormwater drainage system outlet (i.e. prior to entry to bio-retention storage area [BRA]).

Bioretention Area

The guidelines (as referenced in **Appendix C**) indicate a minimum 300 mm of amended soil media is required in all treatment areas, to support vegetation and treat nutrients. The desired Ksat is in the range of 100 to 300 mm/hr (2.4 to 7.2 m/day) to allow infiltration of stormwater while retaining sufficient moisture to support the vegetation.

Clogging will occur in the first few years, however once the vegetation is established, the roots and associated biological activity will maintain the hydraulic conductivity of the soil media over time.

Guidelines also indicate treatment area of the bio-retention base to be minimum 2% of the connected impervious catchment area to provide sufficient treatment capacity. The BRA base area meets this requirement. Additional design specifications that should be adopted for the final design of the BRA for landscape approval is presented in **Appendix C** along with a schematic cross section of the BRA.

3.5.7 ACID SULFATE SOILS

As detailed in **Appendix D**, the ASS conditions will not likely prevent the development or impose insurmountable requirements on the development.

Following engineering design, when excavation depths and alignments are known, acid sulfate soil and groundwater investigations targeting proposed excavations will be undertaken. The investigations will be undertaken in accordance with DWER guidelines (DWER, 2015) and aim to determine the extent and severity of acid sulfate soils within the proposed areas of disturbance.

Assessment of baseline groundwater quality within proposed areas of disturbance will also be undertaken as required by DWER guidelines. The results of the targeted investigations and assessment of groundwater quality will be utilised to inform the relevant management requirements to be outlined in an acid sulfate soil and dewatering management plan.

3.5.8 VEGETATION, FLORA AND FAUNA

The development has been strategically located to utilise 11.85 ha of Completely Degraded (Cleared) and Parkland Cleared areas. The proposed development will necessitate the clearing of approximately 6.38 ha of native vegetation ranging from Good – Very Good to Degraded.

Areas containing VT1 in good or better condition, Black cockatoo habitat and potential breeding trees were identified as being of environmental significance and requiring retention, where practicable.

The development has been strategically located to ensure that vegetation of greater quality and significant trees are retained within conservation POS in the central and western parts of the subject land, and lots are concentrated in parts of the subject land which are predominately either Degraded or Completely Degraded. For example, of the area to be developed, approximately 63.3% is in Completely Degraded condition and 1.53% is in Degraded condition.

POS areas comprising a total of 1.97 ha will protect approximately 0.228 ha (49.565%) of Good to Very Good and 0.307 ha (0.127%) of Good quality vegetation, where engineering and bushfire constraints permit. These areas will also provide the opportunity for both rehabilitation and recreation pursuits.

Vegetation management as required by the BMP (Strategen 2019) will necessitate vegetation within the northernmost 10 m of POS A and the easternmost 1 m of POS C being managed in a low threat state in accordance with Asset Protection Zone standards. Each of these areas has been classified as Completely Degraded (Cleared) and so impacts to vegetation here are expected to be negligible.

In response to the above, proposed POS areas for vegetation and tree retention were developed and are depicted in the Local Structure Plan. The occurrences of these environmental attributes within the proposed POS areas are provided in **Table 12**.

TABLE 12: OCCURRENCE OF KEY ENVIRONMENTAL ATTRIBUTES WITHIN THE POS AREAS *Source: Strategen*

Environmental Attribute	Are (ha)/No. in Project Area	Area (ha)/ No. in POS (ha)	Occurrence % within POS areas
VT1	3.769	0.883	23.43%
Vegetation in Good or Better Condition	2.87	0.535	18.641%
Black Cockatoo Potential Breeding Trees (number of trees)	89	32	35.955%
Black Cockatoo Foraging Habitat (ha)	2.919	0.496	17%

3.5.8.1 PREDICTED ENVIRONMENTAL OUTCOME

Future POS areas within the Local Structure Plan, will lead to the following significant environmental attributes being conserved and managed for the long-term:

- VT1 in good or better condition;
- Black cockatoo foraging habitat;
- Black cockatoo potential breading trees.

3.5.8.2 SECONDARY APPROVAL REQUIREMENTS

Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) an action that could be a significant impact on Matters of National Environmental Significance (MNES) should be referred to the Commonwealth Minister for the Environment and Energy in order to determine whether or not the proposed action will require formal environmental assessment and approval.

The proposed development will result in the removal of 2.42 ha of vegetation that comprises foraging habitat suitable for Black Cockatoos, including 57 potential breeding trees, of which none have hollows suitable for breeding. Due to the presence of MNES, the proposal will be subject to an EPBC Act referral.

3.5.9 BUSHFIRE MANAGEMENT

As outlined in the Strategic BMP contained in **Appendix B**, the bushfire hazards both within and adjacent to the subject land and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines for Planning in Bushfire-Prone Areas and AS 3959.

In accordance with the Strategic BMP, a BMP shall be prepared to support a subdivision application to meet the relevant commitments outlined in the Strategic BMP, address the relevant requirements of State Planning Policy 3.7 Planning in Bushfire Prone Areas and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines for Planning in Bushfire Prone Areas.

3.6 INFRASTRUCTURE COORDINATION, SERVICING AND STAGING

An Engineering Service Report has been prepared by JDSi Consulting Engineers in support of this LSP (refer **Appendix F**). Key aspects of the Report are included below.

3.6.1 EARTHWORKS

Existing levels are approximately 0.5-2.0m lower than the adjoining boundaries of the subject land. Earthworks will consist of top soil stripping, disposal of waste and organic matter and cut to fill balance across the subject land. The balance would require additional clean fill to be imported, followed by incremental compaction to achieve the finished design levels.

The recommended design criteria of maintaining a 1.5m separation between the finished levels and the maximum groundwater levels (AAMGL) will be adopted. Retaining walls may be necessary along the longitudinal spines of the development cells to be able to provide level building sites.

3.6.2 WATER SUPPLY

The Water Corporation owns and maintains an existing water reticulation system adjacent to the LSP area. This consists of DN200 & DN250 PVC water mains located around the subject land.

Information obtained from the Water Corporation indicates that the development of the subject land can be supplied without further distribution mains, by way of extension from existing water mains in the area.

3.6.3 WASTEWATER

The Water Corporation owns and maintains all sewerage reticulation systems in the area. The LSP area is located inside the current scheme planning for wastewater.

An existing DN255 diameter and a DN150 diameter PVC sewer main are already reticulated through the boundaries of the subject land and connect into the existing surrounding sewer network. The sewer network is functional as a gravity sewer. Following approval from Water Corporation, the sewage system for the LSP area will be able to flow into this existing network.

3.6.4 POWER SUPPLY

Western Power LV/HV assets are reticulated surrounding the subject land. The surrounding areas have recently been developed; therefore, connection points are expected to be available for low voltage supply. Existing HV infrastructure in the area is all three phase and undergrounded. The only above ground section is along Park Street, which is likely to require removal as part of this development.

It is therefore considered that sufficient capacity within the existing network exists to supply the LSP area.

3.6.5 TELECOMMUNICATIONS

As a result of the Australian Government's decision to roll out a National Broadband Network (NBN) the ownership issues of delivering the wholesale fibre to the home system have been transferred to the Government with a number of retail service providers likely to offer services over the network.

Telstra has indicated that the LSP area is earmarked for NBN infrastructure, with the implication that the existing developments in the area have also been approved for NBN reticulation.

3.6.6 GAS SUPPLY

Alinta Gas has indicated that there is existing DN160 PE gas infrastructure located around the LSP area. It is therefore expected that LSP area can be reticulated with gas.

3.7 DEVELOPMENT CONTRIBUTION ARRANGEMENTS

The majority of the LSP area is located within Development Contribution Area (DCA) 1 – Brabham (Albion) as identified in LPS17. A landowner shall be liable to make a cost contribution in accordance DCA1 and clause 5A.2 of LPS17 at the time of subdivision.

Development of the LSP area will also generate the need for contributions to a primary school in the locality at the subdivision stage.