HENLEY BROOK LOCAL STRUCTURE PLAN

VARIOUS LOTS ON STARFLOWER ROAD, PARK STREET, HENLEY STREET, BROOKLANDS DRIVE, DIANE PLACE, ANDREA DRIVE, PETRANA PLACE, LOSINO BOULEVARD AND ASTURIAN DRIVE, HENLEY BROOK

CITY OF SWAN

NOVEMBER 2020

(as Amended October 2024)

BURGESS DESIGN GROUP
TOWN PLANNING + URBAN DESIGN

Prepared for:	Progress Developments (on behalf of Little Property (WA) Pty Ltd)	
Prepared by:	Burgess Design Group	
	A:	101 Edward Street, Perth WA 6000
	P:	PO Box 8779, Perth Business Centre, WA 6849
	T:	(08) 9328 6411
	E:	reception@burgessdesigngroup.com.au
Project planner	Mark Szabo	
Job code	PRO BRO	
File reference	201111RLGA_Henley Brook LSP v3 (TRACKED CHANGES)	

Revision:	Date:	Description:	Author:	Reviewer:
0	28/12/19	First issue	Mitch Bisby	Mark Szabo/Jon Burgess
1	07/02/19	LWMS updates	Mitch Bisby	Mark Szabo
2	26/07/19	Pre-lodgement updates	Mitch Bisby	Mark Szabo
3	11/11/20	WAPC modifications	Mitch Bisby	Mark Szabo
Ongoing	*NB. Edits by third parties re: LSP Amendments 1 and 2.*			

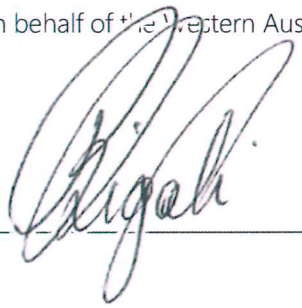
ENDORSEMENT OF THE HENLEY BROOK LOCAL STRUCTURE PLAN

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

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

12 February 2021 Date

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

12 February 2021 Date

12 February 2031 Date of Expiry

TABLE 1: TABLE OF AMENDMENTS			
AMDT NO.	SUMMARY OF THE AMENDMENT	AMDT TYPE	DATE APPROVED BY WAPC
1	(Urbis) To generally: ▪ Introduce a third public primary school reserve over Lots 52, 53 and 9010 Park Street, Henley Brook; ▪ Reconfigure Public Open Space ('POS 10') on Lot 51 Park Street, Henley Brook; ▪ Decrease the area of the north-eastern primary school from 4ha to 3.5ha; and ▪ Update the Structure Plan to reflect the changes and incidental reconfigurations	Standard	14 Dec 2022
2	(CDP Town Planning and Urban Design) To generally: ▪ Update the eastern portion of Brooklands Drive from an *Access Street C* to a *Neighbourhood Connector B* classification. ▪ Update the Structure Plan Map (Plan 1) and relevant Part 2 report and plan references.	Standard	07 Feb 2025

TABLE 2: TABLE OF DENSITY PLANS		
DENSITY PLAN NO.	AREA OF DENSITY PLAN APPLICATION	DATE ENDORSED BY WAPC

EXECUTIVE SUMMARY

This Structure Plan applies to land generally bound by Starflower Road to the west, Gnangara Road to the north, Morgan Fields Estate and the planned Henley Brook Avenue to the east, and Park Street to the south, being the land located within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map.

A summary of all key statistics and planning outcomes of the structure plan is provided in Table 3 below:

TABLE 3: SUMMARY TABLE		
ITEM	DATA	REPORT REFERENCE
Total area covered by the structure plan (ha)	233.6482	1.2
Area of each land use proposed (ha):		
- Residential, including additional uses for:	128.3189	4.2.1
Park Home Park	*6.7177*	
Local Centre	*0.3242*	
- Public Purposes – Primary School	11.2204	4.6
- Public Purposes – Water Corporation	0.1429	4.8
- MRS Other Regional Road	2.2921	4.4
- Public Open Space	30.4336	4.3
- Local Roads	61.2403	4.4
Total estimated lot yield	3,432 (3,260 if the Park Home Park Additional Use area is subtracted from this figure)	4.2.1
Estimated number of dwellings	3,500	4.2.1
Estimated residential site density:		
Dwellings per gross urban zoned hectare	15	4.2.1
Dwellings per site hectare	27	4.2.1
Estimated population	9,800	4.2.1
Number of primary schools	3	4.6
Estimated commercial floor space (ha)	0.1000	4.7
Public open space		
- Gross	30.4336 (13.03%)	4.3
- Creditable	22.1413 (10.46%)	4.3

TABLE OF CONTENTS

PART ONE | IMPLEMENTATION **10**

1. STRUCTURE PLAN AREA **11**
2. OPERATION **11**
3. SUBDIVISION AND DEVELOPMENT REQUIREMENTS **11**

3.1 LAND USE PERMISSIBILITY 11
3.2 DEVELOPMENT REQUIREMENTS 12
3.3 RESIDENTIAL DENSITY CRITERIA 12
3.4 RESIDENTIAL DENSITY CAP 13
3.5 FORESHORE MANAGEMENT PLAN 13
3.6 TRANSPORTATION NOISE ASSESSMENT 13
3.7 GAS PIPELINE RISK MANAGEMENT PLAN 13
3.8 PRO-RATA CONTRIBUTIONS TOWARDS COST OF PRIMARY SCHOOL SITES 13
3.9 ACID SULPHATE SOILS 14
3.10 PUBLIC OPEN SPACE 14
3.11 BUSHFIRE RISK MANAGEMENT 14
3.12 VEHICULAR ACCESS RESTRICTIONS 14

4. LOCAL DEVELOPMENT PLANS **15**
5. ADDITIONAL INFORMATION **15**

PART TWO | EXPLANATORY SECTION **18**

1. PLANNING BACKGROUND **19**

1.1 INTRODUCTION AND PURPOSE 19
1.2 LAND DESCRIPTION 19

2. PLANNING FRAMEWORK **23**

2.1 ZONING AND RESERVATIONS 23
2.2 STRATEGIC PLANS & POLICIES 26
2.3 PRE-LODGEMENT CONSULTATION 29

3. SITE CONDITIONS AND CONSTRAINTS **30**

3.1 LANDFORM AND SOILS 30
3.2 BIODIVERSITY AND NATURAL AREA ASSETS 31
3.3 HYDROLOGY 33
3.4 NOISE 35
3.5 BUSHFIRE RISK 35
3.6 GAS PIPELINES 37
3.7 LAND OWNERSHIP 38

4. LAND USE AND SUBDIVISION REQUIREMENTS **40**

4.1 DESIGN AND LAND USE 40
4.2 RESIDENTIAL ZONED LAND 40

4.3 PUBLIC OPEN SPACE 42
4.4 ADDITIONAL USE – PARK HOME PARK 43
4.5 EDUCATION FACILITIES 44
4.6 ACTIVITY CENTRES AND EMPLOYMENT 46
4.7 MOVEMENT NETWORK 47
4.8 WATER MANAGEMENT 54
4.9 INFRASTRUCTURE COORDINATION, SERVICING AND STAGING 55
4.10 DEVELOPMENT CONTRIBUTION ARRANGEMENTS 57

5. CONCLUSION 58

LIST OF FIGURES

Figure 1 Location Plan
Figure 2 Aerial Photograph
Figure 3 MRS Map
Figure 4 LPS17 Map
Figure 5 Opportunities and Constraints Plan

LIST OF PLANS

Plan 1 Structure Plan Map
Plan 2 Public Open Space, Schools, & Access Restrictions

LIST OF APPENDICES

Appendix 1 Environmental Assessment and Management Strategy
Appendix 2 Local Water Management Strategy
Appendix 3 Bushfire Management Plan
Appendix 4 Parmelia Gas Pipeline AS2885 Safety Management Study
Appendix 5 Public Open Space Schedule
Appendix 6 Transport Impact Assessment
Appendix 7 Infrastructure Servicing Report
Appendix 8 Gas Easement Summary Guidelines
Appendix 9 Landowner Schedule

LIST OF TABLES

Table 1 Table of Amendments
Table 2 Table of Density Plans
Table 3 Summary Table
Table 4 Additional Information
Table 5 Pre-Lodgement Consultation
Table 6 Existing Road Upgrades
Table 7 Public Transport Services
Table 8 Typical Pedestrian and Cyclist Networks

LIST OF IMAGES

Image 1 Access Street C 17.9m Cross-Section
Image 2 Safe Active Streets Cross-Section

LIST OF ABBREVIATIONS

DBNGP	Dampier to Bunbury Natural Gas Pipeline
FRTBC	Forest Red-tailed black cockatoo
PGP	Parmelia Gas Pipeline
WAPC	Western Australian Planning Commission

PART ONE | IMPLEMENTATION

1. STRUCTURE PLAN AREA

This structure plan applies to all land within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map (Plan 1).

2. OPERATION

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

3. SUBDIVISION AND DEVELOPMENT REQUIREMENTS

3.1 LAND USE PERMISSIBILITY

Land use permissibility shall be in accordance with the Structure Plan Map and the corresponding zones and reserves set out in the City of Swan *Local Planning Scheme No.17*, except that:

I. Land identified as 'Residential' on the Structure Plan Map may also be used for the following additional uses as though they were 'D' uses in the zoning table:
    a. Display Home Centre (means two or more dwellings and incidental car parking to be open for public inspection as examples of dwelling design); and
    b. Residential Sales Office (means a building, structure, and associated car parking used incidental to the sale of land and dwellings, and is temporary in nature).

II. Land identified as 'Additional Use 1 – Park Home Park' on the Structure Plan Map may also be used for Park Home Park (for aged accommodation and/or a Lifestyle Village accommodating persons over the age of 45 years) as though it were a 'P' use in the zoning table.

III. Land identified as 'Additional Use 2 – Local Centre' on the Structure Plan Map may also be used for the following additional uses as though they were 'D' uses in the zoning table:
    a. Convenience Store;
    b. Fast Food Outlet;
    c. Shop;
    d. Office; and

e. Restaurant,

and such uses, in aggregate, shall not exceed 500m² of net lettable area within each 'Additional Use – Local Centre' area.

3.2 DEVELOPMENT REQUIREMENTS

1. The Development Application for the school is to address the entire site, inclusive of Public Open Space 10 (POS 10);

2. The Department of Education is to construct Public Open Space 10 to the satisfaction of the City of Swan; and

3. The Department of Education is to fund the development of the oval and associated amenities that make it an active playing space.

3.3 RESIDENTIAL DENSITY CRITERIA

A residential density code plan shall be submitted with subdivision applications indicating the residential density coding applicable to each lot, according to the following criteria:

I. A base code of R30
II. R40 for lots:
    a. at the end of cells;
    b. abutting or directly opposite public open space or a primary school;
    c. with frontage to a neighbourhood connector or integrator road; and/or
    d. within 500m of a train station, bus rapid transit station, or equivalent.
III. R60 for lots:
    a. With frontage to a road that is a high frequency bus route;
    b. to be used for aged care, a retirement village, or park home park;
    c. within 250m of a train station, bus rapid transit station, or equivalent; and/or
    d. to which II applies that also:
        i. have access to a laneway; and/or
        ii. are over 600m² in area that are to be developed for grouped or multiple dwellings*.

**Note: Section 3.2 (III)(d)(ii) is not intended to facilitate the re-subdivision of sites for green-title or survey-strata lots. If this is proposed, a new density code plan shall be submitted that complies with the criteria listed above.*

3.4 RESIDENTIAL DENSITY CAP

I. The number of residential lots within the structure plan area shall not exceed 3,500; and

II. A density schedule summary shall be submitted with subdivision applications that propose residential development setting out the following:

Original parent lot no. (*as shown on the Structure Plan Map*)	Residential area proposed to be developed	No. of residential lots proposed	Cumulative no. of residential lots within the parent lot.
#	(ha)	#	#

3.5 FORESHORE MANAGEMENT PLAN

The alignment and profile of St Leonard's Creek shall be reviewed as part of a foreshore management plan prepared in accordance with the approved *Local Water Management Strategy*.

3.6 TRANSPORTATION NOISE ASSESSMENT

Updated noise modelling is to be undertaken at the subdivision stage where noise sensitive development is proposed within the area identified as *'further noise modelling required'* on the Structure Plan Map.

3.7 GAS PIPELINE RISK MANAGEMENT PLAN

Applications for subdivision or development approval abutting or involving works within a high-pressure gas pipeline corridor shall be accompanied by a pipeline risk management plan.

3.8 PRO-RATA CONTRIBUTIONS TOWARDS COST OF PRIMARY SCHOOL SITES

A condition of subdivision approval for residential development shall be imposed requiring pro-rata contributions towards the cost of the acquisition of primary school sites.

3.9 ACID SULPHATE SOILS

A condition of subdivision approval shall be imposed requiring the preparation of an acid sulphate soils self-assessment form where the site is identified as being within an area of 'moderate to low' risk of acid sulphate soils.

3.10 PUBLIC OPEN SPACE

Public open space shall be provided generally in accordance with the Structure Plan Map (Plan 1) and the Public Open Space and Schools Map (Plan 2).

3.10.1 PUBLIC OPEN SPACE WITHIN GAS PIPELINE CORRIDOR

The design, development and maintenance of POS# 2, 4, 7, 12 and 13 should be undertaken in accordance with the Gas Easement Summary Guidelines (Appendix 8) and in consultation with the City of Swan, Australian Gas Infrastructure Group, and APA Group.

3.11 BUSHFIRE RISK MANAGEMENT

A bushfire management plan shall be prepared in accordance with the requirements of *State Planning Policy 3.7: Planning in Bushfire Prone Areas (2015)* and submitted with any application for subdivision and/or development approval of land designated as a Bushfire Prone Area by the Fire and Emergency Services Commissioner.

3.12 VEHICULAR ACCESS RESTRICTIONS

Vehicular access restrictions apply as follows (see Plan 2 for affected areas):

I. For roads forecast to accommodate between 5,000-7,000 vehicles per day, vehicular access to individual lots shall be provided by means of paired driveways and reversing pockets that enable vehicles to enter the road in a forward gear; and

II. For roads forecast to accommodate in excess of 7,000 vehicles per day, no direct vehicular access to lots is permitted. Alternate means of vehicular access shall be provided by way of controlled access places or laneways.

4. LOCAL DEVELOPMENT PLANS

Local development plans are to be prepared for lots:

I. of irregular shape or less than 260m² in area;
II. that obtain access from a laneway or right-of-way;
III. abutting areas of public open space;
IV. intended to accommodate grouped or multiple dwellings; and/or
V. intended to accommodate retail/commercial uses.

and shall set out the following (as applicable):

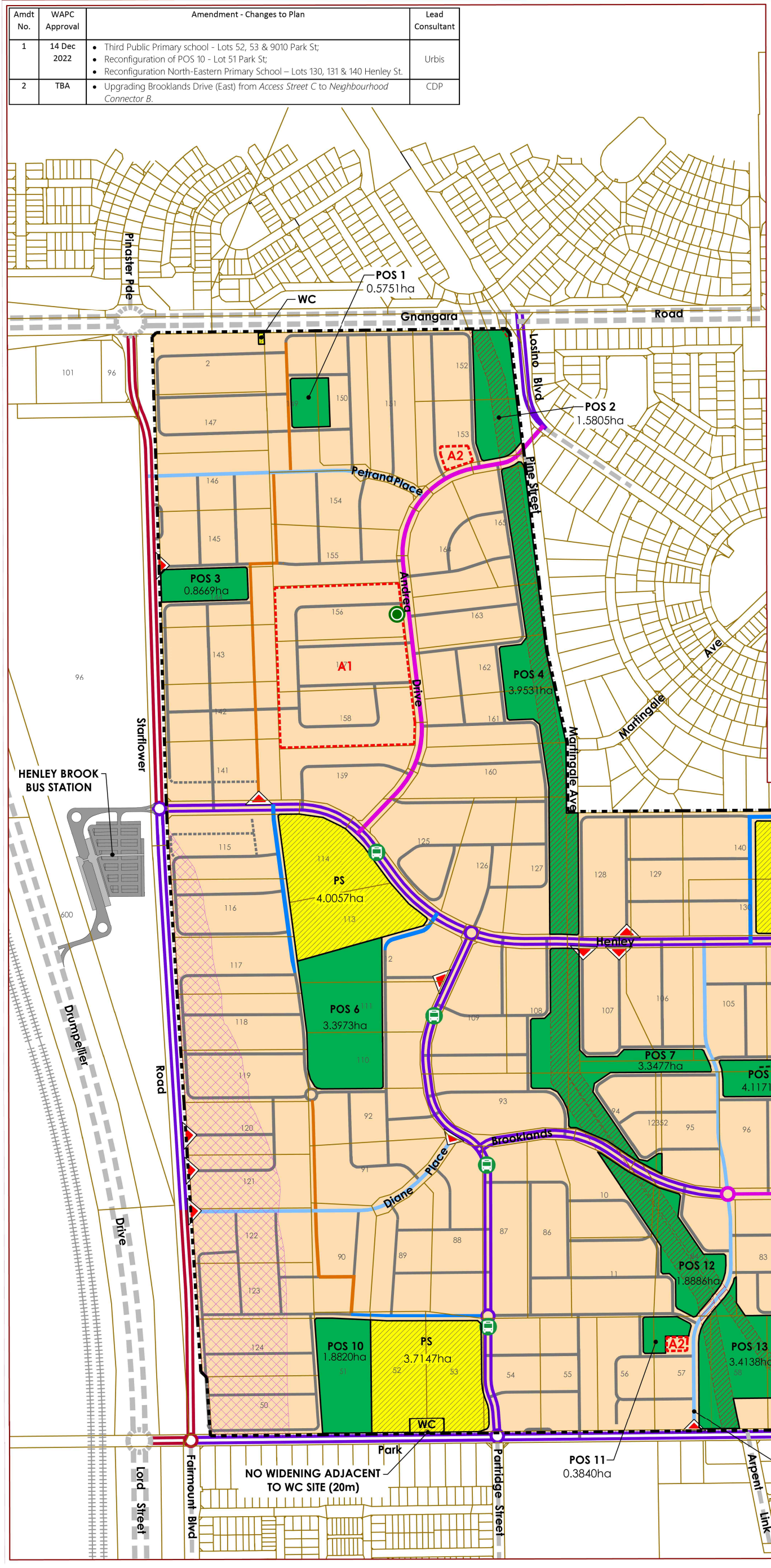
a. street and boundary setbacks;
b. dwelling/building orientation;
c. fencing;
d. open space;
e. garage setbacks and width;
f. vehicular and pedestrian access;
g. parking requirements
h. overshadowing; and
i. visual privacy.

5. ADDITIONAL INFORMATION

TABLE 4: ADDITIONAL INFORMATION

ADDITIONAL INFORMATION	APPROVAL STAGE	CONSULTATION REQUIRED
Urban water management plan	Post-subdivision	City of Swan and Department of Water and Environmental Regulation
Bushfire management plan, as required	Subdivision	Department of Fire and Emergency Services
Transportation noise assessment, as required	Subdivision	City of Swan
Gas pipeline risk management plan, as required	Subdivision	APA Group, DBP
Foreshore management plan	Subdivision	City of Swan
Local development plan, as required	Post-subdivision	City of Swan

Amdt No.	WAPC Approval	Amendment - Changes to Plan	Lead Consultant
1	14 Dec 2022	• Third Public Primary school - Lots 52, 53 & 9010 Park St; • Reconfiguration of POS 10 - Lot 51 Park St; • Reconfiguration North-Eastern Primary School – Lots 130, 131 & 140 Henley St.	Urbis
2	TBA	• Upgrading Brooklands Drive (East) from *Access Street C* to *Neighbourhood Connector B*.	CDP



LEGEND

- STRUCTURE PLAN AREA

MRS RESERVES

- OTHER REGIONAL ROAD

LOCAL SCHEME

- RESIDENTIAL (R30-R60) WITH ADDITIONAL USE FOR DISPLAY HOME CENTRE & RESIDENTIAL SALES OFFICE*
- PUBLIC OPEN SPACE
- PS — PUBLIC PURPOSES - PRIMARY SCHOOL
- WC — PUBLIC PURPOSES - WATER CORPORATION
- A1 — ADDITIONAL USE 1 - PARK HOME PARK*
- A2 — ADDITIONAL USE 2 - LOCAL CENTRE*

ROAD NETWORK

- INTEGRATOR B (25.2m)
- NEIGHBOURHOOD CONNECTOR A (24.4m)**
- NEIGHBOURHOOD CONNECTOR B (19.4m)
- ACCESS STREET B (17.9m)
- ACCESS STREET C (17.9m)*
- ACCESS STREET D (15m)***
- SAFE ACTIVE STREET (15m)*
- LANEWAY (6m)
- INDICATIVE EXTERNAL ROADS
- ROUNDABOUT INTERSECTION****
- LEFT-IN/LEFT-OUT INTERSECTION****

OTHER

- INDICATIVE ST LEONARDS CREEK ALIGNMENT (SUBJECT TO FURTHER ASSESSMENT)
- GAS PIPELINE EASEMENT
- NOISE ASSESSMENT REQUIRED
- FUTURE RAILWAY
- POSSIBLE BLACK COCKATOO ROOST TREE TO BE RETAINED
- PLANNED BUS STOP (INDICATIVE ONLY)

NOTES:

**REFER TO STRUCTURE PLAN REPORT FOR DETAIL*

***PARK STREET TO BE 21m (1m WIDENING ON NORTHERN SIDE) WITH NO ON-STREET OR EMBAYED PARKING, EXCEPT ADJACENT TO THE 'PUBLIC PURPOSES (WC)' SITE, WHICH IS TO REMAIN UNCHANGED AT 20m.*

****MAY BE REDUCED TO 13m ADJACENT TO PUBLIC OPEN SPACE AND/OR ABUTTING ANOTHER ROAD RESERVE, OR 10m WHERE USED AS A CONTROLLED ACCESS PLACE*

*****REMAINING INTERSECTIONS TO BE PRIORITY CONTROLLED*

NORTH

Scale: 1:7500 @ A3

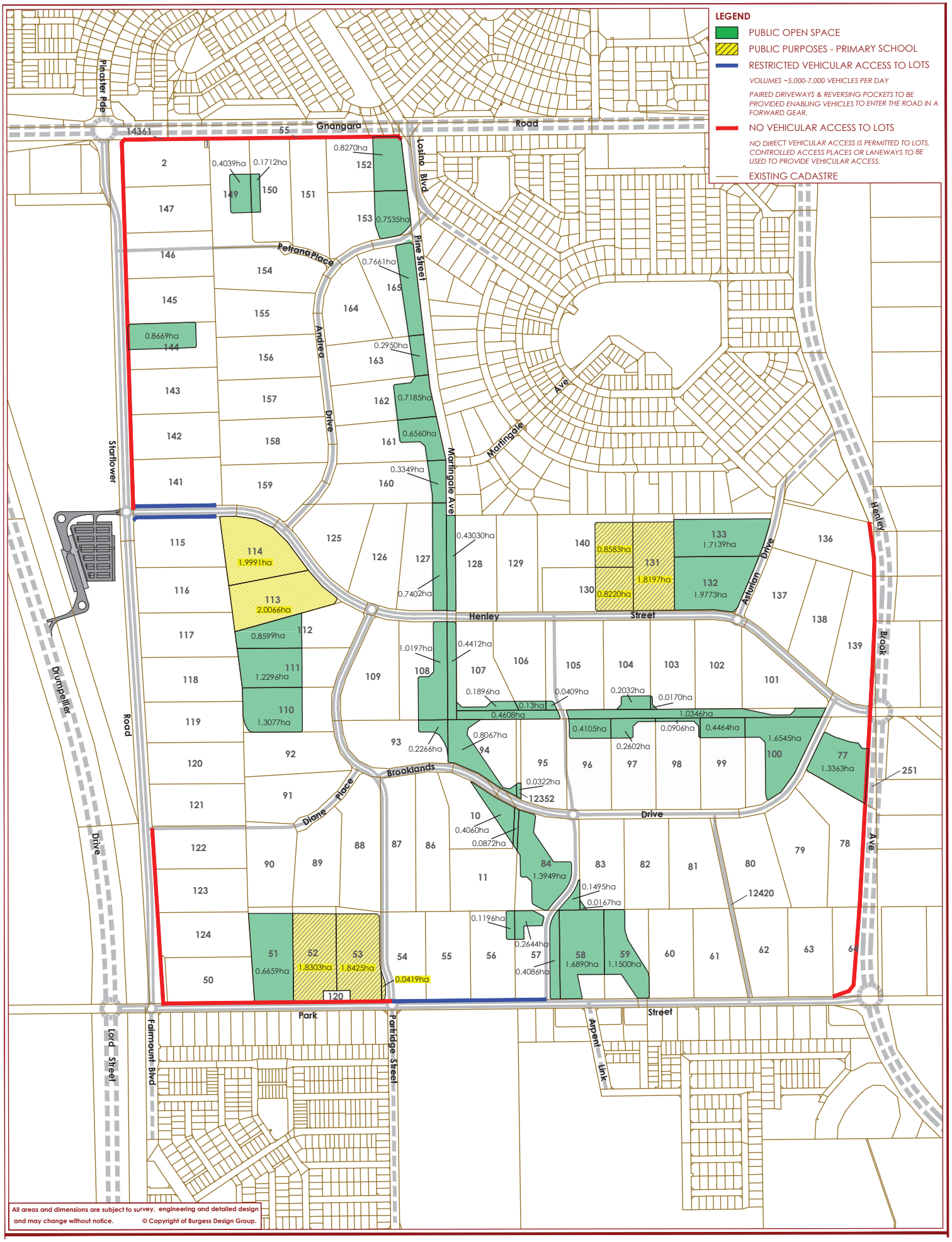
0 75 150 225m

PLAN: MRHB-2-004 DATE: 23/03/2023

PLAN 1: STRUCTURE PLAN MAP

HENLEY BROOK LOCAL STRUCTURE PLAN

BURGESS DESIGN GROUP
TOWN PLANNING + URBAN DESIGN



URBIS

HENLEY BROOK LOCAL STRUCTURE PLAN

PROPOSED PUBLIC OPEN SPACE, SCHOOLS & ACCESS RESTRICTIONS AMENDMENT

1:7500 @ A3

0 100 200 300 400

DATE: 03.11.2022
JOB NO: P0031628
DWG NO: 6
REV:

PART TWO | EXPLANATORY SECTION

1. PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This structure plan has been prepared on behalf of Little Property (WA) Pty Ltd in accordance with the WAPC's *Structure Plan Framework (2015)* and the deemed provisions of the City of Swan *Local Planning Scheme No.17* to guide the subdivision and development of land in Henley Brook.

The structure plan has been prepared by Burgess Design Group with inputs from a multidisciplinary team comprising:

KCTT	Infrastructure Servicing Report
	Transport Impact Assessment
Emerge Associates	Environmental Assessment and Management Strategy
	Spring Flora and Vegetation Assessment
	Level 1 Fauna Assessment
	Foreshore Area Report
	Local Water Management Strategy
	Bushfire Management Plan
Lloyd George	Transport Noise Assessment
Pipeline Integrity	Pipeline Risk Management Plan

This structure plan provides a synthesis of all available information and sets out a planning framework to guide the future development of Henley Brook.

1.2 LAND DESCRIPTION

1.2.1 LOCATION

The site is located approximately 20 kilometres north-east of the Perth Central Business District and 10km north of the Midland Regional Centre.

The site is generally bound by Starflower Road to the west, Gnangara Road to the North, Morgan Fields Estate and the planned Henley Brook Avenue to the east, and Park Street to the south (refer Figure 1 – Location Plan).

1.2.2 AREA AND LAND USE

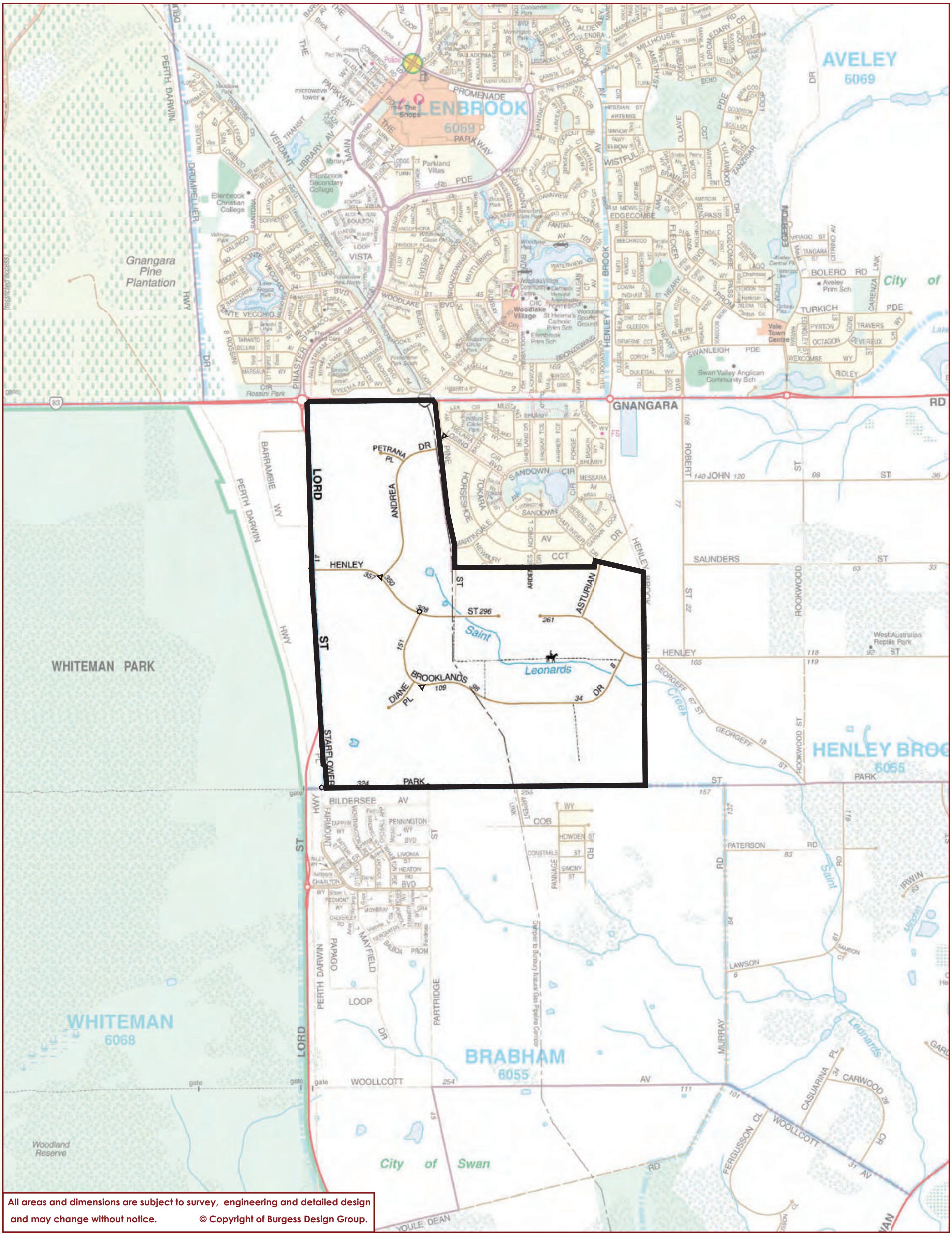
The structure plan encompasses 233.6482ha of land.

Existing uses are predominantly rural-residential in nature, with a number of properties used for the agistment of horses (refer Figure 2 – Aerial Photograph). Aerial imagery indicates the site was cleared between 1953 and 1965 to support a range of rural and agricultural uses, including horse agistment and grazing. Some scattered trees remained, and vegetation cover has increased over time through planting in residential gardens and along lot boundaries since the current subdivision was implemented in the 1980's.

1.2.3 OWNERSHIP

This structure plan applies to 105 individual lots, including 103 rural residential lots and two water corporation sites, plus a number of bridle trails and existing roads, being the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map.

Despite landownership changing as an almost immediate and ongoing effect of the approval of this structure plan, such as through subdivision and exercising of land purchase option agreements by developers, a landownership schedule is provided at Appendix 9 to show landownership within the structure plan area as at 26 August 2020.



NORTH

0 0.25 0.5 0.75 1km
SCALE 1:25,000 (A3)

FIGURE 1: LOCATION PLAN
HENLEY BROOK STRUCTURE PLAN
HENLEY BROOK

BURGESS DESIGN GROUP
TOWN PLANNING + URBAN DESIGN
PO Box 8779, Perth Business Centre 6849
www.burgessdesigngroup.com.au
P (08) 9328 6411
F (08) 9328 4062

Plan No: PRO BRO 07-02d-01
Date: 02.11.20
Client: Progress
Planner: MS/MB

CITY OF SWAN

NORTH

0 50 100 150 200 250m

SCALE 1:10,000 (A4)

FIGURE 2: AERIAL

HENLEY BROOK STRUCTURE PLAN

HENLEY BROOK

BURGESS DESIGN GROUP
PO Box 8779, Perth Business Centre 6849 P (08) 9328 6411
www.burgessdesigngroup.com.au F (08) 9328 4062

Plan No: PRO BRO 07-02d-02 Client: Progress
Date: 02.11.20 Planner: MS/MB

CITY OF SWAN

2. PLANNING FRAMEWORK

2.1 ZONING AND RESERVATIONS

2.1.1 METROPOLITAN REGION SCHEME

The site is zoned 'Urban' under the *Metropolitan Region Scheme* (MRS) (refer Figure 3 – MRS Map).

2.1.2 CITY OF SWAN LOCAL PLANNING SCHEME NO.17

The site is zoned 'Residential Development' under the City of Swan *Local Planning Scheme No.17* (LPS17) (refer Figure 4 – LPS17 Map).

The objectives of the 'Residential Development' zone are to:

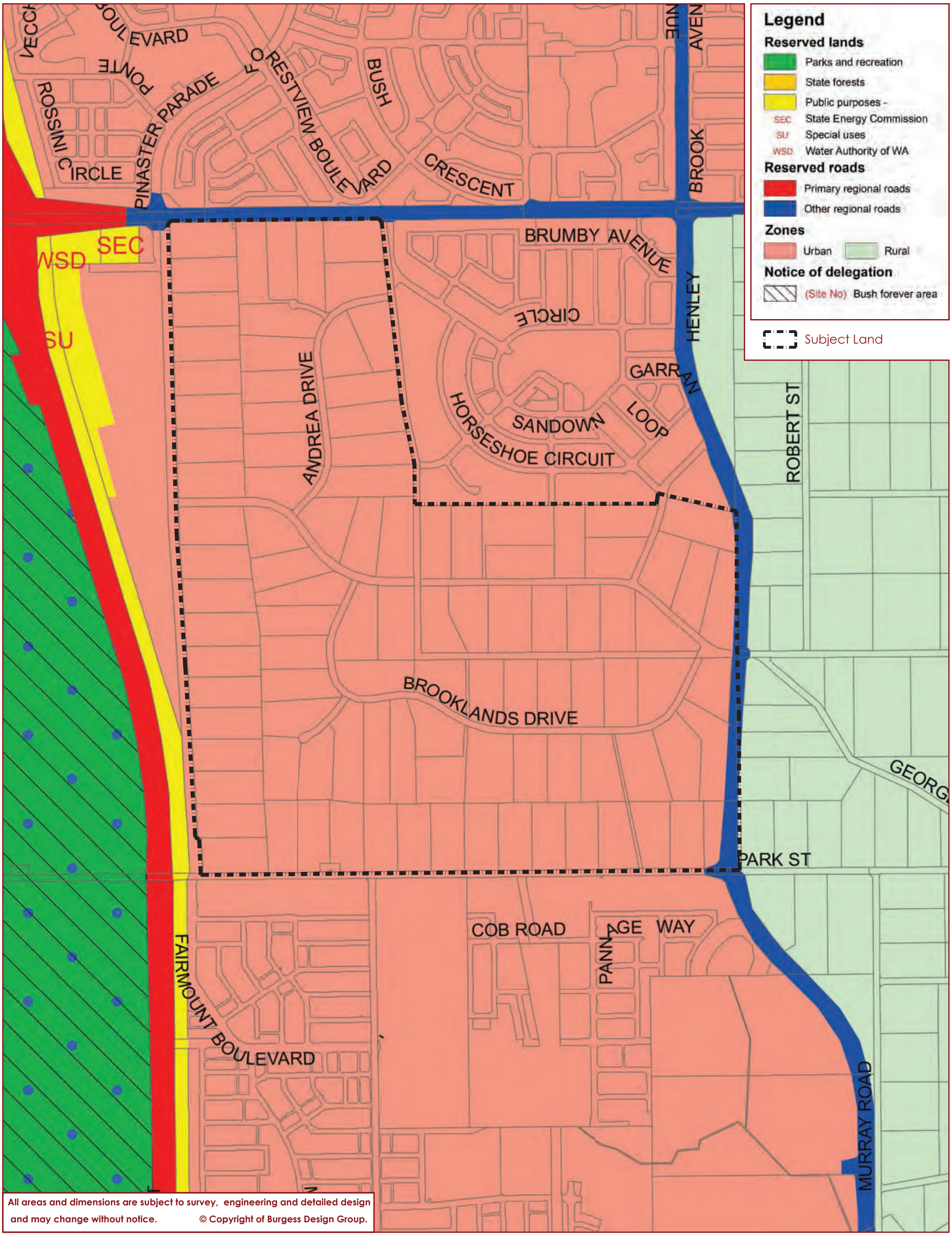
a) *'provide for the coordinated development of future residential areas through the application of a comprehensive plan to guide subdivision and development to be known as a "structure plan";*

b) *provide for predominantly residential development, but including also a range of compatible services, consistent with the needs of an integrated neighbourhood, and planned so as to minimise adverse impacts on amenity;*

c) *avoid the development of land for any purposes or at a time when it is likely to compromise development elsewhere in the district or prejudice the future development of land in the Residential Development zone for more appropriate purposes;*

d) *take account of the need to protect the amenity and on-going use of adjacent property owners as well as to provide for the needs of future residents.'*

This structure plan has been prepared to satisfy these objectives.



NORTH
NTS

FIGURE 3: MRS MAP
HENLEY BROOK STRUCTURE PLAN
HENLEY BROOK

BURGESS DESIGN GROUP PO Box 8779, Perth Business Centre 6849 P (08) 9328 6411 www.burgessdesigngroup.com.au F (08) 9328 4062

Plan No: PRO BRO 07-02d-03 Client: Progress
Date: 02.11.20 Planner: MS/MB

CITY OF SWAN

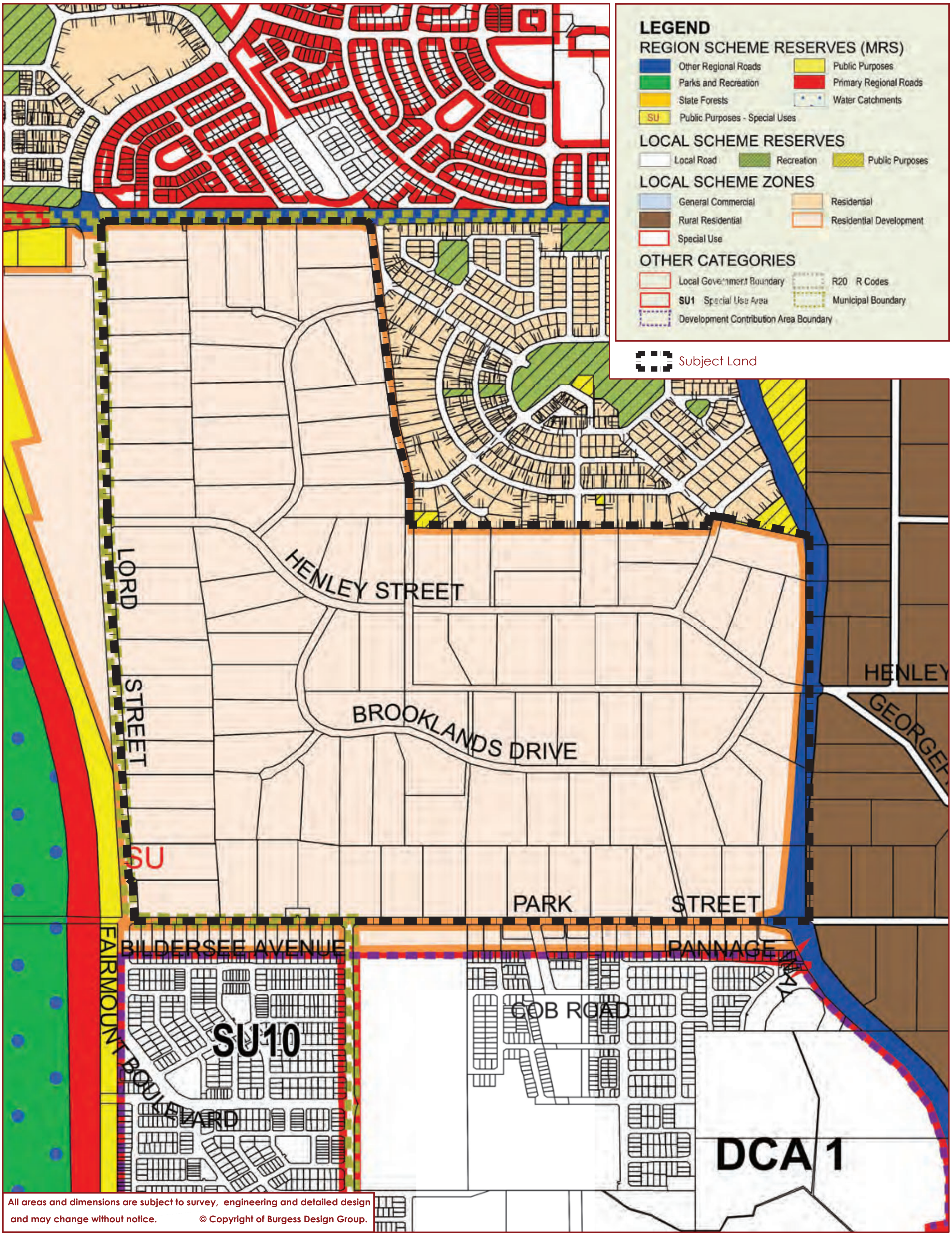


FIGURE 4: LPS17 MAP

HENLEY BROOK STRUCTURE PLAN

HENLEY BROOK

BURGESS DESIGN GROUP TOWN PLANNING + URBAN DESIGN
PO Box 8779, Perth Business Centre 6849
www.burgessdesigngroup.com.au
P (08) 9328 6411
F (08) 9328 4062

Plan No: PRO BRO 07-02d-04
Date: 02.11.20
Client: Progress
Planner: MS/MB

CITY OF SWAN

2.2 STRATEGIC PLANS & POLICIES

2.2.1 DIRECTIONS 2031 (2010)

Directions 2031 (2010) establishes the vision for future growth of the Perth Metropolitan and Peel regions. It envisages 'a world class liveable city; green, vibrant, more compact and accessible with a unique sense of place'.

The structure plan satisfies the objectives of *Directions 2031* in the following ways:

- The structure plan facilitates urban development that is efficient in its design and use of resources;
- The structure plan satisfies the density target of 15 dwellings per gross urban zoned hectare;
- The proposed development forms part of a planned and integrated growth corridor; and
- The development will help to support the creation and ongoing sustainability and patronage of major public transport and road infrastructure planned for the area.

2.2.2 NORTH EAST SUB-REGIONAL PLANNING FRAMEWORK (2018)

The *North East Sub-Regional Planning Framework (2018)* sets out an integrated planning framework for land use and infrastructure in the sub-region.

The structure plan complies with the key objectives of the framework, as follows:

- The site is identified as 'Urban Expansion' in the framework;
- The structure plan responds directly to the ecological and social values of the site through comprehensive planning that will provide increased opportunities for recreation, landscape retention and management, and access to education facilities for the local community;
- The structure plan promotes a consolidated urban form predicated on the designation of medium density residential uses in a manner that is sympathetic to the suburban character of its surrounds and the existing and proposed services and amenities; and
- The sustainable use and/or management of resources, infrastructure, bushfire risk, public transport, and other services and amenities.

2.2.3 SWAN URBAN GROWTH CORRIDOR SUB-REGIONAL STRUCTURE PLAN (2009)

The *Swan Urban Growth Corridor Sub-Regional Structure Plan (2009)* guides the development of 1,100 hectares of urban land, linking Midland/Guildford with Ellenbrook.

Though the site is not contained within the Sub-Regional Structure Plan, this structure plan responds to it as follows:

- The design integrates with adjacent urban areas, including the continuation of key linkages through to a district centre in Brabham to the south;
- The structure plan depicts densities and an urban structure that is compatible with surrounding areas;
- The structure plan represents a logical extension of urban uses, resulting in a contiguous urban corridor connecting Ellenbrook to Midland and Guildford, consistent with the objectives of the sub-regional structure plan.

2.2.4 STATEMENT OF PLANNING POLICY 2.7: PUBLIC DRINKING WATER SOURCE POLICY (2003)

Statement of Planning Policy 2.7: Public Drinking Water Source Policy (2003) aims to ensure that land use and development within public drinking water source areas is compatible with the protection and long-term management of water resources for public water supply.

As discussed in Section 3.3.4 of this report, the site has recently been reclassified from 'Priority 2' to 'Priority 3*'. In accordance with Department of Water and Environmental Regulation guidance, the proposed uses are considered to be compatible with this classification.

2.2.5 STATE PLANNING POLICY 3.6: DEVELOPMENT CONTRIBUTIONS FOR INFRASTRUCTURE (2009) & DRAFT STATE PLANNING POLICY 3.6: INFRASTRUCTURE CONTRIBUTIONS (2019)

State Planning Policy 3.6: Development Contributions for Infrastructure (2009) and draft *State Planning Policy 3.6: Infrastructure Contributions (2019)* set out the principles underlying development contributions and the form, content, and process for the preparation of development contribution plans.

A development contribution plan will be required to set out cost contribution arrangements for the site. It is envisaged that the City of Swan will initiate an amendment to LPS17 to designate a development contribution area over the site, and then prepare a development contribution plan that is informed by this structure plan in accordance with the policy. A list of suggested contribution items is included at Section 4.10 of this report.

2.2.6 STATE PLANNING POLICY 3.7: PLANNING IN BUSHFIRE PRONE AREAS (2015)

State Planning Policy 3.7: Planning in Bushfire Prone Areas (2015) aims to preserve life and reduce the impact of bushfire on property and infrastructure.

Portions of the site and its surrounds are located within a designated bushfire prone area. As such, a Bushfire Management Plan has been prepared to address the objectives of the policy, as set out in Section 3.5 of this report.

2.2.7 STATE PLANNING POLICY 5.4: ROAD AND RAIL NOISE (2019)

State Planning Policy 5.4: *Road and Rail Noise (2019)* addresses noise from major transport corridors and its impact on nearby noise sensitive land uses.

Gnangara Road, Drumpellier Drive and Henley Brook Avenue can each be classified as a 'major road' under the policy. As such, a *Transportation Noise Assessment* has been undertaken to address the objectives of the policy, as set out in Section 3.4 of this report.

2.2.8 PLANNING BULLETIN 87: HIGH PRESSURE GAS TRANSMISSION PIPELINES IN THE PERTH METROPOLITAN REGION (2007) & DRAFT DEVELOPMENT CONTROL POLICY 4.3: PLANNING FOR HIGH-PRESSURE GAS PIPELINES (2016)

Planning Bulletin 87: *High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region (2007)* and Draft Development Control Policy 4.3: *Planning for High-Pressure Gas Pipelines (2016)* seek to protect people from unacceptable levels of risk by protecting high-pressure gas pipelines from unregulated encroachment.

The Dampier to Bunbury Natural Gas Pipeline and the Parmelia Gas Pipeline bisect the site. As discussed in Section 3.6 of this report, a *Pipeline Risk Management Plan* has been prepared to assess risks and set out management requirements to ensure that any risks associated with development are as low as reasonably practicable.

2.3 PRE-LODGEMENT CONSULTATION

TABLE 5: PRE-LODGEMENT CONSULTATION			
AGENCY	DATE	METHOD	OUTCOME
Land owners within and adjacent to the structure plan area	July 2015	draft North-East Sub-regional Planning Framework consultation period	North-East Sub-regional Planning Framework finalised March 2018
	2015-present	Henley Brook landowners - direct	Burgess Design Group has assisted landowners in discussions with the City of Swan and WAPC, and in liaison with developer groups.
	2017	MRS Amendment 1329/57 consultation period	Amendment to the MRS approved on 19 October 2018
Developers within the area	2015-present	Meetings, phone & email correspondence	Considered in design & implementation strategy
Local government	2015-present	Meetings, MRS and concurrent LPS17 Amendment	Site rezoned to facilitate urban development
Department of Planning, Lands and Heritage	2015-present	Meetings, MRS and concurrent LPS17 Amendment	Site rezoned to facilitate urban development
Department of Water and Environmental Regulation	2016-2018	MRS Amendment	Site to be reclassified to Priority 3*
Department of Education	2016	MRS Amendment	Need for 2 primary school sites identified
Main Roads Western Australia	2016	MRS Amendment	Access arrangements to major roads clarified
Public Transport Authority	2018	Email correspondence	Bus route changes confirmed. Rail and station facilities unconfirmed.
Water Corporation	2015-2018	Email correspondence	Wastewater and water supply strategies agreed. Capital Investment Program to be reviewed.
Department of Fire and Emergency Services	2016	MRS Amendment	Confirmed need for bushfire risk management planning

3. SITE CONDITIONS AND CONSTRAINTS

An *Environmental Assessment and Management Strategy* (EAMS) has been prepared by Emerge Associates (refer Appendix 1) to support the preparation and implementation of the structure plan. The EAMS provides a synthesis of information from a range of sources regarding the environmental features, attributes, and values of the site, including the findings of the following reports:

- Spring Flora and Vegetation Assessment (Emerge Associates)
- Level 1 Fauna Assessment (Emerge Associates)
- Local Water Management Strategy (Emerge Associates)
- Foreshore Area Report (RPS)
- Bushfire Management Plan (Emerge Associates)
- Transport Noise Assessment (Lloyd George Acoustics)

The main findings of these reports are summarised below. A Context and Constraints Plan (refer Figure 5) has also been prepared to illustrate the issues discussed herein.

3.1 LANDFORM AND SOILS

The site has a south-easterly aspect, falling from approximately 42m Australian Height Datum (AHD) in the north western corner, to 30m AHD along the south eastern boundary.

The *Geological Survey of Western Australia* (Gozzard 1986) indicates that the site is within the Bassendean dune system. Soils comprise primarily of pebbly silt of alluvial origins, with some areas of sand within the northern and central portions of the site.

3.1.1 ACID SULFATE SOILS

Acid sulfate soils (ASS) contain iron sulphide materials and are generally present in waterlogged anoxic conditions. In its natural state, ASS do not present any risk to the environment. However, when oxidised (such as when disturbed by excavation for earthworks), ASS produce sulphuric acid, which can pose risks to the surrounding environment, infrastructure, and human health.

Regional ASS risk mapping indicates that the central-west, northern, and south-eastern portions of the site (predominantly associated with sandy soils) have a 'moderate to low' risk of ASS occurring within 3m of the natural soil surface.

Remaining areas of the site are shown as having 'low to no' risk of ASS occurring within 3m of the natural soil surface.

Given the limited depth to groundwater and likely extent of excavation within the site to support the installation of services, and in particular sewer, ASS investigations and management considerations are likely to be required as a condition of subdivision approval for areas identified as having a 'moderate to low' risk.

3.2 BIODIVERSITY AND NATURAL AREA ASSETS

The biodiversity values of the site are limited due to the highly modified nature of almost all vegetation within the study area. Nonetheless, a small patch of banksia woodland and a single black cockatoo roosting tree have been identified within the site. However, neither is considered to be of conservation significance as discussed in further detail below.

3.2.1 FLORA

Regional vegetation mapping prepared by Beard *et al.* (2013) shows the site as containing two vegetation associations: Bassendean 1001, of which 22.13% of the pre-European extent remains, with 2.8% formally reserved for conservation; and Bassendean 1018, of which 17.25% of the pre-European extent remains, with 0.71% formally reserved for conservation.

A site-specific *Spring Flora and Vegetation Assessment* (Emerge Associates 2018) found that vegetation within the site is highly disturbed and modified, having been historically cleared to support agricultural land uses. Almost all vegetation within the site is in 'completely degraded' condition. The remaining 3.26ha includes more intact native vegetation that is present in predominantly 'degraded' condition (3ha), with smaller areas in 'good' (0.15ha) and 'very good' (0.11ha) condition.

A small patch of plant community BaBmW identified in the south eastern corner of the site may be considered to represent 'banksia woodlands of the Swan Coastal Plain' threatened ecological community and priority ecological community. Given the small size of this vegetation and its predominantly 'degraded' condition, it is not considered to be a significant or particularly representative patch; nor is it considered

to be manageable from a long-term retention perspective due to its size and extent of weed coverage (>20%).

No other potential threatened, priority, or other significant flora species were recorded or considered likely to occur in the site.

3.2.2 FAUNA

The majority of the site does not support significant fauna habitat values. However, scattered paddock and windbreak trees provide some habitat value for avifauna; including state and federally protected black cockatoo species (Forest Red-tailed black cockatoo (FRTBC) and Carnaby's black cockatoo).

The site contains a number of mature eucalypt trees (diameter at breast height larger than 500mm), including *Corymbia calophylla* (marri), *Eucalyptus rudis* (flooded gum), *Eucalyptus gomphocephala* (tuart) and *Eucalyptus marginate* (jarrah), that may provide roosting or breeding habitat. A stand of non-endemic Eucalypt species was observed being used for roosting by FRTBC. However, the site is not considered to provide quality foraging habitat, and while roosting of FRTBC was observed within the site, it is likely to be part of a network of roosting sites used sporadically over the year.

The wider area incorporating Whiteman Park and the Gnangara Pine Plantation (and other Bush Forever sites) is known to support habitat for black cockatoo species, and would provide habitat that is greater in extent, in better condition, and contains more numerous higher value foraging and breeding species. On this basis, the vegetation within Whiteman Park and the Gnangara Pine Plantation is likely to be preferentially used by black cockatoo species in comparison to the intermittent scattered habitat values found within the site.

Despite the limited fauna habitat values within the site, the structure plan provides for the retention of some existing vegetation. In particular, the identified FRTBC roosting site has been identified for retention. In addition, the proposed retention of remnant vegetation within the St Leonards Creek foreshore area (discussed in further detail below) will provide an increased net environmental value and improve the quality and quantity of fauna habitat within the site.

3.3 HYDROLOGY

3.3.1 GROUNDWATER

The site is within the Mirrabooka Groundwater Area and the Henley Brook Groundwater Sub-area. Groundwater monitoring undertaken to inform the *Local Water Management Strategy* (Appendix 2) found that groundwater contours within the site range from 37.5m AHD in the north-west portion of the site to 30.5m AHD in the south west. Maximum groundwater levels range from close to the surface to approximately 5m below the existing surface and are expected to generally flow in a south-easterly direction towards the Swan River.

The structure plan responds to groundwater values within the site by locating land uses that could potentially have a higher risk of groundwater contamination outside of wellhead protection zones for existing bores within the site. In addition, the structure plan provides for adequate areas of POS to accommodate water sensitive urban design measures to maintain or improve groundwater quality and maintain infiltration and recharge to underlying aquifers. It should also be noted that the site is susceptible to groundwater perching and seasonal surface water ponding, so the use of sand fill and/or subsoil groundwater control measures will likely be needed.

The *Local Water Management Strategy* provides a management framework for groundwater and surface water within the site (see Section 4.8). Urban water management plans will then be used to refine and guide the implementation of those management measures at the detailed design and construction stages.

3.3.2 SURFACE WATER

The south-eastern portion of the site is identified within the 100-year average recurrence interval floodplain of the Swan River. This floodplain is associated with St Leonard's Creek, a tributary of the Swan River to which it joins approximately 3.5km south east of the site.

A *Foreshore Area Report* prepared to identify an appropriate foreshore protection area found the creek contains limited biophysical values because of historical alterations made to this trapezoidal drain to support agricultural uses. As such, the foreshore area has been determined based on maintaining the hydraulic function provided by the floodway and protecting the small patches of flooded gum

vegetation associated with the existing drain. It should be noted that DWER mapping does not consistently follow the observed location of the existing drain. As such, it is recommended that the alignment and profile of the Creek is reviewed as part of any future urban water management plan/s completed over the land.

The structure plan responds to the surface water values of the site by locating St Leonard's Creek within a parcel of public open space, and through the provision of adequate areas of open space to accommodate water sensitive urban design measures for the detention of minor and major rainfall events. Additional management strategies are set in the Local Water Management Strategy discussed in Section 4.8 of this report.

3.3.3 WETLANDS

No conservation significant wetlands have been identified within the site. A multiple use wetland (UFI 13396) is identified over the majority of the site, and is described as a palusplain wetland of seasonally waterlogged flats. This poses no impediment to development, as hydrological functions will be managed in accordance with the *Local Water Management Strategy*.

3.3.4 PUBLIC DRINKING WATER SOURCE AREAS

The site is currently located within a 'Priority 3*' public drinking water source area, which has recently been reclassified from a 'Priority 2' classification historically associated with the Gnangara Underground Water Pollution Control Area.

The proposed uses are listed as being 'acceptable' or 'compatible (with conditions)' within a Priority 3* area under the [then] Department of Water *Water Quality Protection Note 25: Land use compatibility tables for Public Drinking Water Source Areas (2016)* and *Water Quality Protection Note 38: P3* (2018)*. The *Local Water Management Strategy* contained at Appendix 2 is considered to satisfy the conditions of the P3* classification as outlined in the water quality protection notes.

3.4 NOISE

A *Transportation Noise Assessment* has been prepared by Lloyd George Acoustics in accordance with the requirements of State Planning Policy 5.4: *Road and Rail Noise* (2019) as part of the EAMS to assess noise levels in the vicinity of major roads (refer Appendix D of EAMS).

The *Transportation Noise Assessment* considers a worst-case scenario, with no structural barriers to noise sources, and found that noise levels in the vicinity of Henley Brook Avenue and Drumpellier Drive can be appropriately managed by:

- Constructing dwellings in accordance with the relevant 'Package A', 'Package B', or 'Package C' requirements as required.
- Placing a notification on relevant certificates of title that the lot may be affected by transport noise.

The development of dwellings on an affected lot that are above one storey will require specialist advice at the building permit stage to determine appropriate attenuation requirements for any upper level/s, as they will receive a different level of noise to the ground floor. It is also considered likely that structural elements, such as boundary fences and noise walls will substantially reduce the impact of noise. The efficacy of such measures will be considered through future noise assessments at the subdivision stage.

Updated noise modelling will be required at subdivision stage for noise sensitive development (including residential uses) within areas identified as *'further noise modelling required'* on the Structure Plan Map (refer Plan 1).

3.5 BUSHFIRE RISK

Portions of the site are within a designated 'bushfire prone area'. As such, a *Bushfire Management Plan* has been prepared to satisfy the requirements of State Planning Policy 3.7: *Planning in Bushfire Prone Areas (2015)* (refer Appendix 3).

The *Bushfire Management Plan* demonstrates that the structure plan responds to the bushfire protection criteria in the following ways:

- Location

  Future development will be located in an area subject to low or moderate bushfire risk, and outside of areas classified as BAL-40 or BAL-FZ. This will be achieved principally through the clearing or management of vegetation within the site in a low-risk state. However, it has been assumed that all vegetation surrounding the site will remain unchanged, and thus development at the periphery of the site may need to respond through appropriate lot layout and the application of higher building standards, as necessary.
- Siting and design

  The structure plan, through the strategic location of public roads, public open space and the use of setbacks, provides suitable separation to enable a BAL rating of BAL-29 or lower for future development across the site.
- Vehicular access

  The structure plan depicts a comprehensive urban road network that satisfies requirements for providing two access routes by way of public roads.
- Water

  Development will be serviced by a reticulated water supply, including fire hydrants installed by the developer to Water Corporation and Department of Fire and Emergency Services standards (generally being within 200m of any dwellings).

Updated bushfire management plans will be required to support applications for subdivision approval in bushfire prone areas (per Part One, Section 3.10), which should give due consideration to the *Bushfire Management Plan* contained at Appendix 3 together with applicable policy requirements. These management plans will also detail appropriate responses to any temporary bushfire risks as development progresses throughout the site.

In the interim, all landowners are required to comply with the requirements of the City of Swan annual firebreak notice to maintain fuel loads at appropriate levels.

3.6 GAS PIPELINES

The site accommodates portions of the Dampier to Bunbury Natural Gas Pipeline and Parmelia Gas Pipeline (PGP) corridors, which bisect the site in a north-south alignment.

In accordance with draft *Development Control Policy 4.3: Planning for High-Pressure Gas Pipelines (2016)*, an AS2885 Safety Management Study and Location Classification Review have been completed to identify and assess potential hazards associated with development within and adjacent to the PGP (refer Appendix 4). In addition, it is understood that the Department of Lands will review and respond to the structure plan as it relates to the DBNGP upon formal lodgement. Informal communications with representatives responsible for managing the DBNGP indicate that the proposed uses and management measures, to the extent that they meet the requirements associated with the PGP, appear acceptable.

3.6.1 LOCATION CLASSIFICATION REVIEW

A *Location Classification Review* was performed by assessing each pipeline section and utilising local knowledge of relevant personnel to establish the land use for each of those sections. The review found that the primary classification of the PGP to a 'T1 Residential' standard stands, and that the structure plan is designed such that a secondary location classification is not needed to address risks associated with any vulnerable land uses (noting that future structures within primary schools are capable of being located more than 300m from the pipeline).

3.6.2 SAFETY MANAGEMENT STUDY

Two activities have been identified that require formal 'ALARP assessment' to demonstrate that risks will be managed such that they are 'as low as reasonably practical'; being auguring for light pole installation and the installation of bores. In addition, 24 actions and control measures have been identified that are to be undertaken prior to, or as part of, development works.

Upon completion of the actions and formal ALARP assessments as described above and detailed in Appendix 4, all threats to and from the PGP are considered to be adequately controlled and managed as required under AS2885.

3.6.3 GAS EASEMENT SUMMARY GUIDELINES

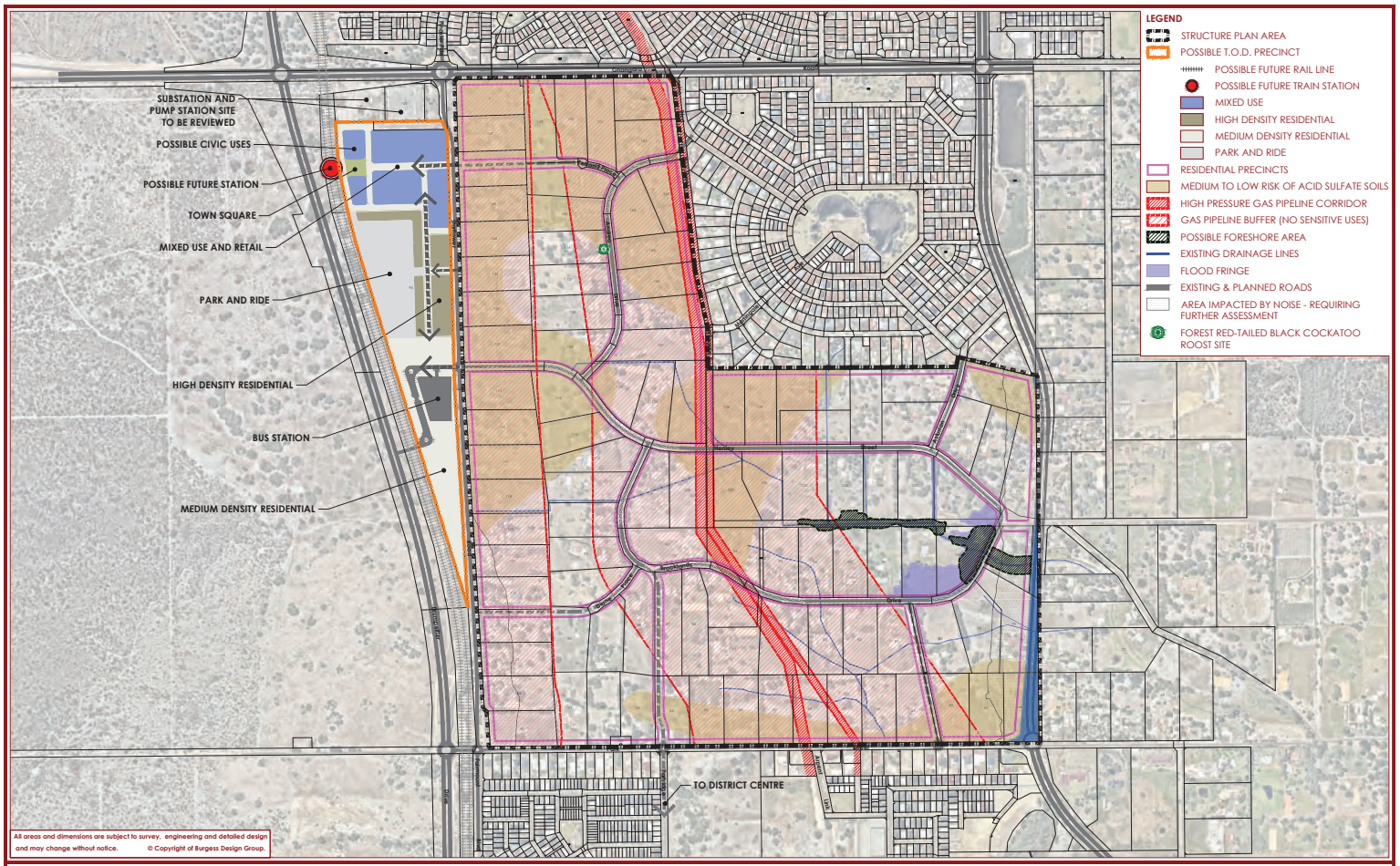
Gas Easement Summary Guidelines (2020) have also been prepared to guide the design, construction and ongoing maintenance of public open space within the gas pipeline corridor; namely affecting POS# 2, 4, 7, 12 and 13 (refer Appendix 8 & Section 4.3.2).

3.7 LAND OWNERSHIP

The Structure Plan encompasses 233.6482ha of land spread across 105 separate lots, together with a number of existing roads, drainage reserves, bridle trails, and high-pressure gas pipeline corridors. This highly fragmented ownership poses a constraint to the efficient and effective implementation of the structure plan.

The Structure Plan responds to this through a highly considered design approach that seeks to leverage existing assets to facilitate the development of a cohesive community with a strong neighbourhood-scale structure without compromising the ability for development to be implemented on an incremental, lot-by-lot basis. This approach is set out in further detail in Section 4 of this report, and includes solutions such as: utilising the existing road network with minor realignments that can occur on a staged basis to provide a legible hierarchy of local roads; setting out residential cells in a regular and robust pattern that also facilitates development of land independent of neighbouring properties wherever possible; and utilising the existing gas pipeline corridors and environmental assets as public open space corridors to realise a net benefit to the community.

Importantly, the technical assessment of the site and preparation of the Structure Plan has been undertaken in a fair and equitable manner in accordance with policy guidance. Land uses have been designated in response to technical requirements irrespective of land ownership.



NORTH
0 50 100 150 200 250m
SCALE 1:10,000 (A3)

FIGURE 5: OPPORTUNITIES & CONSTRAINTS
HENLEY BROOK STRUCTURE PLAN
HENLEY BROOK
CITY OF SWAN

BURGESS DESIGN GROUP
PO Box 8779, Perth Business Centre 6849 P (08) 9328 6411
www.burgessdesigngroup.com.au F (08) 9328 4062

Plan No: PRO BRO 07-02d-05Client: Progress
Date: 02.11.20 Planner: MS/MB

4. LAND USE AND SUBDIVISION REQUIREMENTS

4.1 DESIGN AND LAND USE

The structure plan seeks to create a mosaic of ten residential precincts that together will form the broader neighbourhood of Henley Brook. Each precinct has a parcel of public open space at its core, acting as a hub of activity, and is bound by high order roads that accommodate through traffic, leaving local streets to accommodate low-volume, low-speed local vehicular traffic and provide a safe environment for pedestrians and cyclists. This structure intends to provide for the creation of legible, safe, and active communities.

The proposed land uses within the structure plan area consist of predominately medium density residential uses, three primary schools, public open space/drainage, together with a lifestyle village, local convenience/commercial facilities, and public purposes reserves for Water Corporation infrastructure (refer Plan 1).

4.2 RESIDENTIAL ZONED LAND

4.2.1 DWELLING TARGET & POPULATION

The structure plan area is expected to yield approximately 3,500 dwellings across a total of 128.3189ha of residential land. This provides a density of 15 dwellings per urban zoned hectare and 27 dwellings per site hectare. This satisfies the minimum density targets of 15 dwellings per urban zoned hectare set out in *Directions 2031* and 22 dwellings per site hectare set out in *Liveable Neighbourhoods*.

An average of 2.8 persons per household (as recorded in Brabham in the 2016 Census) would provide for a total population of approximately 9,800 people in the structure plan area.

4.2.2 DENSITY CRITERIA

The structure plan adopts a site-responsive approach to the designation of residential density codes, according to the following criteria:

I. A base code of R30
II. R40 for lots:
    a. at the end of cells;
    b. abutting or directly opposite public open space or a primary school;
    c. with frontage to a neighbourhood connector or integrator road; and/or
    d. within 500m of a train station, bus rapid transit station, or equivalent.
III. R60 for lots:
    a. With frontage to a road that is a high frequency bus route;
    b. to be used for aged care, a retirement village, or park home park;
    c. within 250m of a train station, bus rapid transit station, or equivalent; and/or
    d. to which II applies that also:
        i. have access to a laneway; and/or
        ii. are over 600m^2 in area that are to be developed for grouped or multiple dwellings.

This method provides the requisite flexibility to accommodate changes to the layout of the structure plan without the need for numerous administrative changes and amendments, and allows for the consideration of residential density codes specific to the design and lot layout of subdivision applications as they are made over time.

The density codes and criteria set out above are consistent with the approaches used in the surrounding area; and will thus result in development that is both in keeping with the character of the locality and that responds to its context.

4.2.3 RESIDENTIAL DENSITY CAP

The number of residential lots within the structure plan area shall not exceed 3,500. In order to monitor the progress of development across the structure plan area, subdivision applications for residential development are required to include information about lot yields for the relevant parent lot at the time of lodgement.

The density cap has been introduced in accordance with the decision of the Statutory Planning Committee of the WAPC at its meeting on 18 August 2020. It aims to avoid placing pressure on community services and infrastructure from unplanned density

increases, particularly the potential over-enrolment of primary schools as has been observed in neighbouring structure plan areas in Brabham (refer Section 4.5.1).

4.3 PUBLIC OPEN SPACE

The Structure Plan depicts 13 parcels of public open space, encompassing 30.4336ha of land, representing 13.03% of the gross site area and a 10.46% net POS contribution (refer Appendix 5 – *Public Open Space Schedule*). Public open space is to be provided generally in accordance with the Structure Plan Map and Appendix 5. A Public Open Space Map (refer Plan 2) has been provided to illustrate the distribution of areas among different landholdings within the structure plan area to assist applicants and decision makers with development proposals.

Public open space forms the core of each residential precinct in the structure plan area, serving as a hub of activity and a focal point for the surrounding community. Public open space has been distributed to maximise accessibility and social benefit to future residents, respond to the prevailing constraints and environmental assets of the site, and to integrate drainage functions to adhere to water sensitive urban design principles.

Notably, a central linear strip of open space transforms existing gas pipeline corridors from a constraint into a major community asset, providing a pedestrian and cyclist movement corridor with a number of pockets along its length to act as hubs for adjoining communities by providing space for play areas and landscaping. This connects directly with another strip of linear open space to the east that accommodates a portion of St Leonards Creek and its associated foreshore area. Together, these parcels of open space will provide a major linkage through the Structure Plan area, connecting the adjoining communities.

4.3.1 IRRIGATION REQUIREMENTS

79,472kL of water per annum will be required to irrigate public open space and primary schools within the structure plan area on an ongoing basis (refer *Public Open Space Catchment Concept Plan* contained at Appendix J of the *Local Water Management Strategy*, Appendix 2)

Existing groundwater licenses within the structure plan area total 155,160kL per annum. Approximately 52,835kL of that total has already or is in the process of being transferred to the control of the proponent, Little Property (WA) Pty Ltd, and other major developer groups active in the structure plan area. An additional 25,500kL is assigned to lots shown as 'Public Purposes – Primary School' on the Structure Plan Map, for a combined allocation of 78,335kL per annum. This is already sufficient to meet irrigation requirements for the majority of the structure plan area, with the available allocation expected to increase along with the need for public open space as the development front moves north from Park Street.

It should be noted that irrigation requirements during the establishment of public open space, being the first two years, is higher than ongoing requirements; totalling 155,097kL per annum across the entire structure plan area. Whilst the total groundwater allocation within the structure plan area is sufficient to meet this requirement, the delivery of public open space and schools will occur in stages, likely spanning in excess of 20 years. As such, only a fraction of this additional amount will be needed at any given time.

4.3.2 GAS EASEMENT SUMMARY GUIDELINES

Gas Easement Summary Guidelines (2020) have been prepared to guide the design, construction and ongoing maintenance of public open space within the gas pipeline corridor; namely affecting POS# 2, 4, 7, 12 and 13 (refer Appendix 8). These Guidelines have been prepared in consultation with the City of Swan and the pipeline operators, Australian Gas Infrastructure Group (Dampier-Bunbury Gas Pipeline) and APA Group (Parmelia Gas Pipeline).

The design, development and maintenance of these open space areas should be undertaken in accordance with the Guidelines, and in consultation with the City of Swan, Australian Gas Infrastructure Group, and APA Group.

4.4 ADDITIONAL USE – PARK HOME PARK

The Structure Plan Map depicts an additional use for 'Park Home Park' over Lots 156-158 Andrea Drive that may be used for aged accommodation and/or a Lifestyle Village accommodating persons over the age of 45 years.

There is a widely accepted need for additional housing stock to cater to the needs of an ageing population. The City of Swan forecast the proportional growth of seniors (aged 55 years and over) will exceed that of all other age groups, and will lead to a shortfall of over 1,300 retirement and lifestyle village units across the City by 2036 (*Urban Housing Strategy 2012*). There is also a need to ensure housing options for seniors provides supportive and inclusive living environments that respond to the physical and social challenges associated with ageing. Nominally, this involves arrangements that allow people to age in place, in housing that responds to their needs (including household size, accessibility, with access to services and amenities), and that is integrated within the broader community.

Incorporating aged accommodation within the Structure Plan is consistent with the principles of ageing in place, and will cater to existing and growing future demand for such housing. It will be designed specifically to meet the needs of seniors, including the provision of amenities to promote social engagement; it will form part of an integrated and comprehensively planned urban expansion area, with access to its associated services; and will provide alternative housing options to support a diverse population in Henley Brook in perpetuity.

4.5 EDUCATION FACILITIES

Three government primary school sites are shown on the Structure Plan Map.

4.5.1 DEMAND

Liveable Neighbourhoods (2009) and *Development Control Policy 2.4: School Sites (1998)* require one government primary school for every 1,500-1,800 dwellings. The Operational Policy 2.4 – Planning for school sites requires one primary school site for every 1,500 dwellings for government schools. The structure plan area is expected to yield in the order of 3,500 dwellings, with the three sites having considered the dwelling yield within the Structure Plan and the broader locality. It should be noted that the potential for Transit Orientated Development (TOD), coinciding with METRONET Ellenbrook Line, may increase school catchment figures in the structure plan area. Further, the Department of Educations have identified this need due to a projection of higher than previously anticipated dwelling yields in Brabham.

During the assessment of this structure plan, consideration was also given to the demand generated by development in neighbouring Brabham. In particular, the Department of Education advised that it forecasts a shortfall in the provision of primary school sites within neighbouring structure plan areas attributable to higher than expected dwelling yields. In response, the City of Swan and WAPC supported enlarging the two primary school sites from 3.5ha to 4ha to accommodate potential additional demand. Notably, the Statutory Planning Committee of the WAPC indicated it may support a future modification to the structure plan to include a third primary school site should the Department of Education acquire land suitable for such a use. A modification was made to provide for a third primary school upon the recommendation of the Department of Education and support of the Statutory Planning Committee of the WAPC. The size of the two central schools may be reviewed subject to the extent of the future student enrolment catchment area and / or dwelling yield within the Structure Plan and the broader locality.

4.5.2 LAYOUT AND DESIGN

Two primary school sites are located on Henley Street, central to nominal catchments either side of the gas pipeline corridor. The third school is located on the corner of Park Street and Partridge Street, adjacent to the southern development in Brabham. All schools are co-located with areas of public open space to allow for the development of shared oval facilities. This provides a net benefit to the community by not only improving access to active recreational facilities, but also making efficient use of urban land and resources by sharing the delivery and maintenance of those facilities.

In accordance with the decision of the Statutory Planning Committee of the WAPC at its meeting on 18 August 2020, the primary school sites are configured as follows:

1. The western primary school site encompasses the entirety of Lot 113 and 114 Henley Street (where it previously included Lot 112 with boundaries that effectively mirrored those of POS 6); and
2. The eastern public primary school site is accommodated within Lot 130, 131 and 140 Henley Street (where it previously encroached within Lot 132 and 133, just eastward).

3. The southern primary school encompasses the entirety of Lot 52 and 53 Park Street and part lot 54 (where the lots were previously earmarked as residential)

It is understood the above configurations intend to respond to landowner submissions and simplify future acquisition processes by minimising the number of affected landholdings.

4.6 ACTIVITY CENTRES AND EMPLOYMENT

4.6.1 ADDITIONAL USE – LOCAL CENTRE

The Structure Plan Map depicts two areas of 'additional use – local centre' that are intended to provide basic convenience facilities to serve the local community. This is consistent with the principles of *Liveable Neighbourhoods (2009)* to provide small neighbourhood centres within a 400-500m walk of most residents. These centres will capitalise on existing roads and infrastructure and growing amenities such as open space corridors and public transport services to provide viable retail uses (as opposed to large scale centres, which rely on a critical mass of population to be viable).

Part One of this report sets out land use permissibility for the additional use areas, predicated on allowing for discretionary consideration of activities that are compatible with the prevailing residential character and commensurate with expectations for local commercial facilities. Such uses would include a local café, corner store or deli. A limit of 500m^2 of nett lettable area applies to each of the two additional areas. This will ensure retail/commercial facilities are not excessive in terms of scale or impact on surrounding residential uses.

4.6.2 ACTIVITY CENTRES

No large scale commercial or retail uses are proposed within the structure plan area.

The ultimate viability of commercial and retail uses in the area is heavily contingent upon the planning of the Morley-Ellenbrook Rail Line, and, in particular, the feasibility of the mooted station that may be constructed directly west of the structure plan area. Should it progress, this infrastructure is expected to be accompanied by a comprehensive transit-oriented development; including high density housing, retail,

commercial, and other employment generating uses that would gain the maximum benefit of being proximate to a major public transport asset.

It is considered premature to designate such uses within the structure plan area in the absence of a clear framework regarding future railway station infrastructure, as it has the potential to significantly undermine the hierarchy and function of any future transit-oriented development. Thus, in order not to fetter that process, it is considered to be in the interest of orderly and proper planning that any commercial and retail uses be located within the 'Urban' cell directly west of the structure plan area. This provides scope to integrate the outcomes of these uses with that of future public transport infrastructure. To that end, the land located between Starflower Road and Drumpellier Drive measures in excess of 24ha, is owned by the State Government, and is also zoned 'Urban' under the Metropolitan Region Scheme, providing an ideal opportunity to deliver such an outcome at whatever scale proves viable once the parameters are known.

The structure plan provides a number of key linkages to land to the west, allowing for future development within that cell to tie in seamlessly with the structure plan area (refer Figure 5). Importantly, this includes maintaining the fundamental structure shown on the Structure Plan Map of using higher order roads to delineate residential precincts, which will facilitate a transition to higher density and commercial and retail uses without comprising the legibility and permeability of the overall development.

4.7 MOVEMENT NETWORK

A *Transport Impact Assessment* report has been prepared to assess the impacts of development and the proposed movement network (refer Appendix 6). This report found that development within the Structure Plan area is expected to generate a total of 28,000 additional vehicle movements per day upon completion.

Planned upgrades to the surrounding road network and the design of the internal road network are sufficient to cater for the development, as set out in the proceeding sections.

4.7.1 EXISTING ROAD NETWORK

The existing regional road network is subject to significant change; including:

- Drumpellier Drive has been constructed as a dual-carriageway, connecting Reid Highway and Gnangara Road, along with a new bus station in the vicinity of Henley Street to improve rapid transit services in the Swan Urban Growth Corridor. Starflower Road has been retained in the vicinity of the site and downgraded to a local road
- Henley Brook Avenue will be constructed as an additional connection between Reid Highway and Gnangara Road
- Tonkin Highway has been extended north of Gnangara Road, significantly changing regional traffic distribution
- Gnangara Road will be constructed as a dual carriageway east of the intersection with Starflower Road

In addition, existing local roads are to be upgraded as set out in Table 6 below:

Table 6: Existing Road Upgrades

Road	Existing width	Proposed width	Proposed classification
Andrea Drive	20m	unchanged	Neighbourhood connector B
Asturian Drive	20m	unchanged	Access Street C
Brooklands Drive			
West of access street C	20m	24.4m	Neighbourhood connector A
East of access street C	20m	20m	Neighbourhood Connector B
Diane Place	20m	Unchanged	Access Street C
Henley Street	20-25m	24.4m	Neighbourhood Connector A
Losino Boulevard	30m+	unchanged	Neighbourhood Connector A
Petrana Place	16m	17.9m	Access Street C
Park Street	20m	21m	Neighbourhood connector A

Any road widening is to be accommodated equally on either side of the road, equidistant from the centreline, except for Park Street, where widening is to be accommodated wholly on the northern side, within the Structure Plan area. It should be noted that no road widening is to be undertaken adjacent to land identified for 'Public Purposes – Water Corporation'.

4.7.2 PROPOSED ROAD NETWORK

A robust network of higher order 'Integrator' and 'Neighbourhood Connector' roads, supplemented by custom 'Access Street C' roads, provide a legible road hierarchy that will convey traffic efficiently throughout the site, between the residential precincts. Local access streets will then accommodate relatively low volumes of low-speed internal traffic in a pedestrian and cyclist friendly environment within each of the residential precincts.

This intended function is reinforced through a broken-grid layout of local access streets that maintains permeability and legibility for pedestrians and cyclists, whilst discouraging through-traffic. The road network has also been designed to maximise accessibility and vistas to areas of public open space in order to maximise the value of these assets to the community and encourage frequent usage.

17.9m ACCESS STREET C CROSS SECTIONS

The Structure Plan Map depicts a number Access Street C roads with a custom 17.9m cross section to reinforce the district/neighbourhood level road hierarchy without imposing the high construction costs typically associated with boulevard treatments (refer Image 1).

This classification is consistent with anticipated traffic volumes for these roads, which are all below 3,000 vehicles per day, as well as intended functions, noting none are expected to accommodate bus routes. A standard 6.0m pavement is shown as a means of traffic calming, avoiding potential instances of induced speeding that is encouraged with wider pavement widths (such as those in an Access Street B). Rather, the additional reserve width provides for wider verges to accommodate green space to improve pedestrian and cyclist amenity and improve view corridors along these throughfares.

SAFE ACTIVE STREETS

The structure plan also features roads with cycle-friendly infrastructure, in accordance with the Department of Transport Safe Active Streets initiative. These specially designed roads will provide a coherent cycling network in combination with on-street cycling lanes and shared paths. These roads integrate seamlessly with the road network, retaining the typical 15m reserve width for a local access street, but feature a reduced pavement width with parking on both sides of the road to provide traffic calming for a shared cycling and driving lane (see Image 2).

4.7.3 RESTRICTED VEHICLE ACCESS

Liveable Neighbourhoods (2009) provides that vehicular access to roads carrying in excess of 5,000 vehicles per day should be planned to avoid potential safety issues and ensure the efficient operation of the road network. To that end:

- paired driveways and reversing pockets (enabling vehicles to enter the road in a forward gear) should be used for volumes between 5,000-7,000; and
- no direct vehicular access is permitted for volumes above 7,000, meaning controlled access places or laneways should be used.

The Structure Plan Map provides for alternative access arrangements where roads are expected to carry in excess of 5,000 vehicles per day. In order to assist applicants and decision makers, Plan 2 depicts the locations of restricted and prohibited vehicular access.

Image 1 – Access Street C 17.9m Cross-Section *(KCTT 2020)*

*Note * - Embayed parking generally required abutting public open space, schools, and lots accessed by a laneway.*

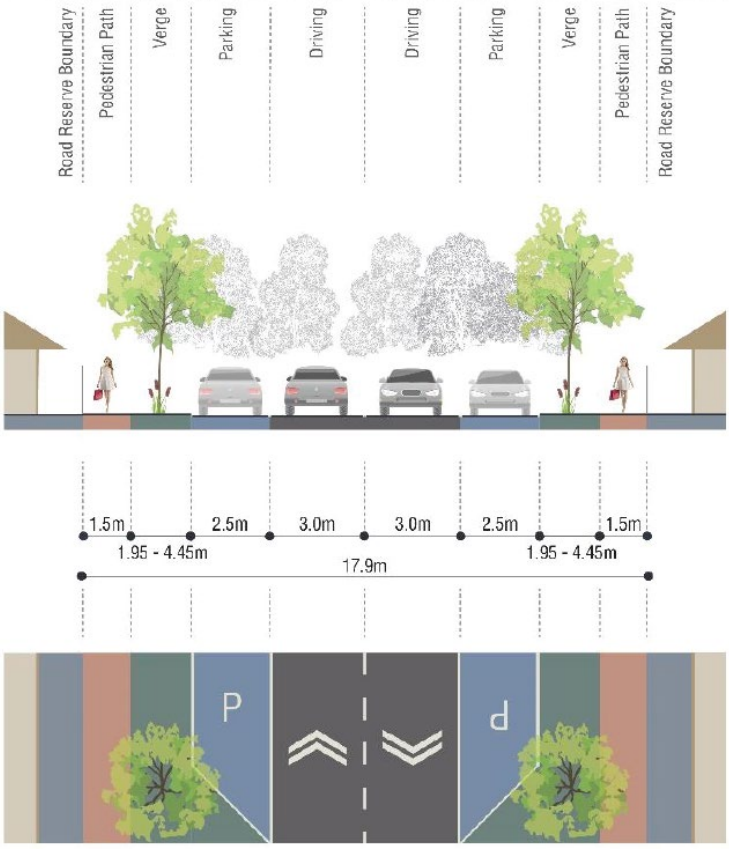
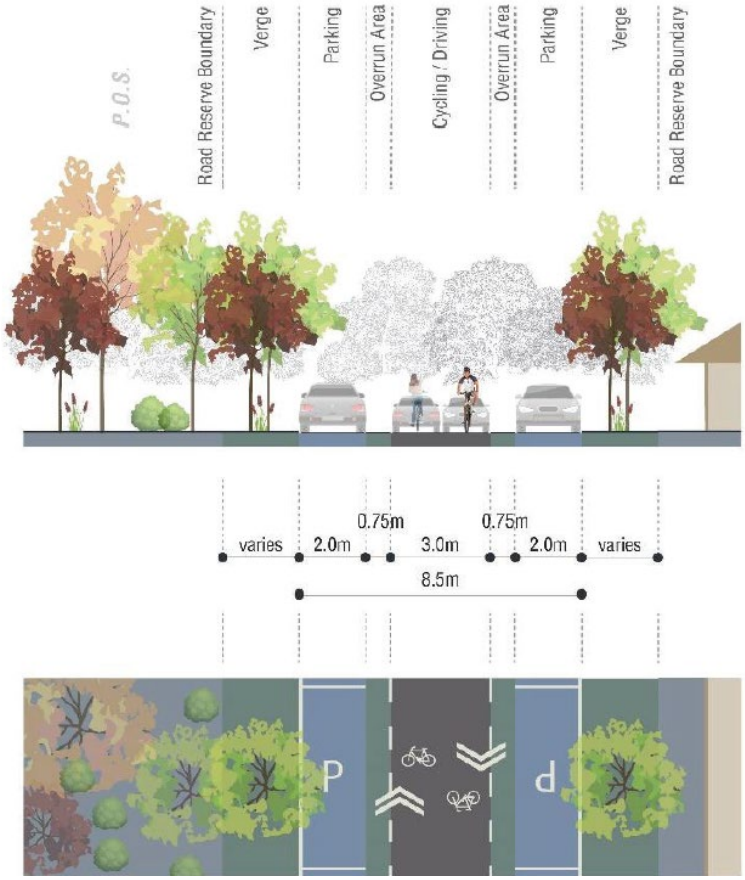


Image 2 – Safe Active Street Cross-Section *(KCTT 2020)*



4.7.4 PUBLIC TRANSPORT NETWORK

RAIL SERVICES

The structure plan area is located adjacent to the proposed Morley to Ellenbrook Rail Line, for which the Government expects planning to be completed by 2022. Preliminary documents indicate that nearby stations will be constructed in the Ellenbrook Town Centre (1.7km north of the site) and in Whiteman (2.3km south of the site) in the vicinity of the Brabham District Centre near Youle-Dean Road.

We understand that an additional station, to be located south west of the intersection of Gnangara Road and Drumpellier Drive, directly west of the Structure Plan area, has been mooted as a potential park-and-ride facility. This would eliminate the need for such a facility in the Ellenbrook Town Centre (which would better be used for high density development) and it would provide a clear synergy with the new bus station located between Drumpellier Drive and Starflower Road.

This Structure Plan has been designed to integrate with the land west of Starflower Road by way of key road connections, offering connectivity for vehicular traffic, public transport services, cyclists and pedestrians, and ensuring that any such future development forms a logical and seamless addition to the urban development front.

BUS SERVICES

There are a number of existing bus routes surrounding the site, as set out in Table 7.

Table 7: Public Transport Services

Route	Description	Peak frequency	Off-peak frequency
335	Ellenbrook Town Centre – Midland Station via West Swan Road	120 minutes	No weekend or public holiday services
336	Ellenbrook – Ellenbrook Transfer Station via Brookmount Drive & Woodlake Boulevard	15 minutes	30 minutes on Saturday (no Sunday & public holiday service)
337	Ellenbrook Town Centre – Ellenbrook Transfer Station via Aveley	20 minutes	20 minutes on Saturday (no service on Sunday and public holidays)
353	Ellenbrook Transfer Station – Bassendean Station via Brabham and Dayton	20 minutes	60 minutes on weekends and public holidays

Table 7: Public Transport Services			
Route	Description	Peak frequency	Off-peak frequency
355	Ellenbrook Town Centre – Whitfords Station via Gnangara Road	20 minutes	No service on weekends or public holidays.
955	Ellenbrook north – Morley Bus Station via Bassendean	30 minutes	30 minutes on weekends and public holidays

The Public Transport Authority has advised that route 353 will be modified to go through the Structure Plan area, nominally via Losino Boulevard, Andrea Drive and Henley Street, before continuing south along Partridge Street. It is envisaged this route will ultimately terminate at the future Whiteman Train Station. Additionally, future bus route 354 is expected to be routed through the structure plan area, providing an additional connection between the future Whiteman and Ellenbrook Train Stations via Aveley.

The Structure Plan Map depicts planned bus stop locations along a portion of Henley Street and the extension of Partridge Street. The Public Transport Authority has advised these locations should be treated as indicative only, with final locations to be determined once road infrastructure is in place and site inspections are undertaken to ensure to suitably compliant boarding areas can be constructed.

4.7.5 CYCLE NETWORKS

Shared paths exist along Gnangara Road and West Swan Road, providing good regional linkages.

An extensive network of on road cycle lanes, shared paths, and pedestrian footpaths will be installed throughout the site as development progresses (refer Table 8 below). Notably, this will include a series of roads to be developed under the Department of Transport Safe Active Streets program, developed to offer an innovative solution to providing a safe and connected cycling network.

These roads will feature a reduced pavement width with parking on both sides of the road to provide traffic calming for a shared cycling and driving lane (refer Image 2).

Table 8: Typical Pedestrian and Cyclist Networks		
Road type/area	Cycling facilities	Pedestrian facilities
Integrator B (25.2m)	On-road cycle lanes (x2)	Pedestrian paths (x2)
Neighbourhood connector A (24.4m)	On-road cycle lanes (x2)	Pedestrian paths (x2)
Neighbourhood connector B (19.4m)	Shared path (x1)	Pedestrian path (x1)
Access street B (17.9m)	Shared path (x1)	Pedestrian path (x1)
Access street C & D (15-17.9m)	On-road (shared)	Pedestrian path (x1)
Safe Active Street (15m)	On-road (shared)	Pedestrian path (x1)

4.8 WATER MANAGEMENT

A *Local Water Management Strategy* has been prepared to support and guide future development (Appendix 2).

The recommended approach to water management for the Structure Plan area includes:

- Use of water wise gardens at the individual lot level to minimise irrigation rates and use of groundwater.
- Retain small event runoff from lots (i.e. first 15mm of rainfall) on site, with the exception of lots <300m² in area.
- Treat road reserve runoff through water sensitive urban design measures, such as tree pits, bio-pockets, swales, and bio-retention areas.
- Detain minor and major event flows within flood storage areas to maintain pre-development discharge rates.
- Design the St Leonards Creek channel to maintain the existing hydrological function, improve water quality outcomes, and improve ecological values.
- Use imported fill and subsoil drains to achieve required separation to groundwater.
- Implement non-structural measures to reduce nutrient loads within stormwater runoff and maintain groundwater quality beneath the site.

The framework set out within the *Local Water Management Strategy* will be refined through the preparation of urban water management plans as development progresses. This will include a review of the alignment and profile of St Leonards Creek, and the status and transfer arrangements of existing water licenses for irrigation of open space.

4.9 INFRASTRUCTURE COORDINATION, SERVICING AND STAGING

An Infrastructure Servicing Report has been prepared by KCTT to support the Structure Plan (refer Appendix 7). This report confirms the site is capable of being provided with all essential services and infrastructure. A summary of the report is provided below.

4.9.1 EARTHWORKS

Cut to fill earthworks will be required to achieve lot levels suitable for all services. Importation of fill will also be needed in areas where groundwater is close to the surface, mostly within the northern quarter of the site, and in the vicinity of St Leonards Creek.

4.9.2 POWER

The development is expected to require in the order of 16MVA of power upon completion.

Western Power's network mapping tool indicates that sufficient spare capacity of 10MVA currently exists to service initial stages. However, this drops to 5MVA by 2025. As such the development may generate a need for some network reinforcement (likely including a dedicated high voltage feeder from the nearest zone substation), possibly attracting headworks costs from Western Power. The requirements for the general area are expected to be reviewed by Western Power on an ongoing basis.

4.9.3 TELECOMMUNICATIONS

NBN Co is responsible for the installation of fibre in all broad-acre developments over 100 lots. Given the scale of the Structure Plan, it is anticipated that NBN will provide services as necessary.

A review of existing telecommunications infrastructure within the area shows existing NBN infrastructure along Park Street and Starflower Road, with additional services on Gnangara Road and within the adjacent Morgan Fields Estate.

4.9.4 GAS

Existing ATCO high pressure main gas services are available in Park Street and Starflower Road (Ø160mm), together with steel mains in Pine Street, Andrea Drive, Losino Boulevard and Gnangara Road (Ø110mm), as well as Starflower Road (Ø150mm).

Extensions are to be undertaken by the developer as needed to service future development.

4.9.5 HIGH PRESSURE GAS PIPELINES

Civil engineering designs and site works will be undertaken to address the following general requirements in the vicinity of the high-pressure gas pipelines:

- No alteration to surface levels within the corridor
- Alteration to surface levels adjacent to the corridor will require battering or retaining walls to maintain the existing levels of the corridor
- Service crossings and road crossings will require approval by the relevant pipeline regulator.

As set out in the AS2885 Safety Management Study and Location Classification Review, a number of specific actions may require further assessment and consideration by pipeline regulators.

4.9.6 SEWER

The wastewater system has been designed to drain generally from the northwest of the site toward the existing low point in the south eastern corner.

In accordance with Water Corporation planning, wastewater will then gravity feed from the south eastern corner of the site to the south; discharging into an existing Ø300mm sewer in Youle-Dean Road, Brabham as an interim measure; and ultimately to a wastewater pump station also located on Youle-Dean Road, to the west of the existing sewer.

4.9.7 WATER

The site is located within the Water Corporation's Ellenbrook Gravity Water Supply Zone, for which we understand remodelling and planning is being undertaken.

Existing upgrades identified in the Corporation's 5-year capital program include the construction of a Ø400mm main from Ellenbrook to Park Street via Starflower Road. This is expected to have sufficient capacity to service initial stages of development, up to approximately 1,000 lots.

Future upgrade requirements and extensions will be discussed with Water Corporation as planning for the area progresses.

4.10 DEVELOPMENT CONTRIBUTION ARRANGEMENTS

A development contribution plan (DCP) has been prepared for the Structure Plan area and forms part of Local Planning Scheme No.17 (LPS17).

Any additional infrastructure to those currently provided for under LPS17 will be subject to consideration as part of a separate Scheme amendment or a review of the existing DCP for the area under the scheme.

4.10.1 CENTRAL ENTRY ROAD

The Structure Plan Map depicts a central entry road linking Park Street (adjacent to POS 13) to Henley Street as an 'Access Street C' road with a left-in/left-out intersection to Park Street. This arrangement provides for the effective and efficient operation of the future road network, and avoids potential safety issues associated with obscured sight lines at the intersection with Park Street because of the local topography.

The Structure Plan Map also includes a note stating:

> "*Potential upgrades beyond a typical Access Street standard and/or a roundabout intersection with Park Street is subject to detailed design and is to be constructed entirely at the applicant's cost*"

This intends to allow for the optional upgrade of the road and intersection/s that has been mooted by a developer in the area, at their own cost, which is understood to assist in the marketing of a residential estate. However, because these upgrades are not necessary to the function of the road network, it would be inconsistent with the principles of *State Planning Policy 3.6: Development Contributions for Infrastructure* (2009) and draft *State Planning Policy 3.6: Infrastructure Contributions (2019)* for the

associated costs to be included within the development contribution plan; namely because there is no need for the upgrades (noting the *Transport Impact Assessment* demonstrates the road network functions sufficiently without it) and there is no nexus to fairly compel other landowners in the area to contribute to these costs (noting the road intends to provide access for a residential estate primarily for marketing purposes, where the planned road network already provides adequate access).

As such, this road may be optionally upgraded, subject to detailed design and assessment at subdivision stage, entirely at the applicant's cost and is not to form part of a future development contribution plan.

5. CONCLUSION

This structure plan has been prepared in accordance with the planning framework adopted by the City of Swan and the Western Australian Planning Commission, and reflects the advice received during consultation with other agencies.

The Structure Plan provides for development of an appropriate nature in accordance with the outcomes of a comprehensive technical analysis comprising:

- Town planning & urban design
- Civil engineering design and infrastructure servicing
- Traffic impact assessment
- Environmental assessment and management strategy
- Spring flora and vegetation assessment
- Level 1 fauna assessment
- Foreshore area assessment
- Local water management strategy
- Bushfire management plan
- Transport noise assessment
- Pipeline risk management plan

Consultation with landowners has occurred throughout the planning investigation and reporting processes, including initial submissions to government on state strategic planning initiatives such as the WAPC frameworks, during the preparation and assessment of the MRS rezoning of the land, and during the formulation of this structure plan.

APPENDIX 1: ENVIRONMENTAL ASSESSMENT AND MANAGEMENT STRATEGY

APPENDIX 2:
LOCAL WATER MANAGEMENT STRATEGY

APPENDIX 3:
BUSHFIRE MANAGEMENT PLAN

APPENDIX 4:
PARMELIA GAS PIPELINE AS2885 SAFETY MANAGEMENT STUDY

APPENDIX 5:
PUBLIC OPEN SPACE SCHEDULE

POS SCHEDULE – TABLE 1 OF 2			Ha	Ha
	Gross area			
A	Structure Plan Area		233.6482	
		GROSS AREA		**233.6482**
	Deductions			
	Non-Creditable Open Areas (1:1 drainage) H		2.1425	
	MRS Other Regional Reserves		2.2921	
	Public Purposes – Primary School		11.2204	
	Public Purposes – Water Corporation		0.1429	
B		**Sub-total**	**15.7979**	
C	Excess Restricted POS		6.1498	
D		**Total deduction (B+C=D)**		**21.9477**
E		**Net subdivisible area (A-D=E)**		**211.7005**
F		**10% requirement (10% of E=F)**		**21.1701**
	POS Provided			
M	Unrestricted open space (L)			17.9073
N	Creditable restricted open space (K-C=N) (Max 20% of F)			4.2340
O	**Total creditable POS provided (M+N)**			**22.1413**
P	**Percentage of POS provided (O/E)**			**10.46%**
Q	**POS surplus (O-F)**			0.9712
R	Gross POS (G)			30.4336
S	(Gross POS / gross area (G/A)			13.03%

POS SCHEDULE – TABLE 2 OF 2								
Note: all areas are in 'ha'		G	H	I	J1	J2	K	L
BGD Code	LWMNS Catchment	**Gross POS**	1:! Area (deduction)	Net Area (G-H)	1:5 Area (Restricted)	Gas Pipeline Corridor (Restricted)	Total Restricted ((J1-H)+J2)	Total Unrestricted
POS 1	1	0.5751	0.0737	0.5014	0.1466	0	0.0729	0.4285

POS SCHEDULE – TABLE 2 OF 2								
Note: all areas are in 'ha'		G	H	I	J1	J2	K	L
POS 2	2	1.5805	0.0210	1.5595	0.0522	0.6791	0.7103	0.8492
POS 3	3	0.8669	0.1488	0.7181	0.3126	0	0.1638	0.5543
POS 4	4	*3.9531*	*0.1425*	3.8106	*0.2471*	*3.0718*	3.1764	0.6342
POS 5	5	*3.6912*	*0.3092*	3.3820	*0.7379*	0	0.4287	2.9533
POS 6	6	3.3973	0.2380	3.1593	0.4414	0	0.2034	2.9559
POS 7	7	3.3477	0.2500	3.0977	0.4551	1.8673	2.0724	1.0253
POS 8	8	4.1171	0.1393	3.9778	0.2811	0	0.1418	3.836
POS 9	9	1.3363	0.3504	0.9859	0.7956	0	0.4452	0.5407
POS 10	10	1.882	0.2360	1.6460	0.4938	0	0.2578	1.3882
POS 11		0.3840	0.0778	0.3062	0.1552	0	0.0774	0.2288
POS 12	11*	1.8886	0.0779	1.8107	0.1552	1.3626	1.4399	0.3708
POS 13		3.4138	0.0779	3.3359	0.1552	1.1165	1.1938	2.1421
TOTAL		30.4336	2.1425	28.2911	4.4290	8.0973	10.3838	17.9073
					12.5263			

* Note: Drainage areas for catchment 11 have been split evenly across POS 11-13 for the purpose of this POS schedule. The distribution may change to suit design requirements at the time of construction.

APPENDIX 6:
TRANSPORT IMPACT ASSESSMENT

APPENDIX 7:
INFRASTRUCTURE SERVICING REPORT

APPENDIX 8:
GAS EASEMENT SUMMARY GUIDELINES

APPENDIX 9:
LANDOWNERSHIP SCHEDULE