LEGEND

ZONES

- RESIDENTIAL R25
- RESIDENTIAL R30
- RESIDENTIAL R40
- RESIDENTIAL R60
- RESIDENTIAL R80
- PS — PUBLIC PURPOSES - PRIMARY SCHOOL
- C — PUBLIC PURPOSES - CIVIC

ZONES

- WSD — PUBLIC PURPOSES - WATER AUTHORITY OF WA
- LOCAL CENTRE (R80)
- MIXED USE

RESERVATIONS

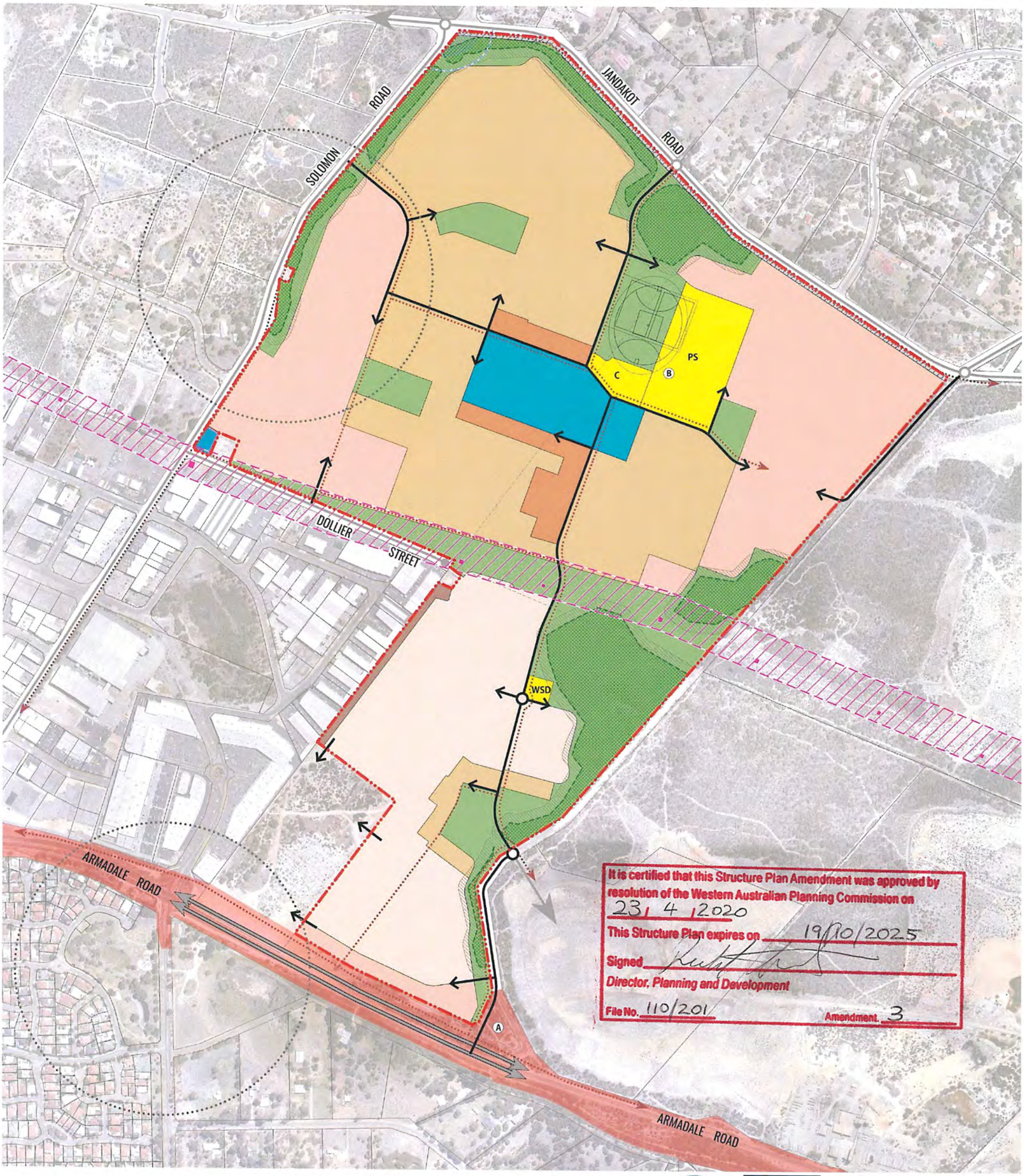
- PRIMARY REGIONAL ROAD (MRS)
- PUBLIC OPEN SPACE

LAND USE PLANNING ELEMENTS THAT INFORM THE STRUCTURE PLAN

- REMNANT BUSHLAND
- WETLAND - RESOURCE ENHANCEMENT
- WETLAND - 30M BUFFER
- ROAD WIDENING
- NEIGHBOURHOOD CONNECTOR
- KEY ACCESS ROADS
- BUSHFIRE PROTECTION ZONE (20m)
- 330kV POWERLINE EASEMENT
- 300m WELLHEAD PROTECTION ZONE
- STRUCTURE PLAN BOUNDARY
- PRIMARY PATH/PEDESTRIAN LINKAGES

(A) The location and design of the Armadale Road and Southern entry access intersection being to the satisfaction of Main Roads WA

(B) Primary School/Oval requirements are shown in Figure 3 and outlined in Section 5.8.



It is certified that this Structure Plan Amendment was approved by resolution of the Western Australian Planning Commission on 23/4/2020

This Structure Plan expires on 19/10/2025

Signed

Director, Planning and Development

File No. 110/201 Amendment 3

COCK/2015/60-1 STRUCTURE PLAN

Plan 1

Calleya

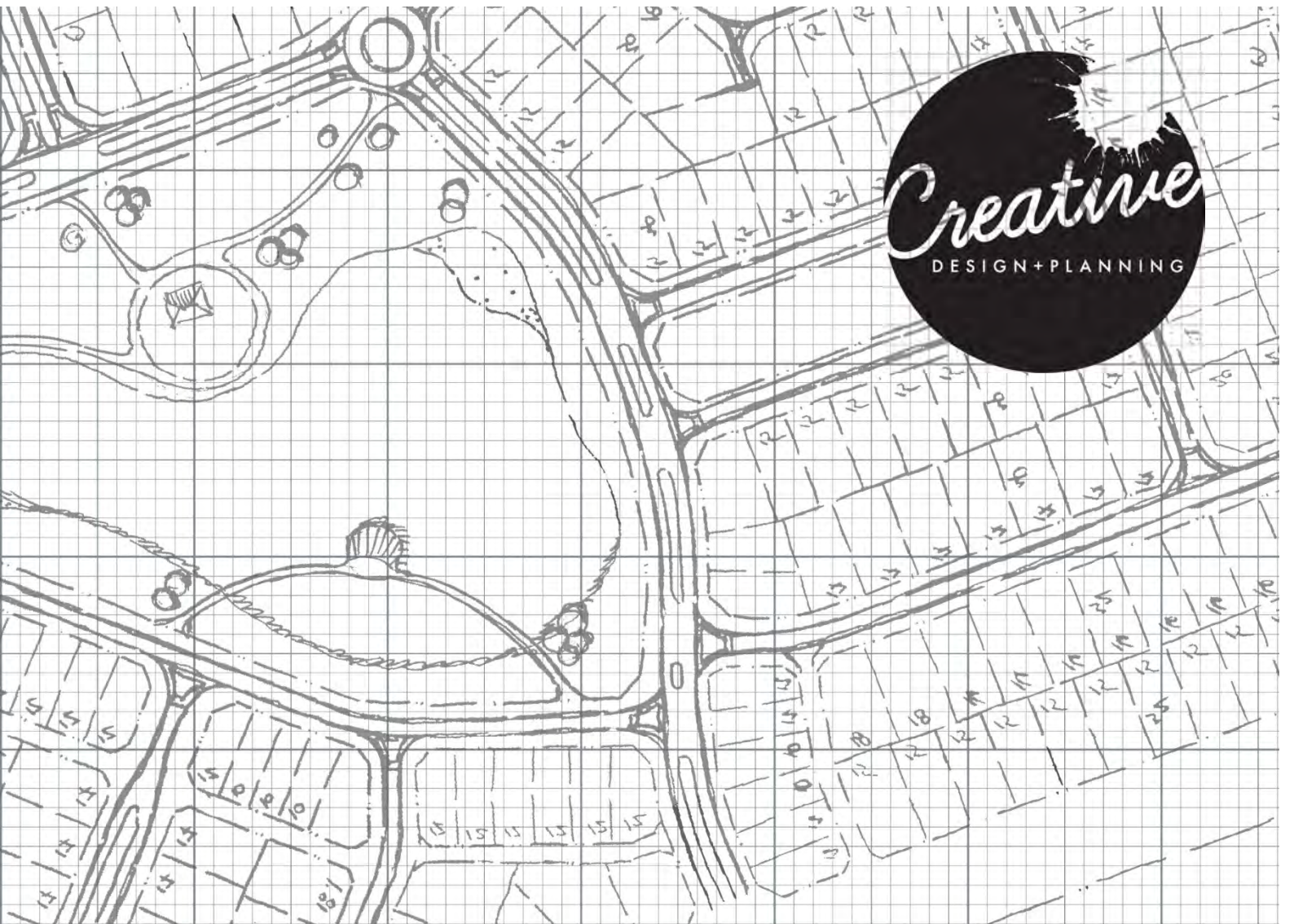
Stockland

NORTH

Scale: 1:7500 @ A3

0 75 150 225m

Date: 25/03/2020 Plan: STOBJ-2-003X



COCK/2015/60-2
BANJUP QUARRY
LOCAL STRUCTURE PLAN

'Parent Lots' Lot 9004 Armadale Road; Lot 9002 Jandakot Road; & Lot 132 Fraser Road, TREEBY

April 2020 (As amended)

Stockland WA Development Pty Ltd

DOCUMENT STATUS

VERSION	COMMENT	PREPARED	REVIEWER	REVIEWED	APPROVED	ISSUE DATE
8	SPC Schedule of Modifications (As adopted)	DPS	JAH	22 Oct 2014	FRA	03 Feb 2014 17 Mar 2014 (Re-issue)
9	Major Var 1 *LSP Update – Northern Precinct*	CD+P	MM	6 Feb 2015	JAH	24 Mar 2015 26 Jun 2015 (Re-issue)
9a	Oct 2015 Council Resolution	CD+P	MM	16 Oct 2015	JAH	16 Oct 2015
10	WAPC Schedule of Modifications (As approved)	CD+P	MM	23 Feb 2016	JAH	24 Feb 2016
11	Amendment 2_Minor (MRS update)	CD+P	CH	19 Dec 2017	JAH	19 Dec 2017
12	Amendment 3_Minor (Density update)	CDP	JAH	09 Apr 2020	JAH	17 Apr 2020

COCK/2015/60-1

BANJUP QUARRY LOCAL STRUCTURE PLAN

'PARENT LOTS' LOT 9004 ARMADALE ROAD; LOT 9002 JANDAKOT ROAD & LOT 132 FRASER ROAD, TREEBY

APRIL 2020 (AS AMENDED)

Prepared for: **Stockland**
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Our Ref: \\WA-SVR\Share\Projects\StoBj\LSP\4. Banjup Quarry (Calleya) LSP_Minor Amdt 3\1. Reports and Correspondence\200409 Banjup Quarry LSP Report (Amdt 3)_v12.docx

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

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

22 October 2013

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

Date of Expiry: 19 October 2025

Table 1: Table of Amendments

AMENDMENT NO.	SUMMARY OF THE AMENDMENT	AMENDMENT TYPE	DATE APPROVED BY WAPC
1	Design update to 'Northern Precinct' and associated supporting documents.	Major	1 March 2016
2	Update of Structure Plan – *Part 2 Explanatory Section* (Plans 1, 3a, 3b, 4, 7, 9 and 10 and supporting text) to: • include 'Urban' land previously reserved as 'Primary Regional Roads'; and • POS and road widening updates pursuant to subdivision approvals and Deposited Plans.	Minor	3 October 2018
3	• Density update – Portion Lot 1488 Clementine Blvd from R60 to R40. • Adjustment of Public Purpose - Civic and Pubic Open Space (Playing Fields) boundary per Deposited Plan 415256. • General audit of all POS and associated deductions. • POS Schedule (Plan 10) and Master plan (Plan 6) updated to address above matters.	Minor	23 April 2020

EXECUTIVE SUMMARY

The *Banjup Quarry Local Structure Plan* (Structure Plan) and amendments thereto has been prepared to guide the subdivision and development of some 144 hectares of land on 'Parent Lots' Lot 9004 Armadale Road, Lot 9002 Jandakot Road and Lot 132 Fraser Road, Treeby; within the City of Cockburn municipality.

The Structure Plan has been prepared on behalf of Stockland WA Development Pty Ltd by the following specialist consultant team:

- CDP Town Planning and Urban Design – urban design, town planning
- Cardno (formerly PDC) – engineering and urban water management
- RPS – environment
- Emerge Associates – landscaping
- Transcore – traffic and transport analysis
- Lloyd George Acoustics – acoustic assessment
- Macroplan – commercial analysis
- Strategen – bushfire management
- CCS Strategic – community planning
- R & E O'Connor Pty Ltd – archaeology assessment

Stockland WA Development Pty Ltd, as primary developer within the Structure Plan area, has branded the overall site 'Calleya' Residential Estate, Treeby. It is recognised that the Structure Plan area now encompasses multiple landowners by virtue of Subdivision/Sales Releases by Stockland.

Purpose

This Structure Plan provides an overarching planning framework to guide and facilitate the development of 144 hectares of land at Treeby for urban purposes, and has been prepared in accordance with the provisions of Part 6 of the City of Cockburn Town Planning Scheme No. 3.

The plan provides for an integrated and coordinated approach to an appropriate mix of land uses and infrastructure, necessary to create a strong and vibrant community, whilst delivering triple bottom line sustainability outcomes.

The Structure Plan, as modified, has been submitted for approval by the Western Australian Planning Commission.

Design Approach

The design approach has been a rigorous multidisciplinary process with continuous reflection upon the purpose of the Structure Plan and improving project outcomes. Overarching development objectives and principles which have informed the design approach include:

- Sustainability
- Transit Oriented Design
- Streetscape & Legibility
- Place Making

Such objectives and principles have already been implemented as part of subdivision development of the 'southern precinct', and will guide all remaining development in the 'northern precinct' of the Structure Plan area.

Project Overview

The Structure Plan will create a framework for the future urban subdivision development of a planned 2,350 dwellings including potential Retirement Living Village, which will ultimately house a new community in the vicinity of ~6,345+ people within a variety of lot product and dwelling types. The Structure Plan will provide for a lower order *Neighbourhood Activity Centre* incorporating a mixed use/commercial centre, as well as a community facility and playing field, primary school and potential retirement living development; and a small Mixed Use site adjacent a similar established land use.

EXECUTIVE SUMMARY TABLE

ITEM	DATA (APPROX)
Structure Plan Area	144.49 ha
Indicative Land Use Breakdown (excluding internal roads & POS) • Residential • Mixed Use • Commercial • Public Purposes – Primary School • Public Purposes – Water Authority of WA • Road Widening o Jandakot Road (1.4582 ha) o Solomon Road + Jandakot Road Intersection (0.2659 ha) o Fraser Road/Ghostgum Avenue (0.1679 ha)	 73.6 ha 0.17 ha 1.46 ha 3.5 ha 0.17 ha 1.89 ha
Directions 2031 and Beyond Dwelling Target	1,700+ dwellings
Estimated number of dwellings	2,350 dwellings [1]
Estimated residential site density	~ 27 - 32 Dwellings/*site hectare* [2] ~ 14.5 - 17 Dwellings/*gross urban zone* [3]
Estimated population (2,350 dwellings)	6,345 @ 2.7ppl/hh
Number of Secondary Schools	0
Number of Primary Schools	1
Estimated commercial floor space (Small Neighbourhood Centre)	2,800m^2 net lettable area
Number & Total Area of Public Open Space • Civic Site/Senior Playing Field (Primary School co-located) • Neighbourhood Parks • Local Parks	 2 sites @ 3.01 ha 8 sites @ 19.83 ha [4] 1 site @ 0.18 ha

FOOTNOTES:

1 *Whilst Stockland's original dwelling yield projection was ~1,990 dwellings, the total **2,350 dwellings** (rounded) indicated above included a 25% increase in growth of the Estate's 'northern precinct' overtime; this provided as a contingency for relevant Transport, Local Water Management and service infrastructure strategies.*

2 *'Residential Site Hectare' refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods. The nominated ranges relate to a potential 25% increase in growth of the 'northern precinct' of the Structure Plan area as detailed under Footnote 1.*

3 *'Gross Urban Zone' refers to the definition under WAPC's Directions 2031 and supporting documents. The nominated ranges relate to a potential 25% increase in growth of the 'northern precinct' of the Structure Plan area as detailed under Footnote 1.*

4 *Inclusive of Resource Enhancement Wetland Buffer area and all Remnant Vegetation areas; excludes area beneath Western Power Powerlines Easement.*

CONTENTS

PART ONE – IMPLEMENTATION

PART TWO - EXPLANATORY SECTION

APPENDICES (PART 3)

Volume 1:

Appendix 1 – Environmental Assessment Report (Mar 2011) and Addendum (June 2015)

Appendix 1a – Archaeological Report

Volume 2:

Appendix 2 – Bushfire Management Plan

Appendix 3 – Servicing Report (July 2012) and Northern Addendum (March 2015)

Appendix 4 – Traffic and Transport Management Strategy

Appendix 5 – Landscaping Strategies and Concepts

Appendix 6 – Noise Impact Assessment

Appendix 7 – Banjup Community Facilities Requirements

Appendix 8 – Retail Potential and Economic Analysis

Appendix 9 – Local Water Management Strategy

Appendix 10 – Banjup Quarry Sustainability Plan

Important Note – Appendices (Part 3):

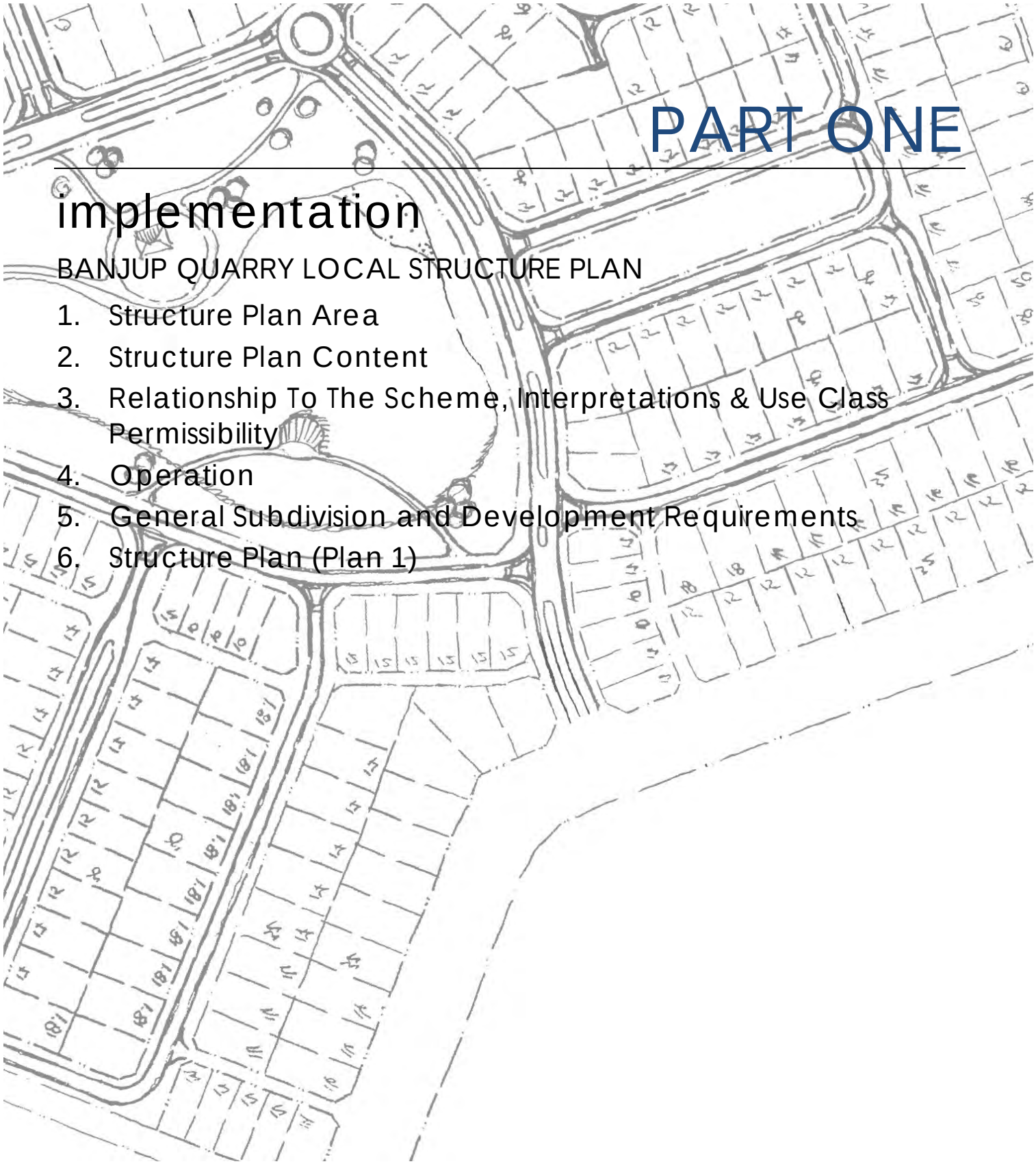
- Specialist Consultant reports prepared under Volumes 1 and 2 of LSP Appendices (Part 3) dated October 2018 still apply.
- No Specialist Consultant reports were updated under LSP Amdt 3 (April 2020) given the minor changes to the LSP plan.

LIST OF PLANS

LIST OF FIGURES

ABBREVIATIONS

AHD	Australian Height Datum
AASS	(Actual) Acid Sulfate Soils
ANEF	Australian Noise Exposure Forecast
ASS	Acid Sulfate Soils
AS	Australian Standard
CoC	City of Cockburn
CBD	Central Business District
CPTED	Crime Prevention Through Environmental Design
DCS (P)	Developer Contributions Scheme (Plan)
DEC	Department of Environment and Conservation
DER	Department of Environment Regulations
DIA	Department of Indigenous Affairs
DPaW	Department of Parks and Wildlife
DoP	Department of Planning
DoW	Department of Water
DUP	Dual Use Path
EPA	Environmental Protection Authority
FMP	Fire Management Plan
Ha	Hectare
HV	High Voltage
Km	kilometre
kV	kilovolt
LCACS	Local Commercial and Activity Centres Strategy (City of Cockburn)
LDP	Local Development Plan
LWMS	Local Water Management Strategy
MRS	Metropolitan Region Scheme
MVA	Megavolt Ampere
NAC	Neighbourhood Activity Centre
OMSRS	Outer Metropolitan Perth and Peel Sub-Regional Strategy
POS	Public Open Space
PSP	Primary Shared Path
RL	Relative Level
SPP	State Planning Policy
UWMP	Urban Water Management Plan
UWPCA	Urban Water Pollution Control Area
VPA	Vehicles Per Day
WAPC	Western Australian Planning Commission
WC	Water Corporation
WSUD	Water Sensitive Urban Design



PART ONE

implementation

BANJUP QUARRY LOCAL STRUCTURE PLAN

1. Structure Plan Area
2. Structure Plan Content
3. Relationship To The Scheme, Interpretations & Use Class Permissibility
4. Operation
5. General Subdivision and Development Requirements
6. Structure Plan (Plan 1)

1 Structure Plan Area

This Structure Plan applies 'Development Area 37' of the City of Cockburn Town Planning Scheme No.3 (the 'Scheme') to 'Parent Lots' Lot 9004 Armadale Road, Lot 9002 Jandakot Road and Lot 132 Fraser Road, Treeby being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan (**Plan 1**). The Structure Plan is identified as the *Banjup Quarry Local Structure Plan*. It is recognised that the Structure Plan area now encompasses multiple landowners by virtue of subdivision/sales releases by Stockland.

2 Structure Plan Content

The Structure Plan comprises the following sections:

a) **Part One – Implementation,** includes the Structure Plan Map and outlines the requirements that will be applied when assessing subdivision and development applications over the land to which the Structure Plan relates.

b) **Part Two – Explanatory Section,** is to provide justification and clarity to the Structure Plan and the textual provisions contained in Part One of the Structure Plan. Part Two is to be used as a reference to guide interpretation and implementation of Part One.

c) **Part Three – Appendices,** includes all specialist consultant reports and documentation used in preparation of the Structure Plan.

3 Relationship To The Scheme, Interpretations & Use Class Permissibility

The Structure Plan (Plan 1) identifies zones and reserves to guide subdivision within the Structure Plan area.

Part Two and all appendices under Part Three are to be used as a reference only to clarify and guide interpretation and implementation of Part One.

4 Operation

This Structure Plan comes into effect on the date it is approved by the Western Australian Planning Commission.

5 General Subdivision & Development Requirements

The Structure Plan (**Plan 1**) and **Table A** that form part of the implementation provisions of this Structure Plan guide the land use permissibility, standards, requirements and prerequisites for subdivision and development within the Structure Plan area.

Table A – General Planning Requirements for the Structure Plan Area

1. Subdivision and Development	1.1	Density a) Residential development within the 'Local Centre' Zone is prescribed a R80 density.
2. Local Development Plans (LDPs)	2.1	Local Development Plans (LDPs), pursuant to Clause 6.2.15 of the Scheme, are to inform applications for subdivision and development in regard to the following: a) Land zoned 'Residential' and comprising one or more of the following site attributes: i. Lots with rear-loaded (laneway) vehicle access; ii. Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space; iii. Lots with a boundary abutting or frontage to Armadale Road or Jandakot Road [1];

iv. Lots within a 100 metre catchment of 'Classified Vegetation' (Bushfire Hazard Zone) thus deemed at risk from bushfire pursuant to Australian Standards [2];

v. Lots affected by the 330kV Western Power high voltage overhead power line easement; and/or

vi. Lots within the 30m buffer catchment of a sewerage pump station.

b) Land zoned 'Local Centre'.

NOTES:

*[1] With reference to 2.1 a)(iii), affected lots are identified spatially in the accompanying 'Banjup Local Structure Plan Noise Impact Assessment' report, under **Part Three – Appendix 6** of the Structure Plan.*

*[2] With reference to 2.1 a)(iv), lots affected by the 100m 'Classified Vegetation' (bushfire hazard zone) are identified spatially in the accompanying Fire Management Plan, under **Part Three – Appendix 2** of the Structure Plan.*

3. Other

3.1 Notifications are to be placed on titles of all affected lots to advise of:

a) Potential noise nuisance associated with Jandakot Airport, for all lots within the Structure Plan area, in accordance with WAPC's *Draft State Planning Policy No. 5.3 Jandakot Airport Vicinity (SPP 5.3).*

b) Construction standards to achieve higher noise standards in accordance with *State Planning Policy 5.4* '*Road and Rail Transportation Noise and Freight Consideration in Land Use Planning' (SPP 5.4)*;

c) Building setbacks and construction standards required to achieve a Bushfire Attack Level – 29 or lower in accordance with Australian Standards (AS3959-2009)*: Construction of buildings in bushfire prone areas* and the Fire Management Plan Calleya Local Structure Plan Amendment by Strategen (June 2015)*;* and/or

d) Building setbacks required to achieve a separation distance of 30m from any approved Sewer Pump Station site.

3.2 Pursuant to 3.1(a) – (b), a detailed *Noise Management Plan* shall accompany any subdivision and/or development application of identified affected lots to clarify actual mitigation measures taking into consideration final ground levels.

Affected lots are identified spatially in the accompanying '*Banjup Local Structure Plan Noise Impact Assessment*' report, under *Part Three – Appendix 6* of the Structure Plan.

3.3 Jandakot Airport Information Program:

a) The developer is to undertake a thorough information program for prospective purchasers based on the proximity of Jandakot Airport.

3.4 Voluntary Legal Agreement

a) The Structure Plan is subject to a *Voluntary Legal Agreement* between Stockland WA Development Pty Ltd and City of Cockburn for specified hard infrastructure items.

LEGEND

ZONES

- RESIDENTIAL R25
- RESIDENTIAL R30
- RESIDENTIAL R40
- RESIDENTIAL R60
- RESIDENTIAL R80
- PS — PUBLIC PURPOSES - PRIMARY SCHOOL
- C — PUBLIC PURPOSES - CIVIC

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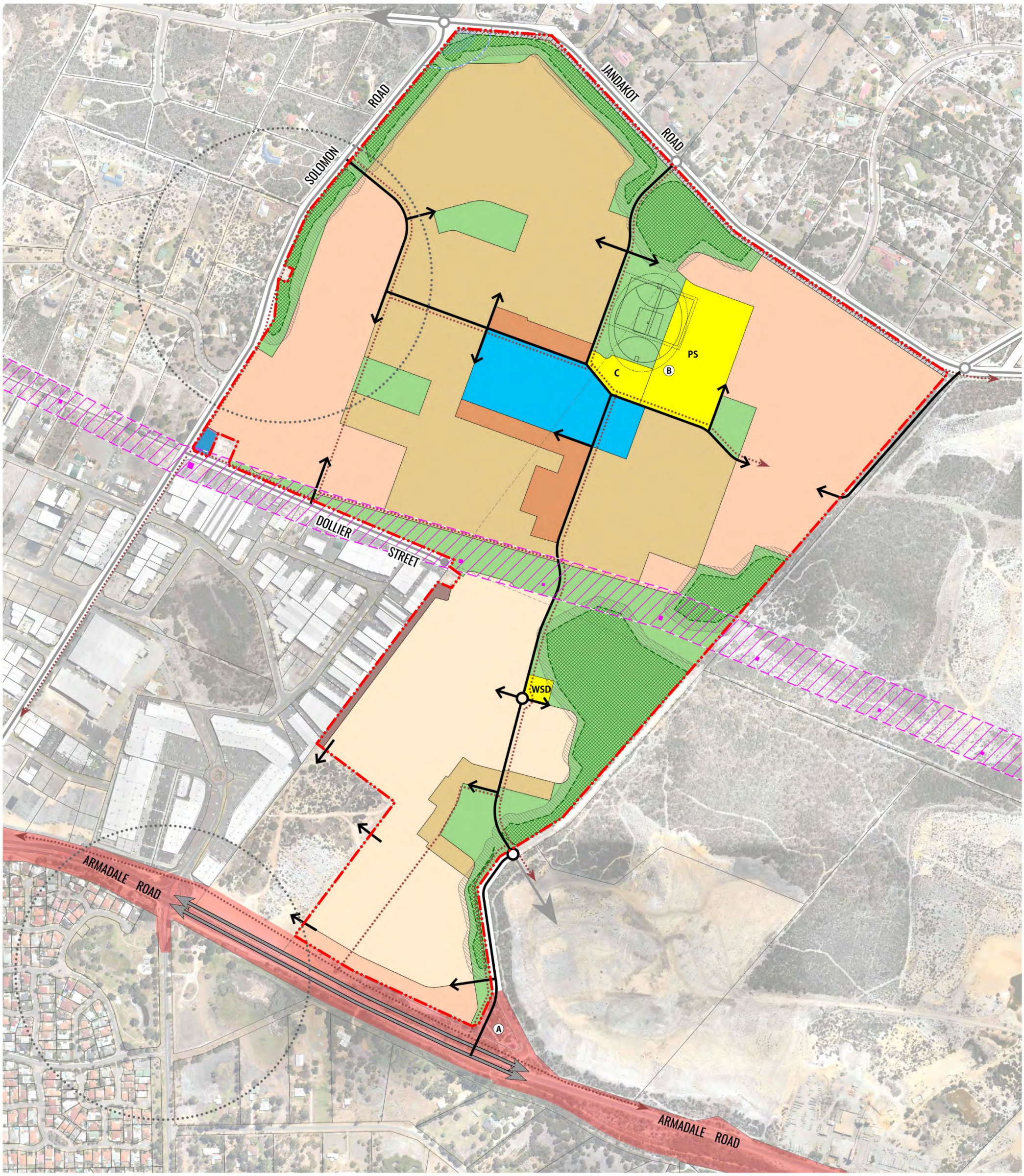


COCK/2015/60-1 STRUCTURE PLAN

Plan 1

Calleya

Stockland

NORTH

Scale: 1:7500 @ A3

0 75 150 225m

Date: 25/03/2020 Plan: STOBJ-2-003X

PART TWO

explanatory section

BANJUP QUARRY LOCAL STRUCTURE PLAN

1. Introduction
2. Statutory, Strategic and Policy Framework
3. Site Analysis
4. Context Analysis
5. Local Structure Plan
6. Infrastructure Co-ordination and Servicing
7. Implementation

Stockland

1 Introduction

The Banjup Quarry Local Structure Plan was formally adopted by the City of Cockburn at its Council meeting held 9th May 2013, and endorsed by the Western Australian Planning Commission on 22nd October 2013.

The first subdivision application (WAPC 148012) was approved by the Western Australian Planning Commission on 22nd October 2013; this comprising 460 lots in the 'southern precinct' of the Structure Plan area (between Armadale Road and Western Power Easement central to the site).

The second subdivision application (WAPC 149633) was approved by the Western Australian Planning Commission on 8th August 2014; this comprising 1,333 lots in the 'northern precinct' (north of Western Power easement) and inclusive of Primary School, Civic, Local Centre and Light Industry zoned sites. Various design reiterations and subdivision of smaller land parcels have occurred subsequent.

'Amendment 1' to the Structure Plan (approved by the WAPC on 1 March 2016) reflects development of the site in accordance with the approved 'southern precinct' subdivision, portion of the approved 'northern precinct' subdivision, as well as key design amendments to the remainder of 'northern precinct' of the Structure Plan area. Minor Amendments have occurred subsequently (in 2018 and 2020) to reflect density changes, minor boundary alignments and inclusion of a portion of Armadale Road 'Primary Regional Roads' reservation to the 'Urban' zone – this pursuant to gazettal of *MRS South East & South West Districts Omnibus 2 Amendment 1297/57* on 15 December 2017.

As developer of the Structure Plan area, Stockland has branded the site as 'Calleya' Residential Estate, Treeby.

1.1 Purpose

The purpose of the Banjup Quarry Local Structure Plan (Structure Plan) report is to provide for the orderly and proper subdivision and development of Lot 9002 Jandakot Road, Lot 9004 Armadale Road, and Lot 132 Fraser Road Treeby, generally for *Urban* purposes.

The information contained in this section provides justification and support for the comprehensive and co-ordinated design response provided for the Structure Plan area, including subsequent subdivision approvals and Structure Plan amendments thereto.

1.2 The Vision

The proposed Structure Plan will transform a former sand quarry into a distinct and thriving community that is '*bold, edgy and genuine*'. The place will celebrate the best of urban living as well as the industrial past of the quarry itself, transformed into a dynamic, living environment. Modern living and movement options will highlight the diversity in lifestyles, and will complement the diversity of open spaces; from interpretive trails through remnant bushland, to contemporary open space design and urban 'green links'. The opportunity to be part of a community, and a place close to work where the whole family can thrive, is something both residents and visitors to the Estate will want to experience.

1.3 Objectives

The intent of this Structure Plan is to establish a statutory framework to guide the planning and design of the Structure Plan, to facilitate development proposals that will enable the transformation of the former sand quarry into a distinct and thriving community that is *bold, edgy and genuine*.

Underpinning the Structure Plan is a series of objectives for the site to help achieve a distinct and well connected urban community, these include:

- Maximise opportunities for sustainable development afforded by the site's characteristics and strategic location in proximity to the Cockburn Activity Centre and Transit Station;
- Respond to the site's convenient proximity and access to public transport (Cockburn Central) by providing for direct pedestrian links to this nearby Transit Oriented Development;
- Provide a stand out approach in rehabilitating the site and creating a distinct residential community;
- Achieve an integrated development that provides appropriate linkages and interfaces with surrounding areas;
- Promote design excellence and innovation in all aspects of urban design, the public realm and built form (including landscape architecture, public art and art spaces);
- Provide high quality multifunctional community spaces for all ages;
- Be at the forefront of innovative sustainable development initiatives;
- Create a vibrant, cohesive, healthy, happy, adaptable prosperous and sustainable community;
- Provide an attractive and viable Local Centre with suitable residential density in and around the centre to support its development;
- Locate and provide public open space to ensure accessibility, visual aesthetics and view corridors for all residents;

- Attract a high level of community amenity to the area through appropriate design of the public realm;
- Ensure appropriate built form outcomes that will respond to the local environment, be that climate, crime prevention, community development or promoting the use of public transport; and
- Generate diversity in the character of place through retention and introduction/attraction of native flora and fauna.

1.4 Background

The area was named Banjup in the 1950's after a lake in the district with an aboriginal meaning of, 'an animal that burrows.'

Prior to European settlement, the traditional (Nyoongar) Aboriginal custodians considered the district 'A Summering Place', valued for food, water sources, travel routes and its mythological Waugal significance.

Early European settlement saw the area used for agricultural purposes, including market gardens, dairy farming and honey production.

Following the acquisition of the Structure Plan area by the Rinker Group in the 1950's, sand extraction for the building industry became the primary use of the site. Over the past 60 years, the quarry has expanded across the Structure Plan area resulting in up to 30m of excavation creating the current basin profile. Only the Structure Plan area's perimeter and internal pockets of remnant vegetation provide representation of the original landscape.

Directions 2031, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, and accompanying *Outer Metropolitan Perth and Peel, Sub-Regional Strategy* (OMSRS) provides a framework for delivering the objectives of *Directions 2031*. Situated within the South-West sub-region, the Structure Plan area is identified as an 'Urban Expansion Area 2011 - 2015' site. Referenced as 'BAN1' in the South-West sub-region spatial framework map, the total site Structure Plan area is projected to yield approximately 1,700+ dwellings, based on a 'Connected City' development model of 15 dwellings per *gross urban zoned hectare*.

Project Consultant PDC has undertaken extensive hydrogeological investigations and modelling of the site in order to satisfy all stakeholders that urban land uses will not present an unacceptable risk to the water resource. The Department of Water (DoW) has been closely involved in this process and through their approval of District and Local Water Management Strategy documents have signalled their approval of Stockland's approach.

As part of the commitments made in these documents, Stockland has committed to works as part of the Urban Water Management phase to validate the hydrogeological modelling by carrying out investigations to ensure the parameters of the model are being met. Further validation of the model will be required during future subdivision stages to validate the data at those locations and to confirm that the predictions of the model at correct.

In the event that the coffee sands layer is deemed to not achieve the geotechnical and hydrogeological parameters of the model, an engineered layer will be constructed to provide the assumed hydrogeology.

Site Context – Pre-development 'basin' landform central to the Banjup Quarry Structure Plan area

On 30 November 2012, the Structure Plan area was effectively rezoned from 'Rural – Water Protection' to 'Urban' under the Metropolitan Region Scheme (MRS Amendment 1221/41 *Banjup Urban Precinct* refers). The rezoning facilitated the intended residential development of the Structure Plan area and to reserve Primary Regional Roads (and associated water catchment reservation adjustment) associated with Armadale Road.

The Structure Plan is surrounded by major infrastructural services and is located within an existing urban setting. It has minimal urban planning constraints and is ideally suited to urbanisation.

The proposed rezoning of the Structure Plan, to facilitate urban development, was supported on the following key merit points:

- It represented a key opportunity for urban infill, considering its potential to supply more than 1,700 dwellings and a population of more than 4,500 people within 20 kilometres of the Perth CBD and within 1 kilometre of the Cockburn Activity Centre and Train Station;
- The Structure Plan area is an expansive area of flat topography and is largely devoid of remnant vegetation or other environmental features as a result of previous land use as a sand mine;
- The sustainability gains associated with the development (compared with fringe development which is now greater than 50 kilometres away from the CBD) are compelling. The Structure Plan area has excellent connection with public transport infrastructure and employment opportunities;
- It provides strong potential for housing diversity adding to the housing supply needed to accommodate Perth's predicted growth;
- It bolsters economic and social support for the Cockburn Activity Centre, increasing the connection between people, jobs and services; and
- It creates synergies between investment, infrastructure, employment and activity which are key components of the more sustainable urban developments within Perth.

Whilst effective as of the 30 November 2012, the MRS Amendment was published in the Government Gazette on 8 January 2013.

1.5 Land Description

1.5.1 Location

The Structure Plan area, located only 18 kilometres from the Perth Central Business District and within the City of Cockburn, lies between Armadale Road, Solomon Road and Jandakot Road. The land is approximately 1.5 kilometres to the east of Cockburn Central Activity Centre and Transit Station, on the eastern side of the Kwinana Freeway. It is wholly contained within the locality of Treeby (formerly Banjup). **Plan 2** illustrates the location and extent of the Structure Plan area.

1.5.2 Land Use

The Structure Plan area has been extensively cleared and excavated as part of a previous sand quarrying operation.

Western Power holds an 80m wide easement for high voltage overhead transmission lines (330kV) which traverses the centre of the Structure Plan area in an east – west direction. The transmission line has been identified by Western Power for reinforcement works however this being a long term consideration.

1.5.3 Ownership, Area & Legal Description

The land the subject of this Structure Plan comprises the following Parent Lots:

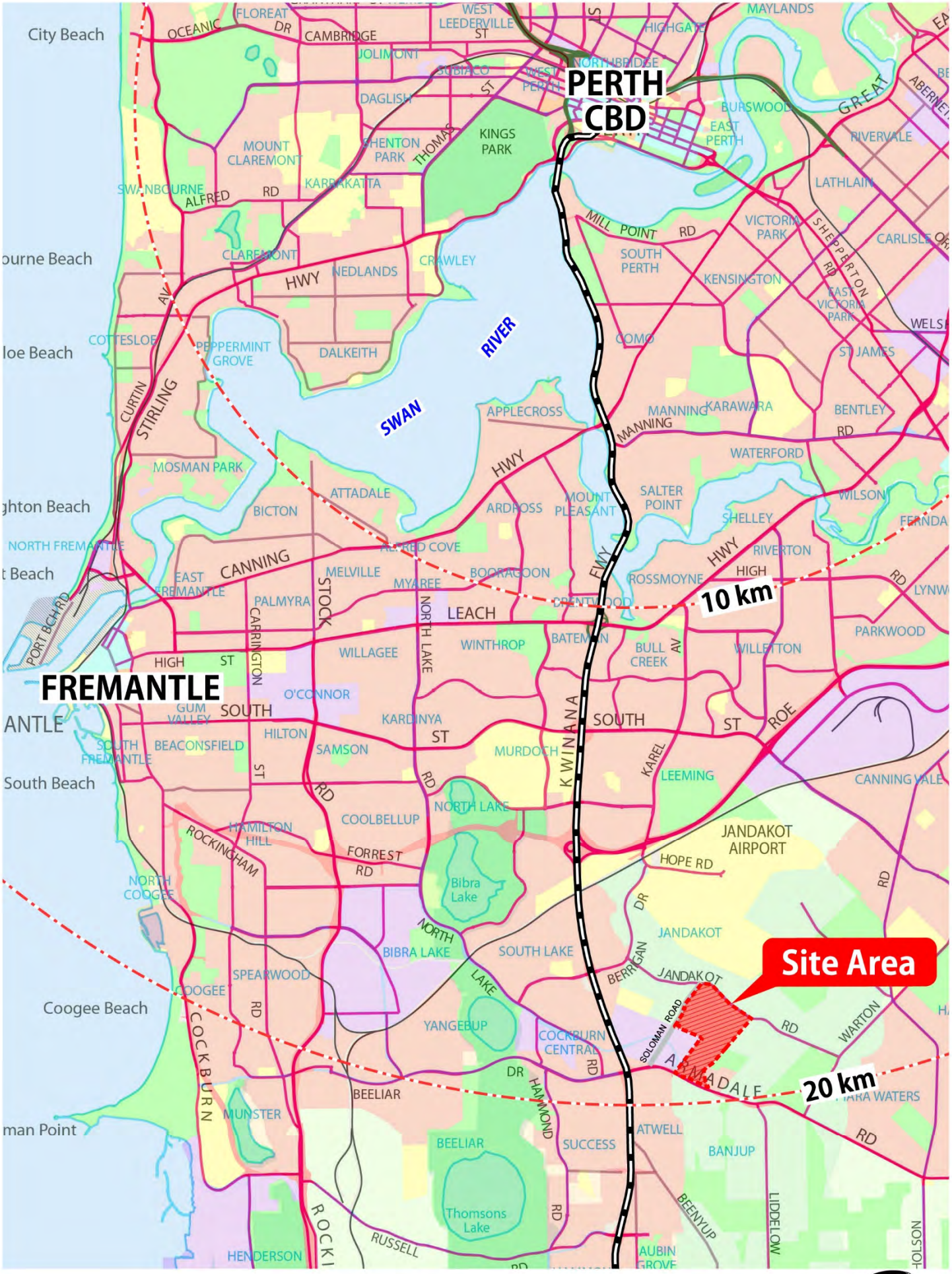
Table 1 – Land Ownership

Parent Lot Number	Owner	Certificate of Title	Area (Ha)
9002	Stockland WA Development Pty Ltd	DP37706 Volume 2564; Folio 760	62.91 ha
9004	Stockland WA Development Pty Ltd	DP46398 Volume 2604; Folio 889	36.52 ha
132	Stockland WA Development Pty Ltd	DP226040 Volume 1112; Folio 228	45.71 ha
		Total	**145.14 Ha[1]**

[1] NB. Land areas include MRS 'Primary Regional Roads' Reservations that will be ceded during the subdivision phase (Clause 42).

Certificates of Title for the above Parent Lots are attached as **Appendix 10**. Majority of the 'southern precinct' and portion of the 'northern precinct' of the Calleya Estate has been sold via subdivision and Stockland sales release, however individual landowners are not documented in this report.

Lot 1, an 8.08ha site owned by Armadale Road Pty Ltd, is not encompassed by the Structure Plan boundary. Notwithstanding, this site has been referenced in the LSP Map (Plan 1) and concept Master Plan (Plan 6) to illustrate a suitable interface and access points with the Structure Plan and as represented in Stockland's subsequent subdivision approvals. In light of the advancement of the Banjup Quarry Local Structure Plan and relevant subdivision approvals, the adjoining landowner will need to prepare a separate, site specific, Structure Plan in due course that complements the development already undertaken.



LOCATION PLAN

Plan 2

Calleya

Stockland

Creative DESIGN+PLANNING

2 Statutory, Strategic & Policy Framework

2.1 Zoning & Reservations

2.1.1 Metropolitan Region Scheme (MRS)

The Structure Plan area was gazetted an 'Urban' zoning under the Metropolitan Region Scheme on 30 November 2012. The rezoning from 'Rural – Water Protection' zone to 'Urban' zone was prepared under MRS Amendment 1221/41 *Banjup Urban Precinct* (**Plan 3a** refers).

A small land parcel fronting Armadale Road was included in the Structure Plan boundary following the gazettal of the MRS *South East & South West Districts Omnibus 2* Amendment 1297/57 on 15 December 2017. This amendment included the rezoning of land from 'Primary Regional Roads' reservation to an 'Urban' zone; this land being surplus to Main Roads WA requirements for Armadale Road.

2.1.2 City of Cockburn Town Planning Scheme No. 3

The Structure Plan area was gazetted a 'Development' zone under the City of Cockburn Town Planning Scheme No. 3 ('the Scheme') on 11th October 2013. The rezoning from 'Resource' to 'Development' zone was prepared under Scheme Amendment 95 (**Plan 3b** refers).

Adjoining Lot 1 was also encompassed by Amendment 95, and has been rezoned to 'Urban' under the MRS.

Subsequent to MRS *South East & South West Districts Omnibus 2* Amendment 1297/57, the said small land parcel was subject to an automatic Scheme amendment to rezone the land from 'Primary Regional Roads' reservation to 'Development' zone. This same land parcel is also the subject of TPS Amendment No.123 to include the land within *Development Area 37*; this amendment is being pursued concurrently with this structure plan amendment.

2.1.3 City of Cockburn - Development Contribution Plan No. 13

In accordance with the *State Planning Policy 3.6 Development Contributions for Infrastructure* (SPP 3.6), the City of Cockburn has introduced a Development Contribution Plan No. 13 (DCP13) for community infrastructure items. The DCP13 applies to all land within the City to be subdivided and/or developed for residential, rural residential or resource zone purposes and applies in addition to any other DCP requirements applying to an area.

DCP13 describes infrastructure items at the regional, sub-regional and local level that have been agreed by the City of Cockburn for inclusion in the calculations of developer costs.

Dwellings within the Structure Plan area have been added to the City's overall housing inventory and will contribute to the existing regional and sub-regional DCP infrastructure items.

The Structure Plan accommodates two items under the *Local (Banjup North and Jandakot)* category of DCP13, these items being:

- **Banjup Playing Field**

  Development of a full sized playing field containing one full sized senior AFL oval, one cricket oval and two senior soccer fields (multi-marked in the same place) and also including a playground area and equipment, picnic furniture and BBQ's.
- **Banjup Community Centre**

  A multi-functional community space that offers a variety of independent and compatible uses including sporting club change rooms, multi-purpose clubhouse, food and beverage areas, separate multi-function community activity space, art and craft spaces, playground area, toilets, covered viewing areas for adjacent playing field and car parking areas for the community centre.

2.2 Relevant State Government Strategies & Policies

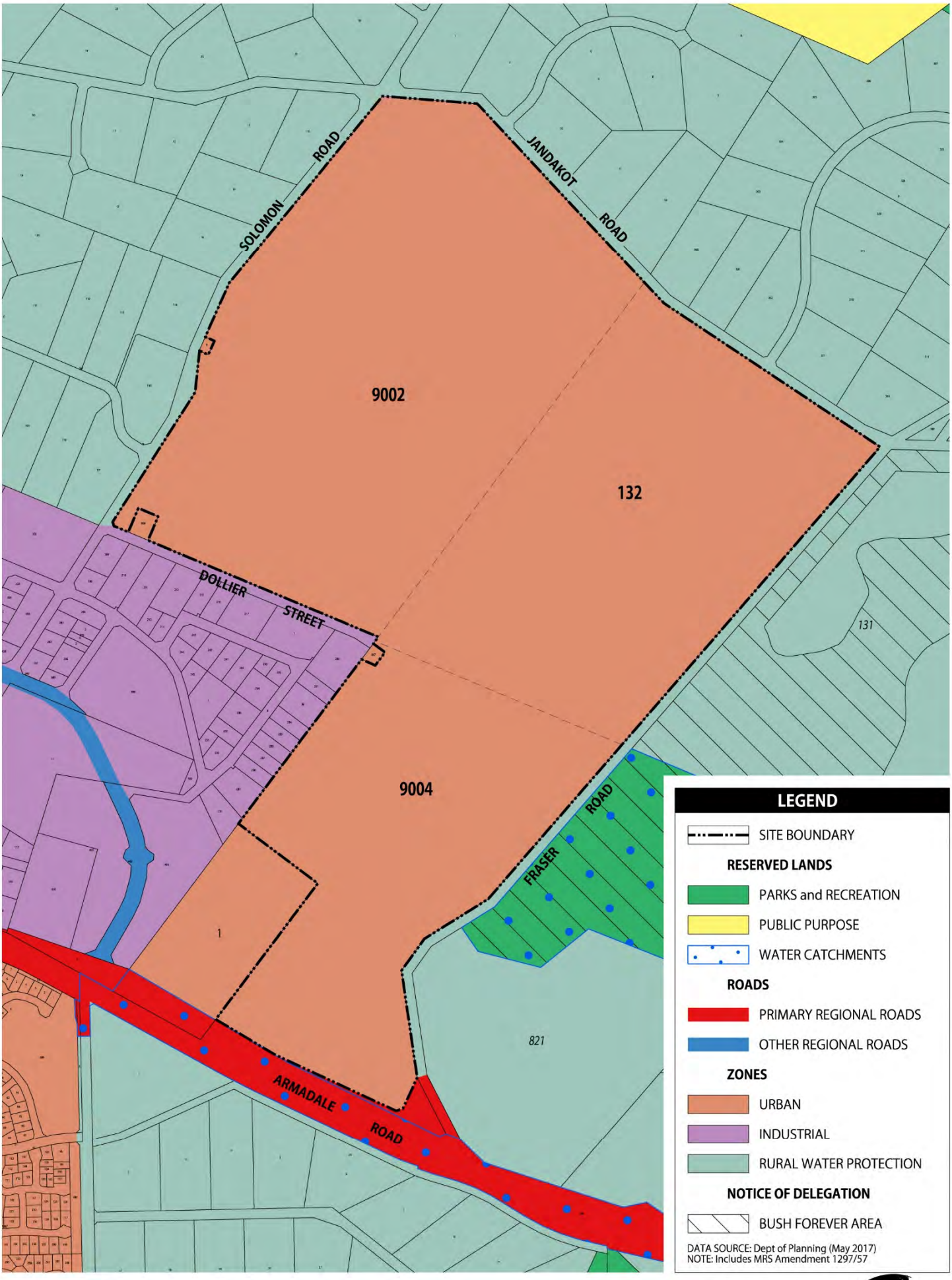
The following is an overview of relevant State Government policies and strategies considered as part of the preparation of the Structure Plan.

2.2.1 WAPC Directions 2031 & Beyond – Spatial Planning Framework for Perth and Peel

Directions 2031, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, is a high level strategic plan that establishes a vision for the future growth of the Perth and Peel region. It provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate that growth.

Broadly defined, the Banjup Quarry Structure Plan area is located within the 'South-West Sub-Region', which encompasses the Cockburn, Rockingham and Kwinana municipalities.

By 2031, the population of this sub-region is expected to grow by 70,000 people to a total population of 278,000. This will result in an additional 41,000 dwellings being required. This increase in population is expected to support an additional 41,000 jobs, for which the document aims to have 70% of the total workforce employed locally.



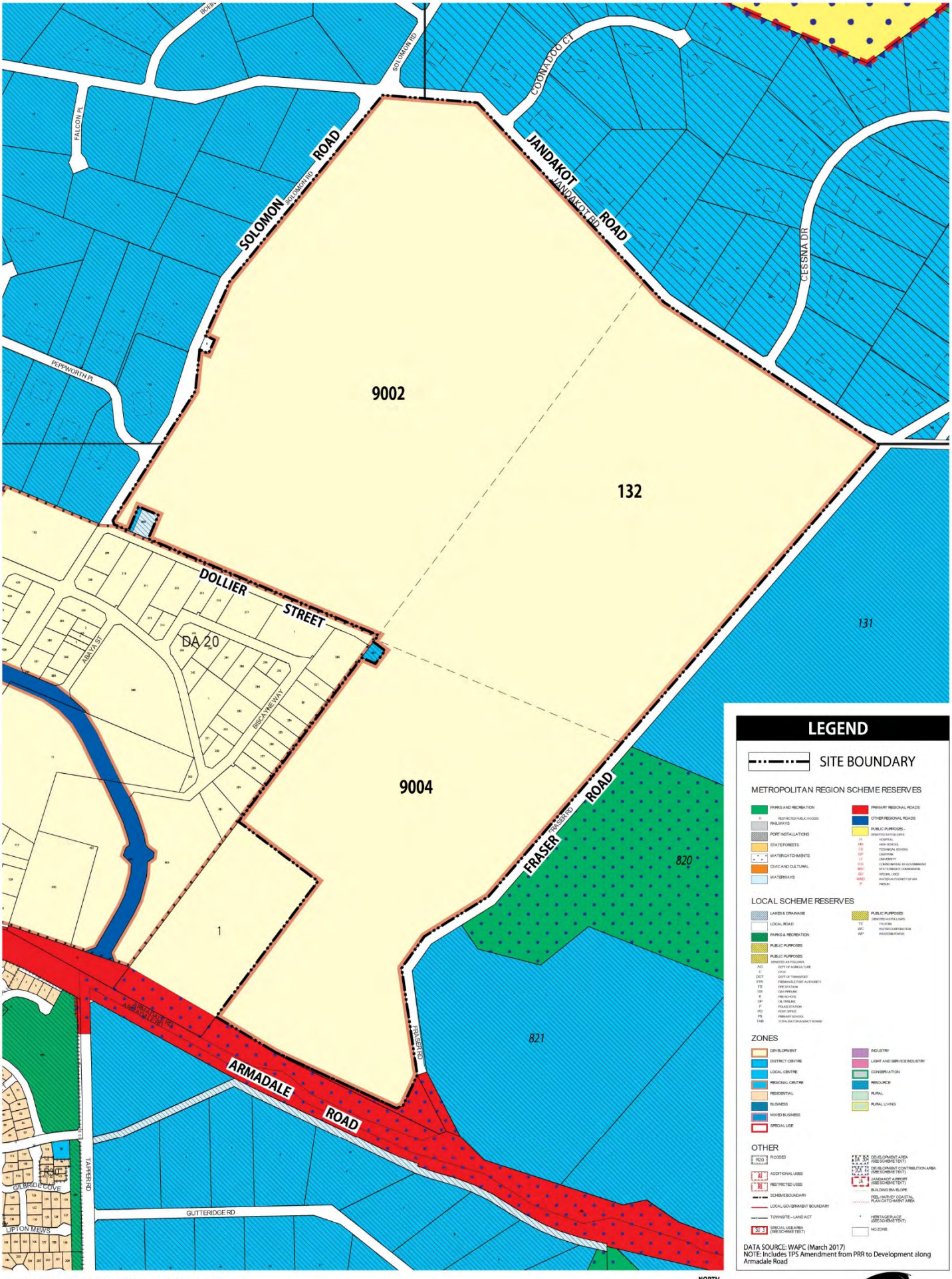
MRS ZONING

Plan 3A

NORTH

0 100 200 300m

Scale: 1:10 000@A4 Date: 17/03/2017 Plan: STOBJ-5-010E



CITY OF COCKBURN

Town Planning Scheme No. 3

Plan 3B

Scale: 1:10 000@A4 Date: 17/03/2017 Plan: STOBJ-5-028C

2.2.2 WAPC Outer Metropolitan Perth and Peel, Sub-Regional Strategy

The *Outer Metropolitan Perth and Peel, Sub-Regional Strategy* (OMSRS) provides a framework for delivering the objectives of *Directions 2031*. The document provides a more detailed analysis in terms of strategic plans of action, stakeholder responsibilities and timeframes for delivery of development within the metropolitan corridors.

Situated within the South-West sub-region, the Structure Plan area is identified as an 'Urban Expansion Area 2011 - 2015' site.

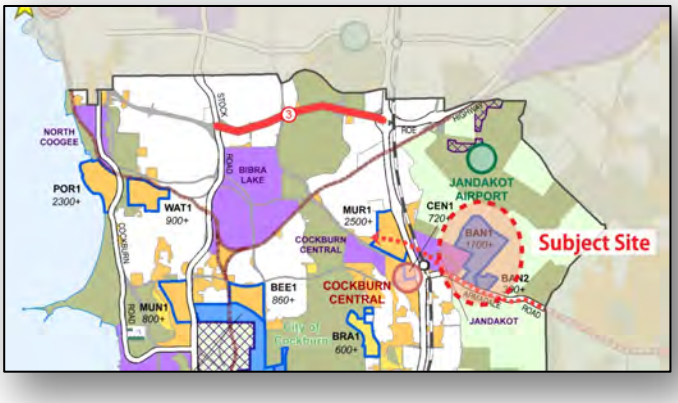


Figure 1: Map Extract of WAPC's *Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy*

Referenced as 'BAN1' in the South-West sub-region spatial framework map, the total site is projected to yield approximately 1,700+ dwellings, based on a 'Connected City' development model of 15 dwellings per gross urban zoned hectare; or 1,100+ dwellings based on a 'business as usual' scenario of 10 dwellings per gross urban zoned hectare.

The strategy acknowledges that *Liveable Neighbourhoods* states that approximately 65 per cent of land is generally available for residential development. Notwithstanding this, the OMSRS increased the land available for residential development to 75 per cent to compensate for variance in scale.

While this assumption is considered to be a conservative approach by the WAPC, it is acknowledged that the site has several environmental conservation considerations, namely retention of areas of good quality remnant native bushland, which would not have been considered in this strategic document. Notwithstanding, dwelling yields are consistent with Directions 2031 projections as identified later in this report.

2.2.3 Development Control Policy 1.6 – Planning to Support Transit Use and Transit-Oriented Development

The location of the Structure Plan area within 1.3 km (minimum) of the Cockburn Activity Centre and Transit Station is considered to be on the extremities of land encompassed by a 'transit oriented precinct' (TOD). The policy requires transit-supportive development patterns (urban form and spatial patterns) to be developed in transit precincts and also requires the development of an appropriate mix of land uses within the precinct to support transit use. Such a mix of land uses include a mix of higher density residential land uses, employment generating land uses, educational facilities and other 'public' land uses. The policy also requires appropriate design of the public domain in transit precincts.

The Structure Plan has been designed to facilitate a residential environment and provides suitable densities that take advantage of its relatively close proximity to the Cockburn Activity Centre and Transit Station.

2.2.4 *Public Transport for Perth in* 2031 (Draft for Consultation – Dept of Transport, July 2011)

The *Draft Public Transport for Perth 2031* is the State Government's vision for improved and expanded public transport in Perth. *Directions 2031* which indicates where people will be living and working, has been used in the preparation of this plan for establishing future travel patterns across the city. This plan identifies the public transport needed to support Perth's growing population and links to and between strategic centres.

Cockburn has been identified within the plan for future rapid transit infrastructure connections to Fremantle and Armadale. The Fremantle - Cockburn Central link via Cockburn Coast is likely to be a future bus rapid transit delivered as part of the Stage Two Projects by 2031. The Cockburn - Armadale link has no timeframe for delivery, however has been earmarked for future rapid transit.

The proposed expansion of public transport to Cockburn Central has been planned with consideration for the imminent residential development of Treeby/Banjup. The proposed residential development is aligned with the vision for public transport in Perth and will maximise the efficiency of proposed future transport infrastructure.

2.2.5 State Planning Policy No. 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning

State Planning Policy 5.4 is designed to protect noise-sensitive development from unreasonable levels of transport noise; by establishing a standardised set of criteria to be used in the assessment of proposals and encourage best-practice design and construction standards for new development. This policy is relevant to the site given it abuts Armadale Road, a 'Primary Regional Roads' Reservation under the MRS. The policy sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development. The objective of this policy is to achieve acceptable indoor noise levels and a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot.

The urban design incorporated in the Structure Plan has been prepared in order to facilitate compliance with SPP 5.4 so that noise levels will not exceed those noise targets prescribed by the policy.

This Policy informs the Structure Plan design, particularly along the Armadale Road boundary to the south and Jandakot Road boundary to the north.

2.2.6 Draft State Planning Policy 5.3 – Land Use Planning in the Vicinity of Jandakot Airport, December 2015

The adopted Structure Plan was assessed under guidance of the October 2011 version of the Draft State Planning Policy 5.3. Subsequent to adoption and subdivision approval for the 'southern' precinct of the Structure Plan area, a December 2015 draft was formally released for public consideration.

This policy has been prepared as a revision to the adopted 2006 and Draft 2011 version of SPP 5.3 and subsequent to the *Jandakot Airport Master Plan (2014).* SPP 5.3 applies to land in the vicinity of Jandakot Airport, which is, or may in the future be affected by aircraft noise associated with the movement of aircraft.

Policy measures explored in SPP 5.3 relate to the following areas in the vicinity of the airport:

- **Core Area** defined by the 20 ANEF (Australian Noise Exposure Forecast) contour; and
- **Frame Area** defined by the area between the 20 ANEF contour and Roe Highway, Ranford Road, Warton Road, Armadale Road and Kwinana Freeway.

Draft SPP 5.3 and the *Jandakot Airport Master Plan (2014)* identifies the entire Structure Plan area is located within the 'Frame Area' of Jandakot Airport, and no portion is located within the 'Core Area' (**Figure 2** refers).

2.2.7 Draft State Planning Policy 2.3 - *Jandakot Groundwater Protection (2014)*

The main purpose of this policy is to ensure development over the Jandakot public groundwater supply mound is compatible with the long term use of the groundwater for human consumption. It aims to prevent land uses that are likely to result in contamination, and protect groundwater quality and quantity.

Under the provisions of this policy and the MRS, the Structure Plan area was recently rezoned from 'Rural-Water Protection' to an 'Urban' zone. The 'Rural-Water Protection' zone boundary correlated with the 'Priority 2' area designated by the Water and Rivers Commission. The Structure Plan area has been reclassified to a 'Priority 3' area. Refer to Section 3.4 of this report for further details regarding the 'Priority 3' designation.

This policy prescribes the permissibility of land uses for land classified as a 'Priority 3' area.

Based on the scientifically supported development for proposed residential purposes, the Structure Plan area can be considered consistent with the objectives of the policy, being:

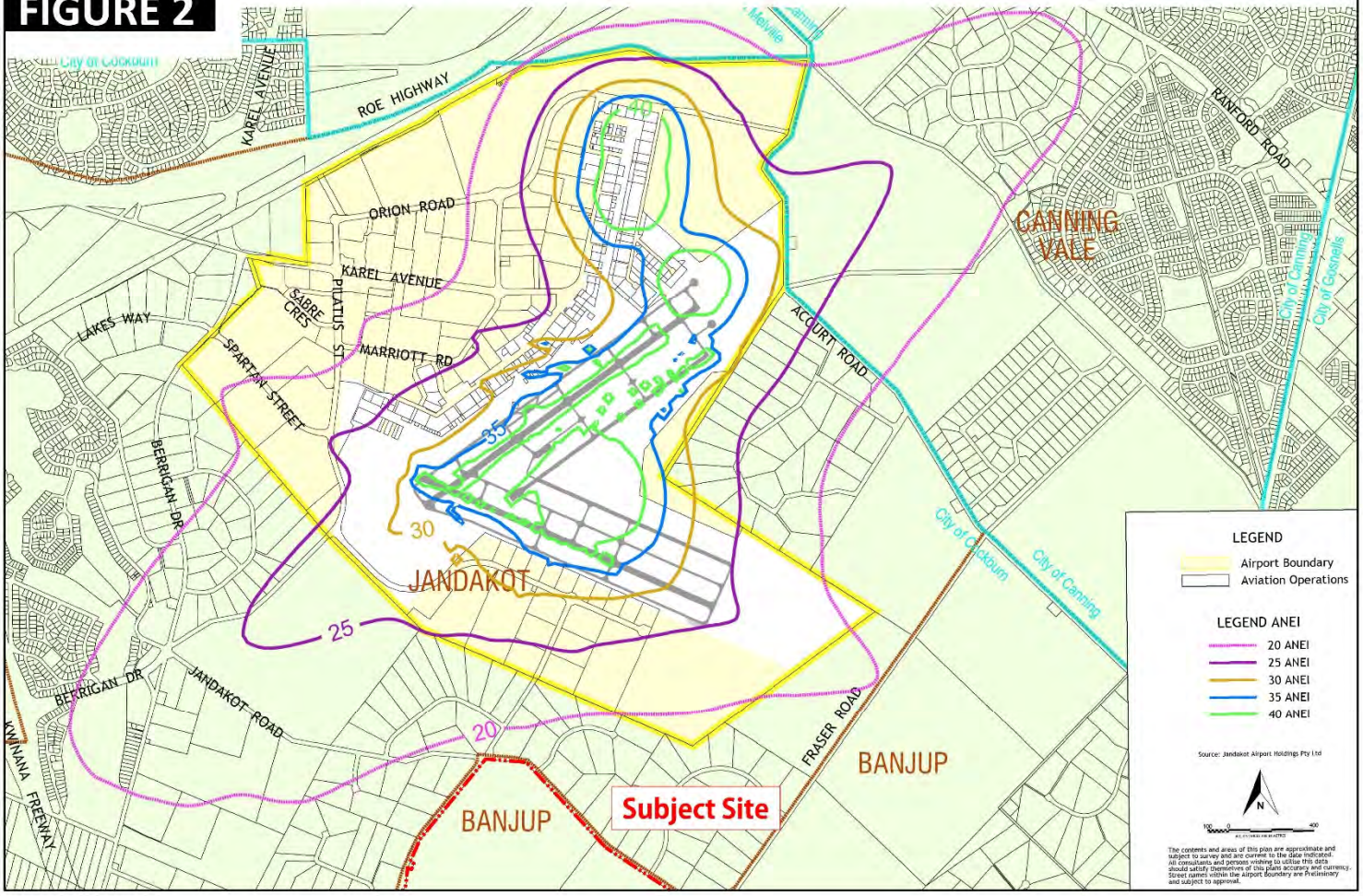
- The Structure Plan is compatible with the protection of groundwater for public supply and maintenance of associated ecosystems;
- The permissibility of proposed land uses is consistent with the policy;
- The Structure Plan will be delivered in a manner that mitigates the risk of contamination of groundwater through nutrient or contaminant export;
- The Structure Plan represents an appropriate balance between environmental and water resource protection and economic viability of the existing land uses; and
- The Structure Plan will maintain the limited remaining natural vegetation cover of importance on the subject land.

The Structure Plan will protect groundwater quality and quantity in the Jandakot Urban Water Pollution Control Area (UWPCA) in order to maintain the ecological integrity of important wetlands hydraulically connected to that groundwater, including wetlands outside the UWPCA.

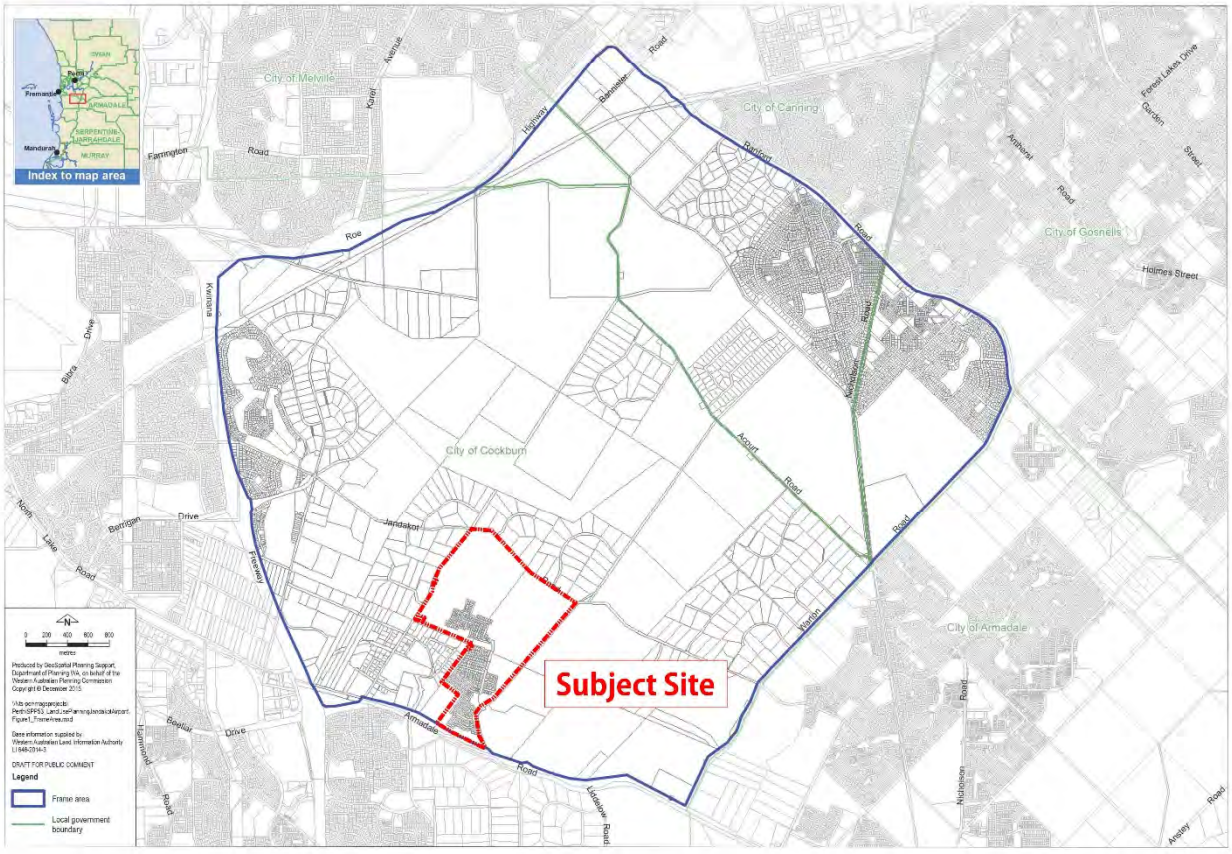
SPP 2.3 informed the rezoning of the land to 'Urban' and will guide future phases of planning, i.e. subdivision, development applications etc.

Jandakot Airport Master Plan 2014 (Core Area 20 ANEF Contour)

FIGURE 2



Draft SPP 5.3 Land Use Planning in the Vicinity of Jandakot Airport, December 2015 (Frame Area)



2.2.8 Planning for Bushfire Protection Guidelines; edition 2, May 2010

Planning for Bushfire Protection Guidelines, edition 2, May 2010 published by the WAPC and the Fire and Emergency Services Authority is to ensure that bush fire hazards are considered in planning decisions at all stages of the planning process; to avoid increased fire risk to life and property. The Structure Plan area's historical land use as a sand quarry has rendered large portions of the site cleared of original vegetation. However some areas of remnant vegetation to the north, north-west and east including part of the power line easement have been retained through the Structure Plan design. In addition, the Structure Plan abuts a *Bush Forever* site to the east. Given the extent of vegetation on and adjacent to the Structure Plan area, planning for bushfire protection requires consideration during the Structure Plan and subdivision phases of the development.

Consideration of bushfire management at the Structure Plan level includes identifying potential bushfire hazards and providing adequate separation from these areas through Structure Plan design. In addition, the Structure Plan provides a framework for more detailed assessment to be undertaken at the subdivision phase, including preparation of Local Development Plans, which will detail any required fire mitigation strategies, as well as appropriate landscaping and interface treatment of the zone between the bushland and residential development.

A Fire Management Plan informs the Structure Plan design, particularly along the western, northern and eastern perimeters of the site, where areas of remnant bushland are to be retained. The Fire Management Plan is referenced under **Part 3 – Appendix 2** of the Structure Plan report.

The Planning for Bush Fire Protection Guidelines (WAPC 2010) have now been reviewed and a new draft *State Planning Policy 3.7: Planning for Bushfire Risk Management* (SPP 3.7) has been prepared.

A Revised *Planning for Bushfire Risk Management Guidelines* have also been prepared and are designed to supplement the objectives and policy measures established in SPP 3.7, to assist in their interpretation and provide advice on how bushfire risk is to be addressed when designing or assessing a proposal within a bushfire-prone area. Once finalised, the revised Guidelines will supersede the current Guidelines.

In addition, the draft Planning and Development (Bushfire Risk Management) Regulations 2014 have been prepared. These instruments apply to different stages of the planning process but work together to achieve the objective of reducing the impact of bushfire damage on lives and property.

The documents have been advertised for public comment however are still currently being reviewed and appropriate amendments to the documents being considered.

The Structure Plan and subsequent Fire Management Plan has been prepared in accordance with the adopted *Planning for Bushfire Protection Guidelines, edition 2, May 2010*

2.2.9 State Sustainability Strategy

The proposal is consistent with the guiding principles and priorities for action outlined in the *State Sustainability Strategy*.

The Structure Plan aims to achieve simultaneous environmental, social and economic improvements. It assists in managing urban growth by revitalising an under-utilised and degraded infill site, provides future residents with ready access to services, employment and recreational opportunities, and promotes an urban form which will engender a strong sense of community. Importantly, the Structure Plan also increases the catchment around the Cockburn Central transit station and Secondary Activity Centre.

2.2.10 Liveable Neighbourhoods

Liveable Neighbourhoods is an operational policy, adopted by the WAPC to guide the design and assessment of urban development. It applies to structure planning and subdivision for Greenfield development sites, and therefore applies to this Structure Plan.

The Structure Plan is consistent with Liveable Neighbourhoods and responds to the key objectives as outlined in **Table 2** over page.

2.3 Relevant Local Planning Strategies and Policies

2.3.1 Local Commercial and Activity Centre Strategy (2012)

The City of Cockburn's *Local Commercial and Activity Centres Strategy* (LCACS) implements the new direction for the planning of activity centres in Perth and Peel, set by the refreshed policy context outlined in *Directions 2031 and beyond* and *State Planning Policy No. 4.2 – Activity Centres for Perth and Peel*.

The Strategy is not a traditional Local Commercial Strategy, as it now provides a shift towards evidence and performance based planning and with a focus on commercial, industrial and specialised centres; this being a shift away from a commercial focus and retail floor space caps.

The Strategy nominates a 'Local Centre' (retail hierarchy) within the Structure Plan area and provides specific requirements as part of the Structure Plan and future development stages. The Structure Plan has been designed to facilitate the creation of a lower order 'Neighbourhood' Activity Centre' and ancillary development central to the subject site, and satisfies the specific requirements detailed in the LCACS.

2.3.2 Relevant Council Policies

Table 3 addresses the Council Policies that inform the Structure Plan design and will also be considered as part of future subdivision stages of development.

2.3.3 City of Cockburn – Relevant Structure Planning

The City of Cockburn has adopted a Structure Plan for the *Solomon Road Development Area* located immediately to the west of the Structure Plan area. The Structure Plan provides guidance for mixed business and light and service industry type development; with a large portion of the site already developed for such purposes.

Also depicted is the proposal to extend North Lake Road eastward over the Kwinana Freeway into Treeby/Banjup and ultimately linking to Armadale Road; this strategic road design subject to Main Roads WA and City of Cockburn review. This intersection will not directly affect the Banjup Quarry Structure Plan area.

Structure Planning will ultimately be required for Lot 1 Armadale Road, adjacent the south-west boundary of the Banjup Quarry Structure Plan. Structure Planning over this area will need to thoughtfully consider the ultimate land use, suitable interface and access arrangements with the adjoining developments that are already subject to approved Structure Plans and subdivision designs.

Connectivity to the Banjup Quarry Structure Plan area is illustrated in the Structure Plan (**Plan 1**) and Master Plan (**Plan 6**) drawings; this including potentially three road connections into Lot 1. The suggested road connections include two connections along the eastern boundary and the third along the northern boundary of Lot 1.

The primary connection runs parallel to Armadale Road and is accessed via the Fraser and Armadale Road intersection. It is noted, the second connection along the eastern boundary of Lot 1 can be removed if it can be demonstrated to the satisfaction of the WAPC that an appropriate vehicular access point from 'Parent Lot' Lot 9004 to Lot 1 is provided.

The intensity of industrial and/or residential development and associated traffic would therefore need to be carefully considered by the Lot 1 proprietor and City during their respective Structure Plan phase, particularly if access through the Banjup Quarry Structure Plan be the preferred access option.

An MRS rezoning request for the Department of Housing landholding at Lot 821 was considered by Council in 2013 and is currently awaiting response from the WAPC.

Notwithstanding the above, the future development of this lot will ultimately tie in with the three-leg roundabout design at the intersection of Fraser Road and Clementine Boulevard and utilise the signalised intersection of Armadale and Fraser Roads.

Table 2 – Liveable Neighbourhood Objectives

Liveable Neighbourhood Objective	Proposed Design Response
Element 1 – Community Design	
To develop a coherent urban system of compact walkable neighbourhoods which cluster to form towns with relatively intense, mixed –use town centres that are capable of catalysing a broad range of employment and social opportunities.	The Structure Plan provides for an urban structure which enables distinct precincts to be developed; each with its own character and sense of place, and highly connected by a comprehensive road, pedestrian and cycle path network, with emphasis on connection with key community nodes within and external to the Structure Plan.
To ensure a site responsive approach to urban development that supports and enhances the context in which it is located, strengthens local character and identity, integrates with its context and promotes a sense of community.	A comprehensive site and contextual analysis has been undertaken in preparation of this Structure Plan. This analysis identified opportunities to enhance local character and deliver a site responsive development. Four key themes were derived from this analysis and specifically informed the design of the Structure Plan, these being; sustainability; transit oriented design; streetscape and place making.
To provide a movement network which has a highly-interconnected street network that clearly distinguishes between arterial routes and local streets, establishes good internal and external access for residents, maximises safety, encourages walking and cycling, supports public transport and minimises the impact of through traffic.	The proposed movement network is based on the recommendations and concepts of a comprehensive Traffic and Transport Management Strategy prepared by traffic consultants. The proposed internal road network ensures permeability and efficient traffic distribution throughout the Structure Plan area. A clearly defined road hierarchy is established, with interconnected streets to provide ease of traffic movements both internally and externally from the Structure Plan area.
To provide a network of well distributed parks and recreation areas that offer a variety of safe, appropriate and attractive public open spaces.	The Structure Plan proposes a total of 12 areas of 'green space', distributed and designed so as to create local 'precinct' amenity and identity. A diverse range of POS types are provided to respond to the needs of residents, and retention of remnant vegetation areas as a key objective.
Element 2 – Movement Network	
To provide a managed network of streets with clear physical distinctions between arterial routes and local streets based on function, legibility, convenience, traffic volume, vehicle speed, public safety and amenity.	The Structure Plan proposes a highly permeable road network, with interconnected streets to ensure ease of traffic movements. The road hierarchy is comprised of the following: • *Neighbourhood Connector A* roads which form the primary connector roads within the Structure Plan area; • *Access Street B - D* design for all local roads within the Structure Plan area, incorporating varying verge widths depending on the urban setting; and • *Laneways* with a 6m trafficable pavement to serve the high density residential development.
To provide safe, convenient and legible pedestrian and cycle movement networks, to provide excellent accessibility between residents and safe and efficient access to points of attraction in and beyond the development.	The proposed network of paths will provide an excellent level of accessibility and permeability for pedestrian and cyclist movement. Nominated streets within the Structure Plan area will provide pedestrian 'green links' and/or prioritise pedestrian movements, enroute to the community nodes.
To provide attractive streetscapes which reinforce the functions of a street as important and valuable public places that add value to the amenity of adjacent housing and developments.	Streetscape design is a key consideration in the Structure Plan. It performs a significant role in establishing the character and identity of each Precinct within the Estate. A variety of streetscapes are proposed to clearly define the road hierarchy, reinforce the character of the street and surrounding residential development, and provide for a distinctly unique experience for visitors and residents alike.

Element 3 – Lot Layout	
To provide a range of residential lot sizes to suit the variety of welling and household types in Western Australia with area and dimensions that meet user requirements.	A range of residential densities are proposed to encourage diversity in lot product. The range of residential lots sizes will be further developed during subdivision design.
To ensure that urban development lots have a suitable level of amenity, services and access.	A Place Making Strategy was prepared to guide the Structure Plan and ensure the delivery of positive place making outcomes. Significant emphasis is placed on providing a high level of amenity to all lots, this to be achieved through: • Well distributed and accessible public open space network; • Creation of individual precincts with unique identity; • Variety in streetscapes and clearly defined road hierarchy; and • Range of residential densities to provide diversity in built product.
To provide for smaller lots and lots capable of supporting higher density development in and around town and neighbourhood centres and public transport stops, and adjacent to high amenity areas such as parks.	The Structure Plan incorporates basic density criteria to provide a framework for the designation of density codings at subdivision stage. A range of densities are proposed from R25-R80. Medium to high densities are provided in areas of high amenity and in close proximity to the Town Centre.
Element 4 – Public Parkland	
To facilitate provision of the public open space contribution and its development as part of the subdivision process and to enhance local amenity.	Whilst providing 27.82ha of "green Space' the Structure Plan includes ~13.51ha of Public Open Space contribution, representing a surplus of ~1.28ha to the 10% requirement. The Structure Plan nominates the location and approximate size of Public Open Space areas to be created at subdivision stage.
Element 5 – Urban Water Management	
To integrate appropriate water management measures in an efficient urban structure and range of parkland types.	A total water cycle management approach has been developed for the Structure Plan area, based on detailed site-specific investigations, industry best practice and City of Cockburn policy requirements. Drainage retention basins are integrated, in nominated locations, within Local Passive Public Open Space.
Element 6 – Utilities	
To provide new urban lots with adequate services including sewerage, water, fire fighting equipment and services, electricity, gas, street lighting and communication services in a timely, cost-effective, coordinated, efficient and aesthetically appropriate manner that supports sustainable development practices.	A Servicing Report prepared by the consultant engineer demonstrates that the Structure Plan area can be adequately provided with all servicing infrastructure.
Element 7 – Activity Centres and Employment	
That new residential areas are provided with sufficient and appropriately located land for activity centres and other employment and business needs.	The Structure Plan proposes a Town Centre (i.e. lower order Neighbourhood Activity centre with a 'Local Centre' Scheme zoning) in a location which offers a large walkable catchment. The Town Centre will incorporate a mix of different land uses to contribute to the diversity and viability of the centre.
Element 8 – Schools	
To set aside adequate and appropriate government and non-government school sites to accommodate the education needs of existing and future communities.	The projected yield of the Structure Plan area being in the order of 2,350+ dwellings warrants the provision of a public Primary School. A co-located school site of approximately 3.5ha is provided in a location with a walkable catchment that extends across the northern half of the Structure Plan area.
To enable school sites to be located and designed to promote safe walk ability, cycling and access by public transport consistent with the requirements of this element.	The proposed Primary School is co-located with an active recreational park and forms the eastern 'wing' of the proposed 'Local Centre'. The Primary School is located along the primary *Neighbourhood Connector A* road, which incorporates a Dual Use Path to ensure a safe and efficient walking environment.

Table 3 – Council Policies

Council Policies	Design Response
LPP 5.1 **Public Open Space**	This Policy has informed the design and provision of Public Open Space within the Structure Plan area. The Structure Plan envisages a Public Open Space contribution of ~ 13.51ha, exclusive of land considered unacceptable for POS contribution in the Policy. This Policy has also specifically informed the co-location of Public Open Space with the proposed Primary School site.
LPP 5.12 **Subdivision Retaining Walls**	The provisions of this Policy will guide future subdivision design and enable a site responsive layout which minimises retaining walls where possible. Construction of retaining walls outlined in the Policy will be considered as part of future development.
LPP 1.4 **Aged or Dependent Persons Dwellings**	The Structure Plan tentatively nominates a Retirement Living Village within the Structure Plan area. The location and design of the potential Retirement Living Village is in accordance with this Policy, namely; • The site is within 800m of the 'Local Centre'; • Sufficient site area can be provided to accommodate a minimum of 5 dwellings; and • The site can be appropriately integrated into the surrounding development. Consideration for the detailed requirements of this Policy will be provided at detailed Development Application stage.
LPP 5.2 **Incorporating Natural Areas in Public Open Space and/or Drainage Areas**	The Structure Plan has been designed to retain a significant proportion of remnant vegetation in Public Open Space. In accordance with this Policy, these Public Open Space areas have been designed to provide practical use without compromising the integrity of the remnant vegetation. A Vegetation Management Plan will be prepared, as a condition of subdivision approval to ensure the management of the retained vegetation is consistent with the City's requirements.
LPP 5.3 **Control Measures for Protecting Water Resources in Receiving Environments**	A Local Water Management Strategy has been prepared which details how the water management objectives of this Policy will be achieved for the Structure Plan area.
LPP 2.2 **Subdivision in Jandakot and Banjup North of Armadale Road**	Notwithstanding the Structure Plan area is not identified within a specific Precinct under this Policy, the generic principles have been used to guide Structure Plan design, namely: • Provide a permeable and logical road layout; • Identification of environmental features worthy of retention; and • Maintain and enhance high level of visual and landscape qualities. Further consideration of the policy principles will also be required at subdivision stage.
LPP 5.15 **Access Street – Road Reserve and Pavement Standards**	This Policy identifies provisions, in addition to Element 2 of Liveable Neighbourhoods, which aim to ensure an optimal movement network in terms of its design, amenity and ability to support intended traffic. The design of the proposed movement network has been based on the provisions of this Policy and the recommendations of a Traffic and Transport Management Strategy.
LPP 5.5 **Local Development Plans**	The Structure Plan identifies the types of development which will require the preparation of a Local Development Plan (LDP), and outlines some general provisions required to be addressed. The provisions of this Policy will guide the future preparation of LDPs for the Structure Plan area.
LPP 5.11 **Filling of Land**	This Policy details the procedure for Engineering certification of filled sites. Approval of future subdivisions within the Structure Plan area will be subject to the conditions outlined in this Policy.

LPP 5.4 **Location of High Voltage Overhead Power Lines**	In accordance with this Policy, advice from Western Power and the Department of Health was sought and used to guide the preparation of the Structure Plan.
LPP 1.2 **Residential Design Guidelines**	The provisions contained within this Policy articulate the City's specific expectations of landowner's/applicants in meeting the criteria of the Residential Design Codes. This Policy will be considered in all future residential Development Applicants within the Structure Plan area.
SEW4 **Bushland Conservation Policy**	Following a comprehensive Environment Assessment, the Structure Plan has been designed to conserve a significant proportion of remnant vegetation in Public Open Space. In accordance with this Policy, these Public Open Space areas have been designed to provide practical use without compromising the integrity of the remnant vegetation. A Vegetation Management Plan will be prepared, as a condition of subdivision approval to ensure the management of the retained vegetation is consistent with the City's requirements.
SPD2 **Community Facilities Infrastructure 10 Year Forward Plan**	This Policy seeks to make developers aware of the likely requirement for the provision of community infrastructure. In accordance with this Policy, the Structure Plan makes provision for co-location of a 'community purposes' site with the proposed Primary School, to serve the needs of future residents. It also acknowledges a contribution will be required towards community infrastructure items in accordance with the City's Development Contributions Plan No.13.
SEW5 **Native Fauna Protection Policy**	The provisions of this Policy have been used to guide the design and location of Public Open Space areas across the Structure Plan area to allow for the retention of some areas of mature trees. A Vegetation Management Plan will be prepared as a condition of subdivision approval to ensure any fauna habitat across the site is appropriately managed.
SEW6 **Wetland Conservation Policy**	The objectives contained within this Policy have specifically informed the design of the Structure Plan. The small portion of Resource Enhancement Wetland extending into the Structure Plan area, has been integrated into Public Open Space to ensure future development does not adversely impact the integrity of this wetland area.
PSPD7 **Jandakot Airport**	The Structure Plan acknowledges the requirements of this Policy, for development in the vicinity of Jandakot Airport, specifically the obligation to place a Notification on Title for certain lots impacted by aircraft noise.

3 Site Analysis

3.1 Topography and Landform

The original natural topography of the Structure Plan area is described as gradually undulating, with a maximum AHD level of 50 metres located in the centre. The Structure Plan area has however been extensively excavated as part of a previous sand quarry operation, thus the natural landform has been significantly altered. Natural ground levels remain around the perimeter of the Structure Plan area adjacent to Solomon, Jandakot, Fraser and Armadale Roads, with the remaining bulk of the site being excavated to RL 30m AHD, forming a flat expanse of sand plain. **Plan 4** illustrates the site area and existing contours prior to recent subdivision development.

3.2 Soils & Geotechnical

The Structure Plan area, forming part of the Swan Coastal Plain, is located on the alluvial plain which has developed west of the Darling Scarp. The Geological Survey of Western Australia (1978) mapped the Structure Plan area as predominantly 'Bassendean Sand', which can be described as white and grey quartz sand plain with low dunes and occasional swamps, iron or humus podzols and areas of complex steep dunes. It is moderately sorted and fine to medium grained sand (Churchwood and McArthur, 1978). This was confirmed during a site inspection undertaken in April 2010.

3.3 Acid Sulphate Soils

Acid Sulfate Soil (ASS) risk mapping compiled by the Department of Environment and Conservation indicates that the entire Structure Plan area has been classified as having a 'moderate to low risk' of ASS occurring within 3m of natural soil surface or deeper.

3.4 Groundwater & Surface Water

The Structure Plan is located at the northern end of the *Jandakot Underground Water Pollution Control Area* (UWPCA). The land was originally defined as a 'Priority 2 (P2)' area in 1996; such areas defined by the Department of Water to minimise water quality contamination threats.

As part of the MRS amendment to 'Urban' over the Structure Plan area it was determined by the relevant authorities that significant changes had occurred to the land and water factors since 1996 when the P2 area was defined. Accordingly the Structure Plan area was reclassified to a 'Priority 3 (P3)' area to reflect the current land and water circumstances.

Priority 3 (P3) generally includes areas where water-supply needs to co-exist with other land uses such as housing, commercial sites and light industry. Management controls, rather than land use restrictions dominate the water management and protection policy for these areas. The areas are defined to minimise the risk of pollution to the water source.

In addition, a Wellhead Protection Zone (WPZ) of 300 metre radius exists for the Water Corporation bore J380, located on the western boundary of the Structure Plan area adjacent to Solomon Road reserve (refer **Plan 1**). The WPZ for Water Corporation bore J370 located in Atwell also extends to a minor extent over the south-west of Lot 1 Armadale Rd, thus outside the Structure Plan boundary.

To protect the water resource in the WPZ, potential contamination sources need to be minimised. For this reason, bioretention and infiltration areas will be lined, and road drainage systems will be sealed (rather than leaky pits) so there will be no concentrated infiltration zones. There will still be at-source infiltration, through pervious areas such as verges and domestic gardens but these pose far less risk than road runoff. Further, to prevent impacts on the water level at the wellhead, there is no extraction of groundwater such as for parkland watering permitted within the WPZ.

3.4.1 Groundwater

Across the Structure Plan area (at completion of the sand quarrying) there is an existing minimum of 2 metres depth to maximum groundwater levels, in accordance with the Environmental Protection Authority conditions of approval to the sand quarrying works.

3.4.2 Surface Water

The Structure Plan area is located on a surface geology of highly transmissive sands which does not generate surface water runoff. This is a contributing element to the existence of the Jandakot Groundwater Mound.

3.4.3 Monitoring

During construction and for 3 years post construction, the developer will undertake the following monitoring:

- Groundwater levels and insitu water quality (EC, TDS, Temp, pH, DO, Redox) will be conducted on a monthly basis for all production and monitoring bores.
- Laboratory analysis will be conducted on a quarterly basis (TN, TKN, NOx, NH3, TP, RP), with certain bores relating to the WPZ being conducted on a monthly basis.

- A drinking water quality suite (including metals) will also be conducted annually, in September, on all monitoring and production bores.
- Where the production bore is required for monitoring, no pumping will be conducted within 24 hours prior to sampling, especially to obtain the static water level.

Contingency actions for adverse impacts have been determined and are listed in the Basic Operating Strategy as submitted to the DoW. In the first instance the initial response will be to retest a sample and notify the Department of the breach. Further contingency measures depend upon the nature of the breach.

After the post-construction phase, the City will undertake monitoring and contingency according to it's usual practices. Monitoring of District level (WIN) bores will continue to be undertaken by the DoW, including monthly water level monitoring.

3.5 Environmental Assets and Constraints

Outside of the groundwater protection issues, the main environmental issues associated with the Structure Plan relate to flora and fauna and are summarised in the sections below.

While the Structure Plan area's historical use as a sand quarry has resulted in the clearing of the vast majority of the original vegetation, peripheral areas of remnant vegetation and revegetated portions required a botanical survey.

RPS undertook a targeted habitat survey in May 2010, and in October 2014 a Level 1 Flora and Vegetation Survey was undertaken which included a targeted search for *Caladenia huegelii* (orchid) individuals. As part of the earlier work, the Structure Plan area was mapped for remnant vegetation (RPS, 2010) and was subsequently updated in 2015 to reflect the modified Structure Plan (**Appendix 1** refers).

As a result of the Structure Plan area's previous use as a sand quarry, the majority is free of native vegetation and consequently identified as being *Degraded to Completely Degraded* with exotic naturalised grasses and Rye Grass (*Secale cereale*) spread throughout the Structure Plan area.

There are some small areas of remnant vegetation, including Banksia Woodland. Four vegetation units were mapped for the remnant vegetation on the periphery of the Structure Plan area (RPS, 2015).

3.5.1 Remnant Vegetation & Rehabilitation Works

The remnant vegetation extents and rehabilitation plantings include:

- Banksia Woodland;
- Melaleuca Dampland;
- Eucalyptus rudis/Melaleuca Dampland; and
- Rehabilitation works and natural revegetation.

The Declared Rare Flora species *Caladenia hueglii,* listed under subsection (2) of Section 23F of the Western Australian *Wildlife Conservation Act 1950* and *the Environment Protection and Biodiversity Conservation Act 1999*, was found in the adjacent Bush Forever Site 309 ('Fraser Road Bushland'), Treeby and within the bushland along the eastern periphery of the Structure Plan area.

The narrow band of remnant Banksia Woodland along the north eastern boundary of the Structure Plan area also presents suitable habitat for the orchid.

Appendix 1 of the RPS report indicates that there are two *Caladenia hueglii* populations within the 'northern precinct' that will be impacted by development.

Informed by the outcomes of the modified Structure Plan, a *Caladenia hueglii* Translocation and Habitat Rehabilitation Plan is required to be approved by DPaW to facilitate the permit to take application for two populations of the orchid.

The current approved Vegetation Management Plan will also need to be updated to respond to the outcomes of the *Caladenia hueglii* Translocation and Habitate Rehabiliation Plan as informed by the modified Structure Plan. The updated Vegetation Management Plan will be subject to approval by the City of Cockburn as part of subdivision conditions.

Site Periphery Bushland – Solomon Road Area

SITE PLAN & ORTHOPHOTO

Plan 4

NORTH

0 100 200 300m

Scale: 1:10 000@A4 Date: 20/03/2017 Plan: STOBJ-5-003B

3.5.2 Fauna

RPS undertook a targeted habitat survey for two *Environment Protection and Biodiversity Conservation Act 1999* protected species, the Carnaby's Black Cockatoo and Graceful Sun Moth and in May 2010; albeit recognising the latter was removed as a protected species post adoption of the 2013 Structure Plan.

3.5.2.1 CARNABY'S BLACK COCKATOO

The survey found that the confined area of remnant vegetation remaining on Structure Plan area (particularly on the eastern side) has some limited fauna habitat value as it includes Banksia trees which form part of Carnaby's Cockatoo natural foraging habitat. However, no Carnaby's Black Cockatoo or evidence of nesting or foraging was noted in the Structure Plan area during the survey.

3.6 Heritage

Ethnosciences was commissioned to conduct a desktop survey of the Aboriginal heritage values of the Structure Plan area. The desktop survey involved an examination of the Register of Aboriginal Sites and a review of other published and non-published materials. The full report by Ethnosciences is included under **Appendix 1**.

The desktop research found two Aboriginal heritage site listings, as shown on the AHIS, overlapping with the Structure Plan area.

The first site (Site ID 3300) is an artefact scatter located in the area near the intersection of Armadale Road and North Lake Road.

The second site (Site ID 4108) was recorded as an artefact scatter immediately west of Fraser Road near the intersection with Armadale Road. Consultant Anthropologist Ryan O'Connor was commissioned to undertake an Archaeological Field Assessment of this site (**Appendix 1a** refers).

As part of 2014 works undertaken for the signalled intersection of Armadale and Fraser Roads, Stockland first sought clarification on Aboriginal Heritage Place 4108.

On 24th January 2014, the Government of Western Australia (Department of Aboriginal Affairs) provided written advice stating the place originally recorded as DAA 4108 (Ready Mix Sandpit 1) has been impacted, and subject to salvage, to the point where it could not be considered as a place to which section 5 of the Aboriginal Heritage Act 1972 (AHA) applies. As such no offence would be committed under Section 17 of the AHA when conducting works which will impact on DAA 4108 (**Appendix 1a** refers).

Prior to its use as a sand quarry the Structure Plan area comprised natural vegetation dominated by Banksia Woodland. There is no known history of any use of the land or construction of buildings which have any European heritage values and this is consistent with the awarding of appropriate government approvals for sand extraction to proceed.

At the present time the only physical structures located in the Structure Plan area comprise the high voltage transmission lines, which would remain in place after urban development, and a small brick building in derelict condition which was part of the sand mining operation, and has no heritage value.

There are no known European ethnographic or archaeological sites or values associated with the Structure Plan area.

4 Context Analysis

A Regional Context Plan is included below as **Plan 5**, providing illustration of the following section.

4.1 Local Context

This cleared former sand quarry provides a significant opportunity to showcase sustainable urban infill within 20km of Perth capitalising upon and contributing towards the improved economic utilisation of existing nearby major infrastructure and services including:

- Cockburn Central Secondary Activity Centre incorporating retail, community, social and cultural infrastructure;
- Cockburn Central Transit Station;
- Kwinana Freeway and Armadale Road (being Regional Roads);
- Jandakot Industrial Area (Solomon Road Development Area);
- Jandakot Airport; and
- Secondary Schools in the surrounding residential areas of Atwell and South Lake.

The immediately surrounding land uses are outlined below:

- Due east of the Structure Plan area the land has been previously utilised for sand quarrying activities, however a portion of the remnant vegetation immediately to the east of the Structure Plan area has been included in Bush Forever;
- The existing Midland Brick operation also exists further east along Armadale Road. The subject Treeby landholdings are however located well outside of the generic buffers which apply to brick works;
- 'Special Rural' land uses exist to the north and west of the Structure Plan;
- Mixed business and light industrial and Service and Light Industry land uses exist to the west of the Structure Plan; and
- The Atwell residential community exists to the south west of the Structure Plan.

4.2 Movement Network

4.2.1 Existing Road Network

The Structure Plan area is in close proximity to the Kwinana Freeway and the Perth – Mandurah railway line. The Cockburn Central transit station is only 1.5 kilometres to the west of the site.

Armadale Road is currently 2 lanes wide, constructed to single carriageway standard at this location. This is proposed to increase to 4 lanes (dual carriageway standard) and ultimately 6 lanes (divided standard).

Whilst there is currently no timeframe, upgrading to dual carriageway standard is expected within the next 5 to 10 years and to six lane standard within the next 15 to 20 years. Pursuant to traffic counts provided by Main Roads WA (2013/14), Armadale Road in the vicinity of the Structure Plan carries approximately 21,860 vehicles per day (vpd).

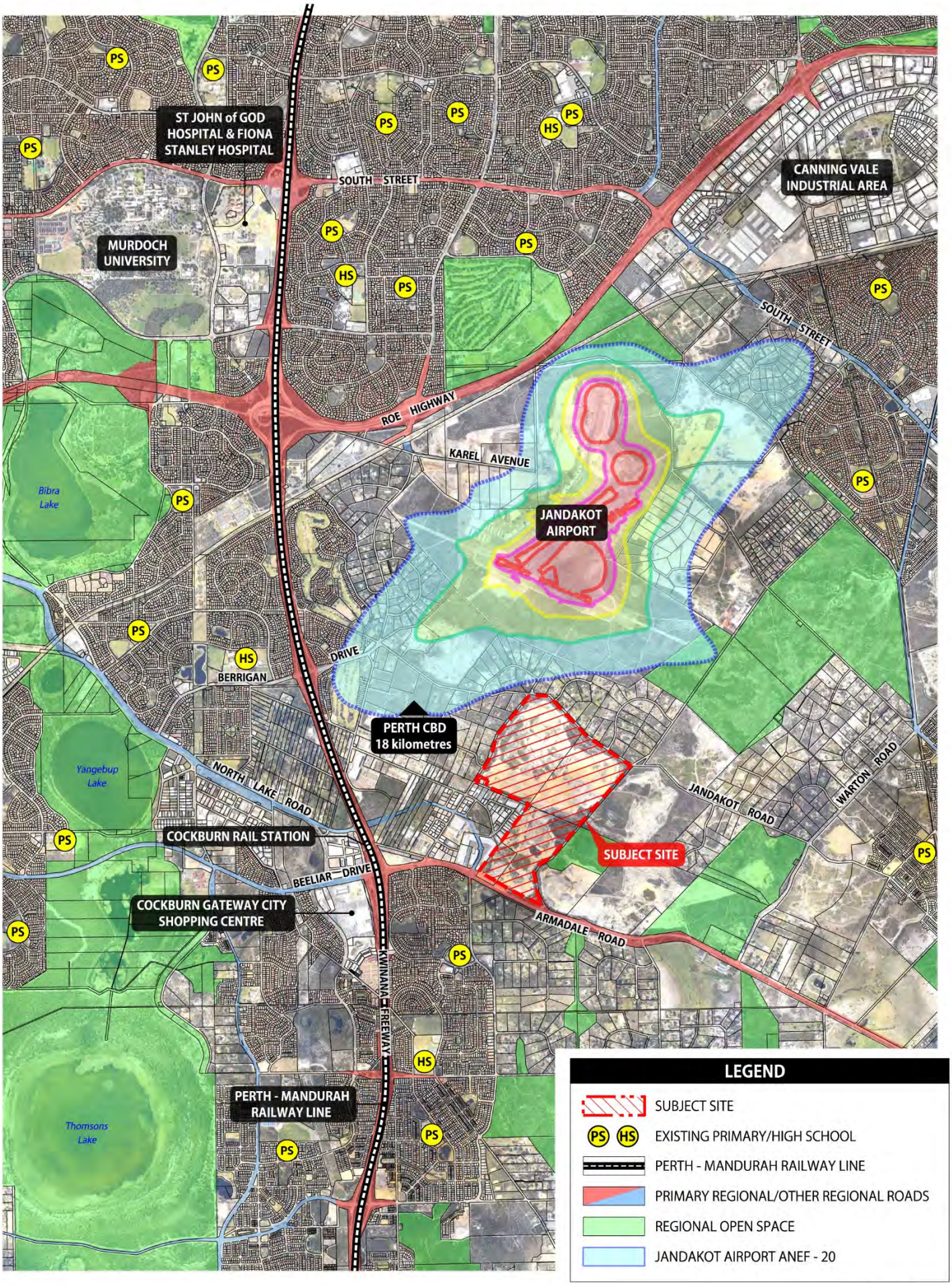
Jandakot Road has a current road reserve of 20 metres, is constructed as a single carriageway standard road and carries about 12,000vpd to the west of Solomon Road and 9,700vpd to the east of Fraser Road (sourced City of Cockburn traffic count, August 2013). Based on traffic generated by the Structure Plan area, as well as strategic planning for Jandakot Airport and North Forrestdale, it is imminent that Jandakot Road will be widened and upgraded to accommodate the future traffic growth in this area.

Main Roads WA in conjunction with the City of Cockburn has currently investigated the options for the extension of North Lake Road over the Kwinana Freeway to Armadale Road. This extension, once resolved and implemented, will provide further indirect access and egress opportunities for the Structure Plan.

The Fraser Road reserve extends between Jandakot and Armadale Roads, albeit is only partly constructed in the southern portion of the Structure Plan area. Safety concerns, regarding the alignment of the original road reserve immediately north of Armadale Road, resulted in the realignment of the Fraser Road on approach to Armadale Road. The road realignment was undertaken in 2014 as part of subdivision works for the southern stages of Stockland's Calleya Estate development (Structure Plan area). This intersection is now signalised and includes turn lanes on Armadale Road and separate left and right lanes on Fraser Road.

The central portion of the Fraser Road Reserve is not intended to service urban development in the short or long term. It is expected that this section of Fraser Road will be rehabilitated with native vegetation to complement the adjoining Bush Forever site.

Dollier Street, a local access road, links the Treeby site to the adjacent Light and Service Industry area to the west. This roadway has the potential to provide increased access opportunities to the Structure Plan area as it is progressively developed.



LEGEND

- SUBJECT SITE
- EXISTING PRIMARY/HIGH SCHOOL
- PERTH - MANDURAH RAILWAY LINE
- PRIMARY REGIONAL/OTHER REGIONAL ROADS
- REGIONAL OPEN SPACE
- JANDAKOT AIRPORT ANEF - 20

REGIONAL CONTEXT PLAN

Plan 5

NORTH

0 0.5 1 1.5km

Scale: 1:50 000@A4 Date: 15/10/2015 Plan: STOBJ-5-004B

4.2.2 Existing Public Transport

The Structure Plan area currently has limited service to public transport, with limited bus services along Armadale Road (Route 518) and no service currently along Jandakot Road. The nearest bus route is to the west of the Structure Plan area, Route 527, which services the Aubin Grove and Atwell areas on the southern side of Armadale Road; or Route 515, terminating at Glen Iris Estate to the north-west.

The Structure Plan area is however within relative walking distance to the Cockburn Central transit station, albeit poor pedestrian linkages currently exist between the Banjup Quarry Structure Plan and this station.

The required upgrade of the existing public transport network to service the Structure Plan area is addressed under Section 5 of this report.

4.2.3 Existing Pedestrian and Cyclist Networks

There are no or limited existing pedestrian or cycling facilities on Armadale Road, Jandakot Road or Solomon Road in the vicinity of the Structure Plan area. The required upgrade of the existing pedestrian and cycle network within and adjacent to the Structure Plan area is addressed under Section 5 of this report.

4.3 Activity & Employment Centres

The Structure Plan area is located approximately 1.5 kilometres to the east of Cockburn Central Activity Centre and Transit Station. *State Planning Policy 4.2 Activity Centres for Perth and Peel* and *Directions 2031* identify Cockburn Central as a Secondary Centre within the activity centre hierarchy.

Cockburn Central is being developed as a transit oriented precinct, incorporating a major bus and train interchange, including Cockburn Central Transit Station on the Perth-Mandurah Railway Line. The Local Centre core is proposed to include a mix of cultural, civic, commercial, entertainment and residential opportunities. The 42 ha precinct is anticipated to ultimately serve a population of more than 200,000 people living and working in the region.

A number of Local Centres also exist in the areas surrounding Treeby/Banjup, however it is expected residents of Calleya Estate will more conveniently utilise the centre proposed within the Structure Plan area.

The Structure Plan area benefits from proximity to a transit station and a strong regional and district road network that includes the Kwinana Freeway, Armadale Road and Beeliar Drive.

This already established road network provides direct connections to regional employment centres in the Perth Central Business District, Kwinana, Rockingham, Fremantle and Mandurah.

Opportunities for local employment will be further encouraged by the development of future industrial and mixed use areas to the north and west of the site.

The Structure Plan area is extremely well located with regard to proximity and accessibility to significant employment nodes, these include:

- Cockburn Central Secondary Activity Centre;
- Jandakot Industrial Area;
- Jandakot Airport Specialised Centre;
- Murdoch University;
- St John of God Hospital and the future Fiona Stanley Hospital in Murdoch;
- Henderson Industrial Area;
- Hamilton Industrial Area;
- Canning Vale Industrial Area; and
- Forrestdale Business Park.

In addition, 'on site' employment opportunities will be provided through the creation of a minor Light and Service industrial land use complementing adjoining development, a proposed lower order Neighbourhood Activity Centre and a proposed Primary School. The earmarked Retirement Living Village will also provide employment opportunities.

4.4 Education

Several educational facilities exist in close proximity to the Structure Plan area. Nearby Public Primary Schools include those in Atwell, Success, Jandakot, South Lake, Bibra Lake and Leeming.

Following discussions with the Department of Education (DoE), a primary school will be provided in the Structure Plan area, with the projected lot yield of ~2,350+ dwellings providing a virtual 'self sufficient' catchment. The size and location of the school has been agreed in principle with the DoE.

A number of established Secondary Schools are within proximity to the site. Lakelands Senior High School lies approximately 3km west of the subject land, and similar distance to the south is Atwell College. A further public Secondary School, Leeming Senior High School is located approximately 5km north of the Structure Plan area and offering advanced education programs.

Several options for private education exist in the locality, including Emmanuel Catholic College, Divine Mercy College, and Mater Christi Catholic Primary School.

Murdoch University and Challenger TAFE are also situated approximately 6km north west of the Structure Plan area offering tertiary education facilities in the local context.

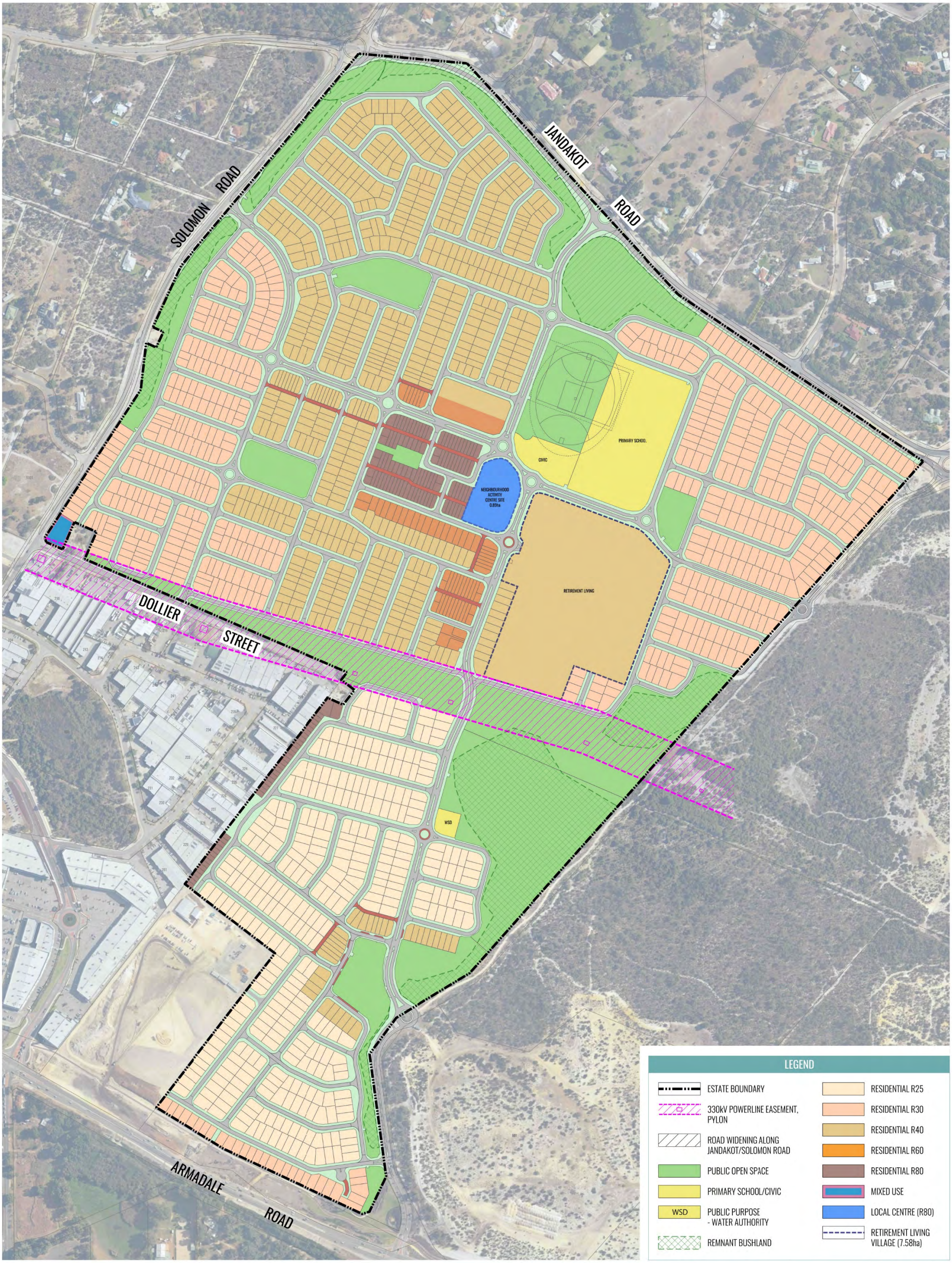
4.5 District and Regional Open Space

The Structure Plan area immediately abuts a large area of bushland to the east protected by its Bush Forever designation, therefore providing a passive recreational option for future residents.

Two District Recreation Centres are located in close proximity to the Structure Plan area, in Leeming to the north and South Lake to the north-west. These will provide residents with a range of sporting and leisure activities.

In addition, the Cockburn Central Local Centre Structure Plan provides for an Environmental and Recreation Precinct to the west of the Local Centre Precinct. The future development of the recreational facilities in Cockburn Central will be easily accessed and provide outstanding facilities for prospective residents, being within 1.6km of the Banjup Quarry Structure Plan area.

Additionally the regional road network offers direct connection to Yangebup Lake, Thomsons Lake and the Cockburn Coast. Future open space areas within the subject site itself will provide a diverse range of recreational areas for the benefit of future residents.



MASTER PLAN

Plan 6

Calleya

Stockland

0 60 120 180m

Scale: 1:6000@A3
Date: 17/04/2020
Plan: STOBJ-6-005i

5 Local Structure Plan

5.1 Development Objectives & Principles

A series of overarching development objectives and principles have been prepared to inform and guide the planning and design of the Structure Plan and were key factors in rationalising the site for *Urban* purposes. The initial four key themes influencing the objectives and principles include as follows and explained thereafter:

- Sustainability
- Transit Oriented Design
- Streetscape & Legibility
- Place Making

5.1.1 Sustainability

Both Stockland and the City of Cockburn are strongly committed to the implementation of sustainability measures in new land developments. To this extent, these two parties in their respective roles as land owner and land developer, and local government authority with responsibility for local planning, environmental management and community development and maintenance, amongst other roles, have collaborated in the preparation of a Sustainability Plan for the Banjup Quarry Structure Plan project (**Appendix 11** refers).

The Sustainability Plan was prepared following a series of workshops with the City of Cockburn and Stockland and specialist consultants in 2011. The workshops evaluated, discussed and agreed upon a schedule of sustainability initiatives. These initiatives are to be embedded into the land development processes associated with the provision of residential and associated supporting infrastructure, and the creation of community life within the Structure Plan area over the full term of its creation and function as a residential community.

The document was prepared to consolidate and provide a balance in expectations between the sustainability objectives of both Stockland's and the City of Cockburn's sustainability platforms. In doing so, the document identified and created 'business as usual' and 'stretch target' sustainability scenarios for the development, with the seven key sustainability principles included as follows:

- Sustainable Planning and Development;
- Sense of Place and Healthy Communities;
- Balanced Economic Growth;
- Environmental Management;
- Efficient Settlement and Use of Resources;
- Management, Accountability, Transparency and Engagement; and
- Community Involvement.

These principles are the overarching elements which are supported by Sustainable Practices and Stockland Sustainable Essentials which outline specific actions and targets. The Plan will continue to be further refined during each development stage of the Calleya project.

5.1.2 Transit Oriented Design

The western portion of the proposed Structure Plan is approximately 1.3km (minimum) to the Cockburn Central Transit Station; or approximately 2km between the transit station and the 'heart' of the Structure Plan area, being the proposed Calleya Estate's Town Centre.

These distances do not portray a conventional 'transit oriented design' development, as defined by Liveable Neighbourhoods; which generally focus on urban development within 400 – 800 metres of a transit station. Notwithstanding the above, Stockland in consultation with the City of Cockburn has committed to provide a subdivision and built form design, and hard infrastructure, that encourages residents to walk/cycle between the two sites.

5.1.3 Streetscape and Legibility

Along with built form (house design), streetscape design performs a significant role in a development's character and identity. The vision for the Banjup Quarry Structure Plan area is to be '*bold, edgy and genuine*'. This may be achieved through a number of design influences, including:

- a permeable road and pedestrian network that provides a legible road hierarchy into and throughout the development;
- offering accessibility of, and connectivity to, Open Space and other community nodes; and
- perceived and constructed setbacks and scale of dwellings to the public realm;
- landscaping design (theme) within the allotments;
- the width of road carriageways to provide a perceived sense of *intimacy* and focus on pedestrian orientated environments;
- verge widths, to enable suitable landscaping and theme that will ultimately establish a unique character and identity for a development, and assist to create comprehensible way-finding routes throughout the development and beyond;
- providing a safe and secure environment through suitable built form and landscape and streetscape design.

These designs factors have guided and are represented in the Structure Plan and subdivision designs, and have ensured the Calleya development provides a distinctly unique experience for visitors and residents alike.

5.1.4 Place Making

Place creation is an important element in the creation of new communities; and it is important to ensure the principles reflect the 'place story' while addressing statutory obligations. The guiding principles for the Structure Plan area have been identified through a Place Making Strategy prepared by Stockland. The Strategy outlines the underlying philosophy for place creation which will guide the development team throughout the life of the Structure Plan area. The principal headings that deliver good place making outcomes and will guide development in the Structure Plan area include:

- Being Regionally Connected;
- Providing a Centrally Focused Community;
- Initiatives in New Urban Planning and Transportation;
- Leading and Site Responsive Built Environment;
- Providing a development with a vibrant Town Centre, and high standards in community amenities and socialisation therefore encouraging community interaction;
- Providing a development that offers a variety of lot and dwelling product that addresses affordability and lifestyle options for a broad demographic base;
- Initiatives in Natural Resource Management; and
- Integrated Cultural and Environmental Heritage.

The development objectives and principles are not restricted to the above themes, however form the basis for sub-themes that are explored in greater detail in the Structure Plan document. These sub-themes include:

5.2 External Design Influences

In preparing the Structure Plan design, a number of external (or abutting) physical constraints needed to be duly considered given their potential impact on the amenity of future Treeby/Banjup residents. These external influences are as follows:

5.2.1 Armadale, Jandakot and Solomon Roads

With the Armadale Road Reserve forming the southern boundary of the Structure Plan area, consideration must be given to the site's interface with this major road, and associated traffic volumes, in order to attenuate noise issues for future residents. To a lesser extent are the traffic noise issues associated with Jandakot and Solomon Roads.

Consultant Lloyd George Acoustics was appointed to prepare an acoustic assessment for the Structure Plan area (**Appendix 6** refers).

This assessment was undertaken in accordance with the WAPC's State Planning Policy 5.4 – *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

The assessment recognised that for development fronting or adjoining Armadale Road:

- modelling indicated that noise levels will exceed the SPP 5.4 Limit criteria at the facades facing Armadale Road.
- Based on predicted noise levels, it is proposed that a combination of noise walls and facade treatments be considered. The height and locations of the noise barriers will be determined in the detailed design phase of the project (i.e. finished ground levels to residential lots).
- The proposed building facade treatments will vary depending on the predicted noise levels with the inclusion of noise barriers; with SPP5.4 'Package A' and 'Package B' construction requirements required dependent upon the extent of noise limits being exceeded.
- Noise received at any first floor would exceed the 'noise limits' and to comply with SPP 5.4. In this case 'Quiet House' design elements would need to be explored.

The interface treatment between residential land uses and external roads will be fully considered during the subdivision phase of development; and is capable of being addressed via, but not limited to, landscaping, separation distances, walling and/or mounding solutions.

5.2.2 Remnant Bushland – Bushfire Management

A revised Fire Management Plan (Strategen, 2015) has been prepared to provide more detailed advice to the Plan prepared by Bushfire Safety Consulting Pty Ltd as part of the 2013 adopted Structure Plan (**Appendix 2** refers). Consistent with the previous report, the revised Fire Management Plan (FMP) demonstrates that the bushfire threat and hazard will be restricted to the remnant vegetation surrounding the perimeter of the site, namely the retained remnant bushland to the west along Solomon Road, north along Jandakot Road and extensive area to the east of Structure Plan, adjacent and inclusive of the Fraser Road Reserve.

The FMP provides an indication of the setback distances required between dwellings and bushfire hazards to achieve the *Bushfire Attack Level (BAL) - 29* or lower, and provided acceptable outcomes as the risk to dwellings will be reduced by increased construction standards in accordance with the Australian standard (AS3959-2009) *Construction of buildings in bushfire prone areas.*

Pursuant to the adopted *Planning for Bushfire Protection Guidelines, edition 2, May 2010*, and to achieve the required BAL's, design measures have been implemented to manage the bushfire risk over the Structure Plan area. A Building Protection Zone (BPZ) of 20 metres has been designated adjacent the abovementioned remnant bushland areas; this BPZ addresses the various vegetation and slope conditions across the site.

The 20 metre BPZ will be achieved by way of an interfacing road network design, landscaping treatment of the remnant bushland fringes, and building setbacks; a combination of all of these design features may be required in some instances.

The bushfire risk associated with adjacent undeveloped land at Lot 1 Armadale Road has been updated based on the detailed assessment of remnant vegetation on this site.

Overall, the Fire Management Plan demonstrates that the bushfire risk over the site can be managed, through dwelling/building setbacks and construction standards as required.

5.2.3 Proximity to Light and Service Industry Areas

Light and Service Industry land uses exist to the west and south-west of the Structure Plan area. Integration with these land uses is an important consideration in planning for the future development of the Structure Plan area; to protect the amenity of future residents, and viability of existing industrial businesses.

The City of Cockburn has noted that within the Light and Service Industry area adjacent to and south of Dollier Street, there are premises which *potentially* generate noise, dust and odour emissions that may be the subject of buffer requirements between the premises and sensitive land uses. Noise modelling undertaken by Lloyd George Acoustics has identified the area affected by industrial noise is restricted to the portion of the Structure Plan area fronting Dollier Street, generally public open space with residential land uses on the northern side.

Guidance as to default buffer distances between Industrial and Sensitive Land Uses has been published by the Environmental Protection Authority in *Guidance for the Assessment of Environmental Factors No.3, June 2005*. This document notes that buffer distances cited in the text for particular industries are not intended to be absolute separation distance, rather they are default values for use in the absence of further detailed evaluation of potential impacts.

Existing industrial premises on the southern side of Dollier Street that required consideration in terms of their potential amenity impact on future residential development included:

5.2.3.1 NOXIOUS CONSIDERATIONS

- *Slake Powder Coating* – 14/30 Dollier Street (powder coating operation): ~80m from the nearest residential cell (north of site) within the Structure Plan area; and
- *Future Foams Pty Ltd* – 8 Biscayne Way (foam mattress manufacturing operation): ~100m from the nearest residential cell (east of site) within the Structure Plan area.

Preliminary inspections by the project's consultant environmentalist RPS were undertaken on

- 16th August 2012;
- 7th June 2013;
- 2nd July 2013; and
- 26th November 2013.

The Slake Powder Coating operation appears particularly innocuous and would not be detrimental to the proposed residential development associated with the Structure Plan area.

The Future Foam operation houses Hazardous Material as sign posted on the on-site buildings. These materials include TDI (Toluene – 2,4, diisocyanate); this being a precursor chemical in the manufacture of polyurethane which is toxic and requires careful management. Such materials would be required to be safely secured and stored on site. It appears that polyurethane manufacture would be carried out inside the site building, as the building appears to be sealable and has air outlet vents on its roof.

From RPS' observations of the premises in their local context and review of the document "Separation Distances Between Industrial and Sensitive Land Uses" (EPA, 2003) the following conclusions were made:

- Whilst both foam manufacture and powder-coating are cited within this report as having the potential to emit noise, dust, odour, and gaseous emissions, in every instance, inspection has found that no such emission emanate from these premises;
- The EPA Guidance statement is silent on the matter of scale of operation. The two premises are very small scale operations. Slake powdercoating operates from adjacent fully enclosed factory units which on estimate are smaller than approximately 500m^2, whilst Future Foams operates from a fully enclosed free standing building which is estimated to be less than 1500m^2 in area;
- in addition to the fact that direct inspections have shown each operation to be emission free, the very small scale of the operations should mitigate against any requirement for specific separation distances to future land uses within the Structure Plan area; and

- The requirement to protect the occupational health and welfare of workers within these premises will create effective measures which will limit the risk of amenity risks to surrounding lands to a very high degree of certainty, as has been demonstrated by the findings of inspections described earlier.

Furthermore, bearing in mind that there are toxic chemicals in use, there are several critical factors that would mitigate against there being buffer requirements around these premises, including:

- Occupational health of workers within the premises would need to be protected to Australian Standards and would mitigate against there being any gaseous emissions from the plant;
- There appears to be air quality controls fitted to the foam manufacture building; and
- The premises are located over the Jandakot Underground Water Pollution Control Area (UWPCA) which suggests a low level of risk to the underlying drinking water and also a low level of risk to the surrounding area.

It should also be recognised that toxic chemicals usually raise concern when mentioned, but need to be considered in the context of the chemicals used day to day. For example in the home and business – i.e. toxic chemicals include herbicides, pesticides in flysprays, disinfectants, solvents etc. In this case, as well as the case of nearby industrial business, safe management is the key factor.

5.2.3.2 NOISE CONSIDERATIONS

Consultant *Lloyd George Acoustics* prepared an updated Noise Impact Assessment (February, 2015) to that originally prepared for the 2013 adopted Banjup Quarry Local Structure Plan. The revised report included additional studies and site inspection and measurements of the industrial development along Dollier Street on

- 11th September 2014 (2 – 3pm); and
- 12th September 2014 (6 – 7am).

The site inspection and measurements identified that noise levels during the day are dominated by aircraft flyovers and road traffic noise, with noise from the majority of the light industry area being intermittent or negligible. The only industry of significant noise emissions was that located at 5 Biscayne Way, Jandakot, which has a rear boundary and access to Dollier Street.

Operating as a refrigerated transport business, the identified noise emissions related to trucks idling, refrigeration units, or trucks being washed down in the yard.

The results of the noise modelling from industry is illustrated in Figure 8-2 under **Appendix 6**; this based on the provision of a 3m high wall being constructed adjacent to those lots with a common boundary with Dollier Street, or 2m high adjacent future Public Open Space.

5.2.3.3 DESIGN IMPLICATIONS

The 2013 adopted Structure Plan included Light and Service Industry zoned on the northern side of Dollier Street, which in part offered a buffer between the existing Industrial area to the west and future residential development within the Structure Plan area. The 2015 modified 'northern precinct' design has in most part replaced the Light and Service Industry zoned land on the northern side of Dollier Street with linear open space (beneath the Western Power easement) and residential cells beyond; **Plan 1** and **Plan 6** refer.

Notwithstanding the land use modification, the distance between industrial and sensitive land uses and 'affected' lots remains comparable between the 2013 and subsequent versions of the Structure Plan.

Inclusion of a noise wall for lots with a common boundary to Dollier Street, noise wall and landscaping treatments within the Western Power easement, and prescribed 'Quiet House' noise construction standards for designated lots will alleviate conflict between the industrial area and sensitive residential land uses to the north of Dollier Street.

Variation in housing product (i.e. higher density Town Houses with no external openings facing the Industrial area) may be considered to transition and alleviate the impact of the adjoining industrial land uses to the rear, particularly along the common western boundary in the 'southern precinct' of the Structure Plan area.

Such design measures addressed above are expected to be sufficient to mitigate risk of both noxious and noise nuisance to future residents from established industrial land uses.

RPS confirmed that, on the basis of the above 'noxious' observations and land use and design parameters, there should be no requirement for any provision within the Structure Plan to provide specific land use separation distances from these premises.

In terms of noise nuisance, compliance with Regulations is generally the responsibility of the noise emitter. Nevertheless, a reasonable and best practice approach for future sensitive land use development is considered appropriate being:

- Construct a noise wall being nominally 2 – 3 metres high (relative to lot level and site context) and of minimum surface mass 12kg/m^2;

- Provide advice to lots potentially significantly affected by industry noise to incorporate higher construction standards (Package A or B type construction) pursuant to SPP 5.4 guidance (**Appendix 6** refers); and
- All affected lots are to have notifications on titles such as:

  '*The lot is situated in the vicinity of neighbouring existing and/or future industry and is currently affected, or may in the future be affected by noise'.*

It is recognised that a more detailed noise assessment report is required to be prepared as part of any future subdivision application (or imposed by way of subdivision conditions) to identify affected lots in accordance with the final subdivision design.

5.2.4 Proximity to Jandakot Airport

The Structure Plan is some 1.5km south of Jandakot Airport, at its closest point. Relevant to the Structure Plan is WAPC's *Draft Statement of Planning Policy 5.3 – Land Use Planning in the Vicinity of Jandakot Airport (SPP 5.3), December 2015* and *Jandakot Airport Master Plan 2014*.

Draft SPP 5.3 2015 and the *Jandakot Airport Master Plan 2014* illustrates that the Structure Plan area is outside (less than) the ANEF 20 contour (**Figure 2** refers), however is located within the 'Frame Area'.

5.2.4.1 NOTIFICATIONS ON TITLE

All lots within the Structure Plan area are subject to notifications on title for the 'Frame Area' of Jandakot Airport.

The notification, pursuant to Section 165 of the Planning and Development Act 2005 is to be placed on the certificates of title of all proposed lots advising of the existence of a hazard or other factor. Notice of this notification is to be included on the diagram or plan of survey (deposited plan).

5.2.4.2 CONSTRUCTION STANDARDS

The *Noise Impact Assessment* (**Appendix 6** refers) includes packages and information guided by the WAPC's *Implementation Guidelines for State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning, December 2014*.

As per the agreed position between the City and Stockland as addressed under approved and future Local Development Plans across the Estate, 6.38mm glazing requirement is required to habitable rooms including kitchens for all lots within the 'Frame Area' of Jandakot Airport.

Plans and supporting documents accompanying building permit applications for all residential lots must demonstrate compliance with the glazing requirements.

In the very few instances where noise attenuation and bushfire management (BAL-19 or greater) requirements conflict in terms of construction standards, specific design measures will be required to achieve both standards.

Given the Primary School is situated within the 'Frame Area' of Jandakot Airport, 6.38mm window glazing and other construction standards may also be required specific to this land use to address noise attenuation measures.

5.2.5 High Voltage Power Line Corridor

Provision 2.1 of Council Policy APD39 - *Location of High Voltage Overhead Power Lines* identifies that developers are required to provide the City with advice from Western Power and the Department of Health (Radiation Health Branch) as to the setbacks required from existing high voltage overhead power lines from residences and other sensitive land uses.

Provision 2.2 states that wherever possible, residences and other sensitive land uses within newly developed areas adjacent to existing overhead high voltage power lines are to be located a minimum acceptable distance from the lines as specified by the Agencies referred to in Provision 2.1.

Department of Health Consultation

Consultation with the Department of Health identified that it does not have any fixed boundary setback requirements for high voltage powerlines.

However, Schedule I of the Radiation Safety (General) Regulations 1983, administered by the Radiological Council, requires that persons are not exposed to 50/60 Hz electric and magnetic fields which exceed the limits specified in Interim Guidelines On Limits Of Exposure To 50/60 Hz Electric And Magnetic Fields (1989).

The limits apply to 'occupationally exposed' and 'non-occupationally exposed' and includes activities underneath the powerlines.

Western Power Consultation

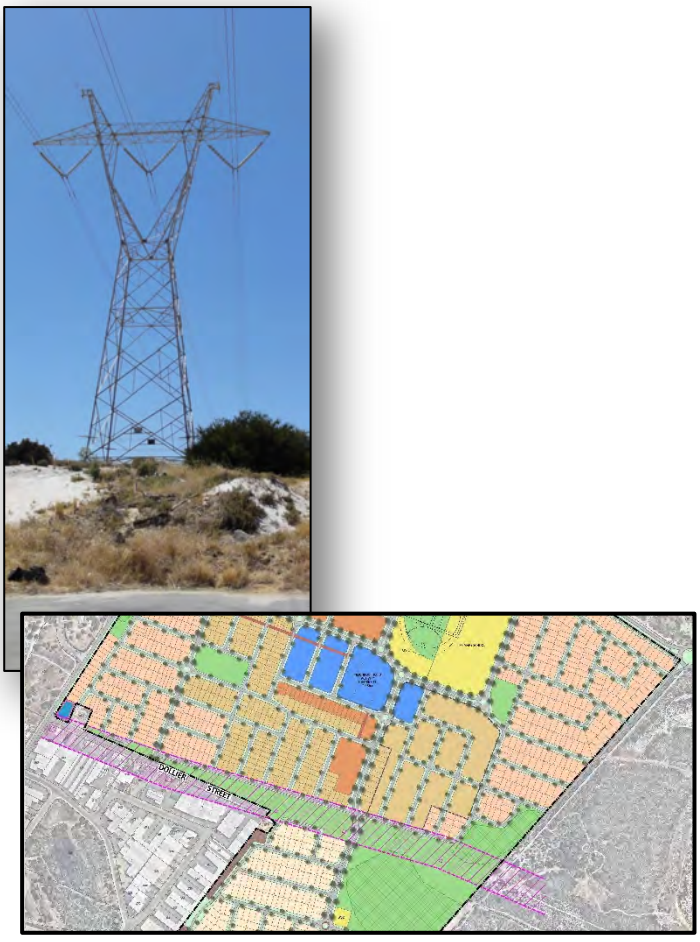
Consultation with Western Power identified that the current easement to the GLT-ST (91) 330kV transmission line is 80m wide for the provision of a future line (duplication) and/or upgrade of the existing line. In the event of an upgrade, the new line will be located to the north of the existing line which will traverse the area earmarked for uncredited Public Open Space.

Permissibility of land uses within the power line corridor is based on a case by case basis by Western Power, however there is a general presumption against permanent building structures or storage (i.e. boats, caravans, sheds and sea containers) being permitted within the easement area.

Roads, ground level changes and proposed lighting within the easement also need to be assessed by Western Power on a case by case basis. There are no additional setback requirements beyond the easement itself.

As a minimum, the easement corridor will be developed as parkland to link 'natural areas' and community nodes where possible. To this end, open space and retention or replanting of low vegetation is possible within the power line easement.

Western Power have undertaken an *Induced Current Analysis* of land under the existing power lines within the easement; this defining the type of developments allowable within the easement. Following consultation with Western Power and Department of Water in early 2015, is currently planned to use a portion of the easement for a stormwater drainage swale to take drainage up to the 1:5 year stormwater event. The maximum time it will take this swale to dry out is 5 days following a 1 in 100 year worst case event, thus for most of periods of the year the swale will remain dry (**Appendix 9** refers).



Existing High Voltage Power Line – East end of Dollier Street.

There is precedence in the vicinity of the Structure Plan area for artificial permanent and temporary water bodies constructed under existing Western Power easements; sites including Berrigan Drive, South Lakes and Belair Drive, Success.

Western Power recognised that the large easement could in fact serve a community function; this through the developer's intention to provide expansive landscaping areas within the easement. Full landscaping design will be undertaken in accordance with Western Power *Induced Current Analysis* and associated guidelines and policies and will be referred to Western Power for endorsement prior to any works.

Management of the Western Power easement will ultimately be controlled by the City, recognising the majority of the easement will be developed for public open space purposes.

The Western Power towers, general infrastructure and access tracks will be managed by Western Power.

5.3 Design Philosophy

The design objectives, as well as external physical constraints listed above, assist to inform the design philosophy for the Banjup Quarry project.

The Structure Plan proposes an urban layout utilising an interconnected road network and open space system. The design of the Structure Plan has been compiled in a manner to encourage pedestrian movement and interaction within the Structure Plan boundary, whilst also providing opportunities for movement beyond the extent of the Structure Plan. The Structure Plan design offers the opportunity for the fostering of community creation within the Estate, offering local identities to precincts within the Structure Plan area, and combining these together to a central focal point incorporating the Primary School and small Activity Centre.

The Structure Plan design has taken into consideration the environmental attributes of the site, as well as acknowledging abutting land uses and how these can best be addressed with regard to interfacing with proposed residential land uses.

The design philosophy has been predicated upon the following objectives:

- Provision of a diverse range of residential densities according with the density targets of *Directions 2031* to encourage diversity of lot product and affordability;
- Suitable interface with existing roads, Armadale Road, Solomon Road and Jandakot Road; the 330kV Power Line and Bush Forever site;
- Creation of areas capable of becoming local nodes and fostering a local sense of community;

- Creation of an attractive and viable Activity Centre with suitable residential density to support its development;
- Location and provision of public open spaces to ensure accessibility, tree retention where possible, visual aesthetics and view corridors;
- Implementation of a suitable engineering and drainage solution for the site;
- Delivery of a safe pedestrian and cyclist environment with pathways linking residential neighbourhoods and associated local parks as well as providing for external connectivity to areas outside of the site;
- Provision of a diverse range of lot product, hence encouraging diversity in dwelling product;
- The retention of significant and mature vegetation where possible; and
- Accommodation of stormwater drainage within public open space areas in accordance with accepted practice and Council/WAPC policy

5.4 Land Composition

Whilst the Structure Plan area will be predominantly developed for residential purposes, there are a number of complementary land uses that will be included. These include a 1.46ha Neighbourhood Activity Centre (NAC) site incorporating a Mixed Use and Commercial (Shop/Retail) development, Public Purposes site (Primary School with co-located community land uses) and a potential Retirement Living Village with space for community facilities under a 'Local Centre' zoning adjacent the core NAC site. In addition, a Mixed Use site is earmarked at the intersection of Dollier and Solomon Roads.

The land use composition including Public Open Space provision is outlined in **Table 4**.

Table 4 – Land Use Budget

Land Use Budget	*Area (Ha)*
Subject Area	**144.49**
Deductions:	
1:1 Year Drainage:	0.8075
Local Centre (Core Site – Neighbourhood Activity Centre):	0.8958 [1]
Public Purposes - Primary School:	3.5000
Public Purposes – Pump Station Site (Reserve 8009):	0.1693
Western Power – High Voltage Powerline Easement:	6.2132
Road Widening (Jandakot, Solomon, Fraser Roads/Ghostgum Ave):	1.892 [2]
Resource Enhancement Wetland Core:	0.0549
Resource Enhancement Wetland Buffer:	0.3080
Surplus Restricted POS (Conservation – Bushland):	8.3517
Total Deductions:	22.19
Developable Area for Residential Purposes	**122.29**
POS Requirement (10%):	12.23
- Restricted Open Space Permitted (2%):	2.44
- Unrestricted Open Space Required (8%):	9.79

NB [1] This 0.8958ha portion references the 'core' site of the Neighbourhood Activity Centre, all other 'Town Centre' cells are classified as residential purposes for the land budget and POS calculations.

NB [2] Road widening along Jandakot Road (1.4582ha), Solomon Road and intersection design with Jandakot Road (0.2659ha) and Fraser Road/Ghostgum Avenue (0.1679ha) as per land take plan provided by the City of Cockburn and/or Deposited Plans. Updates of road widening will be required at the time of formal subdivision/Deposited Plan updates.

NB [3] The proposed Mixed Use site at the corner of Solomon Road and Dollier Street is classified as residential purposes for the land budget and POS calculations. This site will become a gross deduction if ultimately developed for Commercial purposes.

5.5 Housing Principles

The Structure Plan provides for the delivery of a diverse range of lot types and housing typologies, achieving residential density targets specified by both state and local policy, as well balancing climate responsive design considerations and the site context.

The delivery of quality housing is a key objective, ensuring the housing style and character reflects the amenity and attributes of the area. R-Codes variations, site specific Local Development Plans and developer implemented design guidelines shall enable key housing principles to be mandated including dwellings to address and survey public open space, incorporation of solar passive design principles for private outdoor living areas and ensuring garages/carports are appropriately located.

The housing principles for the Structure Plan are to guide density, dwelling forecasts and subdivision as follows:

- Provide diversity in housing choice, lot sizes and tenure;
- Achieve a target of ~15 dwellings per gross urban zoned hectare of land (inclusive of land required for infrastructure and surplus POS by way of Bushland retention) and ~25 dwellings per site hectare of residential land (exclusive of land required for infrastructure and surplus POS by way of Bushland Retention) across the Structure Plan area.
- Higher density development (above 25 dwellings per site hectare) and potential aged persons/independent living accommodation within 400 metres of the Town Centre, public open space and along transport routes and primary connector roads;
- Promoting mixed use development within the Neighbourhood Activity Centre ('Local Centre' zone);
- Housing design, lot layout and access arrangements that create attractive streetscapes; and
- Environmentally sustainable design approaches in terms of solar orientation of lots and/or building design.

5.5.1 Density Overview

Residential R25 density will be the minimum base coding over the Structure Plan area, thus allowing for the provision of traditional single dwelling lots from 300m^2, averaging (minimum) 350m^2. The R25 areas predominantly encompass the 'southern precinct', and northern half of the 'northern precinct' of the Structure Plan area. This density will accommodate the majority of intended lot product envisaged by the developer acknowledging the reduction in minimum lot sizes now prescribed by the 2013 adopted Residential Design Codes (RCodes).

Residential R30 – R40 densities will generally be centrally focussed given Stockland's intention to provide more intensive residential development in proximity to the Calleya Town Centre. Development adjacent to public open space areas, locations that enhance passive surveillance of public spaces and for lots abutting Armadale Road will also be subject to R30 – R40 'medium density' provisions to offer variation in lot product and housing types.

Residential R60 density development is proposed immediately abutting the 'Local Centre' zoned area, thus further encouraging variation in lot product and housing types, including townhouse development capable of reducing to a minimum lot size of 120m^2.

Residential R80 density will be the default density for residential development within the 'Local Centre' zoning. As illustrated in the Structure Plan (**Plan 1**), the Local Centre zoning extends beyond the designated 1.46 ha 'core' Neighbourhood Activity Centre site; this to promote mixed use development including ability for multi-storey apartments within and adjacent to the 'core' site subject to demand and commercial viability.

The R80 density will also be provided abutting the existing Light and Service Industry area along the Structure Plan's western boundary, whereby the intended built form will serve as a physical barrier to these adjoining non-sensitive land uses.

The overall R25 – R80 density range offers a minimum and average lot product considered suitable for this location within the outer-metropolitan area of Perth; being a combination of lot product primarily ~100m^2– 600m^2 in area.

5.6 Dwelling Forecasts

5.6.1 Directions 2031 Forecasts

Situated within the South-West sub-region, the Structure Plan area is identified as an 'Urban Expansion Area 2011 - 2015' site; referenced as 'BAN1' in the South-West sub-region spatial framework map.

The *Directions 2031* and accompanying *Outer Metropolitan Perth and Peel, Sub-Regional Strategy* sets the following dwelling target rates for the Structure Plan area:

Table 5 – Directions 2031 Targets:

Directions 2031 Scenario	Projected Dwellings:
'Connected City' @ **15 dwellings** per *gross urban zone*	1,700+ dwellings
'Business as usual' @ **10 dwellings** per *gross urban zone*	1,100+ dwellings

Stockland's current lot mix and yield projections inclusive of the 25% growth contingency for the 'northern precinct' results in a dwelling yield of approximately 2,350 dwellings; or 1,990 dwellings without the growth contingency.

This projected yield is notwithstanding several site restrictions, including large power line easement, road widening, and large areas of remnant vegetation being retained; all physical barriers that erode the effective developable land area available.

Based on the identified *physical* site restrictions and non-residential (i.e. industrial) land uses under *Table 4 – Land Use Budget,* the total 'developable area', for 'Urban' purposes pursuant to Directions 2031 '*gross urban zone*' definitions, equates to ~136.52ha.

In this case specific dwelling yield calculations would equate to:

- 1,990 dwellings = 14.5 dwellings per *gross urban zone*;
- 2,350 dwellings = 17.2 dwellings per *gross urban zone*.

The proposed forecast across the Structure Plan area is subject to the final design for respective subdivision stages; based on detailed road (widening) and drainage design and environmental constraints, including landowner preference for retention of good quality remnant native vegetation. Preferred lot mix and market demand at the time of land release will also influence final dwelling yields as suggested by the 25% growth contingency.

5.6.2 Liveable Neighbourhoods Forecasts

Based on the *Liveable Neighbourhoods* 'Site Hectare' definition, the Structure Plan's 'developable area' equates to ~73.23ha exclusive of potential 'Urban' rezoned land fronting Armadale Road. As such the overall LN density for the Structure Plan will be in the order of:

- 1,990 dwellings = ~27 dwellings per *site hectare*;
- 2,350 dwellings = ~32 dwellings per *site hectare.*

Higher yields, well exceeding 25 dwellings per hectare, are projected in proximity to the proposed Town Centre (Neighbourhood Activity Centre).

The projected densities will fulfil the *Liveable Neighbourhoods* targets of average 22 dwellings per site hectare for the overall development, and 20 – 30 dwellings per site hectare target range for development within 400m of a Town Centre.

5.7 Streetscapes and Built Form Environment

5.7.1 Neighbourhood Character

Stockland's vision for the project is to be '*bold, edgy and genuine*'. To achieve this vision, a number of design elements need to work coherently and Council and WAPC support is required to create the unique streetscape and built form intentions of the developer.

The Structure Plan provides for an urban structure which enables distinct precincts to be developed; each with its own character and sense of place, and highly connected by a comprehensive road, pedestrian and cycle path network, with emphasis on connection with key community nodes within and external to the project.

There are a number of ways in which precincts may be defined, including but not exclusive to:

- the prevailing design of the general streetscape (i.e. variation in road reserve widths and verge and median treatments, materials used within the road reserves and verges, landscaping, retaining and fencing);
- the prevailing built form (i.e. number of storeys, lot widths, front and rear loaded, setbacks etc); and
- the prevailing Public Open Space design (i.e. retention of remnant vegetation compared to newly created POS areas, and usability, function and configuration of POS areas).

The development of 'Living Streets' for specific lower order Access Streets throughout the Structure Plan may also be considered in consultation with the City and WAPC. Such streets may offer greater focus and priority to pedestrian movements by designing road cross-sections that ensure vehicles are secondary in importance; this achieved through constructed or perceived narrowing of road pavements to a one-way road network or provision of 'passing corridors' adjacent large, landscaped verge areas.

All such design measures will be further explored as part of the subdivision design phase, Estate branding, Covenants and Guidelines, and Local Development Plan preparation. A positive approach to such design measures also needs to be adopted by the WAPC and Local Authority to achieve such goals.

5.7.2 Built Form Innovation

Small lot product (i.e. less than 120m^2) promotes a new type of housing product that has yet to be fully explored and appreciated in Western Australia. Such built form will be coherent, site sensitive and sustainable in this infill development, and contribute as a 'stimulant' of the '*bold, edgy and genuine*' and sustainability vision for the development overall.

Pursuant to the R-Codes (August 2013), a R80 density coding will facilitate the development of this new type of housing product. Residential development at a R80 density coding will be strategically located to provide an appropriate interface (barrier) to surrounding non-sensitive land uses, such as existing Light and Service industrial areas to the west of the Structure Plan area. The R80 density will facilitate town house or apartment style development, incorporating parapet walls to provide an acoustic and visual barrier to the surrounding non-sensitive land uses.

Development to R80 within the 'Local Centre' zoning is also proposed to encourage diversity of lot and housing product, with potential mixed-use apartment style dwellings being explored to complement the Calleya Town Centre 'hub'.

5.7.3 Housing Typologies

A diversity and flexibility of housing products will be provided that complement the various lot sizes and proposed densities presented in the Structure Plan. Increased densities will be concentrated within and immediately adjacent to the proposed Town Centre (Neighbourhood Activity Centre), areas of open space, public transport routes and primary connector roads, while larger lots generally provided away from such areas. A diversity of housing typologies allow changes in density and landform to be achieved.

The housing typologies envisaged will include Single and Double-Storey; Traditional Front Loaded and Rear Loaded Cottages; Terraces – Attached and Semi-Detached and Multi-Storey dwellings, including potential maisonette and apartment style dwelling product. The character of these typologies will differ depending on the nature of the lot and surrounding physical environment and 'precinct based' character and Estate branding.

5.7.4 Solar Orientation

Where the orientation of the lot makes it possible, dwellings will be orientated north for good solar passive design. However, where contours and landform have taken priority in determining lot orientation, northern orientation cannot always be achieved. In these cases, dwellings will be individually designed incorporating sun control elements such as solar shading devices for harsh summer sun, or the appropriate location of living spaces to maximise access to winter sun.

5.7.5 Parking Principles in Residential Areas

Parking and garage provision will be addressed on merit, depending on density and site location; i.e. whether the dwelling is in the outer edges of the development or closer to the Town Centre. In the periphery areas, where densities are likely to be lower, garages will predominately be front-loaded. Closer to the Town Centre, or in higher density areas as addressed under Section 5.5.1 – *Density Overview* where smaller (narrow) lot product may prevail, garages may predominantly be accessed from rear lane ways to preserve the built form and pedestrian focus of the streets.

Single car garaging will be strongly encouraged to promote the benefits of walking or cycling to public transport nodes, namely the Cockburn Central Transit Station; and to encourage reduced reliance on motor vehicles.

On-street visitor parking bays are promoted in a variety of street settings in the Structure Plan area, as further addressed in the Movement Section of this report. The focus on on-street visitor parking will alleviate concerns of cars parking over footpaths, thus minimising pedestrian-vehicle conflict, particularly in the preferred higher density urban setting where small and narrow lot product will prevail.

Based on subdivision development already approved in the 'southern precinct' of the Structure Plan area, a Built Form, Footpath and Street Tree Strategy has been prepared to address the commitment for regular street tree planting, and positioning (setbacks) of garages adjacent to footpaths and service infrastructure; this addressed in detail under Section 5.14.

5.8 Town Centre Precinct

Zoned 'Local Centre' under the Scheme, the Town Centre Precinct is proposed in the 'heart' of the Structure Plan area; this being central to the 'northern precinct' of the site. The location offers a larger local (walkable) catchment comparative to the 'southern precinct' of the site, which is more linear in design and with a more limited dwelling potential by virtue of densities offered and areas of remnant vegetation being retained.

The Town Centre Precinct will include a number of different land uses which will contribute positively to the diversity and viability of the Centre. Such land uses include a Neighbourhood Activity Centre (NAC) with mixed-use opportunities (i.e. core 'Shop/Retail' area), commercial type frontage to the earmarked Retirement Living site to the east, Public Purposes (Education and Civic) that incorporates a Town Square, and higher density residential opportunities; details on all land uses addressed in the sections below. The proposed mix of uses will also provide the basis for a vibrant 'centrepiece' to be established.

Suitable integration of these various land uses is the key objective of the developer, with emphasis on delivering a Town Centre that ensures that all land uses contribute to its activation and viability; when historically uses such as schools and retirement living estates have often been purposely separated from the public realm.

A conceptual design of the Town Centre has been prepared to illustrate the potential distribution of land uses within the core Neighbourhood Activity Centre site and immediate surrounds (**Figure 3** refers).

The proposed Town Centre will be the subject of a Local Development Plan addressing the objectives of both the WAPC's SPP 4.2 - Activity Centres for Perth and Peel, and City of Cockburn's Local Commercial and Activity Centres Strategy (LCACS); this to ensure there is suitable integration between the various land uses, including built form interface and diversity (including third dimension overlap) of uses.

An indicative LDP boundary is notated to illustrate the suggested 'area of focus'.

5.8.1 Neighbourhood Activity Centre

Pursuant to the *City of Cockburn Local Commercial and Activity Centres Strategy* (LCACS), the Banjup Town Centre is earmarked as a '*Local Centre*' under the Activity Centre hierarchy. However, it is recognised that the LCACS was prepared prior to the progress of this Structure Plan; with the Structure Plan providing an updated economic assessment specific to the Structure Plan area (**Appendix 8** refers).

Subsequently, the analysis undertaken by MacroPlan as part of the original Banjup Quarry Structure Plan preparation indicates that the development will have sufficient capacity to sustain a smaller scale *Neighbourhood Activity Centre* (NAC)*;* such Centres being characterised by '*providing for daily and weekly household shopping needs, community facilities and a small range of other convenience services.*'

The State Planning Policy 4.2 - *Activity Centres for Perth and Peel* states that *Local Centres* generally relate to developments with a shop/retail floor space component of no more than 1,500m^2. The specialist report undertaken for the Banjup Quarry Structure Plan indicates that the shop/retail floor space component at Treeby has capacity to accommodate up to 2,800m^2.

Neighbourhood Activity Centres do not have a shop/retail floor space component 'cap', nor require a mix of land uses as a proportion of the Centre's total floor space. However, based on the analysis undertaken by Macroplan, the following findings will guide the feasibility of any future shop/retail development:

- A notational 1,800m^2 supermarket is sustainable and suggests this size supermarket would attract a smaller operator such as an IGA.
- The extent of specialty shops (i.e. ~800m^2) that can be successfully incorporated at the proposed Centre will be dependent on the level of major trader business at the site, as well as the nature and scale of the centre. The suggested uses may include:
  - Food Retail – a range of food retail operators are required to service the daily needs of the local residents and to complement the supermarket offered, including bakery, a poultry outlet, a butcher and a green grocer.
  - Food catering – the centre could incorporate 2 – 3 take-away stores and casual cafe/restaurant. The food catering and take-away food stores are likely to be particularly popular given the proposed nearby community facilities, school and retirement village. Higher density residential in proximity is also likely to result in well performing food catering specialty stores.
- Retail facilities at the NAC are not projected to be supportable during the initial 3-4 years of development of the project, reflecting the low population base in those years (i.e. below 2,000 residents);

CALLEYA TOWN CENTRE COMMUNITY HUB

Figure 3

- A centre incorporating a supermarket of over 1,800m^2 together with an associated provision of retail specialty space is likely to become supportable by around 2021 – 2022, however recent lot sales rates in the 'southern precinct' may see this timeline shifted forward.

  The estimated amount of total supportable retail floor space would be in the order of 2,800m^2, and would likely be anchored by a supermarket with a limited level of specialty retail. Whilst the population at this time is projected to be over 3,000 residents, underlying growth levels are expected to slow thereafter.

The indicative timing suggested above will of course depend on the ultimate rate at which residential development within the Estate proceeds. The timing of the NAC should be flexible around this critical factor; however as a general guide, the centre should be developed sooner rather than later, which could in turn stimulate the take-up of the remainder of the residential development.

In addition to the shop/retail focus, there is opportunity for complementary land uses including office space, medical, child care and higher density residential uses that will assist to activate the site and establish a vibrant Town Centre.

5.8.2 Residential R80

The proposed 'Local Centre' zoning extends east and west of the NAC to encourage mixed use development adjacent to this 'shop/retail' focussed site. Subject to market demand and commercial viability at the time of development (thus not mandating such development), mixed-use opportunities will be explored, including potential townhouse, home office and apartment built form opportunities. The 'Local Centre' zoning provides flexibility for mixed use development, particularly for potential ground floor tenancies such as office, medical and the like without precluding other 'Permitted' uses with merit under a 'Local Centre' zone.

5.8.3 Retirement Living

The suggested Retirement Living Village (RLV) site will be centrally located to the Structure Plan and approximately 7.59 ha in area. The RLV site will form the eastern 'wing' of the future Town Centre. The conceptual design for the Town Centre at **Figure 3** shows only the portion of the RLV site which interfaces with the Town Centre, with the balance of the RLV site located to the east and south.

Pursuant to **Plan 1**, the RLV site is assigned a **R40** density coding and will be required to comply with requirements under Part 5 – Provision 5.5.2 of the RCodes (or amended thereto).

Whilst now formally confirmed by the developer that a RLV will be the ultimate land use on this site, the Structure Plan Map (**Plan 1**) and Master Plan (**Plan 6**) illustrate residential cells for the purpose of guiding suitable road network design under a conventional residential development scenario. Development for a RLV will see the broader site amalgamated into one land parcel and considered under a more detailed Development Application submitted to the City.

Much consideration has been given to the interface of the RLV site to the public realm (should it be ultimately developed), to provide a connected rather than a 'gated community' often characteristic of Retirement Living estates.

Stockland has undertaken some preliminary 'Master Planning' of the RLV site, to develop various design principles to promote a healthy, vibrant community both internally to the site and with its interface and interaction with the broader residential community.

Whilst the position and scale of the RLV has changed since the 2013 adopted version of the Structure Plan, the following design principles still apply and include:

- Provision of a Clubhouse – being the heart of the village;
- Internal Pedestrian Connectivity – provision of informal paths for pedestrian movement to the clubhouse and throughout the village;
- External Pedestrian Connectivity – provision of formal paths through the village to delineate that external pedestrian movements are welcomed through the village and will provide clear connection to the broader path network throughout the Structure Plan area;
- Creation of Precincts – creating identifiable character and precincts within the village;
- Legibility – creation of a clear network of streets and path network to assist in way finding;
- Pedestrian friendly – creation of pleasant, safe landscaped streets;
- Orientation – suitable street layout & built form designed to capture views, winter sun and cross ventilation;
- Security – village access is to be controlled; passive surveillance; environmental design and security featured to homes;
- Functionality – provision of on-street visitor parking; garbage and emergency vehicle access; and
- Choice – provide a range of Independent Living Unit (ILU) house designs and price to ensure diversity of people and economic sustainability.

5.8.3.1 INTERFACE TO TOWN CENTRE

The location of the Village Club House will be specifically designed to enhance the connection to the core shop/retail site and maximise the opportunity for engagement with the wider community.

Conceptually it is envisaged that a Town Square with children's playground opposite and adjacent to a café or community facilities (preferably within the Village Club House) as the 'common ground' for the Retirement Village and the broader community, as well as providing a family amenity link to the village. Areas of the clubhouse exclusively for village use will be located towards the village side of the building.

Development of the above objectives will explore this and other opportunities to maximise the potential for the Retirement, Residential and Retail (3R's) working together. Careful development of Design Controls (LDPs), Restrictive Covenants etc over the Town Centre site will be essential to successful realisation of built form and social outcomes.

The RLV's location now in the east 'wing' of the Town Centre offers opportunity for the co-location of commercial/community facilities on site that will complement both the RLV site as well as broader residential community. Such facilities will be in charge of the RLV and may include provision for a medical centre (GPs, physiotherapy, chiropractic, optometrist etc) as well supplementary businesses including chemists, cafes and the like.

As such portion of the RLV site will be encompassed by the proposed 'Local Centre' zone to enable such facilities to co-exist in such a location.

5.8.3.2 INTERFACE TO ADJOINING RESIDENTIAL AREAS

Whilst sections of the proposed Retirement Village will be sleeved behind residential lots, the other sections will have site boundaries that interface directly with the public domain. Accordingly, Stockland's design objective is to provide a building interface that provides a residential perspective and to encourage synergy between the two land uses.

The edge interface of the RLV with the surrounding community may necessitate input from the Local Authority, particularly for those areas adjacent to the Town Centre and *Neighbourhood Connectors*. Excluding the portion of the RLV site forming the eastern 'wing' of the proposed Town Centre, the remainder of the development will be subject to its own design controls and addressed accordingly at the Development Application phase.

5.8.4 Public Purposes - Education

A Primary School is proposed in the centre of the Structure Plan area, and forming the north-eastern 'wing' of the proposed Town Centre.

The projected yield of the Structure Plan cell, being in the order of 2,350 dwellings provides a virtual 'self-sufficient' school catchment. The ultimate student catchment may extend to the north, east and west of the Structure Plan boundary, this being existing 'Semi-Rural' and potential 'Urban' development in the surrounding areas. The southern side of Armadale Road may also offer a secondary catchment, however given the proximity of Atwell Primary School to the south, it is anticipated that Armadale Road will govern the school catchment boundaries.

The Primary School being co-located with an active recreational park (senior playing field) ensures maximised use of this POS during most times of the day. The position, alignment and dimensions of the district playing oval is shown in **Figure 3**. A maximum of 0.6211 ha of the Primary School site will constitute the shared component of POS with the district playing oval.

It is recognised that a 400m walkable catchment to the Primary School extends across the northern half of the Structure Plan area, with the 'southern precinct' of the site still within 1km walking distance.

For those students being dropped off/collected by car, it is suggested that circulation of vehicles and drop off areas around the site will be encouraged in an anti-clockwise direction; to provide a safe environment for children exiting and entering vehicles. Circulation of vehicles may be influenced by the location of the approved internal student drop-off areas, street signage (e.g. 'no-standing' on nominated sides of the street), as well as local advertising and community education.

No Secondary and Tertiary Education is provided within the Structure Plan area, however several public and private education options are available in the District context, as identified in Section 4 of this report.

5.8.5 Public Purposes – Civic

The Jandakot and Banjup North community will require both social and community activity spaces to meet its needs. The Structure Plan makes provision for the co-location of a community purposes site with the Primary School.

Pursuant to the *Banjup Community Facilities* report prepared by CCS Strategic (**Appendix 7** refers) and Development Contribution Plan No. 13 (DCP13) the Structure Plan accommodates two items under the *Local (Banjup North and Jandakot)* category of DCP13, these items being:

- '**Banjup' Playing Field (now Treeby)**

  Development of a full sized playing field containing one full sized senior AFL oval, one cricket oval and two senior soccer fields (multi-marked in the same place) and also including a playground area and equipment, picnic furniture and BBQ's.

- **'Banjup' Community Centre (now Treeby)**

  A multi-functional community space that offers a variety of independent and compatible uses including sporting club change rooms, multi-purpose clubhouse, food and beverage areas, separate multi-function community activity space, art and craft spaces, playground area, toilets, covered viewing areas for adjacent playing field and car parking areas for the community centre.

5.9 General Community Infrastructure

The redevelopment of the Banjup Quarry site presents significant opportunity to create a well serviced development with a focus on community and local infrastructure. The vision for the site is to create a thriving community that will be '*bold, edgy and genuine'*. In delivery of this vision it will be important to provide facilities that meet the contemporary living needs of the community and are presented in a style that echoes the vision.

In delivering this vision, paying particular attention to Public Open Space, there are many opportunities which exist in relation to the peripheral bushlands and internal parklands across the Structure Plan area. The linear bushland area presents opportunities to provide walk trails and community connectors for passive recreation, while the undulating landform creates a unique leisure and recreation opportunity by utilising the vertical difference between the perimeter road and urban development area.

Embracing the high voltage transmission line easement as a functional element of the development, including use a primary east-west pedestrian/cycle link or community space (i.e. dog park), will be a challenge requiring innovative solutions in partnership with Western Power and the City.

Also, the incorporation of multipurpose community structures and open spaces will be a critical element in the delivery of the project vision.

The mix of uses across the Structure Plan area presents a significant opportunity to build strong networks and partnerships between residents and visitors to the estate.

Community Garden Initiative

Establishing social links between the varying demographics and land uses could be achieved through the creation of community activity groups, community garden, or other initiatives which will foster active community participation for all ages.

The general development will also provide:

- An extensive and legible internal path networks for cycling and pedestrian activity;
- External network connections to link the local community with regional road and transport networks, including an internal road network suitably designed to accommodate extensions to existing (or new) bus services;
- A full size playing field with capacity for one senior AFL oval, one cricket oval and two senior soccer fields with standard 'buffers'; and
- A community centre as the hub for community activities. This includes a multipurpose facility catering to the diverse needs of community members and groups.

The suggestion of a children's playground, child care centre, cafe, and perhaps gym are appropriate elements to be located within the Town Centre. These components could also be more closely linked to the community centre enhancing a 'Town Square' and its focus opposite the retail elements.

5.10 Zoning and Land Use Permissibility

Pursuant to the City's Scheme, and for the purposes of planning and development control, standards and provisions, the Structure Plan area is encompassed by a 'Development' Zone. Whilst this enables the development to provide project specific land use and zoning provisions pursuant to the approved Structure Plan it is the recommendation of the City to remain consistent with the provisions under Table 1 of the Scheme. Land use permissibility is detailed under Part One of the Structure Plan report.

The 'Development' zoning offers a diversity of commercial and residential uses to be established in a manner consistent with the land use and development intent for the Town Centre and adjacent residential (including Retirement Living) development.

The proposed Primary School and community infrastructure on the northern side of the Town Centre has a 'Public Purpose – Primary School/Civic' land use classification, consistent with intent of these uses.

5.11 Local Development Plans

5.11.1 Residential

Local Development Plans (LDPs) are to be prepared and approved by the Local Authority in accordance with Clause 6.2.15 of the Scheme for development comprising one or more of the following site attributes:

- Lots with rear-loaded (laneway) vehicle access;
- Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space;
- Lots with a boundary abutting or frontage to Armadale Road or Jandakot Road;
- Lots within a 100 metre catchment of 'Classified Vegetation' (Bushfire Hazard Zone) thus deemed at risk from bushfire pursuant to Australian Standards;
- Lots affected by the 330kV Western Power high voltage overhead powerlines easement; and/or
- Lots within the 30m buffer catchment of a sewerage pump station.

Buildings requiring upgrades to facade construction (i.e. quiet house principles) shall be in accordance with WAPC's *Draft State Planning Policy No. 5.3 Jandakot Airport Vicinity (SPP 5.3) and State Planning Policy 5.4 Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

The height and location of noise barriers required to achieve the noise limit criteria is outlined in *State Planning Policy 5.4 Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

Affected lots may be identified spatially in the accompanying *Noise Impact Assessment*, under **Part Three – Appendix 6** of the Structure Plan; this to be updated subject to finished ground levels adjacent or type of built form design being developed.

Lots encompassed by the Bushfire Risk area are identified spatially in the accompanying Fire Management Plan, under **Part Three – Appendix 2** of the Structure Plan (or as reviewed through the subdivision process, etc).

Building setbacks and construction standards required to achieve Bushfire Attack Level – 29 or lower may be found in *Australian Standards (AS3959-2009): Construction of buildings in bushfire prone areas*.

LDPs may be prepared as part of a subdivision application or imposed as a condition of subdivision approval. It is expected that, similar to the approved 'southern precinct', the prevailing R25 lots may seek a 'generic' front setback and open space variation to the 'Deemed to Comply' provisions of the Residential Design Codes; hence establishing a preferred built form and streetscape character by the developer.

The LDP's will generally address the following:

- Built form outcomes, including setbacks, garage locations and open space provision;
- High levels of integration between the POS and the built form to enhance surveillance;
- Appropriate separation of public and private spaces;
- Correct orientation and design of homes to address solar orientation principles;
- On-street and off-street parking provision;
- Bushfire protection measures; and/or
- 'Quiet House' design measures.

5.11.2 Town Centre

A Local Development Plan for the Town Centre ('Local Centre' zoned land) is required under Part 1 of the Structure Plan. An indicative LDP boundary has been notated in **Figure 3** and will encompass the Neighbourhood Activity Centre (i.e. core Shop/Retail site), interfacing residential area, Civic/Community Building/Space north of Town Centre, and the eastern periphery of the proposed Retirement Living Village site. A LDP in this instance shall provide built form design guidance with respect to (but not exclusive to):

- Provision of a landmark building adjacent to the Main Street;
- Activation at the pedestrian level;
- Pedestrian scale to buildings;
- Addressing primary street and active facades;
- Vehicular and pedestrian access to buildings and car parking;
- Weather protection for pedestrians;
- Solar orientation principles; and
- Landscaping.

The Primary School is not intended to be included in the Town Centre LDP. Notwithstanding, the Department of Education has been fully engaged and will positively contribute to the activation of the proposed Main Street, including appropriate positioning of its Administration Offices and higher frequented spaces, such as Kindergarten and Pre-School building to be located towards the Main Street frontage.

5.12 Movement Networks

A Transport Assessment has been prepared by traffic consultants, Transcore to identify projected traffic volumes and suggested road hierarchies in and adjacent to the Structure Plan area (**Appendix 4** refers). The key findings are summarised in the following section.

Transcore developed a comprehensive EMME model for the proposed structure plan which was used to investigate various access system options for the area in order to design an optimal solution.

The EMME transport includes the proposed 25% growth contingency of dwelling yields for the 'northern precinct' (thus 2,350 dwellings) and future traffic projections on the abutting road network, such as Armadale, Jandakot and Solomon Roads. The EMME enables assessment of the impact of the existing and future land uses and developments including the proposed Structure Plan area for the post-development horizon of 2031; assuming that the Structure Plan area will be fully developed and operational by this time.

It is noted that all traffic volume figures represent total daily vehicular trips (vpd). According to the modelling results, existing and ultimate traffic volumes on primary roads are summarised as follows:

- The primary east-west connector road through the northern portion of the site is projected to service between ~2,500 to 4,000vpd; increasing to ~5,000 vpd on approach to the intersection with Solomon Rd.
- Solomon Rd is projected to carry ~13,000 vpd north of the Estate entry intersection, and ~12.600 vpd south of the intersection.
- The primary north-south connector is projected to carry ~3,000 vpd, increasing to 5,000 vpd on approach to the intersection with Armadale Road.
- Armadale Rd is projected to carry ~56,000 vpd east of the Estate entry intersection, and ~58,000 vpd west of the intersection.
- Jandakot Rd is projected to carry ~32,000 vpd along the northern boundary of the Estate.

Based on the Transcore report recommendations, road cross-section concepts have been prepared to establish a general road hierarchy and preferred streetscape character internal to the site. The road cross-sections (**Figures 4 - 5**) accompany **Plan 7** - *Internal Road Hierarchy*.

5.12.1 External Road Hierarchy and Site Access

The Structure Plan proposed three key entry points into the Estate, including:

5.12.1.1 ARMADALE ROAD

Armadale Road is a *Primary Regional Road* in the Metropolitan Region Scheme, which currently carries ~22,000 vpd and served by a single lane carriageway abutting the Structure Plan area (two-lane carriageway immediately to the west).

Armadale Road is projected to become heavily congested in the near future, and Main Roads WA is currently exploring design solutions to improve traffic operations, particularly at the Freeway intersection. Armadale Road is projected to carry ~56,000 – 58,000 vpd in the long term as is anticipated to include a triple-lane divided carriageway design.

Based on existing and projected traffic volumes, Estate access onto Armadale Road is now suitably accessed via a signalised T-intersection; this including realignment of the Fraser Road reserve on approach to Armadale Road as illustrated in the revised Structure Plan.

5.12.1.2 JANDAKOT ROAD

Jandakot Road is currently a 20m road reserve carrying ~9,700 – 12,000 vpd, with long term projections in the order of ~32,000 vpd. Road widening of up to 10m (i.e. total 30m reserve width) will provide for a suitable *Integrator A* road design to service ultimate traffic projections; namely a dual divided carriageway design with localised widening at intersections to cater for turn lanes.

Estate access onto Jandakot Road is provided via two intersections:

- a 3-way dual lane roundabout intersection with the proposed central *Neighbourhood Connector A* road; and
- a 3-way (minimum) dual lane roundabout intersection with Fraser Road.

5.12.1.3 SOLOMON ROAD

Solomon Road is currently a 20m road reserve carrying ~5,800 vpd, with long term projections in the order of ~13,000 vpd abutting the Structure Plan area.

The 20m width will provide for a suitable *Integrator B* road design to service ultimate traffic projections, this consistent with the southern portion of Solomon Road on approach to Armadale Road.

Estate access onto Solomon Road is proposed via a T-intersection treatment.

Minor entries include one off Dollier Street and another via Fraser Road. The road network also offers access into the site from the east, albeit subject to future development of the adjoining land holdings.

5.12.2 Internal Road Configuration and Hierarchy

The projected traffic volumes prepared under the EMME strategic model for the internal Structure Plan road network were used to further explore the preferred road hierarchy and generic road reservation and cross sections. The general road hierarchy and traffic volumes are represented under **Plan 7** and **Figures 4 - 5**.

The proposed internal road network ensures permeability and efficient traffic distribution throughout the Structure Plan area. The Structure Plan proposes a highly permeable road network, with interconnected streets providing opportunity for ease of traffic movements both internally and externally from the Structure Plan area.

The internal road network compromises of the following road hierarchy:

5.12.2.1 NEIGHBOURHOOD CONNECTORS

The primary north-south *Neighbourhood Connector A* (NCA) extends from Armadale Road through to Jandakot Road. The road 'terminates' at two T-intersection points (potential roundabouts) along the route, on the rationale that:

- The southern leg will function as an 'Entry Statement' off Armadale Road and will ultimately connect with the broader NCA road network to the east, when this adjoining landholding is developed;
- The central termination point relates to the Town Centre; to provide a more intimate and pedestrian orientated setting; and
- The termination points will assist in discouraging a 'rat-run' through the Estate, namely between Jandakot and Armadale Roads, without compromising the traffic flow internal to the Structure Plan area.

The primary north-south connector is projected to carry on average ~3,000 vpd, increasing to 5,000 vpd on approach to the intersection with Armadale Road and 4,600 on approach to Jandakot Road.

Based on the traffic volumes being generated, 23m road reserve designs are proposed for all NCA roads. The width is representative of a boulevard design (comprising 3.5m carriageway and 1.5m dedicated cycle lane), 5m verges and 3m median.

Variation also provides for design options to include pedestrian 'green-links' to one verge, incorporating a combination of dual-use path, landscape corridor and/or on-street parking embayments (**Figure 4** refers).

The verge widths will vary depending on the number of the above design elements being implemented at any one time.

The NCA landscaped verge design will create an Estate identity and will assist pedestrian way finding enroute to community nodes (i.e. Local Centre, School, key Public Open Spaces etc). A standard footpath will generally be provided in the opposite verge to the Shared Path ('Dual Use Path').

The primary east-west road in the 'northern precinct' is generally planned as a *Neighbourhood Connector B* (NCB) in terms of road hierarchy (**Plan 7** refers), however from the Town Centre to Solomon Road will be designed to a *Neighbourhood Connector A* (i.e. Boulevard) standard for Estate identity and way finding measures. This road east of the Town Centre continues towards Fraser Road and with road designs varying between NCB and *Access Street* standards subject to localised traffic volumes. This road will generally service between ~1,000 to ~2,400 vpd; with approaches to Solomon Road and Fraser Road being ~4,400 vpd and 2,600 vpd respectively.

The Town Centre 'Main Street' is proposed as an 18m road reserve (NCB), this comprising a 7.4m single carriageway and 5.3m verges to accommodate intermittent dedicated street parking, landscaping, and pedestrian amenity and footpath treatments (**Figure 5** refers). The reduced road reserve and proposed road treatments is specifically aimed to create an intimate 'Village' setting that assists to reduce vehicle speeds; thus offering a safe pedestrian environment between the various land uses fronting and in the vicinity of the 'Main Street'.

5.12.2.2 ACCESS STREETS

All local roads will typically comprise of an *Access Street D* design, this consisting of a 15m road reserve with 6m wide trafficable carriageway pavement and 4.5 wide verges. Where fronting Public Open Space, Access Street verges may be reduced to minimum 2.5 metres depending on the location and alignment of services, street parking and pedestrian traffic.

The proposed 4.5m (or wider) verges are in response to creating a more pedestrian friendly urban setting, to provide wider areas of verge landscaping, with intended reduction in street setbacks to dwellings. The wider verges will also offer space for on-street visitor parking without compromising verge landscape design. The on-street visitor parking bays will alleviate concerns of cars parking over footpaths, thus minimising pedestrian-vehicle conflict, particularly in the preferred higher density urban setting which will include small and narrow lot product.

These design measures will suitably address visitor parking design challenges for the proposed smaller lot product.

Maximum desirable traffic volumes for this type of road are less than 1,000 vpd. Where traffic volumes exceed 1,000 vpd, an *Access Street B* may be warranted and shall comprise of minimum 16.0m reserve with 6.0m trafficable carriageways and 4.5 – 5.5m verges, subject to localised amenity and service infrastructure. Larger reserves may be provided where servicing the proposed Primary School (i.e. 7.2m carriageways) and other key pedestrian connectivity roads throughout the site and enroute to the District Nodes (i.e. Cockburn Central Transit Station).

5.12.2.3 LANEWAYS

The typical road reserve for Laneways entails a 6m wide trafficable pavement sufficient to allow two-way movement, rubbish collection and vehicle access into garages located on the rear properties. No cross-section is provided in this instance as laneways will conform to *Liveable Neighbourhoods* design parameters.

Maximum desirable traffic flow for a laneway is 300 vpd.

5.12.3 Pedestrian and Cycle Network

The proposed network of paths will provide an excellent level of accessibility and permeability for pedestrian and cyclist within the Structure Plan area, including connections to major external nodes. **Plan 8** illustrates the proposed pedestrian and cyclist network for the Structure Plan area.

The Structure Plan allows for pathway connections to the proposed regional pathway along Armadale Road as well as connectivity to Jandakot Road, Solomon Road and Dollier Street enroute to the Cockburn Central Transit Station. In accordance with *Liveable Neighbourhoods* design principles, footpaths are to be provided on at least one side of all lower order roads (i.e. Access Streets) and on both sides of higher order roads (i.e. Neighbourhood Connectors); this in addition to dedicated cycle lanes provided on the Neighbourhood Connectors (boulevard design).

Footpath widths will generally be 1.5 - 2m wide, with Shared Paths (or Dual Use Paths) varying between 2.1 – 2.5m depending on the location, projected pedestrian volumes and availability of other paths within the same road reserve or adjacent POS.

Shared Path Network, Stockland Development

5.12.4 Public Transport

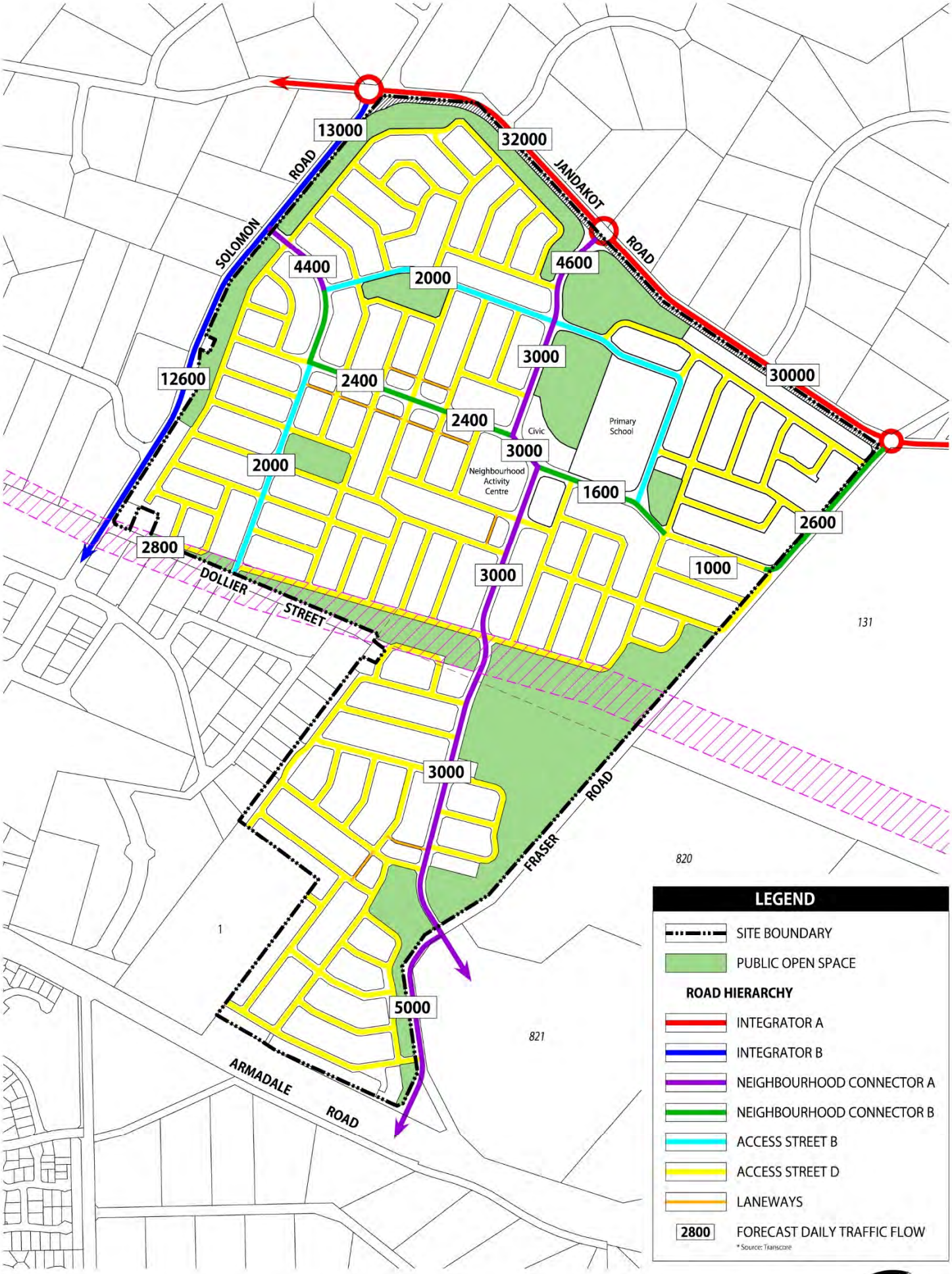
The Structure Plan area currently has limited service to public transport, with limited bus services along Armadale Road (Route 518) and no service currently along Jandakot Road.

The nearest bus route is to the west of the Structure Plan area, Route 527, which services the Aubin Grove and Atwell areas on the southern side of Armadale Road; or Route 515, terminating at Glen Iris Estate to the north-west.

The site is however within relative walking distance to the Cockburn Central transit station, albeit poor pedestrian linkages currently exist between the Structure Plan area and this station. The pedestrian linkages and environment from the project area to Cockburn Central will need to be better defined and enhanced from a landscape and safety perspective.

Longer term public transport options may result in a service through the Structure Plan area, thus linking residents directly to both the Murdoch and Cockburn Train Stations. This may involve a rerouting and extension of the existing 515 bus service (currently terminating at Glen Iris Estate) and potentially providing a link between Cockburn Central and Murdoch Transit Stations (**Plan 9** refers).

Positioning of bus stops, timed stops (dedicated bays) and ultimate route throughout the Structure Plan area is subject to a detailed planning assessment by the Public Transport Authority. Any new route or extensions of existing routes will be subject to patronage use and demand and Government funding.



INTERNAL ROAD HIERARCHY

Plan 7

NORTH

0 100 200 300m

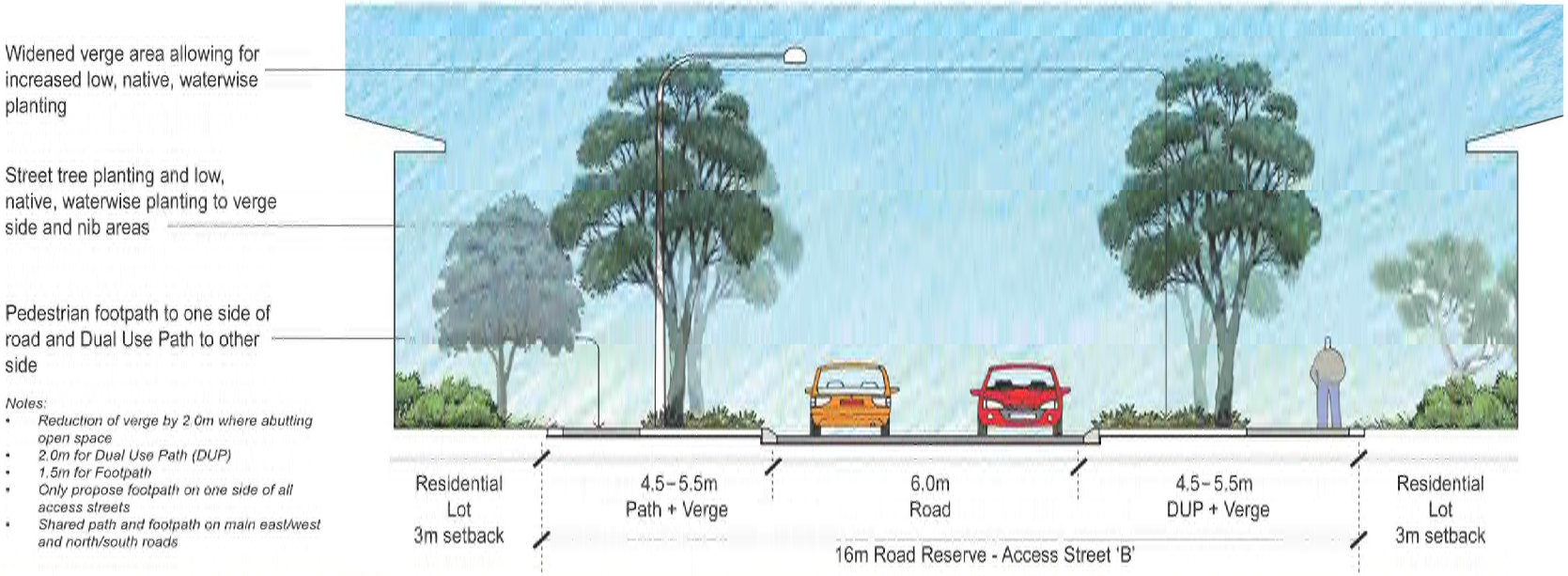
Scale: 1:10 000@A4 Date: 20/03/2017 Plan: STOBJ-5-001I

FIGURE 4

NEIGHBOURHOOD CONNECTOR 23m ROAD RESERVE

Notes:
- *Reduction of verge by 2.0m where abutting open space*
- *2.1-2.5m DUP meanders within verge*
- *Shared path and footpath on main east/west and north/south roads*

ACCESS STREET 16.0m ROAD RESERVE



Notes:
- *Reduction of verge by 2.0m where abutting open space*
- *2.0m for Dual Use Path (DUP)*
- *1.5m for Footpath*
- *Only propose footpath on one side of all access streets*
- *Shared path and footpath on main east/west and north/south roads*

UPDATED BANJUP QUARRY LOCAL STRUCTURE PLAN
LANDSCAPE DOC NO : BQ01-LSP-002 Rev D March 2015

1:100 @ A3 (0 1 2 3 4m)

THIS DRAWING IS INDICATIVE ONLY AND MAY NOT REPRESENT THE FINAL SCOPE OF LANDSCAPE WORKS

emerge ASSOCIATES Integrated Science & Design

FIGURE 5

ACCESS STREET 15.0m ROAD RESERVE

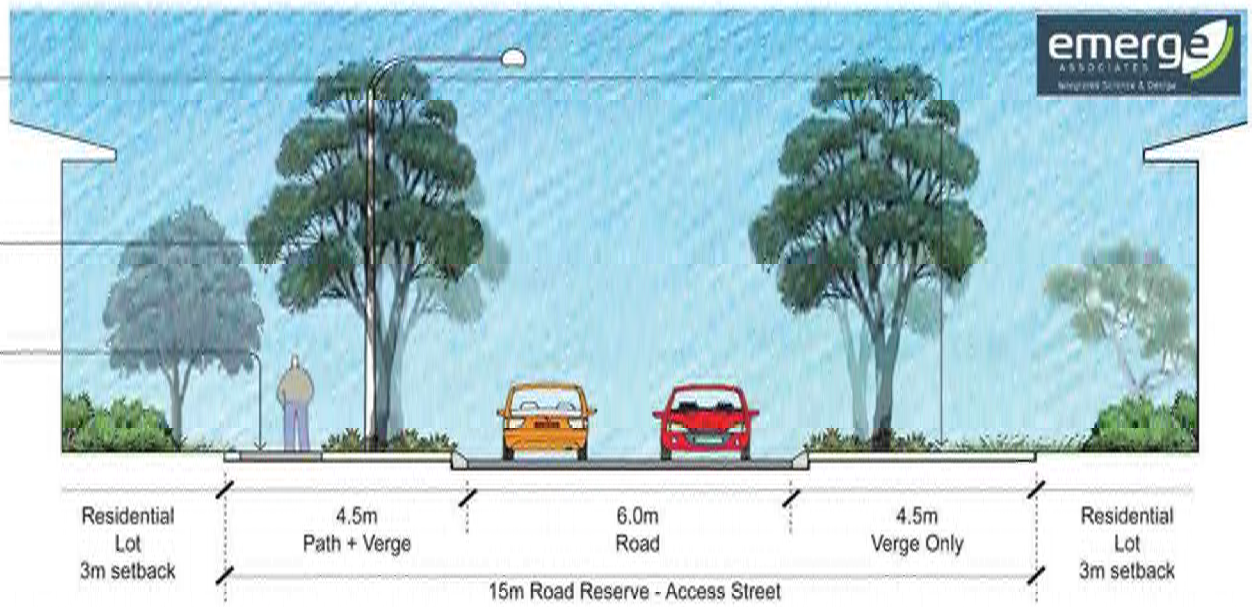
Widened verge area allowing for increased low, native, waterwise planting

Street tree planting and low, native, waterwise planting to verge side and nib areas

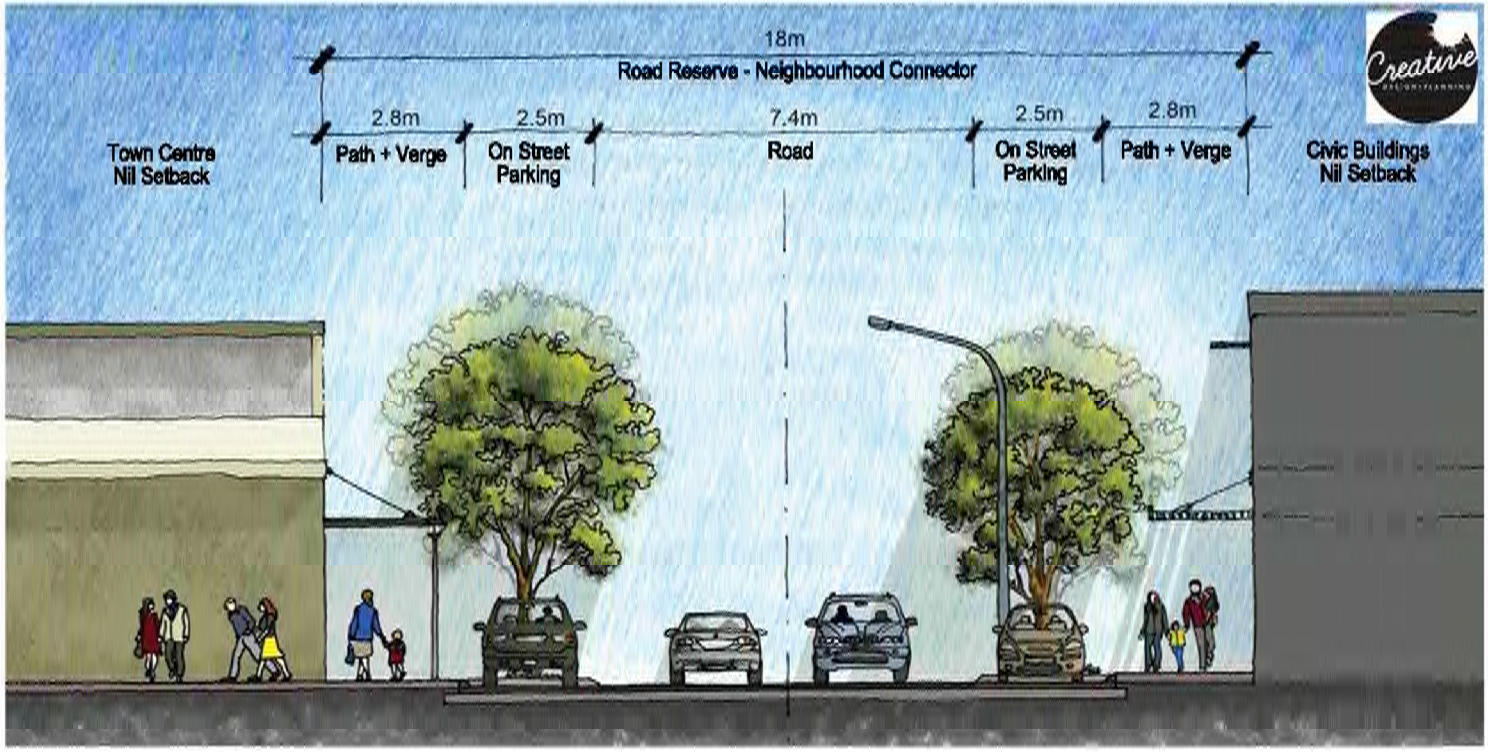
Pedestrian footpath to one side of road with verge only on other

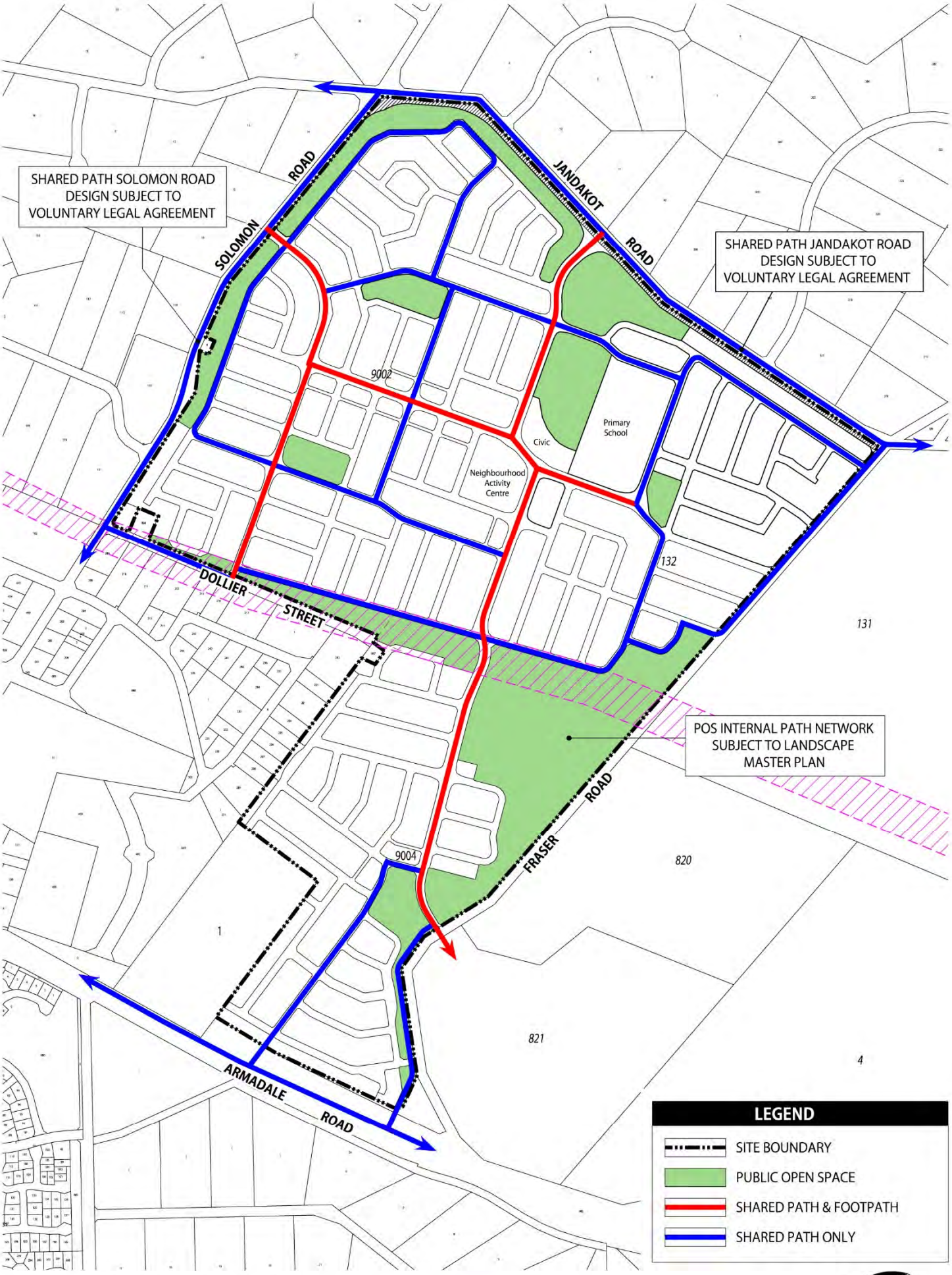
Notes:

- *Reduction of verge by 2.0m where abutting open space*
- *2.0m for Dual Use Path (DUP)*
- *1.5m for Footpath*
- *Only propose footpath on one side of all access streets*
- *Shared path and footpath on main east/west and north/south roads*



NEIGHBOURHOOD CONNECTOR 18m ROAD RESERVE (TOWN CENTRE)





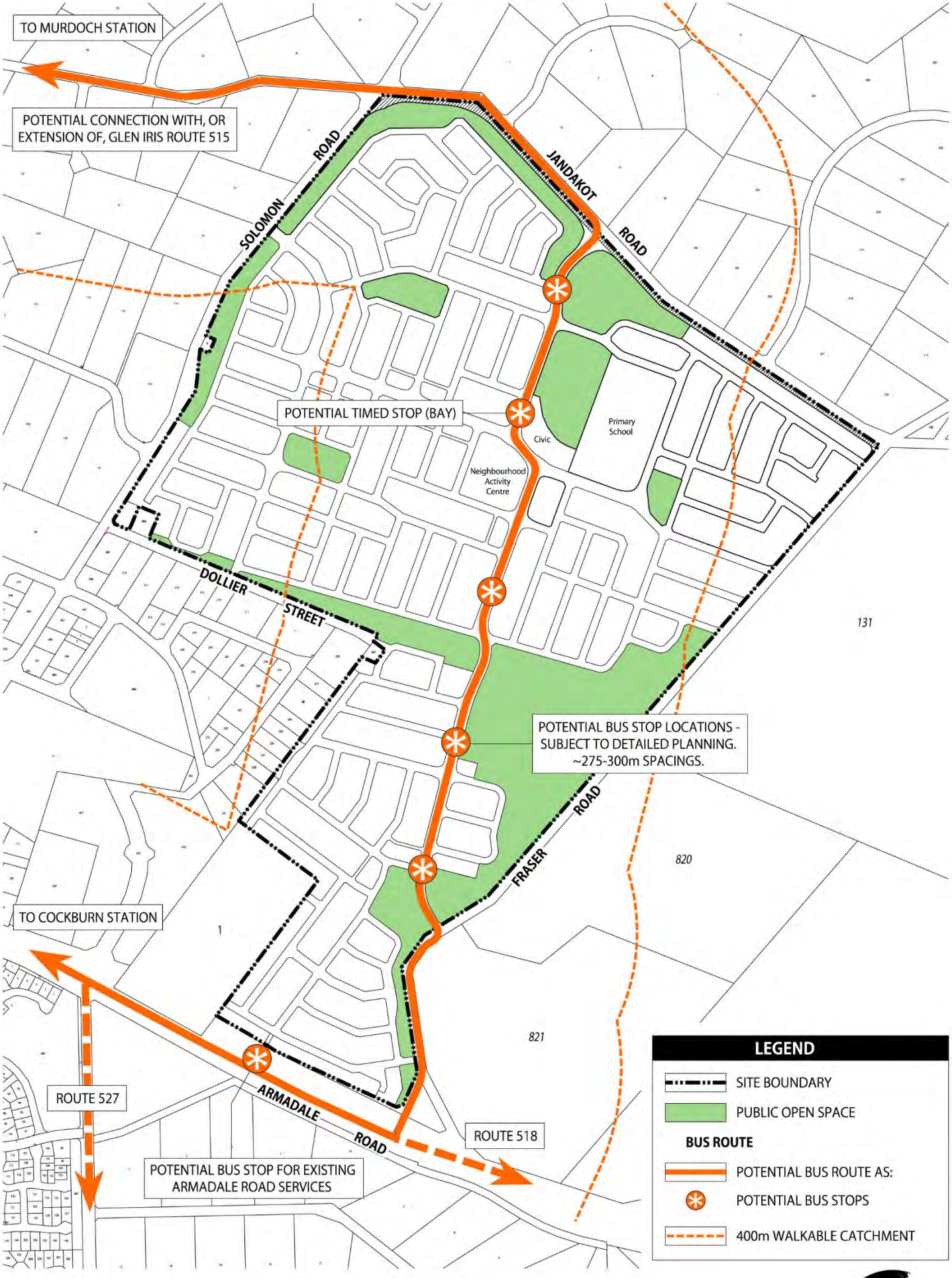
INDICATIVE PATH NETWORK

Plan 8

NORTH

0 100 200 300m

Scale: 1:10 000@A4 Date: 19/02/2016 Plan: STOBJ-5-005J



PREFERRED BUS ROUTE

Plan 9

NORTH

0 100 200 300m

Scale: 1:10 000@A4 Date: 20/03/2017 Plan: STOBJ-5-006i

5.13 Public Open Space

The Banjup Quarry Structure Plan proposes a total of 12 areas of 'green space', of which 11 are to be credited or partly credited as Public Open Space (POS). A Public Open Space *Master Plan* and Open Space Strategy are provided under **Plans 10** and **11**; with Concept Drawings and Street and POS Tree Strategies provided under **Appendix 5**. These plans collectively rationalise the land areas, POS hierarchy, required drainage provision and suggested landscape form and intended long term development.

The POS areas are distributed and will be designed so as to create local 'precinct' amenity and identity in the north-western, north-eastern and southern areas of the Structure Plan. In addition, the provision of pedestrian 'green-links' both along the primary road network and between residential cells (i.e. wide PAWs) will provide an important connection for residents to all active and passive recreation spaces throughout the site and beyond. The Structure Plan design and POS strategy was strongly influenced by Stockland's objective to retain areas of remnant vegetation ('conservation areas') along the western, northern and eastern perimeters, this equating to ~12ha of remnant bushland proposed to be retained and partly incorporated into the credited active/passive POS.

The conservation areas will be sensitively managed to provide practical use without compromising the integrity of the remnant bushland. This may be achieved via utilisation of established bush tracks, to create more formal paths through existing vegetation stands, lookout facilities at strategic locations, and native planting and revegetation of disturbed peripheral areas; as such up to 10% of the remnant bushland area in POS 'E1' has been assumed as 'useable' space. There will also be opportunity to utilise some peripheral areas to create synergy between the local residential development and remnant bushland, through appropriate location and choice of playground equipment, 'kick about' space and desired 'social' spaces such as dedicated dog park areas.

The intended use of the Western Power easement for is also worthy of merit, recognising in excess of 4.6ha of land will be landscaped for community use, including potential dog park in the eastern portion of the easement. This parkland will not be credited as public open space.

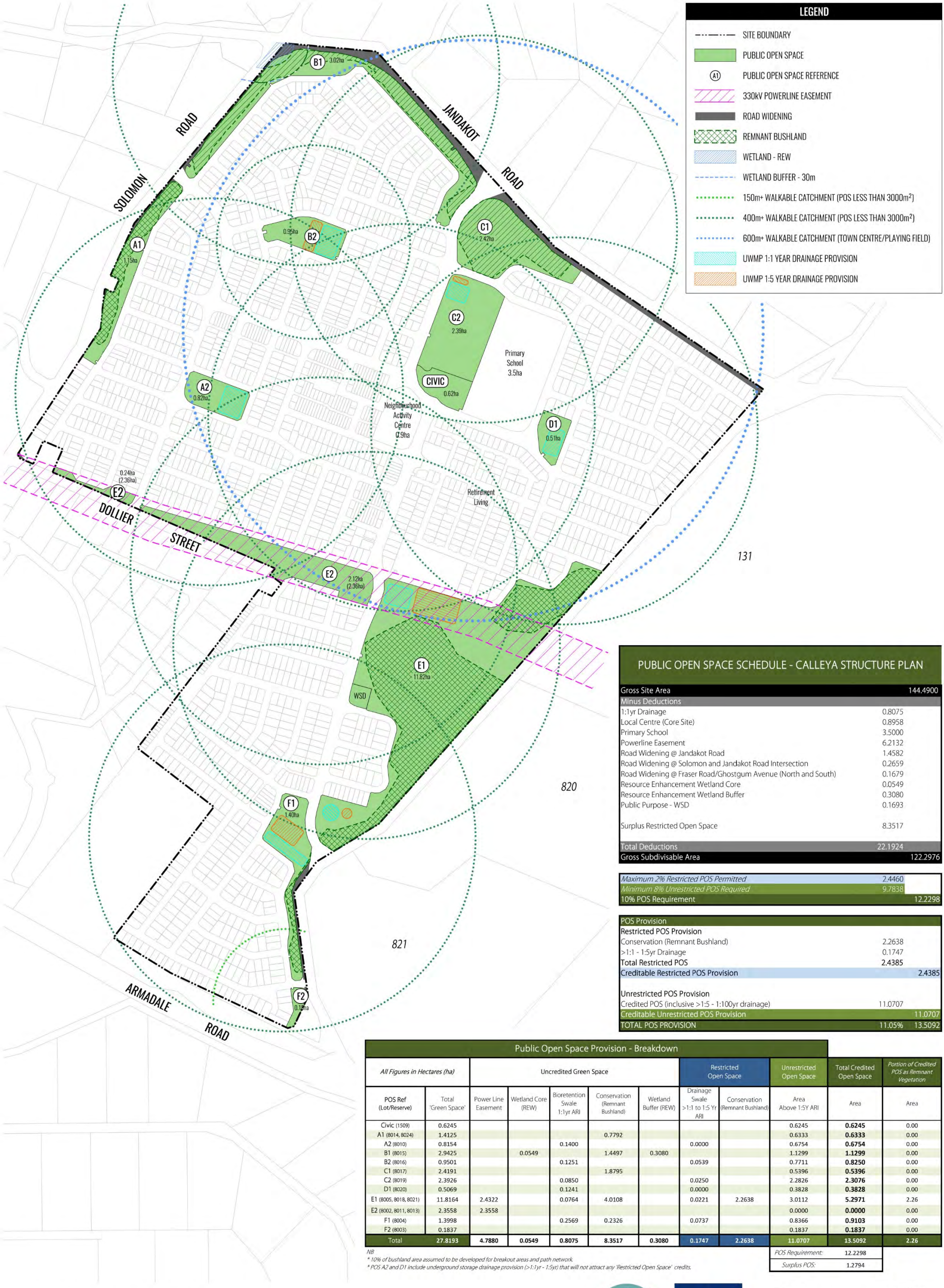
The main POS ('C2') will be co-located with the proposed Primary School, directly to the north of the Town Centre. This POS will include a senior football/cricket oval or two soccer pitches as well as community infrastructure (i.e. change rooms, community buildings). The position, alignment and dimensions of the district playing oval is shown in **Figure 3**. A maximum of 0.6211 ha of the Primary School site will constitute the shared component of POS with the district playing oval. The oval will comprise 205m north-south and 165m east-west dimensions, with the east-west dimension to achieve a minimum 15m oval separation to the adjoining road and minimum 6m separation between rectangular playing fields. A notional separation of 6m to the Primary School is shown in **Figure 3**, subject to negotiation with and approval by the Department of Education.

Secondary POS areas (active and passive) as illustrated in the accompanying plans have been suitably designed to ensure all future residents are within 400m of an area of POS; these spaces generally being 5,000m^2 or greater in area.

5.14 Built Form, Footpath and Street Tree Strategy

To complement the POS areas, and broader street tree strategy for the Structure Plan area (**Appendix 5** refers), a Built Form, Footpath and Street Tree Strategy has been prepared (**Figure 6** refers). This strategy provides illustration of how built form, footpaths, street trees and service infrastructure (i.e. street lights) may function in a typical Calleya Estate streetscape.

As part of the broader sustainability objectives, a street tree is recommended to be provided for every residential lot. This objective may not be suitable for each and every lot given the practicality of positioning of service infrastructure (i.e. clearance to street lights) particularly in higher density areas where a greater number of smaller (narrower) lot product is provided. Notwithstanding this, the developer will provide a street tree wherever practical, this generally planted once a lot has been developed and crossovers and service infrastructure positioning has been determined.



PUBLIC OPEN SPACE SCHEDULE - CALLEYA STRUCTURE PLAN

Gross Site Area		144.4900
Minus Deductions		
1:1yr Drainage	0.8075	
Local Centre (Core Site)	0.8958	
Primary School	3.5000	
Powerline Easement	6.2132	
Road Widening @ Jandakot Road	1.4582	
Road Widening @ Solomon and Jandakot Road Intersection	0.2659	
Road Widening @ Fraser Road/Ghostgum Avenue (North and South)	0.1679	
Resource Enhancement Wetland Core	0.0549	
Resource Enhancement Wetland Buffer	0.3080	
Public Purpose - WSD	0.1693	
Surplus Restricted Open Space	8.3517	
Total Deductions	22.1924	
Gross Subdivisable Area		122.2976

Maximum 2% Restricted POS Permitted	2.4460	
Minimum 8% Unrestricted POS Required	9.7838	
10% POS Requirement		12.2298

POS Provision		
Restricted POS Provision		
Conservation (Remnant Bushland)	2.2638	
>1:1 - 1:5yr Drainage	0.1747	
Total Restricted POS	2.4385	
Creditable Restricted POS Provision		2.4385
Unrestricted POS Provision		
Credited POS (inclusive >1:5 - 1:100yr drainage)	11.0707	
Creditable Unrestricted POS Provision		11.0707
TOTAL POS PROVISION	11.05%	13.5092

Public Open Space Provision - Breakdown

All Figures in Hectares (ha)		Uncredited Green Space					Restricted Open Space		Unrestricted Open Space	Total Credited Open Space	*Portion of Credited POS as Remnant Vegetation*
POS Ref (Lot/Reserve)	Total 'Green Space'	Power Line Easement	Wetland Core (REW)	Bioretention Swale 1:1yr ARI	Conservation (Remnant Bushland)	Wetland Buffer (REW)	Drainage Swale >1:1 to 1:5 Yr ARI	Conservation (Remnant Bushland)	Area Above 1:5Y ARI	Area	Area
Civic (1509)	0.6245								0.6245	**0.6245**	0.00
A1 (8014, 8024)	1.4125				0.7792				0.6333	**0.6333**	0.00
A2 (8010)	0.8154			0.1400			0.0000		0.6754	**0.6754**	0.00
B1 (8015)	2.9425		0.0549		1.4497	0.3080			1.1299	**1.1299**	0.00
B2 (8016)	0.9501			0.1251			0.0539		0.7711	**0.8250**	0.00
C1 (8017)	2.4191				1.8795				0.5396	**0.5396**	0.00
C2 (8019)	2.3926			0.0850			0.0250		2.2826	**2.3076**	0.00
D1 (8020)	0.5069			0.1241			0.0000		0.3828	**0.3828**	0.00
E1 (8005, 8018, 8021)	11.8164	2.4322		0.0764	4.0108		0.0221	2.2638	3.0112	**5.2971**	2.26
E2 (8002, 8011, 8013)	2.3558	2.3558							0.0000	**0.0000**	0.00
F1 (8004)	1.3998			0.2569	0.2326		0.0737		0.8366	**0.9103**	0.00
F2 (8003)	0.1837								0.1837	**0.1837**	0.00
Total	**27.8193**	**4.7880**	**0.0549**	**0.8075**	**8.3517**	**0.3080**	**0.1747**	**2.2638**	**11.0707**	**13.5092**	**2.26**

POS Requirement:	12.2298
Surplus POS:	1.2794

NB
** 10% of bushland area assumed to be developed for breakout areas and path network.*
** POS A2 and D1 include underground storage drainage provision (>1:1yr - 1:5yr) that will not attract any 'Restricted Open Space' credits.*

PUBLIC OPEN SPACE

Plan 10

Calleya

Stockland

NORTH

Scale: 1:7000 @ A3

0 70 140 210m

Date: 16/04/2020 **Plan:** STOBJ-5-007P

POS STRATEGY PLAN

PLAN 11

BUSHLAND POS
- Retention of existing landscape topography with vegetation
- Sensitive implementation of footpath / informal tracks through exisiting vegetation
- Native planting and revegetation to Bushland POS, in particular to disturbed peripheral areas
- Managed access routes and points within and around the Bushland POS areas
- Environmental initiatives to be implemented as part of ongoing management of Bushland POS

PASSIVE POS
- Caters for residents within a 300m radius
- Some facility provisions including shelters, seating and BBQs, footpath links and signage
- Predominantly managed landscape peripheral shrub planting with trees, rehab planting may be required

NEIGHBOURHOOD ACTIVE POS
- Centrally located to cater for residents within a 400m walkable catchment
- POS shall include a mixture of open turf kickabout areas, planting, shade trees and drainage
- Picnic facilities and gathering nodes with key activities
- Facilities may include BBQs, shelters with seating and play equipment

DISTRICT POS
- Centrally located and easily accessible with regards to neighbouring residential areas
- Large expansive turf areas predominantly associated for active sport provision, either formal or informal recreation
- Local community sports groups are able to utilise the facility provision within the POS

CIVIC / TOWN SQUARE POS
- Formal plaza and central focal point to development
- Flexibility of space allows for a variety of community events to take place
- Direct links to wider public transport networks and Cockburn Central
- Central water feature within plaza area to be a main focal point for community
- Provision of large canopied trees allowing for improved microclimate allowing increased usage


BUSHLAND POS


PASSIVE POS


NEIGHBOURHOOD ACTIVE POS


DISTRICT POS


CIVIC / TOWN SQUARE POS

UPDATED BANJUP QUARRY LOCAL STRUCTURE PLAN

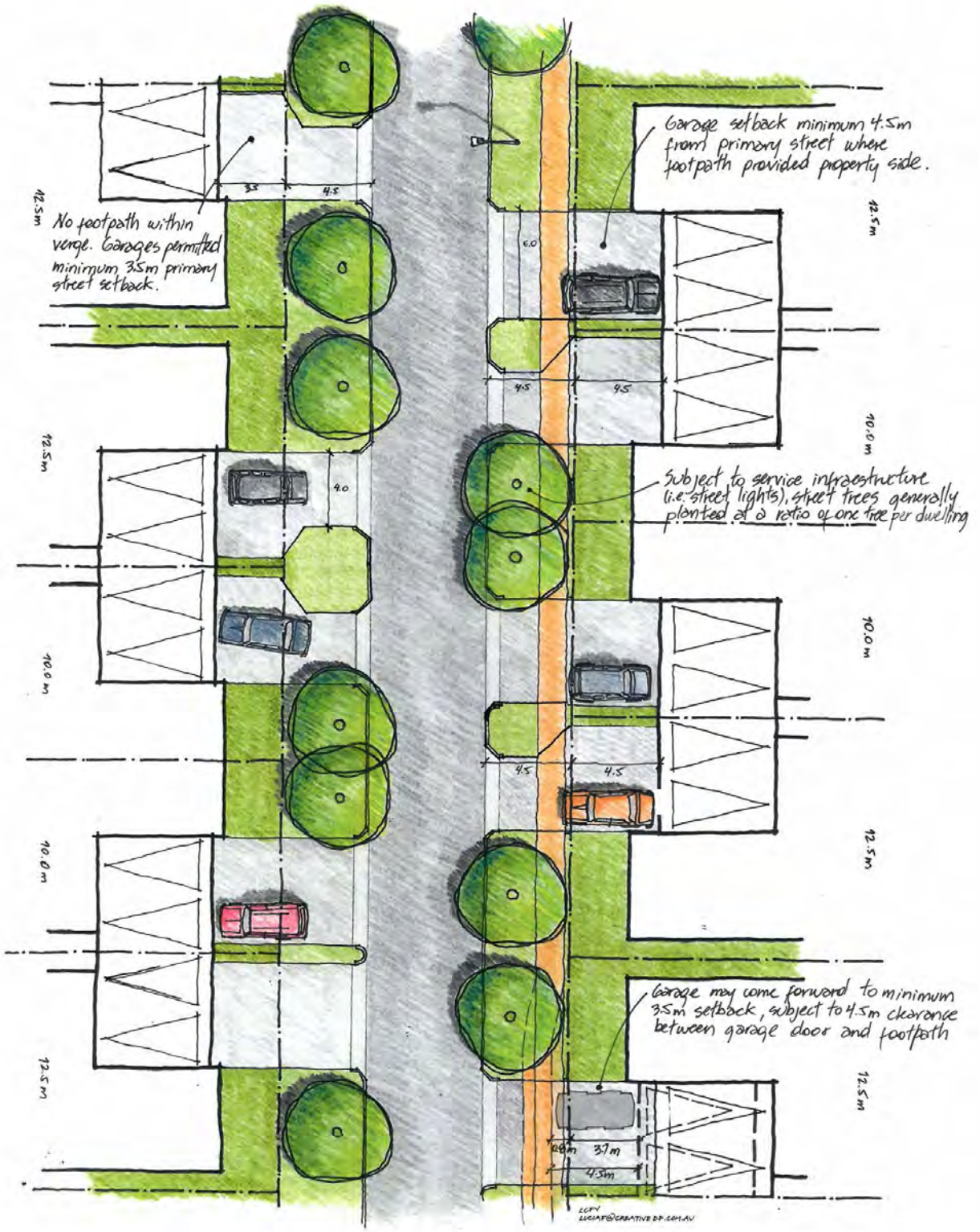
LANDSCAPE DOC.NO : BQ01-LSP-002 Rev F October 2015

1:10,000 @ A3

0 100 200 300 400m

THIS DRAWING IS INDICATIVE ONLY AND MAY NOT REPRESENT THE FINAL SCOPE OF LANDSCAPE WORKS

emerge ASSOCIATES Integrated Science & Design



BUILT FORM, FOOTPATH AND STREET TREE STRATEGY

Figure 6

Not to Scale Date: 24/02/2015 Plan: STOBJ-5-006F

5.15 Urban Water Management

Urban water management is governed overall by the Western Australian Planning Commission under the *State Planning Policy 2.9: Water Resources (2006). Better Urban Water Management (WAPC, 2008a)* and *Planning Bulletin 92: Urban Water Management (WAPC, 2008b)* have been prepared to facilitate better management of urban resources by ensuring that an appropriate level of consideration is given to the total water cycle at each stage of the planning system and thus provide guidance to State Planning Policy 2.9. To integrate water management within the planning system, specific water management documents have been aligned with the planning system. Better Urban Water Management notes the following:

- A District Water Management Strategy (DWMS), to be submitted in support of a District Structure Plan, local planning strategy or region scheme amendment;
- Local Water Management Strategy (LWMS), to be submitted in support of a Structure Plan or Scheme Amendment; and
- Urban Water Management Plans (UWMP), to be submitted at the subdivision stage.

This framework emphasises the application of water sensitive urban design to manage the way in which water within an urban context is utilised. This type of design aims to minimise the impact of urbanisation on the natural water cycle.

A DWMS (Emerson Stewart, 2011) was prepared for the site and approved by the Department of Water in July 2011 (DoW Ref: RF7321-02 WRD126344).

A LWMS and addendum was prepared for the site and approved by the Department of Water on 22 May 2013. This has now been revised to reflect the revised Structure Plan layout. Revision 2 of the document was approved by the Department of Water on 4 May 2015 (**Appendix 9** refers).

A total water cycle management approach for the Structure Plan area has been developed based on detailed site-specific investigations, industry best-practice and relevant state and City of Cockburn policies relating to water management. The overall objective for water management at the Structure Plan area is to create a water sensitive urban design development to improve the management of stormwater and increase the efficiency of water usage.

The Structure Plan area was originally classified as a Priority 2 (P2) drinking water protection area; however acknowledging justification for the site to be formally reclassified to Priority 3 (P3) for urban development, whilst protecting the drinking water source, has been endorsed by the DoW.

Urban Water Management – Public Open Space

The water management criteria proposed for the development includes:

- Implement Water Sensitive Urban Design and structural BMP treatment trains for pre-treatment of stormwater prior to infiltration or discharge.
- Retain and infiltrate the 1yr 1 hour ARI event as close to source as possible within bio-retention basins.
- Infiltration (other than of roof runoff at lot level) will be inhibited in the Wellhead Protection Zone to protect the drinking water source. In the rest of the site, road runoff will be treated prior to infiltration.
- Maintain and if possible, improve the quality of surface and groundwater leaving the site.
- Incorporate stormwater treatment into the landscaped environment through the use of basin storage zones and bio-retention swales within POS areas as notated in **Plan 10**.
- Provide appropriate clearance between maximum flood storage levels and finished floor levels in lots.
- Water should be conserved wherever possible and waterwise principles implemented in the landscape design.

- Water quality criteria will be achieved through the provision of in-road and POS bioretention swales and areas. These will retain, treat and infiltrate the 1 in 1 year, 1 hour storm, and attenuate for the Critical 5 year ARI storm event. Runoff from larger events will provide some runoff into an external drainage system; however the first flush (which accounts for the vast majority of nutrients and contaminants) will be fully treated in the bioretention system. Within the WPZ, road runoff will not be infiltrated, but will be conveyed outside the WPZ for treatment and infiltration.
- Lot levels will be set to achieve appropriate clearance from maximum flood storage levels, and fill will be used as needed. Water conservation will be promoted through the use of water saving fittings in display homes, and water wise plantings will be employed in public areas (see previous section).

Further detail on how water management objectives will be achieved can be reviewed in the LWMS (**Appendix 9**). The LWMS has been prepared with the intention of not only demonstrating that the Structure Plan is spatially able to accommodate the water management approaches proposed, it also intends to guide the future detailed designs for the site by providing clear, auditable criteria that will ensure that overall water management objectives are met

5.15.1 Development Contingencies

Contingencies have been detailed in the Basic Operating Strategy as reviewed by the Department of Water – Table 6 below provides summary; and noting monitoring commitments have been addressed above.

As part of any contingency response, the DoW and City of Cockburn will be notified in the first instance, within 7 days of becoming aware of the impact, to advise of a problem and the proposed contingency response.

As part of the contingency response, resampling will be undertaken immediately to confirm the accuracy of the results. Where appropriate, the frequency of monitoring will be increased to confirm if issue exists.

Factors that may prevent the development being able to supply sufficient water to meet irrigation needs may include:

- Increased irrigation needs (due to climate factors or garden maintenance being inadequate),
- Failure of supply (due to pump failure, low yields from wells, enforced low yields due to dropping water table).

Table 6 – Urban Water Development Contingencies

Issue	Contingency
Providing an Adequate Water Supply	
Drying climate leads to increased water demand above budgeted water supply.	If plants are dying due to lack of water, replacement should be with alternative planting using even lower water use plants. Alternatively, high water use areas to be repurposed to lower uses and water supply distributed more evenly. For example, an area of turf may be reduced by paving a section or adding a playground with un-irrigated surfacing (sand / soft-fall) to allow an increase in the kL/ha rates of irrigation with no net increase in water use. As a last resort, some areas may be allowed to die out in dry years (as has occurred in parts of Melbourne during recent high level water restrictions).
Increased water demand due to imperfect garden maintenance.	Incorporate additional measures such as improved mulching to reduce evaporative loss, addition of bentonite / zeolite clay to sandy soil to increase water retention, review of watering schedule and method to ensure minimised loss to wind drift and evaporation, review maintenance procedures.
Failure of supply due to pump failure.	Standardise pumps used across the development and ensure that a functional spare is kept for use in case of failure.
Failure of supply due to low yields from wells.	Overdesign production wells to allow for loss of function over time, include additional wells, maintenance on current wells to ensure working at maximum efficiency.
Failure of supply due to enforced low yields to protect dropping water table.	Reduce water demand to meet lower supply as per increased demand due to drying climate, above.
Water Quality	
Contaminants detected upstream of Water Corporation production bores.	Should contaminants be detected it is proposed to re-test to ensure that the exceedence is not a monitoring error. Should there be an actual exceedence encountered the DoW are to be contacted and informed of the exceedence and the nature of the contamination. Should the swales prove to be a source of pollutants they will be re-lined with a geo-synthetic clay liner, with appropriate sub-soil drains. Once the DoW are informed an appropriate action plan is to be agreed and enacted. This can only be undertaken through negotiation.
Increased Water Levels	
Water levels rise above 1.2m clearance to lot level.	The risk of water level rise above 1.2m clearance to lot is not deemed to be a realistic risk. No subsoil drainage will be required to control any potential ground water rise. Based on design, there is a minimum 3.0m separation between the predevelopment maximum ground water level and lot pad levels. It is not anticipated to have a ground water rise of in excess of 1.8m as a result of urbanisation of the Structure Plan area.
Protection of Water Corporation Wellhead Protection Zone	
Reduced water levels in Water Corporation production bores (identified to be caused by our abstraction).	Reduce water use/requirements through suitable management techniques such as additional mulching, change turf for drought tolerant vegetation, and providing additional non-irrigated POS areas.
Reduced quality of drinking water found within Water Corporation extraction well.	Additional monitoring will be conducted to determine the extent of the problem and if possible the source. A negotiated approach with DoW would need to be conducted if this was to occur.
Protection of Water Levels	
Water level decline in excess of regional trends.	Reduce water demand to meet lower supply as per increased demand due to drying climate, above.

6 Infrastructure Co-ordination & Servicing

In order to service the Structure Plan area, major headworks for utilities infrastructure are expected to be developed from existing services to the west and therefore will enter the Structure Plan area from existing Armadale Road easements. A Servicing Report has been prepared by engineering consultants, PDC (**Appendix 3** refers). Given the advancement in the development of the 'southern precinct' of the Structure Plan area, the Servicing Report has concentrated on the provision of services to the 'northern precinct'. A summary of the key findings of the Servicing Report is below.

6.1 Roads

All roads will be constructed to City of Cockburn engineering standards.

Jandakot Road will be widened and both Jandakot and Solomon Roads ultimately upgraded as part of development works. This will include reconstruction where required plus kerbing, sheeting, drainage, underground services, landscaping, construction of shared paths and upgrade of approaches.

The construction of roundabouts is also proposed at the intersection of Jandakot and Solomon Roads, and Jandakot Road and northern Estate entry (**Appendix 4** refers).

Main Roads will fund the ultimate widening of Armadale Road (6 lanes) including Fraser Road signalled intersection, however has indicated there is currently no funding identified for such works. Consequently, Stockland has since funded a temporary signalled intersection at this location.

The realignment of Fraser Road, and the temporary signalled intersection resulted in a portion of the WAPC owned Lot 868 being developed for road purposes (currently reserved 'Primary Regional Roads' under the MRS). A ~1.3 ha portion of Stockland's Lot 9004 landholding is also reserved for 'Primary Regional Roads' under the MRS. Stockland has agreed, subject to survey following agreement on the detailed design, to dedicate free of cost an equal land portion to that provided for by Lot 868 to create the new intersection. The subject land area is delineated area 'B' on the Structure Plan (**Plan 1**).

The realignment of the Fraser and Armadale Roads intersection also results in the severance of a small parcel of land originally intended for drainage purposes; this central to the southern property boundary and delineated 'A' on the Structure Plan (**Plan 1**).

Main Roads WA has since advised that this land parcel is not required for drainage purposes; this following agreement of a drainage strategy prepared by Stockland's engineering consultant PDC that demonstrated an alternative drainage area can be accommodated immediately east of the new Fraser Road intersection. On this basis, a request to initiate an amendment to the MRS has been lodged with the WAPC to rezone this small portion of Lot 9004 from 'Primary Regional Roads' reservation to 'Urban', to facilitate its development for residential purposes.

Construction of the southern and northern portions of Fraser Road, which are incorporated into the Structure Plan design, will be undertaken by Stockland. In anticipation of development of Armadale Road frontage lots to the west and east (Lots 1 and 821), Stockland will seek a contribution towards the construction of Fraser Road from the respective landowners; this by virtue of Fraser Road being an important (only) full movement intersection with Armadale Road thus construction and use of Fraser Road is imperative to the adjoining land holdings.

The section of Fraser Road on approach to Armadale Road is projected to accommodate in the order of 5,000 vpd, thus will need to be designed as a *Neighbourhood Connector A*. It is suggested that the existing 20m road reserve will be suffice to accommodate a *Neighbourhood Connector A* (i.e. boulevard design) on the presumption that no residential properties will directly front and/or have direct driveway access to this road. No further widening of Fraser Road will also assist to retain remnant vegetation in the immediate surrounds. During construction all site access will be via the existing Dollier Street.

The central portion of the Fraser Road Reserve is not intended to service urban development in the short or long term. It is expected that this section of Fraser Road will be rehabilitated with native vegetation to compliment the adjoining Bush Forever site.

6.2 Sewerage

Sewerage reticulation will be provided by a gravity sewer reticulation network that flows to a wastewater pump station in the 'southern precinct'. An interim strategy provides for a DN300 pressure sewer main from the pump station to connect to an existing DN150 pressure main in Verde Drive. The ultimate strategy is for the DN300 pressure main to be connected to the Water Corporation's Bibra Lake Gravity Sewer Main. Once this DN300 pressure main reaches capacity it will be duplicated.

6.3 Drainage and Stormwater Management

In accordance with the LWMS, the majority of stormwater will be managed on site. This generally means that the 1-year 1-hour ARI events will be infiltrated within biofilters, at source; while events up to the critical 5-year ARI event will be attenuated/infiltrated within POS infiltration areas.

It is currently proposed that the drainage network connects into the Atwell Drain, directly to the south of the development. Stormwater, in large events (greater than the critical 5-year ARI event), will head south through the 1200mm trunk main and enter the Atwell Drain system along Tapper Road. Stormwater will be conveyed to the main drain running along Bartram Road, where it will enter the Water Corporations Bartram Road Branch Drain. Modelling has been completed for the post development scenario. Modelling indicates that there is sufficient capacity within the existing Atwell Drain to accommodate inflows from the entire Calleya site.

6.4 Ground Water

Due to the site's previous Priority 2 area status, the Water Corporation has not yet undertaken infrastructure planning for the Structure Plan area. Allowance is only made for the Structure Plan area in preliminary water infrastructure planning.

Preliminary advice from the Water Corporation is that water service options may be available at the Stirling Trunk Main located approximately 4.5 km to the east, or the Jandakot Trunk Main located approximately 3.5 km to the west. The latter option presents the opportunity to common trench with the sewer mains proposed above.

Recommended pressure pipe sizes will be finalised subject to ranges of operating pressures in the trunk mains to be advised by Water Corporation. A pressure reducing valve (PRV) would be required at Stirling trunk main tie-in.

Infrastructure modelling of the Integrated Water Supply Scheme (IWSS) with additional demands at the Structure Plan area is to be completed by Water Corporation to determine any further headworks upgrades required to accommodate the water service capacity of the planned development.

6.5 Power

The Estate's 'southern precinct' is presently being supplied from one HV feeder, the APM504 feeder. There is insufficient capacity on this feeder to supply the entire 'southern precinct' and as such, a temporary supply from a second HV feeder coming from the east on Armadale Road, the Cockburn feeder, has been secured.

An initial temporary power supply for the first 120 lots in the 'northern precinct' can be provided from the existing APM504 feeder after the completion of the Fraser Road HV Project. A permanent power supply for the whole 'northern precinct' will be provided via the Calleya HV Feeder Project circa June 2015. Once the Calleya HV Feeder is operational, capacity in the APM504 Feeder will be freed up to supply the remaining 'southern precinct' stages.

6.6 Telephone

Telecommunications including NBN connections are currently available and are live in the developed stages of the 'southern precinct'. Such services will be continued north as development (staging) progresses.

6.7 Gas

Information provided by the WA Gas Network indicates that there is sufficient capacity in the existing MP gas main for the entire proposed development. A MP gas main has been extended to the site as part of the civil works associated with Stage 1 (Southern Precinct).

6.8 Water reticulation

Water supply reticulation within the proposed development area will be in accordance with standard Water Corporation design requirements, with connection to the new main in Armadale Road as required.

Water Corporation advice is to connect into existing reticulation south of the site at Atwell, thus the development will be connected into the Thompson Lake System at two locations.

The first location requiring installation of a DN375 distribution main along Solomon Road that extends towards the existing main at Armadale Road/Beeliar Drive. The second location a DN500 distribution main constructed along Armadale and Tapper Roads connecting to existing services south of Armadale Road.

Internal water reticulation, in addition to that already installed in the 'southern precinct', will be completed during the detailed design phase of development, and will be designed in accordance with the Water Corporation's Design Standard "DS 63 – Water Reticulation Pipes DN 250 and Smaller".

7 Implementation

7.1 Site Works

Site works for urban development typically comprises the clearing of existing vegetation and, where necessary, the earth working of existing ground to facilitate a required form of development. Prior to subdivision and/or clearing the Department of Environment Regulation will need to be satisfied adequate studies and mitigation measures have been undertaken in relation to existing vegetation and flora.

In Perth it is often the case that the extent of site works is dictated by the density and nature of development and by the finished ground shape required for building houses, etc. Increased densities and decreasing lot sizes has led to a current trend for the development areas to be fully earth worked to create level lots which are terraced between retaining walls.

This approach provides a number of positive outcomes:

- Reduces house building costs;
- Rationalises retaining wall layouts and designs consistent with Local Authority specifications; and
- Enables lots to be terraced up natural slopes to maintain elevation and views.

Over the past 60 years, the previous quarry land use expanded across the Structure Plan area resulting in up to 30m of excavation creating the current basin profile. Only the site's perimeter and internal pockets of remnant vegetation provide representation of the original landscape. The Western Power easement for high voltage overhead transmission lines (330kV), which traverses the centre of the Structure Plan area, also provides site works challenges given the pylon footings are elevated well above the surrounding ground levels, thus needs to be suitably addressed.

The landowner's objectives for the urban development of Banjup Quarry project includes a more sustainable approach to site works in which the form of the existing undulating topography on the periphery of the site is to be maintained. The internal 'basin' area of the site will include some filling, primarily to tie in with the natural ground levels along the periphery, and some encroachment of the bushland into central-eastern area of the quarry basin.

7.1.1 Site works Controls

There are a number of factors which need to be considered in reviewing the finished levels of the development of the Structure Plan. These are summarised as follows:

- Finished development levels will need to match the finished development levels along Dollier Street, this relating to an existing industrial area on the southern side of this road;
- Finished development levels will need to correspond to the natural ground levels of the remnant bushland areas in the western, northern and eastern peripheries of the Structure Plan area;
- Finished development levels will need to correspond or provide suitable interface to the elevated pylons associated with the high voltage power lines traversing the site, to minimise the aesthetic burden on any adjoining residential areas.

Finished roads levels on approach to Armadale Road require cutting of the immediate area, to provide suitable intersection and road grades. The resultant adjacent lot levels are anticipated to be considerably higher than Armadale Road and the main entrance road, which may result in rear loaded (or 'dual frontage') lot product or potential Grouped Housing site to minimise driveway grades.

7.1.2 Site Works Proposal

The Structure Plan has been designed in accordance with the following objectives:

- To maximise the preservation of the remnant vegetation and associated topographic features; and
- To allow for roads and development sites to be graded to best follow the existing topography and to best reflect the remnant bushland being retained.

7.2 Town Planning Scheme No. 3 Requirements

The Structure Plan area was gazetted an 'Urban' zoning under the Metropolitan Region Scheme on 30 November 2012. The rezoning from 'Rural – Water Protection' zone to 'Urban' zone was prepared under MRS Amendment 1221/41 *Banjup Urban Precinct.*

A small land parcel fronting Armadale Road was later included in the Structure Plan boundary following the gazettal of the MRS *South East & South West Districts Omnibus 2* Amendment 1297/57 on 15 December 2017. This amendment included the rezoning of land from 'Primary Regional Roads' reservation to an 'Urban' zone; this land being surplus to Main Roads WA requirements for Armadale Road.

The Structure Plan area was gazetted a 'Development' zone under the City of Cockburn Town Planning Scheme No. 3 ('the Scheme') on 11 October 2013. The rezoning from 'Resource' to 'Development' zone was prepared under Scheme Amendment 95.

Subsequent to MRS South East & South West Districts Omnibus 2 Amendment 1297/57, the said small land parcel was subject to an automatic Scheme amendment to rezone the land from 'Primary Regional Roads' reservation to 'Development' zone. This same land parcel is also the subject of TPS Amendment No.123 to include the land within Development Area 37; this amendment is being pursued concurrently with this structure plan amendment.

Adjoining Lot 1 was also encompassed by Amendment 95, albeit is still zoned 'Urban Deferred' under the MRS.

In accordance with the *State Planning Policy 3.6 Development Contributions for Infrastructure* (SPP 3.6), the City of Cockburn has introduced a Development Contribution Plan No. 13 (DCP13) for community infrastructure items.

As detailed in Sections 2.1.3 and 5.8.5, the Structure Plan accommodates two items under the *Local (Banjup North and Jandakot)* category of DCP13, these items being:

- **'Banjup' Playing Field (now Treeby)**
  Development of a full sized playing field containing one full sized senior AFL oval, one cricket oval and two senior soccer fields (multi-marked in the same place) and also including a playground area and equipment, picnic furniture and BBQ's.
- **'Banjup' Community Centre (now Treeby)**
  A multi-functional community space that offers a variety of independent and compatible uses including sporting club change rooms, multi-purpose clubhouse, food and beverage areas, separate multi-function community activity space, art and craft spaces, playground area, toilets, covered viewing areas for adjacent playing field and car parking areas for the community centre.

The DCP will be reviewed when considered appropriate, though not exceeding a period of five years duration, having regard to the rate of development in the area since the last review and the degree of development potential still existing.

The estimated cost of infrastructure items will be reviewed at least annually to reflect changes in funding and revenue sources and indexed based on the Building Cost Index or other appropriate index as approved by the qualified person undertaking the certification of costs in accordance with the provisions of DCP13.

7.3 Legal Agreement for Hard Infrastructure

Initial discussions between Stockland and the City of Cockburn proposed hard infrastructure upgrades and contributions relevant to the Structure Plan and surrounds to be facilitated by a Development Contribution Area (DCA) and an associated Development Contribution Plan (DCP).

Resolution saw an alternative to the DCA/DCP approach, with required upgrades to be secured via an abuttal subdivision option, pursuant to provisions under WAPC's *Statement of Planning Policy 3.6 – Development Contributions for Infrastructure*' (SPP3.6). SPP3.6 as extract states,

"Alternatively, contributions can be implemented through voluntary legal agreements.

This applies to subdivisional works such as roads, drainage and the provision of power, water and telecommunications and other items outlined in appendix 1. They may also be applied as conditions of development. The calculation will be to apply the detail of the developer contribution plan to the development, including any offsets for the ceding of land or construction of infrastructure."

In this case the voluntary legal agreement (VLA) sets out the subdivider's contribution towards provision of the following hard infrastructure items, pursuant to SPP 3.6 provisions, as summarised (but not limited to) below:

- Full road widening of Jandakot Road between Solomon and Fraser Roads;
- Full contribution towards upgrading of Jandakot Road between Solomon and Fraser Roads;
- Full contribution towards upgrading of Solomon Road between Dollier Street and Jandakot Road;
- Construction of a 2.5m wide shared path (Structure Plan side) on both Jandakot Road and Solomon Road;
- Construction of three roundabouts at Solomon Road/Jandakot Road, new internal subdivision road/Jandakot Road and Fraser Road/Jandakot Road intersections (subject to review);
- Construction of 2.5m wide dual use path along one side of Armadale Road (Structure Plan side) between Fraser Road and the junction of Solomon Road and Knock Place.

Upgrading provisions of the various roads noted above will generally relate (but are not limited) to:

- All preliminaries and detailed design;
- Earthworks and service relocations where required;
- Kerbing, lighting, full traffic controls and on-street cycle lanes (where nominated);
- Stormwater management;

- Landscaping; and
- Modifications to intersection approaches (where nominated).

The VLA specifies timeframes, as a means of triggering these infrastructure upgrades. The VLA was implemented prior to adoption of the Structure Plan by Council, as per previous agreement. The level of contribution may be subject to change based on agreed amendments thereto.

7.4 Staging

The development of the Banjup Quarry Structure project will be implemented in stages (**Plan 12** refers). This staging plan is indicative as timing, location and composition of the future stages will be dependent on market demand.

Staging has commenced in the 'southern precinct' of the Estate, namely the south-central portion of the site for Display Village, Sales Office and residential purposes. The Town Centre may commence at an early time to give it a head start on the residential front, acknowledging the greater extent of earthworks and site preparation required for a facility of this size.

Development of the community playing field may include early seeding of the oval, so it is ready for use by the time the residential and community development front reaches this area in a few years time.

Residential staging may also be influenced by the Department of Education's (DoE) eagerness to develop the Primary School at an early stage. Regular contact with DoE will be made to ascertain preferred timing and to negotiate built form design outcomes for the school site, acknowledging its prominent location with the 'Main Street' of the Town Centre.

The provision of engineering infrastructure and primary internal road network will also need to be staged to suit development demand and/or suitable site access at an early stage. A detailed programme for this will prepared as part of ongoing detailed planning and design of the infrastructure.

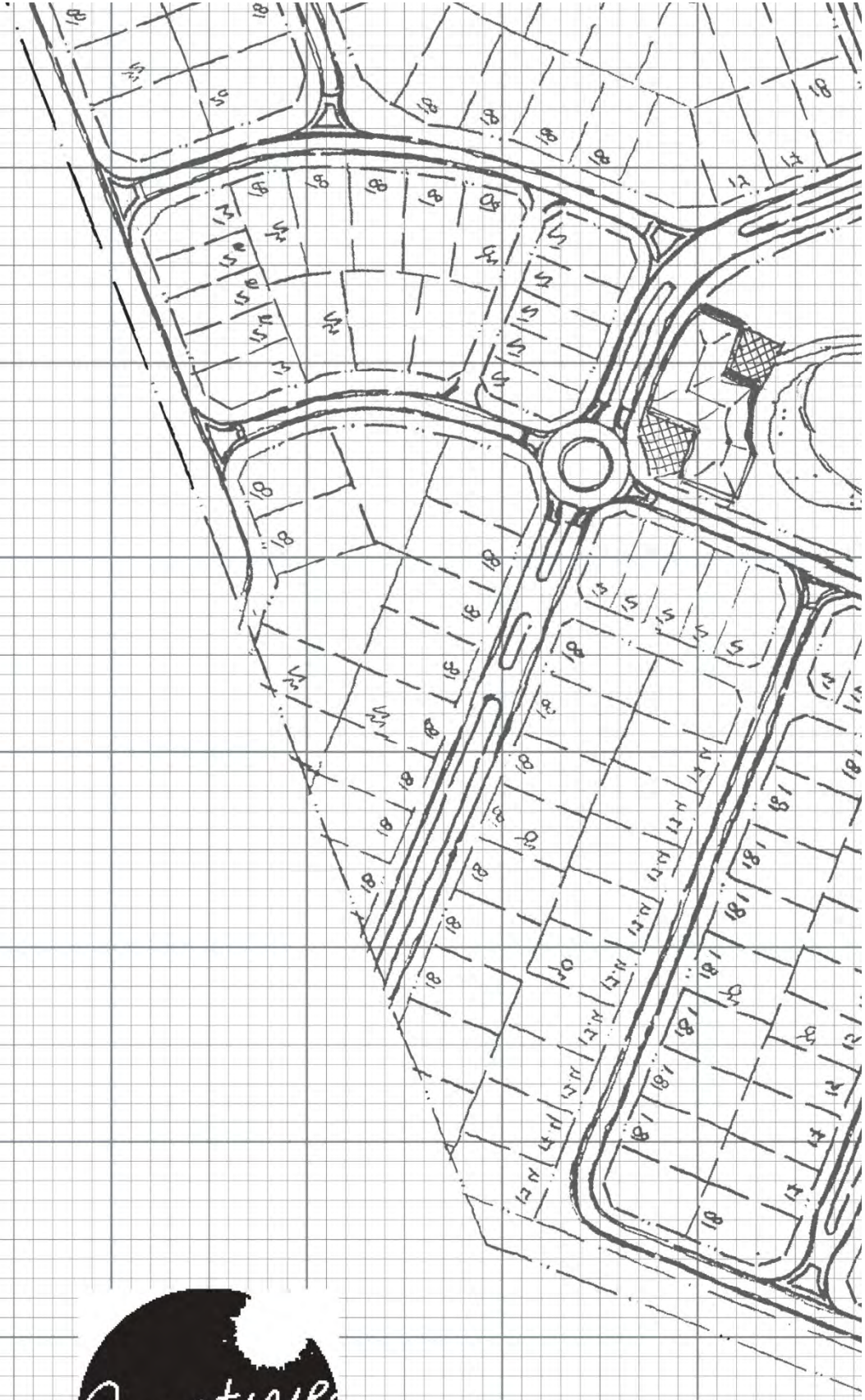
STAGING PLAN

Plan 12

NORTH

0 100 200 300m

Scale: 1:10 000@A4 Date: 19/02/2016 Plan: STOBJ-5-008i



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